IBM Intelligent Transportation
IBM Traffic Information Hub

IBM Intelligent Transportation Product Documentation

Version 1 Release 0

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Chapter 1. Solution overview

Transportation is an important part of an economy. Our rapidly urbanizing planet depends on getting people and things from here to there. Every day the world relies on a complex network of transportation systems to move people, food, and the products that sustain civilization. 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.

The IBM® Intelligent Transportation solution offering brings traffic awareness, traffic analytics, and traffic prediction capabilities to transportation authorities so that they can:

- Reduce traffic congestion
- Increase visibility of traffic performance
- Proactively manage traffic conditions
- Increase visibility of incidents across a diverse set of traffic systems

By providing traffic prediction capabilities and a comprehensive and scalable platform for transportation management solutions, the IBM Intelligent Transportation offering helps to optimize traffic flow. It also helps traffic authorities to analyze traffic performance across a wide variety of transportation network inputs, optimize throughput, efficiency, response time, and improve the user experience across the transportation network.

The IBM Traffic Information Hub is a product of the IBM Intelligent Transportation solution offering and is designed to provide a centralized traffic management system with features in transportation prediction.

The IBM Traffic Information Hub is a portal-based solution that runs on top of the IBM Intelligent Operations Center. The IBM Intelligent Operations Center is a software solution designed for effective supervision and coordination of operations and provides the base platform for the IBM Traffic Information Hub.

The IBM Traffic Information Hub can be deployed in two ways, either on premise or as a cloud-based offering. The IBM Traffic Information Hub can also be integrated with other products in the IBM Smarter Cities® Software Solutions portfolio.

Intended audience

This information center is intended for people who are using, installing, administering, and maintaining the IBM Traffic Information Hub. It also contains implementation documentation for the optional transportation prediction component and also for customizing and integrating the external transport management systems that the IBM Traffic Information Hub requires.

This information center assumes that users have prior knowledge of or proficiency with the prerequisite software. Training for these base products is outside the scope of this information center. 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 in the "Additional information" on page 241 page of the References section.

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See also the IBM Intelligent Operations Center Information Center for details about the administration and maintenance of the base platform.

Features of the IBM Traffic Information Hub

The IBM Traffic Information Hub is the foundational component of IBM Intelligent Transportation, supplying the transportation information model and basic platform for visualization and analysis of traffic flow and event data. The IBM Traffic Information Hub integrates data from disparate traffic and road data capture systems by using integration protocols recognized by the worldwide transportation industry.

The IBM Traffic Information Hub provides on-demand geographical visibility, analysis, and reporting, for current, future, and historic traffic data. The IBM Traffic Information Hub:

- 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 as well as in tabular and report views
- Offers the ability to be alerted to traffic events on the network in real-time, graphically, in tabular view
- Offers the ability to interrogate traffic-related devices to obtain status and feeds
- Provides insight and 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

Transportation data standards

The IBM Intelligent Transportation solution family is developed in accordance with the Intelligent Transportation Systems (ITS) standards in the areas of managing traffic, historical data, and traffic event information. ITS standards aim to improve transportation safety and mobility, and enhance productivity through the integration of advanced communications technologies into the transportation infrastructure. The IBM Traffic Information Hub aggregates and normalizes traffic data in a format that is compliant with transportation engineering standards and protocols globally recognized within the industry.

The architecture of the IBM Intelligent Transportation solution family is designed to support both the Traffic Management Data Dictionary (TMDD) Version 3.0 and the Datex-II standard traffic data model.

The IBM Traffic Information Hub also integrates disparate traffic and road data capture systems in compliance with the National Transportation Communications for Intelligent Transportation System Protocol (NTCIP).

Subsystems

The IBM Traffic Information Hub is comprised of three complementary subsystems.

Current traffic management

The current traffic management subsystem of the IBM Traffic Information Hub 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 IBM Traffic Information Hub processes traffic data and provides basic traffic and incident management services through the roadside and other subsystems.

The following table describes the traffic management features of the IBM Traffic Information Hub

Table 1. Features of the current traffic management subsystem.

Feature	Provides
Traffic surveillance	Processes to collect and store current traffic flow data collected by sensors in the field for use in traffic management. Also, Intelligent Transportation Systems (ITS) functions for: • Storing and managing processed traffic flow data • Displaying traffic flow data • Analyzing, correlating, and summarizing traffic flow data
Transportation event management	Processes and a graphical user interface for managing the classification of traffic events, including: • Storing, managing, and categorizing event data • Analyzing, correlating, and summarizing traffic events • Reviewing and managing traffic event data
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.
`1.0.1.1` Traffic awareness subscription and publishing	Representational State Transfer (REST) services providing outbound subscription and publishing capabilities to retrieve traffic awareness data from the solution into XML format.

In the solution interface, the Operator: Traffic page is the GUI for the traffic management subsystem. This portal page provides an operational view of the current traffic situation.

Note: The transportation prediction subsystem data is also displayed on the **Operator:Traffic** page, providing the optional transportation prediction component is installed.

Historical traffic management

The historical traffic management subsystem of the IBM Traffic Information Hub provides summary reports of historical traffic flow and performance of the traffic network.

The historical 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 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

Table 2. Features of the historical traffic management subsystem.

Feature	Provides
Historical traffic data analysis	Processes to store historical TMDD traffic data collected from field subsystems. A graphical user interface for analyzing historical traffic flow performance levels in the transportation network. Also, Intelligent Transportation Systems (ITS) functions for: • Storing and managing historical data • Displaying historical traffic flow data • Analyzing, correlating, and summarizing historical traffic flow data
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.

In the solution interface, the Planner: Traffic page is the main GUI for the historical management subsystem. This portal page allows you to review the historical traffic activity and analyze the past performance of the transportation network.

Transportation prediction

The transportation prediction subsystem provides traffic prediction capabilities for transportation authorities, leveraging traffic data collected by the Traffic Information Hub. Unlike the current and historical traffic data management subsystems, the transportation prediction feature is a separately installed component that is optional to deploy on top of the IBM Traffic Information Hub.

The feature provides traffic prediction using current and historical traffic data collected and stored by the IBM Traffic Information Hub including:
• Geographical visibility of predicted traffic levels at preset points (5, 10, 15, 30, 45, 60 minutes) from the current time
• Listed view of the details related to the predicted traffic levels at preset points (5, 10, 15, 30, 45, 60 minutes) from the current time
• Executive reports for traffic prediction based on speed and volume
• Accuracy reports analyzing traffic prediction data generated by the system

The transportation prediction feature performs traffic prediction calculations that are used as input for real-time prediction, and generates predicted information for an hour from the current time.

Traffic data collected by traffic subsystems is used to perform estimate and mean calculation, and also to trigger and monitor calculations. The transportation prediction feature processes traffic data and provides predicted information. The traffic prediction based on speed and volume and the accuracy reports help transport authorities and departments ensure smooth traffic flow by rerouting traffic to avoid traffic congestion.

The following table describes the optional transportation prediction component of the IBM Traffic Information Hub.

Feature	Provides
Traffic prediction visualization	Processes and a graphical user interface to display the predicted traffic levels for an hour from the current time. Predicted traffic information is available in the map and also listed in the Operator: Traffic view. This portal page provides an operational view of the traffic situation.
Traffic prediction reports	A graphical user interface to analyze and display the traffic reports for prediction based on speed and volume Predicted traffic reports are available in the Operator: Traffic view. This portal page provides an operational view of the traffic situation.
Accuracy reports	A graphical user interface to analyze and display the accuracy reports for the predicted traffic information. Accuracy reports are available in the Operator: Traffic view. This portal page provides an operational view of the traffic situation.
Administrative and operational interfaces	A browser-based graphical user interface featuring 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 IT Administrator has the permission to configure the settings for the traffic prediction calculations in the **Administration** view of the solution interface.
1.0.1.1 Traffic prediction subscription and publishing	REST services providing outbound subscription and publishing capabilities to retrieve traffic prediction data from the solution into XML format.

Sections of the documentation are marked with the ➕ icon to indicate that the information applies to the optional transportation prediction component.

Users and benefits

The IBM Traffic Information Hub is designed for traffic authority personnel working in government or city traffic departments.

The following table describes some of the traffic authority personnel who could benefit from using the IBM Traffic Information Hub and the optional transportation prediction component from the IBM Intelligent Transportation solution offering.

Table 3. Benefits of the IBM Traffic Information Hub to traffic authority personnel

If you are a...	This software can help you....
Traffic Operator	• Monitor and manage traffic and the road network • Manage events in the road network and help to reduce traffic congestion • View real-time traffic data from transit field systems on a geographical map of the city • View forecasted traffic conditions on a geographical map of the city • Zoom in on specific roads or traffic hot spots • Identify and monitor traffic congestion • Decide how to optimize traffic flow in the short term • Identify the cause of congestion using event type information • Analyze and decide on short-term corrective measures to relieve congestion • Predict future traffic flow levels and potential problem areas
Traffic Planner	• View real-time and archived traffic data from transit field systems • Produce visual geographical reports on historical traffic data • Analyze traffic patterns of a city or urbanized area • Evaluate patterns in traffic volume related to specific roads or time periods • Evaluate patterns in traffic speed related to specific roads or time periods • Decide how to optimize traffic flow in the longer term • Produce customized traffic flow and event reports • Provide historical reports as a factual basis for predicting future traffic performance and congestion levels
Traffic Manager	• Oversee historical and real-time traffic flow performance • Evaluate persistent congestion issues • Obtain an insight into forecasted traffic levels and potential problems • Obtain consolidated data and insights for making decisions that affect the overall operational efficiency and performance of the traffic system • Provide the current and forecasted traffic status to other interested city departments and allied agencies

What's new in 1.0.1

The IBM Intelligent Transportation version 1.0.1 solution offering provides enhancements and new features for the IBM Traffic Information Hub product. Enhancements in this release of the IBM Traffic Information Hub help transport authorities to reduce traffic congestion and enhance the travel experience in cities and communities worldwide.

The enhancements in this release of the IBM Traffic Information Hub are in the areas of:
• Architecture and database schema
• Traffic prediction
• User experience

- Installation
- Uninstallation
- Upgrade
- Extended browser support
- Globalization

Architecture and database schema

In this release of the IBM Traffic Information Hub, there are architectural changes to IBM Traffic Information Hub to support the integration of the new transportation prediction feature. The architectural changes provide a comprehensive and scalable platform for transportation management solutions.

Learn more...

Traffic prediction

The IBM Traffic Information Hub V 1.0.1 introduces the optional transportation prediction feature which provides capabilities in traffic prediction by using the TMDD traffic data collected and processed by the IBM Traffic Information Hub.

The optional transportation prediction feature produces traffic speed and volume predictions up to an hour into the future based on the analysis of current and historical traffic data. The transportation prediction feature also provides the following additional portlets in the portal user interface for viewing traffic prediction data:
- Predicted Traffic Conditions portlet
- Traffic Prediction Custom Reports portlet
- Traffic Flow Prediction Reports portlet
- Traffic Speed Prediction Reports portlet
- An additional **Predicted Traffic Levels** information tab on the Traffic Conditions - Details portlet
- A set of administration portlets for configuring the transportation prediction feature in the **Administration** view of the solution interface.

Learn more...

User experience

The following changes have been made to the user interface of the IBM Traffic Information Hub:
- The **Traffic Operations** view is now titled **Operator: Traffic**.
- The **Traffic Planning** view is now titled **Planner: Traffic**.
- The GIS maps on the **Operator: Traffic** and **Planner: Traffic** views are enhanced, providing you with options to reset the map and clear the current query.

Learn more...

Reports

Additional reports are available in the IBM Traffic Information Hub in this release. They include:
- Traffic Congestion
- Traffic Prediction Speed : Next Hour
- Traffic Prediction Volume : Next Hour
- Prediction Accuracy - By Day of Week

- Prediction Accuracy - By Interval
- Prediction Accuracy - By Day and Hour
- Prediction Accuracy - By Category

Note: The traffic prediction reports are only available if you install the optional transportation prediction component.

The Traffic Custom Reports portlet is now available on the **Operator: Traffic** view as well as the **Planner: Traffic** view.

Learn more...

Improved installation utility

The installation program for installing the IBM Traffic Information Hub and the optional transportation prediction component has been enhanced as follows:

Installation prerequisite check
> A prerequisite check is incorporated in the installation script. When you run the command to install the IBM Traffic Information Hub, prerequisite checking is performed automatically to ensure that the required IBM Intelligent Operations Center Fix Pack 1 is installed.

Upgrade detection check
> The installation script also detects if a previous version of the IBM Traffic Information Hub is installed in your environment.

Verbose installation logs
> The installation program logs all steps executed by the installer and when finished, returns a successful log message.

Post-installation validation check
> A post-installation validation check is automatically carried out to ensure that the installation was successful.

Learn more...

Upgrade

If you previously deployed the IBM Traffic Information Hub version 1.0 you can now upgrade your existing deployment without requiring to manually uninstall the previous version. The upgrade utility includes the automatic data migration from the database schema of IBM Traffic Information Hub version 1.0 to the new schema for version 1.0.1.

Learn more...

Uninstallation

You can now use a command-line uninstallation utility to remove the IBM Traffic Information Hub from the IBM Intelligent Operations Center environment.

There is also a separate uninstallation utility for removing the optional transportation prediction component from the IBM Traffic Information Hub.

Learn more...

Extended browser support

The IBM Traffic Information Hub now supports additional browser versions.

Learn more...

Globalization

In addition to English, the IBM Traffic Information Hub product, including the embedded help, is available in the following languages:
* Simplified Chinese
* Traditional Chinese
* Korean
* Japanese
* French
* German
* Italian
* Spanish
* Brazilian Portuguese

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 installation and administration documentation are translated into, see the IBM® Intelligent Transportation Support Portal.

What's new in Interim Feature 1

> 1.0.1.1

IBM Intelligent Transportation version 1.0.1 Interim Feature 1 provides performance and stability improvements to the IBM Traffic Information Hub product and the optional transportation prediction subsystem.

Enhancements to the IBM Traffic Information Hub are in the areas of:
* Traffic awareness and prediction subscription and publishing capabilities
* Map performance tuning
* Installation prerequisite checks

Traffic awareness and prediction subscription and publishing capabilities

Interim Feature 1 provides additional REST services for the IBM Traffic Information Hub and the transportation prediction feature.

When you install the IBM Traffic Information Hub version 1.0.1 Interim Feature 1, traffic awareness data is available through **Request** and **Response**. Additionally, when you install the transportation prediction feature, the REST services provide outbound subscription and publishing capabilities to retrieve traffic awareness and traffic prediction data from the solution into XML format.

If you are a traffic operator you can export the current road link status from the IBM Traffic Information Hub into an XML file by using the **TMDD LinkStatusMsg** REST service.

You can also export the predicted link status into an XML file by using the extended **TMDD LinkStatusMsg** REST service that is provided with the transportation prediction feature.

Learn more...

Map performance tuning

If you have installed Interim Feature 1, you can now perform new performance tuning customization of the Current Traffic Conditions map on the Operator: Traffic view. These include the assignment of an importance value to a road link and the optimization of the geospatial geometry for a road link.

Learn more...

Installation prerequisite checks

The prerequisite validation checks made by the installation utilities provided with Interim Feature 1 have been enhanced to ensure that the correct IBM Intelligent Operations Center platform version is installed. If a previous version of the product is installed in this environment, the installer also checks to ensure this is running the required version and performs the necessary upgrade functions.

Learn more...

Sections of the documentation are marked with the 1.0.1.1 icon to indicate that the information applies only to the Interim Feature 1 for IBM Traffic Information Hub.

Chapter 2. Installing and configuring

The IBM Traffic Information Hub is an IBM Intelligent Transportation solution that runs on top of the IBM Intelligent Operations Center. IBM Intelligent Transportation provides a deployment wizard that installs the IBM Traffic Information Hub into the existing IBM Intelligent Operations Center and underlying environment. A deployment wizard is also provided for the optional transportation prediction feature. After deploying the IBM Traffic Information Hub product and the optional transportation prediction feature some additional configuration is required.

Preparing for installation

Before deploying the IBM Traffic Information Hub and optional transportation prediction feature, understand the system configuration for the IBM Traffic Information Hub. Ensure that the prerequisites of the solution and the underlying IBM Intelligent Operations Center environment are met before you start the deployment.

Related tasks:

"Deploying the solution" on page 26
IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

"Installing the solution" on page 25
As soon as you complete the prerequisite preparation tasks, you are ready to install the IBM Traffic Information Hub product using the IBM Intelligent Transportation installer. To deploy the IBM Traffic Information Hub you can run either the GUI deployment wizard or the silent installation command. After deploying the IBM Traffic Information Hub, some additional configuration is required.

System configuration

The IBM Intelligent Transportation deployment wizard installs the IBM Traffic Information Hub on top of the IBM Intelligent Operations Center Fix Pack 1 production environment. The IBM Intelligent Operations Center Fix Pack 1 is a prerequisite for the IBM Traffic Information Hub. An additional server is temporarily required for deployment of the IBM Traffic Information Hub and the optional transportation prediction feature.

The IBM Traffic Information Hub uses the following IBM Intelligent Operations Center servers:

IBM Intelligent Operations Center servers	Provides...
Access server	Security services for the solution.
Analytic server	Data analysis services for the solution. When the transportation prediction feature is installed, this server additionally hosts prediction analytics and database adapter services.
Application and integration server	Application and messaging services for the solution.
Database server	Repository and modeling services for the solution.
Event and management server	Manages events handled by the solution.
Portal server	User interface services for the solution.

Additional system configuration requirements

If you are installing the optional transportation prediction feature, the Cognos® Dispatch and Gateway servers on the IBM Intelligent Operations Center analytic server should observe the following Java™ Virtual Machine (JVM) settings:

JVM setting	Required value (MB)
Initial Heap Size	2048
Maximum Heap Size	2048

You can find details about the IBM Intelligent Operations Center server configuration in the IBM Intelligent Operations Center information center.

IBM Intelligent Transportation installation management server

The IBM Intelligent Transportation installation management server is used only during the deployment of the IBM Traffic Information Hub and the optional transportation prediction feature. It is not used in the production environment. The IBM Intelligent Transportation installation management server contains the installation and configuration scripts used to deploy the IBM Traffic Information Hub onto the IBM Intelligent Operations Center environment. The IBM Intelligent Transportation installation management server communicates directly with the IBM Intelligent Operations Center event and management server.

Note: `1.0.1.1` If you are installing the IBM Traffic Information Hub using the installer for version 1.0.1 Interim Feature 1 or later, you can perform the installation from any of the IBM Intelligent Operations Center node servers, providing all of the required services and applications are running. A dedicated installation management server can also be used to run the installation, but is not a mandatory requirement as it was in previous versions.

Related tasks:

"Installing the solution" on page 25
As soon as you complete the prerequisite preparation tasks, you are ready to install the IBM Traffic Information Hub product using the IBM Intelligent Transportation installer. To deploy the IBM Traffic Information Hub you can run either the GUI deployment wizard or the silent installation command. After deploying the IBM Traffic Information Hub, some additional configuration is required.

Related information:

Installing and configuring the IBM Intelligent Operations Center

Hardware requirements

The IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed on top of, must meet the minimum hardware requirements specified for the IBM Intelligent Operations Center product. However, if you plan to install the optional transportation prediction feature, some additional memory resources are required. A temporary IBM Intelligent Transportation installation management server that meets the minimum hardware specification is also required. This server is only required during the deployment process.

IBM Intelligent Operations Center hardware requirements

The hardware requirements of the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed on top of are defined in the IBM Intelligent Operations Center Information Center. These are the minimum hardware requirements for installing the IBM Traffic Information Hub.

If you are installing the optional transportation prediction feature, the following IBM Intelligent Operations Center servers require additional memory resources.

Server	Number of processors	Memory	Hard disk
Analytic server	8	24 GB	80 GB
Database server	8	24 GB	80 GB

Ensure these hardware specifications are met before you start the installation of the transportation prediction feature.

The IBM Intelligent Operations Center cluster might also require additional resources, depending on any additional IBM Smarter Cities Software Solutions that are deployed in this environment. For more information, see the related links at the end of this topic.

Installation management server hardware requirements

The IBM Intelligent Transportation installation management server can be a physical hardware server or a virtual machine running on a VMware Server. It can also be a server in the cloud, if the IBM Intelligent Operations Center environment is also deployed in the cloud.

The IBM Intelligent Transportation installation management server must meet the following requirements:

Server Hardware	Minimum requirements
Number of processors	2
Processor type:	An x86 64-bit processor that must be one of the following types: • AMD 64-bit processor • Intel Extended Memory 64 Technology (EM64T) processor
Memory	8 GB
Hard disk	80 GB

Note:
- The /tmp folder on the IBM Intelligent Transportation installation management server must have at least 35 GB of available space.
- Define the swap space to be twice the amount of the physical memory. For example, if a server has 8 GB memory, define 16 GB of swap space.

1.0.1.1 If you are installing the IBM Traffic Information Hub using the installer for version 1.0.1 Interim Feature 1 or later, you can perform the installation from any of the IBM Intelligent Operations Center node servers, providing all of the required services and applications are running. A dedicated installation management server can also be used to run the installation, but is not a mandatory requirement as it was in previous versions.

IBM Intelligent Transportation client hardware requirements

Clients accessing the IBM Traffic Information Hub solution portal must meet the following hardware requirements:

Client Hardware	Minimum requirements
Monitor	1280 x 800 resolution
Memory	2 GB

Client Hardware	Minimum requirements
Processor CPU	2 GHz

Related tasks:

"Installing the solution" on page 25
As soon as you complete the prerequisite preparation tasks, you are ready to install the IBM Traffic Information Hub product using the IBM Intelligent Transportation installer. To deploy the IBM Traffic Information Hub you can run either the GUI deployment wizard or the silent installation command. After deploying the IBM Traffic Information Hub, some additional configuration is required.

"Preparing the installation management server" on page 21
You must prepare the server that runs the installation of the IBM Traffic Information Hub and the optional transportation prediction component before you start the IBM Intelligent Transportation deployment wizard. The IBM Intelligent Transportation installation management server is only required during the deployment process.

Related information:

Hardware requirements of the IBM Intelligent Operations Center

Software requirements

The servers and clients involved in the deployment of the IBM Traffic Information Hub must meet the minimum software requirements. This includes the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed onto and the installation management server that the IBM Intelligent Transportation installer runs from.

Server software requirements

The software requirements of the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed on top of are defined in the IBM Intelligent Operations Center Information Center. These are the minimum software requirements. For more information, see the related links at the end of this topic.

The IBM Traffic Information Hub installer is run on the installation management server. The IBM Traffic Information Hub installer requires the 64-bit Red Hat Enterprise Linux versions 5.5 or later but earlier than 6.0, with the Secure Shell (SSH) service installed and open.

Client software requirements

The IBM Traffic Information Hub solution portal can be accessed with any of the following supported web browsers:

Client browser	Supported versions
Mozilla Firefox	• 10.0 • 9.0 • 3.6 • 3.5 • 3.0
Internet Explorer	• 9.1 (32 and 64 bit)

Related tasks:

"Installing the solution" on page 25
As soon as you complete the prerequisite preparation tasks, you are ready to install the IBM Traffic Information Hub product using the IBM Intelligent Transportation installer. To deploy the IBM Traffic Information Hub you can run either the GUI deployment wizard or the silent installation command. After deploying the IBM Traffic Information Hub, some additional configuration is required.

"Preparing the installation management server" on page 21
You must prepare the server that runs the installation of the IBM Traffic Information Hub and the optional transportation prediction component before you start the IBM Intelligent Transportation deployment wizard. The IBM Intelligent Transportation installation management server is only required during the deployment process.

Related information:

Software requirements of the IBM Intelligent Operations Center

GIS server requirement

In addition to the underlying IBM Intelligent Operations Center, the IBM Traffic Information Hub requires access to a geographic information system (GIS) server.

The IBM Traffic Information Hub requires a GIS server with ESRI ArcGIS Server Standard 10. The IBM Traffic Information Hub does not support other GIS servers.

Related concepts:

"Configuring ESRI ArcGIS" on page 36
ESRI ArcGIS server is required to provide the base maps of the user interface. ESRI ArcGIS is not a part of IBM Intelligent Transportation and is required as an additional service. After installing the IBM Traffic Information Hub configure the ESRI ArcGIS server to work with the solution.

Related tasks:

"Configuring the base map for the solution" on page 93
Before you can use the solution portal, a base map is required for the map portlets in the IBM Traffic Information Hub user interface. Layers of traffic data are superimposed over the base map that is configured for the system.

Media packaging

You can order the IBM Traffic Information Hub as a package of DVDs or obtain it through Passport Advantage®. The IBM Traffic Information Hub is a product of the IBM Intelligent Transportation family in the IBM Smarter Cities Software Solutions portfolio.

The IBM Traffic Information Hub product offering includes DVDs for::
- IBM Traffic Information Hub version 1.0.1 English
- IBM Traffic Information Hub version 1.0.1 Multilingual
- IBM Traffic Information Hub version 1.0.1 Quick Start Guide Multilingual

To download the product from Passport Advantage®, see the related link to the Passport Advantage download document for the product.

The IBM Traffic Information Hub media includes the installation files for the optional transportation prediction component that is also provided with the solution.

Related tasks:

"Preparing the installation media" on page 22

Before you run the IBM Traffic Information Hub deployment wizard, you must first obtain and prepare the installation media. The installation media for the IBM Traffic Information Hub also includes the installation package and post-installation script file templates for the optional transportation prediction feature.

Related information:

➡ Passport Advantage home page

➡ Passport Advantage - Download the IBM Traffic Information Hub V1.0.1 image files

Upgrading from an earlier version

If you are running the IBM Traffic Information Hub version 1.0.0, you can use the installation wizard to upgrade to version 1.0.1. The IBM Traffic Information Hub 1.0.0 system must have the IBM Intelligent Transportation interim fix PO00021 applied before you can start the upgrade to version 1.0.1.

Before you begin

Ensure that the prerequisite steps outlined in the *Preparing for installation* section of the information center are carried out before you begin to upgrade the solution.

As a precaution, back up the data before you attempt to upgrade a previous version of the IBM Traffic Information Hub. You should also back up the Portal server. For more information about backing up the portal server, see the related link at the end of this topic.

About this task

The IBM Traffic Information Hub installer detects if the previous release of the IBM Traffic Information Hub is deployed in this environment. The IBM Traffic Information Hub installation utility automatically migrates the existing 1.0 traffic database tables and data to the database schema of version 1.0.1. To upgrade, you do not need to manually uninstall the previous version of the IBM Traffic Information Hub.

Procedure

To upgrade an existing deployment of the IBM Traffic Information Hub version 1.0 to version 1.0.1, complete the prerequisite preparation steps and then follow the instructions in "Installing the solution" on page 25.

Related information:

➡ Websphere Portal Wiki : Backup and restore

➡ Downloading IBM Intelligent Transportation interim fix PO00021

Installing the IBM Intelligent Operations Center

Before installing the IBM Traffic Information Hub, you must first install the IBM Intelligent Operations Center Fix Pack 1.

About this task

The IBM Intelligent Operations Center Fix Pack 1 is required by the IBM Traffic Information Hub. It is not possible to install the IBM Traffic Information Hub without first deploying and configuring the IBM Intelligent Operations Center Fix Pack 1.

The IBM Intelligent Operations Center Fix Pack 1 must be running during the installation of the IBM Traffic Information Hub or the optional transportation prediction feature.

Procedure

Install, configure, and verify the IBM Intelligent Operations Center Fix Pack 1 by using the installation and configuration sections of the IBM Intelligent Operations Center Information Center.

What to do next

Prepare the IBM Intelligent Operations Center servers before you start the IBM Intelligent Transportation installer.

For more information, see the related links at the end of this topic.

Related tasks:

"Preparing the IBM Intelligent Operations Center servers"
Before you start the deployment of the IBM Traffic Information Hub, you must first prepare the existing IBM Intelligent Operations Center environment that you are installing on top of.

Related information:

Installing and configuring the IBM Intelligent Operations Center

Preparing the IBM Intelligent Operations Center servers

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

About this task

The IBM Intelligent Operations Center must be running during the installation of IBM Traffic Information Hub. Some of the IBM Intelligent Operations Center services are automatically restarted by the installer. To avoid a disruption in service, it is recommended that users of the IBM Intelligent Operations Center do not access the system during the IBM Traffic Information Hub installation period.

Procedure

1. Make sure that all of the IBM Intelligent Operations Center servers are started.
2. Configure the port of the Tivoli® Access Manager Server running on the IBM Intelligent Operations Center event and management server. For detailed steps, see the related task link at the end of this topic.
3. Log on to the IBM Intelligent Operations Center event and management server as the root user and run the following command to disable the heartbeat service:/opt/IBM/ISP/heartbeat/scripts/ control_heartbeat.sh disable

   Note: Enable the heartbeat service on the IBM Intelligent Operations Center event and management server after installation is complete.
4. Check the status of all of the IBM Intelligent Operations Center components to ensure that they are started before the installation begins. If any of the IBM Intelligent Operations Center components are not started, the installation of the IBM Traffic Information Hub does not complete successfully. For more information, see the related links at the end of this topic.
5. Verify that the IBM Cognos Business Intelligence servers are running and accessible. For detailed steps, see the related task link at the end of this topic.
6. Verify that you can access the IBM Intelligent Operations Center solution portal by logging on as the administrator using the following URL:

   http://*hostname*/wpsv70/wps/myportal

Where *hostname* is the IBM Intelligent Operations Center access server. In the solution portal you can see the **Intelligent Operations Center** link on the top navigation bar.

7. Before starting the installer for IBM Traffic Information Hub or the optional transportation prediction feature, ensure that WebSphere® Application Server is running on the following IBM Intelligent Operations Center servers:
   - Portal server
   - Application and integration server
   - Analytic server

What to do next

After the IBM Intelligent Operations Center environment is configured and all servers are up and running, you are ready to start preparing the IBM Traffic Information Hub installation management server.

Related tasks:

"Installing the IBM Intelligent Operations Center" on page 16
Before installing the IBM Traffic Information Hub, you must first install the IBM Intelligent Operations Center Fix Pack 1.

"Preparing the installation management server" on page 21
You must prepare the server that runs the installation of the IBM Traffic Information Hub and the optional transportation prediction component before you start the IBM Intelligent Transportation deployment wizard. The IBM Intelligent Transportation installation management server is only required during the deployment process.

"Configuring the Tivoli Access Manager Server port settings"
Before starting the installation of the IBM Traffic Information Hub, the port of the Tivoli Access Manager Server running on the IBM Intelligent Operations Center application and integration server must be configured.

Related information:

Querying the status of the IBM Intelligent Operations Center servers

Configuring the Tivoli Access Manager Server port settings
Before starting the installation of the IBM Traffic Information Hub, the port of the Tivoli Access Manager Server running on the IBM Intelligent Operations Center application and integration server must be configured.

Before you begin

It is important that the port number you assign to the Tivoli Access Manager Server during this procedure is not already in use by the solution.

Before you begin, use the following operating system command to see what ports are currently in use:
```
netstat -a | grep 89
```

If the port number recommended in this procedure is already in use, try an alternative port number that is available.

