

IBM Intelligent Transportation  
Version 1 Release 6

*IBM Intelligent Transportation  
Product Documentation*





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Version 1 Release 6

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**Note**

Before using this information and the product it supports, read the information in "Notices" on page 409.

This edition applies to IBM Intelligent Transportation version 1, release 6, modification 0. This edition applies to all subsequent releases and modifications until otherwise indicated in new editions.

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## Figures



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## Chapter 1. Solution overview

Transportation is a vital means of connecting people, goods, and services to sustain civilization. Transportation is an important part of an economy. Our rapidly urbanizing planet depends on getting people and things from here to there. Yet many existing transportation infrastructures are inadequate to serve the needs of the 21st century. Globally, transport authorities are facing similar strategic challenges such as increasing environmental issues, traffic volumes, and congestion.

Smarter transportation can drive economic vitality and improve our quality of life. It can be more efficient, provide better service to customers and constituents, protect the environment, and help assure our safety and security.

IBM® Intelligent Transportation is a comprehensive and scalable platform for transportation management solutions that offers intelligence, insight, and system-wide information integration. It provides centralized management of traffic and transit operations by using data that is collected from disparate systems across geographic locations. IBM Intelligent Transportation increases situational awareness, providing a comprehensive picture of what is coming down the road at any given time. This solution helps cities to proactively manage the transportation network and enhance the travel experience for commuters. Specifically, IBM Intelligent Transportation helps traffic and transit authorities to:

- Reduce traffic congestion
- Increase visibility of incidents across a diverse set of traffic systems
- Improve incident response and traffic flow
- Analyze historical data to gain performance insights and understand patterns of behavior of traffic and road incidents
- Predict future traffic levels up to an hour into the future
- Increase visibility of active transit vehicles and fleet services and their associated issues
- Predict arrival times of transit vehicles
- Analyze the performance and bottlenecks of the transit system

The architecture of IBM Intelligent Transportation is developed in accordance with standards in the areas of traffic and vehicle data management that are widely recognized in the transportation industry. IBM Intelligent Transportation aggregates and normalizes traffic and vehicle data in a format that is compliant with the following globally recognized transportation engineering standards and protocols:

- Intelligent Transportation Systems (ITS)
- Traffic Management Data Dictionary (TMDD), Version 3.0
- Datex-II Standard Traffic Data Model
- Transmodel, Version 5.0
- Service Interface for Real Time Information (SIRI), Version 1.3

IBM Intelligent Transportation is a solution within the IBM Smarter Cities® Software Solutions product family that integrates into the IBM Intelligent Operations Center.

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### Intended audience

This product documentation is intended for people who are using, installing, administering, and maintaining IBM Intelligent Transportation. It also contains implementation documentation for customizing the solution and integrating the external transportation information systems that IBM Intelligent Transportation requires.

This product documentation assumes that users have prior knowledge of, or proficiency with, the prerequisite software. Training for these base products is outside the scope of this product documentation. If you require training for these products, ask your systems integrator or IBM representative where you can obtain information about base component training opportunities.

You can find links to the component product documentation on the *Additional product information* page of the *References* section.

For details about the administration and maintenance of the base platform, see also the IBM Intelligent Operations Center product documentation.

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## Features of IBM Intelligent Transportation

IBM Intelligent Transportation provides awareness, analysis, and prediction capabilities for traffic operations and transit fleet operations. IBM Intelligent Transportation integrates traffic and transit data from disparate transportation systems by using integration protocols that are recognized by the worldwide transportation industry. IBM Intelligent Transportation provides on-demand geographical visibility, analysis, and reporting of traffic and transit data.

IBM Intelligent Transportation is a portal-based solution that runs on top of the IBM Intelligent Operations Center. IBM Intelligent Transportation leverages the base architecture and features of the IBM Intelligent Operations Center to enable real time communication and collaboration with other city agencies to effectively supervise, coordinate actions, and resolve operational issues efficiently. IBM Intelligent Transportation V1.6 also provides high-availability capabilities that can help traffic organizations run mission-critical operation centers in fail-safe environments.

IBM Intelligent Transportation can be deployed in two ways, either on premises or as a cloud-based offering on the IBM SmartCloud®. IBM Intelligent Transportation can also be integrated with other products in the IBM Smarter Cities Software Solutions portfolio.

There are two products available in the IBM Intelligent Transportation solution family that provide features in traffic operations and transit vehicle operations.

Product	Installable features
IBM Intelligent Operations for Transportation	Traffic Awareness
	Traffic Prediction
IBM Intelligent Transit Analytics	Vehicle Awareness and Prediction

### Traffic Awareness

Traffic Awareness is the foundational traffic operations feature of IBM Intelligent Operations for Transportation. It supplies the transportation information model and basic platform for visualization and analysis of traffic operations data. The Traffic Awareness feature integrates data from disparate traffic and road data capture systems by using integration protocols that are recognized by the worldwide transportation industry.

The Traffic Awareness feature provides geographical visibility on demand and also provides the following functionality:

- Transforms multi-source traffic data into a centralized traffic information system
- Includes a near real-time visual interface to aggregate traffic information
- Helps provide the insight needed to balance traffic across routes
- Provides real-time display of traffic conditions graphically, as service levels on a road network, and in tabular and report views

- Provides information about the additional travel time required when the road links are congested
- Offers the ability to alert you to traffic events on the network in real time, graphically, and in tabular view
- Offers the ability to interrogate traffic-related devices to obtain status and feeds
- Provides insight and the ability to analyze historical patterns of traffic conditions on the most critical links in the network
- Provides the ability to study the historic correlation between traffic incidents of different types and traffic service levels
- Improves citywide traffic planning and management even where infrastructure is constrained and expansion is not an option

The Traffic Awareness feature is divided into two traffic operations subsystems that are known as the current traffic management subsystem and the historical traffic management subsystem.

### Current traffic management subsystem

The current traffic management subsystem provides facilities to monitor and manage the traffic flow in the area it serves. This subsystem helps transport authorities and departments to ensure that the most efficient use is made of the surface street and freeway network. The Traffic Awareness feature processes traffic data and provides basic traffic and incident management services through the roadside and other subsystems.

The following table describes the features of the current traffic management subsystem of the Traffic Awareness feature.

Feature	Description
Traffic surveillance	Processes to collect and store current traffic flow data that is collected by sensors in the field for use in traffic management. This subsystem also provides the following Intelligent Transportation Systems (ITS) processes: <ul style="list-style-type: none"> <li>• Storing and managing processed traffic flow data</li> <li>• Displaying traffic flow data</li> <li>• Analyzing, correlating, and summarizing traffic flow data</li> </ul>
Transportation event management	Processes and a graphical user interface for managing the classification of traffic events, such as: <ul style="list-style-type: none"> <li>• Storing, managing, and categorizing event data</li> <li>• Analyzing, correlating, and summarizing traffic events</li> <li>• Reviewing and managing traffic event data</li> </ul>
Administrative and operational interfaces	A browser-based graphical user interface featuring an operations view to facilitate traffic management. The interface also includes role-based administrative features, providing the capability to configure the system so that it can correctly operate within a particular customer environment.
Programming and client interfaces	A Representational State Transfer (REST) service named <b>LinkStatus</b> which provides Request and Response services for retrieving traffic data from the solution.

Information from the traffic management subsystem is presented in the IBM Intelligent Transportation portal solution interface. The Operator: Traffic view displays the current traffic situation and performance levels.

## Historical traffic management subsystem

The historical traffic management subsystem is responsible for providing facilities for managing and analyzing historical traffic performance information in the area it serves. It does so by collecting, storing, managing, and distributing historical data that is generated from Intelligent Transportation Systems (ITS) sources. This subsystem provides transport authorities and departments with useful information in the following areas of transportation management:

- Administration
- Operations
- Performance monitoring
- Planning
- Policy evaluation
- Program assessment
- Research applications
- Safety

The following table describes the features that are provided by the historical traffic management subsystem of the Traffic Awareness feature.

Feature	Description
Historical traffic data analysis	Processes to store historical TMDD traffic data that is collected from field subsystems. A graphical user interface for analyzing historical traffic flow performance levels in the transportation network. This subsystem also provides the following ITS processes: <ul style="list-style-type: none"><li>• Storing and managing historical data</li><li>• Displaying historical traffic flow data</li><li>• Analyzing, correlating, and summarizing historical traffic flow data</li></ul>
Administrative and traffic planning interfaces	A browser-based graphical user interface featuring a planners view to facilitate traffic planning. The interface also includes role-based administrative features, providing the capability to configure the system so that it can correctly operate within a particular customer environment.

Information from the historical management subsystem is presented in the IBM Intelligent Transportation portal solution interface. The Planner: Traffic view displays the historical traffic data so that you can analyze the past performance of the transportation network.

## Traffic Prediction



The Traffic Prediction feature of IBM Intelligent Operations for Transportation provides traffic prediction capabilities for transportation authorities. The Traffic Prediction feature uses the historical and real-time traffic data that is collected by the Traffic Awareness system to predict future traffic levels of a geographical area, up to an hour in advance.

Traffic Prediction is an optional feature that enhances the IBM Intelligent Transportation solution by providing the following benefits:

- Geographical visibility of predicted traffic levels at selected time intervals ahead of the current time up to one hour ahead of the current time. For example, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 minutes



- Listed view of details that are related to the predicted traffic levels at selected time intervals ahead of the current time, as selected with the **Prediction interval** slider. For example, 5, 10, 15, 30, 45, or 60 minutes
- Executive reports for traffic prediction that are based on speed and volume
- Accuracy reports analyzing traffic prediction data

The Traffic Prediction predictive analytics perform estimate and mean calculations that are required by the algorithm to generate near future traffic levels. Three months of historical traffic speed or volume data is required for the generation of future traffic levels.

The following table describes the detailed subsystems that are provided by the Traffic Prediction feature.

Subsystems	Provides
Predictive analytics	Complex algorithms and processes that generate predictions of the traffic levels of a geographical area, one hour from the current time. The predictions are based on historical traffic speed and volume data from the previous three months. You can also provide the holiday data for your transportation network to further improve the accuracy of the predicted traffic levels.
Traffic prediction visualization	Processes and a graphical user interface to display the traffic prediction data. The predicted traffic levels are displayed on a GIS map and a table.
Traffic prediction reports	A graphical user interface to analyze and display summary reports of traffic predictions. The reports are based on speed and volume.
Accuracy reports	A graphical user interface to analyze and display reports that summarize the accuracy of traffic predictions.
Administrative and operational interfaces	A browser-based graphical user interface that includes an administration view to facilitate traffic prediction. The interface also includes role-based administrative features, providing the capability to configure traffic prediction settings so that it can correctly operate within a particular customer environment. The Traffic IT Administrator has the permission to configure the settings for the traffic prediction calculations in the <b>Administration</b> view of the solution interface.
Programming and client interfaces	REST services that provide outbound subscription and publishing capabilities to retrieve current and predicted traffic data from the solution into XML format. Extends the <b>LinkStatus</b> REST service that is provided by the Traffic Awareness feature.

The information from the traffic management subsystem is presented in the IBM Intelligent Transportation portal solution interface. The Operator: Traffic view displays the current and the forecasted traffic situation.

Sections of the documentation are marked with the  icon to indicate that the information applies to the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation.

## Vehicle Awareness and Prediction



Vehicle Awareness and Prediction provides vehicle awareness and arrival time prediction capabilities for transit systems. Vehicle Awareness and Prediction is the foundational feature of IBM Intelligent Transit Analytics, helping both transit operations departments and passengers to get a clear picture of the vehicle service in the transportation network.

The Vehicle Awareness and Prediction feature captures and delivers data about the transit vehicles that are being monitored, such as their position, speed, and whether they are on schedule. Incoming and accumulating vehicle data is captured from external systems in the field through Service Interface for Real Time Information (SIRI) messages. The Vehicle Awareness and Prediction feature also produces estimates for the arrival times of the vehicles at their upcoming planned stops.

Vehicle Awareness and Prediction is an optional feature that you can install on top of an existing deployment of IBM Intelligent Transportation. The Vehicle Awareness and Prediction feature integrates into the Traffic Awareness system and solution portal.

The following table describes the subsystems of the Vehicle Awareness and Prediction feature and how it enhances the IBM Intelligent Transportation solution.

Subsystem	Provides
Transit Awareness	<p>Processes to collect and store current vehicle awareness data that is collected by sensors in the field for use in transit operations management. Also provides the ability for transit operators to perform the following:</p> <ul style="list-style-type: none"> <li>• Monitor vehicle performance in real time</li> <li>• Visualize the current locations of vehicles in real time on a GIS map</li> <li>• Query information about a vehicle, stop location, or a service</li> <li>• Analyze current problems in transit operations, such as vehicles that are off-schedule, off-route, or that have broken-down</li> <li>• Understand which vehicles and services are continually failing to keep schedule</li> <li>• Visualize stop locations of a service</li> <li>• Understand stop performance issues, for example stops with off-schedule vehicles</li> <li>• Understand the services and individual vehicles that are consistently failing to keep to the planned schedule</li> </ul>
Transit Arrival Prediction	<p>Sophisticated algorithms and processes that generate the predicted arrival time of vehicles to a specified location on a route. For example, the arrival times of buses at a particular stop on a route. You can also:</p> <ul style="list-style-type: none"> <li>• Understand which vehicles are not arriving to their destinations as scheduled</li> <li>• Accommodate daily timetable changes</li> </ul>
Transit Analytics	<p>Reports that summarize and analyze the performance of the transit operations. The transit analytic reports highlight the under performers and the bottlenecks in the transit system from a schedule adherence perspective.</p>

Subsystem	Provides
Administrative and operational interfaces	<ul style="list-style-type: none"> <li>• A browser-based graphical user interface that features an operations view to facilitate transit operations management. The interface also includes role-based administrative features, providing the capability to configure the system so that it can correctly operate within a particular customer environment.</li> <li>• An infrastructure data loader which is a command-line interface for loading basic infrastructure data that includes: <ul style="list-style-type: none"> <li>– Route shapes</li> <li>– Vehicle information</li> <li>– Production timetables</li> </ul> </li> <li>• A command-line interface for automatically generating the metadata that is required by the vehicle prediction feature from historical traffic data. A command-line interface for automatically pruning obsolete data in the database.</li> <li>• A subscription client manager, which is a stand-alone agent that is designed to keep the subscription of SIRI vehicle monitoring messages running.</li> </ul>
Programming and client interfaces	A Representational State Transfer (REST) service that provides Request and Response services for retrieving SIRI formatted vehicle monitoring and stop monitoring messages that contain the predicted arrival time for active buses.

The information from the Vehicle Awareness and Prediction feature is presented in the IBM Intelligent Transportation portal solution interface. The Operator: Transit view displays the current traffic situation and the forecasted traffic situation.

Sections of the documentation are marked with the  icon to indicate that the information applies to the optional Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

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## Users and benefits

IBM Intelligent Transportation is designed for transportation authorities, city departments, and other businesses that are managing transportation in a city.

The following table describes some of the traffic and transit operations personnel who can benefit from using IBM Intelligent Transportation.

If you are a ...	This software can help you ...
Traffic operator	<ul style="list-style-type: none"> <li>• Monitor and manage traffic and the road network</li> <li>• Manage events in the road network and help to reduce traffic congestion</li> <li>• View real-time traffic data from transit field systems on a geographical map of the city</li> <li>• View forecasted traffic conditions on a geographical map of the city</li> <li>• Zoom in on specific roads or areas that are prone to traffic congestion</li> <li>• Identify and monitor traffic congestion</li> <li>• Identify the cause of congestion using event type information</li> <li>• Analyze and decide on short-term corrective measures to relieve congestion</li> <li>• Predict future traffic flow levels and potential problem areas</li> <li>• Notify, update, and issue alerts to appropriate traffic authority colleagues, managers, or executives</li> </ul>
Traffic planner	<ul style="list-style-type: none"> <li>• View real-time and archived traffic data from transit field systems</li> <li>• Produce visual geographical reports on historical traffic data</li> <li>• Analyze traffic patterns of a city or urban area</li> <li>• Evaluate patterns in traffic volume related to specific roads or time periods</li> <li>• Evaluate patterns in traffic speed related to specific roads or time periods</li> <li>• Decide how to optimize traffic flow in the longer term</li> <li>• Produce customized traffic flow and event reports</li> <li>• Provide historical reports as a factual basis for predicting future traffic performance and congestion levels</li> </ul>
Traffic manager or supervisor	<ul style="list-style-type: none"> <li>• Oversee historical and real-time traffic flow performance</li> <li>• Evaluate persistent congestion issues</li> <li>• Obtain an insight into forecasted traffic levels and potential problems</li> <li>• Obtain consolidated data and insights for making decisions that affect the overall operational efficiency and performance of the traffic system</li> <li>• Provide the current and forecasted traffic status to other interested city departments and allied agencies</li> <li>• Communicate quickly and easily on matters of importance</li> </ul>
Transit operator or monitor	<ul style="list-style-type: none"> <li>• Visualize the current locations of a fleet in real-time</li> <li>• View detailed information about a selected vehicle, service, or stop</li> <li>• Predict the arrival time of vehicles at a specified location</li> <li>• Determine which vehicles are delayed or off route</li> <li>• Identify and monitor problems that are associated with a service</li> <li>• Notify, update, and issue alerts to appropriate transit operations colleagues, managers, or executives</li> </ul>
Transit planner or scheduler	<ul style="list-style-type: none"> <li>• Analyze vehicles and services that are consistently delayed or off route</li> <li>• Identify underperformers and bottlenecks in the transit system</li> <li>• Identify problem road links that contribute to vehicle delays</li> <li>• Identify the planned vehicle schedules, stops, or lines that must be improved</li> <li>• Decide how to optimize the schedule or route of a service to prevent delays and bottlenecks</li> </ul>
Transit supervisor or manager	<ul style="list-style-type: none"> <li>• Oversee the performance of the transit operations network</li> <li>• Evaluate persistent delays and problems in transit services</li> <li>• Obtain consolidated data and insights for making decisions that affect the overall operational efficiency and performance of the transit system</li> <li>• Communicate quickly and easily on matters of importance</li> </ul>

**Related concepts:**

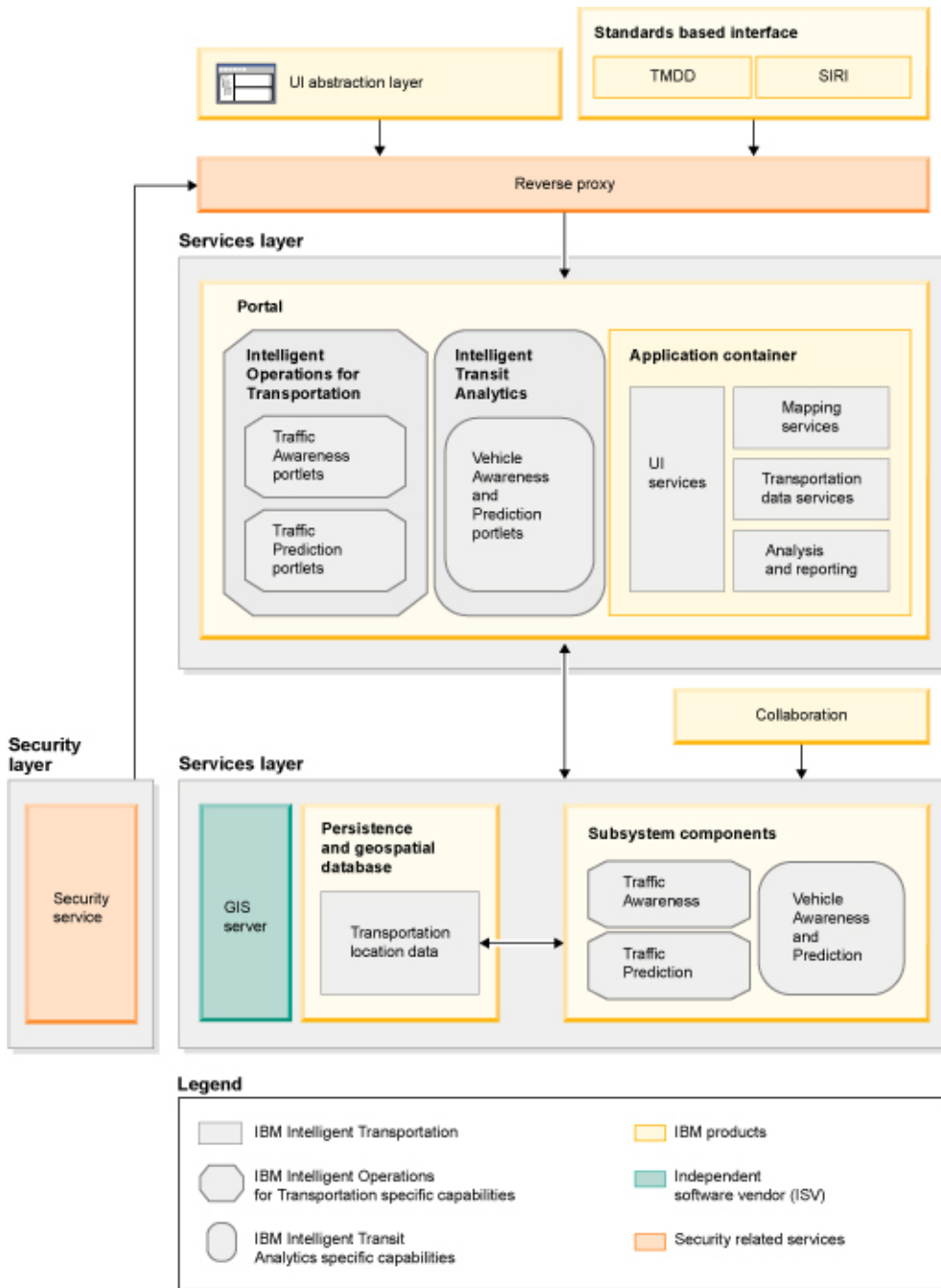
Chapter 4, “Securing the solution,” on page 97

Securing IBM Intelligent Transportation is an important consideration. To ensure that the system is secure, you must manage who can access the system and assign the correct level of access within the solution.

# Components

At a high level, the structure of IBM Intelligent Transportation can be divided into major components, subsystems, and services.

The following diagram shows a high-level view of IBM Intelligent Transportation.



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## User license types

The IBM Intelligent Transportation version 1.6 release offering provides several user license types to suit the needs of your organization and deployment. You can deploy your IBM Intelligent Transportation solution on premises or as a cloud-based offering in the IBM SmartCloud. During the installation of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, review the license information for the product and user type that you purchased.

### On premise

The following user license types are available for IBM Intelligent Operations for Transportation:

1. IBM Intelligent Operations for Transportation Premium User
2. IBM Intelligent Operations for Transportation Standard User
3. IBM Intelligent Operations for Transportation Developer User

There is only one user license type available for IBM Intelligent Transit Analytics.

### Cloud implementation

If you are implementing IBM Intelligent Transportation in the IBM SmartCloud, the following user license types are also available:

1. IBM Intelligent Operations for Transportation Premium User on IBM SmartCloud
2. IBM Intelligent Operations for Transportation Standard User on IBM SmartCloud
3. IBM Intelligent Transit Analytics on IBM SmartCloud

For more information about the user license types that are available for IBM Intelligent Transportation version 1.6, see the official product information pages.

#### Related information:



Product information : IBM Intelligent Operations for Transportation



Product information : IBM Intelligent Transit Analytics

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## What's new in version 1.6

IBM Intelligent Transportation version 1.6 provides increased system reliability and several aesthetic enhancements to the user interface of the solution portal to help you to better manage your transportation network. Enhancements have also been added to the Traffic Prediction feature.

### High Availability

IBM Intelligent Transportation version 1.6 introduces high availability capability that can help traffic organizations run mission-critical operation centers in fail-safe environments. This new high availability capability supports high availability configurations for the IBM Intelligent Operations for Transportation component to help improve reliability and resiliency. The high availability environment provides failover support to standby servers.

Both components of IBM Intelligent Transportation can be installed in either a standard or a high availability operating environment, however, failover is not supported for IBM Intelligent Transit Analytics. Failover is supported for IBM Intelligent Operations for Transportation, but the following functions are not highly available:

- Batch and command line data load and configuration scripts
- Reporting functionality

- Instant messaging capability
- Databases that are associated with instant messaging and collaboration capabilities
- Security identity management functions
- Installation and solution deployment functions

Learn more...

## Traffic Prediction enhancements

### Processing Holiday Data

To improve the accuracy of the predicted traffic levels that are generated by IBM Intelligent Transportation, you can now import specific holiday data for your transportation network. The traffic prediction algorithms have been enhanced to process the holiday data. The holiday data requires a separate ingest from the standard data ingest.

Learn more...

### Processing Mean Data

The application now provides historical traffic conditions data to a consuming application in a publish/subscribe model. The data represents the mean traffic data for that day of the week that can be used in an application such as a journey planner.

Learn more...

## User interface enhancements

### New look and feel

In this release, there are enhancements to improve the performance of the solution portal. The user interface is revamped to match the new look and feel of the underlying IBM Intelligent Operations Center version 1.6.

### Enhanced content filtering on the GIS maps

After you select content to view on the GIS maps in the solution portal, when you refresh the browser page, switch from one view to another view, or resize a portlet, your content selection is preserved.

Learn more...

### Getting help

A new context-sensitive help menu replaces the individual portlet help that was available in earlier releases. Use the embedded help menu on the main navigation bar to access context-sensitive help that explains how to use the current view of the solution portal user interface.

## Globalization enhancements

The IBM Intelligent Transportation version 1.6 product interface and embedded help is translated into the following languages:

- Brazilian Portuguese
- French
- German
- Italian
- Japanese
- Korean
- Russian (new for version 1.6)
- Simplified Chinese



- Spanish
- Traditional Chinese

**Note:** The administration documentation is also translated into some of the group 1 languages in the previous list. For information about the languages that the product documentation is translated into, see the IBM Intelligent Transportation Support Portal.



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## Chapter 2. Installing and configuring

IBM Intelligent Transportation is a solution that runs on top of the IBM Intelligent Operations Center. Deployment wizards and command line utilities are provided for installing IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

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### Preparing for installation

Before you deploy the products of IBM Intelligent Transportation, understand the required system configuration and ensure that the prerequisites are met for the environment.

#### Related concepts:

“Installing IBM Intelligent Operations for Transportation” on page 35

As soon as you complete the prerequisite tasks, you are ready to install IBM Intelligent Operations for Transportation into an existing environment that is running the IBM Intelligent Operations Center version 1.6. You can install IBM Intelligent Operations for Transportation by running either the GUI deployment wizard or the silent installation command-line program from the IBM Intelligent Operations Center analytics server.

### Supported operating environments

You can deploy the products of IBM Intelligent Transportation in either a standard or a high availability (HA) operating environment. The underlying IBM Intelligent Operations Center environment must support the same operating environment topology, otherwise the installation will fail. Specify the operating environment during the installation of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

#### Standard topology

If the underlying IBM Intelligent Operations Center is installed in a standard environment, IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics must also be installed in a standard environment.

#### High availability topology

If the underlying IBM Intelligent Operations Center environment is installed in a high availability operating environment, you can install both IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics in a high availability topology.

While you can install IBM Intelligent Transit Analytics in a high availability operating environment, it is not enabled for high availability. Only IBM Intelligent Operations for Transportation is enabled for high availability. Therefore, only one InfoSphere® Streams server is required for the deployment of IBM Intelligent Transit Analytics regardless of the operating environment type.

Both components of IBM Intelligent Transportation can be installed in either a standard or a high availability operating environment, however, failover is not supported for IBM Intelligent Transit Analytics. Failover is supported for IBM Intelligent Operations for Transportation, but the following functions are not highly available:

- Batch and command line data load and configuration scripts
- Reporting functionality
- Instant messaging capability
- Databases that are associated with instant messaging and collaboration capabilities

- Security identity management functions
- Installation and solution deployment functions

**Note:** If you try to install IBM Intelligent Operations for Transportation or IBM Intelligent Transit Analytics for high availability on an environment that is running on a standard deployment of the IBM Intelligent Operations Center, the installation will fail.

## Applications and services of IBM Intelligent Transportation in a standard operating environment

In a standard operating environment, IBM Intelligent Transportation is installed on top of four servers that are provided by the underlying IBM Intelligent Operations Center environment. IBM Intelligent Transportation uses many of the services that are provided by IBM Intelligent Operations Center. IBM Intelligent Transportation also provides a number of extra applications and services that are installed on to the IBM Intelligent Operations Center servers. A fifth server is required if you choose to deploy the optional IBM Intelligent Transit Analytics chargeable component.

For information about the core services that are provided by IBM Intelligent Operations Center, see *IBM Intelligent Operations Center servers in the standard topology*.

The following lists provide information about the applications services that are installed by IBM Intelligent Transportation on each of the platform servers that are required in a standard operating environment.

### Application server

The IBM Intelligent Operations Center application server provides the following applications and services:

- Applications for the traffic awareness and prediction UI portlets
- Applications for traffic prediction batch calculations and forecast calculations
- Post-installation script for migrating V1.5 data to V1.6
- Applications for vehicle awareness and prediction UI portlets and SIRI ingest
- SIRI subscription manager
- REST Services for traffic and transit data
- User directory integration, including password synchronization plug-in services

### Data server

The IBM Intelligent Operations Center data server provides the following services:

- Traffic, transit, and system configuration data store
- LDAP and security
- Scripts and tools for the Traffic Prediction feature: historical data load; holiday admin; master data
- Scripts and tools for the Vehicle Awareness and Prediction feature: data load; pruning; metadata generation

### Analytics server

The IBM Intelligent Operations Center analytics server is used to run the installation programs of IBM Intelligent Transportation. The analytics server also provides the following services:

- Predictive analytic applications
- Traffic awareness and prediction data summary reports
- Vehicle awareness and prediction data summary reports

### Web server

The IBM Intelligent Operations Center web server provides the following services:

- Provides web server services

## InfoSphere Streams server

The InfoSphere Streams server is only required if you are deploying IBM Intelligent Transit Analytics. This server provides the core InfoSphere Streams applications for the prediction engine of the Vehicle Awareness and Prediction feature. The prediction engine calculates the estimated time of arrivals of the vehicles in the transit system.

**Note:** This is the only server that is required by IBM Intelligent Transportation that is not provided by IBM Intelligent Operations Center.

The IBM Intelligent Operations Center also provides an optional Semantic model server. This server is not used by IBM Intelligent Transportation.

## Applications and services of IBM Intelligent Transportation in a high availability operating environment

In a high availability environment, IBM Intelligent Transportation is installed on eight servers that are provided by the underlying IBM Intelligent Operations Center environment. IBM Intelligent Transportation uses many services that are provided by IBM Intelligent Operations Center. IBM Intelligent Transportation also provides a number of extra services that are installed on to the IBM Intelligent Operations Center servers. A ninth server is required if you choose to deploy the optional IBM Intelligent Transit Analytics chargeable component. However, the IBM Intelligent Transit Analytics component is not enabled for high availability.

For information about the core services that are provided by IBM Intelligent Operations Center, see *IBM Intelligent Operations Center servers in the high availability topology*.

The following lists provide information about the services that are installed by IBM Intelligent Transportation on each of the platform servers that are required in a high availability operating environment.

### Application server 1

The IBM Intelligent Operations Center application server 1 provides the following applications and services:

- Applications for the traffic awareness and prediction UI portlets
- Applications for traffic prediction batch calculations and forecast calculations
- Post-installation script for migrating V1.5 data to V1.6
- Applications for vehicle awareness and prediction UI portlets and SIRI ingest
- SIRI subscription manager
- REST Services for traffic and transit data
- User directory integration, including password synchronization plug-in services

### Application server 2

The IBM Intelligent Operations Center application server 2 provides the following applications and services:

- Applications for the traffic awareness and prediction UI portlets
- Applications for traffic prediction batch calculations and forecast calculations
- Post-installation script for migrating V1.5 data to V1.6
- Applications for vehicle awareness and prediction UI portlets and SIRI ingest
- SIRI subscription manager
- REST Services for traffic and transit data
- User directory integration, including password synchronization plug-in services

**Note:** The SIRI Subscription Manager is deployed on both Application Servers but only one instance can be running at a time. Because IBM Intelligent Transit Analytics is not enabled for high availability, if the primary application server becomes unavailable, manual intervention is required to update the configuration and to start the SIRI Subscription Manager on the other application server host. For more information, see *Configuring the Subscription Manager in a high availability environment*.

#### **Data server 1**

The IBM Intelligent Operations Center data server 1 provides the following applications and services:

- Traffic, transit, and system configuration data store
- LDAP and security
- Scripts and tools for the Traffic Prediction feature: historical data load; holiday admin; master data
- Scripts and tools for the Vehicle Awareness and Prediction feature: data load; pruning; metadata generation

#### **Data server 2**

The IBM Intelligent Operations Center data server 2 provides the following applications and services:

- Traffic, transit, and system configuration data store
- LDAP and security
- Scripts and tools for the Traffic Prediction feature: historical data load; holiday admin; master data
- Scripts and tools for the Vehicle Awareness and Prediction feature: data load; pruning; metadata generation

#### **Analytics server 1**

The IBM Intelligent Operations Center analytics server 1 is used to run the installation programs of IBM Intelligent Transportation. This server also provides the following applications and services:

- Predictive analytic applications
- Traffic awareness and prediction data summary reports
- Vehicle awareness and prediction data summary reports

#### **Analytics server 2**

The IBM Intelligent Operations Center analytics server 2 provides the following applications and services:

- Predictive analytic applications
- Traffic awareness and prediction data summary reports
- Vehicle awareness and prediction data summary reports

#### **Web server 1**

The IBM Intelligent Operations Center web server 1 provides the following applications and services:

- Provides web server services

#### **Web server 2**

The IBM Intelligent Operations Center web server 2 provides the following services:

- Provides web server services

#### **InfoSphere Streams server**

The InfoSphere Streams server is only required if you are deploying IBM Intelligent Transit Analytics. This server provides the core InfoSphere Streams applications for the prediction engine

of the Vehicle Awareness and Prediction feature. The prediction engine calculates the estimated time of arrivals of the vehicles in the transit system.

While you can install IBM Intelligent Transit Analytics in a high availability operating environment, it is not enabled for high availability. Only IBM Intelligent Operations for Transportation is enabled for high availability. Therefore, only one InfoSphere Streams server is required for the deployment of IBM Intelligent Transit Analytics regardless of the operating environment type. In the event of server or service failure, some manual intervention is required to restart the services and applications of the IBM Intelligent Transit Analytics component.

**Note:** This is the only server that is required by IBM Intelligent Transportation that is not provided by IBM Intelligent Operations Center. The InfoSphere Streams server is deployed in a stand-alone configuration and is therefore not enabled for high availability.

IBM Intelligent Operations Center also provides an optional Semantic model server. This server is not used by IBM Intelligent Transportation.

**Related tasks:**

“Configuring the Subscription Manager in a high availability environment” on page 187

When you install IBM Intelligent Transit Analytics in a high availability operating environment, you must configure and start a single instance of the Subscription Manager on the primary IBM Intelligent Operations Center application server. If the daemon process stops for any reason, you must also manually reconfigure the settings, and start the Subscription Manager on the secondary application server. You then must modify the system properties table accordingly.

## Hardware requirements

Most of the hardware that is required by IBM Intelligent Transportation is provided by the prerequisite IBM Intelligent Operations Center environment. The environment must meet the minimum hardware requirements that are specified for IBM Intelligent Transportation and IBM Intelligent Operations Center. Extra memory, processor, and data storage resources might be required depending on how the system is deployed and used. An extra server is required for the deployment of IBM Intelligent Transportation but only if you are installing IBM Intelligent Transit Analytics for vehicle awareness and vehicle prediction capabilities.

## IBM Intelligent Operations for Transportation hardware requirements

All of the servers that are required by IBM Intelligent Operations for Transportation are provided by IBM Intelligent Operations Center. IBM Intelligent Transportation can be installed in either a standard or a high availability operating environment. In IBM Intelligent Operations Center, there are four servers that are required in a standard operating environment and there are eight servers that are required in a high availability environment. For more information about the minimum hardware that is required for the prerequisite software, see the following topics in the IBM Intelligent Operations Center product documentation:

- *IBM Intelligent Operations Center hardware requirements for a standard environment.*
- *IBM Intelligent Operations Center hardware requirements for a high availability environment.*

Depending on the usage of the system, extra physical memory, processor, and data storage hardware might be required to support both IBM Intelligent Operations for Transportation and IBM Intelligent Operations Center.

## IBM Intelligent Transit Analytics hardware requirements

To install IBM Intelligent Transit Analytics, an extra server is required to run InfoSphere Streams.

While you can install IBM Intelligent Transit Analytics in a high availability operating environment, it is not enabled for high availability. Only IBM Intelligent Operations for Transportation is enabled for high

availability. Therefore, only one InfoSphere Streams server is required for the deployment of IBM Intelligent Transit Analytics regardless of the operating environment type.

For more information about the extra requirements of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics that are on top of the requirements of IBM Intelligent Operations Center, see *Detailed system requirements for IBM Intelligent Transportation*.

## Client hardware requirements

To access the IBM Intelligent Transportation solution portal, ensure that the client system meets the hardware requirements of the supported web browsers of IBM Intelligent Operations Center.

### Related information:

 [Detailed system requirements for IBM Intelligent Transportation](#)

## Software requirements of IBM Intelligent Transportation

The servers and clients that are involved in the deployment of IBM Intelligent Transportation must meet the minimum software requirements. The IBM Intelligent Operations Center servers provide the base software platform that is required by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. Extra software must be installed and configured for IBM Intelligent Transit Analytics.

### IBM Intelligent Operations for Transportation server software requirements

The IBM Intelligent Operations Center servers that the IBM Intelligent Transportation solution is installed on top of must meet the minimum software requirements. For more information, see the IBM Intelligent Operations Center product documentation.

For the detailed software requirements of the products and features that are provided by IBM Intelligent Transportation, see *Detailed system requirements for IBM Intelligent Transportation*.

In addition to the IBM Intelligent Operations Center servers, a GIS server is required to provide the maps that are displayed in the solution portal. For more information, see *GIS server requirements*.

### IBM Intelligent Transit Analytics server software requirements

If you are planning to install IBM Intelligent Transit Analytics, you must install and configure InfoSphere Streams V3.1 Red Hat Enterprise Linux (RHEL) version 6.1 64-bit on an extra server. InfoSphere Streams must be installed and running before you start the installation of IBM Intelligent Transit Analytics. Use the InfoSphere Streams V3.1 installation media that is bundled with IBM Intelligent Transportation V1.6.

## Ports

Before you start the installation of IBM Intelligent Transportation, ensure that the required ports are open and accessible. For information about the ports that are used by IBM Intelligent Transportation and IBM Intelligent Operations Center, see the related link.

## Client software requirements

To access the IBM Intelligent Transportation solution portal, use a browser that is supported by IBM Intelligent Operations Center version 1.6.

### Related concepts:



“GIS server requirements”

In addition to the underlying IBM Intelligent Operations Center, IBM Intelligent Transportation requires access to a geographic information system (GIS) base map server to display map-based information and to enable map-based interaction. IBM Intelligent Transportation V1.6 is designed to support Environmental Systems Research Institute's (Esri) ArcGIS Version 10.0. However, a service engagement can be used to enable alternative GIS applications.

“Ports that are used by IBM Intelligent Transportation” on page 323

The solution servers communicate with each other using ports during operation and installation. Securing IBM Intelligent Transportation ports is an important consideration. To ensure that the system is secure, and to avoid potential port conflicts, see the various chargeable components, servers, and ports that are used by the solution in standard and high availability deployments.

**Related information:**



Detailed system requirements for IBM Intelligent Transportation

## GIS server requirements

In addition to the underlying IBM Intelligent Operations Center, IBM Intelligent Transportation requires access to a geographic information system (GIS) base map server to display map-based information and to enable map-based interaction. IBM Intelligent Transportation V1.6 is designed to support Environmental Systems Research Institute's (Esri) ArcGIS Version 10.0. However, a service engagement can be used to enable alternative GIS applications.

When configuring the ArcGIS Version 10.0 map service to work with IBM Intelligent Transportation, consider all of the following points:

- Ensure that you have the required Esri street map files that cover the geographical area of the transportation network with the level of detail that is required.
- Deploy the map files as described in the Esri product documentation.
- The geographic data must conform to the specified geographic coordinate system. Data that includes geographic or location information can use either latitude and longitude values, or shape files. Spatial data must use the World Geodetic System GCS\_WGS\_1984 geographic coordinate system, referenced through the WGS84\_SRS\_1003 (ID 1003) spatial reference system. If the data to be imported does not use this coordinate system, then convert or reproject the data before you attempt to import the data. The coordinates must cover the entire world, even if only the tiles for a specific region are defined.
- The map server must be projected to either EPSG:3857 (also known as EPSG:900913) or EPSG:4326.
- IBM Intelligent Transportation requires the **ArcGIS Online/Bing Maps/Google Maps** tiling scheme.

**Related concepts:**

“Software requirements of IBM Intelligent Transportation” on page 20

The servers and clients that are involved in the deployment of IBM Intelligent Transportation must meet the minimum software requirements. The IBM Intelligent Operations Center servers provide the base software platform that is required by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. Extra software must be installed and configured for IBM Intelligent Transit Analytics.

**Related information:**



Esri website



Esri ArcGIS Help 10.1

## Installation sequence

You must install the features of IBM Intelligent Transportation in a specific order. Traffic Awareness is the foundational feature of IBM Intelligent Transportation and must be installed and configured first. The Traffic Prediction and Vehicle Awareness and Prediction features can be installed in any order after you deploy the Traffic Awareness feature. The installation sequence is the same regardless of whether you install the solution in a standard or a high availability environment.

## IBM Intelligent Operations for Transportation

The Traffic Awareness and Traffic Prediction features are provided by IBM Intelligent Operations for Transportation. Because the Traffic Awareness and Traffic Prediction features share the same installer program, they can be installed at the same time or separately. You must install the Traffic Awareness feature before you install the Traffic Prediction feature.

## IBM Intelligent Transit Analytics

The Vehicle Awareness and Prediction feature is provided by the IBM Intelligent Transit Analytics product of IBM Intelligent Transportation. You cannot install the Vehicle Awareness and Prediction feature before you install the Traffic Awareness feature of IBM Intelligent Operations for Transportation.

The Traffic Prediction and Vehicle Awareness and Prediction features are both optional to deploy and can also coexist together with the Traffic Awareness feature.

## Supported sequences

The following table summarizes the supported installation sequences and scenarios for the features of IBM Intelligent Transportation.

Scenario by products	First feature to install	Second feature to install	Third feature to install
Install all features of both products	Traffic Awareness	Traffic Prediction	Vehicle Awareness and Prediction
Install all features of both products	Traffic Awareness	Vehicle Awareness and Prediction	Traffic Prediction
Install all features of IBM Intelligent Operations for Transportation	Traffic Awareness	Traffic Prediction	Not applicable
Install only the foundational feature of IBM Intelligent Operations for Transportation and also IBM Intelligent Transit Analytics	Traffic Awareness	Vehicle Awareness and Prediction	Not applicable
Install only the foundational feature of IBM Intelligent Operations for Transportation	Traffic Awareness	Not applicable	Not applicable

**Note:** The products of IBM Intelligent Transportation are sometimes referred to as chargeable components.

## Upgrading from an earlier version

There are significant product design changes in this release. Upgrading to version 1.6 from an earlier version of IBM Intelligent Transportation is not supported. If you are running IBM Intelligent Transportation version 1.5, you can preserve and migrate your existing system data to a new installation of IBM Intelligent Transportation V1.6. Several data migration steps are required before and after the installation of IBM Intelligent Transportation V1.6.

**Note:** When you migrate your existing traffic data from version 1.5 to 1.6, you do not have to import and load your shapefile data into the database. The shapefile data from version 1.5 is preserved and migrated to version 1.6.

For more information, see *Migrating existing V1.5 data to V1.6* in the post-installation section.

**Related concepts:**

“What’s new in version 1.6” on page 11

IBM Intelligent Transportation version 1.6 provides increased system reliability and several aesthetic enhancements to the user interface of the solution portal to help you to better manage your transportation network. Enhancements have also been added to the Traffic Prediction feature.

**Related tasks:**

“Migrating existing V1.5 data to V1.6” on page 53

If you are migrating the data from your existing IBM Intelligent Transportation V1.5 solution to version 1.6, before you proceed with the post-installation tasks, complete the migration procedure. Scripts are provided by IBM Intelligent Operations for Transportation to help you to migrate your Traffic Awareness, Traffic Prediction, and Vehicle Awareness and Prediction data, and to transform the internal structure of the databases to the new schema that is required by IBM Intelligent Transportation version 1.6.

## Media packaging

You can order the products of IBM Intelligent Transportation as a package of DVDs, or obtain the electronic installation media through Passport Advantage®.

The product number of IBM Intelligent Transportation version 1.6 is **5725-D70**.

The IBM Intelligent Transportation version 1.6 release offering includes physical media for the following products:

Physical media	Includes
IBM Intelligent Operations for Transportation version 1.6	<ul style="list-style-type: none"> <li>• Installation DVD for IBM Intelligent Operations for Transportation version 1.6 Multilingual. Contains the following features:               <ul style="list-style-type: none"> <li>– Traffic Awareness</li> <li>– Traffic Prediction</li> </ul> </li> <li>• Installation DVDs for IBM Intelligent Operations Center version 1.6 Multilingual.</li> <li>• IBM SPSS® Statistics Server version 22.0.0.0</li> </ul> <p><b>Note:</b> For more information, see <i>Installation guidelines for installing IBM SPSS Statistics Server with IBM Intelligent Transportation V1.6</i>.</p>
IBM Intelligent Transit Analytics version 1.6	<ul style="list-style-type: none"> <li>• Installation DVD for IBM Intelligent Transit Analytics version 1.6 Multilingual. Contains the Vehicle Awareness and Prediction feature.</li> <li>• Installation DVD for InfoSphere Streams version 3.1 (RHEL 6.1 64-bit) English.</li> </ul>





To download the electronic installation media, see the related links to the Passport Advantage® download documents for each product. The download documents provide information about the installation media that is available, including details about the part numbers and the product installation files that they include.

**Related tasks:**

“Preparing the installation media” on page 31

Before you start to deploy the chargeable components of IBM Intelligent Transportation, you must first obtain and prepare the installation media.

**Related information:**

-  [Passport Advantage home page](#)
-  [Passport Advantage - Download IBM Intelligent Operations for Transportation V1.6 image files](#)
-  [Passport Advantage - Download IBM Intelligent Transit Analytics V1.6 image files](#)
-  [Installation guidelines for installing IBM SPSS Statistics Server with IBM Intelligent Transportation V1.6](#)

## Preparing the servers

Before you start the installation of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, prepare the underlying platform servers, the installation server, and the installation media.

### Installing IBM Intelligent Operations Center

Before you install the features of IBM Intelligent Transportation version 1.6, you must first install IBM Intelligent Operations Center version 1.6. If you are planning to install IBM Intelligent Transportation in a high availability environment, you must ensure that IBM Intelligent Operations Center is also deployed in a high availability environment.

#### About this task

IBM Intelligent Operations Center version 1.6 is required by IBM Intelligent Transportation. It is not possible to install IBM Intelligent Transportation version 1.6 without first deploying and configuring IBM Intelligent Operations Center version 1.6.

#### Procedure

1. Install, configure, and verify IBM Intelligent Operations Center version 1.6 according to the installation and configuration instructions in the IBM Intelligent Operations Center product documentation.

**Note:** Ensure that you use the installation media that is bundled with IBM Intelligent Transportation version 1.6.

2. Check the IBM Intelligent Transportation Support Portal for the latest information about fixes for IBM Intelligent Operations Center version 1.6 that are required by IBM Intelligent Transportation.
3. Ensure that all of the services and components of the underlying IBM Intelligent Operations Center environment are started. You can start all of the components and services by using the platform control tool (**IOControl**) on the IBM Intelligent Operations Center analytics server.

For more information about starting the IBM Intelligent Operations Center components in a standard or high availability operating environment, see *Managing the solution* in the IBM Intelligent Operations Center product documentation.

#### What to do next

Prepare the IBM Intelligent Operations Center servers before you start the installation of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. See *Preparing the IBM Intelligent Operations Center servers*.

#### Related information:

-  [IBM Intelligent Transportation Support Portal](#)

### Preparing the IBM Intelligent Operations Center servers

Before you start the deployment of IBM Intelligent Transportation, you must first prepare the existing IBM Intelligent Operations Center environment that you are installing the solution on top of.

## Before you begin

Uninstallation is not supported in IBM Intelligent Operations Center version 1.6. Ensure that you back up the IBM Intelligent Operations Center environment that you are installing IBM Intelligent Transportation on to.

## About this task

The IBM Intelligent Operations Center servers must be running during the installation of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If any of the IBM Intelligent Operations Center servers and services are not started, the installation of IBM Intelligent Transportation does not complete successfully. Some of the IBM Intelligent Operations Center services are automatically restarted by the installation utilities of IBM Intelligent Transportation.

To avoid a disruption in service, users must not access the system during the IBM Intelligent Transportation deployment period.

## Procedure

1. Ensure that the IBM Intelligent Operations Center servers are started. If you are deploying IBM Intelligent Transportation in a high availability environment, ensure that both the primary and secondary IBM Intelligent Operations Center servers are started. Otherwise, the installation of IBM Intelligent Transportation in a high availability environment will fail.
2. Ensure that the Java™ Virtual Machine (JVM) settings for the IBM Intelligent Operations Center application server are correctly configured according to the minimum software requirements for IBM Intelligent Transportation.
3. Use the platform control tool (**IOCControl**) on the IBM Intelligent Operations Center analytics server to ensure that all of the IBM Intelligent Operations Center servers and services are running.  
For more information about starting the IBM Intelligent Operations Center components in a standard or high availability operating environment, see *Managing the solution* in the IBM Intelligent Operations Center product documentation.
4. Complete the prerequisite configuration and verification of the IBM Cognos® Business Intelligence servers, which are required for the reports feature of IBM Intelligent Transportation. See the related links at the end of this topic.
5. Log on to the solution portal by using the following URL:  
`https://web_hostname/wps/portal`

Where:

- In a standard operating environment, *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.
- In a high availability environment, *web\_hostname* is the host name of one of the following:
  - IBM Intelligent Operations Center web server 1
  - IBM Intelligent Operations Center web server 2
  - The host name or IP address of the load balancer cluster

## Results

In the solution portal, you can see the **Intelligent Operations Center** link on the top navigation bar.

## What to do next

After the prerequisite environment is configured and all servers and services are up and running, you are ready to start preparing the installation server for the installation of IBM Intelligent Transportation.

**Related concepts:**

“Software requirements of IBM Intelligent Transportation” on page 20

The servers and clients that are involved in the deployment of IBM Intelligent Transportation must meet the minimum software requirements. The IBM Intelligent Operations Center servers provide the base software platform that is required by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. Extra software must be installed and configured for IBM Intelligent Transit Analytics.

**Related tasks:**

“Verifying the Cognos installation” on page 27

Before you install IBM Intelligent Transportation, verify that the Cognos application server is up and running on the IBM Intelligent Operations Center analytics server. Verify that you can successfully connect to the Cognos Dispatch server and the Cognos Gateway server by using a browser.

**Configuring Cognos in a high availability operating environment:**

If you are deploying IBM Intelligent Transportation in a high availability operating environment, ensure that the Cognos servers that are required for the reports of the solution are set to Cluster-Compatible load balancing mode in the Cognos Administration Console. The Cognos load balancing mode configuration must be done before you start the installation program for IBM Intelligent Operations for Transportation.

**About this task**

In order for the Cognos components in the installation program of IBM Intelligent Operations for Transportation to install successfully, the Cognos server configuration must be switched from the default **Weighted Round Robin** mode to the **Cluster Compatible** mode.

**Note:** You do not have to complete the following procedure if you are deploying IBM Intelligent Transportation in a standard operating environment. This procedure is required when there are multiple Cognos servers in the deployment, which is the case in a high availability environment.

**Procedure**

1. Connect to the Cognos Gateway server by using the following URL:  
`http(s)://ihs_server1/ServletGateway/servlet/Gateway`  
Where *ihs\_server1* is the primary IBM Intelligent Operations Center web server, also referred to as web server 1.
2. When prompted, log on as the *wpsadmin* user.
3. In the upper-right corner, click **Launch > IBM Cognos Administration**.
4. On the **Status** tab, click **System**.
5. Click the arrow for the **Actions** menu next to **System** and click **Set properties**.
6. Click the **Settings** tab.
7. Select **Tuning** from the **Category** list.
8. Required: In the **Value** column, change the default value for **Load balancing mode** from **Weighted Round Robin** to **Cluster Compatible**.
9. Click **OK**.
10. Stop all of the middleware services and restart them as the *ibmadmin* user. For more information, see *Starting the components in a high availability environment* in the IBM Intelligent Operations Center product documentation.
11. Verify that the IBM Cognos Business Intelligence servers are running and accessible. For more information, see *Verifying the Cognos installation*.

**Related tasks:**

“Verifying the Cognos installation” on page 27

Before you install IBM Intelligent Transportation, verify that the Cognos application server is up and running on the IBM Intelligent Operations Center analytics server. Verify that you can successfully connect to the Cognos Dispatch server and the Cognos Gateway server by using a browser.

## Verifying the Cognos installation:

Before you install IBM Intelligent Transportation, verify that the Cognos application server is up and running on the IBM Intelligent Operations Center analytics server. Verify that you can successfully connect to the Cognos Dispatch server and the Cognos Gateway server by using a browser.

### Procedure

1. Verify connectivity to the Cognos Dispatch server.

a. Connect to the Cognos Dispatch server by using the following URL:

`http://hostname:port/p2pd/servlet/dispatch/ext`

where:

- *hostname* is the host name of the IBM Intelligent Operations Center analytics server or the IBM Intelligent Operations Center web server.
- *port* is the open port that is configured for this server, for example, 9082

**Note:** In a high availability environment, complete this step for both the primary and the secondary analytics servers.

b. When prompted, log on with the *wpsadmin* user account.

c. In the top navigation bar, click **Launch**.

d. Click **IBM Cognos Administration**.

The IBM Cognos Connection administration console is displayed.

2. Verify connectivity to the Cognos Gateway server.

a. Connect to the Cognos Gateway server by using the following URL:

`http://hostname:port/ServletGateway/servlet/Gateway`

where:

- *hostname* is the host name of the IBM Intelligent Operations Center analytics server or the IBM Intelligent Operations Center web server
- *port* is the open port that is configured for this server, for example, 9081

**Note:** In a high availability environment, complete this step for both the primary and the secondary analytics servers.

b. When prompted, log on with the *wpsadmin* user account.

c. In the top navigation bar, click **Launch**.

d. Click **IBM Cognos Administration**.

The IBM Cognos Connection administration console is displayed.

3. Go to the IBM Cognos Content Manager on the IBM Intelligent Operations Center analytics server by using the following URL:

`http://analytics_server:port/p2pd/servlet`

where:

- *analytics\_server* is the host name of the IBM Intelligent Operations Center analytics server
- *port* is the open port that is configured for this server, for example, 9082

**Note:** In a high availability environment, complete this step for both the primary and the secondary analytics servers.

If the Content Manager is working as expected, the status is set to **Running**. In a high availability environment, the primary analytics server shows a status of **Running** and the secondary analytics server shows a status of **Running as standby**.

**Related tasks:**

“Configuring Cognos in a high availability operating environment” on page 26

If you are deploying IBM Intelligent Transportation in a high availability operating environment, ensure that the Cognos servers that are required for the reports of the solution are set to Cluster-Compatible load balancing mode in the Cognos Administration Console. The Cognos load balancing mode configuration must be done before you start the installation program for IBM Intelligent Operations for Transportation.

## Preparing the installation server

Unlike the previous releases, you no longer require a dedicated installation server to run the installation programs of IBM Intelligent Transportation. Run the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics from the IBM Intelligent Operations Center analytics server. Some preparation steps are required to prepare the IBM Intelligent Operations Center analytics server for the installation of IBM Intelligent Transportation.

## Before you begin

During the deployment of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, the installation programs access the topology files that are generated during the installation of IBM Intelligent Operations Center. If the installer cannot access IBM Intelligent Operations Center topology files on the analytics server, the installation fails.

If the solution that you are installing IBM Intelligent Transportation on top of is running in a high availability environment, you must run the installation from the IBM Intelligent Operations Center analytics server 1, otherwise referred to as the primary analytics server. Also, all of the IBM Intelligent Operations Center servers in the high availability environment must be started before you start the installation of IBM Intelligent Transportation.

## Procedure

1. Ensure that the analytics server can communicate with all of the IBM Intelligent Operations Center server nodes.
2. Use the platform control tool (**IOControl**) on the IBM Intelligent Operations Center analytics server to ensure that all of the IBM Intelligent Operations Center servers and services are running.  
For more information about starting the IBM Intelligent Operations Center components in a standard or high availability operating environment, see *Managing the solution* in the IBM Intelligent Operations Center product documentation.
3. Log on to the solution portal by using the following URL:  
`https://web_hostname/wps/portal`

Where:

- In a standard operating environment, *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.
  - In a high availability environment, *web\_hostname* is the host name of one of the following:
    - IBM Intelligent Operations Center web server 1
    - IBM Intelligent Operations Center web server 2
    - The host name or IP address of the load balancer cluster
4. IBM Installation Manager is required to run the installation programs of IBM Intelligent Transportation. By default, IBM Installation Manager is installed on the IBM Intelligent Operations Center analytics server server. For more information, see *Installing the IBM Installation Manager*.
  5. Obtain and prepare the installation media for IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. For detailed instructions, see *Preparing the installation media*.

**Related concepts:**



“Hardware requirements” on page 19

Most of the hardware that is required by IBM Intelligent Transportation is provided by the prerequisite IBM Intelligent Operations Center environment. The environment must meet the minimum hardware requirements that are specified for IBM Intelligent Transportation and IBM Intelligent Operations Center. Extra memory, processor, and data storage resources might be required depending on how the system is deployed and used. An extra server is required for the deployment of IBM Intelligent Transportation but only if you are installing IBM Intelligent Transit Analytics for vehicle awareness and vehicle prediction capabilities.

“Software requirements of IBM Intelligent Transportation” on page 20

The servers and clients that are involved in the deployment of IBM Intelligent Transportation must meet the minimum software requirements. The IBM Intelligent Operations Center servers provide the base software platform that is required by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. Extra software must be installed and configured for IBM Intelligent Transit Analytics.

**Related tasks:**

“Preparing the installation media” on page 31

Before you start to deploy the chargeable components of IBM Intelligent Transportation, you must first obtain and prepare the installation media.

“Installing IBM Installation Manager” on page 34

Before you start the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, IBM Installation Manager must be installed on the IBM Intelligent Operations Center analytics server that the installation is run from.

## Preparing to install Vehicle Awareness and Prediction



Before you deploy the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, review the hardware and software requirements and complete the prerequisite steps. Extra hardware and software is required.

### Hardware and software requirements

The Vehicle Awareness and Prediction feature runs on the IBM Intelligent Operations Center servers that provide the prerequisite platform for IBM Intelligent Transit Analytics.

In addition to the IBM Intelligent Operations Center servers, an extra Red Hat Enterprise Linux (RHEL) V6.1 64-bit server is required to host the prerequisite InfoSphere Streams 3.1 software. To set up the additional hardware and software that is required before you install the Vehicle Awareness and Prediction feature, complete the instructions in *Installing and preparing the InfoSphere Streams* server.

### Prepare the underlying IBM Intelligent Operations Center servers

Before you can begin the installation of IBM Intelligent Transit Analytics, the servers and services of the IBM Intelligent Operations for Transportation and the IBM Intelligent Operations Center environment must be running. Complete the steps that are outlined in *Preparing IBM Intelligent Operations Center*.

**Related tasks:**

“Installing the Vehicle Awareness and Prediction feature by using the wizard” on page 47

IBM Intelligent Transit Analytics provides a deployment wizard to install the Vehicle Awareness and Prediction feature into an existing environment that is running the Traffic Awareness feature of IBM Intelligent Operations for Transportation version 1.6. Run the installation program from the IBM Intelligent Operations Center analytics server that was used to install IBM Intelligent Operations for Transportation.

“Installing the Vehicle Awareness and Prediction feature from the command line” on page 49  
To silently deploy the Vehicle Awareness and Prediction feature, run the IBM Intelligent Transit Analytics command-line installer from the IBM Intelligent Operations Center analytics server that was used to install the Traffic Awareness feature. You can choose to install the feature in a standard or a high availability operating environment by specifying a parameter in the command.

#### Related information:

 Detailed system requirements for IBM Intelligent Transportation

#### Installing and preparing the InfoSphere Streams server:

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics requires an additional server to be added into the environment for IBM Intelligent Transportation. In addition to the IBM Intelligent Operations Center servers, a server that is running InfoSphere Streams version 3.1 is required. Before you start the installation of IBM Intelligent Transit Analytics, install InfoSphere Streams V3.1.

#### About this task

Complete the following prerequisite steps to install and prepare the InfoSphere Streams server for the installation of IBM Intelligent Transit Analytics. The installation might fail if the required steps are not completed.

#### Procedure

1. Obtain the installation media for InfoSphere Streams V3.1 that is bundled with the IBM Intelligent Transit Analytics V1.6 installation media. For more information about how to obtain the installation media, see *Media packaging*.
2. Install and configure InfoSphere Streams V3.1 for the Red Hat Linux 6.1 64-bit operating system. Use the following documentation to complete the installation:
  - InfoSphere Streams V3.1 readme file
  - InfoSphere Streams V3.1 product documentation

**Note:** Ensure that the following default installation structure is preserved:

- The JVM directory is set to `/opt/ibm/java-x86_64-70`.

**Note:** InfoSphere Streams is installed into the `/opt/ibm/InfoSphereStreams` directory.

3. After you complete the installation, make a note of the **streamsadmin** account credentials. You will need this information during the installation of IBM Intelligent Transit Analytics.
4. Log on to the InfoSphere Streams server as the **streamsadmin** user.
5. Ensure that the streams environment is loaded correctly by adding the following line to the `.bashrc` file of the **streamsadmin** user:

```
source /opt/ibm/InfoSphereStreams/bin/streamsprofile.sh
```
6. Create the `/opt/IBM` directory:

```
mkdir /opt/IBM
```
7. Ensure that all members of the streams administrators group have write access to the `/opt/IBM` directory. Enter the following commands:

```
chmod 775 /opt/IBM
chgrp streamsadmin /opt/IBM
```

#### What to do next

You are now ready to proceed with the installation of IBM Intelligent Transit Analytics.

#### Related concepts:

“Media packaging” on page 23

You can order the products of IBM Intelligent Transportation as a package of DVDs, or obtain the electronic installation media through Passport Advantage®.

**Related information:**

 [InfoSphere Streams V3.1 Information Center](#)

 [Passport Advantage - Download IBM Intelligent Transit Analytics V1.6 image files](#)

 [IBM Passport Advantage](#)

## Preparing the installation media

Before you start to deploy the chargeable components of IBM Intelligent Transportation, you must first obtain and prepare the installation media.

### Before you begin

Separate installation media is provided for each of the chargeable components of IBM Intelligent Transportation.

The prerequisite software for each product is also provided with the installation media and is required during the preparation phase of installation. For more information about the products that are contained in the installation media packaging, see *Media packaging*.

There are two forms of installation media that are available for deploying IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics:

- Product installation DVDs
- Installation packages that licensed customers can download from the IBM Passport Advantage website

Copy the IBM Intelligent Transportation and IBM Intelligent Transit Analytics installation media to the IBM Intelligent Operations Center analytics server before you deploy the solution. If the IBM Intelligent Operations Center that you are installing IBM Intelligent Transportation on top of is running in a high availability environment, you must copy the files to IBM Intelligent Operations Center analytics server 1. For more information, see the following topics.

**Related concepts:**

“Media packaging” on page 23

You can order the products of IBM Intelligent Transportation as a package of DVDs, or obtain the electronic installation media through Passport Advantage®.

**Related tasks:**

“Installing IBM Installation Manager” on page 34

Before you start the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, IBM Installation Manager must be installed on the IBM Intelligent Operations Center analytics server that the installation is run from.

“Preparing the installation server” on page 28

Unlike the previous releases, you no longer require a dedicated installation server to run the installation programs of IBM Intelligent Transportation. Run the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics from the IBM Intelligent Operations Center analytics server. Some preparation steps are required to prepare the IBM Intelligent Operations Center analytics server for the installation of IBM Intelligent Transportation.

## Preparing the installation DVDs

An installation DVD is available for the products of IBM Intelligent Transportation. Before you can run the installation wizard for each product, you must first mount the installation DVD on to the IBM Intelligent Operations Center analytics server where the installation must be run from.

## About this task

This task is not required if you downloaded the installation media from the IBM® Passport Advantage® website.

To mount a DVD on the Linux operating system of the installation server, you must issue the **mount** command. Depending on your system configuration, you might need root user authority for this procedure.

Perform this task for each of the products of IBM Intelligent Transportation that you are planning to install.

## Procedure

1. Log on to the IBM Intelligent Operations Center analytics server as the *root* user.
2. Insert the installation DVD into the drive and enter the following command:  

```
mount -t iso9660 -o ro /dev/cdrom /cdrom
```

where *cdrom* represents the mount point of the DVD.
3. View the contents of the mounted installation DVD by placing the disk into the drive and entering the following command:  

```
cd /cdrom
```

Where *cdrom* represents the mount point directory.
4. Create a temporary installation directory on the IBM Intelligent Operations Center analytics server to store the installation files.

**Note:** For example, */IOTimages* and */ITAimages*. Create a different installation directory for IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics installation media. Copying the IBM Intelligent Transit Analytics media into the same directory as the IBM Intelligent Operations for Transportation media might cause problems if you need to rerun the installation utility later.

5. Copy the installation files from the DVD into the directory that you created in the previous step.

## Results

You are ready to start the installation of the IBM Intelligent Transportation product that you are ready to deploy.

## What to do next

Start the installation of the product you are installing from the directory that you extracted the installation package into. Do not delete the directory until you complete the deployment and you are sure that you no longer have to rerun the installation utility.

**Note:** The Traffic Awareness feature is the foundational component of the IBM Intelligent Transportation solution and must be installed first. Do not attempt to install either the Traffic Prediction or Vehicle Awareness and Prediction features until you install, configure, and verify the foundational Traffic Awareness feature.

## Preparing the downloaded installation package

The products of IBM Intelligent Transportation version 1.6 each have their own installation package. You must first copy and extract the required installation files and directory structure onto the IBM Intelligent Operations Center analytics server before you begin the deployment.

## Before you begin

This task is not required if you are using the IBM Intelligent Transportation product DVDs to run the installation.

## About this task

Perform this task for each of the products of IBM Intelligent Transportation that you are planning to download and install.

## Procedure

1. Download the installation packages for IBM Intelligent Transportation version 1.6 from Passport Advantage.
2. Log on to the IBM Intelligent Operations Center analytics server as the *root* user.
3. Create a temporary installation directory on the IBM Intelligent Operations Center analytics server to store the installation files, for example, */IOTimages* and */ITAimages*.

**Note:** Create a different installation directory for IBM Intelligent Operations for Transportation and for IBM Intelligent Transit Analytics installation media. Copying the IBM Intelligent Transit Analytics media into the same directory as the IBM Intelligent Operations for Transportation media might cause problems if you need to rerun the installation utility later.

4. Copy the installation files from the installation package into the directory that you created in the previous step.
5. Extract the installation tar files from the installation package by using the following command:

```
#tar -zxvf installtarfilename
```

where *installtarfilename* is the installation package file name as shown in the following table:

IBM Intelligent Transportation product	Features that are provided by the installer	Installation package file name
IBM Intelligent Operations for Transportation	Traffic Awareness Traffic Prediction	CIR5KML.tar.gz
IBM Intelligent Transit Analytics	Vehicle Awareness and Prediction	CIR5LML.tar.gz

## Results

You are ready to start the installation of IBM Intelligent Transportation.

## What to do next

Start the installation of the product you are installing from the directory that you extracted the installation package into. Do not delete the directory until you complete the deployment and you are sure that you no longer have to rerun the installation utility.

**Note:** The Traffic Awareness feature is the foundational component of the IBM Intelligent Transportation solution and must be installed first. Do not attempt to install either the Traffic Prediction or Vehicle Awareness and Prediction features until you install, configure, and verify the foundational Traffic Awareness feature.

## Related information:

 [Passport Advantage home page](#)

 [Passport Advantage - Download IBM Intelligent Operations for Transportation V1.6 image files](#)

## Installing IBM Installation Manager

Before you start the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, IBM Installation Manager must be installed on the IBM Intelligent Operations Center analytics server that the installation is run from.

### Before you begin

By default, IBM Installation Manager is installed on the IBM Intelligent Operations Center analytics server during the deployment of IBM Intelligent Operations Center. This task is only required if you removed IBM Installation Manager after deploying IBM Intelligent Operations Center.

Before you can install IBM Installation Manager, you must copy the installation media on to the IBM Intelligent Operations Center analytics server. For more information, see *Preparing the installation media*.

### About this task

To install IBM Installation Manager, complete the following steps:

#### Procedure

1. Log on to the IBM Intelligent Operations Center analytics server as the **root** user.
2. Start the IBM Intelligent Operations for Transportation installation launchpad by running the `install_home/launchpad.sh` command.
3. Click **Install IBM Installation Manager**.
4. Click **Next**.
5. Read the license information.
6. If you agree to the license terms, select I accept the terms in the license agreement and click **Next**. The installation will continue.
7. If you do not agree to the license terms, select I do not accept the terms in the license agreement and click **Next**. The installation will terminate.
8. Select where IBM Installation Manager will be installed.
9. Click **Next**.
10. Click **Install**.
11. After IBM Installation Manager is installed, the IBM Installation Manager needs to be closed and restarted.

### Results

The IBM Installation Manager is installed and ready for the deployment of IBM Intelligent Transportation.

#### Related tasks:

“Preparing the installation media” on page 31

Before you start to deploy the chargeable components of IBM Intelligent Transportation, you must first obtain and prepare the installation media.

“Preparing the installation server” on page 28

Unlike the previous releases, you no longer require a dedicated installation server to run the installation programs of IBM Intelligent Transportation. Run the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics from the IBM Intelligent Operations Center analytics server. Some preparation steps are required to prepare the IBM Intelligent Operations Center analytics server for the installation of IBM Intelligent Transportation.

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## Running the installation programs

After you install the prerequisite software and preparing the installation server and media, you are ready to install the IBM Intelligent Transportation solution. IBM Installation Manager must be installed on the installation server before you proceed with installing IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

For information about how to troubleshoot problems with the installation programs of IBM Intelligent Transportation, see *Installation log files*.

### Related concepts:

“Viewing installation log files” on page 295

Installation log files can provide helpful information about a completed installation or help you to identify problems about a failed installation attempt.

## Installing IBM Intelligent Operations for Transportation

As soon as you complete the prerequisite tasks, you are ready to install IBM Intelligent Operations for Transportation into an existing environment that is running the IBM Intelligent Operations Center version 1.6. You can install IBM Intelligent Operations for Transportation by running either the GUI deployment wizard or the silent installation command-line program from the IBM Intelligent Operations Center analytics server.

### Prerequisite information

IBM Intelligent Operations Center version 1.6 must be deployed and running before you install IBM Intelligent Operations for Transportation. If the prerequisite software is not installed, the installation of IBM Intelligent Operations for Transportation is unsuccessful. For more information, see *Preparing for installation*.

If you previously attempted to install IBM Intelligent Operations for Transportation V1.6 on top of the IBM Intelligent Operations Center V1.6 environment, ensure that you complete all of the required manual uninstallation instructions before you attempt to reinstall the product, otherwise reinstallation might fail. For more information, see *Uninstalling the solution*.

### Features

The IBM Intelligent Operations for Transportation installation program includes the Traffic Awareness and Traffic Prediction features. You can install both features at the same time. Alternatively, you can install the foundational Traffic Awareness feature and then install the Traffic Prediction feature later.

### Operating environment

The operating environment that you select during the installation of IBM Intelligent Operations for Transportation must match the operating environment of the underlying IBM Intelligent Operations Center environment. For example, you cannot deploy the Traffic Awareness feature or the Traffic Prediction feature in a high availability environment if the underlying IBM Intelligent Operations Center is not deployed in a high availability operating environment.

### Configuration tasks

Post-installation configuration is also required after the product is successfully deployed. For more information, see the *Post-installation configuration* section.

### Related concepts:

“Preparing for installation” on page 15

Before you deploy the products of IBM Intelligent Transportation, understand the required system

configuration and ensure that the prerequisites are met for the environment.

“Installing IBM Intelligent Transit Analytics” on page 45

After deploying IBM Intelligent Operations for Transportation, you can install IBM Intelligent Transit Analytics. The IBM Intelligent Transit Analytics installation program includes the Vehicle Awareness and Prediction feature. You can install IBM Intelligent Transit Analytics by running either the GUI deployment wizard or the silent installation command-line program on the IBM Intelligent Operations Center analytic server that you installed IBM Intelligent Operations for Transportation from.

**Related tasks:**

Chapter 3, “Uninstalling the solution,” on page 81

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

## **Installing the Traffic Awareness feature**

Traffic Awareness is the foundational feature of IBM Intelligent Operations for Transportation. Use the IBM Intelligent Operations for Transportation version 1.6 installation package to install the Traffic Awareness feature.

**Related concepts:**

“Traffic Awareness” on page 2

Traffic Awareness is the foundational traffic operations feature of IBM Intelligent Operations for Transportation. It supplies the transportation information model and basic platform for visualization and analysis of traffic operations data. The Traffic Awareness feature integrates data from disparate traffic and road data capture systems by using integration protocols that are recognized by the worldwide transportation industry.

### **Installing Traffic Awareness by using the deployment wizard:**

To install the Traffic Awareness feature, run the IBM Intelligent Operations for Transportation deployment wizard on the IBM Intelligent Operations Center analytics server.

### **Before you begin**

Prepare the installation media before you start the deployment wizard. You must also complete the prerequisite tasks that are outlined in the section titled *Preparing for installation*. Prerequisites include deploying IBM Intelligent Operations Center version 1.6 and making sure that all of the servers and services are up and running before you start the installation. If any of the IBM Intelligent Operations Center services are not running during the installation of the Traffic Awareness feature, you might experience deployment problems later.

You must also ensure that IBM Installation Manager is installed. By default, IBM Installation Manager is installed on the IBM Intelligent Operations Center analytics server. For more information, see *Installing the IBM Installation Manager*.

### **About this task**

To complete this task, you will need the following deployment information:

- IBM Intelligent Operations Center installation location directory
- IBM Intelligent Operations Center topology password
- Java home directory
- Host name of the InfoSphere Streams server
- Root user name and password of the InfoSphere Streams sever
- InfoSphere Streams admin user



You must also ensure that the operating environment that you select during the installation matches the operating environment of the underlying IBM Intelligent Operations Center. You must not select to install the solution in a high availability operating environment unless IBM Intelligent Operations Center is deployed as a high availability environment.

### Procedure

1. Log on to the IBM Intelligent Operations Center analytics server as the *root* user. If you are installing the product in a high availability environment, log on to the primary analytics server.
2. Go to the temporary directory where you extracted the IBM Intelligent Operations for Transportation installation package when you prepared the installation media, for example, IOTInstall.
3. Start the IBM Intelligent Operations for Transportation deployment wizard by running the following commands as the *root* user:
 

```
cd disk1
./launchpad.sh
```
4. Click **Install Intelligent Operations for Transportation**.
5. Click **Install**.
6. In the **Install** tab, under **Install Packages**, select the product and **version 1.6.0.0** followed by **Next**.
7. Read the license information.
  - a. If you agree to the license terms, select I accept the terms in the license agreement and click **Next**. The installation continues.
  - b. If you do not agree to the license terms, select I do not accept the terms in the license agreement and click **Cancel**. The installation is terminated.
8. On the **Location** window, preserve the default **Package Group Name** settings and click **Next**. Do not change the **Installation Directory** or the **Shared Resources Directory**. Ensure that the directories specified have the available disk space that is required by the installer.
9. On the **Translations** tab, click **Next**. All group 1 languages are automatically installed.
10. Select the features of IBM Intelligent Operations for Transportation to install. By default, both the **Traffic Awareness** and the **Traffic Prediction** features are selected. Clear the **Traffic Prediction** feature check box if you do not want to install it now. You can install the optional **Traffic Prediction** feature later.
11. Click **Next**.
12. Complete all of the fields on the **User Input** panel as follows:

Field	Input required
Operating environment	Choose either: <ul style="list-style-type: none"> <li>• <b>High Availability</b></li> <li>• <b>Standard</b></li> </ul> Do not select <b>High Availability</b> unless the underlying IBM Intelligent Operations Center is also deployed in a HA environment. If you do not specify the correct operating environment, the installation fails.
Intelligent Operations Center install location	Installation directory that IBM Intelligent Operations Center was installed from.
Intelligent Operations Center topology password	The topology password that was defined during the deployment of IBM Intelligent Operations Center.
Java home	The Java home directory. By default, this directory is set to <code>opt/ibm/java-x86_64-70/jre</code> . Modify this directory if required.

13. Click **Validate**. You cannot proceed to the next part of the installation until the IBM Intelligent Operations Center deployment information is successfully validated. If any of the details that are entered on the **User Input** panel are incorrect, reenter the correct value and click **Validate**.
14. When all fields are successfully validated, click **Next**.
15. Review the installation options and click **Install** to start the installation. Allow approximately 90 minutes for the installation process to complete. This time may vary depending on your environment and connectivity capabilities.
16. After the installation completes, close IBM Installation Manager and the launchpad.

## Results

The Traffic Awareness feature of IBM Intelligent Operations for Transportation is installed into the existing IBM Intelligent Operations Center server cluster.

## What to do next

Verify the installation to ensure that the solution is correctly deployed and working with IBM Intelligent Operations Center. Complete the post-installation configuration steps that are outlined in *Configuring the Traffic Awareness feature*.

**Note:** If you are migrating your traffic awareness data from IBM Intelligent Operations for Transportation version 1.5 to version 1.6, ensure that you complete the instructions that are outlined in *Migrating to version 1.6* before you attempt to install IBM Intelligent Transit Analytics.

If you did not select to install the optional Traffic Prediction feature during the installation, you can run the deployment wizard again and install it later. See *Installing the Traffic Prediction feature*. Do not remove or modify the installation media on the IBM Intelligent Operations Center analytics server until you complete the installation of the Traffic Prediction feature.

### Related tasks:

“Installing IBM Installation Manager” on page 34

Before you start the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, IBM Installation Manager must be installed on the IBM Intelligent Operations Center analytics server that the installation is run from.

### Installing Traffic Awareness from the command line:

To run a silent installation of the Traffic Awareness feature, run the IBM Intelligent Operations for Transportation command-line installer from the analytics server. You can also install the optional Traffic Prediction feature at the same time that you install the Traffic Awareness feature. You can choose to install the features in either a standard or a high availability operating environment by specifying a parameter on the command line.

### Before you begin

Prepare the installation media before you start the installation command. You must also complete the prerequisite tasks that are outlined in the section titled *Preparing for installation*. Prerequisites include deploying IBM Intelligent Operations Center version 1.6 and making sure that all of the servers and services are up and running before you start the installation. If any of the IBM Intelligent Operations Center services are not running during the installation of the Traffic Awareness feature, you can experience deployment problems later.

### About this task

To complete this task, you will need the following deployment information:

- IBM Intelligent Operations Center installation location directory

- IBM Intelligent Operations Center topology password
- Java home directory

You must also ensure that the operating environment that you select during the installation matches the operating environment of the underlying IBM Intelligent Operations Center. You must not select to install the solution in a high availability operating environment unless IBM Intelligent Operations Center has been deployed as a high availability environment.

### Procedure

1. Log on to the IBM Intelligent Operations Center analytics server as the *root* user. If you are installing the product in a high availability environment, log on to the primary analytics server.
2. Go to the temporary directory where you extracted the IBM Intelligent Operations for Transportation installation package when you prepared the installation media, for example, *IOTInstall*.
3. Start the IBM Intelligent Operations for Transportation silent installation program by running the following commands as the *root* user:

```
cd disk1
./silent_install.sh IOC_LOCATION IOCTP_PASS JAVAHOME OPENVTYPE OPERATION IM_LOCATION INSTALL_LOCATION
```

Where:

- *IOC\_LOCATION* is the IBM Intelligent Operations Center installation directory location.
- *IOCTP\_PASS* is the topology password of IBM Intelligent Operations Center.
- *JAVAHOME* is the Java home directory. By default, this directory is set to `opt/ibm/java-x86_64-70/jre`. Modify this directory if required.
- *OPENVTYPE* is the operating environment type.
  - To install product in a standard operating environment, specify the value `STD`
  - To install product in a high availability operating environment, specify the value `HA`

**Note:** The *OP\_ENV\_TYPE* that you specify, must match the operating environment of the underlying IBM Intelligent Operations Center. If you do not specify the correct operating environment, the installation fails.

- *OPERATION* confirms the features that you would like to install.
  - To install only the Traffic Awareness feature, specify `installTA`
  - To install only the Traffic Prediction feature, specify `installTP`
  - To install both the Traffic Awareness and the Traffic Prediction feature at the same time, specify `installALL`

**Note:** You cannot use the `installTP` option in the command, unless the Traffic Awareness feature is already deployed and running.

- *IM\_LOCATION* is the location where the IBM Installation Manager is installed, which can optionally be specified.
- *INSTALL\_LOCATION* is the installation directory and is an optional parameter. If you are not using the default installation and are specifying the installation location in your command, you must ensure that the *IM\_LOCATION* is also specified in the command.

### Example commands for the Traffic Awareness feature

To silently install the Traffic Awareness feature in a standard operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password
/opt/ibm/java-x86_64-70/jre STD installTA
```

To silently install the Traffic Awareness feature in a high availability operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password
/opt/ibm/java-x86_64-70/jre HA installTA
```

#### Example commands for installing the Traffic Prediction feature

To silently install the Traffic Prediction feature in a standard operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password
/opt/ibm/java-x86_64-70/jre STD installTP
```

To silently install the Traffic Prediction feature in a high availability operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password
/opt/ibm/java-x86_64-70/jre HA installTP
```

#### Example commands for installing both features of IBM Intelligent Operations for Transportation

To silently install both the Traffic Awareness and Traffic Prediction features in a standard operating environment, enter the following command:

```
./silent_install.sh /opt/IBM/IOC/BA/ioc password
/opt/ibm/java-x86_64-70/jre STD installALL
```

To silently install both the Traffic Awareness and Traffic Prediction features in a high availability environment, enter the following command:

```
./silent_install.sh /opt/IBM/IOC/BA/ioc password
/opt/ibm/java-x86_64-70/jre HA installALL
```

4. Optional: If prompted, type *y* to overwrite the existing directory.
5. Follow the prompts to complete the installation process. The progress of the installation is reported in the command-line window.

## Results

The Traffic Awareness feature of IBM Intelligent Operations for Transportation is installed into the existing IBM Intelligent Operations Center server cluster.

## What to do next

Verify the installation to ensure that the solution is correctly deployed and working with IBM Intelligent Operations Center. Complete the post-installation configuration steps that are outlined in *Configuring the Traffic Awareness feature*.

**Note:** If you are migrating your traffic awareness data from IBM Intelligent Operations for Transportation version 1.5 to version 1.6, ensure that you complete the instructions that are outlined in *Migrating to version 1.6* before you attempt to install IBM Intelligent Transit Analytics.

If you plan to install the optional Traffic Prediction feature at a later stage, you can run the command-line installation utility again and install it later. See *Installing the Traffic Prediction feature*. Do not remove or modify the installation media on the IBM Intelligent Operations Center analytic server until you complete the installation of the Traffic Prediction feature.

## Verifying the installation of the Traffic Awareness feature:

Verify the installation of the Traffic Awareness feature to ensure that it is correctly deployed and working with the IBM Intelligent Operations Center. Review the log files that are generated by the installation program to identify problems and the potential cause.

## Procedure

Check the installation log files

1. Log on to the IBM Intelligent Operations Center analytic server and go to the following directory:  
`/var/ibm/InstallationManager/logs/native/`

The log file name is in the format of `yyyymmdd_hhmma.log`, for example `20131031_0836a.log`. The log files indicate whether the installation was successful. For more information, see *Installation log files*.

**Note:** In a high availability environment, log on to the IBM Intelligent Operations Center analytic server that the installation was run from.

Verify that you can access the solution portal by logging on as the Traffic IT Administrator

2. Log on to the solution portal by using the following URL:

`https://web_hostname/wps/portal`

Where:

- In a standard operating environment, `web_hostname` is the host name of the IBM Intelligent Operations Center web server.
- In a high availability environment, `web_hostname` is the host name of one of the following:
  - IBM Intelligent Operations Center web server 1
  - IBM Intelligent Operations Center web server 2
  - The host name or IP address of the load balancer cluster

## Results

In the solution portal, you can see the **Transportation** link on the top navigation bar.

## What to do next

The Traffic Awareness feature of IBM Intelligent Operations for Transportation is now ready for post-installation configuration.

### Related concepts:

“Viewing installation log files” on page 295

Installation log files can provide helpful information about a completed installation or help you to identify problems about a failed installation attempt.

## Installing the Traffic Prediction feature



Traffic Prediction is an optional feature of IBM Intelligent Operations for Transportation that enhances the Traffic Awareness feature. You can install the Traffic Prediction feature at the same time that you install the foundational Traffic Awareness feature. Alternatively, you can install the Traffic Prediction feature afterward.

To install the Traffic Prediction feature after you complete the installation of the Traffic Awareness feature, complete either one of the following installation procedures:

### Related concepts:

“Traffic Prediction” on page 4

The Traffic Prediction feature of IBM Intelligent Operations for Transportation provides traffic prediction capabilities for transportation authorities. The Traffic Prediction feature uses the historical and real-time traffic data that is collected by the Traffic Awareness system to predict future traffic levels of a geographical area, up to an hour in advance.

## Related tasks:

“Installing IBM Installation Manager” on page 34

Before you start the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, IBM Installation Manager must be installed on the IBM Intelligent Operations Center analytics server that the installation is run from.

## Installing Traffic Prediction using the deployment wizard: 🛠️

To install the Traffic Prediction feature, run the IBM Intelligent Operations for Transportation version 1.6 installation deployment wizard on the IBM Intelligent Operations Center analytic server that was used to install the Traffic Awareness feature.

### Before you begin

You must install the Traffic Awareness feature before you install the Traffic Prediction feature.

Ensure that all of the servers and services are up and running before you start the installation. If any of the IBM Intelligent Operations Center and Traffic Awareness services are not running during the installation of the Traffic Prediction feature, you can experience deployment problems later. You cannot install the Traffic Prediction version 1.6 feature without installing the Traffic Awareness version 1.6 feature.

You must also ensure that IBM Installation Manager is installed. For more information, see *Installing the IBM Installation Manager*.

### About this task

To complete this task, you will need the following deployment information:

- IBM Intelligent Operations Center installation location directory
- IBM Intelligent Operations Center topology password
- Java home directory location

If you are planning to install the Traffic Prediction feature during the installation of the Traffic Awareness feature, skip this task. Alternatively you can install the Traffic Prediction feature later by using the following instructions:

### Procedure

1. Log on to the IBM Intelligent Operations Center analytic server as the *root* user.
2. Go to the temporary directory where you extracted the IBM Intelligent Operations for Transportation installation package when you prepared the installation media, for example, `IOTInstall`.
3. Start the IBM Intelligent Operations for Transportation deployment wizard by running the following commands as the *root* user:

```
cd disk1
./launchpad.sh
```
4. Click **Install IBM Intelligent Operations for Transportation**.
5. Click **Modify**.
6. Under **Install Packages**, select the product and **version 1.6.0.0** followed by **Next**.
7. Read the license information.
  - a. If you agree to the license terms, select I accept the terms in the license agreement and click **Next**. The installation continues.
  - b. If you do not agree to the license terms, select I do not accept the terms in the license agreement and click **Cancel**. The installation is terminated.

8. On the **Location** window, preserve the default **Package Group Name** settings and click **Next**. Do not change the **Installation Directory** or the **Shared Resources Directory**. Ensure that the directories specified have the available disk space that is required by the installer.
9. On the **Translations** tab, click **Next**. All group 1 languages are automatically installed.
10. Select the **Traffic Prediction** feature. By default, both the **Traffic Awareness** and the **Traffic Prediction** features are selected. Clear the **Traffic Awareness** feature, if this is already selected.
11. Click **Next**.
12. Complete all of the fields on the **User Input** panel as follows:

Field	Input required
<b>Operating environment</b>	Choose either: <ul style="list-style-type: none"> <li>• <b>High Availability</b></li> <li>• <b>Standard</b></li> </ul> Do not select <b>High Availability</b> unless IBM Intelligent Operations for Transportation and the underlying IBM Intelligent Operations Center are also deployed in a HA environment. If you do not specify the correct operating environment, the installation fails.
<b>Intelligent Operations Center install location</b>	Installation directory that IBM Intelligent Operations Center was installed from.
<b>Intelligent Operations Center topology password</b>	The topology password that was defined during the deployment of IBM Intelligent Operations Center.
<b>Java home</b>	The Java home directory. By default, this directory is set to <code>opt/ibm/java-x86_64-70/jre</code> . Modify this directory if required.

13. Click **Validate**. You cannot proceed to the next part of the installation until the IBM Intelligent Operations Center deployment information is successfully validated. If any of the details that are entered on the **User Input** panel are incorrect, reenter the correct value and click **Validate**.
14. When all fields are successfully validated, click **Next**.
15. Review the installation options and click **Install** to start the installation. Allow approximately 90 minutes for the installation process to complete. This time may vary depending on the features that you are installing and your environment and connectivity capabilities.
16. After the installation completes, close IBM Installation Manager and the launchpad.

## Results

The Traffic Prediction feature is installed on top of the existing Traffic Awareness feature of IBM Intelligent Operations for Transportation.

## What to do next

Verify that the installation was successful. See *Verifying the installation of the Traffic Prediction feature*.

After verifying the installation, complete the post-installation configuration that is required for the Traffic Prediction feature.

**Note:** If you are migrating your traffic prediction data from IBM Intelligent Operations for Transportation version 1.5 to version 1.6, ensure that you complete the instructions that are outlined in *Migrating to version 1.6* before you attempt to install IBM Intelligent Transit Analytics version 1.6.

## Installing the Traffic Prediction feature from the command line: 🚗

To silently deploy the Traffic Prediction feature, run the IBM Intelligent Operations for Transportation version 1.6 command-line installation utility. You can choose to install the feature in a standard or a high availability operating environment by specifying a parameter in the command.

### Before you begin

You must install the Traffic Awareness feature before installing the Traffic Prediction feature. Use the IBM Intelligent Operations for Transportation installation media on the IBM Intelligent Operations Center installation server that you used to install Traffic Awareness.

Ensure that all of the servers and services are up and running before you start the installation. If any of the IBM Intelligent Operations Center and Traffic Awareness services are not running during the installation of the Traffic Prediction feature, you can experience deployment problems later. You cannot install the Traffic Prediction feature without installing the Traffic Awareness feature.

### About this task

To complete this task, you will need the following deployment information:

- IBM Intelligent Operations Center installation location directory
- IBM Intelligent Operations Center topology password
- Java home directory

You can install the Traffic Prediction feature during the installation of the Traffic Awareness feature and skip this entire task. Alternatively you can install the Traffic Prediction feature later by using the following instructions:

### Procedure

Complete steps 1 to 6 in the topic: “Installing Traffic Awareness from the command line” on page 38, however in step 4, you must use the `installTP` option to install only the Traffic Prediction feature.

### Example commands for installing the Traffic Prediction feature

To silently install the Traffic Prediction feature in a standard operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password  
/opt/ibm/java-x86_64-70/jre STD installTP
```

To silently install the Traffic Prediction feature in a high availability operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password  
/opt/ibm/java-x86_64-70/jre HA installTP
```

**Note:** The `OP_ENV_TYPE` value must match the operating environment of the Traffic Awareness feature and underlying IBM Intelligent Operations Center. If you do not specify the correct operating environment, the installation fails.

### Results

The Traffic Prediction feature is installed on top of the existing IBM Intelligent Operations for Transportation system according to the selected operating environment.



## What to do next

Verify that the installation was successful. See *Verifying the installation Traffic Prediction*.

After verifying the installation, complete the post-installation configuration required for the Traffic Prediction feature.

**Note:** If you are migrating your traffic prediction data from the IBM Intelligent Operations for Transportation version 1.5 to version 1.6, ensure that you complete the instructions that are outlined in *Migrating to version 1.6* before you attempt to install IBM Intelligent Transit Analytics.

### Related tasks:

“Verifying the installation of the Traffic Prediction feature”

Verify that the installation of the Traffic Prediction feature completed successfully by checking the installation log files and the solution portal.

### Verifying the installation of the Traffic Prediction feature: 🚗

Verify that the installation of the Traffic Prediction feature completed successfully by checking the installation log files and the solution portal.

### Procedure

1. Complete steps 1 and 2 in “Verifying the installation of the Traffic Awareness feature” on page 40.
2. Click **Transportation**.
3. On the **Operator: Traffic** tab, verify that you can see the **Predicted Traffic Conditions** portlet. If the **Predicted Traffic Conditions** portlet is displayed, this is a good indication that the installation was successful.

## What to do next

To start generating traffic predictions with your traffic data, complete the post-installation steps that are outlined in *Configuring Traffic Prediction*.

### Related concepts:

“Viewing installation log files” on page 295

Installation log files can provide helpful information about a completed installation or help you to identify problems about a failed installation attempt.

### Related tasks:

“Installing the Traffic Prediction feature from the command line” on page 44

To silently deploy the Traffic Prediction feature, run the IBM Intelligent Operations for Transportation version 1.6 command-line installation utility. You can choose to install the feature in a standard or a high availability operating environment by specifying a parameter in the command.

## Installing IBM Intelligent Transit Analytics



After deploying IBM Intelligent Operations for Transportation, you can install IBM Intelligent Transit Analytics. The IBM Intelligent Transit Analytics installation program includes the Vehicle Awareness and Prediction feature. You can install IBM Intelligent Transit Analytics by running either the GUI deployment wizard or the silent installation command-line program on the IBM Intelligent Operations Center analytic server that you installed IBM Intelligent Operations for Transportation from.

Post-installation configuration is also required after the product is successfully installed.

## Prerequisite information

The Traffic Awareness feature of IBM Intelligent Operations for Transportation version 1.6 must be deployed and running before you install IBM Intelligent Transit Analytics. IBM Intelligent Operations for Transportation must also be running on top of the IBM Intelligent Operations Center version 1.6. If the prerequisite software is not installed, the installation of IBM Intelligent Transit Analytics is unsuccessful. For more information, see *Installing IBM Intelligent Operations for Transportation*.

If you previously attempted to install IBM Intelligent Transit Analytics on top of this environment, ensure that you complete all of the required manual uninstallation instructions before you attempt to reinstall the product, otherwise reinstallation might fail. For more information, see *Uninstalling the solution*.

### Related concepts:

“Installing IBM Intelligent Operations for Transportation” on page 35

As soon as you complete the prerequisite tasks, you are ready to install IBM Intelligent Operations for Transportation into an existing environment that is running the IBM Intelligent Operations Center version 1.6. You can install IBM Intelligent Operations for Transportation by running either the GUI deployment wizard or the silent installation command-line program from the IBM Intelligent Operations Center analytics server.

### Related tasks:

Chapter 3, “Uninstalling the solution,” on page 81

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

## Installing the Vehicle Awareness and Prediction feature



Vehicle Awareness and Prediction is the foundational feature of IBM Intelligent Transit Analytics. Use the IBM Intelligent Transit Analytics version 1.6 installation package to install the Vehicle Awareness and Prediction feature.

You can deploy IBM Intelligent Transit Analytics in a standard operating environment or a high availability operating environment of IBM Intelligent Transportation. However, IBM Intelligent Transit Analytics is not enabled for high availability. Only IBM Intelligent Operations for Transportation is enabled for high availability.

The operating environment that you select during the installation of IBM Intelligent Transit Analytics must match the operating environment that was selected for IBM Intelligent Operations for Transportation and the underlying IBM Intelligent Operations Center. For example, you cannot deploy IBM Intelligent Transit Analytics in a high availability environment if IBM Intelligent Operations for Transportation is not deployed in a high availability operating environment.

**Note:** If you plan to migrate your IBM Intelligent Operations for Transportation data from version 1.5 to version 1.6, ensure that you run the migration utility on the restored version 1.5 system databases before you start the installation program. If you do not migrate the IBM Intelligent Operations for Transportation version 1.5 database over to the required format for version 1.6 before you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, the migration process fails.

### Related concepts:

“Vehicle Awareness and Prediction” on page 5

Vehicle Awareness and Prediction provides vehicle awareness and arrival time prediction capabilities for transit systems. Vehicle Awareness and Prediction is the foundational feature of IBM Intelligent Transit Analytics, helping both transit operations departments and passengers to get a clear picture of the vehicle service in the transportation network.

## Installing the Vehicle Awareness and Prediction feature by using the wizard:

IBM Intelligent Transit Analytics provides a deployment wizard to install the Vehicle Awareness and Prediction feature into an existing environment that is running the Traffic Awareness feature of IBM Intelligent Operations for Transportation version 1.6. Run the installation program from the IBM Intelligent Operations Center analytics server that was used to install IBM Intelligent Operations for Transportation.

### Before you begin

Complete the prerequisite steps that are outlined in *Preparing to install the Vehicle Awareness and Prediction* feature.

You must also ensure that IBM Installation Manager is installed. By default, IBM Installation Manager is installed on the IBM Intelligent Operations Center analytics server. For more information, see *Installing the IBM Installation Manager*.

### About this task

To complete this task, you will need the following deployment information:

- IBM Intelligent Operations Center installation location directory
- IBM Intelligent Operations Center topology password
- Java home directory
- Host name of the InfoSphere Streams server
- Root user name and password of the InfoSphere Streams sever
- InfoSphere Streams admin user

You must also ensure that the operating environment that you select during the installation matches the operating environment of the underlying IBM Intelligent Operations for Transportation and IBM Intelligent Operations Center. You must not select to install the solution in a high availability operating environment unless the underlying platform is deployed as a high availability environment.

