14

Backup and Recovery of Oracle SOA Suite

Objectives

After completing this lesson, you should be able to:

- Adopt a backup and recovery strategy
- Back up your Oracle Fusion Middleware environment
- Recover Oracle Fusion Middleware and Oracle SOA Suite

Agenda

- Discussing the backup and recovery strategy
  - Online
  - Offline
  - Full
  - Incremental
- Backing up your Oracle Fusion Middleware environment
- Recovering Oracle Fusion Middleware and Oracle SOA Suite

Documenting Oracle Fusion Middleware Installations

Keep a record of your Oracle Fusion Middleware product installations, which should ideally document:

Each Host

- Host name
- Virtual host name
- Domain name
- IP address or virtual IPs
- Hardware platform
- OS release level and patch information

FMW Installation

- Installation type (e.g. Infrastructure, SOA Suite)
- Username/ID, environment profile, and shell type
- Directory structure, mount points, full path to FMW home, config, Oracle home, WLS home
- Port numbers used by installation

Database

- Database version and patch level
- Base language
- Character set
- Global database name
- SID

About Backup and Recovery

Backup

- **Scheduled**
- **At least weekly (to capture logs)**
- **Different tools for different components**

Recovery

- **Unscheduled (usually)**
- **At least annually (if only to test procedures)**
- **Not necessarily the reverse of backup; may be new tools**

- Protect against failures of hardware, software, power, environmental disasters, accidental and malicious changes, and more
- Guarantee a point of recovery, minimizes loss of business availability, insures an SLA, and may satisfy legal requirements
- May impact business
- May be hardware and software

Types of Backups

- Online
  - Nondisruptive
  - Possibly inconsistent
  - Possibly tricky, especially for a database
- Offline
  - Requirement that *all* processes should be stopped
  - Very easy
- Full
  - Easier to recover
  - Slower to create
- Incremental
  - Harder to recover
  - Faster to create

Recommended Backup Strategy

- Perform an online backup and ensure that you do not make configuration changes until the backup is complete.
- Perform a full offline backup immediately after:
  - Installing an Oracle Fusion Middleware product
  - Updating operating system software
  - Upgrading or patching Oracle Fusion Middleware products
- Perform a backup of runtime artifacts after every administrative change or on a regular basis.
- Create unique names for each backup of the environment.

Limitations and Restrictions for Backing Up Data

- You should not be adding users or changing permissions while backing up the directory servers (LDAP).
- Online persistent stores by nature would result in an inconsistent backup.
  - Database backups can accommodate inconsistencies.
  - File-based stores and copies thereof cannot accommodate an online backup.
- HTTP session states and cookies information may be lost.
  - In-memory replication may lose the state.
  - Replication of the HTTP session state solves this problem.

Quiz

What mode must the Middleware software be in to perform a full backup?

a. Online
b. Offline
c. Either online or offline
d. Neither. A full backup is technically impossible.

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Backup Tools

To back up your Oracle SOA environment:

- For file-based artifacts, you can use file copy utilities such as `zip`, `copy`, `xcopy`, `tar`, or `jar`
- For database schemas, you can use RMAN for offline, online, and incremental backups. Alternatively, you can use file-based utilities for offline backup of key database files (control files, archive logs, and data files).

