



**Guide for Warehouse Pack, Version 3.1.0.0, using Tivoli Data Warehouse,
Version 1.2**



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Version 1.2**

Note

Before using this information and the product it supports, read the information in "Notices" on page 69.

First Edition (October 2004)

This edition applies to Version 3, Release 1 of IBM Tivoli Business Systems Manager and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this guide

This document describes the warehouse pack, version 3.1.0.0 for IBM® Tivoli® Business Systems Manager, version 3.1. This warehouse pack is created for IBM Tivoli Data Warehouse, Version 1.2.

Who should read this guide

This guide is for people who do any of the following activities:

- Plan for and install the warehouse pack
- Use and maintain the warehouse pack
- Create additional warehouse packs that use data from this warehouse pack

Administrators and installers should have the following knowledge or experience:

- Basic system administration and file management of the operating systems on which the components of Tivoli Data Warehouse are installed
- An understanding of the basic concepts of relational database management
- Experience administering IBM DB2 Universal Database™

Additionally, report designers and warehouse pack creators should have the following knowledge or experience:

- An understanding of the source data and application
- Data warehouse information and design, extract, transform, and load (ETL) processes, and online analytical processing (OLAP)

Publications

This section lists publications in the Tivoli Data Warehouse and the Tivoli Business Systems Manager product libraries and related documents. It also describes how to access Tivoli publications online and how to order Tivoli publications.

Tivoli Data Warehouse publications

The Tivoli Data Warehouse Documentation CD, LK3T-8111, provides all documents in the Tivoli Data Warehouse library, except for *Enabling an Application for Tivoli Data Warehouse*, GC32-0745. *Enabling an Application for Tivoli Data Warehouse* is available only on the Tivoli Data Warehouse Support Web site. All documents are available in English; selected documents are available in other languages.

The following documents are available in the Tivoli Data Warehouse library:

- *Tivoli Data Warehouse Release Notes*, SC32-1399, provides last-minute information about Tivoli Data Warehouse and lists hardware requirements and software prerequisites.
- *Installing and Configuring Tivoli Data Warehouse*, GC32-0744, describes how Tivoli Data Warehouse fits into your enterprise, explains how to plan for its deployment, and gives installation and configuration instructions. It contains maintenance procedures and troubleshooting information. Additionally, this guide describes how to install warehouse packs and reports. This document also describes how to install DB2 Universal Database and Crystal Enterprise v.9 Special Edition for use with Tivoli Data Warehouse.

- *Tivoli Data Warehouse Messages*, SC09-7776, lists the messages generated by Tivoli Data Warehouse and describes the actions you should take.
- *Enabling an Application for Tivoli Data Warehouse*, GC32-0745, provides information about connecting an application to Tivoli Data Warehouse. This document is for application programmers who use Tivoli Data Warehouse to store and report on the data of their application, data warehousing experts who import Tivoli Data Warehouse data into business intelligence applications, and customers who create reports.

The Tivoli Data Warehouse information center contains the documents from the Tivoli Data Warehouse library in PDF and HTML formats. The information center is available from the Tivoli Software Information Center Web site.

IBM Tivoli Business Systems Manager publications

The following publications are in the IBM Tivoli Business Systems Manager library:

- *Planning Guide*, SC32-9088, provides an introduction to the Tivoli Business Systems Manager product. It also contains planning and design information to consider when implementing a Tivoli Business Systems Manager solution.
This document is written for network planners, system designers, systems administrators, and others who are responsible for planning and implementing the product.
- *Installation and Configuration Guide*, SC32-9089, provides the installation and configuration tasks necessary for the implementation of Tivoli Business Systems Manager.
This document is written for system administrators and others who are responsible for installing and configuring Tivoli Business Systems Manager.
- *Introducing the Consoles*, SC32-9086, provides an introduction to the Tivoli Business Systems Manager console, Web console, executive dashboard, and the reporting system.
This document is written for operators and administrators.
- *Administrator's Guide*, SC32-9085, describes administrative tasks for Tivoli Business Systems Manager.
This document is written for system administrators and others who perform administrative tasks for Tivoli Business Systems Manager.
- *Problem and Change Management Integration Guide*, SC32-9130, describes how to write request processors to enable the problem, change, and automatic ticket integration function provided with Tivoli Business Systems Manager to work with problem and change management applications.
This document is written for system programmers.
- *Command Reference*, SC32-1243, describes the commands available for use with Tivoli Business Systems Manager.
This document is written for system administrators and others who run commands and scripts for Tivoli Business Systems Manager.
- *Message Reference*, SC32-9087, describes the messages for Tivoli Business Systems Manager.
This document is written for system programmers, network planners, operations managers, system designers, system administrators, network operators, and others who need message information for Tivoli Business Systems Manager.
- *Troubleshooting Guide*, SC32-9084, describes troubleshooting tasks to diagnose problems with Tivoli Business Systems Manager.

This document is written for system administrators and others who perform diagnostic tasks for Tivoli Business Systems Manager.

- *Release Notes*, GI11-4029, describes what is new for this release of the Tivoli Business Systems Manager product.
- *Guide for Warehouse Pack, Version 3.1.0.0, using Tivoli Data Warehouse*, SC32-9114-00, describes how to use the warehouse pack to extract data from the Tivoli Business Systems Manager database and load it into the Tivoli Data Warehouse database, where it can be accessed using reporting and data analysis tools.

This document is written for administrators and others who plan for and install the warehouse pack, use and maintain the warehouse pack and its reports, or create new reports.

An index is provided for searching the Tivoli Business Systems Manager library. If you have Adobe Acrobat on your system, you can use the Search command to locate specific text in the library. For more information about using the index to search the library, see the online help for Acrobat.

Related publications

The *Tivoli Software Glossary* includes definitions for many of the technical terms related to Tivoli software. The *Tivoli Software Glossary* is available at the following Tivoli software library Web site:

<http://www.ibm.com/software/tivoli/library/>

Access the glossary by clicking the **Glossary** link on the left pane of the Tivoli software library window.

Accessing publications online

The documentation CD contains the publications that are in the product library. The format of the publications is PDF and HTML.

IBM posts publications for this and all other Tivoli products, as they become available and whenever they are updated, to the Tivoli software information center Web site. Access the Tivoli software information center by first going to the Tivoli software library at the following Web address:

<http://www.ibm.com/software/tivoli/library/>

Scroll down and click the **Product manuals** link. In the Tivoli Technical Product Documents Alphabetical Listing window, click the **Tivoli Business Systems Manager** link to access the product library at the Tivoli software information center.

Note: If you print PDF documents on other than letter-sized paper, set the option in the **File → Print** window that allows Adobe Reader to print letter-sized pages on your local paper.

Ordering publications

You can order many Tivoli publications online at the following Web site:

<http://www.elink.ibm.com/public/applications/publications/cgi-bin/pbi.cgi>

You can also order by telephone by calling one of these numbers:

- In the United States: 800-879-2755
- In Canada: 800-426-4968

In other countries, see the following Web site for a list of telephone numbers:

<http://www.ibm.com/software/tivoli/order-lit/>

Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully. With this product, you can use assistive technologies to hear and navigate the interface. You can also use the keyboard instead of the mouse to operate all features of the graphical user interface.

For information about installing the Tivoli Business Systems Manager product using the built-in screen reader, see the *IBM Tivoli Business Systems Manager: Installation and Configuration Guide*. For information about the shortcut keys that can be used with the Tivoli Business Systems Manager console, see the Accessibility appendix in *IBM Tivoli Business Systems Manager: Introducing the Consoles*.

Tivoli technical training

For Tivoli technical training information, refer to the following IBM Tivoli Education Web site:

<http://www.ibm.com/software/tivoli/education>

Support information

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

- Searching knowledge bases: You can search across a large collection of known problems and workarounds, Technotes, and other information.
- Obtaining fixes: You can locate the latest fixes that are already available for your product.
- Contacting IBM Software Support: If you still cannot solve your problem, and you need to work with someone from IBM, you can use a variety of ways to contact IBM Software Support.

For more information about these three ways of resolving problems, see “Support information” on page 65.

Participating in newsgroups

User groups provide software professionals with a forum for communicating ideas, technical expertise, and experiences related to the product. They are located on the Internet and are available using standard news reader programs. These groups are primarily intended for user-to-user communication and are not a replacement for formal support.

To access a newsgroup, use the instructions appropriate for your browser.

IBM Tivoli Business Systems Manager:

news://news.software.ibm.com/ibm.software.tivoli.business-systems-manager

IBM Tivoli Enterprise Console®:

news://news.software.ibm.com/ibm.software.tivoli.enterprise-console

IBM Tivoli Service Level Advisor:

news://news.software.ibm.com/ibm.software.tivoli.service-level-advisor

IBM Tivoli Switch Analyzer:

news://news.software.ibm.com/ibm.software.tivoli.switch-analyzer

IBM Tivoli NetView® for UNIX® and IBM Tivoli NetView for Windows®:

news://news.software.ibm.com/ibm.software.tivoli.netview-unix-windows

IBM Tivoli NetView for z/OS®:

news://news.software.ibm.com/ibm.software.netview

Conventions used in this guide

This guide uses several conventions for special terms and actions and for commands and paths that vary according to the operating system.

