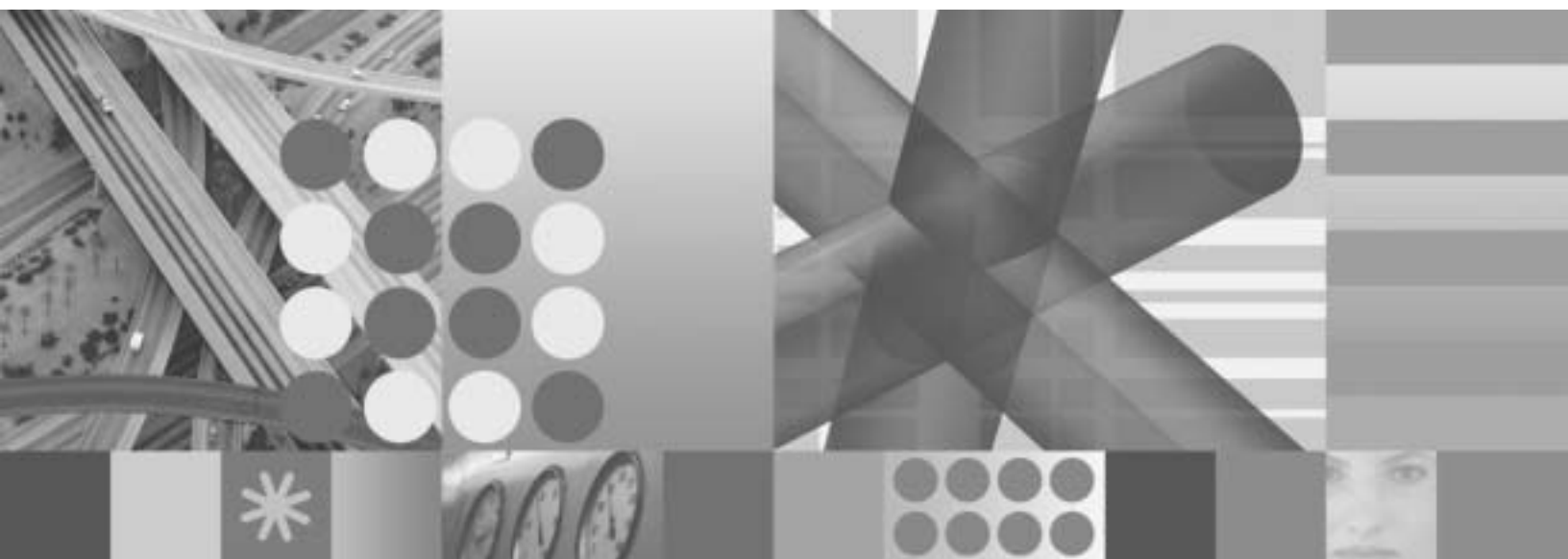


Version 4.3.1



Guide for Microsoft Active Directory Integration



Guide for Microsoft Active Directory Integration

Note

Before using this information and the product it integrates, read the information in “Notices” on page 53.

This edition applies to version 4 release 3 modification level 1 of IBM Tivoli Configuration Manager (program number 5724-C06) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Contents

| | | | |
|--|-----------|---|-----------|
| Preface | v | Scheduling replications | 24 |
| Who should read this guide | v | Defining dynamic replication | 24 |
| What this guide contains | v | Notifying the administrator | 25 |
| Publications | vi | Chapter 5. Running replications | 27 |
| IBM Tivoli Configuration Manager library | vi | Replicating from Microsoft Active Directory | 27 |
| Related publications | vii | Replicating from Tivoli endpoint manager | 27 |
| Accessing publications online | vii | Chapter 6. Query Directory for | |
| Ordering publications | viii | Microsoft Active Directory command | |
| Tivoli technical training | viii | line | 29 |
| Support information | viii | wadquerydc | 29 |
| Conventions used in this guide | viii | wadquerycfg | 30 |
| Typeface conventions | viii | wadqueryrep | 34 |
| Operating system-dependent variables and paths | ix | Chapter 7. Suggested configurations | 37 |
| Chapter 1. Introducing Microsoft Active | | Simple environment | 37 |
| Directory in your Tivoli environment | 1 | Complex environment | 37 |
| Advantages of Microsoft Active Directory integration | 1 | Chapter 8. Microsoft Active Directory | |
| New components | 1 | integration scenario | 39 |
| A roadmap to implementing the Active Directory | | Chapter 9. Database schema | 41 |
| integration | 2 | Chapter 10. Troubleshooting | 45 |
| Chapter 2. Planning and installing your | | Logs and traces | 45 |
| environment | 3 | Problem determination | 46 |
| Software requirements | 4 | Chapter 11. Uninstalling Microsoft | |
| Installing Microsoft Active Directory integration | | Active Directory integration | |
| components | 4 | components | 47 |
| Installing the Query Directory for Microsoft Active | | Appendix. Support information | 49 |
| Directory component | 5 | Searching knowledge bases | 49 |
| Installing the Query Directory for Microsoft Active | | Searching the information center | 49 |
| Directory Command Line component | 8 | Searching the Internet | 49 |
| Chapter 3. Working with repositories | | Obtaining fixes | 49 |
| and queries | 11 | Receiving weekly support updates | 50 |
| Running the admin script | 11 | Contacting IBM Software Support | 50 |
| Creating DB2 tablespaces | 12 | Determining the business impact | 51 |
| Creating Informix tablespaces | 13 | Describing problems and gathering information | 52 |
| Creating Microsoft SQL Server tablespaces | 14 | Submitting problems | 52 |
| Creating Oracle tablespaces | 15 | Notices | 53 |
| Creating Sybase tablespaces | 16 | Trademarks | 55 |
| Running the schema scripts | 17 | Index | 57 |
| Installing DB2 schemas | 17 | | |
| Installing Informix schemas | 17 | | |
| Installing Microsoft SQL Server schemas | 18 | | |
| Installing Oracle schemas | 18 | | |
| Installing Sybase schemas | 19 | | |
| Creating the query library | 20 | | |
| Predefined queries | 20 | | |
| Chapter 4. Configuring the replication | | | |
| settings | 23 | | |
| Defining Microsoft Active Directory domain | | | |
| controllers | 23 | | |

Preface

The purpose of this guide is to describe how you can integrate the Microsoft® Active Directory environment with the Tivoli® environment, taking advantage of the functions provided by IBM® Tivoli Configuration Manager version 4.3.1.

This guide explains how to install and configure the environment and how to integrate the Active Directory.

Who should read this guide

This guide is intended for IT specialists and administrators who want to integrate the Microsoft Active Directory environment with the Tivoli environment, using IBM Tivoli Configuration Manager, version 4.3.1.

Readers should be familiar with the following topics:

- Windows® operating systems
- Tivoli environment
- IBM Tivoli Configuration Manager environment
- Supported database architectures and concepts

What this guide contains

This guide contains the following chapters:

- *Chapter 1. Introducing Microsoft Active Directory in your Tivoli environment*
Provides an introduction to the Microsoft Active Directory integration.
- *Chapter 2. Planning and installing your environment*
Describes how to plan and install the Active Directory integration components.
- *Chapter 3. Working with repositories and queries*
Describes configuration tasks to be performed after installation.
- *Chapter 4. Configuring the replication settings*
Describes how to configure the replication settings.
- *Chapter 5. Running replications*
Describes how to run replications.
- *Chapter 6. Query Directory for Microsoft Active Directory command line*
Describes the syntax and arguments for the command line, together with examples.
- *Chapter 7. Suggested configurations*
Gives some suggestions on how to configure your environment.
- *Chapter 8. Microsoft Active Directory integration scenario*
Describes how you can implement a Microsoft Active Directory integration scenario.
- *Chapter 9. Database schema*
Describes the Active Directory integration tables, views, and queries.
- *Chapter 10. Troubleshooting*
Describes how to manage logs and traces in the Active Directory integration and how to perform problem determination.

- *Chapter 11. Uninstalling Active Directory integration components*
Describes how to uninstall the Active Directory integration components.

Publications

This section lists publications in the IBM Tivoli Configuration Manager library and related documents. It also describes how to access Tivoli publications online and how to order Tivoli publications.

IBM Tivoli Configuration Manager library

The following documents are available in the IBM Tivoli Configuration Manager library:

- *Release Notes*, GI11-0926
Contains the latest information about this release of IBM Tivoli Configuration Manager, including installation and upgrade notes; software limitations, problems, and workarounds; documentation notes; and internationalization notes.
- *Introducing IBM Tivoli Configuration Manager*, GC23-4703
Explains the concepts of IBM Tivoli Configuration Manager and its components and provides a road map to the IBM Tivoli Configuration Manager documentation.
- *User's Guide for Software Distribution*, SC23-4711
Explains the concepts and procedures necessary to effectively distribute software over networks using the Software Distribution component of IBM Tivoli Configuration Manager.
- *Reference Manual for Software Distribution*, SC23-4712
Provides in-depth information about the IBM Tivoli Configuration Manager commands used by the Software Distribution component and explains advanced features, concepts, and procedures necessary to effectively use the Software Distribution component.
- *User's Guide for Inventory*, SC23-4713
Explains the concepts and procedures necessary to effectively use the Inventory component of IBM Tivoli Configuration Manager and provides in-depth information about the commands used by the Inventory component.
- *Messages and Codes*, SC23-4706
Provides details of the messages generated by the IBM Tivoli Configuration Manager components.

- *Inventory Online Help*
Provides related information about using the Inventory graphical user interface (GUI).
- *Database Schema Reference, SC23-4783*
Describes the IBM Tivoli Configuration Manager database tables.
- *User's Guide for Deployment Services, SC23-4710*
Describes the common support and management tasks provided by Deployment Services for Software Distribution and Inventory.
- *Patch Management User's Guide, SC23-5263*
Describes how you can implement an automated patch management solution in a Windows environment.
- *License Management Extension, SC32-2260*
Describes the license management facilities provided in your Configuration Manager environment.
- *User's Guide for Operating System Deployment Solution, SC32-2578*
Describes how you can implement an operating system deployment solution in your Tivoli environment.

Related publications

The following documents also provide useful information:

- *Tivoli Management Framework: Planning for Deployment Guide, GC32-0803*
Explains how to plan for deploying your Tivoli environment. It also describes Tivoli Management Framework and its services.
- *Tivoli Management Framework: Reference Manual, GC32-0806*
Provides in-depth information about Tivoli Management Framework commands. This manual is helpful when writing scripts that are later run as Tivoli tasks. This manual also documents default and validation policy scripts used by Tivoli Management Framework.
- *Tivoli Management Framework User's Guide, GC32-0805.*
Describes the concepts and procedures for using Tivoli Management Framework services.

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

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

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

Accessing publications online

The product CD contains the publications that are in the product library. The format of the publications is PDF, HTML, or both. To access the publications using a Web browser, open the `infocenter.html` file. The file is in the appropriate publications directory on the product CD.

