IBM Tivoli Monitoring for Business Integration: WebSphere MQ, Version 5.1.1
Warehouse Enablement Pack, Version 1.1.0.2
Implementation Guide

for Tivoli Enterprise Data Warehouse, Version 1.1

**Note:** Before using this information and the product it supports, read the information in Notices.

**Second Edition (June 2004)**

This edition applies to version 1, release 1, of Tivoli Enterprise Data Warehouse and to all subsequent releases and modifications until otherwise indicated in new editions.

# Contents

# 1   About this document

This document describes the Tivoli Enterprise Data Warehouse enablement pack, Version 1.1.0 for IBM® Tivoli Monitoring for Business Integration: WebSphere MQ®. This pack is created for Enterprise Data Warehouse, Version 1.1. This document covers the following topics:

- Installing and configuring the warehouse pack
- The data flow and data structures used by the warehouse pack

With this warehouse pack and the prerequisite IBM Tivoli Monitoring warehouse pack, you can extract data from the IBM Tivoli Monitoring middle layer database into the central data warehouse.  The data is then used to populate data marts created for reporting on WebSphere MQ components.

## 1.1  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 and its reports
- Create new reports
- 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 Enterprise 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)

## 1.2  Publications

This section lists publications in the Tivoli Enterprise Data Warehouse library and other related documents. It also describes how to access Tivoli publications online and how to order Tivoli publications.

The following sets of documentation are available to help you understand, install, and manage this warehouse pack:

- IBM Tivoli Monitoring for Business Integration
- IBM Tivoli Monitoring for Business Integration: WebSphere MQ
- Tivoli Enterprise Data Warehouse
- IBM DB2, DB2 Data Warehouse Center, and DB2 Warehouse Manager
- IBM Redbooks

## 1.2.1 IBM Tivoli Monitoring for Business Integration library

The following IBM Tivoli Monitoring for Business Integration documents are available online using the Tivoli Software Information Center:

- *IBM Tivoli Monitoring for Business Integration: Readme First,* SC32-1439

Provides information on where to find all of the IBM Tivoli Monitoring for Business Integration documentation, including the titles and locations of all documentation.

- *IBM Tivoli Monitoring for Business Integration Installation and Setup Guide*, SC32-1402

Provides information about installing each of the IBM Tivoli Monitoring for Business Integration components.

- *IBM Tivoli Monitoring for Business Integration User's Guide*, SC32-1403

Provides information about how to use each IBM Tivoli Monitoring for Business Integration component to manage resources.

- *IBM Tivoli Monitoring for Business Integration Problem Determination Guide,* SC32-1404

Provides information and messages to assist users with troubleshooting problems with the software.

## 1.2.2 IBM Tivoli Monitoring for Business Integration: WebSphere MQ library

The following IBM Tivoli Monitoring for Business Integration: WebSphere MQ documents are available online using the Tivoli Software Information Center:

- *IBM Tivoli Monitoring for Business Integration: WebSphere MQ Reference Guide*, SC32–1405

Provides information about the tasks and resource models that IBM Tivoli Monitoring for Business Integration WebSphere MQ provides.

- *IBM Tivoli Monitoring for Business Integration: WebSphere MQ Workflow Warehouse Enablement Pack Implementation Guide,* SC32-1409

Provides information that helps users deploy and use Tivoli Enterprise Data Warehouse with IBM Tivoli Monitoring for Business Integration WebSphere MQ.

- *Program Directory for IBM Tivoli Monitoring for Business Integration: WebSphere MQ for z/OS*, GI11-4234-01

Provides information about installing IBM Tivoli Monitoring for Business Integration: WebSphere MQ for z/OS.

## 1.2.3 Tivoli Enterprise Data Warehouse library

The following documents are available in the Tivoli Enterprise Data Warehouse library. The library is available on the Tivoli Enterprise Data Warehouse Documentation CD as well as online, as described in "Accessing publications online" on page 4.

- *Tivoli Enterprise Data Warehouse Release Notes*, SC32-1399

Provides late-breaking information about Tivoli Enterprise Data Warehouse and lists hardware requirements and software prerequisites.

- *Installing and Configuring Tivoli Enterprise Data Warehouse*, GC32-0744

Describes how Tivoli Enterprise 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.

- *Enabling an Application for Tivoli Enterprise Data Warehouse*, GC32-0745

Provides information about connecting an application to Tivoli Enterprise Data Warehouse. This book is for application programmers who use Tivoli Enterprise Data Warehouse to store and report on their application data, data warehousing experts who import Tivoli Enterprise Data Warehouse data into business intelligence applications, and customers who put their local data in Tivoli Enterprise Data Warehouse.

## 1.2.4 Related publications

The following sections describe additional publications to help you understand and use Tivoli Enterprise Data Warehouse.

### 1.2.4.1 IBM Redbooks

IBM Redbooks are developed and published by the IBM International Technical Support Organization, the ITSO. They explore integration, implementation, and operation of realistic customer scenarios. The following Redbooks contain information about Tivoli Enterprise Data Warehouse:

- *Introduction to Tivoli Enterprise Data Warehouse*, SG24-6607-00

  Provides a broad understanding of Tivoli Enterprise Data Warehouse. Some of the topics that are covered are concepts, architecture, writing your own extract, transform, and load processes (ETLs), and best practices in creating data marts.

- *Planning a Tivoli Enterprise Data Warehouse Project*, SG24-6608-00

  Describes the necessary planning you must complete before you can deploy Tivoli Enterprise Data Warehouse. The guide shows how to apply these planning steps in a real-life deployment of a warehouse pack using IBM Tivoli Monitoring. It also contains frequently used Tivoli and DB2 commands and lists troubleshooting tips for Tivoli Enterprise Data Warehouse.

### 1.2.4.2 IBM DB2, DB2 Data Warehouse Center, and DB2 Warehouse Manager library

The DB2 library contains important information about the database and data warehousing technology provided by IBM DB2, DB2 Data Warehouse Center, and DB2 Warehouse Manager. Refer to the DB2 library for help in installing, configuring, administering, and troubleshooting DB2, which is available on the IBM Web site:

http://www-3.ibm.com/software/data/db2/library/

After you install DB2, its library is also available on your system.

The following DB2 documents are particularly relevant for people working with Tivoli Enterprise Data Warehouse:

- *IBM DB2 Universal Database for Windows Quick Beginnings*, GC09-2971

  Guides you through the planning, installation, migration (if necessary), and setup of a partitioned database system using the IBM DB2 product on Microsoft Windows.

- *IBM DB2 Universal Database for UNIX Quick Beginnings*, GC09-2970

  Guides you through the planning, installation, migration (if necessary), and setup of a partitioned database system using the IBM DB2 product on UNIX.

- *IBM DB2 Universal Database Administration Guide: Implementation*, SC09-2944

  Covers the details of implementing your database design. Topics include creating and altering a database, database security, database recovery, and administration using the Control Center, which is a DB2 graphical user interface.

- *IBM DB2 Universal Database Data Warehouse Center Administration Guide*, SC26-9993

  Provides information on how to build and maintain a data warehouse using the DB2 Data Warehouse Center.

- *IBM DB2 Warehouse Manager Installation Guide*, GC26-9998

  Provides information on how to install the following Warehouse Manager components: Information Catalog Manager, warehouse agents, and warehouse transformers.

- *IBM DB2 Universal Database and DB2 Connect Installation and Configuration Supplement*, GC09-2957

  Provides advanced installation considerations, and guides you through the planning, installation, migration (if necessary), and set up of a platform-specific DB2 client. This supplement also contains information on binding, setting up communications on the server, the DB2 GUI tools, DRDA® AS, distributed installation, the configuration of distributed requests, and accessing heterogeneous data sources.

- *IBM DB2 Universal Database Message Reference Volume 1*, GC09-2978 and *IBM DB2 Universal Database Message Reference Volume 2*, GC09-2979

Lists the messages and codes issued by DB2, the Information Catalog Manager, and the DB2 Data Warehouse Center, and describes the actions you should take.

## 1.2.5 Accessing publications online

The publications CD or product CD contains the publications that are in the product library. The format of the publications is PDF, HTML, or both.

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. The Tivoli Software Information Center is located at the following Web address:

http://publib.boulder.ibm.com/tividd/td/tdprodlist.html

**Note**: If you print PDF documents on other than letter-sized paper, select the **Fit to page** check box in the Adobe Acrobat Print dialog. This option is available when you click **File → Print**. **Fit to page** ensures that the full dimensions of a letter-sized page print on the paper that you are using.

## 1.2.6 Ordering publications

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

http://www.elink.ibmlink.ibm.com/public/applications/publications/cgibin/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, for a list of telephone numbers, see the following Web site:

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

## 1.3  Accessibility

Accessibility features help users with a physical disability, such as restricted mobility or limited vision, to use software products successfully. For the warehouse pack, you use the interfaces of IBM DB2 and the reporting tool. See those documentation sets for accessibility information.

## 1.4  Contacting software support

If you have a problem with a Tivoli product, refer to the following IBM Software Support Web site:

http://www.ibm.com/software/sysmgmt/products/support/

If you want to contact customer support, see the IBM Software Support Guide at the following Web site:

http://techsupport.services.ibm.com/guides/handbook.html

The guide provides information about how to contact IBM Software Support, depending on the severity of your problem, and the following information:

- Registration and eligibility
- Telephone numbers and e-mail addresses, depending on the country in which you are located
- Information you must have before contacting IBM Software Support

## 1.5  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. You can use Web browsers like Netscape Navigator or Microsoft Internet Explorer to view these newsgroups:

Tivoli Enterprise Data Warehouse

[news://news.software.ibm.com/ibm.software.tivoli.enterprise-data-warehouse](news://news.software.ibm.com/ibm.software.tivoli.enterprise-data-warehouse)

## *1.6 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**)
- Column headings in a table
- Keywords and parameters in text

*Italic*

- Citations (titles of books, diskettes, and CDs)
- Words defined in text
- Emphasis of words (words as words)
- Letters as letters
- 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

# 2 Overview

The following sections provide an overview of Tivoli Enterprise Data Warehouse and the warehouse pack for IBM Tivoli Monitoring for Business Integration: WebSphere MQ.

## 2.1 Overview of Tivoli Enterprise Data Warehouse

Tivoli Enterprise Data Warehouse provides the infrastructure for the following:

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

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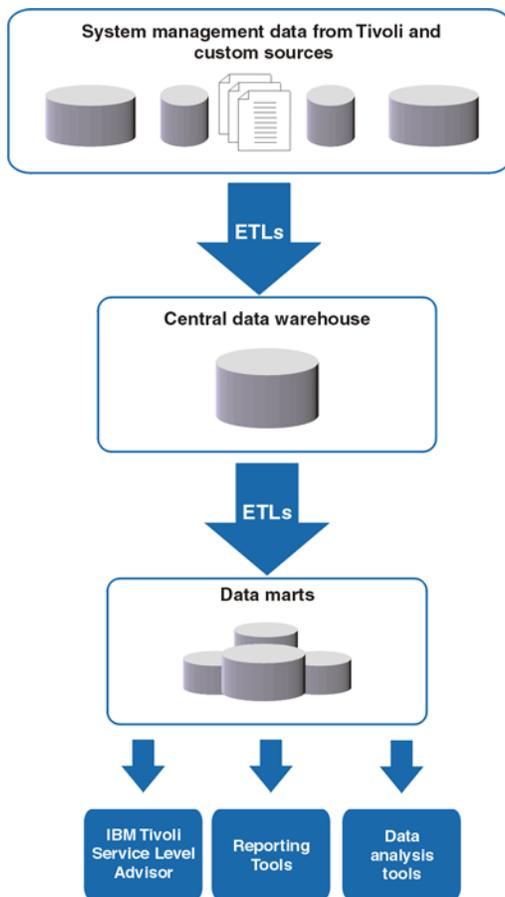


**Figure 1. Tivoli Enterprise Data Warehouse overview**

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 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 enablement pack*, referred to as a *warehouse pack* in the rest of this document.

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. Exception tables are described in Exception tables on page 29.

