



**IBM Tivoli Decision Support for OS/390
Version 1.6 (DB2)**

Warehouse Enablement Pack, Version 1.2.0

Implementation Guide

for Tivoli Data Warehouse, Version 1.2

Note:

Before using this information and the product it supports, read the information in Notices on page 33.

First Edition (February 2004)

This edition applies to IBM Tivoli Decision Support for OS/390 Version 1.6 and to all subsequent releases and modifications until otherwise indicated in new editions.

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1 About this guide

This document describes the warehouse enablement pack, Version 1.2.0 for IBM Tivoli® Decision Support for OS/390® Version 1.6 (DB2)®. This warehouse enablement pack (hereafter referred to as warehouse pack) is created for Tivoli Data Warehouse, Version 1.2 and it is used to load DB2 data for IBM Tivoli Decision Support for OS/390 into a central data warehouse.

With this implementation guide, you can install and configure the warehouse pack and analyze the data structures it uses.

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
- 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 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 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 Decision Support for OS/390
- IBM Tivoli Data Warehouse
- Crystal Enterprise
- IBM DB2, DB2 Data Warehouse Center, and DB2 Warehouse Manager
- IBM Redbooks

Note: The documentation for Crystal Enterprise is available on the Crystal Enterprise CD, which is distributed with Tivoli Data Warehouse.

1.2.1 IBM Tivoli Decision Support for OS/390 library

The following documents are available in the IBM Tivoli Decision Support for OS/390 library:

- *Tivoli Decision Support for OS/390, System Performance Feature Reference, (vol. I), Version 1.*, SH19-6819

Provides reference information for the System Performance feature, describes the component tables and lookup tables associated with the feature, and provides a detailed explanation of how the feature process each type of system performance data.

- *Tivoli Decision Support for OS/390, Administration Guide, Version 1.6*, SH19-6816

Provides information about customizing Tivoli Decision Support for OS/390.

1.2.2 Tivoli Data Warehouse library

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

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

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

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

Describes how Tivoli Data Warehouse fits into your enterprise, explains how to plan for its deployment, and gives installation and configuration instructions. It contains maintenance procedures and troubleshooting information.

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

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

- *Tivoli Data Warehouse Messages*, SC09-7776

Lists the messages generated by Tivoli Data Warehouse, and describes the corrective actions you should take.

1.2.3 Related publications

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

1.2.3.1 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 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.

- *IBM DB2 UDB for z/OS and OS/390 Administration Guide, SC26-9931*
Provides information on how to administer DB2 UDB on z/OS and OS/390 systems.
- *IBM DB2 UDB for z/OS and OS/390 An introduction to DB2 for OS/390, SC26-9937*
Provides start-up information for DB2 for OS/390 users.
- *IBM DB2 UDB for z/OS and OS/390 Messages and codes, GC26-9940*
Lists the messages and codes issued by DB2 on z/OS and OS/390 systems.
- *IBM DB2 UDB for z/OS and OS/390 Installation Guide, GC26-9936*
Provides information on how to install DB2 UDB on z/OS and OS/390 systems.
- *IBM DB2 UDB for z/OS and OS/390 Diagnosis Guide and Reference, LY37-3740*
Provides information on how to understand DB2 errors and instruct corrective actions that should be taken.

1.2.3.2 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 Data Warehouse:

- *Introduction to Tivoli Enterprise Data Warehouse, SG24-6607*
Provides a broad understanding of Tivoli 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*
Describes the necessary planning you must complete before you can deploy Tivoli 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 Data Warehouse.

1.2.4 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.

1.2.5 Ordering publications

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

<http://www.elink.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 Crystal Enterprise. 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, 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 newsreader 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 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 Data Warehouse and the warehouse pack for Tivoli Decision Support for OS/390 DB2 Component.

2.1 Overview of Tivoli Data Warehouse

Tivoli 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 reports

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

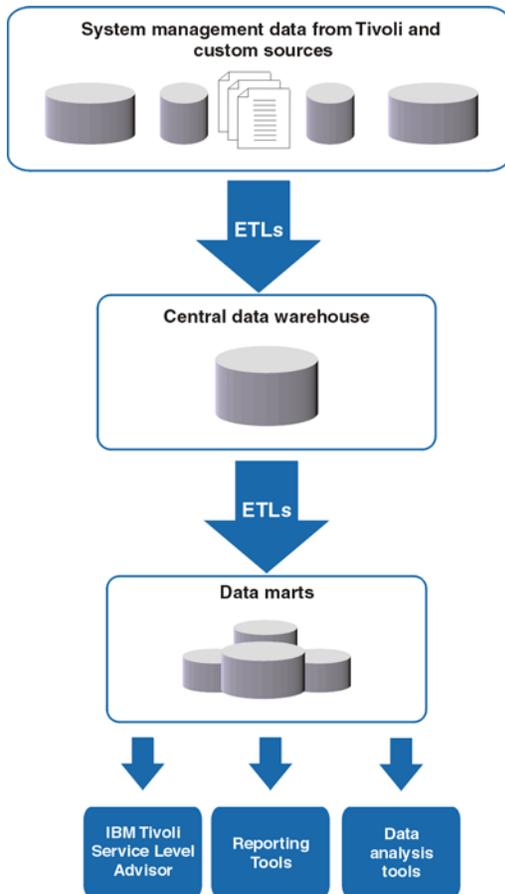


Figure 1. Tivoli Data Warehouse basic architecture

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

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

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

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

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

The ETLs are typically scheduled to run periodically, usually during non-peak hours.

2.2 Overview of the warehouse pack for Tivoli Decision Support for OS/390

Tivoli Decision Support for OS/390 is structured with several components relative to the different applications where it collects data. Consequently also the extract transform and load processes are also defined as different Subject Areas according to each Tivoli Decision Support component. For instance in the “DB2 Warehouse Center” you can find the following Subject Areas, if the corresponding warehouse packs were installed:

- D01_TDS/390-MVS_v1.6.0_Subject_Area (ETLs for Tivoli Decision Support for OS/390 System performance feature MVS component)
- D07_TDS/390-OPC_v1.6.0_Subject_Area (ETLs for Tivoli Decision Support for OS/390 System performance feature OPC component)
- D09_TDS/390-RACF_v1.6.0_Subject_Area (ETLs for Tivoli Decision Support for OS/390 System performance feature RACF component)

The relationship between Tivoli Decision Support and Tivoli Data Warehouse through the ETL processes varies according to the different tasks they perform. The graph below shows what has been just stated:

