IBM Tivoli Composite Application Manager Extended Agent
for Oracle Database
6.3.1 Fix Pack 2

Installation and Configuration Guide

IBM

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Chapter 1. Overview of the agent

The IBM Tivoli Composite Application Manager Extended Agent for Oracle Database (product code RZ) provides you with the capability to monitor Oracle Database. You can also use the agent to take basic actions with the Oracle Database.

IBM® Tivoli® Monitoring is the base software for the Oracle Database Extended agent. The Oracle Database Extended agent monitors Oracle RAC performance, Oracle ASM performance, General Oracle database performance, and Data Guard performance.

IBM Tivoli Monitoring

IBM Tivoli Monitoring provides a way to monitor the availability and performance of all the systems in your enterprise from one or several designated workstations. It also provides useful historical data that you can use to track trends and to troubleshoot system problems.

You can use IBM Tivoli Monitoring to achieve the following tasks:
- Monitor for alerts on the systems that you are managing by using predefined situations or custom situations.
- Establish your own performance thresholds.
- Trace the causes leading to an alert.
- Gather comprehensive data about system conditions.
- Use policies to take actions, schedule work, and automate manual tasks.

The Tivoli Enterprise Portal is the interface for IBM Tivoli Monitoring products. You can use the consolidated view of your environment as seen in the Tivoli Enterprise Portal to monitor and resolve performance issues throughout the enterprise.

See the IBM Tivoli Monitoring publications listed in "Prerequisite publications" on page 63 for complete information about IBM Tivoli Monitoring and the Tivoli Enterprise Portal.

Features of the Oracle Database Extended agent

Use the Oracle Database Extended agent software to monitor Oracle RAC (Real Application Clusters) databases, ASM (Automatic Storage Management) databases, normal databases, which have a single Oracle instance for each Oracle database, and Oracle Data Guard. Use the software to identify, notify you of, and correct common problems with the application that it monitors. The software includes the following features:
- Remote database monitoring

  You can install the Oracle Database Extended agent on a different workstation from the one where the Oracle database to be monitored is running.
- Multiple agent instances monitoring

  You can configure and start multiple agent instances.
- Multiple database connections monitoring in one agent instance

  You can define multiple database connections to monitor multiple Oracle database by using one agent instance.
- Agent events monitoring

  You can find detail information about all triggered events in the Database Connection workspace, and determine the problem with the monitored database.

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* Oracle database monitoring

  The agent monitors Oracle RAC (Real Application Clusters) databases, ASM (Automatic Storage Management) databases, and normal databases, which have a single Oracle instance for each Oracle database.

* Data Guard monitoring

  Data Guard provides a set of services that create and maintain standby databases. These standby databases are used to enable Oracle databases to switch one standby database to production role in case the primary database is unavailable because of planned or unplanned outage.

  The agent monitors the Data Guard configuration, the transport activities of redo logs between the primary database and standby databases, the Redo Apply at physical standby databases, and SQL Apply at logical databases.

* Topology views for RDBMS (relational database management system) databases, including RAC databases, and for ASM databases

  – For RDBMS database connections, including RAC database connections, the agent provides the relationship between the following components:

    - Services

    - RDBMS instances

    - Database

  – For ASM database connection, the agent provides the relationship between the following components:

    - RDBMS instances

    - Database

    - ASM instances

    - ASM disk groups

    - ASM disk

Functions of the monitoring agent

The Oracle Database Extended agent provides the following functions for Oracle Database 10g release 1, Oracle Database 10g release 2, Oracle Database 11g release 1, and Oracle Database 11g release 2:

Oracle RAC performance monitoring

Oracle Real Application Clusters (RAC) enables a single database to run across a cluster of servers. The most important services in RAC are GCS (Global Cache Services) and GES (Global Enqueue Service). The Oracle Database Extended agent provides the following features to monitor those two services:

* GCS monitoring

  Information about the following items is provided:

  – GCS Memory: the memory that currently used by GCS

  – GCS Current Block: the received time and served time of the current block

  – GCS Block Lost: the percentage of block lost during the transfer

  – GCS CR Latency: the received time and served time of the CR block

  – GCS Waits: the waiting sessions that are related to GCS

  – Cache Fusion: the ratio of cache fusion

* GES monitoring

  Information about the following items is provided:

  – GES Enqueue Statistics: the contents statistics in GES

  – GES Latency: the latency statistics in GES

  – GES Lock: current locks in GES

- – GES Memory: the memory that currently used by GES
- – Messaging Statistics: the time to process messages in GCS and GES

Oracle ASM performance monitoring

Oracle ASM is a volume manager and a file system for Oracle database files. The following features are provided for ASM monitoring:

- ASM topology monitoring, providing the topology of ASM instances, ASM disk groups, and ASM disks
- ASM alert log monitoring
- ASM availability monitoring
- ASM capacity monitoring, providing information about ASM disk groups, ASM disks, and ASM files.
- ASM IO statistics, providing the I/O statistics of ASM disk groups, I/O statistics of ASM disks, and information about ASM operations.

General Oracle database performance monitoring

The Oracle Database Extended agent provides monitoring for the availability, performance, resource usage, and activities of the Oracle database.

- Availability of instances in the monitored Oracle database
- Resource information such as memory, caches, segments, resource limitation, tablespace, undo (rollback), system metric, and system statistics
- Activity information such as OS statistics, sessions, contention, and alert log

Data Guard performance monitoring

This function provides information about alert logs, Data Guard configuration, Redo Apply, SQL Apply, and transport of redo logs.

New in this release

For version 6.3.1 Fix Pack 2 of the Oracle Database Extended agent, enhancements were made since version 6.3.1.

The following enhancements were made:
- User interface configuration improvements.
  - Simplifies the database connection configuration with three connection types:
    - Basic: Oracle database server host name (or IP address), Listener port, and Oracle database service name (or Oracle SID) must be specified.
    - TNS: only the TNS Alias must be specified or selected from the drop-down list that is discovered from the `ORACLE_HOME/network/admin/tnsnames.ora` file.
    - Advanced: only the Oracle connection string must be specified to be compatible with an old version of agent configuration.
  - -Supports the following connection string format: "//*hostname:port/ORACLE_SID*".
  - At least one database connection must be added during the GUI configuration.
- New environment variables that you can use to customize the agent, such as **KRZ_LISTENER_INCLUDE**, **KRZ_LISTENER_EXCLUDE**, **KRZ_TNS_INCLUDE**, **KRZ_TNS_EXCLUDE**, **KRZ_REDIRECT_TNS**, **KRZ_EVENT_LEVEL**, and **KRZ_SQL_PREFILTER**.
  - Provides the option to control whether the agent monitors the specific Listener name and Oracle net service end points. Both including and excluding filters are provided (**KRZ_LISTENER_INCLUDE**, **KRZ_LISTENER_EXCLUDE**, **KRZ_TNS_INCLUDE**, **KRZ_TNS_EXCLUDE**).
  - Provides the option (**KRZ_REDIRECT_TNS**) to control whether to redirect the value of the predefined **TNS_ADMIN** environment variable to the agent log directory to disable the Oracle `sqlnet.log`.

- Provides the option (**KRZ_EVENT_LEVEL**) to control which level of agent event is sent. The level with a scope from high to low is MISC, INFO, WARN, or ERROR.
- Provides the option (**KRZ_SQL_PREFILTER**) to control whether the agent combines the filter information in the SQL query that is sent to the Oracle database for the data processing.
- Performance improvement for Top SQL monitoring.
- Disk Space usage monitoring for Archive Destination when Archive destination is defined in the Oracle database as USE_DB_RECOVERY_FILE_DEST instead of a real physical directory.
- More SQL statement samples in the `krzcussql.properties` customized SQL template file for Oracle Jobs, Oracle Users, and Oracle Queues monitoring.

Components of the IBM Tivoli Monitoring environment

After you install and set up the Oracle Database Extended agent, you have an environment that contains the client, server, and monitoring agent implementation for Tivoli Monitoring.

This Tivoli Monitoring environment contains the following components:

Tivoli Enterprise Portal client
> The portal has a user interface based on Java™ for viewing and monitoring your enterprise.

Tivoli Enterprise Portal Server
> The portal server is placed between the client and the Tivoli Enterprise Monitoring Server and enables retrieval, manipulation, and analysis of data from the monitoring agents. The Tivoli Enterprise Portal Server is the central repository for all user data.

Tivoli Enterprise Monitoring Server
> The monitoring server acts as a collection and control point for alerts received from the monitoring agents, and collects their performance and availability data. The Tivoli Enterprise Monitoring Server is also a repository for historical data.

Tivoli Enterprise Monitoring Agent, Oracle Database Extended agent (one or more instances of the monitoring agent).
> The instances communicate with the systems or subsystems that you want to monitor. This monitoring agent collects and distributes data to a Tivoli Enterprise Portal Server.

IBM Tivoli Netcool/OMNIbus
> Tivoli Netcool/OMNIbus is an optional component and the recommended event management component. The Netcool/OMNIbus software is a service level management (SLM) system that delivers real-time, centralized monitoring of complex networks and IT domain events. Event information is tracked in a high-performance, in-memory database and presented to specific users through individually configurable filters and views. The software includes automation functions that you can use to perform intelligent processing on managed events. You can use this software to forward events for Tivoli Monitoring situations to Tivoli Netcool/OMNIbus.

IBM Tivoli Enterprise Console®
> The Tivoli Enterprise Console is an optional component that acts as a central collection point for events from various sources, including events from other Tivoli software applications, Tivoli partner applications, custom applications, network management platforms, and relational database systems. You can view these events through the Tivoli Enterprise Portal (by using the event viewer), and you can forward events from Tivoli Monitoring situations to the Tivoli Enterprise Console component. If you do not already use Tivoli Enterprise Console and need an event management component, you can choose to use IBM Tivoli Netcool/OMNIbus.
>
> The Tivoli Business Service Manager component delivers real-time information to help you respond to alerts effectively based on business requirements. Optionally, you can use this component to meet service-level agreements (SLAs). Use the Tivoli Business Service Manager tools to help build a service model that you can integrate with Tivoli Netcool/OMNIbus alerts or

optionally integrate with data from an SQL data source. Optional components provide access to data from other IBM Tivoli applications such as Tivoli Monitoring and TADDM.

Agent Management Services

You can use IBM Tivoli Monitoring Agent Management Services to manage the Oracle Database Extended agent.

Agent Management Services is available for the following IBM Tivoli Monitoring OS agents: Windows, Linux, and UNIX. The services are designed to keep the Oracle Database Extended agent available, and to provide information about the status of the product to the Tivoli Enterprise Portal. For more information about Agent Management Services, see "Agent Management Services" in the *IBM Tivoli Monitoring Administrator's Guide*.

User interface options

Installation of the base IBM Tivoli Monitoring software and other integrated applications provides various interfaces that you can use to work with your resources and data.

The following interfaces are available:

Tivoli Enterprise Portal user interface
>   You can run the Tivoli Enterprise Portal as a desktop application or a browser application. The client interface is a graphical user interface (GUI) based on Java on a Windows or Linux workstation. The browser application is automatically installed with the Tivoli Enterprise Portal Server. The desktop application is installed by using the Tivoli Monitoring installation media or with a Java Web Start application. To start the Tivoli Enterprise Portal browser client in your Internet browser, enter the URL for a specific Tivoli Enterprise Portal browser client installed on your Web server.

Command-line interface
>   You can use Tivoli Monitoring commands to manage the Tivoli Monitoring components and their configuration. You can also run commands at the Tivoli Enterprise Console event server or the Tivoli Netcool/OMNIbus ObjectServer to configure event synchronization for enterprise situations.

Manage Tivoli Enterprise Monitoring Services window
>   You can use the window for the Manage Tivoli Enterprise Monitoring Services utility to configure the agent and start Tivoli services not designated to start automatically.

IBM Tivoli Netcool/OMNIbus event list
>   You can use the Netcool/OMNIbus event list to monitor and manage events. An event is created when the Netcool/OMNIbus ObjectServer receives an event, alert, message, or data item. Each event is made up of columns (or fields) of information that are displayed in a row in the ObjectServer alerts.status table. The Tivoli Netcool/OMNIbus web GUI is also a web-based application that processes network events from one or more data sources and presents the event data in various graphical formats.

IBM Tivoli Enterprise Console
>   You can use the Tivoli Enterprise Console to help ensure the optimal availability of an IT service for an organization. The Tivoli Enterprise Console is an event management application that integrates system, network, database, and application management. If you do not already use Tivoli Enterprise Console and need an event management component, you can choose to use Tivoli Netcool/OMNIbus.

Chapter 2. Agent installation and configuration

Agent installation and configuration requires the use of the *IBM Tivoli Monitoring Installation and Setup Guide* and agent-specific installation and configuration information.

To install and configure the Oracle Database Extended agent, use the "Installing monitoring agents" procedures in the *IBM Tivoli Monitoring Installation and Setup Guide* along with the agent-specific installation and configuration information.

If you are installing silently by using a response file, see "Performing a silent installation of IBM Tivoli Monitoring" in the *IBM Tivoli Monitoring Installation and Setup Guide*.

With the self-describing agent capability, new or updated IBM Tivoli Monitoring agents using IBM Tivoli Monitoring V6.2.3 or later can become operational after installation without having to perform additional product support installation steps. To take advantage of this capability, see "Enabling self-describing agent capability at the hub monitoring server" in the *IBM Tivoli Monitoring Installation and Setup Guide*. Also, see "Self-describing monitoring agents" in the *IBM Tivoli Monitoring Administrator's Guide*.

Requirements

Before installing and configuring the agent, make that sure your environment meets the requirements for the IBM Tivoli Composite Application Manager Extended Agent for Oracle Database.

For information about system requirements, see the Prerequisites topic (http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/topic/com.ibm.itcama.doc_7.2.1/prerequisites/apps721_systemreqs.html) in the IBM Tivoli Composite Application Manager for Applications Information Center.

Language pack installation

The steps for installing language packs depend on which operating system and mode of installation you are using.

To install a language pack for the agent support files on the Tivoli Enterprise Monitoring Server, the Tivoli Enterprise Monitoring Agent, and the Tivoli Enterprise Portal Server, make sure that you installed the product in the English language. Then use the steps for the operating system or mode of installation you are using:
* "Installing language packs on Windows systems"
* "Installing language packs on UNIX or Linux systems" on page 8
* "Installing language packs on Windows, UNIX, or Linux systems silently" on page 8

Installing language packs on Windows systems

You can install the language packs on a Windows system.

Before you begin

First, make sure that you installed the product in the English language.

Procedure
1. On the language pack CD, double-click the `lpinstaller.bat` file to start the installation program.
2. Select the language of the installer and click **OK**.
3. In the Introduction panel, click **Next**

4. Click **Add/Update** and click **Next**.

5. Select the folder where the National Language Support package (NLSPackage) files are located. Typically, the NLSPackage files are located in the `nlspackage` folder where the installer executable file is located.

6. Select the language support for the agent of your choice and click **Next**. To make multiple selections, press Ctrl and select the language that you want.

7. Select the languages that you want to install and click **Next**.

8. Examine the installation summary page and click **Next** to begin installation.

9. After installation completes, click **Finish** to exit the installer.

10. Restart the Tivoli Enterprise Portal, Tivoli Enterprise Portal Server, and Eclipse Help Server if any of these components are installed.

Installing language packs on UNIX or Linux systems

You can install the language packs on a UNIX or Linux system.

Before you begin

First, make sure that you installed the product in the English language.

Procedure

1. Enter the `mkdir` command to create a temporary directory on the computer, for example, `mkdir` *dir_name*. Make sure that the full path of the directory does not contain any spaces.

2. Mount the language pack CD to the temporary directory that you created.

3. Enter the following command to start the installation program: `cd` *dir_name* `lpinstaller.sh -c` *install_dir* where *install_dir* is where you installed IBM Tivoli Monitoring. Typically, the directory name is `/opt/IBM/ITM` for UNIX and Linux systems.

4. Select the language of the installer and click **OK**.

5. In the Introduction panel, click **Next**.

6. Click **Add/Update** and click **Next**.

7. Select the folder where the National Language Support package (NLSPackage) files are located. Typically, the NLSPackage files are located in the `nlspackage` folder where the installer executable file is located.

8. Select the language support for the agent of your choice and click **Next**. To make multiple selections, press Ctrl and select the language that you want.

9. Select the languages that you want to install and click **Next**.

10. Examine the installation summary page and click **Next** to begin installation.

11. After installation completes, click **Finish** to exit the installer.

12. Restart the Tivoli Enterprise Portal, Tivoli Enterprise Portal Server, and Eclipse Help Server if any of these components are installed.

Installing language packs on Windows, UNIX, or Linux systems silently

You can use the silent-mode installation method to install the language packs. In silent mode, the installation process obtains the installation settings from a predefined response file. It does not prompt you for any information.

Before you begin

First, make sure that you installed the product in the English language.

Procedure

1. Copy and paste the `ITM_Agent_LP_silent.rsp` response file template as shown in "Response file example."

2. Change the following parameter settings:

   NLS_PACKAGE_FOLDER
   > Folder where the National Language Support package (NLSPackage) files are located. Typically, the NLSPackage files are located in the `nlspackage` folder, for example: `NLS_PACKAGE_FOLDER = //tmp//LP//nlspackage`.

   PROD_SELECTION_PKG
   > Name of the language pack to install. Several product components can be included in one language package. You might want to install only some of the available components in a language pack.

   BASE_AGENT_FOUND_PKG_LIST
   > Agent for which you are installing language support. This value is usually the same as *PROD_SELECTION_PKG*.

   LANG_SELECTION_LIST
   > Language you want to install.

3. Enter the command to install the language pack with a response file (silent installation):

   - For Windows systems:

     `lpinstaller.bat -f `*path_to_response_file*

   - For UNIX or Linux systems:

     `lpinstaller.sh -c `*candle_home*` -f `*path_to_response_file*

     where *candle_home* is the IBM Tivoli Monitoring base directory.

