Tivoli

IBM

Version 6.1

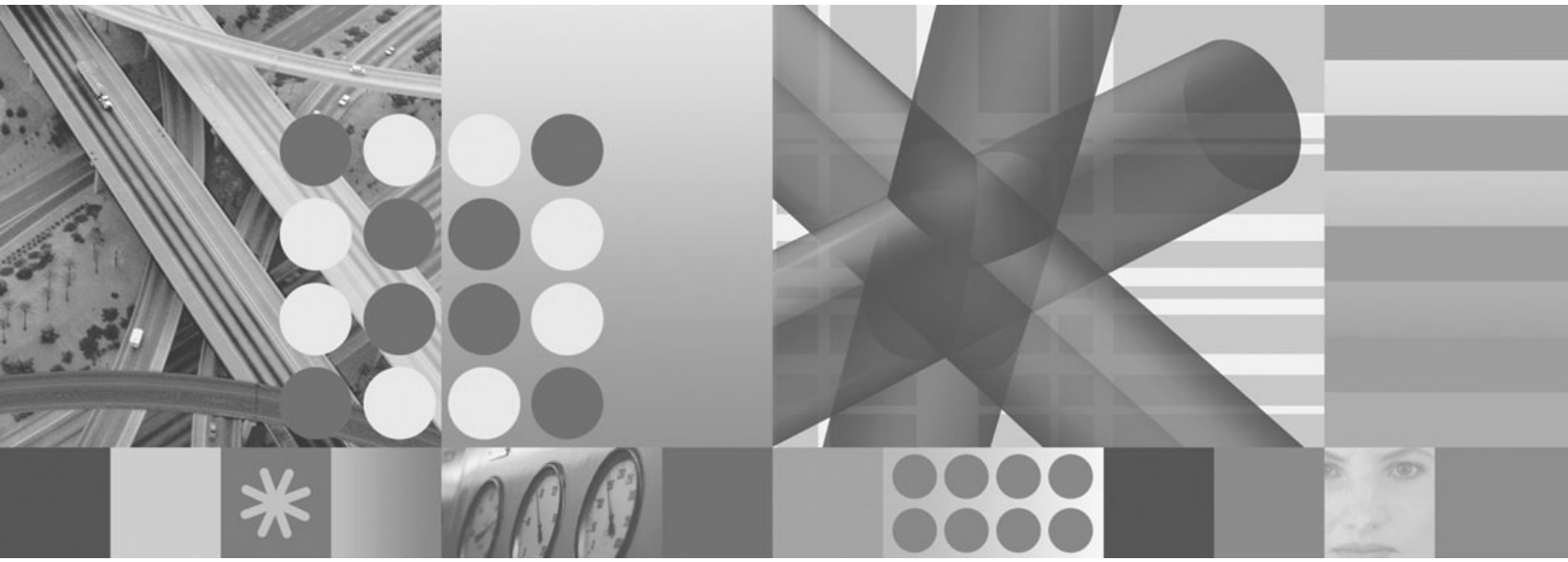
IBM Tivoli Directory Integrator 6.1: Problem Determination Guide

SC32-2565-00

Tivoli®

IBM

Version 6.1



IBM Tivoli Directory Integrator 6.1: Problem Determination Guide

SC32-2565-00

Note

Before using this information and the product it supports, read the general information under Appendix B, "Notices," on page 33.

First Edition (June 2006)

This edition applies to version 6, release 1, of IBM Tivoli Directory Integrator and to all subsequent releases and modifications until otherwise indicated in new editions.

© Copyright International Business Machines Corporation 2005. All rights reserved.
US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Preface v
Who should read this book v
Publications v
IBM Tivoli Directory Integrator library v
Related publications vi
Accessing publications online vi
Accessibility vi
Contacting IBM Software support vii

Chapter 1. Introduction to problem determination 1
IBM Tivoli Directory Integrator overview 1
Troubleshooting topics 1
Built-in troubleshooting features 1
Using the Messages Guide to resolve errors 3

Chapter 2. Performance Test Utilities and Debugging. 5
Performance test utilities 5
Running the performance test utilities scripts . . 5
Performance debugging 6
Data collected by the performance debugging tool 6
Running the performance debugging tool. 6

Chapter 3. Installation and uninstallation 7
Troubleshooting Installation 7
Gathering installation information 7
Performing a manual uninstallation. 9
ikeyman file needs executable persmissions on HP-UX and Solaris operating systems 10
Unable to migrate Cloudscape System Store of TDI 6.0 to TDI 6.1. 10
Known Limitations 10
Glibc package 2.3 or higher required for installation on Linux operating systems 10
Maintenance Level 3 required for installation on an AIX 5.3 operating system. 10
Incorrect text emphasis when installing TDI on a Windows operating system in Simplified Chinese. 11
Some messages display when installing TDI 6.1 using the -console option on an HP-UX operating system 11
Some messages display when uninstalling TDI 6.1 using the -console option on Windows and AIX operating systems. 11
Debug statements created when uninstalling TDI 6.1 using the -console option on UNIX operating systems. 12
Product name does not appear following uninstallation of TDI 6.1 using the -console option 12
Migration from TDI 6.0 to TDI 6.1 on the HP-UX 11iv2 operating system is not supported. . . . 12

Chapter 4. Configuration Editor 13
Troubleshooting the Config Editor. 13
Config Creation Save As command not working properly 13
Locking of parameter file. 13
Keyboard shortcuts might not work if JAWS is configured. 13
Error occurs when opening, closing or creating a Config file if JAWS is configured 13
Resize Config Editor panel if Password Store drop-down menu does not appear. 13
Known Limitations 14
Alignment of text boxes and buttons slightly off on Config panel for ScriptConnector 14
Drop-down menu truncates the first time Inherit from: ibmdi.CSV button is clicked 14
Slight truncation of column names in Simplified Chinese on Windows 2003 operating systems . . 14
IBM JavaScript limitations 14

Chapter 5. Troubleshooting the Administration and Monitoring Console 17
Administration and Monitoring Console (AMC) Problem Determination 17
AMC scripts might fail if ksh not on UNIX operating systems 17
Unable to start AMC via the start_tdiamc script 17
Unable to deploy AMC .war file on Red Hat Enterprise Linux s390 operating system 17

Chapter 6. Components 19
Components overview. 19
Connectors 19
CommandLine Connector 19
JDBC Connector. 19
Windows Users and Groups Connector 21
Function Components 21
Event Handlers 21
Parsers 21
LDIF Parser 21

