Oracle9*i* Application Server: Backup and Recovery

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Introduction to Backup and Recovery

Backup and recovery refers to the various strategies and procedures involved in guarding against hardware failures and data loss, and reconstructing the data should loss occur. This chapter provides an introduction to backup and recovery for Oracle9*i* Application Server (Oracle9*i*AS).

It contains the following topics:

1.1 Introduction

This document describes how to perform backup and recovery on Oracle9*i*AS Release 2 (9.0.2.x) and (9.0.3.x). This document has a companion tool: the Oracle9*i*AS Backup and Recovery Tool.

This document and the Oracle9*i*AS Backup and Recovery Tool are available on the Oracle Technology Network (OTN):

`http://otn.oracle.com`

Under Products, select Oracle9*i* Application Server. Then navigate to the High Availability section and look under Technical Information. The exact URL is:

`http://otn.oracle.com/products/ias/hi_av/content9ias.html`

1.2 Assumptions and Restrictions

The following assumptions and restrictions apply to the procedures in this document:

- The following Oracle9*i*AS releases are supported:
  - Oracle9*i*AS Release 2 (9.0.2.1.0) or later
  - Oracle9*i*AS Release 2 (9.0.3)
- The following installation types are supported:
  - J2EE and Web Cache
  - Portal and Wireless
  - Business Intelligence and Forms
  - Infrastructure
- All operating system platforms that are certified for Oracle9*i*AS are supported.
- Each host must have a Perl installation of version 5.0 or above.
- The metadata repository must be a single instance database. The procedures in this document do not support using Real Application Clusters (RAC).
- These restrictions apply when you are restoring Oracle9*i*AS:
  - You can restore to the same host
  - You can restore to a different host with the same system configuration as the original host, such as hostname, IP address, user names, directory

paths, and operating system levels. For a complete list refer to Section 2.2.3, "Creating a Record of Your Oracle9iAS Configuration".

1.3 Backing Up and Recovering an Oracle9*i*AS Environment

Your **Oracle9*i*AS environment** is the framework within which you perform backup and recovery. An Oracle9*i*AS environment contains the following:

- An **infrastructure installation** containing a metadata repository
- A **middle-tier installation** (J2EE and Web Cache, Portal and Wireless, Business Intelligence and Forms)

These installations contain configuration information, applications, and data that are interdependent. During normal operation, the application server automatically keeps this information in sync. However, in the event of system failure or data loss, it is up to the administrator to restore the application server to a consistent state.

It is therefore important to consider your Oracle9*i*AS environment as a single entity, rather than a collection of installations, when performing backup and recovery. This means backing up data across all installations at the same point in time, rather than on a per installation basis.

For example, it would not be sufficient to back up your infrastructure on Monday and your middle-tier installation on Tuesday. In the event of loss, you would only be able to restore your infrastructure to Monday's state and your middle tier to Tuesday's state, which would create problems in how your application server functions. Instead, you should backup critical data from the infrastructure and middle tier at the same time. Then, in the event of loss, you can restore and recover both to a consistent state.

The backup and recovery strategies and procedures in this document involve backing up the entire Oracle9*i*AS environment as a whole and restoring it so that its state remains consistent.

1.3.1 Overview of the Backup Strategy

The overall backup strategy is to:

- Perform an initial **complete cold backup** of your Oracle9*i*AS environment, which involves:
  - Backing up the middle tier Oracle home
  - Backing up the infrastructure Oracle home

- Performing a complete cold backup of the metadata repository
- Backing up Oracle system files

Notice that the complete cold backup includes everything necessary to restore your initial installation.

- Perform regular **partial online backups** of your Oracle9*i*AS environment, which includes:
  - Backing up the configuration files in the middle tier Oracle home
  - Backing up the configuration files in the infrastructure Oracle home
  - Performing an online backup of the metadata repository

  Notice that the partial online backup involves saving the configuration information across your entire Oracle9*i*AS environment at the same point in time.

1.3.2 Overview of Recovery Strategies

This document provides a variety of recovery strategies, depending on the type of failure. There are two types of recovery strategies:

- Restore and recovery strategies for data loss, host failure, or media failure

  These strategies enable you to recover from failures that involve actual data loss. Depending on the type of loss, they can involve:
  - Restoring Oracle static binaries or libraries from a complete cold backup
  - Restoring configuration files from your most recent partial online backup
  - Restoring and recovering the metadata repository to its latest state

  In all cases, these strategies involve making sure your state is consistent across all installations.

- Recovery Strategies for Process or System Outages and Crashes

  These strategies involve restarting processes that have stopped or failed. They do not involve restoring data. They are included in this document for completeness.

1.4 What is the Oracle9*i*AS Backup and Recovery Tool?

The Oracle9*i*AS Backup and Recovery tool is a Perl script and associated configuration files that will automatically perform some of the procedures in this document.

The tool can be used in different ways, depending on your level of experience and requirements:

- At a minimum, all users can refer to the tool for the list of Oracle9*i*AS configuration files that must be backed up.
- If you are new to backup and recovery, you can use the tool to automatically perform configuration file and metadata repository backup and recovery.
- If you are experienced with backup and recovery, you can refer to the tool for guidance when setting up your own specific configuration file and metadata repository backup and recovery scripts.

The following table summarizes the backup and recovery procedures mentioned in the previous section and show which ones you can perform with the tool.

Procedure	Method
Backing up the middle tier Oracle home	Use standard OS utilities like `tar` or `cpio`.
Backing up the infrastructure Oracle home	Use standard OS utilities like `tar` or `cpio`.
Performing a complete cold backup of the metadata repository	You can use the Oracle9*i*AS Backup and Recovery Tool for this, or refer to the tool and develop your own scripts.
Backing up Oracle system files	Use standard OS utilities like `tar` or `cpio`.
Backing up the configuration files in the middle tier Oracle home	You can use the Oracle9*i*AS Backup and Recovery Tool for this, or refer to the tool and develop your own scripts.
Backing up the configuration files in the infrastructure Oracle home	You can use the Oracle9*i*AS Backup and Recovery Tool for this, or refer to the tool and develop your own scripts.
Performing an online backup of the metadata repository	You can use the Oracle9*i*AS Backup and Recovery Tool for this, or refer to the tool and develop your own scripts.
Restoring Oracle static binaries or libraries from a complete cold backup	Use standard OS utilities like `tar` or `cpio`.
Restoring configuration files from your most recent partial online backup	You can use the Oracle9*i*AS Backup and Recovery Tool for this, or refer to the tool and develop your own scripts.

Procedure	Method
Restoring and recovering the metadata repository to its latest state	You can use the Oracle9*i*AS Backup and Recovery Tool for this, or refer to the tool and develop your own scripts.

The Oracle9*i*AS Backup and Recovery tool is not available in the standard Oracle9*i*AS installation and can be downloaded from Oracle Technology Network (OTN) at http://otn.oracle.com. Refer to Appendix B, "Oracle9iAS Backup and Recovery Tool" for details.

1.5 Getting Started with Backup and Recovery

This section provides a roadmap for getting started with Oracle9*i*AS backup and recovery.

1. **Learn about database backup and recovery.**

   The Oracle9*i*AS environment includes the metadata repository—an Oracle9*i* Release 1 (9.0.1) Enterprise Edition database. Performing backup and recovery on Oracle9*i*AS includes performing backup and recovery of a database. It is therefore important for application server administrators to understand database backup and recovery.

   If you are not experienced with database backup and recovery, Oracle recommends you read *Oracle9i Backup and Recovery Concepts Release 1 (9.0.1)*, Part Number A90133-02, which is available in the Oracle9*i* document library.

   In particular, the following topics apply to Oracle9*i*AS backup and recovery:

   - Using ARCHIVELOG mode
   - Performing closed database backups
   - Performing online database backups
   - Using the RMAN backup and recovery utility

2. **Implement the backup strategy.**

   Chapter 2, "Backup" outlines the Oracle-recommended backup strategy and backup procedures. Following this backup strategy ensures that you will be able to perform the recovery procedures in this document.

   Part of implementing the backup strategy involves downloading and configuring the Oracle9*i*AS Backup and Recovery Tool.

3. **Restore and recover as necessary.**

   In the event of system failure or data loss, refer to Chapter 3, "Restore and Recovery". It outlines different types of failures and describes the procedures you can follow to recover.

2

Backup

This chapter describes the Oracle-recommended backup strategy and procedures.

It contains the following topics:

2.1 Backup Strategy

This section describes the backup strategy recommended by Oracle. Using this strategy ensures that you can perform the recovery procedures described in this document.

The backup strategy is as follows:

Immediately after you install Oracle9*i*AS:

1. Download and configure the Oracle9*i*AS Backup and Recovery Tool.

   Refer to Section 2.2.1, "Downloading and Configuring the Oracle9iAS Backup and Recovery Tool".

2. Enable ARCHIVELOG mode in the metadata repository.

   Refer to Section 2.2.2, "Enabling ARCHIVELOG Mode".

3. Create a record of your Oracle9*i*AS environment.

   Refer to Section 2.2.3, "Creating a Record of Your Oracle9iAS Configuration".

4. Perform a complete cold backup of your Oracle9*i*AS environment.

   Refer to Section 2.2.4, "Performing a Complete Cold Backup of Your Oracle9iAS Environment".

5. Perform regular partial online backups of your Oracle9*i*AS environment.

   Refer to Section 2.2.5, "Performing a Partial Online Backup of Your Oracle9iAS Environment".

Any time you upgrade or patch Oracle9*i*AS or your operating system:

1. Update the record of your Oracle9*i*AS environment.

   Refer to Section 2.2.3, "Creating a Record of Your Oracle9iAS Configuration".

2. Perform a complete cold backup of your Oracle9*i*AS environment.

   Refer to Section 2.2.4, "Performing a Complete Cold Backup of Your Oracle9iAS Environment".

3. Perform regular online backups of your Oracle9*i*AS environment.

   Refer to Section 2.2.5, "Performing a Partial Online Backup of Your Oracle9iAS Environment".