Response file example

```
#     IBM Tivoli Monitoring Agent Language Pack Silent Installation Operation
#
#This is a sample response file for silent installation mode for the IBM Tivoli
#Monitoring Common Language Pack Installer.
#.
#This file uses the IBM Tivoli Monitoring Common Agent Language Pack with the
#install package as an example.
#Note:
#This response file is for the INSTALLATION of language packs only.
#This file does not support UNINSTALLATION of language packs in silent mode.
#-------------------------------------------------------------------------------
#-------------------------------------------------------------------------------
#To successfully complete a silent installation of the the example of Common Agent
#localization pack, complete the following steps:
#
#1.Copy ITM_Agent_LP_silent.rsp to the directory where lpinstaller.bat or
#lpinstaller.sh is located (IBM Tivoli Monitoring Agent Language Pack build
#location).
#
#2.Modify the response file so that it is customized correctly and completely for
#your site.
#  Complete all of the following steps in the response file.
#
#3.After customizing the response file, invoke the silent installation using the
#following command:
#For Windows:
#    lpinstaller.bat -f <path_to_response_file>
#For UNIX and Linux:
#    lpinstaller.sh -c <candle_home> -f <path_to_response_file>
#Note:<candle_home> is the IBM Tivoli Monitoring base directory.
#-------------------------------------------------------------------------------
```

```
#-------------------------------------------------------------------------------
#Force silent install mode.
#-------------------------------------------------------------------------------
INSTALLER_UI=silent

#-------------------------------------------------------------------------------
#Run add and update actions.
#-------------------------------------------------------------------------------
CHOSEN_INSTALL_SET=ADDUPD_SET


#-------------------------------------------------------------------------------
#NLS Package Folder, where the NLS Packages exist.
#For Windows:
#   Use the backslash-backslash(\\) as a file separator (for example,
#C:\\zosgmv\\LCD7-3583-01\\nlspackage).
#For UNIX and Linux:
#   Use the slash-slash (//) as a file separator (for example,
#//installtivoli//lpsilenttest//nlspackage).
#-------------------------------------------------------------------------------
#NLS_PACKAGE_FOLDER=C:\\zosgmv\\LCD7-3583-01\\nlspackage
NLS_PACKAGE_FOLDER=//tmp//LP//nlspackage


#-------------------------------------------------------------------------------
#List the packages to process; both variables are required.
#Each variable requires that full paths are specified.
#Separate multiple entries with a semicolon (;).
#For Windows:
#          Use the backslash-backslash(\\) as a file separator.
#For Unix and Linux:
#          Use the slash-slash (//) as a file separator.
#-------------------------------------------------------------------------------
#PROD_SELECTION_PKG=C:\\zosgmv\\LCD7-3583-01\\nlspackage\\KIP_NLS.nlspkg
#BASE_AGENT_FOUND_PKG_LIST=C:\\zosgmv\\LCD7-3583-01\\nlspackage\\KIP_NLS.nlspkg
PROD_SELECTION_PKG=//tmp//LP//nlspackage//kex_nls.nlspkg;//tmp//LP//nlspackage//
koq_nls.nlspkg
BASE_AGENT_FOUND_PKG_LIST=//tmp//LP//nlspackage//kex_nls.nlspkg;//
tmp//LP//nlspackage//koq_nls.nlspkg


#-------------------------------------------------------------------------------
#List the languages to process.
#Separate multiple entries with semicolons.
#-------------------------------------------------------------------------------
LANG_SELECTION_LIST=pt_BR;fr;de;it;ja;ko;zh_CN;es;zh_TW
```

Agent-specific installation and configuration

In addition to the installation and configuration information in the *IBM Tivoli Monitoring Installation and Setup Guide*, use the agent-specific installation and configuration information to install the Oracle Database Extended agent.

Agent-specific installation and configuration requires the following procedures and information:
- Granting privileges
- Naming conventions for agent instances and database connections
- Local configuration
- Remote installation and configuration
- Setting environment variables
- Customizing Oracle alert log monitoring
- Defining and running customized SQL statements
- Starting or stopping the agent

Granting privileges

After installing the agent, you must grant privileges to the Oracle user account that is used by the Oracle Database Extended agent.

You can grant privileges for the following users:
- RDBMS instance users
- ASM instances Non-SYS users
- Data Guard users

Granting privileges to users for RDBMS instances

For RDBMS instances, the Oracle user ID that the Oracle Database Extended agent uses must have select privileges on the dynamic performance views, tables, and data dictionary views that are required by the agent, and must have other Oracle object privileges and system privileges that are necessary to run Take Action commands.

About this task

Procedure

The procedure for granting privileges includes the following actions:
- If an Oracle database user ID does not exist, create this ID by using Oracle facilities and running the following command: `create user UserName identified by Password`
- Grant select privileges on the dynamic performance views, tables, and data dictionary views to the Oracle user ID that you created by running the **krzgrant.sql** script that is provided with the Oracle Database Extended agent.

  Disclaimer: The select privileges for the dynamic performance views, tables, and data dictionary views rely on the capabilities of Oracle database in specific application environments. You may grant authorized Oracle privileges to the Oracle database user ID only for the dynamic performance views, tables, and data dictionary views that are used by the Oracle Database Extended agent.

  Grant select privileges before you configure the Oracle Database Extended agent. For directions about how to customize and run the **krzgrant.sql** script, see "Customizing the krzgrant.sql script" and "Running the **krzgrant.sql** script" on page 12.
- Grant other Oracle object privileges and system privileges to the Oracle user ID that the Oracle Database Extended agent uses by using Oracle facilities. Before you run Take Action commands, make sure that the Oracle user ID has the necessary privileges.

Customizing the krzgrant.sql script: If you do not have Oracle authorized select privileges on some dynamic performance views, tables, and data dictionary views in the **krzgrant.sql** script, you can customize the **krzgrant.sql** script before running it.

Note: The: agent instance checks all default privileges in the **krzgrant.sql** script and reports an agent event with a lack of privileges when the agent starts. You can disable privilege checking by using the following variable setting: KRZ_CHECK_ORACLE_PRIVILEGE=FALSE. The test connection step of GUI configuration checks all Oracle privileges defined in the `krzgrant.sql` file. If you confirm that the Oracle user has the correct privileges, ignore that checking privileges fails in the test connection step.

Edit the `krzgrant.sql` file in a plain text editor to remove or add the '--' prefix at the beginning of grant statements to skip the granting execution for those unauthorized Oracle tables or views.

For example, change the following lines:

```
execute immediate 'grant select on DBA_HIST_SNAPSHOT to '||userName;
 execute immediate 'grant select on DBA_HIST_SQLSTAT to '||userName;
 execute immediate 'grant select on DBA_HIST_SQLTEXT to '||userName;
 execute immediate 'grant select on DBA_HIST_SQL_PLAN to '||userName;
 execute immediate 'grant select on DBA_HIST_SYSMETRIC_SUMMARY to '||userName;
```

to these lines:

```
-- execute immediate 'grant select on DBA_HIST_SNAPSHOT to '||userName;
-- execute immediate 'grant select on DBA_HIST_SQLSTAT to '||userName;
-- execute immediate 'grant select on DBA_HIST_SQLTEXT to '||userName;
-- execute immediate 'grant select on DBA_HIST_SQL_PLAN to '||userName;
-- execute immediate 'grant select on DBA_HIST_SYSMETRIC_SUMMARY to '||userName;
```

Running the `krzgrant.sql` script:
About this task

Important:
- The krzgrant.sql is not applicable for ASM instances. Run the **krzgrant.sql** script for RDBMS instances. For logical standby databases, grant permissions on the primary database, and the permissions are replicated to standby databases.
- If you do not run the **krzgrant.sql** script, an event is issued in the agent event workspace.
- Before beginning this procedure, perform the appropriate installation procedures in the IBM Tivoli Monitoring Installation and Setup Guide.

After the installation, you can find the **krzgrant.sql** script in the following directory:
- Windows x86 systems: `install_dir\TMAITM6`
- Windows x64 systems: `install_dir\TMAITM6_X64`
- UNIX and Linux systems: `install_dir/arch/rz/bin`

Where:

install_dir
> Installation directory for the Oracle Database Extended agent.

arch   IBM Tivoli Monitoring system architecture identifier. For example, li6263 represents Linux Intel v2.6 (32 bit).

The **krzgrant.sql** script has the following usage: `krzgrant.sql user_ID temporary_directory`

Where:

user_ID
> The ID of the Oracle user. This user ID must be created before running this sql file. Example value: tivoli.

temporary_directory
> The name of the temporary directory that contains the `krzagent.log` output file of the **krzgrant.sql** script. This directory must exist before running this SQL script. Example value: `/opt/IBM/ITM/tmp`.

You must have the Oracle database administrator (DBA) authorization role and write permission to the temporary directory to perform the following procedure.

Procedure
1. From the command line, run the commands to set environment variables.
   - Windows systems:
     ```
     SET ORACLE_SID= sid
     SET ORACLE_HOME= home
     ```

- UNIX or Linux systems

```
ORACLE_SID = sid
export ORACLE_SID
ORACLE_HOME = home
export ORACLE_HOME
```

Where:

sid   Oracle system identifier, which is case-sensitive.

home   Home directory for the monitored Oracle instance.

2. From the same command-line window where you set environment variables, start the Oracle SQL Plus or an alternative tool that you use to issue SQL statements.

3. Log on to the Oracle database as a user that has Oracle DBA privileges.

4. Navigate to the directory that contains the **krzgrant.sql** script and run the following command to grant select privileges:

```
@krzgrant.sql user_ID temporary_directory
```

The output is logged in the krzagent.log file in the temporary directory. This log records the views and tables to which the Oracle Database Extended agent is granted select privileges.

After the privileges are successfully granted, you can configure and start the Oracle Database Extended agent.

Granting privileges to non-SYS users for ASM instances
About this task

You must connect to ASM instances that are using the SYSDBA and SYSASM roles for users. If you do not want to use the SYS account to connect to ASM instances, create a user account and grant the SYSDBA and SYSASM roles to the account.

Procedure

1. Run the following commands to create a user account and grant roles:
   - For Oracle 10g

     Important: Oracle 10g does not have the SYSASM role and does not support creating a new database user in the ASM instance directly using sqlplus.

     When you create the ASM connection in the configuration panel, specify the UserName user and the SYSDBA role for Oracle Database 10g. Use only the SYSDBA role. The UserName must be created first.

     a. Set the **ORACLE_HOME** and **ORACLE_SID** environment variables as RDBMS home/sid:
        - Windows systems:

          ```
          SET ORACLE_SID= sid
          SET ORACLE_HOME= home
          ```
        - UNIX or Linux systems:

          ```
          export ORACLE_SID = sid
          export ORACLE_HOME = home
          ```

     b. Create the database user by logging in to RDBMS in sqlplus, and creating a new user:
        - create user UserName identified by Password
        - connect / as sysdba
        - grant sysdba to UserName

     c. Rename the original ASM password file:
        1) Back up the ASM password file:

           ```
           mv password file for asm instance password file for asm instance.orig
           ```
        2) Copy the RDBMS password file and rename the file with the ASM password file name:

```
        cp password file for database instance password file for asm instance
```

    d. Verify the connection to ASM on a separate computer with UserName in sqlplus SQL> connect UserName/Password as sysdba.

- For Oracle 11g

  For Oracle 11g, you must log in to the ASM database with the SYSASM role to create a new user for a Tivoli agent, and grant the SYSDBA role or SYSASM role:

```
create user UserName identified by Password
grant sysdba to UserName
or
grant sysasm to UserName
```

2. When you create the ASM connection in the configuration panel, specify the *UserName* user and the SYSDBA role for Oracle Database 10g, and the *UserName* user and the SYSDBA or SYSASM role for Oracle 11g.

   Note: If you choose the SYSASM role to access the Oracle 11g ASM database, you must configure the agent instance by using Oracle 11g Oracle home or Oracle instant client to connect to the Oracle database.

Granting privileges to users for Data Guard

For logical standby databases, grant permissions on the primary database, and the permissions are replicated to standby databases. For instructions on granting permissions for the primary database, see "Granting privileges to users for RDBMS instances" on page 11.

The physical standby database is a read-only database, and cannot be modified. You can use only the SYS user to monitor the physical standby database.

Naming conventions for agent instances and database connections

Follow the naming conventions when you name an agent instance or a database connection.

The Oracle Database Extended agent instances and monitored database connections are represented by the following nodes and subnodes in the Navigator tree:

Agent instance :RZ node
    This node is an agent instance.

RDB connection :RDB subnode
    Each node is an individual Oracle RDB (relational database) connection.

ASM connection :ASM subnode
    Each node is an individual Oracle ASM connection.

DG connection :DG subnode
    Each node is an individual Oracle Data Guard connection.

For directions regarding how to set the agent instance name and database connection name, see "Local configuration" on page 18 for local instances, and "Remote installation and configuration" on page 30 for remote agent instances.

Default naming conventions for agent instance nodes

Follow the naming conventions when you name an agent instance.

For RZ nodes, the following part of the node name must not be longer than 32 characters:

Instance:*Hostname*:rz

Where:

Instance
> Name of the agent instance.

Hostname
> Name of the system where the agent is running.

Depending on the instance number, the node name varies:
- When a single instance of the Oracle Database Extended agent is defined on a system, the node for the agent instance has the following name:

  Oracle Database Extended - *Instance*:*Hostname*:rz
- When multiple instances of the Oracle Database Extended agent are defined on a system, a node that is called *Instance*:*Hostname*:rz is created for each agent instance. All the nodes are in a folder that is called `Oracle Database Extended`.

If the *Instance*:*Hostname*:RZ part is longer than 32 characters, *Instance*:*Hostname* is truncated. After the truncation, if there are agent instances with the same node or subnode name, and these agent instances are connected to the same hub Tivoli Enterprise Monitoring Server, the agent instances do not work correctly.

Default naming conventions for database connection subnodes
Follow the naming conventions when you name a database connection.

For RDB subnodes, ASM subnodes, and DG subnodes, the subnode ID part of a subnode name must not be longer than 24 characters:

DBConnection-Instance-Hostname

Where: *DBConnection* is an alias that you set for the database connection.

Depending on the database connection number, the subnode name varies:
- When a single database connection is defined for an agent instance, the subnode name has the following format:
  - RDB subnodes: Oracle RDBMS-RZ:*subnode_ID*:RDB
  - ASM subnodes: Oracle ASM-RZ:*subnode_ID*:ASM
  - DG subnodes: Oracle Data Guard-RZ:*subnode_ID*:DG
- When multiple database connections are defined for an agent instance, the subnodes are in folders:
  - The RDB subnodes are in the Oracle RDBMS folder, and a subnode that is called RZ:*subnode_ID*:RDB is created for each RDB connection.
  - The ASM subnodes are in the Oracle ASM folder, and a subnode that is called RZ:subnode_ID:ASM is created for each ASM connection.
  - The DG subnodes are contained in the Oracle Data Guard folder, and a subnode that is called RZ:*subnode_ID*:DG is created for each Data Guard connection.

If the subnode ID is longer than 24 characters, it is truncated. After the truncation, if there are database connections with the same subnode name under the same hub Tivoli Enterprise Monitoring Server, the monitoring for these database connections does not work correctly. Also, for a subnode with a truncated subnode ID, the Agent_Event, RDB_Alert_Log_Details, or ASM_Alert_Log_Details situation is not issued if the conditions for any of these situations are met. To avoid the subnode being truncated, reduce the length of the database connection name, agent instance name, or hostname; or, see "Changing default naming conventions for database connections" for information.

Changing default naming conventions for database connections
To avoid a subnode name that is truncated, change the subnode naming convention by using environment variables.

To avoid a subnode name that is truncated, change the subnode naming convention by setting the following environment variables: **KRZ_SUBNODE_INCLUDING_AGENTNAME**, **KRZ_SUBNODE_INCLUDING_HOSTNAME**, and **KRZ_MAX_SUBNODE_ID_LENGTH**.

If you set **KRZ_SUBNODE_INCLUDING_AGENTNAME** to NO, the subnode ID part of the subnode name does not include the agent instance name. For example:
- Default subnode name: *DBConnection-Instance-Hostname*
- Subnode name with environment variable set to NO: *DBConnection-Hostname*

If you set **KRZ_SUBNODE_INCLUDING_HOSTNAME** to NO, the subnode ID part of the subnode name does not include the host name. For example:
- Default subnode name: *DBConnection-Instance-Hostname*
- Subnode name with environment variable set to NO: *DBConnection-Instance*

The **KRZ_MAX_SUBNODE_ID_LENGTH** environment variable controls the maximum length of the subnode ID for the subnode name. The default value is 24.

Note: In 6.3.1-TIV-ITM_KRZ-IF0001 and 6.3.1-TIV-ITM_KRZ-IF0002, the environment variable is named KRZ_MAX_SUBNODE_NAME_LENGTH. In this release, this environment variable is renamed as KRZ_MAX_SUBNODE_ID_LENGTH. To be compatible with old releases, KRZ_MAX_SUBNODE_NAME_LENGTH continues to work.

Installation and configuration considerations

The Oracle Database Extended agent supports local monitoring and remote monitoring.

Differences between local and remote monitoring

Table 1 contains a comparison of the two different ways of monitoring.

Table 1. Comparison of local and remote monitoring

Feature	Local	Remote
Installation on Oracle Server computer	Yes	No
Oracle physical disk usage monitoring	Yes	Not supported
Oracle alert log monitoring	Yes	Yes, requires mounting the log directory for the remote computer to a local computer, and requires specifying the mount path at agent configuration.
Other monitoring features	Yes	Yes
Maintenance effort	A large effort requires applying an agent patch on each Oracle server computer.	A small effort requires applying a patch on the computer on which the agent is installed one time.

Best practice: number of agent instances and database connections on one system

The best practice involves considering the number of agent instances and database connections on one system. 10 agent instances times five database connections (monitoring 50 databases on one system) is optimal. The performance of the agent depends on system performance, network performance, and most importantly the number of data requests, including situation and historical data collection. With fewer data requests for one database, more databases can be monitored on one system. As a best practice, first configure 10 agent instances times five database connections, and observe performance, such as the

length of the response time for the data request. If the performance is acceptable, you can consider monitoring more databases on the system; if not acceptable, set up another system with the Oracle Database Extended agent installed.

