

# Welcome to the World of OPatch

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SIOUG MakeIT 2023

## 2 HALLO, GRÜEZI, HI!



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- Data Engineering Associate Manager, Instructor and Tool Owner of db\*BACKUP
- Working with Oracle since 2006
- Focused on High Availability Solutions, Migration Projects, Backup & Recovery and Cloud Technologies
- Oracle ACE Pro





**1994**

FOUNDATION

**> 22000**

TRAINING PARTICIPANTS  
PER YEAR



**21000**



ORDERS  
PER YEAR



**> 750**

CUSTOMERS PER  
YEAR



**123 Mio.**

TURNOVER

**> 300**

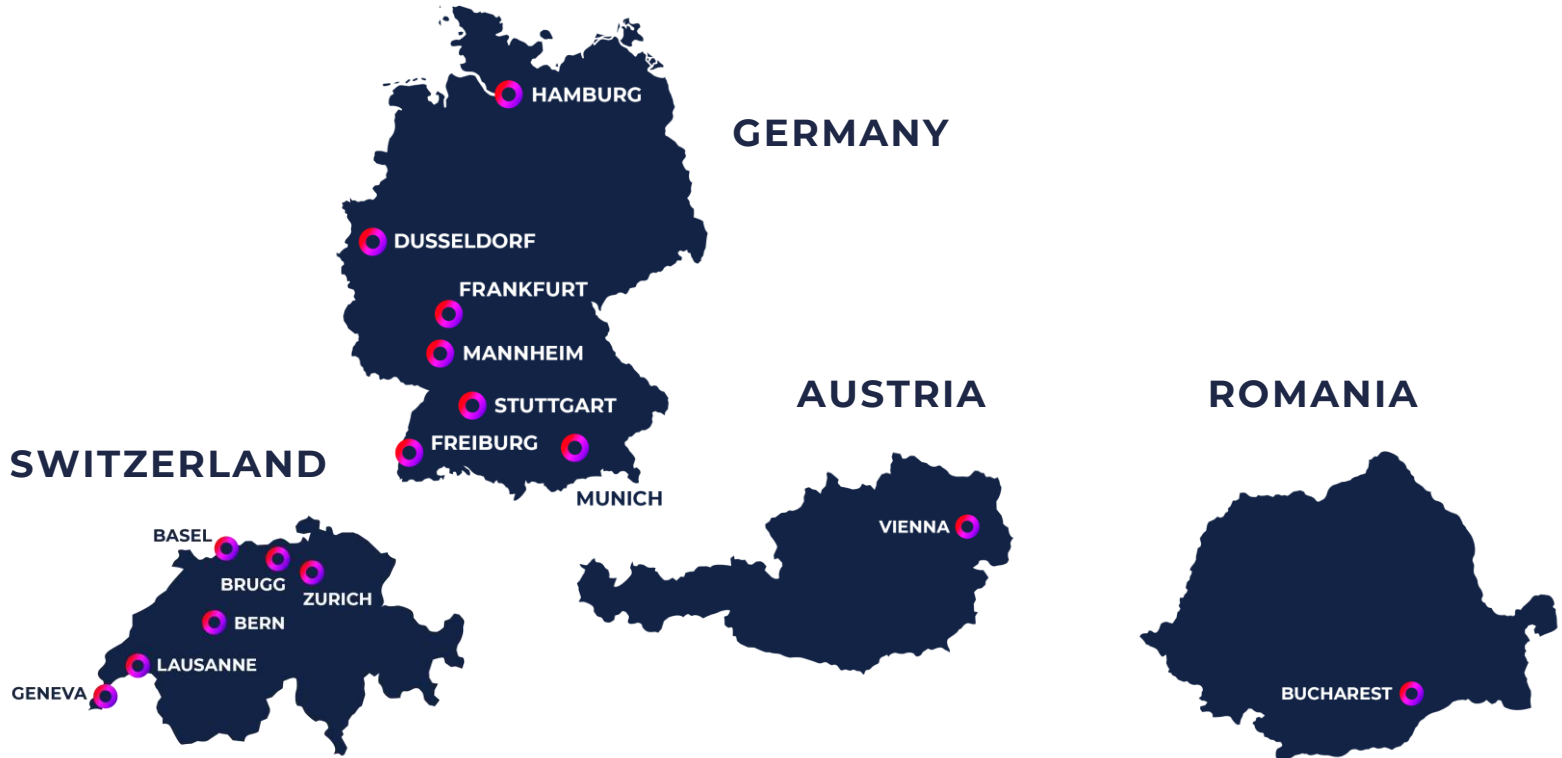
ACTIVE SLAs



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## 4 OUR WORKSPACES



## **5 AGENDA**

**1. Introduction**

**2. OPatch Components and Architecture**

**3. Characteristics of a Patch**

**4. Installation**

**5. Features**

**6. Miscellaneous**

# INTRODUCTION

## 7 WHY SHOULD I PATCH MY DATABASE SERVER?

*The data of a company and its availability becomes more and more important to be successful. Losing this data because of bugs or security issues are critical.*

