20

Backup and Recovery Operations

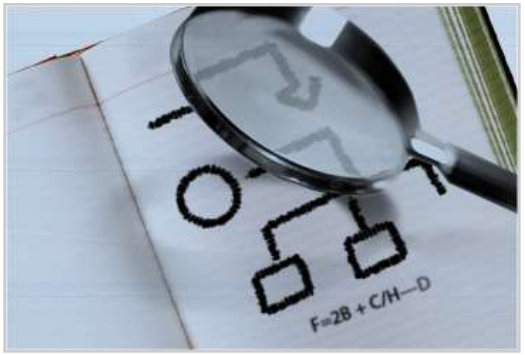
Objectives

After completing this lesson, you should be able to:

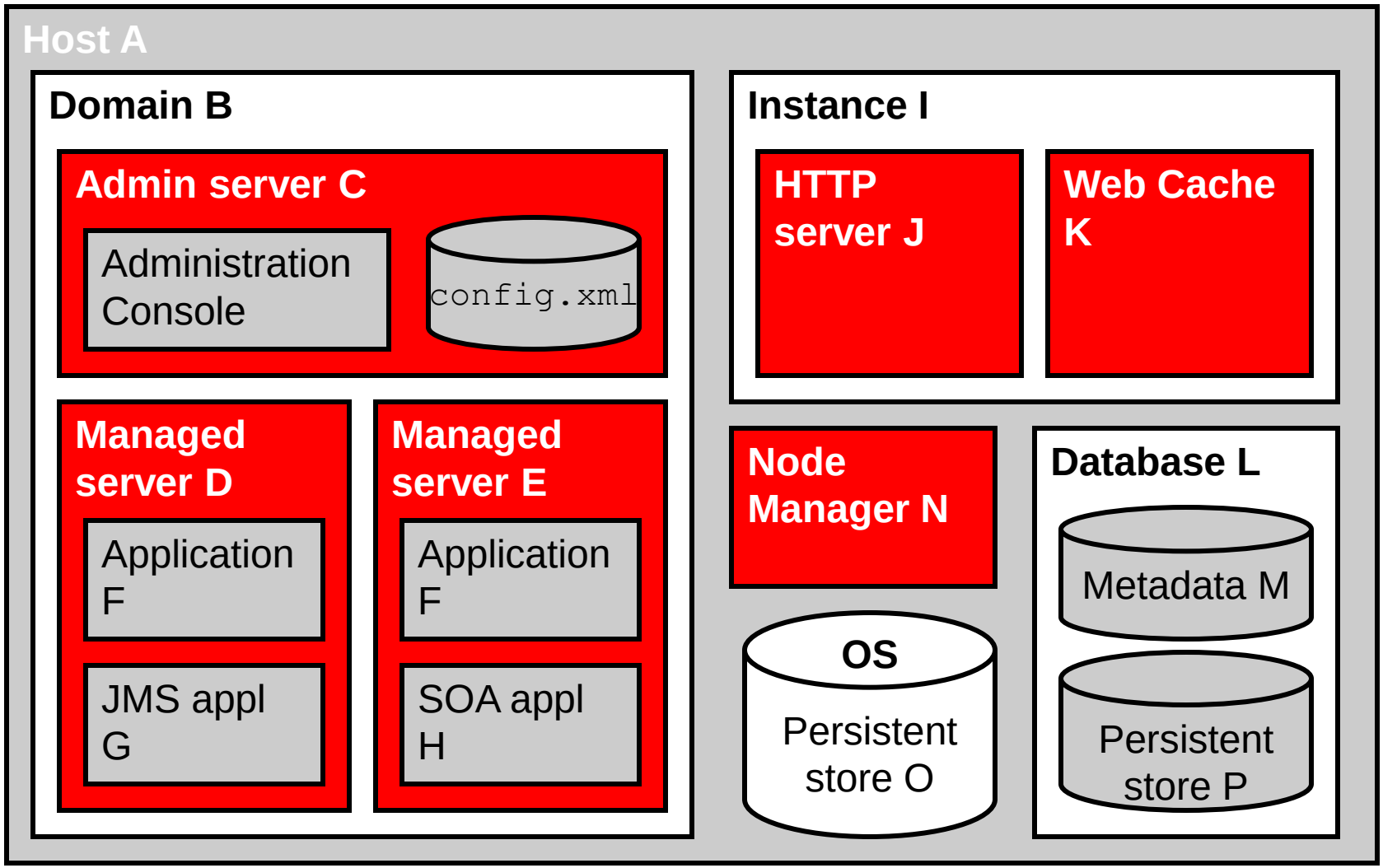
- Recommend a backup and recovery strategy
- Perform a full offline backup and recovery
- Perform an online and offline domain backup
- Perform an offline domain recovery
- Perform an Instance Home backup and recovery