## 2.2  Overview of the WebSphere MQ warehouse enablement pack

The warehouse pack for IBM Tivoli Monitoring for Business Integration: WebSphere MQ provides metadata to enable the IBM Tivoli Monitoring 5.1.1 central data warehouse ETL to load data into the central data warehouse for WebSphere MQ queue manager, queue, and channel resources. For more information, see Metadata tables for applications that use the resource model ETL on page 31. The IBM Tivoli Monitoring for Business Integration: WebSphere MQ resource models running on Tivoli endpoints collect and log this operational data. The IBM Tivoli Monitoring Tivoli Enterprise Data Warehouse Support 5.1.1 component then uploads and inserts the operational data into a middle layer database as shown in Figure 2.
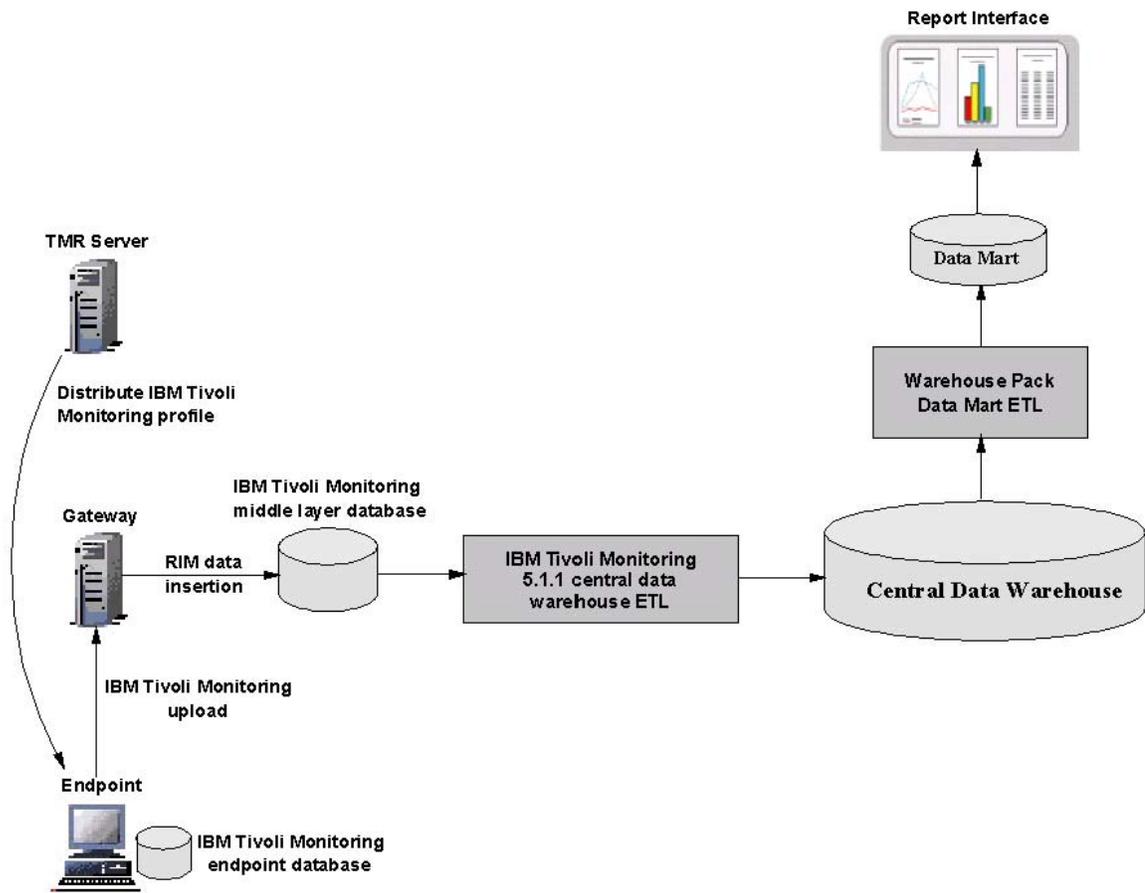
Figure 2. Data flow of operational data from IBM Tivoli Monitoring to Tivoli Enterprise Data Warehouse

This warehouse pack also provides a data mart ETL that comprises the three warehouse processes, extracts historical WebSphere MQ data from the central data warehouse, and inserts the data into the related queue manager, queue, and channel star schemas. See ETL processes on page 16 and Star schemas on page 43 for more details. The star schemas are included in the Monitoring for WebSphere MQ data mart database from which prepackaged reports are provided for WebSphere MQ status and analysis. See Reports on page 58 for more information on the prepackaged reports. You can also use the Monitoring for WebSphere MQ data mart database to create customized reports to meet your specific analytical needs.

# 3   Installing and configuring the warehouse pack

This section describes the information about installing and configuring the warehouse pack.

## 3.1  Prerequisites

Before installing the warehouse pack for IBM Tivoli Monitoring for Business Integration: WebSphere MQ, the following software must be installed:

- IBM Tivoli Monitoring for Business Integration, Version 5.1.1: WebSphere MQ Workflow
- IBM DB2 Universal Database Enterprise Edition Version 7.2
- IBM DB2 Universal Database Enterprise Edition Version 7.2 Fix Pack 8
- Tivoli Enterprise Data Warehouse, Version 1.1
- Tivoli Enterprise Data Warehouse, Version 1.1 fix pack 2 (1.1-TDW-FP02)
- IBM Tivoli Monitoring, Version 5.1.1, warehouse pack

You can obtain the Tivoli Enterprise Data Warehouse fix pack from the following Web site:

http://www.ibm.com/software/sysmgmt/products/support/TivoliDataWarehouse.html

Click the Downloads link in the Self help section.

## 3.2  Supported hardware and software

The IBM Tivoli Monitoring for Business Integration: WebSphere MQ Warehouse Pack, Version 1.1.0, supports IBM Tivoli Monitoring for Business Integration, Version 5.1.1: WebSphere MQ. It supports all versions of DB2, Informix, Microsoft SQL Server, Oracle, and Sybase database products as documented in the IBM Tivoli Monitoring 5.1.1 Release Notes GI10-5797-01 in the "Documentation Notes" sections.

For information about the hardware and software requirements of Tivoli Enterprise Data Warehouse, see the *Tivoli Enterprise Data Warehouse Release Notes*.

## 3.3  Product notes and limitations

### 3.3.1 Tivoli Enterprise Data Warehouse

This warehouse pack must be installed using the user "db2". If that is not the user name used when installing the Tivoli Enterprise Data Warehouse core application, you must create a user temporary tablespace for use by the installation program. The user temporary tablespace that is created in each central data warehouse database and data mart database during the installation of Tivoli Enterprise Data Warehouse is accessible only to the user that performed the installation.

If you are installing the warehouse pack using the same database user that installed Tivoli Enterprise Data Warehouse, or if your database user has access to another user temporary tablespace in the target databases, no additional action is required.

If you do not know the user name that was used to install Tivoli Enterprise Data Warehouse, you can determine whether the tablespace is accessible by attempting to declare a temporary tablespace while connected to each database as the user that will install the warehouse pack. The following commands are one way to do this:

```
db2 "connect to TWH_CDW user installing_user using password"

db2 "declare global temporary table t1 (c1 char(1))with replace on commit preserve rows not
logged"

db2 "disconnect TWH_CDW"
```

```
db2 "connect to TWH_MART user installing_user using password"

db2 "declare global temporary table t1 (c1 char(1))with replace on commit preserve rows not
logged"

db2 "disconnect TWH_MART"
```

The variables in these commands are the following:

*installing_user*  Identifies the database user that will install the warehouse pack.

*password*    Specifies the password for the installing user.

If the **declare** command is successful, the specified database user can install the warehouse pack. No additional action is required.

If the **declare** command fails, run the following DB2 commands to create a new tablespace for the installation in both the central data warehouse database and data mart databases:

```
db2 "connect to TWH_CDW user installing_user using password"

db2 "create user temporary tablespace usertmp2 managed by system using (' usertmp2')"

db2 "disconnect TWH_CDW"

db2 "connect to TWH_MART user installing_user using password"

db2 "create user temporary tablespace usertmp3 managed by system using (' usertmp3')"

db2 "disconnect TWH_MART"
```

The variables in these commands are the following:

*installing_user*  Identifies the database user that will install the warehouse pack.

*password*    Specifies the password for the installing user.

## 3.3.2 IBM Tivoli Monitoring for Business Integration: WebSphere MQ

Before distributing an IBM Tivoli Monitoring profile that contains IBM Tivoli Monitoring for Business Integration: WebSphere MQ resource models, WebSphere MQ queue managers configured on the target Tivoli endpoints must be discovered and activated. This ensures that the resource models log the correct command level and platform type attributes for the WebSphere MQ queue manager resources.

Metrics collected for z/OS and remotely administered WebSphere MQ resources have a time key value based on the distributed Tivoli endpoint to which the WebSphere MQ software has been distributed.

The queue manager platform type attribute is set to 'REMOTE' for all remotely administered WebSphere MQ resources.

## *3.4  Database sizing considerations*

Ensure that you have sufficient space in the central data warehouse database for the historical data collected by this warehouse pack. To estimate how much space is required for the IBM Tivoli Monitoring for Business Integration: WebSphere MQ warehouse pack, complete the following worksheets for the central data warehouse database and data mart database.

## 3.4.1 Central data warehouse database

The following worksheet estimates the required space in megabytes for the historical WebSphere MQ data. This estimate is based on the number of WebSphere MQ components inserted into the central data warehouse database and on how many days these components' measurements are stored.  This estimate is increased by 20% to accommodate staging tables and temporary tables.

| IBM Tivoli Monitoring for Business Integration, Version 5.1.1: WebSphere MQ | | | | |
|---|---|---|---|---|
| **Object managed** | **Number of components** | **Total components** | **Component space** | **Measurements per day space** |
| WebSphere MQ Host | *num_hosts* | *num_hosts* | $num\_hosts \times 2300$ | 0 |
| Queue managers per host | *num_qmgrs* | $num\_hosts \times num\_qmgrs$ | $num\_hosts \times num\_qmgrs \times 3400$ | $num\_hosts \times num\_adminSrv\_per\_host \times 8064$ |
| Queues per queue manager | *num_queues* | $num\_hosts \times num\_qmgrs \times num\_queues$ | $num\_hosts \times num\_qmgrs \times num\_queues \times 3400$ | $num\_hosts \times num\_qmgrs \times num\_queues \times 16200$ |
| Channels per queue manager | *num_chnls* | $num\_hosts \times num\_qmgrs \times num\_chnls$ | $num\_hosts \times num\_qmgrs \times num\_chnls \times 4200$ | $num\_hosts \times num\_qmgrs \times num\_chnls \times 39200$ |
| **Total** | | Sum of total components | Sum of components | Sum of measurements |

| | |
|---|---|
| **Number of days** | *num_days* |
| **Estimate database size in megabytes** | (Sum of components + (sum of measurements $\times$ *num_days*)) $\times$ 1.2/102400 |

In the following example, 1179.22 megabytes is estimated for storing component information and 180 days of measurement information for a WebSphere MQ host, a single queue manager, 100 queues, and 100 channels.

| IBM Tivoli Monitoring for Business Integration, Version 5.1.1: WebSphere MQ | | | | |
|---|---|---|---|---|
| **Object managed** | **Number of components** | **Total components** | **Component space** | **Measurements per day space** |
| WebSphere MQ Host | 1 | 1 | 2300 | 0 |
| Queue managers per host | 1 | 1 | 3400 | 46100 |
| Queues per queue manager | 100 | 100 | 340000 | 1620000 |
| Channels per queue manager | 100 | 100 | 420000 | 3920000 |
| **Total** | | 202 | 765700 | 5586100 |

| | |
|---|---|
| **Number of days** | 180 |
| **Estimate database size in megabytes** | 1179.22 |

## 3.4.2 Data mart database

The following example shows an estimate of the required space in MB for the extracted WebSphere MQ data. This estimate is based on the number of WebSphere MQ components inserted into the data mart database and on how many days these components' fact measurements are stored. This estimate is increased by 10% to accommodate staging tables and temporary tables.

| IBM Tivoli Monitoring for Business Integration, Version 5.1.1: WebSphere MQ | | | | |
|---|---|---|---|---|
| **Object managed** | **Number of components** | **Total components** | **Component space** | **Measurements per day space** |
| WebSphere MQ Host | $num\_hosts$ | $num\_hosts$ | $num\_hosts \times 300$ | 0 |
| Queue managers per host | $num\_qmgrs$ | $num\_hosts \times num\_qmgrs$ | $num\_hosts \times num\_qmgrs \times 320$ | $num\_hosts \times num\_adminSrv\_per\_host \times 107300$ |
| Queues per queue manager | $num\_queues$ | $num\_hosts \times num\_qmgrs \times num\_queues$ | $num\_hosts \times num\_qmgrs \times num\_queues \times 320$ | $num\_hosts \times num\_qmgrs \times num\_queues \times 51200$ |
| Channels per queue manager | $num\_chnls$ | $num\_hosts \times num\_qmgrs \times num\_chnls$ | $num\_hosts \times num\_qmgrs \times num\_chnls \times 380$ | $num\_hosts \times num\_qmgrs \times num\_chnls \times 124200$ |
| **Total** | | Sum of total components | Sum of components | Sum of measurements |

| | |
|---|---|
| **Number of days** | $num\_days$ |
| **Estimate database size in megabytes** | (Sum of components + (sum of measurements $\times num\_days$)) $\times 1.1/102400$ |

In the following example, 3412.35 megabytes is estimated for storing component information and 180 days of fact information for a WebSphere MQ host, a single queue manager, 100 queues, and 100 channels.

| IBM Tivoli Monitoring for Business Integration, Version 5.1.1: WebSphere MQ | | | | |
|---|---|---|---|---|
| Object managed | Number of components | Total components | Component space | Measurements per day space |
| WebSphere MQ Host | 1 | 1 | 300 | 0 |
| Queue managers per host | 1 | 1 | 320 | 107300 |
| Queues per queue manager | 100 | 100 | 32000 | 5120000 |
| Channels per queue manager | 100 | 100 | 38000 | 12420000 |
| Total | | 202 | 70620 | 17647300 |

| | |
|---|---|
| Number of days | 180 |
| Estimate database size in megabytes | 3412.35 |

## 3.5  Data sources and targets

Because the warehouse pack for IBM Tivoli Monitoring for Business Integration: WebSphere MQ leverages the IBM Tivoli Monitoring 5.1.1 central data warehouse ETL, no additional data sources or target sources are required for operational data.