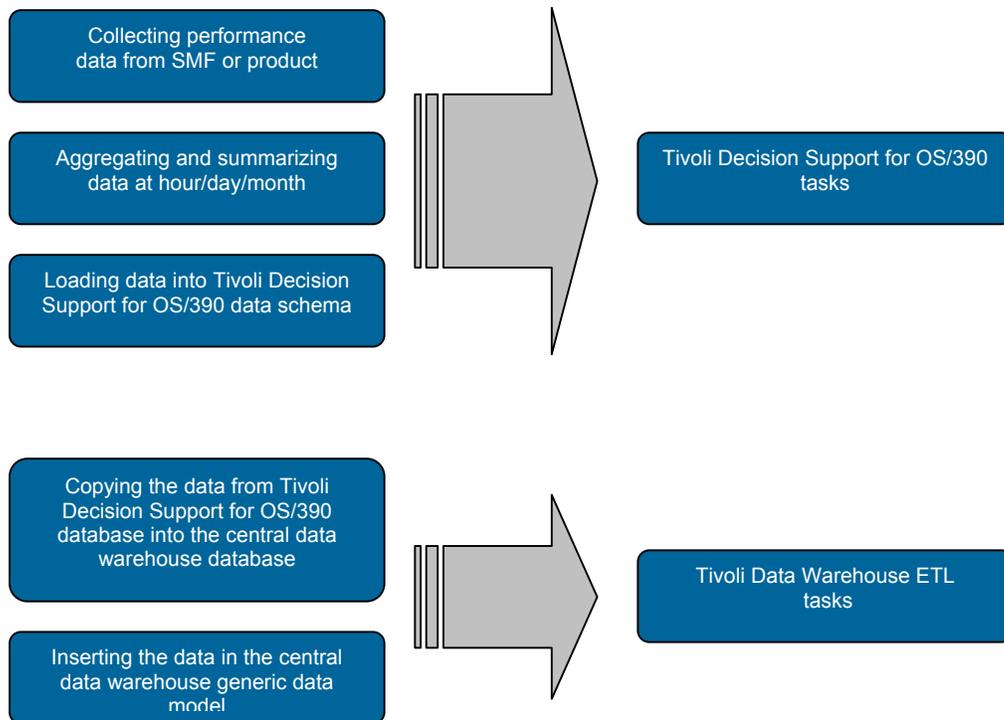


Figure 2. Overview of the warehouse pack for Tivoli Decision Support for OS/390

This figure refers only to the central data warehouse loading, because this warehouse pack does not provide either data marts or reports.

To understand how Tivoli Decision Support for OS/390 interacts with Tivoli Data Warehouse, see that topic in *Installing and Configuring Tivoli Data Warehouse*.

2.3 Data source and targets for Tivoli Decision Support for OS/390 (DB2)

The following table shows the corresponding Tivoli Decision Support for OS/390 source locations for the Central data warehouse OS/390 component types and measurement types managed by warehouse pack.

Tivoli Decision Support for OS/390 source Table name	Tivoli Decision Support for OS/390 Source field or Source formula	Tivoli Data Warehouse CompTyp_Cd (C) MsmtTyp_Nm (M) AttrTyp_cd (A)
DB2_SYSTEM_T	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	SRB_TIME_DBM1+SRB_TIME_DIST+ SRB_TIME_IRLM+SRB_TIME_MSTR+ TCB_TIME_DBM1+TCB_TIME_DIST+ TCB_TIME_IRLM+TCB_TIME_MSTR	(M) 'DB2 CPU Time'
	(TCB_TIME_DBM1+SRB_TIME_DBM1)*100/ /(TCB_TIME_DBM1+TCB_TIME_MSTR+ TCB_TIME_DIST+TCB_TIME_IRLM+ SRB_TIME_DBM1+SRB_TIME_MSTR+ SRB_TIME_DIST+SRB_TIME_IRLM)	(M) 'DB2 CPU Utilization (DBM1 Address Space)'
	(TCB_TIME_MSTR+SRB_TIME_MSTR)*100/(TCB_TIME_DBM1+TCB_TIME_MSTR +TCB_TIME_DIST+TCB_TIME_IRLM +SRB_TIME_DBM1+SRB_TIME_MSTR +SRB_TIME_DIST+SRB_TIME_IRLM)	(M) 'DB2 CPU Utilization (MSTR Address Space)'
	(TCB_TIME_DIST+SRB_TIME_DIST)*100/ (TCB_TIME_DBM1+TCB_TIME_MSTR+ TCB_TIME_DIST+TCB_TIME_IRLM+ SRB_TIME_DBM1+SRB_TIME_MSTR+ SRB_TIME_DIST+SRB_TIME_IRLM)	(M) 'DB2 CPU Utilization (DIST Address Space)'
	(TCB_TIME_IRLM+SRB_TIME_IRLM)*100/ (TCB_TIME_DBM1+TCB_TIME_MSTR+ TCB_TIME_DIST+TCB_TIME_IRLM+ SRB_TIME_DBM1+SRB_TIME_MSTR+ SRB_TIME_DIST+SRB_TIME_IRLM)	(M) 'DB2 CPU Utilization (IRLM Address Space)'
	IDENTIFY	(M) 'DB2 Successful Identify Requests'
	SIGNON	(M) 'DB2 Successful Sign-On Requests'
	CREATE_THREAD	(M) 'DB2 User Threads'
	WRITES_NOWAIT+WRITES_FORCE	(M) 'DB2 Log Writes'
COMMAND_COUNT	(M) 'DB2 Commands'	
DB2_DATABASE_T	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	(EDM_REQ_DBD-EDM_LOAD_DBD)*100/ EDM_REQ_DBD	(M) 'DB2 Database Descriptors Read Efficiency'