Typeface conventions

This guide uses the following typeface conventions:

Bold

- Lowercase commands and mixed case commands that are otherwise difficult to distinguish from surrounding text
- Interface controls (check boxes, push buttons, radio buttons, spin buttons, fields, folders, icons, list boxes, items inside list boxes, multicolumn lists, containers, menu choices, menu names, tabs, property sheets), labels (such as **Tip:**, and **Operating system considerations:**)
- Keywords and parameters in text

Italic

- Words defined in text
- Emphasis of words (words as words)
- New terms in text (except in a definition list)
- Variables and values you must provide

Monospace

- Examples and code examples
- File names, programming keywords, and other elements that are difficult to distinguish from surrounding text
- Message text and prompts addressed to the user
- Text that the user must type
- Values for arguments or command options

Operating system-dependent variables and paths

This guide uses the UNIX convention for specifying environment variables and for directory notation.

When using the Windows command line, replace *\$variable* with *%variable%* for environment variables and replace each forward slash (/) with a backslash (\) in directory paths. The names of environment variables are not always the same in Windows and UNIX. For example, %TEMP% in Windows is equivalent to \$tmp in UNIX.

Note: If you are using the bash shell on a Windows system, you can use the UNIX conventions.

Terminology

For a list of terms and definitions for Tivoli and other IBM products, refer to the IBM terminology Web site:

<http://www.ibm.com/ibm/terminology/>

For brevity and readability, the term Tivoli NetView for z/OS refers to both the Tivoli NetView for z/OS product and the Tivoli NetView for OS/390[®] product.

Chapter 1. Overview

The following sections provide an overview of the IBM Tivoli Data Warehouse and IBM Tivoli Business Systems Manager Warehouse Pack, Version 3.1.0.0 products.

Overview of Tivoli Data Warehouse

Tivoli Data Warehouse provides the infrastructure for the following processes:

- Extract, transform and load (ETL) processes through the IBM DB2[®] Data Warehouse Center tool
- Schema generation of the central data warehouse
- Historical reports

As shown in Figure 1 on page 2, Tivoli Data Warehouse consists of a centralized data store where historical data from many management applications can be stored, aggregated, and correlated.

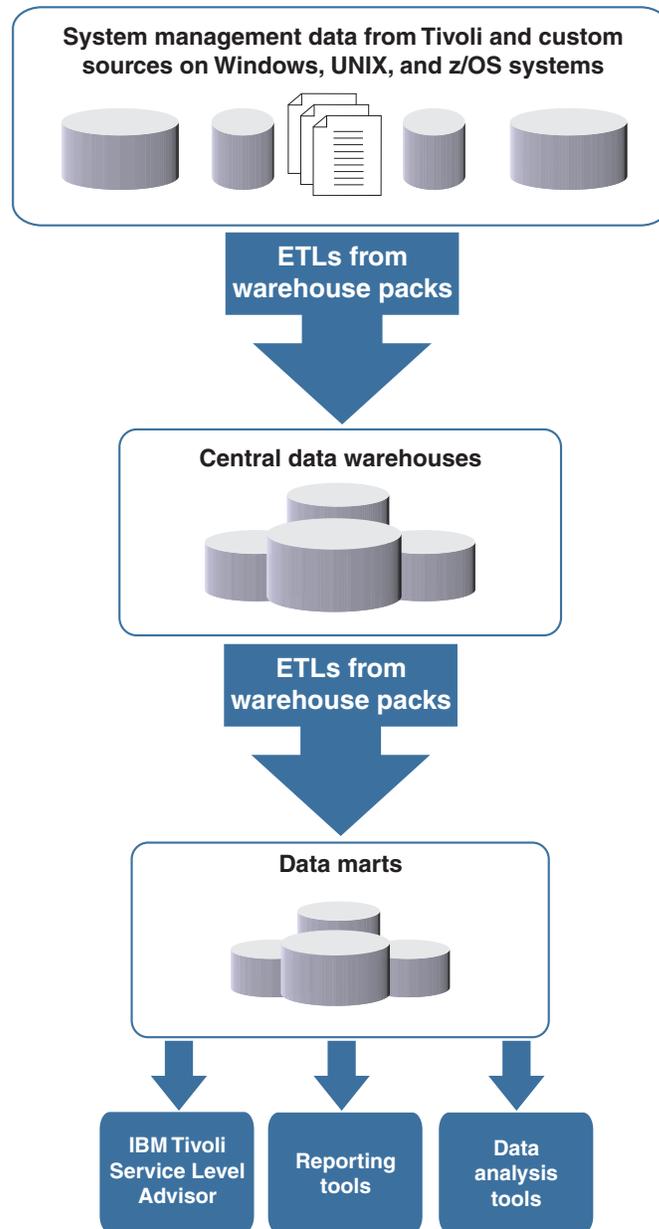


Figure 1. Tivoli Data Warehouse basic architecture

The *central data warehouse* uses a generic schema that is the same for all applications. As new components or new applications are added, more data is added to the database; however, no new tables or columns are added in the schema.

A *data mart* is a subset of a data warehouse that contains data which is tailored and optimized for the specific reporting needs of a department or team.

The *central data warehouse ETL* reads the data from the operational data stores of the application that collects it, verifies the data, makes the data conform to the schema, and places the data into the central data warehouse.

The *data mart ETL* extracts a subset of data from the central data warehouse, transforms it, and loads it into one or more star schemas, which can be included in data marts to answer specific business questions.

A program that provides these ETLs is called a *warehouse pack*.

The ETLs are typically scheduled to run periodically, usually during non-peak hours. If an ETL encounters data that it cannot correctly transform, it creates an entry in an exception table. For more information about exception tables, see “Exception tables” on page 63.

Overview of the Tivoli Business Systems Manager Warehouse Pack

Tivoli Business Systems Manager is an enterprise management product that captures resource states and the events for those resources. The resource state information can be formatted as the input data for the IBM Tivoli Service Level Advisor. The integration of the Tivoli Business Systems Manager with the Tivoli Data Warehouse stores the data in the Tivoli Data Warehouse databases using the Tivoli Business Systems Manager Pack, Version 3.1.0.0. The Tivoli Service Level Advisor extracts the data for the service level agreement analysis from the Tivoli Data Warehouse databases. Tivoli Business Systems Manager Pack, Version 3.1.0.0 provides the central data warehouse ETL for the business systems and executive dashboard service resources, and the measurement data for the business systems. It extracts the data from the Tivoli Business Systems Manager database, maps and transforms the data model from the Tivoli Business Systems Manager to the Tivoli Data Warehouse, calculates the measurements, and stores the resulted data in the Tivoli Data Warehouse database (in the central data warehouse schema).

Tivoli Business Systems Manager Pack, Version 3.1.0.0 uses the Tivoli Data Warehouse architecture. It uses the OBJECT' ODBC data source for the DB2 warehouse GTM_OBJECT_Source source and the TWH_CDW ODBC data source for the DB2 warehouse GTM_TWH_CDW_Target target. The twh_objs table in the Tivoli Business Systems Manager object database is the connection table used for the GTM_OBJECT_Source warehouse source. The GTM.CENTR_LOOKUP and GTM.CUST_LOOKUP tables in the Tivoli Data Warehouse database are the connection tables used for the GTM_TWH_CDW_Target warehouse target.

Relationship of resource classes and component types

The resource classes in the Tivoli Business Systems Manager database refer to component types in the Tivoli Data Warehouse database. Examples of resource classes and the common component types with which they correlate are shown in Table 1.

Table 1. Examples of Tivoli Business Systems Manager resource classes and Tivoli Data Warehouse common component types

Tivoli Business Systems Manager resource class	Tivoli Data Warehouse component type
Business System	Business System
Executive Dashboard Service	Service

For detailed information about the executive dashboard service class definition, configuration, and usage, see the *IBM Tivoli Business Systems Manager: Administrator's Guide*. The Tivoli Business Systems Manager central data warehouse ETL provides the measurement data for all the business systems.

The business system and executive dashboard service resources in the Tivoli Business Systems Manager database are created in the Tivoli Data Warehouse database as components in the TWG.COMP table. The parent-child relationships of the business systems are loaded in TWG.COMPRELN table. The following information is loaded or updated in the Tivoli Data Warehouse databases:

- All business systems and executive dashboard service resources
- Relationships of the Business Systems
- Relationships of the executive dashboard service resources
- Relationships of the business systems with the executive dashboard service resources
- Changes of the resource names in the Tivoli Business Systems Manager databases

One business system in the Tivoli Business Systems Manager database refers to one component in the Tivoli Data Warehouse database.