The TWH_CDW and TWH_MART ODBC system data source names, which are created during Tivoli Enterprise Data Warehouse installation, are used to access the *CTQ_TWH_CDW_Source* and the *CTQ_TWH_Mart_Source* data sources and the *CTQ_TWH_MART_Target* and the *CTQ_TWH_MD_Target* target sources specific to the warehouse pack for IBM Tivoli Monitoring for Business Integration: WebSphere MQ.

## 3.6  Pre-installation procedures

Before installing the warehouse pack for IBM Tivoli Monitoring for Business Integration: WebSphere MQ, you must install all the necessary prerequisite software as described in Prerequisites – on page 9.

## 3.7  Installation procedure

Install the warehouse pack as described in *Installing and Configuring Tivoli Enterprise Data Warehouse*. The installation properties file for the warehouse pack is located on the IBM Tivoli Monitoring for Business Integration: WebSphere MQ 5.1.1 Component Software CD in the /TEDW/tedw_apps_etl/ctq directory.

## 3.8  Post-installation procedures

Manually stop and restart the following services for Tivoli Presentation Services:

- Server for IBM Console
- Web Services for the IBM Console

The procedure is described in the appendix "Starting and stopping Tivoli Presentation Services" in *Installing and Configuring Tivoli Enterprise Data Warehouse*.

Through the IBM DB2 Data Warehouse Center, update the user ID and password for the *CTQ_TWH_CDW_Source* and the *CTQ_TWH_Mart_Source* data sources and the *CTQ_TWH_MART_Target* and the *CTQ_TWH_MD_Target* target sources. In addition, schedule the *CTQ_m05_Load_Metric_Data_Process* process and set each of the process steps provided by this warehouse pack to production mode (refer to page 17 - Process dependencies for details).

If not already performed after installing the IBM Tivoli Monitoring, Version 5.1.1 warehouse pack, you must update the user ID and password for the *AMX_TWH_CDW_Source* and the *AMX_TWH_ITM_RIM_Source* data sources and the *AMX_TWH_CDW_Target* data target. You must also configure the data source name for the *AMX_TWH_ITM_RIM_Source* data source to the ODBC system data source name that is created for the IBM Tivoli Monitoring middle layer database.

# 4 Maintaining

This section describes maintenance tasks for the warehouse pack.

## 4.1 *Backing up and restoring*

Because this warehouse pack does not create any tables in the IBM Tivoli Monitoring middle-layer repository, no additional backup of this database or any special precautions are required before running the provided warehouse processes.

## 4.2 *Pruning*

### 4.2.1 Central data warehouse database

Pruning data from the measurement (Msmt) table is implemented with a combination of triggers and the *CDW_C05_Prune_Msmt_Process* warehouse process. Schedule how often you want the *CDW_C05_Prune_Msmt_Process* warehouse process to run (for example, weekly or monthly). The prune measurement control table (Prune_Msmt_Control) governs what data is pruned. By default, all WebSphere MQ data older than three months is pruned when the *CDW_C05_Prune_Msmt_*Process warehouse process is executed.

To modify the default date duration value, run the following SQL statement, where *X* is a date duration in the format *yyyymmdd* (for example, a value of X=0000108 represents 0 years, 01 months, 08 days and would result in all data older than 1 month and 8 days being pruned).

```
UPDATE TWG.Prune_Msmt_Control
SET PMSMTC_AGE_IN_DAYS = X
WHERE TMSUM_CD = 'H'
AND MSRC_CD = 'CTQ'
```

### 4.2.2 Data mart database

Pruning data from the WebSphere MQ fact tables is implemented in the *CTQ_m15_s010_Load_Fact* warehouse process step.  The prune mart control table (Prune_Mart_Control) governs what data is pruned and contains a date duration value for every WebSphere MQ fact table. By default, all hourly and daily fact data older than three months is pruned when the *CTQ_m15_s010_Load_Fact* process step runs. Conversely, all weekly and monthly fact data older than one year is pruned.

To modify the default date duration value for any of the WebSphere MQ fact tables, run the following SQL statement, where *table_name* is the appropriate WebSphere MQ fact table name and *X* is a date duration in the format *yyyymmdd* (for example, a value of X=0000108 represents 0 years, 01 months, 08 days and would result in all data older than 1 month and 8 days being pruned).

```
UPDATE CTQ.Prune_Mart_Control
SET PMARTC_DURATION = X
WHERE TABLE_NAME = 'table_name'
```

# 5 ETL processes

This warehouse pack has the following processes:

- CTQ_m05_Load_Metric_Data_Process
- CTQ_m10_Load_Component_Data_Process
- CTQ_m15_Load_Fact_Data_Process

## 5.1 *CTQ_m05_Load_Metric_Data_Process*

This process populates the WebSphere MQ metric dimension tables with metric information.

This process has the following step:

- CTQ_m05_s010_Load_Metric

This step populates the following metric tables with metric information related to WebSphere MQ measurement types:

- CTQ.D_QMGR_METRIC (WebSphere MQ queue manager)

- CTQ.D_QUEUE_METRIC (WebSphere MQ queue)

- CTQ.D_CHANNEL_METRIC (WebSphere MQ channel)

## 5.2 *CTQ_m10_Load_Component_Data_Process*

This process populates the WebSphere MQ component dimension tables with component information.

This process has the following step:

- CTQ_m10_s010_Load_Component

This step populates the following component dimension tables with component information related to WebSphere MQ component instances:

- CTQ.D_HOST (WebSphere MQ host)

- CTQ.D_QMGR (WebSphere MQ queue manager)

- CTQ.D_QUEUE (WebSphere MQ queue)

- CTQ.D_CHANNEL (WebSphere MQ channel)

## 5.3 *CTQ_m15_Load_Fact_Data_Process*

This process populates the WebSphere MQ fact tables with measurement data. This process also prunes obsolete data from the WebSphere MQ fact tables.

This process has the following steps:

- CTQ_m15_s010_Load_Fact

This step prunes any obsolete data as governed by the CTQ.PRUNE_MART_CONTROL table from each of the WebSphere MQ fact tables. Then, this step populates the following fact tables with WebSphere MQ measurement data:

- CTQ.F_QMGR_HOUR (WebSphere MQ queue manager hourly)

- CTQ.F_QUEUE_HOUR (WebSphere MQ queue hourly)

- CTQ.F_CHNL_HOUR (WebSphere MQ channel hourly)

- CTQ_m15_s020_Queue_Manager_Fact_Rollup

This step rolls up data from the WebSphere MQ queue manager hourly and staging hourly fact tables into the following fact tables:

- CTQ.D_QMGR_DAY (WebSphere MQ queue manager daily)

- CTQ.D_QMGR_WEEK (WebSphere MQ queue manager weekly)

- CTQ.D_QMGR_MONTH (WebSphere MQ queue manager monthly)
- CTQ_m15_s030_Queue_Fact_Rollup

This step rolls up data from the WebSphere MQ queue hourly and staging hourly fact tables into the following fact tables:

- CTQ.D_QUEUE_DAY (WebSphere MQ queue daily)

- CTQ.D_QUEUE_WEEK (WebSphere MQ queue weekly)

- CTQ.D_QUEUE_MONTH (WebSphere MQ queue monthly)
- CTQ_m15_s040_Channel_Fact_Rollup

This step rolls up data from the WebSphere MQ channel hourly and staging hourly fact tables into the following fact tables:

- CTQ.D_CHNL_DAY (WebSphere MQ channel daily)

- CTQ.D_CHNL_WEEK (WebSphere MQ channel weekly)

- CTQ.D_CHNL_MONTH (WebSphere MQ channel monthly)

## 5.4 Process dependencies

The warehouse processes provided by this warehouse pack must run in the following order:

1. CTQ_m05_Load_Metric_Data_Process
2. CTQ_m10_Load_Component_Data_Process
3. CTQ_m15_Load_Fact_Data_Process

Shortcuts have been created for these processes to ensure that they run in the correct order. Therefore, you only need to schedule the *CTQ_m05_Load_Metric_Data_Process* process and set each previously described process step to production mode through the IBM DB2 Data Warehouse Center for the data mart ETL provided by this warehouse pack to run successfully.

Because this warehouse pack leverages the IBM Tivoli Monitoring 5.1.1 central data warehouse ETL, the IBM Tivoli Monitoring 5.1.1 warehouse process *AMX_c05_ETL1_Process* must run before WebSphere MQ data is inserted into the central data warehouse database. Therefore, consider scheduling the *AMX_c05_ETL1_Process* warehouse process to run before the *CTQ_m05_Load_Metric_Data* warehouse process.

# 6 Generic schema implementation

Before reading this section, read about the generic schema for the Tivoli Enterprise Data Warehouse central data warehouse, which is described in *Enabling an Application for Tivoli Enterprise 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.

## *6.1 Component configuration*

The following sections describe the component configuration.

### 6.1.1 Component type (table CompTyp)

| CompTyp_Cd CHAR(17) | CompTyp_Parent_Cd CHAR(17) | CompTyp_Nm* VARCHAR(120) | CompTyp_Strt_DtTm TIMESTAMP | CompTyp_End_DtTm TIMESTAMP |
|---|---|---|---|---|
| IP_HOST | NULL | IP Host | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 |
| CTQ_HOST | NULL | WebSphere MQ Host | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 |
| CTQ_QMGR | NULL | WebSphere MQ Queue Manager | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 |
| CTQ_QUEUE | NULL | WebSphere MQ Queue | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 |
| CTQ_CHANNEL | NULL | WebSphere MQ Channel | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 |

### 6.1.2 Component (table Comp)

| Comp_ID INTEGER | CompTyp_Cd CHAR (17) | Centr_Cd CHAR(6) | Cust_ID INTEGER | Comp_Corr_ID INTEGER | Comp_Nm VARCHAR (254) | Comp_Corr_Val VARCHAR (254) | Comp_Strt_DtTm TIMESTAMP | Comp_End_DtTm TIMESTAMP | Comp_Ds VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| 0 | IP_HOST | CDW | 1 | | mqdeveloper.tivoli.com | | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | IP_HOST |
| 1 | CTQ_QMGR | CDW | 1 | 0 | QM1 | QM1 | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | |
| 2 | CTQ_QUEUE | CDW | 1 | 1 | Q1 | Q1 | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | |
| 3 | CTQ_CHANNEL | CDW | 1 | 1 | SENDER | SENDER | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | |

## 6.1.3 Component relationship type (table RelnTyp)

| RelnTyp_Cd<br>CHAR(6) | RelnTyp_Nm*<br>VARCHAR(120) |
|---|---|
| PCHILD | Parent Child Relation |

## 6.1.4 Component relationship rule (table RelnRul)

| CompTyp_Source_Cd<br>CHAR(17) | CompTyp_Target_Cd<br>CHAR(17) | RelnTyp_Cd<br>CHAR(6) | RelnRul_Strt_DtTm<br>TIMESTAMP | RelnRul_End_DtTm<br>TIMESTAMP |
|---|---|---|---|---|
| IP_HOST | CTQ_QMGR | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |
| IP_INTERFACE | CTQ_QMGR | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |
| CTQ_HOST | CTQ_QMGR | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |
| CTQ_QMGR | CTQ_QUEUE | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |
| CTQ_QMGR | CTQ_CHANNEL | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |

## 6.1.5 Component relationship (table CompReln)

| CompReln_ID<br>INTEGER | Comp_Source_ID<br>INTEGER | Comp_Target_ID<br>INTEGER | RelnTyp_Cd<br>CHAR(6) | CompReln_Strt<br>_DtTm<br>TIMESTAMP | CompReln_End<br>_DtTm<br>TIMESTAMP |
|---|---|---|---|---|---|
| 1 | 0 | 1 | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |
| 2 | 1 | 2 | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |
| 3 | 1 | 3 | PCHILD | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 |

## 6.1.6 Attribute type (table AttrTyp)

| AttrTyp_Cd<br>CHAR(17) | AttrTyp_Nm*<br>VARCHAR(120) |
|---|---|
| LAST_IP_ADDRESS | Last IP Address |
| AMX_EID | IBM Tivoli Monitoring Endpoint Identifier |
| AMX_GMT_OFFSET | IBM Tivoli Monitoring Endpoint GMT Offset |
| CTQ_QMGRPLATFORM | WebSphere MQ Queue Manager Platform Type |

| AttrTyp_Cd<br>CHAR(17) | AttrTyp_Nm*<br>VARCHAR(120) |
|---|---|
| CTQ_QMGRCMDLVL | WebSphere MQ Queue Manager Command Level |
| CTQ_QUEUETYPE | WebSphere MQ Queue Type |
| CTQ_QUEUEUSAGE | WebSphere MQ Queue Usage |
| CTQ_CHANNELTYPE | WebSphere MQ Channel Type |
| CTQ_CHANNELPROT | WebSphere MQ Channel Protocol |
| CTQ_CHANNELTRANS | WebSphere MQ Channel Transmission Queue |

## 6.1.7 Attribute rule (table AttrRul)

| CompTyp_Cd<br>CHAR(17) | AttrTyp_Cd<br>CHAR(17) | AttrRul_Strt_D<br>tTm<br>TIMESTAMP | AttrRul_End_D<br>tTm<br>TIMESTAMP | AttrRul_Dom_Ind<br>CHAR |
|---|---|---|---|---|
| IP_HOST | LAST_IP_ADDRESS | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_HOST | AMX_EID | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_HOST | AMX_GMT_OFFSET | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_QMGR | CTQ_QMGRPLATFORM | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_QMGR | CTQ_QMGRCMDLVL | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_QUEUE | CTQ_QUEUETYPE | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_QUEUE | CTQ_QUEUEUSAGE | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_CHANNEL | CTQ_CHANNELTYPE | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_CHANNEL | CTQ_CHANNELPROT | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |
| CTQ_CHANNEL | CTQ_CHANNELTRANS | 2002-01-19-<br>11.36.54.000000 | 9999-01-01-<br>00.00.00.000000 | N |

## 6.1.8 Attribute domain (table AttrDom)

This warehouse pack does not use the attribute domain table.

