Tivoli® Decision Support for Server Performance Prediction (Advanced Edition)

Release Notes, Version 2.1

Version 2.1

GI11-0859-00

Tivoli® Decision Support for Server Performance Prediction (Advanced Edition)

Release Notes, Version 2.1

Version 2.1

GI11-0859-00

Tivoli Decision Support for Server Performance Prediction (Advanced Edition), Version 2.1, Release Notes

ISO 9001 Certification

This product was developed using an ISO 9001 certified quality system.

Certification has been awarded by Bureau Veritas Quality International (BVQI) (Certification No. BVQI - 92086 / A).

BVQI is a world leader in quality certification and is currently recognized by more than 20 accreditation bodies.

Contents

Preface

This document describes the Tivoli® Decision Support for Server Performance Prediction (Advanced Edition), Version 2.1 product. You can use this product to augment Tivoli Distributed Monitoring (Advanced Edition), Version 4.1 to manage your enterprise network strategically.

Note: The Tivoli guides, as a group, are called discovery guides. Tivoli Decision Support for Server Performance Prediction (Advanced Edition) is a discovery guide.

Tivoli Decision Support for Server Performance Prediction (Advanced Edition), Version 2.1 is derived from Tivoli Decision Support for Server Performance Prediction, Version 2.1. The principal difference between them is that the former obtains its performance data using Tivoli Distributed Monitoring (Advanced Edition), Version 4.1, while the latter obtains its data using Tivoli Distributed Monitoring (Classic Edition), Version 3.7.

Tivoli Decision Support for Server Performance Prediction (Advanced Edition) is issued as a patch (2.1-SPP-0002) on Tivoli Decision Support, but is a new and separate guide, an can be installed alongside Tivoli Decision Support for Server Performance Prediction.

Who Should Read This Book

This document is intended for the users of Tivoli Decision Support for Server Performance Prediction (Advanced Edition).

Before using Tivoli Decision Support for Server Performance Prediction (Advanced Edition), you should be familiar with the following:

- The operating system on your machine
- The basic use of discovery guides and the Tivoli Discovery Interface

To set up the Tivoli Decision Support for Server Performance Prediction (Advanced Edition), your system administrator should be familiar with the following:

- The Tivoli Discovery Administrator
- The basic use of Crystal Reports
- The basic use of Cognos PowerPlay
- The Open Database Connectivity (ODBC) for your database

What This Book Contains

This book is contains the following chapters:

- Chapter 1, “Chapter 1, “Introduction””

  This chapter introduces you to the product and its concepts.

- Chapter 2, “Chapter 2, “Installation and Configuration””

  This chapter tells you how to perform the installation and configuration tasks that are needed when you install the Guide. Instructions for uninstalling the product components are also given.

- Chapter 3, “Chapter 3, “Running Tivoli Decision Support for Server Performance Prediction (Advanced Edition)””

  This chapter explains how the product runs in automatic mode, and how to recover if the automatic process does not complete for some reason. In addition, it describes various tasks that allow you to maintain and fine tune the running of the software.

It also contains these Appendixes:

- Appendix C, “Appendix C, “Troubleshooting””

  This appendix gives information about what to do if there are problems.

- Appendix D, “Appendix D, “Software Defects, Limitations, and Workarounds””

  This appendix gives full details of any known defects or limitations to the product, giving, where possible, workarounds that will enable you to avoid the problem.

- Appendix A, “Appendix A, “Functional Description””

  This appendix provides a detailed description of what information is collected and how the cubes are built.

- Appendix B, “Appendix B, “Alternative Installation and Configuration Procedures””

  This appendix contains less-used and alternative procedures for carrying out some of the configuration tasks.

Publications

This section lists publications in the *Tivoli Decision Support for Server Performance Prediction (Advanced Edition)* library and any other related documents. It also describes how to access Tivoli publications online, how to order Tivoli publications, and how to make comments on Tivoli publications.

Tivoli Decision Support for Server Performance Prediction (Advanced Edition) Library

The following document is available in the *Tivoli Decision Support for Server Performance Prediction (Advanced Edition)* library:

- *Tivoli Decision Support for Server Performance Prediction (Advanced Edition): Release Notes*, GI11-0859

  Provides copyright, prerequisites, installation procedures, and trouble shooting for the Tivoli Decision Support for Server Performance Prediction (Advanced Edition).

  After you have unpacked the .tar file containing the patch, the file name of this manual on your system will be: `TDS\Guide docs\tds_spp_ae_21_rel_notes.pdf`

Prerequisite Publications

To be able to use the information in this book effectively, you must have some prerequisite knowledge, which you can get from the following books:

- *Tivoli Decision Support: Installation Guide*, GC32-0438

  Provides installation procedures for Tivoli Decision Support and its components in standalone and network mode.

  File name on your system: `TDS\Docs\Pdf\install.pdf`

- *Tivoli Decision Support: User’s Guide*, GC32-0436

  Describes Tivoli Decision Support features and concepts, and provides procedures for using the Tivoli Discovery Interface.

  File name on your system: `TDS\Docs\Pdf\user-gd.pdf`

- *Tivoli Decision Support: Administrator Guide*, GC32-0437

  Explains the features of the Tivoli Discovery Administrator.

  File name on your system: `TDS\Docs\Pdf\admin-gd.pdf`

- *Tivoli Decision Support: Advanced Topics*

  Provides information about advanced topics in Tivoli Decision Support, such as how to use the Discovery Administrator and the Discovery Interface, and the creation of Crystal Reports.

  File name on your system: `TDS\Docs\Pdf\advtopics.pdf`

- *Tivoli Decision Support: Release Notes*, GI10-9852

  Provides late-breaking information and information about any defects in Tivoli Decision Support.

  File name on your system: `TDS\Docs\Pdf\rel_notes.pdf`

- *Tivoli Decision Support for Server Performance Prediction: Release Notes*

  Provides copyright, prerequisites, installation procedures, and trouble shooting for the Tivoli Decision Support for Server Performance Prediction, Version 2.1.

- *Tivoli Distributed Monitoring (Advanced Edition): User's Guide*, SH19-4565

  Provides information about the prerequisites for and installation of the Tivoli Distributed Monitoring (Advanced Edition) TDS Configuration component.

- *Tivoli Distributed Monitoring (Advanced Edition): Resource Model Reference*, SH19-4564

  Provides full information about the specific Server Performance Prediction resource models for Windows® and UNIX®/Linux platforms, that are provided with Tivoli Distributed Monitoring (Advanced Edition), Version 4.1.

- *Tivoli Distributed Monitoring (Advanced Edition): Release Notes*, GI10-5793

  Provides late-breaking information and information about any defects in Tivoli Distributed Monitoring (Advanced Edition), Version 4.1.

Accessing Publications Online

You can access many Tivoli publications online at the Tivoli Customer Support Web site:

http://www.tivoli.com/support/documents/

These publications are available in PDF or HTML format, or both. Translated documents are also available for some products.

Ordering Publications

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

http://www.ibm.com/shop/publications/order

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.tivoli.com/inside/store/lit_order.html

Providing Feedback about Publications

We are very interested in hearing about your experience with Tivoli products and documentation, and we welcome your suggestions for improvements. If you have comments or suggestions about our products and documentation, contact us in one of the following ways:

- Send an e-mail to pubs@tivoli.com.
- Complete our customer feedback survey at the following Web site:
  http://www.tivoli.com/support/survey/

Contacting Customer Support

If you have a problem with any Tivoli product, you can contact Tivoli Customer Support. See the *Tivoli Customer Support Handbook* at the following Web site:

http://www.tivoli.com/support/handbook/

The handbook provides information about how to contact Tivoli Customer 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 you are in
- What information you should gather before contacting support

Conventions Used in This Book

This book uses several conventions for special terms and actions, operating system-dependent commands and paths, and margin graphics.

Typeface Conventions

The following typeface conventions are used in this book:

Bold	Commands, keywords, file names, authorization roles, URLs, or other information that you must use literally appear like **this**, in **bold** type. Names of windows, dialogs, and other controls also appear like **this**, in **bold** type.
Italic	Variables and values that you must provide appear like *this*, in *italic* type. Words and phrases that are emphasized also appear like *this*, in *italic* type.
`Monospace`	Code examples, output, and system messages appear like `this`, in `monospace` type.

Operating System-dependent Variables and Paths

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

When using the Windows command line, replace $*variable* with *%variable%* for environment variables and replace each forward slash (/) with a backslash (\) in directory paths.

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

1

Introduction

This document describes the Tivoli Decision Support for Server Performance Prediction (Advanced Edition) product.

Tivoli Decision Support for Server Performance Prediction (Advanced Edition) helps you plan for network growth by providing data, in the form of key system metrics, that show workload trends. Most performance problems are the result of these two factors:

- System workload gradually growing to the point where it exceeds the capacity of the system.
- Soft-error volume gradually increasing until an unrecoverable error occurs.

The product derives endpoint performance data from Tivoli Distributed Monitoring (Advanced Edition). If Tivoli Inventory is available, enterprise system hardware information is also used by Tivoli Decision Support for Server Performance Prediction (Advanced Edition).

Features

The features of the product are as follows:

- Tivoli Decision Support for Server Performance Prediction (Advanced Edition) has the following components:

  Tivoli Distributed Monitoring (Advanced Edition) TDS Configuration
  This component, hereafter referred to as *TDS Configuration*, is installed alongside Tivoli Distributed Monitoring (Advanced Edition), which it uses to distribute and monitor two specific resource models (one for Windows NT® endpoints and one for UNIX endpoints) which monitor the performance of each endpoint to which they are distributed. Properties monitored include disk and memory utilization, network performance and CPU usage, and the information is accumulated in a database at the endpoint.

  The component also creates three jobs that run every 24 hours, using TME® Task Library tasks. The first job collects the data from each Tivoli profile-subscribed endpoint database, collates it, and stores it. The second job aggregates the data and the third rolls it up into an RDBMS Interface Module (RIM) database.

  Tivoli Decision Support for Server Performance Prediction (Advanced Edition) Guide
  This component, hereafter referred to as the *SPP (Advanced) Guide*, is installed on Tivoli Decision Support. With a user-defined frequency (normally daily), it accesses the data stored in the RIM database and creates the Tivoli Decision Support cubes that provide information about your enterprise's hardware

environment, network, memory, I/O performance, and CPU utilization. From the performance trends and resource utilization patterns shown, you can take steps to optimize the network.

- Tasks are provided to enable you to recover from any problems that might prevent the automatic data aggregation and roll-up activities from running.
- If you use Tivoli Inventory, you can also access the Tivoli Inventory database to obtain information about your enterprise hardware environment. Inventory information is not a prerequisite for using the SPP Guide, but it does provide additional information that is not available from Tivoli Distributed Monitoring (Advanced Edition).
- The SPP Guide provides capacity management for both centralized and distributed environments. By using time-of-day and day-of-week variances, with a factored-in standard deviation, it creates a trend wave against which key forecast values are calculated. These values are 30, 60, and 90-day forecasted daily and peak-hour averages. SPP Guide also projects the number of days before the hourly average exceeds a critical value.

2

Installation and Configuration

This chapter describes how to do the following:

- Satisfy the Prerequisites
- Install and Configure the TDS Configuration Component
- Install and Configure the SPP (Advanced) Guide
- Remove Tivoli Decision Support for Server Performance Prediction (Advanced Edition)

Satisfy the Prerequisites

This section describes how to satisfy the prerequisites for the product, in the following areas:

- Hardware Prerequisites
- Tivoli Application Dependencies
- ODBC Drivers
- Supported Databases

Hardware Prerequisites

The hardware prerequisites for the Tivoli Distributed Monitoring (Advanced Edition) TDS Configuration component (hereafter referred to as the *TDS Configuration component*, are the same as those for the Tivoli Distributed Monitoring (Advanced Edition) server component, which are described in the installation chapter of the *Tivoli Distributed Monitoring (Advanced Edition): User's Guide*.

The hardware prerequisites for Tivoli Decision Support are described in *Tivoli Decision Support: Release Notes*.

Tivoli Application Dependencies

To use the Tivoli Decision Support for Server Performance Prediction (Advanced Edition) product, you must install the following applications:

- Tivoli Decision Support, Version 2.1.1 plus the 2.1-TDS-0007.

  Note: Ensure that you have installed the following components:
  - Tivoli Discovery Interface.
  - Tivoli Discovery Administrator.
  - Cognos (Administrator).
  - Seagate Crystal Reports (required only when creating new reports).

- Tivoli Distributed Monitoring (Advanced Edition), Version 4.1.
- Optionally, Tivoli Inventory Version 3.6 or later.

ODBC Drivers

Use the ODBC drivers provided by your database client software when configuring the ODBC connection for this discovery guide.

Note: The Microsoft® Access ODBC driver must be installed on your system before you can use an ED Drill Through data source with Seagate Crystal Reports. Microsoft Access is recommended, though not required.

Supported Databases

Tivoli Decision Support for Server Performance Prediction (Advanced Edition) supports the following relational database management systems (RDBMS):

- DB2®, Version 6.1
- Informix, Version 7.3
- Microsoft-SQL, Version 7.0
- Oracle, Version 8.0.5
- Sybase, Version 11.9.2

Note: To use Tivoli Decision Support for Server Performance Prediction (Advanced Edition) with a DB2 or Informix database, the Tivoli Distributed Monitoring (Advanced Edition) and Tivoli Inventory databases must also be, respectively, DB2 or Informix. These databases can reside on different servers.

To use Tivoli Decision Support for Server Performance Prediction (Advanced Edition) with a Microsoft-SQL, Oracle, or Sybase database, the Tivoli Distributed Monitoring (Advanced Edition) and Tivoli Inventory databases can be any of these database systems.

Install and Configure the TDS Configuration Component

This section explains how to install and configure the TDS Configuration component. The installation requires you to complete each of the following procedures in the order given:

- Verify Prerequisites
- Install the TDS Configuration Component
- Create and Configure the TDS Configuration Database Structure

Verify Prerequisites

The following are the prerequisites for using the TDS Configuration component:

- Ensure that an appropriate RDBMS is installed either within the Tivoli region or on an accessible system outside it. If the RDBMS server software is installed within the Tivoli management region, the configuration steps below should be implemented to provide direct access to the RDBMS server. If the RDBMS server is installed outside the Tivoli management region, the RDBMS client component must be installed within the region, and the configuration steps will refer to the RDBMS client software

  Your database administrator is responsible for installing and maintaining the database. For information about installing and using your database, refer to the documentation provided with it.

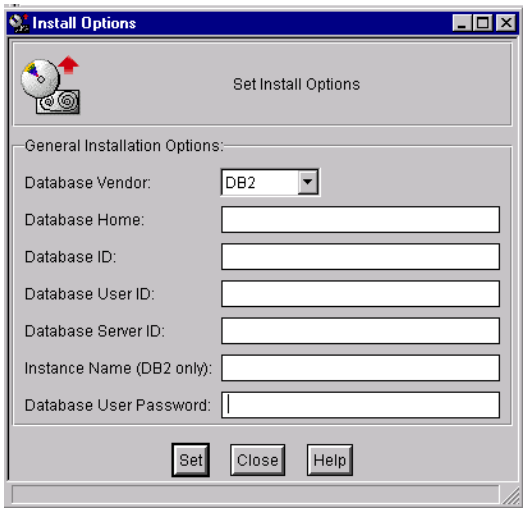
- Ensure that Tivoli Distributed Monitoring (Advanced Edition) is installed and updated on all managed nodes (including the Tivoli Management region server) in your system.

Install the TDS Configuration Component

This component must be installed on the Tivoli management region server, and on all gateways attached to endpoints that you want to monitor.

The procedure for each system where the component is to be installed is the same, as follows:

1. Ensure that Tivoli Distributed Monitoring (Advanced Edition) is installed and updated on all managed nodes (including the Tivoli Management region server) in your system.
2. In the Tivoli Desktop dialog, select **Desktop → Install → Install Product**. The Install Product dialog is displayed.
3. Select **Distributed Monitoring (Advanced Edition) 4.1 - TDS Configuration** and click **Install & Close**. The Install Options dialog is displayed:



4. This step creates the RIM object needed to interface with the database, and what you do depends on where your RDMS software is installed:
   - If your RDBMS server or client is installed on the Tivoli management region server, you should fill in the fields as indicated in Table 1, and click **Set**.

Table 1. TDS Configuration Install Options

Database Vendor	The vendor name of the RDBMS product to manage the TDS Configuration data. The supported databases are Sybase, Oracle, MS-SQL, DB2, and Informix.
Database Home	The directory on the RIM host where the database software is installed.
Database ID	A unique name for the database. The default value is **dm_db**.
Database User ID	ID of the user who is authorized to access the database. The default value is **DM**.
Database Server ID	The name of the RDBMS server. This is an alias to enable client/server connection.
Instance Name (DB2 only)	DB2 instance name.

Table 1. TDS Configuration Install Options (continued)

Database User Password	The database users password. The default is **DM_TDS**). After the RIM creation you can change the password by using the Tivoli Management Framework command **wsetrimpw**. For DB2 users, the password must match the password of the DB2 instance owner. For Sybase users, the password must be at least 6 characters. For Informix users, the password must match the Informix NT or UNIX user password.