	(EDM_REQ_CT_SECT-EDM_LOAD_CT_SECT)*100/ EDM_REQ_CT_SECT	(M) 'DB2 Cursor Table Read Efficiency'
	(EDM_REQ_PT_SECT-EDM_LOAD_PT_SECT)*100/ EDM_REQ_PT_SECT	(M) 'DB2 Package Table Read_Efficiency'
	(EDM_POOL_SIZE-EDM_PAGES_FREE)*100/ EDM_POOL_SIZE	(M) 'DB2 EDM Pool Utilization Percentage'
	SQL_CLOSE+ SQL_DELETE+ SQL_DESCRIBE+SQL_DESCRIBE_TABLE+ SQL_FETCH+SQL_INSERT+ SQL_OPEN+SQL_PREPARE+ SQL_SELECT+SQL_UPDATE	(M) 'DB2 DML Type SQL Statements'
	SQL_ALTER_DATABASE+SQL_ALTER_INDEX+ SQL_ALTER_STOGROUP+SQL_ALTER_TABLE+ SQL_ALTER_TS+SQL_ALTER_FUNCTION+ SQL_ALTER_PROC+SQL_COMMENT_ON+ SQL_CREATE_ALIAS+SQL_CREATE_DATABAS+ SQL_CREATE_INDEX+SQL_CREATE_STG+ SQL_CREATE_SYNONYM+SQL_CREATE_VIEW+ SQL_CREATE_AUX_TAB+SQL_CRT_DIST_TYPE+ SQL_CREATE_FUNCT+SQL_CRT_PROCEDURE+ SQL_CREATE_TRIGGER+SQL_DROP_ALIAS+ SQL_DROP_DATABASE+SQL_DROP_INDEX+ SQL_DROP_PACKAGE+SQL_DROP_STOGROUP+ SQL_DROP_SYNONYM+SQL_DROP_TABLE+ SQL_DROP_TS+SQL_DROP_VIEW+ SQL_DROP_DIST_TYPE+SQL_DROP_FUNCTION+ SQL_DROP_PROCEDURE+SQL_DROP_TRIGGER+ SQL_LABEL_ON	(M) 'DB2 DDL Type SQL Statements'
DB2_US_TRAN_SHAR_H	SQL_GRANT+SQL_REVOKE+SQL_LOCK_TABLE	(M) 'DB2 Control Type SQL Statements'
	PLAN_ALLOC_SUCC	(M) 'DB2 Plan Allocations'
	PLANS_BOUND+PKG_BOUND	(M) 'DB2 Plans And Packages Bound'
	PLANS_REBOUND+PKG_REBOUND	(M) 'DB2 Plan And Packages Rebound'
	LOCK_REQUESTS	(M) 'DB2 IRLM Lock Requests'
	DEADLOCKS	(M) 'DB2 Deadlocks'
	LOCK_SUSPENDS	(M) 'DB2 Lock Suspends'
	LOCK_TIMEOUTS	(M) 'DB2 Lock Timeouts'
	LOCK_ESCAL_SHARED+LOCK_ESCAL_EXCL	(M) 'DB2 Lock Escalations'
	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	SH_LOCK_REQS	(M) 'DB2 Lock Requests'
	SH_UNLOCK_REQS	(M) 'DB2 Unlock Requests'
	SH_CHANGE_REQS	(M) 'DB2 Change Requests'
DB2_SYS_PARAMETER	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	SERVICE_UNIT_LIMIT	(M) 'DB2 Service Units Limit'
	MONITOR_BFR_SIZE	(M) 'DB2 Monitor Buffer Size'
	LOG_OPUT_BFR_SIZE	(M) 'DB2 Log Output Buffer Pool Size'
	LOG_INPUT_BFR_SIZE	(M) 'DB2 Log Input Buffer Pool Size'
DB2_USER_TRAN_H	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	APPLICATION_NAME	(C) 'D05_APPL'
	ELAPSED_SEC/(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Elapsed Time'

	COMMIT_COUNT	(M) 'DB2 Commit Count'
	ABORT_COUNT	(M) 'DB2 Abort Count'
	(IO_WAIT_SEC+OTHER_READ_SEC+OTHER_WRITE_SEC) /(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Other I/O Wait Time '
	SERVICE_TASK_SEC/(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Service Wait Time'
	TCB_SEC/(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Average TCB Seconds'
	SRB_SEC/(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Average SRB Seconds'
	LOCK_LATCH_SEC/(COMMIT_COUNT+ ABORT_COUNT)	(M) 'DB2 Lock/Latch Time'
	ARC_LOGWAIT_SEC/(COMMIT_COUNT+ ABORT_COUNT)	(M) 'DB2 Archive Log Wait Time'
	ARC_LOGREAD_SEC/(COMMIT_COUNT+ ABORT_COUNT)	(M) 'DB2 Archive Log Read Time'
	(DRAIN_LOCK_SEC + DRAIN_WAIT_SEC) /(COMMIT_COUNT+B.ABORT_COUNT)	(M) 'DB2 Drain Time'
	UDF_EXECUTED	(M) 'DB2 User Defined Functions Executed'
	UDF_ABENDED	(M) 'DB2 User defined Functions Abended'
	UDF_TIMED_OUT	(M) 'DB2 User Defined Functions Timed out'
	UDF_REJECTED	(M) 'DB2 User Defined Functions Rejected'
	ACTIV_SQL_TRIGGER	(M) 'DB2 Statement Triggers Activated'
	ACTIV_ROW_TRIGGER	(M) 'DB2 Row Triggers Activated'
	TRIGGER_ERRORS	(M) 'DB2 Trigger Errors'
	IO_WAIT_LOGWRT_SEC /(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Log Write I/O Time'
DB2_BUFFER_POOL_T	IO_WAIT_DB_SEC /(COMMIT_COUNT+ABORT_COUNT)	(M) 'DB2 Database I/O Wait Time'
	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'BP'!!CHAR(BUFFER_POOL_ID)	(C) 'D05_BF_POOL'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	SYNC_READ_IO	(M) 'DB2 Synchronous Reads'
	SEQ_PREFETCH_REQ	(M) 'DB2 Sequential Prefetch Requests'
	LIST_PREFETCH	(M) 'DB2 List Prefetch Requests'
	BUFFER_UPDATES	(M) 'DB2 Buffer Updates'
	PAGES_WRITTEN	(M) 'DB2 Pages Written'
	ASYNCR_WRITE_IO	(M) 'DB2 Asynchronous Writes'
	DATASET_OPENS	(M) 'DB2 Data Set OPENS Performed'
	(GETPAGE-SYNC_READ_IO)*100 /GETPAGE	(M) 'DB2 Buffer Pool Read Efficiency'
	(1-(SPTH_REACHED+NO_READ_ENGINE)) /SEQ_PREFETCH_REQ*100	(M) 'DB2 Prefetch Availability'
	(1-(SYNC_WRITE_IO+ASYNCR_WRITE_IO)) /PAGES_WRITTEN*100	(M) 'DB2 DASD Write Efficiency'
	(1-PAGES_WRITTEN) /BUFFER_UPDATES*100	(M) 'DB2 Buffer Update Efficiency'
DB2_BP_SHARING_T	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	'BP'!!CHAR(BUFFER_POOL_ID)	(C) 'D05_BF_POOL'
	CHG_PGS_SYN_WRTN	(M) 'DB2 Changed Pages Synchronously Written'
	CHG_PGS_ASYN_WRTN	(M) 'DB2 Changed Pages Asynchronously Written'
	CLEAN_PGS_SYN_WRTN	(M) 'DB2 Clean Pages Synchronously Written'
	CLEAN_PGS_ASYN_WRT	(M) 'DB2 Clean Pages Asynchronously Written'
	READ_FAILED_NOSTOR	(M) 'DB2 Read Failed No Storage'