Additional Tips:

- Create a backup of the JRE/JDK on your system. This isn't an Oracle product, but it is utilized by Oracle9*i*AS and, if accidentally lost or corrupted, would need to be restored in order for Oracle9*i*AS to function. This issue applies to HP-UX, HP Tru64, and IBM AIX systems.
- Make sure your backups are valid by routinely verifying that they can be restored.

2.2 Backup Procedures

This section describes the backup procedures in detail.

It contains the following topics:

2.2.1 Downloading and Configuring the Oracle9*i*AS Backup and Recovery Tool

The Oracle9*i*AS Backup and Recovery tool was developed to assist with backing up and recovering the configuration files and metadata repository in an Oracle9*i*AS environment. It is important to note that this tool does not cover backing up and restoring Oracle9*i*AS software, such as binaries, oraInventory files, or Oracle system files (for example, /var/opt/oracle). In addition, any user or application-specific files that are not part of the default installation, are not covered. You will need to handle backup and recovery of these pieces separately, as required.

Your first task is to download and configure the Oracle9*i*AS Backup and Recovery Tool for each installation in your Oracle9*i*AS environment:

1. Download and configure the tool in your infrastructure installation.
2. Download and configure the tool in your middle-tier installation.

The reason you must download and configure the tool for all installations is that you will customize the tool for each one.

Refer to Section B.2, "Downloading and Configuring the Oracle9iAS Backup and Recovery Tool" for instructions.

2.2.2 Enabling ARCHIVELOG Mode

By default, the metadata repository does not have ARCHIVELOG mode enabled. You should enable ARCHIVELOG mode before you perform your first complete cold backup. Otherwise, your backup control files will contain the NOARCHIVELOG mode setting.

> **See Also:** You can find more detailed information on the parameters in this section, and setting up archive logging in general, in *Oracle9i Database Administrator's Guide Release 1 (9.0.1).*

To enable ARCHIVELOG mode:

1. Set up archive logging parameters.

   On Unix:

   Edit the following file:

   (UNIX) *INFRA_ORACLE_HOME*/dbs/init.ora

   a. (Mandatory) Uncomment the following line by removing the initial '#' character so it appears like this:

      ```
      log_archive_start = true
      ```

   b. (Optional) The default destination directory for archive logs is:

      INFRA_ORACLE_HOME/rdbms

      If you would like to use a different directory, uncomment the following line and specify the directory. For example:

      ```
      log_archive_dest = 'LOCATION = /disk1/archive'
      ```

   c. (Optional) The default filename format for archive logs is:

      T*thread*S*sequence*.ARC

      If you would like to use a different format, uncomment the following line and specify a format. For example:

      ```
      log_archive_format = arch%s.arc
      ```

   On Windows:

Edit the following file:

(Windows) *INFRA_ORACLE_HOME*\..\admin\iasdb\pfile\init.ora

a. (Mandatory) Add the following line to the file. You can add this line anywhere in the file:

```
log_archive_start = true
```

b. (Optional) The default destination directory for archive logs is:

INFRA_ORACLE_HOME\rdbms

If you would like to use a different directory, add the following line and specify the directory. For example:

```
log_archive_dest = 'LOCATION = C:\database_archives\'
```

c. (Optional) The default filename format for archive logs is:

T*thread*S*sequence*.ARC

If you would like to use a different format, add the following line and specify a format. For example:

```
log_archive_format = arch%s.arc
```

2. Make sure the ORACLE_HOME and ORACLE_SID (the default is iasdb) environment variables are properly set.

3. Make sure nobody is using the database.

4. Perform a clean, normal shutdown of the database instance.

```
INFRA_ORACLE_HOME/bin/sqlplus /nolog
SQL> connect sys/password as sysdba
SQL> shutdown
```

5. Start up the instance and mount, but do not open, the database.

```
SQL> startup mount;
```

6. Enable database ARCHIVELOG mode.

```
SQL> alter database archivelog;
SQL> alter system set log_archive_start=true scope=spfile;
```

7. Shut down and restart the database instance.

```
SQL> shutdown
SQL> startup
```

8. Verify the database is now in ARCHIVELOG mode.

   Execute the following command and verify that Database log mode is Archive Mode and Automatic archival is Enabled.

```
SQL> archive log list;
Database log mode           Archive Mode
Automatic archival          Enabled
Archive destination         /private/ora9ias/dbs/arch
Oldest on-line log sequence 19
Next log sequence to archive 21
Current log sequence        21
```

2.2.3 Creating a Record of Your Oracle9*i*AS Configuration

In the event you need to restore and recover your Oracle9*i*AS environment, it is important to have all the necessary information at your disposal. This is especially true in the event of a hardware loss that requires you to reconstruct all or part of your Oracle9*i*AS environment on a new disk or host.

You should maintain an up-to-date record of your Oracle9*i*AS environment that includes the information listed in this section. You should keep this information both in hardcopy and electronic form. The electronic form should be stored on a host or email system that is completely separate from your Oracle9*i*AS environment.

Your Oracle9*i*AS hardware and software configuration record should include:

- The following information for each host in your environment:
  - Hostname
  - Virtual hostname (if any)
  - Domain name
  - IP address
  - Hardware platform
  - Operating system release level and patch information
- The following information for each Oracle9*i*AS installation in your environment:

- Installation type (eg: Infrastructure, J2EE and Web Cache, Portal and Wireless)
- Host on which the installation resides
- (Unix only) User name, userid number, group name, groupid number, environment profile, and type of shell for the operating system user that owns the Oracle home (`/etc/passwd` and `/etc/group` entries)
- (Unix only) Directory structure, mount points, and full path for `ORACLE_HOME`
- Amount of disk space used by the installation
- Port numbers used by the installation

Note: *`ORACLE_HOME`*`/install/portlist.ini` contains the port numbers assigned during installation. However, this file is not updated if you change port numbers after installation, so you need to keep track of those changes manually.

- The following information for the metadata repository:
  - Database version and patch level
  - Base language
  - Character set
  - Database name
  - SID

2.2.4 Performing a Complete Cold Backup of Your Oracle9*i*AS Environment

This section describes how to perform an complete cold backup of your Oracle9*i*AS environment. It contains the following steps:

- Step 1: Shut down your Oracle9iAS environment
- Step 2: Back up the infrastructure
- Step 3: Back up the middle tier
- Step 4: Back up your Oracle system files
- Step 5: Start your Oracle9iAS environment

Step 1: Shut down your Oracle9*i*AS environment

1. Stop the middle-tier instance.

   Refer to Section A.2, "Stopping a Middle-Tier Instance" for instructions.

2. Stop the infrastructure.

   Refer to Section A.4, "Stopping an Infrastructure" for instructions.

Step 2: Back up the infrastructure

1. Perform a cold database backup of the metadata repository.

   You can perform this step using your own procedures or the Oracle9*i*AS Backup and Recovery Tool.

   For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

   ```
   cd INFRA_BACKUP_TOOL_DIRECTORY
   (Unix) ./bkp_restore.pl -m backup_cold
   (Windows) perl bkp_restore.pl -m backup_cold
   ```

   Note that the Backup and Recovery Tool leaves the Metadata Repository running. You should shut it down before proceeding with these steps.

   > **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

2. Backup the infrastructure Oracle home.

   Perform a complete backup of all files in the infrastructure Oracle home using your preferred operating system command, such as `tar` or `cpio`.

   Be sure to perform this backup as root because some of the files in the Oracle home are owned by root. It is important to perform the backup so that file owners, groups, permissions, and timestamps are preserved.

   For example:

   ```
   cd INFRA_ORACLE_HOME
   tar cvf full_path_of_backup_file .
   ```

3. Backup the infrastructure configuration files.

   Perform a backup of all configuration files in the infrastructure Oracle home. For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

   ```
   cd INFRA_BACKUP_TOOL_DIRECTORY
   ```

```
(Unix) ./bkp_restore.pl -m backup_config
(Windows) perl bkp_restore.pl -m backup_config
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

The reason for doing a configuration file backup immediately after backing up the entire Oracle home is that it provides a snapshot of your initial configuration files, in case you start to reconfigure your system and then would like to restore the configuration files to their original state.

Step 3: Back up the middle tier

1. Backup the middle tier Oracle home.

   Perform a complete backup of all files in the middle-tier Oracle home using your preferred operating system command, such as `tar` or `cpio`.

   Be sure to perform this backup as root because some of the files in the Oracle home are owned by root. It is important to perform the backup so that file owners, groups, permissions, and timestamps are preserved.

   For example:

   ```
   cd MID_TIER_ORACLE_HOME
   tar cvf full_path_of_backup_file .
   ```

2. Backup the middle tier configuration files.

   Perform a backup of all configuration files in the middle tier Oracle home.

   For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

   ```
   cd MID_TIER_BACKUP_TOOL_DIRECTORY
   (Unix) ./bkp_restore.pl -m backup_config
   (Windows) perl bkp_restore.pl -m backup_config
   ```

   > **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

   The reason for doing a configuration file backup immediately after backing up the entire Oracle home is that it provides a snapshot of your initial configuration files, in case you start to reconfigure your system and then would like to restore the configuration files to their original state.

Step 4: Back up your Oracle system files

On each host in your Oracle9*i*AS environment:

1. Make a backup of your Oracle system files using your preferred operating system command, such as `tar` or `cpio`.

   Consult your OS-specific documentation to determine which directory contains your Oracle system files. For example, on Unix systems, they may be in the /etc or the /var/opt/oracle directory.

2. If the `oraInventory` directory resides outside of your Oracle9*i*AS Oracle home, make a backup of it using your preferred operation system command, such as `tar` or `cpio`.

   Consult your OS-specific documentation to determine the location of the oraInventory directory.

   - On Unix systems the location of the oraInventory directory may be listed in `/etc/oraInst.loc` or `/var/opt/oracle/oraInst.loc`.
   - On Windows systems, the location of the `oraInventory` directory can be obtained from the registry:

     ```
     HKEY_LOCAL_MACHINE\SOFTWARE\ORACLE\INST_LOC
     ```

Step 5: Start your Oracle9*i*AS environment

1. Start the infrastructure.

   Refer to Section A.3, "Starting an Infrastructure" for instructions.

2. Start the middle-tier instance.

   Refer to Section A.1, "Starting a Middle-Tier Instance" for instructions.

2.2.5 Performing a Partial Online Backup of Your Oracle9*i*AS Environment

Once you have performed a complete cold backup of your Oracle9*i*AS environment, you should perform subsequent partial online backups at regular intervals.These backups can be performed online (while Oracle9*i*AS is up and running), and only contain configuration files and the metadata repository.

You can set up a regularly scheduled job that performs a partial online backup. The frequency with which you perform a backup depends on how often you perform administrative operations on your Oracle9*i*AS environment, such as changing passwords, changing configuration parameters, installing new components, or deploying new applications.

This section describes how to perform a partial online backup of your Oracle9*i*AS environment. It contains the following steps:

- Step 1: Back up the infrastructure
- Step 2: Back up the middle tier

Step 1: Back up the infrastructure

Note: You can leave all infrastructure processes running while you perform this step.

1. Perform a backup of all configuration files in the infrastructure Oracle home.

   For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

   ```
   cd INFRA_BACKUP_TOOL_DIRECTORY
   (Unix) ./bkp_restore.pl -m backup_config
   (Windows) perl bkp_restore.pl -m backup_config
   ```

   See Also: Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

2. Perform an online database backup of the metadata repository.

   You can perform this step using your own procedures or the Oracle9*i*AS Backup and Recovery Tool.

   For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

   ```
   cd INFRA_BACKUP_TOOL_DIRECTORY
   (Unix) ./bkp_restore.pl -m backup_online
   (Windows) perl bkp_restore.pl -m backup_online
   ```

   See Also: Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 2: Back up the middle tier

Note: You can leave all middle tier processes running while you perform this step.

Perform a backup of all configuration files in the middle tier Oracle home.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd MID_TIER_BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m backup_config
(Windows) perl bkp_restore.pl -m backup_config
```