Road Map

- Backup
  - Full
  - Incremental
    - Online
    - Offline
- Recovery

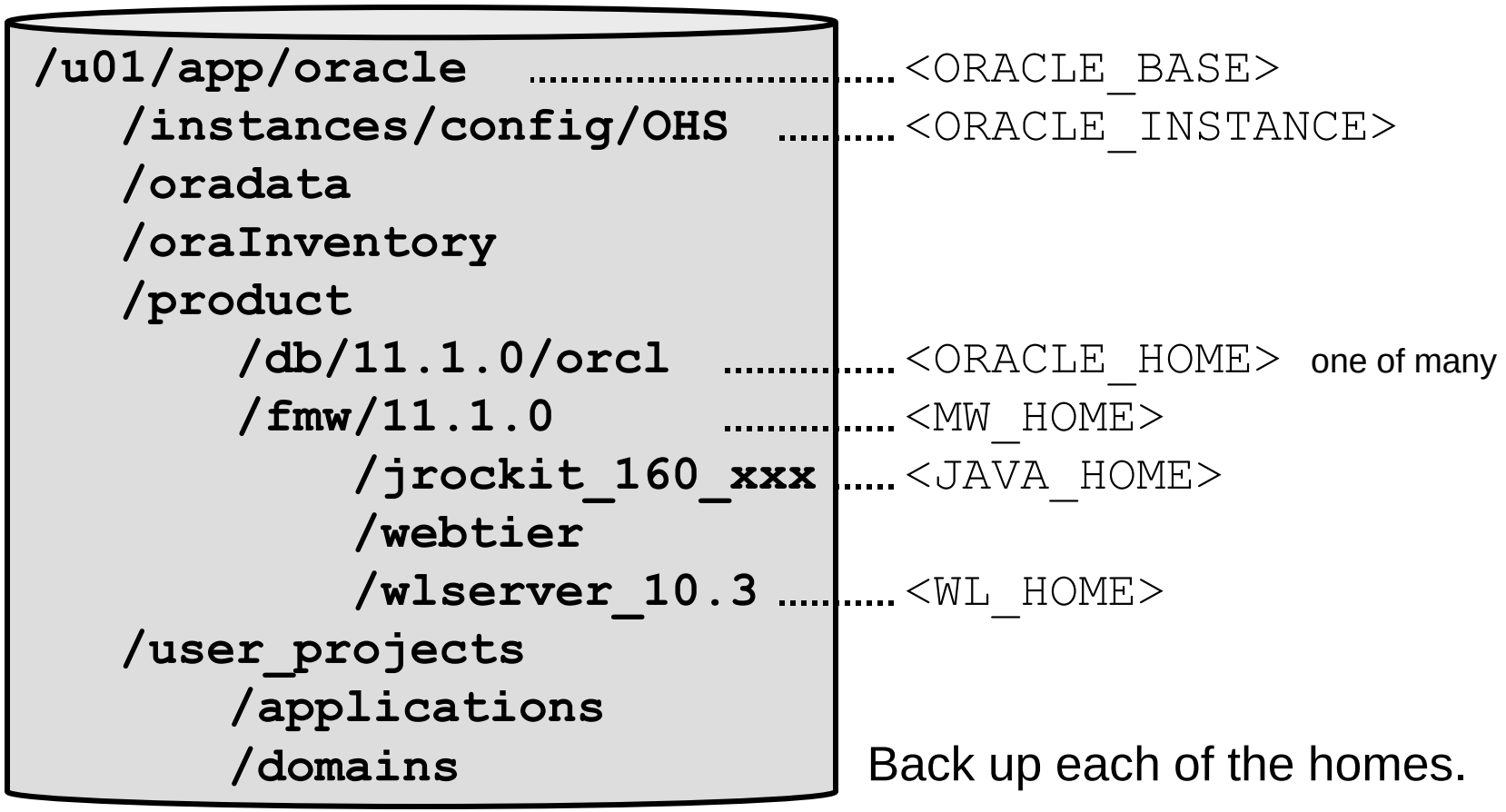


Review of Terms and Components



Homes: Oracle, Middleware, WebLogic

You can set up the disk in any way you like; this is only a portion of one suggested layout:



Back up each of the homes.