To install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, complete the following steps:

### Procedure

1. Log on to the IBM Intelligent Operations Center analytics server as the *root* user. If you are installing the product in a high availability environment, log on to the primary analytics server.
2. Go to the temporary directory where you extracted the IBM Intelligent Transit Analytics installation package when you prepared the installation media, for example, `ITAIInstall`.
3. Start the IBM Intelligent Transit Analytics deployment wizard by running the following command as the *root* user:

```
cd disk1
/launchpad.sh
```
4. Click **Install Intelligent Transit Analytics**. IBM Installation Manager loads.
5. Click **Install**. Do not click **Modify** as this function is not supported in this release.
6. On the **Install** tab, under **Install Packages**, select the product and **Version 1.6.0.0** followed by **Next**.
7. Read the license information.
  - a. If you agree to the license terms, select I accept the terms in the license agreement and click **Next**. The installation program continues.
  - b. If you do not agree to the license terms, select I do not accept the terms in the license agreement and click **Cancel**. The installation program is terminated.

8. On the **Location** window, preserve the default **Package Group Name** settings and click **Next**. Do not change the **Installation Directory** or the **Shared Resources Directory**. Ensure that the directories specified have the available disk space that is required to complete the installation.
9. Click **Next**.
10. On the **Translations** tab, click **Next**. All group 1 languages are automatically installed.
11. Select the **Vehicle Awareness and Prediction** feature and then click **Next**
12. Complete all of the fields on the **User Input** panel as follows:

Field	Input
<b>Operating Environment</b>	Choose either: <ul style="list-style-type: none"> <li>• <b>High Availability</b></li> <li>• <b>Standard</b></li> </ul> Do not select <b>High Availability</b> unless IBM Intelligent Operations for Transportation and the underlying IBM Intelligent Operations Center are also deployed in a HA environment. If you do not specify the correct operating environment, the installation fails.
<b>Intelligent Operations Center installation location</b>	Installation directory of IBM Intelligent Operations Center. By default, the installation directory is /opt/IBM/IOC/BA/ioc.
<b>Intelligent Operations Center topology password</b>	The topology password that was defined during the deployment of IBM Intelligent Operations Center.
<b>Java home</b>	The Java home directory. By default, this directory is set to opt/ibm/java-x86_64-70/jre. Modify this directory if necessary.
<b>InfoSphere Streams Hostname</b>	Host name of the InfoSphere Streams server. By default, the host name is set to streams.
<b>InfoSphere Streams root user</b>	ID of the root user of InfoSphere Streams. By default, the root user is <b>root</b> .
<b>InfoSphere Streams root password</b>	Password of InfoSphere Streams root user.
<b>InfoSphere Streams admin user</b>	Admin user of InfoSphere Streams. By default, the admin user is <b>streamsadmin</b> .

13. Click **Validate**. A message is displayed while the fields are validated. You cannot proceed to the next part of the installation until the IBM Intelligent Operations Center and the InfoSphere Streams deployment information is successfully validated. If any of the details that are entered on the **User Input** panel are incorrect, reenter the correct value and click **Validate** again.
14. When all fields are successfully validated, click **Next**.
15. Review the installation options and click **Next** to start the installation. Allow approximately 90 minutes for the installation process to complete. This time may vary depending on your environment and connectivity capabilities.
16. After the installation completes, close IBM Installation Manager and the launchpad.

## Results

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics is installed on top of IBM Intelligent Operations for Transportation.

## What to do next

Verify that the installation was successful. See *Verifying the installation*.

After verifying the installation, complete the post-installation configuration that is required for the Vehicle Awareness and Prediction feature.

**Related concepts:**

“Preparing to install Vehicle Awareness and Prediction” on page 29

Before you deploy the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, review the hardware and software requirements and complete the prerequisite steps. Extra hardware and software is required.

**Related tasks:**

“Installing IBM Installation Manager” on page 34

Before you start the installation programs of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, IBM Installation Manager must be installed on the IBM Intelligent Operations Center analytics server that the installation is run from.

**Installing the Vehicle Awareness and Prediction feature from the command line:** 

To silently deploy the Vehicle Awareness and Prediction feature, run the IBM Intelligent Transit Analytics command-line installer from the IBM Intelligent Operations Center analytics server that was used to install the Traffic Awareness feature. You can choose to install the feature in a standard or a high availability operating environment by specifying a parameter in the command.

**Before you begin**

Complete the prerequisite steps that are outlined in *Preparing to install the Vehicle Awareness and Prediction* feature.

**About this task**

To complete this task, you will need the following deployment information:

- IBM Intelligent Operations Center installation location directory
- IBM Intelligent Operations Center topology password
- Java home directory
- Host name of the InfoSphere Streams server
- Root user name and password of the InfoSphere Streams sever
- InfoSphere Streams admin user

To silently install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, complete the following steps:

**Procedure**

1. Log on to the IBM Intelligent Operations Center analytic server as the *root* user. If you are installing the product in a high availability environment, log on to the primary analytics server.
2. Go to the temporary directory where you extracted the IBM Intelligent Transit Analytics installation package when you prepared the installation media, for example, *ITAinstall*.
3. Start the IBM Intelligent Transit Analytics silent installation utility by running the following command as the *root* user:

```
cd disk1
./silent_install.sh IOC_LOCATION IOCTP_PASSWD JAVAHOME OP_ENV_TYPE STREAMS_HOST
STREAMS_ROOT STREAMS RTPW STREAMS_ADMIN IM_LOCATION INSTALL_LOCATION
```

Where:

- *IOC\_LOCATION* is the IBM Intelligent Operations Center installation directory location.
- *IOCTP\_PASSWD* is the topology password of the IBM Intelligent Operations Center.

- *JAVAHOME* is the Java home directory. By default, this directory is set to `opt/ibm/java-x86_64-60/jre`. Modify this directory if required.
- *OP\_ENV\_TYPE* is the operating environment type as follows:
  - To install product in a standard operating environment, specify the value `STD`
  - To install product in a high availability operating environment, specify the value `HA`

**Note:** The *OP\_ENV\_TYPE* that you specify must match the operating environment of the underlying IBM Intelligent Operations Center. If you do not specify the correct operating environment, the installation fails.

- *STREAMS\_HOST* is the host name of the InfoSphere Streams server.
- *STREAMS\_ROOT* is the name of the InfoSphere Streams root user.
- *STREAMS\_RTPW* is the password of the InfoSphere Streams root user.
- *STREAMS\_ADMIN* is the name of the InfoSphere Streams administration user.
- *IM\_LOCATION* is the location where the IBM Installation Manager is installed and is an optional parameter.
- *INSTALL\_LOCATION* is the installation directory and is an optional parameter. If you are not using the default installation and are specifying the install location in your command, you must ensure that the *IM\_LOCATION* is also specified in the command.

#### Example commands for installing the Traffic Prediction feature

To silently install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics in a standard operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password /opt/ibm/java-x86_64-70/jre
STD streams root password streamsadmin
```

To silently install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics in a high availability operating environment, enter the following command:

```
./silent_install.sh /installHome/ioc16/tools/svc password /opt/ibm/java-x86_64-70/jre
HA streams root password streamsadmin
```

4. Follow the prompts to complete the installation process. The progress of the installation is reported in the command-line window. Allow enough time for the installation process to complete.

#### Related concepts:

“Preparing to install Vehicle Awareness and Prediction” on page 29

Before you deploy the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, review the hardware and software requirements and complete the prerequisite steps. Extra hardware and software is required.

#### Verifying the installation of the Vehicle Awareness and Prediction feature:

Verify the installation of the Vehicle Awareness and Prediction feature to ensure that it is correctly deployed and running on the IBM Intelligent Transportation solution.

#### About this task

To confirm the successful deployment of the Vehicle Awareness and Prediction feature, complete the following checks.

#### Procedure

1. Ensure that the portal applications, InfoSphere Streams application, and database are installed and running.
  - a. Complete the steps in “Verifying the portal applications” on page 52.
  - b. Complete the steps in “Verifying the InfoSphere Streams application” on page 52.

- c. Complete the steps in “Verifying the database” on page 52.
2. Check the installation log files to see whether the installation was successful. Log on to the IBM Intelligent Operations Center analytic server and go to the following directory:  
`/var/ibm/InstallationManager/logs/native/`

The log file name is in the format of `yyyymmdd_hhmma.log`, for example `20131031_0836a.log`. The log files indicate whether the installation was successful. For more information, see *Installation log files*.

**Note:** In a high availability environment, log on to the IBM Intelligent Operations Center analytic server that the installation was run from.

3. Verify the Subscription Manager on the IBM Intelligent Operations Center application server by checking the contents of the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/vap/tools` directory.

If the installation is successful, the following files are listed:

- `subscriptionCancelling.xml`
  - `subscription.properties`
  - `subscriptionRequest.xml`
  - `trans_vap_httpd_subscription_mgr_client.jar`
  - `vap_subscriptionmgr.sh`
4. Verify the database tools on the IBM Intelligent Operations Center data server by checking the contents of the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts/` directory. If the installation is successful, the following folders and files are listed:
    - `migration`
    - `confidencelevel.xml`
    - `importShape.sh`
    - `offline.properties`
    - `trans_vap_common_resource.jar`
    - `trans_vap_offline_base.jar`
    - `trans_vap_offline_infrastructure.jar`
    - `trans_vap_offline_metadata.jar`
    - `vapgenmetadata.sh`
    - `vap_installdb.sh`
    - `vap_loaddata.sh`
    - `vapprune.sh vap`
    - `QueryProcessingMsg.sh`
    - `vapQueryStopLinkUsedJP.sh`

**Related concepts:**

“Controlling the services of the Vehicle Awareness and Prediction feature” on page 191

If you have installed the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, additional services are required to be running to collect vehicle awareness information and generate arrival predictions.

“Viewing installation log files” on page 295

Installation log files can provide helpful information about a completed installation or help you to identify problems about a failed installation attempt.

Verifying the portal applications: 

To confirm the successful deployment of the Vehicle Awareness and Prediction feature, check that the portal applications are installed and running. Several portal application services must be running on the IBM Intelligent Operations Center web server.

### Procedure

1. Log on to the administration console in the solution portal as the portal administrator.

`http://web_hostname:9060/admin`

Where *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter *\*vap\**.
4. Select the following applications:
  - **trans\_vap\_httpd\_web\_ear**
  - **trans\_vap\_restservice\_ear**
  - **trans\_vap\_ui\_restservices\_ear**
  - **vap\_portlet\_ear**

### Results

If the installation is successful, the status of the four Vehicle Awareness and Prediction feature portal applications is set to running.

Verifying the InfoSphere Streams application: 

To confirm the successful deployment of the Vehicle Awareness and Prediction feature, check that InfoSphere Streams application is installed and running.

### Procedure

1. Log on to the InfoSphere Streams server as the administrator, for example *streamsadmin*.
2. Enter the following command:

```
streamtool lsinstance
```

### Results

If the InfoSphere Streams application that is required by the Vehicle Awareness and Prediction feature is successfully installed, the command displays the following output:

```
trans_vap@streamsadmin.
```

Verifying the database: 

To confirm the successful deployment of the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, verify that the system database is updated to include the required schema and tables.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the DB2<sup>®</sup> database administrator.
2. Connect to the TIH\_HS database by using one of the following methods:



- To connect to the database from the DB2 command line, enter the following command: db2 connect to TIH\_HS
  - To connect to the database from the DB2 Data Studio, right-click **TIH\_HS** and then click **Connect**.
3. Verify that the TRANSMODEL schema was created in the TIH\_HS database.
  4. Verify that the following tables are loaded:

Table name	Data source
transmodel.vehicledetecting	Realtime SIRI
transmodel.observedpassingtime	Realtime SIRI
transmodel.estimatedpassingtime	Forecasted data
transmodel.estimatedpassingtimedetail	Forecasted data
transmodel.StopLink	Infrastructure data
transmodel.JourneyShape	Infrastructure data

---

## Post-installation configuration

After successfully completing the installation of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, additional steps are required to fully deploy the features of the solution.

### Migrating existing V1.5 data to V1.6

If you are migrating the data from your existing IBM Intelligent Transportation V1.5 solution to version 1.6, before you proceed with the post-installation tasks, complete the migration procedure. Scripts are provided by IBM Intelligent Operations for Transportation to help you to migrate your Traffic Awareness, Traffic Prediction, and Vehicle Awareness and Prediction data, and to transform the internal structure of the databases to the new schema that is required by IBM Intelligent Transportation version 1.6.

#### Before you begin

Review the information in *Upgrading from an earlier version*.

Do not start to migrate your V1.5 databases until after the installation of IBM Intelligent Operations for Transportation V1.6. If you are planning to install IBM Intelligent Transit Analytics, complete the migration of the V1.5 data to V1.6 before you start the installation.

**Note:** The data migration utility migrates the shapefile data that you loaded into the version 1.5 environment over to the new version 1.6 environment. When you migrate the data from V1.5 over to the new version V1.6 deployment, you do not need to import and load the shapefile data and the associated post-installation procedure that is outlined in *Shapefiles for road segments*.

#### About this task

The migration procedure involves the following stages:

- Obtain the migration scripts that are provided by IBM Intelligent Transportation V1.6, specifically for migrating data from a V1.5 environment.
- Export the data from your source databases on the IBM Intelligent Operations Center data server of the V1.5 environment into a temporary location.
- Compress and transfer the exported files from the original V1.5 data server to the new V1.6 data server.
- Import the V1.5 source data into the target 1.6 databases of IBM Intelligent Transportation V1.6.

## Procedure

Obtain the scripts

1. Log on to the IBM Intelligent Operations Center data server.
2. Go to the `/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts` directory. There are two migration scripts as follows:
  - **export.sh** is the script that must be copied to and run from the V1.5 environment to export the existing data.
  - **import.sh** is the script that must be run from the V1.6 environment to migrate the exported V1.5 data to the format that is required for V1.6.

Export

3. Log on to the V1.5 data server.

**Note:** You might have to set the `BA_SERVER` shell variable to indicate the location of the V1.5 application server. By default, this variable is set to `ioc15app.ibmplatform.com`. If your environment is different, set and export this value accordingly before you execute the scripts.

4. Copy the **export.sh** script from the V1.6 scripts directory to a temporary directory on the V1.5 IBM Intelligent Operations Center data server, for example, `/tmp` or `/home/db2inst`.
5. Enter the following data export command:  

```
sh export.sh -d databaseName [-v] [tableSpec]*
```

Where

- **-d** is a mandatory parameter that precedes the *databaseName*
- *databaseName* is a required parameter that specifies the source database name, for example `TIH_HS`.
- **-v** is an optional parameter for requesting verbose output.
- *tableSpec* is the name of a specific table in the database to specifically export. If you do not specify the table name, the entire database is exported.

When the script completes, the V1.5 exported data files are exported into a subdirectory that matches the database name with a prefix of `export`, for example `\export-TIH_HS`. The exported files in the `export` directory are restricted to 50000 lines by default and each file name has a syntax of `schemaName.tableName-DDDDD`.

Move the V1.5 data over to the V1.6 server

6. Compress the export directory.
7. Log on to the V1.6 data server and copy the compressed file over to the V1.6 IBM Intelligent Operations Center data server in a temporary directory.
8. Extract the V1.5 folder and files from the compressed export file.

Import

9. The following command is an example of the data import command:  

```
sh import.sh [-v] -d databaseName [-h exportDirectory] [tableSpec]*
```

Where

- **-v** is an optional parameter for requesting verbose output
- **-d** is a mandatory parameter that precedes the *databaseName*
- *databaseName* is a required parameter that specifies the target database name, for example `TIH_HS`.
- **-h** is a mandatory parameter that precedes the *exportDirectory*.
- *exportDirectory* is the name and path of the folder that was created by the export script, for example, `export-TIH_HS`.
- *tableSpec* is the name of a specific table in the database to import. If you do not specify the table name, the entire database is imported.

The following command is an example of the export command:

```
sh -x import.sh -v -d TIH_HS -h export-TIH_HS GEOSPATIAL.NODE
```

## Results

### What to do next

Rerunning the procedure to import the data will result in errors. If you do need to repeat the import procedure, ensure that the database is cleared before you rerun the script.

To troubleshoot problems that are associated with the migration scripts, review the `/tmp/upgrade.trace` log file for any problems that might occur during the import process. Typically these are issues that occur because of truncations of the link ID, that might cause duplicated primary key issues. Isolate, update, and retry these imports. Imports and exports are executed by the database. If the exported database contains Vehicle Awareness and Prediction data and Vehicle Awareness and Prediction is not installed, Vehicle Awareness and Prediction import errors are displayed. Ignore these errors.

#### Related concepts:

“Upgrading from an earlier version” on page 22

There are significant product design changes in this release. Upgrading to version 1.6 from an earlier version of IBM Intelligent Transportation is not supported. If you are running IBM Intelligent Transportation version 1.5, you can preserve and migrate your existing system data to a new installation of IBM Intelligent Transportation V1.6. Several data migration steps are required before and after the installation of IBM Intelligent Transportation V1.6.

### Verifying the migration

After you run the data migration scripts on the restored database from your version 1.5 environment, check the TIH\_HS database to verify that the migration was successful.

### About this task

There are two ways that you can verify the success of the data migration. First, verify the records in the TIH\_HS database and then log on to the solution portal and check that the migrated data is displayed in the user interface as expected.

### Procedure

Verify that the database content is displayed

1. Log on to the IBM Intelligent Operations Center data server as the database administrator, for example, the **db2inst1** user.
2. Enter the following command to connect to the recently migrated database:  

```
db2 connect to tih_hs
```
3. To verify the number of link records that are in the database, enter the following command:  

```
db2 "select count (*) from tmdd.link"
```
4. To verify the number of linkstatus records that are in the database, enter the following command:  

```
db2 "select count (*) from tmdd.linkstatus"
```
5. Compare the output of the commands with the data that was migrated from the version 1.5 database. The output from each command displays the records that are stored in the database.

Verify that the data is displayed in the solution portal

6. Verify that you can access the IBM Intelligent Transportation portal by logging on as the Traffic IT Administrator by using the following URL:

```
http://WebServer_hostname/wps/portal
```

where:

- In a standard operating environment, *WebServer\_hostname* is the host name of the IBM Intelligent Operations Center web server.
  - In a high availability environment, *WebServer\_hostname* is the host name of one of the following items:
    - IBM Intelligent Operations Center web server 1
    - IBM Intelligent Operations Center web server 2
    - The host name or IP address of the load balancer cluster
7. Go to the Historical Traffic Conditions portlet on the Planner: Traffic view.
  8. Click **Select Content**. and submit a query to display historical traffic data for a time period that you have sufficient data for. The data is displayed on the map and in the list on the Planner: Traffic view.

## Importing and configuring the TMDD data source

After you install IBM Intelligent Operations for Transportation, the system must be configured to connect to one or more owner centers to feed the database with near real time and historical traffic data. The data source must be available in the required Traffic Management Data Dictionary (TMDD) data format that IBM Intelligent Transportation is designed to support.

Before you begin to integrate the Traffic Awareness system with an owner center and to configure the traffic data import process, you must do some planning to ensure that the desired results are achieved.

The following steps are required in order to import and configure the TMDD data source:

1. “Planning the TMDD data integration” on page 113.
2. “Connecting to an owner center” on page 121.
3. “Setting up a subscription to traffic data” on page 123.
4. “Running a bulk load of traffic data” on page 126.
5. “Verifying the data import” on page 128.

For detailed information about how to integrate the TMDD data source into the IBM Intelligent Transportation databases, see *Integrating the solution*.

### Related concepts:

“Integrating the Traffic Awareness system” on page 109

The Traffic Awareness feature of IBM Intelligent Operations for Transportation interfaces with Traffic Management Centers and Advanced Traffic Management Systems (ATMS) using the Institute of Transportation Engineers (ITE) Traffic Management Data Dictionary (TMDD) Version 3.0 standard. TMDD standardizes data objects for traffic and event data and defines the messages and dialogs exchanged between systems in a US ITS National Architecture Center-to-Center (C2C) pattern.

“Configuring the Traffic Awareness feature” on page 66

Before you can view the data of the foundational Traffic Awareness feature in the solution portal, there are some important post-installation configuration steps to complete.

Chapter 5, “Integrating the solution,” on page 109

Products and services can be integrated with IBM Intelligent Transportation.

## Configuring the IBM Lotus Sametime Contacts portlet

If you installed IBM Intelligent Transportation in a high availability environment, you must configure the IBM Lotus® Sametime® Contacts portlet so that it points to the correct URL for the load balancer in your environment. You can configure the Contacts portlet by updating the system properties table of the IBM Intelligent Operations Center database.

### About this task

To configure the Contacts portlet, complete the following steps:

## Procedure

1. Log on to the IBM Intelligent Operations Center data server 1 as the *root* user.
2. Connect to the IBM Intelligent Operations Center database in a terminal console and update the IBM Lotus Sametime server URL by entering the following commands:

```
su - db2inst2
db2 connect to iocdb
db2 "UPDATE IOC.SYSPROP SET
VALUE='http://load_balancer_name/stwebclient/popup.jsp'
WHERE NAME='ContactsServiceURL'"
```

where *load\_balancer\_name* is the host name of the load balancer.

## Shapefiles for road segments

A shapefile is an industry standard that is used to exchange geospatial information. To complete the data import process, a shapefile must be loaded into the IBM Intelligent Transportation system. A shapefile can be used as the basis of the Traffic Management Data Dictionary (TMDD) defined road segments that are being monitored by the system. Use DB2 Spatial Extender to import spatial data from external sources to the database through data exchange files.

### Shapefile definition

A shapefile is a type of data exchange file that is required by IBM Intelligent Transportation to define the road segments on the Graphical Information System (GIS) maps.

A shapefile describes spatial geometries such as points, polylines, and polygons. A shapefile consists of a collection of files with the same file name but different file extensions. The shapefile collection can include the following four files:

- A file that contains spatial data in shape format, a de facto industry-standard format that is developed by ESRI. Such data is often called shape data, and has a file extension of *.shp*.
- A file that contains business data that pertains to locations that are defined by shape data, with a file extension of *.dbf*.
- A file that contains an index to shape data, with a file extension of *.shx*.
- A file that contains a specification of the coordinate system on which the data in a *.shp* file is based. This file has an extension of *.prj*.

The shapefile data must be in the World Geodetic System 1984 (WGS84) coordinate system format. If your shapefile data is not in the WGS84 coordinate system format, you can convert it after the import by using functions that are provided by DB2 Spatial Extender.

DB2 Spatial Extender is provided by the IBM Intelligent Operations Center and can be accessed and run from the data server. For more information, see the related link.

If you are migrating your existing version 1.5 data over to the new version 1.6 deployment, you do not need to import and load the shapefile data and can skip this post-installation task. When you run the migration scripts, the shapefile data from the version 1.5 environment is automatically migrated into the system database of the version 1.6 environment.

### Preparing and importing the shapefile

Copy the shapefile for the geographical area of your transportation network into a directory on the IBM Intelligent Operations Center data server.

Import the shapefile with the DB2 control center application on the IBM Intelligent Operations Center data server. The file name and extension of the shapefile are case-sensitive when specified on the import command. Some configuration is required to prepare the shapefile for a successful import.

**Note:** To prevent the shapefile from getting corrupted, compress the file before you copy it over to the IBM Intelligent Operations Center data server.

You can reuse existing information that is contained in the shapefile, including references, connectivity, and names.

The shapefile must be imported and loaded during the initial deployment and setup. If extra road links that are not already in the shapefile are added to the geographical region after you deploy the system, you can reload the updated shapefile again. If the shapes of the existing road links in the geographical region are modified after you load the shapefile, you cannot reload the modified data as this is not supported in IBM Intelligent Transportation version 1.6.

## Loading the shapefile

For more information, see *Guidelines for ingesting link data and historical traffic data into IBM Intelligent Transportation* in the IBM Support Portal.

### Related information:

 [Guidelines for ingesting link data and historical traffic data into IBM Intelligent Transportation](#)

 [DB2 Spatial Extender Information Center](#)

 [DB2: Troubleshooting the shapefile import](#)

## Configuring the maps

Configure and customize the geographical information system (GIS) base map service and the settings of the map portlets in the solution portal.

### GIS maps of IBM Intelligent Transportation

The following GIS maps are provided in the solution portal of IBM Intelligent Transportation.

Map	Provided by	Displays	Configuration options
Current Traffic Conditions	IBM Intelligent Operations for Transportation	Latest traffic situation, including information about traffic service levels, estimated travel times, devices, and events.	<ul style="list-style-type: none"> <li>• Predefined traffic layers</li> <li>• Regions</li> <li>• Map Settings - Starting point and zoom level</li> <li>• Base Maps</li> <li>• Traffic Settings</li> </ul> <p><b>Note:</b> The base map that you specify is used by all of the map portlets that are provided by IBM Intelligent Operations for Transportation.</p>
Historical Traffic Conditions	IBM Intelligent Operations for Transportation	Historical traffic levels for the transportation network for a specified time period.	<ul style="list-style-type: none"> <li>• Map Settings - Starting point and zoom level</li> </ul> <p><b>Note:</b> Inherits base map from the Current Traffic Conditions portlet.</p>

Map	Provided by	Displays	Configuration options
Predicted Traffic Conditions	IBM Intelligent Operations for Transportation *	Predicted traffic situation for predefined intervals, as generated by the system by using the accumulated traffic data.	<ul style="list-style-type: none"> <li>None</li> </ul> <p><b>Note:</b> Inherits base maps, starting point, and zoom level from the Current Traffic Conditions portlet.</p>
Transit Conditions	IBM Intelligent Transit Analytics	Latest vehicle awareness data for the transit network, including vehicle locations, estimated arrival times, route lines, stop locations, and the latest timetable information.	<ul style="list-style-type: none"> <li>Base Maps</li> <li>Map Settings - starting point and zoom level</li> </ul>

\* Requires the optional Traffic Prediction feature to be installed.

## Accessing the map configuration interface

To access the map configuration interface in the solution portal, complete the following steps.

1. Log on to the **Transportation** solution portal as either the Traffic or Transit IT administrator at:  
[https://web\\_hostname/wps/portal](https://web_hostname/wps/portal)

Where:

- In a standard operating environment, *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.
  - In a high availability environment, *web\_hostname* is the host name of one of the following:
    - IBM Intelligent Operations Center web server 1
    - IBM Intelligent Operations Center web server 2
    - The host name or IP address of the load balancer cluster
2. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.
  3. After you complete the map configuration, return to the portlet display menu and click **Back**.

## Configuration steps

The following topics outline how to configure the GIS maps that display the traffic and transit data of your transportation network in the user interface.

### Configuring the base map

Before you can view the traffic or transit data in the user interface on a map, you must first configure a base map service. The base map service that you specify in your configuration must meet the minimum supported requirements of IBM Intelligent Transportation version 1.6.

### Before you begin

IBM Intelligent Transportation V1.6 is designed to support Environmental Systems Research Institute's (Esri) ArcGIS Version 10.0 map service. For more information, see *GIS server requirements*.

### About this task

From the **Base Maps** tab in the map configuration view, you can add, edit, or delete a base map. You can configure multiple base map layers for the solution, but only one base map at a time can be displayed in

the map portlets. Users can switch from one predefined base map to another depending on their preference. However when they refresh or restart the session, the default base map is displayed.

## Procedure

1. Log on to the solution portal as either the Traffic or Transit IT administrator and click **Transportation**.
2. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
3. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.

**Note:** If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, you must configure the Predicted Traffic Conditions map from within the configuration interface of the Current Traffic Conditions map portlet. The Predicted Traffic Conditions portlet inherits its base map configuration from the Current Traffic Conditions map portlet.

4. Click **Base Maps**.
5. Click **Add Map**.
6. Complete the following base map configuration fields:
  - a. Enter a **Name** for the base map.
  - b. Enter a **Description** for the base map.
  - c. Optional: To make this map the default map for the solution, select **Default map?**. If you configured multiple base maps, use this option to select the preferred base map for the solution.
  - d. Enter the **URL** of the Esri ArcGIS server as follows:

`http://map_service_URL/tile/{z}/{y}/{x}`

where:

- *map\_service\_URL* is the URL of the GIS map service that hosts the tiles
- *tile* is the path to the tiles for the GIS map service
- *{z}* is the level
- *{y}* is the row
- *{x}* is the column

Ensure that you are using a valid base map URL of a supported GIS map service. IBM Intelligent Transportation requires the **ArcGIS Online/Bing Maps/Google Maps** tiling scheme. If you do not use a valid base map URL, the base map does not display as expected. For more information about the common problems that might occur when you set up a base map, see the troubleshooting section of the product documentation.

**Note:** For information about the map server products and services that are supported by IBM Intelligent Transportation, see *GIS server requirements*.

- e. Click **OK**.
- f. To return to the map view, go to the portlet display menu and click **Back**.

## Results

The recently configured base map is visible from the base map selection control on the map. Click the + icon on the map to view a list of available base maps that are configured for the solution.

### Related concepts:

“GIS server requirements” on page 21

In addition to the underlying IBM Intelligent Operations Center, IBM Intelligent Transportation requires access to a geographic information system (GIS) base map server to display map-based information and to enable map-based interaction. IBM Intelligent Transportation V1.6 is designed to support Environmental Systems Research Institute's (Esri) ArcGIS Version 10.0. However, a service engagement can be used to enable alternative GIS applications.



“Known problems and solutions” on page 296

Common problems with IBM Intelligent Transportation are documented in the problem-solution topics. If you have a problem with the product, review the problem-solution topics to determine whether a solution is available. The problem-solution topics are categorized by issue.

**Related information:**

 [Esri website](#)

 [Esri ArcGIS Help 10.1](#)

## Setting the center point and zoom level for the maps

After you configure the base map service, configure the center point and zoom level for each of the maps that are displayed in the solution portal of IBM Intelligent Transportation.

### About this task

Complete this task for each of the map portlets that are provided by the solution.

### Procedure

1. Log on to the solution portal as either the Traffic or Transit IT administrator and click **Transportation**.
2. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
3. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.

**Note:** If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, you must configure the Predicted Traffic Conditions map from within the configuration interface of the Current Traffic Conditions map portlet. The Predicted Traffic Conditions portlet inherits its base map configuration from the Current Traffic Conditions map portlet.

4. Click **Map Settings**. The current map is displayed with the center point highlighted.
5. Use the zoom controls on the map to set the zoom level.
6. Use the panning controls to center the map.
7. Click **Save**.
8. Click **OK**.
9. To return to the map view, go to the portlet display menu and click **Back**.

### Adding road categories

Create road categories to define the types of road links that a user can include when you add a traffic layer on the Current Traffic Conditions map portlet. Road categories are configured from the **Traffic Settings** tab of the map configuration view.

### About this task

This task is only applicable to the Traffic Awareness feature of IBM Intelligent Operations for Transportation.

### Procedure

1. Log on to the solution portal as either the Traffic or Transit IT administrator and click **Transportation**.
2. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
3. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.

**Note:** If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, you must configure the Predicted Traffic Conditions map from within the

configuration interface of the Current Traffic Conditions map portlet. The Predicted Traffic Conditions portlet inherits its base map configuration from the Current Traffic Conditions map portlet.

4. Click **Traffic Settings**.
5. In the **New road category** field, enter the road category name.
6. In the **Value stored in database** field, enter a value name.
7. Click **Add to list**.
8. To return to the map view, go to the portlet display menu and click **Back**.

## Results

The road category is added to the list of available road categories that can be selected when you add traffic layers.

**Note:** The default road category value is Highway.

## Adding regions

Configure predefined regions that define a geographical region of interest within the transportation network. Use the marquee selection tool to select the geographical region on the map.

### About this task

This task is only applicable to the Traffic Awareness feature of IBM Intelligent Operations for Transportation.

### Procedure

1. Log on to the solution portal as either the Traffic or Transit IT administrator and click **Transportation**.
2. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
3. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.

**Note:** If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, you must configure the Predicted Traffic Conditions map from within the configuration interface of the Current Traffic Conditions map portlet. The Predicted Traffic Conditions portlet inherits its base map configuration from the Current Traffic Conditions map portlet.

4. Click **Regions**.
5. Pan and zoom the map to the area of the new region to be created.
6. Click **New**. The polygon selection tool is activated.
7. To create a marquee selection:
  - a. Select a first point on the map.
  - b. Outline the new region by clicking points around the perimeter of the area. The newly selected area is outlined on the map.
  - c. To close the marquee, double click your mouse in the map. A Create Region window is displayed.

**Note:** A region must be created with 3 or more points.

8. In the Create Region window:
  - To draw more areas as part of the region, click **Add Region**. Add additional areas as described in Steps 2-4.
  - To save the current region, enter the new region name in the **New Region** field and click **OK**.

The new region is displayed on the map. Details for the new region are displayed beside the map.

9. To return to the map view, go to the portlet display menu and click **Back**.

## Deleting regions

If you are a Transportation IT Administrator, you can delete a predefined region from the Configuration view in the map portlets of the solution.

### About this task

To delete a predefined region, use the following procedure.

### Procedure

1. Log on to the solution portal as either the Traffic or Transit IT administrator and click **Transportation**.
2. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
3. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.

**Note:** If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, you must configure the Predicted Traffic Conditions map from within the configuration interface of the Current Traffic Conditions map portlet. The Predicted Traffic Conditions portlet inherits its base map configuration from the Current Traffic Conditions map portlet.

4. Click **Regions**.
5. Select the region to delete by clicking the region on the map or by clicking the region name that is beside the map.
6. Click **Delete**.
7. Click **OK**.
8. To return to the map view, go to the portlet display menu and click **Back**.

## Adding traffic layers

Traffic layers are map layers that provide visibility of the geospatial traffic data that is captured by the Traffic Awareness feature of IBM Intelligent Operations for Transportation. Traffic layers are superimposed over the top of the GIS map in the Current Traffic Conditions portlet on the Operator: Traffic views.

If you are a Transportation IT Administrator, you can configure the following predefined traffic layers:

- Events
- Devices
- Levels
- External services

Go to the Current Traffic Conditions portlet on the Operator: Traffic view. To access the map configuration interface, switch the portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the map portlet.

### Adding traffic event layers:

To monitor specific traffic events that are occurring in the transportation network, add traffic event layers to the map in the Current Traffic Conditions portlet on the Operator: Traffic view.

### Procedure

1. Click **Select Content**. The map filter form is displayed.
2. On the selection form, under **Events**, click **New Layer**.
3. In the **New Layer** window, in the **Name** field, enter a name to identify the event layer.
4. Optional: In the **Layer description** field, enter a description for the layer.
5. Required: Select an event **Group**.

6. Select at least one **Severity** for the event layer. To select multiple items, press Ctrl as you click each item.
7. Required: In the **When** section, choose one of the following options:
  - To monitor the latest traffic event data that is available in the system, select **Current values** and complete the required information:
    - a. To determine how often the view is refreshed with the latest data, specify a polling interval in the **Poll for Updates** field. The polling interval can be any value from 20 - 600 seconds.
    - b. Select at least one **Status** from the list.
  - To view traffic event information for a specific time period in the past, select **Date range** and complete the required fields:
    - a. Using the date and time picker, enter the start date and time.
    - b. Using the date and time picker, enter the end date and time.
    - c. Select at least one **Status** from the list.
8. Optional: In the **Where** section, select a predefined region, or choose to draw a region on the map. You can constrain the layer to a selected geographical area by drawing a region on the map.
9. Click **OK**.

## Results

The recently created layer is displayed in the **Events** section of the **Select Content** filter form. If the layer is selected, the layer-specific content is loaded and is displayed on the map.

The **Events** list in the Traffic Conditions - Details portlet is updated to display more information about the traffic data that is being displayed on the map. Map markers are plotted on the map to represent each event. If there are many events that are located close to each other on the map, the events are grouped into a cluster. You can view the details of the events in the cluster by clicking the event cluster icon.

## Adding traffic device layers:

To monitor specific traffic devices in the transportation network, add traffic device layers to the map by using the Current Traffic Conditions portlet on the Operator: Traffic view.

## Procedure

1. Click **Select Content**.
2. On the selection form, under **Devices**, click **New Layer**. The New Device Layer window is displayed.
3. In the **Layer label** field, enter a name for the layer.
4. Optional: In the **Layer description** field, enter a description for the layer.
5. In the **What** section, select the type and status of the devices to display in the layer.
6. Optional: To determine how often the view is refreshed with the latest data, specify a polling interval in the **Poll for Updates** field. The polling interval can be any value from 20 - 600 seconds.
7. Optional: In the **Where** section, select a predefined region, or choose to draw a region on the map. Drawing a region on the map allows you to constrain the layer to that region.
8. Click **OK**.

## Results

The recently created layer is displayed in the **Devices** section of the **Select Content** filter form. If the layer is selected, the layer-specific content is loaded and visible on the map. Map markers are plotted on the map to represent each device. If there are many devices that are located close to each other on the map, the devices are grouped into a cluster. You can view the details of the devices in the cluster by clicking the device cluster icon.

The **Devices** list in the Traffic Conditions - Details portlet is updated to display more information about the traffic data that is being displayed on the map.

### Adding traffic level layers:

To monitor the traffic level of a specific road link or region in the transportation network, add traffic level layers from the Current Traffic Conditions portlet on the Operator: Traffic view. By default, there are several predefined traffic level layers available to select. You can also create your own predefined traffic level layers.

### About this task

The predefined **Traffic Links** and **Travel Time** layers are mutually exclusive. If you select the **Travel Time** traffic level layer, you cannot select and view any other Traffic Level layers until you clear the **Travel Time** layer selection.

Notify your system administrator if you would like to change the system-wide predefined layers. To create your own predefined traffic level layers use the following steps:

### Procedure

1. Click **Select Content**.
2. On the selection form in the **Traffic Levels** area, click **New Layer**.
3. In the **New Traffic Level Layer** window, enter a name for your layer in the **Layer label** field.
4. Optional: Enter a description for the layer in the **Layer description** field.
5. Optional: If you are monitoring the traffic levels of a specific road link, in the **Road Name** field, enter the link name.
6. Select at least one item from the **Road Category** list. To select multiple items, press Ctrl as you click each item.
7. Optional: To determine how often the view is refreshed with the latest data, specify a polling interval in the **Poll for Updates** field. The polling interval can be any value from 20 - 600 seconds.
8. Optional: In the **Where** section, select a predefined region, or choose to draw a region on the map. You can constrain the layer to a region by drawing a region on the map.
9. Click **OK**.

### Results

The recently created layer is displayed in the **Traffic Levels** section of the **Select Content** filter form. If the layer is selected and status data is available, the layer-specific content is loaded and is visible on the map.

The **Traffic Levels** list in the Traffic Conditions - Details portlet updates to display more information about the traffic data that is being displayed on the map.

### Adding external services layers:

Add external services layers to the map from the Current Traffic Conditions portlet on the Operator: Traffic view.

### Procedure

1. Click **Select Content**.
2. On the selection form in the **External Services** section, click **New Layer**.
3. Enter a name for the layer in the **Layer label** field.
4. Optional: Enter a description for the layer in the **Layer description** field.

5. Select the required **Service type**.
6. Enter the URL for the required external service in the **Service URL** field.

**Note:** If the service is hosted on a different domain, configure the global proxy of the application server to handle proxy requests for that URL.

7. Click **OK**.

## Results

The recently created external services layer is displayed in the **External Services** section of the **Select Content** filter form. If the layer is selected, the layer-specific content is loaded and is visible on the map.

## Deleting traffic layers:

If you are a Transportation ID Administrator, you can remove the predefined traffic layers from the maps in the solution portal.

## About this task

This task can be performed on the Current Traffic Conditions portlet on the Operator: Traffic view.

## Procedure

1. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.
2. Click **Show Layers**. The Layer options window is displayed.
3. Locate the layer to be deleted, then click the **X** icon next to this layer. The layer is deleted.

## Configuring the Traffic Awareness feature

Before you can view the data of the foundational Traffic Awareness feature in the solution portal, there are some important post-installation configuration steps to complete.

A connection to a Traffic Management Data Dictionary (TMDD) V3.0 owner center is required to supply traffic data to IBM Intelligent Operations for Transportation. For more information, see *Importing and configuring the TMDD data source*.

## Related concepts:

“Importing and configuring the TMDD data source” on page 56

After you install IBM Intelligent Operations for Transportation, the system must be configured to connect to one or more owner centers to feed the database with near real time and historical traffic data. The data source must be available in the required Traffic Management Data Dictionary (TMDD) data format that IBM Intelligent Transportation is designed to support.

## Configuring the thread pool of the portal web container

After you install the Traffic Awareness feature, increase the maximum number of threads that are allowed in the thread pool that is used by the web container for the portal server. The default maximum thread number is 50, but if there are more than 30 concurrent users that connect to the IBM Intelligent Transportation solution, then this value must be increased to 100.

## About this task

From the IBM Intelligent Operations Center application server, use the following procedure to increase the **Maximum Size** field of the **WebContainer**.

**Note:** If this procedure is not performed, users might experience problems when they log on to the solution.

## Procedure

1. To log on to the WebSphere® Portal Server Administration console, click **Administration**.
2. In the topology tree, expand **Servers > Server Types > WebSphere application Servers**.
3. Click **Portal server > Thread pools > WebContainer**.
4. In the **Maximum Size**, enter 100. This value limits the number of requests that the application server can process concurrently. The default value is 50.
5. Click **Save**.
6. Restart the IBM Intelligent Operations Center application server.

## Configuring the reports of the Traffic Awareness feature

After you install the Traffic Awareness feature of IBM Intelligent Operations for Transportation, configure the reports of the solution so that they display the required traffic and event data that you are interested in viewing.

### About this task

Configure and customize the Traffic Awareness reports in the TIH package in the Traffic Custom Reports portlet in the solution portal.

You must log on as a user with Traffic IT Administrator permissions to perform the following tasks:

### Procedure

1. Required: “Configuring a system-wide report for all users” on page 160.
2. Optional: “Enabling accessibility” on page 272
3. Optional: “Changing the language settings of the reports” on page 271

### Related concepts:

“Customizing the reports” on page 159

IBM Intelligent Transportation provides a set of predefined reports that summarize your system data, for each feature that you install. You can customize the reports to suit the requirements of your organization. You can also modify the portlets that are provided in the solution portal so that they display the report information that you are most interested in.

## Configuring the Traffic Prediction feature

After successfully completing the installation of the optional Traffic Prediction feature, additional configuration steps are required.

### Transferring master and historical data to traffic prediction tables



After you have installed the Traffic Prediction feature, the system must be configured to feed the database with the master and historical traffic data. The data source must be available to the Traffic Prediction feature in the required Traffic Management Data Dictionary (TMDD) data format that the system is designed to support.

### About this task

Use the following procedure to feed the Traffic Prediction database tables with the master and historical traffic data.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the *root* user.
2. Type `su - db2inst2`.

3. Open the following directory: /opt/IBM/iss/intelligentTransportation/transportationPrediction/scripts
4. Edit the configurable queries, the log file names and the path for the log files, in the **TP\_Historic\_Data.sh** and **TP\_Master\_Data.sh** template script files.
5. Run the modified script files to load data into the traffic prediction tables. Run the **TP\_Master\_Data.sh** script to load the master data that is required for the prediction calculation by using the following command:

```
./TP_Master_Data.sh database_name database_username database_password
```

Where:

- *database\_name* is the name of the Traffic Awareness historical database, for example TIH\_HS.
  - *database\_username* and *database\_password* are the account credentials for the database instance.
6. Set the prediction frequency parameter in the engine parameters window as defined in the Configuring and enabling Traffic Prediction calibration steps, if the prediction frequency is not 15 minutes. The historical data is then transferred as required by the prediction algorithm.

7. Run the **TP\_Historic\_Data.sh** script to load data to the link\_report table by using the following command:

```
./TP_Historic_Data.sh database_name database_username database_password
current_date_time older_date_time
```

Where:

- *database\_name* is the name of the Traffic Awareness historical database, for example TIH\_HS.
  - *database\_username* and *database\_password* are the account credentials for the database instance.
  - *current\_date\_time* is the current date and time in the YYYY-MM-DD-HH.MM.SS format.
  - *older\_date\_time* is the start date and time for the historical data required for the mean and estimate batch calculations. The date and time are in the YYYY-MM-DD-HH.MM.SS format.
8. To retrieve the *current\_date\_time* and *older\_date\_time* values, as mentioned in the previous step, from the TMDD.LINKSTATUS table:
    - a. Connect to the TIH\_HS database.
    - b. To get the oldest datetime, enter this query: SELECT MIN(LASTUPDATETIME) FROM TMDD.LINKSTATUS
    - c. To get the current, or latest datetime, enter this query: SELECT MAX(LASTUPDATETIME) FROM TMDD.LINKSTATUS

**Note:** If the database transaction log is not large enough, the historical data load might fail. Increase the transaction log limit for the database in case the load fails. Delete the contents from the link\_report table, or drop and re-create the link\_report table, and repopulate the historical data in the table.

9. Run the **REORG** database maintenance command on the following Traffic Prediction database tables:
  - tptool.LINK\_REPORT
  - tmdd.LINKSTATUS
  - datex\_II.TRAFFICSPEED
  - datex\_II.TRAFFICFLOW

For more information about the database maintenance commands and how they work, see the DB2 Information Center.

## Results

The historical data and default values for Traffic Prediction configuration are loaded.

## Configuring the Traffic Prediction engine





After the Traffic Prediction feature is successfully installed, the Transportation IT Administrator must log on to the portal and configure traffic prediction for the first time using the administration portlets that are available in the **Administration** view of the solution interface. For later configurations, you can configure individual administration portlets as required.

## Before you begin

Before you perform this task, you must first transfer the master and historic data to the Traffic Prediction tables.

## About this task

Complete the following tasks to configure the Traffic Prediction feature.

## Procedure

1. Configure the general settings for traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in “Configuring and enabling Traffic Prediction” on page 274. Ensure that traffic prediction is disabled by clearing the following check boxes:
  - **Enable traffic prediction**
  - **Enable prediction based on speed**
  - **Enable prediction based on volume**
2. By default, a subnet called *Zone1* is created with all of the available links by the Traffic Prediction post installation scripts.
  - a. View the subnet in the **Solution Administration > Create Traffic Prediction Subnets** portlet.
  - b. Create multiple subnets by copying the links from the Traffic Prediction - Create Subnet portlet. The Traffic Prediction - Create Subnet portlet prevents a link ID from being present in multiple subnets.
  - c. To get the maximum number of predicted links, create the subnet with a proper link relationship. Edit and delete the subnets using the Traffic Prediction - Update Subnet portlet.
  - d. Generate relationships after the subnet, or subnets, are created. Relationships can be generated for each individual subnet, or for all of the subnets.
3. Specify the details required to create a subnet ID and generate a relationship between the traffic links in the Create Traffic Prediction Relationship Matrix portlet by following the instructions in “Creating the relationship matrix” on page 282.
4. Configure the traffic prediction mean calculation settings in the Configure Traffic Prediction Calculations - Mean portlet by following the instructions in “Configuring mean Traffic Prediction calculations” on page 276.
5. Configure the traffic prediction estimate calculation settings in the Configure Traffic Prediction Calculations - Estimate portlet by following the instructions in “Configuring estimate Traffic Prediction calculations” on page 277.
6. Trigger all the traffic prediction calculations in the Initiate Calculation Manually portlet by following the instructions in “Manually initiating traffic prediction calculations” on page 198. It is recommended that all the mean and estimate traffic prediction calculations are triggered manually the first time, with the mean calculations triggered first. Mean calculations for any one day are triggered and completed before estimate calculations are triggered for the same day. Later, the calculations are run at scheduled times by default.
7. Monitor all the traffic prediction calculations in the Traffic Prediction Calculation Monitoring portlet by following the instructions in “Monitoring traffic prediction calculations” on page 198. You can customize the query in the selection form to monitor specific calculations.
8. Enable traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in “Configuring and enabling Traffic Prediction” on page 274. Ensure that the **Enable**

**traffic prediction** check box is selected. Also, select either the **Enable prediction based on speed** check box or the **Enable prediction based on volume** check box, or select both.

9. Complete the Traffic Prediction configuration instructions in Configuring Traffic Prediction.

## Results

To verify the result:

1. From the database server, connect to **TIH\_OP** using DB2.
2. Verify the number of records in the **CACHE.JOB\_TRIGGERS** table by entering `SELECT * FROM CACHE.JOB_TRIGGERS.`

**Note:** For the default configuration, this results in 22 records, with one job for prediction and 21 jobs for mean and estimate calculations. The number of mean and estimate jobs varies, depending on the day category that is configured from the Configure Traffic Prediction Calculations portlets.

### Related concepts:

“Customizing the Traffic Prediction feature” on page 169

You can customize the optional Traffic Prediction feature to provide traffic prediction details beyond an hour from the current time, to provide customized reports, and to configure data collection, enablement, and calculation in the administration portlets.

## Displaying link relationships



For successful traffic prediction, you need a connected road network in which links have relationships or connections between them.

### About this task

Use the following instructions to display the relationships between links. The first column that is displayed is the link IDs, and the second column that is displayed indicates the number of relationships that the link IDs have. Ideally, each link is connected to at least one other link through the node that they share on the road network.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the DB2 database administrator.
2. From the command prompt, run the following SQL command:

```
select link_id,count(link_id) from tptool.link_subnet group by link_id order by count(link_id) asc
```

where:

*link\_id* is a link ID.

## Results

The expected output is a list displaying link IDs and the number of relationships that the link IDs have.

## Configuring the Predicted Traffic Conditions map



When you install the optional Traffic Prediction feature, an additional map portlet is added to the Operator: Traffic view in the solution portal. The Predicted Traffic Conditions map inherits the settings of the Current Traffic Conditions portlet.

## Procedure

For more information about how to configure the Predicted Traffic Conditions map, see *Configuring the maps*

### Related concepts:

“Configuring the maps” on page 58

Configure and customize the geographical information system (GIS) base map service and the settings of the map portlets in the solution portal.

## Configuring the reports of the Traffic Prediction feature



After you install the Traffic Prediction feature of IBM Intelligent Operations for Transportation, configure the reports of the solution so that they display the required traffic prediction data that you are interested in viewing.

### About this task

Configure and customize the Traffic Prediction reports in the TP package in the Traffic Prediction Custom Reports portlet in the solution portal.

To perform the tasks that are in the following procedure, you must log on as a user with Traffic IT Administrator permissions.

## Procedure

1. Required: “Configuring a system-wide report for all users” on page 160.
2. Optional: “Enabling accessibility” on page 272
3. Optional: “Changing the language settings of the reports” on page 271

### Related concepts:

“Customizing the reports” on page 159

IBM Intelligent Transportation provides a set of predefined reports that summarize your system data, for each feature that you install. You can customize the reports to suit the requirements of your organization. You can also modify the portlets that are provided in the solution portal so that they display the report information that you are most interested in.

## Configuring the Traffic Prediction holiday ingest



After you install the Traffic Prediction feature of IBM Intelligent Operations for Transportation, you can optionally configure the solution so that the predicted traffic levels for the transportation network incorporate the official national holidays that impact traffic patterns. You can configure holidays in the system. You can add, update, read, and delete holiday dates for holiday categories by using REST services. Call the REST services by running a script with defined arguments that can include the path to an input file. Defining the holiday information about your transportation network improves the accuracy of the predicted traffic levels that are generated by the IBM Intelligent Transportation system.

### About this task

You can configure multiple holiday categories such as: national holiday (Republic Day, Independence Day), or festival (Easter, Christmas). Each holiday category is treated separately, and each holiday date that is listed under the same category has a similar traffic pattern. This traffic pattern is distinct from any other existing category. You can retrieve holidays and corresponding holiday categories that are in the

solution. You can also add holidays to any of the existing categories, delete holidays from a category, and delete individual categories. You specify or retrieve peak times only; all other times of the day are considered off-peak.

**Note:** If you attempt to retrieve or configure an element that does not exist, the solution returns an error. Use the following instructions to manage holidays and associated categories in the solution:

## Procedure

1. Log on to the IBM Intelligent Operations Center data server as the database administrator, for example *db2inst2*.
2. Open the following directory: `/opt/IBM/iss/intelligentTransportation/transportationPrediction/scripts`
3. Run the *holidayAdmin.sh* script with one of the following instructions to manage holiday categories and holidays in the solution:

- To add a holiday, run the following command:

```
./holidayAdmin.sh UserID Password https://host_name:port/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/addHoliday ADD_HOLIDAY INPUT_FILE_PATH
```

Where:

- *host\_name* is the host name of the IHS that is used.
- *port* is the port number that is used on the IHS.
- *INPUT\_FILE\_PATH* is the location of a plain text file with a defined structure.

**Note:** If the added holiday exists in a category, the existing holiday details are updated with the new details.

- To delete a holiday from a category, run the following command:

```
./holidayAdmin.sh UserID Password https://host_name:port/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/deleteHoliday DELETE_HOLIDAY CATEGORY_NAME HOLIDAY_NAME
```

- To add a holiday category, run the following command:

```
./holidayAdmin.sh UserID Password https://host_name:port/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/addCategory ADD_CATEGORY INPUT_FILE_PATH
```

- To delete a holiday category, run the following command:

```
./holidayAdmin.sh UserID Password https://host_name:port/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/deleteCategory DELETE_CATEGORY CATEGORY_NAME CATEGORY_KEY
```

**Note:** The holiday category key has a value 20 - 99.

- To retrieve a holiday from a category, run the following command:

```
./holidayAdmin.sh UserID Password https://host_name:port/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/holidayCategory READ_HOLIDAY CATEGORY_NAME
```

For example, to retrieve all holidays in the National category, run the following command:

```
./holidayAdmin.sh user1 password1 https://iop20ihs/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/holidayCategory READ_HOLIDAY National
```

Also, if you use *CATEGORY\_NAME* values to display all holidays in all categories by running the holiday REST service script, the following output is displayed at the command prompt, and with the following structure. To display this output, run the following REST service command:

```
./holidayAdmin.sh user1 password1 https://iop20ihs/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/holidayCategory READ_HOLIDAY ALL
```

**Note:** The following output is displayed at the command prompt.

```

{
  "Holidays": {
    "Category": [
      {
        "CategoryName": "Public Holiday",
        "CategoryNumber": "30",
        "PeakTime": "8:00 AM - 8:30 AM,8:30 AM - 9:00 AM,9:00 AM - 9:30 AM,9:30 AM -
10:00 AM,5:30 PM - 6:00 PM,6:00 PM - 6:30 PM,6:30 PM - 7:00 PM",
        "Holiday": [
          {
            "HolidayName": "Republic Day",
            "HolidayDate": "2013-01-26"
          },
          {
            "HolidayName": "Independence Day",
            "HolidayDate": "2013-08-15"
          }
        ]
      }
    ],
    {
      "CategoryName": "Festival Holiday",
      "CategoryNumber": "40",
      "PeakTime": "8:00 AM - 8:30 AM,8:30 AM - 9:00 AM,9:00 AM - 9:30 AM,9:30 AM -
10:00 AM,5:30 PM - 6:00 PM,6:00 PM - 6:30 PM,6:30 PM - 7:00 PM",
      "Holiday": [
        {
          "HolidayName": "ChristmasDay",
          "HolidayDate": "2013-12-25"
        },
        {
          "HolidayName": "Easter",
          "HolidayDate": "2013-04-06"
        }
      ]
    }
  ]
}

```

For example, if you use an *INPUT\_FILE\_PATH* directory path value to add holidays to the *Festival\_Holiday* category by running the holiday REST service script, configure the input file content with the following file structure, and use the syntax of the following example command:

```

./holidayAdmin.sh UserID Password https://host_name:port
/ibm/iss/trans/forecast/service/holidayrest/tpt_holidayadmin/addHoliday ADD_HOLIDAY
/home/tmp/FestivalHoliday

```

Where:

- The `/home/tmp/FestivalHoliday` file contains the following structure:

```

{
  "Holidays": {
    "Category": {
      "CategoryName": "Festival_Holiday",
      "CategoryNumber": "60",
      "PeakTime": "8:00 AM - 8:30 AM,8:30 AM - 9:00 AM,9:00 AM -
9:30 AM,9:30 AM - 10:00 AM,5:30 PM - 6:00 PM,6:00 PM - 6:30 PM,6:30 PM - 7:00 PM",
      "Holiday": [
        {
          "HolidayName" : "Christmas_Day",
          "HolidayDate" : "2013-12-25"
        },
        {
          "HolidayName" : "Easter",
          "HolidayDate" : "2013-04-06"
        }
      ]
    }
  }
}

```

```

    }
  ]
}

```

If you use an `INPUT_FILE_PATH` directory path value to add a category that is called *Religious\_Holiday* by running the holiday REST service script, configure the input file content with the following file structure:

```

{
  "Holidays": {
    "Category": {
      "CategoryName": "Religious_Holiday",
      "CategoryNumber": "50",
      "PeakTime": "8:00 AM - 8:30 AM,8:30 AM - 9:00 AM,9:00 AM -
9:30 AM,9:30 AM - 10:00 AM,5:30 PM - 6:00 PM,6:00 PM - 6:30 PM,6:30 PM - 7:00 PM",
    }
  }
}

```

## What to do next

After you run the `holidayAdmin.sh` script to update the holiday data, restart the `trans_tptool_batch_ear` application from the WebSphere Application Server console to incorporate the changes.

**Note:** You do not need to restart the `trans_tptool_batch_ear` application after you run the `READ_HOLIDAY` command of the `holidayAdmin.sh` script.

### Related tasks:

“Controlling the servers of the Traffic Prediction feature” on page 191

If you start the Traffic Awareness/Traffic Prediction features using the IBM Intelligent Operations Center control scripts, the applications that are deployed are started automatically. Ensure that the IBM Intelligent Operations Center and the underlying Traffic Awareness servers are running before you start the Traffic Prediction feature.

## Configuring the Vehicle Awareness and Prediction feature



After successfully installing Vehicle Awareness and Prediction on top of your IBM Intelligent Transportation version 1.6 solution, additional configuration steps are required. A connection to a Service Interface for Real-Time Information (SIRI) message source is required to supply transit data to IBM Intelligent Transit Analytics.

### Importing and configuring vehicle-related data sources



After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, set up and configure the required vehicle data of the transit network. The Vehicle Awareness and Prediction feature provides a data load utility to help you to import the required data into the existing `TIH_HS` database of IBM Intelligent Transportation. The vehicle data source must be available in the required Service Interface for Real Time Information (SIRI) data format that IBM Intelligent Transportation is designed to support.

Before you run the Vehicle Awareness and Prediction data load utility, you must do some planning to ensure that the correct results are achieved.

To import and configure the data that is required by IBM Intelligent Transportation, complete the steps in the following procedures:

1. “Planning the transit data integration” on page 136
2. “Importing infrastructure, production timetable and configuration data” on page 137
3. “Configuring the InfoSphere Streams application” on page 145 and the `vap.cfg` configuration properties file.
4. “Configuring the Subscription Manager” on page 148
5. “Accumulating historical information for vehicle prediction” on page 151
6. “Starting the vehicle arrival predictions” on page 155

For detailed information about how to integrate the vehicle awareness data for your transit system into IBM Intelligent Transportation, see the *Integrating the solution* section of the product documentation. You can also find more supporting information in the *References* section.

After you complete the instructions to load the basic infrastructure data and production timetable data into your system, you are ready to complete the configuration of the solution portal user interface. If the data import was successful, the vehicle data is displayed in the user interface of the solution portal.

**Related concepts:**

“Integrating the Vehicle Awareness and Prediction system” on page 136

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics uses incoming and accumulating vehicle position data that is supplied by subsystems in the transit network. The data is supplied by subsystems in the Service Interface for Real Time Information (SIRI) data standard format.

“Configuration properties of the `vap.cfg` file” on page 145

The `vap.cfg` file contains the configuration options that you can set for the Vehicle Awareness and Prediction feature.

**Related tasks:**

“Running the services to accumulate data” on page 151

The Vehicle Awareness and Prediction feature must be run for a significant time period to accumulate enough historical vehicle monitoring information in the database. This ensures that the vehicle arrival predictions are more accurate.

“Configuring the default vehicle lines and services” on page 76

After the data is loaded into the system and the InfoSphere Streams server is running, you can optionally configure the lines and services that you would like to display by default in the map in the solution portal interface.

## Configuring the Transit Conditions map



After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, configure the Transit Conditions map portlet that is on the Operator: Transit view in the solution portal.

### Before you begin

Before you can configure the settings of the map portlets that are provided by the IBM Intelligent Transit Analytics feature, you must first define a GIS base map service. For more information, see *Configuring the ESRI ArcGIS server*. If you already defined a GIS base map service for the Traffic Awareness map portlets, you can skip this step.

### About this task

You must have Transit IT Administrator portal security permissions to complete this task.

### Procedure

1. Log on to the solution portal by using the following URL:  
`https://web_hostname/wps/portal`

Where:

- In a standard operating environment, *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.
  - In a high availability environment, *web\_hostname* is the host name of one of the following:
    - IBM Intelligent Operations Center web server 1
    - IBM Intelligent Operations Center web server 2
    - The host name or IP address of the load balancer cluster
2. Go to the Transit Conditions portlet on the Operator: Transit view.
  3. To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.
  4. Configure the following map configuration settings:
    - Base Maps
    - Map Settings - starting point and zoom level

## What to do next

For more information about each of the options that you can configure for each map portlet of the solution, see *Configuring the maps*.

### Related concepts:

“Configuring the maps” on page 58

Configure and customize the geographical information system (GIS) base map service and the settings of the map portlets in the solution portal.

## Configuring the reports of the Vehicle Awareness and Prediction feature



After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, configure the reports so that they display the required transit data that you are interested in viewing.

### About this task

Configure and customize the Vehicle Awareness and Prediction reports in the VAP package in the Transit Custom Reports portlet in the solution portal.

You must log on as a user with Traffic IT Administrator permissions to perform the following tasks:

### Procedure

1. Required: “Configuring a system-wide report for all users” on page 160.
2. Optional: “Enabling accessibility” on page 272
3. Optional: “Changing the language settings of the reports” on page 271

### Related concepts:

“Customizing the reports” on page 159

IBM Intelligent Transportation provides a set of predefined reports that summarize your system data, for each feature that you install. You can customize the reports to suit the requirements of your organization. You can also modify the portlets that are provided in the solution portal so that they display the report information that you are most interested in.

## Configuring the default vehicle lines and services





After the data is loaded into the system and the InfoSphere Streams server is running, you can optionally configure the lines and services that you would like to display by default in the map in the solution portal interface.

## Before you begin

Before you can configure the default vehicle lines and services, you must load the transit data into the system and configure the Transit Conditions map portlet. The lines and services of your transit network are not displayed in the user interface until the vehicle infrastructure data and the production timetable for the current day is successfully loaded into the system. For more information, see *Importing and configuring vehicle-related data sources*.

## Procedure

1. Log on to the solution portal by using the following URL:

```
https://web_hostname/wps/portal
```

Where:

- In a standard operating environment, *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.
  - In a high availability environment, *web\_hostname* is the host name of one of the following:
    - IBM Intelligent Operations Center web server 1
    - IBM Intelligent Operations Center web server 2
    - The host name or IP address of the load balancer cluster
2. Go to the Transit Conditions portlet on the Operator: Transit view.
  3. Switch the portlet to configuration mode by clicking **Personalize** on the portlet display menu, which is in the upper right corner of the portlet.
  4. Select the vehicle lines and services that you would like to be selected on the map filter panel by default.
  5. Click **Save**.

## Results

When you open the filter panel on the map in the Transit Conditions portlet, the predefined lines and services are selected by default.

### Related concepts:

“Importing and configuring vehicle-related data sources” on page 74

After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, set up and configure the required vehicle data of the transit network. The Vehicle Awareness and Prediction feature provides a data load utility to help you to import the required data into the existing TIH\_HS database of IBM Intelligent Transportation. The vehicle data source must be available in the required Service Interface for Real Time Information (SIRI) data format that IBM Intelligent Transportation is designed to support.

### Related tasks:

“Configuring the Transit Conditions map” on page 75

After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, configure the Transit Conditions map portlet that is on the Operator: Transit view in the solution portal.

## Verifying the Vehicle Awareness and Prediction feature in the solution portal



After you complete the installation and configuration of the Vehicle Awareness and Prediction feature, verify that the solution portal user interface displays the vehicle data of your transit network.

## Before you begin

Vehicle data is not displayed in the user interface until the data is successfully loaded into the system and the Subscription Manager is running. Before you verify the solution portal results, complete all of the tasks that are outlined in *Importing and configuring vehicle-related data sources*.

## About this task

The Vehicle Awareness and Prediction feature provides a portal page for visualizing transit data on a map, in a structured list, and in report graphs. To view the Operator: Transit portal page, log on to the solution as a user with Transit Operator access permissions.

## Procedure

1. Log on to the solution portal by using the following URL:

`https://web_hostname/wps/portal`

Where:

- In a standard operating environment, *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.
  - In a high availability environment, *web\_hostname* is the host name of one of the following:
    - IBM Intelligent Operations Center web server 1
    - IBM Intelligent Operations Center web server 2
    - The host name or IP address of the load balancer cluster
2. Click **Transportation** and open the Operator: Transit portal page.
  3. Click **Select Content**. The transit lines and services that are loaded into the system are displayed in the list of lines and services that are available for selection.
  4. On the filter panel, select at least one line or service and then also select at least one of the following check boxes:
    - If you would like to view vehicles of the selected lines or services, select **Vehicles**.
    - If you would like to view the stops of the selected lines or services, select **Stops**.
    - If you would like to view the route outline of the selected lines or services, select **Routes**.
  5. Wait several minutes and then verify that the vehicles change position.

### Related concepts:

“Importing and configuring vehicle-related data sources” on page 74

After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, set up and configure the required vehicle data of the transit network. The Vehicle Awareness and Prediction feature provides a data load utility to help you to import the required data into the existing TIH\_HS database of IBM Intelligent Transportation. The vehicle data source must be available in the required Service Interface for Real Time Information (SIRI) data format that IBM Intelligent Transportation is designed to support.

## Configuring security

Ensuring your deployment is secure from unauthorized access or malicious activity is a critical consideration. There are many aspects of securing the system to consider. Most of the security configuration is carried out during the deployment of the IBM Intelligent Operations Center. There are also ways that you can make the IBM Intelligent Transportation solution more secure.

After you deploy IBM Intelligent Transportation, and become familiar with the solution portal, the first security step to take is to delete the sample users that are provided with the solution. The sample users are created during the deployment of IBM Intelligent Transportation and have access permissions to the solution portal interface. They are provided to help you get started and familiar with the solution and the different roles of the solution.

For all other information about how to secure IBM Intelligent Transportation, see *Best practices for security* in the *Securing the solution* section.

**Related tasks:**

“Best practices for security” on page 97

Ensure that your IBM Intelligent Transportation solution is secure by following best practices.

## Configuring users and groups

To use the solution you must have a portal user account that is assigned to the required groups and roles of IBM Intelligent Transportation in the solution portal.

User authentication is associated with authorization rights that give the user access to the appropriate features and data. IBM Intelligent Transportation takes advantage of the user and group management interface that is provided by the IBM Intelligent Operations Center base platform. It also integrates with the existing security infrastructure for single sign-on.

User access is managed by WebSphere Portal, which hosts both the IBM Intelligent Operations Center and IBM Intelligent Transportation solutions. The Portal server uses the Tivoli® Directory Server as the Lightweight Directory Access Protocol (LDAP) database for IBM Intelligent Transportation and the IBM Intelligent Operations Center.

### Portal administrator

The WebSphere Portal administrator that was created during the initial deployment of IBM Intelligent Operations Center can assign users to the IBM Intelligent Transportation groups and roles. You can add additional users to the administrator group as needed.

### Assigning permissions

If your users are existing users of IBM Intelligent Operations Center, they already have a user ID and password and only need to be added to the required groups and roles of the IBM Intelligent Transportation solution. The groups and roles determine what views of the IBM Intelligent Transportation solution portal your users can access.

For more information, see *Securing the solution*.

### Importing users and groups

If your users are not existing users of the IBM Intelligent Operations Center, you can import your users from an external LDAP directory source into the solution. For more information, see the topic titled *Importing users and groups* in the IBM Intelligent Operations Center product documentation.

**Related concepts:**

Chapter 4, “Securing the solution,” on page 97

Securing IBM Intelligent Transportation is an important consideration. To ensure that the system is secure, you must manage who can access the system and assign the correct level of access within the solution.

### Deleting sample users

IBM Intelligent Transportation includes sample users. For security reasons, delete the sample users after you have deployed the solution and become familiar with how to use the solution portal.

### About this task

The WebSphere Portal administrator manages user accounts in the **Administration** view. Use the following procedure to delete the sample users that are shipped with the solution.

For a list of sample users that are provided by IBM Intelligent Transportation, see *Sample users*.

## Procedure

1. Log on to the portal as the system administrator, or as a user who is a member of the *wpsadmin* security group.
2. Click **Administration**.
3. Click **Access > Users and Groups**.
4. Select all of the sample users that are provided with IBM Intelligent Transportation when you install the product.

**Important:** Do not delete the following required users. If you delete them, IBM Intelligent Transportation and the IBM Intelligent Operations Center will not operate properly.

- **wpsadmin**
- **wasadmin**
- **wpsbind**
- **admin**
- **notesadmin**

Also, you must not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues can occur.

## Related concepts:

“Sample users” on page 100

During the deployment of IBM Intelligent Transportation, sample users are created with corresponding responsibilities and access permissions.

---

## Chapter 3. Uninstalling the solution

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

### Before you begin

Use the information in this guide to uninstall IBM Intelligent Transportation version 1.6 from your IBM Intelligent Operations Center environment. Alternatively, if you would like to temporarily uninstall IBM Intelligent Transportation from the IBM Smarter Cities solution portal, you can stop the services and hide IBM Intelligent Transportation by completing the steps in *Temporarily disabling and hiding the solution*.

### About this task

The following steps are required to uninstall IBM Intelligent Transportation from an existing IBM Intelligent Operations Center environment.

### Procedure

1. Complete the steps that are outlined in *Uninstalling the services of the Vehicle Awareness and Prediction feature*.
2. Complete the steps that are outlined in *Uninstalling the services of the Traffic Prediction feature*.
3. Complete the steps that are outlined in *Uninstalling the portal component*.
4. Delete the sample users that are provided in the solution portal on the IBM Intelligent Operations Center application server. For more information, see *Deleting sample users*.
5. Stop all services of the IBM Intelligent Operations Center environment by completing the following substeps:
  - a. Change the user to *ibmadmin* by entering the following command:  
`su - ibmadmin`
  - b. Using the Platform Control Tool on the IBM Intelligent Operations Center analytics server, go the following location:  
`/opt/IBM/ISP/mgmt/scripts/`
  - c. Enter the following command:  
`./IOControl -a stop -c all -p password` where *password* is the password for the Platform Control Tool that was defined when the Platform Control Tool was installed.

**Note:** If you are uninstalling IBM Intelligent Transportation on a high availability environment, you must enter the following command:

```
./IOControl.sh -a 091 -p password
```

6. Complete the steps that are outlined in *Uninstalling the Cognos component*.
7. On the IBM Intelligent Operations Center analytics server, IBM Intelligent Operations Center data server, and the IBM Intelligent Operations Center application server, delete `/opt/IBM/iss/intelligentTransportation` using the following command:  

```
#rm -rf /opt/IBM/iss/intelligentTransportation
```

**Note:** If you are uninstalling IBM Intelligent Transportation on a high availability environment, you must complete this step on the following nodes:

IBM Intelligent Operations Center analytics server 1

IBM Intelligent Operations Center analytics server 2

IBM Intelligent Operations Center data server 1  
IBM Intelligent Operations Center data server 2  
IBM Intelligent Operations Center application server 1  
IBM Intelligent Operations Center application server 2

8. Complete the steps that are outlined in *Uninstalling the database component*.

## Results

IBM Intelligent Transportation V1.6 is removed from the existing IBM Intelligent Operations Center environment.

### Related tasks:

“Uninstalling the services of the Vehicle Awareness and Prediction feature”

To uninstall the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, uninstall the InfoSphere Streams services that are no longer required.

“Uninstalling the services of the Traffic Prediction feature” on page 87

If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, uninstall the WebSphere Application Server services that are provided by this feature.

“Uninstalling the portal component” on page 90

To uninstall IBM Intelligent Transportation, you must uninstall the IBM Intelligent Operations for Transportation portal component.

“Uninstalling the database component” on page 92

Complete the following procedure to uninstall the TIH\_HS and TIH\_OP databases of IBM Intelligent Transportation.

“Uninstalling the Cognos component” on page 93

To uninstall IBM Intelligent Transportation, you must uninstall the Cognos components of the product.

“Temporarily disabling and hiding the solution” on page 94

Instead of removing the IBM Intelligent Transportation version 1.6 solution, you can temporarily disable it so that it is still deployed but not visible in the solution portal to the IBM Smarter Cities user. When you disable IBM Intelligent Transportation version 1.6, the solution continues to use the system resources of the IBM Intelligent Operations Center.

“Deleting sample users” on page 79

IBM Intelligent Transportation includes sample users. For security reasons, delete the sample users after you have deployed the solution and become familiar with how to use the solution portal.

---

## Uninstalling the services of the Vehicle Awareness and Prediction feature

To uninstall the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, uninstall the InfoSphere Streams services that are no longer required.

### Procedure

1. Log on to the InfoSphere Streams server as the streams administrator, for example, streamsadmin. You can log on as root and then su streamsadmin.
2. Go to the following directory:  
/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics.
3. Stop the application by running the following command:  
./stopper.sh -i trans\_vap

The following message is displayed:

```
Job id 0 of the trans_vap@streamsadmin instance was canceled.
```

You can view the processes that are running by entering the following command:

```
- streamtool lpsps -i trans_vap
```

4. Stop the streams instance that was created during the installation of IBM Intelligent Transit Analytics by running the following command:  
`streamtool stopinstance -i trans_vap`

The following message is displayed:

The `trans_vap@streamsadmin` instance was stopped.

5. Optional: Remove the streams host tags that the IBM Intelligent Transit Analytics installer inserts by running the following command:  
`streamtool rmhosttag -i trans_vap --noprompt ingest,dbclient,main,siriHost,siriGzipHost`
6. Optional: Delete the streams instance by running the following command:  
`streamtool rminstance -i trans_vap`
7. Delete the following directory:  
`/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics`
8. Optional: Uninstall InfoSphere Streams by using the uninstallation information that is provided in the *InfoSphere Streams information center*. You can access the *InfoSphere Streams information center* by clicking the related link.
9. Log on to the IBM Intelligent Operations Center application server as the portal administrator and open the following administrative console:  
`https://APPLICATION_SERVER_HOST:9044/ibm/console`  
where  
`APPLICATION_SERVER_HOST` is the host name for the IBM Intelligent Operations Center application server = `iop20app`, or IBM Intelligent Operations Center application server 1 = `iop20appri` in a high availability environment.
10. From the **Console** menu, click **Applications > Application Types > WebSphere enterprise applications**.
11. Select the following applications, which are the services of the Vehicle Awareness and Prediction feature:
  - `trans_vap_httpd_web_ear`
  - `trans_vap_restservice_ear`
  - `trans_vap_ui_restservices_ear`
  - `vap_portlet_ear`

**Note:** To quickly find the services of IBM Intelligent Transportation, use the **Search Terms** filter field, and enter **\*vap\***.

12. Click **Uninstall**. When prompted, choose to **Save directly to the master configuration**.
13. On the IBM Intelligent Operations Center application server, complete the following substeps.

**Note:** When uninstalling Vehicle Awareness and Prediction on a high availability environment, complete the following tasks on the IBM Intelligent Operations Center application server 1.

- a. Remove the following file:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihsnode1/servers/ihsserver1/plugin-cfg.xml`
- b. Remove the following file:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/plugin-cfg.xml`
- c. To regenerate the first `plugin-cfg.xml` for the IBM Intelligent Operations Center web server 1, from the **Console** menu, click **Servers > Web Servers > Generate Plug-in**.
- d. To regenerate the second `plugin-cfg.xml`, from the **Console** menu, click **Environment > Update global Web server plug-in configuration > Overwrite**.
- e. Use the command line interface to connect to the IBM Intelligent Operations Center web server and delete the `plugin-cfg.xml` file from the following location:  
`/opt/IBM/WebSphere/Plugins/config/ihsserver1/plugin-cfg.xml`

- f. Copy the ihserver1 plugin-cfg.xml file from the following location:  
 /opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihnode1/servers/  
 ihserver1/plugin-cfg.xml  
 to the following location:  
 iop20ihs:/opt/IBM/WebSphere/Plugins/config/ihserver1/plugin-cfg.xml  
 You might need to remove the destination file first.
- g. Restart the http server on the IBM Intelligent Operations Center web server with the following command:  

```
cd /opt/IBM/HTTPServer/bin/
ps -eo pid,args | grep httpd | grep -v grep | cut -c1-6 | xargs kill
sleep 10
apachectl -k restart
```

14. Log on to the IBM Intelligent Operations Center data server as the db2inst2 user.

15. Open a terminal on the IBM Intelligent Operations Center data server and issue the following DB2® commands:

```
#su - db2inst2
#db2 force application all
db2 connect to tih_hs
db2 drop TABLE transmodel.DatedVehicleJourney;
db2 drop TABLE transmodel.Direction;
db2 drop TABLE transmodel.EstimatedPassingTimeDetail;
db2 drop TABLE transmodel.EstimatedPassingTime;
db2 drop TABLE transmodel.JourneyPattern;
db2 drop TABLE transmodel.JourneyShape;
db2 drop TABLE transmodel.JourneyShapeDetail;
db2 drop TABLE transmodel.JourneyShapeInJourneyPattern;
db2 drop TABLE transmodel.Line;
db2 drop TABLE transmodel.MonitoredVehicleJourney;
db2 drop TABLE transmodel.ObservedPassingTime;
db2 drop TABLE transmodel.Point;
db2 drop TABLE transmodel.RecordedStop;
db2 drop TABLE transmodel.Route;
db2 drop TABLE transmodel.RouteLink;
db2 drop TABLE transmodel.RouteLinkInStopLinkSequence;
db2 drop TABLE transmodel.StopLink;
db2 drop TABLE transmodel.StopLinkWithJourneyPattern;
db2 drop TABLE transmodel.StopPoint;
db2 drop TABLE transmodel.StopPointInJourneyShapeInJP;
db2 drop TABLE transmodel.TargetPassingTime;
db2 drop TABLE transmodel.VPCachedEstimatedPassingTime;
db2 drop TABLE transmodel.VPCachedEstimatedPassingTimeDetail;
db2 drop TABLE transmodel.VPCachedRecordedStop;
db2 drop TABLE transmodel.VPCachedVehicleLocation;
db2 drop TABLE transmodel.VPCachedJourneyPatternShape;
db2 drop TABLE transmodel.VPConfiguration;
db2 drop TABLE transmodel.VPForecastMetaData;
db2 drop TABLE transmodel.VPForecastMetaDataDetail;
db2 drop TABLE transmodel.VPMilestoneInJourneyShapeInJP;
db2 drop TABLE transmodel.VPUpdatingRecord;
db2 drop TABLE transmodel.Vehicle;
db2 drop TABLE transmodel.VehicleDetecting;
db2 drop TABLE transmodel.VehicleType;
db2 drop TABLE transmodel.GroupOfOperator;
db2 drop TABLE transmodel.Operator;
db2 drop TABLE transmodel.GroupOfOperator_Operator_Mapping;
db2 drop TABLE transmodel.Employee;
db2 drop TABLE transmodel.Service;
db2 drop TABLE transmodel.RouteDetail;
db2 drop TABLE transmodel.VehicleDetectingCalculation;
db2 drop TABLE transmodel.Fare;
db2 drop TABLE transmodel.Range;
db2 drop TABLE transmodel.Service_Fare_Mapping;
db2 drop TABLE transmodel.Timeplan;
```



```

db2 drop TABLE transmodel.TimeplanDetail;

db2 drop function transmodel.getConfidenceLevel;
db2 drop function transmodel.getValidDuration;
db2 drop function transmodel.TimestampFormatWithTimezone;
db2 drop function transmodel.fun_getJourneyDestination;
db2 drop function transmodel.fun_getJourneyShape;
db2 drop function transmodel.fun_getJourneyShapeCross;
db2 drop function transmodel.queryProcessingCount;

db2 drop procedure transmodel.getDirection;
db2 drop procedure transmodel.getJourneyShapeInJourneyPattern;
db2 drop procedure transmodel.getObservedPassingTime;
db2 drop procedure transmodel.getPoints;
db2 drop procedure transmodel.getPointsOfStopLink;
db2 drop procedure transmodel.getProductionTimetable;
db2 drop procedure transmodel.getRouteLinkInStopLink;
db2 drop procedure transmodel.getStopLinkInJourneyShape;
db2 drop procedure transmodel.getStopLinks;
db2 drop procedure transmodel.getStopLinksByStops;
db2 drop procedure transmodel.getStopLinkWithJourneyPattern;
db2 drop procedure transmodel.getStopMonitoringXml;
db2 drop procedure transmodel.getStopPoints;
db2 drop procedure transmodel.getVehicleMonitoringXml;
db2 drop procedure transmodel.getVPForecastMetaData;
db2 drop procedure transmodel.getVPForecastMetaDataUpdateID;
db2 drop procedure transmodel.pruneCacheTable;
db2 drop procedure transmodel.pruneTable;
db2 drop procedure transmodel.reorgTable;
db2 drop procedure transmodel.putDatedVehicleJourneyShape;
db2 drop procedure transmodel.putEstimatedPassingTime;
db2 drop procedure transmodel.putEstimatedPassingTimeDetail;
db2 drop procedure transmodel.putJourneyShape;
db2 drop procedure transmodel.putJourneyShapeDetail;
db2 drop procedure transmodel.putMilestone;
db2 drop procedure transmodel.initMonitoredVehicleJourney;
db2 drop procedure transmodel.putObservedPassingTime;
db2 drop procedure transmodel.putStopPointInJourneyShapeInJP;
db2 drop procedure transmodel.putVehicleDetecting;
db2 drop procedure transmodel.putVPCachedEstimatedPassingTime;
db2 drop procedure transmodel.putVPCachedEstimatedPassingTimeDetail;
db2 drop procedure transmodel.putVPCachedVehicleLocation;
db2 drop procedure transmodel.putVPForecastMetaData;
db2 drop procedure transmodel.putVPForecastMetaDataDetail;
db2 drop procedure transmodel.queryVPForecastMetaData;
db2 drop procedure transmodel.queryVPForecastMetaDataUpdateID;
db2 drop procedure transmodel.refreshJourneyPattern;
db2 drop procedure transmodel.getMonitoredVehicleJourney;
db2 drop procedure transmodel.InitVPCachedEstimatedPassingTime;

db2 drop tablespace ts_vapdata01;
db2 drop tablespace ts_vapdata02;
db2 drop tablespace ts_vapdata03;
db2 drop tablespace ts_vapdata04;
db2 drop tablespace ts_vapindex;
db2 drop tablespace ts_vaptemp;
db2 drop tablespace ts_vapusrtemp;
db2 drop bufferpool vapbufferpool1;
db2 drop bufferpool vapbufferpool2;
db2 drop bufferpool vapbufferpool3;
db2 drop bufferpool vapbufferpool4;

db2 drop xsrobject transmodel.confidencelevelxsd;
db2 drop xsrobject transmodel.stopmonitoringRequestxsd;
db2 drop xsrobject transmodel.vehiclemonitoringRequestxsd;

db2 drop schema transmodel restrict;

```

An error message might be displayed, such as:

```
DB21034E The command was processed as an SQL statement because it was not a
valid Command Line Processor command. During SQL processing it returned:
SQL0478N DROP, ALTER, TRANSFER OWNERSHIP or REVOKE on object type "SCHEMA"
cannot be processed because there is an object
"TRANSMODEL.STOPLINKWITHJOURNEYPATTERN", of type "TABLE", which depends on it.
```

If this message is displayed, delete the table that is referred to in the message. For example:

```
db2 drop table transmodel.stoplinkwithJourneyPattern.
```

Then, try:

```
db2 drop schema transmodel restrict;
```

```
db2 connect to IOCDDB
```

```
db2 "delete from IOC.SysProp where name like 'Transit%' and group like 'TransportCognos%'"
```

**Note:** If you are uninstalling Vehicle Awareness and Prediction on a high availability environment, then try:

```
db2 drop schema transmodel restrict;
```

```
db2 connect to IOCDDB
```

```
db2 "delete from IOC.SysProp where name like 'Transit%' and group like 'TransportCognos%'"db2
"delete from IOC.SysProp where group = 'VAP' and name in
('HTTPD_CONFIGURATION','SUBSCRIPTION_MANAGER_HOST')"
```

16. In the WebSphere Console, go to **Users and Groups > Manage Groups**. Click **TransitITAdministrator**, then click the **Members** tab and select "asullivan", and click **Remove**. Next, click **TransitOperator**, then click the **Members** tab and select "asullivan", and click **Remove**.
17. On the IBM Intelligent Operations Center analytics server, open the following file in the gedit text editor:  
/installHome/ioc16/tools/svc/topology/vap\_std.xml  
or if you are uninstalling Vehicle Awareness and Prediction on a high availability environment;  
/installHome/ioc16/tools/svc/topology/vap\_ha.xml  
Replace each instance of "Ready" with "New" (case sensitive). For each component element in the xml, move the status attribute to before the id attribute. For example, change:  
component package="BASE" type="generic" id="VALIDATE\_SIGNATURE" status="New"  
to  
component package="BASE" type="generic" status="New" id="VALIDATE\_SIGNATURE"
18. On the IBM Intelligent Operations Center analytics server, open the following file:  
/var/ibm/InstallationManager/installRegistry.xml  
and remove the following profile:  
**profile id='IBM Intelligent Transit Analytics'**
19. On the IBM Intelligent Operations Center analytics server, IBM Intelligent Operations Center data server, and the IBM Intelligent Operations Center application server, delete the following file:  
/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics  
with the following command:  
#rm -rf /opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics  
and delete the following directory on the streams node:  
#rm -rf /opt/IBM/

**Note:** If you are uninstalling Vehicle Awareness and Prediction on a high availability environment, you must complete this step using the following nodes:

IBM Intelligent Operations Center analytics server 1

IBM Intelligent Operations Center analytics server 2

IBM Intelligent Operations Center data server 1

IBM Intelligent Operations Center data server 2

IBM Intelligent Operations Center application server 1

IBM Intelligent Operations Center application server 2

20. On the IBM Intelligent Operations Center analytics server, open Installation Manager by clicking **Applications > Installation Manager**.

Go to **File > Preferences**.  
Click **Repositories** and clear all of the check boxes.  
Click **Apply** and then click **OK**.  
Close Installation Manager.

**Related tasks:**

“Uninstalling the services of the Traffic Prediction feature”

If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, uninstall the WebSphere Application Server services that are provided by this feature.

“Uninstalling the Cognos component” on page 93

To uninstall IBM Intelligent Transportation, you must uninstall the Cognos components of the product.

**Related information:**

 InfoSphere Streams V3.1 Information Center

---

## Uninstalling the services of the Traffic Prediction feature



If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, uninstall the WebSphere Application Server services that are provided by this feature.

### Before you begin

In the procedure, steps that apply to both the uninstallation of the standard and the high availability topologies contain instructions for each topology.

### Procedure

1. Log on to the IBM Intelligent Operations Center application server as the portal administrator and open the WebSphere Application Server administrative console with the following URL:

`https://APP_SERVER_HOST.ibmplatform.com:9044/ibm/console`

Where:

APP\_SERVER\_HOST is IBM Intelligent Operations Center application server.

**Note:** For the high availability topology, APP\_SERVER\_HOST is IBM Intelligent Operations Center application server 1.

2. In the WebSphere Application Server console, click **Resources > Work managers** and delete **TPtoolWorkManager**.
3. From the WebSphere Application Server console menu, click **Applications > Application Types > WebSphere enterprise applications**.
4. In the **Search Terms filter** field, type **\*trans\*** and select the following applications:
  - trans\_tpt\_admin\_portlet\_ear
  - trans\_tpt\_mean\_messages\_rest\_ear
  - trans\_tpt\_messages\_rest\_ear
  - trans\_tpt\_report\_portlet\_ear
  - trans\_tptool\_batch\_ear
  - trans\_tptool\_forecast\_ear
  - trans\_forecast\_rest\_ear
  - trans\_forecaster\_portlet\_ear
5. Click **Uninstall** and click **Save directly to the master configuration**.
6. On the IBM Intelligent Operations Center application server, complete the following substeps.

**Note:** When uninstalling Vehicle Awareness and Prediction on a high availability environment, complete the following tasks on the IBM Intelligent Operations Center application server 1.

- a. Remove the following file:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihsnode1/servers/ihsserver1/plugin-cfg.xml`
  - b. Remove the following file:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/plugin-cfg.xml`
  - c. To regenerate the first plugin-cfg.xml for the IBM Intelligent Operations Center web server 1, from the **Console** menu, click **Servers > Web Servers > Generate Plug-in**.
  - d. To regenerate the second plugin-cfg.xml, from the **Console** menu, click **Environment > Update global Web server plug-in configuration > Overwrite**.
  - e. Use the command line interface to connect to the IBM Intelligent Operations Center web server and delete the plugin-cfg.xml file from the following location:  
`/opt/IBM/WebSphere/Plugins/config/ihsserver1/plugin-cfg.xml`
  - f. Copy the ihsserver1 plugin-cfg.xml file from the following location:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihsnode1/servers/ihsserver1/plugin-cfg.xml`  
to the following location:  
`iop20ihs:/opt/IBM/WebSphere/Plugins/config/ihsserver1/plugin-cfg.xml`  
You might need to remove the destination file first.
  - g. Restart the http server on the IBM Intelligent Operations Center web server with the following command:  

```
cd /opt/IBM/HTTPServer/bin/  
ps -eo pid,args | grep httpd | grep -v grep | cut -c1-6 | xargs kill  
sleep 10  
apachectl -k restart
```
7. To remove the database components for Traffic Prediction, for the standard topology, log on to the IBM Intelligent Operations Center data server as `db2inst2`. For the high availability topology, log on to IBM Intelligent Operations Center data server 1.
- a. Open a terminal and type the following DB2 commands:  

```
su - db2inst2  
db2 force application all  
db2 connect to tih_hs  
db2 DROP TABLE TPTOOL.TRAFFIC_STATUS  
db2 DROP TABLE TPTOOL.TRAFFIC_USER  
db2 DROP TABLE TPTOOL.TRAFFIC_STATISTICS  
db2 DROP TABLE TPTOOL.LINK  
db2 DROP TABLE TPTOOL.TRAFFIC_SUBNET;  
db2 DROP TABLE TPTOOL.ACTIVE_LINKS;  
db2 DROP TABLE TPTOOL.TRAFFIC_INCIDENT;  
db2 DROP TABLE TPTOOL.TPTOOL_CONFIG;  
db2 DROP TABLE TPTOOL.LINK_SUBNET_WEIGHTS;  
db2 DROP TABLE TPTOOL.TRAFFIC_WEIGHTS;  
db2 DROP TABLE TPTOOL.FORECAST_NOTE;  
db2 DROP TABLE TPTOOL.FORECAST_TYPES;  
db2 DROP TABLE TPTOOL.LINK_FORECAST_NOTE;  
db2 DROP TABLE TPTOOL.LINK_REPORT_HIST;  
db2 DROP TABLE TPTOOL.TRAFFIC_FORECAST;  
db2 DROP TABLE TPTOOL.WORKING_LK_SUBNET;  
db2 DROP TABLE TPTOOL.WORKING_TR_SUBNET;  
db2 DROP TABLE TPTOOL.LINK_FORECAST;  
db2 DROP TABLE TPTOOL.LINK_STATS;  
db2 DROP TABLE TPTOOL.ACCURACY_REPORT;  
db2 DROP TABLE TPTOOL.TPTOOL_PROCESS_LOG;  
db2 DROP TABLE TPTOOL.MEAN_DAY_CATEGORY;  
db2 DROP TABLE TPTOOL.LINK_REPORT;  
db2 DROP TABLE TPTOOL.LINK_TMC_LKUP;  
db2 DROP TABLE TPTOOL.LINK_INRIX;  
db2 DROP TABLE TPTOOL.EST_DAY_CATEGORY;
```

```

db2 DROP TABLE TPTOOL.EST_DAY_SUB_CATEGORY;
db2 DROP TABLE TPTOOL.REPORTS_PERIOD;
db2 DROP TABLE TPTOOL.HOLIDAY_LIST;
db2 DROP TABLE TPTOOL.HOLIDAY_CATEGORY;
db2 DROP TABLE TPTOOL.HOLIDAY_EST_SUB_CATEGORY;
db2 DROP TABLE TPTOOL.HOLIDAY_MEANS_CATEGORY;
db2 DROP TABLE TPTOOL.TPT_SCHEDULER_JOBS;
db2 DROP TABLE TPTOOL.LINK_SUBNET;
db2 DROP TABLE TPTOOL.LINK_WEIGHTS;
db2 DROP TABLE TPTOOL.GIS_TRAFFIC_FORECAST;
db2 DROP TABLE TPTOOL.FREQUENCY;
db2 DROP TABLE TPTOOL.qrtz_simprop_triggers;
db2 DROP TABLE TPTOOL.MESSAGE_SUBSCRIPTIONS;
db2 DROP TABLE TPTOOL.PROCESSING_REQUESTS;
db2 DROP TABLE TPTOOL.qrtz_job_details
db2 DROP TABLE TPTOOL.qrtz_triggers
db2 DROP TABLE TPTOOL.qrtz_simple_triggers
db2 DROP TABLE TPTOOL.qrtz_cron_triggers
db2 DROP TABLE TPTOOL.qrtz_blob_triggers
db2 DROP TABLE TPTOOL.qrtz_calendars
db2 DROP TABLE TPTOOL.qrtz_fired_triggers
db2 DROP TABLE TPTOOL.qrtz_paused_trigger_grps
db2 DROP TABLE TPTOOL.qrtz_scheduler_state
db2 DROP TABLE TPTOOL.qrtz_locks
db2 DROP TABLE TPTOOL.job_triggers
db2 DROP SEQUENCE TPTOOL.FORMULA_FORCAST_ID_SEQ
db2 DROP SEQUENCE TPTOOL.TPTOOL_PROCESS_ID_SEQ
db2 DROP SEQUENCE TPTOOL.TPTOOL_PROCESS_LOG_ID_SEQ
db2 DROP SEQUENCE TPTOOL.TRAFFIC_FORECAST_ID_SEQ
db2 DROP SEQUENCE TPTOOL.TRAFFIC_REPORT_ID_SEQ
db2 DROP SEQUENCE TPTOOL.TRAFFIC_STATISTIC_ID_SEQ
db2 DROP SEQUENCE TPTOOL.TRAFFIC_WEIGHT_ID_SEQ
db2 DROP procedure TPTOOL.getTransPredMeanXml
db2 DROP procedure TPTOOL.purgeTransPredData.sql
db2 DROP procedure TPTOOL.purgeTransPredForecastReportData.sql
db2 connect to TIH_OP
db2 DROP TABLE CACHE .qrtz_job_details
db2 DROP TABLE CACHE .qrtz_triggers
db2 DROP TABLE CACHE .qrtz_simple_triggers
db2 DROP TABLE CACHE .qrtz_cron_triggers
db2 DROP TABLE CACHE .qrtz_blob_triggers
db2 DROP TABLE CACHE .qrtz_calendars
db2 DROP TABLE CACHE .qrtz_fired_triggers
db2 DROP TABLE CACHE .qrtz_paused_trigger_grps
db2 DROP TABLE CACHE .qrtz_scheduler_state
db2 DROP TABLE CACHE .qrtz_locks
db2 DROP TABLE CACHE .job_triggers
db2 DROP TABLE CACHE.TRAFFIC_PREDICTED
db2 DROP TABLE CACHE.qrtz_simprop_triggers
db2 DROP procedure CACHE.getTransPredXml.sql

```

8. To remove the Traffic Prediction J2C authentication data, complete the following steps:
  - a. In the WebSphere Application Server console, click **Security > Global security > JAAS - J2C authentication data**.
  - b. Delete **Prediction\_Messages\_Auth\_Alias**.
9. To remove the tag file and refresh the XML installation files, open the following file on IBM Intelligent Operations Center analytics server in a text editor:

```
/installHome/ioc16/tools/svc/topology/tp_std.xml
```

**Note:** For the high availability topology, open the file:

```
/installHome/ioc16/tools/svc/topology/tp_ha.xml
```

10. Replace every instance of the term *Ready* with the term *New* in the XML file.
11. Open the following file on IBM Intelligent Operations Center analytics server in a text editor:

**Note:** For the high availability topology, open the file on IBM Intelligent Operations Center analytics server 1.