Chapter 7. Known limitations and general troubleshooting 23
Known limitations 23
SSL connects with expired self signed certificates 23
Programatically disabling components 23
gg script not required for execution of the pwsync_racf example 24
General troubleshooting 24
Error occurs when an encrypted password exceeds the size of the table column in which the password is stored 24
AssemblyLine Flow. 24

© Copyright IBM Corp. 2005

-c switch does not allow you to work with mulitple file names 24
Memory Leaks 25
Platform specific problems 25

Chapter 8. Troubleshooting scenarios 27
Log files not showing up or showing up after only the second run of the server 27

Appendix A. Support information . . . 29
Searching knowledge bases 29
Search the information center on your local system or network 29
Search the Internet 29
Obtaining fixes 29
Contacting IBM Software Support 30
Determine the business impact of your problem 31
Describe your problem and gather background information 31
Submit your problem to IBM Software Support 31

Appendix B. Notices 33
Trademarks 35

Index 37

Preface

This book provides information about possible problems and corrective actions that can be tried before contacting IBM Software Support. It also includes information about tools you can use for problem determination with IBM® Tivoli® Directory Integrator 6.1.

Who should read this book

This book is intended for those responsible for the identification and resolution of problems in the IBM Tivoli Directory Integrator.

Publications

Read the descriptions of the IBM Tivoli Directory Integrator library and the related publications to determine which publications you might find helpful. After you determine the publications you need, refer to the instructions for accessing publications online.

IBM Tivoli Directory Integrator library

The publications in the IBM Tivoli Directory Integrator library are:

IBM Tivoli Directory Integrator 6.1: Getting Started
A brief tutorial and introduction to IBM Tivoli Directory Integrator 6.1.

IBM Tivoli Directory Integrator 6.1: Administrator Guide
Includes complete information for installing the IBM Tivoli Directory Integrator. Includes information about migrating from a previous version of IBM Tivoli Directory Integrator. Includes information about configuring the logging functionality of IBM Tivoli Directory Integrator. Also includes information about the security model underlying the Remote Server API.

IBM Tivoli Directory Integrator 6.1: Users Guide
Contains information about using the IBM Tivoli Directory Integrator 6.1 tool. Contains instructions for designing solutions using the IBM Tivoli Directory Integrator tool (**ibmditk**) or running the ready-made solutions from the command line (**ibmdisrv**). Also provides information about interfaces, concepts and AssemblyLine/EventHandler creation and management. Includes examples to create interaction and hands-on learning of IBM Tivoli Directory Integrator 6.1.

IBM Tivoli Directory Integrator 6.1: Reference Guide
Contains detailed information about the individual components of IBM Tivoli Directory Integrator 6.1 AssemblyLine (Connectors, EventHandlers, Parsers, Plug-ins, and so forth).

IBM Tivoli Directory Integrator 6.1: Problem Determination Guide
Provides information about IBM Tivoli Directory Integrator 6.1 tools, resources, and techniques that can aid in the identification and resolution of problems.

IBM Tivoli Directory Integrator 6.1: Messages Guide
Provides a list of all informational, warning and error messages associated with the IBM Tivoli Directory Integrator 6.1.

© Copyright IBM Corp. 2005

IBM Tivoli Directory Integrator 6.1: Password Synchronization Plug-ins Guide
Includes complete information for installing and configuring each of the four IBM Password Synchronization Plug-ins: Windows Password Synchronizer, Sun ONE Directory Server Password Synchronizer, IBM Directory Server Password Synchronizer, Domino Password Synchronizer and Password Synchronizer for UNIX® and Linux®. Also provides configuration instructions for the LDAP Password Store and MQe Password Store.

IBM Tivoli Directory Integrator 6.1: Release Notes
Describes new features and late-breaking information about IBM Tivoli Directory Integrator 6.1 that did not get included in the documentation. IBM Tivoli Directory Integrator 6.1.

Related publications

Information related to the IBM Tivoli Directory Integrator is available in the following publications:

- IBM Tivoli Directory Integrator 6.1 uses the JNDI client from Sun Microsystems. For information about the JNDI client, refer to the *Java™ Naming and Directory Interface™ 1.2.1 Specification* on the Sun Microsystems Web site at http://java.sun.com/products/jndi/1.2/javadoc/index.html.
- The Tivoli Software Library provides a variety of Tivoli publications such as white papers, datasheets, demonstrations, redbooks, and announcement letters. The Tivoli Software Library is available on the Web at: http://www.ibm.com/software/tivoli/library/
- The *Tivoli Software Glossary* includes definitions for many of the technical terms related to Tivoli software. The *Tivoli Software Glossary* is available, in English only, from the **Glossary** link on the left side of the Tivoli Software Library Web page http://www.ibm.com/software/tivoli/library/

Accessing publications online

The publications for this product are available online in Portable Document Format (PDF) or Hypertext Markup Language (HTML) format, or both in the Tivoli software library: http://www.ibm.com/software/tivoli/library.

To locate product publications in the library, click the **Product manuals** link on the left side of the Library page. Then, locate and click the name of the product on the Tivoli software information center page.

Information is organized by product and includes READMEs, installation guides, user's guides, administrator's guides, and developer's references as necessary.

Note: To ensure proper printing of PDF publications, select the **Fit to page** check box in the Adobe Acrobat Print window (which is available when you click **File->Print**).

Accessibility

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

Contacting IBM Software support

Before contacting IBM Tivoli Software support with a problem, refer to IBM System Management and Tivoli software Web site at:

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

If you need additional help, contact software support by using the methods described in the *IBM Software Support Guide* at the following Web site:

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

The guide provides the following information:

- Registration and eligibility requirements for receiving support
- Telephone numbers and e-mail addresses, depending on the country in which you are located
- A list of information you must gather before contacting customer support

Chapter 1. Introduction to problem determination

This guide provides information about IBM Tivoli Directory Integrator 6.1 tools, resources, and techniques that can aid in the identification and resolution of problems.

IBM Tivoli Directory Integrator overview

IBM Tivoli Directory Integrator (TDI) manages the technicalities of connecting to and interacting with the various data sources that you want to integrate, abstracting away the details of their APIs, transports, protocols and formats. Instead of focusing on data, TDI lifts your view to the information level, enabling you to concentrate on the transformation, filtering and other business logic required to perform each exchange.