	WRIT_FAILED_NOSTOR	(M) 'DB2 Write Failed No Storage'
	REG_PG_LIST_RPL	(M) 'DB2 Requests To Register A Page List'
DB2_PACKAGE_H (1)	MVS_SYSTEM_ID	(C) 'MVS_SYSTEM'
	DB2_SYSTEM_ID	(C) 'MVS_SUBSYSTEM'
	'DB2'	(A) 'MVS_SUBSYS_TYPE'
	DB2_PACKAGE	(C) 'D05_PKG'
	PACKAGE_SQL	(M) 'DB2 SQL Statements'
AVAILABILITY_T (2)	Count(Substr(INTERVAL_TYPE,1,1) = ' ')	(M) 'DB2 Resource Starts'
	Count(Substr(INTERVAL_TYPE,3,1) = ' ')	(M) 'DB2 Resource Stops'
	((DAYS(END_TIME)*60*24)+(MIDNIGHT_SECONDS(END_TIME)/60))- ((DAYS(START_TIME)*60*24)+(MIDNIGHT_SECONDS(START_TIME)/60)) (where INTERVAL_TYPE IN ('==','!=',' ='))	(M) 'Available'
	((DAYS(END_TIME)*60*24)+(MIDNIGHT_SECONDS(END_TIME)/60))- ((DAYS(START_TIME)*60*24)+(MIDNIGHT_SECONDS(START_TIME)/60)) (where INTERVAL_TYPE = (' ') and previous recorded INTERVAL_TYPE = ('!='))	(M) 'Unavailable'
	((DAYS(END_TIME)*60*24)+(MIDNIGHT_SECONDS(END_TIME)/60))- ((DAYS(START_TIME)*60*24)+(MIDNIGHT_SECONDS(START_TIME)/60)) (where INTERVAL_TYPE = (' '))	(M) 'Unknown'

Note (1): Defining the D05_PKG component and every measurement related to it, we use the DB2_PACKAGE_H table joined with the DB2_USER_TRAN_H table.

Note (2): Components are not loaded from AVAILABILITY_T table. Only measurements are loaded and they all refer to MVS_SUBSYSTEM component type.

3 Installing and configuring the warehouse pack

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

3.1 Prerequisite hardware and software

Before installing the warehouse pack for Tivoli Decision Support for OS/390 DB2 component, you must install the following software:

- IBM Tivoli Decision Support for OS/390 Version 1.6 System performance feature with the following component:
 - DB2 component
 - MVS availability component
- IBM DB2 Universal Database, Version 7.2
- IBM DB2 Universal Database for z/OS and OS/390, Version 7
- Tivoli Data Warehouse, Version 1.2 and its prerequisites
- Crystal Enterprise and its prerequisites

This warehouse pack supports Central data warehouses on DB2 UDB for z/OS and OS/390.

Refer to the *Tivoli Data Warehouse Release Notes* and *Tivoli Decision Support for OS/390 Administration Guide* for specific information about hardware prerequisites, database and operating system support, and product prerequisites. For late-breaking news about prerequisites, refer to the following IBM Software Support Web site:

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

3.2 Product notes and limitations

For performance and disk capacity reasons, data from Tivoli Decision Support for OS/390 can only be stored in the central data warehouse database on OS/390 system.

In addition, place Tivoli Decision Support for OS/390 in the same DB2 subsystem as central data warehouse.

To avoid resource contention, warehouse packs on OS/390 must be run in sequence. See the following sections for instructions on how to install and schedule multiple Tivoli Decision Support for OS/390 warehouse packs.

3.3 Database-sizing considerations

Refer to the “Estimating the size of your Tivoli Data Warehouse deployment” in *Installing and Configuring Tivoli Data Warehouse* manual.

3.4 Pre-installation procedures

3.4.1 Configure Tivoli Decision support for OS/390 to get availability data

To collect MVS availability data for DB2 into Tivoli Decision support for OS/390 you must configure the MVS_AVAIL_RESOURCE lookup table. The following can be used as a sample:

MVS_SYSTEM_ID	SUBSYSTEM_ID	JOB_NAME	RESOURCE_TYPE	RESOURCE_NAME
%	%	%	OTHER	OTHER
ESJ4	STC	DSN%	SUBSYS	DB2G
ESJ4	DB2	%	SUBSYS	DB2G

Where:

- MVS_SYSTEM_ID: Name of your MVS system (% can be used as a wildcard).
- SUBSYSTEM_ID: Subsystem type or name (% can be used as a wildcard) as defined in SYS1.PARMLIB(IEAICSxx) member. For subsystems not explicitly defined in this member, the STC type is used, leaving the details in the JOB_NAME column.
- JOB_NAME: Name of the job for which you would measure availability (% can be used as a wildcard).
- RESOURCE_TYPE: In this field you must specify "SUBSYS" for the MVS resources for which you want to collect availability data.
- RESOURCE_NAME: The name used as a component name in Tivoli Data Warehouse for MVS data. For correlation purposes with other measurements, ensure that this name is a subsystem identifier.

Note: to have availability data for the DB2 MVS Subsystem loaded into the central data warehouse you need to specify a RESOURCE_NAME in the MVS_AVAIL_RESOURCE table that refer to the subsystem names of your MVS Subsystem.

3.5 Installation of the warehouse pack

To install this warehouse pack, perform the following steps:

1. Make sure that Tivoli Decision Support for OS/390 is installed and the data source is available.
2. Make sure that all prerequisite product patches are applied.
3. Make sure that Tivoli Data Warehouse is installed. For instructions about installing Tivoli Data Warehouse, refer to *Installing and Configuring Tivoli Data Warehouse*.
4. Record the following information that will be used during the installation:

ODBC source	User ID	Password	Database type	Database alias
TDS390	Your DB2 UDB for z/OS and OS/390 User ID	Your DB2 UDB for z/OS and OS/390 Password	DB2 UDB for z/OS and OS/390	The ODBC data source used for central data warehouse (for example, TCDW1)

5. Install the warehouse pack as described in *Installing and Configuring Tivoli Data Warehouse*, using the installation properties file (tw_h_install_props.cfg) located in the tw_h_weps\d05\v1200 directory.
6. If you want to run multiple warehouse packs on OS/390 select “Do not schedule the data extraction, transformation and loading”, when the ETL configuration window is displayed. In this way you are able to manually schedule ETLs in sequence as explained in the following *Post-installation procedures* section.
7. Perform the post-installation steps described in *Post-installation procedures*.