Installation considerations on Windows systems
Launch installer `setup.exe` as Administrator role

To run the installer in the Administrator role, in the Documents library window, right-click the `setup.exe` file and select **Run as administrator** (Figure 1).
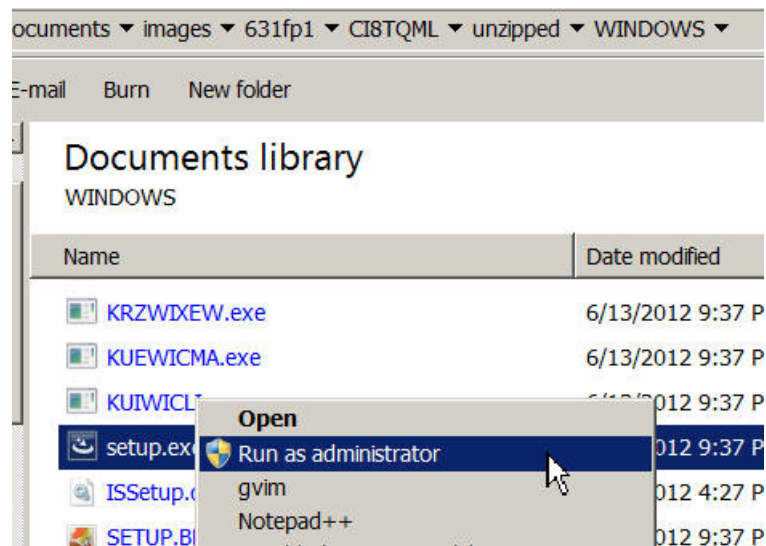

Figure 1. Launching the installer in the Administrator role

Select the 32-bit agent or the 64-bit agent

- Select the **Monitoring Agent for Oracle Database Extended** check box if you are using a 32-bit Oracle Home or Oracle Client (Figure 2).
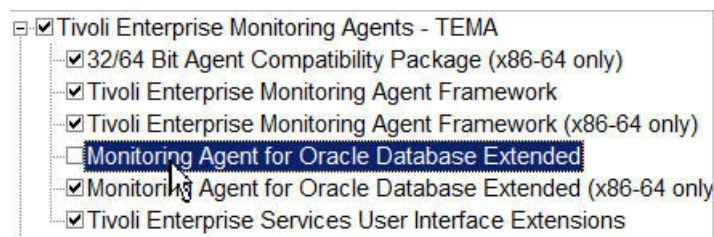

Figure 2. 32-bit agent check box

- Select the **Monitoring Agent for Oracle Database Extended (x86-64 only)** check box if you are using a 64-bit Oracle Home or Oracle Client (Figure 3 on page 18).
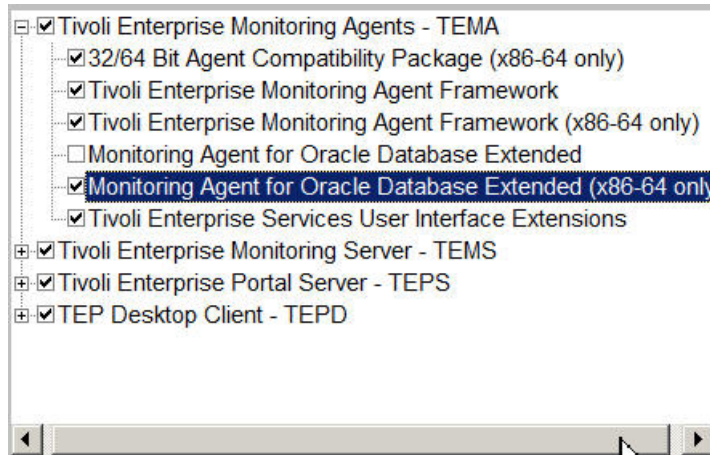
Figure 3. 64-bit agent check box

Launch Manage Tivoli Monitoring Servers as Administrator role

To run Manage Tivoli Monitoring Servers in the Administrator role, right-click the **Manage Tivoli Monitoring Servers** icon and select **Run as administrator** (Figure 4).
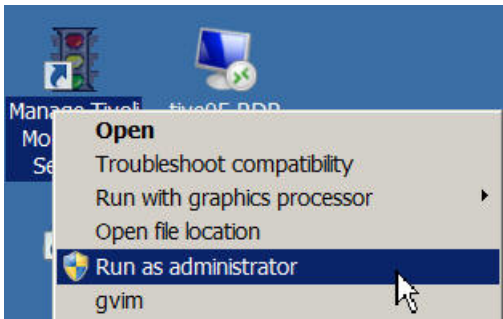

Figure 4. Launching Manage Tivoli Monitoring Servers in the Administrator role

Local configuration

On Windows, UNIX, and Linux systems, you can configure the Oracle Database Extended agent through the Manage Tivoli Enterprise Monitoring Services tool or the command line. You can also configure the agent silently on UNIX and Linux systems.

Important: The Oracle Database Extended agent does not support silent configuration on Windows systems.

To configure an Oracle Database Extended agent instance, complete the configuration procedure depending on which operating system you are using:

- Windows systems
  - Configuring the agent through theManage Tivoli Enterprise Monitoring Services tool on Windows systems
- UNIX and Linux systems
  - Configuring the agent through the Manage Tivoli Enterprise Monitoring Services tool on UNIX and Linux systems
  - Configuring the agent through the command line on UNIX and Linux systems
  - Configuring the agent silently on UNIX and Linux systems

Configuring the agent through the Manage Tivoli Monitoring Services tool on Windows systems

On Windows systems, you can configure the Oracle Database Extended agent through the Manage Tivoli Enterprise Monitoring Services tool.

Procedure

1. To open the Manage Tivoli Enterprise Monitoring Services window, click **Start** > **Programs** > **IBM Tivoli Monitoring** > **Manage Tivoli Monitoring Services**.

2. Right-click the **Monitoring Agent for Oracle Database Extended** item with the **Task/SubSystem** column value of **Template**, and click **Configure Using Defaults**.

3. Enter a unique instance name, and click **OK**. Only letters, Arabic numerals, the underline character, and the minus character can be used in the instance name.

   Important: Do not create an instance name with a long length. For the length limitation of instance names, follow the conventions in "Default naming conventions for agent instance nodes" on page 14 when you name the agent instance.
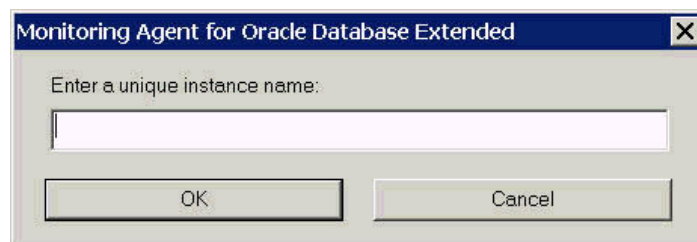

Figure 5. Entering the instance name for the agent

4. In the **Default Configuration** section of the Agent Configuration window, complete the fields as required for your site. You can select **Show Advanced Options** to show the advanced options. For descriptions of these fields, see Table 2 on page 20
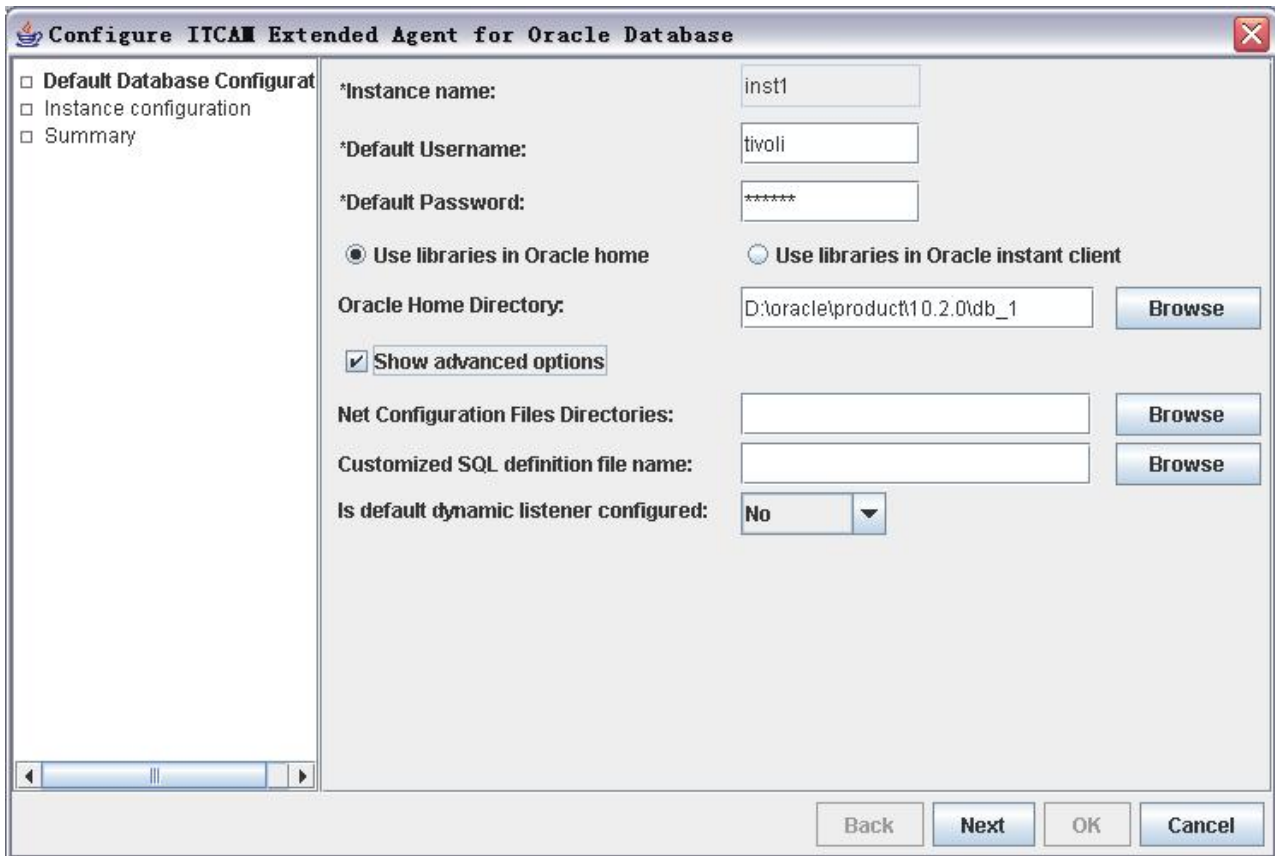
Figure 6. Default Configuration section of the Agent Configuration window

Table 2. Default Configuration attributes

Attribute name	Description
Default user name	The default database user ID for the connection. This user ID is the one that the agent uses to access the connected database instance. This user ID must have select privileges on the dynamic performance views and tables that are required by the agent, and other Oracle object privileges and system privileges that are required to run Take Action commands.
Default password	The password that is associated with the specified default database user ID.
Use libraries in Oracle home	Select this option if an Oracle database is installed. This attribute is the Oracle database installation directory on the system where the agent is installed. The Oracle Database Extended agent uses this file path to obtain the Oracle Call Interface (OCI) library files. In the **Oracle home directory** field, enter the directory name, or browse to the directory. **Important:** For a list of the supported Oracle Call Interface client library version for each platform, see "Supported Oracle Call Interface client library versions" on page 50.

Table 2. Default Configuration attributes (continued)

Attribute name	Description
Use libraries in Oracle instant client	Select this option if no Oracle database is installed. This attribute is the Oracle instant client installation directory that contains the OCI library files on the system where the agent is installed. The Oracle Database Extended agent uses this file path to obtain the OCI library files. The Oracle instant client that is on a network drive does not work. For example: • On a Windows system, if the full path of the `oci.dll` file is `C:\instantclient_10_2\oci.dll`, `C:\instantclient_10_2` must be used for this field as the Oracle instant client installation directory. • On a UNIX system, If the full path of the `libocci.so.10.1` file is `/home/tivoli/oci/libocci.so.10.1`, `/home/tivoli/oci` must be used as the Oracle instant client installation directory. In the **Oracle instant client installation directory** field, enter the directory name, or browse to the directory. **Important:** For a list of the supported Oracle Call Interface client library version on each platform, see "Supported Oracle Call Interface client library versions" on page 50 Also, see Oracle Database Instant Client (http://www.oracle.com/technetwork/database/features/instant-client/index.html) for instant client packages that you can download.
Net configuration files directories	This attribute is the directory that contains Oracle database net configuration file. The Oracle Database Extended agent uses this file path to obtain the `tnsnames.ora` file. This directory is defined by the **TNS_ADMIN** environment variable for each Oracle database instance. The default directory is *ORACLE_HOME*/network/admin on UNIX or Linux systems, and *ORACLE_HOME*\NETWORK\ADMIN on Windows systems. *ORACLE_HOME* is the installation directory for the Oracle database. If you have multiple net configuration file directories, separate the directories by using a semicolon (;) on Windows systems, or a colon (:) on UNIX and Linux systems. If you are monitoring Oracle databases remotely, you can copy net configuration files from the remote system to the system where the agent is installed, or merge the content of net configuration files on the remote system to the net configuration files on the system where the agent is installed.
Customized SQL definition file name	This attribute is the full file path name of the customized SQL definition file. The SQL statements defined in this file and related information are displayed in the CustomSQLs workspace. The default file path is *CANDLEHOME*/config/krzcussql.properties on UNIX or Linux systems, *CANDLEHOME*\TMAITM6\krzcussql.properties on Windows systems, and *CANDLEHOME*\TMAITM6_x64\krzcussql.properties on Windows x64 systems.
Is default dynamic listener configured	The default dynamic listener is (PROTOCOL=TCP)(HOST=localhost)(PORT=1521). If the default dynamic listener is configured at this workstation, select this option.

5. Click **Next**.
6. In the **Instance Configuration** section, create, delete, edit, or test database connections.
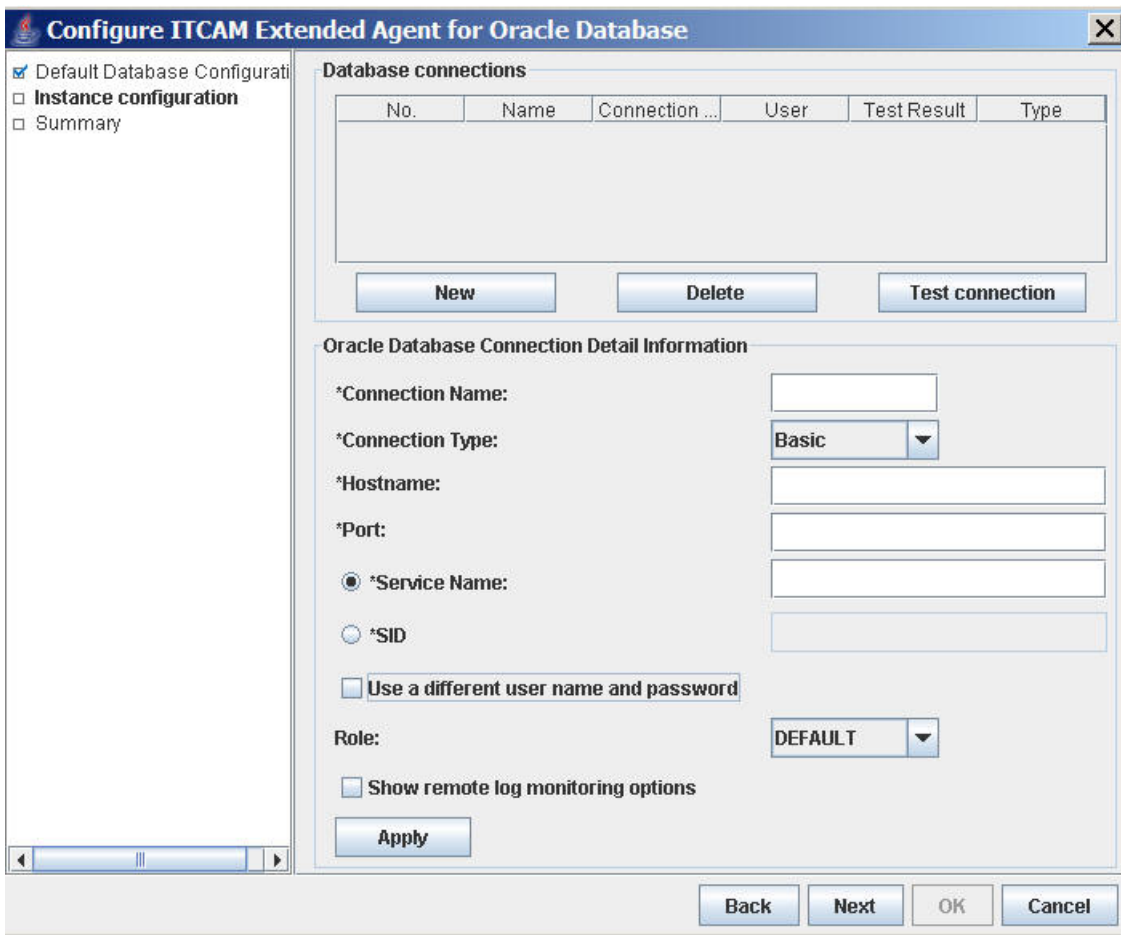
Figure 7. Instance Configuration section of the Agent Configuration window

- To create a database connection, click **New**, enter the database connection information, and click **Apply**. For descriptions of the fields, see Table 3 on page 23.
- To delete a database connection, select the database connection in the Database Connections list, and click **Delete**.
- To edit a database connection, select the database connection in the Database Connections list, modify the database connection information, and click **Apply**.
- To test a database connection, select the database connection in the Database Connections list, and click **Test connection**. The test result is displayed.
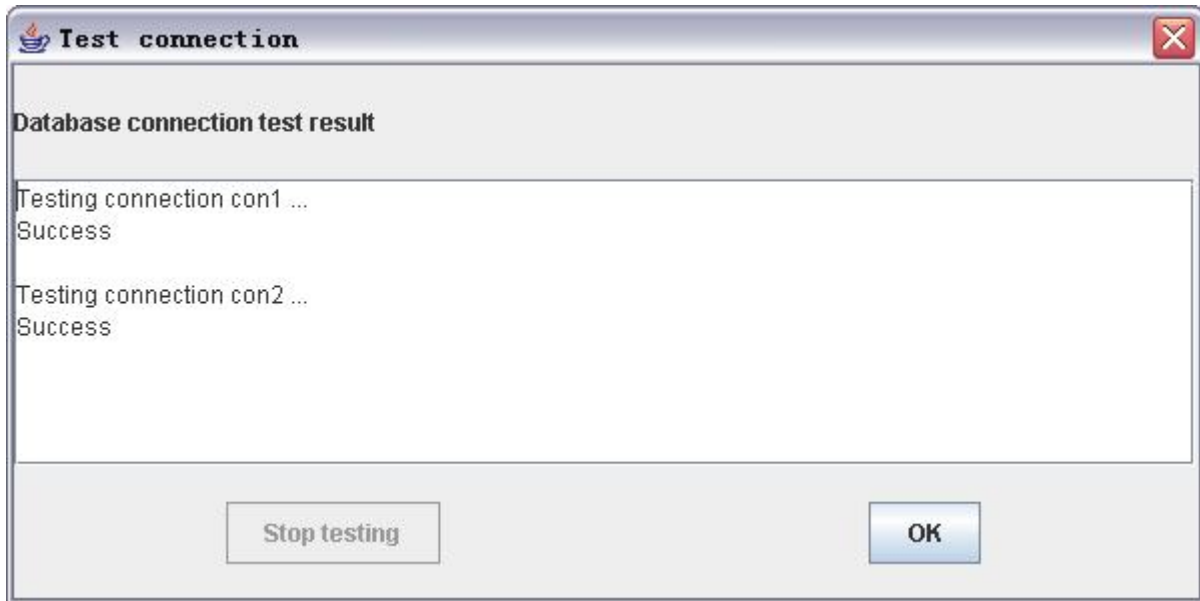
Figure 8. Connection test result

Table 3. Instance Configuration section

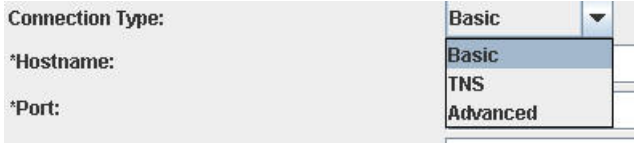| Attribute name	Description
Connection Name	An alias for the connection to the database. Only letters, Arabic numerals, the underline character, and the minus character can be used in the connection name. The maximum length of a connection name is 25 characters. **Important:** Follow the conventions in "Default naming conventions for database connection subnodes" on page 15 when you name the database connection.