Tivoli Business Systems Manager business system shortcuts

Dragging and dropping a business system in the Tivoli Business Systems Manager product creates a business system shortcut. In the Tivoli Business Systems Manager database, the business system shortcut has the same children as the source resource from which it was copied. The specified link type (a business system logical link) enables this function. In Tivoli Data Warehouse, there is no distinction for the source resource with the business system shortcuts. They are all modeled as components of the BUSINESS_SYSTEM component type. The relationship of the business system shortcuts with the source business system in the Tivoli Business Systems Manager is used to create the parent and child relationships of the business system shortcuts with the children of the source business system in the Tivoli Data Warehouse database.

The relationship of business systems is modeled differently in Tivoli Data Warehouse than in Tivoli Business Systems Manager for business systems shortcuts. The following example shows the children of the business system shortcut Bank 1 being resolved by a LOBL link type in Tivoli Business Systems Manager. In Tivoli Data Warehouse, the central data warehouse ETL creates a direct link.

```
Data Centers (business system)
Eastern Complex (business system)          ---Original---
  Bank 1 (business system)
    CICS A (business system resource)
    CICS B (business system resource)

Western Complex (business system)
  Bank 1 (business system shortcut)        ---Dragging and Dropping---
    CICS A (business system resource)
    CICS B (business system resource)
```

When the business systems from the Tivoli Business Systems Manager program are loaded into the Tivoli Data Warehouse program, the business system information is saved in the Tivoli Data Warehouse database, as described in Table 2.

Table 2. Business system resource mapping

Tivoli Business Systems Manager	Tivoli Data Warehouse
Object name	Component name
Class ID	GTM_CID attribute
Ctime	Component start date

Table 2. Business system resource mapping (continued)

Tivoli Business Systems Manager	Tivoli Data Warehouse
Ctime	Component start time
Object ID	GTM_ID attribute
Resource type	GTM_RTYPE attribute

The service components are modeled differently from the business systems in the Tivoli Data Warehouse database. The executive dashboard service resource information is saved in the Tivoli Data Warehouse database, as described in Table 3.

Table 3. Executive dashboard service resource mapping

Tivoli Business Systems Manager	Tivoli Data Warehouse
Object name	User label attribute
_ServiceID	Component name
_ServiceGUID	NAME_GUID attribute
Ctime	Component start date
Ctime	Component start time
Class ID	GTM_CID attribute
Object ID	GTM_ID attribute
*_Flag of linked business system	GTM_Enable
<p>* When an executive dashboard service is created, it is enabled in Tivoli Data Warehouse and there is no record for the GTM_Enable attribute. Clearing the Service check box in the Tivoli Business Systems Manager executive dashboard property page changes the value for the GTM_Enable attribute of the Service component in the Tivoli Data Warehouse to 0. When the Service is marked as a service again (by selecting the Service check box in the Tivoli Business Systems Manager executive dashboard property page), then the GTM_Enable attribute value of the Service component in the Tivoli Data Warehouse database is set to 1.</p>	

Like the parent and child (PCHILD) relationship between the service and the sub-service, the SUPPRT (Support) relationship of the service with the business system in the Tivoli Data Warehouse is also created based on the link type, executive dashboard service link, from Tivoli Business Systems Manager.

When a Tivoli Business Systems Manager business system is renamed, a new NAME attribute for the business system component is inserted with the new name as the CompAttr_Val value in the TWG.CompAttr table of the TWH_CDW database. When an executive dashboard service resource is renamed in Tivoli Business Systems Manager or in the executive dashboard list, a new USER_LABEL attribute for the service component is inserted with the new display name as the CompAttr_Val value in the TWG.CompAttr table of the TWH_CDW database. The original attribute is expired by the Tivoli Data Warehouse trigger or the Tivoli Business Systems Manager central data warehouse ETL.

When an executive dashboard service or business system is deleted from the Tivoli Business Systems Manager database, the component, attributes, and relationships in the central data warehouse database are expired in the next run of the Tivoli Business Systems Manager central data warehouse ETL. The state changes of all business systems are provided for the measurements using the state transition

matrix. The alert states or resource states in the Tivoli Business Systems Manager are mapped into the Tivoli Service Level Advisor availability measurement types, as shown in Table 4.

Table 4. Mapping measurements in Tivoli Business Systems Manager with Tivoli Service Level Advisor

Object state in Tivoli Business Systems Manager	Measurement type in Tivoli Service Level Advisor
Green	Available
Yellow	Degrading
Red	Unavailable
In maintenance	Unmanaged
Owned (Red)*	Repairing
Unknown	Unknown

* The Owned (Red) state is only recorded for the time period when the resource has the ownership note due to a Red event. When the resource has an ownership note because of a Yellow event, the ETL transfers it as either Degrading or Available, based on the alert state of the resource.

Figure 2 presents a high-level view of the Tivoli Business Systems Manager central data warehouse ETL processes that make the Tivoli Business Systems Manager data available in the Tivoli Data Warehouse database.

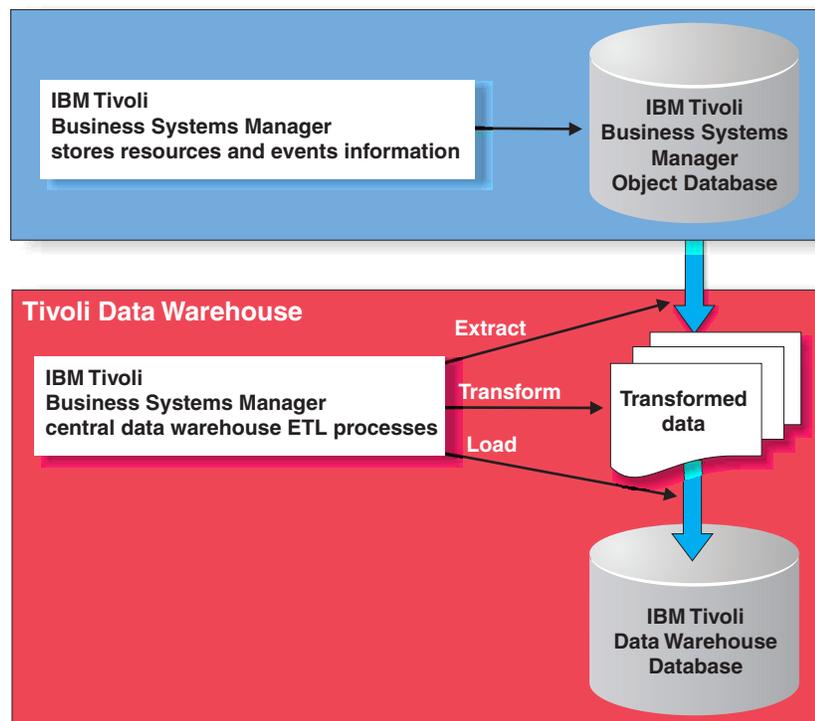


Figure 2. Tivoli Business Systems Manager central data warehouse ETL processes

The Tivoli Business Systems Manager 3.1.0.0 Warehouse Pack includes the following tasks:

- The task in Tivoli Business Systems Manager. Tivoli Business Systems Manager stores the following information in the Tivoli Business Systems Manager application database:
 - Deletions, creations, and name changes of the business systems
 - Deletions, creations, and display name changes of the executive dashboard service resources
 - Relationship of business systems
 - Relationship of business systems with executive dashboard services
 - Relationship of the executive dashboard services
 - Alert state changes of the business systems
- The task in the Tivoli Business Systems Manager central data warehouse ETL. Tivoli Business Systems Manager central data warehouse ETL extracts the following information from the Tivoli Business Systems Manager application database and transforms and loads this information to the Tivoli Data Warehouse database:
 - Business system resource information and changes
 - Executive dashboard service resource information and changes
 - Relationship of business systems, including those to link the children of the source business systems to the business system shortcut
 - Relationship of business systems with executive dashboard services
 - Relationship of executive dashboard services
 - Measurement data of all the business systems for Tivoli Service Level Advisor

Tivoli Business Systems Manager central data warehouse ETL also provides processes for the following tasks:

- Updating the extraction control for the initialization process
- Migrating Tivoli Business Systems Manager data loaded with the Tivoli Business Systems Manager Warehouse Pack 2.1.1 in Tivoli Data Warehouse

Chapter 2. Reports

Tivoli Business Systems Manager Pack, Version 3.1.0.0 does not provide predefined reports.

Chapter 3. Installing and configuring the warehouse pack

This section describes the installation and configuration of the warehouse pack.

Prerequisites

Before installing the warehouse pack for Tivoli Business Systems Manager 3.1.0.0 Warehouse Pack, install the following software:

- IBM Tivoli Business Systems Manager, Version 3.1
- IBM DB2 Universal Database, Version 7.2 (with fix pack 8e, 9, 10a, or 11)
- IBM DB2 Universal Database for z/OS and OS/390, Version 7, if you are using these products
- IBM Tivoli Data Warehouse, Version 1.2 with Fix pack 2 or greater
- Crystal Enterprise 9 and its prerequisites
- IBM Tivoli Service Level Advisor, Version 2.1

If the previous version of the Tivoli Business Systems Manager Warehouse Pack was installed, check the version number. If the version of the Tivoli Business Systems Manager Warehouse Pack is not 2.1.1, you must upgrade to Tivoli Business Systems Manager Warehouse Pack version 2.1.1 and complete the migration procedure before installing Tivoli Business Systems Manager 3.1 Warehouse Pack. This warehouse pack supports central data warehouses on DB2 Universal Database for z/OS and OS/390, DB2 Universal Database for Windows and UNIX systems, or both. Tivoli Business Systems Manager uses the `twh_install_props.cfg` file to specify z/OS, distributed, or both.