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

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

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

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

Ordering publications

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

<http://www.elink.ibm.link.ibm.com/public/applications/publications/cgibin/pbi.cgi>

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

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

In other countries, contact your software account representative to order Tivoli publications.

Tivoli technical training

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

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

Support information

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

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

For more information about these three ways of resolving problems, see “Support information,” on page 49.

Conventions used in this guide

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

Typeface conventions

This guide uses the following typeface conventions:

Bold

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

Italic

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

Monospace

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

Operating system-dependent variables and paths

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

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

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

Chapter 1. Introducing Microsoft Active Directory in your Tivoli environment

This chapter provides an introduction to the integration of Microsoft Active Directory with your Tivoli environment.

Microsoft Active Directory is a directory service that provides a central repository for information about computers, users, and network resources in an organization and makes this information easy for the administrators to create, find, and use.

A new Tivoli Configuration Manager component, Query Directory for Microsoft Active Directory, provides the capability of merging Microsoft Active Directory and Tivoli endpoint information into a relational database, the Query Directory repository.

Advantages of Microsoft Active Directory integration

This section describes the advantages of the Active Directory integration.

With this new feature you can replicate data from Microsoft Active Directory and Tivoli endpoint managers to a relational database in one of the following ways:

- Manually submitting replications
- Scheduling replications
- Setting dynamic replications

Using the data replicated to the relational database, Tivoli applications and Administrators can:

- Discover Computers in Active Directory not having an endpoint installed.
- Discover machines with endpoints not having any associated Computer in Active Directory.
- Query for Active Directory Users, Computers, Organizational Units, Groups, or retrieve the list of associated endpoints for distribution.

New components

This section describes the new components of the Microsoft Active Directory integration.

Two elements of the main Tivoli Configuration Manager infrastructure are installed for the Microsoft Active Directory integration implementation.

Query Directory for Microsoft Active Directory

A Query Directory for Microsoft Active Directory component must be deployed on a Windows managed node. This component provides the following facilities:

- An engine that replicates the Microsoft Active Directory and Tivoli endpoint manager information into a relational database.
- A command line you use to perform Microsoft Active Directory integration commands.

Query Directory for Microsoft Active Directory - Command line

The Query Directory for Microsoft Active Directory - Command line

component runs on Windows and UNIX platforms. This command-line interface is also contained in the Query Directory for Microsoft Active Directory component. You use it to perform the following tasks:

- Define domain controllers
- Set replications parameters
- Run replications

A roadmap to implementing the Active Directory integration

This section provides a roadmap to implementing the Active Directory integration.

Table 1 outlines the sequence of steps necessary to get the Microsoft Active Directory integration up and running.

Table 1. Roadmap

| Step | Task | Refer to... |
|------|--|--|
| 1 | Install IBM Tivoli Management Framework, version 4.3.1 | <i>Tivoli Enterprise Installation Guide</i> |
| 2 | Install IBM Tivoli Configuration Manager, version 4.3.1 (optional) | <i>Tivoli Configuration Manager Planning and Installation Guide</i> |
| 3 | Plan where to install the components | Chapter 2, "Planning and installing your environment," on page 3 |
| 4 | Install the Query Directory for Microsoft Active Directory component | "Installing the Query Directory for Microsoft Active Directory component" on page 5 |
| 5 | Install the Query Directory for Microsoft Active Directory Command Line component (optional) | "Installing the Query Directory for Microsoft Active Directory Command Line component" on page 8 |
| 6 | Configure the Tivoli environment | Chapter 3, "Working with repositories and queries," on page 11 |
| 7 | Configure the replication settings | Chapter 4, "Configuring the replication settings," on page 23 |
| 8 | Replicate from Active Directory | "Replicating from Microsoft Active Directory" on page 27 |
| 9 | Replicate from endpoint manager | "Replicating from Tivoli endpoint manager" on page 27 |
| 10 | Run a distribution using defined queries (optional) | |

Chapter 2. Planning and installing your environment

This chapter describes some basic considerations you need to make about your environment before starting the installation and configuration of the Query Directory for Microsoft Active Directory component.

Before you begin

To integrate the Microsoft Active Directory environment with your Tivoli environment you need to install new components as described in Table 2:

Table 2. Resources

| Components | Resource |
|--|--------------------------------------|
| Query Directory for Microsoft Active Directory | Tivoli server Tivoli managed node |
| Query Directory for Microsoft Active Directory - Command line (optional) | Tivoli server Tivoli managed node |

With the addition of the Query Directory for Microsoft Active Directory to the Tivoli environment, the network topology is extended as follows:

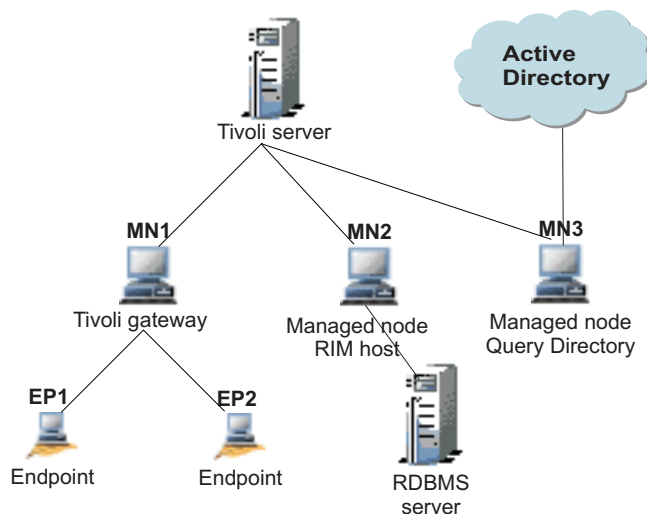


Figure 1. Network topology

Table 3. Resources used by IBM Tivoli Configuration Manager and their required software by system

| Label | Resources | Installed Software | Comments |
|---------------|-----------------------|---|--|
| Tivoli server | Tivoli server | <ul style="list-style-type: none">Tivoli Management Framework | |
| MN1 | Tivoli gateway | <ul style="list-style-type: none">Tivoli Management Framework | Run the wcrtgate command or use the Tivoli desktop to create the gateway. |
| MN2 | Managed node RIM host | <ul style="list-style-type: none">Tivoli Management FrameworkRDBMS client software | This managed node is the RIM host for the Microsoft Active Directory RIM object. |

Table 3. Resources used by IBM Tivoli Configuration Manager and their required software by system (continued)

| Label | Resources | Installed Software | Comments |
|-------|--------------|---|--|
| MN3 | Managed node | <ul style="list-style-type: none"> • Tivoli Management Framework • Query Directory for Microsoft Active Directory | This managed node is the Windows workstation that replicates data from Active Directory and Tivoli endpoint managers to a relational database. The installation of this software creates the RIM object. |
| EP1 | Endpoint | <ul style="list-style-type: none"> • Tivoli endpoint • Database client | |
| EP2 | Endpoint | <ul style="list-style-type: none"> • Tivoli endpoint • Database client | |

Software requirements

This section describes the software requirements.

The software required to integrate Microsoft Active Directory with Tivoli environment is:

- Windows on the managed node where you want to install the Query Directory for Microsoft Active Directory component.
- Windows or UNIX on the workstation where you want to install the Query Directory for Microsoft Active Directory - Command line component.
- Tivoli Management Framework 4.3.1 on the Tivoli server and Tivoli gateway.
- Windows 2000 Server with Service Pack 4 or Windows Server 2003 on the workstation where to run Microsoft Active Directory.

Installing Microsoft Active Directory integration components

This section describes the main steps to install the components for integrating Microsoft Active Directory environment with Tivoli environment.

Before you begin

About this task

To install the Microsoft Active Directory integration components, perform the following steps:

1. Install Tivoli Management Framework. Refer to *Tivoli Enterprise Installation Guide*.
2. Install the Query Directory for Microsoft Active Directory component on a managed node. For details see “Installing the Query Directory for Microsoft Active Directory component” on page 5.
3. Optionally install the Query Directory for Microsoft Active Directory - Command Line component on the Tivoli server and on the managed nodes from where you want to manage the Active Directory integration. For details see “Installing the Query Directory for Microsoft Active Directory Command Line component” on page 8.

Installing the Query Directory for Microsoft Active Directory component

This section describes the methods you can use to install the Query Directory for Microsoft Active Directory component.

About this task

The Query Directory for Microsoft Active Directory component can be installed using the following methods:

- “Tivoli desktop installation”
- “Tivoli command line installation” on page 6

Tivoli desktop installation

This section describes how to install the Query Directory for Microsoft Active Directory component using the Tivoli desktop.

Before you begin

About this task

The basic procedure for using the Tivoli desktop to install the Query Directory for Microsoft Active Directory component is as follows:

1. From the Tivoli desktop, select **Install** -> **Install Product** from the **Desktop** menu.
2. From the Install Product window, click **Select Media**, and the File Browser window opens.
3. In the File Browser window, browse to the Query Directory for Microsoft Active Directory Images directory and click **Set Path**.
4. Click **Set Media & Close**.
5. From the Install Product window, select **Query Directory for Microsoft Active Directory** and the managed node you are installing on.
6. The Install Options dialog opens.



Define the database data and click **Set** and then **Close**. For details on the installation options, see Table 4 on page 7.

7. Click **Install & Close**.

Tivoli command line installation

This section describes how to install the Query Directory for Microsoft Active Directory component using the command line.

Before you begin

To install this component from the Tivoli command line, launch the following command:

```
winstall -c source-dir -i ADIENG.IND installation_options managed_node
```

where:

-c source-dir

Specifies the complete path to the directory containing the installation image.

-i ADIENG.IND

Specifies the product index file from which the product is installed. Index files have an IND extension.

installation_options

Specifies component-specific keyword=value pairs. For details, see Table 4 on page 7.

managed_node

Specifies the managed nodes on which to install this component.