- Fixing bugs to increase stability of the (database) server
- Minimizing security risks
- Assuring correctness of the returned data (wrong result bugs)
- Allowing usage of broken database features

## 8 WHAT SHOULD I PATCH?

***Only a consequent patching strategy increases the overall security of the complete environment.***

- Hardware (Server, Switches, etc.)
- Operating System
- Grid Infrastructure (if used)
- Databases
- Application Servers
- Clients
- Applications



## 9 TYPES OF PATCHES 1/2

### **Security Patch Update (SPU)**

- Cumulative collection of security fixes (Oracle's Critical Patch Update Program)

### **Patch Set Update (PSU)**

- Cumulative collection of proven high-impact bugs
- Does not include changes to the optimizer (no change in application behavior)

### **Bundle Patch (BP) / Release Update (RU)**

- Cumulative collection of fixes for a given feature, product or configuration
- Includes changes to the optimizer
- starting with January 2017, fixes are disabled per default

## 10 TYPES OF PATCHES 2/2

### Release Update Revision (RUR)

- Contains security and regressions fixes to a Release Update
- Increases the lifetime of a Release Update (two RURs per RU)

### Monthly Recommended Patches (MRP)

- Available with 19.17 and higher and the official replacement of the RURs
- Only available for Linux x86-64
- “Merge Patch” based on the recommended patch list (Note 555.1)
- Per RU, 6 MRPs will be released
  - One for RAC (DB, OCW, ACFS, ASM) and one for Single Instance (DB, ASM) environment

# OPATCH COMPONENTS AND ARCHITECTURE

## 12 ORACLE PATCH UTILITY (OPATCH) 1/2

- **Platform-dependent utility** to handle patches for several Oracle products
  - Oracle Database, Grid Infrastructure, WebLogic Server, Fusion Middleware, ...
- Requires the installation of the Oracle Universal Installer (OUI)
  - Actually opatch is bound to a specific OUI version
- **Written in Java**
  - Main JAR file opatch.jar is in **\$ORACLE\_HOME/OPatch/lib**
- First OPatch version was 10.1.0.0.0 for Oracle Database versions 9.2 and 10.1
- During a patch operation, **affected files are backed up** in **\$ORACLE\_HOME/.patch\_storage** directory
  - In the event of an error, the **old state is restored**



Check **\$ORACLE\_HOME/cfgtoollogs/opatch\*** directories for logfiles

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Check `$ORACLE_HOME/cfgtoollogs/patch*` directories for logfiles

## 14 ORACLE PATCH UTILITY (OPATCH) 2/2

Function	Usage
<b>apply / napply</b>	Apply one or more patches
<b>compare</b>	Compares two versions of the lsinventory (created as XML file using <code>opatch lsinventory -xml &lt;File&gt;</code> command) output to identify any changes
<b>lsinventory / lspatches</b>	List installed patches for the current Oracle Home.
<b>rollback / nrollback</b>	Rollback one or more patches
<b>util</b>	Provides additional utility functions <ul style="list-style-type: none"><li>■ Handling of Online Patches</li><li>■ Cleaning up <code>.patch_storage</code> directory</li><li>■ Execute tasks/commands on remote nodes</li></ul>



With `lsinventory -bugs_fixed` you can check if a specific bug is already fixed by an installed patch.