- If neither your RDBMS server nor client is installed on the Tivoli management region server, you should leave all the fields empty, click **Set**, and set up the RIM object as described in "Creating the RIM Object Using a Shell Script" on page 56.

5. The Product Install dialog opens. It provides a list of the operations to be performed and warns of any problems you might want to correct before installing.
6. Review the status information and click **Continue Install**.

   The Product Install dialog informs you when installation is complete.
7. Verify that the RIM object has been created correctly by issuing the command **wgetrim spr_rim**. If any of the settings are not correct, use the **wsetrim** command with the appropriate options to change the object labeled *spr_rim*.

Create and Configure the TDS Configuration Database Structure

This section explains how to create and configure the TDS Configuration database structure from a shell script (an alternative method using the SQL processor is described in "Creating the Database Structure Using the SQL Processor" on page 58). There are three basic steps:

- Verify Prerequisites
- Create and Configure the Database Structure
- Verify the RIM Object Connection

Verify Prerequisites

The prerequisites for this procedure are as follows:

1. Read the description of the procedure in "Create and Configure the Database Structure", and determine the system on which you will run the procedure. If this system is inside the Tivoli region, ensure that it has the Tivoli environment set. To set the Tivoli environment run the following command, depending on your environment (the location of the command shown here is the default):

   UNIX/Linux

   ```
   /etc/Tivoli/setup_env.sh
   ```

   Windows

   ```
   /system32/winnt/drivers/etc/Tivoli/setup_env.cmd
   ```
2. Before creating the TDS Configuration database structure, ensure you have backed up your RDBMS database.

Create and Configure the Database Structure

The steps are as follows:

1. Determine the system from where the procedure is to be run, which will depend on the database vendor and the operating system:

   Creating Oracle, Sybase, or Microsoft-SQL Databases

   The procedure should be run from the RIM host where the database server or client is installed, and in the following way:

   - For Windows NT and Windows 2000, from a Tivoli bash shell
   - For UNIX, from any UNIX shell

   Creating DB2 and Informix Databases

   The procedure should be run from a DB2 or Informix command line on the database server. This because you cannot execute the DB2 database creation script from the *DB2 Client Command Line Processor* without an existing database connection and because Informix uses the *dbaccess* facility, which is shipped as part of the Informix server.

2. If the database server or client on which you need to run the procedure has TDS Configuration installed on it, from the `$BINDIR/TME/Tmw2k/TDS/rdbcfg` directory run the **cr_rollup_db.sh** script to create the database structure.

3. If the database server or client on which you need to run the procedure is *inside* the Tivoli region, and does *not* have TDS Configuration installed on it, you should proceed as follows, depending on the operating system of the database server or client:

   UNIX/Linux

   Mount the `$BINDIR/TME/Tmw2k/TDS/rdbcfg` directory of any system with TDS Configuration installed (for example, the Tivoli server) as an NFS mount on the database server or client, and run the procedure described in step 2 from within that directory.

   Windows

   Follow these steps:

   a. Copy the following files from the `$BINDIR/TME/Tmw2k/TDS/rdbcfg` directory from any system where TDS Configuration has been installed:

      cr_rollup_db.sh
      cr_db.<*database_extension*>
      cr_tbl.<*database_extension*>

      where *database_extension* is one of the following, depending on your database vendor:

DB2	Db2
Informix	Inf
Microsoft-SQL 6.x	Mssql
Microsoft-SQL 7.0	Mssql7
Oracle	Ora
Sybase	Syb

   b. Run the **cr_rollup_db.sh** script to create the database structure.

4. If the database server on which you need to run the procedure is *outside* the Tivoli region, you should proceed as follows, depending on the operating system of the server or client:

   Follow these steps:

a. Run the procedure described in step 2 on page 7 on any system with TDS Configuration installed, ignoring any error messages that are displayed because the database is not found.

b. Copy the resulting `cr_db.<database_extension>.sql` file to the database server or client, where *database_extension* is one of the following, depending on your database vendor:

DB2	Db2
Informix	Inf

c. Run the file in the SQL processor on the database server or client.

Note: If you run the database creation script from a shell with the Tivoli environment set on the TDS Configuration RIM host, the script **cr_rollup_db.sh** attempts to fetch your database configuration from the RIM object attributes. If you do not have the Tivoli Distributed Monitoring (Advanced Edition) RIM object already created, you will be asked for the parameters identified in Table 1 on page 5 in a series of questions. You will also be asked for other parameters, as follows:

UserId password	Password of database to be configured
Database Device (Sybase and Microsoft-SQL only)	Do not use the master device for the TDS Configuration database. The master database, model database, and temporary database all reside on the master device. Currently, the master device cannot be expanded onto any other device.
Database Space (Informix only)	Do not use the rootdbs dbspace for the TDS Configuration database. You must create a separate dbspace for this database.
Database Size	The size (in MB) of the TDS Configuration database to be created. For Sybase, Microsoft-SQL, and Informix only, the maximum size is the size of the device (or dbspace) dedicated for the TDS Configuration database.
Database administrator password	Administrator password for database (*sa* password for DB2)

5. When prompted to do so, enter the database administrator passwords.

Verify the RIM Object Connection

After creating the database structure for TDS Configuration, test the RIM connection to the database by means of the following Tivoli Management Framework command issued from the Tivoli server:

```
wrimtest -l spr_rim
```

For example:

```
Resource Type: RIM
Resource Label: spr_rim
Host Name: amadeus
User Name: DM
Vendor: MS_SQL
Database: dm_db
Database Home:d:\mssql7
Server ID: Amedeus
Instance Home:
Opening Regular Session...Session Opened
RIM: Enter Option >
```

Type **x** and press Enter to release the session.

Install and Configure the SPP (Advanced) Guide

To install and configure the SPP (Advanced) Guide on Tivoli Decision Support, you should use the following procedures in the given order:

- Verify Prerequisites
- Install SPP (Advanced) Guide
- Configure SPP (Advanced) Guide

Verify Prerequisites

Before installing the TDS Guide, you must ensure that your ODBC Data Source client and the ODBC driver provided with the client are installed and configured, and that the ODBC connection to the server is operational. The steps for installing and configuring the ODBC Data Source client depend on whether you are using DB2 as a database software:

Not Using DB2

Follow these steps:

1. From the Control Panel dialog, select **ODBC Data Source.** The ODBC Data Source Administrator dialog is displayed.
2. Select the **System DSN** tab.
3. Click **Add**. The Create New Data source dialog is displayed.
4. Select the ODBC driver appropriate for your database, and click **Finish**.
5. Type a meaningful Name for the ODBC data source.

   Note: Record the data source name you have specified, because you will use it in the "Import the Guide into Tivoli Decision Support" procedure.
6. Type a Description for the data source.
7. From the drop-down list, select the server to which you want to connect the data source.
8. If you use Sybase, type the Tivoli Distributed Monitoring (Advanced Edition) database name in the Database Name field.

Using DB2

Follow the procedure in "Setting up the ODBC Data Source Connection For DB2" on page 59.

Contact your RDBMS system administrator for additional information.

Install SPP (Advanced) Guide

To install the SPP (Advanced) Guide on Tivoli Decision Support, perform the following steps:

1. Download the 2.1-SPP-0002 patch from one of the following sources:

   FTP ftp://ftp.tivoli.com/support/patches/patches_2.1/2.1-SPP-0002:

   External WEB
   http://www.tivoli.com/patches

   Internal WEB:
   http://www-internal.tivoli.com/patches

   The 2.1-SPP-0002 patch contains the 2.1-SPP-0002.zip file

2. Unzip the 2.1-SPP-0002.zip file in a directory.
3. From the Start menu select **Run**.

   The Run dialog is displayed.
4. Type the name of the path to the setup.exe file and click **OK**. The TDS for SPP Advanced Edition 2.1 Installation Dialog is displayed.
5. Click **Next**.
6. The Setup Complete dialog is displayed. Click **Finish** to complete the setup.

The online documentation is stored in *TDS*/Guide Docs, where *TDS* is the Tivoli Decision Support installation directory.

Configure SPP (Advanced) Guide

To configure the SPP (Advanced) Guide for Server Performance Prediction, use the following procedures in the order given:

- "Import the Guide into Tivoli Decision Support"
- "Add a Data Source"
- If the Tivoli Inventory database is not installed, follow the procedure: "Copy the Default Inventory Export Files"
- If you are using Tivoli Inventory, Version 4.0, or your database is DB2 or Informix, follow the procedure: "Customize the Queries"
- "Assign and Verify a Data Source"

Import the Guide into Tivoli Decision Support

To import the guide, the procedure differs, depending on whether this is the first time that you are importing any guide into Tivoli Decision Support:

Importing a guide for the first time

The steps are as follows:

1. From the Start menu, select **Programs → Tivoli Decision Support 2.1 → Tivoli Discovery Administrator**.
2. Click **Yes**. The Add Decision Support Guide Wizard is displayed, with Import Installed Decision Support Guide already selected.
3. Click **Next**.
4. Select **Server Performance Prediction (Advanced Edition)** and click **Next** and then click **Finish**. After completing the import, the Add Data Source dialog is displayed.
5. Click **Yes** to add a data source. The Add Data Source Wizard is displayed.

   Now follow the instructions in the section "Add a Data Source" on page 11 and when the wizard has finished, return here.
6. After completing the Add Data Source Wizard, the Assign Data Source Wizard is displayed. Click **Yes** to assign a data source.

   Now follow the instructions in the section "Assign and Verify a Data Source" on page 13.

The guide is now successfully installed.

Importing a guide subsequently

The steps are as follows:

1. From the action bar, select **Decision Support Guides**, and from the corresponding menu select **Import**.
2. In the Import Decision Support Guides dialog, select **SPP for DM Advanced Edition** and click **OK**.

Add a Data Source

This procedure should be followed at least once, specifying, in step 3, the database created in "Create and Configure the TDS Configuration Database Structure" on page 6. Then, if you have decided to use Tivoli Inventory to access hardware information, you should repeat the procedure, specifying the Tivoli Inventory database in 3.

To add a data source perform the following steps:

1. From the Start menu, select **Programs → Tivoli Decision Support 2.1 → Tivoli Discovery Administrator**. The Tivoli Discovery Administrator dialog is displayed.
2. Select **Data Sources → Add**. The Add Data Source Wizard dialog is displayed.
3. According to your environment, from the drop-down list select the required Datasource Name and click **Next**.
4. Type the database User Name and Password, and click **Next**. For a list of the default database user names and passwords, see Table 2:

Table 2. Database default values

Database Connection	Default User Name	Default Password	Default Qualifier
Microsoft-SQL, Oracle, and Sybase Tivoli Distributed Monitoring (Advanced Edition) rollup database	DM	DM_TDS	DM
Informix Tivoli Distributed Monitoring (Advanced Edition) rollup database	informix	informix	informix
DB2 Tivoli Distributed Monitoring (Advanced Edition) rollup database	db2admin	db2admin	db2admin
Microsoft-SQL, Oracle, and Sybase Tivoli Inventory database	tivoli	tivoli	tivoli
Informix Tivoli Inventory database	informix	informix	informix
DB2 Tivoli Inventory database	db2admin	db2admin	db2admin

5. Type the database qualifier, and click **Next**. For a list of the default database qualifiers, see Table 2.

   Note: Your database qualifier may be different. Contact the database administrator for additional information if the default settings were not used.

6. Ensure that your settings are correct and click **Finish**.

Copy the Default Inventory Export Files

This procedure is only required if Tivoli Inventory is not installed.

The SPP (Advanced) Guide uses two Tivoli application databases: the TDS Configuration database and the Tivoli Inventory database. The Tivoli Inventory database is optional for the

operation of the SPP (Advanced) Guide and supplies additional enterprise hardware data when you have this product in your environment.

If the Tivoli Inventory database is not installed, the SPP (Advanced) Guide will need to use a set of default files that were copied to your system during the guide installation.

Copy the following files from *TDS*\Util\TDS for SPP Advanced Edition to *TDS*\data\export, which must be created first (where *TDS* is the directory in which Tivoli Decision Support is installed):

- DMAE_INV_Memory.csv
- DMAE_INV_OsType.csv
- DMAE_INV_Processor.csv
- DMAE_INV_SysByIP.csv

Always retain the copy of the default versions of these files.

Customize the Queries

This procedure is required if you are using Tivoli Inventory, Version 4.0, or your database is DB2 or Informix. It is also required if you change to use Tivoli Inventory, Version 4.0, or change from another database to DB2 or Informix. In these situations, to use the SPP for DM Advanced Edition (1) Inventory Hw cube, you must copy the contents of the following files to their related queries. In all cases, the files are found in the directory:

<*TDS*>/Util/TDS for SPP Advanced Edition/

where <*TDS*> is the complete path of the installation directory of the TDS Configuration component.

Files to be copied

The files to be copied depend on which situation you are in, as follows:

Using DB2 or Informix, but not using Tivoli Inventory 4.0

The files to be copied are as follows:

Copy the contents of this file:	To this query:
IP_Network_DB2_Inf.sql	IP Network
Memory_DB2_Inf.sql	Memory
OS_Type_DB2_Inf.sql	OS Type
Processor_DB2_Inf.sql	Processor

Using DB2 or Informix, and using Tivoli Inventory 4.0

The files to be copied are as follows:

Copy the contents of this file:	To this query:
IP_Network_DB2_Inf_for_inv40.sql	IP Network
Memory_DB2_Inf_for_inv40.sql	Memory
OS_Type_DB2_Inf_for_inv40.sql	OS Type
Processor_DB2_Inf_for_inv40.sql	Processor

Not using DB2 or Informix, but using Tivoli Inventory 4.0

The files to be copied are as follows:

Copy the contents of this file:	To this query:
IP_Network_for_Inv40.sql	IP Network
Memory_for_Inv40.sql	Memory
OS_Type_for_Inv40.sql	OS Type
Processor_for_Inv40.sql	Processor

Procedure for Copying

To copy the contents of the files to the queries:

1. From the Start menu, select **Programs -> Tivoli Decision Support 2.1 -> Tivoli Discovery Administrator.** The Tivoli Discovery Administrator dialog is displayed.
2. In the left pane of the dialog, expand the **SPP for DM Advanced Edition (1) Inventory Hw** cube and click **Queries**. The right pane of the dialog shows the list of queries.
3. Double-click the first query in the list. The Cube Query dialog is displayed.
4. Ensure that the SQL Columns tab is selected and replace the contents of the SQL Columns page with the contents of the appropriate file (see the previous table).
5. Click **OK** to save the contents and close the Cube Query dialog. You are returned to the Tivoli Discover Administrator dialog.
6. Repeat steps 3 to 5 for each query of the SPP for DM Advanced Edition (1) Inventory Hw cube.

Files to Copy if you Change Database

If, after configuring the database queries, you decide to change database, if your new environment includes DB2 or Informix or Tivoli Inventory, Version 4.0, perform steps 1 to 6, above, using the files indicated in “Files to be copied” on page 12. If in your new environment you are not using DB2, Informix or Tivoli Inventory 4.0, perform steps 1 to 6, above, copying the following files to the related queries of the SPP for DM Advanced Edition (1) Inventory Hw cube (from the directory indicated previously):

Copy the contents of this file:	To this query:
IP_Network.sql	IP Network
Memory.sql	Memory
OS_Type.sql	OS Type
Processor.sql	Processor

Assign and Verify a Data Source

To assign and verify a data source for the SPP (Advanced) Guide:

1. From the Start menu, select **Programs->Tivoli Decision Support 2.1->Tivoli Discovery Administrator**. The Tivoli Discovery Administrator dialog is displayed.
2. Select **Data Sources → Assign Data Source**.
3. From the Data Source drop-down list select Tivoli Inventory data source or, if Tivoli Inventory is not installed on your system, select the blank line.
4. Select the following queries for the SPP for DM Advanced Edition (1) Inventory Hw cube or SPP (1) Inventory Hw (DB2/Informix) cube, and click **OK**:

Query
IP Network
Memory
OS Type
Processor

5. From the Tivoli Discovery Administrator dialog, select **Data Sources → Assign Data Sources**.
6. From the drop-down list, select the Tivoli Distributed Monitoring (Advanced Edition) roll-up db data source.
7. Select the queries for the remaining cubes, according to the following table, and click **OK**:

Query	Cube Name
Update System Averages	SPP for DM Advanced Edition (2) Summary
Rank Systems	SPP for DM Advanced Edition (3) Rank
Daily Info	SPP for DM Advanced Edition (4) Daily
Forecasts	SPP for DM Advanced Edition (5) Trend
Note: The Sever Performance Prediction (6) Hourly cube does not have any queries. This cube is created from the data in SPP cubes 1-5.	

8. From the Tivoli Discovery Administrator dialog, click the **Data Sources** folder.
9. Right-click each data source you assigned, and select **Test Connectivity**.
   - If the connection is successful, the Test Data Source dialog is displayed with the following message:

     ```
     Connection Successful
     ```

     Click **OK**.
   - If the connection fails, the Tivoli Discovery Administrator dialog is displayed with the following error message:

     ```
     Error connecting to Data Source DataSourceName
     ```

     DataSourceName is the name of the data source

     a. Click **Details** to display more information about the connection error.

     b. Verify that the data source definition, user name, password, and qualifier are correct.
10. Repeat the Test Connectivity procedure described in the previous step for each data source.