## 6.1.9 Component attribute (table CompAttr)

| CompAttr_ID INTEGER | Comp_ID INTEGER | AttrTyp_Cd CHAR(17) | CompAttr_Strt _DtTm TIMESTAMP | CompAttr_End _DtTm TIMESTAMP | CompAttr_Val VARCHAR(254) |
|---|---|---|---|---|---|
| 1 | 0 | LAST_IP_ADDRESS | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | 11.22.33.44 |
| 2 | 1 | CTQ_QMGRPLATFORM | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | WINDOWSNT |
| 3 | 1 | CTQ_QMGRCMDLVL | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | 530 |
| 4 | 2 | CTQ_QUEUETYPE | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | QLOCAL |
| 5 | 2 | CTQ_QUEUEUSAGE | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | XMITQ |
| 6 | 3 | CTQ_CHANNELTYPE | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | SDR |
| 7 | 3 | CTQ_CHANNELPROT | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | TCP |
| 8 | 3 | CTQ_CHANNELTRANS | 2002-01-19-11.36.54.000000 | 9999-01-01-00.00.00.000000 | Q1 |

The following table lists the possible values for each of the WebSphere MQ attribute types:

| Attribute type code | Component attribute values |
|---|---|
| CTQ_QMGRPLATFORM | MVS |
| | REMOTE |
| | UNIX |
| | WINDOWSNT |
| CTQ_QMGRCMDLVL | 120 |
| | 210 |
| | 520 |
| | 521 |
| | 530 |
| CTQ_QUEUETYPE | QLOCAL |
| | QREMOTE |
| | QMODEL |
| | QALIAS |
| CTQ_QUEUEUSAGE | NORMAL |

| Attribute type code | Component attribute values |
|---|---|
| | XMITQ |
| CTQ_CHANNELTYPE | CLUSRCVR |
| | CLUSSDR |
| | RCVR |
| | RQSTR |
| | SDR |
| | SVR |
| | SVRCONN |
| CTQ_CHANNELPROT | DECNET |
| | LU62 |
| | NETBIOS |
| | SPX |
| | TCP |
| | UDP |
| CTQ_CHANNELTRANS[1] | *Transmission queue name* |
| [1]For WebSphere MQ channels not associated with a transmission queue, the transmission queue name will be blank. | |

## *6.2  Component measurement*

The following sections describe the component measurement

## 6.2.1 Measurement group type (table MGrpTyp)

| MGrpTyp_Cd CHAR(6) | MGrpTyp_Nm* VARCHAR(120) |
|---|---|
| CATEG | Category |
| GROUP | Aggregate Types or Group Functions |
| STATE | State |

## 6.2.2 Measurement group (table MGrp)

| MGrp_Cd CHAR(6) | MGrpTyp_Cd CHAR(6) | MGrp_Parent_Cd CHAR(6) | MGrp_Nm* VARCHAR(120) |
|---|---|---|---|
| PERF | CATEG | NULL | Performance |
| UTIL | CATEG | NULL | Utilization |
| AVL | CATEG | NULL | Availability |
| STATE | CATEG | NULL | Percentage State measurements |
| STORAG | CATEG | NULL | Storage |

| MGrp_Cd CHAR(6) | MGrpTyp_Cd CHAR(6) | MGrp_Parent_Cd CHAR(6) | MGrp_Nm* VARCHAR(120) |
|---|---|---|---|
| AVG_E | GROUP | NULL | Average Value Exists |
| MIN_E | GROUP | NULL | Minimum Value Exists |
| MAX_E | GROUP | NULL | Maximum Value Exists |
| TOT_E | GROUP | NULL | Total Value Exists |
| CTQRST | STATE | NULL | Queue Manager Percent in State Measurements |
| CTQSVR | STATE | NULL | Command Server Percent in State Measurements |
| CTQINT | STATE | NULL | Channel Initiator Percent in State Measurements |
| CTQLIS | STATE | NULL | Channel Listener Percent in State Measurements |
| CTQLST | STATE | NULL | Channel Percent in State Measurements |

## 6.2.3 Measurement group member (table MGrpMbr)

| MGrp_Cd CHAR(6) | MGrpTyp_Cd CHAR(6) | MsmtTyp_ID INTEGER |
|---|---|---|
| AVG_E | GROUP | 1-31, 38-44, 47-55 |
| CTQINT | STATE | 14-16 |
| CTQLIS | STATE | 17-19 |
| CTQLST | STATE | 21-31 |
| CTQSVR | STATE | 11-13 |
| MAX_E | GROUP | 4-10, 20, 38-44, 47-55 |
| MIN_E | GROUP | 4-10, 20, 38-44, 47-55 |
| CTQRST | STATE | 1-3 |
| TOT_E | GROUP | 32-37, 45, 46 |

## 6.2.4 Measurement unit category (table MUnitCat)

| MunitCat_Cd CHAR(6) | MunitCat_Nm* VARCHAR(120) |
|---|---|
| TM | Time Duration |
| QTY | Quantity |
| PRC | Percentage |
| RT | Rate |

## 6.2.5 Measurement unit (table MUnit)

| MUnit_Cd CHAR(6) | MUnitCat_Cd CHAR(6) | Munit_Nm* VARCHAR(120) |
|---|---|---|
| PRC | PRC | Percentage |
| Bps | RT | Bytes per Second |
| MBps | RT | Megabytes per Second |
| KBps | RT | Kilobytes per Second |
| Rps | RT | Requests per Second |
| Qps | RT | Quantity per Second |
| Qpm | RT | Quantity per Minute |
| QTY | QTY | Quantity |
| GB | QTY | Gigabytes |
| KB | QTY | Kilobytes |
| MB | QTY | Megabytes |
| B | QTY | Bytes |
| MSec | TM | Milliseconds |
| Sec | TM | Seconds |
| Min | TM | Minutes |
| Hr | TM | Hours |
| Day | TM | Days |
| HSc | TM | Hundredths of a Second |

## 6.2.6 Time summary (table TmSum)

The period over which a measurement may be summarized.

| TmSum_Cd CHAR | TmSum_Nm* VARCHAR(120) |
|---|---|
| H | Hourly |
| D | Daily |
| W | Weekly |
| M | Monthly |
| Q | Quarterly |
| Y | Yearly |

## 6.2.7 Measurement source (table MSrc)

| MSrc_Cd CHAR(6) | MSrc_Parent_Cd CHAR(6) | MSrc_Nm* VARCHAR(120) |
|---|---|---|
| Tivoli | NULL | Tivoli Application |
| AMX | Tivoli | IBM Tivoli Monitoring |
| CTQ | AMX | IBM Tivoli Monitoring for Business Integration, Version 5.1.1 : WebSphere MQ |

## 6.2.8 Measurement type (table MsmtTyp)

The following table lists all of the measurement types that are defined in the managed object format (MOF) file used by the resource models for IBM Tivoli Monitoring for Business Integration: WebSphere MQ. Measurement types **in bold type** are implemented in IBM Tivoli Monitoring for Business Integration: WebSphere MQ. Data for these measurement types is placed in the central data warehouse.  You can write a customized resource model to collect data for the additional measurement types.  For information about implementing a resource model, see the *IBM Tivoli Monitoring Workbench User 's Guide,* Version 5.1.1, SH19-4571-01.

The values for MsmtTyp_Nm are stored in the central data warehouse database as a short string containing underscore ( _ ) characters, but are displayed in reports as descriptive, translated phrases where each underscore character is replaced with a space.  For example, Queue_manager_status_up is displayed as Queue manager status up in reports.

| MsmtTyp_ID INTEGER | MUnit_Cd CHAR(6) | MSrc_Cd CHAR (6) | MsmtTyp_Nm* VARCHAR(120) | MsmtTyp_Ds* VARCHAR(254) |
|---|---|---|---|---|
| 1 | PRC | CTQ | **Queue_manager_status_up** | Queue manager status up |
| 2 | PRC | CTQ | **Queue_manager_status_down** | Queue manager status down |
| 3 | PRC | CTQ | **Queue_manager_status_unknown** | Queue manager status unknown |
| 4 | QTY | CTQ | **Dead_letter_queue_messages** | Number of messages that are outstanding in the dead-letter queue for a queue manager |
| 5 | QTY | CTQ | **Number_of_channels_active** | Number of channels that are active for a queue manager |
| 6 | PRC | CTQ | **Percentage_of_channels_active** | Percentage of channels that are active for a queue manager |
| 7 | QTY | CTQ | **Number_of_channels_not_active** | Number of channels that are not active for a queue manager |
| 8 | PRC | CTQ | **Percentage_of_channels_not_active** | Percentage of channels that are not active for a queue manager |
| 9 | PRC | CTQ | **Page_set_used** | Percentage used of the total pages in a page set for a queue manager |
| 10 | PRC | CTQ | **Page_set_unused** | Percentage that is not used of the total pages in a page set for a queue manager |
| 11 | PRC | CTQ | **Command_server_status_up** | Command server status up |
| 12 | PRC | CTQ | **Command_server_status_down** | Command server status down |
| 13 | PRC | CTQ | **Command_server_status_unknown** | Command server status unknown |
| 14 | PRC | CTQ | **Channel_initiator_status_up** | Channel initiator status up |
| 15 | PRC | CTQ | **Channel_initiator_status_down** | Channel initiator status down |
| 16 | PRC | CTQ | **Channel_initiator_status_unknown** | Channel initiator status unknown |
| 17 | PRC | CTQ | **Channel_listener_status_up** | Channel listener status up |
| 18 | PRC | CTQ | **Channel_listener_status_down** | Channel listener status down |
| 19 | PRC | CTQ | **Channel_listener_status_unknown** | Channel listener status unknown |
| 20 | KB | CTQ | **TEC_cache_size** | Size of the Tivoli Enterprise Console cache file |
| 21 | PRC | CTQ | **Channel_status_running** | Channel status running |

| MsmtTyp_ID INTEGER | MUnit_Cd CHAR(6) | MSrc_Cd CHAR (6) | MsmtTyp_Nm* VARCHAR(120) | MsmtTyp_Ds* VARCHAR(254) |
|---|---|---|---|---|
| 22 | PRC | CTQ | Channel_status_inactive | Channel status inactive |
| 23 | PRC | CTQ | Channel_status_stopped | Channel status stopped |
| 24 | PRC | CTQ | Channel_status_starting | Channel status starting |
| 25 | PRC | CTQ | Channel_status_retrying | Channel status retrying |
| 26 | PRC | CTQ | Channel_status_initializing | Channel status initializing |
| 27 | PRC | CTQ | Channel_status_binding | Channel status binding |
| 28 | PRC | CTQ | Channel_status_requesting | Channel status requesting |
| 29 | PRC | CTQ | Channel_status_paused | Channel status paused |
| 30 | PRC | CTQ | Channel_status_stopping | Channel status stopping |
| 31 | PRC | CTQ | Channel_status_unknown | Channel status unknown |
| 32 | QTY | CTQ | Channel_messages | Number of messages sent or received by a channel |
| 33 | QTY | CTQ | Channel_batches_completed | Number of completed batches by a channel |
| 34 | QTY | CTQ | Channel_buffers_sent | Number of transmission buffers sent by a channel |
| 35 | QTY | CTQ | Channel_buffers_received | Number of transmission buffers received by a channel |
| 36 | QTY | CTQ | Channel_bytes_sent | Number of bytes sent by a channel |
| 37 | QTY | CTQ | Channel_bytes_received | Number of bytes received by a channel |
| 38 | QTY | CTQ | Queue_messages_outstanding | Number of messages that are outstanding in a message queue |
| 39 | PRC | CTQ | Queue_used_percentage | Percentage used of a queue where percentage is the number of outstanding messages divided by the maximum number of messages allowed in the queue |
| 40 | QTY | CTQ | Input_handles | Number of input handles open for a queue |
| 41 | QTY | CTQ | Output_handles | Number of output handles open for a queue |
| 42 | Min | CTQ | Oldest_message | Oldest message outstanding in a message queue |
| 43 | KB | CTQ | Largest_message | Largest message outstanding in a message queue |
| 44 | QTY | CTQ | Peak_queue_depth | Peak queue depth for a queue |
| 45 | QTY | CTQ | Queue_messages_in | Number of messages that have been put on the queue |
| 46 | QTY | CTQ | Queue_messages_out | Number of messages that have been successfully retrieved from the queue |
| 47 | Qpm | CTQ | Queue_messages_in_per_minute | Number of messages put on the queue per minute |

| MsmtTyp_ID INTEGER | MUnit_Cd CHAR(6) | MSrc_Cd CHAR (6) | MsmtTyp_Nm* VARCHAR(120) | MsmtTyp_Ds* VARCHAR(254) |
|---|---|---|---|---|
| 48 | Qpm | CTQ | Queue_messages_out_per_minute | Number of messages retrieved from the queue per minute |
| 49 | Qpm | CTQ | Channel_messages_per_minute | Number of messages sent or received by a channel per minute |
| 50 | Qpm | CTQ | Channel_batches_completed_per_minute | Number of completed batches by a channel per minute |
| 51 | Qpm | CTQ | Channel_buffers_sent_per_minute | Number of transmission buffers sent by a channel per minute |
| 52 | Qpm | CTQ | Channel_buffers_received_per_minute | Number of transmission buffers received by a channel per minute |
| 53 | Qpm | CTQ | Channel_bytes_sent_per_minute | Number of bytes sent by a channel per minute |
| 54 | Qpm | CTQ | Channel_bytes_received_per_minute | Number of bytes received by a channel per minute |
| 55 | Sec | CTQ | Queue_reset_interval | Time since queue last reset |