About this task

If the port is not correctly configured, some features of the IBM Traffic Information Hub do not function as expected. Change the port setting on the Tivoli Access Manager Server from 8900 to 8930 prior to starting the IBM Traffic Information Hub installation program.

Log on to the IBM Intelligent Operations Center application and integration server as the system administrator and perform the following procedure.

Procedure

1. Log on to the WebSphere Application Server administrative console using the following URL:

   `http://`*`hostname:port`*`/ibm/console`

   Where:

   - *hostname* is the host name of the IBM Intelligent Operations Center application and integration server.
   - *port* is the open port configured for this server. For example port number 9060.

   The profile page of **ISKDmgr01** displays.

2. Click **System administration** > **Console Preferences** and then select the following options:

   - **Turn on workspace automatic fresh**
   - **Show the help portlet**
   - **Synchronize changes with Nodes**

3. Click **Apply**.

4. On the main console menu, click **Security**.

5. Click **Global security**, followed by **External authorization providers**.

6. From the list of **Authorization providers**, select **External JACC provider** and then click **Configure....** On the next page click **Tivoli Access Manager properties**. The **Configuration** page opens.

7. In the **Tivoli Access Manager client settings** section, change the **Client listening port set value** from `8900:8999` to `8930:8999` and click **OK** to confirm.

8. Click **Save**.

9. Propagate the port change to member servers `MEMBER01` and `MEMBER02` of the `ISKCluster`.

   a. Stop the node agents of the `ISKCluster` by using the following commands:

   ```
   /opt/IBM/WebSphere/AppServer/profiles/ISKCustom01/bin/stopNode.sh -username wpsadminusername
   -password wpsadminpassword
   /opt/IBM/WebSphere/AppServer/profiles/ISKCustom02/bin/stopNode.sh -username wpsadminusername
   -password wpsadminpassword
   ```

   Where *wpsadminusername* and *wpsadminpassword* are the credentials of the WebSphere Application Server administrator.

   b. Stop the member servers of the `ISKCluster` by using the following commands:

   ```
   /opt/IBM/WebSphere/AppServer/profiles/ISKCustom01/bin/stopServer.sh MEMBER01 -username
   wpsadminusername -password wpsadminpassword
   /opt/IBM/WebSphere/AppServer/profiles/ISKCustom02/bin/stopServer.sh MEMBER02 -username
   wpsadminusername -password wpsadminpassword
   ```

   Where *wpsadminusername* and *wpsadminpassword* are the credentials of the WebSphere Application Server administrator.

   c. Restart the Deployment Manager (DM) on node ISKDmgr01. On the command line, change to the following location:

   ```
   cd /opt/IBM/WebSphere/AppServer/profiles/ISKDmgr01/bin
   ```

   d. Enter the following commands. Wait for the first command to finish before starting the Deployment Manager:

   ```
   ./stopManager.sh dmgr -username wpsadminusername -password wpsadminpassword
   ./startManager.sh dmgr -username wpsadminusername -password wpsadminpassword
   ```

   Where *wpsadminusername* and *adminpassword* are the credentials of the WebSphere Application Server administrator.

   e. Start the member servers of the `ISKCluster` by using the following commands:

   ```
   /opt/IBM/WebSphere/AppServer/profiles/ISKCustom01/bin/startNode.sh
   /opt/IBM/WebSphere/AppServer/profiles/ISKCustom02/bin/startNode.sh
   ```

f. Start the node agents of the `ISKCluster` by using the following commands:

```
/opt/IBM/WebSphere/AppServer/profiles/ISKCustom01/bin/startServer.sh MEMBER01
/opt/IBM/WebSphere/AppServer/profiles/ISKCustom02/bin/startServer.sh MEMBER02
```

Related tasks:

"Preparing the IBM Intelligent Operations Center servers" on page 17
Before you start the deployment of the IBM Traffic Information Hub, you must first prepare the existing IBM Intelligent Operations Center environment that you are installing on top of.

Verifying the Cognos installation

Before installing the IBM Traffic Information Hub, verify that the Cognos application server is up and running on the IBM Intelligent Operations Center analytic server. Verify that you can successfully connect to the Cognos Dispatch server and the Cognos Gateway server using a browser.

Before you begin

If you are installing the optional transportation prediction feature, ensure that Cognos Dispatch and Gateway servers on the IBM Intelligent Operations Center analytic server observe the correct Java Virtual Machine (JVM) settings specified in the *System configuration* topic.

About this task

From the IBM Intelligent Operations Center analytic server, complete the following steps:

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 analytic server
      - *port* is the open port configured for this server. For example 9082
   b. When prompted, log on with the *wpsamin* user account.
   c. In the top navigation bar, click **Launch**.
   d. Click **IBM Cognos Administration**.

   The IBM Cognos Connection administration console loads.
2. Verify connectivity to the Cognos Gateway server by.
   a. Connect to the Cognos Dispatch server by using the following URL:

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

      Where:
      - *hostname* is the hostname of the IBM Intelligent Operations Center analytic server
      - *port* is the open port configured for this server. For example 9083
   b. When prompted, log on with the *wpsamin* user account.
   c. In the top navigation bar, click **Launch**.
   d. Click **IBM Cognos Administration**.

   The IBM Cognos Connection administration console loads.

Related concepts:

"System configuration" on page 11
The IBM Intelligent Transportation deployment wizard installs the IBM Traffic Information Hub on top of the IBM Intelligent Operations Center Fix Pack 1 production environment. The IBM Intelligent Operations Center Fix Pack 1 is a prerequisite for the IBM Traffic Information Hub. An additional server is temporarily required for deployment of the IBM Traffic Information Hub and the optional transportation prediction feature.

Preparing the installation management server

You must prepare the server that runs the installation of the IBM Traffic Information Hub and the optional transportation prediction component before you start the IBM Intelligent Transportation deployment wizard. The IBM Intelligent Transportation installation management server is only required during the deployment process.

Before you begin

Review the hardware and software requirements of the installation management server.

Procedure

1. Install and configure a new server running the Linux operating system, according to the minimum software and hardware requirements.
2. Temporarily disable any firewall security that is currently running on the server and then restart the system.
3. Configure the network settings of the server so that it can communicate with all of the existing IBM Intelligent Operations Center server nodes.
4. Test the connectivity of the server to and from all other servers in the environment:
   a. From the new server, ping each of the IBM Intelligent Operations Center server nodes, by using their host names to ensure that they are reachable.
   b. From each of the existing IBM Intelligent Operations Center server nodes, ping the IBM Intelligent Transportation installation management server by using the host name to ensure that it is reachable.
   c. Contact your local network administrator to resolve any connectivity issues.

What to do next

Prepare the installation media before you start the deployment of the IBM Traffic Information Hub and the optional transportation prediction component.

Related concepts:

"Hardware requirements" on page 12
The IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed on top of, must meet the minimum hardware requirements specified for the IBM Intelligent Operations Center product. However, if you plan to install the optional transportation prediction feature, some additional memory resources are required. A temporary IBM Intelligent Transportation installation management server that meets the minimum hardware specification is also required. This server is only required during the deployment process.

"Software requirements" on page 14
The servers and clients involved in the deployment of the IBM Traffic Information Hub must meet the minimum software requirements. This includes the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed onto and the installation management server that the IBM Intelligent Transportation installer runs from.

Related tasks:

"Preparing the IBM Intelligent Operations Center servers" on page 17
Before you start the deployment of the IBM Traffic Information Hub, you must first prepare the existing IBM Intelligent Operations Center environment that you are installing on top of.

"Preparing the installation media"
Before you run the IBM Traffic Information Hub deployment wizard, you must first obtain and prepare the installation media. The installation media for the IBM Traffic Information Hub also includes the installation package and post-installation script file templates for the optional transportation prediction feature.

Preparing the installation media

Before you run the IBM Traffic Information Hub deployment wizard, you must first obtain and prepare the installation media. The installation media for the IBM Traffic Information Hub also includes the installation package and post-installation script file templates for the optional transportation prediction feature.

Before you begin

There are two forms of installation media for deploying the IBM Traffic Information Hub:

- Product installation DVD
- Licensed customers can download the installation package from the IBM® Passport Advantage® website

See the link at the end of this page for more information about the Passport Advantage software package numbers and download links.

Related concepts:

"Media packaging" on page 15
You can order the IBM Traffic Information Hub as a package of DVDs or obtain it through Passport Advantage®. The IBM Traffic Information Hub is a product of the IBM Intelligent Transportation family in the IBM Smarter Cities Software Solutions portfolio.

Related tasks:

"Deploying the solution" on page 26
IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

"Preparing the installation management server" on page 21
You must prepare the server that runs the installation of the IBM Traffic Information Hub and the optional transportation prediction component before you start the IBM Intelligent Transportation deployment wizard. The IBM Intelligent Transportation installation management server is only required during the deployment process.

Related information:

➡ Passport Advantage home page

➡ Passport Advantage - Download the IBM Traffic Information Hub V1.0.1 image files

Preparing the installation DVD

The installation DVDs for the IBM Traffic Information Hub contain all the files required to start the deployment. The installation files for the IBM Traffic Information Hub and the transportation prediction feature are on separate DVDs within the installation media. You must first mount each DVD on to the IBM Intelligent Transportation installation management server.

About this task

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

To mount a CD-ROM on Linux operating systems, you must issue the `mount` command. Depending on your system configuration, you might need root user authority for this procedure.

Procedure

For each DVD provided with the IBM Traffic Information Hub installation media, insert the DVD into the drive and enter the following command:

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

Note: `/cdrom` represents the mount point of the DVD.

Results

View the contents of the mounted installation DVD by placing the disc into the drive and enter the `cd /cdrom` command where `/cdrom` is the mount point directory.

What to do next

The IBM Intelligent Transportation installation management server is ready to run the required deployment wizard.

Note: The installation of the transportation prediction feature requires that IBM Traffic Information Hub version 1.0.1 is already installed and configured. It cannot be used stand-alone or with any other application.

Related tasks:

"Deploying the solution" on page 26
IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

Preparing the downloaded installation package

The IBM Traffic Information Hub installation package contains all the files required to start the deployment of the IBM Traffic Information Hub solution and the optional transportation prediction feature. You must first copy and extract the required installation files and directory structure onto the IBM Intelligent Transportation installation management server before you begin the deployment.

About this task

This task is not required if you are using the IBM Traffic Information Hub product DVD media to run the installation.

Procedure

1. Log on to the IBM Intelligent Transportation installation management server as the *root* user.
2. Create a new directory to contain the temporary installation files and directory structure. For example `/images`.

   Note: To contain the temporary installation files and directory structure for the optional transportation prediction feature, create a different directory. For example `/images/TP`. If not, the transportation prediction feature installation files will overwrite the IBM Traffic Information Hub installation files.

3. Copy the IBM Traffic Information Hub installation package into the new directory that you created in the previous step.

   Note: Copy the transportation prediction feature installation package to the directory you created for the transportation prediction installation files. For example `/images/TP`.

4. From the operating system command line, go to the directory where you just copied the installation package.
5. Extract the installer by using the following command:

   `#tar -xvf CI78XEN.tar`

   Note: To extract the transportation prediction installer, use the following command:

   `#tar -xvf CI78ZEN.tar`

Results

The installation management server is now ready to run the IBM Intelligent Transportation deployment wizard and deploy the IBM Traffic Information Hub solution. The installation starts from the directory into which you have just extracted the IBM Traffic Information Hub installation package. The optional transportation prediction feature deployment wizard is also ready to be run after the IBM Traffic Information Hub version 1.0.1 is installed and configured.

Related tasks:

"Deploying the solution" on page 26
IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

Installing the solution

As soon as you complete the prerequisite preparation tasks, you are ready to install the IBM Traffic Information Hub product using the IBM Intelligent Transportation installer. To deploy the IBM Traffic Information Hub you can run either the GUI deployment wizard or the silent installation command. After deploying the IBM Traffic Information Hub, some additional configuration is required.

Before you begin

The installation of the IBM Traffic Information Hub requires an installation management server to run the deployment wizard on. The IBM Intelligent Transportation installation management server must meet the minimum hardware and software requirements and be able to connect to and from the IBM Intelligent Operations Center servers. The IBM Intelligent Operations Center environment provides the middleware required by the IBM Traffic Information Hub.

The IBM Intelligent Transportation installation management server can be a physical hardware server or a virtual machine running on a VMware Server. It can also be a server in the cloud, if the IBM Intelligent Operations Center environment is also deployed in the cloud.

About this task

The deployment wizard performs several deployment steps:
- Component selection
- Specification of the IBM Intelligent Operations Center event and management server and operating system administrator
- Specification of the existing IBM Intelligent Operations Center administrator account
- Review of deployment progress, status messages and results

When the deployment of the IBM Traffic Information Hub version 1.0.1 is complete, the IBM Intelligent Transportation installation management server can also be used to install the optional transportation prediction component.

The installation profile on the IBM Intelligent Transportation installation management server can be optionally saved for later reference and is useful for future upgrades that are required.

Related concepts:

"Preparing for installation" on page 11
Before deploying the IBM Traffic Information Hub and optional transportation prediction feature, understand the system configuration for the IBM Traffic Information Hub. Ensure that the prerequisites of the solution and the underlying IBM Intelligent Operations Center environment are met before you start the deployment.

"System configuration" on page 11
The IBM Intelligent Transportation deployment wizard installs the IBM Traffic Information Hub on top of the IBM Intelligent Operations Center Fix Pack 1 production environment. The IBM Intelligent Operations Center Fix Pack 1 is a prerequisite for the IBM Traffic Information Hub. An additional server is temporarily required for deployment of the IBM Traffic Information Hub and the optional transportation prediction feature.

"Hardware requirements" on page 12
The IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed on top of, must meet the minimum hardware requirements specified for the IBM Intelligent Operations Center product. However, if you plan to install the optional transportation prediction feature, some additional memory resources are required. A temporary IBM Intelligent Transportation installation management server that meets the minimum hardware specification is also required. This server is only required during the deployment process.

"Software requirements" on page 14
The servers and clients involved in the deployment of the IBM Traffic Information Hub must meet the minimum software requirements. This includes the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed onto and the installation management server that the IBM Intelligent Transportation installer runs from.

Related tasks:

"Upgrading from an earlier version" on page 16
If you are running the IBM Traffic Information Hub version 1.0.0, you can use the installation wizard to upgrade to version 1.0.1. The IBM Traffic Information Hub 1.0.0 system must have the IBM Intelligent Transportation interim fix PO00021 applied before you can start the upgrade to version 1.0.1.

Deploying the solution

IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

Before you begin

Prepare the installation media before you start the deployment wizard. You must also perform the prerequisite tasks that are outlined in the section entitled *Preparing for installation*. Prerequisites include installing the IBM Intelligent Operations Center Fix Pack 1 and making sure that all of the servers are up and running. For more information, see the related links at the end of this topic.

About this task

Run the deployment wizard on the IBM Intelligent Transportation installation management server that you prepared the installation media on.

The deployment wizard requires the following information about the existing IBM Intelligent Operations Center Fix Pack 1 environment:

- The host name and operating system administrator ID and password of the IBM Intelligent Operations Center event and management server.
- The user name and password of the IBM Intelligent Operations Center administration account that was created during the installation.

Procedure

1. Log on to the installation management server as the *root* user.

2. View the files on the DVD. Alternatively, if you are using the installation download package, then go to the temporary directory where you extracted the IBM Traffic Information Hub installation package while preparing the installation media. For example /images/disk1.

3. Start the IBM Traffic Information Hub deployment wizard by running the following command as the *root* user:

   ```
   ./LinuxSetup
   ```

   The IBM Traffic Information Hub licensing agreement window displays.

4. Click **I agree** to accept the license agreement of the IBM Traffic Information Hub and start the deployment wizard.

5. On the deployment wizard welcome window, click **Next** to continue to the next panel and start the deployment setup.

6. On the **Select Tasks** panel, click **Next** to continue.

7. On the **Specify Targets** panel:

   a. In the **Target Computer** field, enter the host name of the IBM Intelligent Operations Center event and management server.

   b. In the User ID and Password fields, enter the credentials for the operating system *root* user of the IBM Intelligent Operations Center event and management server.

   c. Optional: To save the information for possible future use, select the **Save this login information** check box.

   d. Optional: Click **Test Connections** to verify that the IBM Intelligent Operations Center event and management server that you have specified can be reached by the installation management server. If the connection test fails, solve the connection issue before proceeding.

   e. To continue to the next deployment panel, click **Next**.

   Note: The **Operating system** field is disabled because only the Linux operating system is currently supported by the IBM Traffic Information Hub.

8. On the **Configure Parameters** panel:

   a. Specify the user name and password of the IBM Intelligent Operations Center management service provided during the installation of IBM Intelligent Operations Center.

   b. Confirm the password again and then click **Next** to continue.

9. The **Summary Panel** displays a summary of all selected tasks and an estimation of the time it takes to complete the deployment. Click **Deploy All** to confirm the deployment selection.

10. To start the installation, click **OK**.

11. Optional: To see more details about the deployment status, click **Deployment messages**.

12. Optional: Click **Master log** to see the full installation log.

13. After the installation is complete, when prompted, you can choose to save the current installation profile. This is useful for reinstalling and upgrading the product.

    - Click **Yes** to save the deployment information and configuration before exiting.
    - Click **No** to delete the deployment profile and logs.
    - Click **Cancel** to go back to the previous panel.

Results

The IBM Traffic Information Hub 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 the IBM Intelligent Operations Center. Complete the post-installation configuration and if required, install the optional transportation prediction component.

Related concepts:

"Preparing for installation" on page 11
Before deploying the IBM Traffic Information Hub and optional transportation prediction feature, understand the system configuration for the IBM Traffic Information Hub. Ensure that the prerequisites of the solution and the underlying IBM Intelligent Operations Center environment are met before you start the deployment.

Related tasks:

"Preparing the installation media" on page 22
Before you run the IBM Traffic Information Hub deployment wizard, you must first obtain and prepare the installation media. The installation media for the IBM Traffic Information Hub also includes the installation package and post-installation script file templates for the optional transportation prediction feature.

"Verifying the deployment" on page 29
Verify the deployment of the IBM Traffic Information Hub to ensure the solution is correctly deployed and working with the IBM Intelligent Operations Center.

"Post-installation configuration" on page 33
After successfully completing the installation of the IBM Traffic Information Hub, additional steps are required to configure the solution.

"Installing the transportation prediction feature" on page 30
The transportation prediction feature can optionally be installed on top of the IBM Traffic Information Hub to provide traffic prediction information. The IBM Traffic Information Hub is the foundational component of IBM Intelligent Transportation. You cannot install the transportation prediction feature until you have completed the deployment and configuration of the IBM Traffic Information Hub version 1.0.1.

Deploying the IBM Traffic Information Hub from a command line

You can also deploy the IBM Traffic Information Hub from a command line.

Before you begin

See the *Before you begin* and *About this task* sections in "Deploying the solution" on page 26.

About this task

Run the silent installation command on the IBM Intelligent Transportation installation management server that you have prepared the installation media on.

Like the GUI deployment wizard, the silent installation also requires the following information about the existing IBM Intelligent Operations Center environment:

- The host name and operating system administrator ID and password of the IBM Intelligent Operations Center event and management server
- The user name and password of the IBM Intelligent Operations Center administration account that was created during the installation.

Procedure

1. Log on to the installation management server as the *root* user.
2. View the files on the DVD. Alternatively, if you are using the installation download package, then go to the temporary directory where you extracted the IBM Traffic Information Hub installation package while preparing the installation media. For example /images/disk1.

3. Start the installation of the IBM Traffic Information Hub by running the following command as the *root* user:

   ```
   ./silent_install.sh target_node_name username password icpadmin icppassword
   ```

   Where:
   - *target_node_name* is the host name of the IBM Intelligent Operations Center event and management server
   - *username* and *password* are the account credentials for the operating system administrator (*root* user) on the IBM Intelligent Operations Center event and management server
   - *icpadmin* and *icppassword* are the account credentials for the IBM Intelligent Operations Center created during the installation of IBM Intelligent Operations Center.

   For example:

   ```
   ./silent_install.sh icp006.ibm.com root passw0rd icpadmin passw0rd
   ```

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 IBM Traffic Information Hub 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 the IBM Intelligent Operations Center. Complete the post-installation configuration and if required, install the optional transportation prediction component.

Verifying the deployment

Verify the deployment of the IBM Traffic Information Hub to ensure the solution is correctly deployed and working with the IBM Intelligent Operations Center.

Procedure

Verify that you can access the IBM Traffic Information Hub portal by logging on as the Transportation IT Administrator or any other Transportation user using the following URL:

```
http://hostname/wpsv70/wps/myportal
```

Where *hostname* is the host name of the IBM Intelligent Operations Center access server.
In the solution portal you can see the **Intelligent Transportation** link on the top navigation bar.

What to do next

The IBM Traffic Information Hub system is now ready for post-installation configuration.

Installing the transportation prediction feature

The transportation prediction feature can optionally be installed on top of the IBM Traffic Information Hub to provide traffic prediction information. The IBM Traffic Information Hub is the foundational component of IBM Intelligent Transportation. You cannot install the transportation prediction feature until you have completed the deployment and configuration of the IBM Traffic Information Hub version 1.0.1.

Before you begin

The transportation prediction feature is provided with the IBM Traffic Information Hub media package. A deployment wizard or a silent installation command is provided to deploy and install the transportation prediction feature that is part of IBM Traffic Information Hub. After deploying the transportation prediction feature, some additional configuration is required.

To run the deployment wizard of the transportation prediction feature, use the IBM Intelligent Transportation installation management server that was used for the installation of the IBM Traffic Information Hub.

About this task

The deployment wizard and the silent installation command performs several deployment steps:

* Component selection
* Specification of the IBM Intelligent Operations Center event and management server and operating system administrator
* Specification of the existing IBM Intelligent Operations Center administrator account
* Review of deployment progress, status messages and results

When the deployment of the transportation prediction feature is complete, the installation profile can be optionally saved for later reference and is useful for future upgrades that are required.

Related tasks:

"Deploying the solution" on page 26
IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

Deploying the transportation prediction feature

You can install the optional transportation prediction feature using a deployment wizard or a silent installation command.

Restriction: The installation of the transportation prediction feature requires that IBM Traffic Information Hub version 1.0.1 is already installed and configured. It cannot be used stand-alone or with any other application.

Deploying the transportation prediction feature using the wizard: ✚

IBM Intelligent Transportation provides a deployment wizard to install the transportation prediction feature into the IBM Traffic Information Hub version 1.0.1.

Before you begin

Prepare the installation media before you start the deployment wizard. You must also perform the prerequisite tasks that are outlined in the previous section titled *Preparing for installation*. Prerequisites include installing IBM Traffic Information Hub. For more information, see the related links at the end of this topic.

About this task

Run the deployment wizard on the IBM Intelligent Transportation installation management server that you have prepared the installation media on.

The deployment wizard requires the following information from the existing IBM Intelligent Operations Center environment:
- The host name and operating system administrator ID and password of the IBM Intelligent Operations Center event and management server.
- The user name and password of the IBM Intelligent Operations Center management service provided during the installation of IBM Intelligent Operations Center.

Procedure
1. Log on to the installation management server as the *root* user.
2. View the files on the DVD. If you are using the installation download package, then go to the temporary directory where you extracted the transportation prediction feature installation package while preparing the installation media. For example `/images/TP/disk1`.
3. Start the IBM Intelligent Transportation deployment wizard by running the following command as root user:

   `./LinuxSetup`

   The software license agreement panel is displayed.
4. Accept the software license agreement and click **Finish** to continue. The welcome panel of the deployment wizard is displayed with information about the installation process.
5. To continue to the next panel and start the deployment setup, click **Next**.
6. On the **Select Tasks** panel, click **Next** to continue.
7. On the component selection panel, click **Next** to continue.
8. On the **Specify Targets** panel:
   a. Specify the host name, operating system administrator (root user), and password of the IBM Intelligent Operations Center event and management server.
   b. Optional: To save the information for possible future use, select the **Save this login information** check box.
   c. Optional: Click **Test Connections** to verify that the IBM Intelligent Operations Center event and management server that you have specified can be reached by the installation management server. If the connection test fails, solve the connection issue before proceeding.
   d. To continue to the next deployment panel, click **Next**.

   Note: The **Operating system** field is disabled because only the Linux operating system is currently supported by IBM Intelligent Transportation.

9. On the **Configure Parameters** panel:

    a. Specify the user name and password of the IBM Intelligent Operations Center management service provided during the installation of IBM Intelligent Operations Center.

    b. Confirm the password again and then click **Next** to continue.

10. The **Summary Panel** displays a summary of all selected tasks and an estimation of the time it takes to complete the deployment. Click **Deploy All** to confirm the deployment selection.

11. To start the installation, click **OK**.

12. Optional: To see more details about the deployment status, click **Deployment messages**.

13. Optional: Click **Master log** to see the full installation log.

14. After the installation is complete, when prompted, you can choose to save the current installation profile. This is useful for reinstalling and upgrading the product.

- Click **Yes** to save the deployment information and configuration before exiting.
- Click **No** to delete the deployment profile and logs.
- Click **Cancel** to go back to the previous panel.

Results

The transportation prediction feature is installed into the IBM Traffic Information Hub .

What to do next

Verify the installation to ensure the solution is correctly deployed and working with the IBM Traffic Information Hub version 1.0.1.

Deploying the transportation prediction feature from a command line:

IBM Intelligent Transportation provides the option to silently install the transportation prediction feature from a command line into the IBM Traffic Information Hub version 1.0.1.

Before you begin

Prepare the installation media before you run the command. You must also perform the prerequisite tasks that are outlined in the section entitled *Preparing for installation*. Prerequisites include installing IBM Traffic Information Hub. For more information, see the related links at the end of this topic.

About this task

Run the command on the IBM Intelligent Transportation installation management server that you have prepared the installation media on.

The silent installation requires the following information from the existing IBM Intelligent Operations Center environment:

- The host name and operating system administrator ID and password of the IBM Intelligent Operations Center event and management server.
- The user name and password of the IBM Intelligent Operations Center management service provided during the installation of IBM Intelligent Operations Center.

Procedure

1. Log on to the installation management server as the *root* user.

2. View the files on the DVD. If you are using the installation download package, then go to the temporary directory where you extracted the transportation prediction feature installation package while preparing the installation media. For example `/images/TP/disk1`.

3. Start the installation of the transportation prediction feature by running the following command as the *root* user:

`./silent_install.sh target_node_name username password iskUser iskPassword`

Where:

- *target_node_name* is the host name of the IBM Intelligent Operations Center event and management server
- *username* and *password* are the account credentials for the operating system administrator (*root* user) on the IBM Intelligent Operations Center event and management server
- *iskUser* and *iskPassword* are the account credentials for the IBM Intelligent Operations Center management service provided during the installation of IBM Intelligent Operations Center.

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 transportation prediction feature is installed into the IBM Traffic Information Hub.

What to do next

Verify the installation to ensure that the solution is correctly deployed and working with the IBM Traffic Information Hub version 1.0.1.

Verifying the deployment

Verify the deployment of the transportation prediction feature to ensure the solution is correctly deployed and working with the IBM Traffic Information Hub.

Procedure

1. Verify that you can access the IBM Traffic Information Hub portal by logging on as the Transportation IT Administrator or any other Transportation user using the following URL:

`http://hostname/wpsv70/wps/myportal`

Where *hostname* is the host name of the IBM Intelligent Operations Center access server. In the solution portal, you can see the **Intelligent Transportation** link on the top navigation bar.

2. Click **Intelligent Transportation**.
3. Verify that you can see the **Predicted Traffic Conditions** portlet in the **Operator: Traffic** tab.

What to do next

The system is now ready for post-installation configuration.

Related concepts:
"Configuring the transportation prediction feature" on page 39
After successfully completing the installation of the optional transportation prediction feature, additional steps are required to configure the solution.

Post-installation configuration

After successfully completing the installation of the IBM Traffic Information Hub, additional steps are required to configure the solution.

Related tasks:

"Deploying the solution" on page 26

IBM Intelligent Transportation provides a deployment wizard to install the IBM Traffic Information Hub into an existing environment that is running the IBM Intelligent Operations Center Fix Pack 1.

"Verifying the deployment" on page 29

Verify the deployment of the IBM Traffic Information Hub to ensure the solution is correctly deployed and working with the IBM Intelligent Operations Center.

Importing and configuring the TMDD data source

After you have installed the IBM Traffic Information Hub, 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 to the IBM Traffic Information Hub in the required Traffic Management Data Dictionary (TMDD) data format that the system is designed to support.

Before you begin to integrate the IBM Traffic Information Hub with an owner center and configure the traffic data import process, you must do some planning to ensure 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 73.
2. "Connecting to an owner center" on page 78.
3. "Setting up a subscription to traffic data" on page 80.
4. "Running a bulk load of traffic data" on page 83.
5. "Verifying the data import" on page 85.

For detailed information about how to integrate the TMDD data source into the IBM Traffic Information Hub see the *Integrating the solution* section of the IBM Intelligent Transportation Information Center.

Related concepts:

Chapter 4, "Integrating the solution," on page 71

The IBM Traffic Information Hub 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.

Setting up the shapefile for road segments

To complete the data import process, a shapefile must be loaded into the IBM Traffic Information Hub. A shapefile corresponds to the Traffic Management Data Dictionary (TMDD) defined road segments that are being monitored by the system. Use the DB2® Spatial Extender to import spatial data from external sources to the IBM Traffic Information Hub via data exchange files.

A shapefile is a type of data exchange file required by the IBM Traffic Information Hub to define the road segments on the 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 one or more of the following four files:

- A file that contains spatial data in shape format, a de facto industry-standard format 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 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`

DB2 Spatial Extender is provided by the IBM Intelligent Operations Center base architecture. DB2 Spatial Extender is deployed on the IBM Intelligent Operations Center database server.

Importing the shapefile

The shapefile for the geographical area of your transportation network must be imported into a directory on the IBM Intelligent Operations Center database server. Import the shapefile with the DB2 control center application on the IBM Intelligent Operations Center database server. Configuration is also required to prepare the shapefile for a successful import.

We recommend that you work with your local IBM Intelligent Transportation representatives when importing a shape file. You can reuse existing information contained in the shape file, including references, connectivity, and names. However, if you are using the transportation prediction component:
- Use integer identifiers greater than one for link identifiers.
- Avoid selecting low-valued identifiers that clash with subnet identifiers.

Contact your IBM Intelligent Transportation representative and arrange a Global Business Services® engagement to complete the work required.

Related information:

[→] DB2 Spatial Extender Information Center

[→] Troubleshooting the shapefile import

Configuring the maps

After installing the IBM Traffic Information Hub, configure the geographical information system (GIS) base map and settings of the map portlets.

About this task

If you are a Transportation IT Administrator, you can configure the maps that display in the following map portlets on the Operator: Traffic and Planner: Traffic views:

You can switch to map **Configure** mode from within each of the map portlets. Only the configuration settings applicable to that map portlet are visible.

To access the map configuration interface, click the upper right corner of the portlet to view the portlet display menu and click **Configure**.