See Also: Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

3

Restore and Recovery

This chapter describes recovery strategies and procedures for different types of failures and outages.

This chapter contains the following topics:

3.1 Restore and Recovery Strategies

This section describes restore and recovery strategies for different types of failures and outages. It contains the following topics:

- Restore and Recovery Strategies for Data Loss, Host Failure, or Media Failure
- Recovery Strategies for Process or System Outages and Crashes

3.1.1 Restore and Recovery Strategies for Data Loss, Host Failure, or Media Failure

This section describes restore and recovery strategies for outages that involve actual data loss or corruption, host failure, or media failure where the host or disk cannot be restarted and are permanently lost. This type of failure requires some type of data restoration before the Oracle9*i*AS environment (middle tier, infrastructure, or both) can be restarted and continue with normal processing.

The strategies in this section have the following characteristics:

- They use ***complete recovery for the metadata repository***, that is, they involve restoring the backup and then applying all online and archived redo logs generated after the restored backup. This recovers the database to the state it was in at the time of the loss.
- They use ***same-point-in-time recovery*** of the middle tier and infrastructure. This means that, no matter where the loss occurred, the middle tier and infrastructure are always restored together so they are in sync as they were at the time of the last backup.

Assumptions

The following assumptions apply to the recovery strategies in this section:

- ARCHIVELOG mode was enabled for all metadata repository backups.
- No administrative changes were made since the last backup. If administrative changes were made since the last backup, they will need to be reapplied after restore and recovery is complete. Administrative changes include any operations that result in changes to configuration files or the metadata repository, such as changing configuration parameters, passwords, or applications.
- Complete recovery of the database can be performed, that is, no redo log files have been lost.

Determining Which Strategy to Use

Table 3–1 describes the restore and recovery strategies for different types of data loss, host failure, or media failure. To use the table, identify the scope of loss (middle tier or infrastructure), identify the type of loss, and follow the recovery strategy. The strategies refer to specific recovery procedures in this document.

If the loss occurred in both the infrastructure and middle tier, follow the infrastructure recovery strategy first, then the middle tier.

Table 3–1 Restore and Recovery Strategies for Data Loss, Host Failure, or Media Failure

Scope of Loss	Type of Loss	Recovery Strategies
Infrastructure	Loss of host	If the host has been lost, you can restore to a new host that has the same hostname and IP address. Follow this procedure: Section 3.2.2, "Restoring an Infrastructure to a New Host"
	Oracle software / binary loss or corruption	If any Oracle binaries have been lost or corrupted, you must recover the entire infrastructure. Follow this procedure: Section 3.2.1, "Restoring an Infrastructure to the Same Host"
	Data failure of the metadata repository (eg: datafile loss, media failure, disk corruption)	If the metadata repository is corrupted due to data loss or media failure, you can restore and recover it. Follow this procedure: Section 3.2.3, "Restoring and Recovering the Metadata Repository"
	Deletion or corruption of configuration files	If you lose any configuration files in the infrastructure Oracle home, you can restore them. Follow this procedure: Section 3.2.4, "Restoring Infrastructure Configuration Files"
	Deletion or corruption of configuration files and data failure of the metadata repository	If you lose some configuration files and the metadata repository is corrupted, you can restore and recover both. Follow these procedures: 1. Section 3.2.4, "Restoring Infrastructure Configuration Files" 2. Section 3.2.3, "Restoring and Recovering the Metadata Repository"

Table 3–1 Restore and Recovery Strategies for Data Loss, Host Failure, or Media Failure(Cont.)

Scope of Loss	Type of Loss	Recovery Strategies
Middle Tier	Loss of host	If the host has been lost, you can restore to a new host that has the same hostname and IP address. Follow this procedure: Section 3.2.6, "Restoring a Middle Tier to a New Host"
	Oracle software / binary deletion or corruption	If any Oracle binaries have been lost or corrupted, you must restore the entire middle tier to the same host. Follow this procedure: Section 3.2.5, "Restoring a Middle Tier to the Same Host"
	Deletion or corruption of configuration files	If you lose any configuration files in the middle tier Oracle home, you can restore them. Follow this procedure: Section 3.2.7, "Restoring Middle Tier Configuration Files"

3.1.2 Recovery Strategies for Process or System Outages and Crashes

This section describes recovery strategies for process or system outages and crashes. These types of outages do not involve any data loss, and therefore do not require any files to be restored or recovered. In some cases, failure may be transparent and no manual intervention is required to restore the failed component. However, in some cases, manual intervention is required to restart a process or component. While these strategies do not strictly fit into the category of backup and recovery, they are included in this document for completeness.

Table 3–2 describes recovery strategies for different types of outages and crashes. To use the table, identify the scope of the outage (middle tier or infrastructure), identify the type of outage, and follow the steps for checking status and restarting.

Note: The following table contains Unix commands. In most cases, you can use the same command on Windows by inverting the slashes. Exceptions to this are noted in the table.

Table 3–2 Recovery Strategies for Process or System Outages and Crashes

Scope of Outage	Type of Outage	How to Check Status and Restart
Infrastructure	Host crash - no data loss	**To restart:** 1. Reboot the host 2. Start the infrastructure. Refer to Section A.3, "Starting an Infrastructure".

	Metadata repository instance failure (eg: crash of the database instance)	**To check status:**
		1. Try connecting to the database using SQL*Plus.
		2. Check the state as follows:
		`SQL> select status from v$instance;`
		To restart:
		ORACLE_HOME`/bin/sqlplus /nolog`
		`SQL> connect sys/`*password*` as sysdba`
		`SQL> startup`
		`SQL> quit`

	Metadata repository listener failure	**To check status:** (Unix and Windows) *ORACLE_HOME*`/bin/lsnrctl status` (Windows) Use the Services tool in the Control Panel to check the status **To restart:** (Unix and Windows) *ORACLE_HOME*`/bin/lsnrctl start` (Windows) Use the Services tool in the Control Panel to start the listener
	Oracle Internet Directory server process (oidldapd) failure	**To check status:** (Unix and Windows) *ORACLE_HOME*`/ldap/bin/ldapbind -h` *OID_HOST* `-p` *OID_PORT* (Windows) Use the Services tool in the Control Panel to check the status **To restart:** (Unix and Windows) *ORACLE_HOME*`/bin/oidctl server=oidldapd \ configset=0 instance=1 start` (Windows) Use the Services tool in the Control Panel to start OID

Table 3–2 Recovery Strategies for Process or System Outages and Crashes(Cont.)

Scope of Outage	Type of Outage	How to Check Status and Restart
Infrastructure (Cont.)	Oracle Internet Directory monitor process (oidmon) failure	**To check status:** *ORACLE_HOME*/ldap/bin/ldapbind -h *OID_HOST* -p *OID_PORT* **To restart:** *ORACLE_HOME*/bin/oidmon start
	Enterprise Manager Web site failure	**To check status:** (Unix and Windows) *ORACLE_HOME*/bin/emctl status (Windows) Use the Services tool in the Control Panel to check status **To restart:** (Unix and Windows) *ORACLE_HOME*/bin/emctl start (Windows) Use the Services tool in the Control Panel to start the EM Web site
	Oracle HTTP Server process failure	**To check status:** *ORACLE_HOME*/dcm/bin/dcmctl getState **To restart:** *ORACLE_HOME*/dcm/bin/dcmctl start -ct ohs -v
	OC4J process failure	**To check status:** *ORACLE_HOME*/dcm/bin/dcmctl getState **To restart:** *ORACLE_HOME*/dcm/bin/dcmctl start -ct oc4j -v
	OC4J_DAS instance failure	**To check status:** *ORACLE_HOME*/dcm/bin/dcmctl getState **To restart:** *ORACLE_HOME*/dcm/bin/dcmctl start -co OC4J_DAS -v
	OPMN failure	**To check status:** *ORACLE_HOME*/opmn/bin/opmnctl status **To restart:** *ORACLE_HOME*/opmn/bin/opmnctl startall

Table 3–2 Recovery Strategies for Process or System Outages and Crashes(Cont.)