Table 4. Installation Options for the Query Directory for Microsoft Active Directory Component

| | Field Name | CLI Option |
|---|---|----------------------|
| | Description | |
| • | ADIEngine RIM Name | @RIM_NAME@ |
| | Specifies the name of the ADIEngine RIM | |
| • | Database Vendor | @RDBMS_Vendor@ |
| | <p>Specifies the vendor name of the RDBMS that you are using for the Query Directory repository.</p> <ul style="list-style-type: none"> • For DB2®, use DB2®. • For Informix®, use Informix®. • For Microsoft® SQL Server, use MS_SQL. • For Oracle, use Oracle. • For Sybase, use Sybase. | |
| • | RIM Host | @RDBMS_Host@ |
| | <p>Specifies the name of the managed node that you have configured to be the RIM host of the Tivoli region. If you want the Tivoli server to be the RIM host, you can use the default entry, ALI_host.</p> | |
| • | Database ID | @RDBMS_DB_Name@ |
| | <p>Specifies the name of the Query Directory repository in the RDBMS.</p> <ul style="list-style-type: none"> • For DB2, use the name of the DB2 server created for Query Directory. If you created a remote client that uses an alias, use the alias name. • For Informix, use the name of the ODBC created for Query Directory. If you created a remote client that uses an alias, use the alias name. • For Microsoft SQL Server, use the default value ADIdb. If you create the database without using any of the supplied scripts, you can use any name for the repository. • For Oracle, use the value of the ORACLE_SID variable. This value is the Oracle instance ID and is located in the tnsnames.ora file in the \$ORACLE_HOME/network/admin directory. The default value that is set during the installation is orcl. • For Sybase, use the default value ADIdb. If you create the database without using any of the supplied scripts, you can use any name for the repository. | |
| • | Server ID | @RDBMS_DB_Param_one@ |
| | <p>Specifies the vendor-specific information that enables the RDBMS to connect to the RIM host.</p> <ul style="list-style-type: none"> • For DB2, use tcPIP. • For Informix, use the value of the INFORMIXDIR variable. • For Microsoft SQL Server, use the host name of the machine where Microsoft SQL Server is installed. • For Oracle, use orcl. • For Sybase, use the value of the DSQUERY variable in the interfaces file. | |
| • | DB_UserName | @RDBMS_DB_UserName@ |
| | Specifies the name of the owner of the Query Directory repository. | |
| • | DB_UserPassword | @RDBMS_DB_Password@ |
| | Specifies the password for the provided user. | |

Table 4. Installation Options for the Query Directory for Microsoft Active Directory Component (continued)

| | Field Name | CLI Option |
|---|---|----------------------|
| | Description | |
| • | Database Home | @RDBMS_DB_Home@ |
| | <p>Specifies the path to the directory where the RDBMS server or client software is installed on the RIM host.</p> <ul style="list-style-type: none"> • For DB2, use the value of the DB2DIR variable. • For Informix, use the value of the INFORMIXDIR variable on a UNIX RIM host, or use the path to the RDBMS server or client software on a Windows RIM host. • For Microsoft SQL Server, use the path to the RDBMS server or client software. • For Oracle, use the value of the ORACLE_HOME variable. • For Sybase, use the value of the SYBASE variable. If the RIM host is on a different machine than the RDBMS server, the value of SYBASE is the directory on the RIM host where the interfaces file is located. | |
| • | Instance Name (DB2 Only) | @RDBMS_DB_Param_two@ |
| | Specifies the name of the DB2 instance. | |

Installing the Query Directory for Microsoft Active Directory Command Line component

This section describes the methods you can use to install the Query Directory for Microsoft Active Directory Command Line component.

Before you begin

About this task

The Query Directory for Microsoft Active Directory Command Line component can be installed using the following methods:

- Tivoli desktop
- Tivoli command line

Tivoli desktop installation

This section describes how to install the Query Directory for Microsoft Active Directory Command Line component using the Tivoli desktop.

Before you begin

About this task

The basic procedure for using the Tivoli desktop to install the Command line component is as follows:

1. From the Tivoli desktop, select **Install -> Install Product** from the **Desktop** menu.
2. From the Install Product window, click **Select Media**, and the File Browser window opens.
3. In the File Browser window, browse to the Query Directory for Microsoft Active Directory Command Line Images directory and click **Set Path**.

4. Click **Set Media & Close**.
5. From the Install Product window, select **Query Directory for Microsoft Active Directory Command Line** and the managed node you are installing on.
6. Click **Install & Close**.

Tivoli command line installation

This section describes the Tivoli command line installation of the Query Directory for Microsoft Active Directory Command Line component.

Before you begin

To install the Query Directory for Microsoft Active Directory Command Line component from the Tivoli command line, launch the following command:

```
winstall -c source-dir -i ADICLI.IND managed_node
```

where:

-c *source-dir*

Specifies the complete path to the directory containing the installation image.

-i ADICLI.IND

Specifies the product index file from which the product is installed. Index files have an IND extension.

managed_node

Specifies the managed nodes on which to install this component. You can specify multiple managed nodes.

Chapter 3. Working with repositories and queries

This chapter describes how to create a repository to store data in an RDBMS.

To create a repository, you run admin and schema scripts. The applications communicate with the RDBMS through RIM objects.

Depending on your installation approach and your RDBMS choice, you might need to manually create the database (the tablespaces and views) in the RDBMS. You can create the database before or after creating the RIM objects. If the requirements for the admin script are fulfilled, you create the database using the installation program to install the Query Directory for Microsoft Active Directory component.

You must complete the following additional RDBMS configuration steps, depending on your configuration:

- “Creating DB2 tablespaces” on page 12, which discusses requirements for databases, users, and passwords
- “Creating Informix tablespaces” on page 13, which discusses requirements for databases, users, and passwords
- “Creating Microsoft SQL Server tablespaces” on page 14, which discusses directory and file space requirements.
- “Creating Oracle tablespaces” on page 15, which discusses database requirements.
- “Creating Sybase tablespaces” on page 16, which discusses directory, file space, and device requirements.

The procedure and requirements for creating databases for each supported RDBMS are described in the *Tivoli Enterprise Installation Guide*. For a list of the supported RDBMS vendors, see the *Tivoli Management Framework Release Notes*.

Running the admin script

This section describes the admin scripts.

When you run the admin script, it creates the container for all the logical objects (users, views, and so on) and creates the tablespace that stores all the physical data in the tables. The admin scripts used by Query Directory for Microsoft Active Directory are located in the \$BINDIR/TME/ADI/SCRIPTS directory.

The names of the admin scripts have the following format:

`adi_vendor_admin.sql`

where:

vendor

One of the following abbreviations for supported RDBMS vendors:

db2 IBM DB2

db2_mvs
IBM MVS™ DB2

infx Informix

ms_sql Microsoft SQL Server

ora Oracle

syb Sybase

Table 5 contains the databases and tablespaces created by running the individual admin scripts. You can run the `adi_vendor_admin.sql` script to create all the databases and tablespaces in a single database or modify this script to create only a subset of the databases and tablespaces.

Table 5. The database and tablespace created by running the admin scripts

| Component | Database name | Tablespace name | Tablespace size | Log file size ¹ | User name | Password |
|--|---------------|-----------------|-----------------|----------------------------|-----------|----------|
| Active Directory | ad_db | ad_ts | 1408 MB | 128 MB | adi_user | tivoli |
| ¹ For an Oracle database the log file size is the system default size instead of the size listed in the table. An Oracle database allocates sufficient system log space when the CREATE DATABASE command is run. The provided admin scripts do not create any additional log space. | | | | | | |

The `adi_vendor_admin.sql` script, without modification, creates all the tablespaces shown in Table 5, creates a single log file of 128 MB, and creates all the users in the `adi_db` database. Each RDBMS provides utilities to move tables to different tablespaces after they are created. If you want to move tables to different tablespaces, see the vendor documentation.

The log files are created at 12.5% of the size of the database. The recommendation of database vendors is that the log files should be from 10% to 25% of the database size. If necessary, the DBA can allocate additional log space after installation.

Creating DB2 tablespaces

This section describes how to create the DB2 tablespaces using the DB2 admin scripts.

Requirement: The **db2** admin scripts do not create the default database. You must use the CREATE DATABASE command to create the database before running the admin script.

The **db2** admin scripts create the tablespace and allocate the log space. The admin scripts do not create or catalog the databases. The size of the DB2 log file is measured in 4 KB pages. Therefore, 4 MB of log space would be as follows:

$$4 \text{ MB} * 1024 \text{ KB/MB} * 4 \text{ KB/page} = 1024 \text{ pages}$$

Requirement:

In DB2 databases, users are operating system users. The provided admin scripts do not create the required users. Admin scripts must be run by a user with DB2 administration privileges. The `db2` users with the passwords listed in Table 5, must exist on the local system. The default values are shown in the table. You can change these values before you start the installation. If the `db2` users listed do not exist before the installation, the provided installation program will not fully complete.

Additionally, these users must be either:

- Previously defined on the system running the DB2 server as an authorized user (using the user management tool)
- Added as the user on the GRANT statement in the admin script.

If you did not run the admin scripts during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_db2_admin.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:

If DB2 is installed on a z/OS® host, you must copy `adi_db2_mvs_admin.sql` script, located in the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:

2. Connect to the RDBMS server:

```
db2 connect to database user name using password
```

where *database* is the name or alias of the database in the system database directory, *name* is the user name of the instance owner of the database, and *password* is the password associated with the user.

3. Run the database admin script to create the database, to write output to the screen, and to write the output to the associated log files:

```
db2 -f adi_db2_mvs_admin.sql -o -t -z log_name.log
```

where *log_name* is the name of the log file.

Creating Informix tablespaces

This section describes how to create the tablespaces using the **Informix** admin script.

Note: The InstallShield wizard does not support the running of admin and schema scripts for Informix.

The Informix admin script creates the:

- Database for the component
- User to access the database

For more details about creating databases and database users, see the Informix documentation.

Requirement:

In Informix databases, users are operating system users. The provided admin scripts do not create the required users. The admin scripts must be run by a user with Informix administration privileges. The default users with the default passwords, as listed in Table 5 on page 12, must exist on the local system exactly as listed or installation using the provided installation program will not fully complete.

Complete the following steps, either before or after the installation:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_infx_admin.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:

2. Run the database admin script to create the database, to write output to the screen, and to write the output to the associated log files:

```
dbaccess - adi_infx_admin.sql
```

To complete database configuration, continue with “Installing Informix schemas” on page 17.

Creating Microsoft SQL Server tablespaces

This section describes how to create the tablespaces using the Microsoft SQL Server admin script.

Requirement: Before running the **ms_sql** admin script, ensure that the directory where the database is to be created already exists and that it has sufficient space. You can edit the admin script by changing the default directory to an existing directory with sufficient space in the database.

The **ms_sql** admin script creates files for the *db_name.mdf* database object, the *adi_ts.ndf* file group, and the *adi_log.ldf* log file. These files are created in the default data directory (c:\Program Files\Microsoft SQL Server\MSSQL\data). The admin script creates the database and default users.

The database automatically grows when space is needed and available. The admin script must be run by the sa user.

If you did not run the admin script during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy the following files from the /ADI/SCRIPTS directory to a temporary directory on the RIM host:
 - *adi_ms_sql_admin.sql*
2. From the temporary directory on the RIM host, run the admin script and log the output:

```
isql -U sa -P password -S server_name -i adi_ms_sql_admin.sql -o log_name.log
```

where *password* is the password for the sa user, *server_name* is the name of the MSSQL server, and *log_name* is the name of the log file.

RIM objects now use ODBC to connect to the RDBMS server, therefore a System Data Source Name (ODBC connection) must be created, as follows:

1. Click **Start** → **Settings** → **Control Panel**
2. Double-click on **Data Sources (ODBC)**. In Windows 2000, double-click **Administrative Tools** then **Data Sources (ODBC)**
3. Select the **System DSN** tab, then click **Add**.
4. Scroll down to select SQL Server.
5. Click **Finish**. The Create a New Data Source to SQL Server dialog is displayed.
6. Type in the name of the database in the **Name** field and select the server from the **Server** pull-down menu.
7. Click **Next**. Select the "With SQL Server authentication using a login ID and password entered by the user" radio button. Deselect the "Connect to SQL Server to obtain default settings for the additional configuration options" checkbox.
8. Click **Next**. Do not change any of the default database settings.
9. Click **Next**. Do not change any of the default language settings.