```
/var/ibm/InstallationManager/installRegistry.xml
```

12. Remove the following lines from the XML file:

```
<feature id='optional.feature' />  
<iu id='optional.install' version='999.999.999.-917800354' />
```

13. Click **Save** and close the file.

14. Delete the following files on the following nodes:

- a. For the standard topology, enter the following command on the IBM Intelligent Operations Center analytics server/IBM Intelligent Operations Center application server and IBM Intelligent Operations Center data server nodes:

```
rm -rf /opt/IBM/iss/intelligentTransportation/transportationPrediction/
```

- b. For the high availability topology, enter the same command on the IBM Intelligent Operations Center analytics server 1/IBM Intelligent Operations Center analytics server 2, IBM Intelligent Operations Center application server 1/IBM Intelligent Operations Center application server 2, and IBM Intelligent Operations Center data server 1/IBM Intelligent Operations Center data server 2 nodes:

15. On the IBM Intelligent Operations Center analytics server, click **Applications > Installation Manager > File > Preferences**.

**Note:** For the high availability topology, do the same on IBM Intelligent Operations Center analytics server 1.

16. Clear all of the check boxes in the **Repositories** section.

17. Click **Apply** and click **OK**.

18. Close the Installation Manager.

#### **Related tasks:**

“Uninstalling the portal component”

To uninstall IBM Intelligent Transportation, you must uninstall the IBM Intelligent Operations for Transportation portal component.

“Uninstalling the services of the Vehicle Awareness and Prediction feature” on page 82

To uninstall the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, uninstall the InfoSphere Streams services that are no longer required.

---

## **Uninstalling the portal component**

To uninstall IBM Intelligent Transportation, you must uninstall the IBM Intelligent Operations for Transportation portal component.

### **About this task**

Complete the following procedure to uninstall the IBM Intelligent Operations for Transportation portal component of IBM Intelligent Transportation.

### **Procedure**

1. Log on to the IBM Intelligent Operations Center application server as the portal administrator and open the administrative console with the following URL:

```
http://APP_SERVER_HOST.ibmplatform.com:9044/ibm/console
```

where:

APPLICATION\_SERVER\_HOST is the host name for the IBM Intelligent Operations Center application server = iop20app.

2. From the Console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. Select the following applications.

Services of the Traffic Awareness feature:

- **trans\_demo\_restservices\_ear**
- **trans\_forecast\_rest\_ear**
- **trans\_forecaster\_portlet\_ear**
- **trans\_portal\_101\_ear**
- **trans\_portlet\_ear**
- **trans\_reports\_portlet\_ear**
- **trans\_restservices\_ear**
- **trans\_tmddecserver\_ear**
- **trans\_tmddpublish\_ear**

Services of the Traffic Prediction feature:

**Note:** Select these services only if you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, and did not follow the instructions in *Uninstalling the services of the Traffic Prediction feature*.

- **trans\_tptool\_batch\_ear**
- **trans\_tptool\_ear**
- **trans\_tpt\_admin\_portlet\_ear**
- **trans\_tpt\_messages\_rest\_ear**
- **trans\_tpt\_report\_portlet\_ear**
- **trans\_forecast\_rest\_ear**

**Note:** To quickly find the services of IBM Intelligent Transportation, use the **Search Terms** filter field and enter **\*trans\***.

4. Click **Uninstall**. When prompted, choose to **Save directly to the master configuration**.
5. On the IBM Intelligent Operations Center application server, complete the following tasks:
  - a. Remove the following file:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihsnode1/servers/ihsserver1/plugin-cfg.xml`
  - b. Remove the following file:  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/plugin-cfg.xml`
  - c. To regenerate the first plugin-cfg.xml for ihsserver1, from the Console menu, click **Servers > Web Servers > Generate Plug-in**.
  - d. To regenerate the second plugin-cfg.xml, from the Console menu, click **Environment > Update global Web server plug-in configuration > Overwrite**.
  - e. Use the command-line interface to connect to the IBM Intelligent Operations Center web server and delete the plugin-cfg.xml file from the following location:  
`rm /opt/IBM/WebSphere/Plugins/config/ihsserver1/plugin-cfg.xml`
  - f. Use the command-line interface to connect to the IBM Intelligent Operations Center application server.
  - g. Copy the ihsserver1 plugin-cfg.xml from  
`/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihsnode1/servers/ihsserver1/plugin-cfg.xml`  
to the following location:  
`iop20ihs/opt/IBM/WebSphere/Plugins/config/ihsserver1/plugin-cfg.xml`.
  - h. Enter the following scp command:

```
/opt/IBM/WebSphere/AppServer/profiles/dmgr/config/cells/cell1/nodes/ihsnode1/servers/
ihsserver1/plugin-cfg.xml
root@iop20ihs://opt/IBM/WebSphere/Plugins/config/ihsserver1/plugin-cfg.xml
```

- i. Use the command-line interface to connect to the IBM Intelligent Operations Center web server.
- j. Restart the http server on the IBM Intelligent Operations Center web server with the following command:

```
cd /opt/IBM/HTTPServer/bin/
ps -eo pid,args | grep httpd | grep -v grep | cut -c1-6 | xargs kill
sleep 10 cd /opt/IBM/HTTPServer/bin/
apachectl -k restart
```

#### Related tasks:

“Uninstalling the database component”

Complete the following procedure to uninstall the TIH\_HS and TIH\_OP databases of IBM Intelligent Transportation.

“Uninstalling the Cognos component” on page 93

To uninstall IBM Intelligent Transportation, you must uninstall the Cognos components of the product.

“Uninstalling the services of the Traffic Prediction feature” on page 87

If you installed the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation, uninstall the WebSphere Application Server services that are provided by this feature.

---

## Uninstalling the database component

Complete the following procedure to uninstall the TIH\_HS and TIH\_OP databases of IBM Intelligent Transportation.

### About this task

Save the IBM Intelligent Transportation databases in case you need to restore and use them later.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the db2inst2 user.

**Note:** If you are uninstalling the database component on a high availability environment, you must log on to the IBM Intelligent Operations Center data server 1 as the db2inst2 user.

2. Open a terminal on the IBM Intelligent Operations Center data server and issue the following DB2® commands:

```
su - db2inst2
db2 force application all
db2 stop hadr on database TIH_HS
db2 deactivate database TIH_HS
db2 drop database TIH_HS
db2 uncatalog db TIH_HS

db2 stop hadr on database TIH_OP
db2 deactivate database TIH_OP
db2 drop database TIH_OP
db2 uncatalog db TIH_OP

db2 Stop DBM
db2 Start DBM
db2 connect to IOCD
db2 "delete from IOC.SysProp where name like 'TMDD%'"
```

**Note:** If the uncatalog command returns without a success message, the reinstallation fails. Run the DB2 list database directory to ensure that both the TIH\_HS and TIH\_OP are uninstalled. If the databases are still present, it might be because:

- The catalog is cached and needs more time to refresh.



- The database connections take a long time to reset.

If you are unable to fully uncatlog both of these databases, consult a database administrator.

**Note:** If you are uninstalling the database component on a high availability environment, you must also complete the following substeps:

- a. Run all of the commands listed in step 2 on IBM Intelligent Operations Center data server 2.
  - b. Remove all corresponding TIH objects from the TSA cluster.
3. On the IBM Intelligent Operations Center analytics server, open the following file:  
/installHome/ioc16/tools/svc/topology/tih\_std.xml  
and replace each instance of "Ready" with "New"
  4. On IBM Intelligent Operations Center application server 1, delete the following directory:  
/opt/IBM/iss/intelligentTransportation
  5. On the IBM Intelligent Operations Center analytics server, open the following file in a text editor:  
/var/ibm/InstallationManager/installRegistry.xml  
Remove the following profile:  
profile id='IBM Intelligent Operations for Transportation'  
Save and close the file.
  6. On the IBM Intelligent Operations Center analytics server, open Installation Manager by clicking **Applications>Installation Manager**.  
Go to **File>Preferences**.  
Click **Repositories** and clear all of the check boxes.  
Click **Apply** and then click **OK**.  
Close Installation Manager.

**Related concepts:**

“Backing up data” on page 202

To prevent the loss of valuable data, back up the IBM Intelligent Transportation databases regularly.

**Related tasks:**

“Uninstalling the portal component” on page 90

To uninstall IBM Intelligent Transportation, you must uninstall the IBM Intelligent Operations for Transportation portal component.

“Uninstalling the Cognos component”

To uninstall IBM Intelligent Transportation, you must uninstall the Cognos components of the product.

## Uninstalling the Cognos component

To uninstall IBM Intelligent Transportation, you must uninstall the Cognos components of the product.

### Procedure

1. Log on to the Cognos Console at:  
https://iop20ihs.ibmplatform.com/ServletGateway/servlet/Gateway  
or  
http://iop20ihspri.ibmplatform.com/ServletGateway/servlet/Gateway
2. In the Public Folders tab, select the products that you want to uninstall (**TIH**, **TPT**, and **VAP**) and click the **X** button.
3. Log on to the iop20ana server as the root user.
4. Open the /opt/IBM/cognos/c10\_64/ deployment folder.
5. The following files contain the IBM Intelligent Transportation Cognos reports. Delete the files that correspond with the products you selected to uninstall in step 2.

**Related tasks:**

“Uninstalling the portal component” on page 90

To uninstall IBM Intelligent Transportation, you must uninstall the IBM Intelligent Operations for

Transportation portal component.

“Uninstalling the services of the Vehicle Awareness and Prediction feature” on page 82

To uninstall the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, uninstall the InfoSphere Streams services that are no longer required.

“Uninstalling the database component” on page 92

Complete the following procedure to uninstall the TIH\_HS and TIH\_OP databases of IBM Intelligent Transportation.

---

## Temporarily disabling and hiding the solution

Instead of removing the IBM Intelligent Transportation version 1.6 solution, you can temporarily disable it so that it is still deployed but not visible in the solution portal to the IBM Smarter Cities user. When you disable IBM Intelligent Transportation version 1.6, the solution continues to use the system resources of the IBM Intelligent Operations Center.

### About this task

The following steps are required to disable IBM Intelligent Transportation in an IBM Intelligent Operations Center environment.

### Procedure

1. Stop the portal services of IBM Intelligent Transportation.
2. Log on to the IBM Intelligent Operations Center application server as the Portal administrator and open the administration console  
`http://APPLICATION_SERVER_HOST:9060/admin`  
where  
APPLICATION\_SERVER\_HOST is the host name for the IBM Intelligent Operations Center application server = iop20app.
3. From the Console menu, click **Applications > Application Types > WebSphere enterprise applications**.
4. Select the following applications:  
Services of the Traffic Awareness feature:
  - **v trans\_portal\_101\_ear**
  - **v trans\_portlet\_ear**
  - **v trans\_reports\_portlet\_ear**
  - **v trans\_restservices\_ear**
  - **v trans\_tmddceserver\_ear**
  - **v trans\_tmddpublish\_ear**Services of the Traffic Prediction feature:

**Note:** The following applications are only applicable if you installed the Traffic Prediction feature of IBM Intelligent Operations for Transportation.

- **v trans\_tpt\_admin\_portlet\_ear**
- **v trans\_tpt\_messages\_rest\_ear**
- **v trans\_tpt\_report\_portlet\_ear**
- **v trans\_forecast\_rest\_ear**

Services of the Vehicle Awareness and Prediction feature:

**Note:** The following applications are only applicable if you installed the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

- **v trans\_vap\_httpd\_web\_ear**

- `v trans_vap_restservice_ear`
- `v trans_vap_ui_restservices_ear`
- `v vap_portlet_ear`

**Note:** To quickly find the services of IBM Intelligent Transportation, use the **Search Terms** filter field, and enter **\*vap\*** or **\*trans\***.

5. Click **Stop**. Hide the **Transportation portal** navigation link.
6. Log on to the Portal Administration page of the IBM Intelligent Operations Center application server as the Portal Administrator.
7. Click **Portal User Interface > Manage Pages**.
8. On the **Manage Pages** tab, search for the page titled **Content Root**.
9. Click **Content Root**.
10. In the list that is under **Pages** in **Content Root**, find the page titled **Transportation**.
11. Go to the **Status** column of the **Transportation** row, click **Active** and then **OK** to confirm.
12. Open the following directory:  
/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics
13. To stop the streams application, enter the following command:  
`stopper.sh -i trans_vap`

**Note:** To restart the streams application, enter the following command:

```
launcher.sh -i trans_vap
```



---

## Chapter 4. Securing the solution

Securing IBM Intelligent Transportation is an important consideration. To ensure that the system is secure, you must manage who can access the system and assign the correct level of access within the solution.

### Securing the base architecture

Because IBM Intelligent Transportation is a solution that runs on top of IBM Intelligent Operations Center, set the high-level security settings through IBM Intelligent Operations Center. For details on the various options available, see the security section of the IBM Intelligent Operations Center Information Center.

### Securing data importation

The importation of data into IBM Intelligent Transportation is performed on the data server. Ensure that the method used to connect and transfer data onto this server is secure. For more information, see the related links at the end of this topic.

### Securing the portal

The following topics explain how to secure the solution and manage user access to the IBM Intelligent Transportation portal.

#### Related concepts:

“Users and benefits” on page 7

IBM Intelligent Transportation is designed for transportation authorities, city departments, and other businesses that are managing transportation in a city.

#### Related tasks:

Chapter 10, “Troubleshooting and support,” on page 287

You can isolate and resolve problems with your IBM products by using the supplied troubleshooting and support information. The information contains instructions for using the problem-determination resources that are provided with your IBM products, including IBM Intelligent Transportation.

---

## Best practices for security

Ensure that your IBM Intelligent Transportation solution is secure by following best practices.

### Procedure

1. Change the default passwords.
2. Delete the sample users.
3. Obfuscate the TMDD data load.
4. If you suspect a security breach in IBM Intelligent Transportation, because of anomalous behaviour such as layers, events, or personal preferences being unexpectedly modified or deleted, do the following substeps:
  - a. Contact the system administrator and change all of the user passwords.
  - b. Examine the logs for the feature that is exhibiting the unexpected behaviour. The feature logs are called SystemOut.log and might be considerable in size, so the system administrator carries out this work.

**Note:** See *Enabling traces and viewing log files* in the *Troubleshooting and support* sections of both the IBM Intelligent Transportation Information Center and the IBM Intelligent Operations Center Information Center for details on SystemOut.log solution logging.

- Secure any necessary ports. For information about the ports to secure, see *Ports and components that are used by IBM Intelligent Transportation* in the Reference section of the IBM Intelligent Transportation Information Center.

**Related concepts:**

“Ports that are used by IBM Intelligent Transportation” on page 323

The solution servers communicate with each other using ports during operation and installation. Securing IBM Intelligent Transportation ports is an important consideration. To ensure that the system is secure, and to avoid potential port conflicts, see the various chargeable components, servers, and ports that are used by the solution in standard and high availability deployments.

“Enabling traces and viewing log files” on page 293

To troubleshoot a problem in IBM Intelligent Transportation, you might need to analyze log files in several systems. The following topics give some guidance on how to access log files.

## User roles and responsibilities

IBM Intelligent Transportation implements security by limiting access to features and data based on user roles.

The security model and user access roles of IBM Intelligent Transportation are consistent with the IBM Intelligent Operations Center and other IBM Smarter Cities Software Solutions.

To use a specific feature of the IBM Intelligent Transportation portal, you must be a member of a user role group that provides the required access level. To manage traffic user and group security, you must have Traffic IT Administrator permissions, and to manage transit user and group security, you must have Transit IT Administrator permissions.

Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues might occur.

Table 1 shows the authorized pages, portlets, and responsibilities of the user roles of the solution.

*Table 1. The roles of IBM Intelligent Transportation.*

User role (role group)	Authorized pages or portlets	Authorized responsibilities
Traffic Planner (TrafficPlanner)	Planner: Traffic view	Query historical traffic flow levels for a selected time period in the past  View detailed information about traffic levels  Generate reports summarizing historical traffic flow data

Table 1. The roles of IBM Intelligent Transportation. (continued)

User role (role group)	Authorized pages or portlets	Authorized responsibilities
<p>Traffic Operator (TrafficOperator)</p>	<p>Operator: Traffic view</p>	<p>All responsibilities of the preceding role. Additionally a Traffic Operator can:</p> <p>Query near current traffic conditions and monitor traffic flow volume and speed</p> <p>View the predicted traffic flow for the next hour ahead</p> <p>Add, cancel, or update traffic events</p> <p>View detailed information about traffic levels, devices, and events</p> <p>Generate reports summarizing:</p> <ul style="list-style-type: none"> <li>• Current traffic flow volume and speed</li> <li>• Predicted traffic flow volume and speed</li> <li>• Accuracy of traffic prediction data</li> <li>• Traffic events</li> </ul>
<p>Traffic IT Administrator (TrafficITAdministrator)</p>	<p>All of the preceding views Administration views and portlets of the Traffic Prediction feature</p>	<p>All preceding responsibilities. Additionally a Traffic IT Administrator can:</p> <p>Configure the base maps of Traffic Awareness and Traffic Prediction</p> <p>Configure predefined traffic layers</p> <p>Configure the Traffic Prediction feature</p> <p>Configure report language and accessibility settings</p>
<p>Transit Operator (TransitOperator)</p>	<p>Operator: Transit view</p>	<p>See vehicles at their latest locations on the map, which is refreshed at a predefined interval</p> <p>See color-coded detail of whether vehicles are early or late</p> <p>For a selected vehicle:</p> <ul style="list-style-type: none"> <li>• See its route</li> <li>• See its future stops</li> <li>• See both scheduled and estimated future stop times for the vehicle</li> </ul> <p>Access the identity data of the vehicle</p> <p>Access the schedule deviation of the vehicle</p> <p>Access a list view of the same information that is conveyed on the map</p>

Table 1. The roles of IBM Intelligent Transportation. (continued)

User role (role group)	Authorized pages or portlets	Authorized responsibilities
Transit IT Administrator (TransitITAdministrator)	Operator: Transit view	All preceding Operator: Transit responsibilities  Configure the base maps of the Operator: Transit view

**Note:** TransitPlanner is an additional role that is also included in the portal security of IBM Intelligent Transportation. Optionally, you can use the TransitPlanner role for securing any customized features that you might add to the solution portal in the area of transit planning.

**Related tasks:**

“Viewing or modifying group membership” on page 102

Manage users of IBM Intelligent Transportation from the **Administration** view. Membership of a role group gives users access to the parts of the solution that are appropriate to that role. You can change the access level of a user by removing the user from one role group and adding that user to another group. You can also remove a user from IBM Intelligent Transportation. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues might occur.

“Removing users or groups” on page 103

If a user or group no longer requires access to the solution, you can remove them from IBM Intelligent Transportation. You can also remove a user or group from the entire solution, including the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions that are deployed in the environment. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues can occur.

---

## Sample users

During the deployment of IBM Intelligent Transportation, sample users are created with corresponding responsibilities and access permissions.

The IBM Intelligent Transportation solution includes the following sample users. The default password for all of the sample users is `password`.

Name	User ID	User role
Sara Jane	sjane	Traffic Operator
Yara Verna	yverna	Traffic Planner
Luke Smith	lsmith	Traffic Operator and Traffic Planner
Maria Jackson	mjackson	Traffic IT Administrator
Romana Leela	rleela	Transit Operator
Adric Sullivan	asullivan	Transit IT Administrator

By default, the sample users only have access to the IBM Intelligent Transportation solution.

If the sample users require access to the IBM Intelligent Operations Center and other IBM Smarter Cities Software Solutions that are installed in this environment, you must add the sample users to the relevant user roles for those solutions. For more information, see the security section of the IBM Intelligent Operations Center Information Center.

**Related tasks:**



“Deleting sample users” on page 79

IBM Intelligent Transportation includes sample users. For security reasons, delete the sample users after you have deployed the solution and become familiar with how to use the solution portal.

---

## Adding a user

You can add users to IBM Intelligent Transportation.

### Before you begin

Choose from one of the following IBM Intelligent Transportation role groups that provide the access level that your users or groups require:

- TrafficOperator
- TrafficPlanner
- TrafficITAdministrator
- TransitOperator
- TransitITAdministrator
- TransitPlanner

**Note:** TransitPlanner is an additional role that is also included in the portal security of IBM Intelligent Transportation. You optionally can use the TransitPlanner role for securing any customized features that you might add to the solution portal in the area of transit planning.

See the related links at the end of this topic for more information about the IBM Intelligent Transportation roles.

### Procedure

1. Log on to the solution portal as a portal administrator. For example, *wpsadmin*, or another user who is a member of the *wpsadmins* portal group.
2. On the main navigation bar at the top of the view, click **Administration > Portal Administration**.
3. On the sidebar menu, click **Access > Users and Groups**.
4. Click **All Portal User Groups**. The list of role groups for IBM Intelligent Transportation, and any other IBM Smarter Cities Software Solutions that are installed in this environment, are displayed.
5. Scroll through the list to find the user role group that you want to assign to your users.
6. Select a role group for IBM Intelligent Transportation. The IDs of the existing group members are listed.
7. Add a user by using one of the following steps:
  - To add a new user, click **New User** and complete the required **Profile Management** fields.

**Note:** To save time, you can duplicate group assignments for a new user that is based on an existing user. Select the new user, and then click the **Duplicate group assignments** icon. Select the existing user from whom you want to duplicate group membership.

- To add an existing user or group of users, click **Add Member**, and select one or more users or groups from the list.
8. Click **OK**.

### Results

A message confirms if the submission is successful. If you added a new user, a user profile is created and displayed on the group list. The new user is authorized to access IBM Intelligent Transportation according to the permissions that are assigned to the selected role group.

---

## Viewing or modifying group membership

Manage users of IBM Intelligent Transportation from the **Administration** view. Membership of a role group gives users access to the parts of the solution that are appropriate to that role. You can change the access level of a user by removing the user from one role group and adding that user to another group. You can also remove a user from IBM Intelligent Transportation. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues might occur.

### About this task

Use the following procedure to add or remove existing users from IBM Intelligent Transportation user role groups. Users that are removed from an IBM Intelligent Transportation user role group can continue to access the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions. For more information about how to completely delete a user and revoke their access to the entire portal and all solutions that are running in this environment, see the related links.

### Procedure

1. Log on to the solution portal as a portal administrator. For example, *wpsadmin*, or another user who is a member of the *wpsadmins* portal group.
  2. On the main navigation bar at the top of the view, click **Administration > Portal Administration**.
  3. On the sidebar menu, click **Access > Users and Groups**.
  4. Click **All Portal User Groups**. The list of role groups for IBM Intelligent Transportation, and any other IBM Smarter Cities Software Solutions that are installed in this environment, are displayed.
  5. Click one of the following IBM Intelligent Transportation user role groups that you would like to view or modify. You can scroll to the next page to find the required user role group that you are interested in.
    - **TrafficOperator**
    - **TrafficPlanner**
    - **TrafficITAdministrator**
    - **TransitOperator**
    - **TransitITAdministrator**
    - **TransitPlanner**
- Note:** The TransitPlanner role is included if you plan to customize the solution and add planning type features.
6. A table that contains all the users and groups that have been assigned to the user role is displayed. You can perform these actions by clicking the icons at the end of each row for a particular user:
    - To remove a user or group, click the **Delete** icon on the row for that user.
    - To view all other roles that the selected user or group has been assigned, click the **View membership** icon on the row for that user.
    - To add an existing portal user or group to this role, click **Add Member** and select the user or groups to be added.
    - To create a new portal user and add the user to the role, click **New User** and complete the required fields.
    - To create a new portal group and add the group to this role, click **New Group** and complete the required fields.
  7. To finish and return to the IBM Intelligent Transportation solution interface, on the main navigation bar at the top of the portal, click **More** and then select **Intelligent Transportation**.

**Related concepts:**

“User roles and responsibilities” on page 98

IBM Intelligent Transportation implements security by limiting access to features and data based on user roles.

**Related tasks:**

“Removing users or groups”

If a user or group no longer requires access to the solution, you can remove them from IBM Intelligent Transportation. You can also remove a user or group from the entire solution, including the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions that are deployed in the environment. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues can occur.

---

## Removing users or groups

If a user or group no longer requires access to the solution, you can remove them from IBM Intelligent Transportation. You can also remove a user or group from the entire solution, including the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions that are deployed in the environment. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues can occur.

### Procedure

1. To remove a user or group from only the IBM Intelligent Transportation portal solution, see the links at the end of this topic.

**Note:** Removing a user from IBM Intelligent Transportation user role groups does not affect any access the user might have to the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions that are installed in this environment.

2. To completely remove a user or group from the entire system, see the security section of the IBM Intelligent Operations Center product documentation.

**Note:** Removing predefined groups might make parts of the IBM Intelligent Transportation application inaccessible.

**Related concepts:**

“User roles and responsibilities” on page 98

IBM Intelligent Transportation implements security by limiting access to features and data based on user roles.

**Related tasks:**

“Viewing or modifying group membership” on page 102

Manage users of IBM Intelligent Transportation from the **Administration** view. Membership of a role group gives users access to the parts of the solution that are appropriate to that role. You can change the access level of a user by removing the user from one role group and adding that user to another group. You can also remove a user from IBM Intelligent Transportation. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues might occur.

“Viewing or modifying user profiles”

View or edit the profile of a user to set or reset any of the user profile attributes including password, name, email, and language. You cannot modify the user ID.

---

## Viewing or modifying user profiles

View or edit the profile of a user to set or reset any of the user profile attributes including password, name, email, and language. You cannot modify the user ID.

## About this task

The portal administrator can view or edit user profiles by using the **Administration** view. Select the user from the authenticated portal users list to open the user profile and change profile details.

**Note:** Users can also change their own profile by clicking **Edit My Profile** on the top navigation bar of the portal.

## Procedure

1. Log on to the solution portal as a portal administrator, for example, *wpsadmin*, or another user who is a member of the *wpsadmins* portal group.
2. On the main navigation bar at the top of the page, click **Administration**.
3. On the sidebar menu, expand the **Access** submenu, and click **Users and Groups**.
4. Click **All Authenticated Portal Users**. A table that contains all existing users is displayed.
5. Find the user and click the edit icon on the row for that user to display their **Profile Management** page. The attribute fields for the user profile are displayed.
6. Optional: To change the password for the user, enter a new password in the **New Password** and **Confirm Password** fields.
7. Add, edit, or delete information in any of the remaining fields.
8. To submit the changes you have made, click **OK**.

## Results

The user profile is updated with the changes that you submitted.

### Related tasks:

“Removing users or groups” on page 103

If a user or group no longer requires access to the solution, you can remove them from IBM Intelligent Transportation. You can also remove a user or group from the entire solution, including the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions that are deployed in the environment. Do not delete the portal security groups that are installed with IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. If you delete the predefined groups of the solution, issues can occur.

---

## Setting the password policy

IBM Security Identity Manager, which is installed on the application server in IBM Intelligent Operations Center, provides a default for how long a password can be used before it must be changed. Set a different password policy using the password management tool if the default value is not acceptable.

## Procedure

See the IBM Intelligent Operations Center password management document for details.

---

## Managing passwords for IBM Intelligent Transportation features

IBM Security Identity Manager, which is installed on the IBM Intelligent Operations Center application server, provides a password management tool for IBM Intelligent Transportation. If you change IBM Intelligent Operations Center middleware passwords, you also change the passwords for the IBM Intelligent Transportation features that you have installed.

## About this task

If you change the middleware passwords of the IBM Intelligent Operations Center 1.6 base architecture servers, complete the following steps to synchronize the passwords with IBM Intelligent Transportation 1.6. Follow the appropriate procedures for IBM Intelligent Transportation installation if the base architecture middleware passwords are modified. For example, the server passwords, the solution administrator password, the WebSphere Application Server administrator password, or the database password.

## Procedure

- If the base architecture server passwords are modified, complete the following steps to synchronize the passwords with IBM Intelligent Transportation:

1. Modify the root passwords in the `iop.ha.targets.xml` file in the `/installHome/ioc16/topology` directory on all servers. Remove the encrypted password from the `defaultValue` field, add a new plain text password, and change the `encryption` field from `encrypted` to `Required`.

```
<component package="BASE" type="host" id="DMZ_HOST_1" status="Ready" description="**
Web Server (primary) **">
  <property name="CPUArch" defaultValue="EM64T"/>
  <property name="OSBit" defaultValue="64"/>
  <property name="OSType" defaultValue="Linux"/>
  <property name="hostname" defaultValue="iop20ihspr1.ibmplatform.com"/>
  <property name="account" defaultValue="root"/>
  <property name="password" defaultValue="pmgP3MhME99kg/E4o9Xkqtcaep9n
uqB3qsMJ4fiA9Tc=" encryption="Encrypted"/>
```

2. Enter the following command to encrypt the file:

```
./ba.sh encryptTopology -t iop.ha.targets -p ibmioc16
```

The output is as follows:

```
CIYBA0233I: Current topology is "iop.ha.targets".
```

```
[hh:mm:ss] CIYBA0240I: Command completed successfully.
```

```
CIYBA0239E: If you want more detailed operation messages, check /installHome/ioc16/log/
encryptTopology_iop.ha.targets_yyyymmdd_hhmm.log
```

- If the `wpsadmin` password is modified, complete the following steps to synchronize the passwords with IBM Intelligent Transportation:

1. Modify the `wpsadmin` password as in the IBM Intelligent Operations Center password management document.
2. Modify the `wpsadmin` password in `iop.ha.coreconfig.xml` for all components by removing the encrypted password from the `defaultValue` field. Add a new plain text password, and modify the `encryption` field from `encrypted` to `Required`.

```
<component package="PORTAL" type="tds_config" id="portal_tds_config_1" status="Ready"
description="** Configure Portal LDAP **">
  <connection role="tds" id="tds_instance_d1"/>
  <connection role="portal" id="portal_base_a1"/>
  <property name="baseEntry" reference="tds_user_registry_1.baseEntry"/>
  <property name="LDAP_UserDN" reference="tds_user_registry_1.userEntry"/>
  <property name="LDAP_GroupDN" reference="tds_user_registry_1.groupEntry"/>
  <property name="LDAP_Admin_Uid" defaultValue="wpsadmin"/>
  <property name="LDAP_Admin_Password"
defaultValue="jRyjCeEalomrHMW97QEFog==" encryption="Encrypted"/>
</component>
```

3. Type the following command to encrypt the file: `./ba.sh encryptTopology -t iop.ha.coreconfig -p ibmioc16`

- If the `db2inst1` or `db2inst2` passwords are modified, complete the following steps to synchronize the passwords with IBM Intelligent Transportation:

1. Update the passwords for *db2inst1* or *db2inst2* using the Identity Manager Tool. See *Managing Passwords using the Identity Manager Tool* in the IBM Intelligent Operations Center password management document.
2. Update the *db2inst1* or *db2inst2* password with the password manager tool using the *Application User column for db2inst1/db2inst2* in the table in the IBM Intelligent Operations Center password management document.
3. Update the database passwords for the Cognos configuration file as in the IBM Intelligent Operations Center password management document.
4. Update the XML files for the existing topology with the new plain text password and encrypt the files.

**Note:**

- For the high availability topology, the XML file is *iop.ha.coreinst.xml* in the */installHome/ioc16/topology* directory on the *iop20anapri* server.
  - For the standard topology, the XML file is *iop.std.coreinst.xml* in the */installHome/ioc16/topology* directory on the *iop20ana* server.
5. In the XML files: *package="DB2"* with *type="db2\_instance"* and *name="instancePassword"*. For *db2inst1*, *name="instanceUser"*, the value is *db2inst1*. For *db2inst2*, *name="instanceUser"*, the value is *db2inst2*.
  6. Update the encrypted *defaultValue* value to the new plain password. Modify the *encryption* parameter to *Required*, and then save the XML file.
  7. Type the following command from the ANA node to run the encryption: */installHome/ioc16/tools/svc/bin/ba.sh encryptTopology -t iop.<topology>.coreinst -p <topology password>* where *<topology>* is *ha* or *std*. The values *ha* or *std* indicate either high availability or standard topologies.
- If the WebSphere Application Server administrator password is modified, complete the following steps to synchronize the passwords with IBM Intelligent Transportation:
    1. Change the WebSphere Application Server administrator password using the WebSphere Application Server console.
    2. Open the WebSphere Application Server console at *http://<appServer>:9061/ibm/console* and log on using the existing administrator password where *<appserver>* is the application server host name.
    3. Click **Users and Groups** > **Manage Users** and select the administrator user.
    4. Type the new password in the **Password edit** field. Type the password in the **Confirm password** field and click **OK**.
    5. Log out of the WebSphere Application Server console.
    6. Update the password using *Password Manager Tool for WAS admin* in the IBM Intelligent Operations Center password management document. See the *Application User* column in the *admin (non IBM Security Identity Manager)(WebSphere Application Server 8)* table.
    7. Update the XML files for the existing topology with the new plain text password and encrypt the files.

**Note:**

- For the high availability topology, the XML file is *iop.ha.coreconfig.xml* in the *installHome/ioc16/topology* directory on the *iop20anapri* server.
  - For the standard topology, the XML file is *iop.std.coreconfig.xml* in the *installHome/ioc16/topology* directory on the *iop20ana* server.
8. In the XML files, *package="WAS"* *type="was\_dmgr\_profile"* for *name="account"* *defaultValue="admin"*, *name="password"*.
  9. Update the encrypted *defaultValue* password to the new plain password and modify the *encryption* parameter to *Required*.

10. Type the following command from the ANA node to run the encryption: `/installHome/ioc16/tools/svc/bin/ba.sh encryptTopology -t iop.<topology>.coreconfig -p <topology password>` where *<topology>* is *ha* or *std*. The values *ha* or *std* indicate either high availability or standard topologies.

**Related information:**



IBM Intelligent Operations Center password management documentation





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## Chapter 5. Integrating the solution

Products and services can be integrated with IBM Intelligent Transportation.

A connection to a Traffic Management Data Dictionary (TMDD) V3.0 owner center is required to supply traffic data to IBM Intelligent Operations for Transportation.

A connection to a Service Interface for Real-Time Information (SIRI) message source is required to supply transit data to IBM Intelligent Transit Analytics.

---

### Integrating the Traffic Awareness system

The Traffic Awareness feature of IBM Intelligent Operations for Transportation interfaces with Traffic Management Centers and Advanced Traffic Management Systems (ATMS) using the Institute of Transportation Engineers (ITE) Traffic Management Data Dictionary (TMDD) Version 3.0 standard. TMDD standardizes data objects for traffic and event data and defines the messages and dialogs exchanged between systems in a US ITS National Architecture Center-to-Center (C2C) pattern.

TMDD defines the abstract interface between an owner center and an external center. The owner center is an organization or system that captures, processes, and owns raw traffic and event data. The external center is an organization or system receiving traffic and event data from the owner center. IBM Intelligent Transportation is the external center to organizations and systems providing data to the Traffic Awareness system database. The organizations and systems providing data to IBM Intelligent Transportation, fill the role of owner centers.

Typical deployments of IBM Intelligent Transportation will want to integrate data and events from multiple systems or centers. This is done by connecting more than one owner center to IBM Intelligent Transportation, the external center. The owner centers might collect events and data from devices and detectors in a certain part of the field of a city, state, or nation. When multiple owner centers are connected to IBM Intelligent Transportation, the Traffic Awareness feature provides a consolidated view of the traffic situation and events across the transportation network monitored by the owner centers.


#### Related concepts:

“Importing and configuring the TMDD data source” on page 56

After you install IBM Intelligent Operations for Transportation, the system must be configured to connect to one or more owner centers to feed the database with near real time and historical traffic data. The data source must be available in the required Traffic Management Data Dictionary (TMDD) data format that IBM Intelligent Transportation is designed to support.

#### Related information:

 [US ITS National Architecture Center-to-Center \(C2C\) Standards](#)

 [Traffic Management Data Dictionary \(TMDD\) and Message Sets for External Traffic Management Center Communications \(MS/ETMCC\) Version 3.0](#)

### Examples of systems that can be integrated

Owner centers provide data to IBM Intelligent Transportation. These owner centers can be any system that can communicate with the Traffic Awareness system using the TMDD protocol.

Example data that owner centers supply include:

- Roadway control and signaling systems
- Events

## Integrating TMDD data

IBM Intelligent Transportation supports three dialogs between owner centers connected to field devices and the external center provided by the Traffic Awareness feature of the solution.

These dialogs are:

- Request/Response
- Subscription
- Publication

In the request/response dialog IBM Intelligent Transportation sends a request to an owner center. Depending on the objects requested, filtering can also be requested. Each request expects an individual response from the owner center.

In the subscription dialog IBM Intelligent Transportation sends a subscription request to an owner center. Depending on the object requested, filtering can also be requested. The request expects responses from the owner center matching the request criteria until the subscription is terminated.

The publication dialog is the response to the IBM Intelligent Transportation subscription by an owner center. Publications are the same as a response in the request/response dialog, but are sent according to the frequency and endpoint specified in the subscription.

Traffic Management Data Dictionary (TMDD) data objects will be categorized by IBM Intelligent Transportation into different categories such as:

- Connection management.
- Center active verification.
- Traffic data.
- Nodes which represent arbitrary points in a road infrastructure. Nodes are typically intersections.
- Links which represent arbitrary segments in a road infrastructure. Links connect nodes.
- Traffic detectors associated with a node or link.
- Incidents or events.

## Communicating between external and owner centers

Communications between the external center provided by IBM Intelligent Transportation and owner centers, known as Center-to-Center (C2C) communications, require peer-to-peer network connections. These connections are typically through local or wide area networks.

Any type of communication link using TCP/IP and UDP/IP protocols with sufficient bandwidth can be used. The following should be considered when defining the network for desired operational performance:

- Frequency of messages to be exchanged
- Size of messages to be exchanged
- Latency between the C2C systems

IBM Intelligent Transportation uses an XML application profile for C2C communications based on the NTCIP standard. The application profile for C2C XML is based on World Wide Web Consortium (W3C) web service architecture message encoding and transport rules. The XML provides message definitions using an XML schema and dialog using the Web Services Definition Language (WSDL). The WSDL provides message encoding and transport for request/response and subscription/publication using Simple Object Access Protocol (SOAP) messages sent by hypertext transfer protocol (HTTP).

### Related concepts:

“Using web services dialogs” on page 111

IBM Intelligent Transportation provides Web Services Definition Language (WSDL) dialogs to

communicate data between IBM Intelligent Transportation and other products and services.

“XSD and WSDL files” on page 113

IBM Intelligent Operations for Transportation provides XSD and WSDL files to be used when integrating owner centers with the Traffic Awareness feature. These files can be used to resolve incompatibilities between owner and external centers.

## Traffic Awareness TMDD support

IBM Intelligent Transportation supports a subset of the Traffic Management Data Dictionary V3 standard.

See the following topics for information on the TMDD support that exists for IBM Intelligent Transportation.

### Related reference:

“Supported TMDD requirements and user needs” on page 325

IBM Intelligent Transportation supports a specific set of TMDD requirements and user needs of TMDD version 3.


“Supported TMDD data objects, dialogs, and types” on page 365

IBM Intelligent Transportation implements a subset of TMDD data objects, dialogs, and subscription and request types.

“Supported TMDD event groups and types” on page 370

IBM Intelligent Transportation supports a subset of TMDD event groups and types.

### Related information:

 [Traffic Management Data Dictionary \(TMDD\) and Message Sets for External Traffic Management Center Communications \(MS/ETMCC\) Version 3.0](#)

## Using web services dialogs

IBM Intelligent Transportation provides Web Services Definition Language (WSDL) dialogs to communicate data between IBM Intelligent Transportation and other products and services.

Table 2 describe the dialogs available in the Traffic Awareness feature.

*Table 2. WSDL dialogs provided by the Traffic Awareness feature*

Dialog Class (Dialog)	Description
ConnectionManagementClassDialogs (DICenterActiveVerificationRequest)	A request-response dialog used by an external center to request that an owner center is active. This is used to initiate connections to the TMDD Adapter.
ConnectionManagementClassDialogs (DICenterActiveVerificationSubscription)	A request-response dialog used by an external center to periodically verify that the owner center is active. This is used to determine if the TMDD Adapter is active.
ConnectionManagementClassDialogs (DICenterActiveVerificationUpdate)	A publication used for an owner center to provide updates to an external center indicating that the owner center is active. This is used to determine if the TMDD Adapter is active.
DetectorClassDialogs (DIDetectorDataRequest)	A request-response dialog used by an external center to request that the owner center provide collected data for a set of owner center's detector stations and sensors. This is used to initiate the map and database when the TMDD Adapter is started.
DetectorClassDialogs (DIDetectorDataSubscription)	A request-response dialog used by an external center to request a subscription from an owner center for updates on the owner center's detector station and sensor collected data. This is used to initiate a feed.

Table 2. WSDL dialogs provided by the Traffic Awareness feature (continued)

Dialog Class (Dialog)	Description
DetectorClassDialogs (DIDetectorDataUpdate)	A publication dialog used for an owner center to provide collected data updates to an external center about the owner center's detector stations and sensors. This is used to set up a detector feed.
DetectorClassDialogs (DIDetectorInventoryRequest)	A request-response dialog used by an external center to request an inventory of an owner center's detector stations and sensors. This is used to initialize the map and database when the TMDD Adapter is started.
DetectorClassDialogs (DIDetectorInventoryUpdate)	A publication dialog used for an owner center to provide inventory updates to an external center on the owner center's detector stations and sensors.
DetectorClassDialogs (DIDetectorStatusUpdate)	A publication dialog used for an owner center to provide status updates to an external center on the owner center's detector stations and sensors.
DeviceClassDialogs (DIDeviceInformationSubscription)	A request-response dialog for an external center to request a subscription from an owner center on updates on to its device inventory, status and control schedule.
EventClassDialogs (DIActionLogSubscription)	A request-response dialog for an external center to request a subscription from an owner center on updates on its action logs.
EventClassDialogs (DIActionLogUpdate)	A publication dialog for an owner center to provide updates on its action logs to an external center.
EventClassDialogs (DIEventIndexSubscription)	A request-response dialog used by external center subscribe to owner center event index updates.
EventClassDialogs (DIEventIndexUpdate)	A publication dialog for an owner center to provide event index status updates to an external center.
EventClassDialogs (DIFullEventUpdateUpdate)	A publication dialog for an owner center to provide event updates to an external center.
LinkClassDialogs (DILinkInventoryRequest)	A request-response dialog used by an external center to request an inventory of the owner center's traffic network links. This is used to initialize the map and database when the TMDD Adapter is started.
LinkClassDialogs (DILinkInventoryUpdate)	A publication dialog for an owner center to provide traffic network link inventory updates to an external center.
LinkClassDialogs (DILinkStatusUpdate)	A publication dialog for an owner center to provide traffic network link status updates to an external center.
NodeClassDialogs (DINodeInventoryRequest)	A request-response dialog used by external center to request an inventory of owner center traffic network nodes. This is used to initialize the map and database when the TMDD Adapter is started.
NodeClassDialogs (DINodeInventoryUpdate)	A publication dialog for an owner center to provide a traffic network node inventory updates to an external center.
NodeClassDialogs (DINodeStatusUpdate)	A publication dialog for an owner center to provide traffic network node status updates to an external center.

Table 2. WSDL dialogs provided by the Traffic Awareness feature (continued)

Dialog Class (Dialog)	Description
TransportationNetworkClassDialogs (DITrafficNetworkInformationSubscription)	A request-response dialog used by an external center subscribe to owner center traffic network node, link, and route updates.

**Related concepts:**

“Communicating between external and owner centers” on page 110  
 Communications between the external center provided by IBM Intelligent Transportation and owner centers, known as Center-to-Center (C2C) communications, require peer-to-peer network connections. These connections are typically through local or wide area networks.

**Related reference:**

“Supported TMDD data objects, dialogs, and types” on page 365  
 IBM Intelligent Transportation implements a subset of TMDD data objects, dialogs, and subscription and request types.

**XSD and WSDL files**

IBM Intelligent Operations for Transportation provides XSD and WSDL files to be used when integrating owner centers with the Traffic Awareness feature. These files can be used to resolve incompatibilities between owner and external centers.

These files can be found in the /opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/ directory on the IBM Intelligent Operations Center application server after the Traffic Awareness feature is installed.

**Related concepts:**

“Communicating between external and owner centers” on page 110  
 Communications between the external center provided by IBM Intelligent Transportation and owner centers, known as Center-to-Center (C2C) communications, require peer-to-peer network connections. These connections are typically through local or wide area networks.

**Configuring the TMDD data flow into IBM Intelligent Transportation**

After installing the Traffic Awareness feature, the system must be configured to connect to one or more owner centers to feed the database with near real time traffic data. The data source must be available to the Traffic Awareness feature in the required TMDD data format that the system is designed to support.

**Before you begin**

Before attempting to complete the tasks below, you must plan how IBM Intelligent Transportation integrates with other traffic systems and what type of traffic data is to be imported. The data source must be prepared and converted into TMDD format before it can be used by the system.

**About this task**

The following tasks are required to import the near real time and historical traffic data into IBM Intelligent Transportation.

**Planning the TMDD data integration**

Before you integrate IBM Intelligent Transportation with owner centers, the appropriate planning must be done to ensure that your system is correctly configured to capture the required information from road-side traffic subsystems.

## About this task

The following procedure consists of important questions for you to consider as part of your TMDD data integration planning.

### Procedure

1. What owner center will provide and feed the data that is required by IBM Intelligent Transportation? The WSDL port of the owner center is required. Also, the URL of the external center that IBM Intelligent Transportation will connect to.
2. Will there be extra owner centers that connect to IBM Intelligent Transportation?
3. What Traffic Management Data Dictionary (TMDD) data types will be fed into IBM Intelligent Transportation? For example:

- Event inventory
- Traffic flow inventory
- Traffic devices inventory
- Road link inventory

4. How will data be fed into IBM Intelligent Transportation?
  - What subscriptions are required and how often?
  - Is a bulk data import required to be run to feed in historical data?
5. Are you planning to install the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation?

If so, ensure that the minimum attributes exist in the TMDD data source. If you would like the system to generate the predicted traffic levels, then the following attributes of TMDD are required:

- *tmdd:link-id*
- *tmdd:speed-average*
- *tmdd:last-update-time*

### Related tasks:

“Running a bulk load of traffic data” on page 126

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

### Related reference:

“Supported TMDD event groups and types” on page 370

IBM Intelligent Transportation supports a subset of TMDD event groups and types.

## TMDD Data Management tools

When the Traffic Awareness feature of IBM Intelligent Operations for Transportation is deployed, a set of TMDD Data Management tools are installed onto the IBM Intelligent Operations Center application server.

The tools are required to populate the system databases located on the IBM Intelligent Operations Center data server.

The TMDD data management tools are used to import TMDD data from one or more owner centers into the system databases. They include the following:

- TMDD subscription management tool
- TMDD bulkload management tool

Both tools are configured using the `ecserver.properties` file that resides in the same directory as the tool. The `ecserver.properties` file is read by the TMDD Data Management tools to determine how the data is imported into the Traffic Awareness.

### **TMDD Subscription Data Management tool**

The TMDD Subscription Data Management tool consists of a shell script that performs the connection and data retrieval from the owner center to IBM Intelligent Transportation.

The tool is located on the IBM Intelligent Operations Center application server and has the following path and filename:

```
/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts/  
createSubscriptions.sh
```

### **TMDD Bulkload Data Management tool**

Like the TMDD Subscription Data Management tool, the TMDD Bulkload Data Management tool consists of a shell script that performs a bulk data import of archived traffic data, from the owner center to IBM Intelligent Transportation.

The TMDD Bulkload Data Management tool is located on the IBM Intelligent Operations Center application server and has the following path and filename:

```
/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts/bulkLoad.sh
```

#### **Related concepts:**

“TMDD data import configuration”

Configure the TMDD data import by applying the required settings to the system properties database table and editing the `ecserver.properties` file. The TMDD data import scripts read both the `ecserver.properties` file and the system properties database table to determine how the data is imported into IBM Intelligent Transportation.

#### **Related tasks:**

“Running a bulk load of traffic data” on page 126

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

### **TMDD data import configuration**

Configure the TMDD data import by applying the required settings to the system properties database table and editing the `ecserver.properties` file. The TMDD data import scripts read both the `ecserver.properties` file and the system properties database table to determine how the data is imported into IBM Intelligent Transportation.

### **The `ecserver.properties` file configuration**

The `ecserver.properties` file is on the IBM Intelligent Operations Center application server in the following directory:

```
/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/
```

The `ecserver.properties` file is case-sensitive and requires administrator access to edit.

For bulk load, all of the required arguments are specified as part of the command line. Configure the `ecserver.properties` file only when you are creating subscriptions for an owner center. To complete the configuration for these subscriptions, configure both the owner center and the subscription settings for the external center.

For a detailed list of these configuration options and values, see *TMDD configuration properties in the ecserver.properties file*.

## The system properties database table configuration

Configure specific parameters to support the initiation and the processing of TMDD publications by the IBM Intelligent Operations for Transportation component. For information on how to modify system properties database table values, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation. For a detailed list of the TMDD configuration options and values, see *TMDD configuration properties in the system properties table*.

### Related concepts:

“TMDD Data Management tools” on page 114

When the Traffic Awareness feature of IBM Intelligent Operations for Transportation is deployed, a set of TMDD Data Management tools are installed onto the IBM Intelligent Operations Center application server.

### Related tasks:

“Connecting to an owner center” on page 121

IBM Intelligent Transportation must be configured to connect to at least one owner center. The owner center provides the TMDD traffic flow and event data.

“Setting up a subscription to traffic data” on page 123

A subscription is a request that is made to an owner center requesting that data is sent periodically to an external center, (IBM Intelligent Transportation). The message that encapsulates the data that is sent to the external center is a publication. Publications are sent to the external center until the subscription is canceled.

“Running a bulk load of traffic data” on page 126

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

### TMDD configuration properties in the `ecserver.properties` file:

The `ecserver.properties` file contains the configuration options that can be set for IBM Intelligent Transportation using a standard editor.

The `ecserver.properties` file is in the following directory on the IBM Intelligent Operations Center application server:

```
/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/
```

Properties that are supplementary to those properties contained in the system properties table are included in the `ecserver.properties` file. Table 3 on page 117 lists the properties that can be configured to suit your deployment of IBM Intelligent Transportation. Any properties that are not listed in Table 3 on page 117 must not be changed. Some of the properties that are listed in Table 3 on page 117 are shared with the system properties database table. If properties are shared, ensure that the same value is used in the `ecserver.properties` file and the system properties database table. Where a property is not shared with the system properties, this fact is noted in the property column in Table 3 on page 117.

For more information, see also *TMDD configuration properties in the system properties table*.



Table 3. *ecserver.properties* file configuration options

Property Name	Section	Value required
oc <b>Note:</b> This property is not shared with system properties table	Owner Centers	The configuration name for the defined owner center
oc.name.port <b>Note:</b> This property is not shared with system properties table	Owner Centers	The URL to the WSDL port of the owner center. For example: <code>http://hostName:TCPportNo/TMDD_Service_Provider/tmddOCSOapHttpService?wsdl</code> where <i>hostName</i> is an IP address (or a name that is resolved by <code>/etc/hosts</code> ) and <i>TCPportNo</i> is the TCP/IP port the service is listening on
oc.name.subscriptions <b>Note:</b> This property is not shared with system properties table	Owner Centers	<p>A space-separated list of subscriptions in the following format:</p> <pre>subscriptionName:publicationType:subscriptionInterval:subscriptionType:subscriptionAction:subscriptionArg</pre> <p>The following list contains all the publication types that can be initiated:</p> <ul style="list-style-type: none"> <li>• CCTVInventorySubscription</li> <li>• CCTVStatusSubscription</li> <li>• CenterActiveVerificationSubscription</li> <li>• DetectorDataSubscription</li> <li>• DetectorInventorySubscription</li> <li>• DetectorStatusSubscription</li> <li>• DMSInventorySubscription</li> <li>• DMSStatusSubscription</li> <li>• FullEventUpdateSubscription</li> <li>• GateInventorySubscription</li> <li>• GateStatusSubscription</li> <li>• IntersectionSignalInventorySubscription</li> <li>• IntersectionSignalStatusSubscription</li> <li>• LCSInventorySubscription</li> <li>• LCSStatusSubscription</li> <li>• LinkInventorySubscription</li> <li>• LinkStatusSubscription</li> <li>• NodeInventorySubscription</li> <li>• OrganizationInformationSubscription</li> <li>• RampMeterInventorySubscription</li> <li>• RampMeterStatusSubscription</li> </ul>
organization-information.organization-id	External Center Identification	Any string value up to 32 characters in length
organization-information.organization-name	External Center Identification	Any string value up to 128 characters in length
organization-information.function	External Center Identification	Any string value up to 128 characters in length
organization-information.organization-location	External Center Identification	Any string value up to 10 characters in length
organization-information.center-location.latitude	External Center Identification	An integer value between -18000000 and 18000000 inclusive

Table 3. *ecserver.properties* file configuration options (continued)

Property Name	Section	Value required
organization-information-center-location.longitude	External Center Identification	An integer value between -180000000 and 180000000 inclusive
organization-information-center-location.horizontal-datum	External Center Identification	A string value of any length
organization-information-center-description	External Center Identification	Any string value up to 128 characters in length
organization-information-center-type	External Center Identification	A string value that is defined as String[fixed, mobile]
organization-information-center-contact-details.contact-id	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.person-name	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.person-title	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.phone-number	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.phone-alternate	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.mobile-phone-number	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.mobile-phone-id	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.fax-number	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.pager-number	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.pager-id	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.email-address	External Center Identification	Any string value up to 128 characters in length
organization-information-center-contact-details.radio-unit	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.address-line1	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.address-line2	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.state	External Center Identification	Any string value up to 2 characters in length
organization-information-center-contact-details.city	External Center Identification	Any string value up to 32 characters in length
organization-information-center-contact-details.zip-code	External Center Identification	Any string value up to 32 characters in length

Table 3. *ecserver.properties* file configuration options (continued)

Property Name	Section	Value required
ec.obfuscation-arg	Subscription Secret	The value that is specified is used to encode the message ID and name to ensure that they depend on one another. Any value can be specified. However, the same value must be used in the system properties database table, and must also match the corresponding value that is used by the TMDD owner center.

**Related concepts:**

“TMDD configuration properties in the system properties table”

Configure specific parameters to support initiation and the processing of TMDD publications by the IBM Intelligent Operations for Transportation component. Edit the parameters of the IBM Intelligent Operations Center system properties table to configure the integration of the data with the *trans\_tmddecserver* web application.

**Related tasks:**

“Setting up a subscription to traffic data” on page 123

A subscription is a request that is made to an owner center requesting that data is sent periodically to an external center, (IBM Intelligent Transportation). The message that encapsulates the data that is sent to the external center is a publication. Publications are sent to the external center until the subscription is canceled.

“Configuring the obfuscation key” on page 125

For additional security, you can protect the communication stream by configuring an obfuscation key for the IBM Intelligent Transportation TMDD External Center, to link the name and ID of a TMDD data subscription together. If an obfuscation key is configured, the IBM Intelligent Transportation TMDD External Center rejects any publications that do not observe the linking of name and ID. After configuring an obfuscation key, communicate the required information to the parties that initiate publications on TMDD owner centers, but are subscribed to by this TMDD External Center. External parties must update their TMDD data subscription configuration in order to be able to successfully send or receive TMDD data between the owner center and the external center.

**TMDD configuration properties in the system properties table:**

Configure specific parameters to support initiation and the processing of TMDD publications by the IBM Intelligent Operations for Transportation component. Edit the parameters of the IBM Intelligent Operations Center system properties table to configure the integration of the data with the *trans\_tmddecserver* web application.

Some of these system properties are shared with the *ecserver.properties* file. Where properties are shared, ensure that the same value is used in the *ecserver.properties* and the system properties database table. IBM Intelligent Operations for Transportation values that are stored in the system properties table have a *GROUP* value of *Transport* and a *NAME* value equal to the property prefixed with *TMDD,*.

To modify an entry in the system properties table, connect to the IBM Intelligent Operations Center data server and update the relevant table entry. For example, to modify the *organization-id* property to *US Highway* in the system properties table, complete the following steps:

1. Log on to the IBM Intelligent Operations Center data server as the administrator. For example, `db2inst2`.
2. Enter the following DB2 command:
 

```
db2 connect to iocdb
db2 " update ioc.sysprop set VALUE='US Highway' where (GROUP='Transport') and (NAME='TMDD,organization-information.organization-id')"
```
3. Restart the TMDD web application to read the updated database entries.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

See Table 4 for system properties that can be configured to suit your deployment of IBM Intelligent Transportation. Any properties that are not listed in Table 4 must not be changed. Where a property is not shared with the `ecserver.properties` file, this fact is noted in the Table 4.

For more information, see also *TMDD configuration properties in the `ecserver.properties` file*.

Table 4. A list of the system properties table configuration options for IBM Intelligent Operations for Transportation

Property Name	Section	Value required
TMDD,logPublication <b>Note:</b> This property is not shared with <code>ecserver.properties</code> file.	logPublication	When the value is set to true, IBM Intelligent Transportation uses the TMDD publication sequence number to check if the publication has already been processed. Such messages are not processed and an error message is displayed.
TMDD,timeStampTolerance <b>Note:</b> This property is not shared with <code>ecserver.properties</code> file.	Owner Centers	The number of seconds allowed to determine whether a time stamp is in the future. TMDD faults messages that have a time stamp after the current time, according to the time of the IBM Intelligent Operations Center application server. The administrator can allow for servers that have discrepancies in their system clocks.
TMDD,schemaFile <b>Note:</b> This property is not shared with <code>ecserver.properties</code> file.	TMDD schema	Specifies the XML schema to determine the validity of a TMDD SOAP payload. If the schema is specified, the validity of the TMDD SOAP payload is checked. If the schema is not specified, no such checking takes place.
TMDD,ec.obfuscation-arg	Subscription Secret	The value that is specified is used to encode the message ID and name to ensure that they depend on one another. Any value can be specified.
TMDD,ec.heartbeat <b>Note:</b> This property is not shared with <code>ecserver.properties</code> file.	logPublication	The interval in seconds used to check whether logged publication messages are late.
TMDD,useBatching <b>Note:</b> This parameter is not shared with <code>ecserver.properties</code> file.		If set to true, link status messages can be batched. A single batch is used to commit all elements of a link status message to the database.
TMDD,organization-information.organization-id	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.organization-name	External Center Identification	Any string value up to 128 characters in length
TMDD,organization-information.function	External Center Identification	Any string value up to 128 characters in length
TMDD,organization-information.organization-location	External Center Identification	Any string value up to 10 characters in length
TMDD,organization-information-center-location.latitude	External Center Identification	An integer value between -180000000 and 180000000 inclusive
TMDD,organization-information-center-location.longitude	External Center Identification	An integer value between -180000000 and 180000000 inclusive
TMDD,organization-information.center-location.horizontal-datum	External Center Identification	A string value of any length

Table 4. A list of the system properties table configuration options for IBM Intelligent Operations for Transportation (continued)

Property Name	Section	Value required
TMDD,organization-information.center-description	External Center Identification	Any string value up to 128 characters in length
TMDD,organization-information.center-type	External Center Identification	A string value that is defined as <i>String[fixed, mobile]</i>
TMDD,organization-information.center-contact-details.contact-id	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.person-name	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.person-title	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.phone-number	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.phone-alternate	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.mobile-phone-number	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.mobile-phone-id	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.fax-number	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.pager-number	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.pager-id	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.email-address	External Center Identification	Any string value up to 128 characters in length
TMDD,organization-information.center-contact-details.radio-unit	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.address-line1	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.address-line2	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.state	External Center Identification	Any string value up to 2 characters in length
TMDD,organization-information.center-contact-details.city	External Center Identification	Any string value up to 32 characters in length
TMDD,organization-information.center-contact-details.zip-code	External Center Identification	Any string value up to 32 characters in length

**Related concepts:**

“TMDD configuration properties in the `ecserver.properties` file” on page 116

The `ecserver.properties` file contains the configuration options that can be set for IBM Intelligent Transportation using a standard editor.

**Connecting to an owner center**

IBM Intelligent Transportation must be configured to connect to at least one owner center. The owner center provides the TMDD traffic flow and event data.

## About this task

To configure the TMDD owner center, edit the `ecserver.properties` file on the IBM Intelligent Operations Center application server by using a text editor. You can configure multiple owner centers in this file. Each owner center is distinguished by a unique name that you need to specify at the start of the **# Owner centers details** section. Each data subscription or bulk load request is assigned to a specific owner center.

## Procedure

1. Log on to the IBM Intelligent Operations Center application server using the system administrator ID.
2. Go to the following folder: `/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/`
3. Open the `ecserver.properties` file using a text editor.
4. Scroll down to the **# Owner centers details** section.
5. Go to the `oc=name` field.
6. Specify the names of the owner centers to connect to, by replacing the text name with a unique name. To specify multiple owner centers, use the space bar as a separator, for example:  
`oc=ownercenter1 ownercenter2`

**Note:** Do not enter the host name here. This is required in a later step.

7. Go to the `oc.name.port` field and replace the text name to match the name of the owner center that you specified in the previous step. For example:  
`oc.ownercenter1.port=`
8. Optional: If you plan to connect IBM Intelligent Transportation to multiple owner centers, copy this line and repeat step 7 for each owner center.
9. For each owner center, replace the example value after the = with the WSDL URL, that includes the correct protocol and port number. For example:  
`# oc.ownercenter1.port=https://hostname.example.com:9451/TMDD_Service_Provider/tmddOCSoapHttpService?wsdl`

10. Save and close the `ecserver.properties` file.

### Related concepts:

“TMDD data import configuration” on page 115

Configure the TMDD data import by applying the required settings to the system properties database table and editing the `ecserver.properties` file. The TMDD data import scripts read both the `ecserver.properties` file and the system properties database table to determine how the data is imported into IBM Intelligent Transportation.

“Running a TMDD data flow subscription”

Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

### Related tasks:

“Running a bulk load of traffic data” on page 126

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

## Running a TMDD data flow subscription

Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

### Related concepts:

“Subscription types” on page 366

IBM Intelligent Transportation supports a number of subscription types.

“Request types” on page 368

IBM Intelligent Transportation supports a number of request types.

#### **Related tasks:**

“Connecting to an owner center” on page 121

IBM Intelligent Transportation must be configured to connect to at least one owner center. The owner center provides the TMDD traffic flow and event data.

#### **Related reference:**

“Publish dialogs” on page 369

IBM Intelligent Transportation implements a subset of TMDD data objects and publish dialogs.

“Request/response dialogs” on page 368

IBM Intelligent Transportation implements a subset of TMDD request/response dialogs.

“Subscription dialogs” on page 367

IBM Intelligent Transportation implements a subset of TMDD data objects and subscription dialogs.

“Supported TMDD data objects, dialogs, and types” on page 365

IBM Intelligent Transportation implements a subset of TMDD data objects, dialogs, and subscription and request types.

#### **Setting up a subscription to traffic data:**

A subscription is a request that is made to an owner center requesting that data is sent periodically to an external center, (IBM Intelligent Transportation). The message that encapsulates the data that is sent to the external center is a publication. Publications are sent to the external center until the subscription is canceled.

#### **About this task**

There are two web services involved in the subscription process. The owner center provides a web service that accepts requests and initiates publications. The external center (IBM Intelligent Transportation) provides a web service, named `trans_tmddecserver_ear` that accepts publications and extracts the data from those publications and writes the information to the system databases.

The `createSubscriptions.sh` script that is provided by the Traffic Awareness feature initiates subscription requests. The following parameters must be set before you run the script.

- The URL to the external center (IBM Intelligent Transportation) that processes the publications
- The URL to access the owner center.
- Information about the desired subscriptions.

The URL to the external center is specified on the subscription script. Since this script is usually on the same node as the external center, and requires the same identities, the same `ecserver.properties` file is used. The owner center and subscription details are specified in this file.

The following `ecserver.properties` settings are required when you connect to an owner center:

- The owner center names specifying the names of the owner centers to be contacted. For example:  
`oc=ocName1 ocName2 ocName3.`
- For each owner center, the associated WSDL port and port type. For example:

```
# Owner Center WSDL port
# Change for local installation
oc.ocName1.port=http://ocName1IP:postNo/TMDD_Service_Provider/tmddOCSoapHttpService?wsdl
# Owner Center port type
# The proxy port allows messages to be traced in eclipse
oc.ocName1.portType=org.tmdd._3.dialogs.TmddOCSoapHttpServicePortType
oc.ocName1.subscriptions=subscriptions
```

Where *subscriptions* is a space separated list of subscriptions in the following format:  
*subscriptionName:publicationType:subscriptionInterval:subscriptionType:subscriptionAction:  
subscriptionArg*

Where the values are as follows:

- *SubscriptionName* is an alphanumeric name that is used to identify the subscription. *SubscriptionName* must be unique to an owner center.
- *PublicationType* is a valid subscription type.
- *SubscriptionInterval* is the interval in seconds that publications are sent to the external center.
- *SubscriptionType* is one of the following options:
  - oneTime - subscription that is requested and response returned one time
  - periodic - data sent to IBM Intelligent Transportation at regular defined intervals
  - onChange - data sent to IBM Intelligent Transportation when updated at the owner center
- *SubscriptionAction* is one of the following options:
  - newSubscription - create a subscription with the owner center
  - replaceSubscription - replace a subscription with the owner center
  - cancelSubscription - cancel a subscription with the owner center
  - cancelAllPriorSubscriptions - cancel all subscriptions with the owner center
- *SubscriptionArg* specifies a subscription-specific argument. The device-type dialog uses *SubscriptionArg* to specify the owning center of the required device information.

## Procedure

1. Determine the URLs to access the owner and external center TMDD servers. The external center is similar to the following URL: `http://ecHostName:portNo/trans_tmddecserver_ear/tmddECSoapHttpService`. The address can be determined by the **Provide HTTP endpoint URL information** and **Context Root For Web Module** links on the **WebSphere Enterprise Applications** page of the WebSphere Application Server administration console.  
In these steps, `http://ocHostName:portNo/TMDD_Service_Provider/tmddOCSOapHttpService` is used for the owner center URL.  
Typically *ecHostName* and *ocHostName* are `/etc/hosts` and *portNo* is a four-digit number for the TCP/IP port that the services listen on.
2. Make sure that the external center service is running and that you have access to the owner center. The external center service status can be determined through the **Enterprise Applications** page of the administrative console.
3. Update the `ecserver.properties` file with the owner center name, WSDL port, and WSDL port type.
4. Update the `ecserver.properties` file with the subscriptions to be initiated.
5. Change to the following directory that contains the TMDD shell scripts.  
`/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts`
6. Specify the following shell variables by using `export` command in the shell. If you do not specify the shell variables, the default values are used.
  - *WAS\_HOME* is the location of the WebSphere Application Server installation. By default, the path is `/opt/IBM/WebSphere`.
  - *TRANS\_HOME* is the location of the configuration and library files for IBM Intelligent Operations for Transportation. By default, the path is set to `/opt/IBM/iss/intelligentTransportation/`.
  - *ISS\_HOME* is the location of the `iss_common.jar` file. By default, the path is set to `/opt/IBM/iss/`.
  - *IOC\_HOME* is the location configuration and library files for the IBM Intelligent Operations Center. By default, the path is set to `/opt/IBM/ioc/`.
  - *JAVA\_HOME* is the location of the JVM. By default, the path is set to `/opt/IBM/WebSphere/AppServer/java`.



7. Run the request.

```
sh createSubscriptions.sh http://eCHostName:portNo/trans_tmddecserver_ear/tmddECSoapHttpService -p path
```

Where **-p path** is a parameter that you can optionally set to specify an alternative non-default path for the `ecserver.properties` configuration file.

#### Related concepts:

“TMDD data import configuration” on page 115

Configure the TMDD data import by applying the required settings to the system properties database table and editing the `ecserver.properties` file. The TMDD data import scripts read both the `ecserver.properties` file and the system properties database table to determine how the data is imported into IBM Intelligent Transportation.

“Subscription types” on page 366


IBM Intelligent Transportation supports a number of subscription types.

#### Related tasks:

“Canceling a subscription” on page 126

If a subscription is no longer required, the subscription can be canceled.

#### Related information:

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

#### *Configuring the obfuscation key:*

For additional security, you can protect the communication stream by configuring an obfuscation key for the IBM Intelligent Transportation TMDD External Center, to link the name and ID of a TMDD data subscription together. If an obfuscation key is configured, the IBM Intelligent Transportation TMDD External Center rejects any publications that do not observe the linking of name and ID. After configuring an obfuscation key, communicate the required information to the parties that initiate publications on TMDD owner centers, but are subscribed to by this TMDD External Center. External parties must update their TMDD data subscription configuration in order to be able to successfully send or receive TMDD data between the owner center and the external center.

#### About this task

Configure the obfuscation key by editing the `ecserver.properties` file and setting the **ec.obfuscation-arg** parameter. The `ecserver.properties` file lists configuration options that can be set for IBM Intelligent Transportation. By default, an obfuscation key is not configured as this is an optional setting. An example entry is provided in the `ecserver.properties`. Once the properties file has been updated, the services of IBM Intelligent Transportation needs to restarted.

#### Procedure

1. Log on to the IBM Intelligent Operations Center application server as the root user.
2. From the command line, open the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/`
3. Edit the `ecserver.properties` file.
4. Create a value for the obfuscation key for the external center, and enter the value into the **ec.obfuscation-arg** parameter. To create the obfuscation key, enter a sequence of between 8 and 12 random alphanumeric characters that would be difficult to guess. For example:  
**ec.obfuscation-arg=6hvF7751jor**
5. Save and close the `ecserver.properties` file.
6. Restart the services of IBM Intelligent Transportation by logging on to the IBM Intelligent Operations Center application server as the root user and entering the following commands to restart the server:

```
cd /opt/IBM/ISP/mgmt/scripts
iopmgmt.sh stop all password
iopmgmt.sh start all password
```

Where *password* is the password for the `ibmadmin` user that was defined when the IBM Intelligent Operations Center was deployed.

## What to do next

When the `ec.obfuscation-arg` parameter is added to the properties file, and the server is restarted, obfuscation is active and any subscriptions created after this are obfuscated. Any subscriptions that are made prior to activating obfuscation are not affected. For more information, see the topic *Setting up a subscription to traffic data*.

### Related concepts:

“TMDD configuration properties in the `ecserver.properties` file” on page 116

The `ecserver.properties` file contains the configuration options that can be set for IBM Intelligent Transportation using a standard editor.

“Controlling the services of the Traffic Awareness feature” on page 189

You can control and query the services of the Traffic Awareness feature from the WebSphere Application Server administrative console on the IBM Intelligent Operations Center application server.

### Canceling a subscription:

If a subscription is no longer required, the subscription can be canceled.

### About this task

To cancel a subscription, follow the same steps as setting up a subscription specifying `cancelSubscription` for the `subscriptionAction`.

### Related tasks:

“Setting up a subscription to traffic data” on page 123

A subscription is a request that is made to an owner center requesting that data is sent periodically to an external center, (IBM Intelligent Transportation). The message that encapsulates the data that is sent to the external center is a publication. Publications are sent to the external center until the subscription is canceled.

## Running a bulk load of traffic data

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

## Before you begin

All services and components on the IBM Intelligent Operations Center application server must be up and running before you start the bulk loading of traffic data. Specifically the `trans_tmddecserver_ear` service which provides the IBM Intelligent Transportation TMDD External Center.

To run the bulk load command, you will need the following information:

- URL to the External Center. For example `http://eHostName:portNo/trans_tmddecserver_ear/tmddECSOapHttpService`
- Obfuscation key, if one has been configured.
- Raw TMDD data files.

**Note:** Each file should contain a single TMDD inventory, data or status message. A single message may contain a number of data points.

## About this task

Use the **bulkLoad.sh** command to execute the bulk loading of traffic data. The bulk load command will package the message as a request to the TMDD External Center server.

## Procedure

1. Log on to the IBM Intelligent Operations Center application server as the root user.
2. Open the following directory containing the TMDD shell scripts:

```
/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts
```

3. Enter the following bulk load command on one line:

```
sh bulkLoad.sh -o obfuscationValue -e tmddECServerURL tmddFilename
```

Where:

- *obfuscationValue* is optional and is the value specified in the **ec.obfuscation-arg** property in the `ecserver.properties` file.
- *tmddECServerURL* is the URL for the External Center.
- *tmddFilename* is the name of the raw TMDD file. Multiple TMDD files should be separated by a space character.

An example bulk load command with an obfuscation key set:

```
sh bulkLoad.sh -o 6hvF7751jor -e  
http://localhost:9081/trans_tmddecserver_ear/tmddECSoapHttpService link.xml linkstatus.xml
```

An example bulk load command without an obfuscation key:

```
sh bulkLoad.sh -e http://localhost:9081/trans_tmddecserver_ear/tmddECSoapHttpService  
link.xml linkstatus.xml
```

**Note:** Both example commands are submitted on one line.

## Results

After the tool has completed, you should see a message confirming that the request was completed successfully.

## What to do next

Complete the steps in *Verifying the data import*.

### Related concepts:

“TMDD Data Management tools” on page 114

When the Traffic Awareness feature of IBM Intelligent Operations for Transportation is deployed, a set of TMDD Data Management tools are installed onto the IBM Intelligent Operations Center application server.

“TMDD data import configuration” on page 115

Configure the TMDD data import by applying the required settings to the system properties database table and editing the `ecserver.properties` file. The TMDD data import scripts read both the `ecserver.properties` file and the system properties database table to determine how the data is imported into IBM Intelligent Transportation.

“Request types” on page 368

IBM Intelligent Transportation supports a number of request types.

### Related tasks:

“Verifying the data import”

After the data import is complete, verify the results to ensure that the data import from the external center to the IBM Intelligent Transportation system database was successful.

“Planning the TMDD data integration” on page 113

Before you integrate IBM Intelligent Transportation with owner centers, the appropriate planning must be done to ensure that your system is correctly configured to capture the required information from road-side traffic subsystems.

“Connecting to an owner center” on page 121

IBM Intelligent Transportation must be configured to connect to at least one owner center. The owner center provides the TMDD traffic flow and event data.

## Verifying the data import

After the data import is complete, verify the results to ensure that the data import from the external center to the IBM Intelligent Transportation system database was successful.

### About this task

Verify that the data import completed successfully by using one of the following steps.

### Procedure

- Log on to application and select content to be displayed on the map. Select a layer using the criteria that you know exists in the recently populated databases of the IBM Intelligent Transportation database. If the data import was successful, the traffic flow and event data are displayed on the Current Traffic Conditions map and list on the Operator: Traffic view of the solution portal.
- To verify that the data loaded successfully into the database, run the following DB2 statements on the database server:

```
db2 connect to TIH_HS
db2 "select count(*) from TMDD.LINKSTATUS"
```

If the second statement returns a number greater than zero, the traffic data load was successful.

### Related tasks:

“Running a bulk load of traffic data” on page 126

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

## Exporting Traffic Awareness and prediction system data

### Managing mean data subscription requests



You can configure the Traffic Prediction feature in a publish/subscribe model to deliver historical traffic conditions, or mean data, to a subscribed application, or client. You can also unsubscribe the client. You can configure the feature so that the client provides traffic prediction that goes beyond 60 minutes. For example, a journey planner that computes travel times.

### About this task

For a client to receive mean data XML messages as a subscriber, the client registers with the Traffic Prediction feature. The mean data is stored locally and compressed, and the system sends an XML notification message to all of the registered clients when data is available. The receiving client downloads and extracts the mean data XML file.

Before transmission, the mean data XML file is compressed and saved locally with the following naming convention:

Mean\_Weekday\_SubnetID. For example: Mean\_MO\_Zone1.

The compressed file is saved to the following directory on the portal server: /tmp/transportation/mean/

## Procedure

Exposing mean data for a subnet

- Wrap IBM Intelligent Transportation mean data in an XML file with the following XSD format:

```
<!-- Licensed Materials - Property of IBM -->
<!-- -->
<!-- 5725D70 -->
<!-- -->
<!--(C) Copyright IBM Corp. 2012 All rights reserved. -->
<!-- -->
<!-- US Government Users Restricted Rights - Use, duplication or disclosure -->
<!-- restricted by GSA ADP Schedule Contract with IBM Corp -->

<?xml version="1.0" encoding="UTF-8" ?>

<xs:schema xmlns="http://www.ibm.com/iss/intelligentTransportation/trafficPredictionMean"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:tmdd="http://www.tmdd.org/3/messages"targetNamespace=
  "http://www.ibm.com/iss/intelligentTransportation/trafficPredictionMean">

  <xs:annotation>
    <xs:documentation xml:lang="en">
      This Schema defines IBM Intelligent Transportation Mean Data.
    </xs:documentation>
  </xs:annotation>

  <xs:import namespace=http://www.tmdd.org/3/messages schemaLocation="TMDD.xsd"/>

  <xs:complexType name="Mean-Link-Details-Type">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        This type defines the mean details (speed average and volume)
        for a specific link.
      </xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="link-id"
        type="tmdd:Transportation-network-identifier"/>
    </xs:sequence>
    <xs:choice>
      <xs:sequence>
        <xs:element name="IBMTransMean-Speed"
          type="tmdd:Link-speed-average/>
        <xs:element name="IBMTransMean-Volume"
          type="tmdd:Link-volume" minOccurs="0"/>
      </xs:sequence>
      <xs:element name="IBMTransMean-Volume" type="tmdd:Link-volume"/>
    </xs:choice>
  </xs:sequence>
</xs:complexType>

  <xs:complexType name="Mean-Period-Details-Type">
    <xs:annotation>
      <xs:documentation xml:lang="en">
        This type defines the mean details for a specific
        period and for all of the links.
      </xs:documentation>
    </xs:annotation>
  </xs:complexType>
</xs:schema>
```

```

</xs:documentation>
</xs:annotation>
<xs:sequence>
  <xs:element name="IBMTransMean-Time" type="tmdd:Time" />
  <xs:sequence>
    <xs:element name="IBMTransMean-Link-Data"
      type="Mean-Link-Details-Type"
      minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:sequence>
</xs:complexType>

<xs:complexType name="Mean-Subnet-Details-Type">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      This type defines the mean details for a specific
      subnet and for all of the periods.
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="IBMTransMean-Subnet" type="xs:String" >
      <xs:annotation>
        <xs:documentation xml:lang="en">
          This element contains the Subnet ID
          for which this mean data is applicable.
        </xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="IBMTransMean-Wday" type="xs:String" >
      <xs:annotation>
        <xs:documentation xml:lang="en">
          This element contains the day-of-the-week identifier
          for which this mean data is applicable (SU for Sunday,
          MO for Monday and so on).
        </xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
  <xs:sequence>
    <xs:element name="IBMTransMean-Period-Data"
      type="Mean-Period-Details-Type" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
</xs:complexType>

<xs:element name="IBMTransMean" type="IBMTransMean-Type" />

<xs:complexType name="IBMTransMean-Type">
  <xs:annotation>
    <xs:documentation xml:lang="en">
      This type defines the mean details.
    </xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="IBMTransMean-Subnet-Data" type="Mean-Subnet-Details-Type"/>
  </xs:sequence>
</xs:complexType>
</xs:schema>

```

## Registering a client with the system

- To register a client with the system, follow these instructions:
  1. The client sends a REST (HTTP POST) request to register the subscription, that includes the following parameters:
    - *subscriptionID*: a unique string ID used to identify the subscription. Any string value can be used for this parameter.

- *endpointURL*: a URL where the XML message is posted. This URL is in standard URL format.
  - *subscriptionExpires*: a subscription expiration time in minutes. This value must be a positive integer greater than zero.
2. The authenticated request is processed by the REST service. If validation fails, an error is returned to the requester.
    - If the request is without *subscriptionId* or *endPointURL* values, the request is rejected with a status code of 400 Bad Request.
    - If the *subscriptionExpires* attribute is missing or if the attribute is an invalid number, the subscription is created with a default expiration time of 60 minutes.
  3. If the *subscriptionID* value in the request is already registered, the system checks the following conditions:
    - If the request comes from the same user that is stored in an existing subscription, the subscription parameters are updated in the TPT00L.MESSAGE\_SUBSCRIPTIONS table and 200 OK is returned to the client.
    - If the request contains an existing *subscriptionID* where there is no existing subscription, the request is rejected with a status code of 409 Conflict. The following error message is sent:{"error": "Subscription id already exists"}
  4. If the *endpointURL* value matches any of the existing subscriptions the request is rejected with a status code of 409 Conflict. This is to avoid duplicate notifications.
  5. If all of the validations are successful, a subscription is created or updated, and stored in the TPT00L.MESSAGE\_SUBSCRIPTIONS table.
  6. The REST service responds to the client with the status of the registration subscription.

**Note:** A subscription ID has a one-to-one correspondence with the URL. To register multiple URLs, each requester uses a unique ID.

7. The following is an example of a client registration request. An example of a response is: HTTP/1.1 201 Created.

```
POST ../ibm/iss/trans/tpt/messages/rest/trans_pred_mean/inbound/subscription HTTP/1.1
Content-Type: application/JSON
User-Agent: Jakarta Commons-HttpClient/3.1
Content-Length: 106
Authorization: Basic d3BzYWRTaW46d3BzYWRTaW4=
Host: localhost: 10039
{
  "subscriptionID": "subscription1",
  "endpointURL": "http://9.123.45.33:90888/servlet",
  "subscriptionExpires": 30
}
```

#### Removing a client subscription

- To remove a client subscription, follow these instructions:
  1. The client sends a REST (HTTP DELETE) request to remove the subscription, with the following parameter:
    - *subscriptionID*: a unique string ID used to identify the subscription.
  2. The authenticated request is processed by the REST service, and client data that is associated with the *subscriptionID* is removed from the TPT00L.MESSAGE\_SUBSCRIPTIONS table.
  3. The REST service responds to the client with the status of the removal of the subscription. An example of a status is: 204 No Content.

**Note:** If the *subscriptionID* value is not found, a success value is returned instead of an error.

4. The following is an example of a client subscription removal request. An example of a response is: HTTP/1.1 204 No Content

```
DELETE .../ibm/iss/trans/tpt/messages/rest/trans_pred_mean/
inbound/subscription?subscriptionID=subscription1 HTTP/1.1
User-Agent: Jakarta Commons-HttpClient/3.1
Content-Length: 106
Authorization: Basic d3BzYWRTaW46d3BzYWRTaW4=
Host: localhost: 10039
```

## Obtaining link status TMDD data

You can export traffic awareness and traffic prediction data from IBM Intelligent Transportation into XML format. The REST services of IBM Intelligent Transportation provide outbound subscription and publishing capabilities. Use the REST services to retrieve link status data from the database which can then be integrated with other client applications as required.

### Obtaining current link status data:

To obtain the current road link status data, access the **TMDD LinkStatusMsg** REST service that is provided with IBM Intelligent Transportation.

### Before you begin

Ensure that the **trans\_tmddpublish\_ear** service is running on the IBM Intelligent Operations Center application server.

### About this task

The **TMDD LinkStatusMsg** REST service calls the operational database on the IBM Intelligent Operations Center data server to retrieve the latest link status data. To publish this data in XML format, you must authenticate as a user with **Traffic operator** permissions.

### Procedure

From the client application, submit the following HTTP call:

```
http://hostname/ibm/iss/trans/tmddpublish/rest/THPublish/LinkStatus
```

Where *hostname* is the host name of the IBM Intelligent Operations Center application server.

### Obtaining current and predicted link status data: 🚗

To obtain the current and predicted road link status data, access the extended **TMDD LinkStatusMsg** REST service that is provided with the Traffic Prediction feature of IBM Intelligent Operations for Transportation.

### Before you begin

Install and configure the Traffic Prediction feature to obtain the current and predicted road link status data via the extended **TMDD LinkStatusMsg** REST service. Ensure that the **TMDD LinkStatusMsg** service is running on the IBM Intelligent Operations Center application server.

### About this task

The extended **TMDD LinkStatusMsg** REST service calls the operational database on the IBM Intelligent Operations Center data server to retrieve the latest current and predicted link status data. To publish this data in XML format, you must authenticate as a user with **Traffic operator** permissions.



## Procedure

From the client application, submit the following HTTP call:

```
HTTP://host name/ibm/iss/trans/tpt/messages/rest/trans_pred/outbound/prediction
```

Where *host name* is the host name and open port of the IBM Intelligent Operations Center application server.

## Results

The current and predicted status of all the road links in the operational database are returned in XML Format.

## Example

### Sample request:

```
GET .../ibm/iss/trans/tpt/messages/rest/trans_pred/outbound/
prediction HTTP/1.1 Accept: application/xml
```

### Sample response:

```
HTTP/1.1 200 OK
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<ns5:linkStatusMsg xmlns:ns6="http://www.ibm.com/iss/
intelligentTransportation/
trafficPrediction" xmlns:ns5="http://www.t added.org/3/messages"
xmlns:ns4="http://www.ntcip.org/c2c-message-administration"
xmlns:ns3="http://www.t added.org/3/dialogs"
xmlns:ns2="http://www.LRMS-Adopted-02-00-00">
<ns5:link-status-item>
<ns5:organization-information>
<ns5:organization-id>149584</ns5:organization-id>
<ns5:organization-name>IBM</ns5:organization-name>
<ns5:organization-location>ISL</ns5:organization-location>
<ns5:last-update-time>
<ns5:date>20120504</ns5:date>
<ns5:time>000000</ns5:time>
</ns5:last-update-time>
</ns5:organization-information>
<ns5:link-list>
<ns5:link>
<ns5:network-id/>
<ns5:link-id>70311903</ns5:link-id>
<ns5:link-status>open</ns5:link-status>
<ns5:link-data-stored>current average speed</ns5:link-data-stored>
<ns5:detection-method>inductive loop monitoring station
</ns5:detection-method>
<ns5:link-traffic-data-algorithm>actual
</ns5:link-traffic-data-algorithm>
<ns5:speed-average>9.9E1</ns5:speed-average>
<ns5:volume>2597</ns5:volume>
<ns5:last-update-time>
<ns5:date>2012-05-09</ns5:date>
<ns5:time>13:15:08</ns5:time>
</ns5:last-update-time>
</ns5:link>
...
```

## What to do next

To set up a subscription to the extended **TMDD LinkStatusMsg** REST service, see *Setting up a subscription to the extended LinkStatusMsg REST service*.

## Related tasks:

“Setting up a subscription to the extended LinkStatusMsg REST service”

You can also set up a subscription to the extended **LinkStatusMsg** REST service to obtain the latest current and predicted traffic data in XML format.

### Setting up a subscription to the extended LinkStatusMsg REST service:

You can also set up a subscription to the extended **LinkStatusMsg** REST service to obtain the latest current and predicted traffic data in XML format.

#### About this task

Subscription requests are secured through WebSphere authentication. After authentication is successful, the subscription request is processed by the REST service.

The scheduler component of the solution invokes the prediction calculations at predefined intervals. When the prediction results are available, the prediction scheduler triggers the publishing of traffic data.

#### Procedure

To send a client subscription request by using the **HTTP POST** REST command:

1. Ensure that the path of the **POST** request is set to the following directory: `.../ibm/iss/trans/tpt/messages/rest/trans_pred/inbound/subscription HTTP/1.1`
2. Set the **Hostname** parameter to be the hostname of the IBM Intelligent Operations Center application server.
3. Ensure that the subscription request includes the following parameters:

Parameter	Description	Example
<b>subscriptionID</b> : <i>string</i>	Where <i>string</i> is a unique ID for identifying the subscription	"subscriberID" : "subscriber1"
<b>endpointURL</b> : <i>URL</i>	Where <i>URL</i> is the endpoint URL where the enhanced LINKSTATUSMSG XML must be output to.	"endpointURL" : "http://9.123.45.33:90888/servlet"
<b>subscriptionExpires</b> : <i>integer</i>	Where <i>integer</i> must be a positive integer > 0 representing the subscription expiration time in minutes	"subscriptionExpires" : 30

The REST service validates the request input. If the validation checks fail, an error is returned to the client. For example:

- If you specify a URL for the **endpointURL** parameter that is already registered, an error is returned
- If the **subscriberID** exists, an error is returned

**Note:** The subscriber ID is associated with the URL. A subscriber ID cannot be registered to multiple URLs. A URL must be associated with a unique **subscriberID**.

When the validation is successful, the REST service performs a look up on the **endpointURL** for all registered subscribers and by using the **subscriptionExpires** parameter, checks to see whether the subscription expired. The latest current and predicted status of all the road links in the operational database are returned in XML Format.

#### Results

A resource is exposed by the REST service for publishing the XML data. This resource is not exposed to the external clients and must be triggered by the forecast job. Obtain the current and predicted status of

all the road links in XML format from the specified endpoint URL.

## Example

### Sample request:

```
POST .../ibm/iss/trans/tpt/messages/rest/trans_pred/inbound/subscription HTTP/1.1
Content-Type: application/json
User-Agent: Jakarta Commons-HttpClient/3.1
Content-Length: 106
Authorization: Basic d3BzYWRTaW46d3BzYWRTaW4=
Host: icp002:10039
{
  "subscriberID" : "subscriber1",
  "endpointURL" : "http://9.123.45.33:90888/servlet",
  "subscriptionExpires" : 30
}
```

### Sample response:

```
HTTP/1.1 200 OK
Content-Type: application/xml
<?xml version="1.0" encoding="UTF-8"?>
<ns5:linkStatusMsg xmlns:ns6="http://www.ibm.com/iss/
intelligentTransportation/
trafficPrediction" xmlns:ns5="http://www.t added.org/3/messages"
xmlns:ns4="http://www.ntcip.org/c2c-message-administration"
xmlns:ns3="http://www.t added.org/3/dialogs"
xmlns:ns2="http://www.LRMS-Adopted-02-00-00">
<ns5:link-status-item>
<ns5:organization-information>
<ns5:organization-id>149584</ns5:organization-id>
<ns5:organization-name>IBM</ns5:organization-name>
<ns5:organization-location>ISL</ns5:organization-location>
<ns5:last-update-time>
<ns5:date>20120504</ns5:date>
<ns5:time>000000</ns5:time>
</ns5:last-update-time>
</ns5:organization-information>
<ns5:link-list>
<ns5:link>
<ns5:network-id/>
<ns5:link-id>70311903</ns5:link-id>
<ns5:link-status>open</ns5:link-status>
<ns5:link-data-stored>current average speed</ns5:link-data-stored>
<ns5:detection-method>inductive loop monitoring station
</ns5:detection-method>
<ns5:link-traffic-data-algorithm>actual
</ns5:link-traffic-data-algorithm>
<ns5:speed-average>9.9E1</ns5:speed-average>
<ns5:volume>2597</ns5:volume>
<ns5:last-update-time>
<ns5:date>2012-05-09</ns5:date>
<ns5:time>13:15:08</ns5:time>
</ns5:last-update-time>
</ns5:link>
...
```

## What to do next

To remove the subscription to the extended **LinkStatusMsg** REST service, send a **HTTP DELETE** REST request that specifies the subscriber ID as follows:

**subscriptionID** : *string*

For example:

```
DELETE ../ibm/iss/trans/tpt/messages/rest/trans_pred/inbound/subscription HTTP/1.1
Content-Type: application/json
User-Agent: Jakarta Commons-HttpClient/3.1
Content-Length: 106
Authorization: Basic d3BzYWRTaW46d3BzYWRTaW4=
Host: localhost:10039
```

```
{
"subscriberID" : "subscriber1"
}
```

After authentication is successful, the request is processed by the REST service and the client data associated with the specified subscriber ID is deleted. If the subscriber ID is not recognized, the REST service returns an error.

---

## Integrating the Vehicle Awareness and Prediction system

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics uses incoming and accumulating vehicle position data that is supplied by subsystems in the transit network. The data is supplied by subsystems in the Service Interface for Real Time Information (SIRI) data standard format.

The SIRI data format is a European data interface standard for exchanging data about planned, current, or future performance of public transport operations. IBM Intelligent Transportation supports the SIRI version 1.3 data format only. Your SIRI data source must meet the minimum supported requirements of IBM Intelligent Transportation version 1.6, otherwise the system might not function as expected.

### Related concepts:

“Importing and configuring vehicle-related data sources” on page 74

After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, set up and configure the required vehicle data of the transit network. The Vehicle Awareness and Prediction feature provides a data load utility to help you to import the required data into the existing TIH\_HS database of IBM Intelligent Transportation. The vehicle data source must be available in the required Service Interface for Real Time Information (SIRI) data format that IBM Intelligent Transportation is designed to support.

### Related reference:

“Supported vehicle transit data” on page 374

IBM Intelligent Transportation is designed to work with the Service Interface for Real Time Information (SIRI) transportation information data standard version 1.3. SIRI is an XML protocol for exchanging real time information about public transport services and vehicles. The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics provides vehicle awareness and prediction estimation capability using a specific set of data that is received and published through SIRI messages.

### Related information:

 [Website for the Service Interface for Real Time Information \(SIRI\) standard](#)

## Planning the transit data integration



Before you integrate transit data into the Vehicle Awareness and Prediction feature, the appropriate planning must be done to ensure that the required results are achieved.

### About this task

IBM Intelligent Transportation supports data ingestion specifications for infrastructure data, vehicle data, and production timetable data. Ensure that the source data sets meet the minimum requirements of the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

**Note:** The following procedure requires that you review your vehicle data requirements and to consider questions about the data you want to integrate.

## Procedure

1. Review the transit vehicle data requirements of IBM Intelligent Transit Analytics that are outlined in *Vehicle data requirements* in the References section of the product documentation.
2. Is your infrastructure data prepared and ready for importing into the solution? The infrastructure data includes the following information:
  - Route
  - Stop
  - Vehicle
3. Are your production timetable files available daily?
4. How often are you required to import the production timetable files into the system in a batch?
5. What owner center provides and feeds the real-time vehicle location data?
6. What is the URL to subscribe to the owner center, and what time is it open for the daily subscription?
7. How do you plan to get the vehicle awareness and prediction information from the IBM Intelligent Transit Analytics system?

You can publish the information of IBM Intelligent Transit Analytics in the following ways:

- View and monitor vehicle location information and prediction directly from the user interface in the IBM Intelligent Transportation solution portal.
- Obtain the vehicle location information and prediction information from the REST service that is provided by IBM Intelligent Transit Analytics.

### Related concepts:

“Vehicle data requirements” on page 374

The IBM Intelligent Transportation supports specific data sets in the SIRI schema. There are data ingestion specifications for infrastructure data, vehicle data, and production timetable data. Ensure that the source data sets meet the minimum requirements of the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

### Related reference:

“Supported vehicle transit data” on page 374

IBM Intelligent Transportation is designed to work with the Service Interface for Real Time Information (SIRI) transportation information data standard version 1.3. SIRI is an XML protocol for exchanging real time information about public transport services and vehicles. The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics provides vehicle awareness and prediction estimation capability using a specific set of data that is received and published through SIRI messages.

## Importing infrastructure, production timetable and configuration data



Load the supported vehicle, stop, and production timetable data into the database by using the data load utility that is provided by the Vehicle Awareness and Prediction feature.

### Data load utility

The data load utility is in the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory. The utility consists of a script titled `vap_loaddata.sh`. The `vap_loaddata` utility reads the `offline.properties` file for the database configuration information.

## Options for running the command

You can run the **vap\_loaddata** script from the command line with the following options to determine the type of infrastructure data that is loaded.

Option	Use this option to...
<b>-a</b> <i>dataDir</i>	Load all of the infrastructure data. The <b>-a</b> option is equivalent to running the command with options <b>-i</b> and <b>-v</b> .
<b>-c</b> <i>configurationFile</i>	Default to the <code>offline.properties</code> file.
<b>-i</b> <i>dataDir</i>	Load the infrastructure data. The <i>dataDir</i> directory must contain the following files: <ul style="list-style-type: none"> <li>• <code>route.csv</code></li> <li>• <code>route shapes</code></li> <li>• <code>route stops</code></li> <li>• <code>journey patterns</code></li> </ul> For a list of the required CSV files, see <i>Required data sets</i> .
<b>-e</b> <i>dataDir</i>	Load the ESRI format shapefile. The <i>dataDir</i> directory must contain the following files: <ul style="list-style-type: none"> <li>• <code>route.shp</code></li> <li>• <code>route.prj</code></li> <li>• <code>route.dbf</code></li> </ul> <b>Note:</b> The <b>-e</b> option is only valid when used with the <b>-i</b> option.
<b>-v</b> <i>dataDir</i>	Load the vehicle data only. The <i>dataDir</i> directory must contain the following files: <ul style="list-style-type: none"> <li>• <code>vehicle.csv</code></li> <li>• <code>vehicletype.csv</code></li> </ul>
<b>-p</b> <i>dataDir</i>	Load the production timetable.
<b>-f</b>	Force mode. No database check is performed when this option is used.
<b>-r</b>	Clear the database. All infrastructure data, production timetables, and vehicle data in the Vehicle Awareness and Prediction database tables will be cleared.
<b>-l</b> <i>confidencelevel.xml</i>	Load confidence level that is specified in <i>confidencelevel.xml</i> .
<b>-t</b> <i>Time</i>	Specify a forecast expiry time. The default forecast expiry time is 300 seconds.
<b>-n</b> <i>StopLinkID</i>	Specify the column name defined in the <code>stoplink_shape.dbf</code> file that contains the ID of the stop link shape. <b>Note:</b> The <b>-n</b> option is only valid when used with the <b>-e</b> option.
<b>-d</b> <i>temp</i>	Specify a temporary directory to save the converted stop link shape files. <b>Note:</b> The <b>-d</b> option is only valid when used with the <b>-e</b> option.
<b>-w</b> <i>password</i>	Specify the database password. The user is prompted to input the database password if the <b>-w</b> option is not specified in the command.

Option	Use this option to...
-h	Obtain syntax help on running the <code>vap_loaddata</code> script.

Run the `vap_loaddata.sh` data load utility to load the required SIRI data into the TIH\_HS database of IBM Intelligent Transportation. The data load utility must be run several times, in a specific sequence, as outlined in the following tasks.

## Loading the basic infrastructure data



Run the `vap_loaddata` utility in two phases to load the basic infrastructure data into the database for vehicle awareness and prediction. First, run the utility to load only the CSV files. Then, run the utility again to load both the CSV and the ESRI shape files.

### Before you begin

Ensure that you have the data sets that are required by the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics. For more information, see *Required data sets*.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the `db2inst2` user.
2. Open the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory.
3. Configure the `offline.properties` file. Ensure that the following required fields are correctly configured:

- `DB_HOST`
- `DB_PORT`
- `DB_NAME`
- `DB_USER`

For more information, see *Configuring offline properties*.

4. Run the following data load utility command to load the CSV files only.

```
./vap_loaddata.sh -i userDataDir
```

Where `userDataDir` is the directory that contains the required CSV data sets to be loaded into the system. The required CSV files are listed in *Required data sets*.

5. Run the following data load utility command to load the CSV and the ESRI shape files.