3.6 Post-installation procedures

Complete the following post-installation procedures.

3.6.1 How to change the default schema name of Tivoli Decision Support for OS/390

Before running any ETL process, if this is the first Tivoli Decision Support for OS/390 warehouse pack that you are installing and you have installed Tivoli Decision Support for OS/390 using a schema (Tivoli Decision Support for OS/390 table prefix) name different from DRL (which is the default name), you must customize the db2os390.translate file, as described in *Installing and Configuring Tivoli Data Warehouse*. For instance, if your schema name is DRLxxx, you must change the following:

```
__TDS390_SCHEMA DRL
```

into:

```
__TDS390_SCHEMA DRLxxx
```

3.6.2 How to schedule ETL processes

If you are installing this warehouse pack as the only OS/390 warehouse pack, you can schedule it using the ETL configuration window during the installation steps. On the contrary, if you are installing multiple OS/390 warehouse packs, you must ensure that their ETLs must be run in sequence. During the installation process, you selected “Do not schedule data extraction, transformation and loading”. Now you must create shortcuts in the Data Warehouse Interface to link the ETL processes in sequence. With shortcuts you specify only the first ETL process runs. All the other processes run automatically because they are linked to that process. For details see “Scheduling warehouse pack ETL processes” in *Installing and Configuring Tivoli Data Warehouse* manual.

3.7 Migration from a previous release of the warehouse pack

This warehouse pack has no migration from previous release.

3.8 Uninstallation of the warehouse pack

To uninstall the warehouse pack on your computer select **Start> Programs> Tivoli Data Warehouse> Uninstall a Warehouse Pack**. For further information see *Installing and Configuring Tivoli Data Warehouse*, “*Uninstalling warehouse packs*” chapter. Before uninstalling the warehouse pack you can delete the related data from the central data warehouse by running a specific SQL script. A sample of it can be found in the twh\apps\d05\v1200\misc directory, the name is d05_data_delete.sql. The sample deletes both the static data and the instances loaded in the central data warehouse by this warehouse pack. Before running this script make sure you do not need those data anymore and make sure you are connected to the central data warehouse Database on host.

To uninstall the warehouse pack using this script you must open a DB2 Command Window and enter the following command from the twh\apps\d05\v1200\misc directory:

```
db2 -z <your logfile name> -tvf d05_data_delete.sql
```

3.9 Multiple data centers

After you install the warehouse pack, you can configure Tivoli Data Warehouse to separate data for multiple data centers. To set this up, you must create SQL scripts with the following values:

Information for scripts	Value or location
Field in source data	MVS System ID
Name of lookup table	D05.Centr_lookup table
Name of center list	TWG.Centr

For the procedural instructions and example of SQL statements, see the information about warehouse pack installation in the *Installing and Configuring Tivoli Data Warehouse* guide.

After the configuration for multiple data centers, you must modify the tables when data centers are added and removed.

3.10 Multiple customer environments

After you install the warehouse pack, you can configure Tivoli Data Warehouse to separate data for the multiple customer environments. To set this up, you must create SQL scripts with the following values:

Information for scripts	Value or location
Field in source data	MVS System ID
Name of lookup table	D05.Cust_lookup table
Name of customer list	TWG.Cust

For the procedural instructions and example of SQL statements, see the information about warehouse pack installation in the *Installing and Configuring Tivoli Data Warehouse* guide.

After your configuration of the multiple customer environments, you must modify the tables when customers are added and removed.

4 Maintenance and problem determination

This section describes maintenance tasks for the warehouse pack.

4.1 Backing up and restoring

Together with the procedures describing maintenance tasks in *Installing and Configuring Tivoli Data Warehouse*, it is recommended that you back up your data on a regular basis. Ensure you have sufficient back up to restore as much event data as you need to store in the central data warehouse.

For further information refer to backing up and restoring in *Installing and Configuring Tivoli Data Warehouse*.

4.2 Deleting data in the central data warehouse

To manage the high volume of measurement data, use the Prune_Msmt_Control table where the deletion criteria are specified. The Prune_Msmt_Log table keeps a history of all data deletion activity.

By default the data older than the deletion criteria specified in the Prune_Msmt_Control table is deleted when the CDW_c05_Prune_and_Mark_Active process runs. This process is within the CDW_Tivoli_Data_Warehouse_v1.2.0_Subject_Area. By default, this process runs daily at 6:00 a.m..

4.2.1 Deleting measurement data (table Prune_Msmt_Control)

This table provides the deletion criteria for the data in the Msmt table

MSrc_Cd CHAR (6)	Tmsum_Cd CHAR (1)	PMsmtC_Age_In_Days DECIMAL(8,0)
D05	P	100
D05	H	100
D05	D	300
D05	W	10000
D05	M	10000

Note: PMsmtC_Age_In_Days column contains the "Prune Measurement Control Age in Days". This is the age at which measurements are deleted (day duration *yyyymmdd*).

4.3 Maintenance of customized environments

For successful Tivoli Data Warehouse maintenance do not change the Tivoli Data Warehouse ETLs, but rather create new ETLs in another subdirectory of the apps directory. At the same time they define your process in the Data Warehouse Center. Tivoli Data Warehouse provides standard maintenance to its subdirectories and processes, if not modified. Refer *Enabling an Application* for details on how to create your ETLs.

4.4 Problem determination

For common problems and solutions, see the *Installing and Configuring Tivoli Data Warehouse* guide.

5 ETL process

The warehouse pack has the following process:

- D05_c05_DB2_Process

5.1 D05_c05_DB2_Process

This process is used to load component and measurement tables from source data into the central data warehouse database.

The process has the following steps:

- D05_c05_s010_processDB2

This step populates the component table (Comp table), the component attribute table (CompAttr table) and the component relationship table (CompReIn table).

- D05_c05_s020_processDB2

This step populates the measurement table (Msmt table).

6 Central data warehouse information

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

This section provides an example of how information is stored in Tivoli Data Warehouse. The data values shown in the following tables come from a generic installation.

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_DfTm TIMESTAMP	CompTyp_End_DfTm TIMESTAMP	Msrc_Corr_Cd CHAR (6)
MVS_SYSTEM		MVS System	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000	MODEL1
MVS_SUBSYSTEM		MVS Subsystem	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000	MODEL1
D05_APPL		Application Name	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000	D05
D05_BF_POOL		Buffer Pool	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000	D05
D05_PKG		Package Name	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000	D05
* This column is translated.					