Remove Tivoli Decision Support for Server Performance Prediction (Advanced Edition)

To remove the Tivoli Decision Support for Server Performance Prediction (Advanced Edition), you must remove it from the Tivoli Distributed Monitoring (Advanced Edition) environment and from the Tivoli Decision Support environment. To do this you perform the following tasks:

- Remove the database connection, the Tivoli Distributed Monitoring (Advanced Edition) user ID, and the database schema.
- Remove the TDS Configuration component.
- Remove the Server Performance Prediction Guide component.

Refer to the following sections for a description of these tasks.

Remove the TDS Configuration Database Structure

This section describes how to remove the database connection, the user ID, and the schema.

The steps are as follows:

1. Determine the system from where the procedure is to be run, which will depend on the database vendor and the operating system:

   Removing Oracle, Sybase, or Microsoft-SQL Databases
   The procedure should be run from the RIM host where the database server or client is installed, and in the following way:
   - For Windows NT and Windows 2000, from a Tivoli bash shell
   - For UNIX, from any UNIX shell

   Removing DB2 and Informix Databases
   The procedure should be run from a DB2 or Informix command line on the database server.

2. If the database server or client on which you need to run the procedure has TDS Configuration installed on it, from the `$BINDIR/TME/Tmw2k/TDS/rdbcfg` directory run the **rm_rollup_db.sh** script to remove the database structure.

3. If the database server or client on which you need to run the procedure does *not* have TDS Configuration installed on it, you should proceed as follows, depending on the operating system of the server or client:

   UNIX Mount the `$BINDIR/TME/Tmw2k/TDS/rdbcfg` directory of any system with TDS Configuration installed (for example, the Tivoli server) as an NFS mount on the database server or client, and run the procedure described in step 2 on page 7 from within that directory.

   Windows
   Follow these steps:

   a. Run the procedure described in step 2 on page 7 on any system with TDS Configuration installed, ignoring any error messages that are displayed because the database is not found.

   b. Copy the resulting `rm_db.<database_extension>.sql` file to the database server or client, where *database_extension* is one of the following, depending on your database vendor:

Db2	DB2
Inf	Informix
Mssql	Microsoft-SQL 6.x
Mssql7	Microsoft-SQL 7.0
Ora	Oracle
Syb	Sybase

c. Run the file in the SQL processor on the database server or client.

4. When prompted to do so, enter the database administrator passwords.
5. Perform the following procedure for Oracle databases only:
   a. After you run the **rm_rollup_db.sh** shell script, connect to Oracle as *internal*.
   b. Shutdown the database.
   c. Delete the following files:
      - usr_name_DATA
      - user_name_TEMP

      Note: These files are located in the $ORACLE_HOME/dbs or $ORACLE_HOME/database directory. Because Oracle does not provide the SQL statement to perform the file deletion, leaving the data file in the database would interfere with the recreation of the same database.
   d. Restart the database.

Remove the TDS Configuration Component

To remove the TDS Configuration component, run the following command:

```
wuninst DM_Advanced_Edition_TDS <Tivoli server> -rmfiles
```

Remove the Server Performance Prediction Guide Component

To remove the Server Performance Prediction Guide component, perform the following steps:

1. From the Start menu, select **Programs → Tivoli Decision Support 2.1 → Tivoli Discovery Administrator**. The Tivoli Discovery Administrator dialog is displayed.
2. In the **Administrator** dialog, select **Decision Support Guides** and in the Properties pane on the right, right-click **Server Performance Prediction (Advanced Edition)**.
3. From the pop-up menu, select **Delete**. The Delete Discovery Guide dialog is displayed.
4. Click **Yes** to remove the Server Performance Prediction Guide component.

3

Running Tivoli Decision Support for Server Performance Prediction (Advanced Edition)

This chapter explains how to use the Tivoli Decision Support for Server Performance Prediction (Advanced Edition) Guide. It commences with a description of how the product gathers and stores information daily in normal circumstances. It then describes the configuration and maintenance tasks that must be run. Finally, it discusses how you recognize that the automatic processing has not collected all of the required data, and what steps you can take to recover.

Normal Running

Tivoli Decision Support for Server Performance Prediction (Advanced Edition) functions as follows:

- After the TDS Configuration component has been enabled, resource models that provide information for the Server Performance Prediction Guide commence running at the endpoints to which they have been distributed. These models check the defined system performance parameters at the endpoint and store it in the endpoint database maintained by the Tivoli Distributed Monitoring (Advanced Edition) endpoint engine.).

  In addition, TDS Configuration creates a series of recursive jobs, that are used to make the endpoint data available to the Tivoli Decision Support for Server Performance Prediction (Advanced Edition) Guide, as described below.

- Each day, at 1:30 a.m. on the Tivoli server, the **ReadDataInDB** job is run. This accesses each endpoint database and writes the accumulated data to the following files at the Tivoli server, in the directory `/tmp/<endpoint>/<profile>/<resource_model>-<metric>/`:

  AVG.log
  MIN.log
  MAX.log
  info

  Any data already in those files is overwritten.

  The job then deletes the data in the endpoint database.

  The job also creates a backup of these files, as follows:

  AVG.log.<*date*>
  MIN.log.<*date*>
  MAX.log.<*date*>

info.<*date*>

where <*date*> is the date that the files are created; in other words, the data collection date plus one day.

- At 2:30 am, a second job is run, called **NewDataAggregation**. This job aggregates the data from all the *.log files for all endpoints, profiles, resource models and metrics into one file in the /TMP/ directory, called dmae_out.log.<*date*>, where <*date*> is the date of the *.log files; in other words, the data collection date plus one day.

  If it completes this process successfully, the job then deletes all of the *.log.<*date*> files for that <*date*>.

- At 3:30 am, a third job is run, called **RollupIntoDB**. This job uploads the contents of the dmae_out.log.<*date*> file to the RDBMS server that you have defined.

  If it completes this process successfully, the job then deletes the dmae_out.log.<*date*> file for that <*date*>.

- At a frequency determined by you, the Tivoli Decision Support Guide runs a job to build the Tivoli Decision Support cubes that allow you to access the data from the guide. In most cases, as the data is collected on a daily basis, it is expected that you will build the cubes once a day as well, but any frequency can be chosen to reflect your enterprise management requirements.

- When you use the Tivoli Decision Support for Server Performance Prediction (Advanced Edition) Guide, the information in the RDBMS is accessed to give you the required information about the performance of the endpoints.

Configuration and Maintenance Tasks

The following tasks are required to configure and maintain the Tivoli Decision Support for Server Performance Prediction (Advanced Edition) Guide:

- **"Enabling the TDS Configuration Component"**,

  This is a task that should be carried out once after all the components have been installed and configured.

- **"Scheduling the Cube Build Task" on page 19**

  This describes how to set the scheduler to build the cubes automatically. It is anticipated that you will want to carry out this task once after you have enabled the TDS Configuration component, and then whenever you want to change the schedule.

- **"Set the Date Range Parameter in the Cube" on page 20**

  This task shows you how to set the date range parameter in each cube to select a specific range of records. By default, the SPP (Advanced) Guide sets the current period to the most recent date in the records that are returned by the query.

- **"Setting Up Crystal Reports in the Tivoli Discovery Interface" on page 21**

  This is a task that you should normally only need to perform once after enabling the TDS Configuration component.

- **"Purging the Database" on page 21**

  This task is used to clean up the database that contains the Tivoli Decision Support data, removing unwanted data.

Enabling the TDS Configuration Component

To enable the TDS Configuration component to collect data, perform the following steps:

1. In the Tivoli Desktop dialog, select **Desktop→TMR Connections→Top Level Policy Regions**. The Top Level Policy Regions dialog is displayed.
2. Drag and Drop the ***hostname*_SPR_Region** in the Tivoli Desktop dialog.
3. Double-click ***hostname*_SPR_Region**, where *hostname* is the host name of your machine. The Policy Region dialog is displayed.
4. Double-click **SPR_ProfileMgr**. The Profile Manager dialog is displayed.
5. Distribute the SPR_NtProfile to the Windows NT and the Windows 2000 subscribers, and the SPR_UnixProfile to the UNIX subscribers.

A specific resource model for each platform is distributed to the subscribers.

Scheduling the Cube Build Task

You must periodically rebuild the cubes to update your cube data. The build process can be scheduled to build automatically at regular intervals (for example, schedule nightly cube builds). Stagger the start times for your cube builds for improved performance. The Server Performance Prediction cubes must be built in the following order:

1. Server Performance Prediction (1) Inventory Hw
2. Server Performance Prediction (2) Summary
3. Server Performance Prediction (3) Rank
4. Server Performance Prediction (4) Daily
5. Server Performance Prediction (5) Trend
6. Server Performance Prediction (6) Hourly

The following procedure uses the Tivoli Discovery Administrator to create a cube building schedule and to determine the schedule TaskID. The cube build is then scheduled using the Cognos Scheduler. Use the following procedure to define a cube building schedule:

1. From the Start menu, select **Programs→Tivoli Discovery Support 2.1→Tivoli Discovery Administrator**.
2. On the Scheduled Task menu, select **Add→Schedule Cube Build**.
   The Add Schedule Wizard appears.
3. Type a name for the schedule you are creating in the Schedule Name box, and click **Next**.
4. Continue to click **Next** until you are prompted for the date range for the schedule.
5. In the Effective from date box, type or select a date that is prior to the current date.
6. Select the To checkbox to display the ending date box.
7. In the ending date box, type or select the date that you entered in the Effective from date box, and click **Next**.
8. Click **Finish**.
9. In the Tivoli Discovery Administrator dialog, click **Scheduled Tasks**.
10. In the Properties pane, right-click the scheduled task you created, and click **Edit**.
    The Edit Schedule dialog is displayed.
11. In the Task page, record the schedule Task ID for use in Step 15.
12. Click **OK**.
13. From the Start menu, select **Programs->Cognos->Scheduler** to start the Cognos Scheduler.

14. From the Insert menu, click **Recurring task**.

    The Insert Task dialog appears.

15. In the Identification page, type the following command string in the File name box:

    `<TDS>/edamin.exe /TaskID=<task_id_from_step_11 on page 19>`

    (where *<TDS>* is the complete path where you installed Tivoli Decision Support and *<task_id_from_step_11 on page 19>* is the schedule Task ID from Step 11).

    Note: Enclose the Tivoli Decision Support path and the edamin.exe in quotes as shown in the following example: ″C:/Program Files/TDS/edamin.exe″ /TaskID=1.

16. Type a brief description of the cube and the schedule in the Description box.
17. In the Timetable page, specify the cube building frequency, run time, and duration.
18. Repeat this procedure for each cube.
19. Minimize the Cognos Scheduler.

Note: Cognos Scheduler must be running for the cube to build at the scheduled time.

Set the Date Range Parameter in the Cube

The SPP (Advanced) Guide sets the current period by the most recent date in the records that are returned by the query. You can use the Date range parameter in each cube to select a specific range of records.

The following sections describe the parameters that you should set for each cube.

SPP for DM Advanced Edition (2) Summary

Date Range Parameter

Set this date range to Rolling 6 months because the Visual Basic function called in the query makes the linear regression computation 6 months of data. The Guide will also work properly with lower values. Note that the more data you have the more accurate the trend.

SPP for DM Advanced Edition (3) Rank

System Purpose Parameter

You must assign the association between the hostname and the server type (DNS Server, Notus Server, Mail Server, etc.). The hostname in the Tivoli Distributed Monitoring (Advanced Edition) database is stored as the full DNS name. The guide strips out this information from the first part of the DNS name so that it works with the Tivoli Inventory data. You cannot use the same hostname for a different domain. Use the first part of the DNS name as the hostname for this parameter.

SPP for DM Advanced Edition (4) Daily

Date Range Parameter

Set this date range to Rolling 6 months because the Visual Basic function called in the query makes the linear regression computation using a maximum of 6 months of data. The Guide can also work properly with fewer values. Note that from a statistical point of view, the more data you have the more accurate the trend.

SPP for DM Advanced Edition (5) Trend

Date Range Parameter

You can set this date range to Explicit Values that you specify as a start and end date, or to Calculated Values that you select from a list. Note that from a statistical point of view, the more data you have the more accurate the trend.

Critical Threshold Parameter

This table contains the Distributed Monitoring (Advanced Edition) monitors names used in the SPP (Advanced) Guide with their respective threshold values. When this threshold value is exceeded, the value becomes critical. The default values are reasonable, but they can be modified.

Forecast Accelerator Parameter

This parameter is the percentage of acceleration to be added to the trend value for the next 30 days. For example at a certain date, an administrator knows that some metrics will grow faster than the usual because users are being added. In this case the administrator specifies the affected hostname and the corresponding percentage of acceleration. This value also can be negative. The default value should be set to zero. The value pair is *hostname:percentage*. Note that here the hostname is the full DNS name. This is because this parameter is passed to the Visual Basic function that makes a query directly to the database where the Distributed Monitoring (Advanced Edition) hostname requires the as full DNS name.

Setting Up Crystal Reports in the Tivoli Discovery Interface

Rather than directly accessing the Tivoli Distributed Monitoring (Advanced Edition) database, the *Subsystem Trend Information* Crystal Report in the Server Performance Prediction guide retrieves its information from the ED Drill Through data source. This data source is generated when Server Performance Prediction (5) Trend cube is built. You must build Server Performance Prediction cubes 2-4 before building cube 5.

The first time you run a Crystal Report using the Discovery Interface, you must set the data source using the *Server Performance Prediction Database Logon* dialog. Specify the DSN, the Qualifier, and the Database name and type for the data source you defined.

The following are the default qualifiers:

- For DB2, enter **DB2ADMIN**
- For MS-SQL and Oracle, enter **DM**
- For Sybase, enter **dm**
- For Informix, enter **informix**

Note: Your database qualifier may be different. Contact the database administrator for additional information.

Purging the Database

This task is used to clean up the Tivoli Decision Support database. To determine how often to do this you will need to balance the need to retain historical data with not only the disk space requirement of the database, but also the system resource requirement to regenerate the cubes at the defined frequency.

The task allows you to purge data between two dates, and has the following steps:

1. Double-click ***hostname* _SPR_Region**, where *hostname* is the host name of your machine. The Policy Region dialog is displayed.

2. Double-click **SPR_TaskLib**. The Task Library dialog is displayed.
3. Double-click the **DMAE_PurgeDataInDB** task. The Execute Task dialog is displayed.
4. Select the Tivoli management region server in the Managed Nodes section of the dialog and press **Set and Execute**. The task dialog is displayed.
5. Fill in all the appropriate fields. The date fields must be filled in using the date format appropriate for your database. For example, if your database holds dates in the format YYYYMMDDHHMMSS, you should enter the End date of November 30, 2001 as "20011130235959".
6. Click **Set & Execute**. The database is purged of data collected between the dates specified.

Problem Solving for Data Generation

This section details tasks that should be performed in the event that any problems are found with the automatic running of the data collection and collation processes.

Diagnosing the Problem

There are several ways that you may become aware that one or more of the automatic tasks has failed or did not start. The following are some examples:

- Your attention might have been drawn to a system log which has reported the failure of a task.
- A user of the data might report that data for a particular day or for a particular endpoint for a particular day is missing.
- You might run a daily job that checks on the successful completion and reports problems to you.

In the circumstances where you only know that data is missing, you need to know how to identify where the failure has occurred. Starting from the top down, you should make the following checks:

1. Has a cube build been scheduled to run since the date of the missing data? If *yes*, proceed to step 2; if *no*, follow these steps:
   a. Build the cube manually as described in "Building the Cubes" on page 24
   b. If this solves the problem take no further action. If it doesn't proceed to step 2.
2. Did the last cube build run correctly, as determined by the system log? If *yes*, proceed to step 3; if *no*, follow these steps:
   a. Build the cube manually as described in "Building the Cubes" on page 24
   b. If this solves the problem take no further action. If it doesn't proceed to step 3.
3. Check the existence of the `/tmp/dmae_out.log.<date>` file at the Tivoli server, and the following metric files, also at the server:

   ```
   /tmp/<endpoint>/<profile>/<resource_model>-<metric>/AVG.log.<date>
   /tmp/<endpoint>/<profile>/<resource_model>-<metric>/MIN.log.<date>
   /tmp/<endpoint>/<profile>/<resource_model>-<metric>MAX.log.<date>
   /tmp/<endpoint>/<profile>/<resource_model>-<metric>/info.<date>
   ```

   where <*date*> is one day after the date of the missing data and *endpoint*>, <*profile*>, <*resource_model*> and <*metric*> refer to the missing data. Analyze the results as follows:

a. If some, but not all of the metric files are available, the **ReadDataInDB** job failed for the day in question and recovery is, unfortunately, impossible.

b. In all other circumstances check the following files for the <*date*> in question, according to this decision table:

Table 3. Decision Table for Task Failure Analysis

metric files available	dmae_out.log available	What has happened
N	N	**ReadDataInDB** has failed without creating any files; the other jobs did not start. This circumstance would normally be very rare. Action: This task cannot be rerun manually, as the input files to the task are already being used by the resource models to accumulate today's data.
Y	N	**NewDataAggregation** has failed; RollupIntoDB did not start. Action: Run the **DMAE_AggregateOnDate** task and then the **DMAE_RollupIntoDBOnDate** task.
Y	Y	Both **NewDataAggregation** and **RollupIntoDB** have failed after creating their output files but before deleting their input files. This situation would normally be very rare. Action: Run the **DMAE_AggregateOnDate** task and then the **DMAE_RollupIntoDBOnDate** task.
N	Y	Only RollupIntoDB has failed. Action: Run only the **DMAE_RollupIntoDBOnDate** task.