Scope of Outage	Type of Outage	How to Check Status and Restart
Middle Tier	Host crash - no data loss	**To restart:** 1. Reboot Host 2. Start the middle tier. Refer to Section A.1, "Starting a Middle-Tier Instance"
	Enterprise Manager Web site failure	**To check status:** *ORACLE_HOME*/bin/emctl status **To restart:** *ORACLE_HOME*/bin/emctl start
	Oracle HTTP Server process failure	**To check status:** *ORACLE_HOME*/dcm/bin/dcmctl getState **To restart:** *ORACLE_HOME*/dcm/bin/dcmctl start -ct ohs -v
	OC4J process failure	**To check status:** *ORACLE_HOME*/dcm/bin/dcmctl getState **To restart:** *ORACLE_HOME*/dcm/bin/dcmctl start -ct oc4j -v
	OC4J_Portal instance failure	**To check status:** *ORACLE_HOME*/dcm/bin/dcmctl getState **To restart:** *ORACLE_HOME*/dcm/bin/dcmctl start -co OC4J_Portal -v
	OPMN failure	**To check status:** *ORACLE_HOME*/opmn/bin/opmnctl status **To restart:** *ORACLE_HOME*/opmn/bin/opmnctl startall
	Web Cache failure	**To check status:** *ORACLE_HOME*/bin/webcachectl status **To restart:** *ORACLE_HOME*/bin/webcachectl start

3.2 Restore and Recovery Procedures

This section contains the procedures for performing different types of restore and recovery.

It contains the following topics:

- Restoring an Infrastructure to the Same Host
- Restoring an Infrastructure to a New Host
- Restoring and Recovering the Metadata Repository
- Restoring Infrastructure Configuration Files
- Restoring a Middle Tier to the Same Host
- Restoring a Middle Tier to a New Host
- Restoring Middle Tier Configuration Files

3.2.1 Restoring an Infrastructure to the Same Host

This section describes how to restore and recover an infrastructure to the same host. Use this procedure when you have lost some or all of your Oracle binaries.

It contains the following steps:

- Step 1: Stop the infrastructure
- Step 2: Restore the infrastructure Oracle home
- Step 3: Restore and recover the metadata repository
- Step 4: Start the infrastructure

Step 1: Stop the infrastructure

Refer to Section A.4, "Stopping an Infrastructure" for instructions.

Step 2: Restore the infrastructure Oracle home

To restore the infrastructure Oracle home:

1. Restore the backup (`tar`, `cpio`) of the infrastructure Oracle home from your complete cold backup. Be sure your method of restoring the files preserves the original owner, group, permissions, and timestamps.
2. Restore the configuration file backup from your most recent partial online backup.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_config -t config_bkp_timestamp
(Windows) perl bkp_restore.pl -m restore_config -t config_bkp_timestamp
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 3: Restore and recover the metadata repository

Restore and recover the metadata repository from your latest backup.

You can perform this step using your own procedures or the Oracle9*i*AS Backup and Recovery Tool.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_db
(Windows) perl bkp_restore.pl -m restore_db
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 4: Start the infrastructure

Refer to Section A.3, "Starting an Infrastructure" for instructions.

3.2.2 Restoring an Infrastructure to a New Host

This section describes how to restore and recover an infrastructure to a host with the same hostname and IP address.

This procedure is for the following scenarios:

- Restoring an infrastructure to the same host after the operating system has been reinstalled. The hostname and IP address must remain the same on the host.
- Restoring an infrastructure to a new host that has the same hostname and IP address as the old host.

It contains the following steps:

- Step 1: Prepare Your Host
- Step 2: Restore Oracle system files and the Infrastructure Oracle home
- Step 3: Restore configuration files

- Step 4: Restore and recover the metadata repository
- Step 5: Synchronize the infrastructure with the new host

Step 1: Prepare Your Host

The first step is to prepare a new host that has an identical system configuration as the original host. Refer to the record you created in Section 2.2.3, "Creating a Record of Your Oracle9iAS Configuration".

1. On the new host, make sure the following is identical to the original host:
   - Hostname
   - Virtual hostname
   - Domain name
   - IP address
   - Hardware platform
   - Operating system release and patch levels
2. Check port usage on the new host. Make sure there aren't any processes using the same ports as the Oracle9*i*AS installations you are about to restore. If there are, you must reconfigure these processes to use different ports before you begin restoring your Oracle9*i*AS installations.
3. On the new host, create an operating system user that is identical to the user who installed Oracle9*i*AS on the original host. The following attributes should be the same:
   - User name
   - Numerical userid
   - Group name
   - Numerical groupid
   - Environment profile
   - Shell

   The user may have the same password or a different password than the original user.
4. Create the infrastructure Oracle home:

a. Create an empty Oracle home directory using the same mount point and full path as the original infrastructure Oracle home. Do not use symbolic links anywhere in the path.

b. Make sure the directory is on a filesystem with enough space to hold the infrastructure.

c. Make sure the directory is owned by the same user and group as on the original host.

Step 2: Restore Oracle system files and the Infrastructure Oracle home

This step varies for Unix and Windows systems.

- On Unix systems:

  1. Restore the Oracle system files from your complete cold backup.
  2. If the `oraInventory` directory resided in a directory that was separate from the infrastructure Oracle home, restore that.
  3. Restore the backup (`tar`, `cpio`) of the infrastructure Oracle home from your complete cold backup. Be sure your method of restoring the files preserves the original owner, group, permissions, and timestamps.

- On Windows systems:

  Reinstall your Infrastructure using Oracle Universal Installer.

Step 3: Restore configuration files

Restore the configuration file backup from your most recent partial online backup.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_config -t config_bkp_timestamp
(Windows) perl bkp_restore.pl -m restore_config -t config_bkp_timestamp
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 4: Restore and recover the metadata repository

Restore and recover the metadata repository from your latest complete cold backup or partial online backup, whichever was most recent.

You can perform this step using your own procedures or the Oracle9*i*AS Backup and Recovery Tool.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_db
(Windows) perl bkp_restore.pl -m restore_db
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Note that when you restore the metadata repository to a new host, the tool may report the following error:

```
RMAN-06054: media recovery requesting unknown log: thread x seq y
```

This is OK. After you get this message, log in to SQL*Plus as a user with SYSDBA privileges and issue the following command to put the database into a consistent state:

```
SQL> ALTER DATABASE OPEN RESETLOGS
```

Step 5: Synchronize the infrastructure with the new host

> **Note:** The following section contains Unix commands. In most cases, you can use the same command on Windows by inverting the slashes. Exceptions to this are noted.

1. (Unix only) Set file permissions by running the following command as root:

   ORACLE_HOME/root.sh

2. Log in as the user that owns the infrastructure Oracle home.
3. Set the ORACLE_HOME environment variable to the infrastructure Oracle home.
4. Set the ORACLE_SID environment variable to the metadata repository SID (default is iasdb).
5. Start the metadata repository.
   a. Start the metadata repository listener:

      ORACLE_HOME/bin/lsnrctl start

   b. Start the metadata repository:

      ORACLE_HOME/bin/sqlplus /nolog

```
SQL> connect sys/password as sysdba
startup
quit
```

6. Start Oracle Internet Directory.

   a. Start Oracle Internet Directory as follows:

      ```
      ORACLE_HOME/bin/oidmon start
      ```

      Wait approximately 30 seconds.

      ```
      ORACLE_HOME/bin/oidctl server=oidldapd configset=0 instance=1 start
      ```

   b. Reregister the DIP (Oracle Directory Integration and Provisioning) using the following command:

      ```
      ORACLE_HOME/bin/odisrvreg -D "cn=orcladmin" -w orcladmin_password
      -p oid_port -h oid_host
      ```

      Note that this is a special step only for this procedure. You do not need to do this every time you start Oracle Internet Directory.

   c. Verify that OID is working:

      ```
      ORACLE_HOME/ldap/bin/ldapbind -h OID_HOST -p OID_PORT
      ```

7. (Unix only) Make sure that `$ORACLE_HOME/lib` is in your `LD_LIBRARY_PATH` environment variable.

8. Run the following command:

   ```
   (Unix) ORACLE_HOME/bin/resetiASpasswd.sh "cn=orcladmin" orcladmin_password
   $ORACLE_HOME
   (Windows) ORACLE_HOME/bin/resetiASpasswd.bat "cn=orcladmin"
   orcladmin_password
   $ORACLE_HOME
   ```

9. Reregister `mod_osso`.

   a. Determine the orasso password by running the following command:

      ```
      ORACLE_HOME/bin/ldapsearch -h infra_hostname -p oid_port
      -D "cn=orcladmin" -w "orcladmin_password"
      -b "cn=IAS Infrastructure Databases, cn=IAS, cn=Products,
      cn=OracleContext" -s sub "orclResourceName=orasso" orclpasswordattribute
      ```

      For example:

```
ORACLE_HOME/bin/ldapsearch -h myhost -p 389 -D "cn=orcladmin"
-w "welcome1" -b "cn=IAS Infrastructure Databases, cn=IAS,
cn=Products, cn=OracleContext" -s sub "orclResourceName=orasso"
orclpasswordattribute
```

This command will return several lines of information. The `orasso` password will be the value of the `orclpasswordattribute`, for example:

```
orclpasswordattribute=Z2L1hKUL
```

b. Run the following command to reregister mod_osso, supplying the `orasso` password you found in the previous step for the `-pass` parameter:

```
ORACLE_HOME/jdk/bin/java -jar $ORACLE_HOME/sso/lib/ossoreg.jar
-oracle_home_path $ORACLE_HOME
-host infra_hostname
-port metadata_repository_port -sid metadata_repository_sid
-site_name infra_hostname:http_port
-success_url success_url
-logout_url logout_url
-cancel_url cancel_url
-home_url home_url
-config_mod_osso TRUE
-u root
-sso_server_version v1.2
-schema orasso
-pass orasso_password
```

For example:

```
ORACLE_HOME/jdk/bin/java -jar $ORACLE_HOME/sso/lib/ossoreg.jar
-oracle_home_path $ORACLE_HOME
-host myhost
-port 1521 -sid iasdb
-site_name myhost:7777
-success_url http://myhost.mycompany.com:7777/osso_login_success
-logout_url http://myhost.mycompany.com:7777/osso_logout_success
-cancel_url http://myhost.mycompany.com:7777/
-home_url http://myhost.mycompany.com:7777/
-config_mod_osso TRUE
-u root
-sso_server_version v1.2
-schema orasso
-pass Z2L1hKUL
```

For more information on this command refer to *Oracle9iAS Single Sign-On Administrator's Guide.*

10. Run the following command to reregister DCM:

    ```
    ORACLE_HOME/dcm/bin/dcmctl resetHostInformation -v
    ```

11. Run the following command to reset the `ias_admin` password. You must supply the same password as was used on the original host:

    ```
    ORACLE_HOME/bin/emctl set password ias_admin_password
    ```

12. Start the rest of the infrastructure processes:

    a. Start the Enterprise Manager Web site:

    ```
    ORACLE_HOME/bin/emctl start
    ```

    b. Start Oracle HTTP Server and OC4J instances:

    ```
    ORACLE_HOME/dcm/bin/dcmctl start -v
    ```

    c. If you have Oracle9*i*AS Web Cache configured, start it:

    ```
    ORACLE_HOME/bin/webcachectl start
    ```

    Note that Web Cache is not configured by default in an infrastructure installation.