Complete the following steps to configure the maps of the IBM Traffic Information Hub solution interface.

Procedure

1. Configure the ESRI ArcGIS server that provides the base map for the IBM Traffic Information Hub solution.
2. Configure the base map for the solution that each of the map portlets display.
3. Configure the following settings for the map in the Current Traffic Conditions portlet on the Operator: Traffic view.
   - Center point and zoom
   - Road categories

- Predefined Regions
- Traffic layers

4. Configure the following settings for the map in the Historical Traffic Conditions portlet.
   - Center point and zoom
   - Road categories

5. Configure the following settings for the map in the Predicted Traffic Conditions portlet on the Operator: Traffic view.
   - Center point and zoom
   - Prediction interval increment

Note: This portlet is only available when you install the optional transportation prediction feature.

Related concepts:

"Configuring ESRI ArcGIS"
ESRI ArcGIS server is required to provide the base maps of the user interface. ESRI ArcGIS is not a part of IBM Intelligent Transportation and is required as an additional service. After installing the IBM Traffic Information Hub configure the ESRI ArcGIS server to work with the solution.

"Adding traffic layers" on page 96
Traffic layers are map layers that provide visibility of the geospatial traffic data captured by the IBM Traffic Information Hub. Traffic layers are superimposed over the top of the solution base map.

Related tasks:

"Configuring the base map for the solution" on page 93
Before you can use the solution portal, a base map is required for the map portlets in the IBM Traffic Information Hub user interface. Layers of traffic data are superimposed over the base map that is configured for the system.

"Setting the center point and zoom level for the maps" on page 94
Configure the center point and zoom level for each of the maps provided by the solution.

"Adding road categories" on page 94
Create road categories to define the types of road links that a user can include when adding a traffic layer. Road categories are configured from the **Traffic Settings** tab of the map configuration view.

"Adding regions" on page 95
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.

"Configuring the prediction interval increment" on page 99
You can set the prediction interval increments for the map slider in the Predicted Traffic Conditions portlet.

Configuring ESRI ArcGIS

ESRI ArcGIS server is required to provide the base maps of the user interface. ESRI ArcGIS is not a part of IBM Intelligent Transportation and is required as an additional service. After installing the IBM Traffic Information Hub configure the ESRI ArcGIS server to work with the solution.

ESRI Data and Maps for ArcGIS 10 files are required. Make sure you have the street map files from ESRI that cover the geographical area of the transportation network with the level of detail that is required.

The following steps must be performed to complete the map service configuration:

- Install the ESRI ArcGIS server as per the recommended requirements.
- Deploy the map files as described in the ESRI guide using the **Add New Service** option in the ArcGIS Server Manager application.

Related concepts:

"GIS server requirement" on page 15
In addition to the underlying IBM Intelligent Operations Center, the IBM Traffic Information Hub requires access to a geographic information system (GIS) server.

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS) base map and settings of the map portlets.

"Configuring the base map for the solution" on page 93
Before you can use the solution portal, a base map is required for the map portlets in the IBM Traffic Information Hub user interface. Layers of traffic data are superimposed over the base map that is configured for the system.

Configuring the thread pool of the portal Web Container

After installing the solution, increase the maximum number of threads allowed in the thread pool used by the Web container for the portal server. The default maximum thread size is 50, but if there are more than 30 concurrent users connecting to the IBM Intelligent Transportation solution, then this value must be increased to 100.

About this task

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

Note: If this procedure is not performed, some of your users could experience problems when logging on to the solution. This task also applies to IBM Intelligent Transportation version 1.0.1.1.

Procedure

1. Log on to the WebSphere Portal Server **Administration** console.
2. In the topology tree, expand **Servers** and click **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 portal server.

Configuring the reports of the solution

After installing the IBM Traffic Information Hub and the optional transportation prediction feature, some configuration of the traffic data reports and reports portlets is required.

About this task

Configure the reports portlets so that they display the traffic data of your transportation network and in the format that you prefer. You can also optionally customize the reports of the solution further.

You must have Transportation IT Administrator permissions to customize the report portlets. If you have Traffic Planner or Traffic Operator permissions, you can modify the criteria of the existing reports that the portlets display.

Procedure

1. Required: "Configuring the properties of a report" on page 101.
2. Optional: "Enabling accessibility" on page 106

3. Optional: "Changing the language settings of the reports" on page 169
4. Optional: "Customizing the content of the Reports portlets" on page 102

Related tasks:

"Configuring the properties of a report" on page 101
Configure the reports that are provided with the IBM Traffic Information Hub so that they reference the required traffic network ID and road link or region.

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 the IBM Traffic Information Hub.

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 and base architecture. 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 draws on 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. Portal administrators belong to an Administrator group, *wpsadmins*. 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 or roles that a user is assigned to, determine what features in the IBM Traffic Information Hub product they can use.

See the link to the security topic at the end of the page for more information about assigning roles and groups to IBM Intelligent Transportation users and the permissions they provide.

See the WebSphere Portal wiki for more information about managing users and groups.

Importing users and groups

If your IBM Traffic Information Hub users are not existing IBM Intelligent Operations Center users, 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 Information Center.

Related concepts:

Chapter 3, "Securing the solution," on page 63
Securing the IBM Traffic Information Hub and the optional transportation prediction feature 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.

Related tasks:

"Adding users and groups" on page 65
To use a specific feature of the IBM Traffic Information Hub solution portal, a user must be a member of a user role group that provides the required access level to use that feature. Use the **Administration** view to give users and groups access to the IBM Traffic Information Hub solution interface.

Related information:

Importing users and groups

↪ Websphere Portal Wiki

Configuring the transportation prediction feature

After successfully completing the installation of the optional transportation prediction feature, additional steps are required to configure the solution.

Related tasks:

"Verifying the deployment" on page 33
Verify the deployment of the transportation prediction feature to ensure the solution is correctly deployed and working with the IBM Traffic Information Hub.

"Installing the transportation prediction feature provided with Interim Feature 1" on page 54
You can install the optional transportation prediction feature that is provided with Interim Feature 1 by running either the deployment wizard or the silent installer. The transportation prediction feature that is provided with Interim Feature 1 is only supported to run on top of the IBM Traffic Information Hub version 1.0.1.1.

Verifying REST service settings for traffic prediction

Before you configure the transportation prediction feature, verify that the transportation prediction REST service settings contain the correct hostname and port number of the IBM Intelligent Operations Center analytic server.

Procedure

1. Log on to the administration console of the WebSphere Portal Server as the portal administrator, for example *wpsadmin*.
2. Select **Applications** > **Application Types** > **WebSphere Enterprise Applications** and click **trans_forecast_rest_ear** application.
3. Select **Web Module Properties > Environment entries for Web modules.**
4. Verify the *QuartzServletHost* and *QuartzServletPort* variables. These variables contain the values of the host name and port number of *transPredBatchServer*, or the IBM Intelligent Operations Center analytic server. Update and save the variable values if any changes are required.
5. To initialize the variables, restart the IBM Intelligent Operations Center portal server.

Related tasks:

"Configuring general settings for traffic prediction" on page 109
Customize the general settings for traffic prediction from the portal administration console on the IBM Intelligent Operations Center Portal Server. You must have Transportation IT administrator permissions to perform this task.

Modifying the container path for tablespaces

After installing the transportation prediction feature, the system must be configured to modify the container path for the tablespaces created by the transportation prediction installer. As the transportation prediction feature is intended for large amounts of data, ensure that the containers are stored in a large storage device, such as a SAN.

Procedure

1. Log on to the IBM Intelligent Operations Center database server as **db2inst1**.
2. The transportation prediction installer creates tablespaces with the following container path: /home/db2inst1/tpt/dataTablespace2/. The tablespaces are: **tptdata**, **tptindex**, and **tempTablespace2**. At the command prompt, enter the following commands to display the tablespace container details:

   a.
   ```
   db2 connect to tih_hs
   ```
   b.
   ```
   db2pd -tablespaces -db tih_hs
   ```

3. To change the container paths, enter the following command to add a new container:
   ```
   ALTER TABLESPACE tablespacename ADD ( FILE 'new path/filename' 2 g)
   ```

   Where:
   - *tablespacename* is the name of the tablespace
   - *new path* is the new file path
   - *filename* is the file name of the new container.

4. Enter the following command to remove the previously specified container:
   ```
   ALTER TABLESPACE tablespacename DROP ( FILE '/home/db2inst1/tpt1/dataTablespace2/tptdata')
   ```

   Where:
   - *tablespacename* is the name of the tablespace.

5. Enter the following command to enable the autoresize:
   ```
   ALTER TABLESPACE tablespacename autoresize yes
   ```

   Where:
   - *tablespacename* is the name of the tablespace.

6. Repeat this process for all three tablespaces, and complete these steps after installation, before running the post-installation script.

Results

The container path for the tablespaces created by the transportation prediction installer is modified.

Transferring master and historical data to traffic prediction tables

After you have installed the transportation 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 transportation 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 transportation prediction database tables with the master and historical traffic data. Some of the required steps differ depending on the version of the transportation prediction feature that you are installing.

Note: If you are using version 1.0.1.1 or later, the scripts required to complete this task do not need to be copied to the IBM Intelligent Operations Center database server.

Procedure

1. Log on to the IBM Intelligent Operations Center database server as the *root* user.
2. Depending on the version of transportation prediction you have installed, do one of the following:
   - If you have installed transportation prediction version 1.0.1:
     a. View the files on the DVD. If you are using the installation download package, then go to the temporary directory where you extracted the transportation prediction feature installation package while preparing the installation media. For example **/images/TP/disk1**. The **TP_Historic_Data.sh** and **TP_Master_Data.sh** script files are available here.
     b. Copy the **TP_Historic_Data.sh** and **TP_Master_Data.sh** script files from the IBM Intelligent Operations Center installation management server to a folder in the **/tmp** directory or **/home/db2inst1** directory of the IBM Intelligent Operations Center database server.
   - `1.0.1.1` If you have installed transportation prediction version 1.0.1.1 or later:
     - Open the following directory:/opt/IBM/iss/intelligentTransportation/ transportationPrediction/scripts
3. Edit the configurable queries in the **TP_Historic_Data.sh** and **TP_Master_Data.sh** template script files.
4. 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 required for the prediction calculation using the following command:

   ./TP_Master_Data.sh *database_name database_username database_password*

   Where:
   - *database_name* is the name of the IBM Traffic Information Hub Historical database, for example TIH_HS.
   - *database_username* and *database_password* are the account credentials for the database instance.
5. Set the prediction frequency parameter in the engine parameters screen as defined in the calibration steps, if the prediction frequency is not 15 minutes. The historic data is then transferred as required by the prediction algorithm.
6. Run the **TP_Historic_Data.sh** script to load data to the link_report table 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 IBM Traffic Information Hub 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.

If the database transaction log is not large enough, the historic data load may 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 recreate the `link_report` table, and recalculate the mean and estimate calculations.

7. Run the **REORG** database maintenance command on the following transportation prediction database tables:

   - tptool.LINK_REPORT
   - tmdd.LINK_STATUS
   - datex_II.TRAFFICSPEED
   - datex_II.TRAFFICFLOW

   For more information about the database maintenance commands and how they work, see the DB2 Information Center. See also "Database maintenance" on page 125.

Results

The historical data and default values for transportation prediction configuration are loaded.

Related information:

⮕ DB2 Information Center

Displaying link relationships

```
1.0.1.1
```

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 in Interim Feature 1. The first column displayed is the link IDs, and the second column displayed indicates the number of relationships the link IDs have. Each link should be connected to at least one other link through the node which they share.

Procedure

1. Log on to the IBM Intelligent Operations Center database 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 the link IDs have.

Configuring the administration portlets

➕

After the transportation 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 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 administration portlets.

Procedure

1. Configure the site title for the traffic prediction administration portlets available in the **Administration** view of the solution interface by following the instructions in "Configuring the site title for the administration portlets" on page 108.
2. Configure the general settings for traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in "Configuring general settings for traffic prediction" on page 109. Ensure that traffic prediction is disabled by clearing the **Enable traffic prediction** check box, **Enable prediction based on speed** check box, and **Enable prediction based on volume** check box.
3. Restart the Prediction server.
    a. Go to /opt/IBM/WebSphere/AppServer/profiles/transportationPrediction/bin/.
    b. Stop the Prediction server by running the following command:
        ./stopServer.sh transPredServer -username wpsadmin -password wpspassw0rd
    c. Start the Prediction server by running the following command:
        ./startServer.sh transPredServer -username wpsadmin -password wpspassw0rd
4. 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 "Customizing the traffic relationship matrix" on page 111.
5. Configure the traffic prediction mean calculation settings in the Configure Traffic Prediction Calculations - Mean portlet by following the instructions in "Customizing traffic prediction mean calculation" on page 111.
6. Configure the traffic prediction estimate calculation settings in the Configure Traffic Prediction Calculations - Estimate portlet by following the instructions in "Customizing traffic prediction estimate calculation" on page 112.
7. Restart the BatchCalculation server. For instructions on how to stop and start the BatchCalculation server, see Controlling the traffic prediction servers.
8. Trigger all the traffic prediction calculations in the Initiate Calculation Manually portlet by following the instructions in "Manually initiating traffic prediction calculations" on page 112. 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.
9. Monitor all the traffic prediction calculations in the Traffic Prediction Calculation Monitoring portlet by following the instructions in "Monitoring traffic prediction calculations" on page 113. You can customize the query in the selection form to monitor specific calculations.
10. Enable traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in "Configuring speed and volume settings for traffic prediction" on page 110. Ensure that the **Enable traffic prediction** check box is selected. Also, select either **Enable prediction based on speed** check box or **Enable prediction based on volume** check box or both.

Results

The following files are created in /opt/IBM/iss/intelligentTransportation/transportationPrediction:
- jobs.xml

- batch.xml

Deleting sample users

The IBM Traffic Information Hub includes sample users. For security reasons, delete the sample users after the solution has been deployed.

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.

Procedure

1. Log on to the portal as the Portal administrator, or a user who is a member of the *wpsadmin* security group.
2. Click **Administration**.
3. Click **Access > Users and Groups**.
4. Click the delete icon for the following users:
   - **yverna** (Yara Verna)
   - **lsmith** (Luke Smith)
   - **sjane** (Sarah Jane)
   - **mjackson** (Maria Jackson)

   Important: Do not delete the following required users. If you delete them, the IBM Traffic Information Hub and the IBM Intelligent Operations Center will not operate properly.
   - **wpsadmin**
   - **wasadmin**
   - **wpsbind**
   - **admin**
   - **notesadmin**

Related concepts:

"Sample users" on page 68
During the deployment of the IBM Traffic Information Hub, sample users are created with corresponding responsibilities and access permissions.

Verifying the installation

After installing the IBM Traffic Information Hub, verify that the solution is installed correctly.

About this task

To confirm the successful deployment of the IBM Traffic Information Hub, check that the portal application, TMDD External Center Applications, and database are installed and running. The log files also provide an indication of successful installation.

Additional security access privileges might be required to perform these tasks.

Verify Portal Applications using the WebSphere Application Server administrative console

About this task

You can verify the successful installation of the portal applications of the IBM Traffic Information Hub on the IBM Intelligent Operations Center portal server.

Procedure

1. Log on to the IBM Intelligent Operations Center portal server as the portal administrator, for example `wpsadmin`.
2. On the WebSphere Application Server administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*trans*`.
4. If the installation is successful, the following portal applications are the running state:
   - **trans_portal_ear**
   - **trans_portlet_ear**
   - **trans_report_portlet_ear**
   - **trans_restservices_ear**

Verify Portal Applications using the standard terminal

About this task

You can also verify the successful installation of the portal applications required by the IBM Traffic Information Hub by using the standard terminal.

Procedure

1. Log on to the IBM Intelligent Operations Center portal server as the root user.
2. Open the directory `/opt/IBM/WebSphere/wp_profile/logs/WebSphere_Portal`.
3. Enter the following command:
   ```
   grep 'trans_' SystemOut.log  | grep started
   ```
4. Check the `SystemOut.log` for start messages for the following applications:
   - **trans_portal_ear**
   - **trans_portlet_ear**
   - **trans_report_portlet_ear**
   - **trans_restservices_ear**

Verify the TMDD External Center Applications

About this task

You can verify the successful installation of the TMDD External Center Applications on the IBM Intelligent Operations Center application and integration server.

Procedure

1. Log on to the IBM Intelligent Operations Center application and integration server as the portal administrator.
2. On the WebSphere Application Server administrative console, select **Applications** > **Application Types** > **WebSphere enterprise applications**.
3. In the **Search Terms** filter field, enter `*trans*`.
4. Select **Applications** > **>Application Types** > **WebSphere Enterprise Applications**.

5. If the installation is successful, the following applications are in the running state:
   - **trans_tmddloadserver_ear**
   - **trans_tmddloadserver_ear**

Verify TMDD External Center Applications using the standard terminal
About this task

You can verify the successful installation of the TMDD External Center Applications using the standard terminal.

Procedure
1. Log on to the IBM Intelligent Operations Center application and integration server as the root user.
2. Open the directory `/opt/IBM/WebSphere/AppServer/lprofiles/ISKCustom01/logs/MEMBER01`.
3. Enter the following command:
   `grep 'trans_' SystemOut.log | grep started`
4. Check the `SystemOut.log` for start messages for the following applications
   - **trans_tmddloadserver_ear**
   - **trans_tmddloadserver_ear**

Verifying the transportation prediction feature installation

After installing the optional transportation prediction feature, use the instructions in this topic to verify that the transportation prediction feature is installed correctly.

About this task

To confirm the successful deployment of the transportation prediction feature, you need to check that the portal application, traffic prediction applications, and database are installed and running. These factors can be confirmed using the log files that are created on successful installation, by viewing the relevant parts of the WebSphere Portal Server and executing DB2 commands.

Your local system administrator might need to give you access to the installation nodes for these components. Your administrator might need to open TCP/IP ports to allow access to the WebSphere Consoles or to provide you with the necessary privileges to access the log files in question.

Verify Portal Applications using the WebSphere Portal Server
About this task

You can verify the successful installation of the portal applications using the WebSphere Portal Server.

Procedure
1. Access the WebSphere Portal Server with the appropriate credentials.
2. Select **Applications** > **Application Types** > **WebSphere enterprise applications**.
3. Using the filter, set the search terms to be `*trans*`.
4. If the installation is successful the following applications are in the running state:
   - `trans_forecast_rest_ear`
   - `trans_forecaster_portlet_ear`
   - `trans_tpt_admin_portlet_ear`
   - `trans_tpt_report_portlet_ear`

Verify Portal Applications using the standard terminal
About this task

You can verify the successful installation of the portal applications using the standard terminal.

Procedure
1. Log on to the event and management server as the *root* user.
2. Specify the following password:

   `passw0rd`
3. Access the log files at /opt/IBM/iss/intelligentTransportation/transportationPrediction/ installv1_0_1/logs.
4. To ensure the installation of the analytic server, check the following log files:
   - `analytics.log`
   - `TPTAdminSolutionConfigurationPageLayout_out.xml`
   - `TPTAdminSolutionManagementPageLayout_out.xml`

   Note: You can also check other log files according to the purpose. For example, check `cognos.log` to ensure the deployment of Cognos server.

Verify the transportation prediction database
About this task

You can verify the successful installation of the transportation prediction database.

Procedure
1. Log on to the database server as DB2 user.
2. Connect to the database TIH_HS:

   `db2 connect to tih_hs`
3. Verify the creation of the schema TPTOOL.
4. Verify the creation of the 38 transportation prediction tables. You can also verify the installation of the transportation prediction database with DB2 Visualizer.

Verify the transportation prediction servers
About this task

You can verify the successful installation of the transportation prediction servers.

Procedure
1. Log on to the analytic server as the *root* user.
2. Access the WebSphere Application Server with the appropriate credentials.
3. Select **Applications** > **Application Types** > **WebSphere enterprise applications**.
4. If the installation is successful the following applications are in the running state:
   - `trans_tptool_ear`
   - `trans_tptool_batch_ear`

Installing and configuring Interim Feature 1

1.0.1.1

You can install the IBM Traffic Information Hub version 1.0.1 Interim Feature 1 on top of a new installation of the IBM Intelligent Operations Center version 1.0 Fix Pack 1. It can also be installed on top of an existing deployment of the IBM Intelligent Operations Center that is already running the IBM Traffic Information Hub version 1.0.1. The installer program for Interim Feature 1 includes the IBM Traffic Information Hub version 1.0.1 in addition to the additional features and improvements that are provided by Interim Feature 1. You can also install the optional transportation prediction feature that is also provided with the Interim Feature 1 installation package.

Unlike with the previous versions of the IBM Traffic Information Hub, you can install Interim Feature 1 from any of the IBM Intelligent Operations Center node servers, providing all of the required services and applications are running.

Note: If you are using the GUI installation wizard, you cannot use the IBM Intelligent Operations Center event and management server to run the installation.

You can use a dedicated installation management server to run the installation as well, but this is an optional requirement, unlike with previous versions. You must ensure that the IBM Intelligent Transportation installation management server meets the minimum hardware and software requirements, and is able to connect to and from the IBM Intelligent Operations Center servers. For more information, see the related *Hardware requirements* topic.

To deploy Interim Feature 1, run either the GUI deployment wizard or the silent installation command. Following installation, the IBM Traffic Information Hub Interim Feature 1 requires post-installation configuration. The installation and configuration procedure for Interim Feature 1 is similar to the deployment steps required in earlier versions of the IBM Traffic Information Hub and the optional transportation prediction feature.

Throughout the documentation, Interim Feature 1 is also referred to using the official version number of this release, version 1.0.1.1.

Sections of the documentation are marked with the [1.0.1.1] icon to indicate that the information applies only to the Interim Feature 1 for IBM Traffic Information Hub.

Preparing to install Interim Feature 1

[1.0.1.1]

Before starting the installation of Interim Feature 1, review the system configuration of the IBM Traffic Information Hub version 1.0.1 and ensure that the requirements and prerequisites are met. Some preparation is also required on the underlying IBM Intelligent Operations Center environment before you can install Interim Feature 1.

System configuration

The system configuration details specified for the IBM Traffic Information Hub version 1.0.1, apply also to Interim Feature 1.

However, a dedicated installation management server is no longer a mandatory requirement. Using the installer for Interim Feature 1, you can install the IBM Traffic Information Hub from any of the IBM Intelligent Operations Center node servers, providing all of the required services and applications are running.

Note: If you are using the GUI installation wizard, you cannot use the IBM Intelligent Operations Center event and management server to run the installation.

For more information, see the related topic titled *System configuration.*

Hardware and software requirements

The hardware and software requirements specified for the IBM Traffic Information Hub version 1.0.1, apply to Interim Feature 1. The GIS server requirements for IBM Traffic Information Hub version 1.0 also apply to Interim Feature 1.

For more information, see the related topics titled *Hardware requirements* and *Software requirements.*

Supported installation paths

You can use the Interim Feature 1 installer to deploy the IBM Traffic Information Hub on top of a new IBM Intelligent Operations Center environment. Also, if you previously installed version 1.0.1 of the IBM Traffic Information Hub, you can upgrade your existing installation to the Interim Feature 1 version.

The following table shows the supported installation paths for deploying the IBM Traffic Information Hub version 1.0.1 Interim Feature 1.

Previous version of the IBM Traffic Information Hub	Direct upgrade support statement
None	Supported
1.0.1	Supported
1.0.0	Not supported *

Note: * If you are upgrading the IBM Traffic Information Hub from version 1.0.0, you must first upgrade to the IBM Traffic Information Hub version 1.0.1 and complete the required configuration. After you have verified the upgrade to version 1.0.1 you can upgrade to version 1.0.1.1.

Preparing the underlying IBM Intelligent Operations Center servers

The IBM Traffic Information Hub version 1.0.1 Interim Feature 1 requires that the underlying environment is running IBM Intelligent Operations Center Fix Pack 1. Interim fix PO00030 must also be applied to the IBM Intelligent Operations Center before you can begin the installation of Interim Feature 1. As with previous versions, the IBM Intelligent Operations Center environment provides the middleware required by the solution.

To prepare the IBM Intelligent Operations Center servers for the installation of Interim Feature 1, complete the following steps:

1. Deploy and configure the IBM Intelligent Operations Center version 1.0 Fix Pack 1 environment according to the installation instructions in the IBM Intelligent Operations Center Information Center.
2. Complete the additional IBM Intelligent Operations Center configuration steps outlined in the topic titled *Preparing the IBM Intelligent Operations Center servers.* These are the prerequisite steps for installing the IBM Traffic Information Hub on top of the IBM Intelligent Operations Center.
3. Download and install the IBM Intelligent Operations Center interim fix PO00030 on to the underlying environment.
4. Verify that the IBM Intelligent Operations Center version 1.0 Fix Pack 1 with interim fix PO00030 applied is successfully deployed and running as expected.

The Interim Feature 1 installation performs several validation checks before the IBM Traffic Information Hub is installed. If the prerequisite software is not installed, the installation of the IBM Traffic Information Hub fails. This also applies to the installation of the optional transportation prediction feature that is provided also with Interim Feature 1.

After completing the preparation steps, you are ready to download and prepare the installation package for Interim Feature 1. Choose one of the IBM Intelligent Operations Center servers to run the installer on.

Alternatively, you can use a dedicated installation management server if required.

Upgrading the transportation prediction feature

If the transportation prediction feature version 1.0.1 was previously installed in this environment, you can use the installer provided in the Interim Feature 1 installation package to upgrade the feature to version 1.0.1.1. The transportation prediction feature provided with Interim Feature 1 is only supported to run on an environment running the IBM Traffic Information Hub version 1.0.1.1. Upgrade the IBM Traffic Information Hub to version 1.0.1.1 before you upgrade the transportation prediction feature.

If you are upgrading the transportation prediction feature from version 1.0.1 to 1.0.1.1, before starting the installer you must first manually start the **transPredServer** and **transPredBatchServer** application servers on the IBM Intelligent Operations Center analytic server. For detailed instructions, see "Controlling the traffic prediction servers" on page 115.

Related concepts:

"Preparing for installation" on page 11
Before deploying the IBM Traffic Information Hub and optional transportation prediction feature, understand the system configuration for the IBM Traffic Information Hub. Ensure that the prerequisites of the solution and the underlying IBM Intelligent Operations Center environment are met before you start the deployment.

"System configuration" on page 11
The IBM Intelligent Transportation deployment wizard installs the IBM Traffic Information Hub on top of the IBM Intelligent Operations Center Fix Pack 1 production environment. The IBM Intelligent Operations Center Fix Pack 1 is a prerequisite for the IBM Traffic Information Hub. An additional server is temporarily required for deployment of the IBM Traffic Information Hub and the optional transportation prediction feature.

"Hardware requirements" on page 12
The IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed on top of, must meet the minimum hardware requirements specified for the IBM Intelligent Operations Center product. However, if you plan to install the optional transportation prediction feature, some additional memory resources are required. A temporary IBM Intelligent Transportation installation management server that meets the minimum hardware specification is also required. This server is only required during the deployment process.

"Software requirements" on page 14
The servers and clients involved in the deployment of the IBM Traffic Information Hub must meet the minimum software requirements. This includes the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is installed onto and the installation management server that the IBM Intelligent Transportation installer runs from.

Related tasks:

"Installing the transportation prediction feature provided with Interim Feature 1" on page 54
You can install the optional transportation prediction feature that is provided with Interim Feature 1 by running either the deployment wizard or the silent installer. The transportation prediction feature that is provided with Interim Feature 1 is only supported to run on top of the IBM Traffic Information Hub version 1.0.1.1.

"Preparing the IBM Intelligent Operations Center servers" on page 17
Before you start the deployment of the IBM Traffic Information Hub, you must first prepare the existing IBM Intelligent Operations Center environment that you are installing on top of.

Related information:

➦ Downloading IBM Intelligent Operations Center interim fix PO00030

Downloading and preparing the installation package for Interim Feature 1

1.0.1.1

Before you run the deployment wizard for the IBM Traffic Information Hub version 1.0.1 Interim Feature 1, you must first obtain and prepare the installation package. The installation package for Interim Feature 1 also includes the installation package for the optional transportation prediction feature version 1.0.1.1.

Before you begin

Review the prerequisite preparation and requirements of Interim Feature 1 before you start this procedure.

Choose the IBM Intelligent Operations Center server to run the installation from. You can install the IBM Traffic Information Hub from all of the IBM Intelligent Operations Center node servers, providing all of the required services and applications are running. However, if you are using the GUI installation wizard,

you cannot use the IBM Intelligent Operations Center event and management server to run the installation. Alternatively, you can also install Interim Feature 1 from a dedicated installation management server.

About this task

Use the following procedure to download and prepare the installation package so that you are ready for deployment.

Procedure

1. Download the installation package for Interim Feature 1 from Fix Central. For more information, see the related links at the end of this topic.

   Note: The installation package includes the installation files for the optional transportation prediction feature.
2. Log on to the designated installation server as the *root* user.
3. Copy the downloaded installation package to a temporary directory on the server that you are using to install the Interim Feature 1. For example `/images`
4. Extract the installation tar files from the installation package using the following command:
   ```
   #tar -xvf IBMTIH-1.0.1.1-Linux-Rfrsh01.zip
   ```
5. To prepare the installation package for the IBM Traffic Information Hub version 1.0.1.1:
   a. Create a directory to contain the temporary installation files and directory structures for the IBM Traffic Information Hub installer. For example `/images/TIH`.
   b. Copy the IBM Traffic Information Hub installation tar file into the directory that you created in the previous step. For example `/images/TIH`
   c. From the operating system command line, go to the directory where you just copied the installation package.
   d. Extract the installer by using the following command:
   ```
   #tar -xvf TIH_1_0_1_1.tar
   ```
6. Optional: If you are planning to install the optional transportation prediction feature provided with Interim Feature 1, to prepare the installation package:
   a. Create a separate directory to contain the temporary installation files and directory structures for the transportation prediction feature installer. For example `/images/TP`.
   b. Copy the transportation prediction feature installation package to the directory you created for the transportation prediction installation files. For example `/images/TP`.

      Note: Do not copy the transportation prediction feature installation files into the directory that you created for the IBM Traffic Information Hub installation files.
   c. From the operating system command line, go to the directory where you just copied the installation package.
   d. Extract the installer by using the following command:
   ```
   #tar -xvf TP_1_0_1_1.tar
   ```
7. Go to the `disk1` directory. The `disk1` folder contains the installation files required to start the installation of the IBM Traffic Information Hub and the transportation prediction feature.

What to do next

You are now ready to perform the installation by using either the GUI wizard or the silent command line installation. For more information, see "Installing Interim Feature 1" on page 53.

Related tasks:

"Installing the transportation prediction feature provided with Interim Feature 1" on page 54
You can install the optional transportation prediction feature that is provided with Interim Feature 1 by running either the deployment wizard or the silent installer. The transportation prediction feature that is provided with Interim Feature 1 is only supported to run on top of the IBM Traffic Information Hub version 1.0.1.1.

"Getting fixes from Fix Central" on page 174
You can use Fix Central to find the fixes that are recommended by IBM Support for a variety of 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.