Before attempting to create the missing data, you should attempt to establish the reason why a task has failed, and takes steps to ensure that the failure is not repeated.

See "Running a Task" for instructions on how to run a particular task.

Note: To help you identify failure situations you might want to create a task that you would run each day to monitor for the presence of any files with the format *.<*date*> in the indicated file structure. The absence of files normally indicates that all automatic tasks have completed successfully.

Running a Task

To run the **DMAE_AggregateOnDate** or the **DMAE_RollupIntoDBOnDate** task that manually recreate the SPP (Advanced) Guide data, perform the following steps (whichever task has to be run, the same dialogs are presented and you should enter the same values):

1. Double-click ***hostname* _SPR_Region**, where *hostname* is the host name of your machine. The Policy Region dialog is displayed.
2. Double-click **SPR_TaskLib**. The Task Library dialog is displayed.
3. Double-click the appropriate task. The Execute Task dialog is displayed.
4. Select the Tivoli management region server in the Managed Nodes area of the dialog and click **Execute**. The task dialog is displayed.
5. In the **Date** text box, type the <*date*> extension of the dmae_out.log file which is the input or the output file (as appropriate) to the task you are running (it corresponds to the day following the one for which you want to collect data).
6. Click **Set & Execute**. The task runs, carrying out the actions described for the corresponding automatic task on page 18.

Don't forget that if you have run the **DMAE_AggregateOnDate** task you should now run the **DMAE_RollupIntoDBOnDate** task.

Building the Cubes

To use the Tivoli Decision Support for Server Performance Prediction (Advanced Edition), build the cubes that will gather data from the database. Perform the following steps:

1. From the Start menu, select **Programs->Tivoli Decision Support 2.1->Tivoli Discovery Administrator**. The Tivoli Discovery Administrator dialog is displayed.

   Note: In the following steps, the cubes must be built in the following order:
   - Server Performance Prediction (1) Inventory Hw
   - Server Performance Prediction (2) Summary
   - Server Performance Prediction (3) Rank
   - Server Performance Prediction (4) Daily
   - Server Performance Prediction (5) Trend
   - Server Performance Prediction (6) Hourly

   Note: If you did not install Tivoli Inventory on your system, you do not need to schedule or build the Server Performance Prediction (1) Inventory Hw cube.

2. In the Tivoli Discovery Administrator dialog, from the Administrator dialog, double-click **Cubes**.
3. Right-click the appropriate Sever Performance Prediction cube, and select **Build**.
4. The Confirm Cube Build dialog is displayed. For the Daily and Trend cubes, the date ranges appear in the dialog. Click **Yes**. Tivoli Decision Support connects to your database and retrieves the records specified in your query. The size of your data and the network speed affect the time required to retrieve all records. Use the status bar to check the status of the processing.
5. The Cube Transform Status dialog is displayed, showing you messages about the processing status. Review the messages for any errors.

   Click **Close**.
6. Repeat Steps 2 to 4 until all the Server Performance Prediction cubes are successfully built.

   –OR–

   Click **Close**.
7. Use the discovery guide to review the views for each topic.

Schedule cube builds on a regular basis and during periods of decreased database activity. Adjust your cube date range to optimize the time required to build a cube.

For more information about how to use the Tivoli Decision Support Discovery Interface, see the *Tivoli Decision Support Users Guide*, and the *Tivoli Decision Support Using Decision Support Guides* documents described in the *Required Documentation* section.

A

Functional Description

The Tivoli Decision Support for Server Performance Prediction (Advanced Edition) analyzes the data from the network applications used to manage your network.

Tivoli Decision Support relies on data collected in a relational database by the Tivoli Distributed Monitoring (Advanced Edition) Roll-up program. It uses the Tivoli Decision Support Configuration database schema. The data in this relational database is then processed by Tivoli Decision Support using queries that are used to create multi-dimensional cubes from which reports are generated. Crystal Reports are also used to gather data from the relational database.

TDS Configuration Database Schema

The TDS Configuration database schema is capable of storing data for metrics that are monitored by Tivoli Distributed Monitoring (Advanced Edition). The data schema is fairly generic. Tivoli Distributed Monitoring (Advanced Edition) provides the scripts to create the database schema tables that are filled during the aggregation process.

The schema consists of:

- 2 tables: DM_METRICS, which is used by the TDS Configuration component, and DM_SYSTEM_SUMMARY, which is used by the Server Performance Prediction Guide component.
- 1 view, called DM_METRIC_SUMMARY.
- 1 trigger, called DM_METRIC_INSERT, that transforms and fills the date field when a UNIX timestamp field is filled by the roll-up task.

The table **DM_METRICS** contains the following columns:

Column Name	Field Type	Description
COLLECTION_DATE	date	Date when the Tivoli Distributed Monitoring (Advanced Edition) data was aggregated. The field type varies according to the vendor DB.
DT_STAMP	integer	The UNIX timestamp that is converted in date by means of a trigger
HOSTNAME	varchar(32)	Host name where the TDS Configuration roll-up task runs
ENDPOINT	varchar(32)	
PROFILE_COLLECTION	varchar(64)	
PROBE_COLLECTION	varchar(32)	Resource in the resource model
PROBE	varchar(32)	Property in the resource model

Column Name	Field Type	Description
PROBE_DESC	varchar(64)	
PROBE_ARG	varchar(32)	Instance in the resource model
MIN_VALUE_00	float	Minimum monitor value during the hour
MAX_VALUE_00	float	Maximum monitor value during the hour
AVG_VALUE_00	float	Average monitor value during the hour
MIN_VALUE_01	float	Minimum monitor value during the hour
MAX_VALUE_01	float	Maximum monitor value during the hour
AVG_VALUE_01	float	Average monitor value during the hour
MIN_VALUE_02	float	Minimum monitor value during the hour
MAX_VALUE_02	float	Maximum monitor value during the hour
AVG_VALUE_02	float	Average monitor value during the hour
MIN_VALUE_03	float	Minimum monitor value during the hour
MAX_VALUE_03	float	Maximum monitor value during the hour
AVG_VALUE_03	float	Average monitor value during the hour
MIN_VALUE_04	float	Minimum monitor value during the hour
MAX_VALUE_04	float	Maximum monitor value during the hour
AVG_VALUE_04	float	Average monitor value during the hour
MIN_VALUE_05	float	Minimum monitor value during the hour
MAX_VALUE_05	float	Maximum monitor value during the hour
AVG_VALUE_05	float	Average monitor value during the hour
MIN_VALUE_06	float	Minimum monitor value during the hour
MAX_VALUE_06	float	Maximum monitor value during the hour
AVG_VALUE_06	float	Average monitor value during the hour
MIN_VALUE_07	float	Minimum monitor value during the hour
MAX_VALUE_07	float	Maximum monitor value during the hour
AVG_VALUE_07	float	Average monitor value during the hour
MIN_VALUE_08	float	Minimum monitor value during the hour
MAX_VALUE_08	float	Maximum monitor value during the hour
AVG_VALUE_08	float	Average monitor value during the hour
MIN_VALUE_09	float	Minimum monitor value during the hour
MAX_VALUE_09	float	Maximum monitor value during the hour
AVG_VALUE_09	float	Average monitor value during the hour
MIN_VALUE_10	float	Minimum monitor value during the hour
MAX_VALUE_10	float	Maximum monitor value during the hour
AVG_VALUE_10	float	Average monitor value during the hour
MIN_VALUE_11	float	Minimum monitor value during the hour
MAX_VALUE_11	float	Maximum monitor value during the hour
AVG_VALUE_11	float	Average monitor value during the hour
MIN_VALUE_12	float	Minimum monitor value during the hour
MAX_VALUE_12	float	Maximum monitor value during the hour
AVG_VALUE_12	float	Average monitor value during the hour

Column Name	Field Type	Description
MIN_VALUE_13	float	Minimum monitor value during the hour
MAX_VALUE_13	float	Maximum monitor value during the hour
AVG_VALUE_13	float	Average monitor value during the hour
MIN_VALUE_14	float	Minimum monitor value during the hour
MAX_VALUE_14	float	Maximum monitor value during the hour
AVG_VALUE_14	float	Average monitor value during the hour
MIN_VALUE_15	float	Minimum monitor value during the hour
MAX_VALUE_15	float	Maximum monitor value during the hour
AVG_VALUE_15	float	Average monitor value during the hour
MIN_VALUE_16	float	Minimum monitor value during the hour
MAX_VALUE_16	float	Maximum monitor value during the hour
AVG_VALUE_16	float	Average monitor value during the hour
MIN_VALUE_17	float	Minimum monitor value during the hour
MAX_VALUE_17	float	Maximum monitor value during the hour
AVG_VALUE_17	float	Average monitor value during the hour
MIN_VALUE_18	float	Minimum monitor value during the hour
MAX_VALUE_18	float	Maximum monitor value during the hour
AVG_VALUE_18	float	Average monitor value during the hour
MIN_VALUE_19	float	Minimum monitor value during the hour
MAX_VALUE_19	float	Maximum monitor value during the hour
AVG_VALUE_19	float	Average monitor value during the hour
MIN_VALUE_20	float	Minimum monitor value during the hour
MAX_VALUE_20	float	Maximum monitor value during the hour
AVG_VALUE_20	float	Average monitor value during the hour
MIN_VALUE_21	float	Minimum monitor value during the hour
MAX_VALUE_21	float	Maximum monitor value during the hour
AVG_VALUE_21	float	Average monitor value during the hour
MIN_VALUE_22	float	Minimum monitor value during the hour
MAX_VALUE_22	float	Maximum monitor value during the hour
AVG_VALUE_22	float	Average monitor value during the hour
MIN_VALUE_23	float	Minimum monitor value during the hour
MAX_VALUE_23	float	Maximum monitor value during the hour
AVG_VALUE_23	float	Average monitor value during the hour
MIN_DAILY_VALUE	float	Minimum monitor value during the day
MAX_DAILY_VALUE	float	Maximum monitor value during the day
AVG_DAILY_VALUE	float	Average monitor value during the day
MIN_HOURLY_AVG	float	Minimum of average monitor value during hour
MAX_HOURLY_AVG	float	Maximum of average monitor value during hour

The table **DM_SYSTEM_SUMMARY** contains the following columns:

Column Name	Field Type	Description
HOSTNAME	varchar(32)	Host name where the Tivoli Distributed Monitoring (Advanced Edition) Roll-up piece runs
PROBE	varchar(64)	Property in the resource model
AVERAGE_VALUE	float	Average monitor value

Tivoli Distributed Monitoring (Advanced Edition) Properties Monitored by the Server Performance Prediction Resource Models

Table 4 lists the properties monitored in the Windows Server Performance Prediction Resource Model (TMW_Spp).

Table 4. Properties monitored in Windows Server Performance Prediction Resource Model

Category	Metric Name (in Guide)	Property	Instance	Metrics Unit	Comments
CPU	Processes	TMW_Objects NumberOfProcesses	–	(count)	
	CPU percent busy	TMW_System PrcTotCpuTime	–	%	
	CPU percent user time	TMW_System PrcTotUserTime	–	%	
	CPU percent system time	TMW_System PrcTotPrivTime	–	%	
	CPU run queue length	TMW_System ProcessorQueueLength	–	(count)	
Memory	Memory page-in rate	TMW_Memory PageInputSec	–	(per second)	
	Memory page-out rate	TMW_Memory PageOutputSec	–	(per second)	
	Swap space available	TMW_Memory Avail			No equivalent measurement
Network	Network packet input rate	TMW_NetworkInterface PacketsReceivedSec	Interface	(per second)	
	Network packet input error rate	TMW_NetworkInterface PacketsReceivedErrors	Interface	(count)	
	Network packet output rate	TMW_NetworkInterface PacketsSentSec	Interface	(per second)	
	Network packet output error rate	TMW_NetworkInterface PacketsOutboundErrors	Interface	(count)	
I/O	Disk IO rate	TMW_PhysicalDisk DiskBytesSec	Physical disk	(per second)	
	Disk transfer rate	TMW_PhysicalDisk DiskXfersSec	Physical disk	(per second)	
	Disk space available	TMW_LogicalDisk FreeMB	Logical disk	(Mbytes)	

Table 5 lists the properties monitored in the UNIX Server Performance Prediction Resource Model (DMXSpp).

Table 5. Properties monitored in UNIX Server Performance Prediction Resource Model

Category	Metric Name (in Guide)	Property	Metric Unit	Comments
CPU	CPU percent busy	DMXCpu/ idleTime	%	
	CPU percent user time	DMXCpu/ userTime	%	
	CPU percent system time	DMXCpu/ sysTime	%	
	CPU run queue length	DMXCpu/ loadAvg1	jobs	Average waiting jobs
	Number of processes waiting	DMXProcess/ numberWaitProcesses	processes	
	Processes	DMXProcess/ numOfProcesses	processes	
I/O	Available diskspace	DMXFileSystem/ availKBytes	KBytes	
	Percent of inodes used for a specified fs	DMXFileSystem/ prcInodeUsed	%	
Memory	Memory page-in rate	DMXMemory/ pageInsRate	pages/second	
	Memory page-out rate	DMXMemory/ pageOutsRate	pages/second	
	Available swap space	DMXMemory/ availSwapSpace	KBytes	
	Percent of virtual storage used	DMXMemory/ pctusedVirtualStorage	%	
Network	Network packet input rate	DMXNetworkInterface/ deltaInPackets	packets/sec	
	Network packet input error rate	DMXNetworkInterface/ deltaInPacketsErr	packets/sec	
	Network packet output rate	DMXNetworkInterface/ deltaOutPackets	packets/sec	
	Network packet output error rate	DMXNetworkInterface/ deltaOutPacketsErr	packets/sec	
	Network packet collision rate	DMXNetworkInterface/ deltaCollisions	packets/sec	

Cubes (Administrator)

A multidimensional cube contains data (measure values) organized into dimensions that allow faster retrieval and drill-down in PowerPlay Transformer and Explorer. You can use the Discovery Interface to quickly retrieve and view your data.

The Server Performance Prediction Guide component uses 6 cubes. The cubes must be built in numerical order (the cube build order is 1,2,3,4,5, and then 6). For more about building the Server Performance Prediction cubes, see the section “Building the Cubes” on page 24.

SPP for DM Advanced Edition (1) Inventory Hw

These cubes use hardware information retrieved from the Tivoli Inventory database. The information is stored in export data files with the following names:

- IP address (DMAE_INV_SysByIP.csv)
- Memory (DMAE_INV_Memory.csv)
- Operating System (DMAE_INV_OsType.csv)
- Processor (DMAE_INV_Processor.csv)

Queries for Tivoli Inventory, Version 3.6 and Version 3.6.2

This section contains the queries for Tivoli Inventory, Version 3.6 and Version 3.6.2. The following SQL queries are used to create the flat files in comma separated value (csv) format. These files are used to feed the dimensions (structure query) and measures (transaction query) of this PowerPlay cube.