6.1.2 Component extension (table Comp_ext)

This table is not used by this warehouse pack.

6.1.3 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_DfTm TIMESTAMP	Comp_End_DfTm TIMESTAMP	Comp_Ds VARCHAR (254)	Msrc_Corr_Cd CHAR (6)
1	MVS_SYSTEM	CDW	1		SY4B		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		SHARED
2	MVS_SYSTEM	CDW	1		ESJ4		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		SHARED
3	MVS_SUBSYSTEM	CDW	1		DSN7		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		SHARED

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_DfTm TIMESTAMP	Comp_End_DfTm TIMESTAMP	Comp_Ds VARCHAR (254)	MSrc_Corr_Cd CHAR (6)
4	MVS_SUBSYSTEM	CDW	1		DB2G		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		SHARED
5	D05_APPL	CDW	1		SPUFI RR		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		D05
6	D05_APPL	CDW	1		DIST SERVER		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		D05
7	D05_APPL	CDW	1		OTHE R		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		D05
8	D05_BF_POOL	CDW	1		BP0		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		D05
9	D05_BF_POOL	CDW	1		BP1		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		D05
12	D05_PKG	CDW	1		JEEPO NE		2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000		D05

Note1: The Comp_Corr_Val column is used to correlate the component instance to its parents. In the above Comp table sample this column was left empty for better readability. However in a real case, for this Wep, it is built using the following structure:

<u>CompType_Cd</u>	<u>Component instance</u>	<u>Comp_Corr_Val</u>
MVS_SYSTEM	<i>mvs_system_id</i>	----
MVS_SUBSYSTEM	<i>subsystem_id</i>	"MVS - <i>mvs_system_id</i> "
D05_APPL	<i>appl_name</i>	"MVS - <i>mvs_system_id</i> - SUBS - <i>db2_subsystem_id</i> "
D05_PKG	<i>pkg_name</i>	"MVS - <i>mvs_system_id</i> - SUBS - <i>db2_subsystem_id</i> - APPL - <i>application_name</i> "
D05_BF_POOL	<i>bf_pool_id</i>	"MVS - <i>mvs_system_id</i> - SUBS - <i>db2_subsystem_id</i> "

Note2: The Component Name (Comp_Nm column) , for components of type MVS_SYSTEM, contains the MVS System Identifier (SID) as specified in the SMFPRM00 member in the SYS1.PARMLIB. The SID is 1to 4 characters long.
Note that an alternative MVS identifier is the SYSNAME which is 1-8 characters long and could also be used in the future.

6.1.4 Component relationship type (table RelnTyp)

RelnTyp_Cd CHAR (6)	RelnTyp_Nm * VARCHAR (120)	MSrc_Corr_Cd CHAR (6)
PCHILD	Parent Child Relation	MODEL1
* This column is translated.		

6.1.5 Component relationship rule (table RelnRul)

CompTyp_Source_Cd CHAR (17)	CompTyp_Target_Cd CHAR (17)	RelnTyp_Cd CHAR (6)	RelnRul_Strt_DfTm TIMESTAMP	RelnRul_End_DfTm TIMESTAMP
MVS_SYSTEM	MVS_SUBSYSTEM	PCHILD	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000
MVS_SUBSYSTEM	D05_APPL	PCHILD	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000
MVS_SUBSYSTEM	D05_BF_POOL	PCHILD	2002-01-01-00.00.00.000000	9999-01-01-00.00.00.000000

CompTyp_Source_Cd CHAR (17)	CompTyp_Target_Cd CHAR (17)	ReInTyp_Cd CHAR (6)	ReInRul_Strt_DtTm TIMESTAMP	ReInRul_End_DtTm TIMESTAMP
D05_APPL	D05_PKG	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000

6.1.6 Component relationship (table CompReIn)

CompReIn_ID INTEGER	Comp_Source_ID INTEGER	Comp_Target_ID INTEGER	ReInTyp_Cd CHAR (6)	CompReIn_Strt_DtTm TIMESTAMP	CompReIn_End_DtTm TIMESTAMP	MSrc_Corr_Cd CHAR (6)
1	1	4	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	SHARED
2	2	3	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	SHARED
3	3	5	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
4	3	6	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
5	4	7	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
6	3	8	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
7	4	9	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
8	3	10	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
9	4	11	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05
10	7	12	PCHILD	2002-01-01- 00.00.00.000000	9999-01-01- 00.00.00.000000	D05

6.1.7 Component type keyword (table CompTyp_Keyword)

This table is not used by this warehouse pack.

6.1.8 Attribute type (table AttrTyp)

AttrTyp_Cd CHAR (17)	AttrTyp_Nm * VARCHAR (120)	MSrc_Corr_Cd CHAR (6)
MVS_SUBSYS_TYPE	MVS Subsystem Type	MODEL1
* This column is translated.		

6.1.9 Attribute rule (table AttrRul)

CompTyp_Cd CHAR (17)	AttrTyp_Cd CHAR (17)	AttrRul_Strt_DtTm TIMESTAMP	AttrRul_End_DtTm TIMESTAMP	AttrTyp_Multi_V al CHAR (1)	AttrRul_Dom_Ind CHAR (1)
MVS_SUBSYSTEM	MVS_SUBSYS_TYPE	2002-01-01- 00.00.000000	9999-01-01- 00.00.000000	N	N

6.1.10 Attribute domain (table AttrDom)

This table is not used by this warehouse pack.

6.1.11 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)	MSrc_Corr_Cd CHAR (6)
1	3	MVS_SUBSYS_TYPE	2003-03-11- 14.09.48.713047	9999-01-01- 00.00.00.000000	DB2	SHARED

6.1.12 Component type relationship (table CTypReIn)

This table is not used by this warehouse pack.

6.1.13 Component attribute type relationship (table ATypReIn)

This table is not used by this warehouse pack.

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
TRANS	State Transition Groups
* This column is translated.	

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		Performance
UTIL	CATEG		Utilization
D05IC1	TRANS		DB2 Subsystem State Transition Measurements
AVG_E	GROUP		Average Value Exists
MIN_E	GROUP		Minimum Value Exists
MAX_E	GROUP		Maximum Value Exists
TOT_E	GROUP		Total Value Exists
* This column is translated.			