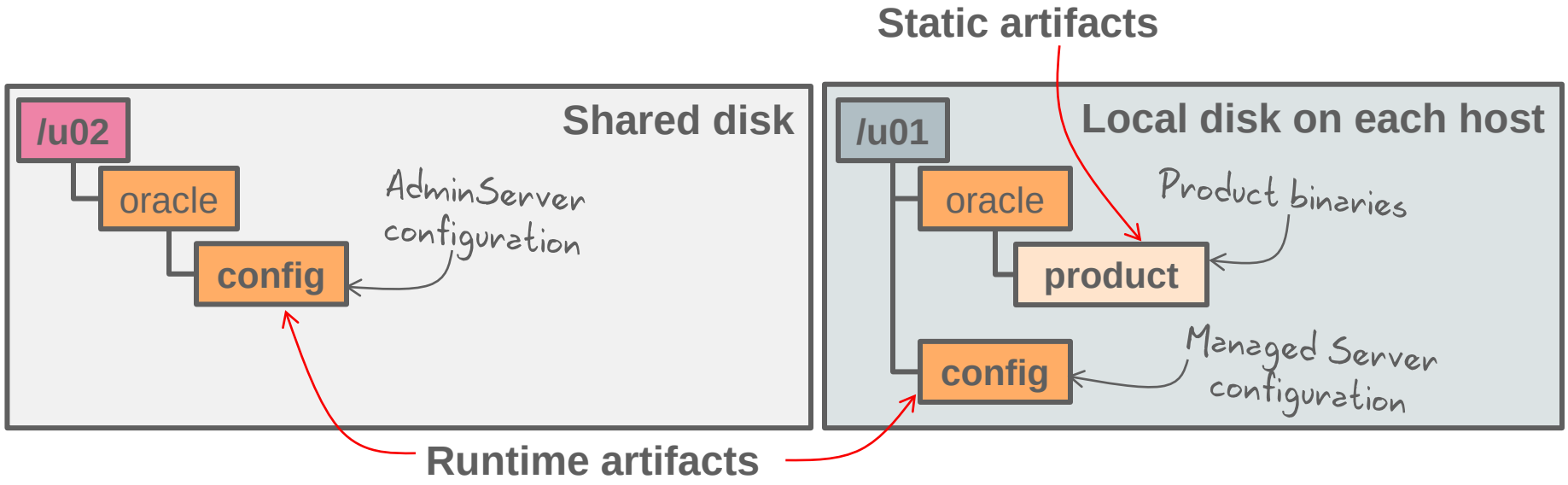
Note: The Oracle WebLogic Server `pack` utility can be used to create a template archive file for WebLogic configuration data.

Backing Up an Enterprise Deployment Topology

For an enterprise deployment architecture, you should back up:

- The static artifacts (product installation binaries)
- The runtime artifacts (WebLogic Server configuration data)
- The Oracle database and product schemas

Note: Ensure that the runtime artifacts are consistent with the database schema backup.



Performing a Full Offline Backup

1. Shut down all Fusion Middleware–related processes:
   A. Stop all the servers in the WebLogic domain.
   B. Shut down the database.
   C. Stop the database listener and optionally the Node Managers.
2. Perform the backup by using your preferred tool:
   A. Back up the Middleware home on all hosts. For example:

```
tar -cvpf fmw_static_full_init.tar $MW_HOME/*
```

   B. Back up the configuration trees for the AdminServer and each Managed Server in the domain.
   C. Back up the database repositories by using RMAN.
3. Test the backup by performing recovery on another computer.
4. Store the backup offsite.

Performing an Online Backup of Runtime Artifacts

1. Back up the Administration Server domain directories.

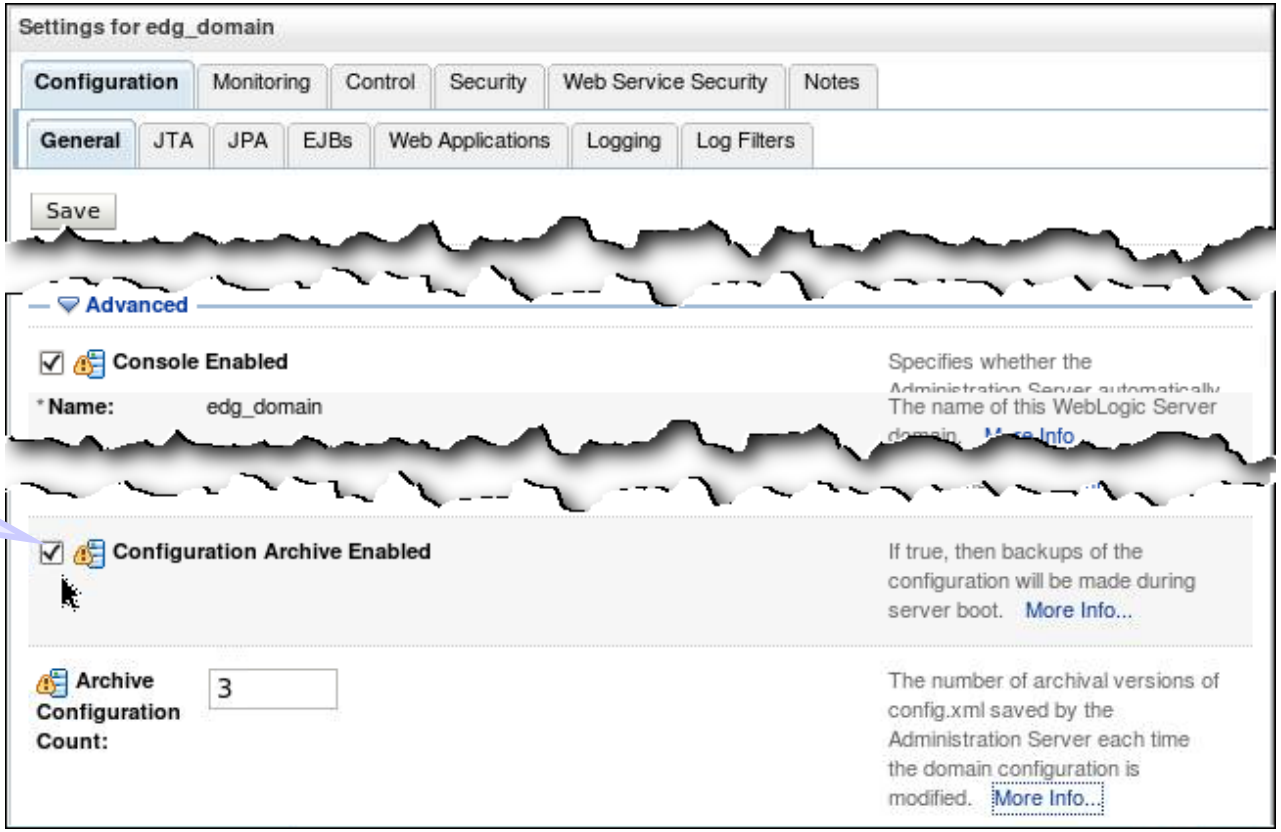
```
$ tar -cvpf edg_domain_adm_150101.tar /u02/oracle/config/*
```