Table 3. Instance Configuration section (continued)
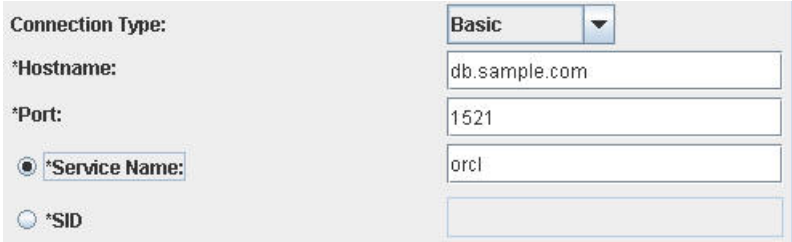
Attribute name	Description
Connection type	Select one of three types of connections to the Oracle Database: • Basic The default connection type is Basic. **Connection Type:** Basic ▼ Basic TNS Advanced **Hostname:* **Port:* *Figure 9. Select Basic type* **Connection Type:** Basic ▼ **Hostname:* db.sample.com **Port:* 1521 ◉ **Service Name:* orcl ○ **SID* *Figure 10. Sample input for Basic type* Usage Scenario: Select **Basic** connection type when the target monitored database is a single instance, such as RDBMS, ASM single instance, DataGuard Primary Node single instance, or DataGuard standby node single instance. • TNS **Connection Type:** TNS ▼ **TNS alias:* ▼ ☐ Use a different user name and password *Figure 11. Select TNS type* Usage Scenario: Select **TNS** connection type when the `ORACLE HOME` directory is specified and the TNS alias for the target monitored database is defined in the `$ORACLE_HOME/network/admin/tnsnames.ora` file.

Table 3. Instance Configuration section (continued)

Attribute name	Description
Connection type (continued)	• Advanced
	Figure 12. Select Advanced type
	Usage Scenario: Select **Advanced** connection type when there is more than one Oracle Instance across multiple physical nodes for the target monitored database, such as the Real Applications Cluster (RAC) database or ASM cluster database.
	For example:
	– Oracle Connection String for Real Applications Cluster (RAC) database:
	(DESCRIPTION=(FAILOVER=ON)(ADDRESS_LIST=(LOAD_BALANCE=ON) (ADDRESS=(PROTOCOL=TCP)(HOST=tivx010.cn.ibm.com)(PORT=1521)) (ADDRESS=(PROTOCOL=TCP)(HOST=tivx015.cn.ibm.com)(PORT=1521))) (CONNECT_DATA=(SERVICE_NAME=orcl)))
	– Oracle Connection String for ASM cluster database:
	(DESCRIPTION=(FAILOVER=ON)(ADDRESS_LIST=(LOAD_BALANCE=ON) (ADDRESS=(PROTOCOL=TCP)(HOST=tivx010.cn.ibm.com)(PORT=1521)) (ADDRESS=(PROTOCOL=TCP)(HOST=tivx015.cn.ibm.com)(PORT=1521))) (CONNECT_DATA=(SERVICE_NAME=+ASM)))
Hostname	Host name or IP address for the Oracle database
Port	Listener port for the Oracle database
Service	A logical representation of a database, a string that is the global database name
SID	Oracle System Identifier that identifies a specific instance of a running database
TNS Alias	Network alias name from `tnsnames.ora`
Oracle connection string	This attribute supports all Oracle net naming methods as follows:
	• SQL Connect URL string of the form: //host:*port*/*service name*. For example, //dlsun242:1521/bjava21
	• Oracle Net keyword-value pair. For example, (DESCRIPTION=(ADDRESS=(PROTOCOL=tcp) (HOST=dlsun242) (PORT=1521)) (CONNECT_DATA=(SERVICE_NAME=bjava21)))
	• TNSNAMES entries, such as `inst1`, with the **TNS_ADMIN** or **ORACLE_HOME** environment variable set and configuration files configured
Use a different user name and password	Select this option, if you want to use a different user account for this connection. Otherwise, the user account that is specified in the Default Configuration section is used.
Database user name	The database user ID for the connection.
	For RDBMS instances, this user ID must have select privileges on the dynamic performance views and tables that are required by the agent, and other Oracle object privileges and system privileges that are required to run Take Action commands.
	For ASM instances, use an account with the SYSDBA or SYSASM role. For example, the sys account.
Database password	The password that is associated with the specified database user ID.

Table 3. Instance Configuration section (continued)

Attribute name	Description
Role	The set of privileges to be associated with the connection. For a user that was granted the SYSDBA system privilege, you can specify a connection that includes that privilege. For ASM instances, use the SYSDBA role for Oracle Database 10g, and the SYSDBA or SYSASM role for Oracle Database 11g.
Show remote log monitoring options	Select this option to monitor remote logs.
Oracle Alert Log File Paths	The absolute file paths of mapped alert log files for remote database instances in this database connection. The agent monitors alert logs by reading these files. If the Oracle Database Extended agent runs on a Windows system and reads the alert log files through the network, the remote file path must follow the Windows universal naming convention. For example, \\tivx015\path\alert_orcl.log. **Important:** Enter the path and alert log file name together. **Important:** A mapped network driver is not supported for the alert log path. If the Oracle Database Extended agent agent runs on a UNIX or Linux system, a locally mounted file system is required for remote alert logs. Multiple files are separated by a semicolon (;) on Windows systems, or a colon (:) on UNIX systems. Each file is matched to a database instance by using the alert_*instance*.log file name pattern, or ignored if unmatched. Local database instance alert log files can be discovered automatically.
Oracle Alert Log File Charset	The code page of the mapped alert log files. If this field is blank, the system current locale is used. For examples: • ISO8859_1, ISO 8859-1 Western European encoding • UTF-8, UTF-8 encoding of Unicode • GB18030, Simplified Chinese GB18030 encoding • CP950, Traditional Chinese encoding • EUC_JP, Japanese encoding • EUC_KR, Korean encoding For the full list of all the supported code pages, see "ICU supported code pages" on page 55

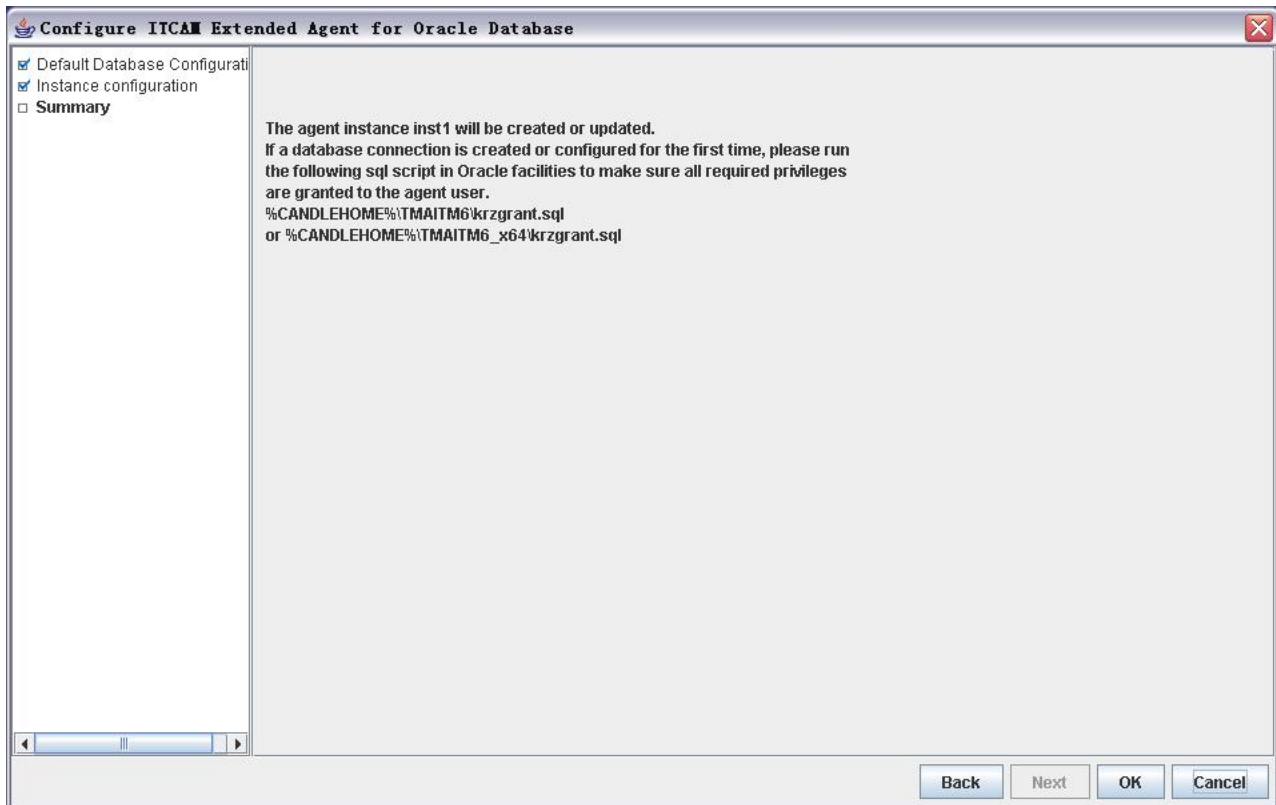7. Click **Next**. The configuration summary is displayed.

Figure 13. Summary section of the Agent Configuration window

8. Click **OK** to complete the configuration.

Configuring the agent through the Manage Tivoli Monitoring Services tool on UNIX and Linux systems

On UNIX and Linux systems, you can configure the Oracle Database Extended agent through the Manage Tivoli Monitoring Services tool.

Procedure

1. To open the Manage Tivoli Enterprise Monitoring Services window, go to the *ITMinstall_dir*/bin directory and run the following command: `./itmcmd manage [-h ITMinstall_dir]` Where: *ITMinstall_dir* is the installation directory of IBMTivoli Monitoring.

2. Click **Monitoring Agent for Oracle Database Extended**, and right-click it.

3. Click **Configure**.

4. In the Manage Application Instances window, click **Add Instances**.

5. Enter a unique instance name, and click **OK**. Only letters, Arabic numerals, the underline character, and the minus character can be used in the instance name.

   Important: Do not create an instance name with a long length. For the length limitation of instance names, follow the conventions in "Default naming conventions for agent instance nodes" on page 14 when you name the agent instance.

6. In the **Default Database Configuration** section of the Agent configuration window, complete the fields as required for your site. You can select **Show Advanced Options** to show advanced options. For descriptions of the fields, see Table 2 on page 20.

7. Click **Next**.

8. In the **Instance Configuration** section, create, delete, or test database connections.

- To create a database connection, click **New**, enter the database connection information, and click **Apply**. For descriptions of the fields, see Table 3 on page 23.
- To delete a database connection, select the database connection in the Database Connections list, and click **Delete**.
- To edit a database connection, select the database connection in the Database Connections list, modify the database connection information, and click **Apply**.
- To test a database connection, select the database connection in the Database Connections list, and click **Test connection**.

9. Click **Next**.
10. Click **OK** to complete the configuration.

Configuring the agent through the command line on UNIX and Linux systems

You can configure the Oracle Database Extended agent on a UNIX or Linux system through the command line.

About this task

Important: If you are reconfiguring a configured agent instance, the value that is set in the last configuration is displayed for each setting. If you want to clear an existing value, press the Space key when the setting is displayed.

Procedure

Complete the following steps to configure the agent:

1. Go to the *ITMinstall_dir*/bin directory, where *ITMinstall_dir* is the installation directory for IBM Tivoli Monitoring.
2. *(Optional)* To check the names and settings of configured agent instances, run the following command: **./cinfo -s rz**
3. To configure the Oracle Database Extended agent, run the following command:**./itmcmd config –A rz**
4. Type a name for the agent instance if you want to configure a new agent instance, or type the name of a configured agent instance that you want to reconfigure, and press Enter. Only letters, Arabic numerals, the underline character, and the minus character can be used in the instance name.

   Important: Do not use an instance name of a long length. For the length limitation of instance name, follow the conventions in "Naming conventions for agent instances and database connections" on page 14.
5. Press Enter when you are asked whether you want to edit the Monitoring Agent for Oracle Database settings. The default value is Yes.
6. Press Enter when you are asked whether you want to edit the Default Database Configuration settings. The default value is Yes.
7. Enter the default database configuration information by doing the following steps. See Table 2 on page 20 for descriptions of the attributes.
   a. Type the default user name, and press Enter.
   b. Type the default password, and press Enter.
   c. Confirm the password.
   d. If you have the Oracle database installed, type the Oracle home directory, and press Enter. If you want to clear the old value for the Oracle home directory, press the space bar, and then press Enter.

      If you do not press Enter, skip to Step 7e.
   e. Type the Oracle instant client installation directory, and press Enter. If you entered the Oracle home directory, this value is ignored.

f. Type the file path of the directory that contains the Oracle database net configuration file, and press Enter.

g. Choose whether the default dynamic listener is configured at this workstation, and press Enter.

h. Type the full file path of the customized SQL definition file, and press Enter.

8. Press Enter when you are asked whether you want to edit the Database Connection settings. The default value is Yes.

9. To add a database connection, type 1, and press Enter.

10. Enter database connection information by doing the following steps. See Table 2 on page 20 for descriptions of the attributes.

a. Type the connection name, and press Enter.

   Important: Follow the conventions in"Naming conventions for agent instances and database connections" on page 14 when naming the database connection.

b. Select the connection type from the three options: `Basic, TNS, Advanced`.

c. (Basic) Type the Hostname, and press Enter

d. (Basic) Type the Port number, and press Enter

e. (Basic: Optional) Type the Service name, and press Enter

f. (Basic: Optional) Type the SID, and press Enter

g. (TNS) Type the TNS Alias name, and press Enter

h. (Advanced) Type the Oracle connection string, and press Enter.

i. Type the user name, and press Enter.

j. Confirm the password.

k. Type the role name, and press Enter.

l. Type the Alert Log paths, and press Enter.

m. Type the Alert Log file charset, and press Enter.

11. *(Optional)* You can type 1 and press Enter, adding multiple database connections to monitor multiple database instances. You also have the following choices:

   • `2 Edit`, to edit a database connection

   • `3 Del`, to delete a database connection

   • `4 Next`, to change to next database connection

   • `5 Exit`, to exit the database connection section

12. Type 5, and press Enter.

13. When you are asked whether the agent connects to a Tivoli Enterprise Monitoring Server, press Enter.

14. Configure the connection between the agent and the Tivoli Enterprise Monitoring Server:

a. Type the host name of the Tivoli Enterprise Monitoring Server, and press Enter.

b. Type the network protocol that the Tivoli Enterprise Monitoring Server uses to communicate with the agent. You have four choices: IP.UDP, SNA, IP.PIPE, or IP.SPIPE.

c. When prompted, provide the required information, depending on the type of protocol you specified.

d. When you are asked whether you want to configure the connection to a secondary Tivoli Enterprise Monitoring Server, press Enter. The default value is No.

e. To accept the default value for the optional primary network name, press Enter. The default value is none.

Configuring the agent silently on UNIX and Linux systems

The Oracle Database Extended agent supports silent configuration on UNIX and Linux systems.

Procedure

Complete the following steps to perform a silent configuration:

1. Create a response file on the workstation where the Oracle Database Extended agent is installed. The response file is a .txt file that contains the configuration options for the agent. The following example is a response file:

```
################# PRIMARY TEMS CONFIGURATION #################
CMSCONNECT=YES
HOSTNAME=host
NETWORKPROTOCOL=Protocol
IPPIPEPORTNUMBER=1918
################# Database connection config #################
INSTANCE=InstanceName
KRZ_CONN_USERID=UserID
KRZ_CONN_PASSWORD=Password
KRZ_ORACLE_HOME=home_path
KRZ_INSTANT_CLIENT_LIBPATH=LibPath
KRZ_TNS_PATHS=Net_Config_File_DIR
KRZ_DYNAMIC_LISTENER=FALSE
KRZ_CUSTOMIZED_SQL=SQL_File
KRZ_CONN_STR.connection1=//host:port/service
KRZ_CONN_USERID.connection1=UserID
KRZ_CONN_PASSWORD.connection1=Password
KRZ_CONN_MODE.connection1=Role
KRZ_LOG_PATHS.connection1=AlertLogPath
KRZ_LOG_CHARSET.connection1=CharSet
```

Where:

CMSCONNECT
>   This option specifies whether the agent is connected to a Tivoli Enterprise Monitoring Server.

InstanceName
>   Name of the agent instance. If you are configuring a new instance, use the following guidelines for the instance name:
>   - Only letters, Arabic numerals, the underline character, and the minus character can be used in the instance name.
>   - Do not use an instance name with a long length. For the length limitation of an instance name, follow the conventions in "Naming conventions for agent instances and database connections" on page 14

connection1
>   Name of the database connection. You can define multiple database connections for an agent instance.

2. Run the following configuration command:`./itmcmd config -A -o InstanceName -p Response_File_Path rz` Where:

InstanceName
>   Name of the agent instance that you want to configure. This instance name must be the same as the instance name in the response file.