Understanding 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**

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

Types of Backups

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

Backup Recommendations

- After the initial domain is created (offline)
- Scheduled backups (online)
- After the component or the cluster changes (online)
- Before application deployment (online)
- Before patches or upgrades (offline)
- Database backups (online) for:
  - LDAP
  - Persistent stores
  - SOA repository

Limitations and Restrictions for Backing Up Data

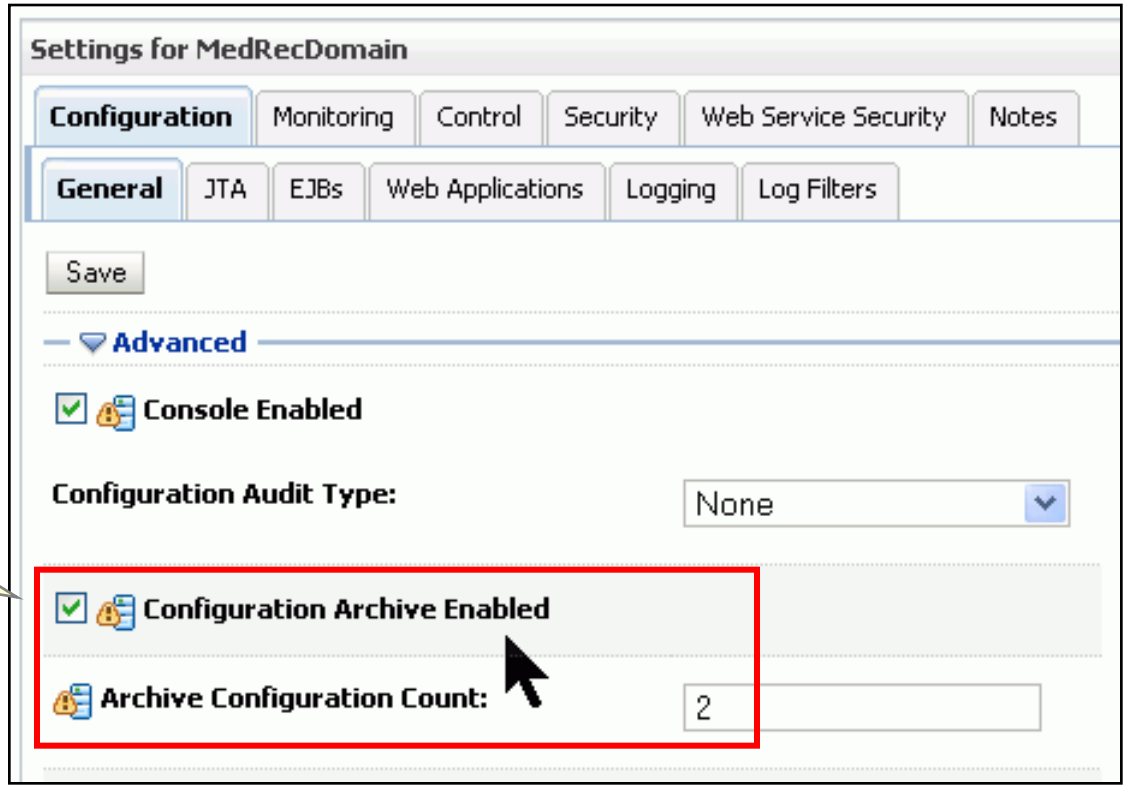
- You should not be adding users or changing permissions while backing up the Lightweight Directory Access Protocol (LDAP).
- Online persistent stores by nature are going to be an inconsistent backup.
  - Database backups can accommodate inconsistencies.
  - File-based stores and OS copies cannot accommodate online backup.
- HTTP session states and cookies information may be lost.
  - In-memory replication may lose the state.
  - JDBC replication of the HTTP session state solves this problem.