Refer to the *Tivoli Data Warehouse Release Notes* and the *Tivoli Business Systems Manager: Installation and Configuration Guide* for the specific information about hardware prerequisites, database and operating system support, and product prerequisites. For late-breaking news about prerequisites, refer to the following IBM Software Support Web site:
<http://www.ibm.com/software/sysmgmt/products/support/>.

Product notes and limitations

If you are using the failover function provided by the Tivoli Business Systems Manager version 3.1 product, when the Tivoli Business Systems Manager database server is moved from one server to another, the following steps are required for completion in the Tivoli Data Warehouse control server:

1. Create a new Microsoft® SQL alias for the new 'Object' database server with the SQL Server Client Network Utility as described in "Pre installation procedures" on page 13.
2. Change the 'OBJECT' system ODBC data source to use the new 'Object' database server with the *ODBC Data Source Administrator* graphical user interface.
3. Change the password for the GTM_OBJECT_SOURCE warehouse source used by Tivoli Business Systems Manager version 3.1 warehouse pack in the DB2 Data Warehouse Control Center.

The Tivoli Business Systems Manager version 3.1.0.0 warehouse pack does not support configuration using the remote warehouse agent on an AIX[®] server. The measurement data is not automatically corrected for the deviation caused by turning the daylight savings time on or off. For example, if the central data warehouse ETL runs at 10:00 p.m. April 10 and the time is moved forward one hour at 2:00 am April 11, when the central data warehouse ETL runs at 10:00 p.m. on April 11, the measurement data from at 10:00 p.m. April 10 to 2:00 am April 11 is not accurate. This can be corrected by configuring the `GTM_CHANGE_TIME` system variable in the Tivoli Business Systems Manager MSSQL query analyzer as shown in the following example:

```
_SetSystemConfiguration 'ROOT', 0, 'TWH', 'GMT_CHANGE_TIME',
<date time>, DATETIME'
```

In this example, `<date time>` is the date and time that you change. The format is `YYYY-MM-DD HH:MM:SS.xxx`, where the `xxx` is fractions of seconds. For example: `2004-09-01 11:00:00.000` changes the date to September 1, 2004 and the time to 11:00 a.m. This value must be set before the time change occurs.

Database sizing considerations

Ensure that you have sufficient space in the Tivoli Data Warehouse databases for the historical data collected by the warehouse pack. To estimate how much space is required for the warehouse pack, complete the worksheets in Table 5, Table 6, and Table 7 on page 13. Refer to the following information and *Installing and Configuring Tivoli Data Warehouse*.

Table 5. Component count list

Component type	Count
Business system	
Service	
Total	

Use the following queries to obtain these counts from the Tivoli Business Systems Manager object database:

- For business system components:

```
SELECT COUNT(*) FROM LineOfBusiness_V WHERE deleted = 0
```
- For service components:

```
SELECT COUNT(*) FROM EVService_V WHERE deleted = 0
```

Table 6. Measurement entry list

Measurement matrix	Number of components	Number of MsmtTypes	Measurements per day
State transition		6	

In Table 6, the following information is to be determined:

Number of components

The number of the business system components obtained in Table 5.

Measurement per day

Can be calculated based on the feature of your business. The more state changes you have, the higher the percentage of this measurement should be. On average, the calculation can be based on the assumption that only

10% of business system resources change state once a day and that the central database warehouse ETL is configured to run once a day. Given these assumptions, the number of the rows of the measurement per day should be:

$$\langle \text{Number of components} \rangle * 10\% * \langle \text{Number of times ETL runs per day} \rangle$$

If more than 10% of your business system resources change state daily, adjust the percentage from 10 to the correct percentage.

Table 7. Total storage requirement working table

Database	Fixed storage requirement	Variable storage requirement	Estimated total storage (fixed + variable)
Central data warehouse	110 MB		
Control database	10 MB	0	10 MB

The storage usage for the control database does not change much across environments. The fixed values are shown in Table 7. The storage usage for the central data warehouse varies according to your environment. The fixed storage requirement for the central data warehouse is the sum of the storage usage of components and measurements. The storage size used for the components can be obtained using the following formula:

$$\langle \text{Total Number of components from component list} \rangle * 1.3(\text{KB})$$

The storage size used for the measurement data can be obtained using the following formula:

$$\begin{aligned} &\langle \text{Measurement per day from measurement list} \rangle \\ &* 0.1(\text{KB}) \\ &* \langle \text{Number days of measurement data kept in Tivoli Data Warehouse} \rangle \end{aligned}$$

The fixed storage size can be obtained using the following formula:

$$\begin{aligned} &\langle \text{Total Number of components from component list} \rangle \\ &* 1.3(\text{KB}) \\ &+ \langle \text{Measurement per day from measurement list} \rangle \\ &* 0.1(\text{KB}) \\ &* \langle \text{Number days of measurement data kept in Tivoli Data Warehouse} \rangle \end{aligned}$$

The variable storage requirement for the central data warehouse varies with the your activities. Use the following formula to calculate the variable storage:

$$\begin{aligned} &(\langle \text{Number of new components for each ETL run} \rangle \\ &+ \langle \text{Number of renamed components for each ETL run} \rangle \\ &+ \langle \text{Number of deleted components for each ETL run} \rangle) \\ &* 1.3(\text{KB}) \\ &+ \langle \text{Total Business System Components} \rangle \\ &* \langle \text{percentage of state changes} \rangle \\ &* 0.1(\text{KB}) \end{aligned}$$

Pre installation procedures

Before running the warehouse pack installation program, make sure that the system has all prerequisite products installed correctly. If you have the Tivoli Business Systems Manager Warehouse Pack 2.1.1 installed and you have run the migration process to update your data, uninstall the Tivoli Business Systems Manager Warehouse Pack 2.1.1 .

To ensure that the TCP/IP network library is used for the source database connection, install the Microsoft SQL Server client on the Tivoli Data Warehouse control server, and create an alias using the Microsoft SQL server client network utility tool with the parameters shown in Table 8.

Table 8. Parameters for creating an alias with the Microsoft SQL server client network utility tool

Parameter	Value
Server alias	Short computer name of the Tivoli Business Systems Manager database server
Network libraries	TCP/IP
Server name	Short or fully-qualified name of the Tivoli Business Systems Manager database server

Installation of the warehouse pack

Install the warehouse pack, as described in *Installing and Configuring Tivoli Data Warehouse*, using the installation properties file `twh_install_props.cfg`. The installation properties file, `twh_install_props.cfg`, is located on the Tivoli Business Systems Manager, version 3.1 CD2 in the `<etl/gtm>` directory.

The default data source names for the ODBC connections are `<AVA>_TWH_CDW_Source` and `<AVA>_TWH_Mart_target`.

Post installation procedures

After you install the warehouse pack, perform the following steps:

1. If the Tivoli Business Systems Manager data are loaded into Tivoli Data Warehouse databases using the Tivoli Business Systems Manager warehouse pack 2.1.1, run the migration procedure, as described in "Migration from a previous release of the warehouse pack" on page 15. If you are not sure if the data was loaded, use the following query to see if the Tivoli Business Systems Manager warehouse pack components are in the TWH_CDW database:

```
SELECT * FROM TWG.CUR_COMP WHERE COMPTYP_CD = 'TBSM_LOB'
```

2. Run the initialization process. The central data warehouse ETL uses the `PMsmtC_Age_In_Days` value of the `TWG.Prune_Msmt_Control` table to control how much of the measurement data should be loaded during the initialization process. The default value is 180. For larger databases, set the `PMsmtC_Age_In_Days` value to 90 using the following SQL command in a DB2 command window on the DB2 data warehouse control server:

```
DB2 connect to TWH_CDW user <user name> using <password>
DB2 UPDATE TWG.Prune_Msmt_Control SET PMsmtC_Age_In_Days = 90
WHERE MSRC_CD = 'GTM'
```

Promote the `GTM_c05_s010_Rebuild_ExtCTRL` step in the `GTM_c05_Init_Process` process to test mode and then run the test manually. After the initialization process completes successfully, reset the `PMsmtC_Age_In_Days` value in the DB2 command window on the DB2 data warehouse control server using the following command:

```
DB2 connect to TWH_CDW user <user name> using <password>
DB2 UPDATE TWG.Prune_Msmt_Control SET PMsmtC_Age_In_Days = 180
WHERE MSRC_CD = 'GTM'
```

3. See the information about installing warehouse packs in *Installing and Configuring Tivoli Data Warehouse* for the procedure to schedule central data

warehouse ETLs for the GTM_c10_Load_Resources_Process process to run automatically. The process for this warehouse pack is located in the GTM_Tivoli_Business_Systems_Manager_v3.1_Subject subject area. Run the steps of the process in the following order:

- a. GTM_c10_s010_Load_Resources_Staging
- b. GTM_c10_s020_Process_Resources_Staging
- c. GTM_c10_s030_Load_Avail_Staging
- d. GTM_c10_s040_Process_Avail_Staging

Migration from a previous release of the warehouse pack

This migration process is designed to migrate all the resources loaded with the Tivoli Business Systems Manager Pack, version 2.1.1 to the resources used in the Tivoli Business Systems Manager Pack, version 3.1.0.0 The Tivoli Business Systems Manager Pack, version 3.1.0.0 uses the common component type BUSINESS_SYSTEM for the Tivoli Business Systems Manager business system resource class (instead of the TBSM_LOB component type in the TWH_CDW database that was used in the previous release).