3.2.3 Restoring and Recovering the Metadata Repository

This section describes how to restore and recover the metadata repository. It assumes that there has only been corruption to the metadata repository, and not to any other files in the Oracle home.

Restore and recover the metadata repository from your latest backup using your own procedures or the Oracle9*i*AS Backup and Recovery Tool.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_db
(Windows) perl bkp_restore.pl -m restore_db
```

See Also: Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

3.2.4 Restoring Infrastructure Configuration Files

This section describes how to restore the configuration files in an infrastructure Oracle home. Use this procedure when any configuration files have been lost or corrupted.

It contains the following steps:

- Step 1: Stop the infrastructure
- Step 2: Restore configuration files
- Step 3: Apply recent administrative changes
- Step 4: Start the infrastructure

Step 1: Stop the infrastructure

Refer to Section A.4, "Stopping an Infrastructure" for instructions.

Step 2: Restore configuration files

Restore the configuration files from your most recent partial online backup.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_config -t config_bkp_timestamp
(Windows) perl bkp_restore.pl -m restore_config -t config_bkp_timestamp
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 3: Apply recent administrative changes

If you made any administrative changes since the last time you did a partial online backup, reapply them now.

Step 4: Start the infrastructure

Refer to Section A.3, "Starting an Infrastructure" for instructions.

3.2.5 Restoring a Middle Tier to the Same Host

This section describes how to restore a middle tier to the same host. Use this procedure when you have lost some or all of your Oracle binaries.

It contains the following steps:

- Step 1: Stop the middle tier instance
- Step 2: Make sure the infrastructure is up
- Step 3: Restore the middle tier Oracle home
- Step 4: Start the middle tier

Step 1: Stop the middle tier instance

Refer to Section A.2, "Stopping a Middle-Tier Instance" for instructions.

Step 2: Make sure the infrastructure is up

If the middle tier is associated with an infrastructure, make sure the infrastructure is up and running while you restore the middle tier. This is because there is a step in the recovery procedure that involves syncing up configuration files between the middle tier and the infrastructure.

Step 3: Restore the middle tier Oracle home

1. Restore the backup (`tar`, `cpio`) of the middle tier Oracle home from your complete cold backup. Be sure your method of restoring the files preserves the original owner, group, permissions, and timestamps.
2. Restore the configuration file backup from your most recent partial online backup.

   For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

   ```
   cd BACKUP_TOOL_DIRECTORY
   (Unix) ./bkp_restore.pl -m restore_config -t config_bkp_timestamp
   (Windows) perl bkp_restore.pl -m restore_config -t config_bkp_timestamp
   ```

   See Also: Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 4: Start the middle tier

Refer to Section A.1, "Starting a Middle-Tier Instance" for instructions.

3.2.6 Restoring a Middle Tier to a New Host

This section describes how to restore and recover a middle-tier installation to a host with the same hostname and IP address.

This procedure is for the following scenarios:

- Restoring a middle-tier installation to the same host after the operating system has been reinstalled. The hostname and IP address must remain the same on the host.
- Restoring a middle-tier installation to a new host that has the same hostname and IP address as the old host.

It contains the following steps:

- Step 1: Prepare Your Host
- Step 2: Restore Oracle system files and the middle tier Oracle home
- Step 3: Restore configuration files
- Step 4: Synchronize the middle tier with the new host

Step 1: Prepare Your Host

The first step is to prepare a new host that has an identical system configuration as the original host. Refer to the record you created in Section 2.2.3, "Creating a Record of Your Oracle9iAS Configuration".

1. On the new host, make sure the following is identical to the original host:
   - Hostname
   - Virtual hostname
   - Domain name
   - IP address
   - Hardware platform
   - Operating system release and patch levels
2. Check port usage on the new host. Make sure there aren't any processes using the same ports as the Oracle9*i*AS installations you are about to restore. If there are, you must reconfigure these processes to use different ports before you begin restoring your Oracle9*i*AS installations.
3. On the new host, create an operating system user that is identical to the user who installed Oracle9*i*AS on the original host. The following attributes should be the same:
   - User name
   - Numerical userid
   - Group name

- Numerical groupid
- Environment profile
- Shell

The user may have the same password or a different password than the original user.

4. Create the middle tier Oracle home:
   a. Create an empty Oracle home directory using the same mount point and full path as the original middle tier Oracle home. Do not use symbolic links anywhere in the path.
   b. Make sure the directory is on a filesystem with enough space to hold the middle-tier installation.
   c. Make sure the directory is owned by the same user and group as on the original host.

Step 2: Restore Oracle system files and the middle tier Oracle home

This step varies for Unix and Windows systems.

- On Unix systems:
  1. Restore the Oracle system files from your complete cold backup.
  2. If the `oraInventory` directory resided in a directory that was separate from the middle tier Oracle home, restore that.
  3. Restore the backup (`tar`, `cpio`) of the middle tier Oracle home from your complete cold backup. Be sure your method of restoring the files preserves the original owner, group, permissions, and timestamps.
- On Windows systems:

  Reinstall your Infrastructure using Oracle Universal Installer.

Step 3: Restore configuration files

Restore the configuration file backup from your most recent partial online backup.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_config -t config_bkp_timestamp
(Windows) perl bkp_restore.pl -m restore_config -t config_bkp_timestamp
```

See Also: Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 4: Synchronize the middle tier with the new host

1. (Unix only) Set file permissions by running the following command as root:

   ORACLE_HOME/root.sh

2. Log in as the user that owns the middle tier Oracle home.
3. Set the ORACLE_HOME environment variable to the middle tier Oracle home.
4. (Unix only) Make sure that $ORACLE_HOME/lib is in your LD_LIBRARY_PATH environment variable.

5. Reregister mod_osso.

   a. Determine the orasso password by running the following command:

   ```
   ORACLE_HOME/bin/ldapsearch -h infra_hostname -p oid_port
   -D "cn=orcladmin" -w "orcladmin_password"
   -b "cn=IAS Infrastructure Databases, cn=IAS, cn=Products,
   cn=OracleContext" -s sub "orclResourceName=orasso" orclpasswordattribute
   ```

   For example:

   ```
   ORACLE_HOME/bin/ldapsearch -h myhost -p 389 -D "cn=orcladmin"
   -w "welcome1" -b "cn=IAS Infrastructure Databases, cn=IAS,
   cn=Products, cn=OracleContext" -s sub "orclResourceName=orasso"
   orclpasswordattribute
   ```

   This command will return several lines of information. The orasso password will be the value of the orclpasswordattribute, for example:

   ```
   orclpasswordattribute=Z2L1hKUL
   ```

   b. Run the following command to reregister mod_osso, supplying the orasso password you found in the previous step for the -pass parameter:

   ```
   ORACLE_HOME/jdk/bin/java -jar $ORACLE_HOME/sso/lib/ossoreg.jar
   -oracle_home_path $ORACLE_HOME
   -host infra_hostname
   -port metadata_repository_port -sid metadata_repository_sid
   -site_name infra_hostname:http_port
   -success_url success_url
   -logout_url logout_url
   -cancel_url cancel_url
   -home_url home_url
   -config_mod_osso TRUE
   -u root
   -sso_server_version v1.2
   -schema orasso
   -pass orasso_password
   ```

   For example:

   ```
   ORACLE_HOME/jdk/bin/java -jar $ORACLE_HOME/sso/lib/ossoreg.jar
   -oracle_home_path $ORACLE_HOME
   -host myhost
   -port 1521 -sid iasdb
   -site_name myhost:7777
   -success_url http://myhost.mycompany.com:7777/osso_login_success
   ```

```
-logout_url http://myhost.mycompany.com:7777/osso_logout_success
-cancel_url http://myhost.mycompany.com:7777/
-home_url http://myhost.mycompany.com:7777/
-config_mod_osso TRUE
-u root
-sso_server_version v1.2
-schema orasso
-pass Z2L1hKUL
```

For more information on this command, refer to *Oracle9iAS Single Sign-On Administrator's Guide*.

6. Run the following command to reregister DCM:

   ORACLE_HOME/dcm/bin/dcmctl resetHostInformation -v

7. Run the following command to reset the `ias_admin` password. You must supply the same password as was used on the original host:

   ORACLE_HOME/bin/emctl set password *ias_admin_password*

8. Start your middle-tier processes:

   a. Start the Enterprise Manager Web site:

      ORACLE_HOME/bin/emctl start

   b. Start Oracle HTTP Server and OC4J instances:

      ORACLE_HOME/dcm/bin/dcmctl start -v

   c. Start Oracle9*i*AS Web Cache:

      ORACLE_HOME/bin/webcachectl start

3.2.7 Restoring Middle Tier Configuration Files

This section describes how to restore the configuration files in a middle-tier Oracle home. Use this procedure when any configuration files have been lost or corrupted.

It contains the following steps:

- Step 1: Stop the middle tier
- Step 2: Restore configuration files
- Step 3: Apply recent administrative changes
- Step 4: Start the middle tier

Step 1: Stop the middle tier

Refer to Section A.2, "Stopping a Middle-Tier Instance" for instructions.

Step 2: Restore configuration files

Restore the configuration files from your most recent partial online backup.