```
./vap_loaddata.sh -i userDataDir -e EsriShapeDir -n STOPLINK_ID_COLUMN_NAME
```

**Note:** The command must be run on one line.

Where:

- `userDataDir` is the directory that contains the required CSV and ESRI shape files to be loaded into the system. The required CSV and ESRI shape files are listed in *Required data sets*.
- `EsriShapeDir` is the directory that contains the ESRI shape files.
- `STOPLINK_ID_COLUMN_NAME` is the name of the column `STOPLINK_ID` as defined in the ESRI shape file.

### What to do next

The results of the data load are output to the console. If you experience error messages after you run the data load utility, check for the following potential causes:

- Input or output file issues

- CSV format issues
- Data integration issues
- SQL exceptions

For CSV format errors and data integration errors, the error message includes the error position in the problem file.

After the basic infrastructure data is loaded into the database, you are ready to load the production timetable.

**Related tasks:**

“Loading the production timetable data” on page 141

The production timetable data is loaded separately to the infrastructure data for the transit system. After you load the basic infrastructure data, load the production timetable data by running the data load utility that is provided by the Vehicle Awareness and Prediction feature.

**Configuring offline.properties:** 

The offline.properties file is a configuration file of the Vehicle Awareness and Prediction feature that is used by both the data load utility and the metadata generator tool.

The offline.properties file is in the opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts directory. The following table lists the property settings of the offline.properties file. Some of the properties must be configured before you run the data load utility and the metadata generator tool.

Property	Description
<b>DB_HOST</b>	The host name or IP address of the database server.
<b>DB_PORT</b>	The port of the database server for the client to access.
<b>DB_NAME</b>	The database name. The database name must always be set to TIH_HS.
<b>DB_USER</b>	The user name of the database administrator.
<b>LOG_LEVEL</b>	<p>Determines the level of logging. The following levels of logging can be set:</p> <ul style="list-style-type: none"> <li>• INFO - General information, such as the running state.</li> <li>• WARNING - Unexpected behavior that does not prevent the utility from running but might require action to be taken. Includes general information also.</li> <li>• ERROR - Critical issues with the data that requires action to be taken.</li> </ul> <p>By default, the <b>LOG_LEVEL</b> parameter is set to <b>INFO</b>.</p>
<b>PARAM_ERROR</b>	The granularity of the metadata generation, in meters. <b>PARAM_ERROR</b> is the base unit of measurement that is used in metadata generation. By default, this value is set to 10.
<b>PARAM_MAX_GAP</b>	The maximum gap between 2 continuous vehicle positions for a specific vehicle. If the gap between the two vehicle positions exceeds this value, the track of the vehicle is discarded by the metadata generator tool. By default, the value is set to 500 meters.



Property	Description
<b>PARAM_MAX_TIME</b>	The maximum time between 2 continuous vehicle positions. If the gap between the two positions exceeds this value, the track of this vehicle is discarded by the metadata generator tool. By default, the value is set to 300 seconds.
<b>PARAM_DIST_FILTER</b>	The maximum distance that a vehicle can deviate from its predefined route. If the vehicle position is far away from the route and deviates further than this value, the track of this vehicle is discarded by the metadata generator tool. By default, the value is 20 meters.
<b>PARAM_MAX_METADATA</b>	The maximum number of metadata records that are stored in the database for each journey pattern. The default value for this setting is 100. Do not set this value to zero. Otherwise, no maximum record is set.
<b>PARAM_METADATA_REPLACE_STRATEGY</b>	The replacement strategy to use when there is more metadata available than the maximum limit specified by the <b>PARAM_MAX_METADATA</b> parameter, when you run the metadata generator tool. The parameter can be set by using either of the following options:  <b>RANDOM</b> When this value is set, if the number of metadata records exceeds the limit, new records randomly overwrite existing records. This is the default behavior.  <b>RING</b> When this value is set, if the number of metadata records exceeds the limit, new records replace the existing records on a first in, first out basis. For example, the oldest data records are overwritten by the new records.
<b>PARAM_LAST_GENERATE_TIME</b>	Do not modify the <b>PARAM_LAST_GENERATE_TIME</b> parameter as this value is set by the system.

For example:

```
#Database connection
DB_HOST=192.168.1.14
DB_PORT=50000
DB_NAME=TIH_HS
DB_USER=db2inst2

# LOG SETTING
LOG_LEVEL=INFO

#Meta data generation parameters
PARAM_MAX_GAP=1000
PARAM_MAX_METADATA=100
PARAM_METADATA_REPLACE_STRATEGY=RANDOM

# DO NOT UPDATE THIS ENTRY MANUALLY, IT IS USED BY PROGRAM.
PARAM_LAST_GENERATE_TIME=
```

## Loading the production timetable data

The production timetable data is loaded separately to the infrastructure data for the transit system. After you load the basic infrastructure data, load the production timetable data by running the data load utility that is provided by the Vehicle Awareness and Prediction feature.

## About this task

To load the production data, you must copy the production timetable data files over to the IBM Intelligent Operations Center data server and then run the **vap\_loaddata.sh** script.

If your production timetable files are larger than 0.5 GB, extra configuration might be required to temporarily increase the Java heap size memory before you load the data.

## Procedure

1. Log on to the IBM Intelligent Operations Center data server as the database administrator, for example the **db2inst2** user.
2. Open the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory.
3. Copy the production timetable files for the transit system to a subdirectory called *PTT\_Dir*.

Ensure that you have the required production timetable file titled `<yyyy-MM-dd><*>productiontimetable.xml`, where:

- `<yyyy-MM-dd>` specifies the date of the published production timetable
- `<*>` is a wildcard string that can be used as a reference for the production timetable

For example, `2013-11-31_productiontimetable.xml`. For more information, see *Sample production timetable file*.

4. Optional: If the production timetable files are significantly large, for example, of the order of 0.5 GB or more, ensure that there is sufficient Java heap memory available to process the files. Increase the memory limits on the Java process of the data load utility by completing the following steps:
  - a. Edit the **vap\_loaddata.sh** script file.
  - b. Search for line that starts the Java process, which begins with the following string:

```
$JAVA_HOME/bin/java
```
  - c. On this line, search for the **-Xmx** parameter. The value that immediately follows the **-Xmx** parameter represents the maximum heap size. For example, the value `-Xmx4096m` indicates that the maximum heap size is set to 4096 MB.
  - d. Increase the Java heap size as required to ensure successful loading of the large production timetable data files. Increase the setting in multiples of whole gigabyte values, for example `-Xmx6144m` or `-Xmx8192m`.

If there is not enough Java heap memory available to process the large files, the data import might not complete successfully.

5. Run the following data load utility command to load the production timetable files.

```
./vap_loaddata.sh -p PTT_Dir
```

Where *PTT\_Dir* is the directory that contains the production timetable XML file.

6. When the large production timetable files are loaded, reset the **-Xmx** memory limit value in the **vap\_loaddata.sh** data load utility back to the original setting.

### Related tasks:

“Loading the basic infrastructure data” on page 139

Run the **vap\_loaddata** utility in two phases to load the basic infrastructure data into the database for vehicle awareness and prediction. First, run the utility to load only the CSV files. Then, run the utility again to load both the CSV and the ESRI shape files.

### Sample production timetable file:

The production timetable file defines the scheduled production timetable for a specified date. The production timetable is a key part of the database schema of IBM Intelligent Transit Analytics.

## Field definitions

The schema and data elements of the production timetable are documented in the specifications for **ProductionTimetableDelivery** response on the Service Interface for Real Time Information (SIRI) version 1.3 website.

The following table outlines the elements of the SIRI production timetable that are used by IBM Intelligent Transit Analytics.

Field	Requirement	Description
DatedVehicleJourneyCode	Mandatory	A reference to the dated vehicle journey that the vehicle is making
JourneyPatternRef	Mandatory	Identifier of the journey pattern that the journey follows
ServiceFeatureRef	Mandatory	Identifier of the service that is running on the specified line
StopPointRef	Mandatory	Identifier of the stop point
Order	Mandatory	Ordering of stop points in the journey, which is useful for loops
AimedArrivalTime	Mandatory	Arrival time
AimedDepartureTime	Mandatory	Departure time
VehicleJourneyRef	Optional	Identifier of the vehicle journey

In the production timetable file, the date and time are based on the **xsd:DateTime** data type. If no timezone information is specified, the date and time default to Coordinated Universal Time.

## Example

The following is an example of a production timetable in a file named 2004-12-17\_productiontimetable.xml.

```
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xsi:schemaLocation=
  "http://www.siri.org.uk/siri xsd/siri_1.3/siri.xsd" version="1.3">
  <ServiceDelivery>
    <ResponseTimestamp>2004-12-17T09:45:00+01:00</ResponseTimestamp>
    <ProductionTimetableDelivery version="1.3">
      <ResponseTimestamp>2004-12-17T09:45:00+01:00</ResponseTimestamp>
      <DatedTimetableVersionFrame>
        <RecordedAtTime>2004-12-17T09:45:00+01:00</RecordedAtTime>
        <LineRef>123</LineRef>
        <DirectionRef>onward</DirectionRef>
        <DatedVehicleJourney>
          <DatedVehicleJourneyCode>1255</DatedVehicleJourneyCode>
          <JourneyPatternRef>125</JourneyPatternRef>
          <DatedCalls>
            <DatedCall>
              <StopPointRef>1234</StopPointRef>
              <Order>1</Order>
              <AimedArrivalTime>2004-12-17T09:45:00+01:00</AimedArrivalTime>
            </DatedCall>
            <DatedCall>
              <StopPointRef>1235</StopPointRef>
              <Order>2</Order>
              <AimedArrivalTime>2004-12-17T09:45:00+01:00</AimedArrivalTime>
            </DatedCall>
          </DatedCalls>
        </DatedVehicleJourney>
      </DatedTimetableVersionFrame>
    </ProductionTimetableDelivery>
  </ServiceDelivery>
</Siri>
```

```
</DatedTimetableVersionFrame>
</ProductionTimetableDelivery>
</ServiceDelivery>
</Siri>
```

## Loading confidence level and forecast expiration time



Use the data load utility that is provided with the Vehicle Awareness and Prediction feature to modify the confidence level and forecast expiration time.

### About this task

The forecast expiration value determines when the forecast results expire and can be configured. By default, the forecast expiration value is set to 300 seconds and is stored in the `TRANSMODEL.vpconfiguration` table. To obtain more accurate vehicle prediction results, you can optionally modify the forecast expiration value by running the data load utility `vap_loaddata` script.

The `vap_loaddata` script is a command-line utility for loading the data that is required by the Vehicle Awareness and Prediction feature.

For syntax help on running the script, use the command `./vap_loaddata.sh -h`.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the `db2inst2` user.
2. Open the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory.
3. Configure the `offline.properties` file. Ensure that the following fields are correctly configured.

- `DB_HOST`
- `DB_PORT`
- `DB_NAME`
- `DB_USER`
- `PARAM_MAX_GAP`

For more information about the `offline.properties` configuration file, see *Configuring the offline.properties file*.

4. Edit the `confidencelevel.xml` file and add the values in the `<confidencelevel>` section. See *Sample confidencelevel.xml file*.
5. To load the confidence level that you configured in the previous step, and to also set the forecast expiry time, enter the following command:

```
./vap_loaddata.sh -l ConfidenceLevel_File -t Time
```

Where:

- `ConfidenceLevel_File` is the name and path of an xml file, for example, `confidencelevel.xml`.
- `Time` is the forecast expiration time, in seconds. The default expiration time is 300 seconds.

For example, to load the confidence level from the `confidencelevel.xml` file and set the forecast expiry time to 500 seconds, use the following command:

```
./vap_loaddata.sh -l confidencelevel.xml -t 500
```

### Results

The confidence level and the forecast expiration value are updated in the `TRANSMODEL.vpconfiguration` table.

## Sample confidencelevel.xml file:

The confidence level settings are configured in an XML file that is read by the **vap\_loaddata** command-line script. By default, the file is named `confidencelevel.xml`. The `confidencelevel.xml` file is in the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory on the IBM Intelligent Operations Center data server.

See the following example of a `confidencelevel.xml` file:

```
<?xml version="1.0" encoding="UTF-8"?>
<confidencelevel>
<level value="certain">
<lowerbound>0</lowerbound>
<upperbound>0.1</upperbound>
</level>
<level value="veryReliable">
<lowerbound>0.1</lowerbound>
<upperbound>0.2</upperbound>
</level>
<level value="Reliable">
<lowerbound>0.2</lowerbound>
<upperbound>0.5</upperbound>
</level>
<level value="Unconfirmed">
<lowerbound>0.5</lowerbound>
</level>
</confidencelevel>
```

## Configuring the InfoSphere Streams application



The InfoSphere Streams server provides the primary processing environment for the vehicle awareness and prediction capabilities of IBM Intelligent Transit Analytics. Configuration is required to set up the InfoSphere Streams application to access and process the SIRI data that is stored in the databases of IBM Intelligent Transportation.

### About this task

To configure the InfoSphere Streams application, edit the `vap.cfg` file as outlined in the following procedure.

### Procedure

1. Log on to the InfoSphere Streams server as the `streamsadmin` user.
2. Go to the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics` directory.
3. Edit the `vap.cfg` file.
4. Configure the required parameters in the `vap.cfg` file. For information about the properties that you can configure, see *Configuration properties of the vap.cfg file*.
5. Save and close the `vap.cfg` file.

### Configuration properties of the vap.cfg file



The `vap.cfg` file contains the configuration options that you can set for the Vehicle Awareness and Prediction feature.

The `vap.cfg` file is in the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics` directory and contains the following sections of configuration items:

- Database configuration
- Service Interface for Real Time Information (SIRI) configuration
- Miscellaneous configuration

The following tables provide details about the properties that you can modify in the `vap.cfg` file:

### Database configuration properties

Property	Description and example
<b>DB_HOST</b>	The host name or IP address of the database server. DB_HOST=192.168.1.14
<b>DB_PORT</b>	The port of the database server that is required for client access. DB_PORT=50000
<b>DB_NAME</b>	The name of the database. This must be set to use the TIH_HS database. DB_NAME=TIH_HS
<b>DB_USER</b>	The name of the database administrator user. DB_USER=db2inst2
<b>DB_PASSWORD</b>	The password of the specified <b>DB_USER</b> . See the note at the end of this table. DB_PASSWORD=*****

**Note:** To change the encoded password that is set in the **DB\_PASSWORD** parameter in the `vap.cfg` file, use the `dbpasswd.sh` script in the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics` directory.

Additional properties are included in the `vap.cfg` file. You must not change any properties that are not listed in the preceding table.

### SIRI configuration properties

Property	Description and example
<b>SIRI_TCP_PORT</b>	The TCP port for receiving uncompressed XML-formatted SIRI messages. SIRI_TCP_PORT=35000
<b>SIRI_GZIP_TCP_PORT</b>	The TCP port for receiving gzip compressed XML-formatted SIRI messages. SIRI_GZIP_TCP_PORT=35001

### Miscellaneous properties

Property	Description and example
<b>OUTSIDE_ROUTE_THRESHOLD</b>	The route threshold, in meters, to filter out the unqualified GPS signal. If the distance from the projected route point is greater than the value specified here, the signal is not projected onto the planned route and the vehicle might be considered off-route. When this scenario occurs, the vehicle location is still displayed on the map. OUTSIDE_ROUTE_THRESHOLD=20.0
<b>MAX_HISTORY_RECORDS</b>	The number of historical records that are used to formulate the vehicle prediction model. The model tends to be more accurate if more historical records are used. MAX_HISTORY_RECORDS=100

Property	Description and example
<b>STOP_DEVIATION_DISTANCE</b>	The stop deviation distance from the stop location, in meters, within which the vehicle is considered at the stop. The actual position of the vehicle might not be at the same geographic position as the scheduled route stop. The stop deviation distance is only applied when the <b>VehicleAtStop</b> tag of the SIRI message that contains the vehicle position is set to true. STOP_DEVIATION_DISTANCE=20.0
<b>CITY_RECT_MAX_LATITUDE</b>	The maximum latitude value of the boundary rectangle of the city. The default latitude range is from -90.0 to 90.0. By default a boundary is not set. CITY_RECT_MAX_LATITUDE=90.0
<b>CITY_RECT_MIN_LATITUDE</b>	The minimum latitude value of the boundary rectangle of the city. The default latitude range is from -90.0 to 90.0. By default a boundary is not set. CITY_RECT_MIN_LATITUDE=-90.0
<b>CITY_RECT_MAX_LONGITUDE</b>	The maximum longitude value of the boundary rectangle of the city. The default longitude range is from -180.0 to 180.0. By default a boundary is not set. CITY_RECT_MAX_LONGITUDE=180.0
<b>CITY_RECT_MIN_LONGITUDE</b>	The minimum longitude value of the boundary rectangle of the city. The default longitude range is from -180.0 to 180.0. By default a boundary is not set. CITY_RECT_MIN_LONGITUDE=-180.0
<b>SIRI_TIME_AGE_THRESHOLD</b>	The age threshold of an incoming SIRI message, in seconds. If the value is greater than -1, the SIRI message is checked to see whether it is within the valid age threshold. A message is considered valid for processing if the current <b>RecordedAtTime</b> value plus the threshold value is greater than or equal to the most recent <b>RecordedAtTime</b> value of all of the received SIRI messages. By default, this value is set to -1 which means that the check is not applied. SIRI_TIME_AGE_THRESHOLD=2
<b>VEHICLE_SPEED_VALID_TIME_INTERVAL</b>	This value, in seconds, is used to check whether the incoming information about the latest vehicle position is valid to calculate the speed that is based on the delta time between the last two consecutive vehicle position updates. If the delta time is within the specified value, then it is valid, otherwise it is invalid. VEHICLE_SPEED_VALID_TIME_INTERVAL=60
<b>CHECK_AT_STOP_ALWAYS</b>	This value is used to control how the system determines whether a vehicle is at a stop. The default setting is false, which means that by default the system uses the <b>at stop</b> status in an incoming SIRI message. If the SIRI information is incorrect, you can change how the system retrieves the information about whether a vehicle is at a stop. If the incoming SIRI messages do not provide the correct <b>at stop</b> status information for vehicles, set this value to true. The <b>at stop</b> status determination logic of IBM Intelligent Transit Analytics is used to generate this value instead. CHECK_AT_STOP_ALWAYS=true
<b>PRODUCTION_TIMETABLE_SCHEDULE_TIME</b>	The time when the production timetable information is retrieved from the database, in the format HH:mm:ss. PRODUCTION_TIMETABLE_SCHEDULE_TIME=03:00:00
<b>PRODUCTION_TIMETABLE_SCHEDULE_TIMEZONE</b>	The timezone for the production timetable. IBM Intelligent Transportation supports all international timezones, which are offset from Coordinated Universal Time (UTC). By default, the system uses the local timezone. PRODUCTION_TIMETABLE_SCHEDULE_TIMEZONE=UTC+08:00
<b>MILESTONE_SAMPLE_INTERVAL</b>	The milestone sample interval is used by prediction algorithms to generate the predicted vehicle arrival times. Increase this value to accelerate the performance of the prediction algorithms. If you set this value too high, the accuracy of the predictions is reduced. By default the value is set to 2. MILESTONE_SAMPLE_INTERVAL=2

## Advanced properties

The following advanced properties determine how the vehicle arrival forecasts are generated. Changing the default settings of these properties might have a negative impact on the quality of the prediction results.

Property	Description and example
<code>FORECAST_MISMATCHED_VEHICLE_JOURNEY_PENALTY</code>	The penalty factor in the case that the current vehicle journey is different from the data of the forecast model. <code>FORECAST_MISMATCHED_VEHICLE_JOURNEY_PENALTY=0.75</code>
<code>FORECAST_MISMATCHED_JOURNEY_PATTERN_PENALTY</code>	The penalty factor in the case that the current journey pattern is different from the data of the forecast model. <code>FORECAST_MISMATCHED_JOURNEY_PATTERN_PENALTY=0.5</code>
<code>FORECAST_MISMATCHED_ROUTE_SHAPE_PENALTY</code>	The penalty factor in the case that the current journey shape is different from the data of the forecast model. <code>FORECAST_MISMATCHED_ROUTE_SHAPE_PENALTY=0.75</code>
<code>FORECAST_TIME_DECAY</code>	The prediction time decay value. By default, this value is set to 60 and must always be greater than 0. This setting indicates how the age of past accumulated prediction data affects the confidence level. This includes data that is from this vehicle or other vehicles on the same route. Low values cause the confidence level to decrease quickly with the age. High values minimize the impact of the age on the confidence level. <code>FORECAST_TIME_DECAY=60</code>
<code>FORECAST_AVL_TIME_DECAY</code>	The vehicle location time decay value. By default, this value is set to 60 and must always be greater than 0. This setting indicates how last vehicle's position affects the confidence level. Low values causes the confidence level to decrease quickly with the age. High values minimize the impact of the age on the confidence level. <code>FORECAST_AVL_TIME_DECAY=60</code>

Do not modify any other properties in the `vap.cfg` file.

## Configuring the Subscription Manager



The Subscription Manager ensures that there is a continuous flow of real-time Service Interface for Real Time Information (SIRI) data into IBM Intelligent Transportation. The Subscription Manager is a process that runs on the IBM Intelligent Operations Center application server and manages the subscription between IBM Intelligent Transportation and the external SIRI data source server. An active subscription ensures that any real-time vehicle data that is available on the SIRI data source server is sent to IBM Intelligent Transportation.

### About this task

You can configure the Subscription Manager by editing the `subscription.properties` file as outlined in the following procedure.

**Note:** The Subscription Manager is a stand-alone Java daemon process and is not enabled for high availability. When you install IBM Intelligent Transit Analytics in a high availability operating environment, configure and start a single instance of the Subscription Manager on the primary IBM Intelligent Operations Center application servers. If the daemon process stops, you must manually configure and start the Subscription Manager on the secondary application server. For more information, see *Configuring the Subscription Manager in a high availability environment*.

### Procedure

1. Log on to the IBM Intelligent Operations Center application server as the root user. If IBM Intelligent Transportation is running in a high availability environment, log on to the IBM Intelligent Operations



Center application server 1. If a systems failure occurs on the primary server, you can complete this procedure from IBM Intelligent Operations Center application server 2.

2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/vap/tools`
3. Open the `subscription.properties` file by using a text editor.
4. Set the parameters for the SIRI subscription.

The following table describes the parameters that you can configure in the `subscription.properties` file.

Parameter	Description	Example
<code>subscription_start_time</code>	The time that the first bus is scheduled to start on a new business day. <b>Note:</b> If vehicles are scheduled to run continually for 24 hours, set the <code>subscription_start_time</code> to 00:00.	07:00
<code>subscription_end_time</code>	The time that the last bus finishes its journey at the end of a business day. <b>Note:</b> If vehicles are scheduled to run continually for 24 hours, set the <code>subscription_end_time</code> to 23:59.	22:00
<code>subscription_server_destination</code>	The URL on the external SIRI data source server where subscription requests are sent.	<code>http://server.xxx.com:80/sirisubscriptionserver</code>
<code>subscription_requestor_ref</code>	A requester reference code that is agreed and set between both systems. This value is used to determine the URL to deliver the subscription data to.	IBM-SmarterCities
<code>subscription_consumer_address</code>	The address that the external SIRI data source server should POST real-time SIRI messages to, typically the external facing load balancer. Where <i>hostname</i> is <ul style="list-style-type: none"> <li>• The host name of the IBM Intelligent Operations Center web server, which can be either of the following items in a high availability environment: <ul style="list-style-type: none"> <li>– Web server 1</li> <li>– Web server 2</li> <li>– Load balancer cluster</li> </ul> </li> </ul>	<code>https://hostname/wps/portal/trans_vap_httpd_web/vap/vehicle/message</code>
<code>subscription_time_out</code>	A timeout value in seconds that determines how long the Subscription Manager must wait before it resends the subscription request if zero messages are received.	600
<code>subscription_manager_port</code>	Port number that the Subscription Manager opens for communication with the IBM Intelligent Transportation SIRI web service. Control messages are also sent to the running process through this port. The port number must match the port that is defined in the VAP HTTPD_CONFIGURATION, SUBSCRIPTION_MANAGER_PORT setting in the IOC.SYSPROP database table. 13001 is the default port number.	13001

Parameter	Description	Example
<b>subscription_request_gzipped</b>	To compress and enable GZIP compression encoding, set this value to true. The default value of this parameter is false, which means that the subscription request sent by the IBM Intelligent Transportation system is in plain text format.	true

5. Close and save the file.

## Results

The Subscription Manager maintains a heartbeat function through the configured port number. If there are not enough incoming SIRI messages during the subscription start and end period, the Subscription Manager assumes that the subscription is broken and issues a new subscription request.

## Example

For an example Subscription Manager configuration, see the following `subscription.properties` file:

```

:
#subscription will be send out at the time
subscription_start_time=07:00

#subscription cancelling will be send out at the time
subscription_end_time=22:00

#The URL on the external SIRI data source server where subscription requests are sent.
subscription_server_destination=
http://127.0.0.1:10039/trans_vap_httpd_web/test/cwy/mockserver

#message should be delivered
#A RequestorRef MUST be agreed between both systems as it will be used
#to find the url to "deliver" the data.
#Ex: IBM-SmarterCities <-> http://ibm-server/dataexchange/
subscription_requestor_ref=IBM-SmarterCities

#url for subscription consumer; The address that the external SIRI data source server
#should POST real-time SIRI messages to, typically the external facing load balancer.
subscription_consumer_address=
https://web_hostname/wps/portal/trans_vap_httpd_web/vap/vehicle/message

#resend subscription if no message after given secs
subscription_time_out=600

#subscription management command communicated port
subscription_manager_port=13001

#subscription request message gzip content encoding or not
subscription_request_gzipped=false

```

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

### Related tasks:

“Configuring the Subscription Manager in a high availability environment” on page 187

When you install IBM Intelligent Transit Analytics in a high availability operating environment, you must configure and start a single instance of the Subscription Manager on the primary IBM Intelligent Operations Center application server. If the daemon process stops for any reason, you must also manually reconfigure the settings, and start the Subscription Manager on the secondary application

server. You then must modify the system properties table accordingly.

## Accumulating historical information for vehicle prediction



IBM Intelligent Transit Analytics uses the historical vehicle monitoring information that is stored in the TIH\_HS database. A tool is provided to generate metadata which is used by the Vehicle Awareness and Prediction feature to produce more accurate vehicle arrival predictions. The more metadata that is in the system database, the more accurate the vehicle arrival predictions are.

To produce a relative and accurate prediction of vehicle arrival, there should be at least 100 complete historical journey records for each journey pattern in the database. For example, if there are 50 journeys that are scheduled for a journey pattern every day, the solution must be running for at least two days to get 100 complete historical journey records for this journey pattern.

You can also regenerate the metadata at a later stage when there is more vehicle awareness information that is stored in the IBM Intelligent Operations for Transportation database.

### Running the services to accumulate data



The Vehicle Awareness and Prediction feature must be run for a significant time period to accumulate enough historical vehicle monitoring information in the database. This ensures that the vehicle arrival predictions are more accurate.

#### About this task

To generate the metadata that the system requires to produce accurate vehicle arrival predictions, start the applications and services that are required by the Vehicle Awareness and Prediction feature.

#### Procedure

1. Ensure that the Vehicle Awareness and Prediction feature is fully deployed and configured by completing all the instructions that are outlined in *Importing and configuring the SIRI data source*.
2. Start the services of the Vehicle Awareness and Prediction feature by completing the tasks in the topic titled *Starting the services*.
3. Allow the solution to run for a sufficient time period, such as 2 or 3 days.

**Note:** To produce a relative and accurate prediction of vehicle arrival, there should be at least 100 complete historical journey records for each journey pattern in the database. For example, if there are 50 journeys that are scheduled for a journey pattern every day, the solution must be running for at least two days to get 100 complete historical journey records for this journey pattern.

4. Stop the services by completing the tasks in *Stopping the services*.

#### What to do next

Complete the steps in *Generating the metadata for vehicle arrival prediction*.

#### Related concepts:

“Importing and configuring vehicle-related data sources” on page 74

After you install the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, set up and configure the required vehicle data of the transit network. The Vehicle Awareness and Prediction feature provides a data load utility to help you to import the required data into the existing TIH\_HS database of IBM Intelligent Transportation. The vehicle data source must be available in the required Service Interface for Real Time Information (SIRI) data format that IBM Intelligent Transportation is

designed to support.

#### Related tasks:

“Generating the metadata for vehicle arrival prediction”

Run the metadata generator tool on the IBM Intelligent Operations Center data server to produce metadata from the historical vehicle monitoring data that is accumulated in the system. Running the metadata generator tool regularly generates more accurate vehicle arrival predictions.

## Generating the metadata for vehicle arrival prediction



Run the metadata generator tool on the IBM Intelligent Operations Center data server to produce metadata from the historical vehicle monitoring data that is accumulated in the system. Running the metadata generator tool regularly generates more accurate vehicle arrival predictions.

### Before you begin

Complete the steps that are outlined in *Running the services to accumulate data*.

### About this task

The metadata generator tool is a command-line interface that automatically generates metadata from historical information that is stored in the TIH\_HS database. The resulting metadata is used by the prediction calculations to generate more accurate vehicle arrival times. Run the metadata generator tool regularly to ensure that the predictions generated by the system are as accurate as possible. You can configure the tool by editing the `offline.properties` file. For more information, see *Configuring offline.properties*.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the `db2inst2` user.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts`
3. To run the metadata generation utility, enter the following command:  

```
./vapgenmetadata.sh -config configFile -password dbPassword -start startDate -end endDate -preview
```

Where:

- `configFile` is a configuration file for specifying more parameters for pruning the database or generating the metadata. By default this file is called `offline.properties`. The `configFile` is only required if you are using the **-config** switch.
- `dbPassword` is the password of the `DB_USER` user that is defined in the configuration file.
- `startDate` is the date to start generating metadata from the historical vehicle monitoring information, which is specified in the format `yyyy-mm-dd`. The start date must be before the end date.
- `endDate` is the date to end the generation of metadata from the historical vehicle monitoring information, which is specified in the format `yyyy-mm-dd`. If no end date is specified, the `endDate` defaults to the current date.
- `-preview` is an optional parameter that can be used to generate metadata without saving it to the system database. This option is useful for running the command to tune the parameters in the configuration file.

For example, to generate historical metadata for a specified date frame, such as after 1st of March 2013 and before 20th of July 2013, enter the following command:

```
./vapgenmetadata.sh -password db2passw0rd -start 2013-01-03 -end 2013-07-20
```

**Note:** By default, the **vapgenmetadata** script uses the `offline.properties` configuration file. To run the command by using a different configuration file to specify the detailed properties, enter the following command:

```
./vapgenmetadata.sh -config config.properties -password db2passw0rd -start 2013-01-03 -end 2013-07-20
```

## Results

The following output is displayed in the console:

```
#JourneyPattern=<#1> #MetaData=<#2> (<#3>,<#4>)
```

Where:

Output	Represents the number of...
#1	Journey patterns
#2	Metadata entries that were processed during this run of the metadata generator tool, including new and replaced records
#3	Metadata entries added during this operation
#4	Metadata entries that were replaced during this operation

## What to do next

To optimize the performance of the system, prune the vehicle data regularly. For more information, see *Pruning the Vehicle Awareness and Prediction data*.

### Related tasks:

“Pruning the database tables of the Vehicle Awareness and Prediction feature” on page 215

Prune the database tables of the Vehicle Awareness and Prediction feature regularly to remove unrequired data and to optimize the performance. The prune utility deletes aged and obsolete forecast, vehicle, and production timetable data.

“Running the services to accumulate data” on page 151

The Vehicle Awareness and Prediction feature must be run for a significant time period to accumulate enough historical vehicle monitoring information in the database. This ensures that the vehicle arrival predictions are more accurate.

### Configuring `offline.properties`:

The `offline.properties` file is a configuration file of the Vehicle Awareness and Prediction feature that is used by both the data load utility and the metadata generator tool.

The `offline.properties` file is in the `opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory. The following table lists the property settings of the `offline.properties` file. Some of the properties must be configured before you run the data load utility and the metadata generator tool.

Property	Description
<b>DB_HOST</b>	The host name or IP address of the database server.
<b>DB_PORT</b>	The port of the database server for the client to access.
<b>DB_NAME</b>	The database name. The database name must always be set to <code>TIH_HS</code> .
<b>DB_USER</b>	The user name of the database administrator.

Property	Description
<b>LOG_LEVEL</b>	<p>Determines the level of logging. The following levels of logging can be set:</p> <ul style="list-style-type: none"> <li>• <b>INFO</b> - General information, such as the running state.</li> <li>• <b>WARNING</b> - Unexpected behavior that does not prevent the utility from running but might require action to be taken. Includes general information also.</li> <li>• <b>ERROR</b> - Critical issues with the data that requires action to be taken.</li> </ul> <p>By default, the <b>LOG_LEVEL</b> parameter is set to <b>INFO</b>.</p>
<b>PARAM_ERROR</b>	<p>The granularity of the metadata generation, in meters. <b>PARAM_ERROR</b> is the base unit of measurement that is used in metadata generation. By default, this value is set to 10.</p>
<b>PARAM_MAX_GAP</b>	<p>The maximum gap between 2 continuous vehicle positions for a specific vehicle. If the gap between the two vehicle positions exceeds this value, the track of the vehicle is discarded by the metadata generator tool. By default, the value is set to 500 meters.</p>
<b>PARAM_MAX_TIME</b>	<p>The maximum time between 2 continuous vehicle positions. If the gap between the two positions exceeds this value, the track of this vehicle is discarded by the metadata generator tool. By default, the value is set to 300 seconds.</p>
<b>PARAM_DIST_FILTER</b>	<p>The maximum distance that a vehicle can deviate from its predefined route. If the vehicle position is far away from the route and deviates further than this value, the track of this vehicle is discarded by the metadata generator tool. By default, the value is 20 meters.</p>
<b>PARAM_MAX_METADATA</b>	<p>The maximum number of metadata records that are stored in the database for each journey pattern. The default value for this setting is 100. Do not set this value to zero. Otherwise, no maximum record is set.</p>
<b>PARAM_METADATA_REPLACE_STRATEGY</b>	<p>The replacement strategy to use when there is more metadata available than the maximum limit specified by the <b>PARAM_MAX_METADATA</b> parameter, when you run the metadata generator tool. The parameter can be set by using either of the following options:</p> <p><b>RANDOM</b> When this value is set, if the number of metadata records exceeds the limit, new records randomly overwrite existing records. This is the default behavior.</p> <p><b>RING</b> When this value is set, if the number of metadata records exceeds the limit, new records replace the existing records on a first in, first out basis. For example, the oldest data records are overwritten by the new records.</p>
<b>PARAM_LAST_GENERATE_TIME</b>	<p>Do not modify the <b>PARAM_LAST_GENERATE_TIME</b> parameter as this value is set by the system.</p>

For example:

```
#Database connection
DB_HOST=192.168.1.14
DB_PORT=50000
DB_NAME=TIH_HS
DB_USER=db2inst2

# LOG SETTING
LOG_LEVEL=INFO

#Meta data generation parameters
PARAM_MAX_GAP=1000
PARAM_MAX_METADATA=100
PARAM_METADATA_REPLACE_STRATEGY=RANDOM

# DO NOT UPDATE THIS ENTRY MANUALLY, IT IS USED BY PROGRAM.
PARAM_LAST_GENERATE_TIME=
```

## Starting the vehicle arrival predictions



After generating the vehicle prediction metadata on the IBM Intelligent Operations Center data server, restart the streams application, portal applications, and Subscription Manager to start producing vehicle predictions.

### Before you begin

Complete the steps that are outlined in the topic titled *Generating the metadata required for vehicle prediction*.

### About this task

Start the services of the Vehicle Awareness and Prediction feature by completing the following steps.

### Procedure

1. Complete the steps in *Starting the portal application services*.
2. Complete the steps in *Starting the Subscription Manager*.
3. Complete the steps in *Starting the streams application*.

### Results

Vehicle predictions are generated based on the historical and real time vehicle monitoring information that is stored in the system.

### What to do next

Regular maintenance is required to optimize the vehicle predictions and the IBM Intelligent Transportation solution. Run the metadata generation tool and the data pruning tool regularly. See *Maintaining the Vehicle Awareness and Prediction feature*.

#### Related concepts:

“Maintaining the Vehicle Awareness and Prediction feature” on page 212

To ensure that the system is performing at the optimum performance level, regular system maintenance is required.





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## Chapter 6. Customizing the solution

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

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### Customizing the solution portal

You can customize elements of the user interface of the IBM Intelligent Transportation solution portal to suit your operation.

You can also customize elements of the solution portal relating to the specific features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.





#### Related information:

 [IBM WebSphere Portal product documentation](#)

### User Portlets

IBM Intelligent Transportation provides user portlets with customizable features.

The Traffic Awareness and Traffic Prediction features provide the following Operator: Traffic View portlets:

Portlet	Description
Current Traffic Conditions	The Current Traffic Conditions portlet is the starting point for viewing the most recent traffic situation, and identifying congestion areas. The portlet contains a geographical information system (GIS) map of the traffic network, providing a visual representation of current traffic data that is collected by the Traffic Awareness system from traffic subsystems.
 Predicted Traffic Conditions	The Predicted Traffic Conditions portlet displays the forecasted traffic situation in the transportation network for up to one hour into the future. The predicted traffic levels are color-coded and displayed on a geographical information system (GIS) map of the traffic network providing a visual representation of the forecasted traffic conditions.
Traffic Conditions - Details	The Traffic Conditions - Details portlet provides a structured view of current traffic data collected by the Traffic Awareness feature from traffic subsystems. Details of the traffic level predictions that are generated by the Traffic Prediction feature are also displayed in this portlet.
Contacts	A collaboration tool for communicating with other users that are logged on to the solution.
Traffic Flow - Past Hour	The Traffic Flow: Past Hour report provides a graph report showing the traffic flow volume of a selected road link in the transportation network during the past hour.
Traffic Event Reports	A graphical report that shows the traffic events of the network. The default traffic event period is the past 30 days.
 Traffic Flow Prediction Reports	A graphical report that shows the forecasted traffic flow volume of the selected road link or network ID, at 5 minute intervals within the next hour of the current time.
 Traffic Speed Prediction Reports	A graphical report that shows the forecasted traffic speed of the selected road link or network ID, at 5 minute intervals within the next hour of the current time.
Traffic Custom Reports	From the Traffic Custom Reports portlet you can access and run all of the reports that are provided by the Traffic Awareness feature.
 Traffic Prediction Custom Reports	You can access and run all of the reports that are provided by the Traffic Prediction feature from the Traffic Prediction Custom Reports portlet.

The Traffic Awareness feature provides the following Planner: Traffic portlets:

Portlet	Description
Historical Traffic Conditions	The Historical Traffic Conditions portlet provides information about the historical traffic conditions of the transportation network. A geographical information system (GIS) map of the traffic network provides a visual representation of historical traffic data collected by traffic subsystems and archived in the Traffic Awareness system database.
Historical Traffic Conditions - Details	The Historical Traffic Conditions - Details portlet on the Planner: Traffic view provides a structured view of historical traffic data, collected and archived in the Traffic Awareness database.
Contacts	A collaboration tool for communicating with other users that are logged on to the solution.
Traffic Flow - Past 30 days	A graphical report that shows the traffic flow volume of the network during the past 30 days. You can modify the traffic congestion graph to present the historical traffic volume total or the average speed of a selected road link. You can choose to view a report showing the historical traffic data for the last 30 days or for the past hour.
Traffic Custom Reports	From the Traffic Custom Reports portlet you can access and run all of the reports that are provided by the Traffic Awareness feature.

The Vehicle Awareness and Prediction feature provides the following Operator: Transit portlets:

Portlet	Description
Transit Conditions	The Transit Conditions portlet provides a visual representation of the latest transit operations data on a geographical information system (GIS) map. The information that displays on the map is useful for analyzing the current performance of the transit operations network, and deciding how to rectify problems that arise.
Transit Conditions - Details	The Transit Conditions - Details portlet displays a table that contains information about vehicles, stops, and routes that are being viewed on the map.
Contacts	A collaboration tool for communicating with other users that are logged on to the solution.
Vehicles Delayed	A portlet containing a graphical report that displays the performance of vehicles by status, highlighting the volume of vehicles that arrived late to their destination location.
Vehicles Off Route	A portlet containing a graphical report that displays the volume of vehicles that were diverted off the planned vehicle route at some point in the duration of the scheduled service.
Transit Custom Reports	You can access and run all of the reports that are provided by the Vehicle Awareness and Prediction feature from the Transit Custom Reports portlet.

You can customize the portlets. For more information, see the link at the end of the topic.

## Administration Portlets

IBM Intelligent Transportation provides a set of administration portlets if you install the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation. To configure the settings that are required for traffic prediction, use the administration portlets available in the **Solution Administration** view of the solution interface.

## Solution Configuration portlets

To configure the solution, you can use the following portlets, which are available at **Solution Administration**.

Portlet	Description
Configure and Enable Traffic Prediction	The Configure and Enable Traffic Prediction portlet provides options to enable and configure data collection that is required for traffic prediction.
Configure Traffic Prediction Calculations - Mean	The Configure Traffic Prediction Calculations - Mean portlet provides options to configure the settings to calculate the mean for each group of days that have a similar traffic pattern.
Configure Traffic Prediction Calculations - Estimate	The Configure Traffic Prediction Calculations - Estimate portlet provides options to configure the settings to calculate the batch estimate for each group of days at peak and off-peak times.
Create Traffic Prediction Relationship Matrix	The Create Traffic Prediction Relationship Matrix portlet provides options to create a relationship between a set of traffic links depending on the number of hops between them. Each link is an initial link and the number of hops determine how far away the other relative links in the subnet are from an initial link.
Traffic Prediction - Create Subnet	The Traffic Prediction - Create Subnet portlet defines multiple subnets and also assigns the underlying links to each of the subnets in Traffic Prediction.
Traffic Prediction - Update Subnet	The Traffic Prediction - Update Subnet portlet selects subnets and edits or deletes the underlying links to each of the subnets in Traffic Prediction.

## Solution Management portlets

To manage the solution, you can use the following portlets, which are available at **Solution Administration**.

Portlet	Description
Initiate Calculation Manually	The Initiate Calculation Manually portlet provides options to initiate mean and estimate traffic prediction calculations manually, outside of the scheduled calculation times. Speed and volume prediction calculations are scheduled and cannot be initiated manually.
Traffic Prediction Calculation Monitoring	The Traffic Prediction Calculation Monitoring portlet provides details of traffic prediction calculations.

### Related concepts:

“Customizing the Traffic Prediction feature” on page 169

You can customize the optional Traffic Prediction feature to provide traffic prediction details beyond an hour from the current time, to provide customized reports, and to configure data collection, enablement, and calculation in the administration portlets.

## Customizing the reports

IBM Intelligent Transportation provides a set of predefined reports that summarize your system data, for each feature that you install. You can customize the reports to suit the requirements of your organization. You can also modify the portlets that are provided in the solution portal so that they display the report information that you are most interested in.

### Related concepts:

“Customizing the Vehicle Awareness and Prediction reports” on page 182

You can customize the reports that are provided by the Vehicle Awareness and Prediction feature to suit your organizational requirements. Supported customization includes modifying some of the report criteria, language, and accessibility settings.

“Customizing the Traffic Awareness reports” on page 169

You can customize the reports that are provided by the Traffic Awareness feature to suit your organizational requirements. Supported customization includes modifying the report criteria, language, and accessibility settings.

## Configuring a system-wide report for all users

Configure the reports that are provided with the IBM Intelligent Transportation solution so that they reference the required traffic network ID and road link or region. You can also change the metric, time period, or other criteria that a report is based on. The graphs that display automatically in the reports are updated to reflect the system-wide report modification.

### Before you begin

Before you configure the system-wide reports, you must first complete the postinstallation tasks and load the data into the system.

### About this task

Complete the following steps in the Custom Reports portlet that is provided by each of the features that you installed:

Portlet	Reports package name	Feature
Traffic Custom Reports	TIH	Traffic Awareness
Traffic Prediction Custom Reports	TPT	Traffic Prediction
Transit Custom Reports	VAP	Vehicle Awareness and Prediction

For each of the features of the solution that you installed, complete the following procedure.

### Procedure

1. Log on to the solution as the Transportation IT Administrator and go to the Custom Reports portlet for the feature that you are interested in.
2. The portlet displays a list of all the traffic flow and event reports. Each row corresponds to a report type. Choose one of the report types. For example, **Traffic Events: Historical Trends**.
3. Click **More**.
4. In the **Available actions** window, click **Set properties**.
5. Go to the **Report** tab.
6. Under **Prompt values**, click **Edit**. The **Configure the report** dialog displays.
7. In the **Configure the report** dialog, complete the required options available for this report type.
8. Click **Finish** to view the report. Click **Cancel** to go back to the previous traffic event graph report. The hourglass icon is displayed while the report is being generated.
9. Click **OK**.

**Note:** Do not modify the report name, as it is referenced in a URL in the user interface portlet configuration.

### Results

The reports are updated to display the selected information and use the latest data that is in the system.

## Enabling accessibility

You can enable accessibility features in the reports portlets of IBM Intelligent Transportation to help visually impaired users to use the solution. When you enable accessibility in the reports portlets, a table is also displayed that contains the values used to plot the graph report. A summary that describes the graph is also available.

### About this task

You can enable accessibility on individual reports that you are interested in running. Repeat the following procedure for every report that is listed in each of the Custom Reports portlets that are available in your solution interface.

### Procedure

1. Select a report from the list of available reports in the **Reports** folder.
2. Click the **More** link that appears next to your selected report.
3. Click **Set properties**.
4. Open the **Report View** tab.
5. In the **Accessibility** section, select the **Enable accessibility support** check box.
6. To save the change, click **OK**.

### Results

After refreshing your browser, the graph in the reports portlets is now accompanied by a table that summarizes the report graph. Scroll down to see the table.

## Changing the language settings of the reports

There are several configuration procedures required to change the language of the reports that are available in the solution portal.

### Changing the language for a report for all users:

The Cognos language set for a report, that is the language of the action toolbar, buttons, and links, can be changed through Cognos® Connections only.

### About this task

To change the language for a specific report, for all users, follow the procedure.

### Procedure

1. Open Cognos Connections.
2. Select the package that you require.
3. Select the **Views** folder.
4. Select the **Run** icon next to the report that you require.
5. Under **Language**, select the language that you require.
6. Click **Run**.

### Related concepts:

“Changing the language settings of the reports” on page 271

The links and action icons in the reports portlets are displayed by using the default language that is configured for the browser. The graphs in the reports portlets are displayed by using the language preference that is set in the reports configuration. You can change the language of the text that displays in the axis of the report graphs to suit your personal language preference.

## Changing the default language for all your reports:

Change Cognos default language for all your reports in the console of IBM Cognos Connection.

### About this task

The Cognos default language setting controls the default language for the action toolbar, buttons, and links for all your reports. This default is initially set to the browser language and can be changed through Cognos® Connections only.

### Procedure

1. Open Cognos Connections.
2. In the upper right corner, click the **Man** icon.
3. Select **My Preferences**.
4. For **Regional options**
  - a. Under **Product language**, select the language that you require.
  - b. Under **Content language**, select the language that you require.
5. Click **OK** to implement the new language settings.

## Changing the language of the graph axes:

From the Custom Reports portlets of each feature of the solution that you installed, you can change the language set for the graph axes in a report.

### Procedure

1. Run the report that you require.
2. In the selected Custom Reports portlet, next to the relevant report click **More**.
3. Click **Set properties**.
4. For **Set Properties, General**, under the language option, change the language.
5. Click **OK**.
6. Run the report again. In the new report, the axes of the graph have text in the language you selected.

## Changing the language of the graph title:

The graph title comes from the data within the database. If the information within the database is translated the title reflects the language.

## Creating custom reports

You can create custom reports by using IBM Cognos Report Studio or IBM Cognos Query Studio.

### Procedure

1. Load the IBM Cognos Connection console.  
`http://hostname:port/p2pd/servlet/dispatch/ext`  
Where:
  - *hostname* is the host name of the IBM Intelligent Operations Center application server
  - *port* is the port number of the Cognos dispatcher service, for example, 9082
2. From the **Launch** menu, select **Report Studio** or **Query Studio**.
3. Select the name of the reports package that you would like to add a new report to. The reports packages that are provided with IBM Intelligent Transportation V1.6 are listed in the following table:

Reports package name	Feature provided by
TIH	Traffic Awareness
TPT	Traffic Prediction
VAP	Vehicle Awareness and Prediction

4. Click **Create New**.
5. Select the type of report to build.
6. Click **OK**.

**Note:** For more information about the report creation process, see the embedded help that is provided with IBM Cognos Report Studio and IBM Cognos Query Studio. For information about how to create custom reports by using data from the Traffic Awareness feature of the solution, see *Metadata modeling*.

### Metadata modeling:

A metamodel defines the language and processes from which to form a model.

Cognos reports are built based on a metadata model. The metadata model for the reports of the Traffic Awareness feature is organized as layers, among which only the Presentation View layer is exposed to report authors. The Presentation View consists of three namespaces:

#### Traffic Flow Analysis

Contains traffic volume, speed measures, and the date time dimension for multidimensional reports and analysis.

#### Traffic Event Analysis

Contains traffic event measure, date time, and event type dimensions for multidimensional reports and analysis.

#### Traffic Travel Analysis

Contains traffic travel time measure, including the average and standard travel measure and time loss dimensions for multidimensional reports and analysis.

#### Custom Query

Contains query subjects that you can use to build custom queries for relational reporting.

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## System properties configuration data

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

The following tables list the configuration settings in the system properties table that are used by the features of IBM Intelligent Transportation.

*Table 5. Properties used by the Traffic Awareness feature of IBM Intelligent Operations for Transportation.*

Group	Name	Value	Description
Transport	<b>Los_Color,A</b>	00ff00	A hexadecimal color code that is used to indicate that the LOS status is at a free flow and low traffic level.
Transport	<b>Los_Color,B</b>	00ff00	A hexadecimal color code that is used to indicate that the LOS status is at a free flow and dense level.

Table 5. Properties used by the Traffic Awareness feature of IBM Intelligent Operations for Transportation. (continued)

Group	Name	Value	Description
Transport	<b>Los_Color,C</b>	ff8c00	A hexadecimal color code that is used to indicate that the LOS status is at a reduced traffic flow level.
Transport	<b>Los_Color,D</b>	ff0000	A hexadecimal color code that is used to indicate that the LOS status is at a stop and go level.
Transport	<b>Los_Color,E</b>	ff0000	A hexadecimal color code that is used to indicate that the LOS status is at a standstill.
Transport	<b>Los_Color,F</b>	ff0000	A hexadecimal color code that is used to indicate that the LOS status is at a standstill.
Transport	<b>Los_Color,UNKNOWN</b>	808080	A hexadecimal color code that is used to indicate that the LOS status is unknown.
Transport	<b>Los_threshold,SpeedLimitPercentage</b>	80	The threshold for comparing the average speed with the actual speed limit for the link.
Transport	<b>Los_threshold,ReducedSpeedCutOff</b>	50	The threshold for determining when a Level of Service (LOS) value falls into category D.
Transport	<b>Los_threshold,StandstillSpeedCutOff</b>	20	The threshold for determining when a LOS value falls into category E.
Transport	<b>Los_threshold,SpeedLimitDefault</b>	100	The default speed value if no speed limit information is available for a traffic link.
Transport	<b>Map,LastUpdateTolerance</b>	120	The tolerance level for map polling.
Transport	<b>Link_Status_Aging,STATUS_AGE_RATE</b>	600	The time period in seconds that determines how often the system checks the latest status value for each link to identify whether it is stale or not. If the link is flagged as stale, the status is set to unknown and is dimmed, in the color gray, on the map. Set the <b>Link_Status_Aging,STATUS_AGE_RATE</b> value to zero to disable the link status age function.
Transport	<b>Link_Status_Aging,STATUS_AGE_THRESHOLD</b>	600	The time period in seconds of how old a link status entry must be to be classified as stale. For optimum results, ensure that the <b>Link_Status_Aging,STATUS_AGE_THRESHOLD</b> value is identical to the <b>Link_Status_Aging,STATUS_AGE_RATE</b> value.

Table 6. Properties used by the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

Group	Name	Value	Description
Transport	<b>Transit,VehiclePollingInterval</b>	15	The time period in seconds for how often the user interface updates the vehicle and stop information that is being displayed on the map and in the list.



Table 6. Properties used by the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics. (continued)

Group	Name	Value	Description
Transport	<b>Transit,VeryEarlyMin</b>	-2147483647	The minimum value range in seconds for vehicle status of <b>Transit,VeryEarly</b> .
Transport	<b>Transit,VeryEarlyMax</b>	-120	The maximum value range in seconds for vehicle status of <b>Transit,VeryEarly</b> .
Transport	<b>Transit,EarlyMin</b>	-120	The minimum value range in seconds for vehicle status of <b>Transit,Early</b> .
Transport	<b>Transit,EarlyMax</b>	-60	The maximum value range in seconds for vehicle status of <b>Transit,Early</b> .
Transport	<b>Transit,OnScheduleMin</b>	-60	The minimum value range in seconds for vehicle status of <b>Transit,On Schedule</b> .
Transport	<b>Transit,OnScheduleMax</b>	60	The maximum value range in seconds for vehicle status of <b>Transit,On Schedule</b> .
Transport	<b>Transit,LateMin</b>	60	The minimum value range in seconds for vehicle status of <b>Transit,Late</b> .
Transport	<b>Transit,LateMax</b>	120	The maximum value range in seconds for vehicle status of <b>Transit,Late</b> .
Transport	<b>Transit,VeryLateMin</b>	120	The minimum value range in seconds for vehicle status of <b>Transit,VeryLate</b> .
Transport	<b>Transit,VeryLateMax</b>	2147483647	The maximum value range in seconds for vehicle status of <b>VeryLate</b> .
Transport	<b>Transit,MaxFeatures</b>	2000	The limit that determines the maximum number of entries to show on the map and in the list.
Transport	<b>Transit,SpeedUnitOfMeasurement</b>	km/h	The unit of measure for vehicle speed. The <b>Transit,SpeedUnitOfMeasurement</b> value can be set to mph or km/h.

Table 7. Properties used for customizing the reports that are provided by Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

Group	Name	Value	Description
TransportCognosMin	<b>late minutes</b>	3	The amount of time in minutes before a vehicle is considered late. By default, in the reports, any time greater than > 3 minutes is considered late.
TransportCognosMin	<b>early minutes</b>	-3	The amount of time in minutes before a vehicle is considered early. By default, in the reports, any time greater than > -3 minutes is considered early. If the arrival of the vehicle is in-between the allocated value of <b>early minutes</b> and <b>late minutes</b> then the vehicle is considered on schedule.
TransportCognos%	<b>Vehicle % Unknown Delay</b>	25	When the Vehicles Delayed report is generated, the percentage of the 1 hour period that the vehicles target arrival time is classified as unknown.

Table 8. Properties for configuring the SIRI web service that is required by the Vehicle Awareness and Prediction feature.

Name	Value	Description
STREAMS_CONNECTION, STREAMS_HOST	Defaults to the stream's host name	The host name where the InfoSphere Streams application is running.
STREAMS_CONNECTION, STREAMS_GZIP_HOST	Defaults to the stream's host name	The host name where the InfoSphere Streams application is running.
STREAMS_CONNECTION, STREAMS_PORT	35000	The location where the InfoSphere Streams application listens for raw SIRI data.
STREAMS_CONNECTION, STREAMS_GZIP_PORT	35001	The location where the InfoSphere Streams application listens for compressed SIRI data.
HTTPD_CONFIGURATION, CACHE_ENABLE	'False'	Determines whether the web service caches incoming SIRI data if it fails to pass it on to the InfoSphere Streams application.
HTTPD_CONFIGURATION, CACHE_DIRECTORY	'Cache'	The name of the directory that is used to store cached SIRI data when caching is enabled.
HTTPD_CONFIGURATION, CACHE_MAXIMUM	60	The maximum number of SIRI messages to cache when caching is enabled.
HTTPD_CONFIGURATION, CACHE_REMOVE_SPEED	5	The maximum number of cached SIRI messages that are sent out for each incoming SIRI message when caching is enabled.
HTTPD_CONFIGURATION, SUBSCRIPTION_MANAGER_HOST	'localhost'	The host where the SIRI Subscription Manager process is running.
HTTPD_CONFIGURATION, SUBSCRIPTION_MANAGER_PORT	13001	The port of the host where the SIRI Subscription Manager process is running and listening for incoming requests from the web service.

Do not modify any other properties in the system properties table unless advised by IBM.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

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## Customizing the Traffic Awareness feature

You can customize the Traffic Awareness feature of IBM Intelligent Operations for Transportation to suit your deployment requirements. The following topics provide information about the customization that is supported for Traffic Awareness.

### Changing the color codes for the traffic levels of service

When you query traffic data in the solution interface, the road links on the maps and associated **Traffic Levels** lists are color coded according to the defined traffic levels of service (LOS). Optionally, you can configure the default colors that represent the traffic levels by updating the system properties database table.

#### Before you begin

##### CAUTION:

Changing the default color codes defined for the traffic levels of service could negatively impact accessibility. The default colors provide an accessible means to consume the data and were chosen so that the traffic levels are contrasted for color blind users.

## About this task

The system properties database table stores system-wide configuration data for the IBM Intelligent Operations Center and integrated solutions, such as IBM Intelligent Transportation. A hexadecimal color code is assigned to the *Los\_Color* property in the system properties database table for each traffic level that is defined in the system.

By default, the current, historical, and predicted **Traffic Levels** on the map and lists are configured as follows:

Name	Los_Color value	Color displayed in the UI
Los_Color,A	00ff00	Green
Los_Color,B	00ff00	Green
Los_Color,C	ff8c00	Amber
Los_Color,D	ff0000	Red
Los_Color,E	ff0000	Red
Los_Color,F	ff0000	Red

To update the hexadecimal color code value in the *Los\_Color* property for a traffic level, complete the following procedure:

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the database administrator.
2. From either the DB2 command line or control center, enter the following command:

```
update IOC.SysProp SET VALUE='hexcode' where Name = 'Los_Color,trafficlevelname'  
and Group = 'Transport'
```

Where *hexcode* is the hexadecimal color code value and *trafficlevelname* is the name of the traffic level of service that you would like to modify.

The following example changes the road links that are categorized with a level of service value of 'A' from green to purple, when displayed on the map or in the list.

```
update IOC.SysProp SET VALUE='800080' where Name = 'Los_Color,A' and Group = 'Transport'
```

3. Restart the IBM Intelligent Operations Center application server.

### Results

The maps of the IBM Intelligent Operations for Transportation feature in the portal solution interface display the recently configured colors when you choose to display traffic level layers.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

#### Related concepts:

“System properties configuration data” on page 163

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

## Setting the link status age rate and threshold

If the status data for a traffic link is not updated after a specified time period, the data is classified as stale, and the status of the link is set to unknown. By default, this time period is set to 600 seconds. You

can configure the link status age limit and set it to a level that suits your system environment requirements. You can also disable the link status age expiry feature so that the data does not get classified as unknown when it reaches a certain age. This setting is applicable only to the Traffic Awareness feature of IBM Intelligent Operations for Transportation.

## Before you begin

To set the traffic link status age, you must first access the system properties database table of the IBM Intelligent Operations Center database. For more information about how to access the system properties database table, see the *System properties configuration data* section.

## About this task

You can configure the link status age settings by modifying the following settings in the system properties database table.

Property	Description
<b>Link_Status_Aging,STATUS_AGE_RATE</b>	The time period in seconds that determines how frequently the system checks the latest status value for each link to identify whether it is stale or not. If the link is flagged as stale, the status is set to unknown and is dimmed, in the color gray, on the map. Set the <b>Link_Status_Aging,STATUS_AGE_RATE</b> value to zero to disable the link status age function.
<b>Link_Status_Aging,STATUS_AGE_THRESHOLD</b>	The time period in seconds of how old a link status entry must be to be classified as stale. For optimum results, ensure that the <b>Link_Status_Aging,STATUS_AGE_THRESHOLD</b> value is identical to the <b>Link_Status_Aging,STATUS_AGE_RATE</b> value.

To modify the traffic link status age settings, complete the following steps:

## Procedure

1. Connect to the IBM Intelligent Operations Center database.
2. To modify the default 600-second link age status limit, enter the following commands:

```
Update IOC.SysProp set Value = new_value where
name = 'Link_Status_Aging,STATUS_AGE_RATE' and group = 'Transport'
Update IOC.SysProp set Value = new_value where
name = 'Link_Status_Aging,STATUS_AGE_THRESHOLD' and group = 'Transport'
```

Where *new\_value* is the time period in seconds. For example, to change the value of the following parameters to 660 seconds,

- **Link\_Status\_Aging,STATUS\_AGE\_RATE**
- **Link\_Status\_Aging,STATUS\_AGE\_THRESHOLD**

enter the following commands:

```
Update IOC.SysProp set Value = '660' where name = 'Link_Status_Aging,STATUS_AGE_RATE'
and group = 'Transport'
Update IOC.SysProp set Value = '660' where name = 'Link_Status_Aging,STATUS_AGE_THRESHOLD'
and group = 'Transport'
```

3. To disable the link status age function, enter the following command:

```
Update IOC.SysProp set Value = '0' where name = 'Link_Status_Aging,STATUS_AGE_RATE'
and group = 'Transport'
```

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

**Related concepts:**

“System properties configuration data” on page 163

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

## Customizing the Traffic Awareness reports

You can customize the reports that are provided by the Traffic Awareness feature to suit your organizational requirements. Supported customization includes modifying the report criteria, language, and accessibility settings.

For more information about how to customize the reports, see *Customizing the reports*.

**Related concepts:**

“Customizing the reports” on page 159

IBM Intelligent Transportation provides a set of predefined reports that summarize your system data, for each feature that you install. You can customize the reports to suit the requirements of your organization. You can also modify the portlets that are provided in the solution portal so that they display the report information that you are most interested in.

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## Customizing the Traffic Prediction feature



You can customize the optional Traffic Prediction feature to provide traffic prediction details beyond an hour from the current time, to provide customized reports, and to configure data collection, enablement, and calculation in the administration portlets.

**Related concepts:**

“Managing traffic prediction calculations” on page 198

To trigger traffic prediction calculations manually and to monitor triggered calculations, use the Initiate Calculation Manually portlet and Traffic Prediction Calculation Monitoring portlet available at **Solution Administration**. You must have IT Administrator permissions to perform this task.

“Administration Portlets” on page 158

IBM Intelligent Transportation provides a set of administration portlets if you install the optional Traffic Prediction feature of IBM Intelligent Operations for Transportation. To configure the settings that are required for traffic prediction, use the administration portlets available in the **Solution Administration** view of the solution interface.

**Related tasks:**

“Configuring the Traffic Prediction engine” on page 68

After the Traffic Prediction feature is successfully installed, the Transportation IT Administrator must log on to the portal and configure traffic prediction for the first time using the administration portlets that are available in the **Administration** view of the solution interface. For later configurations, you can configure individual administration portlets as required.

## Configuring and enabling Traffic Prediction



The Configure and Enable Traffic Prediction portlet is an interactive window that contains options to enable traffic prediction and to configure data collection that is required for traffic prediction. The Traffic Prediction feature uses the traffic data collected by traffic subsystems to predict traffic for a specific time.

## Configurable options

The Configure and Enable Traffic Prediction portlet displays different editable fields with which you can enable and configure traffic prediction. The portlet contains the following sections and fields.

Table 9. Configure and Enable Traffic Prediction elements

Elements	Description
<b>Enable traffic prediction</b>	This check box determines whether the collected data is used for traffic prediction. Select the check box to enable traffic prediction using the collected data. Clear the check box to disable traffic prediction based on speed and volume. The check box is cleared by default.
<b>Configure General Settings</b>	This section is used to configure the general settings required to set up traffic prediction.
<b>Polling interval</b>	This field defines how often data is retrieved from the IBM Intelligent Transportation database. Select the required value from the list. Default value: 5 minutes
<b>Prediction interval</b>	This field defines how often traffic prediction is calculated. Ensure that this value is divisible by the value selected in the <b>Polling interval</b> field. Select the required value from the list. Default value: 5 minutes
<b>Time slots to be used for prediction during an evaluation</b>	This field defines the time slots for which traffic is to be predicted. The time slots are determined by the number of times traffic prediction can be done, specified in the <b>Prediction interval</b> field, within an hour. Select the required time slots from the available list. <b>Note:</b> Ensure that there is a correlation between these values and the selected setting for the <b>Percentage of data allowed to be missing</b> value. For example, if the <b>Percentage of data allowed to be missing</b> value is configured at 30%, the prediction interval is configured at 5 minutes, and the number of data periods to use for prediction is configured at 6, select the time slots so that for any particular time point, only 1 time point out of the last 6 is missing, since 2/6 is 33.3%. This is above the 30% limit configured. With a selection of prediction time slots of 5, 10, 15, 30, 45, and 60, prediction fails for the 30 minute time point. This is because the percentage of time points allowed to be missing is greater than 30%, in this case, the two time points 20 and 25, which is 2/6, or 33.3%. Similarly, prediction fails for the 45 and 60 minute time points. Predictions in this example will not fail with a selection of prediction time slots of 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60.
<b>Number of data periods to use for prediction</b>	This field defines the latest number of traffic records that are used for traffic prediction. Select or specify the required value. Default value: 6
<b>Stop prediction whenever a previously processed date is found in database</b>	This check box determines whether traffic prediction is to be discontinued for the specific traffic record when an already processed date is found in the database. Select the check box to enable the check for an already processed date and to discontinue traffic prediction for the specific record if the condition is found. The check box is selected by default.
<b>Configure Speed Prediction</b>	Use this section to configure the settings required to set up traffic prediction based on speed.
<b>Enable prediction based on speed</b>	This check box determines whether the collected data is used to predict the speed of vehicles. Select the check box to enable traffic prediction based on speed using the collected data. The check box is selected by default.
<b>Percentage of data allowed to be missing</b>	This field defines the percentage of data that can be unavailable while performing the speed prediction calculations. Select or specify the required value. Default value: 50
<b>Percentage of data allowed to be zero</b>	This field defines the percentage of data that can be zero while performing the speed prediction calculations. The calculation is stopped if the amount of zero data exceeds this percentage. Select or specify the required value. Default value: 30

Table 9. Configure and Enable Traffic Prediction elements (continued)

Elements	Description
<b>Configure Volume Prediction</b>	This section is used to configure the settings required to set up traffic prediction based on volume.
<b>Enable prediction based on volume</b>	This check box determines whether the collected data is used to predict the volume of vehicles. Select the check box to enable traffic prediction based on volume using the collected data. The check box is selected by default.
<b>Percentage of data allowed to be missing</b>	This field defines the percentage of data that can be unavailable while performing the volume prediction calculations. Select or specify the required value. Default value: 50
<b>Percentage of data allowed to be zero</b>	This field defines the percentage of data that can be zero while performing the volume prediction calculations. The calculation is stopped if the amount of zero data exceeds this percentage. Select or specify the required value. Default value: 30

## Configuring general settings for traffic prediction

You can configure the **Configure General Settings** section to specify the information required for traffic prediction.

### Procedure

1. Log on to the Configure and Enable Traffic Prediction portlet with the appropriate logon details.
2. Click **Solution Administration > Configure Traffic Prediction**.
3. Select the required **Polling interval** from the list.
4. Select the required **Prediction interval** from the list. Ensure that this value is divisible by the polling interval.
5. Select the required **Time slots to be used for prediction during an evaluation** from the available list.
6. Specify the **Number of data periods to use for prediction**.
7. Optional: If a previously processed date is found in the database, you can choose to stop predictions from being generated. To enable this option, select the check box titled **Stop prediction whenever a previously processed date is found in database**.
8. Click **Apply** to save the configuration or click **Reset** to go back to the default values.

### Results

The jobs are stored in the database. To verify the jobs:

1. Log on to the database server and connect to **TIH\_OP** using DB2.
2. Determine the number of records in the **CACHE.JOB\_TRIGGERS** table by entering `SELECT * FROM CACHE.JOB_TRIGGERS`. There is one record with the job name of **AdapterTrigger**.

A confirmation of your saved configuration is displayed at the top of the portlet. These updated criteria are used the next time traffic prediction is enabled and run.

## Enabling traffic prediction

Use the **Enable traffic prediction** check box to determine whether the collected data is used for traffic prediction. Select the check box to enable traffic prediction using the collected data. In addition, enable either speed or volume prediction or both to predict traffic. Clear the **Enable traffic prediction** check box to disable both speed and volume prediction.

### Procedure

1. Select the **Enable traffic prediction** check box to predict traffic using the collected data.
2. Select or specify the required information in the **Configure General Settings** section.

3. Optional: In the **Configure Speed Prediction** section, select the **Enable prediction based on speed** check box to configure the settings required to set up traffic prediction based on speed.
  - a. Specify the **Percentage of data allowed to be missing**.
  - b. Specify the **Percentage of data allowed to be zero**.
4. Optional: In the **Configure Volume Prediction** section, select the **Enable prediction based on volume** check box to configure the settings required to set up traffic prediction based on volume.
  - a. Specify the **Percentage of data allowed to be missing**.
  - b. Specify the **Percentage of data allowed to be zero**.
5. Click **Apply** to save the configuration or click **Reset** to go back to the previous saved values.

## Results

A confirmation of your saved configuration is displayed at the top of the portlet. These updated criteria determine which traffic prediction is run and the configuration to be used. Also, any portlets on the **Operator: Traffic** view that display the traffic prediction results are updated automatically the next time the graph or page is refreshed.

## Configuring mean Traffic Prediction calculations

**Administrator** 

The Configure Traffic Prediction Calculations - Mean portlet is an interactive window that contains options to specify the details required to calculate the mean. Mean calculation is a traffic process that calculates the mean for each group of days with similar traffic patterns. Each day of the week can be considered as a separate group, so a maximum of seven processes can be configured to calculate the mean.

### Configurable options

The mean calculation is performed with the data collected from the IBM Intelligent Transportation database. The data that is generated by this calculation is used as an input for real-time prediction. The Configure Traffic Prediction Calculations - Mean portlet displays different editable fields with which the settings can be configured to calculate the mean. The portlet contains the following sections and fields.

*Table 10. Configure Traffic Prediction Calculations - Mean elements*

Elements	Description
<b>Number of weeks to use for mean calculation</b>	This field defines the number of weeks of traffic data across which the average for speed and volume for each group is calculated. Select or specify the required value.
<b>Alpha value for calculating weighted mean</b>	This field defines the alpha value that can be used to calculate the weighted mean. This value is multiplied with the previous data points and thus gives emphasis to the recent data points. Select or specify the required value.
<b>Group the days of week that have similar traffic patterns</b>	This section is used to configure the groups that are used to calculate the mean. The days of the week are grouped based on similar traffic patterns. A maximum of 7 groups can be configured. Empty groups are ignored. Use the arrows to move the days of the week among the groups.

## Configuring settings to calculate mean Procedure

1. Select or specify the required **Number of weeks to use for mean calculation**.
2. Select or specify the required **Alpha value for calculating weighted mean**.



- Use the arrows to group the days of the week in different columns that are based on similar traffic patterns. A maximum of seven groups can be configured. Empty groups are ignored while calculating the mean.
- Click **Apply Changes** or click **Reset** to go back to the default values.

## Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required processes are scheduled. You can also initiate the calculation in the Initiate Calculation Manually portlet. To open the portlet, click **Solution Administration > Initiate Traffic Prediction Calculations**. The data that is generated by this calculation is used as an input for real-time prediction.

## Configuring estimate Traffic Prediction calculations



The Configure Traffic Prediction Calculations - Estimate portlet is an interactive window that contains options to specify the details to calculate the batch estimate. Estimate calculation is a traffic process that calculates the batch estimate for each group of days with similar traffic patterns and two sets of times. Calculate the two types of estimate, peak and off-peak estimates, based on the peak times and off-peak times for each group of days. Configure a maximum of 14 processes to calculate peak and off-peak estimates.

### Configurable options

The estimate calculation is performed with the data collected from the IBM Intelligent Transportation database. The data that is generated by this calculation is used as an input for real-time prediction. The Configure Traffic Prediction Calculations - Estimate portlet displays different editable fields with which the settings can be configured to calculate the batch estimate. The portlet contains the following sections and fields.

Table 11. Configure Traffic Prediction Calculations - Estimate elements

Elements	Description
<b>Step 1: Group the days of the week that have similar traffic patterns</b>	This section is used to configure the groups that are used to calculate a pair of peak and off-peak estimates. The days of the week are grouped based on similar traffic patterns. A maximum of 7 groups can be configured. Empty groups are ignored. Use the arrows to move the days of the week among the groups.
<b>Step 2: For each group of days, specify which times typically involve the heaviest (peak) traffic levels</b>	This section is used to configure the details for each group. The times are used to calculate a peak estimate and off-peak estimate for each group of days.
<b>Associate with a previously created mean</b>	This field defines the calculated mean value that is to be associated with the specific estimate group, and is configurable for each estimate group. The mean groups that are listed in the drop-down list are available from the groups that are created in the Configure Traffic Prediction Calculations - Mean portlet. Select the required mean from the drop-down list.
<b>Number of weeks to use for this calculation</b>	This field defines the period across which the estimate for each group is calculated, and is configurable for each estimate group. Select or specify the required value.
<b>Off-Peak times</b>	This column defines the times at which traffic levels are low for a specific group. Use the arrows to move the times between the <b>Off-Peak times</b> and <b>Peak times</b> columns.
<b>Peak times</b>	This column defines the times at which traffic levels are high for a specific group. Use the arrows to move the times between the <b>Off-Peak times</b> and <b>Peak times</b> columns.

## Configuring settings to calculate estimate

### Before you begin

Ensure that the configuration is saved for mean calculation in the Configure Traffic Prediction Calculations - Mean portlet. Click **Solution Administration > Configure Traffic Prediction Calculations**.

### Procedure

1. In the **Step 1: Group the days of the week that have similar traffic patterns** section, use the arrows to group the days of the week in different columns that are based on similar traffic patterns. A maximum of seven groups can be configured. Empty groups are ignored while calculating the estimate.
2. In the **Step 2: For each group of days, specify which times typically involve the heaviest (peak) traffic levels** section, specify the following settings for each estimate group:
  - a. Select the required **Associate with a previously created mean** from the drop-down list.
  - b. Select or specify the **Number of weeks to use for this calculation**.
  - c. Use the arrows to group the times in **Off-Peak times** column and **Peak times** column.
3. Click **Apply Changes** or click **Reset** to go back to the default values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required processes are scheduled. To initiate the calculation in the Initiate Calculation Manually portlet, click **Solution Administration > Initiate Traffic Prediction Calculations**. The data that is generated by this calculation is used as an input for real-time forecasting.

## Monitoring Traffic Prediction calculations

**Administrator** 

The Traffic Prediction Calculation Monitoring portlet provides details of traffic prediction calculations.

### Portlet overview

The Traffic Prediction Calculation Monitoring portlet is an interactive window that displays the information about traffic prediction calculations that are based on the results of your current query in the **Select Content** form. The portlet lists the traffic prediction calculations in a tabular format, which is separated into the following columns:

*Table 12. Traffic Prediction Calculation Monitoring properties*

Field label	Description
Process ID	The process ID assigned to the calculation

Table 12. Traffic Prediction Calculation Monitoring properties (continued)

Field label	Description
<b>Name</b>	<p>The name of the calculation. For example:</p> <ul style="list-style-type: none"> <li>• INSERT_FEED – the process of retrieving real-time data from the IBM Intelligent Transportation database, preprocessing the data, and inserting the data into the cache referred by the prediction calculations</li> <li>• MeanXX – the process of calculating the average for a specific group; where XX indicates the day or group for which the average is calculated</li> <li>• PeakXX – the process of calculating the peak time estimate for a specific group; where XX indicates the days for which the peak estimate is calculated</li> <li>• OffPeakXX – the process of calculating the off-peak time estimate for a specific group; where XX indicates the days for which the off-peak estimate is calculated</li> </ul> <p><b>Note:</b> If the group contains only Monday, then the name of the calculation is suffixed with MO. For example: MeanMO; if the group contains both Monday and Tuesday, the name of the calculation is suffixed with MOTU, for example: MeanMOTU; and so on. Available suffixes and days are:</p> <ul style="list-style-type: none"> <li>• MO Monday</li> <li>• TU Tuesday</li> <li>• WE Wednesday</li> <li>• TH Thursday</li> <li>• FR Friday</li> <li>• SA Saturday</li> <li>• SU Sunday</li> </ul>
<b>Type</b>	<p>The type of the calculation. For example:</p> <ul style="list-style-type: none"> <li>• INSERT_FEED – fetches real-time data from the IBM Intelligent Transportation database, preprocesses the data, and inserts the data into the cache referred by the prediction calculations</li> <li>• ESTIMATE – calculates the peak and off-peak estimates for a specific group of days</li> <li>• MEAN – calculates the average of a group of days that have a similar traffic pattern</li> <li>• PREDICTION – calculates the traffic prediction for a specific time</li> </ul>
<b>Status</b>	<p>The status of the calculation. For example:</p> <ul style="list-style-type: none"> <li>• INITIATED – the calculation was started</li> <li>• COMPLETED – the calculation was completed</li> <li>• ERROR – the calculation logged errors</li> </ul>
<b>Date and Time</b>	The server date and time at which the calculation is monitored and status is determined
<b>Status Description</b>	A description of the status of the associated process

Additional information that describes the status of calculations and running processes. The possible values are:

Calculation Type	Status	Message
Insert Feed	INITIATED	Processing real-time data from <b>Transportation Link Status</b> table.
Insert Feed	COMPLETED	Insert feed is completed. Cache updated with real-time records. <i>number_of_records</i> records in cache.
Insert Feed	ERROR	Failed to load cache with real-time information. Check the logs on the prediction node for more details.

Calculation Type	Status	Message
Insert Feed	ERROR	No new feeds are available for inserting. Check that real-time feeds are being fed into the <b>Transportation</b> database. Check the trace logs on the prediction node for more details.
Prediction	INITIATED	Prediction calculations are initiated.
Prediction	COMPLETED	Prediction calculations are completed for <i>number_of_links</i> links.
Prediction	ERROR	Prediction calculations have errors. Check the logs on the prediction node for more details.
Mean	INITIATED	Mean calculations are initiated with statistic ID <i>ID</i> .
Mean	COMPLETED	Mean calculations are completed with statistic ID <i>ID</i> . Check the <i>Link_Stats</i> table with this ID for more details.
Mean	ERROR	Mean calculations with statistic ID <i>ID</i> has errors. Check the logs on the prediction node for more details.
Estimate	INITIATED	Estimate calculations are initiated with weight ID <i>ID</i> .
Estimate	COMPLETED	Estimate calculations are completed with weight ID <i>ID</i> . Check the <i>Link_Weights</i> table with this ID for more details.
Estimate	ERROR	Estimate calculations with weight ID <i>ID</i> has errors. Insufficient data error is detected for a number of links. Check the trace logs on the prediction node for more details.

## Selecting traffic prediction calculation details to show in the table

The table in the Traffic Prediction Calculation Monitoring portlet is populated based on your choices in the selection form.

### Procedure

1. Click **Select Content**. A form is displayed.
2. Use the form to specify the traffic prediction calculation that you would like to monitor:
  - **Calculation Type**
  - **Status**
  - **From date**
  - **To date**
3. After you make your selection, click **Select Content** again to hide the selection form.
4. Click **Update** or click **Reset** to go back to the default values.

### Results

The table is updated with the latest available traffic prediction calculation information based on your selection.

## Sorting the traffic prediction calculation monitoring table

Sorting the list is useful for navigating through long lists of traffic prediction calculations that are returned by a query. You can sort the traffic prediction calculation details by clicking the column heading. For example, click the **Status** column heading to sort the traffic prediction calculations by status. Clicking the column heading once sorts the list by the column values in ascending order. Clicking the **Status** column heading again sorts the list in descending order. The list can be sorted by one column value at a time.

## Starting Traffic Prediction calculations manually

### Administrator

The Initiate Calculation Manually portlet provides options to initiate mean and estimate traffic prediction calculations manually, outside the scheduled calculation times. Speed and volume prediction calculations are scheduled and cannot be initiated manually.

### Portlet overview

The Initiate Calculation Manually portlet is an interactive window from where you can initiate a traffic prediction calculation.

### Configurable options

The Initiate Calculation Manually portlet displays different editable fields with which you can specify the traffic prediction calculation to be triggered. The following table outlines the details to be provided.

Table 13. Initiate Calculation Manually properties

Field label	Description
<b>Calculation process to initiate</b>	<p>The name of the calculation that is to be triggered at the current time, outside of the scheduled times. Select the required calculation name from the drop-down list. For example:</p> <ul style="list-style-type: none"><li>• MeanXX – the process of calculating the average for a specific group; where XX indicates the day or group for which the average is calculated</li><li>• PeakXX – the process of calculating the peak time estimate for a specific group; where XX indicates the days for which the peak estimate is calculated</li><li>• OffPeakXX – the process of calculating the off-peak time estimate for a specific group; where XX indicates the days for which the off-peak estimate is calculated</li></ul> <p><b>Note:</b> If the group contains only Monday, then the name of the calculation is suffixed with MO. For example: MeanMO. If the group contains both Monday and Tuesday, then the name of the calculation is suffixed with MOTU, for example: MeanMOTU; and so on. Available suffixes and days are:</p> <ul style="list-style-type: none"><li>• MO Monday</li><li>• TU Tuesday</li><li>• WE Wednesday</li><li>• TH Thursday</li><li>• FR Friday</li><li>• SA Saturday</li><li>• SU Sunday</li></ul>
<b>Subnet ID on which to run calculation</b>	<p>The ID of the area from where data is used for the calculation. The subnet IDs that are defined in the Create Traffic Prediction Relationship Matrix portlet are displayed in the drop-down list. Select the required ID from the list.</p>

## Manually triggering a traffic prediction calculation

### Procedure

1. Select the **Calculation process to initiate** from the list.
2. Select the **Subnet ID on which to run calculation** from the list.
3. After you make your selection, click **Initiate** or click **Reset** to go back to the default values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required traffic prediction calculation is triggered.

### What to do next

You can view the status of the triggered traffic prediction calculation in the Traffic Prediction Calculation Monitoring portlet by clicking **Solution Administration > Monitor Traffic Prediction Calculations**.

## Creating the relationship matrix

**Administrator** 

The Create Traffic Prediction Relationship Matrix portlet contains options that are required to create a relationship between a set of traffic links that depends on the number of hops between them. Each link is an initial link and the number of hops determine how far away the other relative links in the subnet are from an initial link.

### Portlet overview

The Create Traffic Prediction Relationship Matrix portlet is an interactive window that contains options to create a subnet ID and to select the number of hops that are required to create a relationship between the traffic links in the specified subnet. The links within a subnet are related on the basis of the distance, in terms of the number of hops, and this relationship is used as input for traffic prediction calculations.

### Configurable options

The Create Traffic Prediction Relationship Matrix portlet displays different editable fields with which you can create a subnet ID and also generate relationships between traffic links. The portlet contains the following sections and fields.

*Table 14. Create Traffic Prediction Relationship Matrix elements*

Field label	Description
<b>Example of hops to related links</b>	This illustration explains the concept of creating a relationship between traffic links in a subnet that is based on the number of hops between them. Each link in a subnet is considered as an initial link and all the other links are related to it depending on the number of hops that are specified.
<b>Subnet ID containing the initial links for which to calculate relationships</b>	This list defines the ID associated with the subnet for which a relationship is to be created. The subnet is a set of traffic link IDs that are collected from the IBM Intelligent Transportation database. Select a subnet ID.

Table 14. Create Traffic Prediction Relationship Matrix elements (continued)

Field label	Description
<b>Number of hops to allow from an initial link to its most distant relatives</b>	This field defines the distance to be considered between an initial link and other relative links in the subnet that is based on the number of hops between them. Select or specify the required value. Default value: 1 <b>Note:</b> At any time, the subnet ID can be associated with only a specific number of hops. That is, only one type of relationship can exist between the traffic links in the subnet. Specifying a different number of hops for the subnet ID overwrites the existing value and creates a new relationship.

## Generating relationships between traffic links

You can specify the information that is required to create a relationship between a set of traffic links in a subnet.

### Procedure

1. Select the required **Subnet ID containing the initial links for which to calculate relationships**.
2. Select or specify the required **Number of hops to allow from an initial link to its most distant relatives**.
3. Click **Generate Relationships** to create the relationship and to store it in the database, or click **Reset** to go back to the default values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet. These updated criteria are used as input for traffic prediction calculations.

## Creating subnets

**Administrator** 

The Traffic Prediction - Create Subnet portlet allows you to define multiple subnets and also assign the underlying links to each of the subnets in Traffic Prediction. Creating multiple subnets means that different groups of links are processed in parallel, which can lead to improved performance.

### Portlet overview

Each subnet is associated with several link IDs. In the portlet, there is an alphanumeric field that represents the subnet ID, and a text box where you can type or paste multiple comma-separated link IDs for the subnet. You define a subnet from the portlet, and the information is sent to the REST service for processing.

### Configurable options

The Traffic Prediction - Create Subnet portlet displays different editable fields with which you can configure the settings to create a subnet with associated link IDs. The portlet contains the following sections and fields.

Table 15. Traffic Prediction - Create Subnet elements

Elements	Description
<b>Define a Subnet with ID</b>	The <b>Define a Subnet with ID</b> field defines the subnet ID to be processed. The ID cannot be an existing ID.

Table 15. Traffic Prediction - Create Subnet elements (continued)

Elements	Description
Links to be associated with the subnet	The <b>Links to be associated with the subnet</b> text box contains the comma-separated link IDs that are associated with the subnet ID in the <b>Define a Subnet with ID</b> field. The link IDs must not exist in another subnet and they must exist in the data tables. If a link is submitted that does not meet these criteria, the event is logged so that this issue can be corrected.

## Defining a subnet

Follow these steps to define a subnet from the Traffic Prediction - Create Subnet portlet. See the previous *Configurable options* section for details.

### Before you begin

Ensure that the links and subnets are properly defined.

### Procedure

1. Specify a subnet ID in the **Define a Subnet with ID** field, and specify the associated link IDs in the **Links to be associated with the subnet** text box.
2. Click **Create Subnet**.

### Results

The task status is displayed at the top of the portlet. For example, Subnet created successfully. If there is a subnet creation failure, the list of failing links is logged. The Traffic IT Administrator who is creating the subnet checks the logs, removes or modifies the link IDs, and repeats the process if required.

## Updating subnets



The Traffic Prediction - Update Subnet portlet allows you to select subnets and edit or delete the underlying links to each of the subnets in Traffic Prediction. Multiple subnets mean that different groups of links are processed in parallel, which can lead to improved performance.

### Portlet overview

Each subnet is associated with several link IDs. In the portlet, there is an alphanumeric field that represents the subnet ID, and a text box with comma-separated link IDs for the subnet. You select a subnet ID to be updated or deleted, and the update or delete request is sent to the REST service for processing.

### Configurable options

The Traffic Prediction - Update Subnet portlet displays different editable fields with which you can configure the settings to update or delete a subnet with associated link IDs. The portlet contains the following sections and fields.

Table 16. Traffic Prediction - Update Subnet elements

Elements	Description
Subnet ID	The <b>Subnet ID</b> field defines the subnet ID to be processed.
Links associated with the subnet	The <b>Links associated with the subnet</b> text box contains the link IDs that are associated with the subnet ID in the <b>Subnet ID</b> field.



## Modifying or deleting a subnet

Follow these steps to edit or delete a subnet from the Traffic Prediction - Update Subnet portlet.

### Before you begin

Ensure that the links and subnets that are specified are properly defined. Review the subnet creation rules in the *Create Subnet* topic.

### Procedure

1. Specify a subnet ID in the **Define a Subnet with ID** field, and the associated link IDs are displayed in the non-editable text box.
2. Depending on whether you want to update or delete the subnet, do one of the following:
  - If you want to update the subnet, click **Edit Links**, add or remove the link IDs and click **Update**.
  - If you want to delete the subnet, click **Delete**.

### Results

The update or delete status message is displayed at the top of the portlet.

## Guidelines to configure traffic prediction



The Traffic Prediction feature defines certain steps to configure traffic prediction for the first time using the administration portlets that are available in the **Administration** view of the solution interface. For later configurations, you can configure individual administration portlets as required. This procedure gives an overall view of how to configure traffic prediction using the various portlets.

### Procedure

1. Configure the general settings for traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in “Configuring and enabling Traffic Prediction” on page 274. Ensure that traffic prediction is disabled by clearing the following check boxes:
  - **Enable traffic prediction**
  - **Enable prediction based on speed**
  - **Enable prediction based on volume**
2. By default, a subnet called *Zone1* is created with all of the available links by the Traffic Prediction post installation scripts.
  - a. View the subnet in the **Solution Administration > Create Traffic Prediction Subnets** portlet.
  - b. Create multiple subnets by copying the links from the Traffic Prediction - Create Subnet portlet. The Traffic Prediction - Create Subnet portlet prevents a link ID from being present in multiple subnets.
  - c. To get the maximum number of predicted links, create the subnet with a proper link relationship. Edit and delete the subnets using the Traffic Prediction - Update Subnet portlet.
  - d. Generate relationships after the subnet, or subnets, are created. Relationships can be generated for each individual subnet, or for all of the subnets.
3. Specify the details required to create a subnet ID and generate a relationship between the traffic links in the Create Traffic Prediction Relationship Matrix portlet by following the instructions in “Creating the relationship matrix” on page 282.
4. Configure the traffic prediction mean calculation settings in the Configure Traffic Prediction Calculations - Mean portlet by following the instructions in “Configuring mean Traffic Prediction calculations” on page 276.

5. Configure the traffic prediction estimate calculation settings in the Configure Traffic Prediction Calculations - Estimate portlet by following the instructions in “Configuring estimate Traffic Prediction calculations” on page 277.
6. Trigger all the traffic prediction calculations in the Initiate Calculation Manually portlet by following the instructions in “Manually initiating traffic prediction calculations” on page 198. It is recommended that all the mean and estimate traffic prediction calculations are triggered manually the first time, with the mean calculations triggered first. Mean calculations for any one day are triggered and completed before estimate calculations are triggered for the same day. Later, the calculations are run at scheduled times by default.
7. Monitor all the traffic prediction calculations in the Traffic Prediction Calculation Monitoring portlet by following the instructions in “Monitoring traffic prediction calculations” on page 198. You can customize the query in the selection form to monitor specific calculations.
8. Enable traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in “Configuring and enabling Traffic Prediction” on page 274. Ensure that the **Enable traffic prediction** check box is selected. Also, select either the **Enable prediction based on speed** check box or the **Enable prediction based on volume** check box, or select both.
9. Complete the Traffic Prediction configuration instructions in Configuring Traffic Prediction.

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## Customizing the Vehicle Awareness and Prediction feature



You can customize the optional Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics to suit your deployment requirements.

The following topics provide information about the customization that is supported for IBM Intelligent Transit Analytics. For further advice on customizing the solution, contact IBM Support.

## Customizing the Vehicle Awareness and Prediction reports



You can customize the reports that are provided by the Vehicle Awareness and Prediction feature to suit your organizational requirements. Supported customization includes modifying some of the report criteria, language, and accessibility settings.

You can also customize the report criteria and decide what value ranges determine the status of a vehicle. You can also change the percentage values that determine whether a vehicle is classified as status unknown.

For more information about how to customize the reports, see *Customizing the reports*.

### Related concepts:

“Customizing the reports” on page 159

IBM Intelligent Transportation provides a set of predefined reports that summarize your system data, for each feature that you install. You can customize the reports to suit the requirements of your organization. You can also modify the portlets that are provided in the solution portal so that they display the report information that you are most interested in.

## Setting the maximum query results for the Transit Conditions map and list



In the Operator: Transit view, you can limit the number of items that are returned in the query results on the map and list portlets. By default, a maximum of 2000 items can be displayed on the map or in the list. The limit is set in the system properties database table of the IBM Intelligent Operations Center database. To update the default limit in the IBM Intelligent Operations Center database, submit an SQL command from the IBM Intelligent Operations Center data server.

## About this task

The system properties database table stores system-wide configuration data for the IBM Intelligent Operations Center and integrated solutions such as IBM Intelligent Transportation. You must have database administrator permissions to update the system properties database table.

Limiting the number of items that are returned in the query results on the map and list portlets can help to improve both client and server performance.

## Procedure

1. Log on to the server as the DB2 database administrator.
2. Connect to the IBM Intelligent Operations Center database by using the following DB2 shell command:  

```
db2 connect to IOCDB
```
3. Update the existing map and list result limit by entering the following SQL command:  

```
update dbTable set value=limit where name="Transit,MaxFeatures" and group="Transport"
```

Where:
  - *dbTable* is the name of the system properties database table, such as IOC.SysProp.
  - *limit* is an integer value that represents the limit you would like to set. The maximum limit is 2000, which is also the default limit. Reduce this value to improve performance.For example, to set the limit to 1000 items, use the following SQL command:  

```
update ioc.sysprop set value=1000 where name="Transit,MaxFeatures" and group="Transport"
```
4. To disconnect, enter the following DB2 shell command:  

```
db2 disconnect all
```
5. Restart the IBM Intelligent Operations Center application server.

## Results

When you submit a query, after you restart the IBM Intelligent Operations Center application server, the map in the Transit Conditions portlet and the list in the Transit Conditions - Details portlet return only the maximum number of items according to the value that is set in the system properties table. If the number of results in a query exceed this limit, a warning message is displayed in the solution portal interface.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

### Related concepts:

“System properties configuration data” on page 163

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

## Setting the polling interval



The polling interval is the length of time that elapses before the information that is displayed on the map and the list on the Operator: Transit view is refreshed with the latest information from the system database. By default, the polling interval is 15 seconds. You can customize this setting if required.

## About this task

The polling interval of the Vehicle Awareness and Prediction feature is set in the system properties database table of the IBM Intelligent Operations Center database.

The system properties database table stores system-wide configuration data for the IBM Intelligent Operations Center and integrated solutions such as IBM Intelligent Transportation. You need database administrator permissions to update the system properties database table.

You can use the following procedure to modify the system properties database.

## Procedure

1. Log on to the server as the DB2 database administrator.
2. Connect to the IBM Intelligent Operations Center database by using the following DB2 shell command:

```
db2 connect to IOCDB
```

3. Update the existing map and list result limit by entering the following SQL command:

```
UPDATE dbTable set value = 'pollingIntervalValue' where  
name = 'Transit,VehiclePollingInterval' and group = 'Transport'
```

Where:

- *dbTable* is the name of the system properties database table, such as IOC.SysProp.
- *pollingIntervalValue* is a value in seconds that represents the polling interval that you would like to set.

For example, to set the polling interval to 10 seconds, use the following SQL command:

```
UPDATE IOC.SysProp set value = '10' where name = 'Transit,VehiclePollingInterval' and  
group = 'Transport'
```

4. To disconnect, enter the following DB2 shell command:

```
db2 disconnect all
```

5. Restart the IBM Intelligent Operations Center application server.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

## Related concepts:

“System properties configuration data” on page 163

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

## Setting the unit of measure for speed



The measured speed in the Vehicle Awareness and Prediction feature of IBM Intelligent Transportation can be either in miles or kilometers per hour, depending on the locale. You can configure the unit of measure for speed and set it to a value that suits your system environment requirements. The default unit of measure for speed is kilometers per hour. This setting is applicable only to the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

## About this task

You can configure the unit of measure for speed settings by modifying the following settings in the system properties database table.

Group	Property	Description
Transport	<b>Transit,SpeedUnitOfMeasurement</b>	A setting that determines the type of unit of measure for speed that is used in Vehicle Awareness and Prediction. The possible values are: <ul style="list-style-type: none"><li>• <b>mph</b> - the unit of measure of speed is miles per hour</li><li>• <b>km/h</b> - the unit of measure of speed is kilometers per hour</li></ul>

To modify the unit of measure for speed settings, complete the following steps:

### Procedure

1. Connect to the IBM Intelligent Operations Center database.
2. Choose from the following options:

- To modify the unit of measure for speed to kilometers per hour, enter the following command:

```
update ioc.sysprop set value = 'km/h' where group = 'Transport'  
and name = 'Transit,SpeedUnitOfMeasurement'
```

- To modify the unit of measure for speed to miles per hour, enter the following command:

```
update ioc.sysprop set value = 'mph' where group = 'Transport'  
and name = 'Transit,SpeedUnitOfMeasurement'
```

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

### Related concepts:

“System properties configuration data” on page 163

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

## Setting the time ranges for vehicle status



Time ranges for vehicle status can be configured for the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

### Before you begin

To set the time ranges for vehicle status, you must first access the system properties database table of the IBM Intelligent Operations Center database.

### About this task

Time ranges for each vehicle status are defined by a maximum and minimum value. The following table includes a list of all of the possible statuses, the default values of each status, and a description of each status:

Group	Name	Value	Description
Transport	<i>Transit,VeryEarlyMin</i>	-2147483647	The minimum value range in seconds for vehicle status of <i>VeryEarly</i>
Transport	<i>Transit,VeryEarlyMax</i>	-120	The maximum value range in seconds for vehicle status of <i>VeryEarly</i>
Transport	<i>Transit,EarlyMin</i>	-120	The minimum value range in seconds for vehicle status of <i>Early</i>
Transport	<i>Transit,EarlyMax</i>	-60	The maximum value range in seconds for vehicle status of <i>Early</i>
Transport	<i>Transit,OnScheduleMin</i>	-60	The minimum value range in seconds for vehicle status of <i>OnSchedule</i>
Transport	<i>Transit,OnScheduleMax</i>	60	The maximum value range in seconds for vehicle status of <i>OnSchedule</i>
Transport	<i>Transit,LateMin</i>	60	The minimum value range in seconds for vehicle status of <i>Late</i>
Transport	<i>Transit,LateMax</i>	120	The maximum value range in seconds for vehicle status of <i>Late</i>
Transport	<i>Transit,VeryLateMin</i>	120	The minimum value range in seconds for vehicle status of <i>VeryLate</i>
Transport	<i>Transit,VeryLateMax</i>	2147483647	The maximum value range in seconds for vehicle status of <i>VeryLate</i>

The values of each status can be modified, but the following statement must be true or the system functions unexpectedly:

*Transit,VeryEarlyMin* < *Transit,VeryEarlyMax* = *Transit,EarlyMin* < *Transit,EarlyMax* =  
*Transit,OnScheduleMin* < *Transit,OnScheduleMax* = *Transit,LateMin* < *Transit,LateMax* =  
*Transit,VeryLateMin* < *Transit,VeryLateMax*

To change the time ranges for vehicle status, complete the following procedure.

**Note:** 2147483647 and -2147483647 are the absolute maximum and minimum values for the integer type that is used to store these values in the code. Therefore, there numbers larger or smaller than these default values are not valid.

## Procedure

When connected to the IBM Intelligent Operations Center database, enter the following statement:

```
UPDATE IOC.SysProp set value = new_value where group = 'Transport' and name = 'Transit,variable_name'
```

Where:

- *new\_value* is the new value for the status.
- *variable\_name* is the name of the status that is being changed.

For example, to change the value of the *Transit,EarlyMin* name to -130, enter the following statement:

```
UPDATE IOC.SysProp set value = '-130' where group = 'Transport' and name = 'Transit,EarlyMin'
```

## What to do next

Check that the following statement is true:

*Transit,VeryEarlyMin* < *Transit,VeryEarlyMax* = *Transit,EarlyMin* < *Transit,EarlyMax* =  
*Transit,OnScheduleMin* < *Transit,OnScheduleMax* = *Transit,LateMin* < *Transit,LateMax* =  
*Transit,VeryLateMin* < *Transit,VeryLateMax*

If this statement is not true, make the necessary adjustments.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

**Related concepts:**

“System properties configuration data” on page 163

The IBM Intelligent Operations Center system properties table stores configuration data for IBM Intelligent Transportation, the IBM Intelligent Operations Center, and any other solution that is integrated in your environment. Some of the configuration settings are system-wide and some are specific to the features of IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

## Configuring the Subscription Manager in a high availability environment

When you install IBM Intelligent Transit Analytics in a high availability operating environment, you must configure and start a single instance of the Subscription Manager on the primary IBM Intelligent Operations Center application server. If the daemon process stops for any reason, you must also manually reconfigure the settings, and start the Subscription Manager on the secondary application server. You then must modify the system properties table accordingly.

### Before you begin

To change the host of the Subscription manager, you must first access the system properties database table of the IBM Intelligent Operations Center database.

### About this task

To set the host of the Subscription Manager, complete the following procedure.

### Procedure

When connected to the IBM Intelligent Operations Center database, enter the following SQL command:

```
UPDATE IOC.SysProp set value = '<hostname>' where group = 'VAP' and  
name = 'HTTPD_CONFIGURATION,SUBSCRIPTION_MANAGER_HOST'
```

Where:

- *<hostname>* is the new value for the status.
- *HTTPD\_CONFIGURATION,SUBSCRIPTION\_MANAGER\_HOST* is the name of the host where the Subscription Manager process is running.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

### What to do next

Restart the `trans_vap_httd_web` EAR in the WebSphere Application Server.

**Related tasks:**

“Starting the Subscription Manager” on page 193

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics requires that the Subscription Manager is running on the IBM Intelligent Operations Center application server. Start the Subscription Manager manually whenever the portal server is restarted.

*“Configuring the Subscription Manager” on page 148*

The Subscription Manager ensures that there is a continuous flow of real-time Service Interface for Real Time Information (SIRI) data into IBM Intelligent Transportation. The Subscription Manager is a process that runs on the IBM Intelligent Operations Center application server and manages the subscription between IBM Intelligent Transportation and the external SIRI data source server. An active subscription ensures that any real-time vehicle data that is available on the SIRI data source server is sent to IBM Intelligent Transportation.



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## Chapter 7. Managing the solution

The topics in this section describe how to perform administrative tasks for IBM Intelligent Transportation.

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### Verifying the version

You can verify the version of IBM Intelligent Transportation that you have deployed by using the Intelligent Operations Center - About portlet in the **Administration** portal. You can also verify the version of the IBM Intelligent Operations Center and other integrated IBM Smarter Cities Software Solutions that you have deployed in this environment.

For more information about the Intelligent Operations Center - About portlet, see the IBM Intelligent Operations Center Information Center.

---

### Controlling the servers and services

IBM Intelligent Transportation runs on top of the IBM Intelligent Operations Center production environment. The IBM Intelligent Operations Center server cluster provides the middleware and base architecture for the solution. You can control and query the services of IBM Intelligent Transportation using command line scripts on the servers of the IBM Intelligent Operations Center.

For information about how to stop and start the IBM Intelligent Operations Center servers that IBM Intelligent Transportation runs on, see the related links in the IBM Intelligent Operations Center Information Center.

### Controlling the services of the Traffic Awareness feature

You can control and query the services of the Traffic Awareness feature from the WebSphere Application Server administrative console on the IBM Intelligent Operations Center application server.

Before manually starting the services of the Traffic Awareness feature, ensure that the services provided by the underlying IBM Intelligent Operations Center are running.

### Starting the services

You can manually start the services of the Traffic Awareness feature in the WebSphere Application Server administrative console on the IBM Intelligent Operations Center application server.

### Before you begin

Before you start the services of the Traffic Awareness feature, ensure that the services provided by the underlying IBM Intelligent Operations Center are running.

### Procedure

1. Log on to the administration console in the solution portal as the portal administrator.

`http://web_hostname:9060/admin`

Where *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*Trans*`.
4. Select the following applications:
  - `trans_portal_101_ear`

- `trans_portlet_ear`
- `trans_reports_portlet_ear`
- `trans_restservices_ear`
- `trans_tmddecserver_ear`
- `trans_tmddloadserver_ear`
- `trans_tmddpublish_ear`

5. Click **Start**.

## Results

After each service has started, the status of the services changes from stopped to started.

## Stopping the services

You can manually stop the services of the Traffic Awareness feature in the WebSphere Application Server administrative console on the IBM Intelligent Operations Center application server.

### Procedure

1. Log on to the administration console in the solution portal as the portal administrator.  
`http://web_hostname:9060/admin`

Where *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*Trans*`.
4. Select the following applications:
  - `trans_portal_101_ear`
  - `trans_portlet_ear`
  - `trans_reports_portlet_ear`
  - `trans_restservices_ear`
  - `trans_tmddecserver_ear`
  - `trans_tmddloadserver_ear`
  - `trans_tmddpublish_ear`
5. Click **Stop**.

## Results

After each service stops, the status of the services changes from started to stopped.

## Querying the status of the services

You can query the status of the services of the Traffic Awareness feature in the WebSphere Application Server administrative console on the IBM Intelligent Operations Center application server.

### Procedure

1. Log on to the administration console in the solution portal as the portal administrator.  
`http://web_hostname:9060/admin`

Where *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*Trans*`.

4. Select the following applications:

- `trans_portal_101_ear`
- `trans_portlet_ear`
- `trans_reports_portlet_ear`
- `trans_resterservices_ear`
- `trans_tmddecserver_ear`
- `trans_tmddloadserver_ear`
- `trans_tmddpublish_ear`

## Results

The status of the service is displayed as a colored icon in the corresponding status column for each service.

- A **green arrow** indicates that the service is running.
- A **red x** indicates that the service has stopped.
- A **question mark** indicates that the service status is unknown.

## Controlling the servers of the Traffic Prediction feature



If you start the Traffic Awareness/Traffic Prediction features using the IBM Intelligent Operations Center control scripts, the applications that are deployed are started automatically. Ensure that the IBM Intelligent Operations Center and the underlying Traffic Awareness servers are running before you start the Traffic Prediction feature.

### Related tasks:

“Configuring the Traffic Prediction holiday ingest” on page 71

After you install the Traffic Prediction feature of IBM Intelligent Operations for Transportation, you can optionally configure the solution so that the predicted traffic levels for the transportation network incorporate the official national holidays that impact traffic patterns. You can configure holidays in the system. You can add, update, read, and delete holiday dates for holiday categories by using REST services. Call the REST services by running a script with defined arguments that can include the path to an input file. Defining the holiday information about your transportation network improves the accuracy of the predicted traffic levels that are generated by the IBM Intelligent Transportation system.

## Controlling the services of the Vehicle Awareness and Prediction feature



If you have installed the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics, additional services are required to be running to collect vehicle awareness information and generate arrival predictions.

Before you start the services of the Vehicle Awareness and Prediction feature, ensure that the services provided by the underlying IBM Intelligent Operations Center and the foundational Traffic Awareness feature are running.

Additionally, the following services must be started for the Vehicle Awareness and Prediction feature to function:

Services	Server
Portal applications	IBM Intelligent Operations Center application server
Subscription Manager	IBM Intelligent Operations Center application server
InfoSphere Streams applications	InfoSphere Streams server

When the IBM Intelligent Operations Center is started the services of the Vehicle Awareness and Prediction feature start automatically. Sometimes these services must be started and stopped manually.

**Related tasks:**

“Verifying the installation of the Vehicle Awareness and Prediction feature” on page 50

Verify the installation of the Vehicle Awareness and Prediction feature to ensure that it is correctly deployed and running on the IBM Intelligent Transportation solution.

**Starting the services**



**Starting the portal application services:** 

The Vehicle Awareness and Prediction feature requires that the **trans\_vap\_restservice\_ear** and **trans\_vap\_httpd\_web\_ear** portal application services are running on the IBM Intelligent Operations Center application server.

**Before you begin**

Depending on the deployment of the IBM Intelligent Operations Center, you might need to open TCP/IP ports to allow access to the WebSphere Application Server administrative console. You might also need to obtain the necessary administrative privileges to access the required log files relating to the portal application services.

**About this task**

To start the required portal application services of the Vehicle Awareness and Prediction feature, use the following procedure:

**Procedure**

1. Log on to the administration console in the solution portal as the portal administrator.

`http://web_hostname:9060/admin`

Where *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter *\*vap\**.
4. Select the following applications:
  - **trans\_vap\_httpd\_web\_ear**
  - **trans\_vap\_restservice\_ear**
  - **trans\_vap\_ui\_retservices\_ear**
  - **vap\_portlet\_ear**
5. Click **Start**.

## Results

After each service has started, the status of the services changes from stopped to started.

## What to do next

Start the Subscription Manager service required by the Vehicle Awareness and Prediction feature.

## Starting the Subscription Manager:

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics requires that the Subscription Manager is running on the IBM Intelligent Operations Center application server. Start the Subscription Manager manually whenever the portal server is restarted.

## Before you begin

The portal application services required by the Vehicle Awareness and Prediction feature must be running before you can start the Subscription Manager.

Edit the `subscription.properties` file to configure the Subscription Manager. See *Configuring the subscription client manager*.

## About this task

To start the Subscription Manager and subscribe the incoming vehicle monitoring Service Interface for Real Time Information (SIRI) messages, perform the following steps:

## Procedure

1. Log on to the IBM Intelligent Operations Center application server as the root user.
2. Open the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/vap/tools`
3. To start the Subscription Manager, enter the following command:  
`./vap_subscriptionmgr.sh`
4. To verify that the Subscription Manager started successfully, enter the following command:  
`tail -f subscription.log`

A message displays confirming that the Subscription Manager started successfully.

## What to do next

Start the streams application required by the Vehicle Awareness and Prediction feature.

## Related tasks:

“Configuring the Subscription Manager in a high availability environment” on page 187

When you install IBM Intelligent Transit Analytics in a high availability operating environment, you must configure and start a single instance of the Subscription Manager on the primary IBM Intelligent Operations Center application server. If the daemon process stops for any reason, you must also manually reconfigure the settings, and start the Subscription Manager on the secondary application server. You then must modify the system properties table accordingly.

## Starting the InfoSphere Streams application:

To generate vehicle arrival predictions, the InfoSphere Streams application must be running. You can enter a console command to start the InfoSphere Streams application.

## About this task

To start the InfoSphere Streams application, complete the following steps.

### Procedure

1. Log on to the InfoSphere Streams server as the administrator, for example *streamsadmin*.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics`
3. Enter the following command:  
`launcher.sh -i trans_vap`

## Stopping the services



### Stopping the portal application services:

Sometimes it is necessary to manually stop the portal application services of the Vehicle Awareness and Prediction feature that are running on the IBM Intelligent Operations Center application server.

### Before you begin

Depending on the deployment of the IBM Intelligent Operations Center, you might need to open TCP/IP ports to allow access to the WebSphere Application Server console. You might also need to obtain the necessary administrative privileges to access the required log files that are relating to the portal application services.

## About this task

To stop the required portal application services of the Vehicle Awareness and Prediction feature, use the following procedure.

### Procedure

1. Log on to the administration console in the solution portal as the portal administrator.  
`http://web_hostname:9060/admin`

Where *web\_hostname* is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*vap*`.
4. Select the following applications:
  - `trans_vap_httpd_web_ear`
  - `trans_vap_restservice_ear`
  - `trans_vap_ui_restservices_ear`
  - `vap_portlet_ear`
5. Click **Stop**.

### Results

After each service starts, the status of the services changes from started to stopped.

## Stopping the Subscription Manager:

Sometimes it is necessary to manually stop the subscription manager of the Vehicle Awareness and Prediction feature that is running on the IBM Intelligent Operations Center application server. Stopping the Subscription Manager stops the flow of incoming vehicle monitoring Service Interface for Real Time Information (SIRI) messages.

### About this task

To stop the Subscription Manager, use the following procedure.

#### Procedure

1. Log on to the IBM Intelligent Operations Center application server as the root user.
2. Open the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/vap/tools`
3. Enter the following command:  
`./vap_subscriptionmgr.sh stop`
4. To verify that the Subscription Manager stopped running, enter the following command:  
`tail -f subscription.log`

A message displays confirming that the Subscription Manager is not running.

### What to do next

For a more detailed status of the Subscription Manager service, check the `subscription.log` file that is displayed by the `tail` command.

## Stopping the InfoSphere Streams application:

Sometimes it is necessary to manually stop the InfoSphere Streams application that is required by the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

### About this task

To stop the InfoSphere Streams application, complete the following steps.

#### Procedure

1. Log on to the InfoSphere Streams server as the administrator, for example `streamsadmin`.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics`
3. Enter the following command:  
`stopper.sh -i trans_vap`

## Querying the services



### Querying the status of the portal application services:

You can query the status of the portal application services of the Vehicle Awareness and Prediction feature by using the WebSphere Application Server administrative console from the IBM Intelligent Operations Center web server.

## Procedure

1. Log on to the administration console in the solution portal as the portal administrator.  
`http://web_hostname:9060/admin`

Where `web_hostname` is the host name of the IBM Intelligent Operations Center web server.

2. From the console menu, click **Applications > Application Types > WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*vap*`.
4. Select the following applications:
  - `trans_vap_httpd_web_ear`
  - `trans_vap_restservice_ear`
  - `trans_vap_ui_restservices_ear`
  - `vap_portlet_ear`

## Results

The status column of the services list displays the status of the services. A service can be either stopped or started.

## Querying the status of the Subscription Manager:

You can query the status of the Subscription Manager to see whether it is monitoring the incoming vehicle monitoring Service Interface for Real Time Information (SIRI) messages, and sending subscription requests when necessary.

## About this task

Complete the following procedure from the IBM Intelligent Operations Center application server.

## Procedure

1. Log on to the IBM Intelligent Operations Center application server as the root user. If the solution is running in a high availability environment, log on to the application server where the subscription manager is supposed to be running.
2. Open the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/vap/tools` directory.
3. To verify that the subscription process is running, enter the following command:

```
ps -ef | grep "com.ibm.trans.vap.httpd.subscriptionmgr.SubscriptionManager" | grep -v grep
```

The Subscription Manager process is listed in the system output, as per the following example:

```
root 19261 1 0 Jun26 pts/1 00:01:52 java -cp /opt/IBM/WebSphere/AppServer/plugins/  
com.ibm.ws.prereq.jaxrs.jar:./trans_vap_httpd_subscription_mgr_client.jar:.  
com.ibm.trans.vap.httpd.subscriptionmgr.SubscriptionManager start subscription.properties
```

4. To verify that the TCP port is open and in the listening state, enter the following command:  
`netstat -a | grep port`

Where `port` is the port that is defined in the `subscription.properties` file for the `subscription_manager_port` variable.

For example, when the port is set to the default port **13001**, the following output displays:

```
tcp 0 0 *:13001 :* LISTEN
```

5. Optional: To monitor the Subscription Manager status, enter the following command:  
`tail -f subscription.log`



The output from the Subscription Manager process is listed, including the stop and start status. Scroll to the end of the log file to find confirmation about whether the subscription process is running.

If the process is running, the following output displays in the console logs:

```
Wed Jun 26 04:55:00 EDT 2013 : start Subscription manager is active now.
```

If the process is stopped, the following output displays in the console logs:

```
Wed Jun 26 05:01:45 EDT 2013 : stop Subscription quits. Socket closed.
```

## What to do next

For a more detailed status of the Subscription Manager service, check the `subscription.log` file that is displayed by the `tail` command. You can also use the `cat` or `more` commands to view the `subscription.log` file.

## Querying the status of the InfoSphere Streams application:

You can query the status of the InfoSphere Streams application to see if it is running and in a healthy state.

### About this task

To query the InfoSphere Streams application, complete the following steps.

#### Procedure

1. Log on to the InfoSphere Streams server as the administrator, for example `streamsadmin`.

2. Enter the following command:

```
streamtool lsjobs -i trans_vap
```

The following output is displayed when the streams application is running and in a healthy state:

```
Id State Healthy ... * Running yes
```

3. To check the status for each streams process, enter the following command:

```
streamtool lspes -i trans_vap
```

The following output is displayed when the streams application is running and in a healthy state:

```
Id State Healthy Host PID JobID JobName Operators
```

## Restarting the Cognos service

In a high availability operating environment, if the primary or secondary IBM Intelligent Operations Center analytics server unexpectedly shuts down, for example, after a power outage, you must manually restart the Cognos service.

### About this task

After the analytics server has restarted, complete the following step to restart the Cognos service.

#### Procedure

1. Log on to the IBM Intelligent Operations Center analytics server 1 or the IBM Intelligent Operations Center analytics server 2 as the `root` user.

2. Enter the following commands

```
/opt/ibm/ldap/V6.3/sbin/ibmslapd
su - ibmadmin
cd /opt/IBM/cognos/c10_64/bin64
./cogconfig.sh -s
cd /opt/IBM/WebSphere/AppServer/profiles/cognosProfile1
./startNode.sh
```

3. Start the Cognos Dispatch server by using one of the following steps:
  - If restarting the service on analytics server 1, enter the command:  
`./startServer.sh CognosX_Displ`
  - If restarting the service on analytics server 2, enter the command:  
`./startServer.sh CognosX_Displ2`
4. Wait for at least five minutes.
5. Start the Cognos Gateway server by using one of the following steps:
  - If restarting the service on analytics server 1, enter the command:  
`./startServer.sh CognosX_GW1`
  - If restarting the service on analytics server 2, enter the command:  
`./startServer.sh CognosX_GW2`

---

## Managing traffic prediction calculations



To trigger traffic prediction calculations manually and to monitor triggered calculations, use the Initiate Calculation Manually portlet and Traffic Prediction Calculation Monitoring portlet available at **Solution Administration**. You must have IT Administrator permissions to perform this task.

### Related concepts:

“Customizing the Traffic Prediction feature” on page 169

You can customize the optional Traffic Prediction feature to provide traffic prediction details beyond an hour from the current time, to provide customized reports, and to configure data collection, enablement, and calculation in the administration portlets.

## Manually initiating traffic prediction calculations



To specify the traffic prediction calculations to be triggered manually, outside of the scheduled calculation times, use the Initiate Calculation Manually portlet available at **Solution Administration > Initiate Traffic Prediction Calculations**. You must have IT Administrator permissions to perform this task.

### Procedure

1. Select the **Calculation process to initiate** from the list.
2. Select the **Subnet ID on which to run calculation** from the list.
3. After you make your selection, click **Initiate** or click **Reset** to go back to the default values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required traffic prediction calculation is triggered.

### What to do next

You can view the status of the triggered traffic prediction calculation in the Traffic Prediction Calculation Monitoring portlet by clicking **Solution Administration > Monitor Traffic Prediction Calculations**.

## Monitoring traffic prediction calculations



To customize the query in the selection form and get the required traffic prediction calculation monitoring table, use the Traffic Prediction Calculation Monitoring portlet available at **Solution Administration > Monitor Traffic Prediction Calculations**. You must have IT Administrator permissions to perform this task.

## Procedure

1. Click **Select Content**. A form is displayed.
2. Use the form to specify the traffic prediction calculation that you would like to monitor:
  - **Calculation Type**
  - **Status**
  - **From date**
  - **To date**
3. After you make your selection, click **Select Content** again to hide the selection form.
4. Click **Update** or click **Reset** to go back to the default values.

## Results

The table is updated with the latest available traffic prediction calculation information based on your selection.



---

## Chapter 8. Maintaining the solution

Perform maintenance tasks to keep your solution running smoothly.

---

### Maintaining the database

The databases of IBM Intelligent Transportation are on the IBM Intelligent Operations Center data server. To optimize the performance and stability of the IBM Intelligent Transportation solution, the databases must be maintained regularly.

Use the maintenance information to manage the TIH\_OP and TIH\_HS IBM Intelligent Transportation databases.

For more information about managing and maintaining the platform databases on the IBM Intelligent Operations Center data server, see the IBM Intelligent Operations Center Information Center.

### Database maintenance

When the IBM Intelligent Transportation solution is running, large amounts of traffic data are collected and generated. To optimize the performance of the solution, ensure that the databases of IBM Intelligent Transportation are maintained regularly.

To prevent performance issues, implement a data maintenance strategy to remove obsolete data, periodically reorganize database tables, and maintain current database table statistics. A regularly scheduled maintenance plan is essential for maintaining peak performance of your system.


Perform the following database maintenance activities at least once a week:

#### REORGCHK

Use the **REORGCHK** command to update the statistics for all objects in the database and determine which tables and indexes must be reorganized. The **REORGCHK** command calculates statistics on the database to determine whether tables or indexes, or both, must be reorganized or cleaned up. The **REORGCHK** command outputs a list of all table and index objects in the database. Objects with an asterisk (\*) in the **REORG** column must be reorganized.

#### REORG

Use the **REORG** command to reorganize a database table by compacting information and reconstructing the rows to eliminate fragmented data. After you use the **REORGCHK** command to identify the database tables or indexes to be reorganized, you must explicitly start the **REORG** command for each object. Tables or indexes that are identified by **REORGCHK** are not automatically reorganized.

 If you install the optional Traffic Prediction feature and your transportation network has at least 2000 links, then for optimum performance, you must run the **REORG** command every day on the following database tables:

- tptool.LINK\_REPORT
- tptool.LINK\_STATS
- tptool.LINK\_FORECAST
- tmdd.LINK\_STATUS
- datex\_II.TRAFFICSPEED
- datex\_II.TRAFFICFLOW

## RUNSTATS

Use the **RUNSTATS** command to update statistics on a daily or weekly basis. You must also update the statistics after schema changes, a massive update, or increased load, such as refreshing the catalog. The optimizer uses the statistics that are updated by the **RUNSTATS** command to determine access paths to the data. Therefore, inaccurate statistics can result in decreased database efficiency.

## REBIND

After you run **RUNSTATS** on the database tables, rebind your applications to take advantage of the latest statistical data. Rebinding ensures that DB2 uses the best access plan. Perform a **REBIND** after you run **RUNSTATS** as part of your normal database maintenance procedures.

**Note:** If a package is already in use, the **db2rbind** command cannot rebind a package.

Some of the database maintenance activities might cause performance degradation and locking while they run. Perform database maintenance during a period of low or minimal usage of the IBM Intelligent Transportation and the IBM Intelligent Operations Center.

For more information about the database maintenance commands and how they work, see the DB2 Information Center.

### Related information:

 [IBM DB2 10.1 Information Center for Linux, UNIX, and Windows](#)

## Verifying the database connection

You can test the connection to the databases on the IBM Intelligent Operations Center data server.

### Procedure

1. Log on to the administrative console of the IBM Intelligent Operations Center data server.
2. To reveal the resources options, on the left menu, beside **Resources** click **+**.
3. Beside **JDBC**, click **+**.
4. Click **Data Sources**.
5. In the table on the right side, select the following databases:
  - **TIH\_OP**
  - **TIH\_HS**
6. To test the status of the connection, at the top of the table click **Test Connection**. On completion, the test result is displayed at the top of the page.

## Backing up data

To prevent the loss of valuable data, back up the IBM Intelligent Transportation databases regularly.

The data of the IBM Intelligent Transportation solution is stored in two databases that are on the IBM Intelligent Operations Center data server. The following table lists the DB2 databases that are used by IBM Intelligent Transportation.

Database name	Database description
TIH_OP	Stores the current traffic operations and prediction data and the map configuration of the solution
TIH_HS	Stores the historic traffic data and the vehicle awareness and prediction data

**Note:** When you back up data, ensure that you also back up the IBM Intelligent Operations Center database, `iocdb`.

You should regularly back up other files, directories, and databases that are provided by the IBM Intelligent Operations Center architecture and base platform. For more information about backing up the IBM Intelligent Operations Center, see the related links.

**Related tasks:**

“Uninstalling the database component” on page 92

Complete the following procedure to uninstall the TIH\_HS and TIH\_OP databases of IBM Intelligent Transportation.

## Monitoring and reserving available free space

Regularly monitor the available free space for the IBM Intelligent Transportation databases.

### About this task

The IBM Intelligent Transportation data that is received through TMDD feeds from Owner Centers is stored on the IBM Intelligent Operations Center data server. The databases are in DB2 format.

Standard DB2 database administration and maintenance procedures are sufficient for managing the databases of IBM Intelligent Transportation.

### Accessing the databases

#### About this task

Use the following procedure to access the databases of IBM Intelligent Transportation.

#### Procedure

1. Log on to the WebSphere Application Server administrative console.
2. Click **Resources** > **Data sources** > *Database\_name*.

**Note:** The *Database\_name* is either **TIH\_OP** or **TIH\_HS**.

3. To access the database, use either the db2 command-line interface, or the DB2 control center.

**Note:** There are several standard Linux commands that you can use to augment the DB2 commands.

### Monitoring resources

#### About this task

The following resources are the principle resources to monitor:

- The DB2 disk utilization.
- The memory that is used by the various DB2 processes, in particular the application heap for the JDBC listener.

The space requirements are dependent on the activity of the system; for example, publication frequency, type, and size of publication.

The page size for tables is set to 32 KB, which restricts the maximum size of the database to 512 GB.

#### Procedure

- To monitor database health:
  1. Examine the log files periodically. The principal log file is `sql1lib/db2dump/db2diag.log` that contains notifications of significant events from DB2.
  2. Review the log file output with a system administrator.
- To monitor database growth:
  - Use options in the database panel in the DB2 control center.

- To monitor table growth:
  - Select **database name** > **tables** > **table name** > **Estimate Size**.

**Note:**

Table growth is dependent on the activity. If there is regular activity, use the DB2 control center to monitor table growth.

Regularly monitoring table growth gives you an idea of the growth rate trend. Generally, tables that store status information have the fastest growth rate.

## Checking disk usage

### About this task

To locate the files with the highest disk usage, use the **du** command.

### Example

If the database data is stored in the directory `/home/db2/`, enter the following command to return a list of directories in ascending order of size:

```
du -s /home/db2/* | sort -n
```

Check disk usage to identify directories that have too much space.

## Monitoring application heap space

### About this task

DB2 uses an application to mediate requests from JDBC. Heap memory allocation for the application to mediate requests from JDBC must be monitored.

### Procedure

1. Identify the application to monitor. For example, for a database that is identified as **TIH\_HS**, the following command identifies the application:

```
db2 list applications | grep S00 | grep jcc
DB2INST2 db2jcc_applica 6522 09A151C3.AE29.110701094207 TIH_HS 1
```

The application **TIH\_HS** has an identifier of 6522.

2. Check the value of the heap allocation to this application. For **TIH\_HS** run:

```
db2mtrk -i -d -v | grep 6522
```

The application heap (6522) has a size of 65,536 bytes.

3. If the application heap size is becoming excessively high, terminate the application. For **TIH\_HS**, run the following command:

```
db2 force application \{6522\}
```

**Note:** For minimum disruption, terminate an activity during a period of low activity.

## Detaching and deleting old partitions

Regularly detach and delete old partitions in the IBM Intelligent Transportation databases to monitor and maintain the performance of the IBM Intelligent Transportation solution.

### Before you begin

Run the **df -h** command to display the amount of free hard disk drive space that is available.



## About this task

Run the **detach** command with the **-drop** option to detach and delete old partitions from the IBM Intelligent Transportation database tables. For more information about partitions, visit the DB2 Information Center.

The following list is a list of all the data types in the databases:

- cctvstatus
- detectorstatus
- gatestatus
- intersectionalsignalstatus
- lcsstatus
- linkstatus
- rampmeter

## Procedure

1. Log on to the IBM Intelligent Operations Center data server as the *db2inst2* user.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts`
3. To run the query, enter the following command:  
`./detach.sh -db database -t type -v -s startDate -e endDate -drop`

where:

- *database* is the name of the database that the partitions are in.
- *type* is the type of data that is to be removed from the database. Use the *devicestatus* type to query all the different data types within the database.
- *startDate* is the date that the partition to be removed begins.
- *endDate* is the date that the partition to be removed ends.

## What to do next

To verify that the partition was removed successfully, run the **df -h** command to display the amount of hard disk drive space that is available. If the amount of free space is greater than the amount before the procedure was completed, the deletion of the partition was successful.

### Related information:

 [IBM DB2 10.1 Information Center for Linux, UNIX, and Windows](#)

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## Maintaining the Traffic Awareness feature

Ensure that the system performs at the optimum performance level by maintaining the system regularly.

## Tuning performance

You can enhance the performance of the product after you complete the installation.

## Tuning the performance of the base architecture

To optimize the performance and stability of the IBM Intelligent Transportation solution, the databases must be maintained regularly. A regularly scheduled database maintenance plan is essential for maintaining peak performance of your system. For more information, see *Maintaining the database*.

IBM Intelligent Transportation runs on top of the IBM Intelligent Operations Center. For general details on tuning performance in IBM Intelligent Transportation, see the section of the IBM Intelligent Operations Center Information Center.

## Tuning the performance of the Traffic Awareness map

Optionally, you can enhance the geospatial performance of the map that is provided with the Traffic Awareness feature. If you find that the road links and associated traffic data on the map in the Current Traffic Conditions portlet are slow to render at certain zoom levels, you can optimize the map display.

By default all road link categories have equal importance regardless of the map zoom level. You can assign an importance level to a road link and associate the importance with a specific zoom level. You can also simplify the geospatial geometry that is displayed for a type of road link by using the zoom level of the map. For example, you can customize the map so that when you zoom out to a high level that covers a larger geographical area, the map displays less geospatial detail.

Use the following procedures to fine-tune the performance and display of the Current Traffic Conditions map on the Operator: Traffic view.

### Assigning an importance value to road links

You can tune the performance of the map display in the Current Traffic Conditions portlet. Configure the system so that the map displays only the specific road links for the current zoom level. By setting an importance criteria, lower priority links within the transportation network are not displayed when you zoom to a high level on the map. You can also specify the road link types that are a higher priority on the map. Run the **setImportance** script from the command line on the IBM Intelligent Operations Center data server to assign an importance value to a road link.

### Before you begin

Before you run the **setImportance** and **generalizelinks** scripts, the system properties database table must be populated with a row that matches the script parameter. Configure the *importance* and *zoomRange* variable values in the system properties database table according to the requirements of your transportation system. For more information, see the related links at the end of this topic.

### About this task

Using the **setImportance** script, you can set the importance of the links on a per road category basis. The script updates the system database with the assigned value for the selected road type category.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the root user.
2. Open the following directory for the performance tuning scripts:  
`/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts`
3. Enter the following command:

```
./setImportance.sh -d dbName -t roadType -i importance
```

where:

- *dbName* is the prefix of the system database name, for example if the database name is TIH\_HS, the prefix is TIH.
- *roadType* is the type of road link for which you are setting the importance value, for example freeway or motorway.
- *importance* is an integer value to classify the importance of all road links matching the specified *roadType* category. The *importance* value must be greater than or equal to zero and less than or equal to 3.

See the following example command:

```
./setImportance.sh -d TIH -t freeway -i 1
```

4. Restart the IBM Intelligent Operations Center application server.

## Results

After you run the script, when the map is zoomed out at a high zoom level, the traffic links are rendered much faster than before. When the map Current Traffic Conditions portlet makes a request for the latest traffic data, the system calculates an importance value which depends on the current zoom level. The map displays any road links that either:

- Match the importance value
- Are greater than the importance value

When the map zooms out, roads assigned a lower level of importance are not displayed.

## What to do next

Optionally, to enhance the performance of the map display further, you can also optimize the geospatial geometry of road links. For more information, see the related task link.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

### Related tasks:

“Configuring the link importance and zoomRange variable values” on page 209

Before you run the performance tuning scripts, you must first define and associate the importance values and the zoom range generalization values to a map zoom level. The *importance* and *zoomRange* variables are used by the script to determine how the geospatial geometry is calculated for road links on the map. Configure the range of *importance* and *zoomRange* values in the system properties database table in the IBM Intelligent Operations Center database.

“Updating the existing link importance and zoomRange variable values” on page 211

To change the existing range of values for the *importance* and *zoomRange* variables, update the system properties database table by using a series of SQL UPDATE commands.

“Optimizing the geospatial geometry of road links”

You can tune the performance of the map display in the Current Traffic Conditions portlet by simplifying the geospatial geometry of the road links within the transportation network. The more simplified a road link is, the fewer points that must be sent to the map at a certain zoom level. To optimize the geometry of a road link and assign multiple geometries for specific zoom levels, run the **generalizeLinks** script from the command line on the system server.

## Optimizing the geospatial geometry of road links

You can tune the performance of the map display in the Current Traffic Conditions portlet by simplifying the geospatial geometry of the road links within the transportation network. The more simplified a road link is, the fewer points that must be sent to the map at a certain zoom level. To optimize the geometry of a road link and assign multiple geometries for specific zoom levels, run the **generalizeLinks** script from the command line on the system server.

## Before you begin

Before you run the **setImportance** and **generalizeLinks** scripts, the system properties database table must be populated with a row that matches the script parameter. Configure the *importance* and *zoomRange* variable values in the system properties database table according to the requirements of your transportation system. For more information, see the related links at the end of this topic.

## About this task

By default, all the points of a road link are contained in a single geometry for a road link. The geometry is the information that you see when you zoom into a road link on the map. When you zoom out of the map, it is not necessary to see the finer detail of every road link. Viewing the entire geometry of a set of road links clutters the map with too much information when the map is zoomed out. The GIS map is also slower to render and update the display when all points are displayed. To improve performance, you can remove points from the geometry of a road link. This can be done while still preserving the general characteristics of the geometry, such as the road shape. The outline of the road link is still visible when the map is fully zoomed out.

Using the **generalizeLinks** script, you can optimize the geometry by specifying the tolerance and zoom range for links that are stored in the database.

The **generalizeLinks** script calls the DB2 spatial generalize function **ST\_Generalize** to simplify the default geometry of a link that is based on the tolerance parameter that is specified in the command. The resulting simplified geometry is then stored in the system database and is assigned to that link at the *zoomRange* that was specified in the script command. For more information, see the *DB2 Information Center*.

## Procedure

1. Log on to the IBM Intelligent Operations Center data server as the root user.
2. Open the following directory for the performance tuning scripts:  
`/opt/IBM/iss/intelligentTransportation/intelligentOperationsTransportation/scripts`

3. Enter the following command:

```
./generalizeLinks.sh -d dbName -t tolerance -z zoomRange
```

Where:

- *dbName* is the prefix of the system database name. For example, if the database name is TIH\_HS, the prefix is TIH.
- *tolerance* is a value in meters which is used as the threshold parameter to the DB2 spatial generalize function. Enter a value of 0.25 meters or less. A value greater than 0.25 meters is not recommended.
- *zoomRange* is the zoom range that you want to associate the resulting generalized geometry with. The *zoomRange* value must be greater than or equal to zero and less than or equal to 3.

See the following example command:

```
./generalizeLinks.sh -d TIH -t 0.2 -z 2
```

4. Restart the IBM Intelligent Operations Center application server.

## Results

After you run the script, when you zoom out to a high level on the map, the traffic links are rendered much faster than before. This is because there are less detailed road link lines on the map. When you zoom in to a lower level on the map, more details are displayed for each road link.

## What to do next

Optionally, to enhance the performance of the map display further, you can also assign an importance value to road links. Lower priority links within the transportation network are not displayed when you zoom to a high level on the map. For more information, see the related task link.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

**Related tasks:**

“Configuring the link importance and zoomRange variable values”

Before you run the performance tuning scripts, you must first define and associate the importance values and the zoom range generalization values to a map zoom level. The *importance* and *zoomRange* variables are used by the script to determine how the geospatial geometry is calculated for road links on the map. Configure the range of *importance* and *zoomRange* values in the system properties database table in the IBM Intelligent Operations Center database.

“Assigning an importance value to road links” on page 206

You can tune the performance of the map display in the Current Traffic Conditions portlet. Configure the system so that the map displays only the specific road links for the current zoom level. By setting an importance criteria, lower priority links within the transportation network are not displayed when you zoom to a high level on the map. You can also specify the road link types that are a higher priority on the map. Run the **setImportance** script from the command line on the IBM Intelligent Operations Center data server to assign an importance value to a road link.

“Updating the existing link importance and zoomRange variable values” on page 211

To change the existing range of values for the *importance* and *zoomRange* variables, update the system properties database table by using a series of SQL UPDATE commands.

**Related information:**



IBM DB2 10.1 Information Center for Linux, UNIX, and Windows

## Configuring the link importance and zoomRange variable values

Before you run the performance tuning scripts, you must first define and associate the importance values and the zoom range generalization values to a map zoom level. The *importance* and *zoomRange* variables are used by the script to determine how the geospatial geometry is calculated for road links on the map. Configure the range of *importance* and *zoomRange* values in the system properties database table in the IBM Intelligent Operations Center database.

### Before you begin

This procedure is only required if you plan to run the **setImportance** or **generalizeLinks** map performance tuning scripts.

### About this task

The system properties database table stores system-wide configuration data for the IBM Intelligent Operations Center and integrated solutions such as IBM Intelligent Transportation. By default, all geospatial information is displayed regardless of the road link type or zoom level of the map.

You can set more values for the *importance* and *zoomRange* variables that can be used to fine-tune the road link detail and geometry that is displayed on the map at different zoom levels.

When you run the **setImportance** and **generalizeLinks** map performance tuning scripts, you must specify an *importance* and a *zoomRange* value in the respective script commands. These values must be predefined in the system properties database table. Before you run the **setImportance** and **generalizeLinks** scripts, the system properties database table must be populated with a row that matches the script parameter.

Use the following procedure to define the importance level range and the zoom generalization range in the IBM Intelligent Operations Center database system properties database table.

### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the database administrator.
2. Optional: To predefine the *importance* values, enter the following SQL command for every importance level value:

```
INSERT INTO DBTable (Group, Name, Value)
VALUES ('Transport','Importance,'importance','zoomLevel');
```

Where:

- *DBTable* is the name of the system properties database table, such as IOC.SysProp.
- *importance* is an integer that represents a value in the importance range, starting from zero which has the least importance.
- *zoomLevel* is the zoom level of the map. The map zoom levels are from 0 to 12, where 0 is the lowest and 12 is the highest zoom level.

For example, suppose that you want to associate a set of map zoom levels that range from 0 -12, with an importance range of 0 - 2. Enter the following SQL commands:

```
INSERT INTO IOC.SysProp (Group, Name, Value)
VALUES ('Transport','Importance,0','4');
INSERT INTO IOC.SysProp (Group, Name, Value)
VALUES ('Transport','Importance,1','8');
INSERT INTO IOC.SysProp (Group, Name, Value)
VALUES ('Transport','Importance,2','12');
```

This means that:

- Road links that are assigned an importance value of 0 are displayed only if the zoom level of the map is in the range of 0 to 4.
  - Road links that are assigned an importance value of 1 are displayed only if the zoom level of the map is in the range of 5 to 8.
  - Road links that are assigned an importance value of 2 are displayed only if the zoom level of the map is in the range of 9 to 12.
3. Optional: To predefine the *zoomRange* values, enter the following SQL command for every zoom range level value:

```
INSERT INTO DBTable (Group, Name, Value)
VALUES ('Transport','zoomRange,GeneralizationZoomRange','zoomLevel');
```

Where:

- *DBTable* is the name of the system properties database table, such as IOC.SysProp.
- *GeneralizationZoomRange* is an integer that represents a value in the zoom generalization range, starting from zero.
- *zoomLevel* is the zoom level of the map. The map zoom levels are from 0 to 12, where 0 is the lowest and 12 is the highest zoom level.

For example, suppose that you want to associate a set of map zoom levels that range from 0 -12, with a geospatial generalization range of 0 - 2. Enter the following SQL commands:

```
INSERT INTO IOC.SysProp (Group, Name, Value)
VALUES ('Transport','zoomRange,0','4');
INSERT INTO IOC.SysProp (Group, Name, Value)
VALUES ('Transport','zoomRange,1','8');
INSERT INTO IOC.SysProp (Group, Name, Value)
VALUES ('Transport','zoomRange,2','12');
```

This means that:

- When the zoom level of the map is 0 - 4, the zoom range generalization is 0.
  - When the zoom level of the map is 5 - 8, the zoom range generalization is 1.
  - When the zoom level of the map is 9 - 12, the zoom range generalization is 2.
4. Restart the IBM Intelligent Operations Center application server.

## What to do next

You are now ready to run the map performance tuning scripts. See the related task links at the end of this topic.

To update the *importance* and *zoomRange* values, see *Updating the existing link importance and zoomRange variable values*.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

#### Related tasks:

“Updating the existing link importance and zoomRange variable values”

To change the existing range of values for the *importance* and *zoomRange* variables, update the system properties database table by using a series of SQL UPDATE commands.

“Assigning an importance value to road links” on page 206

You can tune the performance of the map display in the Current Traffic Conditions portlet. Configure the system so that the map displays only the specific road links for the current zoom level. By setting an importance criteria, lower priority links within the transportation network are not displayed when you zoom to a high level on the map. You can also specify the road link types that are a higher priority on the map. Run the **setImportance** script from the command line on the IBM Intelligent Operations Center data server to assign an importance value to a road link.

“Optimizing the geospatial geometry of road links” on page 207

You can tune the performance of the map display in the Current Traffic Conditions portlet by simplifying the geospatial geometry of the road links within the transportation network. The more simplified a road link is, the fewer points that must be sent to the map at a certain zoom level. To optimize the geometry of a road link and assign multiple geometries for specific zoom levels, run the **generalizeLinks** script from the command line on the system server.

#### Updating the existing link importance and zoomRange variable values:

To change the existing range of values for the *importance* and *zoomRange* variables, update the system properties database table by using a series of SQL UPDATE commands.

#### About this task

This procedure is required only if you previously configured the *importance* and *zoomRange* variable values by using the SQL INSERT commands, and if you have a requirement to update the existing values.

#### Procedure

1. Optional: To update the existing *importance* values, enter the following SQL command for every importance value in the range:

```
update DBTable Set Value='zoomLevel' where Name = 'Importance,importance'
```

where:

- *DBTable* is the name of the system properties database table, such as `IOC.SysProp`.
- *importance* is an integer that represents a value in the importance range, starting from zero which has the least importance.
- *zoomLevel* is the zoom level of the map. The map zoom levels are from 0 to 12, where 0 is the lowest and 12 is the highest zoom level.

For example, suppose that you want to update the map zoom levels that range from 0 to 12, with an importance range of 0 - 2. Enter the following SQL commands:

```
update IOC.SysProp Set Value='4' where Name = 'Importance,0'  
update IOC.SysProp Set Value='8' where Name = 'Importance,1'  
update IOC.SysProp Set Value='12' where Name = 'Importance,2'
```

2. Optional: To update the existing *zoomRange* values, enter the following SQL command for every value in the range:

```
update DBTable Set Value='zoomLevel' where Name = 'ZoomRange,GeneralizationZoomRange'
```

where:

- *DBTable* is the name of the system properties database table, such as `IOC.SysProp`.
- *GeneralizationZoomRange* is an integer that represents a value in the generalization zoom range, starting from zero which has the least importance.
- *zoomLevel* is the zoom level of the map. The map zoom levels are from 0 to 12, where 0 is the lowest and 12 is the highest zoom level.

For example, suppose that you want to update the map zoom levels that range from 0 to 12, with a geospatial generalization range of 0 - 2. Enter the following SQL commands:

```
update IOC.SysProp Set Value='4' where Name = 'ZoomRange,0'  
update IOC.SysProp Set Value='8' where Name = 'ZoomRange,1'  
update IOC.SysProp Set Value='12' where Name = 'ZoomRange,2'
```

3. Restart the IBM Intelligent Operations Center application server.

### What to do next

You are now ready to run the map performance tuning scripts. See the related task links at the end of this topic.

**Note:** You can also view, create, modify, and delete system properties from within the **Solution Administration** view of the **Solution Portal**. For more information, see *Configuring system properties* in the IBM Intelligent Operations Center product documentation.

#### Related tasks:

“Configuring the link importance and zoomRange variable values” on page 209

Before you run the performance tuning scripts, you must first define and associate the importance values and the zoom range generalization values to a map zoom level. The *importance* and *zoomRange* variables are used by the script to determine how the geospatial geometry is calculated for road links on the map. Configure the range of *importance* and *zoomRange* values in the system properties database table in the IBM Intelligent Operations Center database.

“Assigning an importance value to road links” on page 206

You can tune the performance of the map display in the Current Traffic Conditions portlet. Configure the system so that the map displays only the specific road links for the current zoom level. By setting an importance criteria, lower priority links within the transportation network are not displayed when you zoom to a high level on the map. You can also specify the road link types that are a higher priority on the map. Run the **setImportance** script from the command line on the IBM Intelligent Operations Center data server to assign an importance value to a road link.

“Optimizing the geospatial geometry of road links” on page 207

You can tune the performance of the map display in the Current Traffic Conditions portlet by simplifying the geospatial geometry of the road links within the transportation network. The more simplified a road link is, the fewer points that must be sent to the map at a certain zoom level. To optimize the geometry of a road link and assign multiple geometries for specific zoom levels, run the **generalizeLinks** script from the command line on the system server.

---

## Maintaining the Vehicle Awareness and Prediction feature



To ensure that the system is performing at the optimum performance level, regular system maintenance is required.

## Generating the metadata for vehicle arrival prediction





Run the metadata generator tool on the IBM Intelligent Operations Center data server to produce metadata from the historical vehicle monitoring data that is accumulated in the system. Running the metadata generator tool regularly generates more accurate vehicle arrival predictions.

## Before you begin

Complete the steps that are outlined in *Running the services to accumulate data*.

## About this task

The metadata generator tool is a command-line interface that automatically generates metadata from historical information that is stored in the TIH\_HS database. The resulting metadata is used by the prediction calculations to generate more accurate vehicle arrival times. Run the metadata generator tool regularly to ensure that the predictions generated by the system are as accurate as possible. You can configure the tool by editing the `offline.properties` file. For more information, see *Configuring offline.properties*.

## Procedure

1. Log on to the IBM Intelligent Operations Center data server as the `db2inst2` user.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts`
3. To run the metadata generation utility, enter the following command:  
`./vappgenmetadata.sh -config configFile -password dbPassword -start startDate -end endDate -preview`

Where:

- `configFile` is a configuration file for specifying more parameters for pruning the database or generating the metadata. By default this file is called `offline.properties`. The `configFile` is only required if you are using the **-config** switch.
- `dbPassword` is the password of the `DB_USER` user that is defined in the configuration file.
- `startDate` is the date to start generating metadata from the historical vehicle monitoring information, which is specified in the format `yyyy-mm-dd`. The start date must be before the end date.
- `endDate` is the date to end the generation of metadata from the historical vehicle monitoring information, which is specified in the format `yyyy-mm-dd`. If no end date is specified, the `endDate` defaults to the current date.
- `-preview` is an optional parameter that can be used to generate metadata without saving it to the system database. This option is useful for running the command to tune the parameters in the configuration file.

For example, to generate historical metadata for a specified date frame, such as after 1st of March 2013 and before 20th of July 2013, enter the following command:

```
./vappgenmetadata.sh -password db2passw0rd -start 2013-01-03 -end 2013-07-20
```

**Note:** By default, the `vappgenmetadata` script uses the `offline.properties` configuration file.

To run the command by using a different configuration file to specify the detailed properties, enter the following command:

```
./vappgenmetadata.sh -config config.properties -password db2passw0rd -start 2013-01-03 -end 2013-07-20
```

## Results

The following output is displayed in the console:

```
#JourneyPattern=<#1> #MetaData=<#2> (<#3>,<#4>)
```

Where:

Output	Represents the number of...
#1	Journey patterns
#2	Metadata entries that were processed during this run of the metadata generator tool, including new and replaced records
#3	Metadata entries added during this operation
#4	Metadata entries that were replaced during this operation

## What to do next

To optimize the performance of the system, prune the vehicle data regularly. For more information, see *Pruning the Vehicle Awareness and Prediction data*.

## Configuring offline.properties



The `offline.properties` file is a configuration file of the Vehicle Awareness and Prediction feature that is used by both the data load utility and the metadata generator tool.

The `offline.properties` file is in the `opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts` directory. The following table lists the property settings of the `offline.properties` file. Some of the properties must be configured before you run the data load utility and the metadata generator tool.

Property	Description
<b>DB_HOST</b>	The host name or IP address of the database server.
<b>DB_PORT</b>	The port of the database server for the client to access.
<b>DB_NAME</b>	The database name. The database name must always be set to <code>TIH_HS</code> .
<b>DB_USER</b>	The user name of the database administrator.
<b>LOG_LEVEL</b>	Determines the level of logging. The following levels of logging can be set: <ul style="list-style-type: none"> <li>• <b>INFO</b> - General information, such as the running state.</li> <li>• <b>WARNING</b> - Unexpected behavior that does not prevent the utility from running but might require action to be taken. Includes general information also.</li> <li>• <b>ERROR</b> - Critical issues with the data that requires action to be taken.</li> </ul> By default, the <b>LOG_LEVEL</b> parameter is set to <b>INFO</b> .
<b>PARAM_ERROR</b>	The granularity of the metadata generation, in meters. <b>PARAM_ERROR</b> is the base unit of measurement that is used in metadata generation. By default, this value is set to 10.
<b>PARAM_MAX_GAP</b>	The maximum gap between 2 continuous vehicle positions for a specific vehicle. If the gap between the two vehicle positions exceeds this value, the track of the vehicle is discarded by the metadata generator tool. By default, the value is set to 500 meters.

Property	Description
<b>PARAM_MAX_TIME</b>	The maximum time between 2 continuous vehicle positions. If the gap between the two positions exceeds this value, the track of this vehicle is discarded by the metadata generator tool. By default, the value is set to 300 seconds.
<b>PARAM_DIST_FILTER</b>	The maximum distance that a vehicle can deviate from its predefined route. If the vehicle position is far away from the route and deviates further than this value, the track of this vehicle is discarded by the metadata generator tool. By default, the value is 20 meters.
<b>PARAM_MAX_METADATA</b>	The maximum number of metadata records that are stored in the database for each journey pattern. The default value for this setting is 100. Do not set this value to zero. Otherwise, no maximum record is set.
<b>PARAM_METADATA_REPLACE_STRATEGY</b>	The replacement strategy to use when there is more metadata available than the maximum limit specified by the <b>PARAM_MAX_METADATA</b> parameter, when you run the metadata generator tool. The parameter can be set by using either of the following options:  <b>RANDOM</b> When this value is set, if the number of metadata records exceeds the limit, new records randomly overwrite existing records. This is the default behavior.  <b>RING</b> When this value is set, if the number of metadata records exceeds the limit, new records replace the existing records on a first in, first out basis. For example, the oldest data records are overwritten by the new records.
<b>PARAM_LAST_GENERATE_TIME</b>	Do not modify the <b>PARAM_LAST_GENERATE_TIME</b> parameter as this value is set by the system.

For example:

```
#Database connection
DB_HOST=192.168.1.14
DB_PORT=50000
DB_NAME=TIH_HS
DB_USER=db2inst2

# LOG SETTING
LOG_LEVEL=INFO

#Meta data generation parameters
PARAM_MAX_GAP=1000
PARAM_MAX_METADATA=100
PARAM_METADATA_REPLACE_STRATEGY=RANDOM

# DO NOT UPDATE THIS ENTRY MANUALLY, IT IS USED BY PROGRAM.
PARAM_LAST_GENERATE_TIME=
```

## Pruning the database tables of the Vehicle Awareness and Prediction feature



Prune the database tables of the Vehicle Awareness and Prediction feature regularly to remove unrequired data and to optimize the performance. The prune utility deletes aged and obsolete forecast, vehicle, and production timetable data.

## Before you begin

Run the metadata generator tool before you prune the historic data. Running the metadata generator tool on historic data helps to improve the accuracy of the vehicle predictions.

## About this task

Run the **vapprune** command to prune the Vehicle Awareness and Prediction feature database tables. You can choose to prune different categories of data at different time intervals. Use the appropriate prune option for each type of data category.

Implement a regular data pruning schedule for the following database tables:

Table 17. Database tables of the Vehicle Awareness and Prediction feature

Category	Database table name
Forecast data	EstimatedPassingTimeDetail
	EstimatedPassingTime
Monitored data	VehicleDetecting
	RecordedStop
	ObservedPassingTime
	MonitoredVehicleJourney
Plan data	TargetPassingTime
	DatedVehicleJourney

To automate the pruning of the database tables, run a **CRON** job that prunes the forecast data daily and prunes the monitored data weekly.

## Procedure

1. Log on to the IBM Intelligent Operations Center data server as the *db2inst2* user.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts`
3. To run the pruning utility, enter the following command on one line:

```
./vapprune.sh -db database [-user dbUser] -password dbPassword
-end endDate [-tzooffset timezoneOffset ][-prune pruneType]
```

Where:

- *database* is the database name to prune.
- *dbUser* is the user name for connecting to the database. By default this user is **db2inst2**.
- *dbPassword* is the password of the specified *dbUser* user.
- *endDate* is the date in the format that determines the data to prune. Data before and including this date is pruned. The date must be specified in the format YYYY-MM-DD and must also be a date that is before the previous day.
- *timezoneOffset* is the timezone number that indicates the number of hours by which the customer zone time is ahead of or behind Coordinated Universal Time (UTC) GMT. The value can be from **-12** to **12**, where the default is 0, which is Coordinated Universal Time.
- *pruneType* is one of the following prune options:

Prune option	Usage
<b>plan</b>	Use to prune forecast data
<b>monitor</b>	Use to prune vehicle monitoring and associated forecast data
<b>forecast</b>	Use to prune the production timetable data, and associated monitoring and forecast data

**Note:** If no prune option is specified, all plan, monitored, and forecast data are pruned.

- *-reorg* is optional and results in the reorganization tables after pruning. Use this command regularly to improve database performance. The Vehicle Awareness and Prediction feature must not be running when you run the command with the *-reorg* option.

To prune all forecast data before the date, 20th of July 2013, enter the following command on one line:  
`./vapprune.sh -db TIH_HS -password db2passw0rd -end 2013-07-20 -prune forecast`

#### Related tasks:

“Generating the metadata for vehicle arrival prediction” on page 152

Run the metadata generator tool on the IBM Intelligent Operations Center data server to produce metadata from the historical vehicle monitoring data that is accumulated in the system. Running the metadata generator tool regularly generates more accurate vehicle arrival predictions.

## Querying the number of vehicle location updates processed



The Vehicle Awareness and Prediction feature of the IBM Intelligent Operations for Transportation solution provides the user with vehicle location updates. The number of vehicle location updates that are processed during a specific period can be identified by running a query.

### About this task

To query the number of vehicle location updates that are processed during a specific period, complete the following procedure.

#### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the *db2inst2* user.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts`
3. Enter the following command:  
`./vapQueryProcessingMsg.sh -db database -user dbUser -password dbPassword -start startDate -end endDate -tzoffset timezoneOffset`

Where:

- *database* is the database name for the query.
- *dbUser* is the user name for connection to the database. By default, the user name is *db2inst2*.
- *dbPassword* is password of the user that is specified in *dbUser*.
- *startDate* is the start date of the period that the vehicle location updates are processed from, specified in the format `yyyy-mm-dd`.
- *endDate* is the end date of the period that the vehicle location updates are processed to, specified in the format `yyyy-mm-dd`.

- *timezoneOffset* is the time zone number. The time zone number indicates the difference in hours between the time zone of the user and Coordinated Universal Time. The time zone number ranges from -12 to 12. By default, the time zone number is 0.

For example, to run a query to identify the number of vehicle location updates that are processed between the dates of the 30th of December 2012 and the 3rd of January 2013, enter the following command:

```
./vapQueryProcessingMsg.sh -db TIH_HS -password db2passw0rd -start 2012-12-30 -end 2013-01-03
```

The following output is displayed:

```
INFO Connection successfully
INFO Counting processing messages from 2012-12-30 to 2013-01-03...
```

```
PROCESSINGCOUNT
-----
                112839
```

```
1 record(s) selected.
```

The output indicates that 11289 is the number of messages that were processed between the 30th of December 2012 and the 3rd of January 2013.

## Querying stop link information and journey patterns



The Vehicle Awareness and Prediction feature of the IBM Intelligent Operations for Transportation solution provides the user with stop link information and journey patterns. You can access this information by running a query.

### About this task

To query stop link information and journey patterns, complete the following procedure.

#### Procedure

1. Log on to the IBM Intelligent Operations Center data server as the DB2 administrator, for example *db2inst2* user.
2. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts`
3. Enter the following command:

```
./vapQueryStopLinkUsedJP.sh -db database -user dbUser -password dbPassword -out fileName
```

where:

- *database* is the database name for the query.
- *dbUser* is the user name for connection to the database. By default, the user name is *db2inst2*.
- *dbPassword* is the password of the user that is specified in *dbUser*. The default password for *db2inst2* is *db2passw0rd*.
- *fileName* is the name of the output file. By default, the file name is *stoplinks.csv*.

For example, to query stop link information and journey patterns, enter the following command:

```
./vapQueryStopLinkUsedJP.sh -db TIH_HS -password db2password -out out.csv
```

The following output is written to the specified output file:

```
##stoplinkid, startStopID, startStopName, endStopID, endStopName,  
isDefault, JourneyPatternID, JourneyPatternName  
611,"s0","stop_0","s1","stop_1","Y","j35","jp_35"  
612,"s1","stop_1","s2","stop_2","Y","j35","jp_35"
```

---

## Maintenance tips

Additional tips for maintaining the solution are documented in the form of individual technotes in the IBM Support Portal.

The following link launches a customized query of the live Support knowledge base for IBM Intelligent Transportation:

IBM Intelligent Transportation technotes and APARs (problem reports)







---

## Chapter 9. Using the solution interface

IBM Intelligent Transportation is a web-based solution that uses portal technology. You can access IBM Intelligent Transportation by using the solution portal.

The user interface of the solution is embedded into the IBM Smarter Cities Software Solutions portal which also hosts the IBM Intelligent Operations Center and other products. Only the products and features deployed in your environment are displayed in the solution portal.

Sections of the documentation that apply to the optional features of IBM Intelligent Transportation are marked with an icon, as outlined in the following table.

Icon	Feature
	Traffic Prediction feature of IBM Intelligent Operations for Transportation
	Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics

You can access the solution portal with any of the supported web browsers. For more information, see the list of browsers that are supported for use with the IBM Intelligent Operations Center.

---

### Logging on

Log on to access the IBM Intelligent Transportation user interface.

#### Before you begin

Contact your local administrator to obtain your user ID and password. Your administrator is responsible for ensuring that you have the security access level that is appropriate to your role in your organization. Your administrator will also supply you with the web address URL for accessing the solution portal.

#### About this task

Use the following procedure to start a new browser session and access IBM Intelligent Transportation. You can also access the solution from other IBM Smarter Cities Software Solutions that are installed in your environment. From the main navigation bar at the top of the portal, select IBM Intelligent Transportation.

#### Procedure

1. Enter the URL into the address field of the browser.

**Note:** The fully qualified domain name is required in the URL, for example, `https://web_hostname/wps/portal` where `web_hostname` is the host name of the web server. If you use the IP address instead of the registered fully qualified domain name, some windows do not open correctly.

2. On the login page, enter your user ID and password.
3. Click **Log In**.

#### Results

Only the pages, features, and data that you have permission to access are displayed. Contact your administrator if you require more access.

---

## Logging off

Log off to exit the IBM Intelligent Transportation user interface and end the server session.

### Procedure

To log off, from the list that is next to your user name at the top of the view, select **Sign Out**.

### Results

The login window opens.

---

## Viewing or editing your user profile

You can view and edit the information in your IBM Intelligent Transportation user profile. An administrator creates a user profile for each new user.

### About this task

The following table lists the attributes that your user profile contains. An administrator can edit all the attributes. The attributes that users can edit are indicated in the table.

Table 18. IBM Intelligent Transportation user profile attributes

Attribute	Description	User can edit?
User ID*	An administrator assigns a user ID to each new user for identification purposes.	No
Password*	An administrator assigns a password for security. The password must be unique and 5 - 60 characters in length. Valid passwords contain only the characters a-z, A-Z, period ".", dash "-", and underscore "_".	Yes
Given name	A given name, or first name.	Yes
Surname*	A surname, last name, or family name.	Yes
Email	An email address.	Yes
Profile image	A profile image; for example, a photograph.	Yes
Telephone number	A telephone number.	Yes
Job title	A job title.	Yes
Preferred language	A preferred language, can be selected from a list.	Yes
Time zone	A preferred time zone, can be selected from a list.	Yes
Notification display limit	Notification display time limit in days. If a notification is older than the number of days specified in this limit, it is not displayed in the Notifications window. The default value is 3.	Yes

**Note:** Attributes that are marked with an asterisk are required for the successful creation of a new user. Attributes that are not marked with an asterisk are optional.

### Procedure

1. To view or edit your user profile, from the list that is next to your user name at the top of the view, select **Edit Profile**.
2. Optional: To change your password, do the following substeps:
  - a. Enter your **Current password**. The password that you enter is not displayed.

- b. Enter your **New password**, and then enter it again in **Confirm password**.
3. Optional: Edit the information in the remaining fields.
4. To submit your changes, click **OK**.

## Results

Your user profile is updated with any changes.

---

## Controlling the map

You can move the cursor around the map by using your mouse or keyboard.

### Controls at the top of the map

The following controls are available at the top of the map:

- Pan arrows (up, down, left, right)
- Zoom in
- World view (zooms out to the maximum extent)
- Zoom out

### Controls for moving around the map

To move around the map, you can use the following controls:

- Click and drag the map by using the mouse
- Press the up pan arrow, or the up arrow key on the keyboard, to pan north
- Press the down pan arrow, or the down arrow key on the keyboard, to pan south
- Press the right pan arrow, or the right arrow key on the keyboard, to pan east
- Press the left pan arrow, or the left arrow key on the keyboard, to pan west

### Zoom controls for magnifying or reducing the scale of the map

To zoom in and out of the map, you can use the following controls:

- Click the **+** map icon to zoom in, or the **-** map icon to zoom out of the center of the map
- Double-click the selected location to center the map and zoom in to that location
- Click the **World view** icon to maximize the zoom out to show the world view
- Press the **+** key on the keyboard to zoom in
- Press the **-** key on the keyboard to zoom out
- Press the **Delete** key or the number **5** key on the keyboard or keypad to zoom out to the maximum level
- Press **Shift** while you use the mouse to draw a rectangle around the area to zoom in on

---

## Resetting and refreshing the map

You can reset the map back to the default view that is displayed when you log in to the solution, or when the page is refreshed. You can also refresh the map so that it displays the latest information that is available in the system database. By default, the map and the list are automatically updated every 15 seconds with the latest data in the system.

## About this task

Notify your system administrator if you would like to change the automatic refresh interval or the default starting location for the map.

### Procedure

- To reset the map:
  1. Go to the map and click **Map Actions**.
  2. Select one of the following options.
    - **Reset the Map and Clear Filters** to zoom and center the map to the default setting and reset the values set in **Select Content** to the default values.
    - **Reset the Map** to zoom and center the map to the default setting.
- To refresh the map:
  1. Go to the map and click **Map Actions > Refresh Selected Layers**.

**Note:** On the map, the **Last Updated** field displays the time that the vehicle information records were updated in the database. If the time displayed in the **Last Updated** field does not change, this is an indication that the latest vehicle position or predicted arrival times have not been updated in the system database. Notify your system administrator if the **Last Updated** field does not change after a significant period of time.

---

## Managing contacts

Click **Contacts** to send instant messages to other users within the solution.

**Note:** You must log on to the solution portal by using the fully qualified domain name of the IBM Intelligent Operations Center application server. If you log on to the portal by using an IP address or a host name alias instead of the registered fully qualified domain name, this instant messaging window does not display correctly.

Your default status indicates that you are available. You can change your status indicator to indicate that you are away from your computer, in a meeting, or that you do not want to be disturbed. You can also change your default status message. To change your status, at the top of the window, click the drop-down button beside your status indicator.

You can set up a list of your contacts that is organized by category. You can organize contacts in categories that are based on the people you want to communicate with. For example, you can have a category for general work contacts and another category for project work contacts.

To communicate with contacts, select from the contacts you set up, or find a contact by typing a name in the field provided. The status of each user is displayed with their name. You can also modify your own online status, contacts, or groups. Click the menus at the top of the window:

- **File** to add contacts, modify groups, or log off
- **Tools** to set up a chat, or announcement; or to change your privacy settings
- **Help** to get more detailed information about how to use the portlet

The meeting room facility is not available within the IBM Intelligent Operations Center.

**Note:** A list is displayed with the status of all users who are logged on. Occasionally, when a user who is logged on closes the browser window or logs off, the status of that user might be still displayed as logged on until the session expires. However, any messages that are sent to that user after the user closed

the browser window, or logged off, are not delivered. An error message is then displayed to a user who is trying to send a message to that user. To ensure that your status is always updated immediately to "unavailable", log off by clicking **File > Log Out**.




## Traffic operations


Use the Operator: Traffic view to monitor and analyze the current and forecasted traffic data available in the IBM Intelligent Transportation solution. Information that is collected by the Traffic Awareness feature from roadside subsystems is displayed on the Operator: Traffic view. If the optional Traffic Prediction feature is installed, extra information about the predicted traffic levels is also displayed on the Operator: Traffic view.

The Operator: Traffic view provides a visual representation of traffic data from which you can complete the following actions:

- View current traffic levels, travel times, devices, and events on a geographical information system (GIS) map and accompanying table
- View the travel time and time loss of a road link, calculated by the system from the latest traffic speed, and volume data
- View predicted traffic levels on a GIS map and accompanying table
- Navigate around the GIS map, zooming in and out of roads or regions within the network
- View graphical reports that summarize recent and predicted traffic speed, volume, and events
- Monitor specific roads, highways, or areas of interest
- Review and manage current and planned traffic events
- Access links to the latest images taken from traffic cameras that are operating in the network
- Customize the traffic data that you would like to monitor on the GIS maps

The Operator: Traffic view contains the following portlets, which you can think of as independent sections of the page that cooperate with one another.

Portlet	Description
Current Traffic Conditions	The Current Traffic Conditions portlet is the starting point for viewing the most recent traffic situation, and identifying congestion areas. The portlet contains a geographical information system (GIS) map of the traffic network, providing a visual representation of current traffic data that is collected by the Traffic Awareness system from traffic subsystems.
 Predicted Traffic Conditions	The Predicted Traffic Conditions portlet displays the forecasted traffic situation in the transportation network for up to one hour into the future. The predicted traffic levels are color-coded and displayed on a geographical information system (GIS) map of the traffic network providing a visual representation of the forecasted traffic conditions.
Traffic Conditions - Details	The Traffic Conditions - Details portlet provides a structured view of current traffic data collected by the Traffic Awareness feature from traffic subsystems. Details of the traffic level predictions that are generated by the Traffic Prediction feature are also displayed in this portlet.
Contacts	A collaboration tool for communicating with other users that are logged on to the solution.
Traffic Flow - Past Hour	The Traffic Flow: Past Hour report provides a graph report showing the traffic flow volume of a selected road link in the transportation network during the past hour.
Traffic Event Reports	A graphical report that shows the traffic events of the network. The default traffic event period is the past 30 days.
 Traffic Flow Prediction Reports	A graphical report that shows the forecasted traffic flow volume of the selected road link or network ID, at 5 minute intervals within the next hour of the current time.
 Traffic Speed Prediction Reports	A graphical report that shows the forecasted traffic speed of the selected road link or network ID, at 5 minute intervals within the next hour of the current time.

Portlet	Description
Traffic Custom Reports	From the Traffic Custom Reports portlet you can access and run all of the reports that are provided by the Traffic Awareness feature.
 Traffic Prediction Custom Reports	You can access and run all of the reports that are provided by the Traffic Prediction feature from the Traffic Prediction Custom Reports portlet.

## Administrator

Providing you have Transit IT Administrator access, you also can configure and customize the portlets in this view. For more information, see *Customizing the solution* in the IBM Intelligent Transportation product documentation.

### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

## Viewing current traffic conditions

Use the Operator: Traffic view to monitor the current traffic conditions and performance of the transportation network.

The foundational Traffic Awareness feature of IBM Intelligent Transportation provides the ability to monitor the latest traffic flow and performance of a city or region. The Operator: Traffic view displays the latest traffic data that is collected from field subsystems in the traffic network, including information about events, devices and service levels.

On the Operator: Traffic view, you can:

- Monitor the current traffic volume, speed, and travel time of road links in the network
- Navigate around the GIS map, zooming in and out of roads or regions within the network
- View a structure list of current and predicted traffic levels
- Show filters (layers) to control the traffic information that is shown on the map
- Create your own custom filters (layers) for the map
- View summary report graphs of traffic data
- View information about devices in the transportation network
- Review and manage traffic events
- View information about closed circuit television (CCTV) traffic camera devices that are located in the network
- Perform map configuration tasks if you have administrative access

The **Traffic Levels** are calculated by the system providing a status summary of the current traffic flow status based on predefined service levels. The Traffic Awareness feature uses the latest traffic volume and speed data captured by roadside systems to determine the current service level of a road link or highway. The road links and highways are ranked and categorized according to the level of service. You can use this information to identify areas that have poor traffic flow and high levels of congestion and decide on corrective measures.

### Selecting traffic information to show on the map

From the map in the Current Traffic Conditions portlet, you can choose the traffic information to display on the map and in the list in the Traffic Conditions - Details portlet.

## About this task

The map in the Current Traffic Conditions portlet displays the geographical area of the traffic network. You can use a list of filters, known as traffic layers, to choose what traffic information to display. You also can use the filter to hide the traffic information that you do not require to see on the map or in the table portlet right now.

## Procedure

1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
2. Optional: To clear the previous query and move the map position back to the default start location, click **Reset the Map and Clear Filters**.
3. Click **Select Content**.
4. Select the traffic layers that you would like to monitor. You can choose from the following types of traffic layers:
  - Traffic Levels
  - Devices
  - Events
  - External Services

**Note:** Some traffic level layers are mutually exclusive. For example, if you select the predefined **Travel Time** traffic level layer, you cannot select and view any other traffic level layers until you clear the **Travel Time** layer selection.

5. After you make your selection, click **Select Content** again to hide the selection form. You can select as many items from each list as required. However, selecting many layers can clutter the map, making it difficult to analyze the geospatial traffic data.

## Results

Based on your selections, the map is updated with the latest traffic data available. The results that are displayed are relative to the timezone that is set in your client browser configuration. Data is not displayed until there is status data available. The Traffic Conditions - Details portlet updates automatically whenever you select content on the map. The map and list provide two ways to look at the same content.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

If the predefined system layers do not show the specific information that you would like to see on the map, create your own traffic layers by using the **Select Content** form.

## What to do next

By default, the map and the list are automatically updated every 15 seconds with the latest data in the system. Notify your system administrator if you would like to change the automatic refresh interval for the map. To manually refresh the map and the list so that the latest system data is displayed for the selected traffic layers, click **Map Actions > Refresh Selected Layers**.

**Note:** On the map, the **Last Updated** field displays the time that the vehicle information records were updated in the database. If the time displayed in the **Last Updated** field does not change, this is an indication that the latest vehicle position or predicted arrival times have not been updated in the system database. Notify your system administrator if the **Last Updated** field does not change after a significant period of time.

## Selecting traffic information to show in the list

The list in the Traffic Conditions - Details portlet on the Operator: Traffic view is populated based on your choices of service levels, devices, and events in the selection form on the map in the Current Traffic Conditions portlet.

### About this task

The map and list provide two ways to look at the same content. In the list, the traffic data is displayed in tabular format, which is separated into the following tabs:

- Traffic Levels
- Devices
- Events
- Forecasted Traffic Levels

### Procedure

1. Click **Select Content**. A form is displayed.
2. Use the form to specify what traffic layers you would like to monitor:
  - Traffic Levels
  - Devices
  - Events
  - External Services
3. After you make your selection, click **Select Content** again to hide the selection form. You can select as many layers as you need. However, if your layer selection results in too many items that are located close to each other on the map, the items are grouped into a cluster. You can view the details of items that are contained in the cluster by clicking the cluster icon.

### Results

Based on your selection, the list in the Traffic Conditions - Details portlet is updated with the latest traffic data available for each layer. Information in the list is displayed in columns, which you can show, hide, and sort, as you require. The list refreshes every time the map selections or zoom level is modified.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

If the optional Traffic Prediction feature is installed in your environment, an extra tab named **Predicted Traffic Levels** is added to the list portlet. The **Predicted Traffic Levels** tab displays a structure view of the predicted traffic levels that are currently displayed on map in the Predicted Traffic Conditions portlet.

### What to do next

You can display a more detailed description of a traffic device, event, or road-link service, by hovering over the row and selecting **Properties**.

### Highlighting items on the map

You can highlight items of interest on the map in the Current Traffic Conditions portlet.

When you hover over a traffic map marker, a hover card that contains a summary of information about the selected device, event, or road link, is displayed.



You can view more information about the traffic device, event, or the current traffic level of a road by clicking the marker on the map. A window that contains more information about the traffic device, event, or road link is displayed. For example, you can see the details about a traffic camera, including the latest CCTV image, by clicking the device marker on the map and then clicking **Properties**. To view the traffic flow information about a road link, select the road link and then click **Traffic Level Details**.

You can focus on individual events, devices, or levels by selecting them in the list in the Traffic Conditions - Details portlet and right-clicking the row. Clicking a row in the list, highlights the traffic device, road link, or event on the map.

## Viewing CCTV traffic device information

From the map on the Current Traffic Conditions portlet, you can view recent closed circuit television (CCTV) traffic device information that is collected from field subsystems in the traffic network. The map displays the properties of the traffic devices and a link to the CCTV image provided by the most recent TMDD data collection.

### About this task

There are two ways to view the CCTV images on the map. You can select the individual traffic camera device or you can choose from a clustered list of traffic devices in the geographical area.

### Procedure

1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
2. Click **Select Content**. A form is displayed.
3. Use the form to select a device layer that includes the traffic cameras and road links for the geographical area that you are interested in.
4. To hide the selection form and view the map, click **Select Content** again. Keep your selection simple so that you can easily find the device that you are looking for.
5. To view the image, click the device marker on the map that represents the traffic camera and select **Properties**. Alternatively:
  - a. Select the circle marker on the map to see all the devices available.
  - b. Click **Show clustered devices** to display a list of traffic camera devices.
  - c. Find the device that you are looking for and then select **Details**.

### Results

The following details of the CCTV camera are displayed along with the latest available image for the selected device:

- Name
- Status
- Location
- Camera type

### What to do next

Click **Cancel** to close the window and go back to the map or **Back** to select another traffic camera device.

## Adding traffic layers

Your IBM Intelligent Transportation IT administrator configures the predefined layers of traffic data that are displayed by default on the map in the Current Traffic Conditions portlet. You can also choose the traffic information that you would like to display on the map. Additionally, you can create custom traffic layers that only you can see.

**Adding traffic layers:** Add layers to monitor traffic flow and performance of specific roads, events, and devices that are relevant to you. For example, perhaps you would like to monitor certain roads regularly without having to specify what to view, each time you log on. Adding your own layers also is useful for viewing the forecast of up and coming events that could have an impact on the traffic flow.

Any custom layers that you add are saved to your user profile. Until you delete them, your custom layers are displayed as a choice in the layer selection list every time you log on to the system and click **Select Content**.

You can create four different types of custom traffic layer on the Current Traffic Conditions map. You can create only traffic level performance layers on the Historical Traffic Conditions map.

### **Adding traffic level layers:**

To monitor the traffic level of a specific road link or region in the transportation network, add traffic level layers from the Current Traffic Conditions portlet. By default, there are several predefined traffic level layers available to select. You can also create your own predefined traffic level layers.

### **About this task**

The predefined **Traffic Links** and **Travel Time** layers are mutually exclusive. If you select the **Travel Time** traffic level layer, you cannot select and view any other Traffic Level layers until you clear the **Travel Time** layer selection.

Notify your system administrator if you would like to change the system-wide predefined layers. To create your own predefined traffic level layers, use the following steps:

### **Procedure**

1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
2. Click **Select Content**.
3. On the selection form in the **Traffic Levels** area, click **New Layer**.
4. In the **New Traffic Level Layer** window, enter a name for your layer in the **Layer label** field.
5. Optional: Enter a description for the layer in the **Layer description** field.
6. Optional: If you are monitoring the traffic levels of a specific road link, in the **Road Name** field, enter the link name.
7. Select at least one item from the **Road Category** list. To select multiple items, press Ctrl as you click each item.
8. Optional: To determine how often the view is refreshed with the latest data, specify a polling interval in the **Poll for Updates** field. The polling interval can be any value from 20 to 600 seconds.
9. Optional: In the **Where** section, select a predefined region, or choose to draw a region on the map. You can constrain the layer to a region by drawing a region on the map.
10. Click **OK**.

### **Results**

The recently created layer is displayed in the **Traffic Levels** section of the **Select Content** filter form. If the layer is selected and status data is available, the layer-specific content is loaded and visible on the map.

The **Traffic Levels** list in the Traffic Conditions - Details portlet updates to display more information about the traffic data that is being displayed on the map.

### Adding traffic event layers:

To monitor specific traffic events that are occurring in the transportation network, add traffic event layers to the map in the Current Traffic Conditions portlet on the Operator: Traffic view.

#### Procedure

1. Click **Select Content**. The map filter form is displayed.
2. On the selection form, under **Events**, click **New Layer**.
3. In the **New Layer** window, in the **Name** field, enter a name to identify the event layer.
4. Optional: In the **Layer description** field, enter a description for the layer.
5. Required: Select an event **Group**.
6. Select at least one **Severity** for the event layer. To select multiple items, press Ctrl as you click each item.
7. Required: In the **When** section, choose one of the following options:
  - To monitor the latest traffic event data that is available in the system, select **Current values** and complete the required information:
    - a. To determine how often the view is refreshed with the latest data, specify a polling interval in the **Poll for Updates** field. The polling interval can be any value from 20 - 600 seconds.
    - b. Select at least one **Status** from the list.
  - To view traffic event information for a specific time period in the past, select **Date range** and complete the required fields:
    - a. Using the date and time picker, enter the start date and time.
    - b. Using the date and time picker, enter the end date and time.
    - c. Select at least one **Status** from the list.
8. Optional: In the **Where** section, select a predefined region, or choose to draw a region on the map. You can constrain the layer to a selected geographical area by drawing a region on the map.
9. Click **OK**.

#### Results

The recently created layer is displayed in the **Events** section of the **Select Content** filter form. If the layer is selected, the layer-specific content is loaded and is displayed on the map.

The **Events** list in the Traffic Conditions - Details portlet is updated to display more information about the traffic data that is being displayed on the map. Map markers are plotted on the map to represent each event. If there are many events that are located close to each other on the map, the events are grouped into a cluster. You can view the details of the events in the cluster by clicking the event cluster icon.

### Adding traffic device layers:

To monitor specific traffic devices in the transportation network, add traffic device layers to the map using the Current Traffic Conditions portlet.

#### Procedure

1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
2. Click **Select Content**.
3. On the selection form, under **Devices**, click **New Layer**. The New Device Layer dialog is displayed.
4. In the **Layer label** field, enter a name for the layer.
5. Optional: In the **Layer description** field, enter a description for the layer.
6. In the **What** section, select the type and status of the devices to display in the layer.

7. Optional: To determine how often the view is refreshed with the latest data, specify a polling interval in the **Poll for Updates** field. The polling interval can be any value from 20 to 600 seconds.
8. Optional: In the **Where** section, select a predefined region, or choose to draw a region on the map. Drawing a region on the map allows you to constrain the layer to that region.
9. Click **OK**.

## Results

The recently created layer is displayed in the **Devices** section of the **Select Content** filter form. If the layer is selected, the layer-specific content is loaded and visible on the map. Map markers are plotted on the map to represent each device. If there are many devices located close to each other on the map, the devices are grouped into a cluster. You can view the details of the devices in the cluster by clicking the device cluster icon.

The **Devices** list in the Traffic Conditions - Details portlet updates to display more information about the traffic data that is being displayed on the map.

### Adding external services layers:

Add external services layers to the map from the Current Traffic Conditions portlet.

## Procedure

1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
2. Click **Select Content**.
3. On the selection form in the **External Services** section, click **New Layer**.
4. Enter a name for the layer in the **Layer label** field.
5. Optional: Enter a description for the layer in the **Layer description** field.
6. Select the required **Service type**.
7. Enter the URL for the required external service in the **Service URL** field.

**Note:** If the service is hosted on a different domain, configure the global proxy of the application server to handle proxy requests for that URL.

8. Click **OK**.

## Results

The recently created external services layer is displayed in the **External Services** section of the **Select Content** filter form. If the layer is selected, the layer-specific content is loaded and visible on the map.

## Managing traffic events

Use the Operator: Traffic view to manage current and planned traffic events within a geographical area. You can add, move, update, or cancel traffic events from the Current Traffic Conditions portlet or the Traffic Conditions - Details portlet.

### Adding traffic events:

You can add new traffic events that have recently occurred or are forecasted for the traffic network, from the Operator: Traffic view.

### Before you begin

Use the **Zoom** and **Pan** map controls to find the exact location on the map where the new traffic event occurred. Otherwise, you will need to know the latitude and longitude coordinates of the event location before you begin.

## Procedure

1. To open the **Add Event** window, either:
  - Go to the Current Traffic Conditions portlet, right-click the map and then click **Add Event**.
  - Go to the Traffic Conditions - Details portlet, click **Add Event**.
2. In the **Add Event** window, enter a **Name** to identify the event.
3. Enter the details of the event, by completing the required **Who**, **What**, **Where**, and **When** fields.
4. Click **OK**.

## Results

If you selected to view traffic event layers on the map, the next time you refresh the page, the recently created event is displayed on the map and in the list.

**Note:** The event is not included in the results displayed on the event summary graph reports. The event reports are generated using data that is collected by the Traffic Awareness system from field based traffic subsystems.

## What to do next

To see the traffic event on the map, click **Select Content** and select the layer appropriate to the event type characteristics. You can also monitor traffic events from the **Events** tab of the Traffic Conditions - Details portlet. The map and list provide two ways to look at the same events content. You can cancel or edit a traffic event from the Traffic Conditions - Details portlet.

*Traffic event properties:*

You can display a more detailed description of a traffic event by hovering over the location of the event in the Current Traffic Conditions map, or the row in the associated list.

The following table outlines the properties that describe a traffic event.

Field label	Description
Sender	The ID of the user that currently is logged on
Contact name	Person to contact for additional information about the event
Contact email	E-mail address of the main contact person for this event
Contact phone number	Telephone number of the main contact person for the event
Originating organization name	Name of the organization that initially processed this event
Originating organization ID	ID of the organization that initially processed this event
Detection method	Method in which the event first was reported within the traffic network
Access level	The transport agencies or departments that you want to be able to view this traffic event
Event ID	Unique identifier that is used to identify the event in the transportation system and subsystems. The syntax and format of the ID are specific to the organization requirements
Name	Meaningful name to identify the event
Headline	Short description for the event

Field label	Description
Group	General classification of the event
Type	Detailed classification of the event, specific to the general classification
Description	Additional details and information to describe the event
Status	The current status of the event
Severity	A measure of the impact that the event will have on the traffic system
Confidence level	Gauges the certainty of the event and the likelihood that it will occur
Comments	Further comments about the event to provide useful information for anyone monitoring this event
Category	Categorization of the traffic event
Start date and time	Date and time the event is expected to begin
Latitude and longitude	Geographical coordinates of the event location
Area name or landmark	Description of the affected area or landmark name that is useful for identifying the location of the event
Route ID	Official road-link or highway route ID where the event is scheduled to occur
Linear reference	The linear reference measure for this event

### Updating traffic events:

You can update traffic events from either the Traffic Conditions - Details portlet or the Current Traffic Conditions portlet on the Operator: Traffic view.

#### About this task

To update a traffic event, select the event on the map and update the details displayed. Alternatively, use the following procedure to update the event from the list.

#### Procedure

1. On the map in the Current Traffic Conditions portlet, select the required traffic event layer so that you can display the interested event on the map and in the list.
2. Go back to list and view **Events**.
3. In the list, highlight the event that you would like to update.
4. Using the right mouse button, click **Update Event**.
5. Modify the required properties of the traffic event.
6. To update and save the event, click **OK**.

### Moving traffic events:

Traffic events can be moved from one location to another from the map in the Current Traffic Conditions portlet.

#### Procedure

1. On the map, display the appropriate traffic event layer. The map and the list are updated to display the events on the **Events** tab.
2. Select the event that must be moved, on the map to display the event menu options.

3. Select **Move Event**. The cursor changes to a four headed arrow.
4. Click and drag the four headed arrow to the new location for the event. Use the pan and zoom map controls to find the required event location.

## Results

After the mouse is released, the event is moved to the specified location on the map. The latitude and longitude event location properties are updated for this event.

## What to do next

You can view the updated event properties by selecting the event icon on the map and selecting **Properties**. You can also move an event by clicking **Update Event** and updating the latitude and longitude event properties.

## Canceling traffic events:

You can cancel a traffic event from the Traffic Conditions - Details portlet.

## Procedure

1. On the map, locate the traffic event to be canceled.
2. Switch to the Traffic Conditions - Details list portlet and view **Events**.
3. Highlight the event in the list.
4. Using the right mouse button, click **Cancel Event**.
5. Click **OK**.

## Results

The traffic event is canceled and remains in the traffic management system. Canceled events do not display on the map or in the list.

**Note:** You can also cancel an event by updating the event and changing the **Status** property to **Canceled**.

## Viewing current traffic data reports

The Traffic Awareness feature of IBM Intelligent Transportation provides graphical report summaries of current traffic flow, speed, and event data that is stored in the system database.

From the Operator: Traffic view, you can view reports on the current traffic situation of the transportation network. From the Traffic Custom Reports portlet you can access and run all of the reports that are provided by the Traffic Awareness feature. The reports are interactive and can provide a lower level of report detail, providing that data is available in the solution database. For example, on a graph that displays data for a specific week, click the graph to drill down and see traffic data for a specific day during that week.

The following current traffic data reports are provided with the Traffic Awareness feature of IBM Intelligent Transportation.

### Traffic Flow: Past Hour:

The Traffic Flow: Past Hour report provides a graph report showing the traffic flow volume of a selected road link in the transportation network during the past hour.

This report displays the following information:

**Graph title**

Displays the name of the selected road link of the transportation network that the report is based on.

**Horizontal axis (x-axis)**

Displays the time period of the past 60 minutes, divided into 10-minute intervals.

**Vertical axis (y-axis)**

Displays the measurement values of the report, such as the traffic flow volume for the selected road link during the past hour.

**Note:** The traffic data retrieved and summarized during the selected period of the report, is based on the current date and time values of the database system.

By default, the Traffic Flow: Past Hour report is displayed in the Traffic Flow - Past Hour reports portlet on the Operator: Traffic view. Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can also run the Traffic Congestion report using your preferred options, from the Traffic Custom Reports portlet.

**Related tasks:**

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

**Traffic Congestion:**

The Traffic Congestion report provides a graph report showing the traffic flow volume total or the average speed of a selected road link in the transportation network, for the past hour or the last 30 days. This information is useful for analyzing traffic congestion and implementing proactive measures to improve the flow of traffic.

This report displays the following information:

**Graph title**

Displays the name of the selected road link of the transportation network that the report is based on.

**Horizontal axis (x-axis)**

Displays the time period of the graph report, which can be either the past hour or the last 30 days.

**Vertical axis (y-axis)**

Displays the measurement values of the report, such as the traffic flow volume total or the average speed for the selected road link.



By default, the Traffic Congestion report is displayed in the Traffic Flow - Past 30 days portlet on the Planner: Traffic view. Your administrator configures the selected criteria for the report that is displayed in the portlet. You should notify your administrator to change the criteria for the graph that displays on the Planner: Traffic view.

You can run the Traffic Congestion report using your preferred options, from the list available, by clicking **Back** in the portlet. However, the default report settings are restored when the browser is refreshed. You can also run the report from the Traffic Custom Reports portlet.

### Available report options

The following options can be changed on the Traffic Congestion report when you click the  **Run with options** icon in the Traffic Custom Reports portlet.

Report option	Available selection
Traffic network	Select a network ID from the list available
Traffic levels for	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"> <li>• Average Speed - Past Hour</li> <li>• Total Volume - Past Hour</li> <li>• Average Speed - Last 30 days</li> <li>• Total Volume - Last 30 days</li> </ul>

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

## Viewing predicted traffic conditions



The Traffic Prediction feature of the solution provides a forecasted view of the traffic situation for a city or region. If the optional Traffic Prediction feature is installed in your environment, from the Operator: Traffic view, you can also see the predicted traffic levels of a set of road links for up to one hour into the future.

The Traffic Prediction feature provides predictions for traffic flow based on measured traffic data for a set of road links. It uses the current and historical traffic data collected by IBM Intelligent Transportation to generate a prediction for each link for a future point in time. Data is retrieved from IBM Intelligent Transportation every 5 minutes to generate traffic prediction data.

If there is at least three months of road link data, you can predict the traffic flow levels, for example, for the next 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, or 60 minutes from the current time period. The current time period is rounded to the nearest 5 minutes. For example, if the time is currently 12:03, you can see what the forecasted traffic levels will be like at 12:05, 12:10, 12:15, 12:30, 12:45, or as far ahead as 13:00 hours, as you select with the **Prediction interval** slider. Predictions are generated every 5 minutes, based on the last 5-minute mark.

The results are displayed in the timezone that is set in your client browser configuration. You must ensure that your browser timezone configuration matches the timezone of the geographical area for the transportation network.

## Road links

The predicted traffic levels for road links are color coded on both the Predicted Traffic Conditions map and the **Predicted Traffic Levels** list in the Traffic Conditions - Details portlet.

The road links are color coded according to the latest **Level of Service** value generated by the solution. The **Predicted Traffic Levels** list provides a legend for each color. By default, the list and the map are color coded as follows:

*Table 19. Color codes of road link traffic levels*

Predicted Level of Service	Color	Industry recognized description
A	Green	Free-flow operations
B	Green	Reasonable free-flow operations
C	Amber	Stable or near free-flow
D	Red	Approaching unstable flow
E	Red	Unstable flow, operations at capacity
F	Red	Forced or breakdown in vehicular flow

The colors used on the map and in the list to classify the traffic flow level predictions for a road link can be configured by your IT Administrator.

You can also view a summary of the traffic prediction data on a graph report. For information about how to run and view the reports that are provided with the Traffic Prediction feature, see the related links.

### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

“Viewing traffic prediction data reports” on page 240

The Traffic Prediction feature of the solution provides graphical report summaries of traffic flow, speed, and service level prediction data that is in the system. You can view reports on the forecasted traffic situation of the transportation network. You can also view reports that show the accuracy of the forecasted traffic information. The traffic prediction data is generated by sophisticated algorithms which use the traffic data that is collected and archived by the system.

## Viewing predicted traffic levels on the map



You can view the predicted traffic levels generated by the solution for selected road links, at preset durations, for up to 60 minutes into the future. The predicted traffic levels are projected on the map in

the portlet and are color coded according to the predicted **Level of Service** value generated by the system. They are also displayed in the list in the Traffic Conditions - Details portlet.

## Before you begin

Before you submit a traffic prediction query, ensure that your client browser timezone matches the timezone of the transportation network.

## About this task

Like the Current Traffic Conditions portlet, the Predicted Traffic Conditions portlet allows you to select the information that you would like to display on the map. However, traffic data is displayed for what is predicted to occur, rather than what has occurred. This information is useful for making operational decisions to reduce traffic congestion and other problems that affect the flow of traffic in the transportation network.

By default, the sixty-minute forecast is projected onto the map display. You can change the prediction interval as required.

## Procedure

1. Click **Select Content** to open the map filter form.
2. Select the **Traffic Links** layer check box to select the layer that you want to view. The layers that you are viewing on the map in the Current Traffic Conditions portlet are selected by default.
3. To select how far into the future you would like to view the predicted traffic levels, move the **Prediction interval** slider. For example, by default, you can select preset durations of 5, 10, 15, 30, 45, and 60 minutes. Your IT administrator can configure the prediction interval increments that are available for selection.
4. To hide the selection form, after making your selection, click **Select Content**.

## Results

Based on your selections, the map is plotted with the latest traffic prediction data that is generated by the solution. The **Predicted Traffic Levels** tab in the Traffic Conditions - Details portlet also updates to reflect the current selection. The list displays all of the available prediction data regardless of the geographical area that is currently being viewed on the map.

**Note:** If there is insufficient data in the database, an error displays on the map, and the list in the table is empty.

## What to do next

Use the map controls to zoom in on a section of the map and see the predicted traffic levels for the road links you are interested in. The results displayed are relative to the timezone that is set in your client browser configuration.

## Viewing predicted traffic levels in the list



If the optional Traffic Prediction feature is installed in your environment, you can view the predicted traffic levels that are generated by IBM Intelligent Transportation in a structured list in the Traffic Conditions - Details portlet. The predicted traffic levels that are currently projected on the map are displayed in the **Predicted Traffic Levels** tab portlet. Like the map, the traffic levels in the list are also color coded according to the predicted **Level of Service** value that is generated by the system.

## About this task

The **Predicted Traffic Levels** tab lists the predicted traffic levels of the road links in the transportation network that are currently selected on the Predicted Traffic Conditions map, for a specified future time period. The list includes the following columns of information:

List column name	Description
Level of Service	A qualitative measure of the traffic flow conditions of a road link, predicted by the system using available historical volume and speed data
Link Name	Name of the road link or highway
Road Category	Category of link, such as road or highway
Last Updated	Date and time the traffic level prediction was generated by the system for the selected link

## Procedure

1. Go to the map in the Predicted Traffic Conditions portlet.
2. Submit a prediction query by clicking **Select Content** and completing the map filter form.
3. Go to the Traffic Conditions - Details portlet.
4. Click the **Predicted Traffic Levels** tab.

## Results

The predicted **Traffic Levels** are calculated by the Traffic Prediction feature by using the historical traffic volume and speed data collected by the Traffic Awareness system. The road links and highways are ranked and categorized according to the level of service. You can use this information to predict the areas that will have poor traffic flow and high levels of congestion within the next 60 minutes and decide on corrective measures.

The predicted traffic levels for road links are color coded in the **Predicted Traffic Levels** list. The road links in the **Predicted Traffic Levels** list are color coded according to the latest **Level of Service** value generated by the Traffic Prediction feature. The **Predicted Traffic Levels** list provides a legend for each color. The Predicted Traffic Conditions map is also color coded in the same way.

## Viewing traffic prediction data reports



The Traffic Prediction feature of the solution provides graphical report summaries of traffic flow, speed, and service level prediction data that is in the system. You can view reports on the forecasted traffic situation of the transportation network. You can also view reports that show the accuracy of the forecasted traffic information. The traffic prediction data is generated by sophisticated algorithms which use the traffic data that is collected and archived by the system.

By default, some of the traffic prediction data reports are displayed in the reports portlets in the user interface on the Operator: Traffic view. You can access and run all of the reports that are provided by the Traffic Prediction feature from the Traffic Prediction Custom Reports portlet.

The following reports are available if the Traffic Prediction feature is installed in your environment.

### Related concepts:

“Viewing predicted traffic conditions” on page 237

The Traffic Prediction feature of the solution provides a forecasted view of the traffic situation for a city or region. If the optional Traffic Prediction feature is installed in your environment, from the Operator: Traffic view, you can also see the predicted traffic levels of a set of road links for up to one hour into the

future.

### Traffic Prediction Volume : Next Hour:

The Traffic Prediction Volume : Next Hour report provides a graph report that shows the predicted traffic flow volume of a selected road link in the transportation network one hour from the current time. This information is useful for identifying potential congestion areas and implementing proactive measures to improve the flow of traffic in the transportation network.

This report displays the following information:

#### Graph title

Displays the name of the selected road link of the transportation network that the report is based on.

#### Horizontal axis (x-axis)

Displays the time period of the report, such as a one hour period ahead of the current time. The time period is divided into intervals of 15 minutes.


#### Vertical axis (y-axis)

Displays the predicted traffic flow volume for the selected road link one hour from the current time.

By default, the Traffic Prediction Volume : Next Hour report is displayed in the Traffic Flow Prediction Reports portlet on the Operator: Traffic view. The report shows the predicted traffic flow volume of the network in the forthcoming hour. Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can run the Traffic Prediction Volume : Next Hour report using your preferred options, from the list available, by clicking **Back** in the portlet. However, the default report settings are returned when the browser is refreshed. You can also run the report and set your preferred options from the Traffic Prediction Custom Reports portlet.

### Available report options

The following options can be changed on the Traffic Prediction Volume : Next Hour report when you click the  **Run with options** icon in the Traffic Prediction Custom Reports portlet.

Report option	Available selection
Traffic levels for	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"><li>• Forecast Speed</li><li>• Forecast Volume</li></ul>

#### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

### Traffic Prediction Speed : Next Hour:

The Traffic Prediction Speed : Next Hour report provides a graph report that shows the predicted traffic flow speed of a selected road link in the transportation network one hour from the current time. This information is useful for identifying potential congestion areas within the next hour of time and implementing proactive measures to help to improve the flow and speed of traffic.

This report displays the following information:

#### Graph title

Displays the name of the selected road link of the transportation network that the report is based on.

#### Horizontal axis (x-axis)

Displays the time period of the report within a one hour period from the current time. The time period is divided into intervals of 15 minutes.

#### Vertical axis (y-axis)


Displays the predicted average traffic flow speed for the selected road link one hour from the current time.

By default, the Traffic Prediction Speed : Next Hour report is displayed in the Traffic Speed Prediction Reports portlet on the Operator: Traffic view. The report shows the predicted average traffic flow speed of the selected road link in the forthcoming hour.

Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can run the Traffic Prediction Speed : Next Hour report using your preferred options, from the list available, by clicking **Back** in the portlet. However, the default report settings are returned when the browser is refreshed. You can also run the report and set your preferred options from the Traffic Prediction Custom Reports portlet.

### Available report options

The following options can be changed on the Traffic Prediction Speed : Next Hour report when you click the  **Run with options** icon in the Traffic Prediction Custom Reports portlet.

Report option	Available selection
Traffic levels for	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"><li>• Forecast Speed</li><li>• Forecast Volume</li></ul>

#### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

### **Prediction Accuracy - By Interval:**

The Prediction Accuracy - By Interval report provides a graph that summarizes the accuracy of the traffic volume or speed prediction data that is generated using recent traffic data in the system. The report is summarized by forecast intervals of every 5 minutes within a 1 hour prediction period.

The accuracy is calculated by comparing the traffic prediction data with the equivalent statistical data captured from field subsystems in the traffic network during the same time period. This report is useful for identifying areas in the prediction system that require calibration and additional configuration.

This report displays the following information:

#### **Graph title**

Displays the transportation network ID or individual road link that the report is based on.

#### **Horizontal axis (x-axis)**

Displays a breakdown of the accuracy by the forecasting time interval set by the administrator.

#### **Vertical axis (y-axis)**

Displays the accuracy, in percentage, of the traffic volume or speed forecasts during the specified time period.

Unlike some of the other reports provided by the Traffic Prediction feature, the Prediction Accuracy - By Interval report is not displayed by default in any of the portlets on the Operator: Traffic view. Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can run the Prediction Accuracy - By Interval report from the Traffic Custom Reports portlet on the Planner: Traffic view. The report is listed in the reports folder in the Traffic Prediction Custom Reports portlet.

### **Available report options**

The following options can be changed on the Prediction Accuracy - By Interval report when you click the



**Run with options** icon in the Traffic Prediction Custom Reports portlet.

<b>Report option</b>	<b>Available selection</b>
Link ID	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"><li>• Accuracy of Speed Forecasts</li><li>• Accuracy of Volume Forecasts</li></ul>
From	Using the date and time pickers, enter the start date and time for the report period

Report option	Available selection
Date	Using the date and time pickers, enter the end date and time for the report period

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

### Prediction Accuracy - By Category:

The Prediction Accuracy - By Category report provides a graph that shows the accuracy of the traffic volume or speed prediction data generated by the system, for each road category.

The accuracy is calculated by comparing the traffic prediction data with the equivalent statistical data captured from field subsystems in the traffic network during the same time period. This report is useful for identifying areas in the prediction system that require further calibration and more configuration.

This report displays the following information:

#### Graph title

Displays the transportation network ID that the report is based on.

#### Horizontal axis (x-axis)

Displays a breakdown of the accuracy of the traffic prediction data by road category.


#### Vertical axis (y-axis)

Displays the accuracy, in percentage, of the traffic volume or speed forecasts during the specified time period.

Unlike some of the other reports provided by the Traffic Prediction feature, the Prediction Accuracy - By Category report is not displayed by default in any of the portlets on the Operator: Traffic view. Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can run the Prediction Accuracy - By Category report from the reports folder in the Traffic Prediction Custom Reports portlet.

### Available report options

The following options can be changed on the Prediction Accuracy - By Category report when you click the  **Run with options** icon in the Traffic Prediction Custom Reports portlet.



Report option	Available selection
Road category	Select a road category from the list available
Based on the metric	<ul style="list-style-type: none"> <li>• Accuracy of Speed Forecasts</li> <li>• Accuracy of Volume Forecasts</li> </ul>
From	Using the date and time selector, enter the start date and time for the report period
To	Using the date and time selector, enter the end date and time for the report period

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

### Prediction Accuracy - By Day of Week: 🚗

The Prediction Accuracy - By Day of Week report provides a graph that summarizes the accuracy of the traffic volume or speed prediction data generated from recent traffic data in the system, during a selected time period. The report is summarized by the days of the week during a specified time period.

The accuracy is calculated by comparing the traffic prediction data with the equivalent statistical data captured from field subsystems in the traffic network during the same time period. This report is useful for identifying areas in the prediction system that require calibration and additional configuration.

This report displays the following information:

#### Graph title

Displays the transportation road link that the report is based on.

#### Horizontal axis (x-axis)

Displays a breakdown of the days of the week.


#### Vertical axis (y-axis)

Displays the accuracy, in percentage, of the traffic volume or speed forecasts for the specified time period.

Unlike some of the other reports provided by the Traffic Prediction feature, the Prediction Accuracy - By Day of Week report is not displayed by default in any of the portlets on the Operator: Traffic view. Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can run the Prediction Accuracy - By Day of Week report from the reports folder in the Traffic Prediction Custom Reports portlet.

## Available report options

The following options can be changed on the Prediction Accuracy - By Day of Week report when you click the  **Run with options** icon in the Traffic Prediction Custom Reports portlet.

Report option	Available selection
Link ID	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"><li>• Accuracy of Speed Forecasts</li><li>• Accuracy of Volume Forecasts</li></ul>
From	Using the date and time pickers, enter the start date and time for the report period
Date	Using the date and time pickers, enter the end date and time for the report period

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

### Prediction Accuracy - By Day and Hour:

The Prediction Accuracy - By Day and Hour report provides a graph that summarizes the accuracy of the traffic volume or speed prediction data generated from recent traffic data in the system, during a selected time period. The report can be summarized by the peak or off peak periods for a specific day of the week.

The accuracy is calculated by comparing the traffic prediction data with the equivalent statistical data captured from field subsystems in the traffic network during the same time period. This report is useful for identifying areas in the prediction system that require calibration and additional configuration.

This report displays the following information:

#### Graph title

Displays the transportation network ID that the report is based on.

#### Horizontal axis (x-axis)

Displays a breakdown of the accuracy by road category.


#### Vertical axis (y-axis)

Displays the accuracy, in percentage, of the traffic volume or speed forecasts for the specified day and hour.

Unlike some of the other reports provided by the Traffic Prediction feature, the Prediction Accuracy - By Day and Hour report is not displayed by default in any of the portlets on the Operator: Traffic view. Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. Notify your administrator to modify the reports and change the criteria for the graphs that are displayed.

You can run the Prediction Accuracy - By Day and Hour report from the reports folder in the Traffic Prediction Custom Reports portlet.

### Available report options

The following options can be changed on the Prediction Accuracy - By Day and Hour report when you click the  **Run with options** icon in the Traffic Prediction Custom Reports portlet.

Report option	Available selection
Link ID	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"> <li>• Accuracy of Speed Forecasts</li> <li>• Accuracy of Volume Forecasts</li> </ul>
Day and Hour	<ul style="list-style-type: none"> <li>• Peak-MO</li> <li>• OffPeak-MO</li> <li>• Peak-TU</li> <li>• OffPeak-TU</li> <li>• Peak-WE</li> <li>• OffPeak-WE</li> <li>• Peak-TH</li> <li>• OffPeak-TH</li> <li>• Peak-FR</li> <li>• OffPeak-FR</li> <li>• Peak-SA</li> <li>• OffPeak-SA</li> <li>• Peak-SU</li> <li>• OffPeak-SU</li> </ul>
From	Using the date and time pickers, enter the start date and time for the report period
Date	Using the date and time pickers, enter the end date and time for the report period

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

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## Traffic planning

From the solution portal of IBM Intelligent Transportation you can get a historical picture of the traffic system showing you where congestion problems occurred in the past days, weeks, months, or years. The Planner: Traffic view displays the historical traffic data that is collected by traffic subsystems and archived in the Traffic Awareness system.

### Planner: Traffic view

The portlets on the Planner: Traffic view provide geographical visualization and summary reports of historical traffic flow and performance of the transportation network, which is useful for planning tasks such as:

- Identifying patterns and trends in traffic flow and performance
- Analyzing historical traffic data on a specific road, region, event, device, or level
- Identifying repeat congestion problems
- Carrying out detailed causal analysis
- Viewing graphical reports summarizing historical traffic speed, volume, and events

The Planner: Traffic view contains the following portlets, which you can think of as independent sections of the page that cooperate with one another.

Portlet	Description
Historical Traffic Conditions	The Historical Traffic Conditions portlet provides information about the historical traffic conditions of the transportation network. A geographical information system (GIS) map of the traffic network provides a visual representation of historical traffic data collected by traffic subsystems and archived in the Traffic Awareness system database.
Historical Traffic Conditions - Details	The Historical Traffic Conditions - Details portlet on the Planner: Traffic view provides a structured view of historical traffic data, collected and archived in the Traffic Awareness database.
Contacts	A collaboration tool for communicating with other users that are logged on to the solution.
Traffic Flow - Past 30 days	A graphical report that shows the traffic flow volume of the network during the past 30 days. You can modify the traffic congestion graph to present the historical traffic volume total or the average speed of a selected road link. You can choose to view a report showing the historical traffic data for the last 30 days or for the past hour.
Traffic Custom Reports	From the Traffic Custom Reports portlet you can access and run all of the reports that are provided by the Traffic Awareness feature.

### Administrator

Providing you have Transit IT Administrator access, you also can configure and customize the portlets in this view. For more information, see *Customizing the solution* in the IBM Intelligent Transportation product documentation.

#### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

## Viewing historical traffic conditions

Use the Planner: Traffic view to obtain information about the historical traffic conditions of your transportation network. You can choose what road categories you are interested in and when the data was collected. The historical subsystem of IBM Intelligent Transportation is useful for identifying congestion areas, and other performance-related location patterns for a particular time in the past.

You can view historical traffic data on a geographical information system (GIS) map, a list, and also in summarized graphical reports. The information displayed is relative to the time zone of your client operating system.

### Road links

Road links are color coded on both the map and list according to the **Level of Service** value collected by the Traffic Awareness system from traffic subsystems at the particular time in the past that is currently being queried. The list in the Historical Traffic Conditions - Details portlet provides a legend for each color. By default, the list and the map are color coded as follows:

Table 20. Color codes of traffic levels for road links on the map

Level of Service	Color	Industry recognized description
A	Green	Free-flow operations
B	Green	Reasonable free-flow operations
C	Amber	Stable or near free-flow
D	Red	Approaching unstable flow
E	Red	Unstable flow, operations at capacity
F	Red	Forced or breakdown in vehicular flow

The colors used on the map and in the list to classify the traffic flow level of a road link can be configured by your Transportation IT Administrator.

You can display more information about the traffic performance level, by selecting the road link from the list. On the map, a hover preview card pops up with the traffic level information and other details about the selected road link.

#### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

### Selecting historical traffic information to show on the map

You can monitor the historical traffic performance levels of a selected road link or road category, for a specific time and date in the past, on the map in the Planner: Traffic view.

#### Before you begin

When you specify a time period for viewing historical traffic data, the timezone of your client operating system is observed. Set the time zone of your client operating system to match the time zone of the geographical region that you are viewing historical data for.

#### About this task

Use the GIS map in the Historical Traffic Conditions portlet to navigate around the transportation network and view the historical traffic performance levels.

## Procedure

1. Click **Select Content**. A form is displayed.
2. Use the form to specify what **Traffic Levels** information you would like to view. Select at least one **Road Category** from the list. To select multiple items, press Ctrl as you click each item.
3. Enter the time period that you would like to view the historical traffic flow situation for.

**Note:** If your client operating system configuration does not match the time zone of the historical traffic data that you are viewing, ensure that the time that you enter takes into account the time zone offset. Alternatively configure your client operating system to use the time zone of the geographical region that you are interested in seeing historical traffic data for and refresh the browser page.

4. Click **Update** to display the selected **Traffic Levels** on the map.
5. After you make your selection, to hide the content selection form on the map, click **Select Content** again.

## Results

Based on your selections, the map is updated with the selected historical traffic levels data. The results that are displayed are relative to the time zone that is set in your client operating system configuration. The list in the Historical Traffic Conditions - Details portlet displays the traffic level details of the defined time period for the road links that are currently being queried on the map. The map and list provide two ways to look at the same content.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

## What to do next

To clear the previous query and move the map position back to the default start location, click **Reset the Map and Clear Filters**.

## Selecting historical information to show on the list

You can monitor the historical traffic performance levels of a selected road link or road category, for a specific time and date in the past, on the list in the Planner: Traffic view. The list in the Historical Traffic Conditions - Details portlet provides a structured view of the historical traffic data that is archived in the Traffic Awareness database.

## Before you begin

When you specify a time period for viewing historical traffic data, the timezone of your client operating system is observed. Set the time zone of your client operating system to match the time zone of the geographical region that you are viewing historical data for.

## About this task

The list is populated based on the query that you submit from the selection form on the map in the Historical Traffic Conditions portlet.

## Procedure

1. Go to the Historical Traffic Conditions map portlet on the Planner: Traffic view.
2. Click **Select Content**. The map and list content selection form is displayed.
3. Specify the **Road Category** you would like to view. To select multiple items, press Ctrl while you click.

4. Enter the time period that you would like to view the historical traffic flow situation for.

**Note:** If your client operating system configuration does not match the time zone of the historical traffic data that you are viewing, ensure that the time that you enter takes into account the time zone offset. Alternatively switch your client operating system to the time zone of the geographical region that you are interested in seeing historical traffic data for and refresh the browser page.

5. To update the list and map, click **Update**.

## Results

Based on your selections and zoom level, the list is updated with the historical traffic data that is available for the selected road categories and time period. The results that are displayed are relative to the time zone that is set in your client operating system configuration. The list is updated automatically whenever you select content on the map.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

## Viewing historical traffic data reports

The Traffic Awareness feature of IBM Intelligent Transportation provides graphical report summaries of historical traffic flow data that is stored in the system database.

From the Planner: Traffic view, you can choose to view reports showing the historical traffic situation during a specific time period. You can access and run all of the reports that are provided by the Traffic Awareness feature, from the Traffic Custom Reports portlet. Because the reports are interactive, you can view a lower level of report detail, if there is data available in the solution database. For example, on a graph that displays data for a specific week, click the graph to drill down and see traffic data for a specific day during that week.

The following historical traffic data reports are provided with the Traffic Awareness feature of IBM Intelligent Transportation.

### Traffic Flow: Historical by Hour

The Traffic Flow: Historical by Hour report provides a graph report showing the historical traffic flow volumes and average speed of the transportation network during a selected time period. This information is useful for analyzing the historical performance of the transportation network and implementing proactive measures to improve the flow of traffic.

This report displays the following information:

#### Graph title

Displays the name of the selected road link of the transportation network that the report is based on.

#### Horizontal axis (x-axis)

Displays the time period of the graph report, such as hourly, daily, or other intervals.

#### Vertical axis (y-axis)

Displays the measurement values of the report, such as the total volume of traffic or the average speed of the road link during the selected time period.

Unlike the other reports provided by the Traffic Awareness feature, the Traffic Flow: Historical by Hour report is not displayed by default in any of the portlets in the solution portal. You can run the Traffic Flow: Historical by Hour report using your preferred criteria, from the Traffic Custom Reports portlet.

## Available report options

The following options can be changed on the Traffic Flow: Historical by Hour report when you click the



**Run with options** icon in the Traffic Custom Reports portlet.

Report option	Available selection
Traffic network	Select a network ID from the list available
Traffic levels for	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"><li>• Total Volume</li><li>• Average Speed</li></ul>
From date & time	Enter the start date and time for the report using the date and time selector
To date & time	Enter the end date and time for the report using the date and time selector
Summarize data by	<ul style="list-style-type: none"><li>• Year</li><li>• Quarter</li><li>• Month</li><li>• Week</li><li>• Day</li><li>• Hour</li><li>• Minute</li></ul>

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

## Traffic Flow: Historical Trends

The Traffic Flow: Historical Trends report provides a graph report showing the historical traffic flow volumes and traffic speed of the transportation network during a selected time period. This information is useful for analyzing the performance of the transportation network and implementing proactive measures to improve the flow of traffic.

This report displays the following information:

### Graph title

Displays the name of the selected road link of the transportation network that the report is based on.

### Horizontal axis (x-axis)

Displays the time period of the graph report, such as hourly, daily, or other intervals.



### Vertical axis (y-axis)

Displays the measurement values of the report, such as the traffic flow or speed volume for the selected road link during the selected time period.

By default, the Traffic Flow: Historical Trends report is displayed in the Traffic Flow - Past 30 days portlet on the Planner: Traffic view. You can modify the graph to present historical traffic volumes or speed for a different date and time range, or other criteria if required, by clicking **Back** in the portlet. However, the default report settings are returned when the browser is refreshed.

Your administrator configures the selected criteria for the report that is displayed in the portlet. Notify your administrator to change the criteria for the graph that displays on the Planner: Traffic view.

You can run the Traffic Flow: Historical Trends report using your preferred criteria, from the Traffic Custom Reports portlet.

### Available report options

The following options can be changed on the Traffic Flow: Historical Trends report when you click the



**Run with options** icon in the Traffic Custom Reports portlet.

Report option	Available selection
Traffic network	Select a network ID from the list available
Traffic levels for	Select a road link from the list available
Based on the metric	<ul style="list-style-type: none"><li>• Total Volume</li><li>• Average Speed</li></ul>
From date	Enter the start date for the report using the date selector
To date	Enter the end date for the report using the date selector
Summarize data by	<ul style="list-style-type: none"><li>• Year</li><li>• Quarter</li><li>• Month</li><li>• Week</li><li>• Day</li></ul>

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

## Traffic Events: Historical Trends

The Traffic Events: Historical Trends report provides a graph report showing the volume of traffic events and a summary of the types of events that occurred within the transportation network during a specified time period. This information is useful for analyzing events that have an impact on traffic flow and performance.

This report displays the following information:

### Graph title

Displays the name of the selected road link of the transportation network that the report is based on.

### Horizontal axis (x-axis)

Displays the time period of the graph report, such as hourly, daily, or other intervals.

### Vertical axis (y-axis)

Displays the total volume of traffic events for a selected road link during the selected time period. You can also see a breakdown of the event types for the total volume of events.

**Note:** The traffic data retrieved and summarized during the selected period of the report, is based on the current date and time values of the database system.

By default, the Traffic Events: Historical Trends report is displayed in the Traffic Event Reports portlet on the Operator: Traffic view. The report shows the total volume of traffic events that occurred in the transportation network during the past 30 days. The graph also shows a breakdown of the event types. You can run the report using your preferred options to display the traffic event volumes for a different date or other required criteria, by clicking **Back** in the portlet. However, the default report settings are returned when the browser is refreshed.

You can also run the Traffic Congestion report using your preferred criteria, from the Traffic Custom Reports portlet.

## Available report options

The following options can be changed on the Traffic Events: Historical Trends report when you click the



**Run with options** icon in the Traffic Custom Reports portlet.

Report option	Available selection
Location type	Select node, link, or reference point
Location	Select the location of the node, link, or reference point
Event type	Select one or more event types pressing the Ctrl key while you select
From date	Enter the start date for the report using the date selector
To date	Enter the end date for the report using the date selector
Summarize data by	<ul style="list-style-type: none"><li>• Year</li><li>• Quarter</li><li>• Month</li><li>• Week</li><li>• Day</li></ul>

### Related tasks:

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the

system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

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## Transit operations



Use the Operator: Transit view to monitor the performance of a transit operations system in real time. This view can help you to visualize the location of vehicles and provide information about the scheduled and estimated arrival times to a specific stop location.

Information that is collected and generated by the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics is displayed on this view.

From the Operator: Transit view, you can:

- View the current location of vehicles on a geographical information system (GIS) map
- Display the location of scheduled stops for a vehicle in a service
- Filter the display of vehicles on the map and list by status
- View the scheduled and estimated arrival times of vehicle at their upcoming planned stops
- Identify patterns in problem vehicles that are delayed or off route
- Display information about stop and the services that use it
- View graphical reports that summarize the number of vehicles that were delayed or off route
- Collaborate with other transit or traffic operations personnel in the transportation network
- Personalize your map layer selections to override the default display

The Operator: Transit view contains the following portlets:

Portlet	Description
Transit Conditions	The Transit Conditions portlet provides a visual representation of the latest transit operations data on a geographical information system (GIS) map. The information that displays on the map is useful for analyzing the current performance of the transit operations network, and deciding how to rectify problems that arise.
Transit Conditions - Details	The Transit Conditions - Details portlet displays a table that contains information about vehicles, stops, and routes that are being viewed on the map.
Contacts	A collaboration tool for communicating with other users that are logged on to the solution.
Vehicles Delayed	A portlet containing a graphical report that displays the performance of vehicles by status, highlighting the volume of vehicles that arrived late to their destination location.
Vehicles Off Route	A portlet containing a graphical report that displays the volume of vehicles that were diverted off the planned vehicle route at some point in the duration of the scheduled service.
Transit Custom Reports	You can access and run all of the reports that are provided by the Vehicle Awareness and Prediction feature from the Transit Custom Reports portlet.

## Administrator

Providing you have Transit IT Administrator access, you also can configure and customize the portlets in this view. You can also customize the vehicle status classifications and the default automatic status refresh interval. For more information, see *Customizing the solution* in the IBM Intelligent Transportation product documentation.

### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

## Monitoring vehicles



Using the IBM Intelligent Transportation solution portal, you can monitor the movement of vehicles on a planned route for a scheduled service and line within the transit network. You can view the latest location of vehicles and see what vehicles are off route or delayed. You can also obtain the scheduled and estimated arrival times of a vehicle to an upcoming stop.

The Transit Conditions portlet is the starting point of the Operator: Transit view

To get started, click **Select Content** to open the filter panel and select the information that you would like to display on the map. The table in the Transit Conditions - Details also updates to display the selected information that is being viewed on the map. On the status bar, you can see the date and time that the information on the map was last updated by the system.

The list in the Transit Conditions - Details portlet provides the same information in table format.

## Viewing vehicles on the map and in the list



To monitor vehicles on the map and in the list, filter your selection to include only the information that you are interested in. For example, you can choose to view only vehicles that are not performing according to the planned schedule. You can also choose to view all vehicles from a specific line or service regardless of their status.

### Procedure

1. Click **Select Content**.
2. On the filter panel, select **Vehicles**.
3. Optional: If you are only interested in monitoring vehicles of a specific status, select the appropriate vehicle status from the list of available options. For example, to view vehicles that are delayed, select **Late**.
4. Select the **Lines** and specific services that you would like to monitor vehicles for. If you are only interested in one specific service, you can quickly select the service from the **Limit to specific services** list by typing in the line and service name. Otherwise, select the services that are listed in the check box navigation tree.
5. Optional: If you would like to display the planned route of the vehicles that you are monitoring on the map and in the list, select **Routes**.
6. Optional: If you would like to display the planned stops of the services that you are monitoring on the map and in the list, select **Stops**.
7. Click **Update**.
















## Results

Based on your selections, the filter panel closes and the map is refreshed with the latest transit information that is available in the solution. The Transit Conditions - Details portlet is also updated to display a structured list of information that is displayed on the map.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

Map icons are used to represent the location of a vehicle on the map and provide information about the status and direction of the vehicle. The appearance of the map marker varies depending on the status of the vehicle. The vehicle map icon contains a hat that is color-coded to reflect the status.

The following table outlines the map icons and the vehicle status that they represent.

Vehicle map icon	Depicts a vehicle whose status is ...	Color on map and list	Icon when highlighted	Icon when dimmed
	On time	Green		
	Late or early	Yellow		
	Very early	Red		
	Very late	Amber		
	Unknown	Gray		

To view more information about a specific vehicle, you can display either the Vehicle hover card or the full Vehicle Properties dialog on the map.

For more information about the **Vehicle Properties** dialog or the hover card, see *Viewing vehicle information*.

### Related concepts:

“Viewing vehicle information” on page 258

To view more information about a specific vehicle that is displayed on the map, open the Vehicle hover card or the Vehicle Properties window.

## Viewing vehicle routes on the map



In addition to viewing vehicles and stops on the map, use the filter to display the vehicle route of a service or line that you are interested in. Displaying a route is useful for visualizing the total journey of a vehicle or set of vehicles that you are interested in monitoring on the map.

### About this task

The route can be displayed on its own or in the background.

**Note:** The vehicle route of a line or service is not displayed by default on the map.

### Procedure

1. Click **Select Content**.
2. Select **Routes**.
3. In the **Lines** section, select the lines and services that you are interested in seeing the route for.
4. You can also choose to display vehicles and stops along the routes of interest. Select **Vehicles** and **Stops** if required.

### Results

The map updates to display the routes of the selected lines and services.

From the **Routes** tab in the table, you can also highlight the route and stops of a service that you are interested in.

## Viewing vehicle information



To view more information about a specific vehicle that is displayed on the map, open the Vehicle hover card or the Vehicle Properties window.

### Vehicle hover card:

The Vehicle hover card gives you a quick summary of information about a vehicle that is displayed on the map in the Transit Conditions portlet. If you hover over a map marker, the Vehicle hover card displays.

The following table outlines the information that displays in the Vehicle hover card.

Vehicle information	Description
Vehicle name	Nickname by which the vehicle is known to operators, for example, Vehicle b28
Vehicle type and line number	Type of vehicle, along with the number or nickname by which the line is identified by, for example, Bus on Line 101
Service number and service type	Service number and service type, for example, Service 102c - Commuter
Vehicle status	Status of the vehicle according to the expected arrival to the next stop on the schedule, which is accompanied by the timestamp that the status was assigned

Vehicle information	Description
Next arrivals	A list of the next four stops that the vehicle must make, according to the planned schedule for this service
Scheduled arrival time	For each stop under the Next arrivals list, the scheduled arrival time of this vehicle to the stop
Estimated arrival time	For each stop under the Next arrivals list, the estimated arrival time of this vehicle to the stop, if available

### Vehicle Details dialog:

The Vehicle Details dialog gives you a more detailed summary of information about a vehicle that is displayed on the map in the Transit Conditions portlet. To view the Vehicle Details dialog, click a vehicle on the map and select **Properties**. You can also view the Vehicle Details dialog by right-clicking the item in the list and selecting **Properties**.

The following table outlines the information that displays in the Vehicle Details dialog.

Vehicle details	Description
Type	Type of vehicle, for example, bus or car
ID	Number or code by which the vehicle is uniquely identified in this system
Registration ID	Unique alphanumeric nickname by which the vehicle is known to operators
Speed	Latest speed recorded for this vehicle, in km per hour
Status	Status of the vehicle according to the expected arrival to the next stop on the schedule
On route	Status of the vehicle with respect to whether it is on the expected route
Stop name	A list of all of the future stops that the vehicle must make, according to the planned schedule for this service
Scheduled arrival time	For each future stop, the scheduled arrival time of this vehicle to the stop
Estimated arrival time	For each future stop, the estimated arrival time of this vehicle to the stop, if available

Click **Cancel** to close the window and return to the map view.

## Monitoring stops



Use the map in the Transit Conditions portlet to monitor vehicle stop points for lines and services in the transit operations network. From here, you can view the services that are actively using the stop, along with the scheduled and estimated arrival times of the next services to the stop. If you are interested in a specific service or line, on the map, you can highlight all stops in the route for that service.

### About this task

If you are interested in a specific service or line, on the map, you can highlight all stops in the route for that service.

## Viewing stops on the map and in the list



Use the Transit Conditions portlet to monitor vehicle stop points for lines and services in the transit operations network. Information about the stops displays on the map and in the table. If you are interested in a specific service or line, on the map, you can highlight all stops in the route for that service.

### Procedure




1. Click **Select Content**.
2. On the filter panel, select **Stops**.
3. Select the **Lines** and specific services that you would like to monitor stops for. If you are only interested in one specific service, you can quickly select the service from the list by typing in the line and service name. Otherwise, select the services that are listed in the check box navigation tree.
4. Click **Update**.

### Results

Based on your selections, the filter panel closes and the map and list are refreshed with the latest information for the planned stops of the selected services or lines.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

Map icons are used to represent the location of a stop on the map. The following table outlines the map icons that are associated with a stop.

Stop map icon	Depicts ...	Icon when highlighted	Icon when dimmed
	A stop service that is used by a vehicle service or line		

The **Stops** tab of the table is also updated to display a structured list of information about stops that are displayed on the map.

**Note:** If multiple services are expected to arrive at a stop, multiple entries for the stop display in the list. Each instance for the stop in the list represents the services that are expected to arrive. However, in this scenario only one icon is displayed on the map to represent the stop.

To display more information about which services are scheduled and estimated to arrive at the stop, you can display either the summary hover card or the more detailed **Stop Properties** dialog.

For more information, see *Viewing stop information*.

#### Related tasks:

“Viewing stop information”

To view more information about a specific stop that is displayed on the map, open the map hover card or the Vehicle Properties window.

## Viewing stop information



To view more information about a specific stop that is displayed on the map, open the map hover card or the Vehicle Properties window.



### Related tasks:

“Viewing stops on the map and in the list” on page 260

Use the Transit Conditions portlet to monitor vehicle stop points for lines and services in the transit operations network. Information about the stops displays on the map and in the table. If you are interested in a specific service or line, on the map, you can highlight all stops in the route for that service.

### Stop hover card:

The Stop hover card gives you a quick summary of information about a stop that is displayed on the map in the Transit Conditions portlet. If you hover over a map marker, the hover card displays. The next four services that are scheduled to arrive at the stop are displayed on the hover card.

The following table outlines the information that displays in the Stop hover card.

Stop information	Description
Stop name	Name by which the stop is identified by, for example, Wayside Market Place
Stop ID	Unique identification number or short name of the stop
Line/Service	Line and service details of the next four services to arrive at this stop, according to the planned schedule
Vehicle	For each of the next three services to arrive at this stop, the ID of the vehicle
Scheduled arrival time	For each of the next three services to arrive at this stop, the scheduled arrival time of the vehicle
Estimated arrival time	For each of the next three services to arrive at this stop, the estimated arrival time of the vehicle

**Note:** If the hover card is not entirely visible, adjust the map location by using the pan controls.

### Stop Properties dialog:

The Stop Properties dialog gives you a more detailed summary of information about a stop that is displayed on the map in the Transit Conditions portlet. From the Stop Properties dialog you can see all of the services that are expected to arrive at the stop.

To view the Stop Properties dialog, click a stop on the map and select **Properties**. Alternatively, you can also access the Stop Properties dialog from the table by right-clicking the stop in the list and selecting **Properties**.

The following table outlines the information that displays in the Stop Properties dialog.

Stop details	Description
ID	The title of the hover card displays the stop number value of the stop, for example, 1412
Name	Name by which the stop is identified by, for example, Wayside Market Place
Location	The latitude and longitude of the stop location
Next Services	Service number and service type of the next services to arrive at this stop, according to the planned schedules

Stop details	Description
Vehicle	For the service that is due to arrive at this stop, the name of the vehicle
Scheduled	For the service that is due to arrive at this stop, the scheduled arrival time
Estimated	For the service that is due to arrive at this stop, the estimated arrival time

Click **Cancel** to close the window and return to the map view.

## Monitoring lines and services



From the Transit Conditions - Details portlet, you can see more information about the routes, lines, and services that you are interested in. The services that are selected on the map are displayed in the Routes tab of the table in this portlet.

### Selecting lines and services to monitor



From the map in the Transit Conditions portlet, you can select the lines and services that you are interested in viewing information for. You can also personalize your view of the map so that the services that you frequently monitor display on the map and by default.

#### About this task

On the map, click **Select Content** and select the lines and services that you would like to display on the map. Alternatively, to personalize your view of the map and list so that your selection displays by default every time that you log on to the solution portal, use the following steps.

#### Procedure

1. In the portlet display menu, click **Personalize**.
2. Under **Default Selected Services**, select the lines and services that you are interested in viewing by default on the map and in the list.
3. Click **Save**.
4. To exit the **Personalize** portlet view, click **Back**.

#### Results

The map and list update to display information for the selected lines and services only.

#### Related concepts:

“Route properties dialog” on page 263

The Route Properties dialog gives you a more detailed summary of information about a route and the services that are using it. To view the Route Properties dialog, go to the Route tab of the table on the Transit Conditions - Details portlet. Find the route that you are interested in, right-click the row, and then select **Properties**.

### Highlighting a specific service on the map



If multiple services are displayed on the map and in the list, you can highlight one specific service route that you are interested in viewing. When you highlight a route, all stops and vehicle map markers for that route change from normal mode to highlighted mode on the map.

## Before you begin

Before you can highlight a specific route on the map, you must first select the information that you would like to view on the map and list.

## Procedure

1. Go to the Transit Conditions - Details portlet.
2. Open the **Route** tab.
3. Find a route that you would like to highlight and right-click the row in the list. A list of active vehicles on that route are displayed.
4. Select the route that you would like to highlight.

## Results

The active vehicles and stops that are associated with the selected route are prominently highlighted on the map and list. All other vehicles and stops that are currently being viewed on the map are dimmed and display in the background of the map.

**Note:** Only information that is being viewed on the map at the current zoom level is displayed in the list. If you would like the list to display all information for the current map filter selection, zoom out to the maximum zoom level on the map. For more information about how to navigate around the map by using either the mouse or the keyboard controls, see *Controlling the map*.

## What to do next

To stop highlighting the vehicles and stops of a selected route, click **Cancel Highlight Mode**.

## Route properties dialog



The Route Properties dialog gives you a more detailed summary of information about a route and the services that are using it. To view the Route Properties dialog, go to the Route tab of the table on the Transit Conditions - Details portlet. Find the route that you are interested in, right-click the row, and then select **Properties**.

The following table outlines the information that displays in the Route Properties dialog.

Route and line details	Description
Line Name	Nickname for the line by which the line is identified
Line ID	Unique ID for the line
Name	Number or nickname by which the service is identified
ID	Unique ID for the service
Length	Length of the outbound journey in km, together with the direction of the route
Destination	Name of the final stop for this route
Today's Schedule	Information about the future arrivals of the vehicles for this line or service, including the vehicle names, stops, scheduled and estimated arrival times

### Related tasks:

“Selecting lines and services to monitor” on page 262

From the map in the Transit Conditions portlet, you can select the lines and services that you are interested in viewing information for. You can also personalize your view of the map so that the services that you frequently monitor display on the map and by default.

## Highlighting items on the transit map



From the map or the list, you can highlight the vehicles and stops associated with a specific service that you are interested in. You can see which stops or vehicles on the map are associated with a specific service.

### Procedure

1. Click a vehicle, stop, or route on the map or list. If you are selecting from the list, right-click the row for the item you are interested in. A list of the services that are on the map is displayed.
2. Select the service that you would like to be highlighted.

### Results

The vehicles and stops that are associated with the selected service are prominently highlighted on the map and list. All other vehicles and stops that are currently being viewed on the map are dimmed and display in the background of the map.

### What to do next

To stop highlighting the vehicles and stops of a selected service, click **Cancel Highlight Mode**.

## Viewing the transit performance reports



The Vehicle Awareness and Prediction feature provides graphical report summaries of transit vehicle data that is stored in the system database.

By default, some of the Vehicle Awareness and Prediction reports are displayed in the reports portlets on the Operator: Transit view. You can access and run all of the reports that are provided by the Vehicle Awareness and Prediction feature from the Transit Custom Reports portlet. The reports are interactive and can provide a lower level of report detail, providing that data is available in the solution database.

The following transit operations data reports are available, if the Vehicle Awareness and Prediction feature is installed in your environment.

### Vehicles Delayed report



The Vehicles Delayed report provides a graph report that shows the number of times an active vehicle of a line or service arrived late to a stop during the past 24 hours. The count totals are recorded on the hour, every hour. The report displays the counts that are recorded for the previous 24 hours from the current time. You can also see the vehicle counts for the vehicles that were on schedule, ahead of schedule, or for vehicles whose status was unknown. This information is useful for analyzing existing schedules and performance problems in the transit operations network.

The Vehicles Delayed report is provided by the Vehicle Awareness and Prediction feature and displays the following information for the selected lines and services:

**Horizontal axis (x-axis)**

Displays the time period for the graph report. This report is an hourly report that covers the past 24 hours from the current time.

**Vertical axis (y-axis)**

Displays the measurement values for each vehicle status. The following statuses can be displayed:

- On schedule
- Ahead of schedule
- Behind schedule
- Undetermined

By default, the Vehicles Delayed report is displayed in a reports portlet on the Operator: Transit view. Your administrator configures the selected criteria for the report that is displayed in the portlet. Notify your administrator to change the criteria for the graph that displays on this view.

You can run the Vehicles Delayed report with your preferred options by clicking **Back** in the reports portlet. The default report settings are restored when the browser is refreshed. You can also run this report from the Transit Custom Reports portlet.

**Available report options**

The following options can be configured for the Vehicles Delayed report by clicking the  **Run with options** icon in the Transit Custom Reports portlet.

Report option	Available selection
Line	Select a transit line name from the list available. This selection is required to run the report. To select multiple items, press the Shift key while you click. If you would like the report to include information about the lines only, click <b>Finish</b> . If you would like the report to also include information about one or more services of the selected lines, click <b>Reprompt</b> after you select a line.
Service	After you selected at least one transit line and clicked <b>Reprompt</b> , the list of services for the selected lines are refreshed and displayed. Optionally, select a transit service name from the list available. If a specific service is not selected, the report displays the off route count for all services that operate under the selected transit line. To select multiple items, press the Shift key while you click.

**Related tasks:**

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

## Vehicles Off Route report



The Vehicles Off Route report provides a graph report that shows the number of vehicles for a line or service that were determined to be off route over the past 24 hours. A vehicle is classified as off route if it deviates from the planned route for at least 25% of the time of its journey. The report is summarized by hour. This information is useful for analyzing the existing routes, and optimizing the planned journey of vehicles in the transit operations network.

The Vehicles Off Route report is provided by the Vehicle Awareness and Prediction feature and displays the following information:

### Horizontal axis (x-axis)

Displays the time period for the graph report. This report is an hourly report that covers the past 24 hours from the current time.

### Vertical axis (y-axis)

Displays the measurement values for each vehicle status. The measurement includes:

- On route
- Off route
- Unknown

**Note:** The report calculates vehicles that were off route for at least 25% of the time during a one hour period. Your system administrator can customize the percentage level for the off route calculation that is generated by this report.

By default, the Vehicles Off Route report is displayed in a portlet on the Operator: Transit view. Your administrator configures the selected criteria for the report that is displayed in the portlet. Notify your administrator to change the criteria for the graph that displays on this view.

You can run the Vehicles Off Route report with your preferred options by clicking **Back** in the portlet. The default report settings are restored when the browser is refreshed. You can also run this report from the Transit Custom Reports portlet.

## Available report options

The following options can be changed on the Vehicles Off Route report when you click the  **Run with options** icon in the Transit Custom Reports portlet.

Report option	Available selection
Line	Select a transit line name from the list available. This selection is required to run the report. To select multiple items, press the Shift key while you click. If you would like the report to include information about the lines only, click <b>Finish</b> . If you would like the report to also include information about one or more services of the selected lines, click <b>Reprompt</b> after you select a line.

Report option	Available selection
Service	After you selected at least one transit line and clicked <b>Reprompt</b> , the list of services for the selected lines are refreshed and displayed. Optionally, select a transit service name from the list available. If a specific service is not selected, the report displays the off route count for all services that operate under the selected transit line. To select multiple items, press the Shift key while you click.

**Related tasks:**

“Refreshing the graph reports” on page 269

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

“Running custom reports” on page 269

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

“Modifying the system-wide reports” on page 270

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

---

## Viewing the reports

IBM Intelligent Transportation provides graphical report summaries of data that is stored in the system. Use the interactive reports portlets of the IBM Intelligent Transportation portal solution to view a graphical summary of the latest data that is collected and generated by the system.

You can run a report to retrieve a summary of the traffic or transit information that you are interested in. The reports are useful for analyzing performance, which can help you to make informed decisions to reduce congestion and improve the flow of traffic or transit services in your transportation network. As a user of IBM Intelligent Transportation you can do the following actions:

- Run a selection of pre-configured reports that are provided by the installable features of IBM Intelligent Transportation
- Refresh the existing graph reports that are displayed by default in the reports portlets to ensure that they are displaying the latest available data.
- Use the **Report Actions** toolbar to send, print, or export the report to a different format, such as PDF, HTML, XML, or XLS.
- Run the report again and modify the time period or other criteria for the report.
- Modify the criteria of existing reports, providing your user account has the required access level.
- Set your language and accessibility preferences for the graph reports.

## Reports portlets

To ensure that you are viewing a summary of the latest data available, you must refresh the graph report. The graphs are automatically refreshed periodically. The automatic refresh period for the system is determined and set by your system administrator.

**Note:** Depending on the number of links that are defined for the transportation network and the amount of historical data that exists in the system, some reports can take at least 1 minute to be generated and displayed in the user solution portal.

A set of reports is provided with each of the features that are deployed in your IBM Intelligent Transportation solution. Some of the reports are displayed by default in the reports portlets in the user interface. During the deployment of the solution, your system administrator determines which reports are displayed by default on the pages in the portal user interface. Your system administrator can customize the reports portlets, update the reports that are provided with the solution, and create new reports. Notify your system administrator if you require changes to the default reports of the solution, or to increase your access permissions. You can also customize some settings in the reports to suit your individual preferences.

**Related concepts:**

“Viewing current traffic data reports” on page 235

The Traffic Awareness feature of IBM Intelligent Transportation provides graphical report summaries of current traffic flow, speed, and event data that is stored in the system database.

“Viewing historical traffic data reports” on page 251

The Traffic Awareness feature of IBM Intelligent Transportation provides graphical report summaries of historical traffic flow data that is stored in the system database.

“Viewing traffic prediction data reports” on page 240

The Traffic Prediction feature of the solution provides graphical report summaries of traffic flow, speed, and service level prediction data that is in the system. You can view reports on the forecasted traffic situation of the transportation network. You can also view reports that show the accuracy of the forecasted traffic information. The traffic prediction data is generated by sophisticated algorithms which use the traffic data that is collected and archived by the system.





“Viewing the transit performance reports” on page 264

The Vehicle Awareness and Prediction feature provides graphical report summaries of transit vehicle data that is stored in the system database.





## Reports action toolbar

To work with the reports of IBM Intelligent Transportation, use the reports action toolbar in the reports portlets. You can find the action toolbar above the graph, or to the right of the report name in the report list view.

You can complete the following actions from the action toolbar if your system administrator enabled them:

Action Icon	Click to ...
 <b>Keep this version</b>	Email the report to selected recipients, save the report as a report version, or save the report as a report view.
 <b>Run</b>	Refresh and run the current report graph with the latest data available. The HourGlass icon displays while the report is being generated.
 <b>Run with options</b>	Change the current report criteria options, such as time period and road link, and then rerun the report with the latest data available. This icon is not available in all report portlets, by default. This icon is available on the Custom Reports portlet that is provided for each feature of the solution. Your system administrator can also enable this option on the static report portlets if wanted.
 <b>Drill down</b>	View a lower level of report detail. Hyperlinks on the graph identify drillable items also. For example, you can drill down to a specific date or time.



Action Icon	Click to ...
 Drill up	View a higher level of report detail. Hyperlinks on the graph identify drillable items also. For example, you can drill up from a specific day view to a wider monthly view.
 Go to	Get to related reports that are linked to the current traffic flow report, if they exist. You can also search existing reports that are indexed in the system.
 View format	View and export the traffic graph report summary in several formats that include: <ul style="list-style-type: none"> <li>• HTML</li> <li>• PDF</li> <li>• XML</li> <li>• Excel</li> </ul> <p>To view the report in a different format, for example, PDF, open the <b>View format</b> menu icon and select the format for the report.</p>
 Add this report	Add the current report to your report folder so that you can select and view the report later.


## Refreshing the graph reports

To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted by using the most recent information that is available in the system.

### About this task

The graph reports displayed in the reports portlets in the user interface are automatically refreshed whenever the browser page is refreshed. Use the following procedure to force a manual refresh so that the latest information in the solution is displayed.

### Procedure

1. Go to the report graph portlet that you are interested in.
2. On the reports action toolbar that is located above the graph, click the  **Run** icon.

**Note:** This icon is not available on all of the reports portlets in the solution. The HourGlass icon displays while the report is being generated.

### Results

The graph report reloads displaying the latest data based on the current system timestamp.

#### Related concepts:

“Reports action toolbar” on page 268

To work with the reports of IBM Intelligent Transportation, use the reports action toolbar in the reports portlets. You can find the action toolbar above the graph, or to the right of the report name in the report list view.

## Running custom reports

If the reports that are displayed by default in the solution portal do not contain the information that you are interested in, you can run the default reports with your preferred criteria. IBM Intelligent


Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements, if your system administrator enables this option.

## About this task

To run a traffic report, go to the required Custom Reports portlet and click the report that you would like to run. For example, if you are analyzing the past traffic performance, go to the Traffic Custom Reports portlet that is provided with the Traffic Awareness feature and select a report. Or if you would like to run a report that is related to the forecasted traffic situation, go to the Traffic Prediction Custom Reports.

You can also use the **Run with options** feature to modify the report options to suit your preferences. Use the following procedure to run a traffic report with options.

## Procedure

1. Find the report that you are interested in.
2. Click the **Run with options**  icon which displays after the report name. A form titled **Configure the report** displays.
3. Set the **What** and **When** options that can be modified for this report type.
4. Click **Finish** to view the report. The HourGlass icon displays while the report is being generated.

## Results

A graphical report displays showing the latest available data for selected metric, during the specified time period. The default reports display again after you refresh the page or log out and log back in to the solution portal.

### Note:

A blank report indicates that there is no report specific data in the database for the specified time period.

## What to do next

Click **Cancel** to return to the default graph display in any of the reports portlets. Alternatively you can also refresh the browser page to reload the default reports that are configured for the system.

### Related concepts:

“Reports action toolbar” on page 268

To work with the reports of IBM Intelligent Transportation, use the reports action toolbar in the reports portlets. You can find the action toolbar above the graph, or to the right of the report name in the report list view.

## Modifying the system-wide reports

### Administrator

If you have access, from the Custom Reports portlet of the feature that you are interested in, you can modify the properties and options of the system-wide reports. For some reports, you can change the metric, time period, or other criteria that a report is based on. The graphs that display automatically when the portal pages are loaded update to reflect the system-wide report modification.

## Before you begin

Your system administrator controls who can modify the reports of the solution. Notify your system administrator if you require changes to the current reports or if you must increase your access permissions.

## About this task

Unlike running a report with options, modifying a report permanently changes the report properties and predefined filter options in the system. You can modify all of the reports that are available in the solution by using the following procedure.

### Procedure

1. In the required Custom Reports portlet, find the name of the report you would like to modify, and click **More**.
2. In the **Available actions** window, click **Set properties**.
3. Go to the **Report** tab.
4. Under **Prompt values**, click **Edit**. The **Configure the report** dialog displays.
5. In the **Configure the report** dialog, complete the required options available for this report type.
6. Click **Finish** to view the report. Or click **Cancel** to go back to the previous traffic event graph report. The HourGlass icon displays while the report is being generated.
7. Click **OK**.

**Note:** Do not modify the report name, as it is referenced in a URL in the user interface portlet configuration.

### Results

The selected report is updated. The next time that the report is run, the graph will be plotted by using the updated criteria. If the report is displayed by default in any of the portlets in the portal, the report will be updated the next time the graph or page is refreshed.

### What to do next

For more information about all the options on this dialog, click **Help** on the **Set properties** title bar of the Custom Reports portlet.

#### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

## Configuring your reports preferences

The globalization and accessibility preferences for the reports portlets of IBM Intelligent Transportation are configured independently from the other portlets in the solution. Within the reports portlets, you can configure language preferences and enable accessibility features.

### Changing the language settings of the reports

The links and action icons in the reports portlets are displayed by using the default language that is configured for the browser. The graphs in the reports portlets are displayed by using the language preference that is set in the reports configuration. You can change the language of the text that displays in the axis of the report graphs to suit your personal language preference.

Notify your administrator if the default language for the report graphs must be modified for all users of the system.

### Changing the language of the graph axis

From the Custom Reports portlet, you can change the language of the text that displays in the axis of the graph by opening the configuration options for each report.

## Procedure

1. Go to the Custom Reports portlet on any page of the solution.
2. Select a report from the list of available reports.
3. Click the **More** link that is next to your selected report.
4. Click **Set Properties**.
5. On the **General** tab, go to the **Language** section and select your preferred language.
6. Click **OK**.

## Results

The next time that you run the report, the axis of the graph will be displayed in the preferred language that you configured.

## What to do next

Repeat this procedure for each of the reports that you plan to use.

## Enabling accessibility

You can enable accessibility features in the reports portlets of IBM Intelligent Transportation to help visually impaired users to use the solution. When you enable accessibility in the reports portlets, a table is also displayed that contains the values used to plot the graph report. A summary that describes the graph is also available.

## About this task

You can enable accessibility on individual reports that you are interested in running. Repeat the following procedure for every report that is listed in each of the Custom Reports portlets that are available in your solution interface.

## Procedure

1. Select a report from the list of available reports in the **Reports** folder.
2. Click the **More** link that appears next to your selected report.
3. Click **Set properties**.
4. Open the **Report View** tab.
5. In the **Accessibility** section, select the **Enable accessibility support** check box.
6. To save the change, click **OK**.

## Results

After refreshing your browser, the graph in the reports portlets is now accompanied by a table that summarizes the report graph. Scroll down to see the table.

---

## Configuring the solution

### Administrator

Administration portlets are also provided in the solution interface of IBM Intelligent Transportation to help you configure and customize your environment.

The following information provides assistance on how to use the administration portlets and configuration options that are in the solution interface. You must also complete other configuration and customization steps in order to fully deploy IBM Intelligent Transportation.

## Configuring the maps

### Administrator

To access the map configuration interface, switch the map portlet to configuration mode by clicking **Edit Shared Settings** on the portlet display menu, which is in the upper right corner of the portlet.

To configure the geographical information system (GIS) maps of the solution interface, authorized access is required. The following table outlines the options that you can configure in the maps that are provided by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics, and the permissions that are required.

Map portlet	Options that can be configured	Access required	Notes
Current Traffic Conditions	<ul style="list-style-type: none"><li>• Base map</li><li>• Center point and zoom</li><li>• Road categories</li><li>• Regions</li><li>• Layers</li></ul>	Traffic IT Administrator	The base map service that is configured in the Current Traffic Conditions portlet is available to all of the maps in the solution portal that are provided by the IBM Intelligent Operations for Transportation.
Predicted Traffic Conditions	<ul style="list-style-type: none"><li>• Base map</li><li>• Center point and zoom</li><li>• Prediction interval increment</li></ul>	Traffic IT Administrator	Configure the map in the Predicted Traffic Conditions portlet by using the map configuration interface in the Current Traffic Conditions portlet.
Historical Traffic Conditions	<ul style="list-style-type: none"><li>• Base map</li><li>• Center point and zoom</li><li>• Road categories</li></ul>	Traffic IT Administrator	Only the center point and zoom settings can be configured from this map portlet. To configure the base map and road categories for the solution, go to the Current Traffic Conditions portlet on the Operator: Traffic view, and switch to configuration mode.
Transit Conditions	<ul style="list-style-type: none"><li>• Base map</li><li>• Center point and zoom</li></ul>	Transit IT Administrator	Any changes that you make to the center point and starting location are only applied to the transit map.

#### Related concepts:

Chapter 6, “Customizing the solution,” on page 157

You can customize the user interface, maps, and reports of IBM Intelligent Transportation. To suit your operational needs, you can also customize the product features, Traffic Prediction, Traffic Awareness, and Vehicle Awareness and Prediction.

Chapter 4, “Securing the solution,” on page 97

Securing IBM Intelligent Transportation is an important consideration. To ensure that the system is secure, you must manage who can access the system and assign the correct level of access within the solution.

## Guidelines to configuring traffic prediction



Configure and customize the Traffic Prediction feature of IBM Intelligent Operations for Transportation by using the solution configuration and management portlets in the **Solution Administration** view of the solution interface.

For a detailed check list and further guidelines about how to configure the Traffic Prediction feature, see *Customizing the Traffic Prediction feature* .

## Configuring and enabling Traffic Prediction

**Administrator** 

The Configure and Enable Traffic Prediction portlet is an interactive window that contains options to enable traffic prediction and to configure data collection that is required for traffic prediction. The Traffic Prediction feature uses the traffic data collected by traffic subsystems to predict traffic for a specific time.

### Configurable options

The Configure and Enable Traffic Prediction portlet displays different editable fields with which you can enable and configure traffic prediction. The portlet contains the following sections and fields.

Table 21. Configure and Enable Traffic Prediction elements

Elements	Description
<b>Enable traffic prediction</b>	This check box determines whether the collected data is used for traffic prediction. Select the check box to enable traffic prediction using the collected data. Clear the check box to disable traffic prediction based on speed and volume. The check box is cleared by default.
<b>Configure General Settings</b>	This section is used to configure the general settings required to set up traffic prediction.
<b>Polling interval</b>	This field defines how often data is retrieved from the IBM Intelligent Transportation database. Select the required value from the list. Default value: 5 minutes
<b>Prediction interval</b>	This field defines how often traffic prediction is calculated. Ensure that this value is divisible by the value selected in the <b>Polling interval</b> field. Select the required value from the list. Default value: 5 minutes
<b>Time slots to be used for prediction during an evaluation</b>	This field defines the time slots for which traffic is to be predicted. The time slots are determined by the number of times traffic prediction can be done, specified in the <b>Prediction interval</b> field, within an hour. Select the required time slots from the available list. <b>Note:</b> Ensure that there is a correlation between these values and the selected setting for the <b>Percentage of data allowed to be missing</b> value. For example, if the <b>Percentage of data allowed to be missing</b> value is configured at 30%, the prediction interval is configured at 5 minutes, and the number of data periods to use for prediction is configured at 6, select the time slots so that for any particular time point, only 1 time point out of the last 6 is missing, since 2/6 is 33.3%. This is above the 30% limit configured. With a selection of prediction time slots of 5, 10, 15, 30, 45, and 60, prediction fails for the 30 minute time point. This is because the percentage of time points allowed to be missing is greater than 30%, in this case, the two time points 20 and 25, which is 2/6, or 33.3%. Similarly, prediction fails for the 45 and 60 minute time points. Predictions in this example will not fail with a selection of prediction time slots of 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, and 60.
<b>Number of data periods to use for prediction</b>	This field defines the latest number of traffic records that are used for traffic prediction. Select or specify the required value. Default value: 6
<b>Stop prediction whenever a previously processed date is found in database</b>	This check box determines whether traffic prediction is to be discontinued for the specific traffic record when an already processed date is found in the database. Select the check box to enable the check for an already processed date and to discontinue traffic prediction for the specific record if the condition is found. The check box is selected by default.
<b>Configure Speed Prediction</b>	Use this section to configure the settings required to set up traffic prediction based on speed.

Table 21. Configure and Enable Traffic Prediction elements (continued)

Elements	Description
<b>Enable prediction based on speed</b>	This check box determines whether the collected data is used to predict the speed of vehicles. Select the check box to enable traffic prediction based on speed using the collected data. The check box is selected by default.
<b>Percentage of data allowed to be missing</b>	This field defines the percentage of data that can be unavailable while performing the speed prediction calculations. Select or specify the required value. Default value: 50
<b>Percentage of data allowed to be zero</b>	This field defines the percentage of data that can be zero while performing the speed prediction calculations. The calculation is stopped if the amount of zero data exceeds this percentage. Select or specify the required value. Default value: 30
<b>Configure Volume Prediction</b>	This section is used to configure the settings required to set up traffic prediction based on volume.
<b>Enable prediction based on volume</b>	This check box determines whether the collected data is used to predict the volume of vehicles. Select the check box to enable traffic prediction based on volume using the collected data. The check box is selected by default.
<b>Percentage of data allowed to be missing</b>	This field defines the percentage of data that can be unavailable while performing the volume prediction calculations. Select or specify the required value. Default value: 50
<b>Percentage of data allowed to be zero</b>	This field defines the percentage of data that can be zero while performing the volume prediction calculations. The calculation is stopped if the amount of zero data exceeds this percentage. Select or specify the required value. Default value: 30

#### Related concepts:

“Traffic predictions not working as expected” on page 302

To troubleshoot issues that relate to traffic predictions not working as expected, configure the Traffic Prediction prediction interval to be divisible by the polling interval.

### Configuring general settings for traffic prediction

You can configure the **Configure General Settings** section to specify the information required for traffic prediction.

#### Procedure

1. Log on to the Configure and Enable Traffic Prediction portlet with the appropriate logon details.
2. Click **Solution Administration > Configure Traffic Prediction**.
3. Select the required **Polling interval** from the list.
4. Select the required **Prediction interval** from the list. Ensure that this value is divisible by the polling interval.
5. Select the required **Time slots to be used for prediction during an evaluation** from the available list.
6. Specify the **Number of data periods to use for prediction**.
7. Optional: If a previously processed date is found in the database, you can choose to stop predictions from being generated. To enable this option, select the check box titled **Stop prediction whenever a previously processed date is found in database**.
8. Click **Apply** to save the configuration or click **Reset** to go back to the default values.

#### Results

The jobs are stored in the database. To verify the jobs:

1. Log on to the database server and connect to **TIH\_OP** using DB2.
2. Determine the number of records in the **CACHE.JOB\_TRIGGERS** table by entering `SELECT * FROM CACHE.JOB_TRIGGERS`. There is one record with the job name of **AdapterTrigger**.

A confirmation of your saved configuration is displayed at the top of the portlet. These updated criteria are used the next time traffic prediction is enabled and run.

## Enabling traffic prediction

Use the **Enable traffic prediction** check box to determine whether the collected data is used for traffic prediction. Select the check box to enable traffic prediction using the collected data. In addition, enable either speed or volume prediction or both to predict traffic. Clear the **Enable traffic prediction** check box to disable both speed and volume prediction.

### Procedure

1. Select the **Enable traffic prediction** check box to predict traffic using the collected data.
2. Select or specify the required information in the **Configure General Settings** section.
3. Optional: In the **Configure Speed Prediction** section, select the **Enable prediction based on speed** check box to configure the settings required to set up traffic prediction based on speed.
  - a. Specify the **Percentage of data allowed to be missing**.
  - b. Specify the **Percentage of data allowed to be zero**.
4. Optional: In the **Configure Volume Prediction** section, select the **Enable prediction based on volume** check box to configure the settings required to set up traffic prediction based on volume.
  - a. Specify the **Percentage of data allowed to be missing**.
  - b. Specify the **Percentage of data allowed to be zero**.
5. Click **Apply** to save the configuration or click **Reset** to go back to the previous saved values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet. These updated criteria determine which traffic prediction is run and the configuration to be used. Also, any portlets on the **Operator: Traffic** view that display the traffic prediction results are updated automatically the next time the graph or page is refreshed.

## Configuring mean Traffic Prediction calculations

**Administrator** 

The Configure Traffic Prediction Calculations - Mean portlet is an interactive window that contains options to specify the details required to calculate the mean. Mean calculation is a traffic process that calculates the mean for each group of days with similar traffic patterns. Each day of the week can be considered as a separate group, so a maximum of seven processes can be configured to calculate the mean.

### Configurable options

The mean calculation is performed with the data collected from the IBM Intelligent Transportation database. The data that is generated by this calculation is used as an input for real-time prediction. The Configure Traffic Prediction Calculations - Mean portlet displays different editable fields with which the settings can be configured to calculate the mean. The portlet contains the following sections and fields.

Table 22. Configure Traffic Prediction Calculations - Mean elements

Elements	Description
<b>Number of weeks to use for mean calculation</b>	This field defines the number of weeks of traffic data across which the average for speed and volume for each group is calculated. Select or specify the required value.
<b>Alpha value for calculating weighted mean</b>	This field defines the alpha value that can be used to calculate the weighted mean. This value is multiplied with the previous data points and thus gives emphasis to the recent data points. Select or specify the required value.



Table 22. Configure Traffic Prediction Calculations - Mean elements (continued)

Elements	Description
<b>Group the days of week that have similar traffic patterns</b>	This section is used to configure the groups that are used to calculate the mean. The days of the week are grouped based on similar traffic patterns. A maximum of 7 groups can be configured. Empty groups are ignored. Use the arrows to move the days of the week among the groups.

## Configuring settings to calculate mean Procedure

1. Select or specify the required **Number of weeks to use for mean calculation**.
2. Select or specify the required **Alpha value for calculating weighted mean**.
3. Use the arrows to group the days of the week in different columns that are based on similar traffic patterns. A maximum of seven groups can be configured. Empty groups are ignored while calculating the mean.
4. Click **Apply Changes** or click **Reset** to go back to the default values.

## Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required processes are scheduled. You can also initiate the calculation in the Initiate Calculation Manually portlet. To open the portlet, click **Solution Administration > Initiate Traffic Prediction Calculations**. The data that is generated by this calculation is used as an input for real-time prediction.

## Configuring estimate Traffic Prediction calculations

**Administrator** 

The Configure Traffic Prediction Calculations - Estimate portlet is an interactive window that contains options to specify the details to calculate the batch estimate. Estimate calculation is a traffic process that calculates the batch estimate for each group of days with similar traffic patterns and two sets of times. Calculate the two types of estimate, peak and off-peak estimates, based on the peak times and off-peak times for each group of days. Configure a maximum of 14 processes to calculate peak and off-peak estimates.

## Configurable options

The estimate calculation is performed with the data collected from the IBM Intelligent Transportation database. The data that is generated by this calculation is used as an input for real-time prediction. The Configure Traffic Prediction Calculations - Estimate portlet displays different editable fields with which the settings can be configured to calculate the batch estimate. The portlet contains the following sections and fields.

Table 23. Configure Traffic Prediction Calculations - Estimate elements

Elements	Description
<b>Step 1: Group the days of the week that have similar traffic patterns</b>	This section is used to configure the groups that are used to calculate a pair of peak and off-peak estimates. The days of the week are grouped based on similar traffic patterns. A maximum of 7 groups can be configured. Empty groups are ignored. Use the arrows to move the days of the week among the groups.

Table 23. Configure Traffic Prediction Calculations - Estimate elements (continued)

Elements	Description
<b>Step 2: For each group of days, specify which times typically involve the heaviest (peak) traffic levels</b>	This section is used to configure the details for each group. The times are used to calculate a peak estimate and off-peak estimate for each group of days.
<b>Associate with a previously created mean</b>	This field defines the calculated mean value that is to be associated with the specific estimate group, and is configurable for each estimate group. The mean groups that are listed in the drop-down list are available from the groups that are created in the Configure Traffic Prediction Calculations - Mean portlet. Select the required mean from the drop-down list.
<b>Number of weeks to use for this calculation</b>	This field defines the period across which the estimate for each group is calculated, and is configurable for each estimate group. Select or specify the required value.
<b>Off-Peak times</b>	This column defines the times at which traffic levels are low for a specific group. Use the arrows to move the times between the <b>Off-Peak times</b> and <b>Peak times</b> columns.
<b>Peak times</b>	This column defines the times at which traffic levels are high for a specific group. Use the arrows to move the times between the <b>Off-Peak times</b> and <b>Peak times</b> columns.

## Configuring settings to calculate estimate

### Before you begin

Ensure that the configuration is saved for mean calculation in the Configure Traffic Prediction Calculations - Mean portlet. Click **Solution Administration > Configure Traffic Prediction Calculations**.

### Procedure

1. In the **Step 1: Group the days of the week that have similar traffic patterns** section, use the arrows to group the days of the week in different columns that are based on similar traffic patterns. A maximum of seven groups can be configured. Empty groups are ignored while calculating the estimate.
2. In the **Step 2: For each group of days, specify which times typically involve the heaviest (peak) traffic levels** section, specify the following settings for each estimate group:
  - a. Select the required **Associate with a previously created mean** from the drop-down list.
  - b. Select or specify the **Number of weeks to use for this calculation**.
  - c. Use the arrows to group the times in **Off-Peak times** column and **Peak times** column.
3. Click **Apply Changes** or click **Reset** to go back to the default values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required processes are scheduled. To initiate the calculation in the Initiate Calculation Manually portlet, click **Solution Administration > Initiate Traffic Prediction Calculations**. The data that is generated by this calculation is used as an input for real-time forecasting.

## Monitoring Traffic Prediction calculations

**Administrator** 

The Traffic Prediction Calculation Monitoring portlet provides details of traffic prediction calculations.

## Portlet overview

The Traffic Prediction Calculation Monitoring portlet is an interactive window that displays the information about traffic prediction calculations that are based on the results of your current query in the **Select Content** form. The portlet lists the traffic prediction calculations in a tabular format, which is separated into the following columns:

Table 24. Traffic Prediction Calculation Monitoring properties

Field label	Description
<b>Process ID</b>	The process ID assigned to the calculation
<b>Name</b>	<p>The name of the calculation. For example:</p> <ul style="list-style-type: none"> <li>• INSERT_FEED – the process of retrieving real-time data from the IBM Intelligent Transportation database, preprocessing the data, and inserting the data into the cache referred by the prediction calculations</li> <li>• MeanXX – the process of calculating the average for a specific group; where XX indicates the day or group for which the average is calculated</li> <li>• PeakXX – the process of calculating the peak time estimate for a specific group; where XX indicates the days for which the peak estimate is calculated</li> <li>• OffPeakXX – the process of calculating the off-peak time estimate for a specific group; where XX indicates the days for which the off-peak estimate is calculated</li> </ul> <p><b>Note:</b> If the group contains only Monday, then the name of the calculation is suffixed with MO. For example: MeanMO; if the group contains both Monday and Tuesday, the name of the calculation is suffixed with MOTU, for example: MeanMOTU; and so on. Available suffixes and days are:</p> <ul style="list-style-type: none"> <li>• MO Monday</li> <li>• TU Tuesday</li> <li>• WE Wednesday</li> <li>• TH Thursday</li> <li>• FR Friday</li> <li>• SA Saturday</li> <li>• SU Sunday</li> </ul>
<b>Type</b>	<p>The type of the calculation. For example:</p> <ul style="list-style-type: none"> <li>• INSERT_FEED – fetches real-time data from the IBM Intelligent Transportation database, preprocesses the data, and inserts the data into the cache referred by the prediction calculations</li> <li>• ESTIMATE – calculates the peak and off-peak estimates for a specific group of days</li> <li>• MEAN – calculates the average of a group of days that have a similar traffic pattern</li> <li>• PREDICTION – calculates the traffic prediction for a specific time</li> </ul>
<b>Status</b>	<p>The status of the calculation. For example:</p> <ul style="list-style-type: none"> <li>• INITIATED – the calculation was started</li> <li>• COMPLETED – the calculation was completed</li> <li>• ERROR – the calculation logged errors</li> </ul>
<b>Date and Time</b>	The server date and time at which the calculation is monitored and status is determined
<b>Status Description</b>	A description of the status of the associated process

Additional information that describes the status of calculations and running processes. The possible values are:

Calculation Type	Status	Message
Insert Feed	INITIATED	Processing real-time data from <b>Transportation Link Status</b> table.

Calculation Type	Status	Message
Insert Feed	COMPLETED	Insert feed is completed. Cache updated with real-time records. <i>number_of_records</i> records in cache.
Insert Feed	ERROR	Failed to load cache with real-time information. Check the logs on the prediction node for more details.
Insert Feed	ERROR	No new feeds are available for inserting. Check that real-time feeds are being fed into the <b>Transportation</b> database. Check the trace logs on the prediction node for more details.
Prediction	INITIATED	Prediction calculations are initiated.
Prediction	COMPLETED	Prediction calculations are completed for <i>number_of_links</i> links.
Prediction	ERROR	Prediction calculations have errors. Check the logs on the prediction node for more details.
Mean	INITIATED	Mean calculations are initiated with statistic ID <i>ID</i> .
Mean	COMPLETED	Mean calculations are completed with statistic ID <i>ID</i> . Check the <i>Link_Stats</i> table with this ID for more details.
Mean	ERROR	Mean calculations with statistic ID <i>ID</i> has errors. Check the logs on the prediction node for more details.
Estimate	INITIATED	Estimate calculations are initiated with weight ID <i>ID</i> .
Estimate	COMPLETED	Estimate calculations are completed with weight ID <i>ID</i> . Check the <i>Link_Weights</i> table with this ID for more details.
Estimate	ERROR	Estimate calculations with weight ID <i>ID</i> has errors. Insufficient data error is detected for a number of links. Check the trace logs on the prediction node for more details.

### Selecting traffic prediction calculation details to show in the table

The table in the Traffic Prediction Calculation Monitoring portlet is populated based on your choices in the selection form.

#### Procedure

1. Click **Select Content**. A form is displayed.
2. Use the form to specify the traffic prediction calculation that you would like to monitor:
  - **Calculation Type**
  - **Status**
  - **From date**
  - **To date**
3. After you make your selection, click **Select Content** again to hide the selection form.
4. Click **Update** or click **Reset** to go back to the default values.

## Results

The table is updated with the latest available traffic prediction calculation information based on your selection.

### Sorting the traffic prediction calculation monitoring table

Sorting the list is useful for navigating through long lists of traffic prediction calculations that are returned by a query. You can sort the traffic prediction calculation details by clicking the column heading. For example, click the **Status** column heading to sort the traffic prediction calculations by status. Clicking the column heading once sorts the list by the column values in ascending order. Clicking the **Status** column heading again sorts the list in descending order. The list can be sorted by one column value at a time.

### Starting Traffic Prediction calculations manually

**Administrator** 

The Initiate Calculation Manually portlet provides options to initiate mean and estimate traffic prediction calculations manually, outside the scheduled calculation times. Speed and volume prediction calculations are scheduled and cannot be initiated manually.

#### Portlet overview

The Initiate Calculation Manually portlet is an interactive window from where you can initiate a traffic prediction calculation.

#### Configurable options

The Initiate Calculation Manually portlet displays different editable fields with which you can specify the traffic prediction calculation to be triggered. The following table outlines the details to be provided.

Table 25. Initiate Calculation Manually properties

Field label	Description
<b>Calculation process to initiate</b>	<p>The name of the calculation that is to be triggered at the current time, outside of the scheduled times. Select the required calculation name from the drop-down list. For example:</p> <ul style="list-style-type: none"><li>• MeanXX – the process of calculating the average for a specific group; where XX indicates the day or group for which the average is calculated</li><li>• PeakXX – the process of calculating the peak time estimate for a specific group; where XX indicates the days for which the peak estimate is calculated</li><li>• OffPeakXX – the process of calculating the off-peak time estimate for a specific group; where XX indicates the days for which the off-peak estimate is calculated</li></ul> <p><b>Note:</b> If the group contains only Monday, then the name of the calculation is suffixed with MO. For example: MeanMO. If the group contains both Monday and Tuesday, then the name of the calculation is suffixed with MOTU, for example: MeanMOTU; and so on. Available suffixes and days are:</p> <ul style="list-style-type: none"><li>• MO Monday</li><li>• TU Tuesday</li><li>• WE Wednesday</li><li>• TH Thursday</li><li>• FR Friday</li><li>• SA Saturday</li><li>• SU Sunday</li></ul>
<b>Subnet ID on which to run calculation</b>	<p>The ID of the area from where data is used for the calculation. The subnet IDs that are defined in the Create Traffic Prediction Relationship Matrix portlet are displayed in the drop-down list. Select the required ID from the list.</p>

## Manually triggering a traffic prediction calculation Procedure

1. Select the **Calculation process to initiate** from the list.
2. Select the **Subnet ID on which to run calculation** from the list.
3. After you make your selection, click **Initiate** or click **Reset** to go back to the default values.

## Results

A confirmation of your saved configuration is displayed at the top of the portlet and the required traffic prediction calculation is triggered.

## What to do next

You can view the status of the triggered traffic prediction calculation in the Traffic Prediction Calculation Monitoring portlet by clicking **Solution Administration > Monitor Traffic Prediction Calculations**.

## Creating the relationship matrix

### Administrator

The Create Traffic Prediction Relationship Matrix portlet contains options that are required to create a relationship between a set of traffic links that depends on the number of hops between them. Each link is an initial link and the number of hops determine how far away the other relative links in the subnet are from an initial link.

## Portlet overview

The Create Traffic Prediction Relationship Matrix portlet is an interactive window that contains options to create a subnet ID and to select the number of hops that are required to create a relationship between the traffic links in the specified subnet. The links within a subnet are related on the basis of the distance, in terms of the number of hops, and this relationship is used as input for traffic prediction calculations.

## Configurable options

The Create Traffic Prediction Relationship Matrix portlet displays different editable fields with which you can create a subnet ID and also generate relationships between traffic links. The portlet contains the following sections and fields.

Table 26. Create Traffic Prediction Relationship Matrix elements

Field label	Description
<b>Example of hops to related links</b>	This illustration explains the concept of creating a relationship between traffic links in a subnet that is based on the number of hops between them. Each link in a subnet is considered as an initial link and all the other links are related to it depending on the number of hops that are specified.
<b>Subnet ID containing the initial links for which to calculate relationships</b>	This list defines the ID associated with the subnet for which a relationship is to be created. The subnet is a set of traffic link IDs that are collected from the IBM Intelligent Transportation database. Select a subnet ID.

Table 26. Create Traffic Prediction Relationship Matrix elements (continued)

Field label	Description
<b>Number of hops to allow from an initial link to its most distant relatives</b>	This field defines the distance to be considered between an initial link and other relative links in the subnet that is based on the number of hops between them. Select or specify the required value. Default value: 1 <b>Note:</b> At any time, the subnet ID can be associated with only a specific number of hops. That is, only one type of relationship can exist between the traffic links in the subnet. Specifying a different number of hops for the subnet ID overwrites the existing value and creates a new relationship.

## Generating relationships between traffic links

You can specify the information that is required to create a relationship between a set of traffic links in a subnet.

### Procedure

1. Select the required **Subnet ID containing the initial links for which to calculate relationships**.
2. Select or specify the required **Number of hops to allow from an initial link to its most distant relatives**.
3. Click **Generate Relationships** to create the relationship and to store it in the database, or click **Reset** to go back to the default values.

### Results

A confirmation of your saved configuration is displayed at the top of the portlet. These updated criteria are used as input for traffic prediction calculations.

## Creating subnets

**Administrator** 

The Traffic Prediction - Create Subnet portlet allows you to define multiple subnets and also assign the underlying links to each of the subnets in Traffic Prediction. Creating multiple subnets means that different groups of links are processed in parallel, which can lead to improved performance.

### Portlet overview

Each subnet is associated with several link IDs. In the portlet, there is an alphanumeric field that represents the subnet ID, and a text box where you can type or paste multiple comma-separated link IDs for the subnet. You define a subnet from the portlet, and the information is sent to the REST service for processing.

### Configurable options

The Traffic Prediction - Create Subnet portlet displays different editable fields with which you can configure the settings to create a subnet with associated link IDs. The portlet contains the following sections and fields.

Table 27. Traffic Prediction - Create Subnet elements

Elements	Description
<b>Define a Subnet with ID</b>	The <b>Define a Subnet with ID</b> field defines the subnet ID to be processed. The ID cannot be an existing ID.

Table 27. Traffic Prediction - Create Subnet elements (continued)

Elements	Description
<b>Links to be associated with the subnet</b>	The <b>Links to be associated with the subnet</b> text box contains the comma-separated link IDs that are associated with the subnet ID in the <b>Define a Subnet with ID</b> field. The link IDs must not exist in another subnet and they must exist in the data tables. If a link is submitted that does not meet these criteria, the event is logged so that this issue can be corrected.

### Related concepts:

“Updating subnets”

The Traffic Prediction - Update Subnet portlet allows you to select subnets and edit or delete the underlying links to each of the subnets in Traffic Prediction. Multiple subnets mean that different groups of links are processed in parallel, which can lead to improved performance.

### Defining a subnet

Follow these steps to define a subnet from the Traffic Prediction - Create Subnet portlet. See the previous *Configurable options* section for details.

### Before you begin

Ensure that the links and subnets are properly defined.

### Procedure

1. Specify a subnet ID in the **Define a Subnet with ID** field, and specify the associated link IDs in the **Links to be associated with the subnet** text box.
2. Click **Create Subnet**.

### Results

The task status is displayed at the top of the portlet. For example, Subnet created successfully. If there is a subnet creation failure, the list of failing links is logged. The Traffic IT Administrator who is creating the subnet checks the logs, removes or modifies the link IDs, and repeats the process if required.

### Updating subnets

**Administrator** 

The Traffic Prediction - Update Subnet portlet allows you to select subnets and edit or delete the underlying links to each of the subnets in Traffic Prediction. Multiple subnets mean that different groups of links are processed in parallel, which can lead to improved performance.

### Portlet overview

Each subnet is associated with several link IDs. In the portlet, there is an alphanumeric field that represents the subnet ID, and a text box with comma-separated link IDs for the subnet. You select a subnet ID to be updated or deleted, and the update or delete request is sent to the REST service for processing.

### Configurable options

The Traffic Prediction - Update Subnet portlet displays different editable fields with which you can configure the settings to update or delete a subnet with associated link IDs. The portlet contains the following sections and fields.



Table 28. Traffic Prediction - Update Subnet elements

Elements	Description
Subnet ID	The <b>Subnet ID</b> field defines the subnet ID to be processed.
Links associated with the subnet	The <b>Links associated with the subnet</b> text box contains the link IDs that are associated with the subnet ID in the <b>Subnet ID</b> field.

#### Related concepts:

“Creating subnets” on page 283

The Traffic Prediction - Create Subnet portlet allows you to define multiple subnets and also assign the underlying links to each of the subnets in Traffic Prediction. Creating multiple subnets means that different groups of links are processed in parallel, which can lead to improved performance.

### Modifying or deleting a subnet

Follow these steps to edit or delete a subnet from the Traffic Prediction - Update Subnet portlet.

#### Before you begin

Ensure that the links and subnets that are specified are properly defined. Review the subnet creation rules in the *Create Subnet* topic.

#### Procedure

1. Specify a subnet ID in the **Define a Subnet with ID** field, and the associated link IDs are displayed in the non-editable text box.
2. Depending on whether you want to update or delete the subnet, do one of the following:
  - If you want to update the subnet, click **Edit Links**, add or remove the link IDs and click **Update**.
  - If you want to delete the subnet, click **Delete**.

#### Results

The update or delete status message is displayed at the top of the portlet.



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## Chapter 10. Troubleshooting and support

You can isolate and resolve problems with your IBM products by using the supplied troubleshooting and support information. The information contains instructions for using the problem-determination resources that are provided with your IBM products, including IBM Intelligent Transportation.

### Related concepts:

Chapter 4, “Securing the solution,” on page 97

Securing IBM Intelligent Transportation is an important consideration. To ensure that the system is secure, you must manage who can access the system and assign the correct level of access within the solution.

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## Techniques for troubleshooting problems

*Troubleshooting* is a systematic approach to solving a problem. The goal of troubleshooting is to determine why something does not work as expected and how to resolve the problem. Certain common techniques can help with the task of troubleshooting.

The first step in the troubleshooting process is to describe the problem completely. Problem descriptions help you and the IBM technical-support representative know where to start to find the cause of the problem. This step includes asking yourself basic questions:

- What are the symptoms of the problem?
- Where does the problem occur?
- When does the problem occur?
- Under which conditions does the problem occur?
- Can the problem be reproduced?

The answers to these questions typically lead to a good description of the problem, which can then lead you to a problem resolution.

### What are the symptoms of the problem?

When you start to describe a problem, the most obvious question is “What is the problem?” This question might seem straightforward; however, you can break it down into several more-focused questions that create a more descriptive picture of the problem. These questions can include:

- Who, or what, is reporting the problem?
- What are the error codes and messages?
- How does the system fail? For example, is it a loop, hang, crash, performance degradation, or incorrect result?

### Where does the problem occur?

Determining where the problem originates is not always easy, but it is one of the most important steps in resolving a problem. Many layers of technology can exist between the reporting and failing components. Networks, disks, and drivers are only a few of the components to consider when you are investigating problems.

The following questions help you to focus on where the problem occurs to isolate the problem layer:

- Is the problem specific to one platform or operating system, or is it common across multiple platforms or operating systems?
- Is the current environment and configuration supported?

- Do all users have the problem?
- (For multi-site installations.) Do all sites have the problem?

If one layer reports the problem, the problem does not necessarily originate in that layer. Part of identifying where a problem originates is understanding the environment in which it exists. Take some time to completely describe the problem environment, including the operating system and version, all corresponding software and versions, and hardware information. Confirm that you are running within an environment that is a supported configuration. Many problems can be traced back to incompatible levels of software that are not intended to run together, or have not been fully tested together.

## **When does the problem occur?**

Develop a detailed timeline of events that lead up to a failure, especially for those cases that are one-time occurrences. You can most easily develop a timeline by working backward: Start at the time an error was reported (as precisely as possible, even down to the millisecond), and work backward through the available logs and information. Typically, you must look only as far as the first suspicious event that you find in a diagnostic log.

To develop a detailed timeline of events, answer these questions:

- Does the problem happen only at a certain time of day or night?
- How often does the problem happen?
- What sequence of events leads up to the time that the problem is reported?
- Does the problem happen after an environment change, such as upgrading or installing software or hardware?

Responding to these types of questions can give you a frame of reference in which to investigate the problem.

## **Under which conditions does the problem occur?**

Knowing which systems and applications are running at the time that a problem occurs is an important part of troubleshooting. These questions about your environment can help you to identify the root cause of the problem:

- Does the problem always occur when the same task is being done?
- Does a certain sequence of events have to happen for the problem to occur?
- Do any other applications fail at the same time?

Answering these types of questions can help you explain the environment in which the problem occurs and correlate any dependencies. Remember that just because multiple problems might have occurred around the same time, the problems are not necessarily related.

## **Can the problem be reproduced?**

From a troubleshooting standpoint, the ideal problem is one that can be reproduced. Typically, when a problem can be reproduced you have a larger set of tools or procedures at your disposal to help you investigate. Problems that you can reproduce are often easier to debug and solve.

However, problems that you can reproduce can have a disadvantage: If the problem affects your business significantly, you do not want it to recur. If possible, re-create the problem in a test or development environment, which typically offers you more flexibility and control during your investigation.

- Can the problem be re-created on a test system?
- Do multiple users or applications encounter the same type of problem?

- Can the problem be re-created by running a single command, a set of commands, or a particular application?

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## Using Knowledge bases and IBM Support

Use the topics to find troubleshooting information by using Knowledge bases, Fix Central, and IBM Support.

### Searching knowledge bases

You can find useful information in the information center for IBM Intelligent Transportation. However, sometimes you have to look beyond the information center to answer your questions or resolve problems. In such cases, you can find solutions to problems by searching IBM knowledge bases.

#### Procedure

To search knowledge bases for information that you want, and to optimize your results, use one or more of the following approaches:

- Find the content that you need by using the IBM Support Portal.  
The IBM Support Portal is a unified, centralized view of all technical support tools and information for all IBM systems, software, and services. You can use the portal to access the IBM electronic support portfolio from one place. You can tailor the pages to focus on the information and resources that you need for problem prevention and faster problem resolution. Familiarize yourself with the IBM Support Portal by viewing the demo videos ([https://www.ibm.com/blogs/SPNA/entry/the\\_ibm\\_support\\_portal\\_videos](https://www.ibm.com/blogs/SPNA/entry/the_ibm_support_portal_videos)) about this tool. The videos introduce you to the portal, explore troubleshooting and other resources, and demonstrate how you can tailor the page by moving, adding, and deleting portlets.
- Search for content about IBM Intelligent Transportation by using the additional technical resources:
  - IBM Intelligent Transportation support portal
  - Detailed system requirements for IBM Intelligent Transportation
  - IBM Intelligent Operations for Transportation product overview
  - IBM Intelligent Transit Analytics product overview
  - IBM Smarter Cities Software Solutions Redbooks®
- Search for content by using the IBM masthead search. You can use the IBM masthead search by typing your search string into the Search field at the top of any [ibm.com](https://www.ibm.com)® page.
- Search for content by using any external search engine, such as Google, Yahoo, or Bing. If you use an external search engine, your results are more likely to include information that is outside the [ibm.com](https://www.ibm.com) domain. However, sometimes you can find useful problem-solving information about IBM products in newsgroups, forums, and blogs that are not on [ibm.com](https://www.ibm.com).

**Tip:** Include “IBM” and the name of the product in your search if you are looking for information about an IBM product.

### Getting fixes from Fix Central

You can use Fix Central to find the fixes that IBM Support uses for various products, including IBM Intelligent Transportation . With Fix Central, you can search, select, order, and download fixes for your system with a choice of delivery options. A product fix for IBM Intelligent Transportation might be available to resolve your problem.

#### Procedure

To find and install fixes:

1. Obtain the tools that are required to get the fix. If it is not installed, obtain your product update installer. You can download the installer from Fix Central. This site provides download, installation, and configuration instructions for the update installer.
2. Select IBM Intelligent Transportation as the product, and select one or more check boxes that are relevant to the problem that you want to resolve.
3. Identify and select the fix that is required.
4. Download the fix.
  - a. Open the download document and follow the link in the "Download Package" section.
  - b. When you download the file, ensure that the name of the maintenance file is not changed. This change might be intentional, or it might be an inadvertent change that is caused by certain web browsers or download utilities.
5. To apply the fix, follow the instructions in the "Installation Instructions" section of the download document.
6. Optional: Subscribe to receive weekly email notifications about fixes and other IBM Support updates.

## Contacting IBM Support

IBM Support assists with product defects, answers to FAQs, and helps users resolve problems with the product.

### Before you begin

Try to find solutions to problems with the product by using other self-help options such as technical notes. If you cannot find a solution, you can contact IBM Support. Before you contact IBM Support, your company or organization must have an active IBM software subscription and support contract. In addition, you must be authorized to submit problems to IBM. For information about the types of available support, see the Support portfolio topic in the *"Software Support Handbook"*.

### Procedure

To contact IBM Support about a problem:

1. Define the problem, gather background information, and determine the severity of the problem. For more information, see the Getting IBM support topic in the *Software Support Handbook*.
2. Gather diagnostic information.
3. Submit the problem to IBM Support in one of the following ways:
  - Online through the IBM Support Portal: You can open, update, and view all of your service requests from the Service Request portlet on the Service Request page.
  - By phone: For the phone number to call in your region, see the Directory of worldwide contacts web page.

### Results

If the problem that you submit is for a software defect or for missing or inaccurate documentation, IBM Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM Support website daily so that other users who experience the same problem can benefit from the same resolution.

## Exchanging information with IBM

To diagnose or identify a problem, you might have to provide IBM Support with data and information from your system. In other cases, IBM Support might provide you with tools or utilities to use for problem determination.

## Sending information to IBM Support

To reduce the time that is required to resolve your problem, you can send trace and diagnostic information to IBM Support.

### Procedure

To submit diagnostic information to IBM Support:

1. Open a problem management record (PMR).
2. Collect the diagnostic data that you need. Diagnostic data helps reduce the time that it takes to resolve your PMR. You can collect the diagnostic data manually or automatically:
  - Collect the data manually.
  - Collect the data automatically.
3. Compress the files by using the .zip or .tar file format.
4. Transfer the files to IBM. You can use one of the following methods to transfer the files to IBM:
  - The Service Request tool
  - Standard data upload methods: FTP, HTTP
  - Secure data upload methods: FTPS, SFTP, HTTPS
  - Email

All of these data exchange methods are explained on the IBM Support website.

## Receiving information from IBM Support

Occasionally an IBM technical-support representative might ask you to download diagnostic tools or other files. You can use FTP to download these files.

### Before you begin

Ensure that your IBM technical-support representative provided you with the preferred server to use for downloading the files and the exact directory and file names to access.

### Procedure

To download files from IBM Support:

1. Use FTP to connect to the site that your IBM technical-support representative provided and log in as anonymous. Use your email address as the password.
2. Change to the appropriate directory:
  - a. Change to the /fromibm directory.  
`cd fromibm`
  - b. Change to the directory that your IBM technical-support representative provided.  
`cd nameofdirectory`
3. Enable binary mode for your session.  
`binary`
4. Use the **get** command to download the file that your IBM technical-support representative specified.  
`get filename.extension`
5. End your FTP session.  
`quit`

## Subscribing to Support updates

You can subscribe to updates to stay informed of important information about your IBM products.

## About this task

By subscribing to updates about IBM Intelligent Transportation, you can receive important technical information for specific IBM Support tools and resources. You can subscribe to updates by using one of two approaches:

### RSS feeds and social media subscriptions

The following RSS feed is available for IBM Intelligent Transportation: IBM Intelligent Transportation RSS feed

For general information about RSS, including steps for getting started and a list of RSS-enabled IBM web pages, visit the IBM Software Support RSS feeds site.

### My Notifications

With My Notifications, you can subscribe to Support updates for any IBM product. My Notifications replaces My Support, which was a similar tool. Using My Notifications, you can specify that you want to receive daily or weekly email announcements. You can specify the type of information you want to receive, such as publications, hints and tips, product flashes (also known as alerts), downloads, and drivers. My Notifications enables you to customize and categorize the products about which you want to be informed and the delivery methods that best suit your needs.

## Procedure

To subscribe to Support updates:

1. To subscribe to the *IBM Intelligent Transportation* RSS feed, use the following substeps:

- a. Open the link: IBM Intelligent Transportation RSS feed.
- b. In the **Subscribe with Live Bookmark** window, select a directory in which to save the RSS feed bookmark and click **Subscribe**.

For more information on subscribing to RSS feeds, see the IBM Software Support RSS feeds link in the Related information section at the end of the topic.

2. Subscribe to My Notifications by going to the IBM Support Portal and click **My Notifications** in the **Notifications** portlet.
3. Sign in using your IBM ID and password, and click **Submit**.
4. Identify what and how you want to receive updates.
  - a. Click the **Subscribe** tab.
  - b. Select IBM Intelligent Transportation RSS feed and click **Continue**.
  - c. Select your preferences for how to receive updates, whether by email, online in a designated folder, or as an RSS or Atom feed.
  - d. Select the types of documentation updates that you want to receive; for example, new information about product downloads and discussion group comments.
  - e. Click **Submit**.

## Results

Until you modify your RSS feeds and My Notifications preferences, you receive notifications of updates that you have requested. You can modify your preferences when needed; for example, if you stop using one product and begin using another product.



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## Installing and using IBM Support Assistant Data Collector

IBM Support Assistant Data Collector (ISA Data Collector) is a tool that collects common diagnostic data that is useful for analyzing general problems.

ISA Data Collector gathers the following types of information:

- Platform problem determination files
- System log and trace files
- Platform provisioning files
- System configuration files
- Java™ dump files
- Problem determination framework internal log files

To download, install, and use ISA Data Collector for IBM Intelligent Transportation 1.6, see *Downloading ISA Data Collector (ISADC) for IBM Intelligent Transportation V1.6*.

### Related information:

 [Passport Advantage - Downloading ISA Data Collector \(ISADC\) for IBM Intelligent Transportation V1.6](#)

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## Enabling traces and viewing log files

To troubleshoot a problem in IBM Intelligent Transportation, you might need to analyze log files in several systems. The following topics give some guidance on how to access log files.

To start the traces and view the logs, enter the commands at run time as the root user.

### Related tasks:

“Best practices for security” on page 97

Ensure that your IBM Intelligent Transportation solution is secure by following best practices.

## Enabling InfoSphere Streams tracing



To troubleshoot issues that relate to the InfoSphere Streams application for vehicle prediction, increase the default logging levels.

### Procedure

1. Log on to InfoSphere Streams as the administrator; for example, *streamsadmin*.
2. Go to the `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics` directory.
3. Start the InfoSphere Streams application by using the following command:

```
./launcher.sh -i trans_vap -l traceLevel
```

where *traceLevel* is one of the following logging level options:

<i>traceLevel</i>	Description	Example command
default	The default logging level	<code>./launcher.sh -i trans_vap</code>
error	Starts the streams application with increased error logging enabled	<code>./launcher.sh -i trans_vap -l error</code>
info	Starts the streams application with informational logging enabled	<code>./launcher.sh -i trans_vap -l info</code>

<i>traceLevel</i>	Description	Example command
debug	Starts the streams application with verbose debug logging enabled	<code>./launcher.sh -i trans_vap -l debug</code>
trace	Starts the streams application with trace logging enabled	<code>./launcher.sh -i trans_vap -l trace</code>

- To find out which InfoSphere Streams processes are running, enter the following command:  
`./streamtool lspes -i trans_vap`
- To view detailed debug information about individual InfoSphere Streams processing elements, or PEs, find the *peID* from the output of the previous step. Enter the following command:  
`./streamtool viewlog -i trans_vap --pe peID`  
where *peID* is the InfoSphere Streams process PE number that is under investigation.
- View the log files in the following directory:  
`/tmp/streams.trans_vap@streamsadmin/jobs/jobNumber`  
where *jobNumber* is the number of the InfoSphere Streams job. The job number is specified on the stdout log file when you start the InfoSphere Streams application.  
For example, the logs for job number 1 are stored in the directory `/tmp/streams.trans_vap@streamsadmin/jobs/1/`. There is a separate log file for each *peID*. For example, the debug output for *peID* 20 is written to the file in the job directory titled `pe20.pa.out`.  
You can also view the following streams logs:

Log	Location
InfoSphere Streams instance boot log	<code>/tmp/streams.trans_vap@streamsadmin/trans_vap@streamsadmin.boot.log</code>
InfoSphere Streams management and application host logs	<code>/tmp/streams.trans_vap@streamsadmin/logs/</code>

For more information about the streams log files, visit the InfoSphere Streams V3.1 Information Center. See the link at the bottom of the topic.

#### Related information:

 [InfoSphere Streams V3.1 Information Center](#)

## Enabling portal tracing

You can trace user login events by enabling portal tracing. Use the following procedure to enable tracing.

### Procedure

- Log on to `http://portalServer/wps/myportal` as an administrative user.
- On the navigation bar at the top of the page, click **Administration**.
- On the sidebar menu, click **Portal Analysis**.
- Click **Enable Tracing**.
- In the field **Append these trace settings**, type the following required trace string:  

```
*=info:com.ibm.wps.engine.*=all:com.ibm.wps.services.puma.*=all:
com.ibm.wps.puma.*=all:com.ibm.wps.sso.*=all:com.ibm.wps.auth.*=all:
com.ibm.wps.services.authentication.*=all:com.ibm.ws.security.*=all:
com.ibm.websphere.wmm.*=all:com.ibm.ws.wmm.*=all:com.ibm.iss.trans.*
=all:com.ibm.iss.trans.vap.*=all:WSMM=all
```
- Click the **Add** icon. Enable Tracing updates the field **Current trace settings**.

**Note:** Restarting WebSphere Portal removes traces that were set by using the Enable Tracing Administration portlet. If there is any problem with the application, the detailed trace information is written to the `trace.log` file.

## Enabling tracing for offline utilities

To troubleshoot issues that relate to the Vehicle Awareness and Prediction offline utilities messages, change the default message level in the `offline.properties` file.

### About this task

The data load utility and history metadata generation tools provide three levels of message to help you identify the cause of a particular error condition. The message levels are INFO, WARNING, and ERROR. The default message level is INFO. You can change the message level by modifying the configuration item that is called `LOG_LEVEL` in the `offline.properties` file.

### Procedure

1. Go to the following directory: `/opt/IBM/iss/intelligentTransportation/intelligentTransitAnalytics/scripts`
2. Open the `offline.properties` file.
3. To select the required message level when the utility starts, use the change configuration item that is called `LOG_LEVEL`.

**Note:** The log file name for the data load utility is `DLU-<timestamp>.log`. Each running of the command generates a separate log file with the timestamp indicator in the name. Similarly, the log file for the history metadata generation tool is `MetaDataGenerator-<timestamp>.log`.

## Viewing installation log files

Installation log files can provide helpful information about a completed installation or help you to identify problems about a failed installation attempt.

Installation logging information goes into the following file on the installation server machine:  
`/var/ibm/InstallationManager/logs/native/yyyymmdd_hhmma.log` eg. `20130613_0605a.log`

When installing IBM Intelligent Transportation, the installation application generates log files for each of the components installed. If the component installs successfully, the value `[ OK ]` is displayed in the log file. For example: `Install component [VALIDATE_SIGNATURE] on host [iop20appri.ibmplatform.com] [00:00:15] [ OK ]`

More log files are also created if you attempt to install any of the components, but the installation application does not complete successfully. When the installation does not complete successfully, you will see `[Fail]` displayed in the log file, as outlined in the following example:

```
Install component [DB_2] on host [iop20dbbkp.ibmplatform.com] [00:00:02] [ Fail ]
Command failed : The following error occurred while executing this line:
/installHome/ioc16/tools/svc/spec/SOLUTION/db_content/build.xml:12:
input file /installHome/ioc16/tools/svc/topology/tih_ha/DB_2/content/content-spec.xml does not exist
at org.apache.tools.ant.ProjectHelper.addLocationToBuildException(ProjectHelper.java:551)"
```

"If you want more detailed operation messages, please check `/installHome/ioc16/tools/svc/log/installTopology_tih_ha_20130613_0605.log`"

**Note:** If you have previously attempted to install IBM Intelligent Transportation V1.6 on this environment, and continue to experience installation problems, complete the instructions in the uninstallation documentation to ensure that you are installing the product on top of a clean environment.

**Related concepts:**

“Running the installation programs” on page 35

After you install the prerequisite software and preparing the installation server and media, you are ready to install the IBM Intelligent Transportation solution. IBM Installation Manager must be installed on the installation server before you proceed with installing IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics.

**Related tasks:**

Chapter 3, “Uninstalling the solution,” on page 81

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

---

## Known problems and solutions

Common problems with IBM Intelligent Transportation are documented in the problem-solution topics. If you have a problem with the product, review the problem-solution topics to determine whether a solution is available. The problem-solution topics are categorized by issue.

**Related tasks:**

“Configuring the base map” on page 59

Before you can view the traffic or transit data in the user interface on a map, you must first configure a base map service. The base map service that you specify in your configuration must meet the minimum supported requirements of IBM Intelligent Transportation version 1.6.

Chapter 3, “Uninstalling the solution,” on page 81

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

## Troubleshooting accessibility

If you have an accessibility issue with IBM Intelligent Transportation, review the problem-solution topics to determine whether a solution is available.

### Enabling accessibility

You can enable accessibility features in the reports portlets of IBM Intelligent Transportation to help visually impaired users to use the solution. When you enable accessibility in the reports portlets, a table is also displayed that contains the values used to plot the graph report. A summary that describes the graph is also available.

### About this task

You can enable accessibility on individual reports that you are interested in running. Repeat the following procedure for every report that is listed in each of the Custom Reports portlets that are available in your solution interface.

### Procedure

1. Select a report from the list of available reports in the **Reports** folder.
2. Click the **More** link that appears next to your selected report.
3. Click **Set properties**.
4. Open the **Report View** tab.
5. In the **Accessibility** section, select the **Enable accessibility support** check box.
6. To save the change, click **OK**.

## Results

After refreshing your browser, the graph in the reports portlets is now accompanied by a table that summarizes the report graph. Scroll down to see the table.

### **Base map layer selection control is not accessible when using the keyboard**

In the map portlets of IBM Intelligent Transportation, you cannot navigate to, or open, the base map layer selection control when using the keyboard. You can access and open the base map layer control feature on the map only by using the mouse.

## Symptoms

Your system administrator configures the base map layers, and sets one of the base maps as the default map that is displayed in the map portlets of the IBM Intelligent Transportation portal. If your IT administrator configured alternative base maps for the solution, you can choose to switch the base map from the default base map to another base map layer. The base map selection control feature on the map allows you to change the default base map from the map during the current session, without having to go into the configuration view.

The base map selection control can be accessed by clicking the + icon. However, when using the keyboard exclusively, you cannot navigate to the + icon to open the base map selection control and select the preferred base map radio button. You can access the base map control and make a base map radio button selection only if you use the mouse.

The problem exists regardless of whether you enable or disable the Virtual PC Cursor.

## Resolving the problem

Contact the IT administrator to change the default base map to the required base map. The IT administrator can use the table in the **Base Map** tab on the map configuration view to set the preferred base map. However, this workaround affects all users of the solution.

Use the following procedure to change the default base map:

1. Log on to the solution as the Transportation IT Administrator and go to the map on the Current Traffic Conditions portlet.
2. Navigate to the upper right corner of the portlet to view the portlet display menu.
3. Click **Edit Shared Settings**.
4. Navigate to the **Base Map** tab.
5. **Edit** the base map that you would like to set as the default.
6. Select **Default map?** and then click **OK**.

**Result** All users of the system see the selected base map displayed in the map portlet.

### **Screen reader does not announce Custom Reports check box column**


The screen reader does not announce the check box column in the Traffic Custom Reports and Traffic Prediction Custom Reports portlets of the Traffic Awareness user interface portal.

## Symptoms

The Custom Reports portlets list the traffic information graph reports that you can run on traffic flow or event data. From the Traffic Custom Reports and Traffic Prediction Custom Reports portlet, you can run any of the available traffic reports that are provided by the solution. A check box column is located before the report **Name** column to enable you to optionally select one or more reports to work with. However, when using screen reading software to access the application, the purpose of the check box column is not announced by the screen reader. The check box status is the only information that is declared.

## Resolving the problem

The check box column in the Traffic Custom Reports and Traffic Prediction Custom Reports portlets is an optional selection setting. To run the traffic graph reports, you do not need to select this column.

Regardless of the check box status, you can run a report by clicking the  **Run** icon that is located next to the report that you are interested in.

## Screen reader does not announce time values

The screen reader does not announce time values in the Traffic Conditions - Details portlet of the Operator: Traffic view, or in the Historical Traffic Conditions portlet of the Planner: Traffic view. You can work around this problem by typing the time in the 12-hour format.

## Symptoms

### Operator: Traffic Traffic Conditions - Details portlet

In the Traffic Conditions - Details portlet of the Operator: Traffic view, you can enter date and time information on the **Add Event** form. When you use the JAWS screen reader to select **Time** list box that contains time values, the reader announces "start date and time edit combo required", followed by an announcement of the time. However, the reader does not announce the time values that you can select from the list.

### Planner: Traffic Historical Traffic Conditions portlet

In the Historical Traffic Conditions portlet of the Planner: Traffic view, on the **Select Content** filter form, you can select to view traffic data for a specific date and time in the past. When you use the JAWS screen reader to select **Time** list box that contains time values, the reader announces "start date and time edit combo required", followed by an announcement of the time. However, the reader does not announce the time values that you can select from the list.

This problem also occurs in several other portlets in the IBM Intelligent Operations Center solution portal. For more information, see the related link.

## Resolving the problem

Use the keyboard to type a time value into the field in the 12-hour format that is required by the client operating system.

## Screen reader announces table cell data inconsistently in Mozilla Firefox

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics provides reporting charts in the Vehicles Delayed Reports, Vehicles Off Route Reports, and Transit Custom Reports. The reporting charts support accessible tables for a screen reader. However, the JAWS screen reader announces table cell data inconsistently in Mozilla Firefox.

## Symptoms

Versions 13 and 14 of the JAWS screen reader do not announce table cell data when used with version 10 of the Mozilla Firefox browser.

## Resolving the problem

To access the table cell data, use version 13 or 14 of the JAWS screen reader with version 8 or 9 of the Internet Explorer browser. Alternatively, use JAWS 12 with Mozilla Firefox 10.

## Navigation not sequential in Select Content form of Current Traffic Conditions portlet

Navigation and focus are displaced in the Select Content form of the Current Traffic Conditions portlet when you use the JAWS screen reader in virtual PC Cursor mode.

### Symptoms

The issue occurs when the JAWS virtual PC Cursor is enabled in the Select Content form of the Current Traffic Conditions portlet in the Operator: Traffic view. Navigation and focus are displaced when using form event handlers such as the check box, and the **Refresh** and **Delete** buttons.

**Note:** The JAWS virtual PC Cursor is the default cursor mode.

### Resolving the problem

Unlike the JAWS virtual PC Cursor, the PC Cursor causes no observed navigation and focus issues. Therefore, on entering the Select Content form, disable the JAWS virtual PC Cursor by using the shortcut, toggle key CTRL+Z. You can then complete the form in PC Cursor mode. On leaving the form, remember to reactivate the JAWS virtual PC Cursor mode by again pressing the toggle key, CTRL+Z.

## Installation warning message

A warning message might be displayed when you install any product with the IBM Installation Manager. The message is structured as follows:

```
CRIMA1002W WARNING: The following repositories are not connected: -/tmp/disk1/Offering/  
[product_prefix]IMinstaller.zip
```

### Symptoms

The error occurs because you removed an installer image file in the file system, but did not remove the directory name from the preferences list of the IBM Installation Manager. If you try to install the listed directory, the message is displayed.

For example, if you open the Manager installer screens for the IBM Intelligent Operations for Transportation, and the installation files are not in the file system, the warning message is displayed.

### Resolving the problem

To clear the message, first remove the installation directory from the repository list in IBM Installation Manager. To do this, click **File** at the top of the IBM Installation Manager screen. Go to the preferences list and delete the reference to the relevant directory; for example, Vehicle Awareness and Prediction. Next, remove the installer image files from the file system.

To prevent the error in future, create a different installation directory for IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics installation media.

**Note:** If you have previously attempted to install IBM Intelligent Transportation V1.6 on this environment, and continue to experience installation problems, complete the instructions in the uninstallation documentation to ensure that you are installing the product on top of a clean environment.

#### Related tasks:

“Preparing the installation media” on page 31

Before you start to deploy the chargeable components of IBM Intelligent Transportation, you must first obtain and prepare the installation media.

Chapter 3, “Uninstalling the solution,” on page 81

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

## Warning message displayed after successful installation

A warning message might be displayed when you successfully install any feature of IBM Intelligent Transportation.

The message is structured as follows:

```
Integrity of download could not be verified as checksums were not found.  
native/com.ibm.tih.tp.install_1.0.0.479254f40dedaecd5c31cfa846a0b24f.zip
```

## Symptoms

The error is a defect in the IBM Installation Manager, and does not affect the installation of IBM Intelligent Transportation. This warning message might also be displayed for the following JAR files:

```
plugins/com.ibm.ioc.install.tih.tp.moreinfo_1.5.0.201306271504.jar  
plugins/com.ibm.ioc.install.tih.tp.license_1.5.0.201306271503.jar  
plugins/com.ibm.ioc.install.tih.tp.common.panel_1.0.0.201306121457.jar  
plugins/com.ibm.ioc.install.tih.tp.common.panel.validator_1.0.0.201306121458.jar
```

## Resolving the problem

The warning message does not affect the installation of any of the features of IBM Intelligent Transportation, so you can ignore the message.

However, if you want to remove the message, you must configure the preferences of the IBM Installation Manager. To do this, go to `disk1/Offering` and extract the `tih_tp_IMinstaller.zip` to the `tih_tp_IMinstaller` folder. Open IBM Installation Manager and click **File > Preferences**. Clear all the check boxes that are, by default, selected. Next, click **Add Repository**, browse to `/disk1/Offering/tih_tp_IMinstaller/repository.config` and click **OK** until you return to the IBM Installation Manager home screen. Finally, click **Install** to begin the installation.

**Note:** If you have previously attempted to install IBM Intelligent Transportation V1.6 on this environment, and continue to experience installation problems, complete the instructions in the uninstallation documentation to ensure that you are installing the product on top of a clean environment.

### Related tasks:

Chapter 3, “Uninstalling the solution,” on page 81

To uninstall IBM Intelligent Transportation version 1.6 from an existing IBM Intelligent Operations Center environment, you must complete a set of manual steps to remove the portal application services, the database, the Cognos reports, and other parts of the deployment.

## Shapefile becomes corrupt when copied

When the shapefile is copied to the IBM Intelligent Operations Center database server, it can become corrupt.

## Cause

This problem occurs because the shape file consists of many files and can be large. This increases the possibility of corruption when the shapefile is copied to the IBM Intelligent Operations Center database server.



## Resolving the problem

To reduce the likelihood of corruption when the shapefile is copied, bundle the shapefile into a compressed file. This method reduces the size and decreases the likelihood of corruption of the file. If corruption then occurs, the process of extracting the file detects the issue.

## Base map does not display as expected

In the map portlets of the IBM Intelligent Transportation solution portal, the underlying base map does not display as expected.

### Symptoms

After you configure a supported geographical information system (GIS) map service and base map for the map portlets of the solution portal, the map does not display as expected. The base map settings that you entered on the map configuration panel are saved without error, but when you return to the map portlet view, at least one of the following symptoms occur:

- Pink colored rectangles are displayed instead of the map
- Server not found error is displayed
- Invalid URL error is displayed

This problem can occur in any of the following map portlets that are provided by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics:

- Current Traffic Conditions
- Traffic Conditions - Details
- Historical Traffic Conditions
- Transit Conditions

### Cause

This problem occurs when you enter an invalid URL in the **URL** field on the **Base Maps** settings tab of the map portlet configuration interface. The problem can also occur if the tile server that the URL is connecting to requires authentication. IBM Intelligent Transportation version 1.5 does not support connecting to a GIS tile service that requires authentication.

## Resolving the problem

To resolve the issue, ensure that you specify a valid base map URL of a supported GIS map service.

**Note:** For more information about which map server products and services are supported by the IBM Intelligent Transportation, see *GIS server requirements*

You can test that the base map URL is valid by pasting the URL into a browser and making a minor modification to the URL. If the URL is valid, the base map displays in the browser page. Use the following steps to validate your base map URL:

1. Start a browser session.
2. Copy and paste the base map URL into a browser address bar, for example:

```
http://map_service_URL/tile/{z}/{y}/{x}
```

where:

- *map\_service\_URL* is the URL of the GIS map service that hosts the tiles
- *tile* is the path to the tiles for the GIS map service
- *{z}* is the level
- *{y}* is the row

- $\{x\}$  is the column
3. Edit the URL and replace the  $\{/z\}/\{y\}/\{x\}$  part at the end of the URL with the correct tile numbers, for example:  
`http://map_service_URL/tile/0/0/0`

The base map is displayed in the browser. If a map does not display, check that the URL is correctly constructed and contains a valid GIS map tile server host name and path to the tiles.

#### Related concepts:

“GIS server requirements” on page 21

In addition to the underlying IBM Intelligent Operations Center, IBM Intelligent Transportation requires access to a geographic information system (GIS) base map server to display map-based information and to enable map-based interaction. IBM Intelligent Transportation V1.6 is designed to support Environmental Systems Research Institute's (Esri) ArcGIS Version 10.0. However, a service engagement can be used to enable alternative GIS applications.

#### Related tasks:

“Configuring the base map” on page 59

Before you can view the traffic or transit data in the user interface on a map, you must first configure a base map service. The base map service that you specify in your configuration must meet the minimum supported requirements of IBM Intelligent Transportation version 1.6.

#### Related information:

 [Esri ArcGIS Help 10.1](#)

## Incorrect language displayed when expanding base map layer selection control

The incorrect language might be displayed when you expand the base map layer selection control.

### Symptoms

Clicking the plus sign to expand the base map layer selection control can display an unrequired language. The unrequired language might be displayed even if the Traffic Awareness portal page opens in the correct language. The following workaround applies only if you are using Mozilla Firefox to access the solution interface.

### Resolving the problem

To resolve the issue in your Mozilla Firefox browser, complete the following steps:

1. Enter the following command in the address bar:  
`about:config`
2. Search for *general.useragent.locale*.
3. Change the associated value to the required language locale.

## Traffic predictions not working as expected

To troubleshoot issues that relate to traffic predictions not working as expected, configure the Traffic Prediction prediction interval to be divisible by the polling interval.

### Symptoms

The problem occurs when you run the Traffic Prediction feature with a prediction interval that is not divisible by the polling interval, for example, a prediction interval of 5 minutes and a polling interval of 4 minutes.

As a result, the outputted **WDAY** and **PERIOD** report values are inconsistent, and the Traffic Prediction feature returns incorrect mean and estimate values.

## Resolving the problem

Correct the inconsistencies in the historic data, and then calculate the mean and estimate values with the corrected data. Run the Traffic Prediction feature again, with a prediction interval that is divisible by the polling interval.

### Related concepts:

“Configuring and enabling Traffic Prediction” on page 274

The Configure and Enable Traffic Prediction portlet is an interactive window that contains options to enable traffic prediction and to configure data collection that is required for traffic prediction. The Traffic Prediction feature uses the traffic data collected by traffic subsystems to predict traffic for a specific time.

## Traffic prediction calculations are missing for some links



Ensure that traffic prediction calculations are processed for all links in IBM Intelligent Transportation by verifying that certain conditions are satisfied.

### Symptom

The traffic prediction calculations that are generated by the Traffic Prediction feature do not show prediction information for all the links that are in the subnet.

### Diagnosing the problem

Traffic prediction calculations have dependencies on estimate and means calculation. Estimate calculations generate weighted statistical IDs that are stored in the **Link\_Weights** table in the TPTOOL schema, whereas means calculations generate statistical IDs that are stored in the **Link\_Stats** table in the TPTOOL schema.

**Note:** For more information about the terms that are used, see the *Glossary* section and the help topics in each of the Traffic Prediction feature administration portlets in the WebSphere Portal interface.

Traffic prediction calculations for the required links are processed only when the following conditions are satisfied:

1. Subnet ID must be created and all the required links must be listed in the **Link\_Subnet** table.
2. Historic data for a minimum of two months must be available.
3. Real-time feeds must be available.
4. Traffic prediction relationship matrix must be generated to create link relationships for the subnet.
5. Means calculations must have populated speed and volume data for all the periods available for the required links. Check whether this condition is met by using the following instructions:
  - a. To check the **statistic\_id**, generated as a result of means calculations, check the **TPTOOL\_CONFIG** table for an entry against the category, for example, *MeanFR\_1*. To get the **statistic\_id** value from the **int\_value** column, run the following query:

```
SELECT * FROM TPTOOL.TPTOOL_CONFIG WHERE config_name = 'MeanFR_1'
```
  - b. To find the details of the means calculations generated in substep 5a, check the **TPTOOL.LINK\_STATS** table with the **statistic\_id**, for example *19*, retrieved from substep 5a with the following query:

```
SELECT * FROM TPTOOL.LINK_STATS WHERE statistic_id = 19
```
  - c. To check the number of means calculations that are available for each link, run the following query:

```
SELECT link_id, COUNT (period) FROM TPTOOL.LINK_STATS WHERE
statistic_id = 19 GROUP BY link_id
```

6. Estimate calculations must be processed for the required links. Traffic prediction is done only for the links present in the **Link\_Weights** table for a specific estimate calculation. Check if this condition is met by using the following instructions:
  - a. To check the **weight\_id** that is generated as a result of estimate calculations, check the **TPTOOL\_CONFIG** table for an entry against the category, for example, *PeakFR\_1*. To get the **weight\_id** value from the **int\_value** column, run the following query:

```
SELECT * FROM TPTOOL.TPTOOL_CONFIG WHERE config_name = 'PeakFR_1'
```
  - b. To find the details of the **weight\_id** that was generated in substep 6a, check the **TPTOOL.LINK\_WEIGHTS** table with the **weight\_id** retrieved from substep 6a with the following query:

```
SELECT * FROM TPTOOL.LINK_WEIGHTS WHERE weight_id = 2001
```
7. The **Link\_Subnet** and **Working\_Lk\_Subnet** tables must contain all the required links.

**Note:** If the estimation calculations generate the **weight\_id** for only a subset of the links in the **Working\_Lk\_Subnet** table, check the logs for `MissingDataExceptions`. The `MissingDataExceptions` can be identified in the trace statements of the `SystemErr.log` file or the `trace.log` file. The following log example indicates that there was insufficient data available for the particular link and that the prediction algorithm was unable to generate a **weight\_id** with the available data.