## 6.2.9 Component measurement rule (table MsmtRul)

| CompTyp_Cd CHAR(17) | MsmtTyp_ID INTEGER |
|---|---|
| CTQ_CHANNEL | 21-37, 49-54 |
| CTQ_QMGR | 1-20 |
| CTQ_QUEUE | 38-48, 55 |

## 6.2.10 Measurement (table Msmt)

| Msmt_ID BIGINT | Comp_ID INTEGER | MsmtTyp_ID INTEGER | TmSum_Cd CHAR | Msmt_Strt_Dt DATE | Msmt_Strt_Tm TIME | Msmt_Min_Val FLOAT | Msmt_Max_Val FLOAT | Msmt_Avg_Val FLOAT | Msmt_Tot_Val FLOAT | Msmt_Smpl_Cnt INTEGER | Msmt_Err_Cnt INTEGER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | H | 2002/06/26 | 0:00 | | | 100 | | | |
| 2 | 1 | 2 | H | 2002/06/26 | 0:00 | | | 0 | | | |
| 3 | 1 | 3 | H | 2002/06/26 | 0:00 | | | 0 | | | |
| 4 | 1 | 4 | H | 2002/06/26 | 0:00 | 5 | 65 | 35 | | | |
| 5 | 1 | 5 | H | 2002/06/26 | 0:00 | 10 | 100 | 65 | | | |
| 6 | 1 | 6 | H | 2002/06/ | 0:00 | 10 | 100 | 65 | | | |

| Msmt_ID BIGINT | Comp_ID INTEGER | MsmtTyp_ID INTEGER | TmSum_Cd CHAR | Msmt_Strt_Dt DATE | Msmt_Strt_Tm TIME | Msmt_Min_Val FLOAT | Msmt_Max_Val FLOAT | Msmt_Avg_Val FLOAT | Msmt_Tot_Val FLOAT | Msmt_Smpl_Cnt INTEGER | Msmt_Err_Cnt INTEGER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 26 | | | | | | | |
| 7 | 1 | 7 | H | 2002/06/26 | 0:00 | 0 | 90 | 35 | | | |
| 8 | 1 | 8 | H | 2002/06/26 | 0:00 | 0 | 90 | 35 | | | |
| 9 | 1 | 11 | H | 2002/06/26 | 0:00 | | | 100 | | | |
| 10 | 1 | 20 | H | 2002/06/26 | 0:00 | 1200 | 2000 | 1500 | | | |
| 11 | 2 | 38 | H | 2002/06/26 | 0:00 | 15 | 92 | 35 | | | |
| 12 | 2 | 39 | H | 2002/06/26 | 0:00 | 5 | 45 | 20 | | | |
| 13 | 2 | 40 | H | 2002/06/26 | 0:00 | 2 | 78 | 40 | | | |
| 14 | 2 | 41 | H | 2002/06/26 | 0:00 | 2 | 78 | 40 | | | |
| 15 | 2 | 42 | H | 2002/06/26 | 0:00 | 0 | 5 | 2 | | | |
| 16 | 2 | 43 | H | 2002/06/26 | 0:00 | 1 | 8 | 4 | | | |
| 17 | 3 | 21 | H | 2002/06/26 | 0:00 | | | 100 | | | |
| 18 | 3 | 32 | H | 2002/06/26 | 0:00 | | | | 0 | | |
| 19 | 3 | 33 | H | 2002/06/26 | 0:00 | | | | 0 | | |
| 20 | 3 | 34 | H | 2002/06/26 | 0:00 | | | | 76 | | |
| 21 | 3 | 35 | H | 2002/06/26 | 0:00 | | | | 76 | | |
| 22 | 3 | 36 | H | 2002/06/26 | 0:00 | | | | 4275 | | |
| 23 | 3 | 37 | H | 2002/06/26 | 0:00 | | | | 4275 | | |

## 6.3 Helper tables

The Tivoli central data warehouse data model supports a multicustomer and multicenter environment. For more information, refer to the "Customers and centers" section in *Enabling an Application for Tivoli Enterprise Data Warehouse*. To support a multicustomer or multicenter environment, you must update the AMX.Cust_Lookup and the AMX.Centr_Lookup tables provided in the Tivoli central data warehouse database by the IBM Tivoli Monitoring 5.1.1 warehouse pack.

Commented out template insert statements are included in the ctq_mart_schema.sql script so you can create views for all component dimension tables and fact tables associated star schemas for this warehouse pack.

## 6.4 Exception tables

This warehouse pack does not generate exception tables.

## 6.5 Incremental extraction

Because this warehouse pack only provides a data mart ETL, the Tivoli central data warehouse is the source database for all extractions of new WebSphere MQ data. New data in the source database is discovered by examining the integer ascending sequence IDs of the relevant tables. When the data mart ETL for this warehouse pack runs, the following automatic actions are performed:

Extract WebSphere MQ measurement type information and insert the information into metric dimension tables:
- Creates temporary tables (CTQ.STAGE_D_QMGR_MET, CTQ.STAGE_D_QUEUE_MET, CTQ.STAGE_D_CHNL_MET) in the Mart database to hold the static measurement type information
- Updates the Extract_Control *to_intseq* value with the maximum *metric_id* values from the permanent metric tables (CTQ.QMGR_METRIC, CTQ.QUEUE_METRIC, CTQ.CHANNEL_METRIC) in the central data warehouse database
- Extracts information from the permanent metric tables and inserts it into the temporary tables
- Copies information from the temporary tables into the permanent metric dimension tables (CTQ.D_QMGR_METRIC, CTQ.D_QUEUE_METRIC, CTQ.D_CHNL_METRIC) in the Mart database
- Updates extraction information in the Extract_Log table, which causes a trigger to fire and update the Extract_Control table to close the extraction window

Extract WebSphere MQ host component information and insert the information into the associated component dimension table:
- Creates a temporary table (CTQ.STAGE_D_HOST) in the Mart database to hold the host component information
- Updates the Extract_Control *to_intseq* value with the maximum *comp_source_id* value from the CUR_COMPRELN view in the central data warehouse database for hosts that have a parent relationship with the WebSphere MQ queue manager components
- Extracts information from the table view and inserts the information into the temporary table
- Copies the information from the temporary table and inserts the information into the permanent host dimension table (CTQ.D_HOST) in the Mart database
- Updates extraction information in the Extract_Log table, which causes a trigger to fire and update the Extract_Control table to close the extraction window

Extract WebSphere MQ queue manager, queue, and channel component information and insert the information into the associated component dimension tables:

- Creates temporary key tables (CTQ.STAGE_QMGR_KEY, CTQ.STAGE_QUEUE_KEY, CTQ.STAGE_CHANNEL_KEY) in the central data warehouse database to hold the component primary key information
- Creates temporary tables (CTQ.STAGE_D_QMGR, CTQ.STAGE_D_QUEUE, CTQ.STAGE_D_CHANNEL) in the Mart database to hold the component information
- Updates the Extract_Control *to_intseq* value with the maximum *compattr_id* values from the CUR_COMPATTR view in the central data warehouse database for queue manager, queue, and channel components. Using the *compattr_id* value to control data extraction ensures that both new component instances and existing component instances with updated attribute values are processed.
- Extracts information from the temporary key tables and the central data warehouse table views and inserts the information into the temporary tables
- Copies information from the temporary tables and inserts the information into the permanent component dimension tables (CTQ.D_QMGR, CTQ.D_QUEUE, CTQ.D_CHANNEL) in the Mart database
- Updates the extraction information in the Extract_Log table, which causes a trigger to fire and update the Extract_Control table to close the extraction window


Extract WebSphere MQ measurements and insert the measurements into the fact tables:
- Creates staging tables (CTQ.STAGE_F_QMGR_HOUR, CTQ.STAGE_F_QUEUE_HOUR, CTQ.STAGE_F_CHNL_HOUR) in the Mart database to hold the measurement value information
- Updates the Extract_Control *to_intseq* value with the maximum *msmt_id* values from the measurement (MSMT) table in the central data warehouse database
- Extracts information from the measurement table and inserts the information into the staging tables
- Copies information from the staging tables into the permanent hourly fact tables (CTQ.F_QMGR_HOUR, CTQ.F_QUEUE_HOUR, CTQ.F_CHNL_HOUR) in the Mart database
- Updates extraction information in the Extract_Log table, which causes a trigger to fire and update the Extract_Control table to close the extraction window

# 7 IBM Tivoli Monitoring integration

## 7.1 Metadata tables for applications that use the resource model ETL

This section defines the data in the Tivoli Enterprise Data Warehouse central data warehouse.

### 7.1.1 Resource translation (table Resource_Transl)

| Resource<br><br>VARCHAR(128) | CompTyp_cd<br><br>VARCHAR(17) |
|---|---|
| WebSphere_MQ_Queue_Manager | CTQ_QMGR |
| WebSphere_MQ_Queue | CTQ_QUEUE |
| WebSphere_MQ_Channel | CTQ_CHANNEL |
| WebSphere_MQ_OS390_Queue_Manager | CTQ_OS390_QMGR |
| WebSphere_MQ_OS390_Queue | CTQ_OS390_QUEUE |
| WebSphere_MQ_OS390_Channel | CTQ_OS390_CHANNEL |
| WebSphere_MQ_RA_Queue_Manager | CTQ_RA_QMGR |
| WebSphere_MQ_RA_Queue | CTQ_RA_QUEUE |
| WebSphere_MQ_RA_Channel | CTQ_RA_CHANNEL |

### 7.1.2 Category translation (table Category_Transl)

| Category<br><br>VARCHAR(128) | MSrc_cd<br><br>VARCHAR(3) |
|---|---|
| WebSphere_MQ | CTQ |

### 7.1.3 Component type translation (table CompTyp_Transl)

| MSrc_Cd<br><br>VARCHAR(6) | ITM_Key_Property[1]<br><br>VARCHAR(1096) | CompTyp_Cd<br><br>VARCHAR(17) | Comp_Format_Nm[1]<br><br>VARCHAR(254) |
|---|---|---|---|
| CTQ | WebSphere_MQ_Queue_Manager.Queue_manager_name | CTQ_QMGR | WebSphere_MQ_Queue_Manager.Queue_manager_name |
| CTQ | WebSphere_MQ_Queue.Queue_name | CTQ_QUEUE | WebSphere_MQ_Queue.Queue_name |
| CTQ | WebSphere_MQ_Channel.Channel_name | CTQ_CHANNEL | WebSphere_MQ_Channel.Channel_name |
| CTQ | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_name | CTQ_OS390_QMGR | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_name |
| CTQ | WebSphere_MQ_OS390_Queue.Queue_name | CTQ_OS390_QUEUE | WebSphere_MQ_OS390_Queue.Queue_name |
| CTQ | WebSphere_MQ_OS390_Channel.Channel_name | CTQ_OS390_CHANNEL | WebSphere_MQ_OS390_Channel.Channel_name |
| CTQ | WebSphere_MQ_RA_Queue_Manager. | CTQ_RA_QMGR | WebSphere_MQ_RA_Queue_Manager. |

| MSrc_Cd VARCHAR(6) | ITM_Key_Property[1] VARCHAR(1096) | CompTyp_Cd VARCHAR(17) | Comp_Format_Nm[1] VARCHAR(254) |
|---|---|---|---|
| | Queue_manager_name | | Queue_manager_name |
| CTQ | WebSphere_MQ_RA_Queue.Queue_name | CTQ_RA_QUEUE | WebSphere_MQ_RA_Queue.Queue_name |
| CTQ | WebSphere_MQ_RA_Channel.Channel_name | CTQ_RA_CHANNEL | WebSphere_MQ_RA_Channel.Channel_name |

[1] Use a semicolon (;) to separate values in ITM_Key_Property and Comp_Format_Nm. Do not use a semicolon after the final value.