- IP Network

  IP Network (from Tivoli Inventory database) retrieves information about the following:

  - Hardware system ID
  - Network node name and address
  - IP octect subaddress
  - Network domain and subdomains
  - Hostname

```
SQL COLUMNS
For Microsoft-SQL, Oracle, and Sybase:
    SELECT
       T1.HARDWARE_SYSTEM_ID,
       T2.NETWORK_NODE_NAME,
       T2.NETWORK_NODE_ADDRESS,
       1 AS SYSTEMS_BY_IP
    FROM
       {oj ?[DB Qualifier].COMPUTER_SYSTEM T1 LEFT OUTER JOIN
           ?[DB Qualifier].NETWORK_NODE T2 ON T1.HARDWARE_SYSTEM_ID =
           T2.HARDWARE_SYSTEM_ID}
    WHERE
       (T2.NETWORK_PROTOCOL = 'TCP' OR T2.NETWORK_PROTOCOL IS NULL)
    AND
       (T2.CONFIG_CHANGE_TYPE  in ('INSERT', 'UPDATE') OR
        T2.CONFIG_CHANGE_TYPE IS NULL)
 For DB2 and Informix:
     SELECT
        T1.HWARE_SYS_ID AS HARDWARE_SYSTEM_ID,
        T2.NET_NODE_NAME AS NETWORK_NODE_NAME,
        T2.NET_NODE_ADDR AS NETWORK_NODE_ADDRESS,
           1 AS SYSTEMS_BY_IP
     FROM
     {oj ?[DB Qualifier].COMPUTER_SYS T1 LEFT OUTER JOIN
         ?[DB Qualifier].NET_NODE T2 ON T1.HWARE_SYS_ID =
           T2.HWARE_SYS_ID}
     WHERE
        (T2.NET_PROTOCOL = 'TCP' OR T2.NET_PROTOCOL IS NULL)
     AND
         (T2.CFG_CHG_TYPE  in ('INSERT', 'UPDATE') OR T2.CFG_CHG_TYPE IS NULL)
CALCULATED COLUMNS
   IP_A_NETWORK
   IP_B_NETWORK
   IP_C_NETWORK
```

```
NETWORK_DOMAIN
NETWORK_SUBDOMAIN
NETWORK_SUBDOMAIN_2
HOSTNAME
```

- Memory

  Memory (from Tivoli Inventory database) retrieves:

  - The hardware system ID
  - The physical memory

```
SQL COLUMNS

For Microsoft-SQL, Oracle, and Sybase:
    SELECT
        HARDWARE_SYSTEM_ID,
        PHYSICAL_MEMORY_KB,
        1 AS SYSTEMS_BY_MEMORY
    FROM
        ?[DB Qualifier].COMPUTER_SYSTEM_MEMORY

For DB2 and Informix:
    SELECT
        HWARE_SYS_ID AS HARDWARE_SYSTEM_ID,
        PHYSICAL_MEM_KB AS PHYSICAL_MEMORY_KB,
        1 AS SYSTEMS_BY_MEMORY
    FROM
        ?[DB Qualifier].COMPUTER_SYS_MEM

CALCULATED COLUMNS
   PHYSICAL_MEMORY
```

- OS Type

  OS Type (from Tivoli Inventory database) retrieves category values for the following:

  - Hardware system ID
  - Operating system booted name and version
  - Computer kernel
  - Windows NT and Windows 2000 service pack
  - Operative system name
  - Version
  - Sub-version

```
SQL COLUMNS

For Microsoft-SQL, Oracle, and Sybase:
    SELECT
       T1.HARDWARE_SYSTEM_ID,
       T1.BOOTED_OS_NAME,
       T1.BOOTED_OS_VERSION,
       T1.COMPUTER_KERNEL_VERSION,
       T2.NT_SERVICE_PACK,
       NULL as NW_SUBVERSION,
       1 AS SYSTEMS_BY_OS
    FROM
       {oj ?[DB Qualifier].COMPUTER_SYSTEM T1 LEFT OUTER JOIN
       ?[DB Qualifier].NT_INFO T2 ON T1.HARDWARE_SYSTEM_ID =
         T2.HARDWARE_SYSTEM_ID}

For DB2 and Informix:
    SELECT
       T1.HWARE_SYS_ID AS HARDWARE_SYSTEM_ID,
       T1.BOOTED_OS_NAME,
       T1.BOOTED_OS_VER AS BOOTED_OS_VERSION,
```

```
       T1.COMPUTER_KRNL_VER AS COMPUTER_KERNEL_VERSION,
       T2.NT_SVC_PACK AS NT_SERVICE_PACK,
       'NULL' as NW_SUBVERSION,
       1 AS SYSTEMS_BY_OS
    FROM
       {oj ?[DB Qualifier].COMPUTER_SYS T1 LEFT OUTER JOIN
       ?[DB Qualifier].NT_INFO T2 ON T1.HWARE_SYS_ID =
         T2.HWARE_SYS_ID}
CALCULATED COLUMNS
   OS_NAME_VERSION
   OS_SUBVERSION
```

- Processor

  Processor (from Tivoli Inventory database) retrieves information about the following:

  - Hardware system ID
  - Number of processors
  - Model
  - Speed
  - CPU rating

```
SQL COLUMNS
For Microsoft-SQL, Oracle, and Sybase:
    SELECT
       T1.HARDWARE_SYSTEM_ID AS HARDWARE_SYSTEM_ID,
       COUNT(*) AS NUM_PROCESSORS,
       MIN(T2.PROCESSOR_MODEL) AS PROCESSOR_MODEL,
       MIN(T2.PROCESSOR_SPEED) AS PROCESSOR_SPEED,
       1 AS SYSTEMS_BY_CPU
    FROM
       ?[DB Qualifier].INSTALLED_PROCESSOR T1,
       ?[DB Qualifier].PROCESSOR T2
    WHERE
       T1.PROCESSOR_ID = T2.PROCESSOR_ID
    GROUP BY
       T1.HARDWARE_SYSTEM_ID
CALCULATED COLUMNS
   MULTIPROCESSOR
   PROCESSOR_INFO
   CPU_RATING
For DB2 and Informix:
    SELECT
      T1.HWARE_SYS_ID,
      COUNT(*) AS NUM_PROCESSORS,
      MIN(T2.PROCESSOR_MODEL) AS PROCESSOR_MODEL,
      MIN(T2.PROCESSOR_SPEED) AS PROCESSOR_SPEED,
      1 AS SYSTEMS_BY_CPU
    FROM
      ?[DB Qualifier].INST_PROCESSOR T1,
      ?[DB Qualifier].PROCESSOR T2
    WHERE
      T1.PROCESSOR_ID = T2.PROCESSOR_ID
    GROUP BY
      T1.HWARE_SYS_ID
```

Queries for Tivoli Inventory, Version 4.0

This section contains the queries for Tivoli Inventory, Version 4.0. The following SQL queries are used to create the flat files in comma separated value (csv) format. These files are used to feed the dimensions (structure query) and measures (transaction query) of this PowerPlay cube.

- IP Network

  IP Network (from Tivoli Inventory database) retrieves information about the following:

  - Hardware system ID
  - Network node name and address
  - IP octect subaddress
  - Network domain and subdomains
  - Hostname

```
SQL COLUMNS

For Microsoft-SQL, Oracle, and Sybase:
 SELECT
     T1.COMPUTER_SYS_ID AS HARDWARE_SYSTEM_ID,
     T2.NETWORK_NODE_NAME,
     T2.NETWORK_NODE_ADDRESS AS NETWORK_NODE_ADDR,
     1 AS SYSTEMS_BY_IP
 FROM
   oj ?[DB Qualifier].COMPUTER T1 LEFT OUTER JOIN
   ?[DB Qualifier].NETWORK_NODE T2 ON T1.COMPUTER_SYS_ID =
   T2.HARDWARE_SYSTEM_ID}
 WHERE
   (T2.NETWORK_PROTOCOL = 'TCP' OR T2.NETWORK_PROTOCOL IS NULL)
 AND
   T2.CONFIG_CHANGE_TYPE  in ('INSERT', 'UPDATE') OR
   T2.CONFIG_CHANGE_TYPE IS NULL)

For DB2 and Informix:
     SELECT
         T1.COMPUTER_SYS_ID AS HARDWARE_SYSTEM_ID,
         T2.NET_NODE_NAME AS NETWORK_NODE_NAME,
         T2.NET_NODE_ADDR AS NETWORK_NODE_ADDR,
         1 AS SYSTEMS_BY_IP
     FROM
        {oj ?[DB Qualifier].COMPUTER T1 LEFT OUTER JOIN
        ?[DB Qualifier].NET_NODE T2 ON T1.COMPUTER_SYS_ID =
          T2.HWARE_SYS_ID}
     WHERE
        (T2.NET_PROTOCOL = 'TCP' OR T2.NET_PROTOCOL IS NULL)
     AND
       (T2.CFG_CHG_TYPE  in ('INSERT', 'UPDATE') OR
        T2.CFG_CHG_TYPE IS NULL)

CALCULATED COLUMNS
   IP_A_NETWORK
   IP_B_NETWORK
   IP_C_NETWORK
   NETWORK_DOMAIN
   NETWORK_SUBDOMAIN
   NETWORK_SUBDOMAIN_2
   HOSTNAME
```

- Memory

  Memory (from Tivoli Inventory database) retrieves:

  - The hardware system ID
  - The physical memory

```
SQL COLUMNS

For Microsoft-SQL, Oracle, and Sybase:
     SELECT
         COMPUTER_SYS_ID AS HARDWARE_SYSTEM_ID,
         PHYSICAL_TOTAL_KB AS PHYSICAL_MEMORY_KB,
```

```
            1 AS SYSTEMS_BY_MEMORY
         FROM
            ?[DB Qualifier].COMPUTER_SYS_MEM SELECT
   For DB2 and Informix:
         SELECT
             COMPUTER_SYS_ID AS HARDWARE_SYSTEM_ID,
             PHYSICAL_TOTAL_KB AS PHYSICAL_MEMORY_KB,
             1 AS SYSTEMS_BY_MEMORY
         FROM
            ?[DB Qualifier].COMPUTER_SYS_MEM
   CALCULATED COLUMNS
      PHYSICAL_MEMORY
```

- OS Type

  OS Type (from Tivoli Inventory database) retrieves category values for the following:

  - Hardware system ID
  - Operating system booted name and version
  - Computer kernel
  - Windows NT and Windows 2000 service pack
  - Operative system name
  - Version
  - Sub-version

```
SQL COLUMNS
For Microsoft-SQL, Oracle, and Sybase:
     SELECT
         T1.HARDWARE_SYSTEM_ID,
         T1.BOOTED_OS_NAME,
         T1.BOOTED_OS_VERSION,
         NULL as COMPUTER_KRNL_VER,
         T2.OS_SUB_VERS AS NT_SERVICE_PACK,
         NULL as NW_SUBVERSION,
         1 AS SYSTEMS_BY_OS
     FROM
        {oj ?[DB Qualifier].COMPUTER_SYSTEM T1 LEFT OUTER JOIN
         ?[DB Qualifier].COMPUTER T2 ON T1.HARDWARE_SYSTEM_ID =
           T2.COMPUTER_SYS_ID}
For DB2 and Informix:
     SELECT
        T1.HWARE_SYS_ID AS HARDWARE_SYSTEM_ID,
        T1.BOOTED_OS_NAME,
        T1.BOOTED_OS_VER AS BOOTED_OS_VERSION,
       'NULL' as COMPUTER_KRNL_VER,
        T2.OS_SUB_VERS AS NT_SERVICE_PACK,
       'NULL' as NW_SUBVERSION,
       1 AS SYSTEMS_BY_OS
     FROM
       {oj ?[DB Qualifier].COMPUTER_SYS T1 LEFT OUTER JOIN
        ?[DB Qualifier].COMPUTER T2 ON T1.HWARE_SYS_ID =
          T2.COMPUTER_SYS_ID}
  CALCULATED COLUMNS
    OS_NAME_VERSION
    OS_SUBVERSION
```

- Processor

  Processor (from Tivoli Inventory database) retrieves information about the following:

  - Hardware system ID

- Number of processors
- Model
- Speed
- CPU rating

```
SQL COLUMNS
For Microsoft-SQL, Oracle, and Sybase:
     SELECT
         T1.COMPUTER_SYS_ID AS HARDWARE_SYSTEM_ID,
         COUNT(*) AS NUM_PROCESSORS,
         MIN(T2.PROCESSOR_MODEL) AS PROCESSOR_MODEL,
         MIN(T2.CURRENT_SPEED) AS PROCESSOR_SPEED,
         1 AS SYSTEMS_BY_CPU
     FROM
        ?[DB Qualifier].INST_PROCESSOR T1,
        ?[DB Qualifier].PROCESSOR T2
     WHERE
        T1.PROCESSOR_ID = T2.PROCESSOR_ID
     GROUP BY
        T1.COMPUTER_SYS_ID
CALCULATED COLUMNS
   MULTIPROCESSOR
   PROCESSOR_INFO
   CPU_RATING
For DB2 and Informix:
   SELECT
       T1.COMPUTER_SYS_ID AS HARDWARE_SYSTEM_ID,
       COUNT(*) AS NUM_PROCESSORS,
       MIN(T2.PROCESSOR_MODEL) AS PROCESSOR_MODEL,
       MIN(T2.CURRENT_SPEED) AS PROCESSOR_SPEED,
       1 AS SYSTEMS_BY_CPU
   FROM
      ?[DB Qualifier].INST_PROCESSOR T1,
      ?[DB Qualifier].PROCESSOR T2
   WHERE
      T1.PROCESSOR_ID = T2.PROCESSOR_ID
   GROUP BY
      T1.COMPUTER_SYS_ID
```

Parameters

Full details of the parameters can be found using the Tivoli Decision Support Guide, as follows:

1. From the Discovery Administrator dialog, expand the cube that you are interested in.
2. Select **Parameters**.
3. Double-click the name of the parameter in which you are interested. The available values are displayed.

Dimensions

The dimension defined for the SPP for DM Advanced Edition (1) Inventory Hw and SPP (1) Inventory Hw cubes is dummy. These cubes should be built only to create the flat .csv files containing Tivoli Inventory data that is used as queries from the Server Performance Prediction cubes.

Measures

Measures are not used in the SPP for DM Advanced Edition (1) Inventory Hw and SPP (1) Inventory Hw cubes.

Server Performance Prediction (2) Summary

This cube uses metric averages from the export data file (DMAE_Averages.csv) that is created from queries against the database. The data range is based on a maximum of 6 months. Building this cube updates the Tivoli Distributed Monitoring (Advanced Edition) database table DM_SYSTEM_SUMMARY.

Queries for Tivoli Inventory

The following SQL queries are used to create the flat files in comma separated value (csv) format for Tivoli Inventory. The .csv files will be used to create the dimensions (structure query) and measures (transaction query) of this multi-dimensional cube.

- Update System Averages

  Update System Averages (from Tivoli Distributed Monitoring (Advanced Edition) database). This cube calls the UpdateSystemSummary Dll function that refreshes the Tivoli Distributed Monitoring (Advanced Edition) System Summary table. The SQL Columns tab dialog executes a dummy query. The function call is necessary because the ODBC driver for Oracle does not support multiple queries and because the date type is managed differently by each database.

```
SQL COLUMNS
SELECT
    COUNT(*)
FROM
    ?[DB Qualifier].DM_METRICS
CALCULATED COLUMNS
   None
```

Parameters

Full details of the parameters can be found using the Tivoli Decision Support Guide, as follows:

1. From the Discovery Administrator dialog, expand the cube that you are interested in.
2. Select **Parameters**.
3. Double-click the name of the parameter in which you are interested. The available values are displayed.

Dimensions

The dimension defined for this cube is dummy. This cube must be built before the Discovery Administrator can create the .csv files containing Average values data that will be used as queries from the Server Performance Prediction cubes.

Measures

The measures are the numbers you can use to value the performance of your business. This is a dummy cube and the measures are not used.

SPP for DM Advanced Edition (3) Rank

The SPP for DM Advanced Edition (3) Rank cube creates from exported data the DMAE_Ranking.csv file. This export file is used to build cubes 4 to 6.

Queries

The following SQL queries are used to create the .csv files. These files will be used to create the dimensions (structure query) and measures (transaction query) of this multi-dimensional cube.

- **Rank Systems**

  Rank Systems (from Tivoli Distributed Monitoring (Advanced Edition) database). Each subsystem under study (CPU, IO, MEMORY, NETWORK) has been characterized by a metric that represents the overall performance for that system. For example, the CPU system the metrics range for cputotpct and loadavg has been split in four category (relatively idle, somewhat busy, moderately busy and very busy as described in the *Parameters* section). So, the average of these two rank values give us a value representing the CPU utilization rank.

```
SQL COLUMNS
    SELECT DISTINCT
       HOSTNAME AS NETWORK_NODE_NAME,,
       1 AS NUM_SYSTEMS
    FROM
       ?[DB Qualifier].DM_SYSTEM_SUMMARY
CALCULATED COLUMNS
   CPU_RANK
   MEMORY_RANK
   IO_RANK
   NETWORK_RANK
   OVERALL_RANK
   CPU_RANK_DESCRIPTION
   MEMORY_RANK_DESCRIPTION
   IO_RANK_DESCRIPTION
   NETWORK_RANK_DESCRIPTION
   OVERALL_RANK_DESCRIPTION
   HOSTNAME
   SYSTEM_PURPOSE
```

Parameters

Full details of the parameters can be found using the Tivoli Decision Support Guide, as follows:

1. From the Discovery Administrator dialog, expand the cube that you are interested in.
2. Select **Parameters**.
3. Double-click the name of the parameter in which you are interested. The available values are displayed.

Dimensions

The dimension defined for this cube is dummy. This cube must be built before the Discovery Administrator can create the .csv files containing Average values data that will be used as queries for the Server Performance Prediction cubes.

Measures

The measures are numbers by which you value the performance of your business. This is a dummy cube and the measures are not used.

SPP for DM Advanced Edition (4) Daily

This cube retrieves data from the database and creates categories and daily average measurements for its multi-dimensional cube. Building this cube creates the export file (DMAE_Daily.csv) with 1 record/day/host/probe.

Queries

The following SQL queries are used to create .csv files. These files will be used to create the dimensions (structure query) and measures (transaction query) of this multi-dimensional cube.