The architecture of IBM Tivoli Directory Integrator is divided into two parts:

- The kernel, where most of the system's functionality is provided, and which you leverage to quickly build the framework of your solution.
- The components, which abstract away the technical details of the data systems, platforms and formats that you want to work with. TDI provides you with a number of components types, such as: Connectors, Parsers and Function Components.

When faults and errors occur, several built in diagnostic tools are used to collect information and determine the exact cause of the problem.

Troubleshooting topics

This guide contains troubleshooting information for the following topics:

- Installation: See Chapter 3, "Installation and uninstallation," on page 7 for more information.
- Configuration Editor: See Chapter 4, "Configuration Editor," on page 13 for more information.
- Administration and Monitoring Console: See "Administration and Monitoring Console (AMC) Problem Determination" on page 17 for more information.
- Components: See Chapter 6, "Components," on page 19 for more information.
- Known Limitations and general troubleshooting: See Chapter 7, "Known limitations and general troubleshooting," on page 23 for more information.
- Scenarios: See Chapter 8, "Troubleshooting scenarios," on page 27 for more information.

Built-in troubleshooting features

Note: Many of the built-in troubleshooting features are documented elsewhere in the IBM Tivoli Directory Integrator 6.1 documentation library. The following sections tell you where to look for information about these features.

Logging

IBM Tivoli Directory Integrator relies on log4j as a logging engine. It is a very flexible framework that lets you log to file, NT eventlog, Unix syslog

© Copyright IBM Corp. 2005

and more, and can be tuned so it suits most needs. It can be a great help when you want to troubleshoot or debug your solution.

For information about IBM Tivoli Directory Integrator logging, see the "Logging and debugging" chapter in the *IBM Tivoli Directory Integrator 6.1: Administrator Guide*.

To see examples of the logging panels of the Config Editor see the "Config Editor" chapter in the *IBM Tivoli Directory Integrator 6.1: Users Guide*.

Debugging

TDI 6.1 offers an AssemblyLine debugging tool called the AL Stepper. The AL Stepper allows you to:

1. Define breakpoints for AssemblyLines.
2. Pause AssemblyLine processing at the defined breakpoints to examine the AssemblyLine for errors.

The AL Stepper is part of the Config Editor. For more information about how to use the AL Stepper, please refer to the "Config Editor" chapter of the *IBM Tivoli Directory Integrator 6.1: Users Guide* for more information about this feature.

Tracing and First Failure Data Capture (FFDC)

IBM Tivoli Directory Integrator is instrumented throughout its code with tracing statements, using the JLOG framework, a logging library similar to log4j, but which is used inside TDI specifically for tracing and First Failure Data Capture (FFDC).

For information about IBM Tivoli Directory Integrator logging, see the "Tracing and FFDC" chapter in the *IBM Tivoli Directory Integrator 6.1: Administrator Guide*.

Action Manager (AM)

The Action Manager is an error management mechanism that allows you to create Action Manager rules for your AssemblyLines.

An Action Manager rule consists of two parts:

1. The condition under which the rule is to be invoked, called a "trigger." Some examples of triggers are Server API failure, AssemblyLine failure, or failure of the AssemblyLine to run at specified intervals.
2. A set of alternate actions to be performed when the trigger is encountered.

The Action Manager is part of the Administration and Monitoring Console (AMC). For instructions on how to use the Action Manager, consult the Administration and Monitoring Console chapter in the *IBM Tivoli Directory Integrator 6.1: Administrator Guide*.

Performance Test and Debug Utilities

IBM Tivoli Directory Integrator 6.1 includes Performance Test and Debug Utilities tools. The Performance Test Tool monitors the system level parameters and the server, records and logs information for the system and server at specified intervals of time. Performance test parameters are then used for throughput measurement and capacity planning.

The Debug utilities tool identifies memory usage and memory leaks in specific TDI components by collecting information at specific intervals and upon certain actions.

See Chapter 2, “Performance Test Utilities and Debugging,” on page 5 for more information about TDI's benchmarking tools.

Using the Messages Guide to resolve errors

The *IBM Tivoli Directory Integrator Version 6.1: Messages Guide* contains a list of messages you might encounter in the IBM Tivoli Directory Integrator logs, graphical user interfaces, and the command line.

Use the unique message ID associated with a message to locate detailed explanations and suggested operator responses in the *IBM Tivoli Directory Integrator Version 6.1: Messages Guide*.

For example, say you encounter the following error message in the Server error log:

```
Sep 13 14:31:04 2004  CTGDIS323E Invalid max pool size for Connector conn_name: max_pool_size.
```

You can search for "CTGDIS323E" in the *IBM Tivoli Directory Integrator Version 6.1: Messages Guide* for information about why the error occurred and how to resolve it.

Chapter 2. Performance Test Utilities and Debugging

There are two performance tools included with TDI 6.1: a performance test utilities tool and a performance debugging tool. These tools monitor and log system and server information at specified intervals of time. The information gathered can then be used for throughput measurement and capacity planning.

This chapter describes these tools and explains how to configure and gather information from them.

Performance test utilities

The Performance test utilities are shell scripts that launch a server instance for a particular configuration and logs system-level (io, cpu, network) and jvm level information. The test utilities can be used to benchmark macro parameters such as throughput, application memory and CPU usage. Data is logged into the performance logs at user specified intervals.

Running the performance test utilities scripts

There are two shell scripts: The ibmdisrvtp.sh utility and the ibmdibenchmark.sh utility. The ibmdisrvtp.sh utility measures server throughput. The ibmdibenchmark.sh utility logs system level information. The utilities must be executed separately.

Note: The performance test utilities shell scripts are not supported on Windows® operating systems.

Running the ibmdisrvtp.sh utility

1. 1. Copy the ibmdisrvtp.sh, benchmark.properties, and tdiperfhead.sh files from the `<itdi_install_dir>/performance` directory to the `solution` directory.
2. Open the benchmark.properties file, and specify the following settings:
   - ibmdiroot: Specify the TDI install directory:
   - solutiondir: Specify TDI solution directory
   - configfile: The name of the Config file to be loaded
   - assemblyline: The AssemblyLine to be started
   - eventhandlers: The Event handler to be started; for example:
   - cmdoptions: The ibmdisrv command line options. By default, the value for cmdoptions is None.
   - jvmcmdoptions: The JVM command line options. By default, the value for jvmcmdoptions is `None`.
3. At a command prompt, execute the following command from command line:

   ```
   ./ibmdisrvtp.sh –f benchmark.properties
   ```

Running the ibmdibenchmark.sh utility

1. Copy the ibmdibenchmark.sh, benchmark.properties, and tdiperfhead.sh files from `<itdi_install_dir>/performance` directory to `solution` directory.
2. Open the benchmark.properties file, and specify the following properties:
   - duration: Duration time in seconds, set `-1` so as to run it for infinite time period.