## 7.1.4 Attribute translation (table AttrTyp_Transl)

| MSrc_Cd VARCHAR(3) | ITM_Attr_Property VARCHAR(254) | AttrTyp_Cd VARCHAR(17) |
|---|---|---|
| CTQ | WebSphere_MQ_Queue_Manager.Queue_manager_platform | CTQ_QMGRPLATFORM |
| CTQ | WebSphere_MQ_Queue_Manager.Queue_manager_command_level | CTQ_QMGRCMDLVL |
| CTQ | WebSphere_MQ_Queue.Queue_type | CTQ_QUEUETYPE |
| CTQ | WebSphere_MQ_Queue.Queue_usage | CTQ_QUEUEUSAGE |
| CTQ | WebSphere_MQ_Channel.Channel_type | CTQ_CHANNELTYPE |
| CTQ | WebSphere_MQ_Channel.Channel_protocol | CTQ_CHANNELPROT |
| CTQ | WebSphere_MQ_Channel.Transmission_queue_name | CTQ_CHANNELTRANS |
| CTQ | WebSphere_MQ_OS390_Queue_Manager.CTQ_HOST | CTQ_HOST |
| CTQ | WebSphere_MQ_OS390_Queue_Manager.LAST_IP_ADDRESS | LAST_IP_ADDRESS |
| CTQ | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_platform | CTQ_QMGRPLATFORM |
| CTQ | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_command_level | CTQ_QMGRCMDLVL |
| CTQ | WebSphere_MQ_OS390_Queue.Queue_type | CTQ_QUEUETYPE |
| CTQ | WebSphere_MQ_OS390_Queue.Queue_usage | CTQ_QUEUEUSAGE |
| CTQ | WebSphere_MQ_OS390_Channel.Channel_type | CTQ_CHANNELTYPE |
| CTQ | WebSphere_MQ_OS390_Channel.Channel_protocol | CTQ_CHANNELPROT |
| CTQ | WebSphere_MQ_OS390_Channel.Transmission_queue_name | CTQ_CHANNELTRANS |
| CTQ | WebSphere_MQ_RA_Queue_Manager.CTQ_HOST | CTQ_HOST |
| CTQ | WebSphere_MQ_RA_Queue_Manager.LAST_IP_ADDRESS | LAST_IP_ADDRESS |
| CTQ | WebSphere_MQ_RA_Queue_Manager.Queue_manager_platform | CTQ_QMGRPLATFORM |
| CTQ | WebSphere_MQ_RA_Queue_Manager.Queue_manager_command_level | CTQ_QMGRCMDLVL |
| CTQ | WebSphere_MQ_RA_Queue.Queue_type | CTQ_QUEUETYPE |
| CTQ | WebSphere_MQ_RA_Queue.Queue_usage | CTQ_QUEUEUSAGE |
| CTQ | WebSphere_MQ_RA_Channel.Channel_type | CTQ_CHANNELTYPE |

| MSrc_Cd<br>VARCHAR(3) | ITM_Attr_Property<br>VARCHAR(254) | AttrTyp_Cd<br>VARCHAR(17) |
|---|---|---|
| CTQ | WebSphere_MQ_RA_Channel.Channel_protocol | CTQ_CHANNELPROT |
| CTQ | WebSphere_MQ_RA_Channel.Transmission_queue_name | CTQ_CHANNELTRANS |

## 7.1.5 Component relationship rule translation (table RelnRul_Transl)

| CompTyp_Source_Cd<br>CHAR(17) | CompTyp_Target_Cd<br>CHAR(17) | RelnTyp_Cd<br>CHAR(6) | RelnRul_Strt_DtTm<br>TIMESTAMP | RelnRul_End_DtTm<br>TIMESTAMP |
|---|---|---|---|---|
| CTQ_QMGR | CTQ_OS390_QMGR | PROXY | | |
| CTQ_QUEUE | CTQ_OS390_QUEUE | SAME | | |
| CTQ_OS390_QMGR | CTQ_OS390_QUEUE | PCHILD | | |
| CTQ_CHANNEL | CTQ_OS390_CHANNEL | SAME | | |
| CTQ_OS390_QMGR | CTQ_OS390_CHANNEL | PCHILD | | |
| CTQ_QMGR | CTQ_RA_QMGR | PROXY | | |
| CTQ_QUEUE | CTQ_RA_QUEUE | SAME | | |
| CTQ_RA_QMGR | CTQ_RA_QUEUE | PCHILD | | |
| CTQ_CHANNEL | CTQ_RA_CHANNEL | SAME | | |
| CTQ_RA_QMGR | CTQ_RA_CHANNEL | PCHILD | | |

## 7.2  IBM Tivoli Monitoring resource models

The following sections describe the information in the IBM Tivoli Monitoring database that is used as the operational data source for Tivoli Enterprise Data Warehouse. For more information about resource models, see the *IBM Tivoli Monitoring Workbench User's Guide*.

The following operational data are extracted, transformed, and loaded into the central data warehouse for this warehouse pack:

- Resource model for Distributed WebSphere MQ Queue Managers

- Resource model for z/OS  WebSphere MQ Queue Managers

- Resource model for remotely administered WebSphere MQ Queue Managers

- Resource model for Distributed WebSphere MQ Queues

- Resource model for z/OS WebSphere MQ Queues

- Resource model for remotely administered WebSphere MQ Queues

- Resource model for Distributed WebSphere MQ Channels

- Resource model for z/OS WebSphere MQ Channels

- Resource model for remotely administered  WebSphere MQ Channels

## 7.2.1 Resource model for Distributed WebSphere MQ Queue Managers

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Queue_manager_name=*queue manager name*; |
| Categories | Name VARCHAR(128) | Queue_manager_command_level |
| | | Queue_manager_platform |
| Resources | Context VARCHAR(64) | Channel Statistics |
| | | Command Server Status |
| | | Information |
| | | Message Statistics |
| | | Queue Manager Status |
| | | Utilization Statistics |
| Metrics | Name VARCHAR(128) | Command_server_status_up |
| | | Command_server_status_down |
| | | Command_server_status_unknown |
| | | Dead_letter_queue_messages |
| | | Number_of_channels_active |
| | | Number_of_channels_not_active |
| | | Percentage_of_channels_active |
| | | Percentage_of_channels_not_active |
| | | Queue_manager_status_up |
| | | Queue_manager_status_down |
| | | Queue_manager_status_unknown |
| | | TEC_cache_size |

[1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value.

## 7.2.2 Resource model for z/OS  WebSphere MQ Queue Managers

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Queue_manager_name=*queue manager name*; |
| Categories | Name VARCHAR(128) | CTQ_HOST |
| | | LAST_IP_ADDRESS |
| | | Queue_manager_command_level |
| | | Queue_manager_platform |

| ITM Table Name | Column Name | Value |
|---|---|---|
| Resources | Context VARCHAR(64) | Channel Initiator Status |
| | | Channel Listener Status |
| | | Channel Statistics |
| | | Command Server Status |
| | | Information |
| | | Message Statistics |
| | | Queue Manager Status |
| | | Utilization Statistics |
| Metrics | Name VARCHAR(128) | Channel_initiator_status_up |
| | | Channel_initiator_status_down |
| | | Channel_initiator_status_unknown |
| | | Channel_listener_status_up |
| | | Channel_listener_status_down |
| | | Channel_listener_status_unknown |
| | | Command_server_status_up |
| | | Command_server_status_down |
| | | Command_server_status_unknown |
| | | Dead_letter_queue_messages |
| | | Number_of_channels_active |
| | | Number_of_channels_not_active |
| | | Page_set_used |
| | | Page_set_unused |
| | | Percentage_of_channels_active |
| | | Percentage_of_channels_not_active |
| | | Queue_manager_status_up |
| | | Queue_manager_status_down |
| | | Queue_manager_status_unknown |

[1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value.

## 7.2.3 Resource model for remotely administered WebSphere MQ Queue Managers

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Queue_manager_name=*queue manager name*; |

| ITM Table Name | Column Name | Value |
|---|---|---|
| Categories | Name<br>VARCHAR(128) | CTQ_HOST |
| | | LAST_IP_ADDRESS |
| | | Queue_manager_command_level |
| | | Queue_manager_platform |
| Resources | Context<br>VARCHAR(64) | Channel Statistics |
| | | Command Server Status |
| | | Information |
| | | Message Statistics |
| | | Queue Manager Status |
| | | Utilization Statistics |
| Metrics | Name<br>VARCHAR(128) | Command_server_status_up |
| | | Command_server_status_down |
| | | Command_server_status_unknown |
| | | Dead_letter_queue_messages |
| | | Number_of_channels_active |
| | | Number_of_channels_not_active |
| | | Percentage_of_channels_active |
| | | Percentage_of_channels_not_active |
| | | Queue_manager_status_up |
| | | Queue_manager_status_down |
| | | Queue_manager_status_unknown |
| [1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value. | | |

## 7.2.4 Resource model for Distributed WebSphere MQ Queues

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key<br>VARCHAR(2096) | Queue_name=*queue name*; WebSphere_MQ_Queue_Manager.Queue_manager_name=*queue manager name*; |
| Categories | Name<br>VARCHAR(128) | WebSphere_MQ_Queue_Manager.Queue_manager_command_level |
| | | WebSphere_MQ_Queue_Manager.Queue_manager_platform |
| | | Queue_type |
| | | Queue_usage |
| Resources | Context<br>VARCHAR(64) | Handle Statistics |
| | | Information |

| ITM Table Name | Column Name | Value |
|---|---|---|
| | | Message Age Statistics |
| | | Message Count Statistics |
| | | Message Size Statistics |
| | | Utilization Statistics |
| Metrics | Name<br>VARCHAR(128) | Input_handles |
| | | Largest_message |
| | | Oldest_message |
| | | Output_handles |
| | | Queue_messages_outstanding |
| | | Queue_used_percentage |
| | | Queue_messages_in |
| | | Queue_messages_out |
| | | Queue_messages_in_per_minute |
| | | Queue_messages_out_per_minute |
| | | Peak_queue_depth |
| | | Queue_reset_interval |

[1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value.

## 7.2.5 Resource model for z/OS WebSphere MQ Queues

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key<br>VARCHAR(2096) | Queue_name=*queue name*;<br>WebSphere_MQ_OS390_Queue_Manager.Queue_manager_name=*queue manager name*; |
| Categories | Name<br>VARCHAR(128) | WebSphere_MQ_OS390_Queue_Manager.CTQ_HOST |
| | | WebSphere_MQ_OS390_Queue_Manager.CTQ_HOST |
| | | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_command_level |
| | | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_platform |
| | | Queue_type |
| | | Queue_usage |
| Resources | Context<br>VARCHAR(64) | Handle Statistics |
| | | Information |
| | | Message Count Statistics |
| | | Utilization Statistics |
| Metrics | Name | Input_handles |

| ITM Table Name | Column Name | Value |
|---|---|---|
| | VARCHAR(128) | Peak_queue_depth |
| | | Output_handles |
| | | Queue_messages_outstanding |
| | | Queue_used_percentage |
| | | Queue_messages_in |
| | | Queue_messages_out |
| | | Queue_messages_in_per_minute |
| | | Queue_messages_out_per_minute |
| | | Queue_reset_interval |
| [1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value. | | |

## 7.2.6 Resource model for remotely administered WebSphere MQ Queues

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Queue_name=*queue name*; WebSphere_MQ_RA_Queue_Manager.Queue_manager_name=*queue manager name*; |
| Categories | Name VARCHAR(128) | WebSphere_MQ_RA_Queue_Manager.CTQ_HOST |
| | | WebSphere_MQ_RA_Queue_Manager.LAST_IP_ADDRESS |
| | | WebSphere_MQ_RA_Queue_Manager.Queue_manager_command_level |
| | | WebSphere_MQ_RA_Queue_Manager.Queue_manager_platform |
| | | Queue_type |
| | | Queue_usage |
| Resources | Context VARCHAR(64) | Handle Statistics |
| | | Information |
| | | Message Count Statistics |
| | | Utilization Statistics |
| Metrics | Name VARCHAR(128) | Input_handles |
| | | Largest_message |
| | | Oldest_message |
| | | Output_handles |
| | | Queue_messages_outstanding |
| | | Queue_used_percentage |
| | | Queue_messages_in |

| ITM Table Name | Column Name | Value |
|---|---|---|
| | | Queue_messages_out |
| | | Queue_messages_in_per_minute |
| | | Queue_messages_out_per_minute |
| | | Peak_queue_depth |
| | | Queue_reset_interval |
| [1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value. | | |

## 7.2.7 Resource model for Distributed WebSphere MQ Channels

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Channel_name=*channel name*;WebSphere_MQ_Queue_Manager.Queue_manager_name=*queue manager name;* |
| Categories | Name VARCHAR(128) | WebSphere_MQ_Queue_Manager.Queue_manager_command_level |
| | | WebSphere_MQ_Queue_Manager.Queue_manager_platform |
| | | Channel_type |
| | | Channel_protocol |
| | | Transmission_queue_name |
| Resources | Context VARCHAR(64) | Batch Statistics |
| | | Buffer Statistics |
| | | Bytes Statistics |
| | | Information |
| | | Message Statistics |
| | | Status |
| Metrics | Name VARCHAR(128) | Channel_batches_completed |
| | | Channel_buffers_received |
| | | Channel_buffers_sent |
| | | Channel_bytes_received |
| | | Channel_bytes_sent |
| | | Channel_messages |
| | | Channel_status_binding |
| | | Channel_status_inactive |
| | | Channel_status_initializing |
| | | Channel_status_paused |
| | | Channel_status_requesting |

| ITM Table Name | Column Name | Value |
|---|---|---|
| | | Channel_status_retrying |
| | | Channel_status_running |
| | | Channel_status_starting |
| | | Channel_status_stopped |
| | | Channel_status_stopping |
| | | Channel_status_unknown |
| | | Channel_messages_per_minute |
| | | Channel_batches_completed_per_minute |
| | | Channel_buffers_received_per_minute |
| | | Channel_buffers_sent_per_minute |
| | | Channel_bytes_received_per_minute |
| | | Channel_bytes_sent_per_minute |

[1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value.