- Daily Info

  Daily Info (from Tivoli Distributed Monitoring (Advanced Edition) database). Retrieves information about the daily values of the Tivoli Distributed Monitoring (Advanced Edition) metrics. Those values will be used to create the cube measures.

```
SQL COLUMNS
SELECT
    HOSTNAME AS NETWORK_NODE_NAME,
    COLLECTION_DATE,
    PROBE,
    PROBE_ARG,
    MIN_DAILY_VALUE,
    AVG_DAILY_VALUE,
    MAX_DAILY_VALUE,
    MIN_HOURLY_AVG,
    MAX_HOURLY_AVG,
    1 AS NUM_DAYS
FROM
    ?[DB Qualifier].DM_METRICS
WHERE
    COLLECTION_DATE Between ?[Date Range].[Start Date] AND
       ?[Date Range].[End Date]
    AND PROBE IN ('PacketsSentSec','PacketsReceivedSec','PacketsReceivedErrors',
'PacketsOutboundErrors','NumberOfProcesses','PrcTotUserTime',
'ProcessorQueueLength','PrcTotCpuTime','PrcTotPrivTime','DiskXfersSec',
'DiskBytesSec','FreeMB','PageOutputSec','PageInputSec','Avail',
'sysTime','loadAvg1','idleTime','userTime','prcInodeUsed','availSwapSpace',
'availKBytes','pctusedVirtualStorage','pageOutsRate','pageInsRate',
'numberWaitProcesses','numOfProcesses','deltaOutPacketsErr','deltaOutPackets',
'deltaInPacketsErr','deltaInPackets','deltaCollisions')
CALCULATED COLUMNS
   PROBE_NAME
   HOSTNAME
   WEEKDAY
   WEEKDAY_NAME
   PROBE_NAME_FILTERED
```

Parameters

Full details of the parameters can be found using the Tivoli Decision Support Guide, as follows:

1. From the Discovery Administrator dialog, expand the cube that you are interested in.
2. Select **Parameters**.
3. Double-click the name of the parameter in which you are interested. The available values are displayed.

Dimensions

The model (a multidimensional representation of a business comprising the structure and specifications for a cube) for this cube (dm_daily.mdl) has most of dimensions used to slice the Tivoli Inventory data:

- ***By Date***: The date dimension that will have the categories automatically generated during the cube build. The last level of detail is day (*Note: this is a PowerPlay limitation*)
- ***By System Purpose***: A terminology property of the System Performance cube that you defined as a parameter by the user.
- ***By Operating System***: Based on the OS type and version in the Tivoli Inventory database.

- ***By CPU Type***: This dimension is based on the hardware system and processor table in Tivoli Inventory database. It includes the number of processors and processor type.
- ***By Physical Memory***: Retrieves data from the memory table of Tivoli Inventory databases.
- ***By Network Address***: This dimension breaks down the IP address into its four component parts. This should not be applied to network devices or to Tivoli Inventory data since you will likely have a 1-255 ratio at this level which would not make for a very useful drill-down.
- ***System Metric***: The categories that populate this dimension are the metric names collected by the TDS Configuration roll-up (see Table 4 on page 28 and Table 5 on page 29.

Dimension Map

A Dimension map is a table that shows the PowerPlay model of a business in rows and columns. The columns are the dimension, the rows are the levels within the dimensions.

By Date		By Day of Week	By System Purpose	By Operating System	By CPU Type	By Physical Memory	By Network Address	System Metric
Year	WEEK	WEEK DAY_ NAME	SYSTEM_ PURPOSE	BOOTED_OS_ NAME	MULTI PROCESSORS	PHYSICAL_ MEMORY	IP_A_ NETWORK	PROBE_NAME
Month			HOSTNAME	OS_NAME_ VERSION	PROCESSOR_ SPEED	HARD WARE_ SYSTEM_ ID	IP_B_ NETWORK	
Day				OS_SUB VERSION	PROCESSOR_ INFO	HOST NAME	IP_C_ NETWORK	
				HARDWARE_ SYSTEM_ID	HARDWARE_ SYSTEM_ID		NETWORK _NODE_ ADDRESS	
				HOSTNAME	HOSTNAME		HOST NAME	
							HARD WARE_ SYSTEM_ ID	

Measures

The measures are the numbers by which you value the performance of your business.

Measure Name	Rollup Function	Type
Daily average	Average	Column = AVG_DAILY_VALUE
Peak hour average	Average	Column = MAX_HOURLY_AVG
Minimum hourly average	Minimum	Column = MIN_HOURLY_AVG
Maximum hourly average	Maximum	Column = MAX_HOURLY_AVG
Minimum daily value	Minimum	Column = MIN_DAILY_VALUE
Maximum daily value	Maximum	Column = MAX_DAILY_VALUE

Check of the Allowed Measures and Dimensions Combination

A measure scope highlights relationships between the measure and levels within a dimension. The following table is lists the measures for the cube and whether they are or not in the scope with dimensions. When a dimension is out of scope the relative level is shown in square bracket and the letter in the round bracket has the following meaning.

By default, PowerPlay Transformer uses yellow to show direct association between the measure and a level, green to show that the measure is allocated to a level, and white to show no association between the measure and a level.

- Level derived indirectly (Query scope) from columns in queries associated with the selected query. Valid for query scope dimension maps only (light yellow)
- Level derived directly (Query and Measure scope) from a column within the selected query; or, a measure that has direct meaning at the level (yellow)
- Level derived from a query with missing columns (Query scope). a level derived from a column in a query that lacks the columns required to generate categories for higher levels in the dimension. Valid for query scope dimension maps only (red)
- Level with allocated measures (Measure scope). levels whose measure values are allocated by transformer. Valid for measure scope dimension maps only (green)
- Not applicable (out of Measure and Query scope) (white)

The best situation is to have all data ranked.

Measure	In scope (with these dimension)	Out of scope (with these dimension)
Average daily value	All except *By Network Address*)	*By Network Address* [HARDWARE_SYSTEM_ID]
Average peak hour value	All except *By Network Address*)	*By Network Address* [HARDWARE_SYSTEM_ID]
Minimum hourly average	All except *By Network Address*	*By Network Address* [HARDWARE_SYSTEM_ID]
Maximum hourly average	All except *By Network Address*	*By Network Address* [HARDWARE_SYSTEM_ID]
Minimum daily average	All except *By Network Address*	*By Network Address* [HARDWARE_SYSTEM_ID]
Maximum daily value	All except *By Network Address*	*By Network Address* [HARDWARE_SYSTEM_ID]

SPP for DM Advanced Edition (5) Trend

This cube uses data from the exported file (DMAE_Trend.csv) which is created by a query against the database and categories for computing the forecast measurements.

Queries

The following SQL queries are used to create .csv files. These files will be used to create the dimensions (structure query) and measures (transaction query) of this multi-dimensional cube.

- 1. Forecasts

  Forecasts (from Tivoli Distributed Monitoring (Advanced Edition) database) provides calculated columns using a Visual Basic DLL program. This module:

  - Forecasts the average hourly value based on a linear regression of average values for the future 30/60/90 days (using an algorithm developed by IBM® research that takes into account time of day and day of week variance)
  - Forecasts the peak hour average value based on the above linear regression algorithm (30/60/90 days); calculates the number of days to reach a given level using either the average value or the peak hour average value
  - Does an hour-by-hour forecast of the next N days that factors in time of day and day of week sensitivity

- Calculates a recommended threshold using the mean and standard deviation of the busiest hour and busiest day
- Calculates the number of times that the monitor exceeded a given threshold (either a user specified one or the calculated recommendation)
- Factors in a projected acceleration rate to any of the above values, so that you seed the growth projection with data that indicates you plan to grow faster in the future than you did in the past (the acceleration rate is a monthly growth rate expressed as a percentage).

```
SQL COLUMNS
SELECT
    HOSTNAME AS NETWORK_NODE_NAME,
    PROBE,
    PROBE_ARG,
    AVG(AVG_DAILY_VALUE) AS DAILY_AVG,
    AVG(MAX_HOURLY_AVG) AS PEAK_HOURLY_AVG,
    MAX(MAX_HOURLY_AVG) AS DAILY_MAX,
    MIN(COLLECTION_DATE) AS FIRST_DAY,
    MAX(COLLECTION_DATE) AS LAST_DAY,
   COUNT(*) AS NUM_DAYS
FROM
    ?[DB Qualifier].DM_METRICS
WHERE
    COLLECTION_DATE Between ?[Date Range].[Start Date] AND
       ?[Date Range].[End Date]
    AND PROBE IN ('PacketsSentSec','PacketsReceivedSec','PacketsReceivedErrors',
'PacketsOutboundErrors','NumberOfProcesses','PrcTotUserTime',
'ProcessorQueueLength','PrcTotCpuTime','PrcTotPrivTime','DiskXfersSec',
'DiskBytesSec','FreeMB','PageOutputSec','PageInputSec','Avail',
'sysTime','loadAvg1','idleTime','userTime','prcInodeUsed','availSwapSpace',
'availKBytes','pctusedVirtualStorage','pageOutsRate','pageInsRate',
'numberWaitProcesses','numOfProcesses','deltaOutPacketsErr','deltaOutPackets',
'deltaInPacketsErr','deltaInPackets','deltaCollisions')
GROUP BY
    PROBE,
    HOSTNAME,
    PROBE_ARG
CALCULATED COLUMNS
   CRITICAL_THRESHOLD
   DAYS_TO_CRITICAL_THRESHOLD
   FORECAST_30_DAY_AVG
   FORECAST_30_DAY_PEAK
   FORECAST_60_DAY_AVG
   FORECAST_60_DAY_PEAK
   FORECAST_90_DAY_AVG
   FORECAST_90_DAY_PEAKFORECAST_ACCELERATOR
   NUM_HOURS
   PROBE_NAME
   TIMES_CRITICAL
   GROWTH_RATE
   HOSTNAME
   FORECAST_STD_DEV
   PROBE_NAME_FILTERED
```

Parameters

The Critical Threshold parameter has some default of reasonable values that you can change to accommodate proper system performance. The Forecast Accelerator is the percentage accelerating added value in the next 30 days to the trend value. For example at a certain date an administrator knows that some metrics will grow faster than usual because users will be added, so the Administrator specifies the host name and the corresponding growth percentage (this value can also be negative).

Full details of the parameters can be found using the Tivoli Decision Support Guide, as follows:

1. From the Discovery Administrator dialog, expand the cube that you are interested in.
2. Select **Parameters**.
3. Double-click the name of the parameter in which you are interested. The available values are displayed.

Dimensions

The model for this cube (dm_trend.mdl) contains most of the dimensions used to slice the Tivoli Inventory data:

- ***By System Purpose***: A terminology property of the System Performance cube that you defined as parameter.
- ***By Operating System***: Retrieves the OS type and version as scanned by Tivoli Inventory.
- ***By CPU Type***: Based on the hardware system and processor table in the Tivoli Inventory database. Includes the number of processors and processor type.
- ***By Physical Memory***: Retrieves information from the memory table of the Tivoli Inventory database.
- ***By Network Address***: This dimension breaks down the IP address into its four component parts. This should not be applied to network devices or to Tivoli Inventory data since you will likely have a 1-255 ratio at this level, which would not make for a very useful drill-down.
- ***By Activity Level***: Contains the information relative to the subsystem rank description.
- ***System Metric***: The categories that populate this dimension are the metric names collected by the TDS Configuration roll-up (see Table 4 on page 28 and Table 5 on page 29.

Dimension Map

A Dimension map is a table that shows the PowerPlay model of a business in rows and columns. The columns are the dimension, the rows are the levels within the dimensions.

By System Purpose	By Operating System	By CPU Type	By Physical Memory	By Network Address	By Activity Level	System Metric
SYSTEM_ PURPOSE	BOOTED_ OS_NAME	MULTI-PROCESSOR	PHYSICAL_ MEMORY	IP_A_ NETWORK	OVERALL_RANK_ DESCRIPTION CPU MEMORY NETWORK IO	PROBE_NAME
HOSTNAME	OS_NAME_ VERSON	PROCESSOR_ SPEED	HARDWARE_ SYSTEM_ID	IP_B_ NETWORK		
	OS_ SUBVERSION		HOSTNAME	IP_C_ NETWORK		
	HARDWARE_ SYSTEM_ID	HARDWARE_ SYSTEM_ID		NETWORK_ NODE_ADDRESS		
	HOSTNAME	HOSTNAME		HARDWARE_ SYSTEM_ID		
				HOSTNAME		

Measures

The measures are the numbers by which you value the performance of your business.

The measurements of this cube are relative to the utilization rank of each subsystem and to the forecast over 30/60/90 days computed for the average value and for the peak value of

the metric highlighted.

Measure Name	Rollup Function	Type
Number of systems	Sum	Column = NUM_SYSTEMS
Daily average value	Average	Column = DAILY_AVG
Average Peak Hour value	Average	Column = PEAK_HOURLY_AVG
Maximum value	Maximum	Column = DAILY_MAX
30 day forecasted average	Average	Column = FORECAST_30_DAY_AVG
60 day forecasted	Average	AverageColumn = FORECAST_60_DAY_AVG
90 day forecasted average	Average	Column = FORECAST_90_DAY_AVG
30 day forecasted peak value	Maximum	Column = FORECAST_30_DAY_PEAK
60 day forecasted peak value	Maximum	Column = FORECAST_60_DAY_PEAK
90 day forecasted peak value	Maximum	Column = FORECAST_90_DAY_PEAK
Days to critical threshold	Minimum	Column = DAYS_TO_CRITICAL_THRESHOLD
Times critical threshold exceeded	Sum	Column = TIMES_CRITICAL
Overall Utilization Rating	Average	Column = OVERALL_RANK
CPU Utilization Rating	Average	Column = CPU_RANK
Memory Utilization Rating	Average	Column = MEMORY_RANK
IO Utilization Rating	Average	Column = IO_RANK
Network Utilization Rating	Average	Column = NETWORK_RANK
Growth Rate%	Average	Column = GROWTH_RATE
Processor Overload	Calculate	DPERCENT ((CPU Utilization rating Network Utilization Rating), Network Utilization Rating)

SPP for DM Advanced Edition (6) Hourly

The SPP for DM Advanced Edition (6) Hourly cube retrieves data from the .csv file generated by the previous cube SPP for DM Advanced Edition (5) Trend which builds DMAE_hourly.csv file, and creates categories for its multi-dimensional cube.

Queries

There are no queries for this cube, because the hourly detail data that supply the dimensions for this cube are provided by the DMAE_hourly.csv file. This file is generated by a Visual Basic DLL function called by the Trend cube.

Parameters

None.

Dimensions

The model for this cube (dm_hourly.mdl) contains most of the dimensions used to slice the Tivoli Inventory data:

- ***By Date***: The date dimension for which the categories are automatically generated during the cube build. The last level of detail is day (*Note: this is a PowerPlay limitation*).
- ***By System Purpose***: Retrieves the terminology property from the System Performance cube (you defined this using a parameter).

- ***By Operating System***: Retrieves the OS type and version from the Tivoli Inventory database.
- ***By CPU Type***: Uses the hardware system and processor table in the Tivoli Inventory database. Includes the number of processors and processor type.
- ***By Physical Memory***: Retrieves information from the memory table of the Tivoli Inventory database.
- ***By Network Address***: This dimension breaks down the IP address into its four component parts. This should not be applied to network devices or to Tivoli Inventory data since you will likely have a 1-255 ratio at this level which would not make for a very useful drill-down.
- ***By Time***: Contains a set of timestamps (strings) at level of hour. This dimension is created using data from the DMAE_Hourly.csv file.
- ***System Metric***: The categories that populate this dimension are the metric names collected by the TDS Configuration roll-up (see Table 4 on page 28 and Table 5 on page 29.

Dimension Map

A Dimension map is a table that shows the PowerPlay model of a business in rows and columns. The columns are the dimension, the rows are the levels within the dimensions.

By Date	By System Purpose	By Operating System	By CPU Type	By Physical Memory	By Network Address	By Time	System Metric
Year	SYSTEM_ PURPOSE	BOOTED_OS_ NAME	MULTIPRO-CESSORS	PHYSICAL _ MEMORY	IP_A_NET- WORK	PROBE_ HOUR	PROBE_NAME
Week	HOST NAME	OS_NAME_ VERSiON	NUM_ PRO-CESSORS	HARD WARE_ SYSTEM_ ID	IP_B_NET- WORK		
Days		OS_SUB VERSION	PROCESS-OR_ INFO	HOST NAME	IP_C_NET- WORK		
		HARDWARE_ SYSTEM_ID	HARDWARE_SYSTEM_ ID		NETWORK_ NODE_ ADDRESS		
		HOSTNAME	HOSTNAME		HOSTNAME		
					HARDWARE_ SYSTEM_ID		

Measures

The measures are the numbers by which you value the performance of your business.

The measurements for this cube are relative to the low and high forecasted values and the hourly average value of the highlighted metric.