10. Click **Finish**. The ODBC Microsoft SQL Server Setup window is displayed showing the configuration you created.
11. Click **OK**. The Create a New Data Source to SQL Server dialog is redisplayed. It contains the new data source you created.

Note: Before using the InstallShield wizard to install IBM Tivoli Configuration Manager, configure the ODBC driver.

Creating Oracle tablespaces

This section describes how to create the tablespaces using the Oracle admin script.

Note: Oracle instant client is not supported when performing an installation using the InstallShield wizard. Oracle instant client cannot be used to run database sql scripts against the database; it can only be used to establish a RIM connection with the database.

Requirement: The **ora** admin scripts do not create the default databases. Oracle databases are created using environment variables and initialization files. The admin scripts cannot discover the values for these settings. Therefore, you must create the databases, using the CREATE DATABASE command, with the appropriate name before running the admin scripts.

The **ora** admin script uses the Oracle defaults to create the needed tablespaces and users, but not the default databases. The admin script creates the **adi_ts.dbf** data files in the default Oracle directories. Note that these directories vary depending on the operating system.

The admin script must be run by the sys user.

If you did not run the admin scripts during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy the following files from the /ADI/SCRIPTS directory to a temporary directory on the computer system where the Oracle client is installed:

- **adi_ora_admin.sql**

2. The sys user must log in as **sysdba**. Therefore the admin script is run as follows:

```
sqlplus "sys/sys_password@server as sysdba" @adi_ora_admin.sql
```

where:

sys_password

The password for the sys user.

server The name of the Oracle server

You must include the quotation marks (").

Note: For Oracle 8.x, the password for the sys user cannot be the Oracle default password. If you use the default password, you will receive an unrelated error.

If you did not run the admin script during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_oracle_admin.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the computer system where the Oracle client is installed:

2. From this directory, start a SQL*Plus session:

```
sqlplus sys/password
```

where *password* is the RDBMS password set for the RDBMS user `sys`.

3. From the temporary directory on the RIM host, run the admin script and log the output:

```
isql -U sa -P password -i adi_oracle_admin.sql.sql -o log_name.log
```

where *password* is the password for the `sa` user, and *log_name* is the name of the log file.

4. Log out of the SQL*Plus session:

```
quit
```

Creating Sybase tablespaces

This section describes how to create the tablespaces using the Sybase admin script.

The Sybase admin script creates the required tablespaces.

Requirement: Before running the **syb** admin scripts, ensure that the directory where the database is to be created already exists and that it has sufficient space. You can edit the admin script by changing the default directory to an existing directory with sufficient space in the database.

The **syb** admin script creates devices where the tablespaces, database, and users are created. In Sybase, the devices are numbered. The admin script uses two devices. The admin script reads the last number used and increments it by one. By default, there are 10 available devices, so ensure that there are enough available devices for use by the admin scripts.

Device sizes are specified in 2 kilobyte (KB) pages, so a device of 128 megabytes (MB) is calculated as follows:

$$128 \text{ MB} * 1024 \text{ KB/MB} * 1 \text{ page/2 KB} = 65536 \text{ pages}$$

The tablespace files created are as follows:

- **adi_ts.dat**
- **adi_log.dat**

The default data directory depends on the operating system. The following is the default by operating system:

For Windows

`c:\sybase\data`

For UNIX

`/data/sybase`

This directory must exist on the database server before the creation of the database, or the directory is edited in the admin script to an existing directory with sufficient space.

The admin script also creates the database and default users.

The admin script must be run by the sa user.

If you did not run the admin script during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_syb_sql_admin.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:
2. From the temporary directory on the RIM host, run the admin script and log the output:

```
isql -U sa -P password -S server_name -i adi_syb_sql_admin.sql -o log_name.log
```

where *password* is the password for the sa user, *server_name* is the name of the Sybase server and *log_name* is the name of the log file.

Running the schema scripts

When you run the schema script, it creates the tables and views in the allocated tablespaces created by running the provided or modified admin script. For a new installation, the schema scripts are located on IBM Tivoli Configuration Manager Installation, Version 4.3.1 in the `/ADI/SCRIPTS` directory.

Installing DB2 schemas

Configuring the DB2 RDBMS consists of running a schema script that creates tables in the DB2 RDBMS. The schema scripts are as follows:

adi_db2_schema.sql

Installs the `adi_db` repository schema, which defines its tables and views.

adi_db2_mvs_schema.sql

Installs the `adi_db` repository schema, which defines its tables and views.

If you did not run the schema scripts during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy the following files from the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:
 - `adi_db2_schema.sql`
 - `adi_db2_mvs_schema.sql`

2. Connect to the RDBMS server:

```
db2 connect to database user name using password
```

where *database* is the name or alias of the database in the system database directory, *name* is the user name of the instance owner of the database, and *password* is the password associated with the user.

3. Run the database schema scripts to create the database and write output to the screen and to associated log files:

```
db2 -f script_name.sql -o -t -z log_name.log
```

where *script_name* is the name of the schema script and *log_name* is the name of the log file. Repeat this step for each schema script.

4. Test that the schema was installed.

Installing Informix schemas

Configuring the Informix RDBMS consists of running several schema scripts as well as creating the database and the database user.

The schema script for installing the adi repository is `adi_infx_schema.sql`. It installs the `adi_db` repository schema, which defines its tables and views.

After creating the repository in the Informix RDBMS, complete the following steps:

1. Verify that you have at least 20,000 locks in the `onconfig` file before running the schema script. This is the minimum number of required locks.
2. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_infx_schema.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the Informix server.
3. From the temporary directory on the Informix server, run the schema scripts:

```
dbaccess db@$informix_server adi_infx_schema.sql.sql >> log_name.log $2>$1
```

where *db* is the name of the repository, *informix_server* is the server instance, and *log_name* is the name of the log file.
4. Test that the schema was installed.

Installing Microsoft SQL Server schemas

Configuring the Microsoft SQL Server RDBMS consists of running the **`adi_ms_sql_schema.sql`** schema script that creates tables in the SQL Server RDBMS. It installs the `adi_db` repository schema, which defines its tables and views.

If you did not run the schema scripts during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_ms_sql_schema.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:
2. From the temporary directory on the RIM host, run the schema scripts and log the output:

```
isql -U name -P password -S server_name -i adi_ms_sql_schema.sql -o log_name.log
```

where *name* is the user created when the admin scripts were run, *password* is the password for the *name* user, *server_name* is the name of the MSSQL server, and *log_name* is the name of the log file.
3. Test that the schema was installed.
4. Log out of the isql session:

```
exit
```

Installing Oracle schemas

Configuring the Oracle RDBMS consists of running the **`adi_ora_schema.sql`** schema script that creates the required tables in the Oracle RDBMS. It installs the `adi_db` repository schema, which defines its tables and views.

Note: Oracle instant client is not supported when performing an installation using the InstallShield wizard. Oracle instant client cannot be used to run database sql scripts against the database; it can only be used to establish a RIM connection with the database.

Note: Oracle instant client is not supported when performing an installation using the InstallShield wizard.

If you did not run the schema scripts during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_ora_schema.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the computer system where the Oracle client is installed:
2. Run the schema script by completing the following steps:
 - a. From this directory, start a SQL*Plus session:


```
sqlplus invtiv/password
```

where *password* is the RDBMS password set for the RDBMS user invtiv.
 - b. Change the password for the user invtiv. Use the appropriate SQL*Plus command to change the password. Use the `wsetrimpw` command to notify the RIM object of this password change. For information about using SQL*Plus, see the Oracle documentation.
 - c. Specify which log file to write information:


```
spool adi_ora_schema.log
```
 - d. Run the script to install the tables and views:


```
@adi_ora_schema.sql
```

The script installs the tables and views. The success and failure of the SQL statements are written to the log.
 - e. Specify which log file to write information:


```
spool h_adi_ora_schema.log
```
 - f. Log out of the SQL*Plus session:


```
quit
```
3. Test that the schema was installed.

Installing Sybase schemas

Configuring the Sybase RDBMS consists of running the **`adi_syb_schema.sql`** schema script that creates the required tables in the Sybase RDBMS. It installs the repository schema, which defines its tables and views.

If you did not run the schema script during the installation, complete the following steps:

1. From the IBM Tivoli Configuration Manager Installation, Version 4.3.1, copy `adi_syb_schema.sql` from the `/ADI/SCRIPTS` directory to a temporary directory on the RIM host:
2. From the temporary directory on the RIM host, run the schema scripts and log the output:


```
isql -U name -P password -S server_name -i adi_syb_schema.sql -o log_name.log
```

where *name* is the user created when the admin scripts were run, *password* is the password for the *name* user, *server_name* is the name of the Sybase server, and *log_name* is the name of the log file.
3. Change the passwords for invtiv, planner, ccm, and mdstatus users. Use the appropriate `isql` command to change the user password for the database, and use the `wsetrimpw` command to change the passwords in the RIM object. These two passwords must be the same. For information about using `isql`, see the Sybase documentation.
4. Test that the schema was installed.
5. Log out of the `isql` session:


```
exit
```

Creating the query library

This section describes how to create the query library of the Query Directory for Microsoft Active Directory component.

About this task

To create the query library with its predefined queries, from the \$BINDIR/../../TME/ADI/SCRIPTS directory run the adi_query.sh script as follows:

```
./adi_query.sh policy_region [rim_name]  
[query_library]
```

where:

policy_region

Specifies the name of the policy region in which to create the query library.

rim_name

Specifies the label of the existing RIM object. This can be either the Tivoli name registry label (in the form @RIM:name) or the text label. To ensure that you always find the RIM object, precede rim_name with @ character.

query_library

Specifies the name of the new query library.

Results

The library is populated with the predefined queries described in “Predefined queries.”

Predefined queries

This section describes the set of predefined queries that are set up when you create the query library.