```
[4/20/12 2:33:44:460 EDT] 00000503 TPTLogger      1 com.ibm.tptool.bigmath.
formulas.EstimationFormula forecast
[12] NaN, NaN, NaN, NaN, NaN, NaN, NaN, NaN, NaN, NaN, NaN, NaN,
[4/20/12 2:33:44:460 EDT] 00000503 TPTLogger      1 com.ibm.tptool.bigmath.
formulas.EstimationFormula forecast
Not Estimating link: 70401627 NAN in result
[4/20/12 2:33:44:460 EDT] 00000503 SystemErr      R   Not Estimating link:
70401627 NAN in result
```

## Resolving the problem

Ensure that you go through the listed conditions to confirm that all the requirements are in place. After you complete the checks and resolve the issues, run the traffic prediction calculations again to get the required result.

### Related concepts:

“Configuring and enabling Traffic Prediction” on page 274

The Configure and Enable Traffic Prediction portlet is an interactive window that contains options to enable traffic prediction and to configure data collection that is required for traffic prediction. The Traffic Prediction feature uses the traffic data collected by traffic subsystems to predict traffic for a specific time.

## Some reports are slow to render in the solution portal

In the reports portlets of the IBM Intelligent Transportation solution interface, some of the graphical reports take at least 1 minute to be generated and displayed.

### Cause

Some reports can be slow to render if there are many links in the system and if there is a large amount of historical data.

## Resolving the problem

For some of the reports that are available in the reports portlets, you must wait at least 1 minute for the report to render in the solution portal.

## System messages of IBM Intelligent Transportation

Each message topic helps you to identify the cause of a particular error condition in IBM Intelligent Transportation and recommends actions to take to resolve the error.

To help you understand the errors that you might encounter, each message topic is divided into three sections: the message that is displayed in IBM Intelligent Transportation or its logs, an explanation, and an action.

### The message

Contains two identifiers, which are the error identification and associated text. The error identification is the message ID. It is a unique number that identifies a message. A final character of E indicates that the message resulted from an error, W indicates a warning message, and I indicates an information message.

### The explanation

Contains an additional explanation of the message.

### The user response

Suggests the corrective action for resolving the error.

To help you search for information about an error message, enter the ID number of the error message in the Search field in the information center.

**Note:** The topics contain only messages that are specific to IBM Intelligent Transportation. For all other messages, see the product documentation.

## Messages in IBM Intelligent Operations for Transportation

Use this section to get information about the critical messages of the IBM Intelligent Operations for Transportation component of IBM Intelligent Transportation.

### CIHIT : Messages in the Traffic Awareness feature

Use the message topics to understand and resolve the error conditions that are raised in messages for the Traffic Awareness feature of IBM Intelligent Operations for Transportation.

---

**CIHIT0078W Warning: Offset value not set in time stamp so the default UTC time zone is assumed. Check processing results for the data item.**

**Explanation:** The incoming time stamp for the data item does not specify the time zone offset information. The time zone offset information is optional, however, when there is no offset specified, the system defaults the time zone to Coordinated Universal Time. If

Coordinated Universal Time is not the correct time zone for the data item, then the data might be rejected or processed incorrectly by IBM Intelligent Transportation.

**User response:** After the TMDD data ingest is complete, check that the data item displays as expected. If the specified data must be set to a different time zone, add the offset to the data source and repeat the data ingestion into IBM Intelligent Transportation.

## Messages in IBM Intelligent Transit Analytics



Use this section to get information about the critical messages of the IBM Intelligent Transit Analytics component of IBM Intelligent Transportation.

### CIHTP : Messages in the IBM InfoSphere Streams application

Use the message topics to understand and resolve the error conditions that are raised in application messages.

---

**CIHTP0007E** The time stamp string for the field of {0} is not valid: {1} (The corresponding datedVehicleJourneyRef is {2}, the dataFrameRef is {3}).

**Explanation:** The timestamp field in the SIRI message does not follow the correct format. The field must follow the `xsd:dateTime` format of `YYYY-MM-DDThh:mm:ss[Z|(+|-)hh:mm]` where:

YYYY represents the year,

MM represents the month,

DD represents the day,

T represents the start of the required time section,

hh represents the hour,

mm represents the minute,

ss represents the second, and

Z|(+|-)hh:mm represents the time zone, which is optional. If Z|(+|-)hh:mm is omitted, the default is Z(UTC).

**User response:** Correct the timestamp field in the SIRI message to follow `xsd:dateTime` format.

---

**CIHTP0020E** Vehicle offset {0} out of range [{1},{2}] for the journey shape {3}.

**Explanation:** The offset of the journey shape is based on its first geospatial point. The entire real-time vehicle offset is calculated based on the vehicle location. The offset must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Otherwise, the error displays.

**User response:** Verify that the infrastructure data is correct. In particular, ensure that the offset value of each stop for the journey shape increases by the order of the stop.

---

**CIHTP0021E** Invalid update: decreasing offset(s) {0} for the vehicle {1}({2}).

**Explanation:** The error indicates that the vehicle is moving backwards.

**User response:** Ensure that the journey shape is defined correctly for the vehicle. To do so, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Otherwise, the vehicle moves backwards.

---

**CIHTP0022E** Invalid update: offset(s) {0} out of range for the vehicle {1}({2}).

**Explanation:** The error indicates that the location of the vehicle is out of the range per the relevant journey shape.

**User response:** Check that the journey shape is defined correctly for the vehicle. To do so, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Otherwise, the vehicle finishes its journey, but still moves forward.

---

**CIHTP0026E** Mismatched journey shape for the journey pattern {0} : points({1}), shape size({2}).

**Explanation:** The error indicates that the number of the geospatial points that consist of the shape is different from the size of the generated shape.

**User response:** Check that no duplicated points are provided when you generate the shape. Ensure that the corresponding CSV files that are used to import the infrastructure data do not contain duplicated points. In addition, you can refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0029E** SIRI message indicates the vehicle {0}({1}) was at stop, but no bus stop nearby (the nearest stop {2} is far from {3} meters).

**Explanation:** The error indicates that the vehicle was at stop according to the SIRI message, but there is no bus stop found nearby.

**User response:** Check that the relevant journey shape is correct. To do so, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset (calculated based on the vehicle location) must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Otherwise, the SIRI message is correct.

---

**CIHTP0030E** The journey pattern {0} does not have stops defined.

**Explanation:** The error indicates that no stops are defined for the journey pattern.

**User response:** Correct the journey pattern to include all of the needed stops. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0033E** There are no stop links existing between {0} and {1}.

**Explanation:** The error indicates that there are no stops links defined between two stops.

**User response:** Correct the infrastructure data to include the required stop links. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0034E** The dated vehicle journey {0} has a different stop list with the relevant journey pattern {1}.

**Explanation:** The error indicates that the stops for the dated vehicle journey are different from the stop list in the underlying journey pattern.

**User response:** Correct the production timetable information for the dated vehicle journey to match the stop list of the underlying journey pattern. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0035E** The stop {0} of the dated vehicle journey {1} does not have the aimed arrival time in the production timetable.

**Explanation:** The error indicates that the stop {0} of the dated vehicle journey {1} does not have the aimed arrival time.

**User response:** Correct the production timetable information for the dated vehicle journey to include the missing aimed arrival time for the stop. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0036E** The stop {0} of the dated vehicle journey {1} does not have the aimed departure time in the production timetable.

**Explanation:** The error indicates that the stop {0} of the dated vehicle journey {1} does not have the aimed departure time.

**User response:** Correct the production timetable information for the dated vehicle journey to include the missing aimed departure time for the stop. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0037E** There are no route links defined for the stop link {0} ({1}->{2}).

**Explanation:** The error indicates that the route links relevant to the stop link are not defined.

**User response:** Correct the infrastructure data to include the route links for the relevant stop link. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0038E** Can not get the coordinate information for the stop {0}.

**Explanation:** The error indicates that the coordinate information of the stop cannot be found.

**User response:** Correct the production timetable information for the dated vehicle journey to include the missing aimed departure time for the stop. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0039E** Can not get the detail information of the stop link {0}.

**Explanation:** The error indicates that the detail information of the stop link cannot be found.

**User response:** Correct the infrastructure data to include the detail information of the stop link. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0040E** Can not get the coordinate information for the point {0}.

**Explanation:** The error indicates that the coordinate information of the point cannot be found.

**User response:** Correct the infrastructure data to include the coordinate information of the point. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0041E** Can not get the stop links for the journey shape {0}.

**Explanation:** The error indicates that the stop links that consist of the journey shape cannot be found in the database.

**User response:** The error is a known internal issue. Contact IBM product support for further help.

---

**CIHTP0054E** The vehicle {0}({1}) is off route (its distance to the route is far from {2} meters).

**Explanation:** The error indicates that the vehicle is offset per the distance criteria.

**User response:** Check that the journey shape is correct. To do so, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Otherwise, the vehicle is off route.

---

**CIHTP0055E** The data of the production timetable on the date of {0} is not available.

**Explanation:** The error indicates that the data of the production timetable on the specific date is not available.

**User response:** Ensure that the production timetable information is imported into the database before the scheduled time. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0056E** The production timetable for the dated vehicle journey {0} on the date of {1} contains less than 2 dated calls.

**Explanation:** The error indicates that the schedule information of the start or end stop is missing in the production timetable for the dated vehicle journey.

**User response:** Ensure that the production timetable information is correct. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0057E** Invalid update: decreasing offset(s) {0} against the previous offset {1} for the vehicle {2}({3}).

**Explanation:** The error indicates that the vehicle is moving backwards.

**User response:** Check that the journey shape is defined correctly for the vehicle. To do so, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Otherwise, the vehicle is moving backwards.

---

**CIHTP0060E** Invalid milestones: number of milestones of shape version id ({0}) is {1} (less than 2).

**Explanation:** The error indicates that the number of milestones of journey shape is less than 2.

**User response:** Check that the production timetable contains the correct information and the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0061E** Invalid milestones: bus stop(s) out of range (shape version id={0}, offset of last bus stop ={1}, offset of last milestone={2}).

**Explanation:** The error indicates that the offset of the last bus stop is out of the offset of the last milestone.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0062E** Invalid milestones: negative offset(s) for shape version id {0} (offset of first milestone={1}).

**Explanation:** The error indicates that the offset of the first milestone is negative.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To check that the journey shape is generated correctly, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0063E** Invalid milestones: decreasing offset(s) (shape version id={0}, offset[{1}]=3, offset[{2}]=4).

**Explanation:** The error indicates that the offset of next milestone is less than that of the previous one.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

---

**CIHTP0064E** Invalid milestones: incompatible with history (shape version id={0}, length of historical trajectories={1}, number of milestones={2}).

**Explanation:** The error indicates that the number of



milestones is incompatible with history data.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

**CIHTP0070E Invalid bus stops: number of bus stops of shape version id ({0}) is {1} (less than 2).**

**Explanation:** The error indicates that the number of bus stops of the journey shape is less than 2.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

**CIHTP0071E Invalid bus stops: bus stop(s) out of range (shape version id={0}, offset of last bus stop ={1}, offset of last milestone={2}).**

**Explanation:** The error indicates that the offset of last bus stop is out of the offset of last milestone.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool. Refer to the troubleshooting sections of the offline data import tool.

**CIHTP0072E Invalid bus stops: negative offset(s) for shape version id {0} (offset of first bus stop={1}).**

**Explanation:** The error indicates that the offset of first bus stop is negative.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time

vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

**CIHTP0073E Invalid bus stops: decreasing offset(s) (shape version id={0}, offset[{1}]= {3}, offset[{2}]= {4}).**

**Explanation:** The error indicates that the offset of next stop is less than that of the previous one.

**User response:** Check that the production timetable contains the correct information and that the journey shape is generated correctly. To do the latter, ensure that the offset of the journey shape is based on its first geospatial point. In addition, the entire real-time vehicle offset, which is calculated based on the vehicle location, must not be greater than the offset of the last stop point on the shape, or less than the offset of the first stop point. Refer to the troubleshooting sections of the offline data import tool.

**CIHTP0080E Invalid history: incompatible with milestones (shape version id={0}, history buffer size={1}, length of historical trajectory={2}, number of milestones={3}).**

**Explanation:** The error indicates that the history data is incompatible with the number of the milestones.

**User response:** Correct the journey history data to have the compatible milestone that is associated with it. Contact IBM product support for further help with this issue.

**CIHTP0081E Invalid history: milestones size of shape version id ({0}) is {2} (less than 2), history buffer size={1}.**

**Explanation:** The error indicates that the number of the milestones linked to history data is less than 2.

**User response:** Correct the journey history data to associate the compatible milestones. Contact IBM product support for further help with this issue.

**CIHTP0083E Invalid history: incompatible with previous trajectories (shape version id={0}, history buffer size={1}, length of new trajectory={2}, length of previous trajectories={3}).**

**Explanation:** The error indicates that the new added history data for the journey shape is incompatible with the existing data; that is, the milestone number is different.

**User response:** Correct the journey history data to be compatible with the existing data. Contact IBM product support for further help with this issue.

---

**CIHTP0102E Failed to refresh the journey patterns according to the production timetable (date {0}).**

**Explanation:** The error indicates that the refresh of the journey patterns failed.

**User response:** The cause of the problem is an internal error. To resolve this issue, contact IBM product support.

---

**CIHTP0103E Failed to construct the shape for the journey pattern {0} (dated vehicle journey {1}).**

**Explanation:** The error indicates that the journey shape cannot be constructed for the dated vehicle journey.

**User response:** Ensure that the infrastructure data and production timetable is correct. Refer to the troubleshooting sections of the offline data import tool.

## CIHVP : Messages in the REST service and WebSphere application server



Use the message topics to understand and resolve the error conditions that are raised in Rest Service and WebSphere Application Server messages.

---

**CIHVP0000E No user name was specified.**

**Explanation:** The outbound rest service cannot get the authorized user information from the session. The error might be caused by an expired session.

**User response:** Log in again and start the rest service.

---

**CIHVP0002E Too many requests.**

**Explanation:** The outbound rest service cannot handle the current request. The error might be caused by overly frequent calling of the outbound rest service, which makes the server busy.

**User response:** Wait for some time and start the rest service.

---

**CIHVP0003E Database connection failed.**

**Explanation:** The outbound rest service cannot establish the connection to the database. The error might be caused by an inaccessible database, or an incorrect database configuration in the portal server.

**User response:** Ensure that the database is accessible from the portal server, and start the rest service.

---

**CIHVP0005E Failed to parse incoming vehicle monitoring request.**

**Explanation:** The outbound rest service parses the incoming vehicle monitoring request according to the SIRI XSD definition. The error might be caused by the incoming vehicle monitoring request violating the SIRI XSD definition.

**User response:** Correct the incoming vehicle monitoring request to follow the SIRI XSD definition.

---

**CIHVP0006E Failed to parse incoming stop monitoring request.**

**Explanation:** The outbound rest service parses the incoming stop monitoring request according to the SIRI XSD definition. The error can be caused if the incoming stop monitoring request violates the SIRI XSD definition.

**User response:** Correct the incoming stop monitoring request to follow the SIRI XSD standard and try again. You can check details of parsing failure in the SystemOut.log file in WebSphere Portal Server. From the root directory, click **opt > IBM > WebSphere > wp\_profile1 > logs > WebSphere\_Portal > SystemOut.log**.

---

**CIHVP0007E Internal error occurred.**

**Explanation:** The error relates to the outbound rest service response.

**User response:** Check the outbound rest service log for details, which is in portal server log. From the root directory, click **opt > IBM > WebSphere > wp\_profile1 > logs > WebSphere\_Portal > SystemOut.log**.

---

**CIHVP0010E Error occurred when generating SIRI XML: "{0}".**

**Explanation:** An error occurs when generating the outbound SIRI messages. {0} indicates the detailed error. The message might be caused by an error that occurs in connecting to the database, an error in executing the stored procedure to generate outbound SIRI messages, or an I/O issue.

**User response:** Investigate each possible explanation for the issue {0} until it is solved, and start the rest service.

---

**CIHVP1001E Access denied for cache directory "{0}".**

**Explanation:** The WebSphere Application Server cannot read or write to the cache directory {0}. The error is caused by the user privilege of the file system not being set correctly.

**User response:** Ensure that you can read and write the cache directory {0} by checking the privileges.

---

**CIHVP1003E Invalid chunk.**

**Explanation:** The WebSphere Application Server cannot parse the chunked message body in the incoming vehicle monitoring messages. The error might be caused by the message body not being chunked correctly in the server, or a network issue.

**User response:** Ensure that the message bodies are chunked correctly, and that the network is stable.

---

**CIHVP1012E Failed to cache messages to file "{0}".**

**Explanation:** When the cache function is turned on, the WebSphere Application Server caches the incoming vehicle monitoring SIRI messages if it loses its connection to the InfoSphere Streams. The WebSphere Application Server resends the messages the next time that it establishes the connection to the InfoSphere Streams server. The error indicates that the WebSphere Application Server fails to cache the vehicle monitoring messages to file {0}. The error might be caused by an I/O issue while the system writes to the file.

**User response:** Ensure that the file system does not have an I/O issue.

---

**CIHVP1013E Failed to establish server connection "{0}":"{1}".**

**Explanation:** The WebSphere Application Server cannot establish a connection to the InfoSphere Streams with IP address {0} on port {1}. The error might be caused by the stream server not starting, or a network issue between the WebSphere Application Server and the InfoSphere Streams.

**User response:** Ensure that the InfoSphere Streams works correctly and is accessible from the WebSphere Application Server.

---

**CIHVP1014E Failed to send out messages to stream server.**

**Explanation:** An error occurs when the WebSphere

## CIHVP : Messages in the Vehicle Awareness and Prediction offline utility



Use the message topics to understand and resolve the error conditions that are raised in the offline administration utility of the Vehicle Awareness and Prediction feature.

Application Server sends vehicle monitoring messages to the InfoSphere Streams. The error might be caused by a network issue, such as connection loss.

**User response:** Ensure that the network is stable and that the InfoSphere Streams is accessible from the WebSphere Application Server.

---

**CIHVP1015E Failed to get the input stream.**

**Explanation:** An error occurs when the system parses the incoming vehicle monitoring messages in the WebSphere Application Server. The error might be caused by I/O exceptions between the customer SIRI server and the WebSphere Application Server.

**User response:** Check that the network is stable between the customer SIRI server and the WebSphere Application Server, and ensure that the customer SIRI server sends messages successfully. The issue is an internal error; for further assistance, you can contact IBM support.

---

**CIHVP0017E Error occurred when closing the server connection: "{0}".**

**Explanation:** The WebSphere Portal Server cannot close the InfoSphere Streams connection successfully. {0} indicates the detailed reason. The error might be caused by an I/O exception between the WebSphere Portal Server and the InfoSphere Streams.

**User response:** Ensure that the network is stable between the WebSphere Portal Server and the InfoSphere Streams. Follow the detailed information indicated in {0}.

---

**CIHVP1018E Error occurred when sending heart beat to subscription manager on host "{0}" port "{1}":"{2}".**

**Explanation:** The WebSphere Application Server sends a heart beat to the subscription manager on host {0} port {1};{2} indicates the detailed error content. The errors might be caused by either the subscription manager not running correctly, or an I/O exception that occurs when connecting to the subscription manager.

**User response:** Ensure that the subscription manager started successfully on the specified host and the port is accessible. Note that in an HA environment the subscription manager may be running on a different machine.

---

**CIHVP2000E Not valid XML date and time format.**

**Explanation:** The system cannot parse an XML element if the data is not in the correct format.

**User response:** Check the date and time format, which must follow the `xsd:dateTime` specification. If necessary, change your data format to one of the following correctly specified examples:

2004-04-12T13:20:00  
 2004-04-12T13:20:15.5  
 2004-04-12T13:20:00-05:00  
 2004-04-12T13:20:00Z  
 13:20:00  
 13:20:15.5  
 13:20:00-05:00  
 13:20:00Z

---

**CIHVP2001E Exception thrown when closing FieldStream.**

**Explanation:** An exception is thrown when the system closes the reading of a CSV file.

**User response:** When the exception is thrown, the message displays detailed information that includes the file name. Because the error can occur for all CSV files that are loaded, the file name is determined in run time and is not fixed.

---

**CIHVP2002W Warning: Length of the string exceeds the maximum 1024 characters permitted. The string must be truncated to meet this requirement.**

**Explanation:** The system supports a string length of up to 1024 characters. It truncates any part longer than 1024 characters.

**User response:** Ensure that the string in XML files and CSV files is equal to or less than 1024 characters.

---

**CIHVP2003E Error in parsing field, not valid Integer format.**

**Explanation:** When the system parses the string argument as a signed integer, an exception is thrown if the string does not contain a parsable integer.

**User response:** Ensure that the characters in the string are all decimal digits, except for the first character, which can be an ASCII minus sign '-' ('\u002D') to indicate a negative value. This way, the resulting integer value is returned exactly as if the argument and the radix 10 were given as arguments to the `parseInt(java.lang.String, int)` method.

---

**CIHVP2004E Error in parsing field, not valid Long format.**

**Explanation:** When the system parses the string argument as a signed decimal long, an exception is thrown if the string does not contain a parsable long value.

**User response:** Ensure that the characters in the string are all decimal digits, except for the first character, which can be an ASCII minus sign '-' ('\u002D') to indicate a negative value. This way, the resulting long value is returned exactly as if the argument and the radix 10 were given as arguments to the `parseLong(java.lang.String, int)` method. The character L ('\u004C') and the character I ('\u006C') must not display at the end of the string as a type indicator, unlike the Java programming language source code.

---

**CIHVP2005E Error in parsing field, not valid Double format.**

**Explanation:** When parsing the string argument as a signed decimal double, an exception is thrown if the string does not contain a parsable double.

**User response:** Check whether the characters in the string are a parsable double.

---

**CIHVP2006E Error in parsing field, not valid Boolean format.**

**Explanation:** An exception is thrown if the string is null, or is not equal to the string "true" or "false", ignoring the string case.

**User response:** Correct the string to be "true" or "false", ignoring the string case.

---

**CIHVP2007E Error in parsing field, not valid DateTime format.**

**Explanation:** The system cannot parse an XML element because it does not follow the correct data type format, `xsd:dateTime`.

**User response:** Ensure that the data format follows `xsd:dateTime` specification. If necessary, change your data format to one of the following correctly specified examples:

2004-04-12T13:20:00  
 2004-04-12T13:20:15.5  
 2004-04-12T13:20:00-05:00  
 2004-04-12T13:20:00Z  
 13:20:00  
 13:20:15.5  
 13:20:00-05:00

13:20:00Z

---

**CIHVP2008E Unexpected token is found.**

**Explanation:** The system cannot parse the CSV format file.

**User response:** Ensure that the CSV file follows the specification. For information about the CSV format, you can reference the RFC specification at the following URL: <http://www.ietf.org/rfc/rfc4180.txt>.

---

**CIHVP2009E Error occurred while parsing.**

**Explanation:** When parsing CSV file, the system cannot find content as expected.

**User response:** Ensure that the CSV file follows the specification. For information about the CSV format, you can reference the RFC specification at the following URL: <http://www.ietf.org/rfc/rfc4180.txt>.

---

**CIHVP2010I Database connection was successful.**

**Explanation:** The information is logged when the utility establishes a connection to the database.

**User response:** You do not have to respond to this message.

---

**CIHVP2011E Failed to connect to database.**

**Explanation:** The utility cannot establish connection to the database.

**User response:** Ensure that all database connection parameters are set correctly, including host, port, user, password, as well as the network status and database status.

---

**CIHVP2012E DB2 JDBC driver is not found.**

**Explanation:** When connecting to the database, the database driver cannot be found.

**User response:** Ensure that the database driver location is correct; for example, the location for the 1.5 release is db2jcc4.jar version 9.7. In addition, ensure that the Java class path is configured to include the database driver location.

---

**CIHVP2013E DB2 JDBC driver getConnection API failed.**

**Explanation:** An exception is thrown when connecting to the database.

**User response:** Refer to the detailed log information.

---

**CIHVP2019E Write to Transmodel.Route table failed.**

**Explanation:** An exception is thrown when writing data to the database table, Transmodel.Route.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2020E Write to Transmodel.Line table failed.**

**Explanation:** An exception is thrown when the system performs a query to the database table, Transmodel.Line.

**User response:** Refer to the detailed log information.

---

**CIHVP2021E Write to Transmodel.Line table failed.**

**Explanation:** An exception is thrown when writing data to the database table, Transmodel.Line.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2022E Write to Transmodel.RouteLink table failed.**

**Explanation:** An exception is thrown when writing data to database table, Transmodel.RouteLink.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2023E Write to Transmodel.Point table failed.**

**Explanation:** An exception is thrown when writing data to database table, Transmodel.Point.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2024E Incorrect file format.**

**Explanation:** When the system is reading data from the Route file (CSV format), an error occurs if the file format does not follow the specification.

**User response:** Check whether each line in the Route file consists of the following five fields: <Route\_extID>, <Route\_Name>, <Direction>, <LineID>, and <LineName>.

---

**CIHVP2025E Failed to get complete route information from file.**

**Explanation:** An exception is thrown when the system opens or reads a file.

**User response:** Check whether there is file system I/O error; for example, the file does not exist, incorrect access privilege, and so on.

---

**CIHVP2026E Failed to get complete route information from database.**

**Explanation:** An exception is thrown when reading data from database.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2027E Failed to get mapping between route extID and journey pattern id from database.**

**Explanation:** An exception is thrown when reading data from database.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2029E Not valid Double format for field Longitude or Latitude.**

**Explanation:** When the system parses a string argument as a signed decimal double, an exception is thrown if the string does not contain a parsable double.

**User response:** Check whether the characters in the string are a parsable double.

---

**CIHVP2030E Failed to access route shape file.**

**Explanation:** An exception is thrown when the system opens or reads the route shapefile.

**User response:** Check whether there is file system I/O error; for example, the file does not exist, or incorrect access privilege.

---

**CIHVP2031E Failed to access Transmodel.RouteLinkInLinkSequence table.**

**Explanation:** An exception is thrown when the system runs a query from the database table, Transmodel.RouteLinkInLinkSequence.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2032E Failed to write to Transmodel.RouteLinkInLinkSequence table.**

**Explanation:** An exception is thrown when the system writes data into the database table, Transmodel.RouteLinkInLinkSequence.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2033E Failed to access Transmodel.stopPointOnRoute table.**

**Explanation:** An exception is thrown when the system runs a query from the database table Transmodel.stopPointOnRoute.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2036E Failed to write to Transmodel.StopPointOnRoute table.**

**Explanation:** An exception is thrown when the system writes data into the database table, Transmodel.StopPointOnRoute.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2038E Exception thrown when executing SQL operations. Check the database or XML file against the XSD file.**

**Explanation:** An error occurs when the system writes confidence level data to the database.

**User response:** Check the database status and the XML file to ensure that they follow the schema.

---

**CIHVP2039E Confidence level mapping XML file not found.**

**Explanation:** The system cannot find the confidence level XML file.

**User response:** Refer to the detailed log information, and check file system for the location and access privilege of the file.

---

**CIHVP2040E Exception thrown when executing SQL operations.**

**Explanation:** The system throws an exception when the system runs SQL operations.

**User response:** Check the detailed exception message for more information.

---

**CIHVP2041E Valid duration should not be negative.**

**Explanation:** The duration is negative.

**User response:** Ensure that the duration is a non-negative integer number.

---

**CIHVP2042E Valid duration should be a number.**

**Explanation:** The duration is not in number format.

**User response:** Ensure that the duration is a non-negative integer number.

---

**CIHVP2043E Not a valid CRUD Indicator.**

**Explanation:** The CRUD indicator in CSV file is not valid.

**User response:** Ensure that the CRUD indicators in the CSV file are valid; that is, "A", "U", "D", ignoring case.

---

**CIHVP2044E Delete reference check failed.**

**Explanation:** If a record is deleted, the system runs a reference check to ensure that no other record, in the database or in the CSV files, contains a reference to the deleted record. If the check fails, the deletion operation does not run.

**User response:** Check the detailed log information for records that have a reference to the deleted record. You must delete the records that contain a reference.

---

**CIHVP2045E Exception thrown when executing SQL query.**

**Explanation:** The exception is thrown when the system runs an SQL query operation.

**User response:** Refer to the detailed log message.

---

**CIHVP2046E AUD field is not set.**

**Explanation:** When a CRUD action is being applied to a record, the record must include one AUD indicator at the beginning of the CSV file; that is, "A", "U" or "D", ignoring case.

**User response:** Check the relevant CSV file and rectify accordingly.

---

**CIHVP2047E Missing ID field.**

**Explanation:** Each record must be referred to by a unique ID, which is normally the field immediately following the AUD field. An error is reported when the Unique ID field is missed.

**User response:** Refer to CSV file specification and rectify the relevant file with a Unique ID field.

---

**CIHVP2048E Exception thrown when cloning DataRecord instance.**

**Explanation:** The object clone operation failed.

**User response:** The exception is a known internal error which you can report as a defect.

---

**CIHVP2049E Multiple AUD actions found for the same record.**

**Explanation:** An error occurs when at least one record is applied to more than one AUD operation in the same batch.

**User response:** Ensure that one CRUD operation at most is applied to the same record. For example, you cannot specify "A" and "D" as the same ID in the same CSV file. In such cases, you can start another loading process after the current loading is finished.

---

**CIHVP2050E Duplicated record found in DB.**

**Explanation:** A record must have a unique ID. When the system adds a new record, the Data Load Utility queries the database table to ensure that there are no records with the same ID. The error occurs when a duplicated record is found.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2051E Addition of record failed.**

**Explanation:** The addition of a record fails because of errors in the CSV file, or because the validity check fails.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2052E Not valid update, ID cannot be found in DB.**

**Explanation:** To update a record, the Data Load Utility checks to ensure that the record referred by the unique ID exists in the database. This error occurs when the check fails.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2053E Update of record failed.**

**Explanation:** The update of a record fails caused by errors in the CSV file, or a validity check failure.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2054E Not valid delete, reference cannot be found in DB.**

**Explanation:** To delete a record from the database, the Data Load Utility queries the database for the record by its ID. The error occurs when this check fails.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2055E Deletion of record failed.**

**Explanation:** The deletion of the record fails because of errors in the CSV file, or validity check failure.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2056E Record is referenced and cannot be deleted.**

**Explanation:** The record to be deleted is actively referenced by other records.

**User response:** Check the detailed log information and rectify the CSV file accordingly.

---

**CIHVP2057E Production timetable for this date is already loaded into the database. Use force mode to update it.**

**Explanation:** When loading the production timetable for a given day, the system finds that production timetable data exists in database for the same date.

**User response:** Use force mode to load the production timetable. Note that the system clears the existing production timetable data for the date, before loading the latest production timetable.

---

**CIHVP2058E Record loading failed.**

**Explanation:** The loading of one record fails.

**User response:** Refer to the detailed log information and rectify the data.

---

**CIHVP2059E Not a valid file.**

**Explanation:** The file to be accessed is not valid.

**User response:** Check the file system and the file content to ensure their validity.

---

**CIHVP2060E XML parsing error.**

**Explanation:** Errors occur when parsing the XML file.

**User response:** Rectify XML file to conform to the schema.

---

**CIHVP2061E Exception thrown when importing production timetable file.**

**Explanation:** The error occurs after XML is parsed, but fails the validity check.

**User response:** Refer to the detailed log information and rectify the XML file accordingly.

---

**CIHVP2064E Reference not found.**

**Explanation:** A reference of the record, specified by ID, is not found.

**User response:** Refer to the detailed log information and rectify the data accordingly.

---

**CIHVP2065E Not valid relationship between two records.**

**Explanation:** The error occurs when a relationship breaks between two records. For example, a journey pattern might have a reference to a route, and service and route both have references to a line. In such cases, the journey pattern and the service must refer to the same line.

**User response:** Refer to the detailed log information and rectify the data accordingly.

---

**CIHVP2066E Required XML element does not exist.**

**Explanation:** A required XML element is missing in the production timetable file.

**User response:** Refer to the detailed log information and rectify the data based on the specification and schema.

---

**CIHVP2067W Warning: Arrival time falls out of operating time of stop.**

**Explanation:** An arrival time in the production timetable file is falling out of the range of the stop operation time. Ideally, the arrival time at a stop must fall within the range of the stop opening and closing times.

**User response:** Check the stop data in the production timetable file and rectify accordingly.

---

**CIHVP2068E Errors in loading XML element.**

**Explanation:** The error occurs if any validity checking fails.

**User response:** Refer to the detailed log information and rectify the XML file accordingly.

---

**CIHVP2069E Required fields are missing.**

**Explanation:** At least one of the mandatory fields for the specified AUD action is missing.

**User response:** Refer to the detailed log information and rectify the data accordingly.

---

**CIHVP2070E Not valid field value.**

**Explanation:** For certain fields only specified values are acceptable. The error occurs when an invalid value is added to a field.

**User response:** Refer to the detailed log information and rectify the data accordingly.

---



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**CIHVP2071E Not valid email format.**

**Explanation:** The email address is in wrong format because the at sign “@” is missing.

**User response:** Rectify the address accordingly.

---

**CIHVP2072E Require at least one field set to update.**

**Explanation:** To update a record, you must set at least one of the applicable fields.

**User response:** Ensure that an applicable field is set.

---

**CIHVP2073E AUD value is not supported for this record.**

**Explanation:** The AUD action is not supported for this type of record. For example, the records, specifiedstoplink.csv and groupoperatormapping.csv, cannot be updated because only addition and deletion are allowed.

**User response:** Rectify the data accordingly.

---

**CIHVP2074E Update of field not allowed.**

**Explanation:** You cannot update certain fields. For example, the routeld in journeypattern.csv is not allowed to be updated.

**User response:** Rectify the data accordingly.

---

**CIHVP2075E Points in stop link shape are duplicated.**

**Explanation:** The points that form a stop link shape must be distinctive. The error occurs if two points are overlapped or too close.

**User response:** Ensure that the points that form a stop link shape are distinctive.

---

**CIHVP2076E Point Coordinates fall out of the bounding box.**

**Explanation:** A point must fall within a predefined bounding box. By default, longitude must be in [-180,180], latitude must be in [-90,90]. The failure of this check reports this error.

**User response:** Ensure that the point coordinates fall within a predefined bounding box.

---

**CIHVP2077E Not valid stop link shape: at least 2 points should be provided.**

**Explanation:** At least 2 points must be provided for a stop link shape. The error occurs if a 0 or 1 point is specified for the stop link shape.

**User response:** Ensure that at least 2 points are provided for a stop link shape.

---

**CIHVP2078E Multiple default stop links exist between two stops.**

**Explanation:** There can be multiple stop links between stops. However, only one must be the default stop link, otherwise the error occurs.

**User response:** Ensure that there is only one default stop link between stops.

---

**CIHVP2081W Warning: coordinates updating failed (the updated point is more than 10 meters from the original point), please consider adding a new point instead.**

**Explanation:** The coordinates of a stop point can be updated, but must not change the order of stops in the stop link. Otherwise, the data integrity breaks and incurs an error. The system checks that the updated point location is not more than 10 meters away from the original location. If the test fails, the warning occurs.

**User response:** Consider adding a new point between the original and the updated point.

---

**CIHVP2082E Shape type is not supported.**

**Explanation:** The shape type defined in ESRI file is not supported. Only subtypes of GEOMETRY are supported.

**User response:** Change the shape type to a subtype of GEOMETRY.

---

**CIHVP2083E Not valid shape file.**

**Explanation:** The shapefile is not a valid ESRI file.

**User response:** Change the shapefile to a valid ESRI file.

---

**CIHVP2085E Unexpected end of file.**

**Explanation:** The system reaches the end of the file when more content is expected.

**User response:** Ensure that you have included all content in the file.

---

**CIHVP2086W Bounding Box was not provided so the default bounding box was used. Provide a bounding box file so that the validity of data can be checked before the import.**

**Explanation:** The warning occurs if the boundingbox.csv is not provided.

**User response:** Provide a bounding box file so that data validity can be checked before importing. Otherwise, the system uses the default bounding box, longitude in [-180, 180], latitude in [-90,90].

---

**CIHVP2088E The database host, port, and user, must be specified in the configuration file.**

**Explanation:** One of the required fields in the configuration file is not provided.

**User response:** Set the database host, port, and user in property file.

---

**CIHVP2089E Cannot establish connection to DB.**

**Explanation:** The system cannot connect to the database.

**User response:** Check the database configuration in the property file, as well as the database status and network status.

---

**CIHVP2090E Database Password must be provided.**

**Explanation:** The database password is not provided.

**User response:** Specify the database password in the argument following “-w” when running `vap_loader.sh`.

---

**CIHVP2093E Exception thrown when connecting to DB.**

**Explanation:** Unexpected errors occur when connecting to the database.

**User response:** Refer to the detailed log information and take the corresponding action.

---

**CIHVP2096E Exception thrown when clearing DB table.**

**Explanation:** The error occurs when clearing the database table.

**User response:** Refer to the detailed log information and take the corresponding action.

---

**CIHVP2097E Error parsing arguments.**

**Explanation:** Errors occur when parsing arguments to start the utility.

**User response:** Refer to the detailed log information and rectify the arguments.

---

**CIHVP2098W Warning: default value is used.**

**Explanation:** The warning occurs if a required value is not provided.

**User response:** Provide the necessary required value if possible. Otherwise, the system provides a predefined default value.

---



---

**CIHVP2099E Could not delete temp file.**

**Explanation:** The temporary file generated during the process cannot be deleted.

**User response:** Manually delete the file to free up space.

---

**CIHVP2100E Could not create temp file.**

**Explanation:** Temporary file cannot be created.

**User response:** Refer to the detailed log information and check the file system.

---

**CIHVP2103E Unknown argument.**

**Explanation:** The argument specified with the program is unknown.

**User response:** Refer to the usage and rectify the arguments.

---

**CIHVP2109E Error occurred when converting shapefile.**

**Explanation:** The error occurs when converting the shapefile.

**User response:** Check the detailed log information and take the corresponding action.

---

**CIHVP2114E Failed to import confidence level.**

**Explanation:** The error occurs when importing the confidence level.

**User response:** Check the detailed log information and take the corresponding action.

---

**CIHVP2117E Failed to configure valid duration.**

**Explanation:** The error occurs when setting the duration.

**User response:** Check the detailed log information and take the corresponding action.

---

**CIHVP2119E Error happened during storing data to DB, some data was possibly written to DB. Enable force mode to begin loading again.**

**Explanation:** Unexpected errors occur in stage 2 of loading the infrastructure data. For example, the database connection might be lost, or a system peak might have happened. In such cases, the system might have written some data to the database, and not have written other data to the database. Therefore, the data integrity cannot be guaranteed.

**User response:** Check the system status first. To reload the data, which writes all the data to the database, you

can use force mode with `-f` argument when running `vap_loader.sh`.

---

**CIHVP2121E Exception thrown when disconnecting from DB.**

**Explanation:** An unexpected error occurs when disconnecting from the database.

**User response:** Check the detailed log information and take corresponding action.

---

**CIHVP2123E Unexpected exception thrown.**

**Explanation:** Unexpected error occurred.

**User response:** Check the detailed log information and take corresponding action.

---

**CIHVP2124E Not valid StopLinkId COLUMN.**

**Explanation:** When converting the ESRI file to the IBM stop link shapefile, the StopLinkId column is not the same as the specified column, following the `-n` argument when running `vap_loader.sh`.

**User response:** Specify the correct column name for StopLinkId.

---

**CIHVP2125E Not valid GEO COLUMN.**

**Explanation:** The geo column in the ESRI file is not specified.

**User response:** Rectify the ESRI file used for the conversion.

---

**CIHVP2126E Error occurred, length of WKT exceed 8k.**

**Explanation:** The length of the WKT exceeds 8000.

**User response:** Rectify the ESRI file used for the conversion.

---

**CIHVP2127E Exception thrown when exporting shape from DB.**

**Explanation:** Errors occur when exporting the shape from the database.

**User response:** Refer to the detailed log information and rectify the ESRI file used for the conversion.

---

**CIHVP2135E Data check failed.**

**Explanation:** The stage 1 of loading infrastructure data fails.

**User response:** Refer to the detailed log information and rectify the data accordingly.

---

**CIHVP2141E No production timetable files were found in the folder.**

**Explanation:** No production timetable files are found in the folder. At least one production timetable file must be located in the specified folder that follows the naming convention, `<yyyy-MM-dd><*>productiontimetable.xml`.

**User response:** Check the folder and name of files.

---

**CIHVP2146E Exception thrown when parsing XML file.**

**Explanation:** Errors occur when parsing the XML file.

**User response:** Refer to the detailed log information and rectify the data.

---

**CIHVP2147E No DatedVehicleJourney in SIRI XML file.**

**Explanation:** The DatedVehicleJourney element is not found in the production timetable XML file.

**User response:** Check the production timetable XML file and rectify the data.

---

**CIHVP2148E Not valid. Production Timetable:DatedVehicleJourney/ DatedVehicleJourneyCode does not exist.**

**Explanation:** The following XML element is missing: DatedVehicleJourneyCode in DatedVehicleJourney.

**User response:** Check the production timetable XML file and rectify the data.

---

**CIHVP2149E Not valid. Production Timetable:DatedVehicleJourney/ DatedCalls does not exist.**

**Explanation:** The production timetable XML element is missing: DatedCalls in DatedVehicleJourney.

**User response:** Check the production timetable XML file and rectify the data.

---

**CIHVP2150E Not valid. Production Timetable:DatedCalls/DatedCall does not exist.**

**Explanation:** The production timetable XML element is missing: DatedCall in DatedCalls.

**User response:** Check the production timetable XML file and rectify the data.

---

**CIHVP2151E Not valid. Production Timetable:DatedCall/StopPointRef does not exist.**

**Explanation:** The production timetable XML element is missing: StopPointRef in DatedCall.

**User response:** Check the production timetable XML file and rectify the data.

---

**CIHVP2152E Not valid. Production Timetable:DatedCall/Order does not exist.**

**Explanation:** The following production timetable XML element is missing: Order in DatedCall.

**User response:** Include the necessary production timetable XML file.

---

**CIHVP2153E Not valid. Production Timetable:DatedCall/AimedArrivalTime does not exist.**

**Explanation:** The following production timetable XML element is missing: AimedArrivalTime in DatedCall.

**User response:** Include the necessary production timetable XML file.

---

**CIHVP2154E Create temporary file failed, metadata generation terminated.**

**Explanation:** An exception is thrown when the system creates or opens the file, TEMP.txt.

**User response:** Check whether there is a file system I/O error.

---

**CIHVP2155E Exception is thrown when opening a file.**

**Explanation:** An exception is thrown when the system creates or opens the file, Tracing.txt.

**User response:** Check whether there is a file system I/O error.

---

**CIHVP2156W Too much metadata present in the database.**

**Explanation:** The warning occurs if there are records in the database with the metadata, JourneyShapeInJourneypattern.

**User response:** Check whether there are duplicated records with the metadata, JourneyShapeInJourneypattern.

---

---

**CIHVP2158E Open temporary file failed.**

**Explanation:** An exception is thrown when the system opens the file, TEMP.txt.

**User response:** Check whether there is a file system I/O error. An error might occur when a file does not exist, or when a file is named as a directory rather than a regular file.

---

**CIHVP2159E Access temporary file failed.**

**Explanation:** An exception is thrown when the system opens or reads the file.

**User response:** Check whether there is a file system I/O error. An error might occur when a file does not exist, or when a file is named as a directory rather than a regular file.

---

**CIHVP2160E Load mapping between journey pattern and route from database failed.**

**Explanation:** An error occurs when the system reads data from the database table, Transmodel.JourneyShapeInJourneyPattern.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2161E Load milestone offset from database failed.**

**Explanation:** An error occurs when reading data from the database table, VPMilestoneInJourneyShapeInJP.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2162I Preview mode is ENABLED, results will not be written to database.**

**Explanation:** The database cannot be modified if Preview mode is enabled.

**User response:** Disable Preview mode if possible.

---

**CIHVP2163I Start writing metadata into database.**

**Explanation:** Metadata is generated and writing to database.

**User response:** You do not have to respond to this message.

---

**CIHVP2164E Error getting/setting the AutoCommit flag.**

**Explanation:** The error occurs when setting the database auto-commit flag.

**User response:** Refer to the detailed DB2 log information.

---

---

**CIHVP2165E The amount of metadata is inconsistent with milestone.**

**Explanation:** The error occurs when adding a new entry to the record, JourneyShapeInJourneyPattern, if the size of Milestones is different to the size of metadata, metaDataEntry.

**User response:** Check for inconsistent data in the database.

---

**CIHVP2166E Write metadata to database failed.**

**Explanation:** The error occurs when writing data to the database.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2167E Error resetting the AutoCommit flag.**

**Explanation:** The error occurs when resetting the database auto-commit flag.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2169E Write to DB table failed.**

**Explanation:** The error occurs when writing data into the database.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2170E Journey pattern stop file not found.**

**Explanation:** The system cannot find the journey pattern file.

**User response:** Ensure that the file path is correct and check that the file has the necessary privileges to be viewed.

---

**CIHVP2171E Access Journey pattern stop file failed.**

**Explanation:** The exception is thrown when the system opens or reads a file.

**User response:** Check for a file system I/O error. Errors can occur if the file does not exist, or if the file was named mistakenly as a directory.

---

**CIHVP2171E Access to DB table failed.**

**Explanation:** The error occurs when reading data from the database.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2173E Copy route stop to journey pattern stop failed.**

**Explanation:** The exception is thrown when reading data from the database, because the copy route stop to journey pattern stop failed.

**User response:** Check whether a database access error occurs. Errors can occur if the database connection is closed, or if the SQL statement is incorrect.

---

**CIHVP2174E Failed to add metaDataEntry to array.**

**Explanation:** The exception is thrown when adding record into `Java.util.ArrayList`.

**User response:** Check whether there is a heap overflow. You can configure the JVM with a larger heap size.

---

**CIHVP2175E Output properties file failed.**

**Explanation:** The exception is thrown when the system opens or reads a file.

**User response:** Check whether there is file system I/O error. An error might occur when a file does not exist, or when a file is named mistakenly as a directory.

---

**CIHVP2176E The following arguments cannot coexist. Try again...**

**Explanation:** When executing the metadata generator tool, the [-prune] and [-preview] arguments cannot be set at the same time.

**User response:** Refer to the usage and only use one of the two arguments, [-prune] or [-preview].

---

**CIHVP2177E Properties file not found.**

**Explanation:** The exception is thrown when the system opens or reads the file, because the property file is missing.

**User response:** Check for a file system I/O error. An error might occur when a file does not exist, or when a file is named mistakenly as a directory.

---

**CIHVP2178E Access properties file failed.**

**Explanation:** The exception is thrown when the system opens or reads the file.

**User response:** Check for a file system I/O error. An error might occur when a file does not exist, or when a file is named as a directory rather than a regular file.

---

**CIHVP2179E Database host not specified.**

**Explanation:** The property of DB\_HOST is null or empty.

**User response:** Set DB\_HOST in the properties file.

---

**CIHVP2180E Database name not specified.**

**Explanation:** The property of DB\_NAME is null or empty.

**User response:** Set DB\_NAME in the properties file.

---

**CIHVP2182E METADATA\_REPLACE\_STRATEGY value in config file is not a valid strategy.**

**Explanation:** The error occurs when the system parses the string that contains the metadata replace strategy.

**User response:** Check whether the METADATA\_REPLACE\_STRATEGY in the configuration file is correct.

---

**CIHVP2183E Start date format is incorrect.**

**Explanation:** The error occurs when the system parses the string that contains the start date.

**User response:** Check whether the startDate element in the property file is correct.

---

**CIHVP2184E End date format is incorrect.**

**Explanation:** The error occurs when the system parses the string that contains the end date.

**User response:** Check whether the endDate element in the property file is correct.

---

**CIHVP2185E Data that was generated today cannot be pruned. Select another day.**

**Explanation:** The metadata generator tool does prune data when the end date is set to the current date or a future date.

**User response:** In the property file, set the endDate element to an earlier date than the current date.

---

**CIHVP2186E End date is mandatory.**

**Explanation:** End date is not set in the property file.

**User response:** Set the endDate element in the property file.

---

**CIHVP2188E Generating metadata from DB failed.**

**Explanation:** The error occurs when the system fails to generate metadata from the database.

**User response:** Check the data in the database and

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refer to the detailed log information.

---

**CIHVP2189I Metadata generation completed.**

**Explanation:** The generation of metadata is successfully completed.

**User response:** You do not have to respond to this message.

---

**CIHVP2190E Output properties file failed.**

**Explanation:** An exception is thrown when the system opens or reads the output properties file.

**User response:** Check whether the file system has an I/O error; for example, the file does not exist, or the file is called a directory rather than a regular file.

---

**CIHVP2194E Exception thrown when closing PreparedStatement.**

**Explanation:** An exception is thrown when disconnecting from the database.

**User response:** Refer to the detailed DB2 log information.

---

**CIHVP2195E Load vehicle tracing from database failed.**

**Explanation:** An exception is thrown when the system reads data from the database.

**User response:** Refer to the detailed DB2 log information.

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## Chapter 11. Reference

The following topics contain additional information that is not present in the main body of the IBM Intelligent Transportation documentation.

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### Ports that are used by IBM Intelligent Transportation

The solution servers communicate with each other using ports during operation and installation. Securing IBM Intelligent Transportation ports is an important consideration. To ensure that the system is secure, and to avoid potential port conflicts, see the various chargeable components, servers, and ports that are used by the solution in standard and high availability deployments.

#### Services and ports

The analytics server connects to all core servers via SSH port 22. See Table 1 for the ports that are used by the solution servers, and the chargeable components that they are associated with in standard deployment. See Table 2 for ports and components in the high availability deployment of the solution.

**Note:** InfoSphere Streams ports are considered only if the Vehicle Awareness and Prediction feature is installed with the IBM Intelligent Transportation solution.

*Table 29. Ports, components, and servers for the standard installation and deployment of the IBM Intelligent Transportation solution.*

Ports	Chargeable component	Solution server	Notes
9082	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	ANA node	
8879	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	Application server	
10039	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	Application server	
9044	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	Application server	
9081	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	Application server	
50002	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	Data server	
9085	IBM Intelligent Operations for Transportation	Application server	
9448	IBM Intelligent Operations for Transportation	Application server	
9086	IBM Intelligent Operations for Transportation	Application server	
9449	IBM Intelligent Operations for Transportation	Application server	

Table 29. Ports, components, and servers for the standard installation and deployment of the IBM Intelligent Transportation solution. (continued)

Ports	Chargeable component	Solution server	Notes
13001	IBM Intelligent Transit Analytics	SIRI subscription manager	A stand-alone Java daemon.
35000 and 35001	IBM Intelligent Transit Analytics	InfoSphere Streams application	The InfoSphere Streams application that is responsible for vehicle prediction calculations.

Table 30. Ports, components, and servers for the high availability installation and deployment of the IBM Intelligent Transportation solution.

Ports	Chargeable component	Solution server	Notes
9082	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	ANA node primary	
8879	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center application server 1	
10039	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center application server 1	
9044	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center application server 1	Administrative console secure port
9081	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center application server 1	HTTP transport port
50002	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center data server 1	
55027	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center data server 1 and IBM Intelligent Operations Center data server 2	
55028	IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics	IBM Intelligent Operations Center data server 1 and IBM Intelligent Operations Center data server 2	
9085	IBM Intelligent Operations for Transportation	IBM Intelligent Operations Center application server 1	
9448	IBM Intelligent Operations for Transportation	IBM Intelligent Operations Center application server 1	
9086	IBM Intelligent Operations for Transportation	IBM Intelligent Operations Center application server 1	
9449	IBM Intelligent Operations for Transportation	IBM Intelligent Operations Center application server 1	
13001	IBM Intelligent Transit Analytics	SIRI subscription manager	A stand-alone Java daemon.
35000 and 35001	IBM Intelligent Transit Analytics	InfoSphere Streams application	The InfoSphere Streams application that is responsible for vehicle prediction calculations.



### Related concepts:

“Software requirements of IBM Intelligent Transportation” on page 20

The servers and clients that are involved in the deployment of IBM Intelligent Transportation must meet the minimum software requirements. The IBM Intelligent Operations Center servers provide the base software platform that is required by IBM Intelligent Operations for Transportation and IBM Intelligent Transit Analytics. Extra software must be installed and configured for IBM Intelligent Transit Analytics.

### Related tasks:

“Best practices for security” on page 97

Ensure that your IBM Intelligent Transportation solution is secure by following best practices.

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## Supported TMDD data

IBM Intelligent Transportation version 1.6 supports Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0 requirements.

## Supported TMDD requirements and user needs

IBM Intelligent Transportation supports a specific set of TMDD requirements and user needs of TMDD version 3.

Table 31 shows the user needs and associated requirements that are defined by TMDD version 3 and whether or not they are supported by IBM Intelligent Transportation.

For data flowing from the IBM Intelligent Transportation solution to an owner center, support is defined as follows:

- Yes - IBM Intelligent Transportation supports the requirement by sending the associated data to the owner center.
- No - IBM Intelligent Transportation does not support the requirement and does not send the associated data to the owner center.
- N/A - The requirement does not apply to IBM Intelligent Transportation in this context.

For data flowing from an owner center to the IBM Intelligent Transportation solution, support is defined as follows:

**Yes** IBM Intelligent Transportation supports the requirement by storing data received from the owner center.

**No** IBM Intelligent Transportation does not support the requirement and does not store data received.

**N/A** The requirement does not apply to IBM Intelligent Transportation in this context.

*Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements*

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
2.3.1.1	Verify Connection Active	3.3.1.1.1	Send Center Active Verification Upon Request	Yes
		3.3.1.1.2	Publish Center Active Verification Information	Yes
		3.3.1.1.3	Subscribe to Center Active Verification Information	Yes
		3.3.1.1.4	Contents of the Center Active Verification Request	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.1.1.4.1	Required Center Active Verification Request Content	Yes
		3.3.1.1.4.2.1	External Center Organization	Yes
		3.3.1.1.5	Contents of the Center Active Information	Yes
		3.3.1.1.5.1	Required Center Active Information	Yes
		3.3.1.1.5.2.1	Owner Organization	No
2.3.1.2	Need to Support Requests	3.3.1.2	Support Request-Response	Yes
2.3.1.3	Need to Support Subscriptions	3.3.1.3.1	Support Periodic Updates	Yes
		3.3.1.3.2	Support Event-Driven Updates	Yes
2.3.1.4	Need to Support Error Handling	3.3.1.4.1	Contents of the Error Report	Yes
		3.3.1.4.1.1	Required Error Report Contents	Yes
		3.3.1.4.1.1.1	Supported Error Identifier Values	No
2.3.2.1	Need to Specify Restrictions	3.3.2.2.1	Contents of Restrictions Information	N/A
		3.3.2.2.2	Required Restriction Information Content	N/A
2.3.2.2	Need to Authenticate the Source of Messages	3.3.2.1.1	Contents of Authentication Information	N/A
		3.3.2.1.1.1	Required Authentication Information Content	N/A
		3.3.2.1.1.2.1	Operator Identifier	N/A
2.3.3	Need to Provide Information on Organizations	3.3.3.1	Send Organization Information Upon Request	Yes
		3.3.3.2	Publish Organization Information	Yes
		3.3.3.3	Subscribe to Organization Information	Yes
		3.3.3.4	Contents of the Organization Information Request	Yes
		3.3.3.4.1	Required Organization Information Request Content	Yes
		3.3.3.4.2.1	Owner Organization Identifier	No
		3.3.3.4.2.2	Owner Center Identifier	No
		3.3.3.5	Contents of the Organization and Centers Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.3.5.1	Required Organization Information Content	Yes
		3.3.3.5.2.1	Organization Name	Yes
		3.3.3.5.2.2	Organization Location	Yes
		3.3.3.5.2.3	Organization Function Description	Yes
		3.3.3.5.2.4	Required Organization Contact Information	Yes
		3.3.3.5.2.5.1	Contact Person Name	Yes
		3.3.3.5.2.5.2	Contact Person Role	Yes
		3.3.3.5.2.5.3	Work Phone Number	Yes
		3.3.3.5.2.5.4	Alternate Phone Number	Yes
		3.3.3.5.2.5.5	Cellular Phone Number	Yes
		3.3.3.5.2.5.6	Cellular Phone Identifier	Yes
		3.3.3.5.2.5.7	Fax Number	Yes
		3.3.3.5.2.5.8	Pager Number	Yes
		3.3.3.5.2.5.10	Internet E-mail Address	Yes
		3.3.3.5.2.5.11	Radio Unit Identifier	Yes
		3.3.3.5.2.5.12	Mailing Address Line 1	Yes
		3.3.3.5.2.5.13	Mailing Address Line 2	Yes
		3.3.3.5.2.5.14	Mailing Address City	Yes
		3.3.3.5.2.5.15	Mailing Address State	Yes
		3.3.3.5.2.5.16	Mailing Address Zip Code	Yes
		3.3.3.5.2.5.17	Mailing Address Country	Yes
		3.3.3.5.2.6	Required Organization Center Information	Yes
		3.3.3.5.2.7.1	Organization Center Name	Yes
		3.3.3.5.2.7.2	Organization Center Description	Yes
		3.3.3.5.2.7.3	Organization Center Type	Yes
		3.3.3.5.2.7.4	Organization Center Location	Yes
		3.3.3.5.2.7.5	Organization Center Contact Information	Yes
		3.3.3.5.2.7.6	Date and Time Change Information	Yes
2.3.4.1	Need For An Index of Events	3.3.4.9.1	Send Event Index Information Upon Request	Yes
		3.3.4.9.2	Publish Event Index Information	Yes
		3.3.4.9.3	Subscribe to Event Index Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.9.4	Contents of the Event Index Information	Yes
		3.3.4.9.5	Required Event Index Information Content	Yes
		3.3.4.9.6.1	URL File Update Date and Time Information	No
2.3.4.2	Need to Correlate an Event with Another Event	3.3.4.7.5	Other References	Yes
		3.3.4.7.5.1	Trip Reference	No
		3.3.4.7.5.2	Responsible Reference	No
		3.3.4.7.5.3	Related Event	No
		3.3.4.7.5.4	Previous Event	No
		3.3.4.7.5.5	Split Event	No
		3.3.4.7.5.6	Merged Event	No
		3.3.4.7.5.7	Sibling Event	No
		3.3.4.7.5.8	Associated Device	No
		3.3.4.7.5.9	Associated URL	Yes
2.3.4.3	Need to Provide Free Form Event Descriptions	3.3.4.6.3.6	Event Description	Yes
		3.3.4.7.3.1	Required Event Comments	Yes
		3.3.4.7.3.2.2	Operator Comments	No
2.3.4.4	Need to Provide Free Form Event Names	3.3.4.6.3.7	Event Name	Yes
2.3.4.5	Need to Provide Multilingual Event Descriptions	3.3.4.6.3.6.3.1	Description Language	N/A
		3.3.4.7.3.2.3	Comment Description Language	N/A
		3.3.4.7.4.2.1	Report Description Language	N/A
2.3.4.6	Need for Current Event Information	3.3.4.1	Send Event Information Upon Request	Yes
		3.3.4.2	Publish Event Information	Yes
		3.3.4.3	Subscribe to Event Information	Yes
		3.3.4.4	Contents of Event Information Request	Yes
		3.3.4.4.1	Required Event Information Request Content	Yes
		3.3.4.4.2.1	Requesting Organization	Yes
		3.3.4.5	Contents of the Event Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6	Required Event Information Content	Yes
		3.3.4.6.1.1	Required Event Message Header Information	Yes
		3.3.4.6.1.2.1	Owner Organization	No
		3.3.4.6.1.2.2	Responding Organization	No
		3.3.4.6.1.2.3	External Center Organization	No
		3.3.4.6.1.2.4	Message Expiry Time	No
		3.3.4.6.2.1	Required Event Reference Information	Yes
		3.3.4.6.2.2.1	Event Response Plan Identifier	No
		3.3.4.6.3.1	Event Category	Yes
		3.3.4.6.3.2	Event Description Confidence Level	Yes
		3.3.4.6.3.3	Event Access Level	Yes
		3.3.4.6.3.4	Event Time	Yes
		3.3.4.6.3.4.1	Required Event Time Information	Yes
		3.3.4.6.3.4.2.2	Sequence Date/Time	No
		3.3.4.6.3.4.2.3	Event Start Date/Time	Yes
		3.3.4.6.3.4.2.4	Alternate Start Date/Time	No
		3.3.4.6.3.4.2.5	Alternate End Date/Time	No
		3.3.4.6.3.4.2.9	Recurrent Times Event in Effect	N/A
		3.3.4.6.3.4.2.10	Event Valid Period	No
		3.3.4.6.3.4.2.10.1	Required Event Effective Period Information	N/A
		3.3.4.6.3.4.2.10.3	Effective Period Qualifier	N/A
		3.3.4.6.3.4.2.10.4	Effective Period Qualifier	N/A
		3.3.4.6.3.5	Event Location	Yes
		3.3.4.6.3.5.1.1	Area Identifier	No
		3.3.4.6.3.5.1.2	Name of Area	No
		3.3.4.6.3.5.1.3	Area Location Rank	N/A
		3.3.4.6.3.5.1.4	Secondary Area Location Reference	N/A
		3.3.4.6.3.5.2	Required Link Location Information	Yes
		3.3.4.6.3.5.3.1	Link Ownership	No
		3.3.4.6.3.5.3.2	Route Designator	Yes
		3.3.4.6.3.5.3.3	Second Route Designator	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6.3.5.3.4	Link Identifier	Yes
		3.3.4.6.3.5.3.5	Link Name	No
		3.3.4.6.3.5.3.6	Link Alignment	No
		3.3.4.6.3.5.3.7	Link Direction	Yes
		3.3.4.6.3.5.3.8	Secondary Point	No
		3.3.4.6.3.5.3.9	Alternate Link Location	No
		3.3.4.6.3.5.4	Required Point on a Link Location Information	Yes
		3.3.4.6.3.5.5.1	Linear Reference Location	Yes
		3.3.4.6.3.5.5.2	Link Name	No
		3.3.4.6.3.5.5.3	Point Name	Yes
		3.3.4.6.3.5.5.4	Cross Street Identifier	No
		3.3.4.6.3.5.5.5	Cross Street Name	No
		3.3.4.6.3.5.5.6	Signed Destination	No
		3.3.4.6.3.5.5.7	Point Location Rank	No
		3.3.4.6.3.5.5.8	Landmark Type	No
		3.3.4.6.3.5.5.9	Secondary Link Location	No
		3.3.4.6.3.5.6	Required Landmark Location Information	No
		3.3.4.6.3.5.7.1	Landmark Point Name	N/A
		3.3.4.6.3.5.7.2	Landmark Location Rank	N/A
		3.3.4.6.3.5.7.3	Landmark Location	N/A
		3.3.4.6.3.5.7.4	Secondary Landmark Location	N/A
		3.3.4.6.3.5.8	Geographic Location	Yes
		3.3.4.6.3.6	Event Description	Yes
		3.3.4.6.3.6.1	Event Quantity	No
		3.3.4.6.3.6.2	Detour	No
		3.3.4.6.3.6.2.1	Required Detour Information	N/A
		3.3.4.6.3.6.2.2.1	Destination	N/A
		3.3.4.6.3.6.2.2.2	Location on Alternate Route	N/A
		3.3.4.6.3.7	Event Name	Yes
		3.3.4.6.3.8	Event Lane	Yes
		3.3.4.6.3.8.1.1	Lane Type	No
		3.3.4.6.3.8.1.2	Direction of Travel	No
		3.3.4.6.3.8.1.3	Total Number of Lanes	Yes
		3.3.4.6.3.8.1.4	Number of Lanes Affected	Yes
		3.3.4.6.3.8.1.5	Lane Number Affected	No
		3.3.4.6.3.8.1.6	Lane Status	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6.3.11	Event Source	Yes
		3.3.4.6.3.11.1	Information Source Organization	Yes
		3.3.4.6.3.11.2	Event Detection Method	Yes
		3.3.4.6.3.12	Event Transit Location	No
		3.3.4.6.3.12.1	Required Event Transit Location Information	N/A
		3.3.4.6.3.12.2.1	Transit Direction of Travel	N/A
		3.3.4.6.3.12.2.2	Transit Stop Detail	N/A
		3.3.4.6.3.12.2.3	Transit Location	N/A
		3.3.4.6.4.1	Required Event Headline Information	Yes
		3.3.4.6.4.2.1	Event Headline Element	No
		3.3.4.7.2	Event Indicator	Yes
		3.3.4.7.2.1	Event Status	Yes
		3.3.4.7.2.2	Event Duration Exceeded Flag	Yes
		3.3.4.7.2.3	Event Priority Level	No
		3.3.4.7.2.4	Event Severity	Yes
		3.3.4.7.2.5	Event Impact Level	No
		3.3.4.7.2.6	Event Active Flag	No
		3.3.4.7.3	Event Comments	Yes
		3.3.4.7.3.1	Required Event Comments	Yes
		3.3.4.7.3.2.1	Operator Identifier	No
		3.3.4.7.3.2.2	Operator Comments	No
		3.3.4.7.3.2.3	Comment Description Language	No
		3.3.4.7.4	Event Reports	No
		3.3.4.7.4.1	Required Event Reports	N/A
		3.3.4.7.4.2.1	Report Description Language	N/A
2.3.4.7	Need for Planned Event Information	3.3.4.1	Send Event Information Upon Request	Yes
		3.3.4.2	Publish Event Information	Yes
		3.3.4.3	Subscribe to Event Information	Yes
		3.3.4.4	Contents of Event Information Request	Yes
		3.3.4.4.1	Required Event Information Request Content	Yes
		3.3.4.4.2.1	Requesting Organization	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.5	Contents of the Event Information	Yes
		3.3.4.6	Required Event Information Content	Yes
		3.3.4.6.1.1	Required Event Message Header Information	Yes
		3.3.4.6.1.2.1	Owner Organization	No
		3.3.4.6.1.2.2	Responding Organization	No
		3.3.4.6.1.2.3	External Center Organization	No
		3.3.4.6.1.2.4	Message Expiry Time	No
		3.3.4.6.2.1	Required Event Reference Information	Yes
		3.3.4.6.2.2.1	Event Response Plan Identifier	No
		3.3.4.6.3.1	Event Category	Yes
		3.3.4.6.3.2	Event Description Confidence Level	Yes
		3.3.4.6.3.3	Event Access Level	Yes
		3.3.4.6.3.4	Event Time	Yes
		3.3.4.6.3.4.1	Required Event Time Information	Yes
		3.3.4.6.3.4.2.1	Planned Event Schedule Element Identifier	No
		3.3.4.6.3.4.2.2	Sequence Date/Time	No
		3.3.4.6.3.4.2.4	Alternate Start Date/Time	No
		3.3.4.6.3.4.2.6	Expected Start Date/Time	Yes
		3.3.4.6.3.4.2.7	Expected End Date/Time	Yes
		3.3.4.6.3.4.2.8	Planned Event Continuous Flag	No
		3.3.4.6.3.4.2.9	Recurrent Times Event in Effect	N/A
		3.3.4.6.3.4.2.10	Event Valid Period	No
		3.3.4.6.3.4.2.10.1	Required Event Effective Period Information	N/A
		3.3.4.6.3.4.2.10.3	Effective Period Qualifier	N/A
		3.3.4.6.3.4.2.10.4	Effective Period Qualifier	N/A
		3.3.4.6.3.5	Event Location	Yes
		3.3.4.6.3.5.1	Area Location Information	No
		3.3.4.6.3.5.1.1	Area Identifier	N/A
		3.3.4.6.3.5.1.2	Name of Area	N/A
		3.3.4.6.3.5.1.3	Area Location Rank	N/A



Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6.3.5.1.4	Secondary Area Location Reference	N/A
		3.3.4.6.3.5.2	Required Link Location Information	Yes
		3.3.4.6.3.5.3.1	Link Ownership	No
		3.3.4.6.3.5.3.2	Route Designator	Yes
		3.3.4.6.3.5.3.3	Second Route Designator	No
		3.3.4.6.3.5.3.4	Link Identifier	Yes
		3.3.4.6.3.5.3.5	Link Name	No
		3.3.4.6.3.5.3.6	Link Alignment	No
		3.3.4.6.3.5.3.7	Link Direction	Yes
		3.3.4.6.3.5.3.8	Secondary Point	No
		3.3.4.6.3.5.3.9	Alternate Link Location	No
		3.3.4.6.3.5.4	Required Point on a Link Location Information	Yes
		3.3.4.6.3.5.5.1	Linear Reference Location	Yes
		3.3.4.6.3.5.5.2	Link Name	No
		3.3.4.6.3.5.5.3	Point Name	Yes
		3.3.4.6.3.5.5.4	Cross Street Identifier	No
		3.3.4.6.3.5.5.5	Cross Street Name	No
		3.3.4.6.3.5.5.6	Signed Destination	No
		3.3.4.6.3.5.5.7	Point Location Rank	No
		3.3.4.6.3.5.5.8	Landmark Type	No
		3.3.4.6.3.5.5.9	Secondary Link Location	No
		3.3.4.6.3.5.6	Required Landmark Location Information	No
		3.3.4.6.3.5.7.1	Landmark Point Name	N/A
		3.3.4.6.3.5.7.2	Landmark Location Rank	N/A
		3.3.4.6.3.5.7.3	Landmark Location	N/A
		3.3.4.6.3.5.7.4	Secondary Landmark Location	N/A
		3.3.4.6.3.5.8	Geographic Location	Yes
		3.3.4.6.3.6	Event Description	Yes
		3.3.4.6.3.6.1	Event Quantity	No
		3.3.4.6.3.6.2	Detour	No
		3.3.4.6.3.6.2.1	Required Detour Information	N/A
		3.3.4.6.3.6.2.2.1	Destination	N/A
		3.3.4.6.3.6.2.2.2	Location on Alternate Route	N/A
		3.3.4.6.3.7	Event Name	Yes
		3.3.4.6.3.8	Event Lane	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6.3.8.1.1	Lane Type	No
		3.3.4.6.3.8.1.2	Direction of Travel	No
		3.3.4.6.3.8.1.3	Total Number of Lanes	Yes
		3.3.4.6.3.8.1.4	Number of Lanes Affected	Yes
		3.3.4.6.3.8.1.5	Lane Number Affected	No
		3.3.4.6.3.8.1.6	Lane Status	No
		3.3.4.6.3.9	Schedule Element Identifier	No
		3.3.4.6.3.10	Element Identifier	No
		3.3.4.6.3.11	Event Source	Yes
		3.3.4.6.3.11.1	Information Source Organization	Yes
		3.3.4.6.3.11.2	Event Detection Method	Yes
		3.3.4.6.3.12	Event Transit Location	No
		3.3.4.6.3.12.1	Required Event Transit Location Information	N/A
		3.3.4.6.3.12.2.1	Transit Direction of Travel	N/A
		3.3.4.6.3.12.2.2	Transit Stop Detail	N/A
		3.3.4.6.3.12.2.3	Transit Location	N/A
		3.3.4.6.4.1	Required Event Headline Information	Yes
		3.3.4.6.4.2.1	Event Headline Element	No
		3.3.4.7.1	Project Reference	No
		3.3.4.7.1.1	Project Reference Information	N/A
		3.3.4.7.1.2	Permit Reference Information	N/A
		3.3.4.7.1.3	Project Description	N/A
		3.3.4.7.1.4	Owner Organization	N/A
		3.3.4.7.2	Event Indicator	Yes
		3.3.4.7.2.1	Event Status	Yes
		3.3.4.7.2.2	Event Duration Exceeded Flag	Yes
		3.3.4.7.2.3	Event Priority Level	No
		3.3.4.7.2.4	Event Severity	Yes
		3.3.4.7.2.5	Event Impact Level	No
		3.3.4.7.2.6	Event Active Flag	No
		3.3.4.7.2.7	Event Class	No
		3.3.4.7.3	Event Comments	Yes
		3.3.4.7.3.1	Required Event Comments	Yes
		3.3.4.7.3.2.1	Operator Identifier	No
		3.3.4.7.3.2.2	Operator Comments	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.7.3.2.3	Comment Description Language	No
		3.3.4.7.4	Event Reports	No
		3.3.4.7.4.1	Required Event Reports	N/A
		3.3.4.7.4.2.1	Report Description Language	N/A
2.3.4.8	Need for Forecast Event Information	3.3.4.1	Send Event Information Upon Request	Yes
		3.3.4.2	Publish Event Information	Yes
		3.3.4.3	Subscribe to Event Information	Yes
		3.3.4.4	Contents of Event Information Request	Yes
		3.3.4.4.1	Required Event Information Request Content	Yes
		3.3.4.4.2.1	Requesting Organization	Yes
		3.3.4.5	Contents of the Event Information	Yes
		3.3.4.6	Required Event Information Content	Yes
		3.3.4.6.1.1	Required Event Message Header Information	Yes
		3.3.4.6.1.2.1	Owner Organization	No
		3.3.4.6.1.2.2	Responding Organization	No
		3.3.4.6.1.2.3	External Center Organization	No
		3.3.4.6.1.2.4	Message Expiry Time	No
		3.3.4.6.2.1	Required Event Reference Information	Yes
		3.3.4.6.2.2.1	Event Response Plan Identifier	No
		3.3.4.6.3.1	Event Category	Yes
		3.3.4.6.3.2	Event Description Confidence Level	Yes
		3.3.4.6.3.3	Event Access Level	Yes
		3.3.4.6.3.4	Event Time	Yes
		3.3.4.6.3.4.1	Required Event Time Information	Yes
		3.3.4.6.3.4.2.2	Sequence Date/Time	No
		3.3.4.6.3.4.2.4	Alternate Start Date/Time	No
		3.3.4.6.3.4.2.9	Recurrent Times Event in Effect	N/A
		3.3.4.6.3.4.2.10	Event Valid Period	No
		3.3.4.6.3.4.2.10.1	Required Event Effective Period Information	N/A

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6.3.4.2.10.3	Effective Period Qualifier	N/A
		3.3.4.6.3.4.2.10.4	Effective Period Qualifier	N/A
		3.3.4.6.3.5	Event Location	Yes
		3.3.4.6.3.5.1	Area Location Information	No
		3.3.4.6.3.5.1.1	Area Identifier	N/A
		3.3.4.6.3.5.1.2	Name of Area	N/A
		3.3.4.6.3.5.1.3	Area Location Rank	N/A
		3.3.4.6.3.5.1.4	Secondary Area Location Reference	N/A
		3.3.4.6.3.5.2	Required Link Location Information	Yes
		3.3.4.6.3.5.3.1	Link Ownership	No
		3.3.4.6.3.5.3.2	Route Designator	Yes
		3.3.4.6.3.5.3.3	Second Route Designator	No
		3.3.4.6.3.5.3.4	Link Identifier	Yes
		3.3.4.6.3.5.3.5	Link Name	No
		3.3.4.6.3.5.3.6	Link Alignment	No
		3.3.4.6.3.5.3.7	Link Direction	Yes
		3.3.4.6.3.5.3.8	Secondary Point	No
		3.3.4.6.3.5.3.9	Alternate Link Location	No
		3.3.4.6.3.5.4	Required Point on a Link Location Information	Yes
		3.3.4.6.3.5.5.1	Linear Reference Location	Yes
		3.3.4.6.3.5.5.2	Link Name	No
		3.3.4.6.3.5.5.3	Point Name	Yes
		3.3.4.6.3.5.5.4	Cross Street Identifier	No
		3.3.4.6.3.5.5.5	Cross Street Name	No
		3.3.4.6.3.5.5.6	Signed Destination	No
		3.3.4.6.3.5.5.7	Point Location Rank	No
		3.3.4.6.3.5.5.8	Landmark Type	No
		3.3.4.6.3.5.5.9	Secondary Link Location	No
		3.3.4.6.3.5.6	Required Landmark Location Information	No
		3.3.4.6.3.5.7.1	Landmark Point Name	N/A
		3.3.4.6.3.5.7.2	Landmark Location Rank	N/A
		3.3.4.6.3.5.7.3	Landmark Location	N/A
		3.3.4.6.3.5.7.4	Secondary Landmark Location	N/A
		3.3.4.6.3.5.8	Geographic Location	Yes
		3.3.4.6.3.6	Event Description	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.6.3.6.1	Event Quantity	No
		3.3.4.6.3.6.2	Detour	No
		3.3.4.6.3.6.2.1	Required Detour Information	N/A
		3.3.4.6.3.6.2.2.1	Destination	N/A
		3.3.4.6.3.6.2.2.2	Location on Alternate Route	N/A
		3.3.4.6.3.7	Event Name	Yes
		3.3.4.6.3.8	Event Lane	Yes
		3.3.4.6.3.8.1.1	Lane Type	No
		3.3.4.6.3.8.1.2	Direction of Travel	No
		3.3.4.6.3.8.1.3	Total Number of Lanes	Yes
		3.3.4.6.3.8.1.4	Number of Lanes Affected	Yes
		3.3.4.6.3.8.1.5	Lane Number Affected	No
		3.3.4.6.3.8.1.6	Lane Status	No
		3.3.4.6.3.9	Schedule Element Identifier	No
		3.3.4.6.3.10	Element Identifier	No
		3.3.4.6.3.11	Event Source	Yes
		3.3.4.6.3.11.1	Information Source Organization	Yes
		3.3.4.6.3.11.2	Event Detection Method	Yes
		3.3.4.6.3.12	Event Transit Location	No
		3.3.4.6.3.12.1	Required Event Transit Location Information	N/A
		3.3.4.6.3.12.2.1	Transit Direction of Travel	N/A
		3.3.4.6.3.12.2.2	Transit Stop Detail	N/A
		3.3.4.6.3.12.2.3	Transit Location	N/A
		3.3.4.6.4.1	Required Event Headline Information	Yes
		3.3.4.6.4.2.1	Event Headline Element	No
		3.3.4.7.2	Event Indicator	Yes
		3.3.4.7.2.1	Event Status	Yes
		3.3.4.7.2.2	Event Duration Exceeded Flag	Yes
		3.3.4.7.2.3	Event Priority Level	No
		3.3.4.7.2.4	Event Severity	Yes
		3.3.4.7.2.5	Event Impact Level	No
		3.3.4.7.2.6	Event Active Flag	No
		3.3.4.7.2.7	Event Class	No
		3.3.4.7.3	Event Comments	Yes
		3.3.4.7.3.1	Required Event Comments	Yes
		3.3.4.7.3.2.1	Operator Identifier	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.4.7.3.2.2	Operator Comments	No
		3.3.4.7.3.2.3	Comment Description Language	No
		3.3.4.7.4	Event Reports	No
		3.3.4.7.4.1	Required Event Reports	N/A
		3.3.4.7.4.2.1	Report Description Language	N/A
2.3.4.10	Need to Reference a URL	3.3.4.7.6	URL References	Yes
		3.3.4.7.6.1	Required URL Reference Information	Yes
		3.3.4.7.6.2.1	Reference Medium	No
2.3.4.11.1	Need to Filter Event Recaps	3.3.4.4	Contents of Event Information Request	Yes
		3.3.4.4.1	Required Event Information Request Content	Yes
		3.3.4.4.3	Event Information Request Filter Content	Yes
		3.3.4.4.3.1	Event Unique Identifier Filter	No
		3.3.4.4.3.2	Event Response Plan Identifier Filter	No
		3.3.4.4.3.3	Event Category Filter	No
		3.3.4.4.3.4	Event Priority Filter	No
		3.3.4.4.3.5	Event Location Filter	No
		3.3.4.4.3.6	Event Description Confidence Level Filter	No
		3.3.4.4.3.7	Event Access Level Filter	No
		3.3.4.4.3.8	Event Action Flag Filter	No
		3.3.4.4.3.9	Event Severity Filter	No
		3.3.4.4.3.10	RequestStart Time Filter	No
		3.3.4.4.3.11	Request End Time Filter	No
		3.3.4.4.3.12	External Center Organization Filter	No
2.3.4.11.2	Need to Filter Event Updates	3.3.4.4	Contents of Event Information Request	Yes
		3.3.4.4.1	Required Event Information Request Content	Yes
		3.3.4.4.3	Event Information Request Filter Content	Yes
		3.3.4.4.3.1	Event Unique Identifier Filter	No
		3.3.4.4.3.10	RequestStart Time Filter	No
		3.3.4.4.3.11	Request End Time Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
2.3.5.1.1	Need for Node Inventory	3.3.5.1.1	Contents of the Traffic Network Information Request	Yes
		3.3.5.1.1.1	Required Traffic Network Information Request Content	Yes
		3.3.5.1.1.2.1	Roadway Network Identifier	No
		3.3.5.1.1.2.2	Traffic Network Identifier	No
		3.3.5.1.1.2.3	External Center Organization	Yes
		3.3.5.2.1.1	Send Node Inventory Information Upon Request	Yes
		3.3.5.2.1.2	Publish Node Inventory Information	Yes
		3.3.5.2.1.3	Subscribe to Node Inventory Information	Yes
		3.3.5.2.1.4	Contents of the Node Inventory Request	Yes
		3.3.5.2.1.5	Contents of the Node Inventory Information	Yes
		3.3.5.2.1.5.1	Required Node Inventory Information Content	Yes
		3.3.5.2.1.5.2.1	Node Name	Yes
		3.3.5.2.1.5.2.2	Node Description	Yes
		3.3.5.2.1.5.2.3	Roadway Network Name	Yes
		3.3.5.2.1.5.2.4	Route Designator	Yes
		3.3.5.2.1.5.2.5	Linear Reference	Yes
		3.3.5.2.1.5.2.6	Node Direction	Yes
		3.3.5.2.1.5.2.7	Node Type	Yes
		3.3.5.2.1.5.2.8	Number of Links	Yes
		3.3.5.2.1.5.2.9	Owner Organization	No
		3.3.5.2.1.5.2.10	Inventory Date and Time Change Information	Yes
2.3.5.1.2	Need for Link Inventory	3.3.5.1.1	Contents of the Traffic Network Information Request	Yes
		3.3.5.1.1.1	Required Traffic Network Information Request Content	Yes
		3.3.5.1.1.2.1	Roadway Network Identifier	No
		3.3.5.1.1.2.2	Traffic Network Identifier	No
		3.3.5.1.1.2.3	External Center Organization	Yes
		3.3.5.3.1.1	Send Link Inventory Information Upon Request	Yes
		3.3.5.3.1.2	Publish Link Inventory Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.5.3.1.3	Subscribe to Link Inventory Information	Yes
		3.3.5.3.1.4	Contents of the Link Inventory Request	Yes
		3.3.5.3.1.5	Contents of the Link Inventory Information	Yes
		3.3.5.3.1.5.1	Required Link Inventory Information Content	Yes
		3.3.5.3.1.5.2.1	Roadway Network Name	Yes
		3.3.5.3.1.5.2.2	Link Name	Yes
		3.3.5.3.1.5.2.3	Route Designator	Yes
		3.3.5.3.1.5.2.4	Secondary Route Designator	Yes
		3.3.5.3.1.5.2.5	Linear Reference	Yes
		3.3.5.3.1.5.2.6	Link Length	Yes
		3.3.5.3.1.5.2.7	Link Capacity	Yes
		3.3.5.3.1.5.2.8	Link Speed Limit	Yes
		3.3.5.3.1.5.2.9	Link Truck Speed Limit	Yes
		3.3.5.3.1.5.2.10	Speed Limit Units	Yes
		3.3.5.3.1.5.2.11	Link Law Enforcement Jurisdiction	Yes
		3.3.5.3.1.5.2.12	Designated Owner	Yes
		3.3.5.3.1.5.2.13	Left Shoulder Width	Yes
		3.3.5.3.1.5.2.14	Right Shoulder Width	Yes
		3.3.5.3.1.5.2.15	Median Type	Yes
		3.3.5.3.1.5.2.16	Alternate Names	Yes
		3.3.5.3.1.5.2.17	Owner Organization	No
		3.3.5.3.1.5.2.18	Inventory Date and Time Change Information	Yes
2.3.5.2.2	Need to Share Link State	3.3.5.1.1	Contents of the Traffic Network Information Request	Yes
		3.3.5.1.1.1	Required Traffic Network Information Request Content	Yes
		3.3.5.1.1.2.1	Roadway Network Identifier	No
		3.3.5.1.1.2.2	Traffic Network Identifier	No
		3.3.5.1.1.2.3	External Center Organization	Yes
		3.3.5.3.2.1	Send Link Status Information Upon Request	Yes
		3.3.5.3.2.2	Publish Link Status Information	Yes
		3.3.5.3.2.3	Subscribe to Link Status Information	Yes



Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.5.3.2.4	Contents of the Link Status Request	Yes
		3.3.5.3.2.5	Contents of the Link Status Information	Yes
		3.3.5.3.2.5.1	Required Link Status Information Content	Yes
		3.3.5.3.2.5.2.1	Link Name	No
		3.3.5.3.2.5.2.2	Link Direction	No
		3.3.5.3.2.5.2.3	Lanes Open	Yes
		3.3.5.1.1	Contents of the Traffic Network Information Request	Yes
		3.3.5.1.1.1	Required Traffic Network Information Request Content	Yes
		3.3.5.1.1.2.1	Roadway Network Identifier	No
		3.3.5.1.1.2.2	Traffic Network Identifier	No
		3.3.5.1.1.2.3	External Center Organization	Yes
		3.3.5.3.2.1	Send Link Status Information Upon Request	Yes
		3.3.5.3.2.2	Publish Link Status Information	Yes
		3.3.5.3.2.3	Subscribe to Link Status Information	Yes
		3.3.5.3.2.4	Contents of the Link Status Request	Yes
		3.3.5.3.2.5	Contents of the Link Status Information	Yes
		3.3.5.3.2.5.1	Required Link Status Information Content	Yes
		3.3.5.3.2.5.2.1	Link Name	No
		3.3.5.3.2.5.2.2	Link Direction	No
		3.3.5.3.2.5.2.3	Lanes Open	Yes
		3.3.5.3.2.5.2.4	Link Priority	Yes
		3.3.5.3.2.5.2.5	Link Restrictions - Axles	Yes
		3.3.5.3.2.5.2.6	Link Restrictions - Height	Yes
		3.3.5.3.2.5.2.7	Link Restrictions - Length	Yes
		3.3.5.3.2.5.2.8	Link Restrictions - Width	Yes
		3.3.5.3.2.5.2.9	Link Restrictions - Weight	Yes
		3.3.5.3.2.5.2.10	Link Restrictions - Axle Weight	Yes
		3.3.5.3.2.5.2.11	Link Restriction Units	Yes
		3.3.5.3.2.5.2.12	Link Surface Conditions	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.5.3.2.5.2.13	Link Saturation	Yes
		3.3.5.3.2.5.2.14	Link Saturation Threshold	Yes
		3.3.5.3.2.5.2.15	Link Level of Service	Yes
		3.3.5.3.2.5.2.16	Lane Numbers	Yes
		3.3.5.3.2.5.2.17	Link Data Stored Type	Yes
		3.3.5.3.2.5.2.18	Roadway Event Source	Yes
		3.3.5.3.2.5.2.19	Traffic Data Type	Yes
		3.3.5.3.2.5.2.20	Link Stops	Yes
		3.3.5.3.2.5.2.21	Link Delay Time	Yes
		3.3.5.3.2.5.2.22	Link Delay Time - Alternate Route	Yes
		3.3.5.3.2.5.2.23	Link Headway	Yes
		3.3.5.3.2.5.2.24	Link Existing Capacity	Yes
		3.3.5.3.2.5.2.25	Link Travel Time	Yes
		3.3.5.3.2.5.2.26	Link Travel Time Increase	Yes
		3.3.5.3.2.5.2.27	Link Volume	Yes
		3.3.5.3.2.5.2.28	Link Average Speed	Yes
		3.3.5.3.2.5.2.29	Link Estimated Speed	Yes
		3.3.5.3.2.5.2.30	Link Density	Yes
		3.3.5.3.2.5.2.31	Link Occupancy	Yes
		3.3.5.3.2.5.2.32	Link Current Advisory Speed	Yes
		3.3.5.3.2.5.2.33	Link Speed Limit	No
		3.3.5.3.2.5.2.34	Link Truck Speed Limit	Yes
		3.3.5.3.2.5.2.35	Speed Limit Units	Yes
		3.3.5.3.2.5.2.36	Event Description Time	Yes
		3.3.5.3.2.5.2.37	Owner Organization	No
		3.3.5.3.2.5.2.38	Status Date and Time Change Information	Yes
2.3.5.5	Need to Maintain English Units	3.3.5.3.1.5.2.8	Link Speed Limit	Yes
		3.3.5.3.1.5.2.9	Link Truck Speed Limit	Yes
		3.3.5.3.1.5.2.10	Speed Limit Units	Yes
		3.3.5.3.2.5.2.6	Link Restrictions - Height	Yes
		3.3.5.3.2.5.2.7	Link Restrictions - Length	Yes
		3.3.5.3.2.5.2.8	Link Restrictions - Width	Yes
		3.3.5.3.2.5.2.11	Link Restriction Units	Yes
		3.3.5.3.2.5.2.32	Link Current Advisory Speed	Yes
		3.3.5.3.2.5.2.33	Link Speed Limit	Yes
		3.3.5.3.2.5.2.34	Link Truck Speed Limit	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.5.3.2.5.2.35	Speed Limit Units	Yes
2.3.6.1.1	Need to Share Detector Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.2.1.1	Send Detector Inventory Information Upon Request	Yes
		3.3.6.2.1.2	Publish Detector Inventory Information	Yes
		3.3.6.2.1.3	Subscribe to Detector Inventory Information	Yes
		3.3.6.2.1.4	Contents of the Detector Inventory Request	Yes
		3.3.6.2.1.5	Contents of the Detector Inventory Information	Yes
		3.3.6.2.1.5.1	Required Detector Inventory Content	Yes
		3.3.6.2.1.5.2.1	Detector Station Inventory Information	No
		3.3.6.2.1.5.2.2	Lane Number	Yes
		3.3.6.2.1.5.2.3	Speed Trap Flag	Yes
		3.3.6.2.1.5.2.4	Vehicle Bin 1	Yes
		3.3.6.2.1.5.2.5	Vehicle Bin 2	Yes
		3.3.6.2.1.5.2.6	Vehicle Bin 3	Yes
		3.3.6.2.1.5.2.7	Vehicle Bin 4	Yes
2.3.6.1.2	Need to Share Updated Detector Inventory	3.3.6.2.1.2	Publish Detector Inventory Information	Yes
		3.3.6.2.1.3	Subscribe to Detector Inventory Information	Yes
2.3.6.1.3	Need to Share Detector Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.3.1	Contents of the Device Status Header	Yes
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.2.2.1	Send Detector Status Information Upon Request	Yes
		3.3.6.2.2.2	Publish Detector Status Information	Yes
		3.3.6.2.2.3	Subscribe to Detector Status Information	Yes
		3.3.6.2.2.4	Contents of the Detector Status Request	Yes
		3.3.6.2.2.5	Contents of the Detector Status Information	Yes
		3.3.6.2.2.5.1	Required Detector Status Content	Yes
		3.3.6.2.2.5.2.1	Detector Station Status Information	No
		3.3.6.2.2.5.2.2	Lane Number	Yes
		3.3.6.2.2.5.2.3	Direction of Travel	Yes
		3.3.6.2.2.5.2.4	Detection Zone Output Mode	Yes
2.3.6.1.5	Need for Detector Data Correlation	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes
		3.3.6.2.1.1	Send Detector Inventory Information Upon Request	Yes
		3.3.6.2.1.2	Publish Detector Inventory Information	Yes
		3.3.6.2.1.3	Subscribe to Detector Inventory Information	Yes
		3.3.6.2.1.4	Contents of the Detector Inventory Request	Yes
		3.3.6.2.1.5	Contents of the Detector Inventory Information	Yes
		3.3.6.2.1.5.1	Required Detector Inventory Content	Yes
		3.3.6.2.1.5.2.1	Detector Station Inventory Information	No
		3.3.6.2.1.5.2.2	Lane Number	Yes
2.3.6.1.6	Need for Detector Data Sharing	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.2.3.1	Send Detector Data Upon Request	Yes
		3.3.6.2.3.2	Publish Detector Data	Yes
		3.3.6.2.3.3	Subscribe to Detector Data Information	Yes
		3.3.6.2.3.4	Contents of the Detector Data Request	Yes
		3.3.6.2.3.4.1	Required Detector Data Request Content	Yes
		3.3.6.2.3.4.2.1	Data Type	Yes
		3.3.6.2.3.4.2.2	Detector Station	No
		3.3.6.2.3.5	Contents of the Detector Data Information	Yes
		3.3.6.2.3.5.1	Required Detector Data Content	Yes
		3.3.6.2.3.5.2.1	Detector Station	No
		3.3.6.2.3.5.2.2	Data Type	No
		3.3.6.2.3.5.2.3	Data Collection Start	Yes
		3.3.6.2.3.5.2.4	Data Collection End	Yes
		3.3.6.2.3.5.2.5	Average Vehicle Speed	Yes
		3.3.6.2.3.5.2.6	Average Vehicle Queue	No
		3.3.6.2.3.5.2.7	Vehicle Stops	No
		3.3.6.2.3.5.2.8	Vehicle Count - Bin 1	No
		3.3.6.2.3.5.2.9	Vehicle Count - Bin 2	No
		3.3.6.2.3.5.2.10	Vehicle Count - Bin 3	No
		3.3.6.2.3.5.2.11	Vehicle Count - Bin 4	No
		3.3.6.2.3.5.2.12	Vehicle Count - Bin 5	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
2.3.6.2.1	Need to Share CCTV Device Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes
		3.3.6.3.1.1	Send CCTV Inventory Information Upon Request	Yes



Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.3.1.2	Publish CCTV Inventory Information	Yes
		3.3.6.3.1.3	Subscribe to CCTV Inventory Information	Yes
		3.3.6.3.1.4	Contents of the CCTV Inventory Request	Yes
		3.3.6.3.1.5	Contents of the CCTV Inventory Information	Yes
		3.3.6.3.1.5.1	Required CCTV Inventory Content	Yes
		3.3.6.3.1.5.2.1	Text Insertion	Yes
		3.3.6.3.1.5.2.2	Camera Type	Yes
		3.3.6.3.1.5.2.3	Camera Pan Left Limit	Yes
		3.3.6.3.1.5.2.4	Camera Pan Right Limit	Yes
		3.3.6.3.1.5.2.5	Camera Tilt Up Limit	Yes
		3.3.6.3.1.5.2.6	Camera Tilt Down Limit	Yes
		3.3.6.3.1.5.2.7	Camera Zoom Limit	Yes
		3.3.6.3.1.5.2.8	Camera Focus Limit	Yes
		3.3.6.3.1.5.2.9	Camera Iris Limit	Yes
2.3.6.2.2	Need to Share Updated CCTV Device Inventory	3.3.6.3.1.2	Publish CCTV Inventory Information	Yes
		3.3.6.3.1.3	Subscribe to CCTV Inventory Information	Yes
2.3.6.2.3	Need to Share CCTV Device Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.3.1	Contents of the Device Status Header	Yes
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.3.2.1	Send CCTV Status Information Upon Request	Yes
		3.3.6.3.2.2	Publish CCTV Status Information	Yes
		3.3.6.3.2.3	Subscribe to CCTV Status Information	Yes
		3.3.6.3.2.4	Contents of the CCTV Status Request	Yes
		3.3.6.3.2.5	Contents of the CCTV Status Information	Yes
		3.3.6.3.2.5.1	Required CCTV Status Content	Yes
		3.3.6.3.2.5.2.1	CCTV Error	Yes
		3.3.6.3.2.5.2.2	CCTV Format	Yes
		3.3.6.3.2.5.2.3	CCTV Pan Position	Yes
		3.3.6.3.2.5.2.4	CCTV Tilt Position	Yes
		3.3.6.3.2.5.2.5	CCTV Zoom Position	Yes
		3.3.6.3.2.5.2.6	CCTV Iris Position	Yes
		3.3.6.3.2.5.2.7	CCTV Focus Position	Yes
2.3.6.4.1	Need to Share DMS Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes
		3.3.6.5.1.1	Send DMS Inventory Information Upon Request	Yes
		3.3.6.5.1.2	Publish DMS Inventory Information	Yes
		3.3.6.5.1.3	Subscribe to DMS Inventory Information	Yes
		3.3.6.5.1.4	Contents of the DMS Inventory Request	Yes
		3.3.6.5.1.5	Contents of the DMS Inventory Information	Yes
		3.3.6.5.1.5.1	Required DMS Inventory Content	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.5.1.5.2.1	Sign Technology	Yes
		3.3.6.5.1.5.2.2	Sign Height	Yes
		3.3.6.5.1.5.2.3	Sign Width	Yes
		3.3.6.5.1.5.2.4	Horizontal Border	Yes
		3.3.6.5.1.5.2.5	Vertical Border	Yes
		3.3.6.5.1.5.2.6	Character Pixel Height	Yes
		3.3.6.5.1.5.2.7	Character Pixel Width	Yes
		3.3.6.5.1.5.2.8	Sign Pixel Height	Yes
		3.3.6.5.1.5.2.9	Sign Pixel Width	Yes
		3.3.6.5.1.5.2.10	Sign Horizontal Pixel Pitch	Yes
		3.3.6.5.1.5.2.11	Sign Vertical Pixel Pitch	Yes
		3.3.6.5.1.5.2.12	DMS Beacon Type	Yes
		3.3.6.5.1.5.2.13	Maximum Number of Pages	Yes
		3.3.6.5.1.5.2.14	Maximum Message Length	Yes
		3.3.6.5.1.5.2.15	Color Scheme	Yes
		3.3.6.5.1.5.2.16	MULTI Tags Supported	Yes
		3.3.6.5.1.2	Publish DMS Inventory Information	Yes
		3.3.6.5.1.3	Subscribe to DMS Inventory Information	Yes
2.3.6.4.3	Need to Share DMS Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.3.1	Contents of the Device Status Header	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.5.2.1	Send DMS Status Information Upon Request	Yes
		3.3.6.5.2.2	Publish DMS Status Information	Yes
		3.3.6.5.2.3	Subscribe to DMS Status Information	Yes
		3.3.6.5.2.4	Contents of the DMS Status Request	Yes
		3.3.6.5.2.5	Contents of the DMS Status Information	Yes
		3.3.6.5.2.5.1	Required DMS Status Content	Yes
		3.3.6.5.2.5.2.1	Current Message Number	Yes
		3.3.6.5.2.5.2.2	Message Source	Yes
		3.3.6.5.2.5.2.3	Time Remaining	Yes
2.3.6.6.1	Need to Share Gate Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes
		3.3.6.7.1.1	Send Gate Inventory Information Upon Request	Yes
		3.3.6.7.1.2	Publish Gate Inventory Information	Yes
		3.3.6.7.1.3	Subscribe to Gate Inventory Information	Yes
		3.3.6.7.1.4	Contents of the Gate Inventory Request	Yes
		3.3.6.7.1.5	Contents of the Gate Inventory Information	Yes
		3.3.6.7.1.5.1	Required Gate Inventory Content	Yes
		3.3.6.7.1.5.2.1	Number of Lanes	Yes
2.3.6.6.2	Need to Share Updated Gate Inventory	3.3.6.7.1.2	Publish Gate Inventory Information	Yes
		3.3.6.7.1.3	Subscribe to Gate Inventory Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
2.3.6.6.3	Need to Share Gate Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.3.1	Contents of the Device Status Header	Yes
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.7.2.1	Send Gate Status Information Upon Request	Yes
		3.3.6.7.2.2	Publish Gate Status Information	Yes
		3.3.6.7.2.3	Subscribe to Gate Status Information	Yes
		3.3.6.7.2.4	Contents of the Gate Status Request	Yes
		3.3.6.7.2.5	Contents of the Gate Status Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
2.3.6.8.1	Need to Share Controllable Lanes Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes



Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.9.1.1	Send LCS Inventory Information Upon Request	Yes
		3.3.6.9.1.2	Publish LCS Inventory Information	Yes
		3.3.6.9.1.3	Subscribe to LCS Inventory Information	Yes
		3.3.6.9.1.4	Contents of the LCS Inventory Request	Yes
		3.3.6.9.1.5	Contents of the LCS Inventory Information	Yes
		3.3.6.9.1.5.1	Required LCS Inventory Content	No
		3.3.6.9.1.5.2.1	Number of Lanes	Yes
2.3.6.8.2	Need to Share Updated Controllable Lanes Inventory	3.3.6.9.1.2	Publish LCS Inventory Information	Yes
		3.3.6.9.1.3	Subscribe to LCS Inventory Information	Yes
2.3.6.8.3	Need to Share Controllable Lanes Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.3.1	Contents of the Device Status Header	Yes
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.9.2.1	Send LCS Status Information Upon Request	Yes
		3.3.6.9.2.2	Publish LCS Status Information	Yes
		3.3.6.9.2.3	Subscribe to LCS Status Information	Yes
		3.3.6.9.2.4	Contents of the LCS Status Request	Yes
		3.3.6.9.2.5	Contents of the LCS Status Information	Yes
2.3.6.9.1	Need to Share Ramp Meter Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes
		3.3.6.10.1.1	Send Ramp Meter Inventory Information Upon Request	Yes
		3.3.6.10.1.2	Publish Ramp Meter Inventory Information	Yes
		3.3.6.10.1.3	Subscribe to Ramp Meter Inventory Information	Yes
		3.3.6.10.1.4	Contents of the Ramp Meter Inventory Request	Yes
		3.3.6.10.1.5	Contents of the Ramp Meter Inventory Information	Yes
		3.3.6.10.1.5.1	Required Ramp Meter Inventory Content	No
		3.3.6.10.1.5.2.1	Associated Detectors Identifiers	No
		3.3.6.10.1.5.2.2	Lane Number	Yes
		3.3.6.10.1.5.2.3	Lane Type	Yes
		3.3.6.10.1.5.2.4	Absolute Minimum Metering Rate	Yes
		3.3.6.10.1.5.2.5	Absolute Maximum Metering Rate	Yes
		3.3.6.10.1.5.2.6	System Minimum Metering Rate	Yes
		3.3.6.10.1.5.2.7	System Maximum Metering Rate	Yes
2.3.6.9.2	Need to Share Updated Ramp Meter Inventory	3.3.6.10.1.2	Publish Ramp Meter Inventory Information	Yes
		3.3.6.10.1.3	Subscribe to Ramp Meter Inventory Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
2.3.6.9.3	Need to Share Ramp Meter Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.3.1	Contents of the Device Status Header	Yes
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.10.2.1	Send Ramp Meter Status Information Upon Request	Yes
		3.3.6.10.2.2	Publish Ramp Meter Status Information	Yes
		3.3.6.10.2.3	Subscribe to Ramp Meter Status Information	Yes
		3.3.6.10.2.4	Contents of the Ramp Meter Status Request	Yes
		3.3.6.10.2.5	Contents of the Ramp Meter Status Information	Yes

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.10.2.5.1	Required Ramp Meter Status Content	No
		3.3.6.10.2.5.2.1	Mainline Flow Rate	Yes
		3.3.6.10.2.5.2.2	Mainline Vehicle Occupancy	Yes
		3.3.6.10.2.5.2.3	Mainline Vehicle Speed	Yes
		3.3.6.10.2.5.2.4	Requested Metering Command Source	No
		3.3.6.10.2.5.2.5	Implemented Metering Command Source	Yes
		3.3.6.10.2.5.2.6	Implemented Plan	Yes
		3.3.6.10.2.5.2.7	Implemented Rate	Yes
		3.3.6.10.2.5.2.8	Implemented Vehicles Per Green	Yes
		3.3.6.10.2.5.2.9	Requested Action	Yes
		3.3.6.10.2.5.2.10	Requested Plan	Yes
		3.3.6.10.2.5.2.11	Requested Rate	Yes
		3.3.6.10.2.5.2.12	Requested Vehicles Per Green	Yes
		3.3.6.10.2.5.2.13	Operational Minimum Metering Rate	No
		3.3.6.10.2.5.2.14	Operational Maximum Metering Rate	No
		3.3.6.10.2.5.2.15	Demand Detector Status	Yes
		3.3.6.10.2.5.2.16	Passage Detector Status	Yes
		3.3.6.10.2.5.2.17	Queue Detector Status	Yes
		3.3.6.10.2.5.2.18	Cycle Count	Yes
		3.3.6.10.2.5.2.19	Passenger Vehicle Count	Yes
		3.3.6.10.2.5.2.20	Queue Detected Flag	Yes
		3.3.6.10.2.5.2.21	Violation Vehicle Count	Yes
2.3.6.10.1	Need to Share Signal System Inventory	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No
		3.3.6.1.1.1.3.1	Device Identifier Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.2.1	Contents of the Device Inventory Header	Yes
		3.3.6.1.2.1.1	Required Device Inventory Content	Yes
		3.3.6.1.2.1.2.1	Device Description	Yes
		3.3.6.1.2.1.2.2	Device Control Type	Yes
		3.3.6.1.2.1.2.3	Controller Description	Yes
		3.3.6.1.2.1.2.4	Uniform Resource Locator (URL)	Yes
		3.3.6.1.2.1.2.5	Roadway Network Identifier	Yes
		3.3.6.1.2.1.2.6	Node Identifier	Yes
		3.3.6.1.2.1.2.7	Node Name	No
		3.3.6.1.2.1.2.8	Link Identifier	Yes
		3.3.6.1.2.1.2.9	Link Name	No
		3.3.6.1.2.1.2.10	Link Direction	Yes
		3.3.6.1.2.1.2.11	Route Designator	Yes
		3.3.6.1.2.1.2.12	Linear Reference	Yes
		3.3.6.1.2.1.2.13	Linear Reference Version	Yes
		3.3.6.1.2.1.2.14	Owner Organization	Yes
		3.3.6.1.2.1.2.15	Inventory Date and Time Change Information	Yes
		3.3.6.11.1.1	Send Signal Inventory Information Upon Request	Yes
		3.3.6.11.1.2	Publish Signal Inventory Information	Yes
		3.3.6.11.1.3	Subscribe to Signal Inventory Information	Yes
		3.3.6.11.1.4	Contents of the Signal Inventory Request	Yes
		3.3.6.11.1.5	Contents of the Signal Inventory Information	Yes
		3.3.6.11.1.5.1	Required Signal Inventory Content	Yes
		3.3.6.11.1.5.2.1	Master Controller	Yes
		3.3.6.11.1.5.2.2	Link Identifiers	No
		3.3.6.11.1.5.2.3	Direction of Traffic	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.11.1.5.2.4	Phase Identifier	No
		3.3.6.11.1.5.2.5	Coordinated Phase	N/A
		3.3.6.11.1.5.2.6	Concurrent Phases	N/A
		3.3.6.11.1.5.2.7	Overlap Phase	N/A
		3.3.6.11.1.5.2.8	Overlap Included Phases	N/A
		3.3.6.11.1.5.2.9	Movement Identifier	No
		3.3.6.11.1.5.2.10	Active Movements	N/A
		3.3.6.11.1.5.2.11	Vehicle Movement Approach Link	N/A
		3.3.6.11.1.5.2.12	Pedestrian Movement Approach Link	N/A
		3.3.6.11.1.5.2.13	Departing Link	N/A
		3.3.6.11.1.5.2.14	Crossing Point	N/A
		3.3.6.11.1.5.2.15	Turning Movement Approach Vector	N/A
		3.3.6.11.1.5.2.16	Turning Movement Type	N/A
		3.3.6.11.1.5.2.17	Turning Movement Lanes	N/A
		3.3.6.11.1.5.2.18	Turning Movement Description	N/A
		3.3.6.11.1.5.2.19	Ring Identifier	No
		3.3.6.11.1.5.2.20	Ring-Phase Assignment	No
		3.3.6.11.1.5.2.21	Special Function Identifier	No
		3.3.6.11.1.5.2.22	Special Function Description	No
		3.3.6.11.1.5.2.23	Time Reference	Yes
		3.3.6.11.1.5.2.24	Pattern Sync Reference	Yes
2.3.6.10.2	Need to Share Updated Signal System Inventory	3.3.6.11.1.2	Publish Signal Inventory Information	Yes
		3.3.6.11.1.3	Subscribe to Signal Inventory Information	Yes
2.3.6.10.3	Need to Share Intersection Status	3.3.6.1.1.1	Contents of Device Information Request	Yes
		3.3.6.1.1.1.1	Required Device Information Request Content	Yes
		3.3.6.1.1.1.2.1	Username of the Requesting Operator	No
		3.3.6.1.1.1.2.2	Password of the Requesting Operator	No
		3.3.6.1.1.1.2.3	Owner Organization	No
		3.3.6.1.1.1.2.4	External Center Organization	Yes
		3.3.6.1.1.1.3	Content of Device Information Request Filter	No

Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.1.1.1.3.1	Device Identifier Filter	No
		3.3.6.1.1.1.3.2	Section Identifier Filter	No
		3.3.6.1.1.1.3.3	Roadway Network Identifier Filter	No
		3.3.6.1.1.1.3.4	Link Identifier Filter	No
		3.3.6.1.1.1.3.5	Route Designator Filter	No
		3.3.6.1.1.1.3.6	Linear Reference Filter	No
		3.3.6.1.3.1	Contents of the Device Status Header	Yes
		3.3.6.1.3.1.1.1	Required Device Status Header Content	Yes
		3.3.6.1.3.1.2.1	Unique Identifier of the Controlling Center	Yes
		3.3.6.1.3.1.2.2	Device Communications Status	Yes
		3.3.6.1.3.1.2.3	Operator Identifier	Yes
		3.3.6.1.3.1.2.4	Event Identifier	Yes
		3.3.6.1.3.1.2.5	Event Response Plan	Yes
		3.3.6.1.3.1.2.6	Owner Organization	Yes
		3.3.6.1.3.1.2.7	Status Date and Time Change Information	Yes
		3.3.6.11.2.1	Send Intersection Status Information Upon Request	Yes
		3.3.6.11.2.2	Publish Intersection Status Information	Yes
		3.3.6.11.2.3	Subscribe to Signal Status Information	Yes
		3.3.6.11.2.4	Contents of the Intersection Status Request	Yes
		3.3.6.11.2.5	Contents of the Intersection Status Information	Yes
		3.3.6.11.2.5.1	Required Intersection Status Content	Yes
		3.3.6.11.2.5.2.1	Section Identifier	Yes
		3.3.6.11.2.5.2.2	Planned Signal Timing Mode Description	Yes
		3.3.6.11.2.5.2.3	Timing Pattern Identifier - Current	Yes
		3.3.6.11.2.5.2.4	Timing Pattern Description	Yes
		3.3.6.11.2.5.2.5	Actuation Mode	Yes
		3.3.6.11.2.5.2.6	Plan Mode	Yes
		3.3.6.11.2.5.2.7	Cycle Length - Planned	Yes
		3.3.6.11.2.5.2.8	Cycle Length - Current	Yes



Table 31. IBM Intelligent Transportation support of TMDD version 3 requirements (continued)


User Need ID	User Need	Requirement ID	Requirement	Supported by IBM Intelligent Transportation
		3.3.6.11.2.5.2.9	Cycle Length - Previous	Yes
		3.3.6.11.2.5.2.10	Master Cycle Length - Actual	Yes
		3.3.6.11.2.5.2.11	Offset - Planned	Yes
		3.3.6.11.2.5.2.12	Offset - Actual	Yes
		3.3.6.11.2.5.2.13	Offset - Previous	Yes
		3.3.6.11.2.5.2.14	Controller Cycle Counter	Yes
		3.3.6.11.2.5.2.15	Master Cycle Counter	Yes
		3.3.6.11.2.5.2.16	Offset Reference	Yes
		3.3.6.11.2.5.2.17	Active Phases	Yes
		3.3.6.11.2.5.2.18	Controller Timestamp	Yes
		3.3.6.11.2.5.2.19	Preemption Description	Yes
		3.3.6.11.2.5.2.20	Special Functions	Yes
		3.3.6.11.2.5.2.21	Phase Split	Yes
		3.3.6.11.2.5.2.22	Ring Status	Yes
		3.3.6.11.2.5.2.23	Phase Status Greens	Yes
		3.3.6.11.2.5.2.24	Phase Status Yellows	Yes
		3.3.6.11.2.5.2.25	Phase Status Reds	Yes
		3.3.6.11.2.5.2.26	Phase Status Walks	Yes
		3.3.6.11.2.5.2.27	Phase Status Pedestrian Clearance	Yes
		3.3.6.11.2.5.2.28	Phase Status Don't Walks	Yes
		3.3.6.11.2.5.2.29	Overlap Phase Status Greens	Yes
		3.3.6.11.2.5.2.30	Overlap Phase Status Yellows	Yes
		3.3.6.11.2.5.2.31	Overlap Phase Status Reds	Yes
2.3.8	Need to Accept Null Values	3.3.8	Accept Null Values	Yes

**Related reference:**

“Traffic Awareness TMDD support” on page 111

IBM Intelligent Transportation supports a subset of the Traffic Management Data Dictionary V3 standard.

**Related information:**

 [Traffic Management Data Dictionary \(TMDD\) and Message Sets for External Traffic Management Center Communications \(MS/ETMCC\) Version 3.0](#)

## Supported TMDD data objects, dialogs, and types

IBM Intelligent Transportation implements a subset of TMDD data objects, dialogs, and subscription and request types.

The tables in this section describe the TMDD dialogs and messages used to communicate the specified TMDD data objects that are required. For example, to request the status of Dynamic Message Signs, a `D1DeviceInformationSubscription` message is required.

**Related concepts:**

“Using web services dialogs” on page 111

IBM Intelligent Transportation provides Web Services Definition Language (WSDL) dialogs to communicate data between IBM Intelligent Transportation and other products and services.

“Running a TMDD data flow subscription” on page 122


Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

**Related reference:**

“Traffic Awareness TMDD support” on page 111

IBM Intelligent Transportation supports a subset of the Traffic Management Data Dictionary V3 standard.

**Related information:**

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

**Subscription types**

IBM Intelligent Transportation supports a number of subscription types.

*Table 32. TMDD data objects and subscription types supported by IBM Intelligent Transportation*

TMDD Data Object	Subscription type
Center Active Verification	sendCenterActiveVerificationSubscription
Organization Information	sendOrganizationInformationSubscription
Full Event Update	sendFullEventUpdateSubscription
Event Index	sendNodeStatusSubscription
Node Inventory	sendNodeInventorySubscription
Link Inventory	sendLinkInventorySubscription
Link Status	sendLinkStatusSubscription
Traffic Detector Inventory	sendDetectorInventorySubscription
Traffic Detector Status	sendDetectorStatusSubscription
Traffic Detector Data	sendDetectorDataSubscription
CCTV Inventory	sendCCTVInventorySubscription
CCTV Status	sendCCTVStatusSubscription
Gate Inventory	sendGateInventorySubscription
Gate Status	sendGateStatusSubscription
Intersection Signal Inventory	sendIntersectionSignalInventorySubscription
Intersection Signal Status	sendIntersectionSignalStatusSubscription
Ramp Meter Inventory	sendRampMeterInventorySubscription
Ramp Meter Status	sendRampMeterStatusSubscription
LCS Inventory	sendLCSInventorySubscription
LCS Status	sendLCSStatusSubscription
DMS Inventory	sendDMSInventorySubscription
DMS Status	sendDMSStatusSubscription

**Related concepts:**

“Running a TMDD data flow subscription” on page 122

Subscriptions define the flow of data from the owner center to the external center provided by IBM


Intelligent Transportation.

**Related tasks:**

“Setting up a subscription to traffic data” on page 123

A subscription is a request that is made to an owner center requesting that data is sent periodically to an external center, (IBM Intelligent Transportation). The message that encapsulates the data that is sent to the external center is a publication. Publications are sent to the external center until the subscription is canceled.

**Related information:**

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

## Subscription dialogs

IBM Intelligent Transportation implements a subset of TMDD data objects and subscription dialogs.

*Table 33. TMDD data objects and subscription dialogs supported by IBM Intelligent Transportation*


TMDD Data Object	Subscription Dialog
Center Active Verification	DICenterActiveVerificationSubscription
Organization Information	DIOrganizationInformationSubscription
Full Event Update	DIFullEventUpdateSubscription
Event Index	DIEventIndexSubscription
Node Inventory	DITrafficNetworkInformationSubscription
Link Inventory	DITrafficNetworkInformationSubscription
Link Status	DITrafficNetworkInformationSubscription
Traffic Detector Inventory	DIDeviceInformationSubscription
Traffic Detector Status	DIDeviceInformationSubscription
Traffic Detector Data	DIDetectorDataSubscription
CCTV Inventory	DIDeviceInformationSubscription
CCTV Status	DIDeviceInformationSubscription
Gate Inventory	DIDeviceInformationSubscription
Gate Status	DIDeviceInformationSubscription
Intersection Signal Inventory	DIDeviceInformationSubscription
Intersection Signal Status	DIDeviceInformationSubscription
Ramp Meter Inventory	DIDeviceInformationSubscription
Ramp Meter Status	DIDeviceInformationSubscription
LCS Inventory	DIDeviceInformationSubscription
LCS Status	DIDeviceInformationSubscription
DMS Inventory	DIDeviceInformationSubscription
DMS Status	DIDeviceInformationSubscription

**Related concepts:**

“Running a TMDD data flow subscription” on page 122

Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

**Related information:**

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

## Request types

IBM Intelligent Transportation supports a number of request types.

Table 34. TMDD data objects and request types supported by IBM Intelligent Transportation

TMDD Data Object	Request type
Organization Information	sendOrganizationInformationRequest
Full Event Update	sendFullEventUpdateRequest
Node Inventory	sendNodeInventoryRequest
Link Inventory	sendLinkInventoryRequest
Link Status	sendLinkStatusRequest
Traffic Detector Inventory	sendDetectorInventoryRequest
Traffic Detector Status	sendDetectorStatusRequest
Traffic Detector Data	sendDetectorDataRequest
CCTV Inventory	sendCCTVInventoryRequest
CCTV Status	sendCCTVStatusRequest
Gate Inventory	sendGateInventoryRequest
Gate Status	sendGateStatusRequest
Intersection Signal Inventory	endIntersectionSignalInventoryRequest
Intersection Signal Status	endIntersectionSignalStatusRequest

### Related concepts:

“Running a TMDD data flow subscription” on page 122


Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

### Related tasks:

“Running a bulk load of traffic data” on page 126

After deploying IBM Intelligent Transportation, you can import existing traffic data into the system. Bulk loading is the importation of TMDD traffic data from an owner center. This is different than the typical TMDD data feed used to provide data to IBM Intelligent Transportation at specific intervals. Bulk loading is normally done when the Traffic Awareness feature is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

### Related information:

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

## Request/response dialogs

IBM Intelligent Transportation implements a subset of TMDD request/response dialogs.

Table 35. TMDD data objects and request/response dialogs supported by IBM Intelligent Transportation

TMDD Data Object	Request/Response Dialog
Center Active Verification	DICenterActiveVerificationRequest
Organization Information	DIOrganizationInformationRequest
Full Event Update	DIFullEventUpdateRequest
Event Index	DIEventIndexRequest
Node Inventory	DINodeInventoryRequest
Link Inventory	DILinkInventoryRequest
Link Status	DILinkStatusRequest

Table 35. TMDD data objects and request/response dialogs supported by IBM Intelligent Transportation (continued)


TMDD Data Object	Request/Response Dialog
Traffic Detector Inventory	DIDetectorInventoryRequest
Traffic Detector Status	DIDetectorStatusRequest
Traffic Detector Data	DIDetectorDataRequest
CCTV Inventory	DICCTVInventoryRequest
CCTV Status	DICCTVStatusRequest
Gate Inventory	DIGateInventoryRequest
Gate Status	DIGateStatusRequest
Intersection Signal Inventory	DIIntersectionSignalInventoryRequest
Intersection Signal Status	DIIntersectionSignalStatusRequest
Ramp Meter Inventory	DIRampMeterInventoryRequest
Ramp Meter Status	DIRampMeterStatusRequest
LCS Inventory	DILCSInventoryRequest
LCS Status	DILCSStatusRequest
DMS Inventory	DIDMSInventoryRequest
DMS Status	DIDMSStatusRequest

**Related concepts:**

“Running a TMDD data flow subscription” on page 122

Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

**Related information:**

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

**Publish dialogs**

IBM Intelligent Transportation implements a subset of TMDD data objects and publish dialogs.

Table 36. TMDD data objects and publish dialogs supported by IBM Intelligent Transportation

TMDD Data Object	Publish Dialog
Center Active Verification	DICenterActiveVerificationUpdate
Organization Information	DIOrganizationInformationUpdate
Full Event Update	DIFullEventUpdateUpdate
Event Index	DIEventIndexUpdate
Node Inventory	DINodeInventoryUpdate
Link Inventory	DILinkInventoryUpdate
Link Status	DILinkStatusUpdate
Traffic Detector Inventory	DIDetectorInventoryUpdate
Traffic Detector Status	DIDetectorStatusUpdate
Traffic Detector Data	DIDetectorDataUpdate
CCTV Inventory	DICCTVInventoryUpdate
CCTV Status	DICCTVStatusUpdate
Gate Inventory	DIGateInventoryUpdate

Table 36. TMDD data objects and publish dialogs supported by IBM Intelligent Transportation (continued)

TMDD Data Object	Publish Dialog
Gate Status	DIGateStatusUpdate
Intersection Signal Inventory	DIIntersectionSignalInventoryUpdate
Intersection Signal Status	DIIntersectionSignalInventoryUpdate
Ramp Meter Inventory	DIRampMeterInventoryUpdate
Ramp Meter Status	DIRampMeterStatusUpdate
LCS Inventory	DILCSInventoryUpdate
LCS Status	DILCSStatusUpdate
DMS Inventory	DIDMSInventoryUpdate
DMS Status	DIDMSStatusUpdate

**Related concepts:**

“Running a TMDD data flow subscription” on page 122

Subscriptions define the flow of data from the owner center to the external center provided by IBM Intelligent Transportation.

**Related information:**



Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

**Supported TMDD event groups and types**

IBM Intelligent Transportation supports a subset of TMDD event groups and types.

Table 37 on page 371 contains the event types that are specified in TMDD FullEventUpdate messages sent to IBM Intelligent Transportation. Only one type can be specified on an event.

Table 37. TMDD event groups and types supported by IBM Intelligent Transportation

TMDD Event Group	TMDD Event Type
AccidentsAndIncidents	Accident
	Serious accident
	Injury accident
	Minor accident
	Multi vehicle accident
	Accident involving a bicycle
	Accident involving a bus
	Accident involving a motorcycle
	Accident involving a pedestrian
	Accident involving a train
	Accident involving a truck
	Accident involving a semi trailer
	Accident involving hazardous materials
	Earlier accident
	Secondary accident
	Incident
	Stalled vehicle
	Abandoned vehicle
	Disabled vehicle
	Disabled truck
	Disabled semi trailer
	Disabled bus
	Vehicle spun out
	Vehicle on fire
	Vehicles slowing to look at accident
	Jackknifed semi trailer
	Jackknifed trailer home
	Jackknifed trailer
	Spillage occurring from moving vehicle
	Spilled load
	Overturned vehicle
	Overturned truck
	Overturned semi trailer
	Overturned bus
Stuck vehicle	
Truck stuck under bridge	
Bus stuck under bridge	

Table 37. TMDD event groups and types supported by IBM Intelligent Transportation (continued)

TMDD Event Group	TMDD Event Type
Closures	Closed to traffic
	Closed
	Closed for repairs
	Reduced to one lane
	Reduced to two lanes
	Reduced to three lanes
	Open to traffic
	Open
Obstruction	Obstruction on roadway
	Object on roadway
	Objects falling from moving vehicle
	Debris on roadway
	Storm damage
	People on roadway
	Bicyclists on roadway
	Large numbers of visitors
	Animal on roadway
	Large animal on roadway
	Herd of animals on roadway
	Animal struck
	Fallen trees
	Downed power lines
	Subsidence
	Road surface collapse
	Frost jacking
	Frost heave
	Flooding
	Broken water main
	Collapsed sewer
	Sewer overflow
	Gas leak
	Mudslide
	Avalanche
	Rockfall
	Landslide
Clearance work	



Table 37. TMDD event groups and types supported by IBM Intelligent Transportation (continued)

TMDD Event Group	TMDD Event Type
Roadwork	Road construction
	Major road construction
	Long term road construction
	Construction work
	Work in the median
	Road reconstruction
	Narrow lanes
	Single line traffic alternating directions
	Road maintenance operations
	Road marking operations
	Road widening
	Cracks
	Bumps
	Drop off
	Storm drain
	Bridge maintenance operations
	Bridge construction
	Bridge demolition work
	Overgrown grass
	Overgrown brush or shrubs
	Overgrown trees
	Avalanche control activities
	Water main work
	Gas main work
	Work on underground cables
	Work on underground services
	Emergency maintenance
Road maintenance cleared	
Road work cleared	

**Related tasks:**

“Planning the TMDD data integration” on page 113


Before you integrate IBM Intelligent Transportation with owner centers, the appropriate planning must be done to ensure that your system is correctly configured to capture the required information from road-side traffic subsystems.

**Related reference:**

“Traffic Awareness TMDD support” on page 111

IBM Intelligent Transportation supports a subset of the Traffic Management Data Dictionary V3 standard.

**Related information:**

 Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

## Supported vehicle transit data



IBM Intelligent Transportation is designed to work with the Service Interface for Real Time Information (SIRI) transportation information data standard version 1.3. SIRI is an XML protocol for exchanging real time information about public transport services and vehicles. The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics provides vehicle awareness and prediction estimation capability using a specific set of data that is received and published through SIRI messages.

The following data types are supported by IBM Intelligent Transit Analytics.

### Related tasks:

“Planning the transit data integration” on page 136

Before you integrate transit data into the Vehicle Awareness and Prediction feature, the appropriate planning must be done to ensure that the required results are achieved.

### Related information:



Website for the Service Interface for Real Time Information (SIRI) standard

## Vehicle data requirements



The IBM Intelligent Transportation supports specific data sets in the SIRI schema. There are data ingestion specifications for infrastructure data, vehicle data, and production timetable data. Ensure that the source data sets meet the minimum requirements of the Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics.

### Infrastructure data

A valid data ingestion file set for infrastructure data contains the following files:

File name	Required?	Defines the ...
“boundingbox.csv” on page 375	Optional	Location range of the map.
“direction.csv” on page 376	Required	Available directions in the transit system.
“employee.csv” on page 377	Optional	Employee details within the transit system.
“groupofoperator.csv” on page 377	Optional	Transit system group of operators.
“groupoperatormapping.csv” on page 378	Optional	Mapping between the <b>Operator</b> and the <b>GroupOfOperator</b> .
“journeypattern.csv” on page 378	Required	Journey patterns of the transit system.
“line.csv” on page 379	Required	List of lines in the transit network.
“operator.csv” on page 380	Optional	Operators of the transit network.
“route.csv” on page 380	Required	Routes and lines of the transit network. The shape and stops of the route are defined in separate files.
“service.csv” on page 381	Optional	Services of the transit system.

File name	Required?	Defines the ...
"specifiedstoplink.csv" on page 382	Required	Non-default stop links in a journey pattern. Most journey patterns use default journey shapefile but some might use a specific shape for a stop link.
"stop.csv" on page 382	Required	Stop points of the transit network.
"stoplink_idx.csv" on page 383	Required if not using ESRI shapefiles	Stop points that represent the physical location of stops. Required if you are not using an ESRI shapefile.
"stoplink_shape.csv" on page 384	Required if not using ESRI shapefiles	Route shape between two stops. The stoplink_shape.csv file is part of the shapefile and is required if you are not using an ESRI shapefile.
"ESRI shapefile [stoplink.shp, stoplink.prj, stoplink.dbf]" on page 387	Required for ESRI shapefiles only	Route shape between two stops. A shapefile is required to determine the route shape between two stops. IBM Intelligent Transportation supports ESRI shapefiles.

## Vehicle data

A valid data ingestion file set for vehicle data contains the following files:

File name	Required?	Defines the ...
"vehicle.csv" on page 384	Required	Vehicles in the transit network.
"vehicletype.csv" on page 385	Required	Types of vehicles that are used in the transit network.

## Production timetable data

A valid data ingestion of production timetable data contains the following file:

File name	Required?	Defines the ...
"Sample production timetable file" on page 386	Required	Scheduled production timetable for a specified date.

### Related tasks:

"Planning the transit data integration" on page 136

Before you integrate transit data into the Vehicle Awareness and Prediction feature, the appropriate planning must be done to ensure that the required results are achieved.

### boundingbox.csv



The boundingbox.csv file defines the location range of the map. All the points must be within the bounding box, which is used to check the validity of the data. This file is optional.

## Field definitions

Field name	Schema	Requirement	Description
min_longitude	min_longitude(double)	Mandatory	The minimal longitude of the map
max_longitude	max_longitude(double)	Mandatory	The maximal longitude of the map
min_latitude	min_latitude(double)	Mandatory	The minimal latitude of the map
max_latitude	max_latitude(double)	Mandatory	The maximal latitude of the map

If a boundingbox.csv file is not provided, the longitude is set to -180.0, 180.0 and the latitude is set to -90.0, 90.0.

## Example

The following is an example of the data that is typically found in the boundingbox.csv file.

