

NN10368-111

Carrier Voice over IP

Communication Server 2000

Database Manager Basics

(I)SN08 Preliminary 03.01 March 2005



Functional description

The Database functionality is comprised of the following software components:

- Oracle* database software (v9.2) - third-party software which implements basic database functionality. Administration of the Oracle database is performed through the use of the Oracle Enterprise Manager Console.
- Database Manager component - contains schema information for the MCS (Multimedia Communication Server) network element data. The schema information is a method of describing the MCS network element data to the Oracle database.

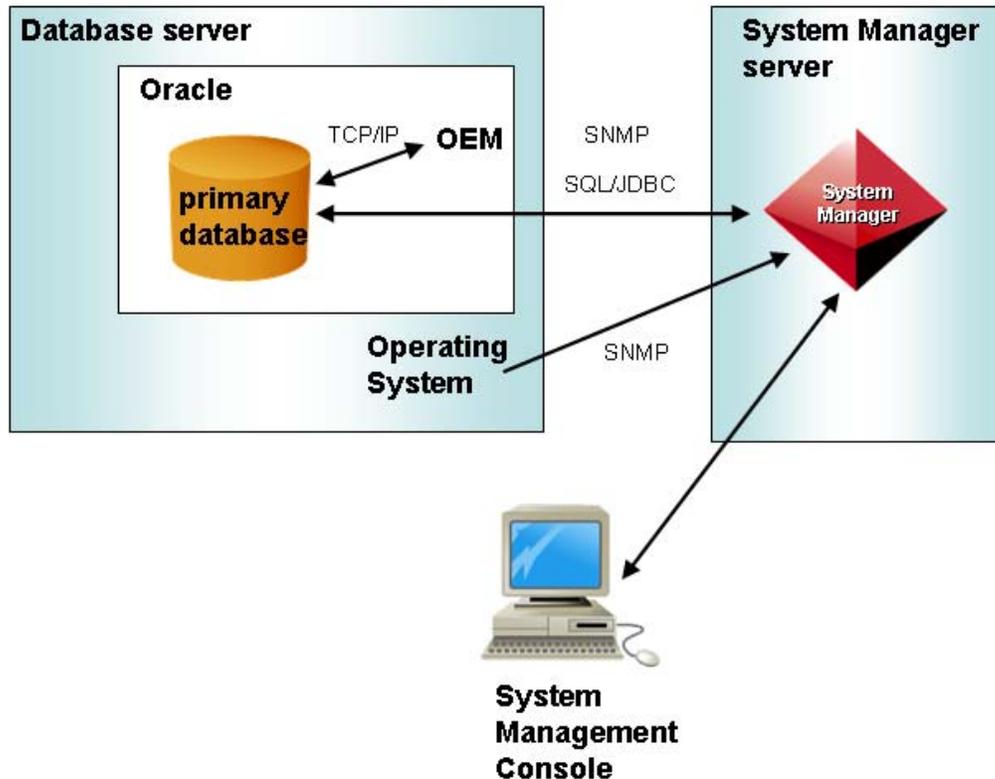
Architecture

Although the normal architecture within the Carrier Voice over IP deployment is a non-redundant (simplex) database architecture, there are two different ways to architect the Database functionality based on whether redundancy is required in the network.

Non-redundant database architecture

In a non-redundant (simplex) architecture, the Database functionality is deployed on a single server. Thus, there is a single, primary, Oracle database storing the MCS network element data. In this architecture, there is no replication of MCS network element data and there is no secondary database.

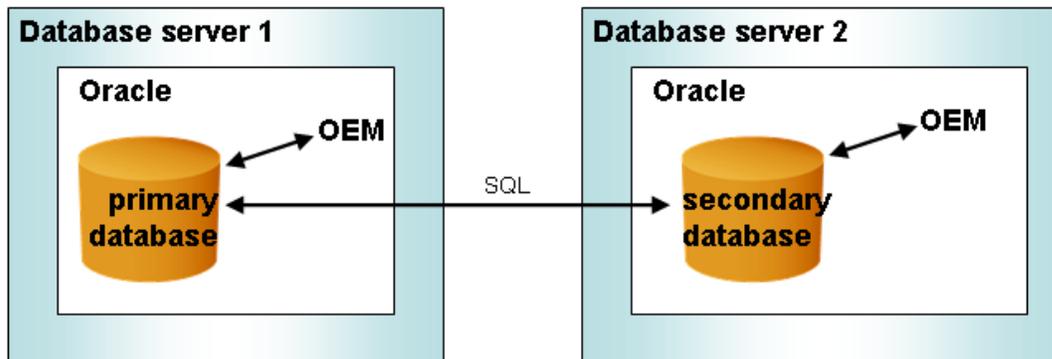
A graphical representation of a non-redundant database architecture can be found in [Figure 1, Interactions and protocols, on page 5](#).

Figure 1 Interactions and protocols

For information about the communication protocols and interactions between the server software components and other MCS network elements, refer to [Network interfaces and protocols on page 12](#).

Redundant database architecture

In a redundant architecture, the Database functionality is deployed similarly as it is in a non-redundant architecture, except on two servers (with an Oracle database located on each server). In this architecture, one server executes the primary database whose data is replicated to a secondary database located on the other server. The relationship is master-master. Refer to [Figure 2, Redundant database architecture, on page 6](#) for a graphical representation.

Figure 2 Redundant database architecture

For information about the communication protocols and interactions between the server software components and other MCS network elements, refer to [Network interfaces and protocols on page 12](#).

Network elements normally send and receive data directly to and from the primary database. However, if an MCS network element identifies a problem with the primary database, a failover state is encountered. At this point, the MCS network element accesses the secondary database to query data since the MCS network elements have limited access to the secondary database. Data reads are allowed from the secondary database. Registrations and network element instance state changes are the only writes allowed. The failover state continues until the MCS network element recognizes that the primary database has returned to service, at which point, any registrations recorded to the secondary database are queued to the primary database.

Database terminology

The following sections explain basic database terminology.

Replication (only in a redundant architecture)

Replication is the automatic process of duplicating data between the primary database and the secondary database as changes are received from the MCS network elements.

As data is added or updated by the MCS network elements, data transactions are sent to the primary database and queued for transfer to the secondary database through the Oracle replication process.

All database information is divided into groupings, called objects. Each database includes some objects that are replicated between the databases and some objects that are not replicated. Replicated objects

consist only of tables. Non-replicated objects include stored procedures, functions, and tables.

ATTENTION

Deployment of the Database functionality creates or updates both replicated objects and non-replicated objects on both databases. Software updates may modify table structures.

Synchronization (only in a redundant architecture)

Replicated databases should always be in synchronization due to the data transfer process described above. In the unlikely event that changes made to one database are not successfully propagated to the other database, a data transaction error (conflict) is encountered. In this case, the two databases are out of synchronization and must be manually synchronized.

Database states

The Oracle database(s) have the states of operation identified in [Table 1, Database operational states, on page 7](#). The primary database ordinarily operates in the normal state, while a secondary database operates in a read-only state at all times.

Table 1 Database operational states

| Database state | Description |
|------------------------------|--|
| Normal (Primary database) | Fully writable for the MCS network elements. Inserts, updates, or deletions are permitted to the primary database. The primary database continuously transfers new data to the secondary database. |

Table 1 Database operational states

| Database state | Description |
|---|---|
| Read-only (Secondary database, only in a redundant architecture) | <p>Read only for the MCS network elements.</p> <p>In the unlikely event of failure of the primary database, the MCS network elements failover to the secondary database.</p> <p>Note 1: Two exceptions to the read only status of the secondary database are allowed. Registrations are allowed so calls can proceed, and the configuration status of network elements may be changed.</p> <p>Note 2: The secondary database remains fully writable for Oracle replication processes.</p> |
| Quiesced (maintenance mode) | <p>No writes are permitted to either database.</p> <p>When the database is quiesced, MCS network elements can only query the database and cannot insert, update, or delete information.</p> <p>Within a redundant architecture, the primary and secondary databases automatically enter this state whenever changes are being made to the replication environment, including modifying replication objects and synchronizing the two databases.</p> |

Database jobs

In order to help administer the Oracle database(s), jobs can be setup using the Oracle Enterprise Manager Console. Jobs are scripts which execute specific maintenance tasks at scheduled times, as defined within the Oracle Enterprise Manager Console by a database administrator.

During installation and commissioning, the following types of jobs are created:

- **Replication jobs (only in a redundant architecture):**
 - **Push Job:** used to reassign all data transactions in the queue to the other database. This job is scheduled every 30 seconds.
 - **Purge Job:** used to delete all transactions in the queue that have been transferred to the other database. This job is scheduled every 10 minutes.

Note: The scheduled frequency of push and purge jobs is based on optimal values established during system capacity testing.

Database backup and recovery

The Database functionality supports the ability to backup the Oracle database using the Oracle Enterprise Manager Console. For more information regarding backup, please refer to [Database backup on page 58](#).

ATTENTION

It is recommended that the Oracle database be backed up daily whether it is a redundant configuration or not. If there is no redundancy in the network, there is no replication process, thus a backup of the data is even more important.

Recovery of an Oracle database restores the database to the last point in time when the database (or secondary database within a redundant architecture) was backed up. All changes made to the database since that last point in time will be lost.

Alert log files and trace files

Other database status information is stored in an alert log file for the corresponding Oracle database. This file holds a chronological log of messages and errors, such as all internal errors, block corruption errors, and deadlock errors.

In addition to the alert log file, when an Oracle process detects an error, it dumps detailed information about the error into a trace file.

Tablespaces

Tablespaces are entities which hold table information (MCS network element and Oracle data in the form of tables). Tablespaces are allocated a certain amount of disk space.

Server hardware

The number of servers and the network elements sharing a server depend on the specific deployment scenario. For the limited availability MCS 5200 4.0 release, only the Sun Microsystems Netra 240 hardware has been verified.

| Hardware | Details |
|--|--|
|  <p>Netra 240</p> | <p>The server has the following hardware features:</p> <ul style="list-style-type: none">• AC or DC power• 2 x 1.28 GHz UltraSPARC IIIi processors• 1 MB integrated L2 cache• 4 GB RAM• 2 x 73 GB SCSI hard drives, 15 000 RPM• 4 x 10/100/1000 Base-T Ethernet ports operating at 100 Mbps• 1 x 10 Mbps Ethernet port for LOM• 2 X USB ports• 1 x TIA/EIA-232F RJ45 serial ports• 1 x TIA/EIA-232-F asynchronous (DB9) serial port• 1 x DVD-ROM drive |

| Hardware | Details |
|---|---|
| <p data-bbox="220 344 423 373">Sun Fire V100</p>  | <p data-bbox="581 344 1252 373">The server has the following hardware features:</p> <ul data-bbox="581 394 1276 835" style="list-style-type: none"> • AC power only • 1 x 550 MHz UltraSPARC III processor • 512 KB internal cache • 1 GB RAM • 2 x 80 GB IDE hard drives, 7 200 RPM • 2 x 10/100 Base-T Ethernet ports operating at 100 Mbps • 2 x USB ports • 2 x RS-232C/RS-423 RJ45 serial ports • 1 x 24X CD-ROM Drive |
| <p data-bbox="220 903 440 932">Netra t 1400/05</p>  <p data-bbox="220 1209 545 1432">Note: This hardware is not available for new installations. It is supported in this release and is available for expansion of existing sites.</p> | <p data-bbox="581 903 1252 932">The server has the following hardware features:</p> <ul data-bbox="581 953 1393 1581" style="list-style-type: none"> • AC or DC power • 4 x 440 MHz UltraSPARC II processors • 4 MB internal cache • 4 GB RAM • 36 GB SCSI hard drives, 10 000 RPM <ul data-bbox="630 1188 1317 1297" style="list-style-type: none"> — 2 drives when deployed for Session Manager — 4 drives when deployed for System Manager, Accounting Manager, or Database Manager • 1 x PCI Quad Fast-Ethernet controller providing 4 x 100 Base-T Ethernet ports • 1 x 12 GB 4 mm DDS-4 internal tape drive when deployed for a System Manager, Accounting Manager, or Database Manager • 2 x RS-232C/RS-423 DB-25 serial ports • 1 x 10X DVD-ROM Drive |

Server backup and recovery

For the Database Manager, two types of backup are necessary. Backup of the data in the database is required, and procedure [Database backup on page 58](#) describes how to schedule that backup each night. The second type of backup is to recover in the event of catastrophic failure, or some other circumstance that requires reinstalling the

operating system. This second type of backup is described in the *MCS Backup and Recovery Guide*.

ATTENTION

Backups of the MCS servers are highly recommended in certain situations based on the software resident on the server. These situations include after the Solaris operating system is patched, the Oracle software is updated, and after the MCS software is updated.