## 15 ENVIRONMENT VARIABLES

- Environment variables can be used to change the behavior of OPatch

Function	Default	Usage
<b>APPLY_MAKE</b>	false	Defines, if opatch should apply make execution order
<b>MW_HOME</b>		Path to the Middleware Home
<b>OPATCH_DEBUG</b>	false	If set to true, log level is set to debug
<b>OPATCH_JRE_MEMORY_OPTIONS</b>		Allows the setting of special JRE memory options
<b>OPATCH_PLATFORM_ID</b>		Internal mechanism to identify the platform are skipped, when set to the specific ID
<b>OPATCH_NO_IMPLICIT_OH</b>	false	If set to true, ORACLE_HOME variable must be set
<b>OPATCH_NO_FUSER</b>	false	If set to true, check for active executables is skipped
<b>ORACLE_OCM_SERVICE</b>		Oracle Configuration Manager Service
<b>ORACLE_HOME</b>		Path to the Oracle Home

## 16 OPATCHAUTO 1/4

- **Orchestration Tool** to generate patching instructions fitting to the target environment
  - Executed as root user
- Uses **OPatch to execute these tasks**
- Performs **pre- and post-patch checks** and automatically rollback patches, if required
- Unlocks and locks the Grid Infrastructure Home
- Use parameter **-generateSteps** to generate patching instructions without executing them

```
$> $ORACLE_HOME/OPatch/opatchauto apply /patch/1234 -oh $ORACLE_HOME \  
-generateSteps
```



## 17 OPATCHAUTO 2/4

- Overview of cases where opatchauto can/cannot be used

Function	Default	Usage
<b>Application of a One-Off Patch</b>	No	Opatchauto can only apply System Patches (e.g. DB/GI RU) – check for the existence of an automation directory.
<b>Patching of a Single-Instance Oracle Home</b>	Yes	Starting with OPatch 12.2.0.11 SIDB environments can be patched.
<b>Grid Infrastructure</b>	Yes	Opatchauto can patch the GI and all available DB Oracle Homes in one operation.
<b>Grid Infrastructure without ASM</b>	Yes	This restriction was lifted with OPatch 12.2.0.11.
<b>Database Oracle Home without Instances</b>	(Yes)	Specify all Oracle Homes using the <b>-oh</b> parameter.

## 18 OPATCHAUTO 3/4

- Installation of a System Patch (e.g. GI/DB Release Update)

```
$> opatchauto apply [ -oh GI_HOME,DB_HOME1,DB_HOME2 ] [ <Path>/<Patch No> ]
```

- Rollback of a System Patch

```
$> opatchauto rollback [ -oh GI_HOME,DB_HOME1,DB_HOME2 ] [ <Path>/<Patch No> ]  
$> opatchauto rollback -id <Patch No> [ -oh GI_HOME,DB_HOME1,DB_HOME2 ]
```



Before starting a patch operation, analyze the patch itself and the environment using the **-analyze** parameter.

## 19 OPATCHAUTO 4/4

- Manual approach

```
$> find <Path>/<Patch No>/* -maxdepth 0 -name "[0-9]*" > /tmp/patches.conf
$> cat /tmp/patches.conf
/u00/stage/ru_jan_2017/26737266/26710464
/u00/stage/ru_jan_2017/26737266/26737232
...
$> opatch napply -phBaseFile /tmp/patches.conf
```



The manual approach is required for use cases where opatchauto cannot be used.

## 20 OPLAN

- **Generates step-by-step instructions** specific to the target environment
  - Either instructions for **apply, rollback or both** operations can be generated
  - Instructions are available as HTML and plain text files
- Fails with PRCR-1001, if no Grid Infrastructure resource ora.asm exists
- Restrictions
  - OPlan not supported for SIHA 12.2 and higher – use opatchauto instead
  - Data Guard environments are supported, but Standby-First Apply is not considered
  - Shared Oracle Home configurations are not supported
- Syntax

```
$> $ORACLE_HOME/OPatch/oplan/oplan generateSteps <Path>/<Patch No>  
$> $ORACLE_HOME/OPatch/oplan/oplan generateApplySteps <Path>/<Patch No>  
$> $ORACLE_HOME/OPatch/oplan/oplan generateRollbackSteps <Path>/<Patch No>
```

## 21 OPATCH ERROR RETRIEVAL TOOL 1/2

- Checks an OPatch error code for the **possible cause and recommendations**
  - Current version includes **150 error codes**
  - Stored as text file `operr.txt` within `$ORACLE_HOME/OPatch/jlib/opatch.jar` (internal path `oracle/opatch/diag/operr.txt`)
- Latest message file can be downloaded from patch 16609471
  - The **patch is not maintained** anymore (last update from 2013)
  - Contains only 149 error codes (error code 220 is missing)
- Syntax:

```
$> $ORACLE_HOME/OPatch/operr <Error Code> [ -f <Path>/operr.txt ]
```