```
120.000001,130.000002,59.000003,65.000004
```

## direction.csv



The direction.csv file defines the available directions in the transportation system. The public transportation system currently defines two directions, onward and backward. Customized directions must be mapped to them. The customized directions are referenced by the routes.

## Field definitions

Field	Schema	Requirement	Description
user defined direction	user defined direction ID(string)	Mandatory	String representation of direction that is used in the user's own system. This value must be consistent with the <b>directionRef</b> field in the production timetable SIRI msg.
mapped direction	mapped direction(string)	Mandatory	The direction of the route. The value a indicates that the direction is onwards. The value r indicates that the direction is backwards. This field is case-sensitive.

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *user defined direction* field value is mandatory and the *mapped direction* field is optional.

## Example

The following is an example of the data that is typically found in the direction.csv file.

A,Onward,a  
A,Backward,r  
U,forward,a  
D,Onward

## employee.csv



The employee.csv file contains the details of employees within the transit system.

### Field definitions

Field name	Schema	Requirement	Description
PersonnelId	personnelId(string)	Mandatory	Personnel ID of the employee.
name	name(string)	Mandatory	The name of the employee.
phoneNumber	phoneNumber(string)	Optional	The phone number of the employee.
eMailAddress	eMailAddress(string)	Optional	The email address of the employee.
operatorId	operatorId(String)	Optional	The ID of the transit operator. OperatorId is mandatory when the content management indicator is set to 'A' for addition.

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *PersonnelId* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

### Example

The following is an example of the data that is typically found in the employee.csv file.

```
A,293431,Mike,60928299,mike@rio.com,Rio  
U,293431,Jane  
D,293431
```

## groupofoperator.csv



The groupofoperator.csv file defines the group of operators responsible for operating a set of lines within the transit system.

### Field definitions

Field name	Schema	Requirement	Description
GroupOfOperatorId	GroupOfOperatorId(string)	Mandatory	The ID that is assigned to GroupOfOperator
name	name(string)	Mandatory	The name that is assigned to GroupOfOperator

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition, and 'U' for update. If the database function indicator is set to 'D' for delete, only the *GroupOfOperatorId* field value is mandatory.

## Example

The following is an example of the data that is typically found in the `groupofoperator.csv` file.

```
A,Grp_Rio,Rio
A,Grp_Rio,
U,Grp_Rio,NewGroup
D,Grp_Rio
```

## groupoperatormapping.csv



The `groupoperatormapping.csv` file defines the mapping between the **Operator** and the **GroupOfOperator**. The values in the fields must reference the corresponding id's in the `Operator.csv` and `GroupOfOperator.csv` files.

## Field definitions

Field name	Schema	Requirement	Description
GroupOfOperatorId	GroupOfOperatorId(string)	Mandatory	ID of the group of operator
OperatorID	OperatorID(string)	Mandatory	The name of the transit operator

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition, and 'U' for update. If the database function indicator is set to 'D' for delete, only the *GroupOfOperatorId* field value is mandatory.

## Example

The following is an example of the data that is typically found in the `groupoperatormapping.csv` file.

```
A,Grp_Rio,Rio
A,Grp_Rio,
U,Grp_Rio,NewGroup
D,Grp_Rio
```

## journeypattern.csv



A journey pattern is a pattern that represents a set of bus stops that are unique within the system. It is a key reference value throughout the system and enables Intelligent Transit Analytics to identify different routes that are based on the stops that are included in the system. Typically, a journey pattern is associated with a route, as defined in the `route.csv` file, and that binding is assigned here. The `journeypattern.csv` file defines the journey patterns. A journey pattern is bound to a specific route, but a route can have multiple journey patterns associated with it. The *routeId* field must map to the corresponding id in the `route.csv` file.

## Field definitions

Field name	Schema	Requirement	Description
journeyPatternId	journeyPatternId(string)	Mandatory	The ID assigned to the journey pattern

Field name	Schema	Requirement	Description
name	name(string)	Optional	The name of the journey pattern
routeId	routeId(string)	Mandatory	The referenced route ID that the journey pattern belongs to

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *journeyPatternId* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required. Also, the journey pattern relationship to a route cannot be changed.

## Example

The following is an example of the data that is typically found in the *journeypattern.csv* file.

```
A,j001,jp_1,r001
U,j001,jp_1 ,
D,j001
```

## line.csv



The *line.csv* file contains a list of the lines in the transit network. A line typically consists of two routes - an outgoing route and a return route.

## Field definitions

The following table associates the *lineId* with the metadata defining a route, such as the name and classification (function).

Field name	Schema	Requirement	Description
lineId	lineId(string)	Mandatory	The line identification reference, which must be the same value that is provided in the SIRI subscription messages.
name	name(string)	Optional	Name of the line.
function	function(string)	Optional	Classification of the line by function.
geoOperationName	geoOperationName(string)	Optional	Classification of the line by geographic operation.
type	type(string)	Optional	The type of the line.
fleetsize	fleetsize(long)	Optional	Classification of the line by size of the fleet.
region	region(string)	Optional	Classification of the line that is based on the city region that it serves.
groupOfoperatorId	groupOfoperatorId(string)	Optional	ID of the GroupOfOperator.

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *lineId* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

## Example

The following is an example of the data that is typically found in the `line.csv` file.

```
A,150,line 150,Main,NORTH RADIAL,BRT,40,CENTRAL REGION,Grp_Rio
A,150,,,,,
U,150,,new,,,,
D,150
```

## operator.csv



The `operator.csv` file defines the operators of the transit network.

### Field definitions

Field name	Schema	Requirement	Description
OperatorID	OperatorID(string)	Mandatory	The ID of the operator
name	name(string)	Mandatory	The name of the operator

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition, or 'U' for update. If the database function indicator is set to 'D' for delete, only the *OperatorID* field value is mandatory.

## Example

The following is an example of the data that is typically found in the `operator.csv` file.

```
A,Rio,Operator Rio
U,Rio,Operator New
D,Rio
```

## route.csv



The `route.csv` file defines the routes and lines of the transit network. The shape and stops of the route are defined in separate files. A route is defined by an outward & return journey. The entries in this file allow the system to define routes, which map to a specific line that references the corresponding *lineId* in the `line.csv` file, along with a direction of outward or return.

### Field definitions

Field name	Schema	Requirement	Description
routeId	routeId(string)	Mandatory	ID assigned to identify the route.
name	name(string)	Optional	The route name.
lineId	lineId(string)	Mandatory	The line ID for the route.



Field name	Schema	Requirement	Description
directionId	directionId(string)	Mandatory	The direction of the route. The value a indicates that the direction is onwards. The value b indicates that the direction is backwards. This field is case-sensitive.

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *routeId* field value is mandatory and the other fields are optional. Also, multiple routes can refer to the same **lineId**, so there is a possibility that a **lineId** links to multiple line names.

## Example

The following is an example of the data that is typically found in the *route.csv* file.

```
A,r001,route_1, 1001, a
A,r002,,1001, r
U,r001,,1002,
U,r001,,r
D,r001
```

## service.csv



The *service.csv* file defines the services of the transit system. A *service.csv* file encapsulates service metadata information that is displayed to the public. It contains a name, number, and other relevant status type information. The two *JourneyPatternId*'s and the *routeId* must map to the corresponding entries in the *journeypattern.csv* and *line.csv* files.

## Field definitions

Field name	Schema	Requirement	Description
serviceId	serviceId(string)	Mandatory	ID of the service
name	name(string)	Optional	Name of the service
number	number(string)	Optional	Number that is assigned to the service
active	active(boolean)	Optional	Status of the service, where the value true means active and false means inactive
type	type(string)	Optional	Type of service
operativeSystem	operativeSystem(string)	Optional	An optional customer-specific value that describes the operative system that supports the specified service
outgoingJourneyPatternId	outgoingJourneyPatternId (string)	Optional	ID of the outgoing journey pattern
returnJourneyPatternId	returnJourneyPatternId (string)	Optional	ID of the return journey pattern
lineId	lineId(string)	Mandatory	ID of the line

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *serviceld* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

## Example

The following is an example of the data that is typically found in the *service.csv* file.

```
A,svc0,service svc0,service number svc0,true,service type svc0,service by Rio,j9,j0,10
U,svc0,service1,,,,,,,,,
D,svc0
```

## specifiedstoplink.csv



A stop link is a shape between two stops. The *specifiedstoplink.csv* file lists the non-default stop links in a journey pattern. Most journey patterns use a default journey shapefile, but some use a specific shape for a stop link. If a journey pattern does not use the default stop links, the stop links must be listed in this file. Multiple shapes are possible between two bus stops, for example, two buses travel along different roads from one stop to the next. Typically, one of these shapes is defined as the default shape because most buses travel this route. If you must define more than one shape, you must enter the alternative shapes in this file.

## Field definitions

Field name	Schema	Requirement	Description
journeyPatternId	journeyPatternId(str)	Mandatory	ID of the journey pattern that applies
stopLinkId	stopLinkId(str)	Mandatory	ID of the stop link

## Example

The following is an example of the data that is typically found in the *specifiedstoplink.csv* file.

```
A, j001, link_1
A, j002, link_2
D, j001, link_2
```

## stop.csv



The *stop.csv* file defines the stop points of the transit network. Stop points represent the physical location of bus stops. The coordinates are contained in the bounding box. With this file, you can define the physical bus stops within the system, and assign each bus stop a unique id. Stops have a name, a position, and a defined time window in which they operate. The id's defined in the *stop.csv* file are referenced by the entries in the *stoplink\_idx.csv* file.

## Field definitions

Field name	Schema	Requirement	Description
stopId	stopId(str)	Mandatory	The stop point id
name	name(str)	Optional	The name of the stop point
longitude	longitude(double)	Mandatory	The longitude of the stop point

Field name	Schema	Requirement	Description
latitude	latitude(double)	Mandatory	The latitude of the stop point
openingTime	openingTime(time)	Optional	The opening time of the stop
closingTime	closingTime(time)	Optional	The closing time of the stop

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *stopId* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

## Example

The following is an example of the data that is typically found in the stop.csv file.

```
A,s001,stop_1,100.01,50.01
A,s002,,101.01,51.01
U,s001,,102.01,52.01
D,s002
```

## stoplink\_idx.csv



The stoplink\_idx.csv file is part of the shapefile that is required to determine the route shape between two stops. The stoplink\_idx.csv and stoplink\_shape.csv files make up the shapefile and are required if you are not using an ESRI shapefile. Shape points do not always start or end with stop points, but the stop point must be projected to the shape within a reasonable distance. The default distance is 10 meters. The start and end stops reference the information that is contained in the stop.csv file. With this file, you can define a link between the two stops, and indicate whether it is the default or not. In this context, a link is the road network between the stops. Vehicles moving between stops usually travel on the same link, but you can define alternative routes by flagging entries in this file with an *isDefault* value of 'false'.

## Field definitions

Field name	Schema	Requirement	Description
stopLinkId	stopLinkId(string)	Mandatory	ID of the stop link
startStopId	startStopId(string)	Mandatory	ID of the first stop
endStopId	endStopId(string)	Mandatory	ID of the second stop
isDefault	isDefault(boolean)	Mandatory	Determines whether it is the default shape of the stop link. There can be multiple shapes for a stop link. The one that is most used must be set as the default. A shape that is not the default can be referenced by a specific journey pattern.

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *stopLinkId* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

Do not update the start stop and end stop details at the same time, otherwise errors might occur.

## Example

The following is an example of the data that is typically found in the stoplink\_idx.csv file.

```
A,link_1,stop_1,stop_2,true  
U,link_1,stop_1,stop_2,false  
D,link_1
```

### Related reference:

“ESRI shapefile [stoplink.shp, stoplink.prj, stoplink.dbf]” on page 387

A shapefile is required to determine the route shape between two stops. IBM Intelligent Transportation supports ESRI shape files.

## stoplink\_shape.csv



The stoplink\_shape.csv file is part of the shapefile that is required to determine the route shape between two stops. The stoplink\_shape.csv and stoplink\_idx.csv files make up the shapefile and are required if you are not using an ESRI shapefile. Shape points do not always start or end with stop points, but the stop point must be projected to the shape within a reasonable distance.

## Field definitions

Field name	Schema	Requirement	Description
stoplinkId	stoplinkId(str)	Mandatory	ID of the stop link
longitude	longitude(double)	Mandatory	Longitude of the point that defines the stop link
latitude	latitude(double)	Mandatory	Latitude of the point that defines the stop link

**Note:** Each stop point is represented by a set of longitude and latitude coordinates. The schema of the stoplink\_shape.csv file can contain an arbitrary number of longitude and latitude coordinates, however there must be at least two or more pairs in each file. Also, the stoplink\_shape.csv file must be aligned with the stoplink\_idx.csv file.

## Example

The following is an example of the data that is typically found in the stoplink\_shape.csv file.

```
link_1,100.000000,100.000000,110.000000,110.000000
```

### Related reference:

“ESRI shapefile [stoplink.shp, stoplink.prj, stoplink.dbf]” on page 387

A shapefile is required to determine the route shape between two stops. IBM Intelligent Transportation supports ESRI shape files.

## vehicle.csv



The vehicle.csv file defines the vehicles in the transit network.

## Field definitions

Field name	Schema	Requirement	Description
id	id(string)	Mandatory	Vehicle ID
registrationNumber	registrationNumber(string)	Optional	Vehicle registration number
vehicleTypeId	vehicleTypeId(string)	Optional	Vehicle type ID

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *id* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

## Example

The following is an example of the data that is typically found in the `vehicle.csv` file.

```
A,ve001,xyz001,vt001
A,ve002, , vt002
U,ve001,newname,
D,ve001
```

## vehicletype.csv



The `vehicletype.csv` file defines the types of vehicles that are used in the transit network.

## Field definitions

Field name	Schema	Requirement	Description
id	id(string)	Mandatory	The vehicle type ID.
name	name(string)	Optional	Vehicle type name.
description	description(string)	Optional	Vehicle type description.
length	length(double)	Optional	Length of vehicle type, in centimeters.
reversingDirection	reversingDirection(boolean)	Optional	In many systems, vehicles cannot change their direction at any point of their route and need switchback or reversing loops to perform a turnaround. If a vehicle can reverse its direction, set to 'true'; otherwise set to 'false'.
selfPropelled	selfPropelled(boolean)	Optional	Classification of whether the vehicle is self-propelled. If a vehicle is self-propelled set to 'true'.
seatingCapacity	seatingCapacity(integer)	Optional	Seating capacity in the vehicle.
standingCapacity	standingCapacity(integer)	Optional	Standing capacity in the vehicle.

Field name	Schema	Requirement	Description
specialPlaceCapacity	specialPlaceCapacity (integer)	Optional	Special place capacity in the vehicle.

**Note:** The **Requirement** column in the field definitions table applies when the database function indicator is set to 'A' for addition. If the database function indicator is set to 'D' for delete, or 'U' for update, the *id* field value is mandatory and the other fields are optional. Only field values to be updated or deleted are required.

## Example

The following is an example of the data that is typically found in the `vehicletype.csv` file.

```
A,vt001, abcXYZ, day bus, 10, false, true, 30, 8, 6
A,vt002,,,,,,,,
U,vt001,newname,,,,,
D,vt001
```

## Sample production timetable file



The production timetable file defines the scheduled production timetable for a specified date. The production timetable is a key part of the database schema of IBM Intelligent Transit Analytics.

## Field definitions

The schema and data elements of the production timetable are documented in the specifications for **ProductionTimetableDelivery** response on the Service Interface for Real Time Information (SIRI) version 1.3 website.

The following table outlines the elements of the SIRI production timetable that are used by IBM Intelligent Transit Analytics.

Field	Requirement	Description
DatedVehicleJourneyCode	Mandatory	A reference to the dated vehicle journey that the vehicle is making
JourneyPatternRef	Mandatory	Identifier of the journey pattern that the journey follows
ServiceFeatureRef	Mandatory	Identifier of the service that is running on the specified line
StopPointRef	Mandatory	Identifier of the stop point
Order	Mandatory	Ordering of stop points in the journey, which is useful for loops
AimedArrivalTime	Mandatory	Arrival time
AimedDepartureTime	Mandatory	Departure time
VehicleJourneyRef	Optional	Identifier of the vehicle journey

In the production timetable file, the date and time are based on the `xsd:DateTime` data type. If no timezone information is specified, the date and time default to Coordinated Universal Time.

## Example

The following is an example of a production timetable in a file named 2004-12-17\_productiontimetable.xml.

```
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xsi:schemaLocation=
  "http://www.siri.org.uk/siri xsd/siri_1.3/siri.xsd" version="1.3">
  <ServiceDelivery>
    <ResponseTimestamp>2004-12-17T09:45:00+01:00</ResponseTimestamp>
    <ProductionTimetableDelivery version="1.3">
      <ResponseTimestamp>2004-12-17T09:45:00+01:00</ResponseTimestamp>
      <DatedTimetableVersionFrame>
        <RecordedAtTime>2004-12-17T09:45:00+01:00</RecordedAtTime>
        <LineRef>123</LineRef>
        <DirectionRef>onward</DirectionRef>
        <DatedVehicleJourney>
          <DatedVehicleJourneyCode>1255</DatedVehicleJourneyCode>
          <JourneyPatternRef>125</JourneyPatternRef>
          <DatedCalls>
            <DatedCall>
              <StopPointRef>1234</StopPointRef>
              <Order>1</Order>
              <AimedArrivalTime>2004-12-17T09:45:00+01:00</AimedArrivalTime>
            </DatedCall>
            <DatedCall>
              <StopPointRef>1235</StopPointRef>
              <Order>2</Order>
              <AimedArrivalTime>2004-12-17T09:45:00+01:00</AimedArrivalTime>
            </DatedCall>
          </DatedCalls>
        </DatedVehicleJourney>
      </DatedTimetableVersionFrame>
    </ProductionTimetableDelivery>
  </ServiceDelivery>
</Siri>
```

### Related information:



Website for the Service Interface for Real Time Information (SIRI) standard

## ESRI shapefile [stoplink.shp, stoplink.prj, stoplink.dbf]



A shapefile is required to determine the route shape between two stops. IBM Intelligent Transportation supports ESRI shape files.

IBM Intelligent Transit Analytics requires that the ESRI shapefile includes the following files:

- stoplink\_shape.shp
- stoplink\_shape.prj
- stoplink\_shape.dbf

For information about the technical specifications of the ESRI shapefile format, go to the ESRI website.

If you do not have an ESRI shapefile to ingest into IBM Intelligent Transportation, then you must ingest the stoplink\_shape.csv and stoplink\_idx.csv files to form the shapefile. For more information, see the related links.

### Related reference:

“stoplink\_idx.csv” on page 383

The stoplink\_idx.csv file is part of the shapefile that is required to determine the route shape between two stops. The stoplink\_idx.csv and stoplink\_shape.csv files make up the shapefile and are required if you are not using an ESRI shapefile. Shape points do not always start or end with stop points, but the stop point must be projected to the shape within a reasonable distance. The default distance is 10 meters. The start and end stops reference the information that is contained in the stop.csv file. With this file, you can define a link between the two stops, and indicate whether it is the default or not. In this context, a link is the road network between the stops. Vehicles moving between stops usually travel on the same link, but you can define alternative routes by flagging entries in this file with an *isDefault* value of 'false'.

“stoplink\_shape.csv” on page 384

The stoplink\_shape.csv file is part of the shapefile that is required to determine the route shape between two stops. The stoplink\_shape.csv and stoplink\_idx.csv files make up the shapefile and are required if you are not using an ESRI shapefile. Shape points do not always start or end with stop points, but the stop point must be projected to the shape within a reasonable distance.

**Related information:**

 [Esri website](#)

## Supported inbound SIRI requests for vehicle monitoring



Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics supports specified inbound SIRI messages for vehicle monitoring through the **VehicleMonitoringRequest** schema.

### VehicleMonitoringRequest topic and policy elements

The **VehicleMonitoringRequest** schema includes topic parameters to filter the information, for example, by vehicle, line, and direction. The **VehicleMonitoringRequest** schema also includes policy parameters to control the amount of data that is returned.

The following table lists the supported inbound topic and policy SIRI request elements for the **VehicleMonitoringRequest** schema.

Table 38. Supported inbound vehicle monitoring SIRI data

VehicleMonitoringRequest element			Structure	Description
Topic	VehicleRef	0:1	->VehicleCode	Identifier of a specific vehicle about which data is requested. Optional SIRI capability: ByVehicle. This option cannot be used when the LineRef element is defined. Choose either VehicleRef or LineRef.
	LineRef	0:1	->LineCode	Filter the results to include only vehicles for the given line. This option cannot be used when the VehicleRef element is defined. Choose either LineRef or VehicleRef.
	DirectionRef	0:1	->DirectionCode	Filter the results to include only vehicles going to the specified direction. Optional SIRI capability: FilterByDirectionRef.



Table 38. Supported inbound vehicle monitoring SIRI data (continued)

VehicleMonitoringRequest element			Structure	Description
Policy	MaximumVehicles	0:1	xsd:positiveInteger	The maximum number of vehicle journeys in a given delivery. The most recent number of VehicleActivity instances within the look-ahead window are included. If absent, there is no limit.
	MaximumNumberOfCalls	0:1	+Structure	If calls are to be returned, the maximum number of calls to include in response. If absent, include all calls.
	Onwards	0:1	xsd:positiveInteger	Maximum number of onwards calls to include.

The following code is an example of an inbound SIRI vehicle monitoring message:

```
<Siri xsi:schemaLocation="http://www.siri.org.uk/siri xsd/siri_1.3/siri.xsd"
xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.3">
<ServiceRequest>
<RequestTimestamp>2012-06-12T09:30:47-05:00</RequestTimestamp>
<RequestorRef>NADER</RequestorRef>
<VehicleMonitoringRequest version="1.3">
<RequestTimestamp>2012-06-12T09:30:47-05:00</RequestTimestamp>
<VehicleRef>VEH222</VehicleRef>
<DirectionRef>Out</DirectionRef>
<MaximumNumberOfCalls>
<Onwards>3</Onwards>
</MaximumNumberOfCalls>
</VehicleMonitoringRequest>
</ServiceRequest>
</Siri>
```

This example inbound SIRI message is for a vehicle whose ID is VEH222 and is moving in the outbound direction with only 3 onward calls remaining.

#### Related information:

 [Website for the Service Interface for Real Time Information \(SIRI\) standard](#)

## Supported inbound SIRI requests for stop monitoring



The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics supports specified inbound SIRI requests for stop monitoring through the **StopMonitoringRequest** schema.

### StopMonitoringRequest topic and policy elements

The **StopMonitoringRequest** schema includes topic parameters to filter the information, for example, by stop, line, and direction. The **StopMonitoringRequest** schema also includes policy parameters to control the amount of data returned.

The following table lists the supported inbound topic and policy SIRI request elements for the **StopMonitoringRequest** schema.

Table 39. Supported inbound vehicle monitoring SIRI data

StopMonitoringRequest element			Structure	Description
Topic	PreviewInterval	0:1	PositiveDurationType	Forward duration for which Visits should be included, that is the interval before predicted arrival at the stop for which to include visits. Journeys due to arrive or depart within this time span are returned only.
	StartTime	0:1	Xsd:dateTime	Initial start time for <b>PreviewInterval</b> . If absent, the current time is assumed. Must be within the data horizon.
	MonitoringRef	1:1	->MonitoringCode	Set this parameter to be an identifier of a stop point. If the parameter starts with the string all or All-forecasted then it will return all forecast results for all stops.
	LineRef	0:1	->LineCode	Filter the results to include Stop Visits only for vehicles for the specified line.
	DirectionRef	0:1	->DirectionCode	Filter the results to include Stop Visits only for vehicles that are running in a specific relative direction. For example, inbound or outbound. <b>Note:</b> Direction does not specify the destination. Optional SIRI capability: TopicFiltering; ByDirection.
	DestinationRef	0:1	->StopPointCode	Filter the results to include only visits for vehicles that are going to the specified destination. Optional SIRI capability: TopicFiltering; ByDestination.
Policy	MaximumStopVisits	0:1	xsd:positiveInteger	The maximum number of arrival or departure visits to include in a specific delivery. The first <i>n</i> <b>StopVisits</b> within the look-ahead window are included. Only visits within the LookAheadInterval are returned. The <b>MinimumStopVisitsPerLine</b> parameter can be used to reduce the number of entries for each line within the total returned.
	MaximumNumbersOfCalls	0:1	+Structure	If calls are to be returned, maximum number of calls to include in the response. If this value is not present, then include all calls. Optional SIRI capability: StopVisitCalls.
	Onwards	0:1	xsd:positiveInteger	Maximum number of onward calls to include.

In the following example, the output returns of the **StopMonitoringRequest** results for line LINE77 with direction OUTBOUND and destination of PLACE98765, are for all stops that the vehicle will first arrive at within the time of 2004-12-17T09:32:27-05:00. The maximum stops are limited to seven stops. The maximum number of onward calls are limited to three.

```
<Siri xsi:schemaLocation="http://www.siri.org.uk/siri xsd/siri_1.3/siri.xsd"
xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.3">
<ServiceRequest>
<RequestTimestamp>2012-06-12T09:30:47-05:00</RequestTimestamp>
<RequestorRef>NADER</RequestorRef>
```

```

<StopMonitoringRequest version="1.3">
  <RequestTimestamp>2004-12-17T09:30:47-05:00</RequestTimestamp>
  <PreviewInterval>100</PreviewInterval>
  <StartTime>2004-12-17T09:30:47-05:00</StartTime>
  <MonitoringRef>All-forecasted</MonitoringRef>
  <LineRef>LINE77</LineRef>
  <DirectionRef>OUTBOUND</DirectionRef>
  <DestinationRef>PLACE98765</DestinationRef>
  <MaximumStopVisits>7</MaximumStopVisits>
  <MaximumNumberOfCalls>
    <Onwards>3</Onwards>
  </MaximumNumberOfCalls>
</StopMonitoringRequest>
</ServiceRequest>
</Siri>

```

### Related information:

 Website for the Service Interface for Real Time Information (SIRI) standard

## Supported outbound SIRI data for vehicle monitoring



The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics supports outbound **vehicle monitoring** SIRI data.

### Sample SIRI XML file

See the following sample of a supported XML file that contains **vehicle monitoring** SIRI data.

```

<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri"
  xmlns:acsb="http://www.ifopt.org.uk/acsb"
  xmlns:ifopt="http://www.ifopt.org.uk/ifopt"
  xmlns:D2LogicalModel="http://datex2.eu/schema/1_0/1_0"
  xmlns:ns1="http://www.siri.org.uk/"
  xmlns:core="http://www.govtalk.gov.uk/core"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.siri.org.uk/siri xsd/siri_1.3/siri.xsd" version="1.3">
  <ServiceDelivery>
    <ResponseTimestamp>
      2006-05-04T18:13:51.0Z
    </ResponseTimestamp>
    <ProducerRef>
      ibm
    </ProducerRef>
    <VehicleMonitoringDelivery version="1.3">
      <ResponseTimestamp>
        2006-05-04T18:13:51.0Z
      </ResponseTimestamp>
      <VehicleActivity>
        <RecordedAtTime>
          2006-05-04T18:13:51.0Z
        </RecordedAtTime>
        <ValidUntilTime>
          2006-05-04T19:13:51.0Z
        </ValidUntilTime>
        <MonitoredVehicleJourney>
          <LineRef>
            54656
          </LineRef>
          <FramedVehicleJourneyRef>
            <DataFrameRef>
              1337
            </DataFrameRef>

```

```

<DatedVehicleJourneyRef>
1234
</DatedVehicleJourneyRef>
</FramedVehicleJourneyRef>
<ConfidenceLevel>
certain
</ConfidenceLevel>
<!-- The next stop points-->
<OnwardCalls>
<OnwardCall>
<StopPointRef>
1456
</StopPointRef>
<Order>
1
</Order>
<ExpectedArrivalTime>
2006-05-04T18:13:51.0Z
</ExpectedArrivalTime>
<ExpectedDepartureTime>
2006-05-04T18:13:51.0Z
</ExpectedDepartureTime>
</OnwardCall>
<OnwardCall>
<StopPointRef>
1456
</StopPointRef>
<Order>
2
</Order>
<ExpectedArrivalTime>
2006-05-04T18:13:51.0Z
</ExpectedArrivalTime>
<ExpectedDepartureTime>
2006-05-04T18:13:51.0Z
</ExpectedDepartureTime>
</OnwardCall>
</OnwardCalls>
</MonitoredVehicleJourney>
</VehicleActivity>
<!--
<VehicleActivity>
...
</VehicleActivity>
-->
</VehicleMonitoringDelivery>
</ServiceDelivery>
</Siri>

```

**Related reference:**

“Supported outbound SIRI data for stop monitoring”

The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics supports outbound **stop monitoring** SIRI data. An example XSD definition and XML output are provided to show the supported outbound SIRI data for **stop monitoring**.

**Related information:**

 [Website for the Service Interface for Real Time Information \(SIRI\) standard](#)

## Supported outbound SIRI data for stop monitoring



The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics supports outbound **stop monitoring** SIRI data. An example XSD definition and XML output are provided to show the supported outbound SIRI data for **stop monitoring**.

## Sample SIRI XML file

See the following sample of a supported XML file that contains **stop monitoring** SIRI data.

```
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.3"
xsi:schemaLocation="http://www.siri.org.uk/siri ../siri.xsd">
<ServiceDelivery>
<ResponseTimestamp>
2004-12-17T09:30:46-05:00
</ResponseTimestamp>
<ProducerRef>
IBM
</ProducerRef>
<StopMonitoringDelivery version="1.3">
<ResponseTimestamp>
2006-05-04T18:13:51.0Z
</ResponseTimestamp>
<ValidUntil>
2006-05-04T18:13:51.0Z
</ValidUntil>
<MonitoredStopVisit>
<RecordedAtTime>
2006-05-04T18:13:51.0Z
</RecordedAtTime>
<MonitoringRef>
HLTST011
</MonitoringRef>
<MonitoredVehicleJourney>
<LineRef>
Line123
</LineRef>
<DirectionRef>
Out
</DirectionRef>
<FramedVehicleJourneyRef>
<DataFrameRef>
2004-12-17
</DataFrameRef>
<DatedVehicleJourneyRef>
Oubound
</DatedVehicleJourneyRef>
</FramedVehicleJourneyRef>
<ConfidenceLevel>
certain
</ConfidenceLevel>
<VehicleRef>
VEH987654
</VehicleRef>
<MonitoredCall>
<ExpectedArrivalTime>
2006-05-04T18:13:51.0Z
</ExpectedArrivalTime>
<ExpectedDepartureTime>
2006-05-04T18:13:51.0Z
</ExpectedDepartureTime>
</MonitoredCall>
<OnwardCalls>
<OnwardCall>
```

```

<StopPointRef>
HLTST012
</StopPointRef>
<Order>
4
</Order>
<ExpectedArrivalTime>
2006-05-04T18:13:51.0Z
</ExpectedArrivalTime>
<ExpectedDepartureTime>
2006-05-04T18:13:51.0Z
</ExpectedDepartureTime>
</OnwardCall>
</OnwardCalls>
</MonitoredVehicleJourney>
</MonitoredStopVisit>
<!--MonitoredStopVisit>
.....
</MonitoredStopVisit-->
</StopMonitoringDelivery>
</ServiceDelivery>
</Siri>

```

**Related reference:**

“Supported outbound SIRI data for vehicle monitoring” on page 391  
The Vehicle Awareness and Prediction feature of IBM Intelligent Transit Analytics supports outbound **vehicle monitoring** SIRI data.

**Related information:**

 Website for the Service Interface for Real Time Information (SIRI) standard

## ITS standards

IBM Intelligent Transportation is designed in compliance with ITS and information technology (IT) standards that are defined and recognized by the transportation industry.

The following table lists the ITS and IT standards that all features of IBM Intelligent Transportation are developed in compliance with.

*Table 40. List of ITS standards in the transportation industry.*

Name	Description	Reference link
Abstract Syntax Notation One (ASN.1)	The international standard developed by the International Telecommunication Union for defining the syntax of information data. It defines a number of simple data types and specifies a notation for referencing these types and for specifying values of these types.	<a href="http://www.itu.int/ITU-T/studygroups/com17/languages/X.680-0207.pdf">http://www.itu.int/ITU-T/studygroups/com17/languages/X.680-0207.pdf</a>
Advanced Traveler Information Systems (ATIS)	Advanced Traveler Information Systems are aimed at providing users of the transportation system with more information to make decisions about route choices, estimate travel times, and avoid congestion. Most ATIS technologies are also aimed at the motor vehicle operator.	<a href="http://www.standards.its.dot.gov/">http://www.standards.its.dot.gov/</a>

Table 40. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
Advanced Traffic Management Systems (ATMS)	Systems that integrate technology in urban environments with the aim to reduce traffic congestion, increase road safety, and improve the flow of vehicle traffic. Such systems use solutions to congestion problems through the deployment of simple and reliable sensing, communications, and data-processing technologies.	<a href="http://www.standards.its.dot.gov/">http://www.standards.its.dot.gov/</a>
Center-to-Center (C2C)	Center-to-Center (C2C) communications span the entire ITS domain, covering the exchange of data between computers that are physically located in different transportation management center facilities. For example, traffic management centers, transit management centers, public safety, parking management centers). C2C standards enable this data exchange, specifying what information is exchanged, how and when it is exchanged, and the underlying transport mechanisms. C2C standards can be divided into 2 categories: (1) the message and data content and (2) the rules for exchanging the messages and data.	<a href="http://www.standards.its.dot.gov/">http://www.standards.its.dot.gov/</a>
Closed-circuit television (CCTV)	The use of video cameras to transmit a signal to a specific place, on a limited set of monitors.	N/A
Data Exchange (Datex)	One of the NTCIP defined standards for center to center communications. Datex is a set of specifications for exchanging traffic information in a standard format between disparate systems. It is aimed at harmonizing the exchange of traffic and travel information at all levels that are applicable to road operators (non-urban and urban) and service providers. It facilitates the electronic exchange of traffic and travel related data between traffic centers including cross border exchange. Datex II is a new generation structured data model that uses UML. It features a platform independent model that can be mapped to multiple implementation platforms.	<a href="http://www.datex2.eu/">http://www.datex2.eu/</a>

Table 40. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
Dynamic Message Signs (DMS)	Dynamic Message Signs (DMS) are LED screens that operate as part of a roadway traffic control system. Dynamic message signs display prohibitory, warning, or announcement messages that are based on the traffic situation and that are installed throughout a transportation network. This standard allows integration of DMS devices and products from multiple manufacturers into a single system by using standard communications and data.	<a href="http://www.standards.its.dot.gov/">http://www.standards.its.dot.gov/</a>
External Centers (EC)	An external center is a transportation system that uses the center-to-center services that are provided by a TMDD owner center or other data center.	<a href="http://www.standards.its.dot.gov/">http://www.standards.its.dot.gov/</a>
Extensible Markup Language (XML)	A standard metalanguage for defining markup languages that is based on Standard Generalized Markup Language (SGML).	<a href="http://www.w3.org/XML/">http://www.w3.org/XML/</a>
Institute of Transportation Engineers (ITE)	An international educational and scientific association of transportation professionals, including, engineers, transportation planners, consultants, educators, and researchers. Founded in 1930, ITE facilitates the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development, and management for any mode of ground transportation. More information about ITE can be found on their website:	<a href="http://www.ite.org/">http://www.ite.org/</a>
Intelligent Transportation System (ITS)	A term used in the transportation industry to refer to using information and communications technology to deliver efficient and reliable services within a transportation infrastructure. These services include managing traffic, archived data, and incident information. ITS standards are open-interface standards that establish communication rules for how traffic systems, devices, products, and components can interconnect, exchange information and interact.	<a href="http://www.its.dot.gov/">http://www.its.dot.gov/</a>



Table 40. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
Location Referencing Message Specification (LRMS)	Describes a set of standard interfaces for the transmission of location references among different components of Intelligent Transportation Systems (ITS). The LRMS facilitates the movement of ITS data on a transportation network, providing a common language for the expression of location among the different components. LRMS interfaces define standard meanings for the content of location reference messages, and standard, public domain formats for the presentation of location references to application software.	<a href="http://www.standards.its.dot.gov/">http://www.standards.its.dot.gov/</a>
National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP)	A family of communication standards that is used for transmitting data and messages between computer systems used in intelligent transportation systems. NTCIP provides both the rules for communicating and the vocabulary necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a system. The NTCIP is the first set of standards for the transportation industry that allows traffic control systems to be built by using a "mix and match" approach with equipment from different manufacturers. Therefore, NTCIP standards reduce the need for reliance on specific equipment vendors and customized one-of-a-kind software.	<a href="http://www.ntcip.org/">http://www.ntcip.org/</a>
Society of Automotive Engineers (SAE)	A non-profit educational and scientific organization dedicated to advancing mobility technology to better serve humanity. Over 90,000 engineers and scientists that develop technical information on all forms of self-propelled vehicles.	<a href="http://www.sae.org/about/">http://www.sae.org/about/</a>
Service Interface for Real Time Information (SIRI) version 1.3	An XML protocol to allow distributed computers to exchange real-time information about public transport services and vehicles.	<a href="http://www.siri.org.uk">http://www.siri.org.uk</a>
Simple Object Access Protocol (SOAP)	A lightweight, XML-based protocol for exchanging information in a decentralized, distributed environment. SOAP can be used to query and return information and start services across the Internet.	<a href="http://www.w3.org/TR/soap/">http://www.w3.org/TR/soap/</a>

Table 40. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
Traffic Management Centers	The hub of a transportation management system. Information about the transportation network is collected and combined with other operational and control data to manage the transportation network and produce traveler information. There are several NTCIP standards for Center-to-Center Communications that are defined for traffic management centers.	<a href="http://www.ntcip.org/library/standards/default.asp?documents=yes&amp;standard=9010">http://www.ntcip.org/library/standards/default.asp?documents=yes&amp;standard=9010</a>
Transmodel version 5.0	TRANSMODEL is a reference data model for Public Transport operations that has been developed within several European projects. It concerns mainly the needs of urban bus, trolleybus, tramway and light rail operators.	<a href="http://www.transmodel.org/en/cadre1.html">http://www.transmodel.org/en/cadre1.html</a>
TMDD Traffic Management Data Dictionary Standard for Center-to-Center Communications	A standard used by the transportation industry to define and support center-to-center interface communications as part of the regional deployment of an intelligent transport system (ITS). TMDD provides the dialogs, message sets, data frames, and data elements to manage the shared use of these devices and the regional sharing of data and incident management responsibility. TMDD is defined under the National Transportation Communications for Intelligent Transportation System Protocol (NTCIP) family of standards.	<a href="http://www.ite.org/standards/tmdd/">http://www.ite.org/standards/tmdd/</a>
Uniform Resource Locator (URL)	The unique address of an information resource that is accessible in a network such as the Internet. The URL includes the abbreviated name of the protocol and the information used by the protocol to locate the information resource.	<a href="http://www.w3.org/Addressing/URL/Overview.html">http://www.w3.org/Addressing/URL/Overview.html</a>
Web Services Description Language (WSDL)	An XML-based specification for describing networked services as a set of endpoints that operate on messages that contain either document-oriented or procedure-oriented information. WSDL is one of the NTCIP defined standards for center to center communications.	<a href="http://www.w3.org/2002/ws/desc/">http://www.w3.org/2002/ws/desc/</a>

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## Glossary

This glossary provides terms and definitions for the IBM Intelligent Transportation software and products.

The following cross-references are used in this glossary:

- *See* refers you from a nonpreferred term to the preferred term or from an abbreviation to the spelled-out form.
- *See also* refers you to a related or contrasting term.

For other terms and definitions, see the IBM Terminology website (opens in new window).

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### A

#### **administrator permission**

The authority granted to an administrator to give them access to create, configure, and delete portal resources or users. This authority is granted by membership of a user role group.

**APAR** See authorized program analysis report.

#### **application server**

A server program in a distributed network that provides the execution environment for an application program.

#### **authentication**

A security service that provides proof that a user of a computer system is genuinely who that person claims to be. Common mechanisms for implementing this service are passwords and digital signatures.

#### **authorization**

The process of granting a user, system, or process either complete or restricted access to an object, resource, or function.

#### **authorized program analysis report (APAR)**

A request for correction of a defect in a supported release of a program supplied by IBM.

### B

#### **base map**

A map that depicts background reference information such as landforms, roads, landmarks, and political boundaries, onto which other thematic information is placed. A base map is used for locational reference and often includes a geodetic control network as part of its structure.

### C

**cache** Memory used to improve access times to instructions, data, or both. Data that resides in cache memory is normally a copy of data that resides elsewhere in slower, less expensive storage, such as on a disk or on another network node.

**CCTV** See closed-circuit television.

#### **closed-circuit television (CCTV)**

The use of video cameras to transmit a signal to a specific place, on a limited set of monitors.

**cloud application**

An application that is extended to be accessible through the Internet. Cloud applications use large data centers and powerful servers that host web applications and web services.

**configuration**

1. The manner in which the hardware and software of a system, subsystem, or network are organized and interconnected.
2. The process of describing to a system the devices, optional features, and program products that have been installed so that these features can be used. See also customization.

**CSV file**

A text file that contains comma-separated values. A CSV file is commonly used to exchange files between database systems and applications that use different formats.

**customization**

1. The modification of a portal page or portlet by a user. WebSphere Portal enables a user to customize a portal page by modifying the page layout and by selecting which portlets will display per device. See also personalization.
2. The process of describing optional changes to defaults of a software program that is already installed on the system and configured so that it can be used. See also configuration.

**D****Data Exchange (Datex)**

A set of specifications for exchanging traffic information in a standard format between disparate systems. It is aimed at harmonizing the exchange of traffic and travel information at all levels applicable to road operators (non-urban and urban) and service providers. It facilitates the electronic exchange of traffic and travel related data between traffic centers including cross border exchange.

**Datex** See Data Exchange.

**DMS** See dynamic message sign.

**domain**

An individual division of a major operation, which generally matches the organization structure and the expertise of the people involved. For example, a city authority is divided into departments dealing with transportation, water, and public safety.

**dynamic message sign (DMS)**

See variable message sign.

**E**

**EAR** See enterprise archive.

**EC** See external center.

**enterprise archive (EAR)**

A specialized type of JAR file, defined by the Java EE standard, used to deploy Java EE applications to Java EE application servers. An EAR file contains EJB components, a deployment descriptor, and web archive (WAR) files for individual web applications. See also Java archive.

**event**

1. A significant occurrence that happens at a given place and time. See also incident.
2. A situation that may impede movement across the transportation network.

**Extensible Markup Language (XML)**

A standard metalanguage for defining markup languages that is based on Standard Generalized Markup Language (SGML).

**external center (EC)**

A traffic data center, such as a TMC, that receives TMDD information developed or stored within it from another center. In the context of the most common dialogs that are used by the TMDD standard, the external center requests and receives information from an owner center.

**F**

**filter** See traffic layer.

**filter form**

A form that can be used to select content to be displayed on the map and list.

**G****geographic information system (GIS)**

A complex of objects, data, and applications that is used to create and analyze spatial information about geographic features.

**geometry**

The information available in a zoomed-in road link on a map.

**geospatial**

Pertaining to the geographical characteristics of the Earth.

**GIS** See geographic information system.

**group** A collection of users who can share access authorities for protected resources.

**H**

**heap** In Java programming, a block of memory that the Java virtual machine (JVM) uses at run time to store Java objects. Java heap memory is managed by a garbage collector, which automatically de-allocates Java objects that are no longer in use.

**hop** One segment of a transmission path between adjacent nodes in a routed network.

**hover help**

Explanatory text that can be viewed by moving a cursor over a graphical user interface (GUI) item such as an icon, field, or text string. Hover help can contain rich text and links.

**I****incident**

An event that is not part of the standard operation of a service and causes or can cause a disruption to or a reduction in the quality of services and customer productivity. See also event.

**institute of transportation engineers (ITE)**

An international educational and scientific association of transportation professionals, including, engineers, transportation planners, consultants, educators, and researchers. Founded in 1930, ITE facilitates the application of technology and scientific principles to research, planning, functional design, implementation, operation, policy development, and management for any mode of ground transportation.

**integration**

The software development activity in which separate software components are combined into an executable whole.

**ISO model**

A set of rules for data communication, sanctioned by the International Organization for Standardization (ISO). The ISO protocols enable systems supplied by different vendors to connect and communicate. They are the basis of the open systems interconnection (OSI) standards.

**ITE** See institute of transportation engineers.

## **J**

**JAR** See Java archive.

### **Java archive (JAR)**

A compressed file format for storing all of the resources that are required to install and run a Java program in a single file. See also enterprise archive.

### **JavaScript Object Notation (JSON)**

A lightweight data-interchange format that is based on the object-literal notation of JavaScript. JSON is programming-language neutral but uses conventions from various languages.

### **Java virtual machine (JVM)**

A software implementation of a processor that runs compiled Java code (applets and applications).

### **journey pattern**

The list of all stops served by a public transit route as a sequence of journey pattern ID, stop ID, or numerical order. The same stop might be included multiple times in the sequence if the transit route includes loops and stops several times at the same location.

### **journey shape**

The geospatial road shape of a journey pattern, as a sequence of geospatial points connected by road segments to match as closely as possible the shape of the road connecting the stops along the journey.

**JSON** See JavaScript Object Notation.

**JVM** See Java virtual machine.

## **L**

### **latitude**

The angular distance of a place north or south of the earth's equator, usually expressed in degrees and minutes.

**layer** An overlay that can be placed on the map to provide additional geospatial information.

**LDAP** See Lightweight Directory Access Protocol.

### **LDAP Directory Interchange Format (LDIF)**

A file format that is used to describe directory information as well as changes that need to be applied to a directory, such that directory information can be exchanged between directory servers that are using LDAP.

**LDIF** See LDAP Directory Interchange Format.

### **level of service (LOS)**

A qualitative measure used in the transportation industry by traffic engineers to determine the effectiveness of elements of a transportation infrastructure. This measure describes the operational conditions of traffic as defined in the Highway Capacity Manual.

### **Lightweight Directory Access Protocol (LDAP)**

An open protocol that uses TCP/IP to provide access to directories that support an X.500 model and that does not incur the resource requirements of the more complex X.500 Directory Access Protocol (DAP). For example, LDAP can be used to locate people, organizations, and other resources in an Internet or intranet directory.

### **linear reference**

A location reference marker along a roadway, generally on a shoulder, indicating its location along a route. An example of a marker is a milepost.

**link ID**

A unique identifier for a traffic link that is being displayed on the map.

**location map**

A map or plan containing interactive areas that have been defined in the IBM Intelligent Operations Center. Events can be associated with one or more of these areas. For example, a diagram of seating areas in a major sports stadium can be defined so that events that have occurred can be associated with the appropriate area.

**longitude**

The angular distance of a place east or west of the meridian at Greenwich, England, usually expressed in degrees and minutes.

**LOS** See level of service.

**O**

**OC** See owner center.

**operations view**

A web page that contains portlets that can cooperate to facilitate comprehensive information supply and interaction at operations level for monitoring incoming data from data sources, and for responding to incoming data.

**owner center (OC)**

A traffic data center, such as a TMC, that provides TMDD information developed or stored within it to another center. The owner center can also have direct control of field devices. In the context of the most common dialogs that are used by this standard, the owner center publishes information or provides responses to a request from an external center.

**P**

**page** In a portal environment, the interface element that contains one or more portlets.

**personalization**

The process of enabling information to be targeted to specific users based on business rules and user profile information. See also customization.

**plug-in**

A separately installable software module that adds function to an existing program, application, or interface.

**PMR** See problem management record.

**polling interval**

The period that elapses between the automatic refresh of the data displayed on a map.

**polygon**

In the GDDM<sup>®</sup> function, a sequence of adjoining straight lines that enclose an area.

**portal** A single, secure point of access to diverse information, applications, and people that can be customized and personalized.

**portlet**

A reusable component that is part of a web application that provides specific information or services to be presented in the context of a portal.

**problem management record (PMR)**

The number in the IBM support mechanism that represents a service incident with a customer.

**production timetable**

The definition of the planned schedules for a transportation system.

## R

### **ramp meter**

A device, usually a basic traffic light or a two-section signal (red and green only, no yellow) light together with a signal controller, that regulates the flow of traffic entering freeways according to current traffic conditions.

### **Really Simple Syndication (RSS)**

An XML file format for syndicated web content that is based on the Really Simple Syndication specification (RSS 2.0). The RSS XML file formats are used by Internet users to subscribe to websites that have provided RSS feeds.

### **Representational State Transfer (REST)**

A software architectural style for distributed hypermedia systems like the World Wide Web. The term is also often used to describe any simple interface that uses XML (or YAML, JSON, plain text) over HTTP without an additional messaging layer such as SOAP.

### **resource bundle**

1. A structured collection of data that provides a key-value mapping for data (resources) used in localizing a program. The values are commonly strings, but may themselves be structured data.
2. A class that contains the text for the store pages. Bundle files are created and accessed according to the Java PropertyResourceBundle API.

**REST** See Representational State Transfer.

### **road category**

A category that is used to define the types of road links that a user can include when adding a traffic layer.

**route** The overall path between a defined list of stops.

**RSS** See Really Simple Syndication.

## S

**SAE** See Society of Automotive Engineers.

### **Secure Sockets Layer (SSL)**

A security protocol that provides communication privacy. With SSL, client/server applications can communicate in a way that is designed to prevent eavesdropping, tampering, and message forgery.

### **service**

The outgoing and return route taken by a vehicle, that includes a schedule.

### **Service Interface for Real Time Information (SIRI)**

A European data interface standard for exchanging data about planned, current, or future performance of public transport operations.

### **shapefile**

A digital file format for geographic information systems software.

### **single sign-on (SSO)**

An authentication process in which a user can access more than one system or application by entering a single user ID and password.

**SIRI** See Service Interface for Real Time Information.

**SOAP** A lightweight, XML-based protocol for exchanging information in a decentralized, distributed environment. SOAP can be used to query and return information and invoke services across the Internet. See also web service.



**Society of Automotive Engineers (SAE)**

A non-profit educational and scientific organization dedicated to advancing mobility technology to better serve humanity. The SAE is composed of over 90,000 engineers and scientists that develop technical information about all forms of self-propelled vehicles including automobiles, trucks and buses, off-highway equipment, aircraft, aerospace vehicles, marine, rail, and transit systems.

**solution**

A combination of products that addresses a particular customer problem or project.

**SSL** See Secure Sockets Layer.

**SSO** See single sign-on.

**stop** A point where passengers can board or alight from vehicles.

**subnet**

See subnetwork.

**subnetwork (subnet)**

A grouping of connected traffic links that is defined by the user. This grouping is to improve application performance.

**subscription**

A request made to an owner center for data to be sent periodically to an external center.

**system properties table**

A table that stores system-wide configuration data for the IBM Intelligent Operations Center.

**T****TCP/IP**

See Transmission Control Protocol/Internet Protocol.

**TMC** See traffic management center.

**traffic event**

A significant occurrence that happens at a given place and time involving a vehicle, road network, or traffic device. See also traffic incident.

**traffic incident**

A traffic event that has an adverse effect. See also traffic event.

**traffic layer**

An overlay of traffic-related information that can be placed on the map to provide additional geospatial information about the transportation network.

**traffic management center (TMC)**

The hub of a transportation management system. Information about the transportation network is collected and combined with other operational and control data to manage the transportation network and produce traveler information. It includes the combination of the hardware and software located in the center, including operators and maintenance personnel, policies and procedures and other entities.

**traffic relationship matrix**

A user-defined matrix that defines the relationships between road links in a map.

**Transmission Control Protocol/Internet Protocol (TCP/IP)**

An industry-standard, nonproprietary set of communication protocols that provides reliable end-to-end connections between applications over interconnected networks of different types.

**transportation prediction feature**

A feature that anticipates traffic conditions within an hour from the current time, provides customized reports, and configures data collection, enablement, and calculation in the administration portlets.

**U****Uniform Resource Locator (URL)**

The unique address of an information resource that is accessible in a network such as the Internet. The URL includes the abbreviated name of the protocol used to access the information resource and the information used by the protocol to locate the information resource.

**URL** See Uniform Resource Locator.

**user administrator**

A person who adds new users and ensures security by giving users membership of role-based authorization groups with appropriate permissions.

**user permission**

The authority granted to a user to give them access to view and work with portal resources. This authority is granted by membership of a user role group.

**user profile**

A description of a user that includes such information as user ID, user name, password, access authority, and other attributes that are obtained when the user logs on.

**user role group**

A group that assigns membership to give a new user the appropriate level of access to the solution. Each new user is added as a member of the appropriate role group. There are different permission levels associated with each role group.

**V****variable message sign (VMS)**

A traffic control device whose message can be changed manually, electrically, mechanically, or electromechanically to provide motorists with information about traffic congestion, traffic crashes, maintenance operations, adverse weather conditions, roadway conditions, organized events, or other highway features (for example, drawbridges, toll booths, and weigh stations).

**vehicle ID**

A unique identifier for a transit vehicle that is being displayed on the map.

**VMS** See variable message sign.

**W****web service**

A self-contained, self-describing modular application that can be published, discovered, and invoked over a network using standard network protocols. Typically, XML is used to tag the data, SOAP is used to transfer the data, WSDL is used for describing the services available, and UDDI is used for listing what services are available. See also SOAP, Web Services Description Language.

**Web Services Description Language (WSDL)**

An XML-based specification for describing networked services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information. See also web service.

**WSDL**

See Web Services Description Language.

## X

XML See Extensible Markup Language.

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### Accessibility

Accessibility features help users with physical disabilities, such as restricted mobility or limited vision, to use software products successfully.

The major accessibility features in this product enable users to do the following:

- Use assistive technologies, such as screen-reader software and digital speech synthesizer, to hear what is displayed on the screen. Consult the product documentation of the assistive technology for details on using those technologies with this product.
- Operate specific or equivalent features using only the keyboard.
- Magnify what is displayed on the screen.

In addition, the documentation was modified to include the following features to aid accessibility:

- All documentation is available in XHTML formats to give the maximum opportunity for users to apply screen-reader software technology.
  - All images in the documentation are provided with alternative text so that users with vision impairments can understand the contents of the images.
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See also the privacy policy considerations of the IBM Intelligent Operations Center.

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