Please refer to the *MCS Backup and Recovery Guide* for details regarding backup and recovery procedures for MCS servers.

Network interfaces and protocols

Network interfaces on the Database Manager connect to the software applications and MCS network elements on the server using the following protocols:

- **Structured Query Language (SQL):** The Oracle database(s) use SQL in order to communicate with the Oracle Enterprise Manager Console and with another Oracle database when using a redundant database architecture.
- **SQL over Java Database Connection (JDBC):** The Oracle database(s) communicates with MCS network elements using SQL over JDBC.
- **Simple Network Management Protocol (SNMP):** The Database functionality uses SNMP in the following areas:
 - An SNMP agent is installed on the server to provide operational information about the server to the System Manager.
 - Oracle provides a separate SNMP agent to report Oracle database state information.

Tools and utilities

The following tools are used to configure and maintain the Database functionality:

- **System Management Console:** Provides operational, fault, and state information for the database. For more details, please refer to *CVoIP System Management Console User Guide*.
- **Oracle Enterprise Manager Console:** Used by the database administrator for fault management of the Oracle database and the administration of database related events and jobs.

OAM&P strategy

Off-line data migration between releases and maintenance updates are supported. For more information, please refer to [Off-line migration on page 16](#).

Database backup and recovery are also supported.

Tasks

After installation and commissioning, an upgrade involving the upgrade of the Oracle software, or the restoration/recovery of the Oracle database(s), it is recommended that certain configuration and administration tasks are performed.

Table 2 Database functionality task flows

| Topic | Subtopic | Procedure |
|-----------------------|---------------------------|--|
| Configuration | sysman preferences | Configuring sysman preferences on page 50 |
| Administration | Export/Import backups | Configuring an Oracle database backup job on page 60 |

Legal note

All basic operations of the Oracle programs which are embedded in the Database functionality, including but not limited to database management operations, must be managed from the user interfaces that Nortel provides.



Upgrades

This chapter describes upgrade tasks that are performed when upgrading to a maintenance release. A maintenance update is an update such as 4.0 to 4.0.1. An upgrade is from 3.0 to 4.0. For information on upgrading to a full release, please contact your next level of support.

How this chapter is organized

This chapter is organized as follows:

- [Functional description on page 16](#)
 - [Deployment of Database functionality on page 16](#)
 - [Off-line migration on page 16](#)
- [Tools and utilities on page 16](#)
- [OAM&P strategy on page 17](#)
 - [Database Manager on page 17](#)
- [Tasks on page 17](#)
- Updating the Database Manager component
 - [Updating the Database Manager on page 17](#)
 - [Downgrade of the Database Manager on page 17](#)

Functional description

Deployment of Database functionality

The following deployment tasks related to the Database functionality are performed during installation and commissioning or when upgrading:

- Addition and configuration of the server(s) hosting the Database functionality.
- Installation of Oracle onto the server(s), including the creation of the **oracle**, **sysman**, and **system** administrator accounts.
- Addition and configuration of the Database Manager software component onto the server hosting the primary database.

Note: In a redundant architecture, the Database Manager component is not deployed on the server hosting the secondary database. When an update is made to the Database Manager component on the server hosting the primary database, the new schema information is communicated to the secondary database.

Off-line migration

Off-line migration of data between releases enables updating the Database functionality, via the Database Manager, from one release to the next, without loss of data.

Once the Database Manager is updated to a new release, the Database functionality can be upgraded to future maintenance releases using the **mcpUpgrade.pl** script on the System Manager. As part of this process, the system automatically creates a backup of the existing Oracle database, assigning a backup name that contains the release name. That backup is then available, if necessary, to restore the Database Manager to an earlier release.

Tools and utilities

Two commands are used for updating and installing software on the Database Manager:

- **mcpUpgrade.pl** — This command is issued on the System Manager server and performs an update of the System Manager and Database Manager software loads.
- **mcpInstall.pl** — This command is used during initial commissioning to put the database schema into the database.

OAM&P strategy

Database Manager

In a non-redundant network, an upgrade failure results in an automatic rollback to the previous load.

In a redundant network, an upgrade failure does not result in an automatic rollback due to the amount of time the database would be in a quiesced state (making both the primary and secondary database unavailable to the MCS network components for write access). In this scenario, the administrator must perform a manual rollback to the previous load.

Tasks

[Table 3, Upgrade/Downgrade task flows, on page 17](#) outlines upgrade/downgrade procedures for the Database functionality.

Table 3 Upgrade/Downgrade task flows

| Topic | Sub-topic | Procedure |
|----------------------------|--------------------|---|
| Database Manager component | Updating | The Database Manager is updated during the System Manager update/ |
| | Rollback/Downgrade | The Database Manager is rolled back during the System Manager rollback. |

Updating the Database Manager

The update must use the **mcpUpgrade.pl** command. Refer to the Upgrades section of the *CVoIP System Manager Basics* for the upgrade procedure.

Downgrade of the Database Manager

Because communication and software load version are tightly coupled between the Database Manager and the System Manager, refer to the *CVoIP System Manager Basics*.



Fault management

How this chapter is organized

This chapter is organized as follows:

- [Functional description on page 19](#)
 - [Database failover in a redundant architecture on page 20](#)
- [Tools and utilities on page 21](#)
- [Tasks on page 22](#)
- [System Management Console Monitoring on page 22](#)
- Oracle Enterprise Manager Console Monitoring
 - [Monitoring database backup jobs on page 24](#)
 - [Fixing broken replication jobs \(only in redundant architecture\) on page 30](#)
- Server Monitoring
 - [Monitoring alert log files and trace files on page 35](#)
 - [Resizing the Undo tablespace on page 36](#)
 - [Resynchronization \(only in a redundant architecture\) on page 37](#)

Functional description

Fault management for the Database functionality consists of monitoring and responding to information provided by the System Management Console and the Oracle Enterprise Manager Console.

To provide a recovery mechanism for a fault scenario, the Oracle database(s) should be backed up on a regular basis. For backup and recovery procedures, see [Administration on page 58](#).

ATTENTION

It is recommended that the Oracle database(s) and external backup media be maintained in separate locations to prevent data loss in case of natural disaster, security breach, or other unforeseen event.

When the primary database is unavailable, the secondary database is in read only mode. There are two exceptions to the read only state. The first exception is that registrations are allowed on the secondary database, and the second exception is that network element configuration states can be written to the secondary database. When the primary database is brought online, the secondary database queues any changes to the primary database.

Database failover in a redundant architecture

A redundant architecture provides the ability for data to be replicated across Oracle databases. As updates are applied to the primary database, they are transferred to the secondary (replicated) database. In the unlikely event of a failure of the primary database, MCS network element queries are redirected to, that is, “failover” to the secondary database.

During a failover, MCS network elements periodically attempt to access the primary database. Once the primary database returns to service, all data processing reverts to the primary database.

MCS network elements access and update the network element data via request and response transactions. If the primary database does not respond to a request, the initiator of the request does the following:

- raises a major DBCM101 alarm indicating a problem with communication to the primary database
- switches over to the secondary database and re-initiates the request

ATTENTION

A critical alarm is raised on the System Management Console when MCS network elements are not able to connect to both the primary and secondary databases.

A minor alarm is raised on the System Management Console when MCS network elements are connected to the primary database and the connection to the secondary database fails.

If all the associated alarms are cleared, then the MCS network elements are accessing the primary database.

Tools and utilities

Use the following tools to perform fault monitoring for the Database functionality:

- **System Management Console:** This user interface provides logs and alarms for the server hosting the Oracle database(s). In addition, threshold crossing for tablespace usage is indicated with a DBMN401 alarm. For information on monitoring and responding to fault information within the browsers of the System Management Console please refer to *CVoIP System Management Console User Guide*. For information about logs and alarms refer to the *MCS 5200 Fault Management: Alarm and Log Reference*.
- **Oracle Enterprise Manager Console:** This user interface is used for viewing replication errors and configuring the database backup job.

Tasks

[Table 4, Fault management task flows, on page 22](#) outlines fault management tasks for the Database functionality.

Table 4 Fault management task flows

| Topic | Subtopic | Procedure |
|---|---|--|
| System Management Console Monitoring | Database instance monitor | System Management Console Monitoring on page 22 |
| Oracle Enterprise Manager Console Monitoring | Backup jobs | Monitoring database backup jobs on page 24 |
| | Replication jobs (only in a redundant architecture) | Fixing broken replication jobs (only in redundant architecture) on page 30 |
| Command line actions | Alert logs and trace files | Monitoring alert log files and trace files on page 35 |
| | Undo tablespace resizing | Resizing the Undo tablespace on page 36 |

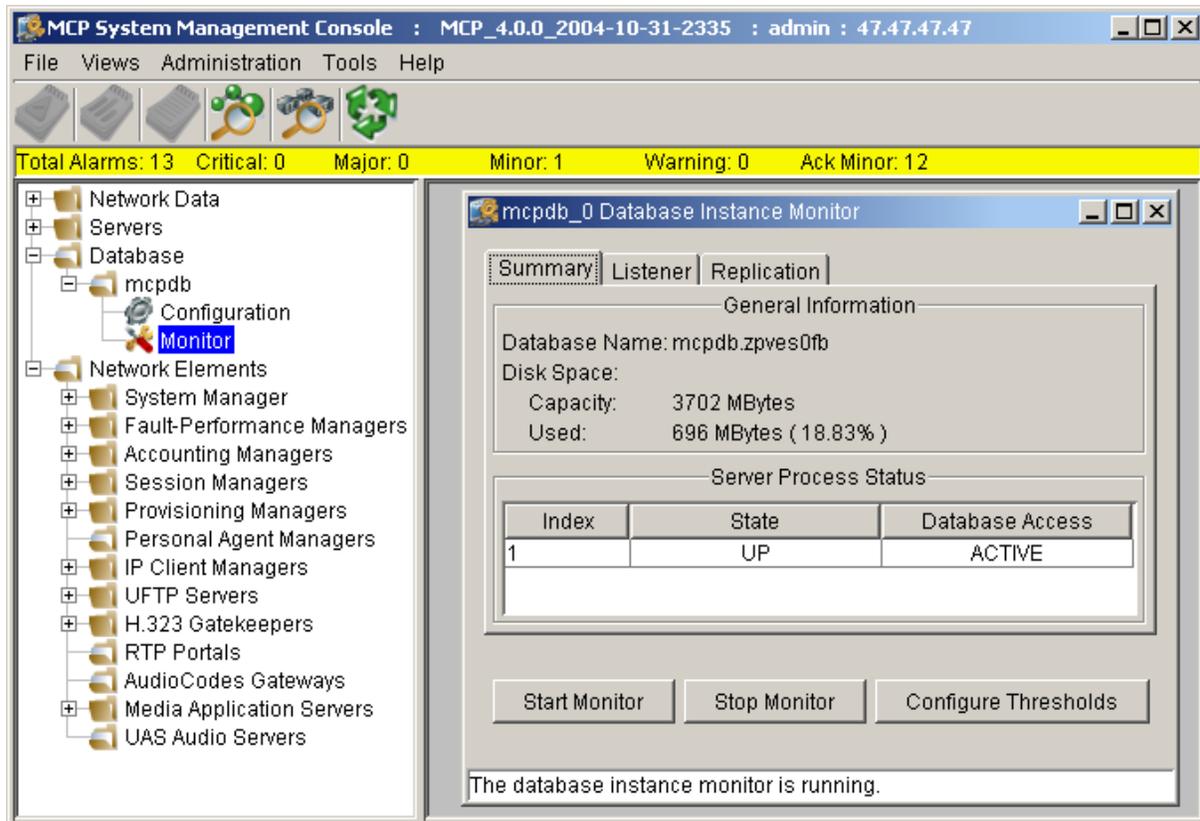
System Management Console Monitoring

Two types of monitoring are performed from the System Management Console. For the first, a server monitor is started and monitors hardware usage thresholds. The second type of monitoring is the Database instance monitor. The Database instance monitor uses SNMP agents and SQL queries to monitor one Oracle database instance and report tablespace usage, listener status, and replication status.

Monitoring the server that hosts the database is a generic procedure that is applicable to all servers monitored from the System Management Console. Refer to *CVoIP System Management Console User Guide*.

The Database instance monitor provides tablespace threshold crossing alarms and information about the listener status and replication status.

Information regarding the Database instance monitor appears in the work area of the System Management Console. Refer to the following figure.



Oracle Enterprise Manager Console monitoring

The Oracle Enterprise Manager Console is used to monitor backup jobs and replication status.