Related information:

➦ Downloading IBM Intelligent Transportation Interim Feature 1

Installing Interim Feature 1

`1.0.1.1`

As soon as you complete the prerequisite preparation tasks, you are ready to install the IBM Traffic Information Hub version 1.0.1 Interim Feature 1. A deployment wizard is provided to install version 1.0.1.1 on top of an existing environment that is running the IBM Intelligent Operations Center.

Before you begin

Complete the prerequisite steps that are outlined in *Preparing to install Interim Feature 1*.

About this task

The installation utility for Interim Feature 1 checks to ensure that the required version of the IBM Intelligent Operations Center is running. If the installer detects that the IBM Intelligent Operations Center version 1.0 Fix Pack 1 with interim fix PO00030 is not installed, the installation of Interim Feature 1 does not complete successfully.

To install or upgrade to the Interim Feature 1, complete the following procedure:

Procedure

1. Download the installation package for the Interim Feature 1. See *Downloading and preparing the installation package*.
2. To start the installation using the wizard, complete steps 3 to 13 in "Deploying the solution" on page 26. Alternatively, if you prefer to run a silent installation, complete the instructions in "Deploying the IBM Traffic Information Hub from a command line" on page 28.
3. Verify the installation of Interim Feature 1 by completing the following steps:
   a. Log on to the IBM Intelligent Operations Center Event and management server as the root user.
   b. Open the `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/properties/version` directory.
   c. Enter the following command:
      ```
      ls -lt
      ```

      This command lists the contents of the directory along with file date and time information. If the installation of the IBM Traffic Information Hub version 1.0.1 Interim Feature 1 is successful, a file titled `IBM_Traffic_Information_Hub.1.0.1.1.swtag` is listed in the output of this command.

What to do next

Complete the required post-installation configuration for the IBM Traffic Information Hub. The post-installation, integration, and customization procedures that are required for the IBM Traffic Information Hub version 1.0.1, also apply to the Interim Feature 1 version. There is also some additional configuration that is only required if you install Interim Feature 1.

Sections of the documentation are marked with the [1.0.1.1] icon to indicate that the information applies only to the Interim Feature 1 for IBM Traffic Information Hub.

Note: The transportation prediction feature provided with version 1.0.1 is not supported to run on the IBM Traffic Information Hub version 1.0.1.1. If you plan to use the transportation prediction feature, you must install the transportation prediction feature version that is provided with the Interim Feature 1 installation package. For more information, see *Installing the transportation prediction feature that is provided with Interim Feature 1*.

Related concepts:

"Preparing to install Interim Feature 1" on page 48
Before starting the installation of Interim Feature 1, review the system configuration of the IBM Traffic Information Hub version 1.0.1 and ensure that the requirements and prerequisites are met. Some preparation is also required on the underlying IBM Intelligent Operations Center environment before you can install Interim Feature 1.

Related tasks:

"Downloading and preparing the installation package for Interim Feature 1" on page 51
Before you run the deployment wizard for the IBM Traffic Information Hub version 1.0.1 Interim Feature 1, you must first obtain and prepare the installation package. The installation package for Interim Feature 1 also includes the installation package for the optional transportation prediction feature version 1.0.1.1.

"Post-installation configuration" on page 33
After successfully completing the installation of the IBM Traffic Information Hub, additional steps are required to configure the solution.

"Installing the transportation prediction feature provided with Interim Feature 1"
You can install the optional transportation prediction feature that is provided with Interim Feature 1 by running either the deployment wizard or the silent installer. The transportation prediction feature that is provided with Interim Feature 1 is only supported to run on top of the IBM Traffic Information Hub version 1.0.1.1.

Installing the transportation prediction feature provided with Interim Feature 1

[1.0.1.1]

You can install the optional transportation prediction feature that is provided with Interim Feature 1 by running either the deployment wizard or the silent installer. The transportation prediction feature that is provided with Interim Feature 1 is only supported to run on top of the IBM Traffic Information Hub version 1.0.1.1.

Before you begin

You must first complete the installation and configuration of the IBM Traffic Information Hub version 1.0.1.1 before you can begin to install the transportation prediction feature V1.0.1.1.

If you are upgrading the transportation prediction feature from version 1.0.1 to 1.0.1.1, before starting the installer you must first manually start the **transPredServer** and **transPredBatchServer** application servers on the IBM Intelligent Operations Center analytic server. For detailed instructions, see "Controlling the traffic prediction servers" on page 115.

About this task

The installation utility for the transportation prediction feature in Interim Feature 1 checks to ensure that the required version of the IBM Traffic Information Hub is installed. If the installer detects that the IBM Traffic Information Hub version 1.0.1.1 is not installed, the installation of the transportation prediction feature does not complete successfully.

Note: Some of the installation and post-installation configuration steps for the transportation prediction feature version 1.0.1.1 are not applicable to 1.0.1.1. The installation steps that apply only to the Interim Feature 1 version are flagged with the **1.0.1.1** icon.

To install or upgrade the transportation prediction component to version 1.0.1.1, complete the following procedure:

Procedure

1. Download and prepare the installation package for the transportation prediction feature provided with Interim Feature 1. For more information, see *Downloading and preparing the installation package.*
2. Complete the installation instructions in "Deploying the transportation prediction feature" on page 30. Alternatively, if you prefer to run a silent installation, complete the instructions in "Deploying the transportation prediction feature from a command line" on page 32.
3. After the installation of Interim Feature 1 is complete, verify that the message REST service is correctly deployed:
   a. Check to ensure that the **tpt_messages_rest** portal application service exists on the IBM Intelligent Operations Center portal server.
   b. Verify the stored procedure creation of the database on the IBM Intelligent Operations Center database server. To verify, complete the following instructions:
      1) Log on to the IBM Intelligent Operations Center database server as `db2inst1`.
      2) Connect to the `TIH_HS` database:

         `db2 connect to TIH_HS`
      3) List the stored procedure created by the TPTOOL schema:

         `db2 "select PROCNAME from syscat.procedures where procschema='TPTOOL'"`

         The result is a stored procedure created under the `TPTOOL` schema called `GETTRANSPREDXML`.
   c. Verify the JAAS (Java Authentication and Authorization Service) authentication alias on the IBM Intelligent Operations Center analytic server. To verify, complete the following instructions:
      1) Log on to the IBM Intelligent Operations Center analytic server WebSphere Application Server administration console.
      2) Select **Security** > **Global Security** > **Java Authentication and Authorization Service** > **J2C Authentication Data**

      The result is an alias called *Prediction_Messages_Auth_Alias* present along with *dbuser*. By default, the user ID is *wpsadmin,* or any user from the Transportation IT Administrator group. Restart the WebSphere Application Server if you modify the user ID.
4. Complete the required post-installation configuration and customization required for the transportation prediction feature. For more information, see *Configuring the transportation prediction feature.*

Related concepts:

"Preparing to install Interim Feature 1" on page 48
Before starting the installation of Interim Feature 1, review the system configuration of the IBM Traffic Information Hub version 1.0.1 and ensure that the requirements and prerequisites are met. Some preparation is also required on the underlying IBM Intelligent Operations Center environment before you can install Interim Feature 1.

"Configuring the transportation prediction feature" on page 39
After successfully completing the installation of the optional transportation prediction feature, additional steps are required to configure the solution.

Related tasks:

"Downloading and preparing the installation package for Interim Feature 1" on page 51
Before you run the deployment wizard for the IBM Traffic Information Hub version 1.0.1 Interim Feature 1, you must first obtain and prepare the installation package. The installation package for Interim Feature 1 also includes the installation package for the optional transportation prediction feature version 1.0.1.1.

✚ "Installing the transportation prediction feature" on page 30
The transportation prediction feature can optionally be installed on top of the IBM Traffic Information Hub to provide traffic prediction information. The IBM Traffic Information Hub is the foundational component of IBM Intelligent Transportation. You cannot install the transportation prediction feature until you have completed the deployment and configuration of the IBM Traffic Information Hub version 1.0.1.

Uninstalling the solution

You can uninstall the IBM Traffic Information Hub by running the uninstallation script from the command line. The uninstallation script removes the IBM Traffic Information Hub and all data from the underlying IBM Intelligent Operations Center environment.

Before you begin

If the transportation prediction feature is installed in the environment, you must first uninstall the transportation prediction feature before you can uninstall the IBM Traffic Information Hub. See the related topic link at the end of this topic.

To preserve the IBM Traffic Information Hub data, log on to the IBM Intelligent Operations Center and copy the `TIH_HS` and `TIH_OP` databases before uninstalling the solution.

All of the IBM Intelligent Operations Center server components must be running during the uninstallation of the IBM Traffic Information Hub. Some of the IBM Intelligent Operations Center services are automatically restarted by the uninstaller. To avoid a disruption in service, it is recommended that users of the IBM Intelligent Operations Center do not access the system during the uninstallation.

About this task

By default, all IBM Traffic Information Hub data and program files are removed from the IBM Intelligent Operations Center servers that the IBM Traffic Information Hub is running on.

Procedure

1. Log on to the IBM Intelligent Operations Center event and management server as the *root* user.
2. From the command line, create a temporary directory to extract the uninstall program, for example `/tmp/TIH_Uninstaller`.

   Note: The temporary directory must be located outside of the main program directory structure, specified in the next step, as the `intelligentTransportation` folder is deleted during the uninstallation.

3. From the command line, open the following directory:

   `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/uninstall`

4. Copy the `trafficInformationHubUninstaller.tar.gz` file into the temporary directory that you created in step 2. For example `/tmp/TIH_Uninstaller`.

5. Open the temporary directory and extract the `trafficInformationHubUninstaller.tar.gz` file by using the following commands:

   `tar -zxvf trafficInformationHubUninstaller.tar.gz`

6. Optional: If a previous uninstallation failed, prior to rerunning the uninstallation script, edit the `install.properties` file to force the utility to skip the steps that were successfully completed on the previous attempt. Otherwise the rerun of the uninstallation utility might fail. For more information, see the related link at the end of this topic.

7. Start the uninstallation of the IBM Traffic Information Hub by running the following command:

   `./uninstall.sh icpadminaccount password`

   Where *icpadminaccount* and *password* are the account credentials for the IBM Intelligent Operations Center administrator that was defined when the IBM Intelligent Operations Center was deployed. The progress of the uninstallation is reported in the command-line window. When the uninstallation completes, the message `Uninstallation completed!` is displayed if the uninstallation was successful. If the uninstallation fails, the uninstaller displays details of what steps failed and the log file to investigate for further information.

Results

The IBM Traffic Information Hub, is removed from the underlying IBM Intelligent Operations Center environment. The IBM Traffic Information Hub program files and database are deleted. The **Intelligent Transportation** link is no longer visible in the navigation bar of the IBM Intelligent Operations Center portal.

Related tasks:

"Retrying the uninstallation of the IBM Traffic Information Hub after a failed attempt"
If a previous attempt to uninstall the IBM Traffic Information Hub failed, configure the uninstallation utility to skip the uninstall steps that previously succeeded during the previous attempt.

"Uninstalling the transportation prediction feature" on page 58
You can uninstall the optional transportation prediction feature from the IBM Traffic Information Hub solution by running the uninstallation script from the command line.

Related information:

DB2 Information Center

Retrying the uninstallation of the IBM Traffic Information Hub after a failed attempt

If a previous attempt to uninstall the IBM Traffic Information Hub failed, configure the uninstallation utility to skip the uninstall steps that previously succeeded during the previous attempt.

Before you begin

Determine which uninstallation steps succeeded and failed by reviewing the logs displayed in the installation wizard and the installation logs located in the `/tmp/TIH_Uninstaller/logs` directory on the IBM Intelligent Operations Center event and management server.

About this task

Before you rerun the uninstallation utility command-line script, configure the `install.properties` file to select which uninstall steps to skip.

Procedure

1. Log on to the IBM Intelligent Operations Center event and management server as the *root* user.

2. Open the `scripts` subfolder located in the temporary directory that you extracted the uninstallation utility to during the previous uninstallation attempt. For example:

   `/tmp/TIH_Uninstaller/scripts`

3. Edit the `install.properties` file.

4. Optional: Disable the uninstall options that you would like to skip by setting the value of the option to `N`.

   The following table lists the options that can be configured. By default all of these options are set to the value `Y`.

Option	Value	Uninstall step that is skipped
`undeployDB`	N	Removal of the IBM Traffic Information Hub databases
`undeployLDAP`	N	Removal of security roles, users, privileges of the IBM Traffic Information Hub
`undeployCognos`	N	Removal of the Cognos reports
`undeployPortal`	N	Removal of the web application, including portal applications, portlets and page layouts.
`undeployTMDD`	N	Removal of the TMDD profile.
`performCleanup`	N	Deletion of all temporary files and folders that are not required after the uninstallation of the IBM Traffic Information Hub.

5. Save and close the `install.properties` file.

What to do next

You are now ready to rerun the IBM Traffic Information Hub uninstallation script.

Related tasks:

"Uninstalling the solution" on page 56
You can uninstall the IBM Traffic Information Hub by running the uninstallation script from the command line. The uninstallation script removes the IBM Traffic Information Hub and all data from the underlying IBM Intelligent Operations Center environment.

Uninstalling the transportation prediction feature

You can uninstall the optional transportation prediction feature from the IBM Traffic Information Hub solution by running the uninstallation script from the command line.

About this task

If you have installed the optional transportation prediction feature, use the following procedure to uninstall the transportation prediction feature before you attempt to uninstall the IBM Traffic Information Hub solution.

All of the IBM Intelligent Operations Center server components must be running during the uninstallation of the transportation prediction feature. Some of the IBM Intelligent Operations Center

services are automatically restarted by the uninstaller. To avoid a disruption in service, it is recommended that users of the IBM Intelligent Operations Center do not access the system during the uninstallation.

Procedure

1. Log on to the IBM Intelligent Operations Center event and management server as the *root* user.
2. From the command line, create a temporary directory to extract the uninstall program, for example `tmp/transportationPrediction/uninstaller`.

   Note: The temporary directory must be located outside of the main program directory structure, specified in the next step, as the `transportationPrediction` folder is deleted during the uninstallation.
3. From the command line, open the following directory:

   `/opt/IBM/iss/intelligentTransportation/transportationPrediction/uninstall`
4. Copy the `transportationPredictionUninstaller.tar.gz` file into the temporary directory that you created in step 2. For example `tmp/transportationPrediction/uninstaller`.
5. Open the temporary directory and extract the `transportationPredictionUninstaller.tar.gz` file using the following command:

   `tar -zxvf transportationPredictionUninstaller.tar.gz`
6. Optional: If a previous uninstallation failed, prior to rerunning the uninstallation script, edit the `uninstall.properties` file to force the utility to skip the steps that were successfully completed on the previous attempt. Otherwise the rerun of the uninstallation utility might fail. For more information, see the related link at the end of this topic.
7. Start the uninstallation of the transportation prediction feature by running the following command:

   `./uninstall.sh iskUser iskPassword`

   Where *iskUser* and *iskPassword* are the account credentials for the IBM Intelligent Operations Center management service that was defined when the IBM Intelligent Operations Center was deployed. The progress of the uninstallation of the transportation prediction feature is reported in the command-line window. When the uninstallation completes, the message `Uninstallation completed!` is displayed if the uninstallation was successful. If the uninstallation fails, the uninstaller displays details of what steps failed and the log file to investigate for further information.

Results

The transportation prediction feature is uninstalled from the IBM Traffic Information Hub solution.

What to do next

Verify the uninstallation to ensure that the transportation prediction feature is removed and the IBM Traffic Information Hub solution is working with the IBM Intelligent Operations Center.

Related tasks:

"Uninstalling the solution" on page 56
You can uninstall the IBM Traffic Information Hub by running the uninstallation script from the command line. The uninstallation script removes the IBM Traffic Information Hub and all data from the underlying IBM Intelligent Operations Center environment.

"Retrying the uninstallation of the transportation prediction feature after a failed attempt"
If a previous attempt to uninstall the optional transportation prediction feature of the IBM Traffic Information Hub failed, configure the uninstallation utility to skip the uninstall steps that previously succeeded during the previous attempt.

Related information:

DB2 Information Center

Retrying the uninstallation of the transportation prediction feature after a failed attempt

If a previous attempt to uninstall the optional transportation prediction feature of the IBM Traffic Information Hub failed, configure the uninstallation utility to skip the uninstall steps that previously succeeded during the previous attempt.

Before you begin

Determine which installation steps succeeded and failed by reviewing the logs displayed in the installation wizard and the installation logs located in the `tmp/transportationPrediction/uninstaller/logs` directory on the IBM Intelligent Operations Center event and management server.

About this task

Before you rerun the uninstallation utility command-line script, configure the `uninstall.properties` file to select which uninstall steps to skip.

Procedure

1. Log on to the IBM Intelligent Operations Center event and management server as the *root* user.
2. Open the `scripts` subfolder located in the temporary directory that you extracted the uninstallation utility to during the previous uninstallation attempt. For example:

   `tmp/transportationPrediction/uninstaller/scripts`
3. Edit the `uninstall.properties` file.
4. Optional: Disable the uninstall options that you would like to skip by setting the value of the option to `N`.

   The following table lists the options of the transportation prediction feature uninstall utility that can be configured. By default all of these options are set to the value `Y`.

Option	Value	Uninstall step that is skipped
`undeployDB`	N	Removal of the transportation prediction database schema
`undeployCognos`	N	Removal of the transportation prediction Cognos reports
`undeployAnalytics`	N	Removal of the batch and forecaster jobs for traffic prediction

Option	Value	Uninstall step that is skipped
`undeployPortal`	N	Removal of the portal applications, portlets, and page layout of the transportation prediction feature
`undeployLicenses`	N	Removal of the transportation prediction feature licenses and signatures files
`performCleanup`	N	Deletion of all temporary files and folders that are not required by the IBM Traffic Information Hub after the uninstallation of the transportation prediction feature

5. Save and close the `uninstall.properties` file.

What to do next

You are now ready to rerun the uninstallation script for the transportation prediction feature.

Related tasks:

You can uninstall the optional transportation prediction feature from the IBM Traffic Information Hub solution by running the uninstallation script from the command line.

Chapter 3. Securing the solution

Securing the IBM Traffic Information Hub and the optional transportation prediction feature 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 the IBM Traffic Information Hub runs on top of the IBM Intelligent Operations Center, set the high-level security settings through the IBM Intelligent Operations Center. For details on the various options available, see the security section of the IBM Intelligent Operations Center Information Center.

Securing the TMDD communication stream

For additional security, you can protect the communication stream by configuring an obfuscation key for the IBM Traffic Information Hub TMDD External Center, to link the name and ID of a TMDD data subscription together. If an obfuscation key is configured, the IBM Traffic Information Hub 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. For more information, see *Configuring the obfuscation key*.

Securing the portal

The following topics explain how to secure the solution and manage user access to the solution portal.

Related concepts:

"Configuring users and groups" on page 38
To use the solution you must have a portal user account that is assigned to the required groups and roles of the IBM Traffic Information Hub.

Chapter 4, "Integrating the solution," on page 71
The IBM Traffic Information Hub 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.

Related tasks:

"Configuring the obfuscation key" on page 82
For additional security, you can protect the communication stream by configuring an obfuscation key for the IBM Traffic Information Hub TMDD External Center, to link the name and ID of a TMDD data subscription together. If an obfuscation key is configured, the IBM Traffic Information Hub 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.

Related information:

Securing the IBM Intelligent Operations Center

User roles and responsibilities

The IBM Traffic Information Hub implements security by limiting access to features and data based on user roles.

The security model and user access roles of the IBM Traffic Information Hub are consistent with the IBM Intelligent Operations Center and other IBM Smarter Cities Software Solutions.

To use a specific feature of the IBM Traffic Information Hub portal and the optional transportation prediction feature, you must be a member of a user role group that provides the required access level to use that feature. You must have Transportation IT Administrator permissions to manage user and group security.

Table 1 shows the authorized pages, portlets, and responsibilities of the user roles of the solution.

Table 4. The roles of the IBM Traffic Information Hub.

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 Run reports summarizing historical traffic flow data

Table 4. The roles of the IBM Traffic Information Hub. (continued)

User role (role group)	Authorized pages or portlets	Authorized responsibilities
Traffic Operator (TrafficOperator)	Operator: Traffic view	All responsibilities of the preceding role. Additionally a Traffic Operator can: Query near current traffic conditions and monitor traffic flow volume and speed View the predicted traffic flow for the next hour ahead Add, cancel, or update traffic events View detailed information about traffic levels, devices, and events Run reports summarizing: • Current® traffic flow volume and speed • Predicted traffic flow volume and speed • Accuracy of traffic prediction data • Traffic events
Transportation IT Administrator (TrafficITAdministrator)	All views and portlets of the solution Administration views and portlets of the transportation prediction feature	All preceding responsibilities. Additionally a Transportation IT Administrator can: Configure the base maps of the solution Configure predefined traffic layers Configure the transportation prediction feature Configure report language and accessibility settings

Related tasks:

"Adding users and groups"
To use a specific feature of the IBM Traffic Information Hub solution portal, a user must be a member of a user role group that provides the required access level to use that feature. Use the **Administration** view to give users and groups access to the IBM Traffic Information Hub solution interface.

"Viewing or modifying group membership" on page 67
Manage users of the IBM Traffic Information Hub from the **Administration** view. Membership of a role group gives users access to the parts of the solution appropriate to that role. You can change the access level of a user by removing them from one role group and adding them to another group. You can also remove a user from the IBM Traffic Information Hub.

Adding users and groups

To use a specific feature of the IBM Traffic Information Hub solution portal, a user must be a member of a user role group that provides the required access level to use that feature. Use the **Administration** view to give users and groups access to the IBM Traffic Information Hub solution interface.

Before you begin

Choose from one of the following IBM Traffic Information Hub role groups that provide the access level that your users or groups require:

- TrafficOperator
- TrafficPlanner
- TrafficITAdministrator

See the related links at the end of this topic for more information about the roles of the IBM Traffic Information Hub.

About this task

You can add new users and groups to the IBM Traffic Information Hub. You can also add users and groups from an existing Lightweight Directory Access Protocol (LDAP) directory source that is configured to work with the underlying IBM Intelligent Operations Center. For more information about how to import LDAP directory users into the solution, see the IBM Intelligent Operations Center Information Center.

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 Portal User Groups**. The list of role groups for the IBM Traffic Information Hub and the IBM Intelligent Operations Center, and any other IBM Smarter Cities Software Solutions installed in this environment are displayed.
5. Scroll through the list to find the user role group that you would like to assign to your users.
6. Select the required IBM Traffic Information Hub role group by clicking it. The IDs of the existing group members are listed.
7. Add the user to the group using one of the following steps:
   - To add a new user, click **New User** and complete the required **Profile Management** fields.
   - 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

The recently added users or groups appear in the membership list of the user role group. The users are authorized to access the solution portal according to the permissions assigned to the role group selected.

What to do next

If the users also require access to the IBM Intelligent Operations Center and other IBM Smarter Cities Software Solutions installed in this environment, add them to the relevant user roles for those solutions. For more information, see the security topics in the information center for the IBM Intelligent Operations Center or the other IBM Smarter Cities Software Solutions you have deployed.

Related concepts:

"Configuring users and groups" on page 38
To use the solution you must have a portal user account that is assigned to the required groups and roles of the IBM Traffic Information Hub.

"User roles and responsibilities" on page 64
The IBM Traffic Information Hub implements security by limiting access to features and data based on user roles.

Related tasks:

"Viewing or modifying group membership"
Manage users of the IBM Traffic Information Hub from the **Administration** view. Membership of a role group gives users access to the parts of the solution appropriate to that role. You can change the access level of a user by removing them from one role group and adding them to another group. You can also remove a user from the IBM Traffic Information Hub.

Related information:

Importing users and groups into the IBM Intelligent Operations Center

Viewing or modifying group membership

Manage users of the IBM Traffic Information Hub from the **Administration** view. Membership of a role group gives users access to the parts of the solution appropriate to that role. You can change the access level of a user by removing them from one role group and adding them to another group. You can also remove a user from the IBM Traffic Information Hub.

About this task

Use the following procedure to add or remove existing users from the IBM Traffic Information Hub user role groups. Users removed from an IBM Traffic Information Hub user role group can still 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 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 page, click **Administration**.
3. On the sidebar menu, expand the **Access** submenu, and click **Users and Groups**.
4. Click **All Portal User Groups**. The list of role groups for the IBM Traffic Information Hub and the IBM Intelligent Operations Center, and any other IBM Smarter Cities Software Solutions installed in this environment are displayed.
5. Click one of the following IBM Traffic Information Hub 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**
6. A table containing all the users and groups that have been assigned to the user role are displayed. You can perform several actions by clicking the icons at the end of each row for the user you are interested in.
   - 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 them 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 Traffic Information Hub 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 64
The IBM Traffic Information Hub implements security by limiting access to features and data based on user roles.

Related tasks:

"Adding users and groups" on page 65
To use a specific feature of the IBM Traffic Information Hub solution portal, a user must be a member of a user role group that provides the required access level to use that feature. Use the **Administration** view to give users and groups access to the IBM Traffic Information Hub solution interface.

Removing users or groups

If a user or group no longer requires access to the solution, you can remove them from IBM Traffic Information Hub. 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 deployed in the environment.

Procedure

1. To remove a user or group from only the IBM Traffic Information Hub portal solution, see the links at the end of this topic.

   Note: Removing a user from the IBM Traffic Information Hub user role groups does not affect any access the user may have to the IBM Intelligent Operations Center and any other IBM Smarter Cities Software Solutions 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 Information Center.

Related tasks:

"Viewing or modifying group membership" on page 67
Manage users of the IBM Traffic Information Hub from the **Administration** view. Membership of a role group gives users access to the parts of the solution appropriate to that role. You can change the access level of a user by removing them from one role group and adding them to another group. You can also remove a user from the IBM Traffic Information Hub.

Related information:

Deleting a user or group in the IBM Intelligent Operations Center

Sample users

During the deployment of the IBM Traffic Information Hub, sample users are created with corresponding responsibilities and access permissions.

The IBM Traffic Information Hub includes the following sample users.

Name	User ID	User role
Sara Jane	sjane	Traffic Operator

Name	User ID	User role
Yara Verna	yverna	Traffic Planner
Luke Smith	lsmith	Traffic Operator and Traffic Planner
Maria Jackson	mjackson	Transportation IT Administrator

By default, the sample users only have access to the IBM Traffic Information Hub solution and the optional transportation prediction feature.

If the sample users require access to the IBM Intelligent Operations Center and other IBM Smarter Cities Software Solutions installed in this environment, they must be added 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 44
The IBM Traffic Information Hub includes sample users. For security reasons, delete the sample users after the solution has been deployed.

Related information:

Securing the IBM Intelligent Operations Center

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. The user ID cannot be modified.

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: Each user 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 containing all existing users is displayed.
5. Find the user that you are interested in. 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. You can 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 you submitted.

Chapter 4. Integrating the solution

The IBM Traffic Information Hub 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 owning center and an external center. The owning 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 owning center. The IBM Traffic Information Hub is the external center to organizations and systems providing data to the IBM Traffic Information Hub. The organizations and systems providing data to the IBM Traffic Information Hub, fill the role of owning centers.

Typical deployments of the IBM Traffic Information Hub will want to integrate data and events from multiple systems or centers. This is done by connecting more than one owning center to the IBM Traffic Information Hub, the external center. The owning 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 owning centers are connected to the IBM Traffic Information Hub, the IBM Traffic Information Hub provides a consolidated view of the traffic situation and events across the transportation network monitored by the owning centers.

Related concepts:

"Importing and configuring the TMDD data source" on page 34
After you have installed the IBM Traffic Information Hub, 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 to the IBM Traffic Information Hub in the required Traffic Management Data Dictionary (TMDD) data format that the system is designed to support.

Chapter 3, "Securing the solution," on page 63
Securing the IBM Traffic Information Hub and the optional transportation prediction feature 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.

Related information:

Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

US ITS National Architecture Center-to-Center (C2C) Standards

Examples of systems that can be integrated

Owner centers provide data to the IBM Traffic Information Hub. These owner centers can be any system that can communicate with the IBM Traffic Information Hub using the TMDD protocol.

Example owner systems include:
- Roadway control and signaling systems
- Events

Integrating TMDD data

The IBM Traffic Information Hub supports three dialogs between owner centers connected to field devices and the external center provided by the IBM Traffic Information Hub.

These dialogs are:
- Request/Response
- Subscription
- Publication

In the request/response dialog the IBM Traffic Information Hub 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 the IBM Traffic Information Hub 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 Traffic Information Hub 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 the IBM Traffic Information Hub 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 the IBM Traffic Information Hub and owner centers, known as Center-to-Center (C2C) communications, require peer-to-peer network connections between systems. 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

The IBM Traffic Information Hub 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 85

The IBM Traffic Information Hub provides Web Services Definition Language (WSDL) dialogs to communicate data between the IBM Traffic Information Hub and other products and services.

"XSD and WSDL files" on page 87

The IBM Traffic Information Hub provides XSD and WSDL files to be used when integrating owner centers with the IBM Traffic Information Hub. These files can be used to resolve incompatibilities between owner and external centers.

IBM Traffic Information Hub TMDD support

The IBM Traffic Information Hub supports a subset of the Traffic Management Data Dictionary V3 standard.

See the following topics for information on the TMDD support that exists for the IBM Traffic Information Hub.

Related reference:

"Supported TMDD requirements and user needs" on page 187

The IBM Traffic Information Hub supports Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0 requirements.

"Supported TMDD data objects, dialogs, and types" on page 227

The IBM Traffic Information Hub implements a subset of TMDD data objects, dialogs, and subscription and request type.

"Supported TMDD event groups and types" on page 233

The IBM Traffic Information Hub 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

Configuring the TMDD data flow into the IBM Traffic Information Hub

After installing the IBM Traffic Information Hub, the system must be configured to connect to one or more owner centers to feed the IBM Traffic Information Hub database with (near) real time traffic data. The data source must be available to the IBM Traffic Information Hub 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 the IBM Traffic Information Hub 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 IBM Traffic Information Hub.

About this task

The following tasks are required to import the (near) real time and historical traffic data into the IBM Traffic Information Hub.

Planning the TMDD data integration

Before integrating the IBM Traffic Information Hub with owner centers, the appropriate planning must be done to ensure desired results.

Procedure

1. What owner center will provide and feed the data that is required by the IBM Traffic Information Hub? The WSDL port of the owner center is required. Also, the URL of the external center that the IBM Traffic Information Hub will connect to.

2. Will there be additional owner centers connecting to the IBM Traffic Information Hub?

3. What TMDD data types will be fed into the IBM Traffic Information Hub? For example:
   - Event inventory
   - Traffic flow inventory
   - Traffic devices inventory
   - Road link inventory

4. How will data be fed into the IBM Traffic Information Hub?
   - What subscriptions are required and how often?
   - Is a bulk data import need to be run to feed in historical data?

Related tasks:

"Running a bulk load of traffic data" on page 83
After deploying the IBM Traffic Information Hub, 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 the IBM Traffic Information Hub at specific intervals. Bulk loading is normally done when the IBM Traffic Information Hub 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 233
The IBM Traffic Information Hub supports a subset of TMDD event groups and types.