Performing a Full Offline Backup

1. Shut down all processes:
   - Stop WebLogic via the Administration Console.
   - Shut down the database.
   - Stop the Listener and the Node Managers.
   - Stop the Enterprise Manager and the emAgent.
   - Stop Web Cache and HTTP server via OPMN.
2. Perform the backup via OS tools:
   - If using TAR, make sure that you keep permissions.
   - If using ZIP, make sure that you include empty directories.
3. Test the backup by performing recovery on another computer:
   - Ideally, use an alternate computer in an alternate data center.
   - Time the recovery for SLA input.
4. Store the backup offsite.

Backing Up a Domain Configuration

- Enable autobackup of configuration.
- Check new JAR files and directories.



Backing Up an Instance Home

- Stop the Web tier (Oracle HTTP Server and Oracle Web Cache):
  - `opmnctl stopall`
  - `opmnctl status`
- Copy the Instance home:
  - As the superuser, change to the `root` directory.
  - Execute `tar -zcvpf myinstance1.tar $ORACLE_INSTANCE`.
- Restart all services:
  - `opmnctl startall`
  - `opmnctl status`

Creating a Record of Installations

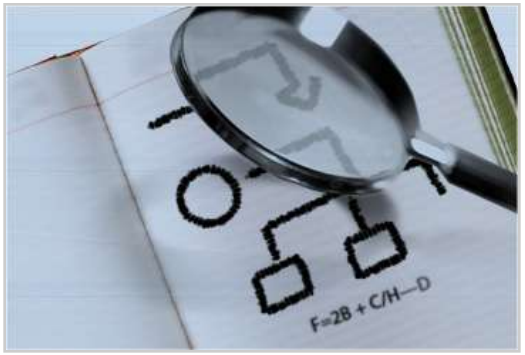
Create a record for your Oracle Fusion Middleware product installation. The record must contain:

- For each host:
  - Names and addresses
  - OS information
- For each installation:
  - Installation type, host, owner name and number, group name and number, environment profile and type of shell, directory structure, mount points, full path for Oracle home, and port numbers used by the installation

Store it offsite.

Road Map

- Backup
- Recovery



Directories to Restore

- Binaries
  - Be mindful of preserving group ownership and permissions.
  - This should be read-only for most users.
- Configurations
  - If the last configuration *caused* the problem, recover to a point in time prior to that.
- Logs are:
  - Not required for recovery
  - Created if they do not exist
- Data
  - Database restores data within tablespaces, not directories.
  - RMAN *restore* brings data up to the last backup, then *recover* brings data up to a later point in time.