Monitoring database backup jobs

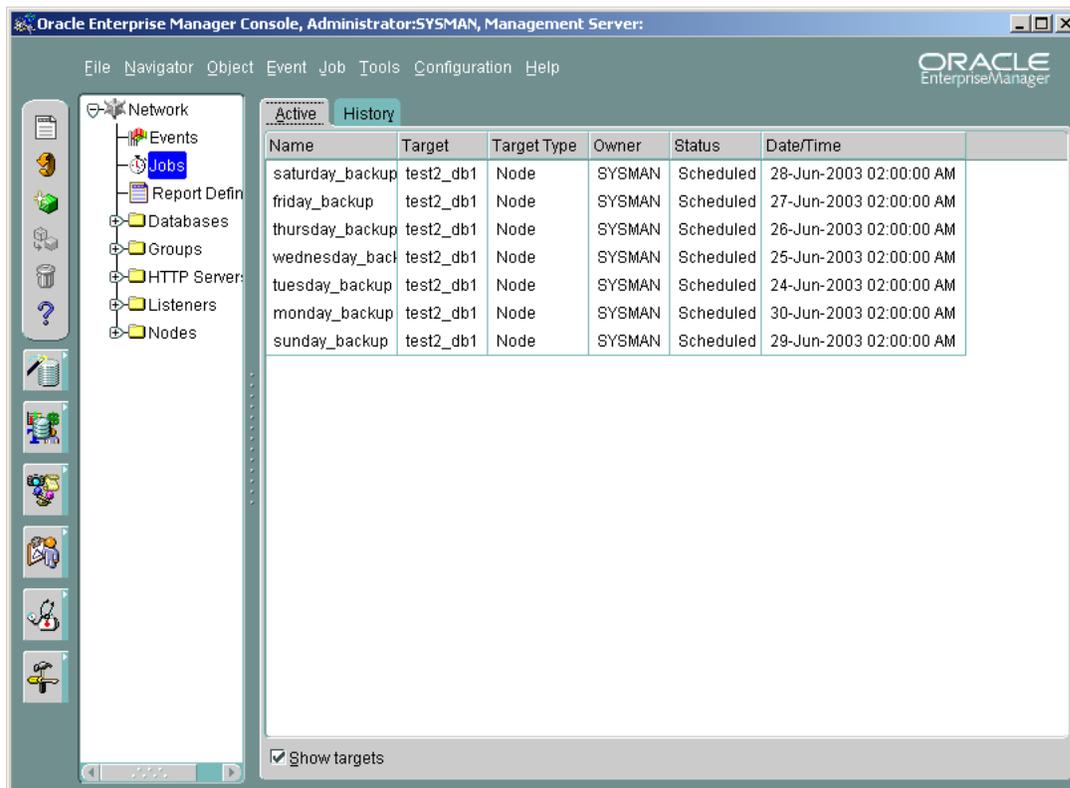
The Oracle Enterprise Manager Console provides status information for all scheduled database backup jobs. For information on scheduling a database backup job, please refer to [Configuring an Oracle database backup job on page 60](#).

If this job hangs, it may be because the Oracle Enterprise Manager Console was used on the secondary database. If the Oracle Enterprise Manager Console connects to the secondary database, then primary database is discovered by the secondary database. This results in confusing the SNMP agents on each database. Perform [Fixing a hung backup job on page 26](#) if backup jobs are hung.

Use the following procedure to view the status and output for database backup jobs.

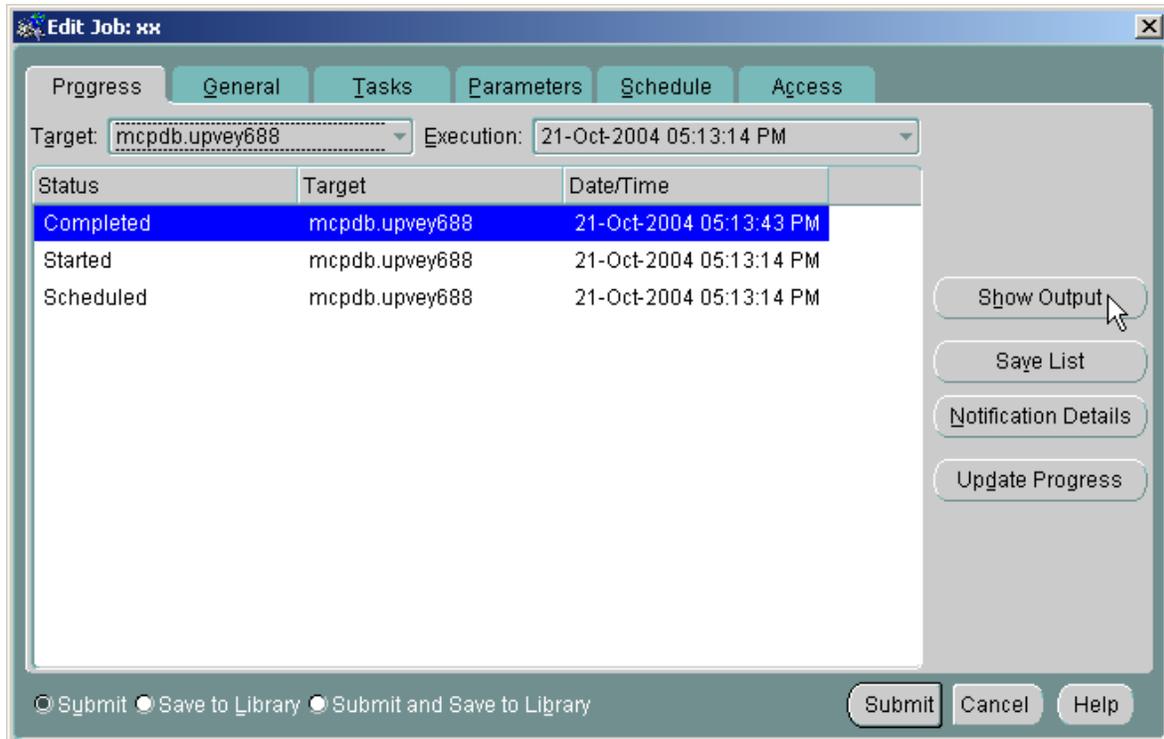
From the Oracle Enterprise Manager Console

- 1 From the **Network** tree, select **Jobs**.



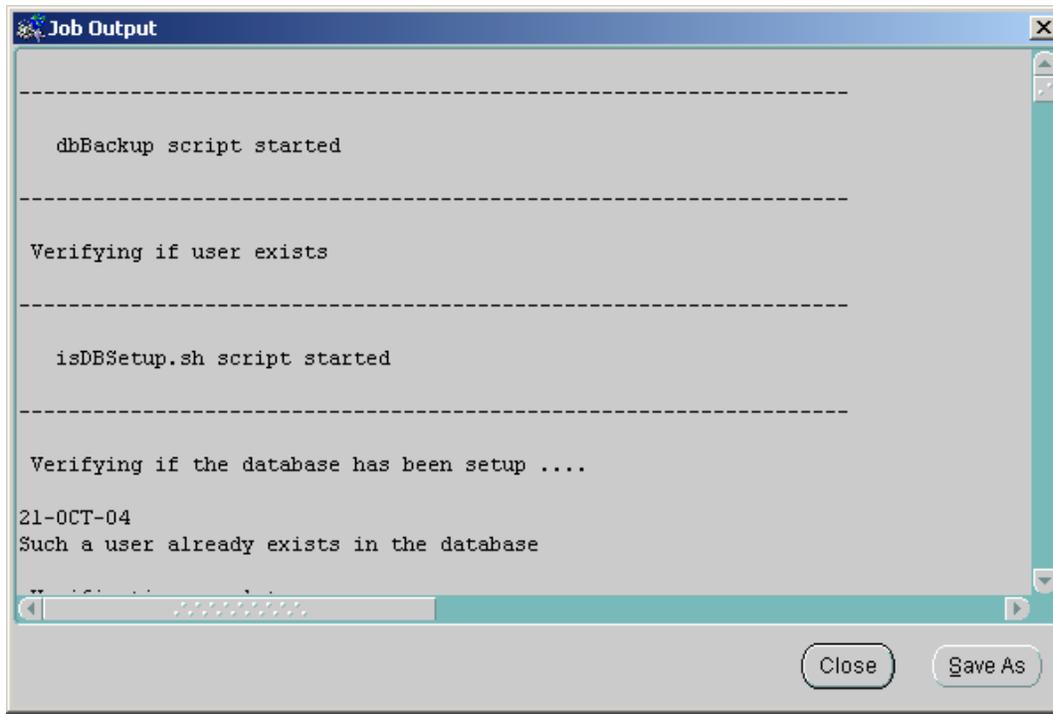
The right panel displays the list of active backup jobs that have been scheduled.

- 2 Select the **History** tab.
The right panel shows the list of completed jobs.
- 3 In the **History** pane, double click the appropriate job to display its properties.
*The **Edit Job** window opens, showing when the job was scheduled, started, and completed.*



- 4 To see the output of the job, select a **Completed** or **Failed** job and click **Show Output**.

The **Job Output** window opens, displaying the information about the job, including the status.



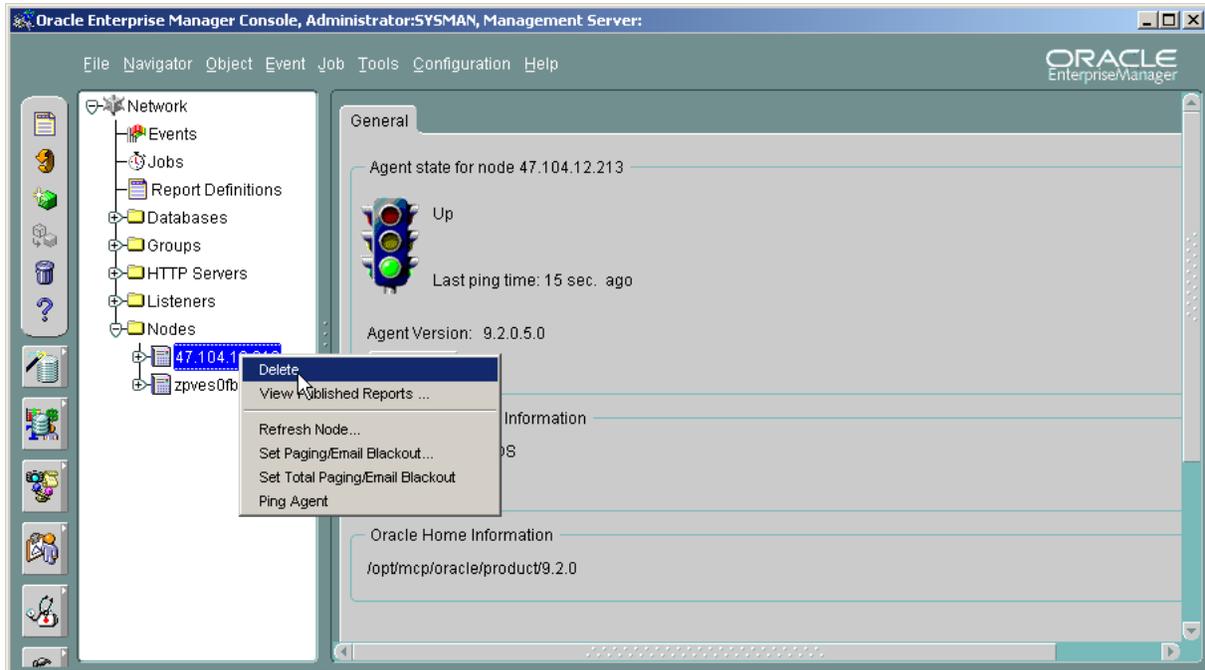
Fixing a hung backup job

This procedure is necessary if the Oracle Enterprise Manager Console is used to connect to the secondary database, and then backup jobs hang.

At the Oracle Enterprise Manager — secondary database

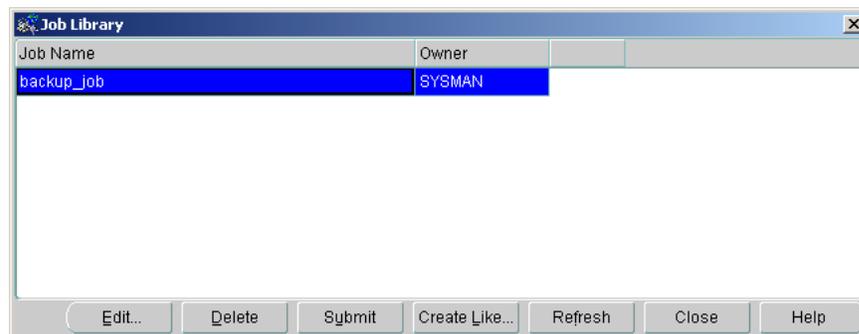
- 1 Log in to the secondary database as sysman.
- 2 Delete the active and history jobs defined on the secondary database. Refer to the figure on page [24](#).