© Copyright IBM Corp. 2005

- interval: Interval time in seconds to collect system level information. If duration is not set to -1 then interval should be lesser than the duration.
- ios: enable/disable input-output information recording (y to enable, n to disable)
- vms: enable/disable memory usage/information recording (y to enable, n to disable)
- nets: enable/disable network information recording (y to enable, n to disable)

3. From the command line, execute the following command:

```
./ibmdibenchmark.sh –f benchmark.properties
```

Performance debugging

The performance debugging tool identifies memory usage and memory leaks in specific TDI components by collecting information at specific intervals and upon certain actions.

Data collected by the performance debugging tool

This feature logs the following information:

- Component name
- Time (in milliseconds)
- Memory usage

Component names are prefixed with name of Assemblyline instance which uniquely identifies each component.

Memory usage is the difference between total memory available (JVM) at start and total memory available at end for each component during its execution.

Before Assemblyline terminates, the performance entry which contains performance statistics is logged. This is then followed by logging of the overall Assemblyline performance statistics.

Running the performance debugging tool

To run the performance debugging tool, use one of the following methods:

- Start the server using the -T parameter

  ```
  ibmdisrv -T
  ```

- Start the server by setting the following property in the global.properties./ solution.properties file:

  ```
  ## Enable\Disable performance logging
  com.ibm.di.server.perfStats=true
  ```

Note: The -T parameter takes precedence over the solution.properties file setting. If the com.ibm.di.server.perfStats value is set to false, you can still obtain performance statistics by starting the server using the -T parameter.

Chapter 3. Installation and uninstallation

Troubleshooting Installation

Installation and un-installation of IBM Tivoli Directory Integrator (TDI) is scripted and implemented by means of Macrovision FLEXnet Publisher Installation Module 1.2.1.

Note: Throughout the following sections you will be asked to gather information for the IBM Solution Install directory (*SI_install_dir*). The location of this directory varies based on operating system and user type:

- On Windows operating systems:
  - If IBM Solution Install was installed by an Administrator (root) user, the IBM Solution Install directory is: C:\Documents and Settings\<*username*>
  - If IBM Solution Install was installed by a non-Administrator (non-root) user, the IBM Solution Install directory is: C:\Program Files\IBM\Common\asci_<*username*>
- On UNIX operating systems:
  - If IBM Solution Install was installed by an Administrator (root) user, the installation directory is: /var/ibm/common/acsi
  - If IBM Solution Install was installed by a non-Administrator (non-root) user, the installation directory is: ~/.acsi_<*username*>/

Gathering installation information

Gathering information about your installation can help IBM Support determine the source of your problem. The following sections describe troubleshooting information that you can generate for different segments within the install.

There are four segments to a TDI install:

1. The initialization, during which the IBM Tivoli Directory Integrator 6.1 Installer either installs or upgrades IBM Solution Install (SI), and the SI service is created/started.
2. The pre-install, which involves stepping through the TDI Installer panels and selecting installation options.
3. The installation action, which occurs after you have selected all the installation options and you begin the product installation.
4. The post-install, which occurs when the installation action is completed, and the TDI install is handling post-install actions such as migration and installing Deployment Engine Update Installer (DEUI).

Troubleshooting initialization

If the IBM Tivoli Directory Integrator install fails to open, or the Initializing Installation Data panel hangs, collect the following logs and send them to IBM Support for analysis:

1. <*tempdir*>/acu_si.log
2. <*tempdir*>/<*userid*>/SIInstall.log
3. <*SI_install_dir*>/logs/si_trace.log

© Copyright IBM Corp. 2005

To determine if IBM Solution Install (SI) is installed on your machine, run the following two commands:

1. Run the `setenv` command from the IBM Solution Install directory:
   - Windows operating systems:
     `setenv`
   - UNIX operating systems:
     `setenv.sh`
2. Run the `listIU` command
   - Windows operating systems:
     `listiu`
   - Unix operating systems:
     `listIU.sh`

After running these commands, if IBM Solution Install is installed, you should see two entries for IBM Solution Install at 1.2.1.16 or higher. If other products have been installed using IBM Solution Install, you will also see those entries.

To gather debug information about this segment of the installation, run the installation in console mode with debugging enabled:

1. Create an .sp file that has the same name as the launcher. This file needs to be in the same place as the launcher too; for example:
   - install_tdiv61_windows.sp
   - install_tdiv61_linux.sp

   This .sp file contains the following line `is.debug=1`
2. Invoke the launcher with the following command:
   `-is:log<pathname>`

   Send the resulting log and the console output to the IBM Support team.

Troubleshooting the pre-install

If the TDI installer does not recognize that a previous version of TDI has been installed, or if the TDI installer does not detect that IBM WebSphere Application Server is present, please gather the following files and send them to IBM Support:

1. The `tdiv61install.log` file. This file is located in the following directory: <*tempdir*>/tdiv61install.log
2. The `vpd.properties` file. On Windows operating systems, this file is located in the C:\WINDOWS or C:\WINNT directory. On UNIX operating systems, this file is located in either in the /root or / directory. On AIX operating systems, this file is located in the /usr/lib/objrepos/ directory

For any other problem with the TDI wizard panels, please gather the tdiv61install.log. If you are uninstalling, gather the tdiv61uninstall.log.

Troubleshooting the installation

To troubleshoot installation, gather at the following log files and send them to IBM Support:

1. Collect the <*SI install directory*>/logs/si_trace.log file.
2. <*tempdir*>/tdiv61install.log or the <*tempdir*>/tdiv61uninstall.log

Troubleshooting the post installation

If the Deployment Engine Update Installer (DEUI) fails to install, gather at the following log files and send them to IBM Support:

1. All DEUI logs found in the <*tempdir*>.
2. <*SI install directory*>/logs/si_trace.log

If there is a problem migrating TDI from 6.0 to 6.1, gather the following files and send them to IBM Support:

1. <*tempdir*>/tdiv61install.log
2. All TDI migration logs found in the <*tempdir*>

Performing a manual uninstallation

If an unexpected error causes uninstallation to fail, you must manually remove IBM Tivoli Directory Integrator, Deployment Engine Update Installer (DEUI) and the IBM Solution Install.