Table 6. Predefined queries

| Query | Description | Conditions |
|-----------------|---|--|
| COMPUTERS_IN_OU | Relates computers to their parent organizational units (OU). Computers are identified by DOMAIN, DN, and GUID. OUs are identified by DOMAIN and OU_DN. | A where clause can restrict the query to computers that belong to a specified OU and domain. For example: COMPUTERS_IN_OU where OU_DN='OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com' The example returns all computers that are part of the OU named OU=Parent,DC=emilio,DC=com in the domain named DC=emilio,DC=com |

Table 6. Predefined queries (continued)

| Query | Description | Conditions |
|--------------------|---|---|
| COMPUTERS_IN_GROUP | <p>Relates computers to the groups to which they belong.</p> <p>Computers are identified by DOMAIN, DN, and GUID. Groups are identified by DOMAIN and GROUP_DN.</p> | <p>A where clause can restrict the query to computers in a specified group and domain. For example:</p> <p>COMPUTERS_IN_GROUP where GROUP_DN='CN=GlobalDist,OU=Child111,OU=Child1,OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com'</p> <p>The example returns all computers that are part of the group named</p> <p>CN=GlobalDist,OU=Child111,OU=Child1,OU=Parent,DC=emilio,DC=com</p> <p>in the domain named DC=emilio,DC=com</p> |
| COMP_NOT_TMA | <p>Returns any computers that do not have the Tivoli endpoint installed.</p> <p>Computers are identified by DOMAIN, DN, and HOSTNAME.</p> | None |
| COMP_WITH_TMA | <p>Returns all computers that have the Tivoli endpoint installed.</p> <p>Computers are identified by DOMAIN, CN, DN, HOSTNAME, TME_OBJECT_ID and TME_OBJECT_LABEL</p> | None |
| GROUPS_IN_OU | <p>Relates groups to their parent OUs.</p> <p>Groups are identified by DOMAIN, DN, and .GUID. OUs are identified by DOMAN and OU_DN</p> | <p>A where clause can restrict the query to groups within a specified OU and domain. For example:</p> <p>GROUPS_IN_OU where OU_DN='OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com'</p> <p>The example returns all groups within the OU named</p> <p>OU=Parent,DC=emilio,DC=com</p> <p>in the domain named DC=emilio,DC=com.</p> |
| TMA_FOR_USER | <p>Relates computers that have the Tivoli endpoint installed to the users who can log on to them.</p> <p>Computers are identified by TME_OBJECT_ID, TME_OBJECT_LABEL. Users are identified by USER_DN</p> | <p>A where clause can restrict the query to computers with endpoints where a specified user can log on. For example:</p> <p>TMA_FOR_USER where USER_DN='CN=Administrator,CN=Users,DC=emilio,DC=com'</p> <p>The example returns all endpoint computers to which the user 'CN=Administrator,CN=Users,DC=emilio,DC=com can log on.</p> |

Table 6. Predefined queries (continued)

| Query | Description | Conditions |
|----------------|--|--|
| TMA_IN_OU | <p>Relates computers that have the Tivoli endpoint installed to their parent OUs.</p> <p>Computers are identified by DOMAIN, TME_OBJECT_ID, TME_OBJECT_LABEL. OUs are identified by DOMAIN and OU_DN.</p> | <p>A where clause can restrict the query to endpoint computers that belong to a specified OU and domain. For example:</p> <p>TMA_IN_OU where OU_DN='OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com'</p> <p>The example returns all computers with endpoints installed that are part of the OU named OU=Parent,DC=emilio,DC=com in the domain named DC=emilio,DC=com</p> |
| TMA_IN_GROUP | <p>Relates computers that have the Tivoli endpoint installed to the groups to which they belong.</p> <p>Computers are identified by DOMAIN, TME_OBJECT_ID, TME_OBJECT_LABEL. Groups are identified by DOMAIN and GROUP_DN.</p> | <p>A where clause can restrict the query to endpoint computers in a specified group and domain. For example:</p> <p>TMA_IN_GROUP where GROUP_DN='CN=GlobalDist,OU=Child111,OU=Child1,OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com'</p> <p>The example returns all computers with endpoints installed that are part of the group named CN=GlobalDist,OU=Child111,OU=Child1,OU=Parent,DC=emilio,DC=com</p> <p>in the domain named DC=emilio,DC=com</p> |
| TMA_NOT_IN_AD | Returns any computers with the Tivoli endpoint installed that are not defined in Active Directory. | None |
| USERS_IN_OU | <p>Relates users to their parent OU</p> <p>Users are identified by DOMAIN, DN, and GUID. OUs are identified by DOMAIN and OU_DN..</p> | <p>A where clause can restrict the query to users that belong to a specified OU and domain. For example:</p> <p>USERS_IN_OU where OU_DN='OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com'</p> <p>The example returns all users that are part of the OU named OU=Parent,DC=emilio,DC=com in the domain named DC=emilio,DC=com</p> |
| USERS_IN_GROUP | <p>Relates users to the groups to which they belong.</p> <p>Users are identified by DOMAIN, DN, and GUID. Groups are identified by DOMAIN and GROUP_DN.</p> | <p>A where clause can restrict the query to users in a specified group and domain. For example:</p> <p>USERS_IN_GROUP where GROUP_DN='CN=GlobalDist,OU=Child111,OU=Child1,OU=Parent,DC=emilio,DC=com' and DOMAIN='DC=emilio,DC=com'</p> <p>The example returns all users that are part of the group named CN=GlobalDist,OU=Child111,OU=Child1,OU=Parent,DC=emilio,DC=com</p> <p>in the domain named DC=emilio,DC=com</p> |

Chapter 4. Configuring the replication settings

This chapter describes the tasks you must perform to configure the replication settings.

To configure the replication settings, perform the following steps:

1. Connect to the domain controllers from which to replicate the information. For details see “Defining Microsoft Active Directory domain controllers.”
2. Schedule the time interval after which to run a replication. For details see “Scheduling replications” on page 24.
3. Configure dynamic replications. For details see “Defining dynamic replication” on page 24.
4. Set the kind of administrator notifications. For details see “Notifying the administrator” on page 25.

Defining Microsoft Active Directory domain controllers

This section describes how you define a domain controller.

Before you begin

Physically the Microsoft Active Directory information is held on one or more equal peer domain controllers, which are servers running Microsoft Windows Server 2003 or Windows 2000 Server operating system.

Microsoft Active Directory creates a replication topology that uses the defined sites to manage traffic. With more than one domain the Active Directory is not replicated across the forest; a global catalog is created, containing all the objects in the forest but only a subset of their attributes, a partial replica. The catalog is held on defined global catalog servers, to deal with inter-domain queries or pass requests across. The global catalog is built and updated automatically by the Active Directory replication system. When configuring Active Directory Integration, you specify whether replicas are from the global catalog or by directly accessing the domain controllers.

About this task

Before replicating domain controller information, you need to define the domain controllers from which to replicate the information as follows.

1. Identify the domain controllers from which to replicate the information.
2. Identify the hostname of each domain controller
3. Use the **wadquerydc** command to define the domain controllers belonging to the Tivoli regions and the user credentials to access them.

For example, if the name of the domain controller to define is nicola@it.ibm.com, its port number is 1278, the user name is Administrator, and the password is password, you can define the domain controller by running the following command:

```
wadquerydc  
-a nicola@it.ibm.com -p 1278 -u Administrator -w password -v password
```

4. If you want to replicate using the global catalog, issue the command:

```
wadquerycfg -s use_global_catalog=true
```

Use of the global catalog is disabled by default.

What to do next

For details about the commands, see “wadquerydc” on page 29 and “wadquerycfg” on page 30.

Scheduling replications

This section describes how you schedule replications from Active Directory domain controllers and Tivoli endpoint managers.

Before you begin

You can schedule replications to run at a specific date interval or time interval. You can interrupt the recursion of a replica by deleting the job from the Tivoli Management Framework Scheduler.

About this task

To schedule a replication to run at a specific time interval, perform the following steps:

1. For Tivoli replication, if the job does not yet exist, enter the following command:

```
wadqueryrep -t -s time_interval
```
2. For Active Directory replication, If the job does not yet exist, enter the following command:

```
wadqueryrep -m -s time_interval
```
3. You can also edit the schedule of an existing job as follows:
 - a. Identify the ID of the job by entering `wadqueryrep -l` to list all the job identifiers.
 - b. Modify the schedule using either the Tivoli desktop or the **wedsched** command.

What to do next

For details about this command, see “wadqueryrep” on page 34.

Defining dynamic replication

This section describes how you dynamically replicate Microsoft Active Directory and Tivoli endpoint manager information into a relational database.

Before you begin

Before setting dynamic replication, decide if you want to dynamically replicate Active Directory or Tivoli information, or both.

About this task

To enable Active Directory dynamic replication, enter the following command:

```
wadquerycfg -s ad_automatic_update=true
```

To enable Tivoli dynamic replication, enter the following command:
`wadquerycfg -s epmgr_automatic_update=true`

What to do next

For details about this command, see “wadquerycfg” on page 30.

Notifying the administrator

This section describes how you notify the administrator of a replication.

Before you begin

Every time a replica starts or ends, you can decide how to collect the notification message containing status and errors. The notification options are:

- Log the message in a log file on a managed node of the Tivoli region. You must define the host name of the workstation on which to log the message as follows:

```
wadquerycfg engine_log_host=managed_node_label
```

- Send the message to the list of addresses you specify in a configuration parameter as follows:

```
wadquerycfg engine_email_list=user@domain
```

You can specify more than one address by separating the addresses with a comma. For information about configuring a mail server to correctly route e-mail, refer to the *IBM Tivoli Enterprise Console®: Installation Guide*.

- Post a notice to the ADIEngine notice group, created during the installation of the product.

What to do next

For details about this command, see “wadquerycfg” on page 30.

Chapter 5. Running replications

This chapter describes how you replicate Microsoft Active Directory and Tivoli endpoint manager information into a common repository, the Query Directory repository.

Before you begin

You can use the **wadqueryrep** command to run the following kinds of replications from Microsoft Active Directory domain controllers or Tivoli endpoint managers:

Table 7. Replication types

| Replication type | From Microsoft Active Directory | From Tivoli endpoint manager |
|---|---------------------------------|------------------------------|
| Manual full replications | ✓ | ✓ |
| Manual delta replication | ✓ ⁽¹⁾ | |
| Scheduled replications through defined jobs | ✓ | ✓ |
| Automatic replications | ✓ ⁽¹⁾ | ✓ |

⁽¹⁾ Not valid for global catalog

Replicating from Microsoft Active Directory

This section describes how you replicate Microsoft Active Directory information into a common repository.

Before you begin

You can choose to run the following kinds of replications from Active Directory domain controllers into the common repository by using the **wadqueryrep** command. For details about this command, see “wadqueryrep” on page 34.

- Manual full replication. To run this replication, enter the following command:

```
wadqueryrep  
-m -f
```

- Manual delta replication, not valid for global catalog. To run this replication, enter the following command:

```
wadqueryrep  
-m
```

- Scheduled replications using defined jobs. To schedule replications every 90 minutes, enter the following command:

```
wadqueryrep  
-m -s 90
```

- Dynamic replications. Use the **wadquerycfg** command to schedule this kind of replications.

Replicating from Tivoli endpoint manager

This section describes how you replicate Tivoli endpoint manager information into a common repository.

Before you begin

The kinds of replications you can run from Tivoli endpoint manager into a common repository by using the **wadqueryrep** command are:

- Manual replications. To run this replication, enter the following command:
`wadqueryrep -t`
- Scheduled replications using defined jobs. Use the **wadqueryrep** command to schedule this kind of replication. For details about this command, see “wadqueryrep” on page 34
- Dynamic replications. Use the **wadqueryrep** command to schedule this kind of replication.

Chapter 6. Query Directory for Microsoft Active Directory command line

This chapter describes the command line of Query Directory for Microsoft Active Directory. You can use the Query Directory commands to define and run replications from Microsoft Active Directory and Tivoli endpoint managers.