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

Recovery of Homes

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

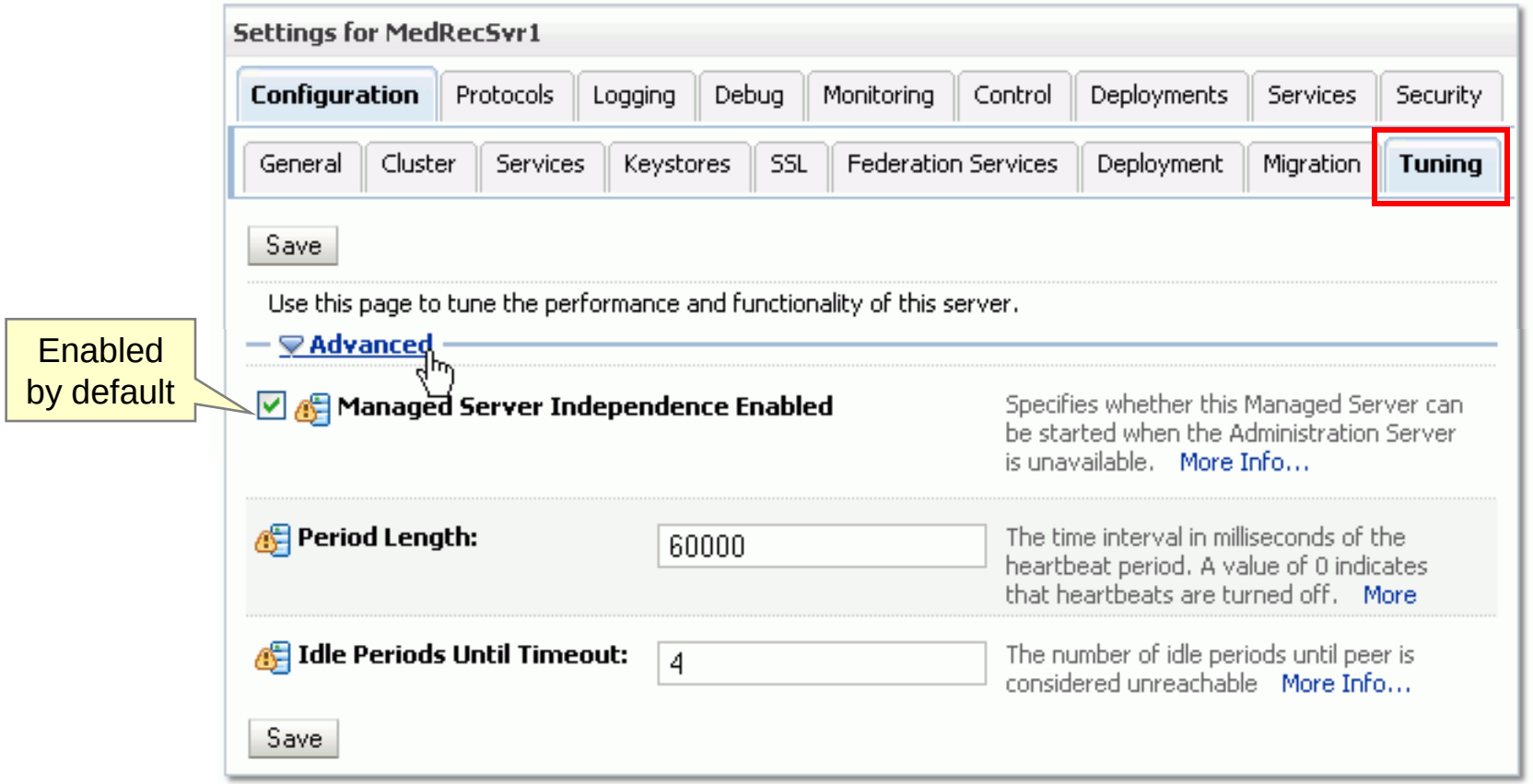
1. Stop all processes.
2. Make a new full offline backup as a checkpoint (which can be reused).
3. Change directory to the affected home.
4. Use OS `copy`, `untar`, or `unzip` commands for the directories affected.
5. Make a new full offline backup (especially if you have been performing incremental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

Recovery of a Managed Server

- If the software crashes, the Node Manager will automatically restart it.
- If the files are damaged, you can recover the files in their original places and restart the software.
- If the computer is damaged, perform either of the following:
  - Restore the files on a new host with the old computer name by using the following OS commands—for example, `copy`, `cp`, `tar`, or `unzip`.
  - Restore the files on another host with a different host name by using templates to extend the domain.

