Patching Oracle RAC

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Objectives

In this lecture, you will learn how to perform the following:

- Describe Oracle Patch types
- Describe available methods to apply patches on RAC
- Understand the best practices in applying patches
- Use Opatch utility and OPatch Automation Utility to apply patches

About Oracle Patches

- Patches include product fixes (security and bugs)
- They are associated with particular releases and versions of Oracle products
- They upgrade the version, but not the release
- They updates the executable files, libraries, and object files in the software home directory
- You need an account in Oracle Support to obtain them
- Can be automated using Oracle EM Cloud Control: *Provisioning & Patching Oracle Database using Enterprise Manager 12c*

Patch Types

Term	Description
Interim patches	contain a single bug fix or a collection of bug fixes provided as required. Previously called patch set exceptions (PSE), one-off patches, or hot fixes.
Interim patches for security bug fixes	contain customer-specific security bug fixes. Old names: test patches, fix verification binary, or e-fix.
Diagnostic patches	intended to help diagnose or verify a fix or a collection of bug fixes
Bundle Patch Updates (BPUs)	a cumulative collection of fixes for a specific product or component
Patch Set Updates (PSUs)	a cumulative collection of high impact, low risk, and proven fixes for a specific product or component and Security Patch Updates
Security Patch Updates (SPU)	a cumulative collection of security bug fixes. SPUs were formerly known as Critical Patch Updates (CPU).

RAC Patches Methods

- All Node Patching
- Rolling Patching
- Minimum Downtime Patching

All Node Patching

- All nodes are shutdown
- Patch applied on all nodes
- Maximum downtime
- Used by Opatch if the patch cannot be applied in a rolling fashion

Rolling Patches

- Applying a patch on one node at a time
- Software homes must be local for each node
- Allows different versions to coexist temporarily
- May not be available for all patches
- To know if a patch is a rolling patch:

```
opatch query -all <patch_location> | grep rolling
```

Minimum Downtime Patching

- The nodes are divided into two sets and the patch is applied at one set at a time. More specifically it goes as follows:
  - You apply the patch on the local node first. This node is used as a base to patch the other nodes.
  - Define the set of nodes to patch first.
  - Stop the nodes in the first set and apply the patch on them, one instance at a time.
  - Stop the nodes in the second set (downtime period) and startup the first set
  - Apply the patch on the second set nodes then start them, one by one.
- Is used when you specify minimize_downtime

Applying Patches Best Practices

- Apply most recent PSU and SPU
- Always apply on a testing environment before applying on a production
- Always read the README file shipped with the patch file
- For large IT environments, the patch automation capability in Oracle EM Cloud Control can simplify the patching process

About OPatch

- OPatch is a Java-based utility that assists you with the process of applying patches to Oracle software.
- OPatch is included with the Oracle 12c Clusterware and database homes.
- Can be upgraded separately from Oracle Support site.
- Further information located in Doc ID 293369.1: Master Note For OPatch

Preparing the Environment for Using OPatch

- To prepare your environment to use OPatch:
  - Upgrade OPatch to latest version
  - Check the `ORACLE_HOME` environment variable
  - Take a backup of the patching software
  - Stage the patch on each node
  - Update the `PATH` environment variable to include the Opatch directory
  - Configure SSH user equivalency

OPatch: General Usage

- Set the PATH variable:

```
export PATH=$PATH:/u01/app/12.1.0/grid/OPatch/
```

- Setting Oracle software home:

```
export ORACLE_HOME=/u01/app/12.1.0/grid
opatch command [ options ]
```

```
opatch command –oh /u01/app/12.1.0/grid [ options ]
```

- To obtain help about an OPatch command:

```
opatch command –help
```

OPatch Common Commands

- To know the current OPatch version:

```
opatch version
```

- To verify what patches have been applied to an Oracle home:

```
opatch lsinventory
```

Applying the Patches

1. All the applications running from the software directory must be stopped

```
# stop all resources running from Oracle database home:
srvctl stop home -oraclehome $ORACLE_HOME -statefile
~/rac1_state.dmp -node srv1

# stop all GI stack in local node
# run as root:
crsctl stop crs [-f]
```

Applying the Patches (cont)

2. As root, run the prepatch script in GI home:

```
cd /u01/app/12.2.0/grid/crs/install
rootcrs.sh -prepatch
```

3. As grid, apply the patch:

```
opatch apply
```

4. As oracle, apply the patch on Oracle home:

```
opatch apply
```

Applying the Patches (cont)

5. As root, run postpatch script:

```
cd /u01/app/12.2.0/grid/crs/install
rootcrs.sh -postpatch
```

6. Start the database home processes

About OPatch Automation Utility

- To automate patch application on Oracle Grid Infrastructure and Oracle RAC database homes
- At the moment, the utility name is **`opatchauto`**
- Grid home and database home should be of the same version
- The utility must be executed by root
- OPatch must be executed on each node (one at a time) in the cluster if the Grid home or RAC home is in non-shared storage

Using OPatch Automation Utility

- To patch Grid home and all Oracle RAC database homes:

```
opatchauto apply
```

- To patch only the GI home:

```
opatchauto apply -oh <Grid_home>
```

- To resume a failed apply process:

```
opatchauto apply resume
```

Note: the response file is not being used starting from OPatch version 12.2.0.1.5

OPatch Log and Trace Files

- OPatch Log files are located in `ORACLE_HOME/cfgtoollogs/opatch`
- Each log file is tagged with the time stamp of the operation.
- OPatch maintains an index of processed commands and log files in the `opatch_history.txt` file.

Querying Patch Inventory from SQL

- **DBMS_QOPATCH** package is an interface to view the database patches that are applied
- The package accesses the OUI patch inventory in real time
- Patches installed on cluster nodes can be checked from a single location

Summary

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