Table 8 shows the commands supported by the Query Directory for Microsoft Active Directory command line.

Table 8. Query Directory for Microsoft Active Directory commands

| Command | Task |
|--------------------------|--|
| wadquerydc | Define the connection to a domain controller |
| “wadquerycfg” on page 30 | Configure the replication parameters |
| “wadqueryrep” on page 34 | Start or schedule the replication |

wadquerydc

This command manages domain controllers for the Microsoft Active Directory replication.

Purpose

You can use wadquerydc to add, delete, or list domain controllers.

```
wadquerydc { -a dc_hostname [[-p dc_port] -u logon_user -w logon_password -v  
verify_logon_password] | -d dc_hostname | -l } [-r { region_id | all}]
```

Parameters

-a dc_hostname

Adds a domain controller in interactive mode. The *dc_hostname* format can be:

- *hostname.domain* as for example `tambasis1.it.ibm.com` where `tambasis1` is the hostname and `it.ibm.com` the domain.
- *hostname* as for example `tambasis1`.

The user is prompted for further parameters: port number, logon user, logon password, and retype logon password.

-p dc_port

Specifies the port number to be used. Default port number is the domain controller port number.

-u logon_user

Specifies the identifier of the domain controller user. The *logon_user* format can be:

- *user@domain* as for example `Administrator@it.ibm.com`
- *domain\user* as for example `it.ibm.com\Administrator`
- *user* as for example `Administrator`. This format is supported only if you specify the domain in the *dc_hostname* keyword.

- w** *logon_password*
Specifies the password of the domain controller user.
- v** *verify_logon_password*
Specifies the password of the domain controller user to check the password is correct.
- d** *dc_hostname*
Removes the specified domain controller.
- l** Lists the domain controllers
- r** *region_id* | *all*
Sets the possibility to define the domain controllers from other regions.

Authorization

- user** For listing domain controller names
- ADI_Admin, senior, super**
For adding and deleting domain controller names

Return Values

The **wadquerydc** command returns one of the following values:

- 0** Indicates that **wadquerydc** completed successfully.
- other than 0**
Indicates that **wadquerydc** failed due to an error.

wadquerycfg

This command configures the Microsoft Active Directory and Tivoli replications.

Purpose

You can use the **wadquerycfg** command to configure the Microsoft Active Directory and Tivoli replication.

wadquerycfg { **-s** [*key=value*] } | **-d** *key* { **-a** | **-c** } *key value* } [**-r** { *region_id* | *all*}]

Parameters

- s** *key=value*
Sets a custom key and its value, or allows you to define existing variables and their values. Specifying the **wadquerycfg -s** command without the *key* argument, displays all keys with the corresponding settings currently used. Specifying the **wadquerycfg -s key** command without a value, displays the value set for the specified key. Specifying the *key* argument with a value, sets the key to the specified value.
- rim_name**
Specifies the name of the RIM used to update the database.
- interconnected_mode**
Specifies if the information to be retrieved concerns all the endpoints of interconnected regions. Possible values are:
 - true** To retrieve the information concerning the endpoints of interconnected regions.

false To retrieve the information concerning the endpoints of the local region.

The default value is false.

use_global_catalog

Retrieves the Microsoft Active Directory data from the domain controllers set as global catalog servers using the **wadquerydc** command. Possible values are:

true To retrieve the Microsoft Active Directory information from the global catalog. You cannot perform delta replications or automatic updates from global catalogs.

false To retrieve the Microsoft Active Directory information from domain controllers that are not global catalog.

The default value is false.

epmgr_automatic_update

Specifies to automatically update the information of endpoints belonging to an endpoint manager or all endpoint managers (depending on the setting of the **interconnected_mode** parameter) in the Query Directory database. Possible values are:

true Automatically update the information of endpoints. When **interconnected_mode=true**, the automatic updates work only for Two-way regions.

false Do not update the information of endpoints automatically.

The default value is false.

ad_automatic_update

Specifies to automatically update the changes to Microsoft Active Directory domain controllers.

true All the domain controllers communicate any change to the Query Directory for Microsoft Active Directory workstation, as soon as it happens.

Set **ad_automatic_update** to true only if **use_global_catalog=false**.

false No Microsoft Active Directory change is automatically communicated to the Query Directory for Microsoft Active Directory workstation.

The default value is false.

To know if the Microsoft Active Directory automatic replication has been started, check the log file, the ADIEngine notice group, or the received messages, depending on the notification parameters you set.

rpc_max_threads

Sets the concurrent remote procedure call thread limit that the Engine can manage at the same time. The default value is 250. In a complex environment, if you set **epmgr_automatic_update=true**, you might need to increase this value.

commit_interval

Sets the number of lines inserted or updated in the common repository,

after which a commit is performed. A frequent commit decreases performances but avoids database internal locks. If you set this value to 0, the commit operation is performed only at the end of the database transaction. The default value is 100.

cli_unix_trace_dir

Specifies the UNIX trace path. The default path name is /tmp. The names of the trace files are: adirep_cli.trc, adidc_cli.trc, adicfg_cli.trc.

cli_win_trace_dir

Specifies the Windows trace path. The default path name is c:\tmp. The names of the trace files are: adirep_cli.trc, adidc_cli.trc, adicfg_cli.trc.

cli_trace_level

Specifies the trace level. Possible values are:

- 0** none
- 1** fatal
- 2** error
- 3** warning
- 4** information
- 5** verbose

The default value is 0.

cli_trace_size

Specifies the maximum size of the trace file. The default size is 1000000 bytes.

cli_trace_files

Identifies the number of trace files. The default value is 3.

engine_log_host

Specifies the label of the managed node where the log files are written. The default is the managed node of the local region where the Query Directory component is installed.

engine_log_dir

Specifies the path in which to write the log files. The default path name is c:\tmp. If the managed node runs on UNIX, the path format must be changed. The name of the log file is adi_engine.log.

engine_log_level

Specifies the level of logging, which is the priority in which messages are logged. Possible values are:

- 0 (no priority)**
no message is logged
- 1 (low priority)**
error messages are logged
- 2 (medium priority)**
error and warning messages are logged
- 3 (highest priority)**
error, warning, and informational messages are logged

The default value is 1.

engine_email_list

Specifies the user e-mail address to notify when an operation is performed. To specify multiple e-mail IDs, separate each ID with a comma.

engine_email_level

Specifies the e-mail level. Possible values are:

0 (none)

no e-mail is sent

1 (error)

an e-mail is sent for errors

2 (warning)

an e-mail is sent for errors and warnings

3 (information)

an e-mail is sent for errors, warnings, or informational messages

The default value is 0.

engine_email_server

Specifies the hostname or IP address of the Mail server. This value overrides any value you previously set using the **wmailhost** command.

engine_trace_dir

Specifies the trace path. The default path name is c:\tmp. The trace file names are ADI_enginex.trc and native_ad_rep.trc.

engine_trace_level

Specifies the trace level. Possible values are:

0 none

1 fatal

2 error

3 warning

4 information

5 verbose

The default value is 0.

engine_trace_size

Specifies the maximum size of the trace file. The default size is 1000000 bytes.

engine_trace_files

Identifies the number of trace files. The default value is 3.

-d key

Deletes the specified key.

-akey value

Appends the specified value to the given key. The comma is used as a separator.

-c key value

Removes the specified value from the given key. The comma is used as a separator.

-r region_id|all

Changes the configuration to more than one Query Directory for Microsoft

Active Directory workstation per time, from a unique console (managed node). This option is valid only for the remote Query Directory for Microsoft Active Directory workstations installed on Managed or Two-way interconnected regions.

Authorization

user For viewing configuration information

ADI_Admin, senior, super
For modifying configuration information

Return Values

The **wadquerycfg** command returns one of the following values:

0 Indicates that **wadquerycfg** completed successfully.

other than 0
Indicates that **wadquerycfg** failed due to an error.

wadqueryrep

This command performs replications from Microsoft Active Directory or from endpoint manager.

Purpose

This command replicates Microsoft Active Directory and Tivoli information. You can decide to replicate immediately or to schedule the replications. You can also use this command to remove information from the database.

wadqueryrep { **-l** | **-c** { *job_id* | *all* } | { **-t** | **-m** [**-f**] | **-t -m** [**-f**] } [**-s** *time_interval* [**-d**]]
| **-x** } [**-r** { *region_id* | *all* }]

Parameters

- l** Lists the scheduled replications.
- c** { *job_id* | *all* }
Removes the specified scheduled replications by specifying the replication job identifier.
- t** Replicates Tivoli endpoint manager information.
- m** Performs a delta replication from Microsoft Active Directory.
- f** Performs a full replication from Microsoft Active Directory. This parameter must be specified together with **-m**.
- s** *time_interval*
Specifies after how many minutes a replication is repeated. You must specify an integer. To specify a different time interval format you can use the Tivoli desktop or the **wedsched** command.
- d** Disables the replication. The replication remains in the scheduler, but does not run until it is enabled.
- x** Performs a cleanup of all the unreliable information from the Query Directory repository. It deletes the following entries:

For Microsoft Active Directory replications:

- Entries having a timestamp older than the timestamp of the last full replication.
- Entries belonging to the domain controllers defined using **wadquerydc**. If you run a cleanup after having removed a domain controller, all the entries related to that domain controller remain in the repository.

For Tivoli replications:

- Entries having a timestamp older than the timestamp of the last replication.
- Entries related to the local Tivoli region, if `interconnected_mode=false`.
- Entries related to the interconnected Tivoli regions if `interconnected_mode=true`.

-r {*region_id* | **all**}

Sets the possibility to replicate from a unique console to more than one ADIEngine object at a time. This option is valid only for the remote Engines installed on Managed or Two-way interconnected regions.

Authorization

user For viewing replication information

ADI_Admin, senior, super
For running replications

Return Values

The **wadqueryrep** command returns one of the following values:

- 0** Indicates that **wadqueryrep** completed successfully.
- other than 0** Indicates that **wadqueryrep** failed due to an error.

Chapter 7. Suggested configurations

This chapter describes how you can configure your environment when you install the Query Directory for Microsoft Active Directory component.

Before you begin

Depending on the complexity of your environment, you can decide to install the Query Directory for Microsoft Active Directory component either on one workstation or on more than one workstation.

The following sections provide you with information to help you determine where you need to install this component:

- “Simple environment”
- “Complex environment”

These suggestions for your system configuration are just suggestions. Consult with your system administrator for details about your configuration and procedures implemented in your environment.

Simple environment

This section describes where you can install the Query Directory for Microsoft Active Directory component in a simple environment.

About this task

In a simple environment, with one region or some interconnected regions, the suggested configuration is to install Query Directory for Microsoft Active Directory on a Windows managed node of a Tivoli region having access to all the Windows endpoints of each Tivoli region. The managed node must be interconnected in “Managing” or “Two-way” mode to the Tivoli regions serving Windows Tivoli endpoints.

You must also ensure that the Windows-managed node is connected to all the domain controllers (by using the **wadquerydc** command) and that you set `interconnected_mode` to true (by using the **wadquerycfg** command).