For example, to do this using the Oracle9*i*AS Backup and Recovery Tool:

```
cd BACKUP_TOOL_DIRECTORY
(Unix) ./bkp_restore.pl -m restore_config -t config_bkp_timestamp
(Windows) perl bkp_restore.pl -m restore_config -t config_bkp_timestamp
```

> **See Also:** Appendix B, "Oracle9iAS Backup and Recovery Tool" for more information.

Step 3: Apply recent administrative changes

If you made any administrative changes since the last time you did a partial online backup, reapply them now.

Step 4: Start the middle tier

Refer to Section A.1, "Starting a Middle-Tier Instance" for instructions.

A

Starting and Stopping Your Oracle9*i*AS Environment

This appendix contains procedures for starting and stopping middle-tier instances and infrastructures using commands.

It contains the following topics:

- Starting a Middle-Tier Instance
- Stopping a Middle-Tier Instance
- Starting an Infrastructure
- Stopping an Infrastructure

> **Note:** The commands in this appendix are in Unix format. You can convert them to Windows format by inverting the slashes.

A.1 Starting a Middle-Tier Instance

You can start a middle-tier instance as follows:

1. Set the ORACLE_HOME environment variable to the middle-tier Oracle home.
2. (Unix only) Set the LD_LIBRARY_PATH environment variable to $ORACLE_HOME/lib.
3. Start OPMN, Oracle HTTP Server, and all OC4J instances:

   ORACLE_HOME/dcm/bin/dcmctl start -v

4. Start Oracle9*i*AS Web Cache (if configured):

   ORACLE_HOME/bin/webcachectl start

5. Start Discoverer (if configured):

   ORACLE_HOME/discoverer902/util/startall.sh

6. Start Reports (if configured):

   ORACLE_HOME/bin/rwserver.sh server=*name*

7. Start the Enterprise Manager Web site:

   ORACLE_HOME/bin/emctl start

A.2 Stopping a Middle-Tier Instance

You can stop a middle-tier instance as follows:

1. Set the ORACLE_HOME environment variable to the middle-tier Oracle home.
2. Stop the Enterprise Manager Web site:

   ORACLE_HOME/bin/emctl stop

3. Stop Reports (if configured):

   ORACLE_HOME/bin/rwserver.sh server-*name* shutdown=yes

4. Stop Discoverer (if configured):

   ORACLE_HOME/discoverer902/util/stopall.sh

5. Stop Oracle9*i*AS Web Cache (if configured):

```
ORACLE_HOME/bin/webcachectl stop
```

6. Stop Oracle HTTP Server, and all OC4J instances:

```
ORACLE_HOME/dcm/bin/dcmctl stop -v
```

7. Stop OPMN:

```
ORACLE_HOME/opmn/bin/opmnctl stopall
```

A.3 Starting an Infrastructure

You can start an infrastructure as follows:

1. Set the ORACLE_HOME environment variable to the infrastructure Oracle home.
2. Set the ORACLE_SID environment variable to the metadata repository SID. The default is iasdb.
3. (Unix only) Set the LD_LIBRARY_PATH environment variable to $ORACLE_HOME/lib.
4. Start the metadata repository:

   ```
   ORACLE_HOME/bin/lsnrctl start

   ORACLE_HOME/bin/sqlplus /nolog
   SQL> connect sys/password as sysdba
   SQL> startup
   SQL> quit
   ```

5. Start Oracle Internet Directory.
   a. Start the Oracle Internet Directory monitor:

      ```
      ORACLE_HOME/bin/oidmon start
      ```

      Wait approximately 30 seconds.

   b. Start the Oracle Internet Directory server:

      ```
      ORACLE_HOME/bin/oidctl server=oidldapd configset=0 instance=1 start
      ```

6. Start OPMN, Oracle HTTP Server, and all OC4J instances:

   ```
   ORACLE_HOME/dcm/bin/dcmctl start -v
   ```

7. Start Oracle9*i*AS Web Cache (if configured):

   ```
   ORACLE_HOME/bin/webcachectl start
   ```

   Note that Web Cache is not configured by default in an infrastructure.
8. Start the Enterprise Manager Web site:

   ```
   ORACLE_HOME/bin/emctl start
   ```

9. Start Intelligent Agent and Oracle Management Server (if configured):

   ```
   ORACLE_HOME/bin/agentctl start agent
   ```

```
ORACLE_HOME/bin/oemctl start oms
```

A.4 Stopping an Infrastructure

You can stop an infrastructure as follows:

1. Set the ORACLE_HOME environment variable to the infrastructure Oracle home.
2. Set the ORACLE_SID environment variable to the metadata repository SID. The default is iasdb.
3. Stop Oracle Management Server and Intelligent Agent (if configured):

   ```
   ORACLE_HOME/bin/oemctl stop oms
   ORACLE_HOME/bin/agentctl stop agent
   ```

4. Stop the Enterprise Manager Web site:

   ```
   ORACLE_HOME/bin/emctl stop
   ```

5. Stop Oracle9*i*AS Web Cache (if configured):

   ```
   ORACLE_HOME/bin/webcachectl stop
   ```

   Note that Web Cache is not configured by default in an infrastructure.

6. Stop Oracle HTTP Server and all OC4J instances:

   ```
   ORACLE_HOME/dcm/bin/dcmctl stop -v
   ```

7. Stop OPMN:

   ```
   ORACLE_HOME/opmn/bin/opmnctl stopall
   ```

8. Stop Oracle Internet Directory:

   a. Stop the Oracle Internet Directory server:

      ```
      ORACLE_HOME/bin/oidctl server=oidldapd instance=n stop
      ```

      where *n* is the instance number (1, 2, 3...). For example:

      ```
      ORACLE_HOME/bin/oidctl server=oidldapd instance=1 stop
      ```

   b. Stop the Oracle Internet Directory monitor:

      Wait approximately 30 seconds.

   ```
   ORACLE_HOME/bin/oidmon stop
   ```

9. Stop the metadata repository:

```
INFRA_ORACLE_HOME/bin/sqlplus /nolog
SQL> connect sys/password as sysdba
SQL> shutdown
SQL> quit

ORACLE_HOME/bin/lsnrctl stop
```

B

Oracle9*i*AS Backup and Recovery Tool

This appendix contains the following topics:

B.1 What is the Oracle9*i*AS Backup and Recovery Tool?

This appendix introduces the Oracle9*i*AS Backup and Recovery Tool. The tool provides automated scripts for performing the following tasks:

- Configuration file backup and recovery in the middle tier and infrastructure
- Cold backup, restore, and recovery of the metadata repository using RMAN
- Online backup, restore, and recovery of the metadata repository using RMAN

The tool can be used in different ways, depending on your level of experience and requirements:

- At a minimum, all users can refer to the tool for the list of Oracle9*i*AS configuration files that must be backed up.
- If you are new to backup and recovery, you can use the tool to automatically perform configuration file and metadata repository backup and recovery.
- If you are experienced with backup and recovery, you can refer to the tool for guidance when setting up your own specific configuration file and metadata repository backup and recovery scripts.

B.2 Downloading and Configuring the Oracle9*i*AS Backup and Recovery Tool

This section describes how to download the Oracle9*i*AS Backup and Recovery Tool and perform initial configuration.

It contains the following steps:

- Step 1: Obtain the Oracle9iAS Backup and Recovery Tool
- Step 2: Install the Oracle9iAS Backup and Recovery Tool
- Step 3: Check Your Perl Installation
- Step 4: Create Backup Directories
- Step 5: Perform Initial Configuration

Warning for Windows users: Do not use a rich text editor, such as WordPad, when editing files in the Backup and Recovery Tool directory. It inserts a return character at the end of each line that may cause the tool to fail. Oracle recommends you use a basic text formatter, such as Notepad, instead.

Step 1: Obtain the Oracle9*i*AS Backup and Recovery Tool

1. Point your browser to the Oracle Technology Network (OTN) Web site:

   `http://otn.oracle.com`

   Under Products, select Oracle9*i* Application Server. Then navigate to the High Availability section and look under Technical Information. The exact URL is:

   `http://otn.oracle.com/products/ias/hi_av/content9ias.html`

2. Download the ZIP file for **Oracle9*i* Application Server: Backup and Recovery.**

   The ZIP file contains a PDF of this document and the following files:

```
backup_cold.tmpl                    config_ohs_files_nt.inp
backup_cold_incr.tmpl               config_oid_files.inp
backup_online.tmpl                  config_opmn_files.inp
backup_online_incr.tmpl             config_portal_files.inp
bkp_restore.pl                      config_reports_files.inp
config.inp                          config_reports_files_nt.inp
config_dcm_files.inp                config_sso_files.inp
config_discoverer_files.inp         config_ultrasearch_files.inp
config_em_files.inp                 config_webcache_files.inp
config_forms_files.inp              config_wireless_files.inp
config_forms_files_nt.inp           nomount_db.tmpl
config_install_files.inp            query_dbid.sql
config_javaobjcache_files.inp       restore_db.tmpl
config_misc_files.inp               restore_db_cf.tmpl
config_oc4j_files.inp               restore_db_cf_norec.tmpl
config_ohs_files.inp                restore_db_norec.tmpl
```

Step 2: Install the Oracle9*i*AS Backup and Recovery Tool

1. Create an empty directory in which to install the Oracle9*i*AS Backup and Recovery Tool. The directory can have any name you choose and can exist within the Oracle9*i*AS Oracle home or anywhere else on your system. The directory should be owned and writable by the operating system user who installed Oracle9*i*AS.

   For example, to create a directory called `BackupTool` in the Oracle9*i*AS Oracle home, log in as the user who installed Oracle9*i*AS and perform:

   ```
   mkdir ORACLE_HOME/BackupTool
   ```

2. Copy all of the tool files into the tool directory.

   - Make sure all files in the directory are owned by the user who installed Oracle9*i*AS.
   - (Unix only) Make sure `bkp_restore.pl` has execute permission (`chmod 755 bkp_restore.pl`).

3. Familiarize yourself with the Oracle9*i*AS Backup and Recovery Tool files, which are described in the following table. Instructions for editing the configuration files are in subsequent steps.