- 3 Select the **Nodes** folder from the network tree and delete the primary database node if it is available.



At the Oracle Enterprise Manager Console — primary database

- 4 Log in to the primary database as sysman.
- 5 Delete the active and history jobs defined on the primary database.
- 6 Resubmit the preexisting jobs such as the backup job by right clicking on **Jobs** and selecting **Job Library** from the context menu.



- 7 Select the job and click **Submit**. Close the window.
- 8 This procedure is complete.

Monitoring MCS-related jobs

The MCS-related jobs perform required actions on the Oracle database and are scheduled at initial deployment of the Database Manager.

These jobs include the following:

- **E911 Cleanup Job (e911_cleanup)**
- **Analyze Tables Job (AnalyzeTables)**

For more information regarding these jobs, please refer to [Database jobs on page 8](#).

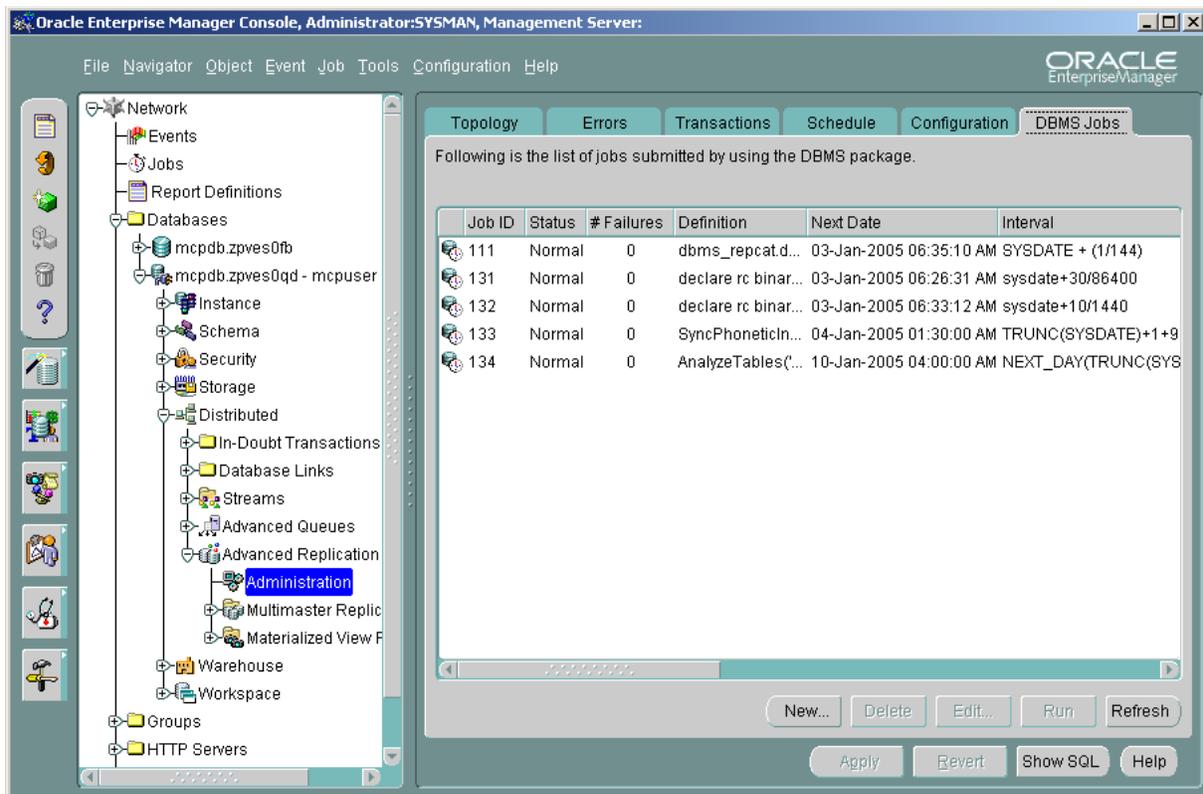
If any of these jobs fail, then the job is marked as failed at the Oracle Enterprise Manager Console.

Use the following procedure to monitor and reschedule any of the MCS-related jobs on the Oracle Enterprise Manager console.

From the Oracle Enterprise Manager console

- 1 Log in to the primary database as **sysman**.
- 2 Select **Databases > mcpdb.<hostname> > Distributed > Advanced Replication > Administration** in the left panel.

The Administration panel opens on the right panel.



3 Select the **DBMS Jobs** tab.

The MCS-related jobs, along with their status information is displayed.

4 If any of the jobs are broken for any reason, two options are available. You can select the job and click **Run** to run the job immediately, or refer to [Rescheduling database jobs on page 33](#).

5 This procedure is complete.

Fixing broken replication jobs (only in redundant architecture)

Two replication jobs, Push and Purge, are scheduled at initial deployment of the Database Manager. The status of each job can be displayed on the Oracle Enterprise Manager Console. A DBMN727 alarm indicates a replication error.

The push and purge jobs may break after the database is unavailable for approximately eight minutes.



CAUTION

After a restart, there is a higher probability that replication jobs may be broken. Therefore, database administrators should monitor jobs closely after any restart.

Use the following procedure to resolve a DBMN727 alarm.

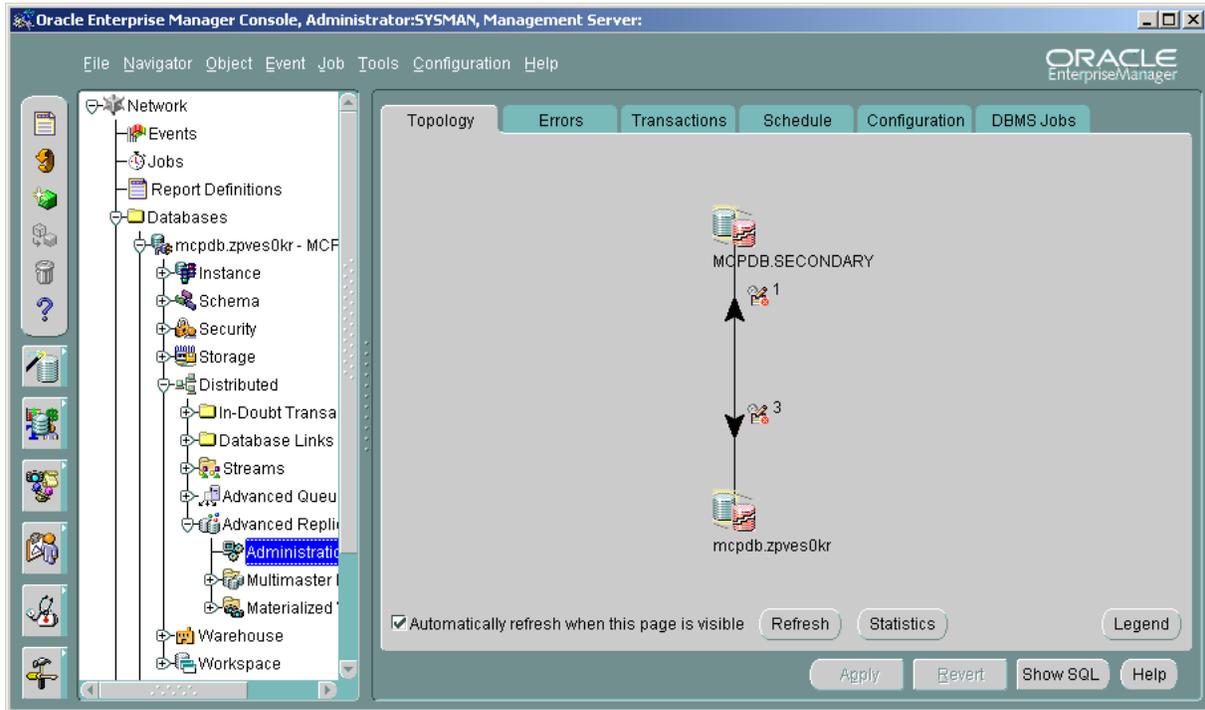
From the Oracle Enterprise Manager console

- 1 Log in to the primary database as **sysman**.
- 2 Select **Databases > mcpdb.<hostname> > Distributed > Advanced Replication > Administration** from the left panel.

The Topology tab opens in the right panel, displaying the two databases set up in replication mode.

A black arrow between the two database icons indicates that everything is normal.

If data transaction errors exist, the **Topology** tab will resemble the following figure. Refer to [Legend on page 32](#) for an explanation of the icons in the **Topology** tab.



- 3 If there is an icon next to the arrow, click the **Errors** tab.

Each failed transactions is listed.

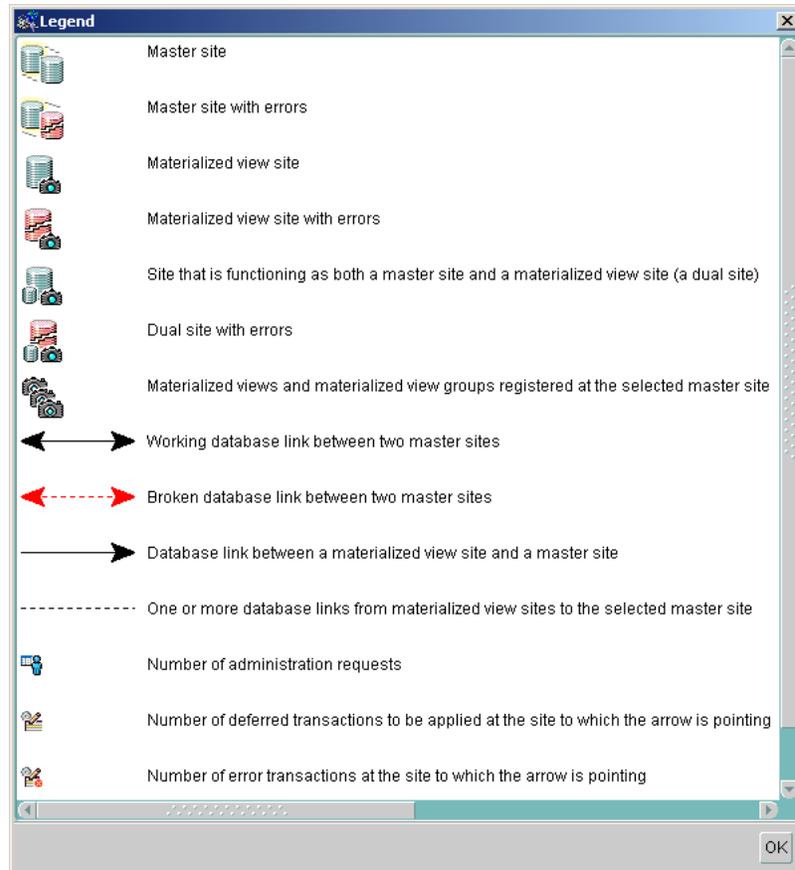
- 4 Select each job, click **Details**, and respond as follows:

| If | Do |
|--|--|
| The cause of the error is due to constraints on registration table (REGDEST) | The error can be safely deleted. |
| The cause of the error is due to network element instance configuration states, table (NEI_ADMIN_STATE). | The error can be safely deleted. |
| The cause of the error is NOT due to constraints on registration table (REGDEST) | Contact your next level of support for assistance. |

- 5 This procedure is complete.

Legend

The following figure shows the legend for the Topology tab.



Rescheduling database jobs

Use this procedure to reschedule a job. Rescheduling a job may be necessary if a weekly job fails, and it is preferred to execute the job during the next maintenance window rather than waiting for the next scheduled run. The following list identifies some considerations for rescheduling jobs:

- Consider scheduling Analyze Tables to run after the bulk provisioning tool is used to make many changes.
- Do not use the bulk provisioning tool during the period that any jobs are scheduled to run.

At the Oracle Enterprise Manager Console

- 1 Select **Databases > mcpdb.<hostname> > Distributed > Advanced Replication > Administration** in the left panel.
- 2 Select the **DBMS Jobs** tab.
- 3 Select the job and click **Edit**.

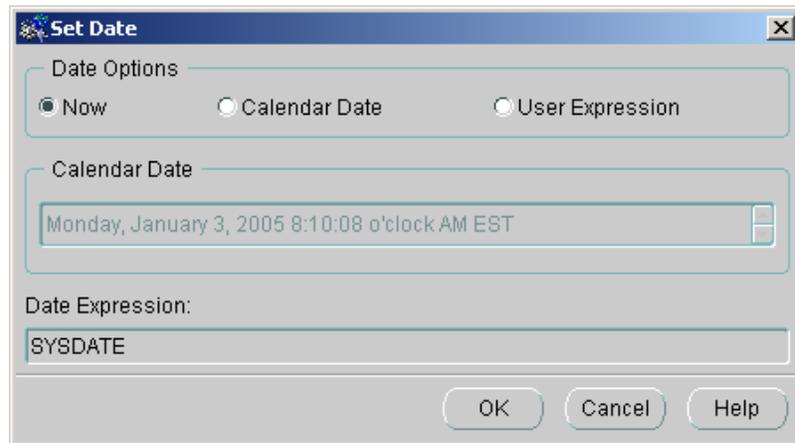
The Edit Job window opens.