TMDD Data Management tools

When the IBM Traffic Information Hub is deployed, a set of TMDD Data Management tools are installed onto the IBM Intelligent Operations Center application and integration server.

The tools are required to populate the IBM Traffic Information Hub databases located on the IBM Intelligent Operations Center database server.

The TMDD data management tools are used to import TMDD data from one or more owner centers into the IBM Traffic Information Hub 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 IBM Traffic Information Hub.

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 the IBM Traffic Information Hub.

The tool is located on the IBM Intelligent Operations Center application and integration server and has the following path and filename:

```
/opt/IBM/iss/intelligentTransportation/trafficInformationHub/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 the IBM Traffic Information Hub.

The TMDD Bulkload Data Management tool is located on the IBM Intelligent Operations Center application and integration server and has the following path and filename:

`/opt/IBM/iss/intelligentTransportation/trafficInformationHub/scripts/bulkLoad.sh`

Related concepts:

"Configuring the `ecserver.properties` file"
The `ecserver.properties` file is read by the TMDD scripts to determine how the data is imported into the IBM Traffic Information Hub.

Related tasks:

"Running a bulk load of traffic data" on page 83
After deploying the IBM Traffic Information Hub, 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 the IBM Traffic Information Hub at specific intervals. Bulk loading is normally done when the IBM Traffic Information Hub is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

Configuring the `ecserver.properties` file

The `ecserver.properties` file is read by the TMDD scripts to determine how the data is imported into the IBM Traffic Information Hub.

The `ecserver.properties` file is configured by the system administrator of the IBM Intelligent Operations Center application and integration server to specify the following:
- TMDD owner centers
- TMDD subscription settings
- TMDD bulk load request settings

The `ecserver.properties` file is located on the IBM Intelligent Operations Center application and integration server in the following directory:

`/opt/IBM/iss/intelligentTransportation/trafficInformationHub/ecserver`

The `ecserver.properties` file is case sensitive.

Related concepts:

"TMDD Data Management tools" on page 74
When the IBM Traffic Information Hub is deployed, a set of TMDD Data Management tools are installed onto the IBM Intelligent Operations Center application and integration server.

Related tasks:

"Connecting to an owner center" on page 78
The IBM Traffic Information Hub 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 80
A subscription is a request made to an owner center requesting that data be sent periodically to an external center (the IBM Traffic Information Hub). The message encapsulating the data 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 83
After deploying the IBM Traffic Information Hub, 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 the IBM Traffic Information Hub at specific intervals. Bulk loading is normally done when the IBM Traffic Information Hub is first installed. The traffic data can be analyzed from the Operator: Traffic and Planner: Traffic views.

Ecserver.properties configuration

The `ecserver.properties` file lists configuration options that can be set for the IBM Traffic Information Hub.

The `ecserver.properties` is located in the following directory:

`/opt/IBM/iss/intelligentTransportation/trafficInformationHub/ecserver`

Additional properties are included in the `ecserver.properties` file. Any properties not listed in Table 5 should not be changed.

Table 5. List of `ecserver.properties` configuration options

Property	Section	Value required
logPublication	logPublication	When uncommented, the IBM Traffic Information Hub will check messages for repeating sequence numbers
oc	Owner Centers	The configuration name for the defined owner center
oc.name.port	Owner Centers	The URL to the WSDL port of the owner center. For example: `http://hostName:TCPportNo/ TMDD_Service_Provider/ tmddOCSoapHttpService?wsdl` where *hostName* is an IP address (or a name resolved by `/etc/hosts`) and *TCPportNo* is the TCP/IP port the service is listening on
oc.name.subscriptions	Owner Centers	List of subscriptions to be initiated
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

Table 5. List of `ecserver.properties` configuration options (continued)

Property	Section	Value required
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 -180000000 and 180000000 inclusive
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 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

Property	Section	Value required
organization-information.center-contact-details.zip-code	External Center Identification	Any string value up to 32 characters in length
schemaFile	TMDD schema	When uncommented, the IBM Traffic Information Hub will check the syntax of messages received
ec.obfuscation-arg	Subscription Secret	The value specified will be used to encode the message ID and name to ensure they are depend on one another. Any value can be specified.

Related tasks:

"Setting up a subscription to traffic data" on page 80
A subscription is a request made to an owner center requesting that data be sent periodically to an external center (the IBM Traffic Information Hub). The message encapsulating the data 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 82
For additional security, you can protect the communication stream by configuring an obfuscation key for the IBM Traffic Information Hub TMDD External Center, to link the name and ID of a TMDD data subscription together. If an obfuscation key is configured, the IBM Traffic Information Hub 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.

Connecting to an owner center

The IBM Traffic Information Hub 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 and integration server 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 and integration server using the system administrator ID.
2. Go to the following folder: `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/ecserver`
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 the IBM Traffic Information Hub 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:

"Configuring the `ecserver.properties` file" on page 75
The `ecserver.properties` file is read by the TMDD scripts to determine how the data is imported into the IBM Traffic Information Hub.

"Running a TMDD data flow subscription"
Subscriptions define the flow of data from the owner center to the external center provided by the IBM Traffic Information Hub.

Related tasks:

"Running a bulk load of traffic data" on page 83
After deploying the IBM Traffic Information Hub, 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 the IBM Traffic Information Hub at specific intervals. Bulk loading is normally done when the IBM Traffic Information Hub 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 the IBM Traffic Information Hub.

Related concepts:

"Subscription types" on page 228
The IBM Traffic Information Hub supports a number of subscription types.

Related tasks:

"Connecting to an owner center" on page 78
The IBM Traffic Information Hub must be configured to connect to at least one owner center. The owner center provides the TMDD traffic flow and event data.

Related reference:

"Supported TMDD data objects, dialogs, and types" on page 227
The IBM Traffic Information Hub implements a subset of TMDD data objects, dialogs, and subscription and request type.

"Publish dialogs" on page 232
The IBM Traffic Information Hub implements a subset of TMDD data objects and publish dialogs.

"Request/response dialogs" on page 231
The IBM Traffic Information Hub implements a subset of TMDD request/response dialogs.

"Subscription dialogs" on page 229
The IBM Traffic Information Hub implements a subset of TMDD data objects and subscription dialogs.

Setting up a subscription to traffic data

A subscription is a request made to an owner center requesting that data be sent periodically to an external center (the IBM Traffic Information Hub). The message encapsulating the data 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 (the IBM Traffic Information Hub) provides a web service, named `trans_tmddecserver_ear` that accepts publications and extracts the data from those publications and writes the information to the IBM Traffic Information Hub databases.

The IBM Traffic Information Hub `createSubscriptions.sh` script initiates subscription requests. This script requires:

* The URL to the external center (IBM Traffic Information Hub) that will process the publications
* The URL to access the owner center.
* Information on 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 connecting 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 used to identify the subscription. *SubscriptionName* should 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:
  - `oneTime` - subscription requested and response returned one time
  - `periodic` - data sent to the IBM Traffic Information Hub regular defined intervals
  - `onChange` - data sent to the IBM Traffic Information Hub when updated at the owner center
- *SubscriptionAction* is one of the following:
  - `newSubscription` - create a new 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 this 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 will be similar to the following: `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 referring to the TCP/IP port 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 WebSphere administration 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 containing the TMDD shell scripts.

   `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/scripts`

6. Specify the shell variables as required for the IBM Traffic Information Hub installation using `export` command in the shell. The shell variable are:
   - *WAS_HOME*: The location of the WebSphere Application Server installation. This is usually `/opt/IBM/WebSphere`.
   - *TRANS_HOME*: The location of the IBM Traffic Information Hub configuration and library files. This is usually `/opt/IBM/iss/intelligentTransportation/trafficInformationHub`.
   - *ISS_HOME*: The location of the `iss_common.jar` file. This is usually `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/lib`.
   - *JAVA_HOME*: The location of the JVM. This is usually `/opt/IBM/WebSphere/AppServer/java`

7. Run the request.

   `sh createSubscriptions.sh http://ecHostName:portNo/trans_tmddecserver_ear/tmddECSoapHttpService`

Related concepts:

"Configuring the `ecserver.properties` file" on page 75
The `ecserver.properties` file is read by the TMDD scripts to determine how the data is imported into the IBM Traffic Information Hub.

"Subscription types" on page 228
The IBM Traffic Information Hub supports a number of subscription types.

Related tasks:

"Canceling a subscription" on page 83
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 Traffic Information Hub TMDD External Center, to link the name and ID of a TMDD data subscription together. If an obfuscation key is configured, the IBM Traffic Information Hub 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 the IBM Traffic Information Hub. 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 IBM Traffic Information Hub needs to restarted.

Procedure

1. Log on to the IBM Intelligent Operations Center application and integration server as root user.
2. From the command line, open the following directory: `/opt/IBM/iss/intelligentTransportation/ trafficInformationHub/ecserver`
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=6hvF775ljor`

5. Save and close the `ecserver.properties` file.
6. Restart the IBM Traffic Information Hub by logging on to the IBM Intelligent Operations Center event and management server as root user and entering the following commands to restart the server:

   ```
   cd /opt/IBM/ISP/mgmt/scripts
   ./IOCControl.sh stop all password
   ./IOCControl.sh start all password
   ```

   Where *password* is the password for the IBM Intelligent Operations Center administrator 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:

Chapter 3, "Securing the solution," on page 63
Securing the IBM Traffic Information Hub and the optional transportation prediction feature 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.

"Ecserver.properties configuration" on page 76
The ecserver.properties file lists configuration options that can be set for the IBM Traffic Information Hub.

"Controlling the services" on page 116
You can control and query the services of the IBM Traffic Information Hub using a command on the IBM Intelligent Operations Center event and management server. You can also control and query the transportation prediction services using a command on the analytic 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 80
A subscription is a request made to an owner center requesting that data be sent periodically to an external center (the IBM Traffic Information Hub). The message encapsulating the data 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 the IBM Traffic Information Hub, 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 the IBM Traffic Information Hub at specific intervals. Bulk loading is normally done when the IBM Traffic Information Hub 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 and integration 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 Traffic Information Hub TMDD External Center.

To run the bulk load command, you will need the following information:
- URL to the External Center. For example http://*ecHostName*:*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 and integration server as the root user.
2. Open the following directory containing the TMDD shell scripts:

   `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/scripts`
3. Enter the following bulk load command:

   `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 6hvF775ljor -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`

Results

After the tool has completed, you should see a message confirming that the request was completed successfully.

What to do next

"Verifying the data import" on page 85

Related concepts:

"TMDD Data Management tools" on page 74
When the IBM Traffic Information Hub is deployed, a set of TMDD Data Management tools are installed onto the IBM Intelligent Operations Center application and integration server.

"Configuring the `ecserver.properties` file" on page 75
The `ecserver.properties` file is read by the TMDD scripts to determine how the data is imported into the IBM Traffic Information Hub.

"Request types" on page 230
The IBM Traffic Information Hub supports a number of request types.

Related tasks:

"Planning the TMDD data integration" on page 73
Before integrating the IBM Traffic Information Hub with owner centers, the appropriate planning must be done to ensure desired results.

"Connecting to an owner center" on page 78
The IBM Traffic Information Hub 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 Traffic Information Hub database was successful.

About this task

The data import can be verified using any one of the following steps.

Procedure

1. Log on to application and select content to be displayed on the map. Select a layer using the criteria that you know should exist in the recently populated databases of the IBM Traffic Information Hub. If the data import was successful, the traffic flow and event data will be displayed in the user interface portal on the map or in the list.

2. To verify the database contents, run select statements on the tables to verify the imported entries. The tables are described in the DLL in the `tables/create` subdirectories under `/opt/IBM/iss/ intelligentTransportation/trafficInformationHub/dbsrc/*/*`.

Using web services dialogs

The IBM Traffic Information Hub provides Web Services Definition Language (WSDL) dialogs to communicate data between the IBM Traffic Information Hub and other products and services.

Table 6 describes the dialogs available in the IBM Traffic Information Hub.

Table 6. The IBM Traffic Information Hub WSDL dialogs

Dialog Class (Dialog)	Description
ConnectionManagementClassDialogs (DlCenterActiveVerificationRequest)	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 (DlCenterActiveVerificationSubscription)	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.

Table 6. The IBM Traffic Information Hub WSDL dialogs (continued)

Dialog Class (Dialog)	Description
ConnectionManagementClassDialogs (DlCenterActiveVerificationUpdate)	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 (DlDetectorDataRequest)	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 (DlDetectorDataSubscription)	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.
DetectorClassDialogs (DlDetectorDataUpdate)	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 (DlDetectorInventoryRequest)	A request-response dialog used by an external center to request an inventory of an own center's detector stations and sensors. This is used to initialize the map and database when the TMDD Adapter is started.
DetectorClassDialogs (DlDetectorInventoryUpdate)	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 (DlDetectorStatusUpdate)	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 (DlDeviceInformationSubscription)	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 (DlActionLogSubscription)	A request-response dialog for an external center to request a subscription from an owner center on updates on its action logs.
EventClassDialogs (DlActionLogUpdate)	A publication dialog for an owner center to provide updates on its action logs to an external center.
EventClassDialogs (DlEventIndexSubscription)	A request-response dialog used by external center subscribe to owner center event index updates.
EventClassDialogs (DlEventIndexUpdate)	A publication dialog for an owner center to provide event index status updates to an external center.
EventClassDialogs (DlFullEventUpdateUpdate)	A publication dialog for an owner center to provide event updates to an external center.
LinkClassDialogs (DlLinkInventoryRequest)	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 (DlLinkInventoryUpdate)	A publication dialog for an owner center to provide traffic network link inventory updates to an external center.

Table 6. The IBM Traffic Information Hub WSDL dialogs (continued)

Dialog Class (Dialog)	Description
LinkClassDialogs (DlLinkStatusUpdate)	A publication dialog for an owner center to provide traffic network link status updates to an external center.
NodeClassDialogs (DlNodeInventoryRequest)	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 (DlNodeInventoryUpdate)	A publication dialog for an owner center to provide a traffic network node inventory updates to an external center.
NodeClassDialogs (DlNodeStatusUpdate)	A publication dialog for an owner center to provide traffic network node status updates to an external center.
TransportationNetworkClassDialogs (DlTrafficNetworkInformationSubscription)	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 72
Communications between the external center provided by the IBM Traffic Information Hub and owner centers, known as Center-to-Center (C2C) communications, require peer-to-peer network connections between systems. These connections are typically through local or wide area networks.

Related reference:

"Supported TMDD data objects, dialogs, and types" on page 227
The IBM Traffic Information Hub implements a subset of TMDD data objects, dialogs, and subscription and request type.

XSD and WSDL files

The IBM Traffic Information Hub provides XSD and WSDL files to be used when integrating owner centers with the IBM Traffic Information Hub. These files can be used to resolve incompatibilities between owner and external centers.

These files can be found in the `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/ecserver` directory on the IBM Intelligent Operations Center application and integration server after the IBM Traffic Information Hub is installed.

Related concepts:

"Communicating between external and owner centers" on page 72
Communications between the external center provided by the IBM Traffic Information Hub and owner centers, known as Center-to-Center (C2C) communications, require peer-to-peer network connections between systems. These connections are typically through local or wide area networks.

Obtaining link status TMDD data

1.0.1.1

If you have installed Interim Feature 1, you can export traffic awareness and traffic prediction data from IBM Traffic Information Hub into XML format. The REST services of Interim Feature 1 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

`1.0.1.1`

To obtain the current road link status data, access the **TMDD LinkStatusMsg** REST service that is provided with Interim Feature 1 for the IBM Traffic Information Hub.

Before you begin

Ensure that the **trans_tmddpublish_ear** service is running on the IBM Intelligent Operations Center portal server.

About this task

The **TMDD LinkStatusMsg** REST service calls the operational database on the IBM Intelligent Operations Center database 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/TIHPublish/LinkStatus`

Where *hostname* is the hostname of the IBM Intelligent Operations Center portal server.

Obtaining current and predicted link status data

`1.0.1.1`

To obtain the current and predicted road link status data, access the extended **TMDD LinkStatusMsg** REST service that is provided with the transportation prediction feature of Interim Feature 1.

Before you begin

Ensure that the **TMDD LinkStatusMsg** service is running on the IBM Intelligent Operations Center portal server.

About this task

The extended **TMDD LinkStatusMsg** REST service calls the operational database on the IBM Intelligent Operations Center database 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://hostname/ibm/iss/trans/tpt/messages/rest/trans_pred/outbound/prediction`

Where *hostname* is the hostname and open port of the IBM Intelligent Operations Center portal 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.tmdd.org/3/messages"
xmlns:ns4="http://www.ntcip.org/c2c-message-administration"
xmlns:ns3="http://www.tmdd.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>
...
```

Chapter 5. Customizing the solution

You can customize the user interface, maps, and reports of the IBM Traffic Information Hub. You can also customize the transportation prediction feature as required.

Sections of the documentation are marked as ✚ to indicate that the information applies to features included in transportation prediction.

Customizing the user interface

You can customize elements of the IBM Intelligent Transportation user interface to suit your operation.

List of portlets

The IBM Traffic Information Hub is a portlet based solution using portal technology.

The following portlets are provided with the IBM Traffic Information Hub.

Note: Portlets marked with the ✚ icon are provided only when the optional transportation prediction feature is installed.

Portlets on the Operator: Traffic view

Portlet	Description
Current Traffic Conditions	The starting point for viewing current traffic data, allowing you to interact with the Operator: Traffic view. It contains a GIS map of the traffic network, which provides a visual representation of current traffic data collected by sensors in the field.
✚ Predicted Traffic Conditions	The starting point for viewing forecasted traffic data. Contains a map that displays the predicted traffic levels of road links in the transportation network for up to one hour into the future. The predicted traffic levels are color coded and are displayed on a GIS map providing a visual representation of the near future traffic conditions.
Traffic Conditions - Details	A table containing categorized information about the status of traffic events, devices, and levels that currently are being monitored on the maps. You can also use this portlet to add and edit traffic events. The **Predicted Traffic Levels** tab appears only when the transportation prediction feature is installed and running in the solution.
Traffic Flow - Past Hour	A graphical report that shows the traffic flow volume of a predefined road link 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. To modify the graph to present traffic event information for a different time period or other criteria, click **Back**.
✚ Traffic Flow Prediction Reports	A graphical report that shows the forecasted traffic flow volume of the selected road link or network ID, at every five-minute interval within the next hour of the current time. To modify the graph to present traffic prediction data for a different road link or network ID, click **Back**.

Portlet	Description
✚ Traffic Speed Prediction Reports	A graphical report that shows the forecasted traffic speed of the selected road link or network ID, at every five-minute interval within the next hour of the current time. To modify the graph to present traffic prediction data for a different road link or network ID, click **Back**.
Traffic Custom Reports	Displays a list of all the reports provided by IBM Traffic Information Hub. Using the reports action tool bar, you can run, modify, save, or export the reports from this portlet.
✚ Traffic Prediction Custom Reports	Displays a list of all the reports provided by the transportation prediction feature. Using the reports action tool bar, you can run, modify, save, or export the reports from this portlet.

Portlets on the Planner: Traffic view

Portlet	Provides ...
Historical Traffic Conditions	The starting point for viewing historical traffic data allowing you to interact with the Planner: Traffic view. It contains a geographical information system (GIS) map of the traffic network, which provides a visual representation of historical traffic data archived by the IBM Traffic Information Hub.
Historical Traffic Conditions - Details	A table containing categorized information about historical traffic performance levels that are currently being monitored on the map in the Historical Traffic Conditions portlet.
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	Displays a list of all the reports available in the IBM Intelligent Transportation solution. Using the reports action tool bar, you can run, modify, save, or export the reports from this portlet.

The transportation prediction feature also provides several administration portlets in the **Administration** view of the solution interface. For a list and description of the administration portlets provided by the transportation prediction feature, see the related link at the end of this topic.

Related concepts:

"Guidelines for customizing portlets"
IBM Intelligent Transportation includes predefined settings and information. IBM Intelligent Transportation also offers various methods to customize the different portlets and portlet content.

"Transportation prediction administration portlets" on page 106
The transportation prediction feature is a portlet-based solution that is part of IBM Traffic Information Hub. To customize the settings required for traffic prediction, use the administration portlets available in the **Administration** view of the solution interface.

Guidelines for customizing portlets

IBM Intelligent Transportation includes predefined settings and information. IBM Intelligent Transportation also offers various methods to customize the different portlets and portlet content.

Map and Historical Traffic Conditions

You can configure the Map and the Historical Traffic Conditions portlets through the options in the Configuration view. Configurable options include layers, regions, map settings, base maps, and traffic settings.

You can also configure portlet content, by clicking **Select content to display on map and in list**.

Traffic Reports

Traffic Reports are built with information that is fed from the Traffic Custom Reports portlet. Therefore, the traffic reports are not stand-alone reports. If you change the setting for the reports under Traffic Custom Reports, the change affects the displayed reports on the Planner: Traffic, and Operator: Traffic pages.

Related concepts:

"List of portlets" on page 91
The IBM Traffic Information Hub is a portlet based solution using portal technology.

Configuring the maps

Configuring the base map for the solution

Before you can use the solution portal, a base map is required for the map portlets in the IBM Traffic Information Hub user interface. Layers of traffic data are superimposed over the base map that is configured for the system.

About this task

Configure a base map from the Current Traffic Conditions portlet on the Operator: Traffic view. 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, however, only one base map at a time can be displayed in the map portlets.

Note: You can only configure the base maps from the Current Traffic Conditions portlet. The **Base Maps** tab is not visible from the Historical Traffic Conditions or the Predicted Traffic Conditions portlets.

Procedure

1. To access the map configuration interface, click the upper right corner of the portlet to view the Current Traffic Conditions portlet display menu and click **Configure**.
2. Click **Base Maps**.
3. Click **Add Map**.
4. 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 have configured multiple base maps, use this option to select the preferred base map.
    d. Enter the **URL** of the ESRI ArcGIS server map.

       Note: Refer to the system requirements page for information about which map server products and services are supported by the IBM Traffic Information Hub.
    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 list of available base maps configured for the solution.

Related concepts:

"GIS server requirement" on page 15
In addition to the underlying IBM Intelligent Operations Center, the IBM Traffic Information Hub
requires access to a geographic information system (GIS) server.

"Configuring ESRI ArcGIS" on page 36
ESRI ArcGIS server is required to provide the base maps of the user interface. ESRI ArcGIS is not a part
of IBM Intelligent Transportation and is required as an additional service. After installing the IBM Traffic
Information Hub configure the ESRI ArcGIS server to work with the solution.

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS)
base map and settings of the map portlets.

Setting the center point and zoom level for the maps
Configure the center point and zoom level for each of the maps provided by the solution.

About this task

After configuring the base map for the solution, specify the starting location and zoom level for the map.
By default, the center point and zoom level configuration of the Current Traffic Conditions map is
applied to the other maps of the solution. If required, you can configure a different center point and
zoom level for the maps in the Historical Traffic Conditions portlet and the Predicted Traffic Conditions
portlet.

Note: The Predicted Traffic Conditions portlet is only available when you install the optional
transportation prediction feature.

Procedure
1. To access the map configuration interface, click the upper right corner of the portlet to view the
   portlet display menu and click **Configure**.
2. Click **Map Settings**. The current map is displayed highlighting the center point.
3. Use the zoom controls on the map to set the zoom level.
4. Use the panning controls to center the map.
5. Click **Save**.
6. Click **OK**.
7. To return to the map view, go to the portlet display menu and click **Back**.

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS)
base map and settings of the map portlets.

Adding road categories
Create road categories to define the types of road links that a user can include when adding a traffic
layer. Road categories are configured from the **Traffic Settings** tab of the map configuration view.

Procedure
1. To access the map configuration interface, click the upper right corner of the portlet to view the
   portlet display menu and click **Configure**.

2. Click **Traffic Settings**.

3. In the **New road category** field, enter the road category name.

4. In the **Value stored in database** field, enter a value name.

5. Click **Add to list**.

6. 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 adding traffic layers.

Note: The default road category value is Highway.

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS) base map and settings of the map portlets.

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.

Procedure

1. To access the map configuration interface, click the upper right corner of the portlet to view the portlet display menu and click **Configure**.

2. Click **Regions**.

3. Pan and zoom the map to the area of the new region to be created.

4. Click **New**. The polygon selection tool is activated.

5. 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.

6. 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.

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

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS) base map and settings of the map portlets.

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. To access the map configuration interface, click the upper right corner of the portlet to view the portlet display menu and click **Configure**.
2. Click **Regions**.
3. Select the region to delete by clicking the region on the map or clicking on the region name beside the map.
4. Click **Delete**.
5. Click **OK**.
6. 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 captured by the IBM Traffic Information Hub. Traffic layers are superimposed over the top of the solution base map.

If you are a Transportation IT Administrator, you can configure the following predefined traffic layers that display in the Current Traffic Conditions portlet on the Operator: Traffic views.
- Events
- Devices
- Levels
- External services

To access the map configuration interface, click the upper right corner of the portlet to view the Current Traffic Conditions portlet display menu and click **Configure**.

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS) base map and settings of the map portlets.

Adding traffic event layers:

To monitor specific traffic events in the transportation network, add traffic event layers using the Current Traffic Conditions portlet.

Procedure
1. Go to the Current Traffic Conditions portlet.
2. Click **Select Content**.
3. On the selection form, under **Events**, click **New Layer**.
4. In the **New Event Layer** window, enter a name for the layer in the **Layer label** field.
5. Optional: Enter a description in the **Layer description** field.
6. Required: Select an event **Group**.
7. Select at least one **Severity** for the event layer. To select multiple items, press Ctrl as you click each item.
8. Required: 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 to 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.
 9. 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.
10. Click **OK**.

Results

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

The **Events** list in the Traffic Conditions - Details portlet updates 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 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.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

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. Providing 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.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

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.

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: To monitor a specific road link, enter the **Road name**.
 7. Optional: To monitor a specific road category, select at least one **Road category** from the 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. Drawing a region on the map allows you to constrain the layer to that region.
10. Click **OK**.

Results

The recently created layer is displayed in the **Traffic Levels** section of the **Select Content** filter form. Providing 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.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

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. Providing the layer is selected, the layer-specific content is loaded and visible on the map.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

Deleting traffic layers:

Use this topic to remove an existing traffic layer.

About this task

Follow the steps in the procedure.

Procedure
1. In the Operator: Traffic view open the Map portlet.
2. Click the **Show Layers**. The Layer options dialog is displayed.
3. Locate the layer to be deleted, then click the **X** icon next to this layer. The layer is deleted.

Configuring the prediction interval increment

You can set the prediction interval increments for the map slider in the Predicted Traffic Conditions portlet.

About this task

You must have Transportation IT Administrator user role permissions to perform this task.

Procedure
1. Go to the Predicted Traffic Conditions portlet on the Operator: Traffic view.
2. To access the map configuration interface, click the upper right corner of the portlet to view the portlet display menu and click **Configure**.
3. Click **Traffic Settings**.
4. In the **Prediction Interval** section, enter the interval time in minutes. Enter a value from 01 - 59 minutes or use the up and down arrows to select the interval time from the list of available options.
5. Click **Add the time slot**.
6. To return to the map view, go to the portlet display menu and click **Back**.

Results

The Predicted Traffic Conditions portlet is updated to reflect the recently saved prediction interval increment value.

Related tasks:

"Configuring the maps" on page 35
After installing the IBM Traffic Information Hub, configure the geographical information system (GIS) base map and settings of the map portlets.