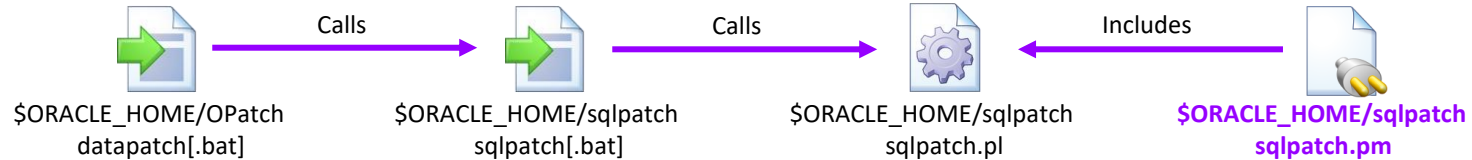
## 22 OPATCH ERROR RETRIEVAL TOOL 2/2

- Example: Lookup of OPatch error code 22

```
$> $ORACLE_HOME/OPatch/operr 22
Error code:      22
Error message:   The Oracle Home may be locked by other OPatch/OUI processes.
Maybe
you are installing some Oracle products or you are using OPatch to patch some
Oracle products on this machine.
Recommended actions:  You can check whether there is OPatch or OUI process
running by
running $ORACLE_HOME/oui/bin/runInstaller. If this command fails, that means
there is other OPatch or OUI process running. Please kill those processes,
remove the file $ORACLE_HOME/.patch_storage/patch_locked and then retry.
You can get the latest message file from My Oracle Support using patch 16609471
```

## 23 SQL PATCHING TOOL (DATAPATCH) 1/2

- Starting with 12c, Oracle provides a Perl script to install required SQL changes
  - No need to run **catbundle.sql** script anymore



- Checks prerequisites and if the SQL changes are already applied
- Supports non-CDB and CDB architecture
  - PDBs are only patched, when they are opened READ WRITE
  - Upgrade of PDB\$SEED requires more time, because invalid objects are recompiled while UPGRADE mode is active (Step: Post Compile)



Starting with 12cR2, DBCA executes datapatch automatically after creating a new database.

## 24 SQL PATCHING TOOL (DATAPATCH) 2/2

- Use automatic detection of the work to do

```
$> $ORACLE_HOME/OPatch/datapatch [-verbose]
```

- Apply specific patches

```
$> $ORACLE_HOME/OPatch/datapatch -apply <Patch No>,<Patch No>,...
```

- Rollback specific patches

- Without using -force parameter, datapatch does not rollback anything

```
$> $ORACLE_HOME/OPatch/datapatch -rollback <Patch No>,<Patch No>,... -force
```














Informations about installed SQL patches are now visible through data dictionary view DBA\_REGISTRY\_SQLPATCH.



# CHARACTERISTICS OF A PATCH

## 26 ANATOMY OF A PATCH

Directory/File	Optional?	Description
 <Patch No>		Root directory
 \ <sub-patch no&gt;<="" td=""><td></td><td>Subdirectory for each sub-patch</td></sub-patch>		Subdirectory for each sub-patch
 \custom	Yes	Custom scripts required to install the patch
 \etc		Configuration files (actions.xml, inventory.xml, ...)
 \files		Changed files
 \online	Yes	Binary and configuration files for online patching
 \README.{html   txt}		Readme file of the sub-patch
 \...		
 \automation	(Yes)	Files required to run opatchauto
 \bundle.xml	(Yes)	Determines the location of sub-patches
 \README.{html   txt}		Readme file of the patch

## 27 QUERY PATCH DETAILS 1/2

- Use **opatch query** to get details about the patch and the local system
- Provides information about **requirements, list of fixed bugs, post installation tasks, ...**
- Internally, \*.xml files (actions.xml, inventory.xml) from patch sub-directories **etc/config** are used to extract information
- Call with all available options:

```
$> opatch query [-all] [-is_auto_patch] [-is_translatable_patch]
                [-get_base_bugs] [-get_component] [-get_os] [-get_date]
                [-get_patch_language] [-get_patch_type] [-get_patching_model]
                [-get_product_family] [-has_sql] [-is_online_patch]
                [-is_rolling_patch] [-is_system_patch] [-jre <LOC> ]
                [-oh <LOC> ] [ <patch_location> ]
```



System Patches are not supported (OPatch error code 21) by this command.