Response_File_Path
>   Full file path of the response file.

>   **Remember:** You must specify the name of the instance that you want to configure in both the response file and the configuration command.

Remote installation and configuration

With IBM Tivoli Monitoring you can deploy monitoring agents from a central location, which is the monitoring server. You can also use the remote agent deployment function to configure deployed agents and install maintenance on your agents.

For information about remote deployment and configuration, see the *IBM Tivoli Monitoring Installation and Setup Guide*. See the *IBM Tivoli Monitoring Command Reference* for commands that you can use to perform these tasks. Before you can deploy any agents from a monitoring server, you must first populate the agent depot with bundles. For information about populating your agent depot, see the *IBM Tivoli Monitoring Installation and Setup Guide*.

Deploying and configuring through the portal

After you add the agent bundle to the Tivoli Enterprise Monitoring Server, if the Tivoli Composite Application Manager Extended Agent for Oracle Database is not listed in the Select a Monitoring Agent window, deploy the agent through the command line.

See the *IBM Tivoli Monitoring Installation and Setup Guide* for detailed information about deploying non-OS agents.

In the New Managed System Configuration window, enter configuration information for the monitoring agent. See Table 2 on page 20 and Table 3 on page 23 for descriptions of the required fields.

Important: The test connection function is unavailable for remote deployment.

When you configure each agent instance remotely through the portal, apply the following guidelines:
- Only letters, Arabic numerals, the underline character, and the minus character can be used in the instance name.
- Do not use an instance name or a database connection name with a long length. For the length limitation of instance names and database connection names, follow the conventions in "Naming conventions for agent instances and database connections" on page 14 when naming an agent instance or a database connection.
- If the number of database connections is less than or equal to 10, the total number of user input characters must not exceed 1000. The user input includes agent instance name, user ID, password, Oracle instance client path, Oracle home directory path, Oracle database connection name, Oracle database connection string, and Oracle Alert Log path.
- If the number of database connections is less than 20 and more than 10, or is equal to 20, the total number of user input characters must not exceed 750.
- If the number of database connections is more than 20, the total number of user input characters must not exceed 500.

Deploying and configuring through the command line

You can use the `configureSystem` or `addSystem` commands to deploy and configure the agent through the command line.

See the *IBM Tivoli Monitoring Installation and Setup Guide* for detailed information about deploying non-OS agents.

For information about displaying the configuration options that are available to use with the `configureSystem` or `addSystem` commands, see the `tacmd describeSystemType` command in the *IBM Tivoli Monitoring Command Reference*.

See Table 2 on page 20 and Table 3 on page 23 for agent-specific configuration information.

addSystem: The tacmd addSystem command deploys an agent that is not already installed on the node.

Important: When you deploy an agent using the `tacmd addSystem -t pc -n node -p properties` command, the length of the *properties* string must not exceed the maximum length of 2500 characters.

Example

The following command is an example of remote deployment for the Oracle Database Extended agent:

```
tacmd addsystem -t RZ -n Primary:sample.node.name:NT
-p INSTANCE=InstanceName
default.KRZ_CONN_USERID=UserID
default.KRZ_CONN_PASSWORD=Password
default.KRZ_INSTANT_CLIENT_LIBPATH=libpath
default.KRZ_ORACLE_HOME=home_path
advance.KRZ_TNS_PATHS=Net_Config_File_DIR
advance.KRZ_DYNAMIC_LISTENER=FALSE
advance.KRZ_CUSTOMIZED_SQL=SQL_File_Path
config:db_connection1.KRZ_CONN_TYPE=Basic
config:db_connection1.KRZ_CONN_HOST=db.sample.com
config:db_connection1.KRZ_CONN_PORT=1521
config:db_connection1.KRZ_CONN_SERVICE=orcl
config:db_connection1.KRZ_LOG_PATHS=logfilepath
config:db_connection1.KRZ_LOG_CHARSET=charset
config:db_connection2.KRZ_CONN_TYPE=TNS
config:db_connection2.KRZ_CONN_TNS=tnsname
config:db_connection2.KRZ_CONN_MODE=mode
config:db_connection2.KRZ_LOG_PATHS=logfilepath
config:db_connection2.KRZ_LOG_CHARSET=charset
config:db_connection3.KRZ_CONN_TYPE=Advanced
config:db_connection3.KRZ_CONN_STR=host:port/service
config:db_connection3.KRZ_CONN_MODE=mode
config:db_connection3.KRZ_LOG_PATHS=logfilepath
config:db_connection3.KRZ_LOG_CHARSET=charset
_WIN32_STARTUP_.Username=UserName
_WIN32_STARTUP_.Password=Password
_WIN32_STARTUP_.LocalSystem=Localsystem
_WIN32_STARTUP_.InteractWithDesktop=Interact
```

Important: On UNIX and Linux systems, if brackets are in a configuration value, embrace the value with double quotation marks such as in the following example:

```
 config:db_connection.KRZ_CONN_STR="(DESCRIPTION=(ADDRESS_LIST=
(ADDRESS=(PROTOCOL=TCP)(HOST=1.2.3.4)(PORT=1521)))
(CONNECT_DATA=(SERVICE_NAME=oracle)))"
```

The following options are required for all remote deployments:

- -n *Primary:sample.node.name:NT*
- -p INSTANCE=*InstanceName*

  The following guidelines apply when you name the agent instance:

  – Only letters, Arabic numerals, the underline character, and the minus character can be used in the instance name.

  – Do not use an instance name with a long length. For the length limitation of an instance name, follow the conventions in "Naming conventions for agent instances and database connections" on page 14 when naming the agent instance.

- default.KRZ_CONN_USERID=*UserID*
- default.KRZ_CONN_PASSWORD=*Password*
- One of the following two options:

  – default.KRZ_INSTANT_CLIENT_LIBPATH=*libpath*

  – default.KRZ_ORACLE_HOME=*home_path*

When you deploy the Oracle Database Extended agent from a UNIX or Linux workstation to a Windows workstation, use double backslashes (\\) instead of backslashes(\) in file paths. For example, use `c:\\oracle\\example` instead of `c:\oracle\example`.

The following parameters and options apply to the
config:*connectionname*:KRZ_CONN_TYPE=[[Basic|TNS|Advanced] command.

Table 4. Connection type options

Parameters	Options

KRZ_CONN_TYPE=Basic	• config:*connectionname*:KRZ_CONN_HOST=HostName
	• config:*connectionname*:KRZ_CONN_PORT=PortNumber
	• One of the following two options:
	  – config:*connectionname*:KRZ_CONN_SERVICE
	  – config:*connectionname*:KRZ_CONN_SID

KRZ_CONN_TYPE=TNS	config:*connectionname*:KRZ_CONN_TNS=tnsname
KRZ_CONN_TYPE=Advanced	config:*connectionname*:KRZ_CONN_STR=*connection string*

Note:
- KRZ_CONN_HOST=*Hostname or IP address for the Oracle database*
- KRZ_CONN_PORT=*Listener Port for the Oracle database*
- KRZ_CONN_SERVICE=*A logical representation of a database, a string that is the global database name*
- KRZ_CONN_SID=*Oracle System Identifier that identifies a specific instance of a running database*
- KRZ_CONN_TNS=*Network alias name from tnsnames.ora*

Important: Follow the conventions in "Naming conventions for agent instances and database connections" on page 14 when naming the agent instance.

The parameters in the example are shown on separate lines for clarity. When typing the command, type all parameters on one line.

configureSystem: Use the **tacmd configureSystem** command to edit configuration options for an existing agent. After the command is issued, the agent restarts automatically for the new configuration parameters to take effect.

The following command is an example of remote configuration for the Oracle Database Extended agent:

```
tacmd configuresystem -m System
-p INSTANCE=InstanceName
default.KRZ_CONN_USERID=UserID
```

The following options are required for all remote configuration:
- -m *System*
- -p INSTANCE=*InstanceName*

Important:
- On UNIX and Linux systems, if there are brackets in a configuration value, embrace the value with double quotation marks. For example,

  ```
  config:db_connection.KRZ_CONN_STR="(DESCRIPTION=(ADDRESS_LIST=
  (ADDRESS=(PROTOCOL=TCP)(HOST=1.2.3.4)(PORT=1521)))
  (CONNECT_DATA=(SERVICE_NAME=oracle)))"
  ```
- When you deploy the Oracle Database Extended agent from a UNIX or Linux workstation to a Windows workstation, use double backslashes (\\) instead of backslashes (\) in file paths. For example, use c:\\oracle\\example instead of c:\oralce\example.

The parameters in the example are shown on separate lines for clarity. When typing the command, type all parameters on one line.

Setting environment variables

You can set environment variables for the agent by using a configuration file (on Windows, UNIX, and Linux systems) or using the Manage Tivoli Enterprise Monitoring Services tool (on Windows systems).

Use one of the following procedures to set the environment variables for the Oracle Database Extended agent:
- On Windows, UNIX and Linux systems, use can use the configuration file.
- On Windows systems, you can use the Manage Tivoli Enterprise Monitoring Services tool.

Table 5 contains descriptions of the environment variables that you use in both procedures.

Table 5. Environment variable descriptions

Variable	Description
`CDP_COLLECTION_TIMEOUT`	The maximum time of data collection. If the execution time exceeded, the agent stops the execution, and reports timeout. The default value is 60 (in seconds). The minimum value is 5 (in seconds).
`CDP_DP_ACTION_TIMEOUT`	The maximum execution time of Take Action commands. If the execution time exceeded, the agent stops the execution. The default value is 20 (in seconds). The minimum value is 5 (in seconds).
`KRZ_ACTION_NEWCONN`	If the value is true, the agent creates a database connection to run Take Action commands.
`KRZ_CHECK_ORACLE_PRIVILEGE`	Controls whether the agent instance checks all default Oracle privileges in the `krzgrant.sql` file when the agent instance starts. The default value is TRUE. If set to FALSE, the agent instance does not check the privileges when the agent starts. **Note:** The test connection step of GUI configuration checks all Oracle privileges that are defined in the `krzgrant.sql` file. If you confirm that the Oracle user has the correct privileges, ignore that checking privileges fails in the test connection step.
`KRZ_CHECK_PRIVILEGE_EVENT_COUNT`	The number of Check Privilege events that are displayed in the Database Connection workspace. The other Check Privilege events are ignored. The value must not be less than 1.
`KRZ_CUSTOM_SQLXML`	The name of the XML file for customized SQL statements.
`KRZ_DEFAULT_MAXROWNUM`	The default maximum row number of all attribute groups. The default value is 1000.
`KRZ_EVENT_LEVEL`	The agent event level controls whether current agent events are sent. The level with a scope from high to low is MISC, INFO, WARN, or ERROR.
`KRZ_LISTENER_EXCLUDE`	The listener name that is excluded by the filter for the Listener monitoring. The specified listener name is not monitored by the Oracle Database Extended agent. If this field is blank, no listeners from the `listener.ora` file are excluded from monitoring. The filter supports the regular expression and more than one filter must be separated by commas. Each filter must not exceed 128 characters. For the detailed syntax for regular expressions, see "ICU regular expressions" on page 53.

Table 5. Environment variable descriptions (continued)

Variable	Description
`KRZ_LISTENER_INCLUDE`	The listener name that is included by the filter for the Listener monitoring. Only the specified listener name is monitored by the Oracle Database Extended agent. If this field is blank, all valid listeners from the `listener.ora` file are included to be monitored. The filter supports the regular expression and more than one filter must be separated by commas. Each filter must not exceed 128 characters. For the detailed syntax for regular expressions, see "ICU regular expressions" on page 53.
`KRZ_LISTENER_PING_INTERVAL`	The interval by which the agent checks whether the listener is active. Listener monitoring is started by default. You can control the interval or turn off listener monitoring. The default value is 300 (in seconds). If the value is less than 1, the agent stops checking the interval.

`KRZ_LOAD_ORACLE_NET`	Use this environment variable to decide whether the Listener and Net Service End Points come from the following files you want to monitor:
	• On UNIX or Linux systems
	    `$ORACLE_HOME/network/admin/listener.ora`
	    `$ORACLE_HOME/network/admin/tnsnames.ora`
	    `$TNS_ADMIN/network/admin/listener.ora`
	    `$TNS_ADMIN/network/admin/tnsnames.ora`
	• On Windows systems
	    `%ORACLE_HOME%\network\admin\listener.ora`
	    `%ORACLE_HOME%\network\admin\tnsnames.ora`
	    `%TNS_ADMIN%\network\admin\listener.ora`
	    `%TNS_ADMIN%\network\admin\tnsnames.ora`
	
	If this new variable is set with a value of `false`, the agent does not load the Listener or Net Service definition from the files in the list, even if the agent is configured with the ORACLE HOME directory.
	
	The agent loads the Listener or Net Service definition if the agent is configured with a `TNS PATH` directory that contains the `listener.ora` or `tnsnames.ora` files.

`KRZ_LOG_INTERVAL`	This attribute defines the search interval (in seconds) for alert log files. The default value is 300 (seconds). Setting the value to 0 disables search. The valid range is 60 - 3600.
`KRZ_LOG_NOREPEAT`	If the value is true, the Oracle Database Extended agent does not resend alert log message entries that were found in the last running of the Oracle Database Extended agent. The default value is FALSE. The valid values are TRUE and FALSE.

Table 5. Environment variable descriptions (continued)

Variable	Description
`KRZ_LOG_MAXREAD`	Only the latest part of alert logs is scanned by the Oracle Database Extended agent while the agent starts. The size of the scanned part is specified by the KRZ_LOG_MAXREAD attribute. The default value is 5M. The value must be positive. The valid data suffixes are M/m presenting megabyte, and K/k presenting kilobyte.
`KRZ_MAX_SUBNODE_ID_LENGTH`	The maximum length of the subnode ID. The default value is 24. **Note:** In 6.3.1-TIV-ITM_KRZ-IF0001 and 6.3.1-TIV-ITM_KRZ-IF0002, the environment variable is named KRZ_MAX_SUBNODE_NAME_LENGTH. In this release, this environment variable is renamed as KRZ_MAX_SUBNODE_ID_LENGTH. To be compatible with old releases, KRZ_MAX_SUBNODE_NAME_LENGTH continues to work.
`KRZ_PING_INTERVAL`	The agent check by interval, which is used to determine the database connection availability. The default value is 60 (in seconds).
`KRZ_REDIRECT_TNS`	If the value is true, the Oracle Database Extended agent checks whether the `TNS_ADMIN` environment variable is set during agent startup, then copies files that include `listener.ora`, `tnsnames.ora`, and `sqlnet.ora` to the agent log directory and redirects the `TNS_ADMIN` to the agent log directory. The default value is TRUE. The valid values are TRUE and FALSE.
`KRZ_SELECT_ACTION_MAXROW`	The maximum number of rows that are returned by the SELECT Take Action command. The default value is 10.
`KRZ_SQL_PREFILTER`	If the value is true, the Oracle Database Extended agent combines the filter information in the SQL query that is sent to the Oracle database for data processing, and then returns data to the Tivoli Enterprise Monitoring Server with records matched with the filter condition. The default value is TRUE. The valid values are TRUE and FALSE.
`KRZ_SUBNODE_INCLUDING_AGENTNAME`	Controls whether the agent instance name is added to the subnode name. The default value is YES. If set to NO, the ID does not include the instance name.
`KRZ_SUBNODE_INCLUDING_HOSTNAME`	Controls whether the host name is added to the subnode name. The default value is YES. If set to NO, the ID does not include the host name.
`KRZ_TNS_EXCLUDE`	The TNS name that is excluded by the filter for the Net Service monitoring. The specified TNS Net Service name is not monitored by the Oracle Database Extended agent. If this field is blank, no Net Service alias from the `tnsnames.ora` file is excluded from monitoring. The filter supports the regular expression and more than one filter is separated by commas. Each filter must not exceed 128 characters. For the detailed syntax for regular expressions, see "ICU regular expressions" on page 53.

Table 5. Environment variable descriptions (continued)

Variable	Description
KRZ_TNS_INCLUDE	The TNS name that is included by the filter for the Net Service monitoring. Only the specified TNS Net Service name is monitored by Oracle Database Extended agent. If this field is blank, all valid Net Service aliases from the tnsnames.ora file are monitored. The filter supports the regular expression and more than one filter is separated by commas, each filter must not exceed 128 characters. For the detailed syntax for regular expressions, see "ICU regular expressions" on page 53.
KRZ_TNS_PING_INTERVAL	The interval by which the agent checks whether the Oracle net services are active. Net service monitoring is started by default. You can control the interval or turn off net service monitoring. The default value is 300 (in seconds). If the value is less than 1, the agent stops checking the interval.

Using the configuration file

Use the configuration file on Windows, UNIX or Linux systems to set environment variables.

Procedure

1. Open the configuration file.

   On Windows systems, the file path of the configuration file is *install_dir*\TMAITM6\ KRZENV_*InstanceName*.

   On UNIX and Linux systems, the file path of the configuration file is *install_dir*/config/rz.ini.

   Where:

   install_dir
   Installation directory of the Oracle Database Extended agent

   InstanceName
   Name of the agent instance.

2. Set the environment variables. See Table 5 on page 34 for a description of the variables.
3. Restart the agent instance for the changes to take effect.

Using the Manage Tivoli Enterprise Monitoring Services tool

On Windows systems, you can use the Manage Tivoli Enterprise Monitoring Services tool to set environment variables:

Procedure

1. To open the Manage Tivoli Enterprise Monitoring Services window, click **Start** > **Programs** > **IBM Tivoli Monitoring** > **Manage Tivoli Monitoring Services**.
2. Right-click the agent instance that you want to configure, and click **Advanced** > **Edit Variables**.
3. In the Override Local Variable Settings window, complete one of the following two steps:
   a. Select the variable that you want to edit, and click **Edit**.
   b. If the variable does not exist, click **Add**, and enter the name and the value that you want to set.

   For descriptions of the variables, see Table 5 on page 34.
4. Click **OK** to close the Add Environment Setting Override window.
5. Click **OK**.
6. Restart the agent instance for the changes to take effect.

Customizing Oracle alert log monitoring

The alert log workspaces are used to monitor the Oracle messages from the Oracle alert log. You can customize the monitoring setting to monitor the messages that you want, and set the severity level for each message.