Attention: Removing IBM Solution Install also removes information about all products installed using IBM Solution Install. Before removing IBM Solution Install, make sure there is no necessary information that will be lost as part of the removal.

To manually uninstall on a Windows operating system:

1. Uninstall the Deployment Engine Update Installer (DEUI) using the following command:

   `<DEUI_install_dir>\uninst\uninst.cmd`
2. Remove SI:
   - Run the following command from the IBM Solution Install directory:

     `setenv`
   - Run the following command from any location:

     `si_inst –r`
   - Remove any remaining files from the IBM Solution Install installation directory.
3. Delete the TDI installation directory. Optionally, delete the TDI Solutions Directory as well.

To manually uninstall on a UNIX operating system:

1. Uninstall the Deployment Engine Update Installer (DEUI) using the following command:

   `<DEUI_install_dir>\uninst\uninst`
2. Remove SI:
   - Remove IBM Solution Install by running the `setnev` command from the IBM Solution Install directory.
   - From any directory, run the following command:

     `si_inst.sh –r`
   - To confirm that IBM Solution Install has been uninstalled, run the following command to verify that the IBM Solution Install directory no longer exists.
     - ls /usr/ibm/common
     - ls /var/ibm/common
3. Delete the TDI installation directory. Optionally, delete the TDI Solutions Directory as well.

ikeyman file needs executable persmissions on HP-UX and Solaris operating systems

On HP-UX and Solaris operating systems, the ikeyman file requires executable file permissions; for example, 555. The ikeyman file is located in the jre/bin directory.

Unable to migrate Cloudscape System Store of TDI 6.0 to TDI 6.1.

The following are symptoms of a failed migration from Cloudscape System Store 6.0 to Cloudscape System Store 6.1.

- The TDISysStore folder is empty.
- Unable to access TDI 6.0 System Store data.
- Installer failed with message similar to: Unable to migrate Cloudscape Database.

The migration failed because the Cloudscape Database could not be migrated by the installer.

TDI 6.1 uses Derby (Cloudscape v 10) drivers that are not compatible with previous versions of Cloudscape. Because TDI 6.0 uses Cloudscape version 5.1 as its System Store, Cloudscape must be migrated to a Cloudscape version 10 database in 6.1.

To migrate to Cloudscape version 10, you need the `migrateCS` script shipped with TDI 6.1. This script is located in the following directory:

`<Install_dir>/tools/CSMigration`

To migrate your older Cloudscape database, invoke the `migrateCS` script as follows:

`migrateCS <oldCSdirectoryDB> <newCSdirectoryDB>`

For example, if your old Cloudscape DB is in the `E:\MyDB` directory, and you wish to create a new one in the `E:\TDI61\MyDB_10` directory, you would run the following command:

```
migrateCS E:\MyDB E:\TDI61\MyDB_10
```

Note: Note: The MyDB_10 folder will be automatically created by the script. It must not exist before invoking the script.

Known Limitations

Glibc package 2.3 or higher required for installation on Linux operating systems

When installing IBM Tivoli Directory Integrator 6.1 (TDI) on a Linux operating system, the glibc package must be at level 2.3 or higher.

To determine the level of the glibc package, run the following command:

```
rpm -qa|grep glibc
```

Maintenance Level 3 required for installation on an AIX 5.3 operating system

Make sure that Maintenance Level 3 has been applied before installing IBM Tivoli Directory Integrator 6.1 on an AIX® 5.3 operating system.

Incorrect text emphasis when installing TDI on a Windows operating system in Simplified Chinese

During TDI installation on a Windows operating system in Simplified Chinese, some text strings in normal text should be in bold text.

Some messages display when installing TDI 6.1 using the -console option on an HP-UX operating system

The following messages might display when you install TDI 6.1 using the -console option on an HP-UX operating system:

```
rm: java not removed.  Text file busy
rm: directory PA_RISC2.0 not removed.  Directory not empty
rm: directory bin not removed.  Directory not empty
rm: libhpi.sl not removed.  Text file busy
rm: directory native_threads not removed.  Directory not empty
rm: libjvm.sl not removed.  Text file busy
rm: directory server not removed.  Directory not empty
rm: libjava.sl not removed.  Text file busy
rm: libnet.sl not removed.  Text file busy
rm: libnio.sl not removed.  Text file busy
rm: libverify.sl not removed.  Text file busy
rm: libzip.sl not removed.  Text file busy
rm: directory PA_RISC2.0 not removed.  Directory not empty
rm: directory lib not removed.  Directory not empty
rm: directory jre not removed.  Directory not empty
rm: directory _bundledJRE_ not removed.  Directory not empty
rm: directory /tmp/istemp8353117173137 not removed.  Directory not empty
```

These messages do not cause the installer to fail. You can ignore these messages.

Some messages display when uninstalling TDI 6.1 using the -console option on Windows and AIX operating systems

Messages similar to the following might display when you uninstall TDI 6.1 using the -console option on Windows and AIX operating systems:

Windows:

```
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/gskikm.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/oldcertpath.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/ibmjcefips.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/ibmjsseprovider2.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/ibmpkcs11impl.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/jaccess.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/indicim.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/dumpfmt.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/ldapsec.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/dtfj.jar
Additional class path file not found: /tmp/istemp258274159235052/_bundledJRE_/jr
e/lib/ext/svcdump.jar
```

AIX:

```
cat: 0652-050 Cannot open /tmp/istemp332024160032502/chunk2.
rm: /tmp/istemp332024160032502/chunk1: A file or directory in the path name does not exist.
rm: /tmp/istemp332024160032502/chunk2: A file or directory in the path name does not exist.
bash#
```

These messages do not cause the uninstaller to fail. You can ignore these messages.

Debug statements created when uninstalling TDI 6.1 using the -console option on UNIX operating systems

Debug statements might display when you uninstall TDI 6.1 using the -console option on Windows and AIX operating systems. These statements do not cause the uninstall to fail.

Product name does not appear following uninstallation of TDI 6.1 using the -console option

Following uninstallation using the -console option, the following message might appear:

```
{0} was successfully uninstalled from your computer
```

This message should read:

```
IBM Tivoli Directory Integrator was successfully uninstalled from your computer
```

This error does not cause the uninstallation to fail.