The measurement matrix of the Tivoli Business Systems Manager business systems is changed from a percentage (in hours) to the state transition measurement matrix. Due to these changes, the following actions are performed in this migration:

1. Create the new components for the Tivoli Business Systems Manager business systems with the BUSINESS_SYSTEM component type.
2. Set the expiration date for all the components and attributes of the TBSM_LOB component type, their relationships, and the measurement matrix defined for the TBSM_LOB component type.
3. Provide the mapping of the old components to the new components for Tivoli Service Level Advisor migration.
4. Load one month of measurement data, based on the state transition matrix for all of the business systems.
5. Migrate the service level agreements previously defined from the previous components to the new components, based on the mapping table, if applicable.

For the Tivoli Business Systems Manager Warehouse Pack 3.1.0.0. and Tivoli Service Level Advisor to function correctly, perform the following procedures:

1. Back up all Tivoli Business Systems Manager databases.
2. Back up the TWH_CDW and TWH_MD Tivoli Data Warehouse databases.
3. Back up all Tivoli Service Level Advisor databases.
4. Promote the following steps to test mode and run them manually in the following order:
 - a. GTM_c10_s010_Load_Resources_Staging
 - b. GTM_c10_s020_Process_Resources_Staging
5. Promote the GTM_c15_s010_Migration step to test mode and run it manually.
6. Promote the following steps to test mode and run them manually in the following order:
 - a. GTM_c10_s030_Load_Avail_Staging
 - b. GTM_c10_s040_Process_Avail_Staging
7. Run the Tivoli Service Level Advisor migration as described in IBM Tivoli Service Level Advisor APAR IY48333-13 document.

The data in the GTM.MIGR_COPM table is used to perform the migration in the Tivoli Service Level Advisor database for the resource changes. The branch value mapping rules are described in the APAR IY48333-13 document.

Uninstallation of the warehouse pack

Uninstall the warehouse pack as described in the *Installing and Configuring Tivoli Data Warehouse* guide. When the warehouse pack is uninstalled, all the staging and working tables in the GTM schema are removed, but the data in the central data warehouse remains and is still usable by other applications.

Chapter 4. Maintenance

This section describes maintenance tasks for the warehouse pack.

The GTM_c10_Load_Process process loads the data incrementally using the extraction control in the Tivoli Business Systems Manager database. The GTM_c05_Init_Process and GTM_c15_Migration_Process processes are only run as documented and should not be run regularly.

Backing up and restoring

For common backup procedures, see the *Installing and Configuring Tivoli Data Warehouse* guide.

Tivoli Business Systems Manager Warehouse Pack, version 3.1.0.0 does not require any special procedure for backing up and restoring databases.

Pruning data

To manage the high volume of measurement data, use the Prune_Msmt_Ctrl table to delete the data that are not needed. The TWG.Prune_Msmt_Log table keeps a history of data deletion. The Tivoli Business Systems Manager measurement data is retained in the TWH_CDW database for 180 days by default. This default value is saved in the PMSmtC_Age_In_Days column of the TWG.Prune_Msmt_Control table. The CDW_c05_Prune_and_Mark_Active process within the CDW_Tivoli_Data_Warehouse_v1.2.0_Subject_Area controls the deletion. By default, this process runs daily at 6:00 am.

```
DB2 UPDATE TWG.Prune_Msmt_Control SET PMSMTC_AGE_IN_DAYS = 30
WHERE MSRC_CD = 'GTM' AND TMSUM_CD = 'P'
```

Measurement data is pruned from the Msmt table based on the age specified in the PMSmtC_Age_In_Days column.

The PMSmtC_Age_In_Days value should be set back to 180 days after completing the post initialization process described in “Post installation procedures” on page 14.

Central data warehouse database

By default, data older than 3 months is pruned when the CDW_c05_Prune_and_Mark_Active process runs. This process is within CDW_Tivoli_Data_Warehouse_v1.2.0_Subject_Area. By default, this process runs daily at 6:00 a.m.

Extraction control (Extract_Control table)

The extraction control table, as shown in Table 9 on page 18, assists you in incrementally extracting data from a source database. For an example of incremental extraction, see the *Enabling an Application for Tivoli Data Warehouse* guide.

Table 9. Extraction control table

ExtCtl_ Source VARCHAR (120)	ExtCtl_ Target VARCHAR (120)	ExtCtl_ From_ RawSeq CHAR (10)	ExtCtl_ To_ RawSeq CHAR (10)	ExtCtl_ From_ IntSeq BIGINT	ExtCtl_ To_ IntSeq BIGINT	ExtCtl_ From_ DtTm TIME STAMP	ExtCtl_ To_ DtTm TIME STAMP	MSrc_ Corr _Cd CHAR (6)
ETL1	MSMT					2003-01-28- 11.36.54. 000000	2003-01-29- 11.36.54. 000000	GTM

Problem determination

For common problems and solutions, see the *Installing and Configuring Tivoli Data Warehouse* guide. This section only documents the guidelines and problem determination strategies specific to the Tivoli Business Systems Manager Warehouse Pack. If any of the central data warehouse ETL steps fail, there are three places to get the error messages:

- DB2 Data Warehouse Center log. It can be viewed by clicking **DB2 Data Warehouse Center** → **Work in Progress** → **Show Log**.
- Tivoli Data Warehouse log, which is located in the <IBM>\Tivoli\common\cdw\ directory.
- DB2 logs located in the <SQLLIB>\logs directory.

For the further problem determination, use the following utilities:

- ODBC trace
- DB2 data warehouse agent trace
- DB2 trace

Database Connection

Tivoli Business Systems Manager Warehouse Pack, version 3.1.0.0 requires the MSSQL network client to be installed on the server where the DB2 warehouse agent is used. You can install either the MSSQL client or the MSSQL network client, though you can use the MSSQL client for debugging. After the Tivoli Business Systems Manager Warehouse Pack, version 3.1.0.0 is installed, the connection should be tested during the installation procedure. If anything changes for the network connectivity after the installation, the following methods can be used to verify the connection:

- Test it using the ODBC data source administrator interface. Locating the system data source on a Windows operating system is documented in the *Installing and Configuring Tivoli Data Warehouse* guide. The Tivoli Business Systems Manager Warehouse Pack, version 3.1.0.0 uses OBJECT as the system data source for the source database and TWH_CDW for the target database.
- Test it using the DB2 Data Warehouse Center by using the following steps:
 1. Find GTM_OBJECT_Source in the Warehouse Source folder.
 2. Open the property page.
 3. Go to the Tables and Views tab to get the list of database tables.

This is only used after the ODBC data source tested successfully.

Data Validation

The following extraction control tables are used in the Object database of Tivoli Business Systems Manager:

twh_objs

Provides business systems and executive dashboard service resources

twh_date

Provides the state changes of business systems

To view the data in MSSQL query analyzer use the following code:

```
SELECT * FROM twh_objs  
SELECT * FROM twh_date
```

The following extraction controls are provided in the Tivoli Data Warehouse database:

GTM.Resource

for business systems and executive dashboard service resources.

TWG.EXTRACT_CONTROL

for the state changes of business systems.

Use the following DB2 command to view the data in the Tivoli Data Warehouse database:

```
SELECT * FROM TWG.EXTRACT_CONTROL WHERE ExtCtl_MSrc_Corr_Cd = 'GTM'  
SELECT * FROM GTM.Resource
```

The following stored procedures in the Object database of the Tivoli Business Systems Manager product can be run as diagnostic tools:

etl_getnewobjs

Retrieves new resources from the last ETL run.

etl_getdeleteobjs

Retrieves deleted resources from the last ETL run.

etl_updateattrs

Retrieves updated attribute from the last ETL run.

twh_getlobstates

Retrieves Tivoli Service Level Advisor measurement data from the last ETL run.

These can be run multiple times without effecting the ETL processes.