6.2.3 Measurement group member (table MGrpMbr)

MGrp_Cd CHAR (6)	MGrpTyp_Cd CHAR (6)	MsmfTyp_ID INTEGER
UTIL	CATEG	12-72
PERF	CATEG	1-11
D05IC1	TRANS	73-75
AVG_E	GROUP	1,4-11,13-20,40-43,51-54,69-70
MIN_E	GROUP	1,4-11,13-20,40-43,51-54,69-70
MAX_E	GROUP	1,4-11,13-20,40-43,51-54,69-70
TOT_E	GROUP	2-3,12,21-39,44-50,55-68,71-75

6.2.4 Measurement unit category (table MUnitCat)

MunitCat_Cd CHAR (6)	MunitCat_Nm * VARCHAR (120)
TM	Time Duration
QTY	Quantity
PRC	Percentage
* This column is translated.	

6.2.5 Measurement unit (table MUnit)

MUnit_Cd CHAR (6)	MUnitCat_Cd CHAR (6)	Munit_Nm * VARCHAR (120)
PRC	PRC	Percentage
QTY	QTY	Quantity
KB	QTY	Kilobytes
Sec	TM	Seconds
Min	TM	Minutes
* This column is translated.		

6.2.6 Measurement alias names (table MTypReIn)

This table is not used by this warehouse pack.

6.2.7 Time summary (table TmSum)

The period over which a measurement may be summarized.

TmSum_Cd CHAR (1)	TmSum_Nm * VARCHAR (120)
H	Hourly
P	Period
* This column is translated.	

6.2.8 Measurement source (table MSrc)

MSrc_Cd CHAR (6)	MSrc_Parent_Cd CHAR (6)	MSrc_Nm VARCHAR (120)
SHARED		Shared
MODEL1		Tivoli Common Data Model V1
Tivoli		Tivoli Application

Msrc_Cd CHAR (6)	Msrc_Parent_Cd CHAR (6)	Msrc_Nm VARCHAR (120)
DRL	Tivoli	Tivoli Decision Support for OS/390
D05	DRL	Tivoli Decision Support for OS/390 (DB2 component)

6.2.9 Measurement source history (table MsrcHistory)

This table is not used by this warehouse pack.

6.2.10 Measurement type (table MsmtTyp)

MsmtTyp_ID INTEGER	MUnit_Cd CHAR (6)	Msrc_Cd CHAR (6)	MsmtTyp_Nm * VARCHAR (120)	MsmtTyp_Ds * VARCHAR (254)
1	Sec	D05	DB2 Elapsed Time	The elapsed time in seconds
2	QTY	D05	DB2 Commit Count	The number of commits that occurred
3	QTY	D05	DB2 Abort Count	The number of aborts that occurred
4	Sec	D05	DB2 Other I/O Wait Time	The I/O wait time for events other than database and log write, in seconds
5	Sec	D05	DB2 Service Wait Time	The wait time due to synchronous unit switching to DB2 services, in seconds
6	Sec	D05	DB2 Lock/Latch Time	The time spent in lock/latch management within DB2, in seconds
7	Sec	D05	DB2 Archive Log Wait Time	The wait time due to processing of ARCHIVE LOG MODE commands, in seconds
8	Sec	D05	DB2 Archive Log Read Time	The wait time for an archive read from tape, in seconds
9	Sec	D05	DB2 Drain Time	The wait time for a drain or a drain lock, in seconds
10	Sec	D05	DB2 Log Write I/O Time	The wait time for log write I/O, in seconds
11	Sec	D05	DB2 Database I/O Wait Time	The wait time for database I/O, in seconds
12	Sec	D05	DB2 CPU Time	Total CPU time
13	PRC	D05	DB2 Database Descriptors Read Efficiency	The hit ratio for database descriptors (DBD) within the EDM pool (for example, how often DB2 finds the required DBD in the EDM pool)
14	PRC	D05	DB2 Cursor Table Read Efficiency	The hit ratio for cursor table sections within the EDM pool (for example, how often DB2 finds the required cursor table section in the EDM pool)
15	PRC	D05	DB2 Package Table Read Efficiency	The hit ratio for package table sections within the EDM pool (for example, how often DB2 finds the required package table section in the EDM pool)

MsmfTyp_ID INTEGER	MUnit_Cd CHAR (6)	MSrc_Cd CHAR (6)	MsmfTyp_Nm * VARCHAR (120)	MsmfTyp_Ds * VARCHAR (254)
16	PRC	D05	DB2 EDM Pool Utilization Percentage	The utilization percentage of the EDM pool (for example, what percentage of the EDM pool is used for database descriptors, cursor table sections and package table sections)
17	PRC	D05	DB2 CPU Utilization (DBM1 Address Space)	Relative CPU consumption for DBM1 address space
18	PRC	D05	DB2 CPU Utilization (MSTR Address Space)	Relative CPU consumption for MSTR address space
19	PRC	D05	DB2 CPU Utilization (DIST Address Space)	Relative CPU consumption for DIST address space
20	PRC	D05	DB2 CPU Utilization (IRLM Address Space)	Relative CPU consumption for IRLM address space
21	QTY	D05	DB2 Lock Requests	The number of lock requests for physical locks
22	QTY	D05	DB2 Unlock Requests	The number of unlock requests for physical locks
23	QTY	D05	DB2 Change Requests	The number of change requests for physical locks
24	QTY	D05	DB2 Successful Identify Requests	The number of successful identify requests. This is the number of successful connections to DB2 by TSO, IMS, CICS, CAF, or a DB2 utility
25	QTY	D05	DB2 Successful Sign-On Requests	The number of successful sign-on requests by IMS or CICS
26	QTY	D05	DB2 User Threads	The number of successful create threads requests. This is the number of threads created, excluding database access threads
27	QTY	D05	DB2 Log Writes	The total number of log write requests processed
28	QTY	D05	DB2 Commands	The number of all DB2 commands issued. This includes normal or abnormal completion of the commands
29	QTY	D05	DB2 DML Type SQL Statements	The number of DML type SQL statements
30	QTY	D05	DB2 DDL Type SQL Statements	The number of DDL type SQL statements
31	QTY	D05	DB2 Control Type SQL Statements	The number of control type SQL statements
32	QTY	D05	DB2 Plan Allocations	The number of successful plan allocations. This is the number of times DB2 successfully completed requests by the user to create a thread by the attachment facility
33	QTY	D05	DB2 Plans And Packages Bound	The number of plans and packages successfully bound
34	QTY	D05	DB2 Plans And Packages Rebound	The number of plans and packages successfully rebound
35	QTY	D05	DB2 IRLM Lock Requests	The number of IRLM lock requests issued