Migration from TDI 6.0 to TDI 6.1 on the HP-UX 11iv2 operating system is not supported

TDI 6.0 does not support the HP-UX 11iv2 operating system. Because of this, migration from TDI 6.0 to TDI 6.1 is not supported on HP-UX 11iv2 (11.23) PA-RISC platforms.

Chapter 4. Configuration Editor

Troubleshooting the Config Editor

The Config Editor (CE) is a graphical interface that allows you to create, test and debug your integration solutions. Configs are created and maintained in the Config Editor and deployed with the Server.

The following chapter describes some problems you might encounter when using the Config Editor and suggests some workarounds.

Config Creation Save As command not working properly

This error occurs when the **Save As** command fails to save Autostart and Logconfig information in the Config file.

To work around this problem, use the shell copy command for your operating system to save Autostart and Logconfig information.

Locking of parameter file

If you use Config Editor to open the external parameter file the file might become locked.

To work around this problem, do not use Config Editor to open the external parameter file.

Keyboard shortcuts might not work if JAWS is configured

The left navigation pane of Config Editor provides a tree view of the current configuration, as well as all the current AssemblyLines, EventHandlers, Connectors, and so forth. When JAWS is configured for TDI, keyboard shortcuts in the left Config Editor pane might not work properly. To work around this problem, use the mouse to obtain focus on the required component or components in the left Config Editor pane.

Error occurs when opening, closing or creating a Config file if JAWS is configured

When JAWS is configured for TDI, an error dialog box might appear when you open, close or create a Config file in the Config Editor. This error does not cause any JAWS or TDI malfunction, and you can safely close the pop-up error dialog box.

Resize Config Editor panel if Password Store drop-down menu does not appear

The Password Store drop-down menu might not appear if the Config Editor panel is too small. If the Password Store drop-down menu does not appear, resize the panel to be bigger. The menu will reappear.

© Copyright IBM Corp. 2005

Known Limitations

Alignment of text boxes and buttons slightly off on Config panel for ScriptConnector

On the **Config** tab of a ScriptConnector, the **External Files** text box is smaller than the **Include global scripts** text box. The boxes should be identical in size. Additionally, **Select . . .** button is smaller than the **Add Files** button. The buttons should be identical in size.

Drop-down menu truncates the first time Inherit from: ibmdi.CSV button is clicked

Clicking the **Inherit from: ibmdi.CSV** button on a CSV Parser's **Config** tab launches the **Select** window. The first time you click **Inherit from: ibmdi.CSV**, the drop-down menu on the **Select** window truncates.

Slight truncation of column names in Simplified Chinese on Windows 2003 operating systems

There might be a slight truncation of Config Editor column names in Simplified Chinese on Windows 2003 operating systems.

IBM JavaScript limitations

The following sections describe limitations you might encounter when using IBM JavaScript™.

String representations of numbers not represented in exponential format

String representations of numbers do not use exponential format. For example, the following string:

```
String( -100000000000000000000 )
```

yields the following:

```
"-100000000000000000000"
```

Package and class references do not return string values

Package and class references do not return string values. For example, the following reference:

```
main.logmsg ("String: " + java.lang.String);
```

results in an exception.

Date constructors cannot take values higher than the maximum integer value

Date constructors that use numeric values higher than 2.32 wrap and return the wrong date value.

All comparisons of prototypes return false

Comparisons of prototypes return false; for example:

```
Math.__proto__ == Object.prototype --> false
```

Arrays with high numeric values truncate

Creating an array with a numeric value higher than 2*32 results in a truncated value and a smaller array than requested.

Sandbox not supported with connectors that return nonserializable data

Nonserializable data returned cannot be stored in a database. For this reason, Sandbox is not supported for connectors that return this kind of data.

Variable override of standard types allowed

IBM JavaScript allows variables to override standard types; for example, the following string:

```
STRING = ""; new STRING())
```

does not result in an exception.

Declaring two or more functions on same line allowed

IBM JavaScript allows you to declare more than one function on the same line.

Redeclared variable does not retain the previous value

Redeclaring a variable does not retain the previous value, even if the declaration is unspecified; for example:

```
a = 10;   var a;   a --> null/undefined
```

Chapter 5. Troubleshooting the Administration and Monitoring Console

Administration and Monitoring Console (AMC) Problem Determination

AMC scripts might fail if ksh not on UNIX operating systems

The createProfile.sh script makes use of ksh. If ksh is not installed on the Unix operating system, the script may fail.

If the script fails, you can run the createProfile command in the script. The createProfile the command is:

```
"$APPSRV_INSTALLROOT/bin/wasprofile.sh" -create -profileName amcprofile -profilePath
"$APPSRV_INSTALLROOT/profiles/amcprofile" -templatePath "$APPSRV_INSTALLROOT/profileTemplates/defa
-nodeName DefaultNode -hostName localhost -cellName DefaultNode
```

Replace the `$APPSRV_INSTALLROOT` with the path of AppSrv directory.

Unable to start AMC via the start_tdiamc script

If the TDI server error log contains the following exception it could mean that a port required by WAS is already in use:

```
ORBX0390E: Cannot create listener thread. Exception=[ > java.net.BindException: Address already ir
```

This error might also occur if you have Google Web Accelerator installed on the machine from which you are attempting to start the Administration and Monitoring Console (AMC). You may need to uninstall Google Web Accelerator to resolve this problem.

Unable to deploy AMC .war file on Red Hat Enterprise Linux s390 operating system

When running the WAS **createProfile.h** and **start_tdiamc.sh** commands on a Red Hat Enterprise Linux s390 operating system, you might encounter the following error:

```
JVMDG080: Cannot find class com/ibm/jvm/Trace
JVMXM012: Error occurred in final diagnostics initialization
Could not create JVM.
```

To workaround this problem, disable the Java Just-In-Time (JIT) compiler.

© Copyright IBM Corp. 2005

Chapter 6. Components

This chapter contains troubleshooting information about IBM Tivoli Directory Integrator (TDI) components.

Components overview

Components abstract away the technical details of the data systems, platforms and formats that you want to work with, allowing you to integrate your information across various data sources.

IBM Tivoli Directory Integrator provides you with a number of components types:

- Connectors
- Function Components
- EventHandlers
- Parsers

The following sections contain troubleshooting information for each type of component.

Connectors

Connectors help you to build your AssemblyLine. Each one is designed to tie a specific data source to your data flow.