Procedure

To customize the monitoring settings for Oracle alert log, complete the following steps:

1. Open the *Host_name*_rz_*Instance_name*_msgid.properties properties file for Oracle alert log monitoring. On Windows 32-bit systems, the file is in the `install_dir`\TMAITM6 directory. On Windows x64 systems, the file is in the `install_dir`\TMAITM6_x64 directory. On UNIX and Linux systems, the file is in the `install_dir`/config directory. Where:

   install_dir
   > Installation directory of the Oracle Database Extended agent.

   Host_name
   > Host name of the system where the agent is running.

   Instance_name
   > Name of the Oracle Database Extended agent.

2. Edit the file as required. The file contains regular expressions that are used to match the message IDs. You can add a new regular expression, comment an existing regular expression, or change the severity level for a regular expression. Each line must be written in the following format: `RegularExpression=ServerityLevel`. For example, ORA-0*44[0-9]=1.

   You have the following five choices for the severity level:

   - 1 - Error
   - 2 - Warning
   - 3 - Information
   - 4 - Miscellaneous
   - 5 - Ignore

   For the detailed syntax for regular expressions, see "ICU regular expressions" on page 53.

3. Save your changes and close the file.

Customizing Listener and Net Service monitoring

The Net Service connection workspace is used to monitor the Oracle Listener status and Net Service endpoint status. You can customize the monitoring setting to monitor or not monitor from the default Oracle Net path and a specific path, and set including or excluding filters for each listener name or net service endpoint name.

Procedure

The following information applies to the steps for this task:

- Each filter variable can include multiple filters that are separated by commas, such as `KRZ_LISTENER_INCLUDE=LISTENER[0-9]`,`ORCL[0-9]`.
- The length of each single filter cannot exceed 128 characters.
- The total length for each filter variable cannot exceed the environment variable length limit in the target operating systems.
- If one Listener or Net Service entry matches both include and exclude filters, this entry is not monitored.
- If both the include and the exclude filters are blank, or not set, the agent monitors all entries from the `listener.ora` and `tnsnames.ora` files.

- The new filter options can be customized in the `installdir/config/rz.ini`, `rz_instance.config` files on UNIX systems or the `installdir\TMAITM6(_X64)\KRZENV_instance` file on Windows systems.
1. To monitor or not monitor from the default Oracle Net path such as `$ORACLE_HOME/network/admin`, set the **`KRZ_LOAD_ORACLE_NET`** variable to `true` or `false`.
2. To monitor or not monitor some specific Listener names, set the **`KRZ_LISTENER_INCLUDE`** or **`KRZ_LISTENER_EXCLUDE`** variable.
3. To monitor or not monitor some specific Net Service names, set the **`KRZ_TNS_INCLUDE`** or **`KRZ_TNS_EXCLUDE`** variable.

Defining and running customized SQL statements

The customized SQL feature provides the capability to define and run your own SQL-based monitoring with the Oracle Database Extended agent.

The customized SQL feature supports only SELECT statements that you can run in an on-demand mode or at an interval.

Defining SQL statements

Define the SQL statements in the `krzcussql.properties` file that is located in the following directory:

- Windows 32-bit systems: *Installation_Dir*`\TMAITM6`
- Windows x64 systems: *Installation_Dir*`\TMAITM6_x64`
- UNIX and Linux systems: *Installation_Dir*`/config`

where: *Installation_Dir* is the installation directory of the Oracle Database Extended agent.

Apply the following guidelines when you define SQL statements:

- Only ASCII characters are supported in the `krzcussql.properties` file.
- Each valid entry starts with `[SELECTSQL]`, and the entry ends when reaching another beginning-bracket character ([) at the beginning of a line.
- In each SELECTSQL entry, you can define the SQL_ID, SQL_TEXT, and SQL_TIMEOUT variables as follows.
  - SQL_ID: Each customized SQL entry must have a valid SQL_ID variable defined.

    The SQL_ID variable is case sensitive, and can consist of uppercase letters (A-Z), lowercase letters (a-z), the underscore character (_), and the hyphen (-).

    If multiple SELECTSQL entries exist with the same SQL_ID, only the last entry takes effect.
  - SQL_TEXT: Each customized SQL entry must have an SQL_TEXT variable.

    For the SQL_TEXT variable, only SELECT statements are supported. INSERT, UPDATE, or DELETE statements are not supported.

    The SQL_TEXT variable supports multiple lines and valid Oracle double dash comment characters (--).
  - SQL_TIMEOUT: You can specify different timeout values for each customized SQL entry in case some SQL statements need more time for execution and fetching data. The default value is 60 seconds.

Running the SQL statements

SQL statements can be executed in an on-demand mode or in an interval mode.

On-demand mode

SQL statements are executed in an on-demand mode by clicking the corresponding SQL record and linking to the SQL Result (Figure 14 on page 40).
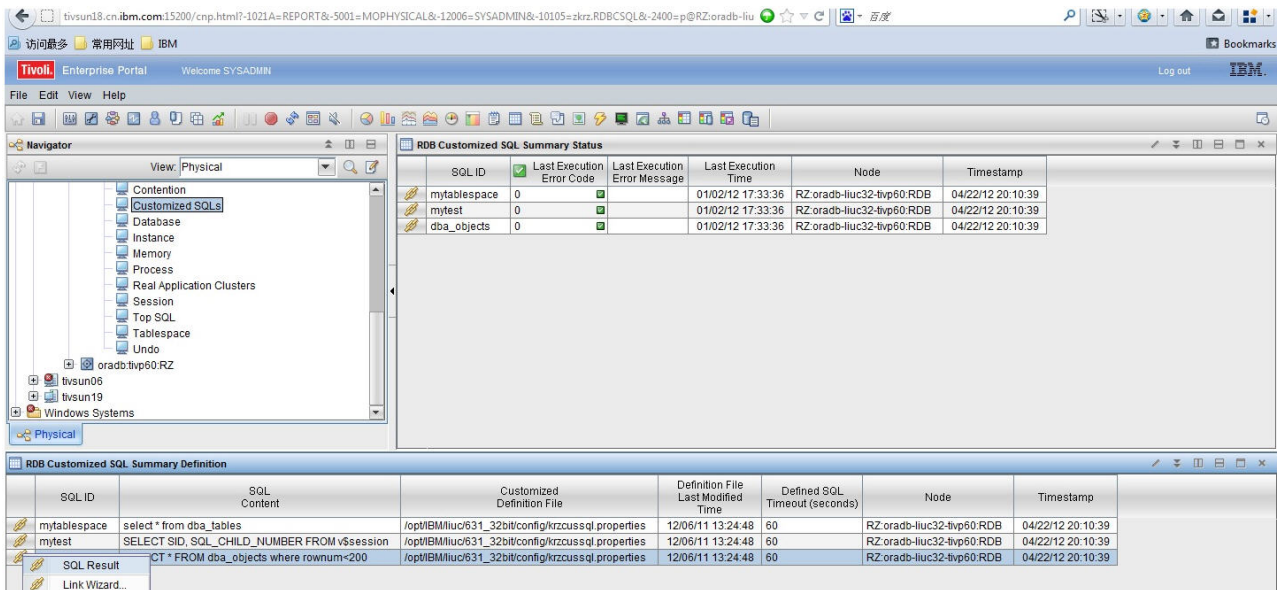
Figure 14. SQL result

Interval mode

SQL statements can be executed in an interval mode by creating a situation. To execute the SQL statements at a regular interval, create a situation for the KRZ RDB CUSTOMIZED SQL DETAIL attribute group.

Example:

```
(SQL ID == 'DualTest')
OR SQL ID == 'EMPTEST'
OR SQL ID == 'JOBTEST'
```

Select the interval you want to use for the situation. The SQL ID matches the SQL ID variable that is defined in the krzcussql.properties file. After starting the situation, the SQL statements run by situation interval.

Sample SQL statements

A total of six sample SQL statements are in the default customized SQL template file. To ensure the sample customized SQL can be run successfully, the SELECT authority from corresponding Oracle performance views must be granted to the Oracle user of the agent in advance.

Table 6. Sample SQL statements in the default customized SQL template file

SQL_ID	SQL_TEXT	Oracle Views to be granted SELECT permission
mytablespace	select * from dba_tables;	dba_tables
mytest	SELECT SID, SQL_CHILD_NUMBER FROM v$session	v$session
dba_objects	SELECT * FROM dba_objects where rownum<200	dba_objects

SQL_ID	SQL_TEXT	Oracle Views to be granted SELECT permission
krz_jobs	SELECT JOB JOBID, LOG_USER LOGUSER, PRIV_USER PRIVUSER, SCHEMA_USER SCHEMAU, TO_CHAR(LAST_DATE, 'YYYYMMDDHH24MISS') LASTSUCCD, LAST_SEC LASTSUCCS, NEXT_SEC NEXTSEC, BROKEN JOBBROKEN, INTERVAL INTERVALFN, NVL(FAILURES,0) JOBFAILS, (SYSDATE - NEXT_DATE) * 1440 NEXTSTART FROM SYS.DBA_JOBS;	SYS.DBA_JOBS
krz_users	SELECT USERNAME, USER_ID USERID, ACCOUNT_STATUS STATUS, LOCK_DATE LOCKDATE, EXPIRY_DATE EXPIRYDATE, DEFAULT_TABLESPACE DEFAULTTS, TEMPORARY_TABLESPACE TEMPTS, CREATED, PROFILE FROM SYS.DBA_USERS;	SYS.DBA_USERS
krz_queues	SELECT NAME, QUEUE_TABLE QUEUETABLE, QID QUEUEID, QUEUE_TYPE TYPE, MAX_RETRIES MAXRETRY, RETRY_DELAY DELAY, ENQUEUE_ENABLED ENQUEUE, DEQUEUE_ENABLED DEQUEUE FROM SYS.DBA_QUEUES;	SYS.DBA_QUEUES

Configuring Top SQL monitoring

The Top SQL workspace is used to monitor the Oracle Top SQL statements. All four columns must be specified as filters in the situation or historical collection.

Specify the following four filters:

Begin Hour Before Current
    The hour before the current time for the begin time. v value is equal to 2.

End Hour Before Current
    The hour before the current time for the end time. The sample value is equal to 0.

Order By
    The sorting column for the Top SQL. All candidate values are listed in Table 7.

Row Order
    The order of the SQL statements. The sample value is less than 21 for the Top 20 SQL statements.

Table 7. All valid Order By values for the Top SQL monitoring

Workspace	Order By value
Top SQL by Elapse Time	elapse_time_delta
Top SQL by CPU Time	cpu_time_delta
Top SQL by buffer gets	buffer_gets_delta

Table 7. All valid Order By values for the Top SQL monitoring (continued)

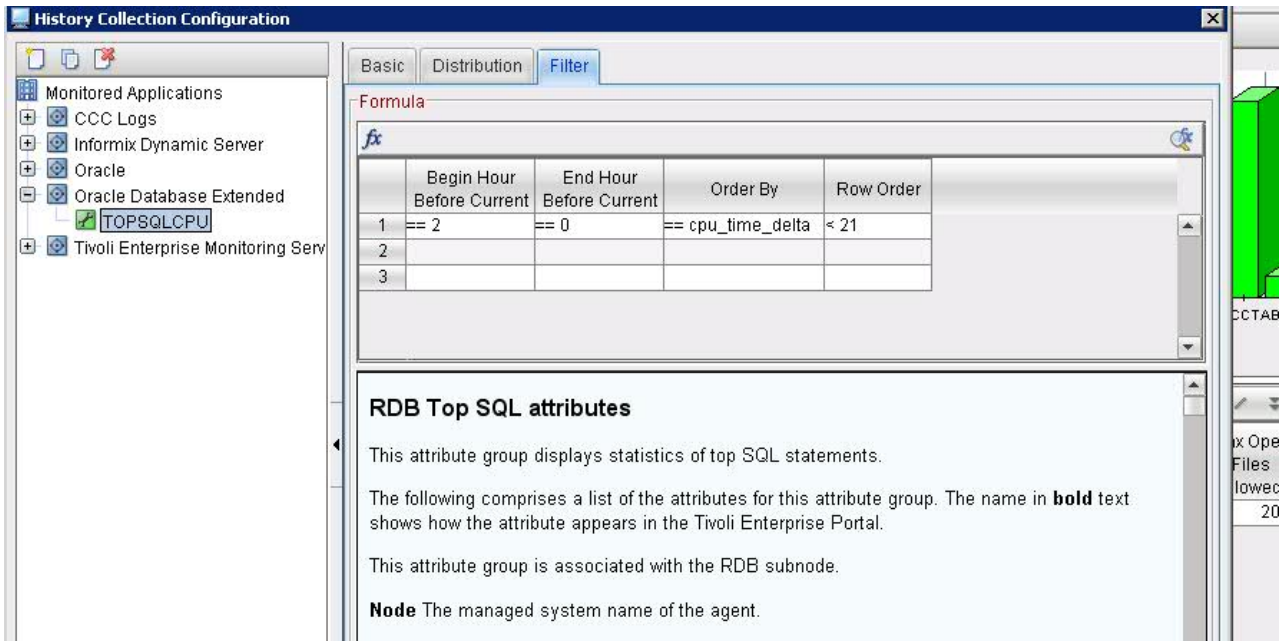| Workspace	Order By value
Top SQL by disk reads	disk_reads_delta
Top SQL by executions	executions_delta
Top SQL by parse calls	parse_calls_delta
Top SQL by sharable memory	sharable_mem
Top SQL by version count	version_count
Top SQL by cluster wait	clwait_delta

Historical collection example:

Figure 15. Sample filter setting in the historical collection configure panel

Situation example:
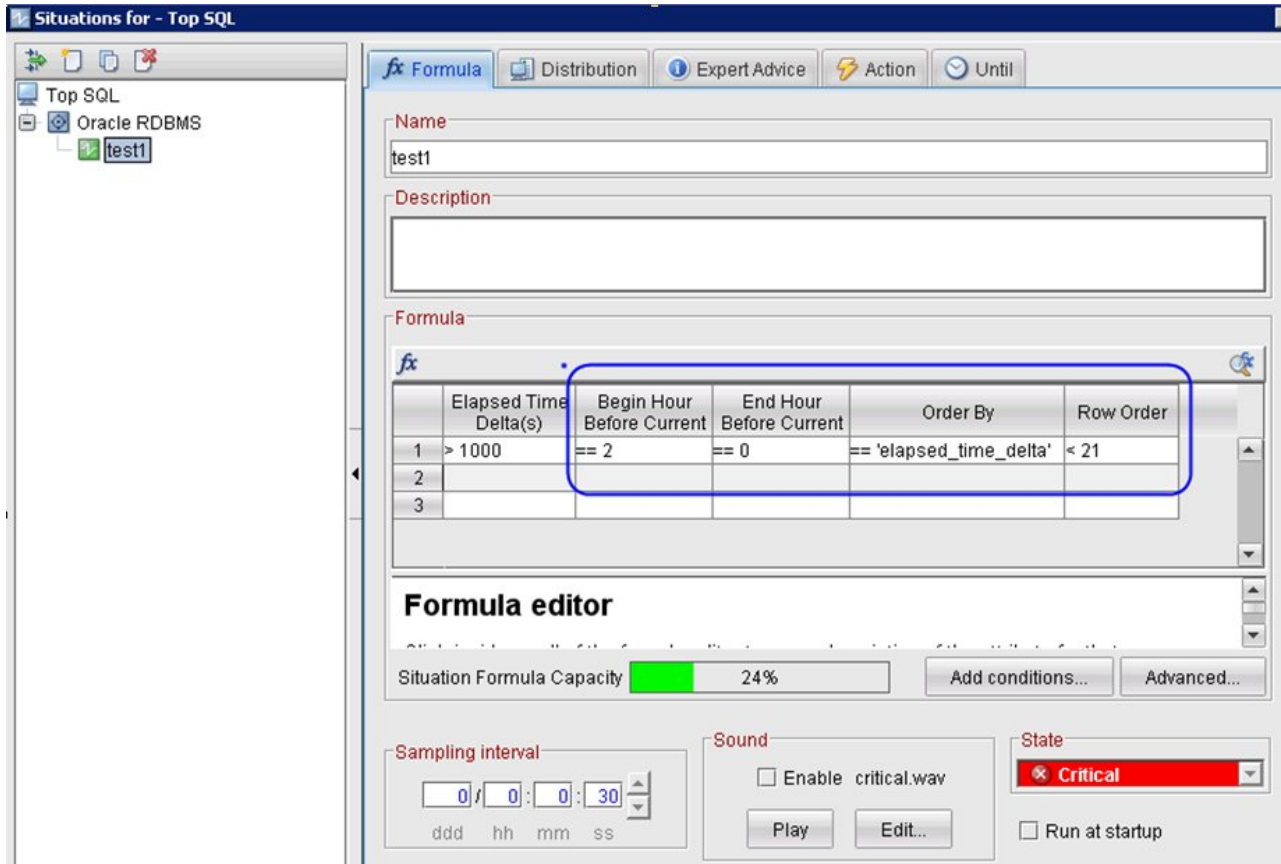
Figure 16. Sample Formula setting in the situation configure panel

Configuring agent event monitoring

The Agent Event workspace is used to monitor the events and includes the error code, error message, suggestions, and other information.

You can set the event level by using the **KRZ_EVENT_LEVEL** environment variable to control the level of the agent event that is sent. The default level is ERROR.