MsmfTyp_ID INTEGER	MUnit_Cd CHAR (6)	MSrc_Cd CHAR (6)	MsmfTyp_Nm * VARCHAR (120)	MsmfTyp_Ds * VARCHAR (254)
36	QTY	D05	DB2 Deadlocks	The number of times deadlocks were detected
37	QTY	D05	DB2 Lock Suspends	The number of lock suspends. This is the number of times a lock could not be obtained because of a lock conflict and the unit of work was suspended
38	QTY	D05	DB2 Lock Timeouts	The number of lock timeouts. This is the number of times a unit of work was suspended because a time exceeded the time-out value
39	QTY	D05	DB2 Lock Escalations	The total number of lock escalations (exclusive and shared mode)
40	QTY	D05	DB2 Service Units Limit	Maximum number of MVS service units that can be used for a thread
41	KB	D05	DB2 Monitor Buffer Size	Monitor trace buffer size, in kilobytes
42	KB	D05	DB2 Log Output Buffer Pool Size	Log output buffer pool size for writing active log data sets, in kilobytes
43	KB	D05	DB2 Log Input Buffer Pool Size	Log input buffer pool size, in kilobytes
44	QTY	D05	DB2 Synchronous Reads	The number of synchronous read I/O operations
45	QTY	D05	DB2 Sequential Prefetch Requests	The number of sequential prefetch requests issued
46	QTY	D05	DB2 List Prefetch Requests	The number of list prefetch requests issued
47	QTY	D05	DB2 Buffer Updates	The number of times a buffer update occurred for system pages. This is the number of updates performed against a page in the buffer pool
48	QTY	D05	DB2 Pages Written	The number of pages written for the buffer pool. This is the number of pages in the buffer pool written to DASD
49	QTY	D05	DB2 Asynchronous Writes	The number of asynchronous write I/Os for the buffer pool
50	QTY	D05	DB2 Data Set OPENS performed	The number of data set OPENS performed successfully for the buffer pool
51	PRC	D05	DB2 Buffer Pool Read Efficiency	The hit ratio within the buffer pool (for example, how often DB2 finds the required page in the buffer pool)
52	PRC	D05	DB2 Prefetch Availability	The availability of the sequential prefetch mechanism
53	PRC	D05	DB2 DASD Write Efficiency	The DASD write efficiency
54	PRC	D05	DB2 Buffer Update Efficiency	The buffer update efficiency

MsmfTyp_ID INTEGER	MUnit_Cd CHAR (6)	MSrc_Cd CHAR (6)	MsmfTyp_Nm * VARCHAR (120)	MsmfTyp_Ds * VARCHAR (254)
55	QTY	D05	DB2 Changed Pages Synchronously Written	The number of changed pages synchronously written from the member virtual pool to the group buffer pool
56	QTY	D05	DB2 Clean Pages Synchronously Written	The number of clean pages synchronously written from the member virtual pool to the group buffer pool
57	QTY	D05	DB2 Changed Pages Asynchronously Written	The number of changed pages asynchronously written from the member virtual pool to the group buffer pool
58	QTY	D05	DB2 Read Failed No Storage	The number of coupling facility read requests that could not complete due to a lack of coupling facility storage resources
59	QTY	D05	DB2 Write Failed No Storage	The number of coupling facility write requests that could not complete due to a lack of coupling facility storage resources
60	QTY	D05	DB2 Requests To Register A Page List	The number of requests to register a page list in the coupling facility
61	QTY	D05	DB2 SQL Statements	The number of SQL statements for a package
62	QTY	D05	DB2 User Defined Functions Executed	The total number of user defined functions that were executed
63	QTY	D05	DB2 User Defined Functions Abended	The total number of times that a user defined function abended
64	QTY	D05	DB2 User Defined Functions Timed Out	The total number of times that a user defined function timed out while waiting to be scheduled
65	QTY	D05	DB2 User Defined Functions Rejected	The total number of times that a user defined function was rejected
66	QTY	D05	DB2 Statement Triggers Activated	The total number of times that a statement trigger was activated
67	QTY	D05	DB2 Row Triggers Activated	The total number of times that a row trigger was activated
68	QTY	D05	DB2 Trigger Errors	The total number of times that an SQL error occurred during the execution of a trigger action
69	QTY	D05	DB2 Average TCB Seconds	The average CPU time used for TCB, in seconds
70	QTY	D05	DB2 Average SRB Seconds	The average CPU time used for SRB, in seconds
71	QTY	D05	DB2 Resource Starts	Number of times the resource started
72	QTY	D05	DB2 Resource Stops	Number of times the resource stopped
73	Min	MODEL1	Available	The amount of time that the resource is available
74	Min	MODEL1	Unavailable	The amount of time that the resource is not available

MsmTyp_ID INTEGER	MUnit_Cd CHAR (6)	Msrc_Cd CHAR (6)	MsmTyp_Nm * VARCHAR (120)	MsmTyp_Ds * VARCHAR (254)
75	Min	MODEL1	Unknown	The amount of time that the state of the resource is unknown
*This column is translated.				

6.2.11 Component measurement rule (table MsmtRul)

CompTyp_Cd CHAR (17)	MsmTyp_ID INTEGER
MVS_SUBSYSTEM	12-43,71-75
D05_APPL	1-11,62-70
D05_BF_POOL	44-60
D05_PKG	61

6.2.12 Measurement (table Msmt)

Msmt_ID BIGINT	Comp_ID INTEGER	Msmt_Typ_ID INTEGER	TmSum_Cd CHAR (1)	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	Msmt_stddev_Val DOUBLE	Msrc_Corr_Cd CHAR (6)
1	6	1	H	2002-02-05	08.00.00	0.34	0.44	0.39					D05
2	6	1	H	2002-02-05	16.00.00	0.33	0.47	0.43					D05
3	6	1	H	2002-02-05	18.00.00	1.3	1.3	1.3					D05
....													

6.2.13 Threshold measurement objective (table Mobj)

This table is not used by this warehouse pack.

6.2.14 Threshold measurement objective range (table MobjRng)

This table is not used by this warehouse pack.

6.2.15 Threshold severity level (table SevLvl)

This table is not used by this warehouse pack.

6.3 Component events

There are no component events for this warehouse pack.

6.4 Helper tables

These tables are not used by this warehouse pack.

6.5 Exception tables

These tables are not used by this warehouse pack.

6.6 Incremental extraction

Data extraction into Tivoli Data Warehouse is done in an incremental way.

New data from the source database is loaded into the data warehouse by checking that the existing measurements for a component are older than the new available ones.

The following columns d05.stage_cntl table store this information:

- cntl_comp_id (INTEGER)
- cntl_dttm (TIMESTAMP)

When loading measurements, this control table checks each comp_id, and accepts only those with a newer timestamp.

After successful loading of the measurement data, this control table is updated with the last timestamp present in the twg.msmt table for each comp_id.

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SH19-8511-00