Complex environment

This section describes where you can install the Query Directory for Microsoft Active Directory component in a complex environment.

Before you begin

In a complex environment, with several interconnected regions and several domain controllers, the suggested configuration is to install the Query Directory for Microsoft Active Directory component on a managed node for each region, each component replicating the endpoint information only from its local endpoint manager. This configuration helps avoid operation duplications, data confliction, and improves performance.

Ensure that the number of domain controller resources is well-balanced across the different Query Directory for Microsoft Active Directory workstations.

Chapter 8. Microsoft Active Directory integration scenario

This chapter describes how to run a Microsoft Active Directory integration scenario.

Before you begin

Before you set replications, install and configure the Query Directory for Microsoft Active Directory component on a Windows managed node. To set a valid replication process, perform the following steps:

1. Add the domain controllers from which you want to run the replications:

```
wadquerydc -a dc_hostname -u logon_user -w logon_password
-v verify_logon_password
```

2. Run a full replication from the defined domain controllers:

```
wadqueryrep -m -f -t
```

The Query Directory repository is populated with information about Microsoft Active Directory objects.

3. Run a replication from Tivoli endpoint managers.

```
wadqueryrep -t
```

The Query Directory repository is populated with information about Tivoli endpoints.

4. Delete all the unreliable information from the Query Directory repository:

```
wadqueryrep -x
```

5. Set dynamic replications from Tivoli endpoint managers:

```
wadquerycfg -s epmgr_automatic_update=true
```

6. Set dynamic replications from the defined domain controllers:

```
wadquerycfg -s ad_automatic_update=true
```

Chapter 9. Database schema

This chapter describes the Query Directory repository, into which the Microsoft Active Directory and Tivoli endpoint managers data is merged.

Tables

This section describes the tables provided with the Query Directory for Microsoft Active Directory component.

Table 9. Query Directory for Microsoft Active Directory tables

| Tables | Description |
|---|--|
| AD_TIVOLI_AGENT (TME_OBJECT_ID, REGION_ID, DOMAIN, COMPUTER_NAME, HOSTNAME, TME_OBJECT_LABEL, ADDRESS, LAST_FULLREP, RECORD_TIME) | Contains the columns to map Microsoft Active Directory objects (DOMAIN and COMPUTER_NAME) to Tivoli objects (OBJECT_ID). |
| AD_OU (DOMAIN, GUID, DN, CN, PARENT_GUID, PARENT_DN, LAST_FULLREP, RECORD_TIME) | Contains information about Microsoft Active Directory organizational units. They are uniquely identified by the DOMAIN and GUID columns. The PARENT_GUID column contains the GUID of the OU containing the object. |
| AD_USER (DOMAIN, GUID, DN, CN, PARENT_GUID, PARENT_DN, LAST_FULLREP, RECORD_TIME) | Contains information about Microsoft Active Directory users. They are uniquely identified by the DOMAIN and GUID columns. The PARENT_GUID column contains the GUID of the OU containing the object. |
| AD_COMPUTER (DOMAIN, GUID, DN, CN, PARENT_GUID, PARENT_DN, HOSTNAME, NETBIOSNAME, MANAGED_BY, LAST_FULLREP, RECORD_TIME) | Contains information about Microsoft Active Directory computers. They are uniquely identified by the DOMAIN and GUID columns. The PARENT_GUID column contains the GUID of the OU containing the object. |

Table 9. Query Directory for Microsoft Active Directory tables (continued)

| Tables | Description |
|---|--|
| AD_GROUP (DOMAIN, GUID, DN, CN, PARENT_GUID, PARENT_DN, LAST_FULLREP, RECORD_TIME) | Contains information about Microsoft Active Directory groups. They are uniquely identified by the DOMAIN and GUID columns. The PARENT_GUID column contains the GUID of the OU containing the object. |
| AD_GROUP_ASSC (DOMAIN, GUID, MEMBER_OF, TYPE) | Contains information about the association between Microsoft Active Directory groups. An object can be contained in more than one group. The MEMBER_OF column contains the GUID of the containing group. |
| AD_ALLOWED_LOGON (DOMAIN, USER_CN, COMP_CN); | Contains information about Microsoft Active Directory log-on-to attribute. This table can be used to map the computers to the users. |
| AD_EXPANDED_OU (DOMAIN, GUID, PARENT_GUID) | Contains information about all the nested organizational units (GUID column) contained in each AD_OU (PARENT_GUID column). |
| AD_EXPANDED_GROUP (DOMAIN, GUID, PARENT_GUID) | Contains information about all the nested groups (GUID column) contained in each AD_GROUP (PARENT_GUID column). |

Views

This section describes the pre-defined views provided with the Query Directory for Microsoft Active Directory component. These views display information about computers and endpoints in Organizational Units:

Table 10. Query Directory for Microsoft Active Directory views

| Views | Description |
|---|--|
| AD_OBJECT(DOMAIN, GUID, TYPE, DN) | Returns information on all the Microsoft Active Directory objects. This is an internal view. |
| COMPUTERS_IN_OU(DOMAIN, DN, GUID, OU_DN) | Returns information on computers in Microsoft Active Directory organizational units. |
| USERS_IN_OU(DOMAIN, DN, GUID, OU_DN) | Returns information on users in Microsoft Active Directory organizational units. |
| GROUPS_IN_OU(DOMAIN, DN, GUID, OU_DN) | Returns information on groups in Microsoft Active Directory organizational units. |

Table 10. Query Directory for Microsoft Active Directory views (continued)

| Views | Description |
|---|--|
| COMPUTERS_IN_GROUP(DOMAIN, DN, GUID, GROUP_NAME, GROUP_DN) | Returns information on computers in Microsoft Active Directory groups. |
| USERS_IN_GROUP(DOMAIN, DN, GUID, GROUP_NAME, GROUP_DN) | Returns information on users in Microsoft Active Directory groups. |
| TMA_IN_OU(DOMAIN, TME_OBJECT_ID, TME_OBJECT_LABEL, OU_DN) | Returns information on endpoints in Microsoft Active Directory organizational units. |
| TMA_IN_GROUP(DOMAIN, TME_OBJECT_ID, TME_OBJECT_LABEL, GROUP_DN) | Returns information on endpoints in Microsoft Active Directory groups. |
| TMA_NOT_IN_AD(TME_OBJECT_ID, TME_OBJECT_LABEL) | Returns information on endpoint not registered in Microsoft Active Directory. |
| COMP_NOT_TMA(DOMAIN, DN, HOSTNAME) | Returns information on computers on which the endpoint is not installed. |
| TMA_FOR_USER(TME_OBJECT_ID, TME_OBJECT_LABEL, USER_DN) | Returns information on the mapping between an endpoint and Microsoft Active Directory users. |
| COMP_WITH_TMA(DOMAIN, CN, DN, HOSTNAME, TME_OBJECT_ID, TME_OBJECT_LABEL) | Returns information on the mapping between computers and endpoints. |

Chapter 10. Troubleshooting

This chapter gives an overview of the initial troubleshooting process and provides descriptions of source information to help you in solving problems.

It includes the following topics:

- “Logs and traces”
- “Problem determination” on page 46

Logs and traces

This section describes the logs and traces related to the Query Directory for Microsoft Active Directory components.

Table 11 and Table 12 describe the logs and traces available for the Microsoft Active Directory integration components:

Table 11. Query Directory for Microsoft Active Directory logs

| Log file name | Description | Path name |
|-------------------|---|--|
| tivoli.cinstall | Logs installation messages | c:\tmp on Windows /tmp on UNIX |
| adi_engine.log | Logs information about Query Directory for Microsoft Active Directory | |
| ADIEng_uninst.log | Logs information on the uninstallation of Query Directory for Microsoft Active Directory component | %DBDIR%\tmp on Windows \$DBDIR/tmp/ on UNIX |
| ADICli_uninst.log | Logs information on the uninstallation of Query Directory for Microsoft Active Directory Command line component | |

Table 12. Query Directory for Microsoft Active Directory traces

| Trace file name | Description | Path name |
|-------------------|---|-----------------------------------|
| adirep_cli.trc | Traces information about the wadqueryrep command | c:\tmp on Windows /tmp on UNIX |
| adidc_cli.trc | Traces information about the wadquerydc command | |
| adicfg_cli.trc | Traces information about the wadquerycfg command | |
| ADI_engine.trc | Traces information about the interactions between Query Directory for Microsoft Directory processes and Tivoli infrastructure | |
| native_ad_rep.trc | Traces information about Microsoft Active Directory replications | |

By default, the tracing function is not enabled. To enable tracing and define the trace file size, the number, and the path name, use the **wadquerycfg** command. For details about this command, see “wadquerycfg” on page 30.

Problem determination

This section describes how to recover from Microsoft Active Directory integration problems.

Endpoint manager automatic replication limitation:

Cause: The Tivoli endpoint manager automatic replication updates the database only when an endpoint is added, deleted, and when the host name or the label of an endpoint changes. The change of any other endpoint attribute, as for example the IP address, is not notified.

Solution: Run a manual Tivoli endpoint manager replication as follows:

```
wadqueryrep -t
```

Microsoft Active Directory automatic replication failure:

Cause: You lose the connection to a domain controller during a Microsoft Active Directory replication.

Solution:

Perform the following steps:

1. Ensure the domain controller is up and running.
2. Run the following command:

```
wadquerycfg -s ad_automatic_update=false
```
3. Run the following command:

```
wadquerycfg -s ad_automatic_update=true
```

Chapter 11. Uninstalling Microsoft Active Directory integration components

This chapter describes how to uninstall Microsoft Active Directory integration components.

Before you begin

To uninstall the Active Directory integration components perform the following steps:

1. Ensure that no replications are scheduled or running during the uninstallation process.
2. To uninstall the Query Directory for Microsoft Active Directory component run the command:

```
wuninst ADIEng managed_node -rmfiles
```

3. To uninstall the Query Directory for Microsoft Active Directory - Command Line component run the command:

```
wuninst ADICLI managed_node -rmfiles
```

Appendix. Support information

If you have a problem with your IBM software, you want to resolve it quickly. This section describes the following options for obtaining support for IBM software products:

- “Searching knowledge bases”
- “Obtaining fixes”
- “Receiving weekly support updates” on page 50
- “Contacting IBM Software Support” on page 50

Searching knowledge bases

You can search the available knowledge bases to determine whether your problem was already encountered and is already documented.

Searching the information center

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

Searching the Internet

If you cannot find an answer to your question in the information center, search the Internet for the latest, most complete information that might help you resolve your problem.

To search multiple Internet resources for your product, use the **Web search** topic in your information center. In the navigation frame, click **Troubleshooting and support ► Searching knowledge bases** and select **Web search**. From this topic, you can search a variety of resources, including the following:

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

Obtaining fixes

A product fix might be available to resolve your problem. To determine what fixes are available for your IBM software product, follow these steps:

1. Go to the IBM Software Support Web site at <http://www.ibm.com/software/support>.
2. Click **Downloads and drivers** in the **Support topics** section.
3. Select the **Software** category.
4. Select a product in the **Sub-category** list.
5. In the **Find downloads and drivers by product** section, select one software category from the **Category** list.