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 SYSPROP 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 SYSPROP database table stores system-wide configuration data for the IBM Intelligent Operations Center and integrated solutions, such as the IBM Traffic Information Hub. A hexadecimal color code is assigned to the *Los_Color* property in the SYSPROP 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)	Los_Color value	Color displayed in the UI
A	00ff00	Green
B	00ff00	Green
C	ff8c00	Amber
D	ff0000	Red
E	ff0000	Red
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 database 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 Subject = 'Los_Color' and Name = 'trafficlevelname'`

   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 Subject = 'Los_Color' and Name = 'A'
```
3. Restart the IBM Intelligent Operations Center portal server.

Results

The maps of the solution interface display the recently configured colors when you choose to display traffic level layers.

Customizing the reports

You can customize the reports of the IBM Traffic Information Hub and the optional transportation prediction feature to suit the requirements of your transportation network. You can also customize the reports portlets that automatically display a selection of the predefined reports that are installed with the solution.

Configuring the properties of a report

Configure the reports that are provided with the IBM Traffic Information Hub so that they reference the required traffic network ID and road link or region.

Before you begin

Before you perform this task, you must first complete the TMDD data import from at least one owner center.

About this task

Perform this task for all of the reports that are provided with the following portlets:
- Traffic Custom Reports
- Traffic Prediction Custom Reports

Note: The Traffic Prediction Custom Reports is only available if the optional transportation prediction feature is installed.

Procedure

1. Log on to the solution as the Transportation IT Administrator and go to the Traffic Custom Reports portlet.
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 the **More...** link in the row containing the selected report.
4. In the **Available actions** window, click **Set properties**.
5. Go to the **Report view** tab.
6. Under **Prompt values**, click **Edit**. The **Configure the report** dialog is displayed.
7. Complete the **Configure the report** fields:
   a. Select the **Traffic network** from the list, if not already displayed.
   b. Select a road link or region from the available options in the **Traffic levels for** field.
   c. Optional: Complete the other required fields for the report criteria. See **Modifying existing reports** in the **Customizing the reports** help section for more information about what to enter here.
8. Click **Finish**.
9. Click **OK**. Click the report name again to view the updated report.

   Note: Do not modify the report name, as the report name is referenced in the portlet URL.

Results

The report portlets display the selected traffic flow and event data graph reports using the latest TMDD data imported from the owner center.

Related tasks:

"Configuring the reports of the solution" on page 37
After installing the IBM Traffic Information Hub and the optional transportation prediction feature, some configuration of the traffic data reports and reports portlets is required.

Customizing the portlet titles

An administrator can customize the portlet title in WebSphere Application Server.

Procedure

1. Log on to the WebSphere Application Server administrative console.
2. Select **Administration** > **Portlet Management** > **Web Modules**.
3. For **Transportation Report Integration Portlet**, click the **copy** icon.
4. Enter a new name for the title and click **OK**.

Customizing the content of the Reports portlets

You can change the traffic data graph report that is displayed by default in the Reports portlets provided with the IBM Traffic Information Hub and the optional transportation prediction feature.

About this task

Log on to the solution interface portal as the Transportation IT Administrator and complete the following procedure for each of the Reports portlets that you would like to modify:

Procedure

1. Navigate to the portlet display menu in the upper right corner of the Reports portlet.
2. Click **Edit Shared Settings**.
3. Enter the **URL** for the required report.
4. Click **Save**.
5. On the portlet display menu, click **Back** to return to the main portlet view.

Results

The Reports portlet updates to display the recently selected report.

Creating reports

Administrators of IBM Intelligent Transportation can create reports. Reports are available for users to view in the Traffic Custom Reports portlet.

About this task

Query Studio and Report Studio can be used to create new reports.

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 IBM Intelligent Transportation metadata model 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.

Custom Query
> Contains query subjects that you can use to build custom queries for relational reporting.

Creating custom reports with Query Studio

You can create custom reports with Query Studio. You cannot modify existing reports with Query Studio

About this task

With objects in the Traffic Flow Analysis and Traffic Event Analysis namespace, you can create multidimensional reports.

With objects in the Custom Query namespace, you can create relational reports.

Procedure

1. Open Cognos Connection.
2. From the **Launch** menu, select **Query Studio**.
3. Select **TIH package**.
4. In the left pane select the required items and drag them to the right into the report.

   Note: Follow the Query Studio user guide help menu to take you through the report creation process.

Viewing reports on the Traffic Custom Reports portlet:
About this task

To view your reports on the Traffic Custom Reports portlet:

Procedure

1. Save your report into **Public Folders** > **TIH Package** > **Views**.
2. View the report in the your folder on the Traffic Custom Reports portlet.

Creating custom reports with Report Studio

You can create custom reports with Report Studio. You cannot modify existing reports with Report Studio

Procedure

1. Open Cognos Connections.
2. From the **Launch** menu, select **Report Studio**.
3. Select **TIH package**.
4. Click **Create New**.
5. Select the type of report type build.
6. Click **OK**.

   Note: Follow the Report Studio user guide help menu to take you through the report creation process.

Modifying the reports

You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Before you begin

Your Transportation IT administrator controls who can modify traffic event reports. Contact your Transportation IT administrator if you require changes to the current traffic 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.

   For a list of reports that are provided with the solution, and details of what options can be modified, see the related links at the end of this topic.
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 traffic report is updated. The next time the traffic report is run, the graph will be plotted using the updated criteria. Also, any portlets on the Operator: Traffic and Planner: Traffic views that are displaying the traffic report, will be updated automatically the next time the graph or page is refreshed.

What to do next

Click **Help** on the **Set properties** title bar for more information on all the options on this dialog.

Changing the language settings for Traffic Reports graphic displays

The language for the various sections of a report are configured separately.

Changing the language for a report

The language settings for a report including buttons and links can be changed through Cognos Connections or through the solution interface. The default language for all reports is set to the English language.

Procedure

1. To change the language through Cognos Connections:
   a. Open Cognos Connections.
   b. Select the required package.
   c. Select the **Views** folder.
   d. Select the **Run** icon next to the required report.
   e. Under **Language**, select the required language.
   f. Click **Run**.
2. To change the language through the solution interface:
   a. Log on to the solution interface.
   b. Navigate to **Intelligent Transportation** > **Operator: Traffic**. The IBM Traffic Information Hub reports are available in the Traffic Custom Reports portlet at the bottom of the page.

      Note: If you have installed the optional transportation prediction feature, the transportation prediction reports are available in the Traffic Prediction Custom Reports portlet at the bottom of the page.
   c. Select the **Run** icon next to the required report.
   d. Under **Language**, select the required language.
   e. Click **Run**.

Setting the default language for the report

Set up the default language for the report in Cognos Connections. You can update both language and content language.

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 required language.
   b. Under **Content language:**, select the required language.
5. Click **OK** to implement the new language settings.

Changing the axis language of a report

In Traffic Custom Reports, you can update the language settings for the axis of a report.

Procedure

1. Run the required report.
2. In the Traffic Custom Reports portlet, next to the relevant report click **More**.
3. Click **Set properties**.
4. For **Set Properties**, **General**, under the Language option adjust the language.
5. Click **OK**.
6. Rerun the report. The graph axis for your report has the newly selected language.

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.

Enabling accessibility

The user interface of the IBM Traffic Information Hub provides accessibility features to help visually impaired users to use the solution. When you enable accessibility in the reports portlets, a table is also displayed containing the values used to plot the graph report. A summary that describes the graph is also available.

Procedure

1. Go to the Traffic Custom Reports portlet on either the Operator: Traffic or the Planner: Traffic view.
2. Select a report from the list of available reports in the **Reports** folder.
3. Click the **More** link that appears next to your selected report.
4. Click **Set properties**.
5. Open the **Report View** tab.
6. In the **Accessibility** section, select the checkbox titled **Enable accessibility support**.
7. To save the change, click **OK**.

Results

After refreshing your browser, in the reports portlets the graph is now accompanied by a table that summarizes the report graph. Scroll down to see the table.

What to do next

If you have installed the optional transportation prediction feature, repeat this procedure in the Traffic Prediction Custom Reports portlet for each of the prediction reports.

Customizing the transportation prediction feature

The optional transportation prediction feature can be customized to provide traffic prediction within an hour from the current time, to provide customized reports, and to configure data collection, enablement, and calculation in the administration portlets.

Transportation prediction administration portlets

The transportation prediction feature is a portlet-based solution that is part of IBM Traffic Information Hub. To customize the settings required for traffic prediction, use the administration portlets available in the **Administration** view of the solution interface.

The following tables list the portal administration portlets that are provided with the transportation prediction feature of the IBM Traffic Information Hub.

Solution Configuration portlets

Portlet name and path	Description
Configure and Enable Traffic Prediction available at **Administration** > **Solution Configuration** > **Configure Transportation Prediction**	An interactive window containing options to enable traffic prediction and to configure data collection required for traffic prediction.

Portlet name and path	Description
Configure Traffic Prediction Calculations - Mean available at **Administration** > **Solution Configuration** > **Configure Transportation Prediction Calculations**	An interactive window containing options to specify the details required to calculate the mean. A maximum of seven processes can be configured. The data generated by this calculation is used as an input for real-time prediction.
Configure Traffic Prediction Calculations - Estimate available at **Administration** > **Solution Configuration** > **Configure Transportation Prediction Calculations**	An interactive window containing options to specify the details to calculate the batch estimate. A maximum of 14 processes can be configured to calculate peak and off-peak estimates. The data generated by this calculation is used as an input for real-time prediction.
Create Traffic Prediction Relationship Matrix available at **Administration** > **Solution Configuration** > **Prepare Transportation Prediction Data**	An interactive window containing options to select a subnet ID and the number of hops 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.

Solution Management portlets

Portlet name and path	Description
Initiate Calculation Manually available at **Administration** > **Solution Management** > **Initiate Transportation Prediction Calculations**	An interactive window that provides options to initiate a traffic process calculation manually, outside of the scheduled process calculation times.
Traffic Prediction Calculation Monitoring available at **Administration** > **Solution Management** > **Monitor Transportation Prediction Calculations**	A table containing detailed information of the traffic processes that have been triggered. You can modify the query in the **Select Content** form to monitor specific processes.

Guidelines to configure traffic prediction

The transportation prediction feature defines certain steps to configure traffic prediction for the first time using the administration portlets available in the **Administration** view of the solution interface. For later configurations, you can configure individual administration portlets as required.

Procedure

1. Configure the site title for the traffic prediction administration portlets available in the **Administration** view of the solution interface by following the instructions in "Configuring the site title for the administration portlets" on page 108.

2. Configure the general settings for traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in "Configuring general settings for traffic prediction" on page 109. Ensure that traffic prediction is disabled by clearing the **Enable traffic prediction** check box, **Enable prediction based on speed** check box, and **Enable prediction based on volume** check box.

3. Restart the Prediction server.

   a. Go to /opt/IBM/WebSphere/AppServer/profiles/transportationPrediction/bin/.

   b. Stop the Prediction server by running the following command:

      ./stopServer.sh transPredServer -username wpsadmin -password wpspassw0rd

   c. Start the Prediction server by running the following command:

      ./startServer.sh transPredServer -username wpsadmin -password wpspassw0rd

4. 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 "Customizing the traffic relationship matrix" on page 111.

5. Configure the traffic prediction mean calculation settings in the Configure Traffic Prediction Calculations - Mean portlet by following the instructions in "Customizing traffic prediction mean calculation" on page 111.

6. Configure the traffic prediction estimate calculation settings in the Configure Traffic Prediction Calculations - Estimate portlet by following the instructions in "Customizing traffic prediction estimate calculation" on page 112.

7. Restart the BatchCalculation server. For instructions on how to stop and start the BatchCalculation server, see Controlling the traffic prediction servers.

8. Trigger all the traffic prediction calculations in the Initiate Calculation Manually portlet by following the instructions in "Manually initiating traffic prediction calculations" on page 112. 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.

9. Monitor all the traffic prediction calculations in the Traffic Prediction Calculation Monitoring portlet by following the instructions in "Monitoring traffic prediction calculations" on page 113. You can customize the query in the selection form to monitor specific calculations.

10. Enable traffic prediction in the Configure and Enable Traffic Prediction portlet by following the instructions in "Configuring speed and volume settings for traffic prediction" on page 110. Ensure that the **Enable traffic prediction** check box is selected. Also, select either **Enable prediction based on speed** check box or **Enable prediction based on volume** check box or both.

Configuring the site title for the administration portlets

To display the site title for the traffic prediction administration portlets, you have to assign a theme policy to the pages. You must have IT Administrator permissions to perform this task.

About this task

The traffic prediction administration portlets residing under the **Solution Management** and **Solution Configuration** pages available in the **Administration** view of the solution interface are set to inherit the theme policy from the parent pages.

For example, the Initiate Calculation Manually portlet available at **Administration** > **Solution Management** > **Initiate Transportation Prediction Calculations** automatically inherits the theme policy you configured for the **Solution Management** page.

Note: If the site title is not configured for the administration portlets, you will see several question mark characters in place of the site title.

For example, you will see **??????** characters as the title in place of the *City Name*.

Procedure

1. Log on to the portal as administrator.
2. Click **Administration** in the WebSphere Portal interface to view the traffic prediction administration portlets.
3. To create a style, navigate to **Portal User Interface** > **Theme Customizer**.
4. In the **Theme Customizer** welcome page, click **create a new style**.
5. In the **Style to copy** list, select **SingleTopNav**.

6. Specify a new style name in the **Style name** field.

7. Click **OK**.

8. To specify the site title in the theme policy, click **select a style to edit** in the **Theme Customizer** welcome page.

9. Select the style name you created in step 6.

10. Click the **Banner** tab.

11. In the **Branding** section, specify the required site title in the **Site title** field. For example, specify the site title as `City Name`.

12. Click **Save Style**.

13. To assign the theme policy to the administration portlets, navigate to **Portal User Interface** > **Manage Pages**.

14. Click **Content Root** > **Administration** > **WebSphere Portal**.

15. Assign the theme style for the **Solution Configuration** and **Solution Management** rows using the following instructions:

    a. Click the **Edit page properties** icon next to each row.

    b. Select the **Theme Style (Theme Policy)** you created and configured in steps 6 and 11.

    c. Click **OK**.

16. To display the **Prepare Transportation Prediction Data** portlet title and complete page, assign a specific theme to the portlet using the following instructions:

    a. Click **Solution Configuration**.

    b. Click the **Edit page properties** icon next to the **Prepare Transportation Prediction Data** row.

    c. Select **Transportation Base Theme 101** from the **Theme** drop-down list.

    d. Click **OK**.

Results

The traffic prediction administration portlets residing under the **Solution Management** and **Solution Configuration** pages display the configured site title.

Configuring general settings for traffic prediction

Customize the general settings for traffic prediction from the portal administration console on the IBM Intelligent Operations Center Portal Server. You must have Transportation IT administrator permissions to perform this task.

Procedure

1. Log on to the Configure and Enable Traffic Prediction portlet with the appropriate logon details.

2. Click **Administration** > **Solution Configuration** > **Configure Transportation Prediction**.

3. Select the required **Polling interval** from the drop-down list.

4. Select the required **Prediction interval** from the drop-down list. Ensure that this value is greater than or equal to 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 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.

Note: If the file `jobs.xml` is not generated after this step, complete the procedure outlined in the topic titled: *Verifying REST service settings for traffic prediction*

Results

A confirmation of your saved configuration is displayed on top of the portlet. These updated criteria are used the next time traffic prediction is enabled and run.

Related tasks:

"Configuring speed and volume settings for traffic prediction"
To enable traffic prediction and customize settings for traffic prediction based on speed and volume, use the Configure and Enable Traffic Prediction portlet available at **Administration** > **Solution Configuration** > **Configure Transportation Prediction**. You must have IT Administrator permissions to perform this task.

"Verifying REST service settings for traffic prediction" on page 39
Before you configure the transportation prediction feature, verify that the transportation prediction REST service settings contain the correct hostname and port number of the IBM Intelligent Operations Center analytic server.

Configuring speed and volume settings for traffic prediction

To enable traffic prediction and customize settings for traffic prediction based on speed and volume, use the Configure and Enable Traffic Prediction portlet available at **Administration** > **Solution Configuration** > **Configure Transportation Prediction**. You must have IT Administrator permissions to perform this task.

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 on 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 displaying the traffic prediction results are updated automatically the next time the graph or page is refreshed.

Related tasks:

"Configuring general settings for traffic prediction" on page 109
Customize the general settings for traffic prediction from the portal administration console on the IBM Intelligent Operations Center Portal Server. You must have Transportation IT administrator permissions to perform this task.

Customizing the traffic relationship matrix

To specify the details required to create a subnet ID and generate a relationship matrix, use the Create Traffic Prediction Relationship Matrix portlet available at **Administration** > **Solution Configuration** > **Prepare Transportation Prediction Data**. You must have IT Administrator permissions to perform this task.

Procedure

1. Enter 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.

   Note: A warning is displayed if a relationship exists for the subnet ID. You can overwrite the existing relationship and create a new relationship with a different number of hops if required.

Results

A confirmation of your saved configuration is displayed on top of the portlet. These updated criteria are used as input for traffic prediction calculations.

Customizing traffic prediction calculations

To customize the traffic prediction mean and estimate calculations, use the Configure Traffic Prediction Calculations - Mean portlet and Configure Traffic Prediction Calculations - Estimate portlet available at **Administration** > **Solution Configuration** > **Configure Transportation Prediction Calculations**. You must have IT Administrator permissions to perform this task.

Customizing traffic prediction mean calculation:

To customize the traffic prediction mean calculation, use the Configure Traffic Prediction Calculations - Mean portlet. You must have IT Administrator permissions to perform this task.

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 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 on top of the portlet and the required processes are scheduled. You can also initiate the calculation in the Initiate Calculation Manually portlet available at **Administration** > **Solution Management** > **Initiate Transportation Prediction Calculations**. The data generated by this calculation is used as an input for real-time prediction.

Customizing traffic prediction estimate calculation: ✚

To customize the traffic prediction estimate calculation, use the Configure Traffic Prediction Calculations - Estimate portlet. You must have IT Administrator permissions to perform this task.

Before you begin

Ensure that the configuration is saved for mean calculation in the Configure Traffic Prediction Calculations - Mean portlet available at **Administration** > **Solution Configuration** > **Configure Transportation 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 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 on top of the portlet and the required processes are scheduled. You can also initiate the calculation in the Initiate Calculation Manually portlet available at **Administration** > **Solution Management** > **Initiate Transportation Prediction Calculations**. The data generated by this calculation is used as an input for real-time forecasting.

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 **Administration** > **Solution Management**. You must have IT Administrator permissions to perform this task.

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 **Administration** > **Solution Management** > **Initiate Transportation Prediction Calculations**. You must have IT Administrator permissions to perform this task.

Procedure

1. Select the **Calculation process to initiate** from the drop-down list.
2. Select the **Subnet ID on which to run calculation** from the drop-down list.
3. After making your selection, click **Initiate** or click **Reset** to go back to the default values.

Results

A confirmation of your saved configuration is displayed on top of the portlet and the required traffic prediction calculation is triggered. You can view the status of the triggered traffic prediction calculation in the Traffic Prediction Calculation Monitoring portlet available at **Administration** > **Solution Management** > **Monitor Transportation 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 **Administration** > **Solution Management** > **Monitor Transportation 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 you would like to monitor:
   - **Calculation Type**
   - **Status**
   - **From date**
   - **To date**
3. After making 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 6. Managing the solution

There are several administrative tasks that you can perform on the IBM Traffic Information Hub and the underlying IBM Intelligent Operations Center environment.

Verifying the version

You can verify the version of IBM Traffic Information Hub and the optional transportation prediction feature that you have deployed by using the Intelligent Operations Center - About portlet in the **Administration** view. 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.

Related information:

Verifying the version of the IBM Intelligent Operations Center and integrated solutions

Controlling the servers

IBM Traffic Information Hub is installed on top of the IBM Intelligent Operations Center production environment. The IBM Intelligent Operations Center server cluster provides the middleware and base architecture for IBM Traffic Information Hub.

For information on controlling the IBM Intelligent Operations Center servers, see the section titled Controlling components with IOCControl in the IBM Intelligent Operations Center Information Center.

Controlling the traffic prediction servers

Manage the servers of the optional transportation prediction feature from the IBM Intelligent Operations Center analytic server

Before you begin

Before starting the transportation prediction servers, ensure that IBM Traffic Information Hub is running.

About this task

Use the following instructions to start or stop the `Prediction` and `BatchCalculation` transportation prediction servers.

Procedure

1. Log on to the IBM Intelligent Operations Center analytic server as the *root* user.

2. Go to the `/opt/IBM/WebSphere/AppServer/profiles/transportationPrediction/bin/` directory. Starting the servers

3. To start the`Prediction` server, enter the following command:

    `./startServer.sh transPredServer -username username -password password`

    Where:

    - *username* is the portal administrator with privileges to start and stop the transportation application servers

- *password* is the password of the portal administrator
4. To start the **BatchCalculation** server, enter the following command:

   `./startServer.sh transPredBatchServer -username username -password password`

Stopping the servers

5. To stop the**Prediction** server, enter the following command:

   `./stopServer.sh transPredServer -username username -password password`

6. To stop the **BatchCalculation** server, enter the following command:

   `./stopServer.sh transPredBatchServer -username username -password password`

Controlling the services

You can control and query the services of the IBM Traffic Information Hub using a command on the IBM Intelligent Operations Center event and management server. You can also control and query the transportation prediction services using a command on the analytic server.

Starting the services

On the IBM Intelligent Operations Center application and integration server, start the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can start the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

Procedure

1. Log on to the event and management server as the *root* user.

   Note: To start the transportation prediction services, log on to the analytic server as the *root* user.
2. Access the WebSphere Application Server administrative console.
3. To reveal the options, on the left menu, beside **Applications** click **+** .
4. Click **Business-level applications**.

   Note: For the transportation prediction services, click **WebSphere enterprise applications**.
5. Use the arrows at the bottom of the page to locate the services that correspond to the application.
6. To start any of the services, use the following sub-steps:
   a. Select check box beside the name of the service.
   b. At the top of the table, click **Start**.

   After a few seconds a message is displayed at the top of the page, giving details on whether the operation completed successfully.

Related tasks:

"Stopping the services"
On the IBM Intelligent Operations Center application and integration server, stop the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can stop the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

"Querying the status of the services"
On the IBM Intelligent Operations Center application and integration server, query the status of the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can query the status of the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

Stopping the services

On the IBM Intelligent Operations Center application and integration server, stop the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can stop the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

Procedure

1. Log on to the event and management server as the *root* user.

   Note: To stop the transportation prediction services, log on to the analytic server as the *root* user.
2. Access the WebSphere Application Server administrative console.
3. To reveal the options, on the left menu, beside **Applications** click **+**.
4. Click **Business-level applications**.

   Note: For the transportation prediction services, click **WebSphere enterprise applications**.
5. Use the arrows at the bottom of the page to locate the services that correspond to the application.
6. To stop any of these services, use the following substeps:
   a. Select check box beside the name of the service.
   b. At the top of the table, click **Stop**.

   After a few seconds a message is displayed at the top of the page, giving details on whether operation completed successfully.

Related tasks:

"Starting the services" on page 116
On the IBM Intelligent Operations Center application and integration server, start the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can start the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

"Querying the status of the services"
On the IBM Intelligent Operations Center application and integration server, query the status of the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can query the status of the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

Querying the status of the services

On the IBM Intelligent Operations Center application and integration server, query the status of the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can query the status of the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

Procedure

1. Log on to the event and management server as the *root* user.

   Note: To stop the transportation prediction services, log on to the analytic server as the *root* user.

2. Access the WebSphere Application Server administrative console.

3. To reveal the options, on the left menu, beside **Applications** click **+**.

4. Click **Business-level applications**.

   Note: For the transportation prediction services, click **WebSphere enterprise applications**.

5. Use the arrows at the bottom of the page to locate the services that correspond to the application.

6. The status of the service is displayed as a colored icon in the corresponding status column for each service.

Results

- 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.

Related tasks:

"Starting the services" on page 116
On the IBM Intelligent Operations Center application and integration server, start the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can start the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

"Stopping the services" on page 117
On the IBM Intelligent Operations Center application and integration server, stop the IBM Traffic Information Hub services through the applications option in the WebSphere Application Server administrative console. You can stop the transportation prediction services on the analytic server through the applications option in the WebSphere Application Server administrative console.

Maintaining the solution

Perform the tasks described in this section to keep your solution running smoothly.

Performance tuning guidelines

There are several steps that you can take to enhance the performance of the IBM Traffic Information Hub. There are also performance tuning steps that can be applied to the underlying IBM Intelligent Operations Center servers that the IBM Traffic Information Hub solution runs on top of.

Tuning the performance of the IBM Intelligent Operations Center

For recommendations and information about how you can tune the performance of the underlying IBM Intelligent Operations Center environment, see the Performance tuning section of the IBM Intelligent Operations Center Information Center.

Tuning the performance of the IBM Traffic Information Hub features

To optimize the performance and stability of the IBM Intelligent Transportation solution, the databases must be maintained on a regular basis. A regularly scheduled database maintenance plan is essential for maintaining peak performance of your system. For more information, see *Maintaining the database.*

1.0.1.1 If you have installed the IBM Traffic Information Hub version 1.0.1 Interim Feature 1, you can optionally configure the map in the Current Traffic Conditions to enhance the geospatial performance in

the user interface. If you are finding that the road links and associated traffic data on the map in the Current Traffic Conditions portlet are slow to render depending on the zoom level, 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 depending on the zoom level of the map. For example, you can customize the map so that when you zoom out to a high level covering 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.

Related concepts:

"Maintaining the database" on page 125
The databases of the IBM Traffic Information Hub are on the IBM Intelligent Operations Center database server. To optimize the performance and stability of the IBM Intelligent Transportation solution, the databases must be maintained on a regular basis.

Assigning an importance value to road links

1.0.1.1

You can tune the performance of the map display in the Current Traffic Conditions portlet by configuring the system so that the map displays only specific types of road links depending on 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 database server to assign an importance value to a road link.

Before you begin

Before running the **setImportance** and **generalizeLinks** scripts, the SYSPROP database table must be populated with a row that matches the script parameter. Configure the *importance* and *zoomRange* variable values in the SYSPROP 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 specified IBM Traffic Information Hub database with the assigned value for the selected road type category.

Note: This procedure can be performed only if the IBM Traffic Information Hub version 1.0.1 Interim Feature 1 is installed.

Procedure

1. Log on to the IBM Intelligent Operations Center database server as the root user.
2. Open the directory that contains the performance tuning scripts. This should be the following directory:

   `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/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 that you are setting the importance value for. 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 portal server.

Results

After running 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.

Related tasks:

> 1.0.1.1 "Configuring the link importance and zoomRange variable values" on page 122
Before running 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 SYSPROP table in the IOCDB database.

> 1.0.1.1 "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 need to 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 IBM Intelligent Operations Center database server.

Optimizing the geospatial geometry of road links

> 1.0.1.1

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 need to 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 IBM Intelligent Operations Center database server.

Before you begin

Before running the **setImportance** and **generalizeLinks** scripts, the SYSPROP database table must be populated with a row that matches the script parameter. Configure the *importance* and *zoomRange* variable values in the SYSPROP 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, so that 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 stored in the IBM Traffic Information Hub.

Note: This procedure can be performed only if the IBM Traffic Information Hub version 1.0.1 Interim Feature 1 is installed.

The **generalizeLinks** script calls the DB2 spatial generalize function **ST_Generalize** to simplify the default geometry of a link based on the tolerance parameter specified in the command. The resulting simplified geometry is then stored in the IBM Traffic Information Hub database and is assigned to that link at the *zoomRange* that was specified in the script command.

For more information, see the related links at the end of the topic. ST_Generalize reference topic in the DB2 Information Center.

Procedure

1. Log on to the IBM Intelligent Operations Center database server as the root user.
2. Open the directory that contains the performance tuning scripts. This should be the following directory:

   `/opt/IBM/iss/intelligentTransportation/trafficInformationHub/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 portal server.

Results

After running the script, when you zoom out to a high level on the map, the traffic links are rendered much faster than before 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 so that 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.

Related tasks:

`1.0.1.1` "Assigning an importance value to road links" on page 119
You can tune the performance of the map display in the Current Traffic Conditions portlet by configuring the system so that the map displays only specific types of road links depending on 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 database server to assign an importance value to a road link.

`1.0.1.1` "Configuring the link importance and zoomRange variable values"
Before running 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 SYSPROP table in the IOCDB database.

Related information:

⬄ DB2 Information Center: ST_Generalize reference information

⬄ DB2 Information Center: ST_Geometry reference information

Configuring the link importance and zoomRange variable values
`1.0.1.1`

Before running 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 SYSPROP table in the IOCDB 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 SYSPROP database table stores system-wide configuration data for the IBM Intelligent Operations Center and integrated solutions such as the IBM Traffic Information Hub. By default, all geospatial information is displayed regardless of the road link type or zoom level of the map.

You can set additional 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 SYSPROP database table. Before running the `setImportance` and `generalizeLinks` scripts, the SYSPROP 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 IOCDB SYSPROP database table.

Procedure
1. Log on to the IBM Intelligent Operations Center database server as the database administrator.
2. Connect to the IOCDB database by using one of the following methods:

- To connect to the database from the DB2 command line, enter the following commands: db2 connect to iocdb.
- To connect to the database from the DB2 control center, right-click **iocdb** and then click **Connect**.

3. Optional: To predefine the *importance* values, enter the following SQL command for every importance level value:

```
INSERT INTO DBTable (Realm, Subject, Name, Value, Type, Description)
VALUES ('MAP','Importance','importance','zoomLevel','Integer', 'Description');
```

Where:

- *DBTable* is the name of the SYSPROP 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.
- *Description* is a string to describe the importance range.

For example to associate a set of map zoom levels that range from 0 -12, with an importance range of 0 - 2, enter the following SQL INSERT commands:

```
INSERT INTO IOC.SysProp (Realm, Subject, Name, Value, Type,
Description) VALUES ('MAP','Importance','0','4','Integer',
'range for roads with the lowest importance');
INSERT INTO IOC.SysProp (Realm, Subject, Name, Value, Type,
Description) VALUES ('MAP','Importance','1','8','Integer',
'range for roads with medium importance');
INSERT INTO IOC.SysProp (Realm, Subject, Name, Value, Type,
Description) VALUES ('MAP','Importance','2','12','Integer',
'range for roads with highest importance');
```

This means that:

- Road links assigned an importance value of 0 display only if the zoom level of the map is in the range of 0 to 4.
- Road links assigned an importance value of 1 display only if the zoom level of the map is in the range of 5 to 8.
- Road links assigned an importance value of 2 display only if the zoom level of the map is in the range of 9 to 12.

4. Optional: To predefine the *zoomRange* values, enter the following SQL command for every zoom range level value:

```
INSERT INTO DBTable (Realm, Subject, Name, Value, Type, Description) VALUES
 ('MAP','zoomRange','GeneralizationZoomRange','zoomLevel','Integer', 'Description');
```

Where:

- *DBTable* is the name of the SYSPROP database table, such as IOC.SysProp.
- *GeneralizationZoomRange* is an integer that represents a value in the zoom generalization range, starting at 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.
- *Description* is a string to describe the geospatial generalization range

For example 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 INSERT commands:

```
INSERT INTO IOC.SysProp (Realm, Subject, Name, Value, Type, Description)
VALUES ('MAP','zoomRange','0','4','Integer', 'zoomRange for most zoomed in');
INSERT INTO IOC.SysProp (Realm, Subject, Name, Value, Type, Description)
VALUES ('MAP','zoomRange','1','8','Integer', 'medium zoomRange');
INSERT INTO IOC.SysProp (Realm, Subject, Name, Value, Type, Description)
VALUES ('MAP','zoomRange','2','12','Integer', 'zoomRange for most zoomed out');
```

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.

5. Restart the IBM Intelligent Operations Center portal 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."

Related tasks:

`1.0.1.1` "Assigning an importance value to road links" on page 119
You can tune the performance of the map display in the Current Traffic Conditions portlet by configuring the system so that the map displays only specific types of road links depending on 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 database server to assign an importance value to a road link.

`1.0.1.1` "Optimizing the geospatial geometry of road links" on page 120
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 need to 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 IBM Intelligent Operations Center database 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 `IOC.Sysprop` database table by using a series of SQL UPDATE commands.

About this task

This procedure is only required if you previously configured the *importance* and *zoomRange* variable values using the SQL INSERT commands and you have a requirement to update the existing values.

Procedure

1. Log on to the IBM Intelligent Operations Center database server as the database administrator.
2. Connect to the `IOCDB` database by using one of the following methods:
   - To connect to the database from the DB2 command line, enter the following commands: `db2 connect to iocdb`.
   - To connect to the database from the DB2 control center, right-click **iocdb** and then click **Connect**.
3. 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 Subject = 'Importance' and Name = '`*`importance`*`'`

   Where:
   - *DBTable* is the name of the SYSPROP 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 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 Subject = 'Importance' and Name ='0'
update IOC.SysProp Set Value='8' where Subject = 'Importance' and Name ='1'
update IOC.SysProp Set Value='12' where Subject = 'Importance' and Name ='2'
```

4. Optional: To update the existing *zoomRange* values, enter the following SQL command for every value in the range:

```
update DBTable Set Value='zoomLevel' where Subject = 'ZoomRange' and Name = 'GeneralizationZoomRange'
```

Where:

- *DBTable* is the name of the SYSPROP 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 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 Subject = 'ZoomRange' and Name ='0'
update IOC.SysProp Set Value='8' where Subject = 'ZoomRange' and Name ='1'
update IOC.SysProp Set Value='12' where Subject = 'ZoomRange' and Name ='2'
```

5. Restart the IBM Intelligent Operations Center portal 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.

Maintaining the database

The databases of the IBM Traffic Information Hub are on the IBM Intelligent Operations Center database server. To optimize the performance and stability of the IBM Intelligent Transportation solution, the databases must be maintained on a regular basis.

Use the information in this section to manage the TIH_OP and TIH_HS IBM Traffic Information Hub databases.

For more information about managing and maintaining the platform databases on the IBM Intelligent Operations Center database 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 the IBM Traffic Information Hub are maintained on a regular basis.

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, need to be reorganized or cleaned up. The **REORGCHK** command outputs list of all table and index objects in the database. Objects with an asterisk (*) in the **REORG** column might need to 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 invoke the **REORG** command for each object. Tables or indexes identified by **REORGCHK** are not automatically reorganized.

If you have installed the optional transportation prediction feature and your transportation network has at least 2000 links, then for optimum performance, you will need to 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. It is also recommended that you update the statistics after schema changes, a massive update, or increased load, such as refreshing the catalog. The statistics updated by the **RUNSTATS** command are used by the optimizer when determining access paths to the data, therefore inaccurate statistics can result in decreased database efficiency.

REBIND

After running **RUNSTATS** on the database tables, rebind your applications to take advantage of the latest statistical data. Rebinding ensures that DB2 is using the best access plan. Perform a **REBIND** after running **RUNSTATS** as part of you 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 some performance degradation and locking while they are being executed. 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:

DB2 Information Center

Verifying the database connection

You can test the connection to the IBM Traffic Information Hub databases on the IBM Intelligent Operations Center database server.

Procedure

1. Log on to the administrative console of the IBM Intelligent Operations Center database 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 of the IBM Traffic Information Hub:
   - **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 Traffic Information Hub databases on a regular basis.

The data of the IBM Traffic Information Hub solution is stored in two databases located on the IBM Intelligent Operations Center database server. The following table lists the databases used by the IBM Traffic Information Hub.

Database name	Database description	Format
TIH_OP	Stores the current traffic operations and prediction data and the map configuration of the solution	DB2
TIH_HS	Stores the historic traffic data	DB2

Note: The traffic prediction data is generated only if the optional transportation prediction feature is installed.

There are other files, directories, and databases provided by the IBM Intelligent Operations Center architecture and base platform that must also be backed up regularly. For more information about backing up the IBM Intelligent Operations Center, see the related links.

Related information:

Backing up the IBM Intelligent Operations Center

Monitoring and reserving available free space

Regularly monitor the available free space for the IBM Traffic Information Hub databases.

About this task

The IBM Traffic Information Hub data received through TMDD feeds from Owner Centers is stored on the IBM Intelligent Operations Center database server. The databases are in DB2 format.

Standard DB2 database administration and maintenance procedures are sufficient for managing the databases of the IBM Traffic Information Hub.

Accessing the databases:
About this task

Use the following procedure to access the databases of the IBM Traffic Information Hub.

Procedure

1. Log on to the WebSphere Application Server administrative console.
2. Click **Resources** > **Data sources** > *Database_name*.

   Note: Where *Database_name* is either **TIH_OP** or **TIH_HS**
3. To access the database use 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 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. Log files must be examined periodically. The principal log file is `sqllib/db2dump/db2diag.log` which contains notifications of significant events from DB2.
  2. Review the log file output with a system administrator.
- To monitor database growth:
  1. Use options in the database panel in the DB2 control center.
- To monitor table growth:
  1. 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 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/` then 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 should be monitored.

Procedure

1. Identify the application to monitor. For example, for a database identified as **TIH_HS**, this following command identifies the application:

```
db2 list applications | grep S00 | grep jcc
DB2INST1 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.