Chapter 5. ETL processes

One subject area, `GTM_Tivoli_Business_Systems_Manager_v3.1_Subject_Area`, is defined. It contains the following processes:

- `GTM_c05_Init_Process`
- `GTM_c10_Load_Process`
- `GTM_c15_Migration_Process`

For performance reasons, Tivoli Business Systems Manager central data warehouse ETL saves the extraction control in both the Tivoli Business Systems Manager and the `TWH_CDW` databases. It is required to synchronize the extraction controls in the databases before running the usual process. The initialization process is defined to synchronize the extraction controls. The `GTM_c05_Init_Process` process is defined to change the extraction markers in the Tivoli Business Systems Manager database based on the data in the Tivoli Data Warehouse database for the incremental extraction. The `GTM_c10_Load_Process` process loads the Tivoli Business Systems Manager resources and measurement data into Tivoli Data Warehouse. The `GTM_c15_Migration_Process` process is used for the migration of the data loaded with the Tivoli Business Systems Manager version 2.1.1 Warehouse Pack into the Tivoli Data Warehouse. The Tivoli Service Level Advisor migration procedure provides migration for the Tivoli Service Level Advisor definitions.

GTM_c05_Init_Process

This process reloads the extraction controls for resources and measurement data in the Tivoli Business Systems Manager application database from the Tivoli Data Warehouse database. Use this process after installing the warehouse pack, applying fixes, or restoring databases to synchronize the extraction controls in the Tivoli Business Systems Manager database.

This process has the following step:

GTM_c05_s010_Rebuild_ExtCTRL

This step reloads the extraction controls for resources and measurement from the Tivoli Data Warehouse database into the Tivoli Business Systems Manager application database.

It is used for the new installation of the Tivoli Business Systems Manager warehouse pack and restoration of the databases for the existing Tivoli Business Systems Manager warehouse pack. It is defined to run on demand, as documented. The procedure to synchronize the extraction control during the installation is documented in "Post installation procedures" on page 14.

If you restored either the Tivoli Business Systems Manager or the Tivoli Data Warehouse databases, before you create new business systems and executive dashboard service resources, use the following procedure to synchronize the extraction control for Tivoli Business Systems Manager and Tivoli Data Warehouse:

1. Promote the `GTM_c05_s010_Rebuild_ExtCTRL` step in the `GTM_c05_Init_Process` process to test mode, if it is not in test mode, and then run it manually.

2. Promote the following steps in the GTM_c10_Load_Process process to test mode, if they are not in test mode, and then run them manually in the following order:
 - a. GTM_c10_s010_Load_Resources_Staging
 - b. GTM_c10_s020_Process_Resources_Staging
3. Change the following steps in the GTM_c10_Load_Process process to production mode for the regular data process:
 - a. GTM_c10_s010_Load_Resources_Staging
 - b. GTM_c10_s020_Process_Resources_Staging

GTM_c10_Load_Process

This process extracts, transforms, and loads the business systems and executive dashboard services information and the measurement data of the BUSINESS SYSTEM components from the Tivoli Business Systems Manager database to the TWH_CDW database. The data is saved in the staging tables in the GTM schema of the TWH_CDW database first, and then the transformed data is loaded from the staging tables into the TWH_CDW database (based on the mapping of the Tivoli Business Systems Manager resources to the Tivoli Data Warehouse components). This process is designed to run incrementally after initialization using the extraction control in Tivoli Business Systems Manager application database.

Run this process after installing the warehouse pack and after running the initialization process. It is scheduled to run at an interval once a day before the Tivoli Service Level Advisor ETL runs, if applicable. All steps run based on the success of the previous steps.

This process has the following steps:

GTM_c10_s010_Load_Resources_Staging

This step extracts and loads the business systems and services, and their changes, from the Tivoli Business Systems Manager database into the staged tables in the GTM schema of the TWH_CDW database. It includes information about component creation, renaming, enabling, and deletion.

GTM_c10_s020_Process_Resources_Staging

This step transforms and loads the resource data from the staged tables into permanent tables in the TWG schema of the TWH_CDW database.

GTM_c10_s030_Load_Avail_Staging

This step extracts and loads the state changes for all business system resources to the staging tables in the GTM schema of the TWH_CDW database.

GTM_c10_s040_Process_Avail_Staging

This step transforms and loads the state changes from the staging tables into permanent tables in the TWG schema of the TWH_CDW database.

GTM_c15_Migration_Process

This process is designed for migrations and future improvement. The migration steps require process control in the scripts. The MIGR_CTRL control table is located in the Tivoli Business Systems Manager application database. When the steps are run for the first time, an indicator for the actions is recorded. After the first run, these steps do nothing unless new code with a different indicator is appended in the scripts. The detailed function and step description are

documented in the migration instructions or the installation instructions in the readme file of the fix packs for each delivery.

Run this process as described in the migration instructions or the installation instructions in the readme file of the fix packs. This process should run on-demand.

This process has the following steps:

GTM_c15_s010_Migration

This is the first step of migration. It can perform a different action at different blocks of code. The detailed description and instruction for each block of code added are documented when the code is created.

GTM_c15_s020_Migration

This is the second step of migration. It can perform a different action at different blocks of code. The detailed description and instruction for each block of code added are documented when the code is created.

GTM_c15_s030_Migration

This is the third step of migration. It can perform a different action at different blocks of code. The detailed description and instruction for each block of code added are documented when the code is created.

GTM_c15_s040_Migration

This is the fourth step of migration. It can perform a different action at different blocks of code. The detailed description and instruction for each block of code added are documented when the code is created.

Chapter 6. Central data warehouse information

Before reading this section, read about the generic schema for the central data warehouse, which is described in *Enabling an Application for Tivoli Data Warehouse*. That document defines the content of each table and explains the relationships between the tables in this document.

Shaded columns in the following tables are translated. These columns are also marked with an asterisk (*) after the column name.

Component configuration

The following sections describe the component configuration.

Component Type

Table 10 on page 26 shows the fields of the compTyp table.

Table 10. Component Type (TWG.CompTyp Table)

CompTyp_Cd CHAR(17)	CompTyp_Parent_ Cd CHAR(17)	CompTyp_Nm* VARCHAR(120)	CompTyp_Strt_ DtTm TIMESTAMP	CompTyp_End_ DtTm TIMESTAMP	MSrc_Corr_Cd CHAR(6)
BUSINESS_ SYSTEM	NULL	Business System	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	MODEL1
SERVICE	NULL	Service	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	MODEL1
* This column is translated.					

Component Extension

This warehouse pack does not use the TWG.Comp_Ext table.

Component

Table 11 on page 28 shows the fields of the Comp table.

Table 11. Component (TWG.Comp Table)

Comp_ID INT	CompTyp_Cd CHAR (17)	Centr_Cd CHAR (6)	Cust_ID INT	Comp_Corr_ID INT	Comp_Nm VARCHAR (254)	Comp_Corr_Val VARCHAR (254)	Comp_Strt_DtTm TIMESTAMP	Comp_End_DtTm TIMES TAMP	Comp_Ds VARCHAR (254)	M_Src _Corr_Cd CHAR (6)
1	BUSINESS_ SYSTEM	CDW	1	NULL	Data Centers	LOB1	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
2	BUSINESS_ SYSTEM	CDW	1	NULL	Eastern Complex	LOB2	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
3	BUSINESS_ SYSTEM	CDW	1	NULL	Bank1	LOB3	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
4	BUSINESS_ SYSTEM	CDW	1	NULL	CICS A	LOB4	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
5	BUSINESS_ SYSTEM	CDW	1	NULL	Western Complex	LOB5	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
6	BUSINESS_ SYSTEM	CDW	1	NULL	Bank1	LOB6	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
7	BUSINESS_ SYSTEM	CDW	1	NULL	CICS B	LOB7	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
8	SERVICE	CDW	1	NULL	Eastern Saving	7614a3bb-13cf-3841-91cd-5e845c831ada	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED
9	SERVICE	CDW	1	NULL	Data Centers	64b73f0a-839d-3cd2-999f-6dd4cc76dfed	2003-01-28-11.36.54.000000	9999-01-01-00.00.00.00	NULL	SHARED

Component Relationship Type

Table 12 on page 30 shows the fields of the ReInTyp table.

Table 12. Relationship Type (TWG.ReIn Typ Table)

ReIn Typ- Cd CHAR(6)	ReIn Typ_Nm* VARCHAR(120)	M Src- Corr_Cd CHAR(6)
PCHILD	Parent Child Relation	MODEL1
SUPPRT	Support Relation	MODEL1

* This column is translated.

Component Relationship Rule

Table 13 on page 32 shows the fields of the ReInRul table.

Table 13. Relationship Rule (TWG.ReinRul Table)

CompTyp_Source_Cd CHAR(17)	CompTyp_Target_Cd CHAR(17)	RelnTyp_Cd CHAR(6)	RelnRul_Strt_ DtTm TIMESTAMP	RelnRul_End_ DtTm TIMESTAMP
BUSINESS_SYSTEM	BUSINESS_SYSTEM	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00
BUSINESS_SYSTEM	SERVICE	SUPPRT	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00
SERVICE	SERVICE	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00

Component Relationship

Table 14 on page 34 shows the fields of the CompReIn table.