Table 8. Levels of the agent events to be sent for each KRZ_EVENT_LEVEL

KRZ_EVENT_LEVEL	Level of agent event to be sent
MISC	MISC, INFO, WARN, ERROR
INFO	INFO, WARN, ERROR
WARN	WARN, ERROR
ERROR	ERROR

You can create a customized agent event situation to monitor typical error codes.
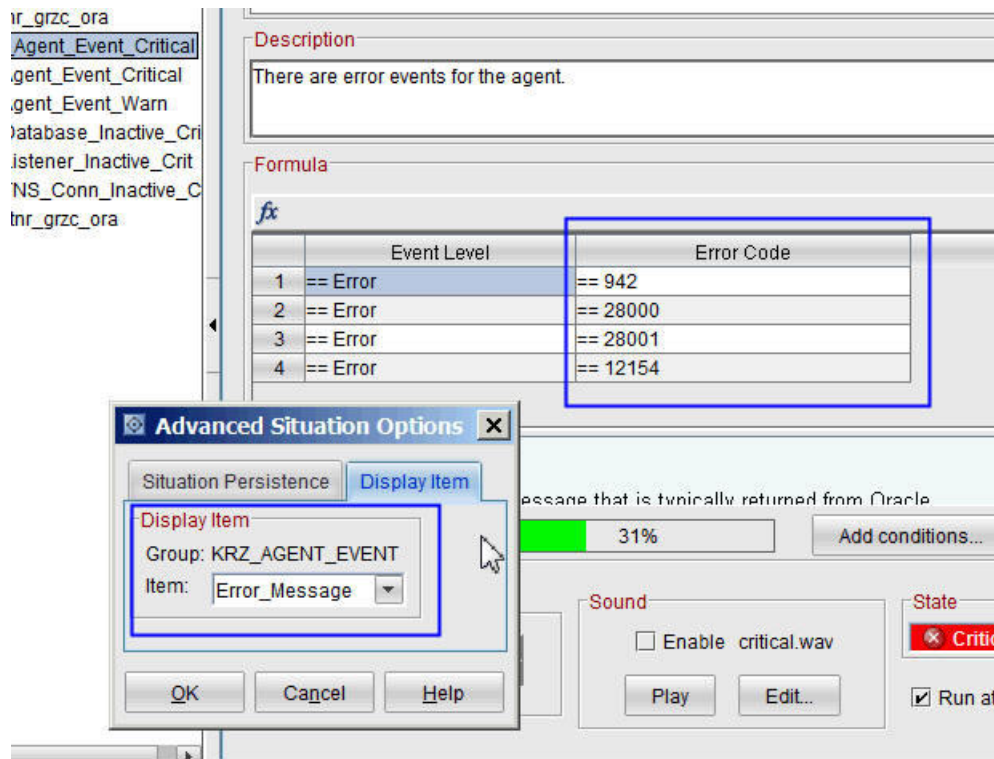
Figure 17. Agent event situation

Table 9. Suggestions for correcting errors for event messages

Error code	Error message	Suggestion
942	`table or view does not exist`	Run **krzgrant.sql** or grant select on "TABLE_NAME" to *itm_user*.
28000	`Account is locked`	Run `alter user` *itm_user* `account unlock;` with the sysdba role in sqlplus.
28001	`Password is expired`	Run `alter user` *itm_user* `identified by "passwd" account unlock;` with the sysdba role in sqlplus.
12154	`TNS: listener does not currently know of service requested in connect descriptor`	1. Check the database status. 2. Check the listener status. 3. Check network connectivity. 4. Check Oracle network connectivity by using the **tnsping** command.

Sample Database connection configuration

You can monitor basic and advanced types of Oracle connections that include RDBMS single instance, Real Application Cluster (RAC), Automatic Storage Management (ASM), and Oracle DataGuard nodes.

The Basic connection includes single instance databases. The Advanced connection includes RAC databases, ASM databases, and nodes in a DataGuard environment.

Monitoring an Oracle RDBMS single instance

Figure 18. Use Basic connection type to specify a single instance database

Monitoring an Oracle Real Application Cluster (RAC) database

Figure 19. Use Advanced connection type to specify a RAC database with more than one instance

Sample connection string: (DESCRIPTION=(FAILOVER=ON)(ADDRESS_LIST=(LOAD_BALANCE=ON
)(ADDRESS=(PROTOCOL=TCP)(HOST=tivp055)(PORT=1521))(ADDRESS=(PROTOCOL=TCP)
(HOST=tivp056)(PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=orcl)))

Monitoring an Oracle Automatic Storage Management (ASM) database

Figure 20. Use Advanced connection type to specify an ASM database with more than one instance and a different user name that has SYSDBA/SYSASM authority

Sample connection string: (DESCRIPTION=(FAILOVER=ON)(ADDRESS_LIST=(LOAD_BALANCE=ON) (ADDRESS=(PROTOCOL=TCP)(HOST=tivp055)(PORT=1521))(ADDRESS=(PROTOCOL=TCP) (HOST=tivp056)(PORT=1521))) (CONNECT_DATA=(SERVICE_NAME=+ASM)

Monitoring Oracle Data Guard – primary node and standby node

To monitor both the Primary Node and the Standby Node in a DataGuard environment, two database connections must be created. One connection is for the primary node and the other connection is for the standby node.

Figure 21. Database connection for primary node with DEFAULT role

Figure 22. Database connection for standby node with sysdba role

Starting or stopping the agent

After you install and configure the Oracle Database Extended agent, you must start the agent. You can use local or remote interfaces.

Important:

- The user who configures, starts, or stops the agent must have write and execute permissions to the agent installation directory.
- Use the same user ID to configure, start, or stop the Oracle Database Extended agent.
- If the locally installed Oracle database is used by the agent to connect monitored databases, the user who starts the agent must have read and execute permissions to the local Oracle database directory.
- If the Oracle Call Interface (OCI) libraries in the Oracle instant client are used to connect monitored databases by the agent, the user who starts the agent must have read and execute permissions to those Oracle Call Interface (OCI) libraries.

After installing and configuring the Oracle Database Extended agent, start the agent by using the command relevant to the operating system and location where the agent is running. Table 10 shows which interfaces you can use with Windows, UNIX, and Linux systems locally and remotely.

Important: Do not use the `kill -9` command to stop the Oracle Database Extended agent process. Do not use the `kill` command as a normal method to stop the monitoring agent.

Table 10. Interfaces for starting and stopping the Oracle Database Extended agent

Operating system	Local	Remote
Windows	• Manage Tivoli Enterprise Monitoring Services • tacmd startAgent • tacmd stopAgent • tacmd restartAgent	• Tivoli Enterprise Portal • tacmd startAgent • tacmd stopAgent • tacmd restartAgent

Table 10. Interfaces for starting and stopping the Oracle Database Extended agent (continued)

Operating system	Local	Remote
UNIX and Linux	• Manage Tivoli Enterprise Monitoring Services • itmcmd agent • CandleAgent	• Tivoli Enterprise Portal • itmcmd agent • CandleAgent

Manage Tivoli Enterprise Monitoring Services

To use Manage Tivoli Enterprise Monitoring Services to start the Oracle Database Extended agent, start the Manage Tivoli Enterprise Monitoring Services utility.

Tivoli Enterprise Portal

For information about using the Tivoli Enterprise Portal to start or stop the monitoring agent, see "Working with monitoring agents" and "Starting and stopping a monitoring agent" in the *IBM Tivoli Monitoring Administrator's Guide.*

tacmd command line

In the following examples, the **tacmd** command is used to start, stop, or restart all Oracle Database Extended agent instances on a Windows system:
- **tacmd startAgent -t rz**
- **tacmd stopAgent -t rz**
- **tacmd restartAgent -t rz**

For information about using the **tacmd** commands, see the *IBM Tivoli Monitoring Command Reference.*

itmcmd command line

Use the following commands to start or stop an Oracle Database Extended agent instance on a UNIX or Linux system:
- `./itmcmd agent –o `*`instance_name`*` start rz`
- `./itmcmd agent –o `*`instance_name`*` stop rz`

where: **-o** specifies the Oracle Database Extended agent instance that you previously configured to start or stop.

To check the names and settings of configured agent instances, navigate to the *ITMinstall_dir*/bin directory, and run the following command:
`./cinfo -s rz`

CandleAgent command line

Use the following commands to start or stop an Oracle Database Extended agent instance on a UNIX or Linux system:
- `./CandleAgent –o `*`instance_name`*` start rz`
- `./CandleAgent –o `*`instance_name`*` stop rz`

where: **-o** specifies the Oracle Database Extended agent instance that you previously configured to start or stop.

To check the names and settings of configured agent instances, navigate to the *ITMinstall_dir*/bin directory, and run the following command:

```
./cinfo -s rz
```

Configuring for clustering and positioning in the portal navigator

For a non-RAC clustered environment such as HACMP, the follow configuration steps are recommended so that a failover event starts the agent on the active node of the cluster. Also, the behavior of agent clustering and positioning in the Tivoli Enterprise Portal Navigator can be configured to display as expected.

Procedure

1. Perform the substep that corresponds to your environment depending on whether you use a shared disk or non-shared disks on the two nodes. This step allows the agent's startup script to find the configuration file on the failover node when the switch occurs.

   a. If the Oracle Database Extended agent is installed on local, non-shared disks on each node of the cluster then configure the agent on each disk using the same instance name.

   b. If the Oracle Database Extended agent is installed in a shared disk location of the clustered environment, then make a copy of ITM/config/*<Active_Hostname>*_rz_*<InstanceName>*.cfg, naming the new file as *<Standby_Hostname>*_rz_*<InstanceName>*.cfg.

2. Change the **CTIRA_HOSTNAME** agent configuration environment variable to provide an alternate host name qualifier.

   a. Open the agent configuration file.
      - On Windows systems, the file path is *ITMHOME*\TMAITM6(_x64)\KRZENV_*InstanceName*.
      - On UNIX and Linux systems, the file path is *ITMHOME*/config/rz.ini.

   b. Modify the environment variable: **CTIRA_HOSTNAME**=*value of CTIRA_HOSTNAME*. For example, **CTIRA_HOSTNAME**='CHN'.

   c. Restart the agent.

3. Add the Oracle Database Extended agent process (service) to the group of Oracle database services in the failover management tool.

   a. For a Windows 2003 cluster, create a resource:
      - Service name: KRZCMA_*<agent instance name>*
      - Start Parameters: **-Hkey** KRZ\Ver631*<agent instance name>*

   b. For a Windows 2008 cluster, add a service as resource:
      - Open the **Failover Cluster Manager** snap-in
      - Right-click **OracleService*<Name>***
      - Select **Add a resource** > **Generic service**
      - Select **IBM Tivoli Monitoring: Oracle Database Extended agent - *<agent instance name>***
      - See the service and parameters display in the panel
      - Select **Next** then select **Finish**
      - Set a dependency on **OracleService*<Name>*** for the newly added resource
      - Bring the resource online

4. Set the **KFW_TOPOLOGY_CLUSTER_LIST** Tivoli Enterprise Portal Server configuration environment variable to change the Physical Navigation to depend on **CTIRA_HOSTNAME**.

   a. Open the Tivoli Enterprise Portal Server configuration file.
      - On Windows systems, the file path is *ITMHOME*\cnps\kfwenv.
      - On UNIX and Linux systems, the file path is *ITMHOME*/config/cq.ini.

   b. Add the **KFW_TOPOLOGY_CLUSTER_LIST** environment variable, and add dynamic affinity of ITCAM Extended Agent for Oracle Database as the value: **KFW_TOPOLOGY_CLUSTER_LIST**=%IBM.OracleAgents

      Note: This affinity applies to both agent nodes and subnodes.

5. Check the Tivoli Enterprise Portal navigator to see whether **CTIRA_HOSTNAME** takes effect. See CHN in the example (marked in the red box).
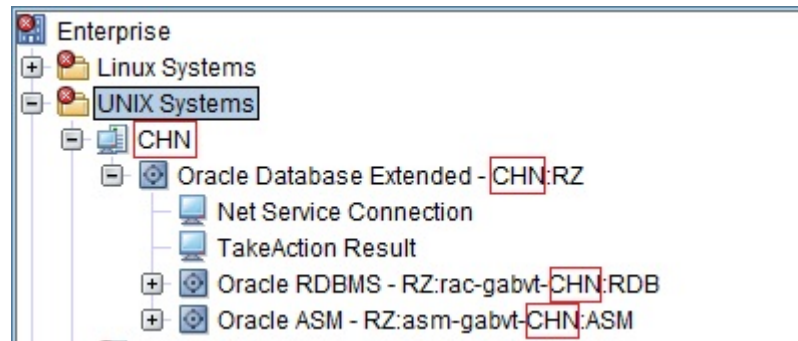

*Figure 23. **CTIRA_HOSTNAME** in portal navigator*

> **Note:** See the IBM Tivoli Monitoring 6.2.2 Fix Pack 4 APAR about **KFW_TOPOLOGY_CLUSTER_LIST**: IV01794: KFW_TOPOLOGY_CLUSTER_LIST BEING MIS-READ FROM CQ.INI (http://www.ibm.com/support/docview.wss?uid=swg1IV01794).
>
> See the IBM Tivoli Monitoring technote: Agent clustering and positioning in the TEP Navigator (http://www.ibm.com/support/docview.wss?uid=swg21326517).

Table 11. ITCAM Extended Agent for Oracle Database affinities

Node or subnode	Affinity
Agent node	%IBM.OracleAgents
Oracle RDBMS subnode	%IBM.OracleAgentRDB
Oracle ASM subnode	%IBM.OracleAgentASM
Oracle Dataguard subnode	%IBM.OracleAgentDG

Supported Oracle Call Interface client library versions

Table 12 shows the versions of the Oracle Call Interface (OCI) library that are supported by the Oracle Database Extended agent on each platform.

Table 12. Supported OCI library for each platform

Platform	Operating system	OCI library version
AIX/PowerPC	• AIX® V7.2 • AIX V7.1 • AIX V6.1	64 bit
HP-UX/Itanium	• HP-UX 11i v3 • HP-UX 11i v2	64 bit
Linux/x86	• SUSE Linux Enterprise Server (SLES) 11.0 • SUSE Linux Enterprise Server (SLES) 10.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 6.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 5.0	32/64 bit

Table 12. Supported OCI library for each platform (continued)

Platform	Operating system	OCI library version
Linux/zOS	• SUSE Linux Enterprise Server (SLES) - 11.0 • SUSE Linux Enterprise Server (SLES) - 10.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 6.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 5.0	32/64 bit
Linux/PowerPC	• SUSE Linux Enterprise Server (SLES) - 11.0 • SUSE Linux Enterprise Server (SLES) - 10.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 6.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 5.0	64 bit
Linux/Itanium	• SUSE Linux Enterprise Server (SLES) 11.0 • SUSE Linux Enterprise Server (SLES) 10.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 5.0 • Red Hat Enterprise Linux (RHEL) AS/ES - 4.0	64 bit
Windows/x86	• Windows Server 2008 Datacenter Edition • Windows Server 2008 Enterprise Edition • Windows Server 2008 Standard Edition • Windows Server 2003 R2 Datacenter Edition • Windows Server 2003 R2 Enterprise Edition • Windows Server 2003 R2 Standard Edition • Windows Server 2003 Standard Edition	32 bit

Table 12. Supported OCI library for each platform (continued)

Platform	Operating system	OCI library version
Windows/x64	• Windows Server 2012 R2 Standard Edition • Windows Server 2012 Standard Edition • Windows Server 2008 R2 Datacenter Edition • Windows Server 2008 R2 Enterprise Edition • Windows Server 2008 R2 Standard Edition • Windows Server 2008 Datacenter Edition • Windows Server 2008 Enterprise Edition • Windows Server 2008 Standard Edition • Windows Server 2003 R2 Datacenter Edition • Windows Server 2003 R2 Enterprise Edition • Windows Server 2003 R2 Standard Edition • Windows Server 2003 Standard Edition	64 bit
Windows/Itanium	• Windows Server 2008 R2 Datacenter Edition • Windows Server 2008 R2 Enterprise Edition • Windows Server 2008 R2 Standard Edition • Windows Server 2008 Datacenter Edition • Windows Server 2008 Enterprise Edition • Windows Server 2008 Standard Edition • Windows Server 2003 Datacenter Edition R2 • Windows Server 2003 Standard Edition	32/64 bit
Solaris/SPARC	• Solaris 11 • Solaris 10 • Solaris 9	32/64 bit
Solaris/Opteron(x86_64)	Solaris 10	64 bit

Remember: Use the latest version of the Oracle client or Oracle instance client to avoid OCI library loading problems.

ICU regular expressions

ICU regular expressions information is essential if you are using the regular expression feature of Oracle Database Extended agent because different programming languages implement regular expressions in slightly different ways.

The information in Table 13 and Table 14 on page 54 is extracted from the *ICU User Guide*. The tables describe the specifics of the ICU regular expression implementation.

Table 13. Regular expression metacharacters

Character	Description
\a	Match a BELL, \u0007
\A	Match at the beginning of the input. Differs from ^ in that \A does not match after a new line within the input.
\b, outside of a [Set]	Match if the current position is a word boundary. Boundaries occur at the transitions between word (\w) and non-word (\W) characters, with combining marks ignored. For more information about word boundaries, see ICU Boundary Analysis.
\b, within a [Set]	Match a BACKSPACE, \u0008.
\B	Match if the current position is not a word boundary.
\cX	Match a control-X character.
\d	Match any character with the Unicode General Category of Nd (Number, Decimal Digit.)
\D	Match any character that is not a decimal digit.
\e	Match an ESCAPE, \u001B.
\E	Terminates a \Q ... \E quoted sequence.
\f	Match a FORM FEED, \u000C.
\G	Match if the current position is at the end of the previous match.
\n	Match a LINE FEED, \u000A.
\N{UNICODE CHARACTER NAME}	Match the named character.
\p{UNICODE PROPERTY NAME}	Match any character with the specified Unicode Property.
\P{UNICODE PROPERTY NAME}	Match any character not having the specified Unicode Property.
\Q	Place quotation marks around all following characters until \E.
\r	Match a CARRIAGE RETURN, \u000D.
\s	Match a white space character. White space is defined as [\t\n\f\r\p{Z}].
\S	Match a non-white space character.
\t	Match a HORIZONTAL TABULATION, \u0009.
\uhhhh	Match the character with the hex value hhhh.
\Uhhhhhhhh	Match the character with the hex value hhhhhhhh. Exactly eight hex digits must be provided, even though the largest Unicode code point is \U0010ffff.
\w	Match a word character. Word characters are [\p{Ll}\p{Lu}\p{Lt}\p{Lo}\p{Nd}].
\W	Match a non-word character.

Table 13. Regular expression metacharacters (continued)

Character	Description
\x{hhhh}	Match the character with hex value hhhh. From 1 to 6 hex digits can be supplied.
\xhh	Match the character with 2 digit hex value hh.
\X	Match a Grapheme Cluster.
\Z \	Match if the current position is at the end of input, but before the final line terminator, if one exists.
\z	Match if the current position is at the end of input.
\n	Back Reference. Match whatever the nth capturing group matched. n must be a number > 1 and < total number of capture groups in the pattern. **Important:** Octal escapes, such as \012, are not supported in ICU regular expressions.
[pattern]	Match any 1 character from the set. See UnicodeSet for a full description of what can appear in the pattern
.	Match any character.
^	Match at the beginning of a line.
$	Match at the end of a line.
\	Place quotation marks around the following character. Characters that must have surrounding quotation marks to be treated as literals are * ? + [( ) { } ^ $	\ . /

Table 14. Regular expression operators

Operator	Description
|	Alternation. A|B matches either A or B.
*	Match 0 or more times. Match as many times as possible.
+	Match 1 or more times. Match as many times as possible.
?	Match zero or one time. Prefer one.
{n}	Match exactly n times.
{n,}	Match at least n times. Match as many times as possible.
{n,m}	Match between n and m times. Match as many times as possible, but not more than m.
*?	Match 0 or more times. Match as few times as possible.
+?	Match 1 or more times. Match as few times as possible.
??	Match zero or one time. Zero is preferred.
{n}?	Match exactly n times
{n,}?	Match at least n times, but no more than required for an overall pattern match.
{n,m}?	Match between n and m times. Match as few times as possible, but not less than n.
*+	Match 0 or more times. Match as many times as possible when first encountered, do not retry with fewer even if overall match fails (Possessive Match)
++	Match 1 or more times. Possessive match.
?+	Match zero or one time. Possessive match.