Deleting database data

You can delete data from the IBM Traffic Information Hub by running database commands on the IBM Intelligent Operations Center database server to delete the traffic flow data tables and device status data tables.

Deleting traffic flow data:
About this task

To remove traffic flow data, the following traffic flow tables are deleted:
- datex_ii.trafficspeed
- datex_ii.trafficheadway
- datex_ii.trafficflow
- datex_ii.trafficconcntration
- tmdd.linkstatus

Procedure
- To delete `tmdd.linkstatus` by link identifier and update time:

```
delete from tmdd.linkstatus where
link_pk = 'link identifier'
and
(lastupdatetime < 'update time')
```

- To delete `datex_ii.trafficspeed` by link identifier, type, and update time:

```
delete from datex_ii.trafficspeed where
(measurementsiterecordid = 'link identifier')and
(measurementsiterecordtype = 'link'))
and
(measurementcalculationtime < 'update time')
```

- To delete `datex_ii.trafficheadway` by link identifier, type, and update time:

```
delete from datex_ii.trafficheadway where
((measurementsiterecordid = 'link identifier') and
(measurementsiterecordtype = 'link'))
and
(measurementcalculationtime < 'update time')
```

- To delete `datex_ii.trafficflow` by link identifier, type, and update time:

```
delete from datex_ii.trafficflow where
((measurementsiterecordid = 'link identifier') and
(measurementsiterecordtype='link'))
and
(measurementcalculationtime < 'update time')
```

- To delete `datex_ii.trafficconcntration` by link identifier, type, and update time:

```
delete from datex_ii.trafficconcntration where
((measurementsiterecordid = 'link identifier') and
(measurementsiterecordtype='link'))
and
(measurementcalculationtime < 'update time')
```

Deleting device status data:
About this task

To remove traffic device status data, the following device status tables are deleted:

- tmdd.cctvimagelist
- tmdd.cctvstatus
- tmdd.detectorstatus
- tmdd.dmsstatus
- tmdd.gatestatus
- tmdd.intersectionsignalstatus
- tmdd.lcsstatus
- tmdd.rcsrampmeterstatus

Procedure

- To delete DetectorStatus by device and time:

  ```
  delete
  from tmdd.detectorstatus
  where devicestatus_pk in
  (select devicestatus_pk
  from tmdd.devicestatus
  where ((deviceid='device') and (lastcommtime < 'time')))
  delete
  from tmdd.devicestatus
  where((deviceid='device') and (lastcommtime < 'time')))
  ```

- To delete DMSStatus by device and time

  ```
  delete
  from tmdd.dmsstatus
  where devicestatus_pk in (select devicestatus_pk
  from tmdd.devicestatus
  where ((deviceid='device') and (lastcommtime < 'time')))

  delete
  from tmdd.devicestatus
  where ((deviceid='device') and (lastcommtime < 'time')))
  ```

- To delete GateStatus by device and time:

  ```
  delete
  from tmdd.gatestatus
  where devicestatus_pk in (select devicestatus_pk
  from tmdd.devicestatus
  where ((deviceid='device') and (lastcommtime < 'time')))

  delete
  from tmdd.devicestatus
  where ((deviceid='device') and (lastcommtime < 'time')))
  ```

- To delete IntersectionSignalRingStatus by device and time:

  ```
  delete
  from tmdd.intersectionsignalringstatus
  where devicestatus_pk in (select devicestatus_pk
  from tmdd.devicestatus
  where ((deviceid='device') and (lastcommtime < 'time')))
  ```

```
delete
from tmdd.devicestatus
where ((deviceid='device') and (lastcommtime < 'time')))
```

- To delete LCS by device and time:

```
delete
from tmdd.lcsstatus
where devicestatus_pk in (select devicestatus_pk
from tmdd.devicestatus
where ((deviceid='device') and (lastcommtime < 'time')))
delete
from tmdd.devicestatus
where ((deviceid='device') and (lastcommtime < 'time')))
```

- To delete rampmeterstatus by device and time:

```
delete
from tmdd.rampmeterstatus
where devicestatus_pk in (select devicestatus_pk
from tmdd.devicestatus
where ((deviceid='device') and (lastcommtime < 'time')))
delete
from tmdd.devicestatus
where ((deviceid='device') and (lastcommtime < 'time')))
```

Chapter 7. Using the solution interface

The IBM Traffic Information Hub is a product of the IBM Intelligent Transportation solution family providing current and historical traffic data management capabilities for the transportation network. The IBM Traffic Information Hub is a web-based solution that uses portal technology.

You can access the solution with any of the supported web browsers. For details of which browsers are supported, see the detailed system requirements.

The optional transportation prediction component helps anticipate traffic flows and speeds on specific road segments. It provides the traffic state characteristics, such as volume and speed, that best characterize the traffic state into the short and medium-term future. The transportation prediction feature provides a layer of intelligence by taking traffic sensor data and applying sophisticated algorithms to it that create relevant future insights from the collected raw data.

Sections of the documentation are marked with the ✚ icon to indicate that the information applies to the optional transportation prediction component.

The IBM Traffic Information Hub user interface is also linked to the portal for the IBM Intelligent Operations Center and other IBM Smarter Cities Software Solutions that are installed in the environment. For more information, see the IBM Intelligent Operations Center Information Center and embedded product help.

Logging on

Access the IBM Intelligent Transportation user interface.

Before you begin

Contact your administrator to obtain a user ID and password. Your administrator is responsible for making sure that you have the required system security access level appropriate to your role in your organization. Your administrator also will supply you with the web address (URL) for accessing IBM Intelligent Transportation.

About this task

On the main navigation bar at the top of the portal, click **More...** and select **Intelligent Transportation** to access IBM Intelligent Transportation from the IBM Intelligent Operations Center or other IBM Smarter Cities Software Solutions installed in this environment. Alternatively, you can use the following procedure to start a new browser session and access IBM Intelligent Transportation.

Procedure
1. Enter the web URL into the address field of your web browser.
2. On the server home page, enter your user ID and password.
3. Click **Login**.
4. Select **Intelligent Transportation** from the navigation bar at the top of this page.

Results

The home page of IBM Intelligent Transportation is displayed in the web browser. All products of IBM Intelligent Transportation are displayed together in the portal user interface. Only the pages, features, and

data that you have permission to access are displayed. Contact your administrator if you need additional access.

Logging off

Exit the IBM Intelligent Transportation user interface.

Procedure

To log off from the IBM Intelligent Transportation user interface, click **Log Out**. By default, the Log Out link is located in the top right corner of the portal.

Viewing or editing your user profile

Click **Edit My Profile** to access your user profile for the portal server. From your user profile you can modify some of your personal user settings, including password, name, email, and language preferences.

Procedure

Refer to the IBM Intelligent Operations Center help and documentation for more information about viewing or editing your user profile.

Related information:

Viewing or editing your user profile in the IBM Intelligent Operations Center

Controlling the map

You can move around the map by using your mouse or keyboard.

The map controls are on the upper left side of the map

The map controls are on the upper left side of the map. They consist of:
1. Pan arrows (up, down, left, right)
2. Zoom in
3. World view (zooms out to the maximum extent)
4. Zoom out

Pan controls for moving around the map

To move around the map you can:
- 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:
- Click the + map icon to zoom in, or the - map icon to zoom out of the center of the map
- Double-click the mouse to center the map and zoom in to the selected 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 Shift while you use the mouse to draw a rectangle around the area to zoom in on

Operator: Traffic view

Use the Operator: Traffic view to monitor and analyze the current and forecasted traffic data available in the IBM Intelligent Transportation solution. Information collected by the IBM Traffic Information Hub is displayed on the Operator: Traffic view. Information generated by the transportation prediction feature is also displayed on this view.

The Operator: Traffic view provides a visual representation of traffic data enabling you to perform the following actions:

- View current traffic levels, devices, and events, on a geographical information system (GIS) map and accompanying table

- 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 summarizing 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 operating in the network
- Customize the traffic data you would like to monitor on the GIS maps

Providing you have IT administrator access, you also can perform some configuration and customization actions from this view.

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 starting point for viewing current traffic data, allowing you to interact with the Operator: Traffic view. It contains a GIS map of the traffic network, which provides a visual representation of current traffic data collected by sensors in the field.
Predicted Traffic Conditions	The starting point for viewing forecasted traffic data. Contains a map that displays the predicted traffic levels of road links in the transportation network for up to one hour into the future. The predicted traffic levels are color coded and are displayed on a GIS map providing a visual representation of the near future traffic conditions.
Traffic Conditions - Details	A table containing categorized information about the status of traffic events, devices, and levels that currently are being monitored on the maps. You can also use this portlet to add and edit traffic events. The **Predicted Traffic Levels** tab appears only when the transportation prediction feature is installed and running in the solution.
Traffic Flow - Past Hour	A graphical report that shows the traffic flow volume of a predefined road link 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. To modify the graph to present traffic event information for a different time period or other criteria, click **Back**.

Portlet	Description
✚ Traffic Flow Prediction Reports	A graphical report that shows the forecasted traffic flow volume of the selected road link or network ID, at every five-minute interval within the next hour of the current time. To modify the graph to present traffic prediction data for a different road link or network ID, click **Back**.
✚ Traffic Speed Prediction Reports	A graphical report that shows the forecasted traffic speed of the selected road link or network ID, at every five-minute interval within the next hour of the current time. To modify the graph to present traffic prediction data for a different road link or network ID, click **Back**.
Traffic Custom Reports	Displays a list of all the reports provided by IBM Traffic Information Hub. Using the reports action tool bar, you can run, modify, save, or export the reports from this portlet.
✚ Traffic Prediction Custom Reports	Displays a list of all the reports provided by the transportation prediction feature. Using the reports action tool bar, you can run, modify, save, or export the reports from this portlet.

For help using each portlet, click the upper right corner of the portlet, and select **Help** from the menu displayed.

To resize a portlet, click the upper right corner of the portlet, and select options from the menu that is displayed, as follows:

* To expand the portlet to fill the page, click **Maximize**.
* To hide the portlet contents, other than its title bar, click **Minimize**.
* To restore a minimized or maximized portlet to its default view, click **Restore**.

Viewing current traffic conditions

Use the Operator: Traffic view to monitor the current traffic conditions and performance of the transportation network.

The traffic management feature of the IBM Traffic Information Hub includes the ability to monitor the latest traffic flow and performance of a city or region. The Operator: Traffic view displays the latest traffic data, collected from field subsystems in the traffic network, including information about events, devices and service levels.

You can also view a summary of the current traffic conditions data on a graph report. For information about how to run and view the reports that are available in the solution, see the related links at the end of this topic.

Related concepts:

"Current and historical traffic data reports" on page 149
The IBM Traffic Information Hub provides graphical report summaries of traffic flow, speed, and event data in the system. You can view reports on the current traffic situation of the transportation network. You can also view reports showing the historical traffic situation during a specific time period.

Selecting traffic information to show on the map

From the map in the Current Traffic Conditions portlet, you can choose the traffic information you would like 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 need to see on the map or in the Traffic Conditions - Details 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 starting 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

   If the content you are interested in is not listed for selection, to create a custom layer, click **New Layer** in the required traffic type section.
5. After making 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 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.

What to do next

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 using the **Select Content** form.

Selecting traffic information to show in the list

The lists in the Traffic Conditions - Details portlet are populated based on your choices of service levels, devices, and events in the selection form in the Current Traffic Conditions portlet.

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 specify what traffic layers you would like to monitor:
   - Traffic Levels
   - Devices
   - Events
   - External Services
4. After making your selection, click **Select Content** again, to hide the selection form. You can select as many layers as required. However, if you select too many items to monitor, the map can become too cluttered.

Results

Based on your selections, the lists in the Traffic Conditions - Details portlet are updated with the latest traffic data available for each layer. Also, the map updates to display the selected layers. A marker appears at the geographical location for each item 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 collected by the IBM Traffic Information Hub from field subsystems in the traffic network. IBM Intelligent Transportation displays traffic device properties including 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 required traffic cameras and the road link or geographical area.
4. After making your selection, click **Select Content** again, to hide the selection form. 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 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 you would like to display on the map. Additionally, you can create custom traffic layers that only you can see.

Adding layers enables you 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 on a regular basis 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.

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: To monitor a specific road link, enter the **Road name**.
7. Optional: To monitor a specific road category, select at least one **Road category** from the 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. Drawing a region on the map allows you to constrain the layer to that region.
10. Click **OK**.

Results

The recently created layer is displayed in the **Traffic Levels** section of the **Select Content** filter form. Providing 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.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

Adding traffic event layers:

Add traffic event layers from the Current Traffic Conditions portlet.

Procedure
1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view.
2. Click **Select Content**. A form is displayed.
3. Under the Traffic Events section, click **New Layer**.
4. On the **New Layer** dialog, in the **Name** field, enter a name to identify the layer.
5. Optional: In the **Layer description** field, enter a description for the layer.

6. In the **What** section, select the group and severity of events to display in the layer.
7. In the **When** section, select the **Current values** or the **Date range** radio button.
   - In the **Current values** section:
     a. Select **Poll for Updates**, then add a time in seconds. The polling interval can be any value from 20 to 600 seconds.
     b. Select the required **Status** from the list.
   - In the **Date range** section:
     a. Add the required start date and time.
     b. Add the required end date and time.
     c. Select the required **Status** from the list.
8. In the **Where** section, select a region that has been predefined by your administrator or choose to draw a region on the map in order to constrain the layer to that region.
9. Click **OK**.

Results

The new event layer is displayed in the Events section of the map. The layer-specific content is loaded and visible on the map. Specific details for the new event layer become visible on the List portlet.

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. Providing 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.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

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. Providing the layer is selected, the layer-specific content is loaded and visible on the map.

What to do next

To manually refresh the data that is displayed on the map, click **Select Content** and then click the **Refresh Layer** icon next to the layer name filter form. From here, you can also see the time that the traffic data for that layer was last updated in the database.

Viewing predicted traffic conditions

The transportation prediction feature of the solution provides a forecasted view of the traffic situation for a city or region. Providing the optional transportation feature is installed, from the Operator: Traffic view, you can see the predicted traffic levels of a set of road links for up to one hour into the future.

The transportation 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 the IBM Traffic Information Hub to generate a prediction for each link for a future point in time. Data is retrieved from the IBM Traffic Information Hub every 5 minutes to generate traffic prediction data.

Providing there is at least three months of road link data, you can predict the traffic flow levels for the next 5, 10, 15, 30, 45, and 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. 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.

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 for a road link or region. You can view more details about the predicted traffic levels in the list.

You can also view a summary of the traffic prediction data on a graph report. For information about how to run and view the traffic prediction reports that are available in the solution, see the related links at the end of this topic.

Related concepts:

➕ "Transportation prediction data reports" on page 156
The transportation 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 showing 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 IBM Traffic Information Hub.

Viewing predicted traffic levels on the map

➕

You can view the predicted traffic levels generated by the solution for selected road categories, at preset durations, for up to 60 minutes into the future. The predicted traffic levels are projected on the map and 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.

Procedure

1. Go to the Predicted Traffic Conditions portlet.
2. Click **Select Content** to open the map filter form.
3. Select the **Road Category** that you would like to view. To select multiple items, press `Ctrl` as you click each item.
4. To select how far into the future you would like to view the predicted traffic levels, move the **Prediction interval** slider. 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.
5. Optional: To automatically update the map with new traffic prediction data that becomes available for that future forecast interval, select **Poll for Updates**.
6. After making your selection, to hide the selection form, click **Select Content**.

Results

Based on your selections, the map and list are updated with the latest traffic prediction data that is generated by the solution. If there is insufficient data in the database, an error displays.

The **Predicted Traffic Levels** tab in theTraffic Conditions - Details portlet also updates to reflect the current selection.

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 on the list

The predicted traffic levels selected for display on the map are also displayed in the list in the Current Traffic Conditions - Details portlet.

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

Based on your selections, the **Predicted Traffic Levels** list is updated with the latest traffic prediction data generated by the transportation prediction feature from traffic data in the IBM Traffic Information Hub. If there is insufficient data in the database, no data displays in the list. The list displays all of the available prediction data regardless of the geographical area that is currently being viewed 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

Add new traffic events that have recently occurred, or are forecasted for the traffic network, by using the Current Traffic Conditions or Traffic Conditions - Details portlets.

Before you begin

Use the **Zoom** and **Pan** map controls to find the exact location on the map where the new traffic event has 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 IBM Traffic Information Hub from 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.

For more information about using the solution interface, click **Help** on the navigation bar at the top of the browser page.

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.

To display a detailed description of a traffic event, hover over the location in the map or the row that corresponds to the event in the Traffic Conditions - Details portlet. The following table outlines the properties that describe a traffic event.

Table 7. Traffic event properties

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
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 the event will have on the traffic system

Table 7. Traffic event properties (continued)

Field label	Description
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

Traffic events can be updated from the Traffic Conditions - Details portlet or the Current Traffic Conditions portlet on the Operator: Traffic view.

About this task

To update a traffic event, you can select the event on the map and update the details displayed. Or you can use the following procedure to update the event from the Traffic Conditions - Details portlet.

Procedure

1. Go to the Current Traffic Conditions portlet and select **Select Content**. Select the required Event layer so that you can display the interested event on the map.
2. Go to the Traffic Conditions - Details portlet 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 in the IBM Traffic Information Hub, click **OK**.

Moving traffic events

Traffic events can be moved from one location to another by using the Current Traffic Conditions portlet on the Operator: Traffic view.

Procedure

1. Go to the Current Traffic Conditions portlet and show the event to be moved by displaying the appropriate traffic event layer. The event displays on the map and in the list, on the **Events** tab.
2. Select the event 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

Use the Traffic Conditions - Details portlet to cancel a traffic event.

About this task

There are two ways in which you can cancel an event. You can cancel a traffic event by updating the event and changing the **Status** property to **Canceled**. Alternatively, you can use the following procedure.

Procedure

1. Go to the Current Traffic Conditions portlet on the Operator: Traffic view, and locate the event to be updated.
2. Go to the Traffic Conditions - Details 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.

Planner: Traffic view

Use the Planner: Traffic view to monitor and analyze historical traffic data archived in the IBM Traffic Information Hub database. Use this view to see summary reports of historical traffic flow and performance of the traffic network.

The Planner: Traffic view provides geographical visualization and summary reports of historical information of the traffic network useful for:

- 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	Provides ...
Historical Traffic Conditions	The starting point for viewing historical traffic data allowing you to interact with the Planner: Traffic view. It contains a geographical information system (GIS) map of the traffic network, which provides a visual representation of historical traffic data archived by the IBM Traffic Information Hub.

Portlet	Provides ...
Historical Traffic Conditions - Details	A table containing categorized information about historical traffic performance levels that are currently being monitored on the map in the Historical Traffic Conditions portlet.
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	Displays a list of all the reports available in the IBM Intelligent Transportation solution. Using the reports action tool bar, you can run, modify, save, or export the reports from this portlet.

For help using each portlet, click the upper right corner of the portlet, and select **Help** from the menu displayed.

To resize a portlet, click the upper right corner of the portlet, and select options from the menu that is displayed, as follows:
- To expand the portlet to fill the page, click **Maximize**.
- To hide the portlet contents, other than its title bar, click **Minimize**.
- To restore a minimized or maximized portlet to its default view, click **Restore**.

Viewing historical traffic conditions

Use the Historical Traffic Conditions portlet on the Planner: Traffic view to see the historical traffic levels displayed on a map of the traffic network, providing a visual representation of the historical traffic conditions.

The Historical Traffic Conditions portlet gives you a historical picture showing you where congestion problems occurred in the past days, weeks, months, or years. You can choose what road categories you are interested in and when this data was collected.

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 IBM Traffic Information Hub. This view is useful for identifying congestion areas, and other performance-related location patterns for a particular time in the past.

The Historical Traffic Conditions - Details portlet displays the traffic level details of a defined time period for the road links that are currently being queried on the Historical Traffic Conditions map. The map and list provide two ways to look at the same content.

You can also view a summary of the historical traffic conditions data on a graph report. For information about how to run and view the reports that are available in the solution, see the related links at the end of this topic.

Related concepts:

"Current and historical traffic data reports" on page 149
The IBM Traffic Information Hub provides graphical report summaries of traffic flow, speed, and event data in the system. You can view reports on the current traffic situation of the transportation network. You can also view reports showing the historical traffic situation during a specific time period.

Selecting historical information to show on the map

To view historical traffic performance information, use the Historical Traffic Conditions portlet on the Planner: Traffic view.

About this task

The map displays the geographical area of the traffic network. To see the traffic performance levels of a selected road link or type, on a specific day or time, use the filter form on the map. The map and the list are updated on the Planner: Traffic view. You also can use the filter to hide information that you do not need to see on the map or in the list right now.

Procedure

1. Go to the Historical Traffic Conditions portlet.
2. Optional: To clear the previous query and move the map position back to the default starting location, click **Reset the Map and Clear Filters**.
3. Click **Select Content**. A form is displayed.
4. 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.
5. Enter the time period that you would like to view the traffic flow situation for.
6. Click **Update** to display the selected **Traffic Levels** on the map.
7. To hide the selection form, click **Select Content**.

Results

Based on your selections, the map is updated with the selected historical traffic levels data. The results displayed are relative to the timezone that is set in your client browser configuration. The list in the Historical Traffic Conditions - Details portlet updates automatically whenever you select content on the map.

Selecting historical information to show on the list

The list in the Historical Traffic Conditions - Details portlet is populated based on the traffic levels query you submit from the selection form in the Historical Traffic Conditions portlet.

Procedure

1. Go to the Historical Traffic Conditions 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 date for the report.
5. Select the time for the report by moving the time slider to the required hour.
6. To update the map and list, click **Update**.
7. After making your selection, to hide the content selection form, click **Select Content** again.

Results

Based on your selections, the list is updated with the historical traffic data available for the selected traffic levels and time period.

Running reports

IBM Intelligent Transportation provides graphical report summaries of the traffic data stored in the system. Some of the traffic reports are displayed by default in the reports portlets in the user interface. The reports feature is useful for analyzing the performance of the transportation network and using this information to make decisions to reduce congestion and improve the flow of traffic.

As a user of IBM Intelligent Transportation you can:

- Run a selection of pre-configured reports that are provided by 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 traffic 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

Use the reports portlets on the Operator: Traffic and Planner: Traffic views to see traffic report graphs which summarize the traffic data that is in the system. To ensure that you are viewing a summary of the latest traffic 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 IT administrator.

Your IT administrator also configures the settings for each report portlet, however you can also customize some settings in the reports to suit your individual preferences.

For a list of reports that are provided with the solution and details of what options can be modified, see the related links at the end of this topic.

Current and historical traffic data reports

The IBM Traffic Information Hub provides graphical report summaries of traffic flow, speed, and event data in the system. You can view reports on the current traffic situation of the transportation network. You can also view reports showing the historical traffic situation during a specific time period.

By default, you can access some of the traffic data reports in the reports portlets in the user interface on the Operator: Traffic and Planner: Traffic views.

You can access and run all of the current and historic traffic data reports that are available in the IBM Intelligent Transportation solution from the Traffic Custom Reports portlet.

The reports are interactive allowing you to view a lower level of report detail, providing that data is available in the IBM Traffic Information Hub database. For example, on a graph displaying 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 and historical traffic data reports are provided out of the box with the solution.

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

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.

The Traffic Flow: Past Hour report is one of several traffic data reports provided by the IBM Traffic Information Hub and 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. You should 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 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the 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.

The Traffic Congestion report is one of several traffic data reports provided by the IBM Traffic Information Hub and 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

Report option	Available selection
Based on the metric	• Average Speed - Past Hour • Total Volume - Past Hour • Average Speed - Last 30 days • Total Volume - Last 30 days

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the 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.

The Traffic Events: Historical Trends report is one of several traffic data reports provided by the IBM Traffic Information Hub and 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.

Your administrator configures the selected criteria for the graph reports that are displayed by default in the portlets on the Operator: Traffic view. You should 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 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 calendar picker
To date	Enter the end date for the report using the calendar picker
Summarize data by	• Year • Quarter • Month • Week • Day

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Traffic Flow: Historical Peak Hours

The Traffic Flow: Historical Peak Hours 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.

The Traffic Flow: Historical Peak Hours report is one of several traffic data reports provided by the IBM Traffic Information Hub and 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 IBM Traffic Information Hub, the Traffic Flow: Historical Peak Hours report is not displayed by default in any of the portlets in the user interface. You can run the Traffic Flow: Historical Peak Hours 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 Peak Hours 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	• Total Volume • Average Speed
From date time	Enter the start date and time for the report using the calendar and time picker
To date time	Enter the end date and time for the report using the calendar and time picker
Summarize data by	• Year • Quarter • Month • Week • Day • Hour • Minute

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the 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.

The Traffic Flow: Historical Trends report is one of several traffic data reports provided by the IBM Traffic Information Hub and 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

Report option	Available selection
Based on the metric	• Total Volume • Average Speed
From date	Enter the start date for the report using the calendar picker
To date	Enter the end date for the report using the calendar picker
Summarize data by	• Year • Quarter • Month • Week • Day

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Transportation prediction data reports

The transportation 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 showing 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 IBM Traffic Information Hub.

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 traffic prediction data reports that are provided by the transportation prediction feature from the Traffic Prediction Custom Reports portlet.

The reports are interactive allowing you to view a lower level of report detail, providing that data is available in the IBM Traffic Information Hub database. For example, on a graph displaying data for a specific week, click the graph to drill down and see traffic data for a specific day during that week.

The following traffic prediction data reports are available providing the transportation prediction feature has been installed in your environment.

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Traffic Prediction Volume : Next Hour

The Traffic Prediction Volume : Next Hour report provides a graph report showing 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.

The Traffic Prediction Volume : Next Hour report is one of several traffic prediction data reports provided by the transportation prediction feature and 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. You should 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	• Forecast Speed
	• Forecast Volume

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Traffic Prediction Speed : Next Hour

✚

The Traffic Prediction Speed : Next Hour report provides a graph report showing 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.

The Traffic Prediction Speed : Next Hour report is one of several traffic prediction data reports provided by the transportation prediction feature and 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. You should 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	• Forecast Speed • Forecast Volume

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the 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 generated by the system from traffic data in the IBM Traffic Information Hub. 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.

The Prediction Accuracy - By Interval report is one of several traffic prediction data reports provided by the transportation prediction feature and 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 transportation 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. You should 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.

Report option	Available selection
Link ID	Select a road link from the list available
Based on the metric	• Accuracy of Speed Forecasts • Accuracy of Volume Forecasts
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 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Prediction Accuracy - By Category

The Prediction Accuracy - By Category report provides a graph that summarizes the accuracy of the traffic volume or speed prediction data generated by the system from traffic data in the IBM Traffic Information Hub. The report is summarized by 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 calibration and additional configuration.

The Prediction Accuracy - By Category report is one of several traffic prediction data reports provided by the transportation prediction feature and 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 transportation 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. You should 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 Traffic Prediction 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 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	• Accuracy of Speed Forecasts • Accuracy of Volume Forecasts
From	Using the date and time pickers, enter the start date and time for the report period
To	Using the date and time pickers, enter the end date and time for the report period

Related tasks:

"Refreshing the graph reports" on page 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the 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 by the system from traffic data in the IBM Traffic Information Hub, 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.

The Prediction Accuracy - By Day of Week report is one of several traffic prediction data reports provided by the transportation prediction feature and 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 transportation 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. You should 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 Traffic Prediction 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 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	• Accuracy of Speed Forecasts • Accuracy of Volume Forecasts
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 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the 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 by the system from traffic data in the IBM Traffic Information Hub, 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.

The Prediction Accuracy - By Day and Hour report is one of several traffic prediction data reports provided by the transportation prediction feature and 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 transportation 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. You should 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 Traffic Prediction 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 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	• Accuracy of Speed Forecasts • Accuracy of Volume Forecasts
Day and Hour	• Peak-MO • OffPeak-MO • Peak-TU • OffPeak-TU • Peak-WE • OffPeak-WE • Peak-TH • OffPeak-TH • Peak-FR • OffPeak-FR • Peak-SA • OffPeak-SA • Peak-SU • OffPeak-SU
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 166
To obtain the latest information, you can refresh the graph report that is being displayed. Refreshing the report ensures that the graph is plotted using the most recent information that is available in the system.

"Running the reports with options" on page 167
In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

"Modifying the reports" on page 168
You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Using the reports action toolbar

To work with the traffic reports, use the reports action toolbar in the reports portlets. The action toolbar appears above the graph, or to the right of the report name in the report list view.