Table 14. Component Relationship (TWG.CompReIn Table)

Comp_Source_ID INT	Comp_Target_ID INT	ReInTyp_Cd CHAR(6)	CompReIn_Strt_DfTm TIMESTAMP	CompReIn_End_DfTm TIMESTAMP	MSrc_Corr_Cd CHAR(6)
1	2	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
2	3	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
3	4	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
1	5	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
5	6	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
6	4	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
6	7	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
8	3	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED
9	1	PCHILD	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	SHARED

Component Type Keyword

This warehouse pack does not use the TWG.CompTyp_Keyword table.

Attribute Type

Table 15 on page 36 shows the fields of the AttrTyp table.

Table 15. Attribute Type (TWG.AttrTyp Table)

AttrTyp_Cd CHAR(17)	AttrTyp_Nm* CHAR(120)	Msrc_ Corr_Cd CHAR(6)
GTM_CID	Tivoli Business Systems Manager class identification	GTM
GTM_ENABLE	Tivoli Business Systems Manager enable flag for executive view service	GTM
GTM_ID	Tivoli Business Systems Manager object identification	GTM
GTM_RTYPE	Resource type	GTM
NAME	Name	MODEL1
NAME_GUID	Name global unique identifier	MODEL1
USER_LABEL	User label	MODEL1

* This column is translated.

Attribute Rule

Table 16 on page 38 shows the fields of the AttrRul table.

Table 16. Attribute Rule (TWG.AttrRul Table)

CompTyp_Cd CHAR(17)	AttrTyp_Cd CHAR(17)	AttrRul_Strt_ DtTm TIMESTAMP	AttrRul_End_DtTm TIMESTAMP	AttrRul_ Dom_Ind CHAR(1)	AttrTyp_ Multi_ Val CHAR(1)
BUSINESS_ SYSTEM	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
BUSINESS_ SYSTEM	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
BUSINESS_ SYSTEM	GTM_RTYP	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
BUSINESS_ SYSTEM	NAME	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
SERVICE	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
SERVICE	GTM_ENABLE	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
SERVICE	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
SERVICE	NAME	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
SERVICE	NAME_GUID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N
SERVICE	USER_LABEL	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	N	N

Attribute Domain

This warehouse pack does not use the TWG.AttrDom table.

Component Attribute

Table 17 on page 40 shows the fields of the CompAttr table.

Table 17. Component Attribute (TWG.CompAttr Table)

Comp_ID INT	AttrTyp_Cd CHAR(17)	CompAttr_ Strt_DtTm TIMESTAMP	CompAttr_ End_ DtTm TIMESTAMP	CompAttr_Val CHAR(254)	M Src_Corr_Cd CHAR(6)
1	NAME	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	Data Centers	GTM
1	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	1	GTM
1	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM
2	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	2	GTM
2	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM
3	NAME	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	Bank1 Enterprise	GTM
3	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	3	GTM
3	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM
4	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	4	GTM
4	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM
4	GTM_RTYPE	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	CICS	GTM
5	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	5	GTM
5	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM
6	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	6	GTM
6	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM

Table 17. Component Attribute (TWG.CompAttr Table) (continued)

Comp_ID INT	AttrTyp_Cd CHAR(17)	CompAttr_ Strt_DtTm TIMESTAMP	CompAttr_End_ DtTm TIMESTAMP	CompAttr_Val CHAR(254)	M Src_Corr_Cd CHAR(6)
7	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	7	GTM
7	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	LOB	GTM
7	GTM_RTYPE	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	CICS	GTM
8	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	1	GTM
8	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	EXES	GTM
8	NAME_GUID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	7614a3bb-13cf-3841-91cd- 5e845c831ada	GTM
8	USER_LABEL	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	Mortgage	GTM
9	GTM_ID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	9	GTM
9	GTM_CID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	EXES	GTM
9	NAME_GUID	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	64b73f0a-839d-3cd2-999f- 6dd4cc76dfed	GTM
8	USER_LABEL	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	Data Centers	GTM
9	GTM_ENABLE	2003-01-28-11.36.54. 000000	9999-01-01-00.00.00.00	0	GTM

Component Type Relationship

This warehouse pack does not use the TWG.CTypReIn table.

Component Attribute Type Relationship

This warehouse pack does not use the TWG.ATypReIn table.

Component measurement

The following sections describe the component measurement.

Measurement Group Type

Table 18 on page 43 shows the fields of the MGrpTyp table.

Table 18. Measurement Group Type (TWG.MGrpTyp Table)

MGrpTyp_Cd CHAR(6)	MGrpTyp_Nm* VARCHAR(120)
GROUP	Aggregate Types or Group Functions
TRANS	State Transition Groups

* This column is translated.

Measurement Group

Table 19 on page 45 shows the fields of the MGrp table.

Table 19. Measurement Group (TWG.MGrp Table)

MGrp_Cd CHAR(6)	MGrpTyp_Cd CHAR(6)	MGrp_Parent_Cd CHAR(6)	MGrp_Nm* VARCHAR(120)
GTMOBJ	TRANS	NULL	Tivoli Business Systems Management State Transition Measurement
TOT_E	GROUP	NULL	Total Value Exists

* This column is translated.

Measurement Group Member

Table 20 on page 47 shows the fields of the MGrpMbr table.

Table 20. Measurement Group Member (TWG.MGrpMbr Table)

MGrp_Cd CHAR(6)	MGrpTyp_Cd CHAR(6)	MsmtTyp_ID INT
GTMObJ	TRANS	1
GTMObJ	TRANS	2
GTMObJ	TRANS	3
GTMObJ	TRANS	4
GTMObJ	TRANS	5
GTMObJ	TRANS	6
TOT_E	GROUP	1
TOT_E	GROUP	2
TOT_E	GROUP	3
TOT_E	GROUP	4
TOT_E	GROUP	5
TOT_E	GROUP	6

Measurement Unit Category

Table 21 on page 49 shows the fields of the MUnitCat table.

Table 21. Measurement Unit Category (TWG.MUnitCat Table)

MUnitCat_Cd CHAR(6)	MUnitCat_Nm* CHAR(120)
TM	Time Duration
* This column is translated.	

Measurement Unit

Table 22 on page 51 shows the fields of the MUnit table.

Table 22. Measurement Unit (TWG.MUnit Table)

MUnit_Cd CHAR(6)	MUnitCat_Cd CHAR(6)	MUnit_Nm* VARCHAR(120)
Min	TM	Minutes

* This column is translated.

Measurement Type Relationship

This warehouse pack does not use the TWG.MTypReIn table.

Time Summary

This warehouse pack does not use the TWG.TmSum table.

Measurement Source

Table 23 on page 53 shows the fields of the MSrc table.

Table 23. Measurement Source (TWG.MSrc Table)

MSrc_Cd CHAR(6)	MSrc_Parent_Cd CHAR(6)	MSrc_Nm* CHAR(120)
Tivoli	NULL	Tivoli Application
MODEL1	NULL	Tivoli Common Data
GTM	Tivoli	Tivoli Business Systems Manager

* This column is translated.

Measurement Source History

This warehouse pack does not use the TWG.MSrc_History table.

Measurement Type

Table 24 on page 55 shows the fields of the MsmtTyp table.

Table 24. Measurement Type (TWG.MsmtTyp Table)

MsmtTyp_ID INT	MUnit_Cd CHAR(6)	MSrc_Cd CHAR(6)	MsmtTyp_Nm* CHAR(120)	MsmtTyp_Ds* CHAR(254)
1	Min	MODEL1	Available	The amount of time that the resource is available
2	Min	MODEL1	Degrading	The amount of time that the resource is degrading
3	Min	MODEL1	Unavailable	The amount of time that the resource is unavailable
4	Min	MODEL1	Repairing	The amount of time that it took to fix the problem associated with the resource
5	Min	MODEL1	Unmanaged	The amount of time that the resource is unmanaged
6	Min	MODEL1	Unknown	The amount of time that the state of the resource is unknown

* This column is translated.

Component Measurement Rule

Table 25 on page 57 shows the fields of the MsmtRul table.

Table 25. Measurement Rule (TWG.MsmtRul Table)

CompTyp_Cd CHAR(17)	MsmtTyp_ID INT
BUSINESS_SYSTEM	1
BUSINESS_SYSTEM	2
BUSINESS_SYSTEM	3
BUSINESS_SYSTEM	4
BUSINESS_SYSTEM	5
BUSINESS_SYSTEM	6

Measurement

Table 26 on page 59 shows the fields of the Msmt table.