The screenshot shows the 'Edit Job' dialog box with the following details:

- Job Number: 134
- Status: Normal
- # Failures: 0
- User: MCPUSER
- Scheduling section:
 - Next Date: 10-Jan-2005 04:00:00 AM (with Set... button)
 - Interval: NEXT_DAY(TRUNC(SYSDATE),'SUNDAY') (with Set... button)
 - Last Date: 03-Jan-2005 04:00:02 AM
- Job Definition: AnalyzeTables('MCPUSER');
- Buttons: OK, Cancel, Help

- 4 In the **Edit Job** window, change the job status to **Normal**.
- 5 Beside the **Next Date** field, click **Set**.

The Set Date window opens.



- 6 Use the radio buttons to select a calendar date or user expression. Modify the date, and click **OK**.
- 7 Click **Apply** on the DBMS Jobs panel.
- 8 This porcedure is complete.

Monitoring alert log files and trace files

In addition to alarms at the System Management Console, jobs status and replication information at the Oracle Enterprise Manager Console, other database status information is stored in an alert log file. If an alert is produced due to an error, more detailed information regarding the error is placed in the trace file.

Use the following procedure to view details in the alert log files and trace files.

ATTENTION

It is recommended that database administrators monitor the alert log files and trace files periodically to ensure there are no errors occurring in the Oracle database(s).

In a telnet window

- 1** Log in as **oracle** to the server hosting the primary or secondary database where the alert has been reported.
- 2** Navigate to the directory containing the database as follows:
cd \$ORACLE_BASE/admin/mcpdb
If there are errors, the trace files corresponding to these errors are stored in the **bdump** or **udump** directories. Alert logs are stored in the **bdump** directory.
- 3** Open the file in the appropriate directory (for example, **alert_mcpdb.log**) and look for any logs or errors at the end of the file.
- 4** This procedure is complete.

Resizing the Undo tablespace

In cases where a Critical alarm is raised at the System Management Console regarding exceeding the disk threshold for the /var/mcp partition on the server hosting the primary database (or secondary database, in a redundant architecture).

The Undo tablespace grows during large provisioning transactions like using the bulk provisioning tool. In the event that the Undo tablespace is reaching its size limit, use the following procedure to resize it.

ATTENTION

Although the following procedure is not service affecting, it is recommended that it only be performed during off-peak hours.

In a telnet window

- 1 Log in as **oracle** to the server hosting the primary database (or secondary database, when within a redundant architecture) where the alarm has been reported.
- 2 Execute the following commands:
cd /var/mcp/run/MCP_4.0/mcpdb_x/bin/util
./recreateUndo.sh
- 3 This procedure is complete.

Resynchronization (only in a redundant architecture)

In a redundant architecture, the Oracle databases operate in replicated mode, wherein MCS network components write to and read from the primary database. The replication process continually propagates data from the primary database to the secondary database. The secondary database serves as a backup and therefore must remain synchronized with the primary database.

In the unlikely event that the two databases are out of synchronization, they must be manually resynchronized using the following procedure.



CAUTION

Part of the resynchronization process involves placing the databases in the quiesced state (i.e. making both databases read-only). This period is approximately 6 minutes. During this time, registrations may fail, but all calls should proceed normally.

In addition, the primary database is restarted, so network elements fail over to the secondary database instance.

Only trained personnel should perform the following task.

Prerequisites

The following information is needed to perform this procedure:

- IP addresses of the System Manager server, the primary database server, and the secondary database server
- the nortel user password for all three servers, and the oracle user password on the database servers
- the database user, such as mcpuser, and password

Action

The following procedure should be used when one of the databases must be synchronized with the data from the other database.

Deploy the latest database software load to the two servers

In a telnet window

- 1 Log in to the System Manager server as user nortel.
- 2 Change directory to the location of the latest software load:

```
$ cd /var/mcp/<site>
```

Note: site is the name of the directory that is used as a temporary workspace for upgrading the office software.

- 3 Deploy the latest software load (files only) to the database servers:

```
$ ./dbInstall.pl -p installprops.txt -fo
```

When prompted for "Perform "Deploy Files Only" operation to Secondary DB also (Y/N)?[Y]:" answer Y.

A log file named /var/mcp/install/logs/dbInstall.log.<time> is created. The files for the software load defined by entry ne.load in the installprops.txt file is transferred from the System Manager server to the database servers.

Log in to the database server with the good data and resynchronize

In a telnet window

- 4 Log in with the oracle account to the database server with the data to synchronize from.
- 5 Change directory and execute the **Resync.pl** command:

```
$ cd /var/mcp/run/MCP_4.0/mcpdb_0/bin/util  
$ ./Resync.pl
```

A menu of resynchronization methods is presented.

```
Please Select Resync Type:  
[1] Resync From Primary To Secondary  
[2] Resync From Secondary To Primary
```

```
Please enter number [1 to 2] of selection:
```

- 6 Ensure that the choice reflects resynchronizing from the database that has the good data.

The script prompts for data entry such as IP addresses and confirmation that the data is correct.

Example of Resync.pl command output

```

Please Select Resync Type:
  [1] Resync From Primary To Secondary
  [2] Resync From Secondary To Primary

Please enter number [1 to 2] of selection:1

Primary DB IP Address[47.47.47.48]:

Secondary DB IP Address[]: 47.47.47.49

Database Username[]: mcpuser
Database Password[mcpuser]: password

-----
ReSync Type:           Resync From Primary To Secondary
Primary DB IP:         47.47.47.48
Secondary DB IP:       47.47.47.49
Database Username:     mcpuser
Database Password:     password
Operation to Perform:  RESYNC

Continue with these settings? (Y/N) [N]:

```

- 7** Enter **Y** to start the resynchronization.

A backup of the secondary database is made, data up to a system change number (SCN) and then begins queueing all the changes made to the secondary database. Resynchronization requires 90 minutes.

Truncate non replicated tables on the secondary database

In a telnet window

- 8** Log in with the oracle account to the secondary Database Manager.

- 9** Truncate the non replicated tables:

```

$ cd /var/mcp/run/MCP_4.0/mcpdb_0/bin/util
$ ./truncateNonRepdTables.sh <dbUser>
<dbPasswd>

```

For each non replicated table, an indication that it is identified and truncated is printed to the screen.

- 10** This procedure is complete.

Perform procedure [Fixing a hung backup job on page 26](#).



Configuration management

How this chapter is organized

This chapter is organized as follows:

- [Functional description on page 41](#)
- [Tools and utilities on page 42](#)
- [Tasks on page 42](#)
- [System Management Console configuration management on page 43](#)
 - [Component database connection configuration on page 43](#)
 - [Configuring tablespace threshold alarms on page 44](#)
- Oracle Enterprise Manager console configuration management
 - [Logging in to the Oracle Enterprise Manager Console on page 47](#)
 - [Configuring sysman preferences on page 50](#)
- Server configuration management
 - [Configuring administrator roles on page 52](#)

Functional description

The following deployment tasks related to the Database functionality are performed during installation and commissioning or when upgrading to a full release:

- Addition and configuration of the server(s) hosting the Database functionality.
- Installation of Oracle onto the server(s), including the creation of the **oracle**, **sysman**, and **system** administrator accounts.
- Addition and configuration of the Database Manager software component onto the server hosting the primary database.

Note: In a redundant architecture, the Database Manager software is deployed to both the primary database server and the

secondary database server. When an update is made to the Database Manager software (located on the server hosting the primary database), the new schema information is communicated to the secondary database.

This chapter documents configuration tasks that can be performed after initial deployment.

Tools and utilities

Use the following tools for configuring the Database functionality:

- **System Management Console:** Used for server monitoring and the Database Instance Monitor.
- **Oracle Enterprise Manager console:** Used by the database administrator to setup preferences for the **sysman** administrator and to setup an observer account.

Tasks

[Table 1, Configuration management tasks, on page HIDDEN](#)[Table 1, Configuration management tasks, on page 42](#) lists the configuration tasks for the Database functionality.

Table 1 Configuration management tasks

| Topic | Subtopic | Procedure |
|--|-----------------------------------|--|
| System Management Console Configuration Management | Database Base service | Component database connection configuration on page 43 |
| | Database Instance Monitor | Configuring tablespace threshold alarms on page 44 |
| Oracle Enterprise Manager console Configuration Management | Log in | Logging in to the Oracle Enterprise Manager Console on page 47 |
| | sysman preferences | Configuring sysman preferences on page 50 |
| Server Configuration Management | System and General Administrators | Configuring administrator roles on page 52 |

System Management Console configuration management

Component database connection configuration

Many MCS network elements need to communicate with the database. The username and password parameters for network element communication with the database are provisioned at the System Management Console under the Databases folder in the config view. The System Manager gathers this information and transmits it to any network element that needs connectivity parameters.

System Manager to Database Manager communication parameters are established in the installprops.txt file that is used on the System Manager server. This installprops.txt file is used for the mcpInstall.pl and mcpUpgrade.pl commands. These commands install the MCP software on the System Manager and the values in the installprops.txt file set the communication parameters.

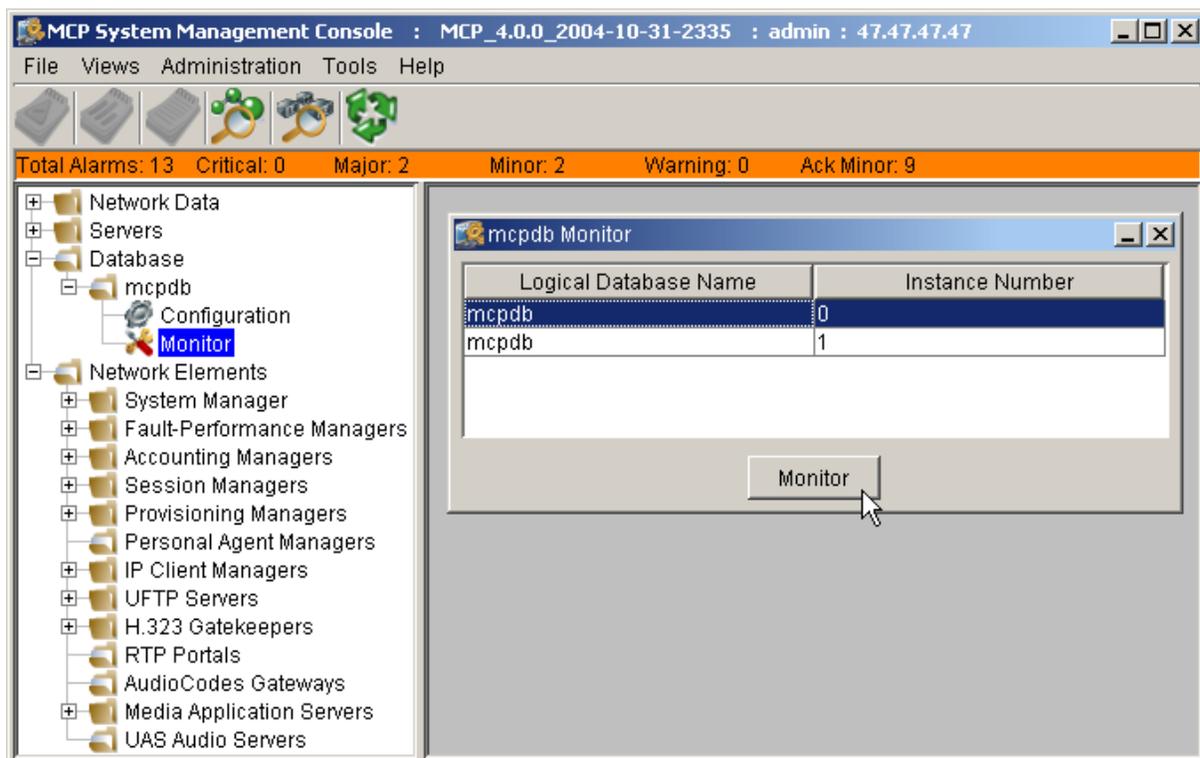
Configuring tablespace threshold alarms

Use the following procedure to add or modify the tablespace threshold alarms for the Database Instance Monitor. This procedure requires an administrative role with DBMonitorConfigService privileges.