The following actions can be done from the action toolbar:

Table 8. Traffic report toolbar actions

Action Icon	Allows you to...
Keep this version	Email the report to selected recipients (if activated by your administrator), save the report as a report version, or save the report as a report view.
Run	Refresh and run the current report graph with the latest traffic data available. The HourGlass icon displays while the report is being generated.
Run with options	Change the current report criteria options, such as time period and road link, and then rerun the report with the latest traffic data available. This icon is not available in all report portlets, by default. It is available on the Traffic Custom Reports portlet. Your administrator can also enable this option on the dynamic report portlets.
Drill down	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.
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, providing they exist. You can also search existing reports that are indexed in the system.

Table 8. Traffic report toolbar actions (continued)

Action Icon	Allows you to...
View format	View and export the traffic graph report summary in several formats including: • HTML • PDF • XML • Excel To view the report in a different format, for example, PDF, open the **View format** menu icon and select the format for the report.
Add this report	Add the current report to your report folder so that you can select and view the report at a later date.

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 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 periodically. This depends on how your IBM Intelligent Transportation IT administrator configured the refresh rate. Use the following procedure to force a manual refresh so that the latest traffic information is displayed.

Note: This icon is not available on all of the reports portlets in the solution.

Procedure

1. Go to the report graph portlet that you are interested in.

2. On the reports action toolbar located above the graph, click the **Run** icon. 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.

Note:

A blank report indicates that there is no report specific data in the database for the specified time period.

What to do next

See the *Traffic reports action toolbar* section of this help topic for a description of the other icons that are available on the reports action toolbar.

Related concepts:

"Current and historical traffic data reports" on page 149
The IBM Traffic Information Hub provides graphical report summaries of traffic flow, speed, and event data in the system. You can view reports on the current traffic situation of the transportation network. You can also view reports showing the historical traffic situation during a specific time period.

"Transportation prediction data reports" on page 156
The transportation 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 showing 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 IBM Traffic Information Hub.

Running the reports with options

In addition to the graph reports that are displayed in the reports portlets in the user interface by default, you can also run other reports based on the traffic data that you are interested in. IBM Intelligent Transportation provides a set of predefined custom reports that you can tailor and run to suit your requirements.

Before you begin

Click **Help** to open the *Using the solution interface* help guide where you can find a list of reports that are provided with the solution and details of what options can be modified.

About this task

To run a traffic report, go to the Traffic Custom Reports portlet or the Traffic Prediction Custom Reports portlet and click the name of the report that you are interested in. The graph report is generated using the latest data that is available in the system. 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 ▶ which appears 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 road link or network during the specified time period. As soon as the browser page is refreshed, the portlet is reset back to the default view, and displays a list of available reports.

Note:

A blank report indicates that there is no report specific data in the database for the specified time period.

Related concepts:

"Current and historical traffic data reports" on page 149
The IBM Traffic Information Hub provides graphical report summaries of traffic flow, speed, and event data in the system. You can view reports on the current traffic situation of the transportation network. You can also view reports showing the historical traffic situation during a specific time period.

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Modifying the reports

You can modify the properties and options of the existing traffic reports in the IBM Intelligent Transportation solution by using the Traffic Custom Reports portlet or by using the Traffic Prediction Custom Reports portlet. You can change the road link, time period, or other criteria that a report is based on. The static and dynamic graphs that appear automatically on the Operator: Traffic and Planner: Traffic views are updated to reflect the report modification.

Before you begin

Your Transportation IT administrator controls who can modify traffic event reports. Contact your Transportation IT administrator if you require changes to the current traffic 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.

   For a list of reports that are provided with the solution, and details of what options can be modified, see the related links at the end of this topic.
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 traffic report is updated. The next time the traffic report is run, the graph will be plotted using the updated criteria. Also, any portlets on the Operator: Traffic and Planner: Traffic views that are displaying the traffic report, will be updated automatically the next time the graph or page is refreshed.

What to do next

Click **Help** on the **Set properties** title bar for more information on all the options on this dialog.

Related concepts:

"Current and historical traffic data reports" on page 149
The IBM Traffic Information Hub provides graphical report summaries of traffic flow, speed, and event data in the system. You can view reports on the current traffic situation of the transportation network. You can also view reports showing the historical traffic situation during a specific time period.

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Configuring your reports user preferences

The globalization and accessibility preferences for the reports portlets of IBM Intelligent Transportation are configured independently from the other portlets in the solution. You can configure language preferences and you can enable accessibility features within the reports portlets.

Changing the language settings of the reports

The links and action icons in the reports portlets are displayed using the default language configured for the browser. The graphs in the reports portlets are displayed using the language preference set in the reports configuration. You can change the language of the text that appears in the axis of the reports graphs to suit your personal language preference.

Notify your administrator if the default language for the report graphs needs to be modified for all users of the system.

Changing the language of the graph axis

Use the Traffic Custom Reports portlet to change the language of the text that appears in the axis of the graph to use your preferred language.

Procedure

1. Go to the Traffic Custom Reports portlet.
2. Select a report from the list of available reports.
3. Click the **More** link that appears 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 you run the report, the axis of the graph will be displayed in the preferred language that you have configured.

What to do next

Repeat this procedure for each of the IBM Intelligent Transportation reports that you plan to use.

Enabling accessibility

The user interface of the IBM Traffic Information Hub provides accessibility features to help visually impaired users to use the solution. When you enable accessibility in the reports portlets, a table is also displayed containing the values used to plot the graph report. A summary that describes the graph is also available.

Procedure

1. Go to the Traffic Custom Reports portlet on either the Operator: Traffic or the Planner: Traffic view.
2. Select a report from the list of available reports in the **Reports** folder.
3. Click the **More** link that appears next to your selected report.
4. Click **Set properties**.
5. Open the **Report View** tab.
6. In the **Accessibility** section, select the checkbox titled **Enable accessibility support**.
7. To save the change, click **OK**.

Results

After refreshing your browser, in the reports portlets the graph is now accompanied by a table that summarizes the report graph. Scroll down to see the table.

What to do next

If you have installed the optional transportation prediction feature, repeat this procedure in the Traffic Prediction Custom Reports portlet for each of the prediction reports.

Chapter 8. Troubleshooting and support for IBM Intelligent Transportation

To isolate and resolve problems with your IBM products, you can use the troubleshooting and support information. This information contains instructions for using the problem-determination resources that are provided with your IBM products, including IBM Intelligent Transportation.

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 starting 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 leading 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 need to 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 performed?
- Does a certain sequence of events need 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. Consequently, 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 is of significant business impact, 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?
- Are multiple users or applications encountering the same type of problem?
- Can the problem be re-created by running a single command, a set of commands, or a particular application?

Related tasks:

"Searching knowledge bases"
You can often find solutions to problems by searching IBM knowledge bases. You can optimize your results by using available resources, support tools, and search methods.

Searching knowledge bases

You can often find solutions to problems by searching IBM knowledge bases. You can optimize your results by using available resources, support tools, and search methods.

About this task

You can find useful information by searching the information center for IBM Intelligent Transportation. However, sometimes you need to look beyond the information center to answer your questions or resolve problems.

Procedure

To search knowledge bases for information that you need, 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. The IBM Support Portal lets you 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) about this tool. These videos introduce you to the IBM Support 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 one of the following additional technical resources:
  - IBM® Intelligent Transportation technotes and APARs (problem reports)
  - IBM® Intelligent Transportation Support Portal page
  - IBM® Intelligent Transportation Forums and communities page
  - Download IBM® Intelligent Transportation V1.0 image files

- 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® 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 domain. However, sometimes you can find useful problem-solving information about IBM products in newsgroups, forums, and blogs that are not on ibm.com.

  Tip: Include "IBM" and the name of the product in your search if you are looking for information about an IBM product.

Related concepts:
"Techniques for troubleshooting problems" on page 171
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.

Getting fixes from Fix Central

You can use Fix Central to find the fixes that are recommended by IBM Support for a variety of 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 downloading 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.

Related tasks:
"Downloading and preparing the installation package for Interim Feature 1" on page 51
Before you run the deployment wizard for the IBM Traffic Information Hub version 1.0.1 Interim Feature 1, you must first obtain and prepare the installation package. The installation package for Interim Feature 1 also includes the installation package for the optional transportation prediction feature version 1.0.1.1.
"Subscribing to Support updates" on page 177
To stay informed of important information about the IBM products that you use, you can subscribe to updates.

Contacting IBM Support

IBM Support provides assistance with product defects, answers to FAQs, and helps users resolve problems with the product.

Before you begin

After trying to find your answer or solution by using other self-help options such as technotes, you can contact IBM Support. Before contacting IBM Support, your company or organization must have an active IBM software subscription and support contract, and 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.

Related tasks:

"Exchanging information with IBM"
To diagnose or identify a problem, you might need 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.

Exchanging information with IBM

To diagnose or identify a problem, you might need 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.

Related tasks:

"Contacting IBM Support" on page 174
IBM Support provides assistance with product defects, answers to FAQs, and helps users resolve problems with the product.

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
   ```

Installing and using IBM Support Assistant Lite

IBM Support Assistant Lite (ISA Lite) is a tool that collects common diagnostic data that is useful for analyzing general problems.

ISA Lite 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 ISA Lite for IBM Intelligent Transportation version 1.0.1, which includes diagnostic data collection for both the IBM Traffic Information Hub and the optional transportation prediction feature, see the link at the end of the topic.

To install and use ISA Lite, follow the instructions in the Quick Start Guide included in the download package.

Log files collected by ISA Lite

ISA Lite for IBM Intelligent Transportation version 1.0.1, collects many log files. For more information about the log files that ISA Lite collects, see the link at the end of the topic.

Related concepts:

"Using log files" on page 182
Use system log files to troubleshoot problems encountered with IBM Intelligent Transportation.

Related information:

➡ Downloading the IBM Support Assistant Lite for IBM Intelligent Transportation 1.0.1

Subscribing to Support updates

To stay informed of important information about the IBM products that you use, you can subscribe to updates.

About this task

By subscribing to receive updates about IBM Intelligent Transportation, you can receive important technical information and updates 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 is a similar tool that you might have used in the past.) With My Notifications, you can specify that you want to receive daily or weekly email announcements. You can specify what 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 folder 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).

Related tasks:

"Getting fixes from Fix Central" on page 174
You can use Fix Central to find the fixes that are recommended by IBM Support for a variety of 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.

Related information:

[→] IBM Software Support RSS feeds

[→] Subscribe to My Notifications support content updates

[→] My Notifications for IBM technical support

[→] My Notifications for IBM technical support overview

Known problems and solutions

Some common problems with IBM Intelligent Transportation are documented, along with their solutions or workarounds. If you have a problem with IBM Intelligent Transportation, review the problem-solution topics to determine if a solution is available to the problem that you are experiencing. The problem-solution topics are categorized according to the type of issue.

Troubleshooting accessibility

Some common problems with product accessibility are documented, along with their solutions or workarounds. If you have an accessibility issue with IBM Intelligent Transportation, review the problem-solution topics to determine if a solution is available to the problem that you are experiencing.

Base map layer selection control is not accessible when using the keyboard

In the map portlets of IBM Intelligent Transportation, it is not possible to 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 displays in the map portlets of the IBM Intelligent Transportation portal. Providing 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 in 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. Select **Configure**.
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?** followed by **OK**.

Result All users of the system see the selected base map displayed in the map portlet.

Navigation problem in the Historical Traffic Conditions portlet

The **Time** field on the content selection form in the Historical Traffic Conditions portlet cannot be navigated to when the JAWS Virtual PC cursor is turned on. You can work around this problem by disabling the JAWS Virtual PC cursor.

Symptoms

If you use the JAWS screen reader to access the solution, the **Time** field on the **Select Content** form on the Historical Traffic Conditions portlet is not accessible. The time values that can be selected in the **Time** list field are not announced by the JAWS screen reader. The problem occurs only when the JAWS Virtual PC cursor feature is enabled.

Note: The JAWS Virtual PC cursor is on by default.

Resolving the problem

Disable the JAWS Virtual PC cursor before you click **Select Content** in the Historical Traffic Conditions portlet. You must then type the date manually, in 15 minute increments, using the correct time format required by the operating system of the client system.

To enable or disable the JAWS Virtual PC cursor, press Insert+z.

Custom Reports checkbox column not announced by screen reader

In the Traffic Custom Reports and Traffic Prediction Custom Reports portlets of the IBM Traffic Information Hub user interface portal, the check box column is not announced by the screen reader.

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 allow 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. In order 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 located next to the report that you are interested in.

Incorrect language displayed when expanding base map layer selection control
The incorrect language can be displayed while expanding the base map layer selection control.

Symptoms

Clicking the plus sign to expand the base map layer selection control can result in an undesired language displaying, even if the IBM Traffic Information Hub portal page displays in the correct language. This workaround applies only if you are using either the Firefox or Chrome browser to access the solution interface.

Resolving the problem

To resolve this issue in your 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 desired language locale.

To resolve this issue in your Chrome browser, complete the following steps:
1. Enter the following command in the address bar:
   ```
   chrome://settings/browser
   ```
2. On the left side, click **Under the Hood**.

   Note: On some versions this is called **Under the Bonnet**.
3. In the **Web Content** section click **Languages and spell-checker settings...**.
4. Select the preferred language on the left side, and on the right side click **Google Chrome is displayed in this language**.

Traffic prediction calculations are missing for some links

In IBM Intelligent Transportation v1.0.1, the transportation prediction feature does not provide traffic prediction calculations for some links. To ensure that traffic prediction calculations are processed for all links, you have to verify that certain conditions are satisfied.

Symptom

The traffic prediction calculations generated by the transportation prediction feature do not show prediction information for all the available links in the subnet.

Diagnosing the problem

Traffic prediction calculations have dependencies on estimate and means calculation. Estimate calculations generate weight IDs that are stored in **Link_Weights** table in the TPTOOL schema; Means calculations generate statistic IDs that are stored in the **Link_Stats** table in the TPTOOL schema.

Note: For more information about the terms used, see the *Glossary* section and the help topics in each of the transportation prediction 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 should be created and all the required links should be listed in the **Link_Subnet** table.
2. Historic data for a minimum of two months should be available.
3. Real-time feeds should be available.
4. Traffic prediction relationship matrix should be generated to create link relationships for the subnet.
5. Means calculations should have populated speed and volume data for all the periods available for the required links. Check if 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 sub-step 5-a, check the **TPTOOL.LINK_STATS** table with the **statistic_id** (for example, *19*) retrieved from sub-step 5-a with the following query:

   `SELECT * FROM TPTOOL.LINK_STATS WHERE statistic_id = 19`

   c. To check the number of Means calculations 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 should 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** (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** generated in sub-step 6-a, check the **TPTOOL.LINK_WEIGHTS** table with the **weight_id** retrieved from sub-step 6-a with the following query:

   `SELECT * FROM TPTOOL.LINK_WEIGHTS WHERE weight_id = 2001`

7. The **Link_Subnet** and **Working_Lk_Subnet** tables should 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 or trace.log. 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. Once you have completed the checks and resolved the issues found, run the traffic prediction calculations again to get the required result.

Using log files

Use system log files to troubleshoot problems encountered with IBM Intelligent Transportation.

Related concepts:

"Installing and using IBM Support Assistant Lite" on page 176
IBM Support Assistant Lite (ISA Lite) is a tool that collects common diagnostic data that is useful for analyzing general problems.

Enabling portal tracing

An administrator can trace user login events by enabling portal tracing.

About this task

Follow the steps in the procedure.

Procedure

1. Log on to `http://portalServer/wps/myportal` as an administrative user.
2. On the navigation bar at the top of the page, click **Administration**.
3. On the sidebar menu, click **Portal Analysis**.
4. Click **Enable Tracing**
5. 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:WSMM=all
   ```

6. 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.

WebSEAL configuration file

Tivoli Access Manager WebSEAL records the WebSEAL server error, user requests, referrer and agent.

A unique WebSEAL configuration file is created for each WebSEAL instance. The name of the configuration file includes the instance name. The records are returned by default at the following location:

`/opt/pdweb/etc/webseald-default.conf`

Check the `webseald-default.conf` for messages that might indicate the problem.

Send the `webseald-default.conf` file to IBM support with other details to troubleshoot the problem.

Enabling the portal services logs

To troubleshoot issues that are relating to the portal applications on the IBM Intelligent Operations Center portal server, enable the portal services logs within the WebSphere Application Server administrative console.

About this task

Use the following procedure to enable logging for the `com.ibm.iss.trans*` portal component of the IBM Traffic Information Hub.

Procedure

1. Log on to the IBM Intelligent Operations Center portal server as the portal administrator, for example `wpsadmin`.
2. In the WebSphere Application Server administrative console, click **Troubleshooting** > **Logs and trace**.
3. Click **WebSphere_Portal** > **Change Log Detail Levels**.
4. In the **Components** section, expand all components in the navigation tree.
5. Select **com.ibm.iss.trans*** and click **All Messages and Traces**. The parameter `com.ibm.iss.trans*=all` displays in the log detail text box.
6. To save the configuration, click **Apply**.
7. Restart the IBM Intelligent Operations Center portal server.

Results

The WebSphere Portal logs files can be viewed from the following directory:

`/opt/IBM/WebSphere/wp_profile/logs/WebSphere_Portal/`

What to do next

If the portal problems cannot be resolved, submit the portal services log files to IBM support for further troubleshooting.

Cognos logs

The `cogserver.log` is stored in the Cognos server machine.

The `cogserver.log` provides an entry point for error diagnosis. The records are stored at the following location:

`/opt/ibm/cognos/c10_64/logs/cogserver.log`

If you get an error code in Cognos Connection, you can search for the error code around the time that the error occurred, as indicated by the timestamp. You might also locate other useful information that you can send to IBM support.

Trace.out log file data collection

The `trace.out` log file contains information that helps to analyze and diagnose problems or errors.

Procedure

To access the `trace.out` log file, use the following steps:

1. Log on to `http://portalServer/wps/myportal` as an administrative user.
2. Select **Servers** > **Server Types** > **Websphere Application Servers**.
3. On the Application servers page, select **server1**.
4. On the troubleshooting option, select **Change Log Detail Levels**.
5. On the Change Log detail Levels page, select **All components**.
6. Expand **com.ibm.iss** > **com.ibm.iss.trans** > **com.ibm.iss.trans.common** > **com.ibm.iss.trans.common.logging** > **com.ibm.iss.trans.common.logging.TransLogger**.
7. Right-click `com.ibm.iss.trans.common.logging.TransLogger`.

8. Select **All Messages and Traces**.
9. Open **trace.out**.

Results

When you have replicated a problem scenario, check the `trace.out` file for messages that might indicate the problem.

Send the `trace.out` file to IBM support with other details to troubleshoot the problem.

Example

The following sample shows an example `trace.out` log file:

```
[6/15/11 16:31:04:946 IST] 000000ae TransLogger
1 com.ibm.iss.trans.tmdd.dao.utils.Utils truncate len=1024

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
< com.ibm.iss.trans.tmdd.dao.utils.Utils truncate RETURN

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
> com.ibm.iss.trans.tmdd.dao.utils.Utils truncate ENTRY

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
1 com.ibm.iss.trans.tmdd.dao.utils.Utils truncate value=80000758

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
1 com.ibm.iss.trans.tmdd.dao.utils.Utils truncate len=1024

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
< com.ibm.iss.trans.tmdd.dao.utils.Utils truncate RETURN

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
> com.ibm.iss.trans.tmdd.dao.utils.Utils truncate ENTRY

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
1 com.ibm.iss.trans.tmdd.dao.utils.Utils truncate value=segment

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
1 com.ibm.iss.trans.tmdd.dao.utils.Utils truncate len=1024

[6/15/11 16:31:04:946 IST] 000000ae TransLogger
< com.ibm.iss.trans.tmdd.dao.utils.Utils truncate RETURN
```

Collecting Java Virtual Machine log data

Java virtual machine (JVM) logs can contain information that you can use to verify that the application has not run out of local resources or lost connectivity.

Procedure

To access the JVM log files:

1. Log on to `http://portalServer/wps/myportal` as an administrative user.
2. Select **Servers** > **Server Types** > **Application Servers**.
3. On the Application servers page, select **server1** > **Logging and Tracing**.
4. Click **JVM Logs**.

Results

Check the JVM log files for stack traces and error messages.

Send the JVM log files to IBM support with other details to troubleshoot the problem.

Chapter 9. References

The following topics contain reference information to help you install, integrate, and manage the solution.

Supported TMDD requirements and user needs

The IBM Traffic Information Hub supports Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0 requirements.

Table 9 shows the user needs and associate requirements defined by TMDD version 3 and whether or not they are supported by the IBM Traffic Information Hub.

For data flowing from the IBM Traffic Information Hub to an owner center, support is defined as follows:
- Yes - The IBM Traffic Information Hub supports the requirement by sending the associated data to the owner center.
- No - The IBM Traffic Information Hub does not support the requirement and does not send the associated data to the owner center.
- N/A -The requirement does not apply to the IBM Traffic Information Hub in this context.

For data flowing from an owner center to the IBM Traffic Information Hub, support is defined as follows:
- Yes - The IBM Traffic Information Hub supports the requirement by storing data received from the owner center.
- No - The IBM Traffic Information Hub does not support the requirement and does not store data received.
- N/A - The requirement does not apply to the IBM Traffic Information Hub in this context.

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		3.3.6.2.1.1	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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		3.3.6.9.1.1	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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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 Patten 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
		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

Table 9. IBM Traffic Information Hub support of TMDD version 3 requirements (continued)

User Need ID	User Need	Requirement ID	Requirement	Supported by the IBM Traffic Information Hub
		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:

"IBM Traffic Information Hub TMDD support" on page 73
The IBM Traffic Information Hub 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

The IBM Traffic Information Hub implements a subset of TMDD data objects, dialogs, and subscription and request type.

The tables in this section describe the TMDD dialogs and messages used to communicate the specified TMDD data objects. For example, to request the status of Dynamic Message Signs, a DlDeviceInformationSubscription message is required.

Related concepts:

"Using web services dialogs" on page 85
The IBM Traffic Information Hub provides Web Services Definition Language (WSDL) dialogs to communicate data between the IBM Traffic Information Hub and other products and services.

"Running a TMDD data flow subscription" on page 79
Subscriptions define the flow of data from the owner center to the external center provided by the IBM Traffic Information Hub.

Related reference:

"IBM Traffic Information Hub TMDD support" on page 73
The IBM Traffic Information Hub 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

The IBM Traffic Information Hub supports a number of subscription types.

Table 10. TMDD data objects and subscription types supported by the IBM Traffic Information Hub

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 79
Subscriptions define the flow of data from the owner center to the external center provided by the IBM
Traffic Information Hub.

Related tasks:

"Setting up a subscription to traffic data" on page 80
A subscription is a request made to an owner center requesting that data be sent periodically to an
external center (the IBM Traffic Information Hub). The message encapsulating the data 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

The IBM Traffic Information Hub implements a subset of TMDD data objects and subscription dialogs.

Table 11. TMDD data objects and subscription dialogs supported by the IBM Traffic Information Hub

TMDD Data Object	Subscription Dialog
Center Active Verification	DlCenterActiveVerificationSubscription
Organization Information	DlOrganizationInformationSubscription
Full Event Update	DlFullEventUpdateSubscription
Event Index	DlEventIndexSubscription
Node Inventory	DlTrafficNetworkInformationSubscription
Link Inventory	DlTrafficNetworkInformationSubscription
Link Status	DlTrafficNetworkInformationSubscription
Traffic Detector Inventory	DlDeviceInformationSubscription
Traffic Detector Status	DlDeviceInformationSubscription
Traffic Detector Data	DlDetectorDataSubscription
CCTV Inventory	DlDeviceInformationSubscription
CCTV Status	DlDeviceInformationSubscription
Gate Inventory	DlDeviceInformationSubscription
Gate Status	DlDeviceInformationSubscription
Intersection Signal Inventory	DlDeviceInformationSubscription
Intersection Signal Status	DlDeviceInformationSubscription
Ramp Meter Inventory	DlDeviceInformationSubscription
Ramp Meter Status	DlDeviceInformationSubscription
LCS Inventory	DlDeviceInformationSubscription
LCS Status	DlDeviceInformationSubscription
DMS Inventory	DlDeviceInformationSubscription
DMS Status	DlDeviceInformationSubscription

Related concepts:

"Running a TMDD data flow subscription" on page 79
Subscriptions define the flow of data from the owner center to the external center provided by the IBM Traffic Information Hub.

Related information:

⊳ Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC) Version 3.0

Request types

The IBM Traffic Information Hub supports a number of request types.

Table 12. TMDD data objects and request types supported by the IBM Traffic Information Hub

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 79
Subscriptions define the flow of data from the owner center to the external center provided by the IBM Traffic Information Hub.

Related tasks:

"Running a bulk load of traffic data" on page 83
After deploying the IBM Traffic Information Hub, 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 the IBM Traffic Information Hub at specific intervals. Bulk loading is normally done when the IBM Traffic Information Hub 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

The IBM Traffic Information Hub implements a subset of TMDD request/response dialogs.

Table 13. TMDD data objects and request/response dialogs supported by the IBM Traffic Information Hub

TMDD Data Object	Request/Response Dialog
Center Active Verification	DlCenterActiveVerificationRequest
Organization Information	DlOrganizationInformationRequest
Full Event Update	DlFullEventUpdateRequest
Event Index	DlEventIndexRequest
Node Inventory	DlNodeInventoryRequest
Link Inventory	DlLinkInventoryRequest
Link Status	DlLinkStatusRequest
Traffic Detector Inventory	DlDetectorInventoryRequest
Traffic Detector Status	DlDetectorStatusRequest
Traffic Detector Data	DlDetectorDataRequest
CCTV Inventory	DlCCTVInventoryRequest
CCTV Status	DlCCTVStatusRequest
Gate Inventory	DlGateInventoryRequest
Gate Status	DlGateStatusRequest
Intersection Signal Inventory	DlIntersectionSignalInventoryRequest
Intersection Signal Status	DlIntersectionSignalStatusRequest
Ramp Meter Inventory	DlRampMeterInventoryRequest
Ramp Meter Status	DlRampMeterStatusRequest
LCS Inventory	DlLCSInventoryRequest
LCS Status	DlLCSStatusRequest
DMS Inventory	DlDMSInventoryRequest
DMS Status	DlDMSStatusRequest

Related concepts:

"Running a TMDD data flow subscription" on page 79
Subscriptions define the flow of data from the owner center to the external center provided by the IBM
Traffic Information Hub.

Related information:

☞ Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management
Center Communications (MS/ETMCC) Version 3.0

Publish dialogs

The IBM Traffic Information Hub implements a subset of TMDD data objects and publish dialogs.

Table 14. TMDD data objects and publish dialogs supported by the IBM Traffic Information Hub

TMDD Data Object	Publish Dialog
Center Active Verification	DlCenterActiveVerificationUpdate
Organization Information	DlOrganizationInformationUpdate
Full Event Update	DlFullEventUpdateUpdate
Event Index	DlEventIndexUpdate
Node Inventory	DlNodeInventoryUpdate
Link Inventory	DlLinkInventoryUpdate
Link Status	DlLinkStatusUpdate
Traffic Detector Inventory	DlDetectorInventoryUpdate
Traffic Detector Status	DlDetectorStatusUpdate
Traffic Detector Data	DlDetectorDataUpdate
CCTV Inventory	DlCCTVInventoryUpdate
CCTV Status	DlCCTVStatusUpdate
Gate Inventory	DlGateInventoryUpdate
Gate Status	DlGateStatusUpdate
Intersection Signal Inventory	DlIntersectionSignalInventoryUpdate
Intersection Signal Status	DlIntersectionSignalInventoryUpdate
Ramp Meter Inventory	DlRampMeterInventoryUpdate
Ramp Meter Status	DlRampMeterStatusUpdate
LCS Inventory	DlLCSInventoryUpdate
LCS Status	DlLCSStatusUpdate
DMS Inventory	DlDMSInventoryUpdate
DMS Status	DlDMSStatusUpdate

Related concepts:

"Running a TMDD data flow subscription" on page 79
Subscriptions define the flow of data from the owner center to the external center provided by the IBM Traffic Information Hub.

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

The IBM Traffic Information Hub supports a subset of TMDD event groups and types.

Table 15 contains the event types to be specified in TMDD `FullEventUpdate` messages sent to IBM
Intelligent Transportation. Only one type can be specified on an event.

Table 15. TMDD event groups and types supported by the IBM Traffic Information Hub

TMDD Event Group	TMDD Event Type
AccidentsAndIncidents	Accident
	Serious accident
	Injury accident
	Minor accident
	Multi vechicle 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 15. TMDD event groups and types supported by the IBM Traffic Information Hub (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 15. TMDD event groups and types supported by the IBM Traffic Information Hub (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 73
Before integrating the IBM Traffic Information Hub with owner centers, the appropriate planning must be done to ensure desired results.

Related reference:

"IBM Traffic Information Hub TMDD support" on page 73
The IBM Traffic Information Hub 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

➡️ SAE J2540 - ITIS Phrase Lists

ITS standards

The IBM Traffic Information Hub is designed in compliance with ITS and information technology (IT) standards defined and recognized by the transportation industry.

The following table lists the ITS and IT standards that the IBM Traffic Information Hub is developed in compliance with.

Table 16. 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.	http://www.itu.int/ITU-T/ studygroups/com17/languages/ X.680-0207.pdf
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.	http://www.standards.its.dot.gov/
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.	http://www.standards.its.dot.gov/

Table 16. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
Center-to-Center (C2C)	Center-to-Center (C2C) communications spans the entire ITS domain, covering the exchange of data between computers 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.	http://www.standards.its.dot.gov/Documents/advisories/adv_c2c.asp
Closed-circuit television (CCTV)	The use of video cameras to transmit a signal to a specific place, on a limited set of monitors.	
Data Exchange (Datex)	One of the NTCIP defined standard 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 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 by using UML, this features a platform independent model that can be mapped to multiple implementation platforms.	http://www.datex2.eu/
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 based on the traffic situation and 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.	http://www.standards.its.dot.gov/Documents/advisories/dms_advisory.htm

Table 16. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
External Centers (EC)	An external center is a transportation system that uses the center-to-center services provided by a TMDD owner center or other data center.	http://www.standards.its.dot.gov/
Extensible Markup Language (XML)	A standard metalanguage for defining markup languages that is based on Standard Generalized Markup Language (SGML).	http://www.w3.org/XML/
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:	http://www.ite.org/
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.	http://www.its.dot.gov/
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.	http://www.standards.its.dot.gov/ fact_sheet.asp?f=92

Name	Description	Reference link
National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP)	A family of communication standards 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.	http://www.ntcip.org/
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.	http://www.sae.org/about/
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.	http://www.w3.org/TR/soap/
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 defined for traffic management centers.	http://www.ntcip.org/library/ standards/ default.asp?documents=yes &standard=9010

Table 16. List of ITS standards in the transportation industry. (continued)

Name	Description	Reference link
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.	http://www.ite.org/standards/tmdd/
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.	http://www.w3.org/Addressing/URL/Overview.html
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. WSDL is one of the NTCIP defined standards for center to center communications.	http://www.w3.org/2002/ws/desc/

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- Traffic Management Data Dictionary Version 3.0
- Datex-II

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