File	Description
`bkp_restore.pl`	The Perl script that you execute to perform backup and recovery operations.
`config.inp`	The main configuration file that contains parameters for customizing the tool for your environment.
`config_<component>_files.inp`	Component configuration files. Each contains a list of configuration files for a particular component. These specify which files to back up when performing a configuration file backup.
`*.tmpl`	Templates for scripts for performing database backup and recovery operations using RMAN. When you initially configure the tool, a customized `.dat` file will be created from each `.tmpl` file.
`query_dbid.sql`	A SQL script called by the tool to initialize your configuration.

Step 3: Check Your Perl Installation

The Oracle9*i*AS Backup and Recovery tool contains a Perl script, so you must have a Perl interpreter on your system and make sure it will work with the tool.

1. Make sure your system has a Perl installation of version 5.0 or above.
2. Make sure your Perl installation contains the `Getopt` module. If this module is not present, you will get an error of this type when you try to run the tool:

   ```
   Can't locate Getopt.pm in @INC
   ```

   If your Perl installation does not contain the `Getopt` module you can:

   - Download the module separately from the Comprehensive Perl Archive Network (CPAN):

     ```
     http://www.cpan.org
     ```

   - Install the latest version of Active Perl (Windows only):

     ```
     http://www.activestate.com/Products/ActivePerl
     ```

3. Make sure the tool can locate your Perl interpreter.

   On Unix:

   a. Locate the Perl executable on your host:

      ```
      which perl
      ```

   b. Edit the `bkp_restore.pl` file. In the first line, supply the full path to the Perl executable on your host, for example:

      ```
      #!/usr/bin/perl -w
      ```

   c. You can then run the tool as follows:

      ```
      cd BACKUP_TOOL_DIRECTORY
      ./bkp_restore.pl options
      ```

   On Windows:

   a. Insert the Perl executable directory into your PATH environment variable. This directory is the same on infrastructure and middle tier installations:

      ```
      ORACLE_HOME\perl\5.6.1\bin\MSwin32-x86
      ```

   b. You can then run the tool as follows:

```
cd BACKUP_TOOL_DIRECTORY
perl bkp_restore.pl options
```

Step 4: Create Backup Directories

Create directories to hold the following types of backup files:

- **Log files**: Log files for database backups and configuration file backups. Create this directory for middle tier and infrastructure installations.
- **Database backup files**: Datafile and control file backups of the database. Create this directory only if this is an infrastructure installation.
- **Configuration backup files**: These are file backups of the configuration files in the Oracle home. Create this directory for middle tier and infrastructure installations.

Recommendations for creating backup directories are as follows:

- Create your backup directories on a filesystem that is on a separate disk and, if possible, a separate disk controller, than your Oracle9*i*AS Oracle home. This will give you the best chance of recovering data in the event of a hardware failure.
- Allow enough disk space for your backups. Configuration file backups can use several hundred megabytes of space; database backups can use 1 or 2 gigabytes of space.
- Make sure your backup directories are writable by the user that installed Oracle9*i*AS.

For example, to create directories on `/private` for log files, database backup files, and configuration backup files:

On Unix:

```
mkdir -p /private/backups/log_files
mkdir -p /private/backups/db_files
mkdir -p /private/backups/config_files
cd /private/backups
chmod 755 log_files db_files config_files
chown Oracle9iAS_user log_files db_files config_files
```

On Windows:

```
mkdir C:\backups\log_files
mkdir C:\backups\db_files
mkdir C:\backups\config_files
```

Step 5: Perform Initial Configuration

Configure the Oracle9*i*AS Backup and Recovery Tool for your installation.

1. Edit `config.inp` and modify the parameters as described in the following table. Notice that some of the instructions are different depending on whether this is a middle-tier or infrastructure installation.

Parameter	Value
`oracle_home`	Specify the full path of the Oracle home.
`log_path`	The full path of the directory for log files.
`config_files_list`	Do not insert a value for this; leave it as `config_files_list=DO_NOT_SET`. This parameter will be updated with the appropriate list of configuration files for your installation when you run `bkp_restore.pl -m configure`.
`config_backup_path`	Specify the full path of the directory for configuration backup files.
`install_type`	Do not insert a value for this; leave is as `install_type=DO_NOT_SET`. This parameter will be updated with the appropriate value for your installation when you run `bkp_restore.pl -m configure`.
`dbid`	Do not insert a value for this; leave it as `dbid=DO_NOT_SET`. In infrastructure installations, this value will be updated with the metadata repository dbid when you run `bkp_restore.pl -m configure`. In middle-tier installations, this value will stay untouched.
`pfile`	**Middle-Tier Installation:** Leave this line commented out. **Infrastructure:** If desired, specify an alternate pfile to use when starting up the database. Otherwise, leave the line commented out and the default pfile will be used: ■ (UNIX) *`ORACLE_HOME`*/dbs/initiasdb.ora ■ (Windows) *`ORACLE_HOME`*/database/initiasdb.ora Be sure to leave the `pfile` entry commented out if you want to use the default because blank values are not allowed in this file.

Parameter	Value
database_backup_path	**Middle-Tier Installation:** Do not insert a value for this; leave it as database_backup_path=VALUE_NOT_SET. **Infrastructure:** Specify the full path of the directory for database backup files.

2. Set the ORACLE_HOME environment variable to the Oracle9*i*AS Oracle home.
3. If this is an infrastructure installation:
   a. Set the ORACLE_SID environment variable to the metadata repository SID. The default is iasdb.
   b. Make sure the metadata repository is started.
4. Run the following command:

```
(UNIX) ./bkp_restore.pl -m configure
(Windows) perl bkp_restore.pl -m configure
```

   This updates parameters in config.inp and, in the case of an infrastructure, creates customized .dat files, which are used to perform backup, restore, and recovery on the database.

> **Note: Any time you modify the parameters in config.inp, you must run bkp_restore.pl -m config in order for those changes to take effect.**

5. You are now ready to use the Oracle9*i*AS Backup and Recovery Tool.

B.3 Using the Tool for Configuration File Backup and Recovery

This section describes how to use the Oracle9*i*AS Backup and Recovery Tool to perform configuration file backup and restore. A configuration file backup is a filesystem backup of all configuration files in a middle tier or infrastructure Oracle home.

This section contains the following topics:

- Customizing the Tool for Your Configuration Files
- Backing Up Configuration Files
- Restoring Configuration Files

B.3.1 Customizing the Tool for Your Configuration Files

As shipped, the Oracle9*i*AS Backup and Recovery Tool backs up all of the Oracle9*i*AS configuration files that are necessary to reconstruct an Oracle9*i*AS installation.You can customize the tool to include any additional files that you would like to back up regularly.

How the Tool Works When Backing Up Configuration Files

Before you customize the tool, you should understand how it works. When you use the tool to back up your configuration files, it:

1. Opens `config.inp` (unless another environment file was specified with the `-e` option) and retrieves `config_files_list`. This contains the names of the configuration files that apply to your installation. These files have the following name format:

   `config_`*`component`*`_files.inp`

2. Attempts to open each file in `config_files_list`. Exits with an error if it cannot open all of the files.

3. The first entry in each configuration file is the *key file*. The key file is used to determine if the component is in this installation. If the tool finds the key file, it knows the component is installed, and attempts to back up all of the entries in the configuration file. It logs an error whenever it can't find a file.

   If the key file does not exist, the tool does not attempt to back up any entries in the configuration file. It logs an error to the log file and skips to the next configuration file.

How to Customize the Tool

Since the tool knows how to determine which configuration files exist in your installation, it is not necessary to customize the tool. The only time you might want to customize the tool is to add your own local configuration files.

To add your own local configuration files:

1. Add entries to the `config_misc_files.inp` file.
2. Make sure that the first entry in the file (the key file) is a file that will always exist in your installation.
3. Add as many entries to the file as you like.

The `config_misc_files.inp` file is always included in the `config_files_list` in parameter in `config.inp`, so there is no need to edit `config.inp`.

B.3.2 Backing Up Configuration Files

To back up the configuration files in a middle-tier or infrastructure installation:

1. Change directory to the Oracle9*i*AS Backup and Recovery Tool directory for the Oracle home you would like to back up. For example:

   ```
   cd ORACLE_HOME/BackupTool
   ```

2. Run the following command (use the `-v` option to see the list of files that are backed up). You can first run the command with the `-d` option to see what it will do and if you get any errors.

   ```
   (Unix) ./bkp_restore.pl [-v] -m backup_config
   (Windows) perl bkp_restore.pl [-v] -m backup_config
   ```

   Upon completion, the command prints the name of the directory in which it stored the backup. This directory has a timestamp in its name. If any errors occurred, it prints the name of the log file that contains the error messages. The log file has the same timestamp.

B.3.3 Restoring Configuration Files

To restore configuration files to a middle-tier or infrastructure installation:

1. Change directory to the Oracle9*i*AS Backup and Recovery Tool directory for the Oracle home you would like to back up. For example:

   ```
   cd ORACLE_HOME/BackupTool
   ```

2. Run the following command (use the `-v` option to see the list of files that are restored):

   ```
   (Unix) ./bkp_restore.pl [-v] -m restore_config -t backup_dir_name
   (Windows) perl bkp_restore.pl [-v] -m restore_config -t backup_dir_name
   ```

   For example:

   ```
   bkp_restore.pl -v -m restore_config -t config_bkp_2003-02-27_13-45
   ```

   The tool copies all files in the backup to the Oracle home. If any errors occurred, it prints the name of the log file that contains the error messages. After all files have been restored, the tool performs `dcmctl updateConfig` to sync up the DCM-related configuration files with the DCM repository.

B.4 Using the Tool for Database Backup and Restore

This section describes how to use the Oracle9*i*AS Backup and Recovery Tool to perform database backup and recovery.

This section contains the following topics:

- Performing Cold Database Backups
- Performing Online Database Backups
- Restoring a Database

B.4.1 Performing Cold Database Backups

To perform a cold database backup:

1. Leave the database open. The tool will take care of stopping it and starting it again when finished.
2. Set the `ORACLE_HOME` environment variable to the infrastructure Oracle home.
3. Set the `ORACLE_SID` environment variable to the metadata repository SID. The default is `iasdb`.
4. Change directory to the Oracle9*i*AS Backup and Recovery Tool directory for the infrastructure Oracle home. For example:

   ```
   cd ORACLE_HOME/BackupTool
   ```

5. Run the following command (use the `-v` option to see the list of files that are backed up):

```
(Unix) ./bkp_restore.pl -m backup_cold
(Windows) perl bkp_restore.pl -m backup_cold
```

This command stores a datafile backup and a control file backup in the `database_backup_path` specified in `config.inp`. It also stores timestamped log files in `log_path`.