Recovery of the Administration Server Configuration

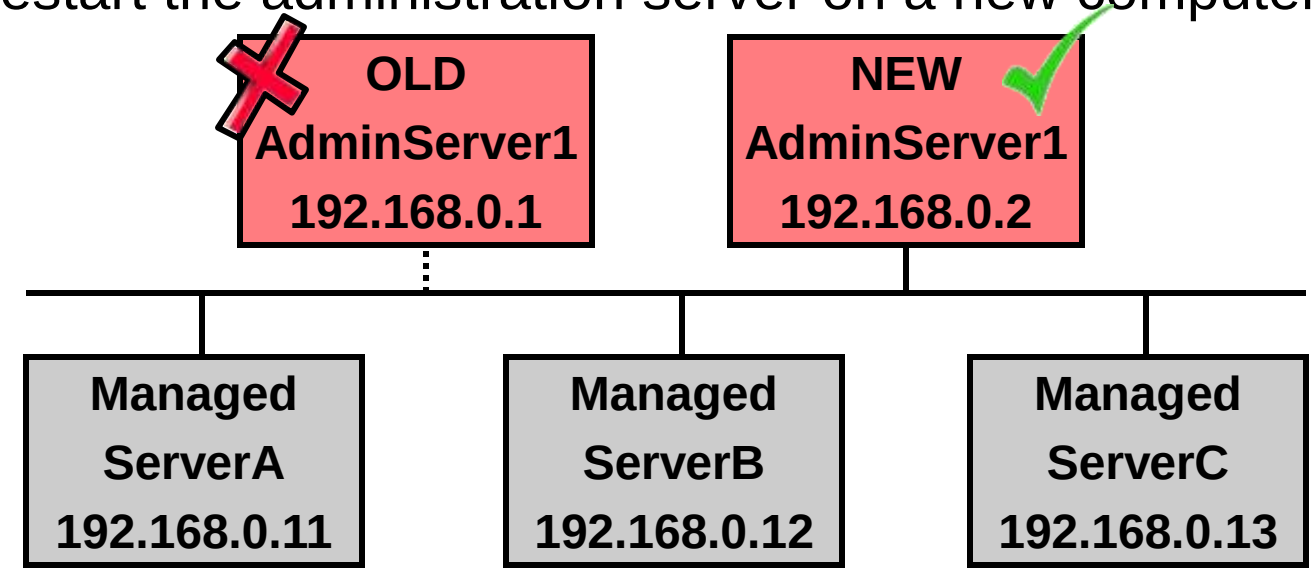
Managed Server Independence (MSI) reduces the urgency to fix the outage.



Restarting an Administration Server on a New Computer

Oracle WebLogic Server allows the creation of a backup of the administration server as follows:

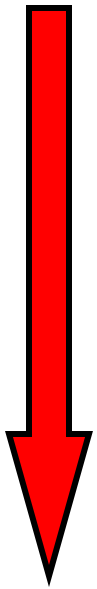
1. Install Oracle WebLogic Server on a backup computer.
2. Copy the application files to a backup computer.
3. Copy the configuration files to a backup computer.
4. Restart the administration server on a new computer.



Recovery of a Cluster

If you accidentally lost a member of a cluster or a whole cluster, you can use several ways to recover it.

+ *Most preferable way to recover*



- Undo the changes in the Change Center.
- Reenter the configuration changes that you made.
- Use the configuration archive to go back one or two versions.
- Recover the configuration.
- Recover the domain.
- Recover WebLogic.
- Perform a full recovery.

– *Least preferable way to recover*

Restoring OPMN-Managed Components to a New Computer

1. Use the methods described earlier to recover the files as though this was the same host.
2. Update the registration of the Oracle instance with the administration server using: `updateinstanceregistration`
3. Update the registration of the component with the administration server using: `updatecomponentregistration`
4. Edit the `targets.xml` file for Fusion Middleware Control.
5. Edit `emd` files for Enterprise Management Agent.
6. Restart the EM Agent.

Quiz

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

1. Online
2. Offline
3. Either online or offline
4. Neither. A full backup is technically impossible.

Quiz

What is another name for an inconsistent backup?

1. Hot
2. Cold
3. Either online or offline
4. Broken. If it is inconsistent, there is something wrong with it.

Quiz

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

1. Make it from the lowest directory possible, as far from `root` as practical.
2. Make sure that you perform the backup signed on as the owner of the Middleware Home directory.
3. Make sure that you preserve the original owner, group, and permissions.
4. Make sure that all Middleware processes are stopped.

Quiz

The configuration archive is enabled by default.

1. True
2. False

Quiz

What happens if you have a backup administration server?

1. You are allowed to have only one administration server. If it fails, the managed servers run in MSI mode until your one administration server comes back.
2. It runs simultaneously with the primary administration server in a load-sharing mode.
3. It can run in a warm standby keeping itself in sync with the main administration server.
4. It must be in cold standby and you have to sync it with the main administration server manually.

Summary

In this lesson, you should have learned how to:

- Recommend a backup and recovery strategy weighing convenience against risk
- Perform a full offline backup and recovery of all components using OS copy tools
- Perform an online domain backup and recovery of the configuration
- Perform an Instance home backup and recovery for Oracle HTTP Server and Web Cache

Practice 20 Overview: Backing Up and Restoring Configuration and Data

This practice covers the following topics:

- Backing up an Oracle WebLogic domain
- Backing up an Oracle HTTP Server installation
- Restoring an Oracle WebLogic domain
- Restoring an Oracle HTTP Server installation