6. Select one product from the **Sub-category** list.
7. Type more search terms in the **Search within results** if you want to refine your search.
8. Click **Search**.
9. From the list of downloads returned by your search, click the name of a fix to read the description of the fix and to optionally download the fix.

For more information about the types of fixes that are available, see the *IBM Software Support Handbook* at <http://techsupport.services.ibm.com/guides/handbook.html>.

Receiving weekly support updates

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

1. Go to the IBM Software Support Web site at <http://www.ibm.com/software/support>.
2. Click **My support** in the upper right corner of the page.
3. If you have already registered for **My support**, sign in and skip to the next step. If you have not registered, click **register now**. Complete the registration form using your e-mail address as your IBM ID and click **Submit**.
4. Click **Edit profile**.
5. In the **Products** list, select **Software**. A second list is displayed.
6. In the second list, select a product segment, for example, **Application servers**. A third list is displayed.
7. In the third list, select a product sub-segment, for example, **Distributed Application & Web Servers**. A list of applicable products is displayed.
8. Select the products for which you want to receive updates, for example, **IBM HTTP Server** and **WebSphere® Application Server**.
9. Click **Add products**.
10. After selecting all products that are of interest to you, click **Subscribe to email** on the **Edit profile** tab.
11. Select **Please send these documents by weekly email**.
12. Update your e-mail address as needed.
13. In the **Documents** list, select **Software**.
14. Select the types of documents that you want to receive information about.
15. Click **Update**.

If you experience problems with the **My support** feature, you can obtain help in one of the following ways:

Online

Send an e-mail message to erchelp@ca.ibm.com, describing your problem.

By phone

Call 1-800-IBM-4You (1-800-426-4968).

Contacting IBM Software Support

IBM Software Support provides assistance with product defects.

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

- For IBM distributed software products (including, but not limited to, Tivoli, Lotus®, and Rational® products, as well as DB2 and WebSphere products that run on Windows, or UNIX operating systems), enroll in Passport Advantage® in one of the following ways:

Online

Go to the Passport Advantage Web site at http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home and click **How to Enroll**.

By phone

For the phone number to call in your country, go to the IBM Software Support Web site at <http://techsupport.services.ibm.com/guides/contacts.html> and click the name of your geographic region.

- For customers with Subscription and Support (S & S) contracts, go to the Software Service Request Web site at <https://techsupport.services.ibm.com/ssr/login>.
- For customers with IBMLink™, CATIA, Linux®, OS/390®, iSeries®, pSeries®, zSeries®, and other support agreements, go to the IBM Support Line Web site at <http://www.ibm.com/services/us/index.wss/so/its/a1000030/dt006>.
- For IBM eServer™ software products (including, but not limited to, DB2 and WebSphere products that run in zSeries, pSeries, and iSeries environments), you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for eServer software products, go to the IBM Technical Support Advantage Web site at <http://www.ibm.com/servers/eserver/techsupport.html>.

If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States. From other countries, go to the contacts page of the *IBM Software Support Handbook* on the Web at <http://techsupport.services.ibm.com/guides/contacts.html> and click the name of your geographic region for phone numbers of people who provide support for your location.

To contact IBM Software support, follow these steps:

1. “Determining the business impact”
2. “Describing problems and gathering information” on page 52
3. “Submitting problems” on page 52

Determining the business impact

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

Severity 1

The problem has a *critical* business impact. You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.

Severity 2

The problem has a *significant* business impact. The program is usable, but it is severely limited.

Severity 3

The problem has *some* business impact. The program is usable, but less significant features (not critical to operations) are unavailable.

Severity 4

The problem has *minimal* business impact. The problem causes little impact on operations, or a reasonable circumvention to the problem was implemented.

Describing problems and gathering information

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

- What software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
- Can you re-create the problem? If so, what steps were performed to re-create the problem?
- Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, and so on.
- Are you currently using a workaround for the problem? If so, be prepared to explain the workaround when you report the problem.

Submitting problems

You can submit your problem to IBM Software Support in one of two ways:

Online

Click **Submit and track problems** on the IBM Software Support site at <http://www.ibm.com/software/support/probsub.html>. Type your information into the appropriate problem submission form.

By phone

For the phone number to call in your country, go to the contacts page of the *IBM Software Support Handbook* at <http://techsupport.services.ibm.com/guides/contacts.html> and click the name of your geographic region.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Software Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the Software Support Web site daily, so that other users who experience the same problem can benefit from the same resolution.

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Index

Special characters

- .dbf data files (Oracle) 15
- .ldf log files (Microsoft SQL Server) 14
- .mdf database objects (Microsoft SQL Server) 14
- .ndf file group (Microsoft SQL Server) 14
- <component>_log.dat file 16
- <component>_ts.dat file 16

A

- abbreviations
 - vendors 11
- adi_db database 12
- admin scripts
 - requirements for Oracle 15
 - running 11
- advantages 1

B

- benefits 1
- books
 - see publications vi, vii

C

- command line 29
- command line installation 8
- commands
 - CREATE DATABASE (Oracle) 15
 - wadquerycfg 30
 - wadquerydc 29
 - wadqueryrep 34
- COMP_NOT_TMA 21
- COMP_WITH_TMA 21
- complex environment 37
- component installation 4, 5, 8
- components 1
- COMPUTERS_IN_GROUP 21
- COMPUTERS_IN_OU 20
- configuring
 - replication 23
- conventions
 - typeface viii
- Conventions used viii
- CREATE DATABASE command (Oracle) 15
- customer support
 - See Software Support

D

- database objects, .mdf files (Microsoft SQL Server) 14
- database schema 41
- DB2
 - creating repositories 17

- DB2 (*continued*)
 - creating tablespaces 12
 - DB2DIR variable 8
 - log file considerations 12
- DB2DIR variable (DB2) 8
- defining
 - domain controllers 23
- devices (Sybase) 16
- directory names, notation ix
- domain controller definition 23
- dynamic replication 24

E

- e-mail notification 25
- education
 - see Tivoli technical training viii
- environment 3
- environment variables, notation ix

F

- file groups, .ndf files (Microsoft SQL Server) 14
- files
 - interfaces (Sybase) 8
- fixes, obtaining 49

G

- GROUPS_IN_OU 21

I

- information centers, searching for problem resolution 49
- Informix
 - creating repositories 17
 - creating tablespaces 13
 - INFORMIXDIR variable 8
 - log file considerations 13
 - onconfig file 18
- INFORMIXDIR variable (Informix) 8
- installation 4, 5, 8
 - Query Directory for Microsoft Active Directory
 - Tivoli command line 6
 - Tivoli desktop 5
 - Query Directory for Microsoft Active Directory Command Line
 - Tivoli command line 9
 - Tivoli desktop 8
- interconnected regions 37
- Internet
 - searching for problem resolution 49
- introduction 1

K

- knowledge bases, searching for problem resolution 49

L

- locks, with Informix 18
- log files
 - .ldf files (Microsoft SQL Server) 14
- logs 45

M

- manuals
 - see publications vi, vii
- Microsoft Active Directory
 - replication 27
- Microsoft SQL Server
 - .ldf log files 14
 - .mdf database objects 14
 - .ndf file groups 14
 - creating repositories 18
 - tablespace creation 14

N

- notation
 - environment variables ix
 - path names ix
 - typeface ix
- notice group 25
- notification 25

O

- onconfig file (Informix) 18
- online publications
 - accessing vii
- Oracle
 - .dbf data files 15
 - admin script requirements 15
 - CREATE DATABASE command 15
 - creating repositories 18
 - ORACLE_HOME variable 8
 - sys user 15
 - sysdba user 15
 - tablespace creation 15
- ORACLE_HOME variable (Oracle) 8
- ordering publications viii
- overview
 - repositories 11

P

- path names, notation ix
- problem determination 46
 - describing problems 52
 - determining business impact 51

- problem determination (*continued*)
 - submitting problems 52
- publications vi
 - accessing online vii
 - ordering viii
 - related vii

Q

- query
 - COMP_NOT_TMA 21
 - COMP_WITH_TMA 21
 - COMPUTERS_IN_GROUP 21
 - COMPUTERS_IN_OU 20
 - GROUPS_IN_OU 21
 - TMA_FOR_USER 21
 - TMA_IN_GROUP 22
 - TMA_IN_OU 22
 - TMA_NOT_IN_AD 22
 - USERS_IN_GROUP 22
 - USERS_IN_OU 22
- query library 20
 - predefined queries 20

R

- RDBMS
 - abbreviations for vendors 11
- replicating from Tivoli 28
- replication 27
- replication settings 23
- replication types 27
- repositories
 - creating 11
 - creating for DB2 17
 - creating for Informix 17
 - creating for Microsoft SQL Server 18
 - creating for Oracle 18
 - creating for Sybase 19
 - overview 11
- resources 3
- roadmap 2

S

- scenario 39
- scheduling replications 24
- schema script
 - running for Microsoft SQL Server 14
- schema scripts
 - location of 17
 - running for DB2 17
 - running for Informix 18
 - running for Microsoft SQL Server 16, 17, 18
 - running for Sybase 19
- schemas
 - installing for DB2 17
 - installing for Informix 17
 - installing for Microsoft SQL Server 18
 - installing for Oracle 18
 - installing for Sybase 19
- scripts
 - admin, running 11

- Server installation program
 - required system users 12, 13
- shell scripts 11
- simple environment 37
- single region 37
- software requirements 4
- Software Support
 - contacting 50
 - describing problems 52
 - determining business impact 51
 - receiving weekly updates 50
 - submitting problems 52
- SQL scripts 11
- SQL*Plus session 16
- Support information viii
- Sybase
 - allocating devices 16
 - creating repositories 19
 - interfaces file 8
 - requirements for admin scripts 16
 - SYBASE variable 8
 - tablespace creation 16
- SYBASE variable (Sybase) 8
- sys user (Oracle) 15
- sysdba user (Oracle) 15

T

- tablespaces
 - creating for DB2 12
 - creating for Informix 13
 - creating for Microsoft SQL Server 14
 - creating for Oracle 15
 - creating for Sybase 16
- tasks 2
- Tivoli replication 28
- Tivoli software information center vii
- Tivoli technical training viii
- TMA_FOR_USER 21
- TMA_IN_GROUP 22
- TMA_IN_OU 22
- TMA_NOT_IN_AD 22
- traces 45
- training, Tivoli technical viii
- troubleshooting 45
- typeface conventions viii

U

- uninstallation 47
- updates 24
- USERS_IN_GROUP 22
- USERS_IN_OU 22

V

- variables
 - DB2DIR (DB2) 8
 - INFORMIXDIR (Informix) 8
 - ORACLE_HOME (Oracle) 8
 - SYBASE variable (Sybase) 8
- variables, notation for ix
- vendor abbreviations 11

W

- wadquerycfg 29
- wadquerydc 29
- wadqueryrep 29



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