B.4.2 Performing Online Database Backups

To perform an online database backup:

1. Leave the database open.
2. Set the `ORACLE_HOME` environment variable to the infrastructure Oracle home.
3. Set the `ORACLE_SID` environment variable to the metadata repository SID. The default is `iasdb`.
4. Change directory to the Oracle9*i*AS Backup and Recovery Tool directory for the infrastructure Oracle home. For example:

```
cd ORACLE_HOME/BackupTool
```

5. Run the following command (use the `-v` option to see the list of files that are backed up):

```
(Unix) ./bkp_restore.pl -m backup_online
(Windows) perl bkp_restore.pl -m backup_online
```

This command stores a datafile backup and a control file backup in the `database_backup_path` specified in `config.inp`. It also stores timestamped log files in `log_path`.

B.4.3 Restoring a Database

To restore a database and perform complete recovery:

1. Shut down the database.
2. Set the `ORACLE_HOME` environment variable to the infrastructure Oracle home.
3. Set the `ORACLE_SID` environment variable to the metadata repository SID. The default is `iasdb`.

4. Change directory to the Oracle9*i*AS Backup and Recovery Tool directory for the infrastructure Oracle home. For example:

   ```
   cd ORACLE_HOME/BackupTool
   ```

5. Run the following command:

   ```
   (Unix) ./bkp_restore.pl -m restore_db
   (Windows) perl bkp_restore.pl -m restore_db
   ```

B.5 Oracle9*i*AS Backup and Recovery Tool Usage Summary

This section summarizes usage for the Oracle9*i*AS Backup and Recovery Tool.

It contains the following topics:

- Prerequisites for Running the Tool
- Syntax
- Usage Examples

B.5.1 Prerequisites for Running the Tool

Before running the Oracle9*i*AS Backup and Recovery Tool:

- Log in as the user that installed Oracle9*i*AS.
- Make sure the `ORACLE_HOME` environment variable is set.
- If you are performing a database backup, make sure the `ORACLE_SID` environment variable is set. The default is `iasdb`.
- Change directory (`cd`) to the directory in which the tool resides.

B.5.2 Syntax

The syntax for the Oracle9*i*AS Backup and Recovery Tool is:

```
bkp_restore.pl [-defsv] -m mode [args]
```

It accepts the following options:

`-d` Print a trace without executing.
`-e` Specify an environment file (default is `config.inp`).
`-f` Force log file, database backup, and configuration file directories to be created if they do not exist.
`-s` Run in silent mode.
`-v` Run in verbose mode.

Use the -m option to specify which mode to run. Some modes take arguments. Table B–1 describes the Oracle9*i*AS Backup and Recovery Tool modes and their arguments.

Table B–1 Oracle9iAS Backup and Recovery Tool Modes and Arguments

Mode and Optional Arguments	Description
`configure` `[-e` *`env_file`*`]`	Configures the tool. ■ If this is an infrastructure, make sure the metadata repository is running before you run this command. ■ Reads the parameters specified in the default environment file (`config.inp`). With the `-e` option, uses the specified environment file instead. ■ Updates `config_files_list` and `install_type` in `config.inp` with the appropriate files for your installation. ■ If this is an infrastructure, queries the database id (`dbid`) and updates the configuration file and creates customized `*.dat` files from the database backup `*.tmpl` files.
`backup_config` `[-e` *`env_file`*`]`	Performs a configuration file backup. ■ Opens `config.inp` (unless the `-e` option was used) and retrieves `config_files_list`, `config_backup_path`, and `log_path`. ■ Attempts to open each file in `config_files_list`. Exits with an error if it cannot open all of the files. ■ For each file in `config_files_list`, checks if the first entry (the kay file) exists. If it does not exist, assumes this component does not exist and moves on to the next file. Otherwise, backs up all files in the list. If any files do not exist, logs an error and continues. ■ When finished, stores the backup in *`config_backup_path`*`/config_bkp_`*`timestamp`*. ■ If any errors are encountered, creates a log file in *`log_path`*`/config_bkp_`*`timestamp`*.

`restore_config`
`[-e` *`env_file`*`]`
`[-t config_bkp_`*`timestamp`*`]`
	Restores configuration files.
	■ Opens `config.inp` (unless the `-e` option was used) and retrieves `config_backup_path` and `log_path`.
	■ If the `-t` option is supplied, restores from that backup.
	■ If the `-t` option is not supplied, displays a list of configuration backups in `config_backup_path` and exits.
	■ Restores all files from the configuration backup to the Oracle home, preserving owner, group, permissions, and timestamp.
	■ Performs `dcmctl updateConfig` to sync up DCM-related configuration files with the DCM repository.
	■ If any errors are encountered, creates a log file in *`log_path`*`/config_rst_`*`timestamp`*.

Table B–1 Oracle9iAS Backup and Recovery Tool Modes and Arguments (Cont.)

Mode and Optional Arguments	Description
`backup_cold` `[-e env_file]`	Performs a complete cold backup of the metadata repository. ■ Opens `config.inp` (unless the `-e` option was used) and retrieves `log_path`. ■ Shuts down the database, starts it in mounted mode, but does not open it. ■ Performs a backup of the datafiles and control files using RMAN. The commands are in `backup_cold.dat`. ■ Stores the backup in the directory specified in `backup_cold.dat`. (This is usually set to the `database_backup_path` in `config.inp`.) ■ Stores a log file in `log_path`. ■ Opens the database.

`backup_cold_incr`
`[-e env_file]`
`-l incr_backup_level`
	Performs an incremental cold backup of the metadata repository.
	■ Opens `config.inp` (unless the `-e` option was used) and retrieves `log_path`.
	■ The `-l` option specifies the increment level (`0-4`).
	■ Shuts down the database, starts it in mounted mode, but does not open it.
	■ Performs a backup of the datafiles and control files using RMAN. The commands are in `backup_cold_incr`*`level`*`.dat`.
	■ Stores the backup in the directory specified in `backup_cold_incr`*`level`*`.dat`. (This is usually set to the `database_backup_path` in `config.inp`.)
	■ Stores a log file in *`log_path`*.
	■ Opens the database.

Table B–1 Oracle9iAS Backup and Recovery Tool Modes and Arguments (Cont.)

Mode and Optional Arguments	Description
`backup_online [-e` *`env_file`*`]`	Performs an online backup of the metadata repository. ■ Opens `config.inp` (unless the `-e` option was used) and retrieves `log_path`. ■ Assumes the database is open. ■ Performs a backup of the datafiles and control files using RMAN. The commands are in `backup_online.dat`. ■ Stores the backup in the directory specified in `backup_online.dat`. (This is usually set to the `database_backup_path` in `config.inp`.) ■ Stores a log file in `log_path`. ■ Leaves the database open.

Table B–1 Oracle9iAS Backup and Recovery Tool Modes and Arguments (Cont.)

Mode and Optional Arguments	Description
`backup_online_incr` `-l` *`incr_backup_level`*	Performs an incremental online backup of the metadata repository. ■ Opens `config.inp` (unless the `-e` option was used) and retrieves `log_path`. ■ The `-l` option specifies the increment level (`0-4`). ■ Assumes the database is open. ■ Performs a backup of the datafiles and control files using RMAN. The commands are in `backup_online_incr`*`level`*`.dat`. ■ Stores the backup in the directory specified in `backup_online_incr`*`level`*`.dat`. (This is usually set to the `database_backup_path` in `config.inp`.) ■ Stores a log file in `log_path`. ■ Leaves the database open.
`restore_db [-e` *`env_file`*`] [-c]`	Restores and recovers the metadata repository from the available cold and online backups. ■ Opens `config.inp` (unless the `-e` option was used) and retrieves `log_path`. ■ Assumes the database is shut down. ■ Restores the control files and datafiles, and performs recovery using RMAN. The commands are in `restore_db.dat`. ■ Stores a log file in `log_path`. ■ Leaves the database open. The `-c` option restores the control file. (By default, the control file is not restored.) If you use the `-c` option, be sure to do a full backup right away, because all past backups are invalidated. By default, this command searches for the most recent backup in the last 7 days and recovers the database to the current time. You can modify this behavior as follows: ■ To begin the search on a day other than the current day, use the `SET UNTIL` command. ■ To search backwards for a number other than 7 days, use the `MAXDAYS` command. Refer to *Oracle9i Recovery Manager Reference* for details.
`help`	Prints a usage message.

B.5.3 Usage Examples

This section contains usage examples for the tool.

1. Configure the Oracle9*i*AS Backup and Recovery Tool using the default `config.inp` file:

   ```
   bkp_restore.pl -m configure
   ```

2. Configure the Oracle9*i*AS Backup and Recovery Tool using a configuration file called `myconfig.inp`:

   ```
   bkp_restore.pl -m configure -e myconfig.inp
   ```

3. Perform a configuration file backup using the default `config.inp` file:

   ```
   bkp_restore.pl -v -m backup_config
   ```

4. Perform a configuration file backup using a config file called `myconfig.inp`:

   ```
   bkp_restore.pl -v -m backup_config -e myconfig.inp
   ```

5. Restore configuration files.

   ```
   bkp_restore.pl -m restore_config -t config_bkp_2003-02-27_13-45
   ```

6. Perform a full cold backup of the metadata repository:

   ```
   bkp_restore.pl -m backup_cold
   ```

7. Perform a level 2 incremental cold backup of the metadata repository:

   ```
   bkp_restore.pl -m backup_cold_incr -l 2
   ```

8. Perform an full online backup of the metadata repository:

   ```
   bkp_restore.pl -m backup_online
   ```

9. Perform a level 0 incremental online backup of the metadata repository:

   ```
   bkp_restore.pl -m backup_online_incr -l 0
   ```

10. Restore the metadata repository:

    ```
    bkp_restore.pl -m restore_db
    ```

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