At the System Management Console

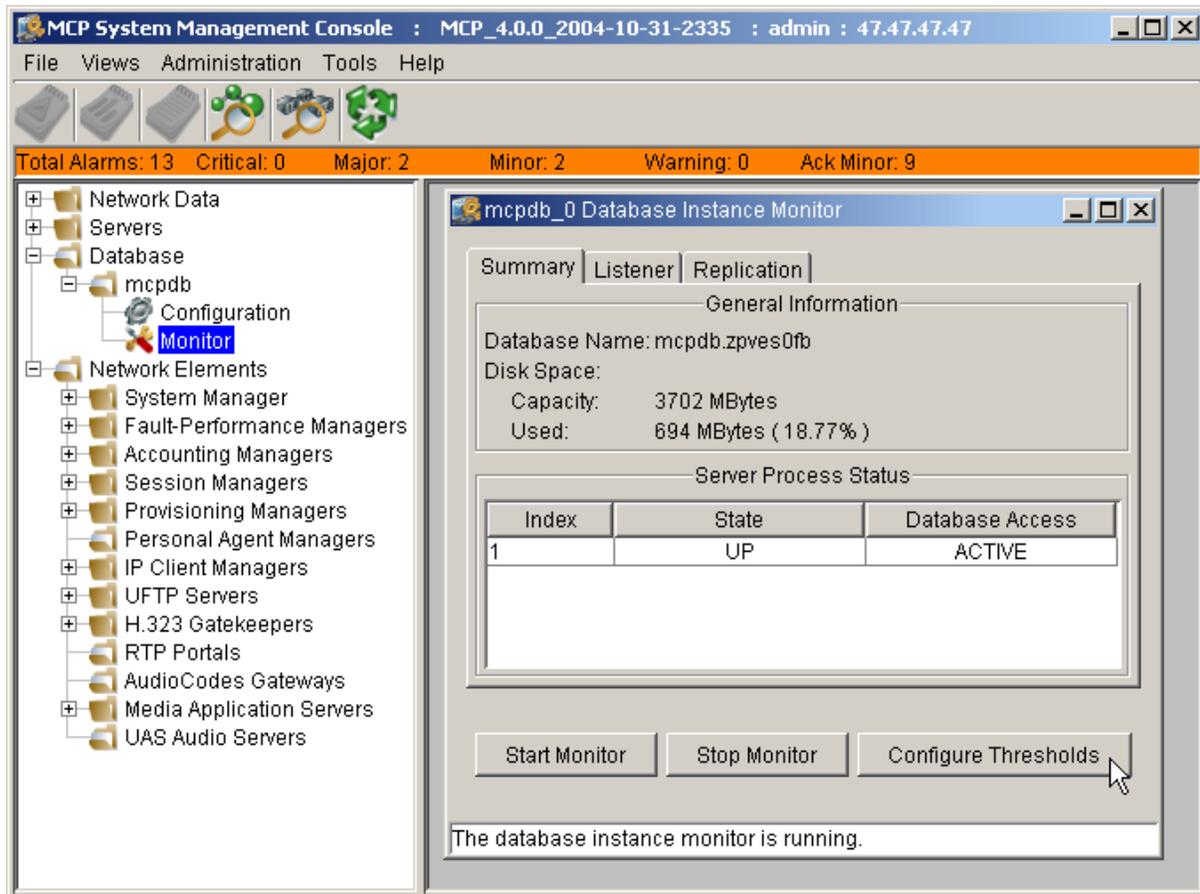
- 1 Select **Database > mcpdb > Monitor** from the config view.

The mcpdb Monitor window opens in the work area.



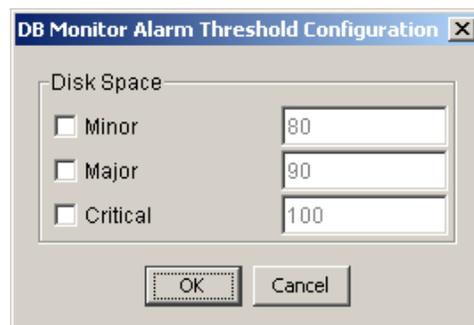
- 2 Select an instance to monitor and click **Monitor**.

The *mcpdb_x Database Instance Monitor* window opens in the work area.



3 Click **Configure Thresholds**.

The *DB Monitor Alarm Threshold Configuration* window opens.



4 Select the Minor, Major, or Critical checkboxes to enable a DBMN401 alarm when a threshold is crossed. Set the resource threshold for each level and click **OK**.

The window closes.

- 5** Within a redundant architecture, repeat this procedure for the database instance on the server hosting the secondary database.

Logging in to the Oracle Enterprise Manager Console

Use the following procedure to log in to the Oracle Enterprise Manager Console.

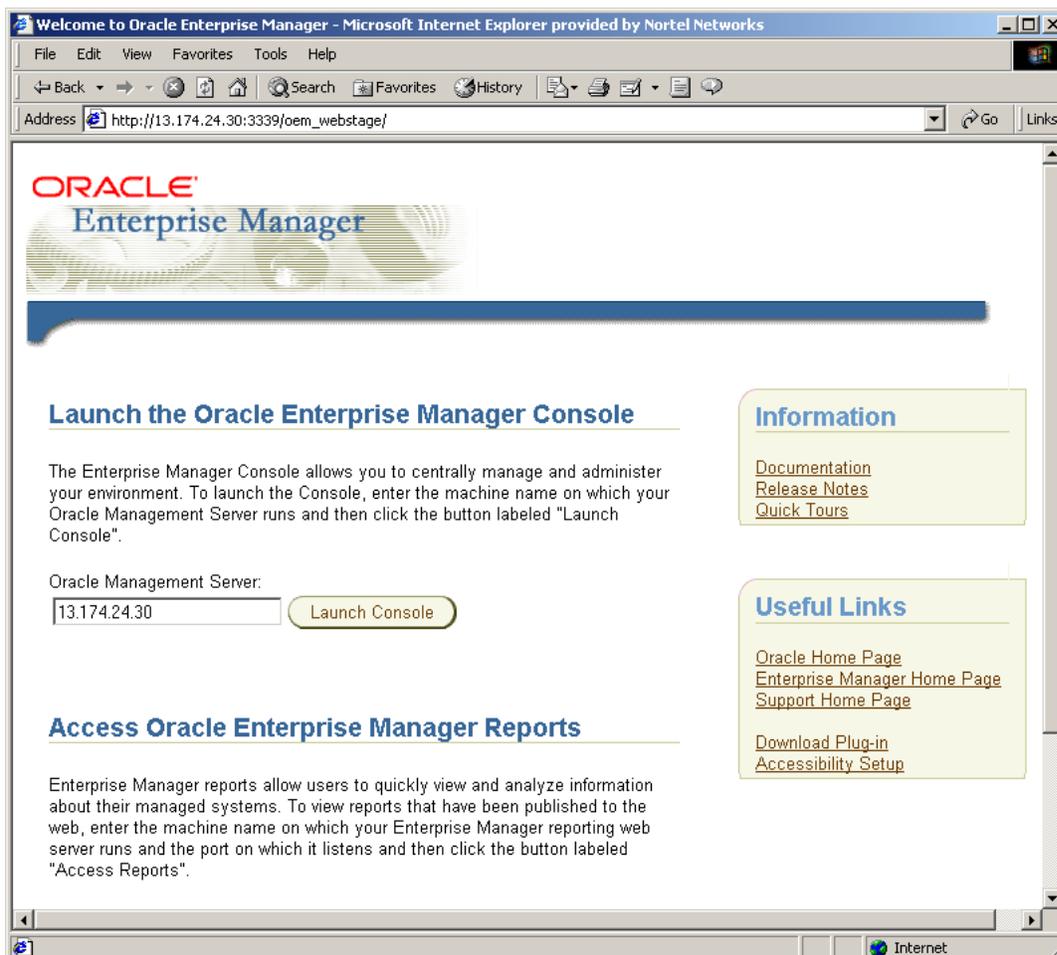
At a web browser

- 1 Enter the IP address or hostname of the database server to connect to in the address box, and add ":3339" to specify connecting to port 3339.

Example

`http://47.47.47.48:3339`

The Launch the Oracle Enterprise Manager Console web page opens.



Note: Prior to launching the Oracle Enterprise Manager Console for the first time (or after upgrading or changing web browsers), the administrator must first download the Oracle

Jinitiator plug-in. This plug-in is required for all web browsers to work with the Oracle Enterprise Manager Console.

*To download the Oracle Jinitiator plug-in, select the **Download Plug-in** item under the **Useful Links** portion of the window. Follow the instructions for downloading and installing the Oracle Jinitiator plug-in.*

- 2** In the **Oracle Management Server** box on the web page, enter the IP address of the server hosting the primary database and click **Launch Console**.

Note: Do not connect to the secondary database. A connection to the secondary database may cause the secondary database to discover the primary database. In this event, jobs may fail. Refer to [Fixing a hung backup job on page 26](#) for more information.

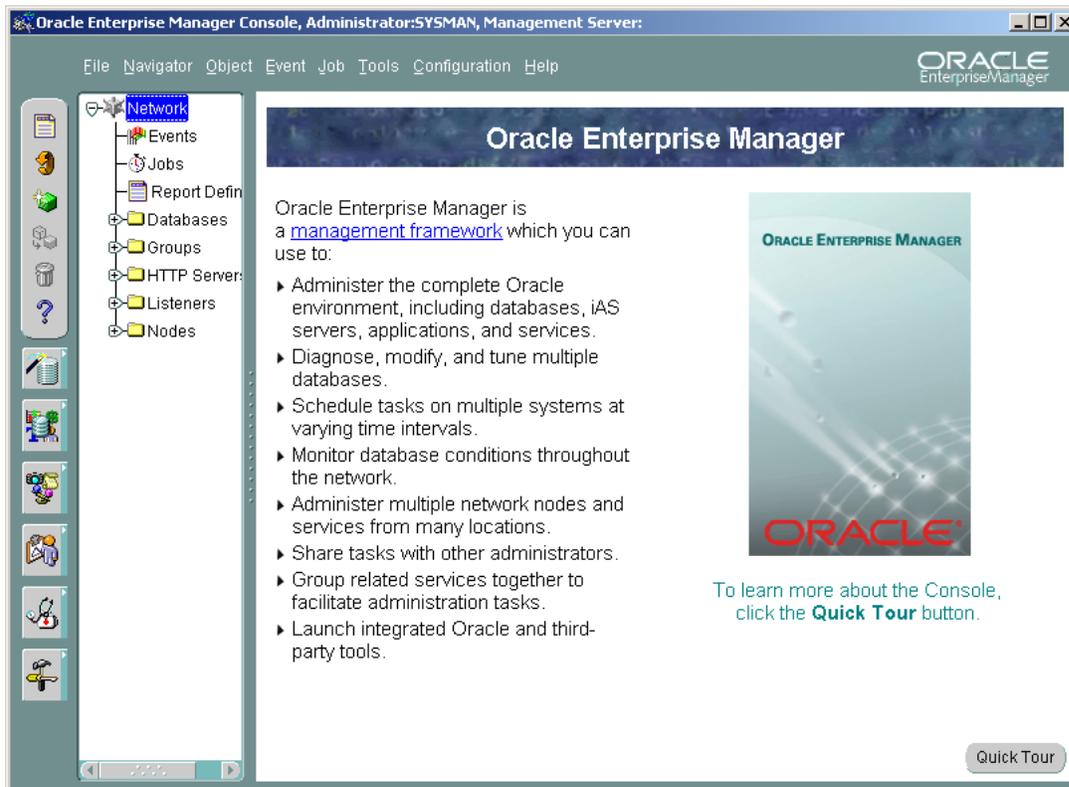
The Oracle Enterprise Manager Console Login window opens.



Note: *If the Oracle Enterprise Manager Console Login window does not appear, ensure that the Oracle Jinitiator plug-in has been installed, as described in the previous step.*

- 3** Enter the **sysman** user name and password provided during installation and click **OK**.

The Oracle Enterprise Manager Console opens.



4 This procedure is complete.

Configuring sysman preferences

Use the following procedure to configure preferences for the **sysman** administrator.