2. Back up the database repositories by using RMAN.

```
$ rman
RMAN> CONNECT TARGET /
RMAN> :
RMAN> BACKUP AS BACKUPSET TAG "BCK1" DATABASE PLUS ARCHIVELOG;
RMAN> EXIT
$
```

Backing Up the Domain Configuration File

- On the egd_domain > Configuration > General page, scroll down and expand the Advance section to enable automatic backup of the `config.xml` file at domain startup time.



Disabled by default

Quiz

When making a tar backup in UNIX, what is a key point to remember?

a. Perform the backup from the lowest directory possible, as far from root as practical.
b. Make sure that you perform the backup signed on as the owner of the Middleware Home directory.
c. Make sure that you preserve the original owner, group, and permissions.
d. Make sure that all Middleware processes are stopped.

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Recovery After Disaster

- Possible causes of failure:
  - Data loss
  - User error
  - Malicious attack
  - Corruption of data
  - Media failure
  - Application failure
- Recovery depends on the cause:
  - Repair
  - Replace
  - Relocate

Recommended Recovery Strategy

- Take the Oracle Fusion Middleware environment offline before performing recovery.
- Rename important existing files and directories before you begin restoring the files from backup.
- Restore the whole directory even if only one or two files are lost or corrupted.
- Recover the database to the most current state by using point-in-time recovery (PITR).

Directories to Restore

- Binaries (static artifacts)
  - Be mindful of preserving group ownership and permissions.
  - This should be read-only for most users.
- Configurations (administration and Managed Servers)
  - If the last configuration *caused* the problem, recover to a point in time *before* that.
- Logs
  - These are not required for recovery, because they are created if they do not exist.
- Data
  - The database restores data within tablespaces, not directories.
  - RMAN *restore* brings data up to the last backup; *recover* brings data up to a later point in time.
- LDAP data (depending on whether changes have been made)