CommandLine Connector

AssemblyLine AssemblyLines/CommandLine failed with error: CreateProcess: dir error=2

If your are running Windows, and trying to execute an internal shell command (such as dir or any command listed by the command), you might have forgotten to prepend cmd /c . For example, the correct syntax for the dir command is cmd /c dir.

DOS-encoded output on Windows operating systems

When you use the Command Line Connector to run a program on a Windows operating system, the output from the program might be encoded using a DOS code page. This can cause unexpected results, because Windows programs usually use a Windows code page. Because a DOS code page is different from a Windows code page, it might be necessary to set the Character Encoding in the Command Line Connector's Parser to the correct DOS code page for your region; for example: `cp850`.

JDBC Connector

COM.ibm.db2.jdbc.DB2Exception: CLI0616E Error opening socket. SQLSTATE=08S01

A Server Service named DB2 JDBC Applet Server is required to be running on the Window machine where the DB2 Server is running. If The DB2 JDBC Applet Server service is not running you will get this message. Refer to the FAQ that has more information on connecting to a DB2 server.

© Copyright IBM Corp. 2005

CLI0616E Error opening socket

The remote DB2 server is not configured for DB2 net driver communications. Refer to the FAQ that has more information on connecting to a DB2 server.

java.sql.SQLException: ORA-01830: date format picture ends before converting entire input string

If you are getting this when inserting/updating date-fields, you are probably passing the Oracle driver dates as a string that does not match what the driver expects. Problem Scenario: (More detailed information about a situation where this can happen, skip to the Suggestion section if not interested) I have an AssemblyLine with a JDBC Connector in addonly mode which writes some records to an Oracle table with a field of type DATE. Normally I would insert something like;

```
INSERT INTO table1 values (to_date('2005/03/01 10:05:13','YYYY/MM/DD HH:MI:SS'))
```

as part of my INSERT query. However with TDI, I can only do something like this in the output map;

```
ret.value = '2005/03/01 10:05:13';
```

but Oracle fails with the following error; java.sql.SQLException: ORA-01830: date format picture ends before converting entire input string

Suggestions: When dates are supplied as strings (which is what you do here) the TDI JDBC Connector will attempt to parse the data using the pattern provided in its 'Date Format' configuration parameter, as explained in the reference guide. To debug your problem: What is your Data Pattern configuration? Find out how TDI sees this field (check in the schema tab of the Connector). A fair guess is that your JDBC driver will convert the Oracle Data type into a java.sql.TimeStamp or java.sql.Date type (and note that there are differences between java.util.Date and java.sql.Date, in terms of precision for example). In case, for example, of a java.sql.Timestamp type, try specifying

```
ret.value = java.sql.Timestamp(java.util.Date().getTime());
```

and see if this helps. Then you will be able to use

```
ret.value = java.sql.Timestamp(system.parseDate(work.getString("yourDate"),
"yyyyMMddHHmmssz").getTime());
```

If none of the above helps, turn the Connector into detailed log mode and see whether the Connector is able to get the schema from the database. If not, the Connector does not use prepared statements which makes it less efficient and more error-prone - so you'll have to make sure that the Connector's 'schema' configuration parameter is set correctly.

Handling of CLOB/BLOB (Character/Binary large object)

If your attributes are of CLOB/BLOB type, the Connector does not handle them on output. On input, you can do something like

```
desc = conn.getObject("yourCLOBAttribute");  ret.value = desc.getSubString(1,desc.length());
```

but it is slow and clumsy. Also it will only work if the JDBC driver actually returns a java.sql.Blob or java.sql.Clob interface object.

Disabling Prepared Statement can result in an exception for queries that exceed the maximum length value

If Prepared Statement is disabled, the JDBC connector attempts to construct a complete SQL query. If the database has a restriction on the length of the SQL

query, and the query exceeds the maximum length value, an exception is thrown. This is a common problem with BLOB/binary data types.

Use ojdbc14.jar to transfer BLOB data from table to another in an Oracle database

Use ojdbc14.jar instead of using classes12.jar when using the JDBC Connector to transfer BLOB data from one table to another table in an Oracle database,

Windows Users and Groups Connector

java.lang.UnsatisfiedLinkError: can't find library NTMetaData (libNTMetaData.so)

This error occurs when you attempt to use the Windows Users and Groups Connector on a non-Windows platform. The Windows Users and Groups Connector is supported on Windows platforms only.

Function Components

They are modeless components that facilitate wrapping of custom logic and external methods. Function components are not datasource specific.

Currently there is no troubleshooting information about specific Function Components.

Event Handlers

EventHandlers extend the functionality of AssemblyLines and Connectors by providing a framework to control how they are run.

Currently there is no troubleshooting information about specific EventHandlers.

Parsers

Parsers are used in conjunction with a transport Connector to interpret or generate the content that travels over the Connector's byte stream.

LDIF Parser

Performance degradation

The TDI 6.1 LDIF Parser shows some performance degradation in terms of execution time compared to the TDI 6.0 LDIF Parser. This is due to underlying JVM changes in TDI 6.1, in which certain APIs experience a performance drop when working with very huge data sets.

The degradation is dependent on various considerations such as hardware, RAM, processor speed, and Disk IO.

Chapter 7. Known limitations and general troubleshooting

This chapter contains miscellaneous problem determination information.

Known limitations

SSL connects with expired self signed certificates

The TrustManager shipped with IBM JRE 1.5.0 verifies a certificate chain up to the trusted certificate; it does not verify the trusted certificate itself. If the self-signed certificate is the trusted certificate, CERTPATH will not examine it to see whether or not the certificate is expired. Because CERTPATH does not check for self-signed certificate expiration, an SSL connection can be established with an expired certificate.

The TrustManager shipped with IBM JRE 1.4.2 verifies the entire certificate chain up to and including the trusted certificate. As a result, if an expired certificate is encountered, an exception is thrown. If you are using IBM JRE 1.5.0, but want to revert to 1.4.2 behavior regarding expired certificates, do the following:

In the java.security file of the Client JVM, change the following entry:

```
ssl.KeyManagerFactory.algorithm=IbmX509
ssl.TrustManagerFactory.algorithm=PKIX
```

to

```
ssl.KeyManagerFactory.algorithm=IbmX509
ssl.TrustManagerFactory.algorithm=IbmX509
```

If the SSL Client-Auth value is set to True, make the same change in the Server JVM's java.security file.