Measure Name	Rollup function	Type
Low Forecasted Value	Average	Column = LOW_FORECAST
Hourly Average Value	Average	Column = HOURLY_AVG
High Forecasted Value	Average	Column = HIGH_FORECAST

Check of the Allowed Measures and Dimensions Combination

Measure	In Scope (with these dimension)	Out of Scope (with these dimension)
Low Forecasted Value	All except *By Network Address* (b)	*By Network Address* [HARDWARE_SYSTEM_ID (d)]

Measure	In Scope (with these dimension)	Out of Scope (with these dimension)
Hourly Average Value	All except *By Network Address* (b)	*By Network Address* [HARDWARE_SYSTEM_ID (d)]
High Forecasted Value	All except *By Network Address* (b)	*By Network Address* [HARDWARE_SYSTEM_ID (d)]

Topic Map & Views (Interface)

The Server Performance Prediction Guide component provides the following questions that are answered by data collected from the Tivoli Distributed Monitoring (Advanced Edition) data repository.

Category Server Performance Prediction

The purpose of the Server Performance Prediction Guide component is to provide you with the capacity to plan using basic trending of key system metrics. Most of the workstation performance problems in a network can be avoided because they are a result of system workload that gradually grows to the point where it exceeds the capacity of the system.

SPP for DM Advanced Edition - How is my overall performance?

This topic is a good starting point for reviewing and analyzing system performance.

View Title	Report Title	Data Source
All System Metrics	dmae_trend_01.ppr	SPP for DM Advanced Edition (5) Trend
Busiest Network Segments	dmae_trend_03.ppr	SPP for DM Advanced Edition (5) Trend
Busiest Systems	dmae_trend_04.ppr	SPP for DM Advanced Edition (5) Trend
Fastest Growing Systems	dmae_trend_13.ppr	SPP for DM Advanced Edition (5) Trend
Subsystem Trend Information	dmae_trend.rpt	Distributed Monitoring (Advanced Edition) Rollup Database
System Utilization Rating	dmae_trend_14.ppr	SPP for DM Advanced Edition (5) Trend

SPP for DM Advanced Edition - How might I improve the performance of my systems?

This topic contains views that identify areas in the enterprise where the efficiency and performance of existing hardware can potentially be improved by shifting the workload or by changing the hardware.

View Title	Report Title	Data Source
Performance Anomalies	dmae_trend_12.ppr	SPP for DM Advanced Edition (5) Trend
Systems that need more memory	dmae_trend_40.ppr	SPP for DM Advanced Edition (5) Trend
Underprovisioned/Overprovisioned Systems	dmae_trend_39.ppr	SPP for DM Advanced Edition (5) Trend

SPP for DM Advanced Edition - Is my resource utilization growing?

This topic provides weekly growth rates for key system performance metrics.

View Title	Report Title	Data Source
Daily Average Performance Trend	dmae_daily_103.ppr	SPP for DM Advanced Edition (5) Trend
Daily Peak Hour Performance Trend	dmae_daily_104.ppr	SPP for DM Advanced Edition (5) Trend
System Performance Comparison	dmae_daily_103_53.ppr	SPP for DM Advanced Edition (5) Trend

SPP for DM Advanced Edition - What are my busiest days?

This topic shows the daily history of performance data.

View Title	Report Title	Data Source
Average Performance by System Purpose	dmae_daily_106.ppr	SPP for DM Advanced Edition (5) Trend
Average vs. Peak hour Performance History	dmae_daily_105.ppr	SPP for DM Advanced Edition (5) Trend
Peak Hour Performance by System Purpose	dmae_daily_107.ppr	SPP for DM Advanced Edition (5) Trend

SPP for DM Advanced Edition - What are my busiest times?

This topic shows system performance metrics on an hourly basis.

View Title	Report Title	Data Source
Hourly Performance by System Purpose	dmae_hourly_02.ppr	SPP for DM Advanced Edition (6) Hourly
Performance history vs. model	dmae_hourly_01.ppr	SPP for DM Advanced Edition (6) Hourly

SPP for DM Advanced Edition - What performance problems are on the horizon?

This topic identifies performance problems that might be encountered in the near future.

View Title	Report Title	Data Source
Metrics most quickly approaching critical threshold	dmae_trend_08.ppr	SPP for DM Advanced Edition (6) Trend
Systems most quickly approaching critical thresholds	dmae_trend_02.ppr	SPP for DM Advanced Edition (6) Trend

* = SPP for DM Advanced Edition (5) Trend cube

Related Views

View Name	View Description	DataFile Name	Related Views
All System Metrics	This view shows a summary of all system performance metrics sorted by system purpose. This is a good starting point for looking for bottlenecks in an enterprise. The following metrics are intended for the UNIX, the Windows NT, and Windows 2000 platform: CPU percent busy/user time/system time = % CPU run queue length = jobs # Disk IO rate = Kb/sec (bytes/sec on Windows NT and Windows 2000) (the highest rate of the one of the local disk) Disk transfer rate = transfers/sec (the highest rate of the one of the local disk) Memory page-in/out rate = pages/sec Memory page-scan rate = seeks/sec (no equivalent measurement on Windows NT and Windows 2000) Network packet collision rate = packet/sec (no equivalent measurement on Windows NT and Windows 2000) Network packet input/output rate = packets/sec Network packet input/output error rate = packets/sec (packet # on Windows NT)	dmae_trend_01.ppr	
Busiest Network Segments	This view highlights the busiest segments in your network based on the network packet collision rate for the systems on that segment. The metric for this view can only be used for UNIX systems because there is no equivalent measurement on Windows NT and Windows 2000 Network packet collision rate = collisions/sec	dmae_trend.ppr	Busiest Systems
Busiest Systems	This view shows the busiest systems based on the average daily run queue length metric for each system. The run queue length metric is the number of processes that are ready to run (processes not waiting for Input/Output or user input) that the system cannot dispatch until it has free processor cycles. Run queue length is the key metric for determining processor load and is measured in average number of waiting processes.	dmae_trend_04.ppr	Busiest Network Segments

View Name	View Description	DataFile Name	Related Views
Fastest Growing Systems	This view shows the percentage growth rate expected over the next 30 days. The initial view shows the average growth rate of all the system performance metrics. Drill down into an average metric to review the growth rate of individual systems. Note: A negative growth rate indicates that system utilization is declining.	dmae_trend_13.ppr	
Sybsystem Trend Information	This view shows a summary of all system performance metrics sorted by hostname and subsystem (CPU, Disk, Memory, Network). The current values for the following metrics are included in the view: daily average, peak hour, and the forecasted values based on historical trends for this data.	dmae_trend.rpt	
System Utilization Rating	This views shows the overall system utilization rating sorted by system purpose. The Utilization rank calculation is based on a quartile ranking for each of the major subsystems (CPU, IO, Network, and Memory) based on two key metrics. The range is from relatively idle to very busy. This view is useful for isolating imbalances in an enterprise. For example, if a system of a particular type is very busy and another system of the same type is relatively idle, consider redistributing the workload more evenly between the two systems.	dmae_trend_14.ppr	Busiest Network Segments Busiest Systems
Performance Anomalies	This view identifies areas where one or more systems is not performing as expected. Hardware activity is proportional the network activity. Systems with the same purpose and the same hardware configuration should have similar processor utilization and network activity. To use this view, select a system purpose and then drill down into it. The systems should show a general upward trend from left to right. If a system has higher CPU utilization than other systems in the group with the same network activity, then check that systems for a problem (for example, an unauthorized workload).	dmae_trend_12.ppr	System Utilization Rating

View Name	View Description	DataFile Name	Related Views
Systems that need more memory	This view identifies systems with a high page scan rate. When evaluating this metric, review the amount of physical memory on the system (for example, a scan rate of 1000 pages/second may be considered very high on a system with 64 MG of physical memory, but not on one with 256 MG of physical memory). The amount of physical memory and other metrics are provided as a layer in this view. The page-scan rate is pages scanned per second. Note: The page-scan rate metric is not available for Windows NT and Windows 2000 systems. Use the page-in rate metric to monitor Windows NT and Windows 2000 memory utilization. If the following error message appears,	dmae_trend_40.ppr	
Underprovisioned/ Overprovisioned Systems	This view identifies systems with CPU activity that is disproportionate to their network activity. This view is ranked from under-provisioned systems (systems that are not equipped to handle this volume of network activity) to over-provisioned systems (systems that can handle additional network activity). Hosts with a negative processor overload (less than 0%) represent over-provisioned systems. If a system shows very high CPU utilization but has relatively low network activity, then that system may be under-provisioned (for example, the CPU is inadequate for the workload). If a system shows very low CPU utilization and shows relatively high network activity, then the system may be over-provisioned (for example, the CPU is excessive for the workload). This view uses the processor overload measure that is expressed as a percentage of the difference between the CPU and network utilization divided by the network utilization.	dmae_trend_39.ppr	
Daily Average Performance Trend	This view shows the 12-week growth trend for critical system performance metrics. The metrics used are average daily values. This data is useful for identifying the growth trends and for identifying changes in resource utilization patterns. To use this view, select a system purpose and then drill down into it. The systems should show a general upward trend from left to right. If a system has higher CPU utilization than other systems in the group with the same network activity, then check that system for a problem (for example, an unauthorized workload).	dmae_daily_103.ppr	Fastest Growing Systems

View Name	View Description	DataFile Name	Related Views
System Performance Comparison	This view shows the 12-week growth trend for critical system performance metrics. This view shows all servers on one graph for each metric as the default starting point. The metrics used are average daily values. This data is useful for identifying the growth trends and for identifying changes in resource utilization patterns. To use this view, select a system purpose and then drill down into it. The systems should show a general upward trend from left to right. If a system has higher CPU utilization than other systems in the group with the same network activity, then check that system for a problem (for example, an unauthorized workload).	dmae_daily_103_53.ppr	Fastest Growing Systems Daily Average Performance Trend Daily Average Performance Trend (Limited to Some Monitors)
Daily Peak Hour Performance Trend	This view shows the 12-week growth trend for critical system performance metrics based on the daily peak hour performance. This data is useful for identifying the growth trend and for identifying changes in resource utilization patterns. To use this view, select a system purpose and then drill down into it. The systems should show a general upward trend from left to right. If a system has higher CPU utilization than other systems in the group with the same network activity, then check that system for a problem (for example, an unauthorized workload).	dmae_daily_104.ppr	Fastest Growing Systems
Average Performance by system Purpose	This view shows the daily average values and peak values for the last 30 days for key system performance metrics sorted by system purpose. Use this view to identify the peak days and overall growth trend for a family of systems.	dmae_daily_106.ppr	
Average vs. Peak Hour Performance History	This view shows the daily averages and the peak hourly averages for the last 30 days for key system performance metrics. By default, this view shows all systems. Drill down into the specific systems.	dmae_daily_105.ppr	
Peak Hour Performance by System Purpose	This view shows the peak hour values for the last 30 days for key system performance metrics sorted by system purpose. Use this view to identify the peak hours and overall growth trend for a family of systems.	dmae_daily_107.ppr	

View Name	View Description	DataFile Name	Related Views
Hourly Performance by System Purpose	This view shows historical data for hourly averages for the system performance metrics broken down by system purpose. The following metrics are intended for UNIX, Windows NT, and Windows 2000: CPU percent busy/user time/system time = % CPU run queue length = jobs # Disk IO rate = Kb/sec (bytes/sec on Windows NT and Windows 2000) (the highest rate of all the disks on the local system) Disk transfer rate = transfers/sec (the highest rate of all the disks on the local system) Memory page-in/out rate = pages/sec Memory page-scan rate = seeks/sec (no equivalent measurement on Windows NT and Windows 2000) Network packet collision rate = packet/sec (no equivalent measurement on Windows NT and Windows 2000) Network packet input/output rate = packets/sec Network packet input/output error rate = packets/sec (packet # on Windows NT)	dmae_hourly_02.ppr	
Performance History vs. Model	This view shows a history of hourly averages, and low and high forecasted values for the system performance metrics. The following metric are intended for the UNIX, Windows NT, and Windows 2000 platforms: CPU percent busy/user time/system time = % CPU run queue length = jobs # Disk IO rate = Kb/sec (bytes/sec on Windows NT and Windows 2000) (the highest rate of all the disks on the local system) Disk transfer rate = transfers/sec (the highest rate of all the disks on the local system) Memory page-in/out rate = pages/sec Memory page-scan rate = seeks/sec (no equivalent measurement on Windows NT and Windows 2000) Network packet collision rate = packet/sec (no equivalent measurement on Windows NT and Windows 2000) Network packet input/output rate = packets/sec Network packet input/output error rate = packets/sec (packet # on Windows NT and Windows 2000)	dmae_hourly_01.ppr	

View Name	View Description	DataFile Name	Related Views
Metrics most quickly approaching critical threshold	This view shows the systems that are approaching critical thresholds. This view is sorted by system purpose. Problem areas include processor, memory, IO, or network-related problems. The WARNING exception is highlighted in yellow, and the CRITICAL exception is highlighted in red. Click on a metric to highlight the metric in the legend.	dmae_trend_08.ppr	
Systems most quickly approaching critical thresholds	This view shows the systems that are predicted to hit a critical performance threshold within the next 180 days. The WARNING exception is highlighted in yellow, and the CRITICAL exception is highlighted in red. Click on a metric to highlight the metric in the legend.	dmae_trend_02.ppr	

Report Definitions

How is my overall performance?

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
All System Metrics	dmae_trend _01.ppr	Trend(5)	PP		Exp	NA	Daily Average Value	System Purpose	System Metric	
Busiest Network Segments	dmae_trend _03.ppr	Trend(5)	PP	Col, Last, All, Desc	Exp	NA	Daily Average Value	Network Packet Collision Rate	By Network Segment	
Busiest Systems	dmae_trend _04.ppr	Trend(5)	PP	Col, Last, All, Desc	Exp	NA	Daily Average Value	CPU run que length	By Hostname	
Fastest Growing Systems	dmae_trend _13.ppr	Trend(5)	PP	Col, Last, All, Desc	Exp	NA	Growth Rate %	Percentage of growth in next 30 days	By Hostname	
Subsystem Trend Information	dmae_trend. rpt	drill-thru	CR							
System Utilization Rating	dmae_trend _14.ppr	Trend(5)	PP		Exp	NA	Number of systems	By Overall Activity Level	By System Purpose	

How might I improve performance on my systems?

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Performance Anomalies	dmae_ trend_ 12.ppr	Trend (5)	PP		Exp	NA	Daily Average Value	By System Purpose	By Network Activity Level	

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Systems that need more memory	dmae_ trend_ 40.ppr	Trend (5)	PP	Col,Last,All Desc	Exp	NA	Daily Average Value	By Physical Memory	By Hostname	By Physical Memory
Underpro-visioned/ Overpro-visioned Systems	dmae_ trend_ 39.ppr	Trend (5)	PP	Col,Last,All Desc	Exp	NA	Processor Overload	Processor Overload	By Hostname	

Is my resource utilization growing?

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Daily Average Performance Trend	dmae_ daily_ 103.ppr	Daily(4)	PP		Exp	Last 12 weeks	Daily Average	Last 12 Weeks	By Day of the Week	
Daily Peak Hour Performance Trend	dmae_ daily_ 104.ppr	Daily(4)	PP		Exp	Last 12 weeks	Peak hour average	Last 12 Weeks	By Day of the Week	
System Performance Comparison	dmae_ daily_ 103_53.ppr	Daily(4)	PP		Exp	Last 12 weeks	Daily Average	Last 12 Weeks	By Day of the Week	

What are my busiest days?

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Average Performance by system Purpose	dmae_ daily_ 106.ppr	Daily(4)	PP		Exp	Last 60 Days	Daily Average	By System Purpose	Last 60 Days	
Average vs. Peak Hour Performance History	dmae_ daily_ 105.ppr	Daily(4)	PP		Exp	Last 30 Days	Measures	Measures	Last 30 Days	
Peak Hour Performance by System Purpose	dmae_ daily_ 107.ppr	Daily(4)	PP		Exp	Last 60 Days	Peak hour average	By system purpose	Last 60 Days	

What are my busiest times?

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Hourly Performance by System Purpose	dmae_ hourly_ 02.ppr	Hourly(6)	PP		Exp	By Date	Hourly Average Value	By System Purpose	By Time	

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Hourly Performance by System Purpose	dmae_ hourly_ 02.ppr	Hourly(6)	PP		Exp	By Date	Hourly Average Value	By System Purpose	By Time	
Performance history vs. model	dmae_ hourly_ 01.ppr	Hourly(6)	PP		Exp	By Date	Measures	High Forecasted Value	By Time	

What performance problems are on the horizon?

View Name	Data File Name	Cube or Database	Chart Type	Rank	Re-port Type	Period	Measure	Row	Column	Layer
Metrics most quickly approaching critical threshold	dmae_ trend_ 08.ppr	Trend(5)	PP		Exp		Days to critical threshold	System Metric	By System Purpose	
Systems most quickly approaching critical thresholds	dmae_ trend_ 02.ppr	Trend(5)	PP	Col, Last, All, Desc	Exp		Days to critical threshold	By Host-name	By Host-name	

B

Alternative Installation and Configuration Procedures

This appendix contains details of the following alternative and little-used procedures:

Creating the RIM Object Using a Shell Script

This section contains instructions for creating the RIM object using a shell script. It is normally only necessary do to this if neither the RDBMS server nor client is installed on the Tivoli management region server.