From the Oracle Enterprise Manager console

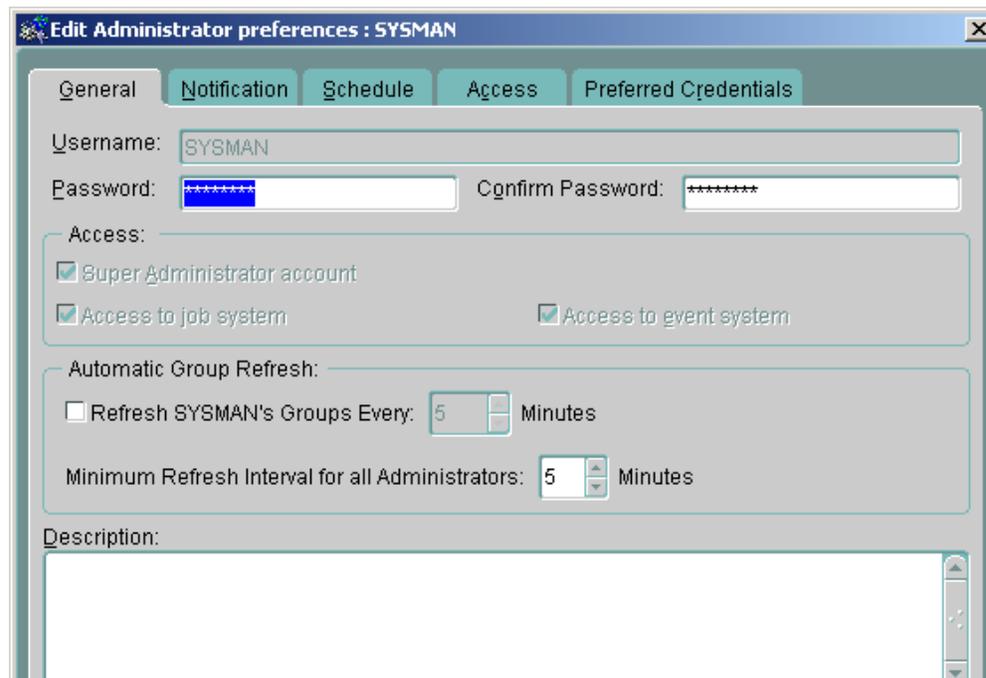
- 1 Select **Configuration > Manage Administrators** from the menu bar.

The Manage Administrator Accounts window opens.

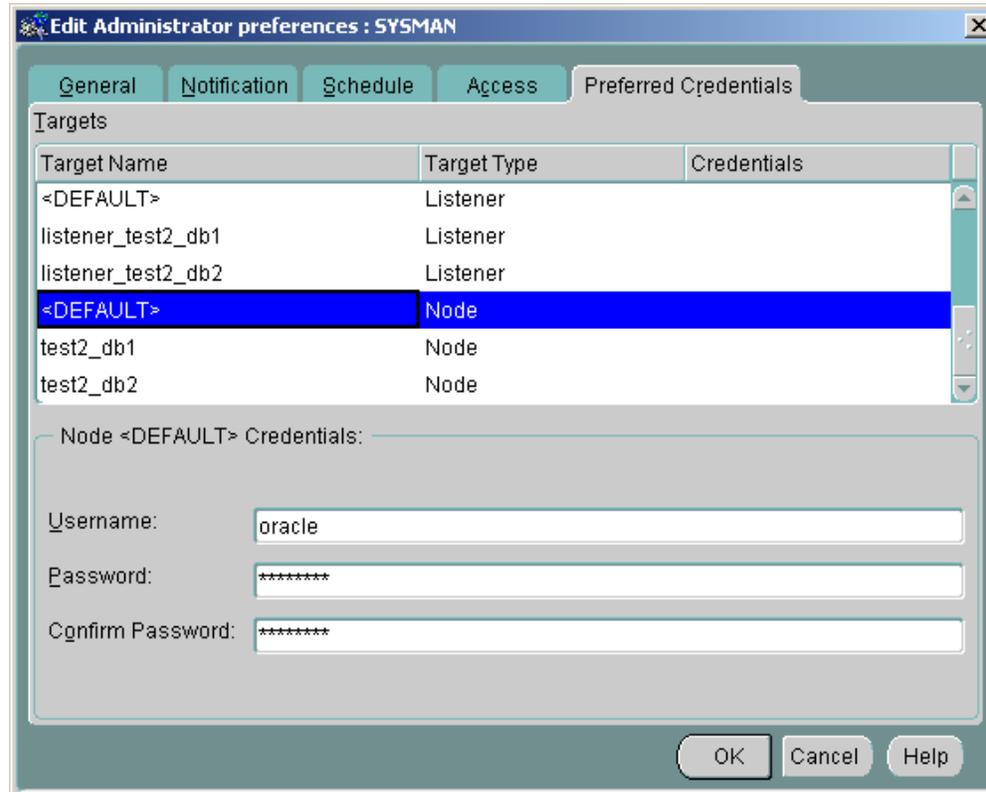


- 2 Select **sysman** and click **Edit**.

The Edit Administrator Preferences > General window opens.



- 3 Select the **Preferred Credentials** tab.
The Preferred Credentials tab opens.



- 4 Under **Targets**, select the **Target Name** and **Target Type** combination of <DEFAULT> and Node.
- 5 Enter the correct **Username** and **Password** for the **oracle** administrator and click **OK**.
All changes are saved and the Edit Administrator window closes.
- 6 This procedure is complete.

Configuring administrator roles

Two important items are related to access and security of the database from changes made at the System Management Console user interface:

- only a single log in is allowed for an administrator account

If an administrator prefers to run two instances of the System Management Console, that administrator needs two administrator accounts for the System Management Console. This security feature ensures that configuration changes and maintenance requires are traceable to a single administrator rather than an account that is used by many administrators.

- administrators are assigned an administrative role

Administrative roles on the System Management Console can be configured to control access to viewing configuration data as well as making configuration changes and maintenance requests. The following privileges are associated with the database:

- LogicalDBService - READ privilege allows viewing the database name as well as the database username and password information. WRITE privilege allows configuring this data.
- DBMonitorConfigService - READ privilege allows viewing the alarm thresholds for tablespace usage. WRITE privilege allows configuring this data.
- DBMonitorService - READ privilege allows viewing the Database Instance Monitor. MTC privilege allows starting and stopping the Database Instance Monitor.
- ServerMonitorService - READ privilege allows viewing the Server Monitor for the servers that host the database. MTC privilege allows starting and stopping the server monitors, as well as configuring alarm thresholds.

Refer to the *CVoIP System Management Console User Guide* for information about configuring roles and administrators.



Accounting management

Functional description

The Database functionality does not perform any accounting management.



Security and Administration

How this chapter is organized

This chapter is organized as follows:

- [Security on page 57](#)
- [Administration on page 58](#)
 - [Functional description on page 58](#)
 - [Tools and utilities on page 59](#)
 - [Tasks on page 59](#)
 - [Configuring an Oracle database backup job on page 60](#)

Security

The Database functionality uses Oracle database technology to ensure confidentiality, integrity, and availability of data. All configuration data held in the Oracle database are also protected by user authentication and network firewalls configured in a network architecture.

Basic administrative roles and corresponding privileges are assigned, and user roles and passwords are provided during installation.

The following table describes user accounts used to administer the Database functionality.

Table 1 Database administrator and user roles

| Username | User type | Description |
|----------|-----------|--|
| oracle | UNIX user | Runs command line scripts on the server(s) hosting the Oracle database(s). |

Table 1 Database administrator and user roles

| Username | User type | Description |
|----------------|--------------------------------|--|
| sysman | Oracle Enterprise Manager user | Manages administration of the database from the Oracle Enterprise Manager Console. |
| mcpuser | Database user | Owns the schema used by MCS network components. |

The password for the mcpuser Oracle account should be changed from the default value during commissioning and installation. The password for that account should be secured. The password is needed during software updates performed at the System Manager server and is recorded in the installprops.txt file. The password value should be removed from the file, or the file secured by changing the access permissions.

Administration

Functional description

Database administration consists of creating backup jobs and recovery for the Oracle database(s). It also includes the option to generate reports to display information about the Oracle database(s).

Database backup

The Oracle Enterprise Manager Console supports scheduling automated backups of the Oracle database as often as required.

Backups should be scheduled during off-peak hours. The default time is 2:00 a.m.



CAUTION

To avoid risk of data loss, always backup data to external media and use consistent and regular backup procedures.

Using the Import/Export database backup method provides the ability to backup an Oracle database by taking a complete export of the data in an Oracle database.

If a backup fails, the job output displays the probable cause of the failure and any available explanatory information. To view the job output, double-click a failed job displayed in the Oracle Enterprise Manager Console. For more information, refer to [Monitoring database backup jobs on page 24](#).

Tools and utilities

The Database functionality uses the Oracle Enterprise Manager Console for administration. This interface is used by the database administrator for administration of database jobs.

Tasks

The following table outlines Database administration tasks.

Table 2 Administration task flows

| Topic | Procedure |
|-------------------|--|
| Database backups | Configuring an Oracle database backup job on page 60 |
| Database recovery | Restoring Oracle database backup files on page 65 |

It is recommended that all the configuration tasks listed in [Configuration management on page 41](#) be completed prior to performing any of the administration tasks listed above.

Configuring an Oracle database backup job

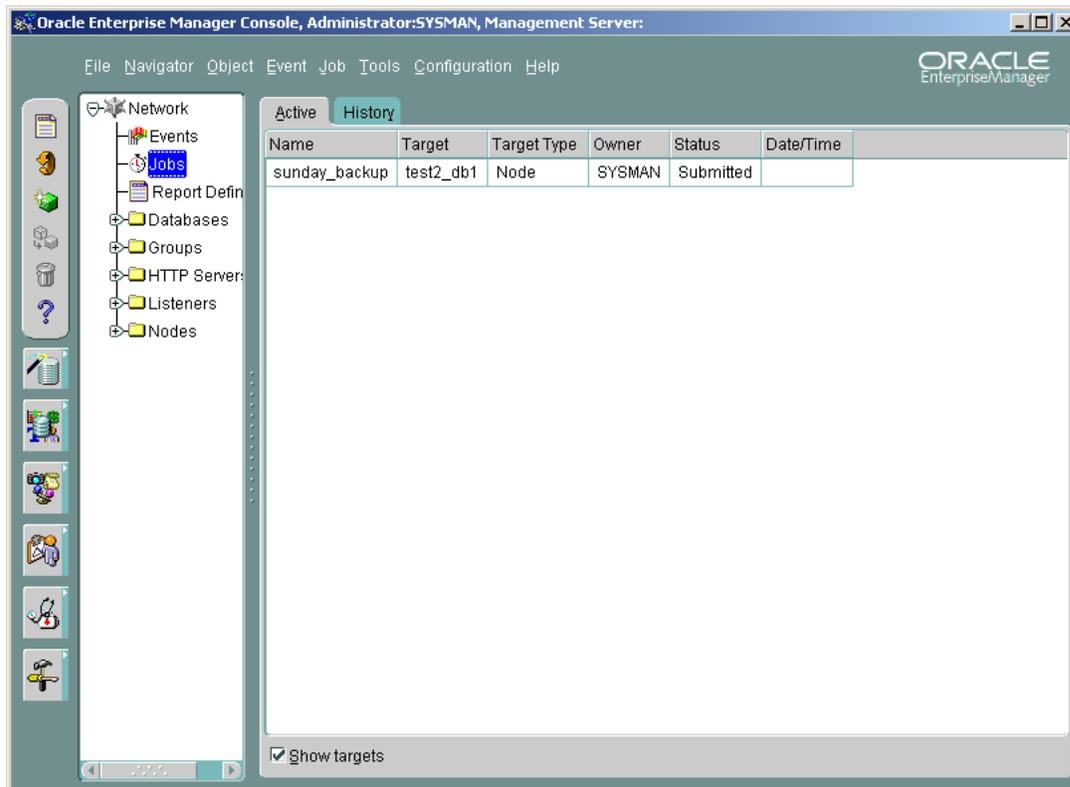
Database backup is achieved by scheduling backups of the primary Oracle database through the Oracle Enterprise Manager Console. Use this procedure to schedule or modify scheduled backups. Do not configure a backup job on the secondary database.

Note: When a scheduled backup job is run, the approximate export rate is 25 MegaBytes of data per minute.

At the Oracle Enterprise Manager Console

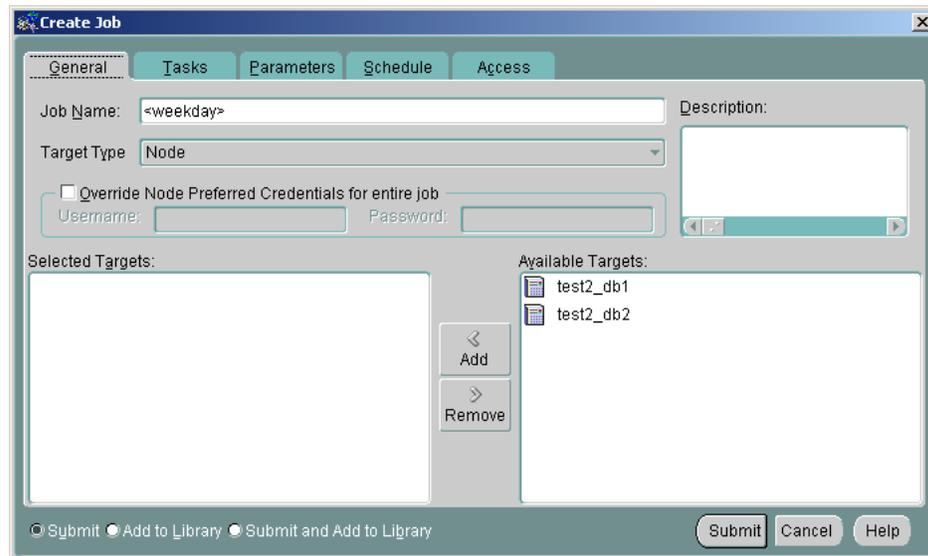
- 1 Select **Jobs** from the network tree.