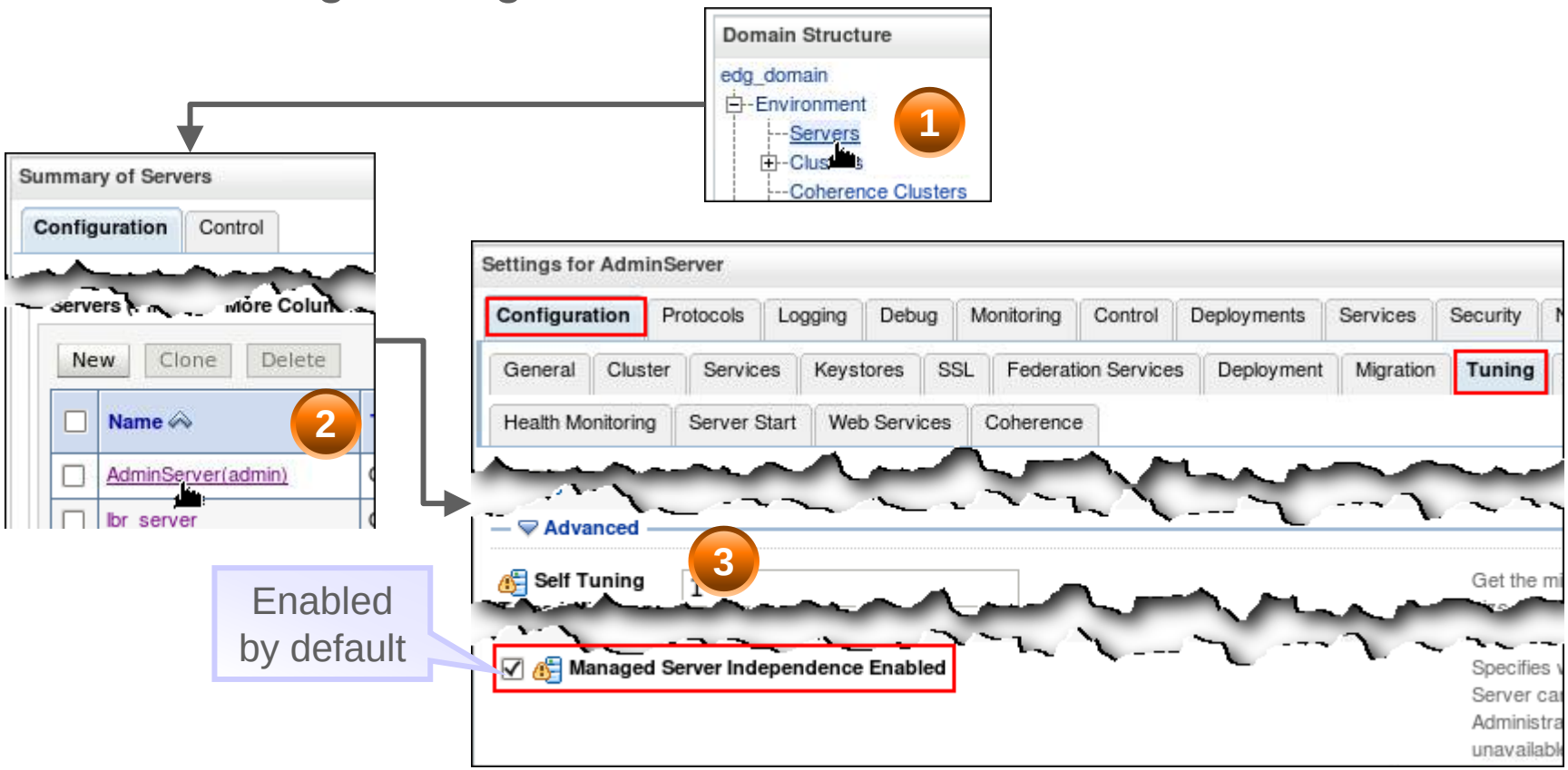
Recovering a Middleware Home

This applies to recovering a Middleware home, an Oracle home, or an Instance home after data loss or corruption:

1. Stop all processes.
2. Make a new full offline backup as a checkpoint (which can be reused).
3. Change directory to the affected home and use relevant copy, untar, or unzip commands to restore the directories that were affected.
4. Make a new full offline backup (especially if you have been performing incremental backups until this point).
5. Restart all processes.

Managed Server Independence (MSI)

Managed Server Independence (MSI), which is set by default, reduces the urgency to fix an outage with the Administration Server, allowing Managed Servers to start.



Recovering a Managed Server

- If a Managed Server crashes, the Node Manager automatically restarts it.
- If files are damaged, you can recover the files in their original places by using a backup and restart the servers.
- If the computer is damaged, perform either of the following:
  - Restore the product folders and Managed Server configuration files on a new host by using the virtual host name for the original computer.
  - Restore the files with the `unpack` tool on another host with a different host name by using templates to extend the domain. **Note:** This technique is not applicable for an Enterprise Deployment topology.
- Configure Whole Server Migration for an Enterprise Deployment topology.

Summary

In this lesson, you should have learned how to:

- Adopt a backup and recovery strategy
- Back up your Oracle Fusion Middleware environment
- Recover Oracle Fusion Middleware and Oracle SOA Suite

Practice 14: Overview

This practice covers the following topics:

- 14-1: Backing up the entire domain and database
- 14-2: Removing a part of the file system for the environment and recovering from the backup