Programatically disabling components

To disable components you will need to use the Initial Work Entry (IWE) to pass a control flag. If your AssemblyLine has an Iterator, store the value in a script variable and zero out the Work Entry; otherwise the Iterator will not engage on the first cycle.

For example, to disable a branch, you might do the following:

```
var branchEnabled = work.getString( "enableBranch" );     task.setWork( null );
```

Then set your Branch to ″Match All″ and include a scripted condition like this:

```
 ret.value = branchEnabled.equals( "yes" );
```

If you intend to use IWE, you must you an extra attribute that you must clear out before continuing.

Disabling Connectors is difficult and requires modifying the Config object before starting the AssemblyLine. If the Connector is not disabled before you start the AssemblyLine, it will be initialized even if you disable it in the prolog before initialization. Modifying the in-memory Config object is possible, but not advised. An alternative is to set your Connector to passive, but this will not help if you are trying to avoid an initialization completely.

© Copyright IBM Corp. 2005

gg script not required for execution of the pwsync_racf example

In the <*TDI_Install*>/examples/pwsync_racf/racf_decrypt.xml file, there is a script, gg, in the **Scripts** folder. The gg script is not used in the example and is not required for execution of the example.

General troubleshooting

The following sections describe general problems and solutions in IBM Tivoli Directory Integrator:

Error occurs when an encrypted password exceeds the size of the table column in which the password is stored

An error similar to the following occurs when an encrypted password exceeds the size of the column where the password is stored:

```
" ORA 12899 value too large for column "System".TESTPASSWD"."test1"(actual 178 , maximum 50)
```

To work around this problem, ensure that the tables used to store passwords are sufficiently large.

AssemblyLine Flow

Connector in Lookup mode with no match in a loop component causes error

Normally a Connector in Lookup mode expects only one hit, and if more than one hit occurs, you are given the opportunity to remedy the situation using 'error'-hooks On Multiple Entries or On No Match. Connectors in the Loop Component behave differently:

- On Multiple Entry is never called.
- On No Match is called only if no match is returned by the Lookup Connector.

If the Lookup Connector finds no entries, the following error occurs:

```
java.lang.Exception: [IF_MgrFound] Entry not found
```

Occasionally a crash also occurs if the exception is not caught.

To work around this error, enable "No Entry Found" without any code in it.

Advanced link criteria for a Lookup Connector in a Loop deleted when saving config

To prevent deletion of advanced link criteria, put your advanced Link Crit in a Connector in your Library that you use in the Loop. Then you will inherit the Link Crit as well.

-c switch does not allow you to work with mulitple file names

If you want to use more than one configuration file, you must also specify the -d switch (Run in daemon mode) in addition to the -c switch. If you do not specify the -d switch, only one configuration file is allowed.

Memory Leaks

Reinitialization of Connectors

If you reinitialize Connectors a lot, make sure to use their terminate() method before you call their initialize() method. The classic example is an AssemblyLine starting up but not able to connect to your data source. If the Connector is not terminated before being initialized again, you might leak memory.

Platform specific problems

Chapter 8. Troubleshooting scenarios

This chapter contains some troubleshooting scenarios you might encounter and provides some solutions.

Log files not showing up or showing up after only the second run of the server

If log files are not showing up, the problem is probably that log4j.properties does not exists in the solution directory before the server is run. The log4j.properties is one of the places where (default) log-files location is configured, so you might want to check out the files content as well. For 6.0 this file is created by the server/ce batch-files that you start TDI with. If you are running TDI as a Windows service, make sure that you have followed the instructions on how to run TDI as a Windows service.

© Copyright IBM Corp. 2005

Appendix A. Support information

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

- "Searching knowledge bases"
- "Obtaining fixes"
- "Contacting IBM Software Support" on page 30

Searching knowledge bases

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

Search the information center on your local system or network

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

Search the Internet

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

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

Obtaining fixes

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

1. Go to the IBM Software Support Web site (http://www.ibm.com/software/support).
2. Under **Products A - Z**, select your product name. This opens a product-specific support site.
3. Under **Self help**, follow the link to **All Updates**, where you will find a list of fixes, fix packs, and other service updates for your product. For tips on refining your search, click **Search tips**.
4. Click the name of a fix to read the description and optionally download the fix.

© Copyright IBM Corp. 2005

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

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

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

Contacting IBM Software Support

IBM Software Support provides assistance with product defects.

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

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

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

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

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

Determine the business impact of your problem

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

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

Describe your problem and gather background information

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

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

Submit your problem to IBM Software Support

You can submit your problem in one of two ways:

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

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

For more information about problem resolution, see Searching knowledge bases and Obtaining fixes.

Appendix B. Notices

This information was developed for products and services offered in the U.S.A. IBM might not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:
INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the information. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this information at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

© Copyright IBM Corp. 2005

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
Department MU5A46
11301 Burnet Road
Austin, TX 78758
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. You may copy, modify, and distribute these sample programs in any form without payment to IBM for the purposes of developing, using, marketing, or distributing application programs conforming to IBM's application programming interfaces.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_. All rights reserved.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, or other countries, or both:

AIX
DB2
developerWorks
Domino
eServer
IBM
iSeries
Lotus
Passport Advantage
pSeries
Rational
Redbooks
RS/6000
S/390
SecureWay
Tivoli
WebSphere
xSeries
z/OS
zSeries

Intel®, Intel Inside (logos), MMX™ and Pentium® are trademarks of Intel Corporation in the United States, other countries, or both.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States and other countries.

Microsoft®, MS-DOS, Windows, and Windows NT® are registered trademarks of Microsoft Corporation

UNIX is a registered trademark in the United States and/or other countries licensed exclusively through X/Open Company Limited.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, and service names may be trademarks or service marks of others.

Index

C

customer support
  see Software Support 30

F

fixes, obtaining 29

I

information centers, searching to find
  software problem resolution 29
Internet, searching to find software
  problem resolution 29

K

knowledge bases, searching to find
  software problem resolution 29

M

messages, resolving 3

P

problem determination
  describing problem for IBM Software
    Support 31
  determining business impact for IBM
    Software Support 31
  submitting problem to IBM Software
    Support 31

S

Software Support
  contacting 30
  describing problem for IBM Software
    Support 31
  determining business impact for IBM
    Software Support 31
  submitting problem to IBM Software
    Support 31

© Copyright IBM Corp. 2005

Printed in USA

SC32-2565-00