The Jobs panel displays the list of active backup jobs that have been scheduled.



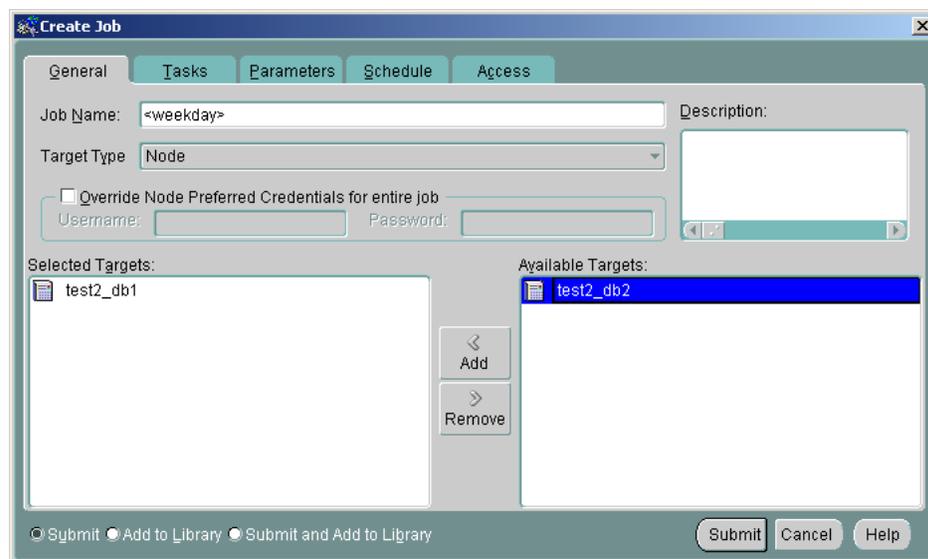
- 2 Select **Job > Create Job** from the menu bar.

The Create Job window opens.



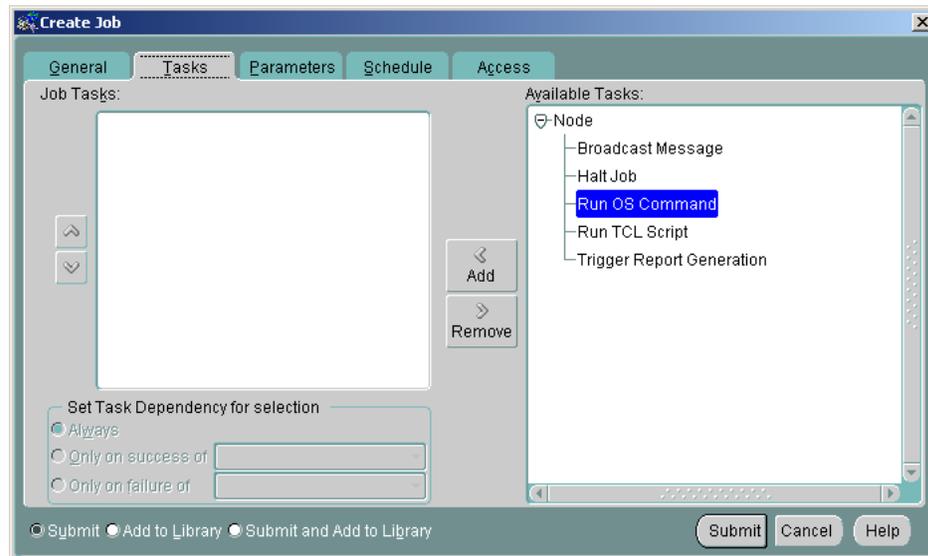
- 3 In the **Job Name** box, enter **<weekday>**, where **weekday** is the day of the week the job should run.
- 4 Under **Target Type**, select **Node**.
- 5 In the **Available Targets** box, select the node name where the primary Oracle database resides and click **Add**.

The target node name which was selected moves into the Selected Targets list.



- 6 Click the **Tasks** tab.

The Tasks panel opens.

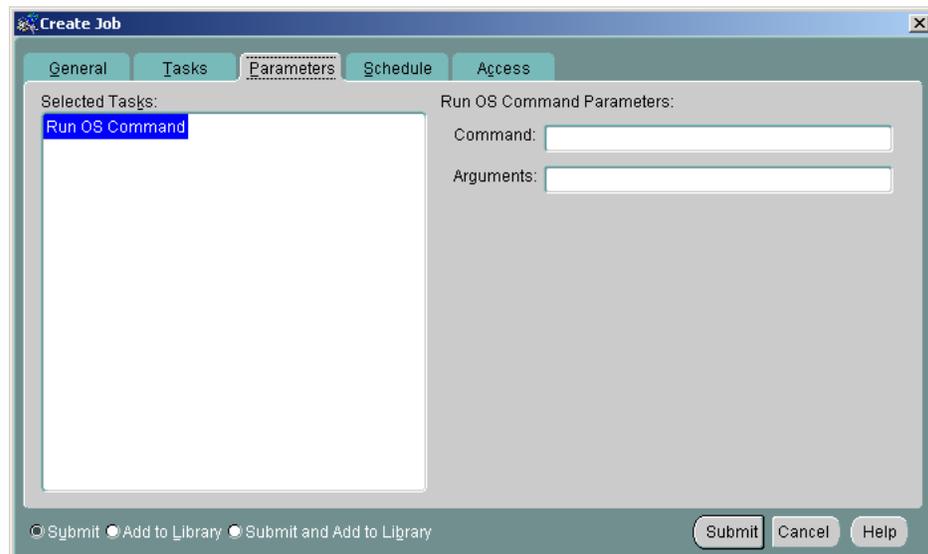


- 7 Select **Run OS Command** from the **Available Tasks** pane and click **Add**.

*The **Run OS Command** task is added to the Job Tasks pane.*

- 8 Click the **Parameters** tab.

The Parameters pane opens.

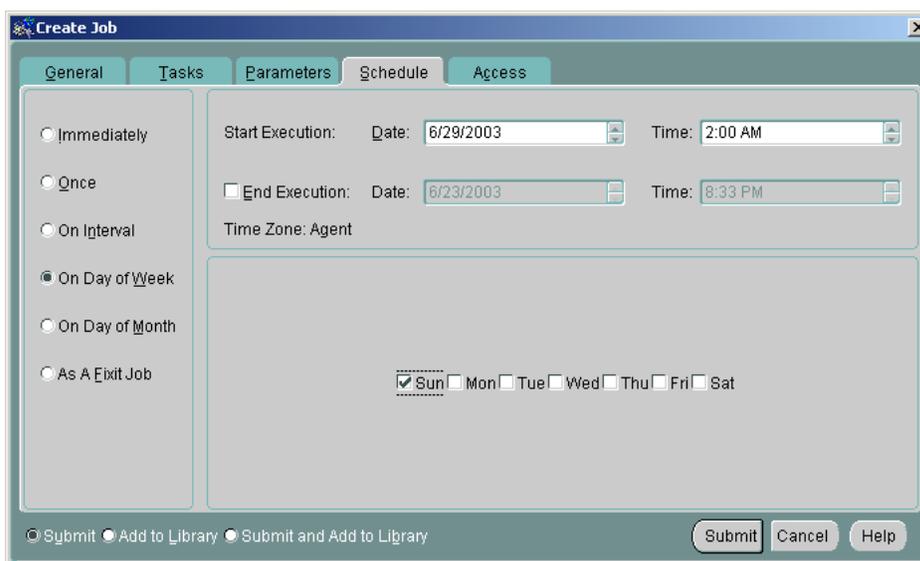


- 9 Enter the following configuration data on the Parameters panel.

| Parameter | Value |
|-----------|--|
| Command | <code>/var/mcp/run/MCP_4.0/mcpdb_0/bin/util/dbBackup.sh</code> |
| Arguments | <p>Enter the following four parameters:</p> <p><code><dbUsername></code> — Enter the Database User provisioned at the System Management Console, for example <code>mcpuser</code>.</p> <p><code><dbPassword></code> — Enter the password for the user.</p> <p><code><backupName></code> — Enter a name for the backup, for example <code>mcdpb</code>.</p> <p><code><backupMedia></code> — Enter TAPE or DISK.</p> |

If DISK is selected, then backups are stored in `/var/mcp/backup/orabackup` on the node.

- 10 Click the **Schedule** tab.
The Schedule panel opens.



- 11 Select the **On Day of Week** radio button and then select the day of the week on which the backup should run.
- Note:** A backup job should be created for each day of the week.
- 12 Choose a default start time during off-peak hours. The recommended time is 2:00 a.m.
- 13 Once all of the above steps are completed, do the following:

- a Select the **Submit and Add to Library** option.
 - b Click the **Submit and Add** button to save the backup.
The Create Job dialog box closes and the new backup job appears in the Jobs tab.
- 14 This procedure is complete.

Restoring Oracle database backup files

Database recovery is achieved by restoring a previous backup version of the Oracle database. Consider the following points before performing a restore:

- Backups of the secondary database are not made, so if the primary database has stale data, follow procedure [Resynchronization \(only in a redundant architecture\) on page 37](#) and resynchronize from secondary to primary.
- If one of two database servers was reinstalled and the data in the remaining database is valid, follow procedure [Resynchronization \(only in a redundant architecture\) on page 37](#) and resynchronize from the remaining database to the one that was just reinstalled.
- Backups are never restored to the secondary database, either synchronize from primary to secondary, or restore the primary database as described in this procedure and then synchronize from primary to secondary.
- If the data to restore was dumped before a software update, such as an MCP_4.0.0-2005-01-13-2335 to MCP_4.0.0-2005-01-20-2335, then follow procedure "Rolling back an update" in the *CVoIP System Manager Basics*.

After restoring the primary database, perform the resynchronization procedure outlined in [Resynchronization \(only in a redundant architecture\) on page 37](#).



CAUTION

Possible loss of data and interruption of service
Only trained personnel should perform the following task.

Use the following procedure to restore files created using the Export/Import backup method.

Note 1: Stop all MCS network components that connect to the Oracle database (for example, Database Instance Monitors, Provisioning Modules, SIP Application Modules, IP Client Managers, Personal Agent Managers, and the Management Module) before performing this procedure. After the procedure is completed, start all MCS network components to return them to their previous state.

Note 2: The approximate import rate for recovering a database is 100 MegaBytes of data per hour.

Prerequisites

Confirm the following prerequisites before beginning this procedure:

- the Database Manager, System Manager, and all network elements are running the same software load
- the currently running software load was running when the backup was created

If either of these conditions is not true, refer to procedure "Rolling back an update" in the *CVoIP System Manager Basics*.

Action

At the System Management Console

- 1 Stop all network elements except the System Manager. If this is not done and the procedure is completed, then restart any network elements that raise an alarm.

At a telnet window

- 2 Log in with the oracle account to the primary database server.
- 3 If there are two databases and they are synchronized, drop synchronization:

```
$ cd /var/mcp/run/MCP_4.0/mcpdb_0/bin
$ ./cleanupReplication.sh <dbUser> <dbPasswd>
```

The progress of dropping replication is printed to the screen. Wait for the message "cleanupReplication.sh script completed."

- 4 Ensure the database dump to restore is located in /var/mcp/backup/orabackup:

```
$ ls /var/mcp/backup/orabackup
```

The list of available dump files to restore is printed to the screen. If the dump to restore is not listed, then FTP the dump to the database server and place it in the /var/mcp/backup/orabackup directory.

- 5 Execute the following commands:

```
$ cd /var/mcp/run/MCP_4.0/mcpdb_0/bin/util
$ ./dbRestore.sh <backupName> <backupMedia>
```

where

backupName

is the name of the backup, such as . Note that the dbRestore.sh script appends ".dmp" to this value.

backupMedia

is TAPE or DISK. If DISK is specified, the backup must be located in the /var/mcp/backup/oradata directory.

The import of data from the file begins. When the import is complete, start all the network elements that were stopped.

- 6 After the import is complete, if the database is redundant, perform [Resynchronization \(only in a redundant architecture\) on page 37](#). After resynchronization completes, add the backup jobs again as described in [Configuring an Oracle database backup job on page 60](#).
- 7 This procedure is complete.

Carrier Voice over IP

Communication Server 2000

Database Manager Basics

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