Table 26. Measurement (TWG.Msmt Table)

Comp_ID INT	MsmtTyp_ID INT	TmSum_Cd CHAR(1)	Msmt_Strt_DT DATE	Msmt_Strt_TM TIME	Msmt_Min_Val DOUBLE	Msmt_Max_Val DOUBLE	Msmt_Avg_Val DOUBLE	Msmt_Tot_Val DOUBLE	Msmt_Smpl_Cnt INT	Msmt_Err_Cnt INT	Msmt_StdDev_Val DOUBLE	MSrc_Corr_Cd CHAR(6)
3	2	P	2003-01-28	11:00:00 AM	NULL	NULL	NULL	10	0	0	0	GTM
3	3	P	2003-01-28	16:00:00	NULL	NULL	NULL	70	0	0	0	GTM
3	4	P	2003-01-28	15:00:00	NULL	NULL	NULL	3530	0	0	0	GTM
3	2	P	2003-01-28	17:00:00	NULL	NULL	NULL	130	0	0	0	GTM

Threshold Measurement Objective

This warehouse pack does not use the TWG.MObj table.

Threshold Measurement Objective Range

This warehouse pack does not use the TWG.MObjRng table.

Threshold Severity Level

This warehouse pack does not use the TWG.SevLvl table.

Component events

The following section describes the component events.

Event Type

This warehouse pack does not use the TWG.EventTyp table.

Event

This warehouse pack does not use the TWG.Event table.

Event Attribute

This warehouse pack does not use the TWG.EventAttr table.

Event Attribute Type

This warehouse pack does not use the TWG.EAttrTyp table.

Event Group

This warehouse pack does not use the TWG.EGrp table.

Event Group Member

This warehouse pack does not use the TWG.EGrpMbr table.

Event Group Type

This warehouse pack does not use the TWG.EGrpTyp table.

Event Type Relationship

This warehouse pack does not use the TWG.ETypReIn table.

Event Relationship

This warehouse pack does not use the TWG.EventReIn table.

Component-Event Relationship

This warehouse pack does not use the TWG.CEReIn table.

Event Rule Relationship

This warehouse pack does not use the TWG.EReInRul table.

Component-Event Rule Relationship

This warehouse pack does not use the TWG.CEReInRul table.

Helper tables

All the helper tables are created in GTM schema.

Component Mapping

Table 27 on page 62 shows the fields of the MIGR_COMP table.

This table is used for Tivoli Service Level Advisor to migrate the component definition changes from the Tivoli Business Systems Manager Warehouse Pack 2.1.1 to the Tivoli Business Systems Manager Warehouse Pack 3.1.0.0.

Table 27. Component mapping table GTM.MIGR_COMP

Ident INTEGER	ORIG_NM VARCHAR (25 4)	ORIG_ID BIGINT	ORIG_CTYPE VARCHAR (17)	NEW_NM VARCHAR (25 4)	NEW_ID BIGINT	NEW_CTYPE VARCHAR (17)	CREATE_DT TIMESTAMP
1	LOB A	1	TBSM_LOB	LOB A	5	BUSINESS_ SYSTEM	'2003-4-13 9:30'
2	LOB B	4	TBSM_LOB	LOB B	10	BUSINESS_ SYSTEM	'2003-4-13 9:30'

The following list describes the columns in Table 27 on page 62:

ORIG_NM

Original name of the component.

ORIG_ID

Original component ID of the component. (This is the ID before any shared components are broken apart.)

ORIG_CTYPE

Original component type code of the component.

NEW_NM

New name of the component.

NEW_ID

New component ID of the component. (This is the ID after any shared components are broken apart.)

NEW_CTYPE

Original component type code of the component.

CREATE_DT

Time stamp of when the new component was added.

Exception tables

This warehouse pack does not use the <exception> tables.

Incremental extraction

This warehouse pack does not use the <incremental extraction> tables.

Data marts

This warehouse pack does not provide data marts.

Support information

This section describes the following options for obtaining support for IBM products:

- “Searching knowledge bases”
- “Obtaining fixes”
- “Contacting IBM Software Support” on page 66

Searching knowledge bases

If you have a problem with your IBM software, you want it resolved quickly. Begin by searching the available knowledge bases to determine whether the resolution to your problem is already documented.

Search the information center on your local system or network

IBM provides extensive documentation that can be installed on your local computer or on an intranet server. You can use the search function of this information center to query conceptual information, instructions for completing tasks, reference information, and support documents.

Search the Internet

If you cannot find an answer to your question in the information center, search the Internet for the latest, most complete information that might help you resolve your problem. To search multiple Internet resources for your product, expand the product folder in the navigation frame to the left and select **Web search**. From this topic, you can search a variety of resources including:

- IBM technotes
- IBM downloads
- IBM Redbooks™
- IBM developerWorks®
- Forums and newsgroups
- Google

Obtaining fixes

A product fix might be available to resolve your problem. You can determine what fixes are available for your IBM software product by checking the product support Web site:

1. Go to the IBM Software Support Web site (<http://www.ibm.com/software/support>).
2. Under **Products A - Z**, click **I**. When the list of products is displayed, click **IBM Tivoli Business Systems Manger for z/OS**. This opens the product-specific support site.
3. Under **Search our support knowledge base for IBM Tivoli Business Systems Manger for z/OS**, type your text in the search field and click the **Submit**

button. You can limit your search by selecting **Solve a problem**, **Download**, or **Learn**, or any combination. For tips on refining your search, click **Search assistance**.

4. When you find the list of fixes, fix packs, or other service updates that you are looking for, click the name of a fix to read the description and optionally download the fix.

To receive weekly e-mail notifications about fixes and other news about IBM products, follow these steps:

1. From the support page for any IBM product, click **My support** in the upper-right corner of the page.
2. If you have already registered, skip to the next step. If you have not registered, click register in the upper-right corner of the support page to establish your user ID and password.
3. Sign in to **My support**.
4. On the My support page, click **Edit profiles** in the left navigation pane, and scroll to **Select Mail Preferences**. Select a product family and check the appropriate boxes for the type of information you want.
5. Click **Submit**.
6. For e-mail notification for other products, repeat Steps 4 and 5.

For more information about types of fixes, see the *Software Support Handbook* (<http://techsupport.services.ibm.com/guides/handbook.html>).

Contacting IBM Software Support

IBM Software Support provides assistance with product defects.

Before contacting IBM Software Support, your company must have an active IBM software maintenance contract, and you must be authorized to submit problems to IBM. The type of software maintenance contract that you need depends on the type of product you have:

- For IBM distributed software products (including, but not limited to, Tivoli, Lotus®, and Rational® products, as well as DB2 and WebSphere® products that run on Windows or UNIX operating systems), enroll in Passport Advantage® in one of the following ways:
 - **Online:** Go to the Passport Advantage Web page (http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home) and click **How to Enroll**
 - **By phone:** For the phone number to call in your country, go to the IBM Software Support Web site (<http://techsupport.services.ibm.com/guides/contacts.html>) and click the name of your geographic region.
- For IBM eServer™ software products (including, but not limited to, DB2 and WebSphere products that run in zSeries®, pSeries®, and iSeries™ environments), you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for eServer software products, go to the IBM Technical Support Advantage Web page (<http://www.ibm.com/servers/eserver/techsupport.html>).

If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States or, from other countries, go to the contacts page of the IBM Software Support Handbook on the Web

(<http://techsupport.services.ibm.com/guides/contacts.html>) and click the name of your geographic region for phone numbers of people who provide support for your location.

Follow the steps in this topic to contact IBM Software Support:

1. Determine the business impact of your problem.
2. Describe your problem and gather background information.
3. Submit your problem to IBM Software Support.

Determine the business impact of your problem

When you report a problem to IBM, you are asked to supply a severity level. Therefore, you need to understand and assess the business impact of the problem you are reporting. Use the following criteria:

Severity 1	Critical business impact: You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.
Severity 2	Significant business impact: The program is usable but is severely limited.
Severity 3	Some business impact: The program is usable with less significant features (not critical to operations) unavailable.
Severity 4	Minimal business impact: The problem causes little impact on operations, or a reasonable circumvention to the problem has been implemented.

Describe your problem and gather background information

When explaining a problem to IBM, be as specific as possible. Include all relevant background information so that IBM Software Support specialists can help you solve the problem efficiently. To save time, know the answers to these questions:

- What software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
- Can the problem be re-created? If so, what steps led to the failure?
- Have any changes been made to the system? (For example, hardware, operating system, networking software, and so on.)
- Are you currently using a workaround for this problem? If so, please be prepared to explain it when you report the problem.

Submit your problem to IBM Software Support

You can submit your problem in one of two ways:

- **Online:** Go to the "Submit and track problems" page on the IBM Software Support site (<http://www.ibm.com/software/support/probsub.html>). Enter your information into the appropriate problem submission tool.
- **By phone:** For the phone number to call in your country, go to the contacts page of the IBM Software Support Handbook on the Web (techsupport.services.ibm.com/guides/contacts.html) and click the name of your geographic region.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible,

IBM Software Support provides a workaround for you to implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM product support Web pages daily, so that other users who experience the same problem can benefit from the same resolutions.

For more information about problem resolution, see [Searching knowledge bases](#) and [Obtaining fixes](#).

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