To create a RIM object, Tivoli Framework applications use the **wcrtrim** command. TDS Configuration provides you with a shell script called **cr_spp_rim.sh** that prompts you for the required input. You should run this script from the Tivoli management region server where you have installed the TDS Configuration component. You should have the role of a Tivoli administrator.

The **cr_spp_rim.sh** script attempts to retrieve your TDS Configuration RIM object attributes. If the **cr_spp_rim.sh** cannot find the TDS Configuration RIM object, you will be prompted to enter the required information that will be used by the **wcrtrim** command. The procedure has the following steps:

1. Change to the following directory: `$BINDIR/TME/Tmw2k/TDS/spr`
2. Run the RIM creation script as follows:

Platform	Command
Windows NT	sh cr_spp_rim.sh
UNIX	cr_spp_rim.sh

Information you are required to supply depends on the vendor product requirements for the specific database. You can also use this script to change the TDS Configuration RIM object attributes. If a RIM object *spr_rim* already exists, you are asked to remove it. If the displayed values are correct, reply **N**, and they will remain unaltered. Otherwise, reply Y, and create a new RIM object by supplying the parameters described in Table 1 on page 5, with the difference that there is an additional field, as follows:

RIM Host
The system where the database server or client software is installed.

Table 6 gives vendor-specific information for the RIM parameters. The titles to each column show not only the name of the attribute, but also the option used with the **wcrtrim** command in the **cr_spp_rim.sh** script.

You should note that some of the parameters use database specific environment variables, highlighted in bold.

Table 6. Vendor-specific information for RIM object attributes

Database Vendor (-v)	Database ID(-d)	Database User ID (-u)	Database Home (-H)	Database Server ID (-s)	Instance Home (-I)
DB2	The name of the database that the TDS Configuration component will use, or an alias for that database, if an alias exists **$DBINSTANCE**	Instance owner id	DB2 CAE install directory **$DB2DIR**	You must specify the string **tcpip** **$DB2COMM**	DB2 Instance install directory **$INSTDIR**

Table 6. Vendor-specific information for RIM object attributes (continued)

Database Vendor (-v)	Database ID(-d)	Database User ID (-u)	Database Home (-H)	Database Server ID (-s)	Instance Home (-I)
Informix	Database source name (DSN) defined in the ODBC control panel (NT) or *.odbc.ini* file (UNIX)	informix user	Informix client install directory	Informix server name defined in sqlhosts	N/A
Microsoft_SQL	Tivoli Distributed Monitoring (Advanced Edition) database name (default *dm_db*)	Microsoft-SQL user for Tivoli Distributed Monitoring (Advanced Edition) (default *DM*)	Microsoft-SQL client install directory	Hostname for Microsoft-SQL Server host	N/A
Oracle	**$ORACLE_SID** (or service name for Oracle 8.1+)	Oracle user for Tivoli Distributed Monitoring (Advanced Edition) (default *DM*)	Oracle client install directory **$ORACLE_ HOME**	**$TWO_TASK**	N/A
Sybase	TDS Configuration database name (default *dm_db*)	Sybase user for TDS Configuration (default *DM*)	Top level directory of the Sybase client install. **$SYBASE**	**$DSQUERY**	N/A

Creating the Database Structure Using the SQL Processor

Your database administrator can customize the SQL templates, such as **cr_db. xxx** and **cr_tbl. xxx**, (where **xxx** can be syb, ora, mssql, mssql7, inf, or db2), and then run these scripts on the RDBMS client or server using the interactive SQL processor.

RDBMS Vendor	Configuration File	Interactive SQL Processor	RDBMS Administrator
Oracle	tnsnames.ora	sqlplus	sys
Sybase	interfaces	isql	sa
Microsoft-SQL	interfaces	isql	sa
DB2		db2	instance owner
Informix	sqlhost	dbaccess	informix

To run the RDBMS configuration scripts on the RDBMS client or server using the SQL processor, perform the following steps as shown for Sybase:

1. On the Tivoli management region server where TDS Configuration is installed, customize the **cr_db.syb** and **cr_tbl.syb** scripts to meet your needs and then save them as **cr_db_syb.sql** and **cr_tbl_syb.sql**.
2. Copy the **cr_db_syb.sql** and **cr_tbl_syb.sql** files from the `$BINDIR/TME/Tmw2k/TDS/rdbcfg` directory on the managed nodes where Tivoli DM (Advanced Edition) is installed, to a temporary directory on the RDBMS server.
3. From the directory that now contains the script, start an isql session as super administrator (sa) and run the **cr_db_syb.sql** script as follows:

   ```
   isql -U sa -P pwd -i cr_db.syb.sql
   ```

   where *pwd* is the RDBMS password for the RDBMS user system administrator.

   The script creates the Tivoli Distributed Monitoring (Advanced Edition) user and the Tivoli Distributed Monitoring (Advanced Edition) database in the Sybase RDBMS.
4. Install the layout by entering the following command:

   ```
   isql -U DM -P pwd -i cr_tbl.syb.sql
   ```

   where *pwd* is the RDBMS password for the user. The password is the one you specified in the Tivoli Distributed Monitoring (Advanced Edition) RIM object creation.
5. Prepare to test the configuration by entering the following command:

   ```
   isql -U DM -P pwd
   ```

   where *pwd* is the RDBMS password for the user.
6. In the SQL session, check that the Tivoli Distributed Monitoring (Advanced Edition) repository was installed, by entering the following:

   ```
   > select * from table
   > go
   ```

   where *table* is the DM-METRICS table you created in Step 4.

   Results should indicate that zero rows were found. If results indicate that <table> is unknown, the Tivoli Distributed Monitoring (Advanced Edition) repository was not installed.
7. Log out of isql by entering the following command:

   ```
   > quit
   ```

Setting up the ODBC Data Source Connection For DB2

The following is a guide to setting up the ODBC data source connection for DB2. In all cases you should verify the proposed steps with the DB2 documentation.

The ODBC drivers for DB2 Databases are included with the DB2 Client Application Enabler that is provided on the DB2 Client Application Enablers™ CD-ROM or can be downloaded from the IBM DB2 web page. The DB2 CLI/ODBC driver is installed during the installation of the DB2 Client Application Enabler.

Register the DB2 Database

Register the DB2 database with the ODBC driver manager as a data source. On Windows 95, Windows 98, Windows NT, and Windows 2000, you can make the data source available to all users of the system (a system data source), or the current user only (a user data source). You can add the data source by using the Client Configuration Assistant (CCA) or Microsoft 32-bit ODBC Administrator Tool, as described hereafter.

To add the data source by using the Client Configuration Assistant (CCA):

1. Select the DB2 database alias that you want to add as a data source.
2. Click the **Properties** push button. The Database Properties dialog is displayed.
3. Select the **Register this database for ODBC** check box.
4. On the supported Windows platforms, select the appropriate radio button to add the data source as either a user or system data source.

To add the data source by using the Microsoft 32-bit ODBC Administration Tool:

1. On the supported Windows platforms, a list of the user data sources appears by default. To add a system data source, click the **System DSN** push button or tab (depending on the platform).
2. Click **Add**.
3. From the list, double-click **IBM DB2 ODBC Driver**.
4. From the Database alias drop-down list, select the database alias to add and click **OK**.

Automate the Registry of a DB2 Database

On Windows 95 and NT, there is a command that can be issued in the command line processor to register the DB2 database with the ODBC driver manager as a data source. An administrator can create a command line processor script to register the required databases. This script is then run on all of the systems that require access to the DB2 databases through ODBC.

Configure the DB2 CLI/ODBC Driver Using CCA

The following is an optional procedure:

1. Select the DB2 database alias you want to configure.
2. Click **Properties**, the Database Properties dialog opens.
3. Click the **Settings** push button. The CLI/ODBC Settings dialog is displayed.
4. Click **Advanced**. Set the configuration keywords in the dialog that is displayed. These keywords are associated with the database alias name, and affect all DB2 CLI/ODBC applications that access the database.

Edit the db2cli.ini File

Add the following line to every database entry in your db2cli.ini file:

```
[DM_DB]
DBALIAS=DM_DB
UID=db2
PWD=db2
```

Access DB2 Data Using ODBC Applications

After you have correctly configured your system to use ODBC, you can access DB2 data using ODBC applications. Start the ODBC application and go to the Open dialog. Select the ODBC database file type. The DB2 databases that you added as ODBC data can be selected from the list. Many ODBC applications will open the table as read-only unless a unique index exists. To test an ODBC connection, see “Assign and Verify a Data Source” on page 13.

C

Troubleshooting

This section provides information that might help you to resolve problems that you may find when using the product. It is divided into the following sections:

If you require information about how to recover when data for one or more days has not been stored in the database, see "Problem Solving for Data Generation" on page 22.

Cube Building

The following is a list of problems that might occur when building the cubes, followed by suggestions for how to solve them:

- ***In the Tivoli Discovery Administrator the following message appears: Error building cube. If you click Details on the message dialog, the following message appears: Error 91 Error getting query parameters; object variable or with block variable not set.***

  The data sources have not been assigned to the cube queries. Assign the data sources to the queries.

  While using the Tivoli Discovery Interface, a Cognos PowerPlay report icon appears with the symbol (a circle bisected by a diagonal line), and you cannot open the report. What does this indicate?

  This symbol indicates that the cube is unavailable. Contact your Tivoli Decision Support administrator, and request that the cube be rebuilt.

- ***Why does the Tivoli Discovery Administrator report that a cube could not be built?***

  The cube you are attempting to rebuild is currently in use, and Tivoli Decision Support cannot overwrite this cube with the new cube data. Close all copies of the Tivoli Discovery Interface that are running. Copy the <CubeName>.mdc file from the Tds\Cubes\Temp directory to Tds\cubes directory (where Tds\ is the Tivoli Decision Support installation directory), replacing the existing cube.

  The queries returned insufficient data to build a cube. Verify your queries.

- ***You closed all the Tivoli Discovery Interface processes, and the cube still does not build.***

  A copy of Cognos PowerPlay may still be running in the background. This can also prevent cube builds from succeeding. Open the Task manager, and look for the process pplay.exe. If you find it, end the process, and rebuild the cube.

- ***Your cubes do not automatically build overnight.***

For scheduled cube builds to occur, the Cognos Scheduler must be running. Start Cognos Scheduler. Review the schedule definitions in Cognos Scheduler and the Tivoli Discovery Administrator. You may have to redefine the cube building schedule definitions if the following conditions exist:

- You have defines a cube building schedule
- One or more schedules cube builds was not executed because the Cognos Scheduler was not running.

■ ***How are relative dates calculated in a report?***

The Date Range parameter for a cube determines the time period that you want to examine. This parameter uses explicit values, a start date and end date, or a calculated value (for example, the last three months and the last six months). The calculated values are relative to the current date. The current period for a Tivoli Decision Support cube is set using one of the following methods:

- Use the Date Range parameter and the <CubeName>_dt.txt to set the current period as shown in the following table:

If the *Date Range* parameter is defined for a query using	**then the resulting date in the <CubeName>_dt.txt[1] is the**
Explicit Date Range	End Date
Calculated Values	Calculated End Date
No Date Range Parameter in the Cube	Date the Cube is Built
[1]where <cubename> is the name of the cube that is being built	

- If you want to use the date in the <CubeName>_dt.txt as the current period, then you must create a new query in the cube model. This query must use the <CubeName>_dt.txt as a local data file. Also, the Set the current period option must be set only for this query.
- Use the Date Range parameter, but do not use the <CubeName>_dt.txt. This selects only records between the specific start date and end date, and sets the current period to the most recent date in the data.
- Do not use either the Date Range parameter or the <CubeName>_dt.txt. This selects all the records, and sets the current period to the most recent date in the data.
- Use the <CubeName>_dt.txt, but do not use the Date Range parameter. This selects all the records, and sets the current period to the date of the current cube build.
- For more information on how to set the current period and select records, see the *Tivoli Decision SupportAdministrator Guide* document.

Report Problems

■ ***The following error message appears: load_graph_from_powercube.***

This indicates that the cube has not been built. Build the cube.

■ ***You tried to open a report, and the Tivoli Discovery Interface gets stuck at the wait cursor.***

The Tivoli Discovery Interface may have lost its connection to the Cognos PowerPlay task. Close the Tivoli Discovery Interface and PowerPlay. Restart the Tivoli Discovery Interface, and your reports should open.

- ***You opened a report, and it contained no data.***

  There may be data in the report, but there is no data in the drill down. The report may be filtered on a dimension. Look at the dimension bar and check if any of the values (especially the date dimension) are drilled down.

- ***The Crystal Reports do not have a left margin.***

  The type of printer attached to a workstation influences the alignment of crystal reports. Try disconnecting the printer and restarting Tivoli Decision Support.

- ***You cannot open a Crystal Report using the Discovery Interface.***

  You must build Server Performance Prediction cubes 2 to 5 before you can open the SPP Crystal Report *Subsystem Trend Information*.

Configuring the Shared Source File Path

If the Tivoli Discovery Administrator or the Tivoli Discovery Interface cannot locate your shared source files, use the procedure in this section to set the location of the shared source files. These files are stored on your (local) system or on the network.

If you installed Tivoli Decision Support using the standalone installation option, the default shared source file path is the file path to the Tivoli Decision Support installation directory on your system. For other installations, the source files usually reside on a network server. Contact your system administrator for the location of the Tivoli Decision Support shared source files.

Set the Shared Source Path

To set the shared source file path:

1. From the **View** menu, select Options.

   The Options dialog is displayed.

2. On the **General** page, in the Network box, type the file path to the following Tivoli Decision Support folders:
   - Cubes
   - Data
   - Reports

3. Click **OK**.

D

Software Defects, Limitations, and Workarounds

Defects

The following is a list of some of the more important software defects. Workarounds are provided when applicable.

- The automatic updating of the SPP Configuration database cannot take place from endpoints where the endpoint label is different from the endpoint hostname. This is a known defect of the product.; in that the **ReadDataInDB** job creates data files in a directory structure using the hostname, but the **NewDataIntegration** job looks for those files in a directory structure using the endpoint label.

  Workaround:

  Modify the **ReadDataInDB** job to change the name of the hostname directory after it has created the data files, following these steps:

  1. Edit the script that is used by the job:

     ```
     $BINDIR/TME/Tmw2k/TDS/spr/inv_read_data.sh
     ```

  2. Locate the following lines towards the end of the script:

     ```
     ...
     "$EXE_DIR_DMQUERY/dmquery" $pr_name $resource_model_name
     "$PERLPATH/perl" -S "$EXE_DIR/copy_log_at_ep.pl"
     ...
     ```

  3. Add the following lines between them:

     ```
     new_name=`echo $ENDPOINT | cut -d" " -f1`
     mv "/tmp/$machine_name" "/tmp/$new_name"
     ```

  4. Close and save the script.

  5. Redefine the task, as follows:

     a. From the Tivoli desktop, double-click ***hostname* _SPR_Region**, where *hostname* is the host name of your machine. The Policy Region dialog is displayed.

     b. Double-click **SPR_TaskLib**. The Task Library dialog is displayed.

     c. Right-click the **DMAE_ReadDataInDB** task and select **Edit Task**. The Edit Task dialog is displayed.

     d. Determine which of the Supported Platforms apply to your endpoints.

     e. For each supported platform, follow these steps:

        1) Deselect the radio button and then reselect it.

        2) In the displayed panel enter the following:

On Host:
The hostname of the Tivoli management region server

Path to File:
The following pathname:

```
$BINDIR/TME/Tmw2k/TDS/spr/inv_read_data.sh
```

3) Click **Set and Close**.

f. When you have redefined the task for all platforms, click **Change and Close** in the Edit Task dialog.

With this change, for every endpoint in the Tivoli region, whether or not the endpoint label and the hostname are the same, the hostname in the directory structure will be changed to the endpoint label, allowing the other tasks to run correctly.

- Auto rerank does not work when using the view *Busiest Systems* under the topic *How is my overall performance?*

  Workaround:

  Use the following procedure to after you drill down into this view to rerank the view. From the View menu, point to Powerbars, and click File. Click the Rank icon in the File Power bar. In the Rank dialog, select the Bar option and click **OK**.

- The *By System Purpose* dimension can contain invalid data when the *System Purpose* parameter in cube 3 does not contain a list of all the valid hostnames and the values that identify the system purpose.

- The view *Systems That Need More Memory* under the topic *How might I improve the performance of my systems?* is dependent on information taken from the *computer_system_memory* and the *computer_system* tables in Inventory database. If this data is incomplete, the reports may not display properly.

Limitations

The following is a list of known software limitations. Workarounds are provided when applicable.

- To optimize the cube building process, ensure that the DM_METRICS table in the TDS Configuration database is adequately sized and does not have unwanted data. To remove unwanted data see “Purging the Database” on page 21.

- Measures on simple bar graphs appear twice centered on the graph and over the Y-axis. On low resolution monitors, the measure names may overlap.

  Workaround:

  The recommended minimum resolution for your monitor is 800 x 600 pixels.

Printed in the United States of America
on recycled paper containing 10%
recovered post-consumer fiber.

GI11-0859-00