## 7.2.8 Resource model for z/OS WebSphere MQ Channels

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Channel_name=*channel name*;WebSphere_MQ_OS390_Queue_Manager.Queue_manager_name=*queue manager name;* |
| Categories | Name VARCHAR(128) | WebSphere_MQ_OS390_Queue_Manager.CTQ_HOST |
| | | WebSphere_MQ_OS390_Queue_Manager.LAST_IP_ADDRESS |
| | | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_command_level |
| | | WebSphere_MQ_OS390_Queue_Manager.Queue_manager_platform |
| | | Channel_type |
| | | Channel_protocol |
| | | Transmission_queue_name |
| Resources | Context VARCHAR(64) | Batch Statistics |
| | | Buffer Statistics |
| | | Bytes Statistics |
| | | Information |
| | | Message Statistics |
| | | Status |
| Metrics | Name VARCHAR(128) | Channel_batches_completed |
| | | Channel_buffers_received |

| ITM Table Name | Column Name | Value |
|---|---|---|
| | | Channel_buffers_sent |
| | | Channel_bytes_received |
| | | Channel_bytes_sent |
| | | Channel_messages |
| | | Channel_status_binding |
| | | Channel_status_inactive |
| | | Channel_status_initializing |
| | | Channel_status_paused |
| | | Channel_status_requesting |
| | | Channel_status_retrying |
| | | Channel_status_running |
| | | Channel_status_starting |
| | | Channel_status_stopped |
| | | Channel_status_stopping |
| | | Channel_status_unknown |
| | | Channel_messages_per_minute |
| | | Channel_batches_completed_per_minute |
| | | Channel_buffers_received_per_minute |
| | | Channel_buffers_sent_per_minute |
| | | Channel_bytes_received_per_minute |
| | | Channel_bytes_sent_per_minute |

[1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value.

## 7.2.9 Resource model for remotely administered  WebSphere MQ Channels

| ITM Table Name | Column Name | Value |
|---|---|---|
| Instances[1] | Instance_Key VARCHAR(2096) | Channel_name=*channel name*;WebSphere_MQ_RA_Queue_Manager.Queue_manager_name=*queue manager name;* |
| Categories | Name VARCHAR(128) | WebSphere_MQ_RA_Queue_Manager.CTQ_HOST |
| | | WebSphere_MQ_RA_Queue_Manager.LAST_IP_ADDRESS |
| | | WebSphere_MQ_RA_Queue_Manager.Queue_manager_command_level |
| | | WebSphere_MQ_RA_Queue_Manager.Queue_manager_platform |
| | | Channel_type |
| | | Channel_protocol |

| ITM Table Name | Column Name | Value |
|---|---|---|
| | | Transmission_queue_name |
| Resources | Context VARCHAR(64) | Batch Statistics |
| | | Buffer Statistics |
| | | Bytes Statistics |
| | | Information |
| | | Message Statistics |
| | | Status |
| Metrics | Name VARCHAR(128) | Channel_batches_completed |
| | | Channel_buffers_received |
| | | Channel_buffers_sent |
| | | Channel_bytes_received |
| | | Channel_bytes_sent |
| | | Channel_messages |
| | | Channel_status_binding |
| | | Channel_status_inactive |
| | | Channel_status_initializing |
| | | Channel_status_paused |
| | | Channel_status_requesting |
| | | Channel_status_retrying |
| | | Channel_status_running |
| | | Channel_status_starting |
| | | Channel_status_stopped |
| | | Channel_status_stopping |
| | | Channel_status_unknown |
| | | Channel_messages_per_minute |
| | | Channel_batches_completed_per_minute |
| | | Channel_buffers_received_per_minute |
| | | Channel_buffers_sent_per_minute |
| | | Channel_bytes_received_per_minute |
| | | Channel_bytes_sent_per_minute |

[1] Use a semicolon (;) to separate values within Instances. Put a semicolon after the last value.

# 8 Data mart schema information

The following sections contain the definition of star schemas, metric dimension tables, data marts, and reports provided with the warehouse pack.

Shaded columns in the following tables are translated and are marked with an asterisk (*). *Installing and Configuring Tivoli Enterprise Data Warehouse* contains instructions for installing support for additional languages.

## *8.1 Star schemas*

Before using this section, read about the star schemas in *Enabling an Application for Tivoli Enterprise Data Warehouse*. That document defines the content of each table and explains the relationships between the tables in this document.

This warehouse pack provides the following star schemas.

## 8.1.1 CTQ Daily WebSphere MQ Channel Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the daily fact table for the WebSphere MQ channel components |
|---|---|
| Name of fact table | CTQ.F_CHNL_DAY |
| Name of metric dimension table | CTQ.D_CHANNEL_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_CHANNEL |

### 8.1.1.1 Fact table CTQ.F_CHNL_DAY

The following columns are used in the fact table:

- Metric_ID INTEGER
- Channel_ID INTEGER
- XQ_chnl_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.2 CTQ Daily WebSphere MQ Queue Manager Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in | Star schema with dimension tables associated with the daily fact table for the |
|---|---|

| IWH_STARSCHEMA) | WebSphere MQ queue manager components |
|---|---|
| Name of fact table | CTQ.F_QMGR_DAY |
| Name of metric dimension table | CTQ.D_QMGR_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |

### 8.1.2.1 Fact table CTQ.F_QMGR_DAY

The following columns are used in the fact table:

- Metric_ID INTEGER
- Qmgr_ID INTEGER
- XQ_qm_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.3 CTQ Daily WebSphere MQ Queue Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the daily fact table for the WebSphere MQ queue components |
|---|---|
| Name of fact table | CTQ.F_QUEUE_DAY |
| Name of metric dimension table | CTQ.D_QUEUE_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_QUEUE |

### 8.1.3.1 Fact table CTQ.F_QUEUE_DAY

The following columns are used in the fact table:

- Metric_ID INTEGER
- Queue_ID INTEGER
- XQ_queue_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP

- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.4 CTQ Hourly WebSphere MQ Channel Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the hourly  fact table for the WebSphere MQ channel components |
|---|---|
| Name of fact table | CTQ.F_CHNL_HOUR |
| Name of metric dimension table | CTQ.D_CHANNEL_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_CHANNEL |

### 8.1.4.1  Fact table CTQ.F_CHNL_HOUR

The following columns are used in the fact table:
- Metric_ID INTEGER
- Channel_ID INTEGER
- XQ_chnl_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_hour TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.5 CTQ Hourly WebSphere MQ Queue Manager Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the hourly fact table for the WebSphere MQ queue manager components |
|---|---|

| | |
|---|---|
| Name of fact table | CTQ.F_QMGR_HOUR |
| Name of metric dimension table | CTQ.D_QMGR_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |

### 8.1.5.1 Fact table CTQ.F_QMGR_HOUR

The following columns are used in the fact table:

- Metric_ID INTEGER
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_hour TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.6 CTQ Hourly WebSphere MQ Queue Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the hourly fact table for the WebSphere MQ queue components |
|---|---|
| Name of fact table | CTQ.F_QUEUE_HOUR |
| Name of metric dimension table | CTQ.D_QUEUE_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_QUEUE |

### 8.1.6.1 Fact table CTQ.F_QUEUE_HOUR

The following columns are used in the fact table:

- Metric_ID INTEGER
- Queue_ID INTEGER
- XQ_queue_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER

- Meas_hour TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.7 CTQ Monthly WebSphere MQ Channel Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the monthly fact table for the WebSphere MQ channel components |
|---|---|
| Name of fact table | CTQ.F_CHNL_MONTH |
| Name of metric dimension table | CTQ.D_CHANNEL_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_CHANNEL |

### 8.1.7.1  Fact table CTQ.F_CHNL_MONTH

The following columns are used in the fact table:

- Metric_ID INTEGER
- Channel_ID INTEGER
- XQ_chnl_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.8 CTQ Monthly WebSphere MQ Queue Manager Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the monthly fact table for the WebSphere MQ queue manager components |
|---|---|
| Name of fact table | CTQ.F_QMGR_MONTH |

| | |
|---|---|
| Name of metric dimension table | CTQ.D_QMGR_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |

### 8.1.8.1 Fact table CTQ.F_QMGR_MONTH

The following columns are used in the fact table:

- Metric_ID INTEGER
- Queue_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.9 CTQ Monthly WebSphere MQ Queue Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the monthly fact table for the WebSphere MQ queue components |
|---|---|
| Name of fact table | CTQ.F_QUEUE_MONTH |
| Name of metric dimension table | CTQ.D_QUEUE_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_QUEUE |

### 8.1.9.1 Fact table CTQ.F_QUEUE_MONTH

The following columns are used in the fact table:

- Metric_ID INTEGER
- Queue_ID INTEGER
- XQ_queu_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP

- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

# 8.1.10 CTQ Weekly WebSphere MQ Channel Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the weekly fact table for the WebSphere MQ channel components |
|---|---|
| Name of fact table | CTQ.F_CHNL_WEEK |
| Name of metric dimension table | CTQ.D_CHANNEL_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_CHANNEL |

## 8.1.10.1  Fact table CTQ.F_CHNL_WEEK

The following columns are used in the fact table:

- Metric_ID INTEGER
- Channel_ID INTEGER
- XQ_chnl_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

# 8.1.11 CTQ Weekly WebSphere MQ Queue Manager Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the weekly fact table for the WebSphere MQ queue manager components |
|---|---|
| Name of fact table | CTQ.F_QMGR_WEEK |

| | |
|---|---|
| Name of metric dimension table | CTQ.D_QMGR_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |

### 8.1.11.1  Fact table CTQ.F_QMGR_WEEK

The following columns are used in the fact table:

- Metric_ID INTEGER
- Channel_ID INTEGER
- XQ_chnl_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP
- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## 8.1.12 CTQ Weekly WebSphere MQ Queue Star Schema

The following table defines the star schema. The description of the star schema is translated.

| Description of star schema (in IWH_STARSCHEMA) | Star schema with dimension tables associated with the weekly fact table for the WebSphere MQ queue components |
|---|---|
| Name of fact table | CTQ.F_QUEUE_WEEK |
| Name of metric dimension table | CTQ.D_QUEUE_METRIC |
| Names of other dimension tables | CTQ.D_HOST |
| | CTQ.D_QMGR |
| | CTQ.D_QUEUE |

### 8.1.12.1  Fact table CTQ.F_QUEUE_WEEK

The following columns are used in the fact table:

- Metric_ID INTEGER
- Queue_ID INTEGER
- XQ_queue_state_dttm TIMESTAMP
- Qmgr_ID INTEGER
- XQ_qmgr_state_dttm TIMESTAMP

- Host_ID INTEGER
- Meas_date TIMESTAMP
- Min_value DOUBLE
- Max_value DOUBLE
- Avg_value DOUBLE
- Total_value DOUBLE
- Sample_count DOUBLE

## *8.2  Metric dimension tables*

This section describes the metric dimension tables used by the star schemas in this warehouse pack. Shaded columns indicate text that is translated. These column headings are also marked with an asterisk (*).

## 8.2.1 CTQ.D_CHANNEL_METRIC

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | not used | Number of messages sent or received by a channel | Channel_messages | QTY | N | N | N | Y | CTQ |
| 2 | not used | Number of completed batches by a channel | Channel_batches_completed | QTY | N | N | N | Y | CTQ |
| 3 | not used | Number of transmission buffers sent by a channel | Channel_buffers_sent | QTY | N | N | N | Y | CTQ |
| 4 | not used | Number of transmission buffers received by a channel | Channel_buffers_received | QTY | N | N | N | Y | CTQ |
| 5 | not used | Number of bytes sent by a channel | Channel_bytes_sent | QTY | N | N | N | Y | CTQ |
| 6 | not used | Number of bytes received by a channel | Channel_bytes_received | QTY | N | N | N | Y | CTQ |
| 7 | not used | Channel status running | Channel_status_running | PRC | N | N | Y | N | CTQ |

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| 8 | not used | Channel status inactive | Channel_status_inactive | PRC | N | N | Y | N | CTQ |
| 9 | not used | Channel status stopped | Channel_status_stopped | PRC | N | N | Y | N | CTQ |
| 10 | not used | Channel status starting | Channel_status_starting | PRC | N | N | Y | N | CTQ |
| 11 | not used | Channel status retrying | Channel_status_retrying | PRC | N | N | Y | N | CTQ |
| 12 | not used | Channel status initializing | Channel_status_initializing | PRC | N | N | Y | N | CTQ |
| 13 | not used | Channel status binding | Channel_status_binding | PRC | N | N | Y | N | CTQ |
| 14 | not used | Channel status requesting | Channel_status_requesting | PRC | N | N | Y | N | CTQ |
| 15 | not used | Channel status paused | Channel_status_paused | PRC | N | N | Y | N | CTQ |
| 16 | not used | Channel status stopping | Channel_status_stopping | PRC | N | N | Y | N | CTQ |
| 17 | not used | Channel status unknown | Channel_status_unknown | PRC | N | N | Y | N | CTQ |
| 18 | not used | Number of messages sent or received by a channel per minute | Channel_messages_per_minute | Qpm | Y | Y | Y | N | CTQ |
| 19 | not used | Number of completed batches by a channel per minute | Channel_batches_completed_per_minute | Qpm | Y | Y | Y | N | CTQ |
| 20 | not used | Number of | Channel_buffers_sent_p | Qpm | Y | Y | Y | N | CTQ |