Table 14. Regular expression operators (continued)

Operator	Description
{n}+	Match exactly n times. Possessive match.
{n,}+	Match at least n times. Possessive Match.
{n,m}+	Match between n and m times. Possessive Match.
(...)	Capturing parentheses. Range of input that matched the parenthesized subexpression is available after the match.
(?: ...)	Non-capturing parentheses. Groups the included pattern, but does not provide capturing of matching text. More efficient than capturing parentheses.
(?> ...)	Atomic-match parentheses. First match of the parenthesized subexpression is the only one tried; if it does not lead to an overall pattern match, back up the search for a match to a position before the "(?>".
(?# ...)	Free-format comment (?# comment).
(?= ...)	Look-ahead assertion. True if the parenthesized pattern matches at the current input position, but does not advance the input position.
(?! ...)	Negative look-ahead assertion. True if the parenthesized pattern does not match at the current input position. Does not advance the input position.
(?<= ...)	Look-behind assertion. True if the parenthesized pattern matches text preceding the current input position, with the last character of the match being the input character just before the current position. Does not alter the input position. The length of possible strings matched by the look-behind pattern must not be unbounded (no * or + operators.)
(?<!...)	Negative Look-behind assertion. True if the parenthesized pattern does not match text preceding the current input position, with the last character of the match being the input character just before the current position. Does not alter the input position. The length of possible strings matched by the look-behind pattern must not be unbounded (no * or + operators.)
(?ismx-ismx: ...)	Flag settings. Evaluate the parenthesized expression with the specified flags enabled or -disabled.
(?ismx-ismx)	Flag settings. Change the flag settings. Changes apply to the portion of the pattern following the setting. For example, (?i) changes to a not case-insensitive match.

ICU supported code pages

Code page information is used for the Oracle Alert Log File Charset attribute when configuring Oracle Database Extended agent instances.

Table 15 contains a complete list of the code pages that are supported by the ICU.

Table 15. Code page descriptions

Code page	Description
ASCII	7-bit ASCII
LATIN1	ISO 8859-1 Western European

Table 15. Code page descriptions (continued)

Code page	Description
ISO8859_2	ISO 8859-2 Eastern European
ISO8859_3	ISO 8859-3 Southeast European
ISO8859_4	ISO 8859-4 Baltic
ISO8859_5	ISO 8859-5 Cyrillic
ISO8859_6	ISO 8859-6 Arabic
ISO8859_7	ISO 8859-7 Greek
ISO8859_8	ISO 8859-8 Hebrew
ISO8859_9	ISO 8859-9 Latin 5 (Turkish)
ISO8859_10	ISO 8859-10 Latin 6 (Nordic)
ISO8859_11	ISO 8859-11 Thai
ISO8859_13	ISO 8859-13 Latin 7 (Baltic Rim)
ISO8859_14	ISO 8859-14 Latin 8 (Celtic)
ISO8859_15	ISO 8859-15 Latin 9 (Western Europe)
UTF_8	UTF-8 encoding of Unicode
EUC_CN	Simplified Chinese Combined (367 + 1382)
EUC_KR	Korean EUC Combined (367 + 971)
EUC_JP	Japanese Combined (895 + 952 + 896 + 953)
EUC_TW	Taiwan Extended UNIX Code (CNS 11643-1986), Combined (367 + 960 + 961)
UCS2	UCS-2 (Really UTF-16 BE)
CP037	IBM EBCDIC US English
CP037_S390	IBM EBCDIC US English LF & NL reversed
CP256	IBM EBCDIC Netherlands
CP259	IBM EBCDIC Symbols Set 7
CP273	IBM EBCDIC German
CP274	IBM EBCDIC Belgium
CP275	IBM EBCDIC Brazil
CP276	IBM EBCDIC French-Canada
CP277	IBM EBCDIC Danish
CP278	IBM EBCDIC Swedish
CP280	IBM EBCDIC Italian
CP282	IBM EBCDIC Portugal
CP284	IBM EBCDIC Latin American Spanish
CP285	IBM EBCDIC UK English
CP290	IBM EBCDIC Japanese Katakana
CP297	IBM EBCDIC French
CP420	IBM EBCDIC Arabic
CP421	IBM EBCDIC Maghreb/French
CP423	IBM EBCDIC Greek
CP424	IBM EBCDIC Latin/Hebrew

Table 15. Code page descriptions (continued)

Code page	Description
CP437	MS-DOS US English
CP500	IBM EBCDIC 500V1
CP708	Arabic (ASMO 708)
CP709	Arabic (ASMO 449+, BCON V4)
CP710	Arabic (Transparent Arabic)
CP720	Arabic (Transparent ASMO)
CP737	reek (formerly 437G)
CP770	Lithuanian Standard RST 1095-89
CP771	KBL (Lithuanian and Russian characters)
CP772	Lithuanian Standard LST 1284:1993
CP773	Lithuanian (Mix of 771 and 775)
CP774	Lithuanian Standard 1283:1993
CP775	Baltic
CP776	Lithuanian 770 extended
CP777	Lithuanian 771 extended
CP778	Lithuanian 775 extended
CP790	Mazovia (Polish + codepage 437 extended characters
CP803	IBM EBCDIC Hebrew (old)
CP813	ISO 8859-7 Greek/Latin
CP819	ISO 8859-1 Latin Alphabet No. 1
CP833	IBM EBCDIC Korean SBCS
CP834	IBM EBCDIC Korean DBCS
CP835	IBM EBCDIC Traditional Chinese DBCS
CP837	IBM EBCDIC Simplified Chinese DBCS
CP838	IBM EBCDIC Thai
CP850	MS-DOS Latin 1
CP851	MS-DOS Greek
CP852	MS-DOS Slavic (Latin 1)
CP853	MS-DOS Turkey Latin 3 (replaced by Latin 5)
CP855	IBM Cyrillic (primarily Russian)
CP856	PC Hebrew
CP857	IBM Turkish (Latin 5)
CP860	MS-DOS Portuguese
CP861	MS-DOS Icelandic
CP862	Hebrew (Migration)
CP863	MS-DOS Canadian-French
CP864	PC Arabic
CP865	MS-DOS Nordic
CP866	MS-DOS Russian
CP868	MS-DOS Urdu

Table 15. Code page descriptions (continued)

Code page	Description
CP869	IBM Modern Greek
CP870	IBM EBCDIC Multilingual Latin 2
CP871	IBM EBCDIC Icelandic
CP872	PC Cyrillic with Euro update
CP874	MS-DOS Thai, superset of TIS 620
CP875	IBM EBCDIC Greek
CP878	KOI-R (Cyrillic)
CP880	Cyrillic Multilingual
CP899	PC Symbols
CP905	IBM EBCDIC Turkey Latin 3 (replaced by Latin 5)
CP912	ISO 8859-2; ROECE Latin-2 Mulitlingual
CP913	ISO 8859-3 Southeast European
CP914	ISO 8859-4 Baltic
CP915	ISO 8859-5; Cyrillic; 8-bit ISO
CP916	ISO 8859-8; Hebrew
CP918	IBM EBCDIC Urdu
CP920	ISO 8859-9; Latin 5
CP921	ISO Baltic (8-bit)
CP922	ISO Estonia (8-bit)
CP929	Thai PC double byte
CP930	IBM EBCDIC Japanese Katakana Extended, Combined (290 + 300)
CP931	IBM EBCDIC Japanese Latin-Kanji, Combined (037 + 300)
CP932	MS Windows Japanese, superset of Shift-JIS, Combined (897 + 301)
CP933	IBM EBCDIC Korean Combined (833 + 834)
CP934	Korean PC Combined (891 + 926)
CP935	IBM EBCDIC Simplified Chinese, Combined (836 + 837)
CP936	MS Windows Simplified Chinese, Combined (903 + 928)
CP937	IBM EBCDIC Traditional Chinese, Combined (037 + 835)
CP938	Traditional Chinese Combined (904 + 927)
CP939	IBM EBCDIC Japanese Latin Extended, Combined (1027 + 300)
CP942	MS-DOS Japanese Kana Combined (1041 + 301)
CP943	MS-DOS Japanese Combined (1041 + 941)
CP944	Korean PC Combined (1040 + 926)
CP946	Simplified Chinese PC Combined (1042 + 928)
CP948	MS-DOS Traditional Chinese, Combined (1043 + 927)
CP949	MS Windows Korean, superset of KS C 5601-1992, Combined (1088 + 951)

Table 15. Code page descriptions (continued)

Code page	Description
CP950	MS Windows Traditional Chinese, superset of Big 5, Combined (1114 + 947)
CP1004	PC-data Latin-1 extended desktop publishing
CP1006	Urdu, 8-bit
CP1008	Arabic, 8-bit ISO/ASCII
CP1025	IBM EBCDIC Cyrillic
CP1026	IBM EBCDIC Turkish
CP1027	IBM EBCDIC Japanese Extended Single Byte
CP1040	Korean PC extended Single Byte
CP1041	Japanese PC extended Single Byte
CP1043	Traditional Chinese extended Single Byte
CP1046	Arabic
CP1047	Latin 1 / Open Systems (US 3270)
CP1047_S390	Latin 1 / Open Systems (US 3270) LF & NL reversed
CP1051	HP-UX Latin1
CP1097	IBM EBCDIC Farsi
CP1098	MS-DOS Farsi
CP1112	IBM EBCDIC Baltic Multilingual
CP1114	Traditional Chinese Single Byte (IBM Big 5)
CP1115	Simplified Chinese Single Byte (IBM GB)
CP1122	IBM EBCDIC Estonia
CP1123	IBM EBCDIC Cyrillic Ukraine
CP1124	Cyrillic Ukraine 8-bit
CP1130	IBM EBCDIC Vietnamese
CP1137	IBM EBCDIC India
CP1140	IBM EBCDIC US (with Euro)
CP1141	IBM EBCDIC Germany, Austria (with Euro)
CP1142	IBM EBCDIC Denmark (with Euro)
CP1143	IBM EBCDIC Sweden (with Euro)
CP1144	IBM EBCDIC Italy (with Euro)
CP1145	IBM EBCDIC Spain (with Euro)
CP1146	IBM EBCDIC UK Ireland (with Euro)
CP1147	IBM EBCDIC France (with Euro)
CP1148	IBM EBCDIC International Latin1 (with Euro)
CP1149	IBM EBCDIC Iceland (with Euro)
CP1153	IBM EBCDIC Latin2 (with Euro)
CP1154	IBM EBCDIC Cyrillic (with Euro)
CP1155	IBM EBCDIC Turkish (with Euro)
CP1156	IBM EBCDIC Baltic Multilingual (with Euro)
CP1157	IBM EBCDIC Estonia (with Euro)

Table 15. Code page descriptions (continued)

Code page	Description
CP1158	IBM EBCDIC Cyrillic Ukraine (with Euro)
CP1159	SBCS Traditional Chinese Host (with Euro)
CP1160	IBM EBCDIC Thailand (with Euro)
CP1164	IBM EBCDIC Vietnamese (with Euro)
CP1250	MS Windows Latin 2 (Central Europe)
CP1251	MS Windows Cyrillic (Slavic)
CP1252	MS Windows Latin 1 (ANSI), superset of Latin1
CP1253	MS Windows Greek
CP1254	MS Windows Latin 5 (Turkish), superset of ISO 8859-9
CP1255	MS Windows Hebrew
CP1256	MS Windows Arabic
CP1257	MS Windows Baltic Rim
CP1258	MS Windows Vietnamese
CP1279	Hitachi Japanese Katakana Host
CP1361	MS Windows Korean (Johab)
CP1381	MS-DOS Simplified Chinese Combined (1115 + 1380)
CP1383	China EUC
CP1386	GBK Chinese
CP1392	Simplified Chinese GB18030
CP5026	IBM EBCDIC Japan Katakana-Kanji Combined (290 + 300)
CP5028	Japan Mixed Combined (897 + 301)
CP5031	IBM EBCDIC Simplified Chinese Combined (836 + 837)
CP5033	IBM EBCDIC Traditional Chinese Combined (037 + 835)
CP5035	IBM EBCDIC Japan Latin Combined (1027 + 300)
CP5038	Japan Mixed Combined (1041 + 301)
CP5045	Korean PC Combined (1088 + 951)
CP5050	Japanese EUC Combined (895 + 952 + 896 + 953)
CP5488	Simplified Chinese GB18030
CP9125	IBM EBCDIC Korean Combined (833 + 834)
EuroShift_JIS	Test code page, Shift-JIS with European characters
SBCS	Single Byte Code Set
DBCS	Double Byte Code Set
MBCS	MultiByte Code Set
UTF16BE	utf-16 big endian
UTF16LE	utf-16 little endian
UTF32BE	utf-32 big endian
UTF32LE	utf-32 little endian
HZ	HZ code set
SCSU	SCSU code set

Table 15. Code page descriptions (continued)

Code page	Description
ISCII	iscii code set
UTF7	utf-7
BOCU1	bocu1
UTF16	utf16 code set
UTF32	utf32 code set
CESU8	cesu8 code set
GB18030	gb18030 code set

Appendix. ITCAM for Applications documentation library

Various publications are relevant to the use of ITCAM for Applications.

For information about how to access and use the publications, see **Using the publications** (http://pic.dhe.ibm.com/infocenter/tivihelp/v61r1/topic/com.ibm.itm.doc_6.3/common/using_publications.htm).

To find publications from the previous version of a product, click **Previous versions** under the name of the product in the **Contents** pane.

Documentation for this product is in the ITCAM for Applications Information Center (http://publib.boulder.ibm.com/infocenter/tivihelp/v24r1/topic/com.ibm.itcama.doc_7.2.1/welcome_apps721.html):
- Quick Start Guide
- Offering Guide
- Download instructions
- Links to Prerequisites
- Installation and Configuration Guide for each agent
- Link to Reference information for each agent
- Link to Troubleshooting Guide for each agent

Prerequisite publications

To use the information about the agents effectively, you must have some prerequisite knowledge.

See the following information at the IBM Tivoli Monitoring Information Center (http://pic.dhe.ibm.com/infocenter/tivihelp/v61r1/index.jsp) to gain prerequisite knowledge:
- *IBM Tivoli Monitoring Administrator's Guide*
- *IBM Tivoli Monitoring Installation and Setup Guide*
- *IBM Tivoli Monitoring High Availability Guide for Distributed Systems*
- IBM Tivoli Monitoring: Installation and Configuration Guides for the following agents: Operating System agents and Warehouse agents
- IBM Tivoli Monitoring: User's Guides for the following agents: Agentless OS monitors, Log file agent, System p agents, Systems Director base agent
- *IBM Tivoli Monitoring Agent Builder User's Guide*
- *IBM Tivoli Monitoring Command Reference*
- *IBM Tivoli Monitoring: Messages*
- *IBM Tivoli Monitoring Troubleshooting Guide*
- IBM Tivoli Monitoring: References for the following agents: Operating System agents and Warehouse agents
- IBM Tivoli Monitoring: Troubleshooting Guides for the following agents: Operating System agents and Warehouse agents
- *Tivoli Enterprise Portal User's Guide*

Related publications

The publications in related information centers provide useful information.

See the following information centers, which you can find by accessing Tivoli Documentation Central (https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Tivoli%20Documentation%20Central):

- Tivoli Monitoring
- Tivoli Application Dependency Discovery Manager
- Tivoli Business Service Manager
- Tivoli Common Reporting
- Tivoli Enterprise Console
- Tivoli Netcool/OMNIbus

Tivoli Monitoring Community on Service Management Connect

Service Management Connect (SMC) is a repository of technical information that is organized by communities.

Access Service Management Connect at https://www.ibm.com/developerworks/servicemanagement.

For information about Tivoli products, see the Application Performance Management community (http://www.ibm.com/developerworks/servicemanagement/apm/index.html).

Connect, learn, and share with Service Management professionals. Get access to developers and product support technical experts who provide their perspectives and expertise. You can use SMC for these purposes:

- Become involved with transparent development, an ongoing, open engagement between other users and IBM developers of Tivoli products. You can access early designs, sprint demonstrations, product roadmaps, and prerelease code.
- Connect one-on-one with the experts to collaborate and network about Tivoli and the Application Performance Management community.
- Read blogs to benefit from the expertise and experience of others.
- Use wikis and forums to collaborate with the broader user community.

Other sources of documentation

You can obtain additional technical documentation about monitoring products from other sources.

See the following sources of technical documentation about monitoring products:

- IBM Integrated Service Management Library (http://www.ibm.com/software/brandcatalog/ismlibrary/) is an online catalog that contains integration documentation as well as other downloadable product extensions.
- IBM Redbook publications (http://www.redbooks.ibm.com/) include Redbooks® publications, Redpapers, and Redbooks technotes that provide information about products from platform and solution perspectives.
- Technotes (http://www.ibm.com/support/entry/portal/software), which are found through the IBM Software Support website, provide the latest information about known product limitations and workarounds.
- Tivoli wikis

  Tivoli Wiki Central (http://www.ibm.com/developerworks/wikis/display/tivoli/Home) is the home for interactive wikis that offer best practices and scenarios for using Tivoli products. The wikis contain white papers contributed by IBM employees, and content created by customers and business partners.

  Two of these wikis are of particular relevance to IBM Tivoli Monitoring:

– Tivoli Distributed Monitoring and Application Management Wiki (http://www-10.lotus.com/ldd/tivmonitorwiki.nsf) provides information about IBM Tivoli Monitoring and related distributed products, including IBM Tivoli Composite Application Manager products.
– Tivoli System z® Monitoring and Application Management Wiki (http://www.ibm.com/developerworks/wikis/display/tivoliomegamon/Home) provides information about the OMEGAMON® XE products, Tivoli NetView® for z/OS®, Tivoli Monitoring Agent for z/TPF, and other System z monitoring and application management products.

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