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| | | transmission buffers sent by a channel per minute | er_minute | | | | | | |
| 21 | not used | Number of transmission buffers received by a channel per minute | Channel_buffers_received_per_minute | Qpm | Y | Y | Y | N | CTQ |
| 22 | not used | Number of bytes sent by a channel per minute | Channel_bytes_sent_per_minute | Qpm | Y | Y | Y | N | CTQ |
| 23 | not used | Number of bytes received by a channel per minute | Channel_bytes_received_per_minute | Qpm | Y | Y | Y | N | CTQ |

## 8.2.2 CTQ.D_QMGR_METRIC

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | not used | Queue manager status up | Queue_manager_status_up | PRC | N | N | Y | N | CTQ |
| 2 | not used | Queue manager status down | Queue_manager_status_down | PRC | N | N | Y | N | CTQ |
| 3 | not used | Queue manager status unknown | Queue_manager_status_unknown | PRC | N | N | Y | N | CTQ |
| 4 | not used | Number of messages that are outstanding in the dead-letter queue for a queue manager | Dead_letter_queue_messages | QTY | Y | Y | Y | N | CTQ |

| Metric_ID INTEGER | Met_catego ry* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| 5 | not used | Number of channels that are active for a queue manager | Number_of_ channels_ac tive | QTY | Y | Y | Y | N | CTQ |
| 6 | not used | Percentage of channels that are active for a queue manager | Percentage_ of_channels _active | PRC | Y | Y | Y | N | CTQ |
| 7 | not used | Number of channels that are not active for a queue manager | Number_of_ channels_no t_active | QTY | Y | Y | Y | N | CTQ |
| 8 | not used | Percentage of channels that are not active for a queue manager | Percentage_ of_channels _not_active | PRC | Y | Y | Y | N | CTQ |
| 9 | not used | Percentage used of the total pages in a page set for a queue manager | Page_set_us ed | PRC | Y | Y | Y | N | CTQ |
| 10 | not used | Percentage that is not used of the total pages in a page set for a queue manager | Page_set_un used | PRC | Y | Y | Y | N | CTQ |
| 11 | not used | Command server status up | Command_s erver_status _up | PRC | N | N | Y | N | CTQ |
| 12 | not used | Command server status down | Command_s erver_status _down | PRC | N | N | Y | N | CTQ |
| 13 | not used | Command | Command_s | PRC | N | N | Y | N | CTQ |

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| | | server status unknown | erver_status _unknown | | | | | | |
| 14 | not used | Channel initiator status up | Channel_ini tiator_status _up | PRC | N | N | Y | N | CTQ |
| 15 | not used | Channel initiator status down | Channel_ini tiator_status _down | PRC | N | N | Y | N | CTQ |
| 16 | not used | Channel initiator status unknown | Channel_ini tiator_status _unknown | PRC | N | N | Y | N | CTQ |
| 17 | not used | Channel listener status up | Channel_list ener_status_ up | PRC | N | N | Y | N | CTQ |
| 18 | not used | Channel listener status down | Channel_list ener_status_ down | PRC | N | N | Y | N | CTQ |
| 19 | not used | Channel listener status unknown | Channel_list ener_status_ unknown | PRC | N | N | Y | N | CTQ |
| 20 | not used | Size of the Tivoli Enterprise Console cache file | TEC_cache _size | KB | Y | Y | Y | N | CTQ |

## 8.2.3 CTQ.D_QUEUE_METRIC

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name * VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exist s CHAR(1) | Avg_exist s CHAR(1) | Total_exis ts CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | not used | Number of messages that are outstanding in a message queue | Queue_mess ages_outsta nding | QTY | N | N | Y | N | CTQ |
| 2 | not used | Number of messages that are | Queue_mess ages_outsta nding | QTY | Y | Y | Y | N | CTQ |

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name * VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| | | outstanding in a message queue | | | | | | | |
| 3 | not used | Percentage used of a queue where percentage is the number of outstanding messages divided by the maximum number of messages allowed in the queue | Queue_used _percentage | PRC | Y | Y | Y | N | CTQ |
| 4 | not used | Number of input handles open for a queue | Input_handl es | QTY | Y | Y | Y | N | CTQ |
| 5 | not used | Number of output handles open for a queue | Output_han dles | QTY | Y | Y | Y | N | CTQ |
| 6 | not used | Oldest message outstanding in a message queue | Oldest_mess age | Min | Y | Y | Y | N | CTQ |
| 7 | not used | Largest message outstanding in a message queue | Largest_mes sage | KB | Y | Y | Y | N | CTQ |
| 8 | not used | Peak queue depth for a queue | Peak_queue _depth | QTY | Y | Y | Y | N | CTQ |
| 9 | not used | Number of messages that have been put on | Queue_mess ages_in | QTY | Y | Y | Y | N | CTQ |

| Metric_ID INTEGER | Met_category* VARCHAR (10) | Met_desc* VARCHAR (254) | Met_name* VARCHAR (120) | Met_units* VARCHAR (120) | Min_exists CHAR(1) | Max_exists CHAR(1) | Avg_exists CHAR(1) | Total_exists CHAR(1) | Msrc_nm* VARCHAR (254) |
|---|---|---|---|---|---|---|---|---|---|
| | | the queue | | | | | | | |
| 10 | not used | Number of messages that have been successfully retrieved from the queue | Queue_messages_out | QTY | Y | Y | Y | N | CTQ |
| 11 | not used | Number of messages put on the queue per minute | Queue_messages_in_per_minute | Qpm | Y | Y | Y | N | CTQ |
| 12 | not used | Number of messages retrieved from the queue per minute | Queue_messages_out_per_minute | Qpm | Y | Y | Y | N | CTQ |
| 13 | not used | Time since queue last reset | Queue_reset_interval | | | | | | |

## *8.3  Dimension tables*

The following sections describe the dimension tables (other than metric dimension tables) that the star schemas use in this warehouse pack.

### 8.3.1 Dimension table CTQ.D_HOST

The following columns are used in this dimension table:

- Host_ID
- Host_name
- Customer_name
- Center_name

### 8.3.2 Dimension table CTQ.D_QMGR

The following columns are used in this dimension table:

- Qmgr_ID
- Qmgr_name
- XQ_qmgr_state_dttm
- Platform_type
- Command_level

### 8.3.3 Dimension table CTQ.D_QUEUE

The following columns are used in this dimension table:

- Queue_ID
- Queue_name
- XQ_queu_state_dttm
- Queue_type
- Queue_usage

### 8.3.4 Dimension table CTQ.D_CHANNEL

The following columns are used in this dimension table:

- Channel_ID
- Channel_name
- XQ_chnl_state_dttm
- Channel_type
- Protocol_type
- Transmission_queue

## 8.4  Data marts and reports

This warehouse pack provides the following data mart.

### 8.4.1 CTQ Monitoring for WebSphere MQ data mart

This data mart uses the following star schemas:

- CTQ Daily WebSphere MQ Channel Star Schema
- CTQ Daily WebSphere MQ Queue Manager Star Schema
- CTQ Daily WebSphere MQ Queue Star Schema
- CTQ Hourly WebSphere MQ Channel Star Schema
- CTQ Hourly WebSphere MQ Queue Manager Star Schema
- CTQ Hourly WebSphere MQ Queue Star Schema
- CTQ Monthly WebSphere MQ Channel Star Schema
- CTQ Monthly WebSphere MQ Queue Manager Star Schema
- CTQ Monthly WebSphere MQ Queue Star Schema
- CTQ Weekly WebSphere MQ Channel Star Schema
- CTQ Weekly WebSphere MQ Queue Manager Star Schema
- CTQ Weekly WebSphere MQ Queue Star Schema

### 8.4.2 Reports

This data mart provides the following prepackaged reports.

#### 8.4.2.1  CTQ Message and Handle Summary for Queues Daily

This summary report shows the average outstanding message count, the average oldest message in minutes, and the average open input handles count for all WebSphere MQ queues grouped by host, queue manager, and queue. The reporting interface uses the following information to create this report:

Group By: (1) Host name (CTQ.D_HOST.HOST_NAME)

         (2) Queue manager name (CTQ.D_QMGR.QMGR_NAME)

         (3) Queue (CTQ.D_QUEUE.QUEUE_NAME)

Aggregate Function: average

Metric: Queue messages outstanding average, Input handles average, Oldest message average

Star Schema Tables: CTQ Daily WebSphere MQ Queue Star Schema

Time Interval: Week

Start/End Time: Last 7 days from current date/time

Order By: output from average aggregation function

Order Type: 1 Descending, 2 Descending, 3 Descending


## 8.4.2.2  CTQ Availability Status for Queue Managers Daily

This summary report shows the average percent in all states (up, down, and unknown) for all WebSphere MQ queue managers grouped by host and queue manager. The reporting interface uses the following information to create this report:

Group By: (1) Host name (CTQ.D_HOST.HOST_NAME)

         (2) Queue manager name (CTQ.D_QMGR.QMGR_NAME)

Aggregate Function: average

Metric: Queue manager status up average, Queue manager status down average,  Queue manager status unknown average

Star Schema Tables: CTQ Daily WebSphere MQ Queue Manager Star Schema

Time Interval: Week

Start/End Time: Last 7 days from current date/time

Order By: output from average aggregation function

Order Type: 1 Descending, 2 Descending


## 8.4.2.3  CTQ Maximum Outstanding Messages for Queues Daily

This extreme case report shows the top 25 WebSphere MQ queue components with a maximum outstanding message count grouped by queue, queue manager, and host. The reporting interface uses the following information to create this report:

Group By: (1) Queue name (CTQ.D_QUEUE.QUEUE_NAME)

         (2) Queue manager name (CTQ.D_QMGR.QMGR_NAME)

         (3) Host name (CTQ.D_HOST.HOST_NAME)

Aggregate Function: maximum

Metric: Queue messages maximum

Star Schema Tables: CTQ Daily WebSphere MQ Queue Star Schema

Time Interval: Week

Start/End Time: Last 7 days from current date/time

Order By: output from maximum aggregation function

Order Type: 1 Descending, 2 Descending, 3 Descending

### 8.4.2.4 CTQ Maximum Running Status for Channels Daily

This extreme case report shows the top 25 WebSphere MQ channel components with a maximum percent in a running state grouped by channel, queue manager, and host. The reporting interface uses the following information to create this report:

Group By: (1) Channel name (CTQ.D_CHANNEL.CHANNEL_NAME)

        (2) Queue manager name (CTQ.D_QMGR.QMGR_NAME)

        (3) Host name (CTQ.D_HOST.HOST_NAME)

Aggregate Function: maximum

Metric:  Channel status running average

Star Schema Tables: CTQ Daily WebSphere MQ Channel Star Schema

Time Interval: Week

Start/End Time: Last 7 days from current date/time

Order By: output from maximum aggregation function

Order Type: 1 Descending, 2 Descending, 3 Descending


### 8.4.2.5 CTQ Maximum Down Status for Queue Managers Daily

This extreme case report shows the top 25 WebSphere MQ queue manager components with a maximum percent in a down state grouped by queue manager and host. The reporting interface uses the following information to create this report:

Group By: (1) Queue manager name (CTQ.D_QMGR.QMGR_NAME)

        (2) Host name (CTQ.D_HOST.HOST_NAME)

Aggregate Function:  maximum

Metric:   Queue manager status down average

Star Schema Tables: CTQ Daily WebSphere MQ Queue Manager Star Schema

Time Interval:  Week

Start/End Time:  Last 7 days from current date/time

Order By:  output of maximum aggregation function

Order Type: 1 Descending, 2 Descending


### 8.4.2.6 CTQ Availability Status for Channels Daily

This summary report shows the average percent in all states (inactive, stopped, starting, retrying, initializing, binding, requesting, running, paused, stopping, and unknown) for all WebSphere MQ channels grouped by host, queue manager, and channel. The reporting interface uses the following information to create this report:

Group By: (1) Host name (CTQ.D_HOST.HOST_NAME)

        (2) Queue manager name (CTQ.D_QMGR.QMGR_NAME)

        (3) Channel name (CTQ.D_CHANNEL.CHANNEL_NAME)

Aggregate Function: average

Metric: Channel status running average, Channel status inactive average, Channel status stopped average, Channel status starting average, Channel status retrying average, Channel status initializing average, Channel status binding average, Channel status requesting average, Channel status paused average, Channel status stopping average, Channel status unknown average

Star Schema Tables: CTQ Daily WebSphere MQ Channel Star Schema

Time Interval: Week

Start/End Time: Last 7 days from current date/time

Order By: output from average aggregation function

Order Type: 1 Descending, 2 Descending, 3 Descending

## *8.5  Language Support for the reporting interface*

For this warehouse pack, language support for the reporting interface is provided for the following languages:

- French
- Japanese
- Brazilian Portuguese
- German
- Italian
- Spanish
- Korean
- Simplified Chinese
- Traditional Chinese

During installation of this warehouse pack, the supplied jar file, com.ibm.twh.ctq.nls@1.1.0.jar, which contains the base resource bundle class has been associated with each of this warehouse pack's star schemas. Therefore, you do not need to complete the steps detailed in "Enabling the report interface for additional languages" sections in the *Installing and Configuring Tivoli Enterprise Data Warehouse* document.

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