## 28 QUERY PATCH DETAILS 2/2

- Example: Get supported OS, patch type and if it is an auto-enabled patch

```
$> $ORACLE_HOME/OPatch/opatch query -get_patch_type -is_auto_patch -get_os
Oracle Interim Patch Installer version 12.2.0.1.11
Copyright (c) 2017, Oracle Corporation. All rights reserved.

Oracle Home      : /u00/app/oracle/product/12.2.0.1
Central Inventory : /u00/app/oraInventory
   from           : /u00/app/oracle/product/12.2.0.1/oraInst.loc
OPatch version   : 12.2.0.1.11
OUI version      : 12.2.0.1.4
Log file location : /u00/app/oracle/product/12.2.0.1/cfgtoollogs/opatch/opatch2017-11-10_21-42-07PM_1.log

-----
Patch is an "auto-enabled" patch: false

List of platforms supported:
  226: Linux x86-64

This patch is a "singleton" patch.

OPatch succeeded.
```

## 29 DOWNLOAD LATEST PATCH VERSIONS 1/2

- My Oracle Support note [2118136.2](#) offers a „**Download Assistant**“ for downloading patches
- Patch IDs and links for the following type of patches are accessible
  - Base Releases
  - Patchsets
  - SPU, PSU and Bundle Patches
  - Release Updates (RU) and Release Update Revisions (RUR)
  - OJVM Patches
  - Windows Bundle Patches
- Replacement for the Quick Reference Note 1454618.1
  - Redirects to the download assistant

# 30 DOWNLOAD LATEST PATCH VERSIONS 1/2

★ Assistant: Download Reference for Oracle Database/GI Update, Revision, PSU, SPU(CPU), Bundle Patches, Patchsets [To Bottom](#)  
and Base Releases (Doc ID 2118136.2)

### Selection(s)

What would you like to download?

- Oracle Database Base Releases
- Oracle Database Patchsets
- Oracle Database Updates (Versions 12.2 & higher)
- Oracle Database Update Revisions (Versions 12.2 & higher)
- Oracle Database PSU, SPU(CPU), Bundle Patches (Versions 12.1 & lower)
- OJVM Update/PSU/Bundle Patches
- Latest Available Microsoft Windows Patches

**Additional Clarification**  
Please select an option above to begin clarifying the issue you are experiencing.

### Solution(s)

Possible Solutions will appear once you make your selection.



### Selection(s)

What would you like to download?

> Oracle Database Updates (Versions 12.2 & higher) [\[Change\]](#)

Please select the version:

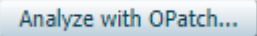
- 21.0.0.0
- 19.0.0.0
- 18.0.0.0
- 12.2.0.1



### Related Information

21.0.0.0			
Description	Database Update	GI Update	Windows Bundle Patch
APR2023 (21.10.0.0.0)	<a href="#">35134934</a>	<a href="#">35132566</a>	<a href="#">35046488</a>
JAN2023 (21.9.0.0.0)	<a href="#">34839741</a>	<a href="#">34838415</a>	<a href="#">34750812</a>
Oct2022 (21.8.0.0.0)	<a href="#">34527084</a>	<a href="#">34526142</a>	<a href="#">34468137</a>
JUL2022 (21.7.0.0.0)	<a href="#">34160444</a>	<a href="#">34155589</a>	<a href="#">34110698</a>
APR2022 (21.6.0.0.0)	<a href="#">33843745</a>	<a href="#">33859395</a>	<a href="#">33829143</a>
JAN2022 (21.5.0.0.0)	<a href="#">33516412</a>	33531909	<a href="#">33589769</a>
OCT2021 (21.4.0.0.0)	<a href="#">33239276</a>	<a href="#">33250101</a>	NA

## 31 CONFLICT CHECKER TOOL 1/2

- Analyzes if one or more **patches are compatible** with the current Oracle Home
  - Direct link: <https://support.oracle.com/epmos/faces/PatchConflictCheck>
  - Or on every patch download page using  button
  - Using the latter approach is recommended
- Check My Oracle Support Note 1091294.1 for further details
- Requires a **copy of the Oracle Home Inventory**

```
$> $ORACLE_HOME/OPatch/opatch lsinventory
```

- Creates a logfile in `$ORACLE_HOME/cfgtoollogs/opatch/lsinv` or `$(orabasehome)/rdbms/log/opatch/lsinv` (for read-only Oracle Homes)
- Example: `lsinventory2023-06-01_15-54-10PM.txt`
- Missing prerequisites are not part of the checks

# 32 CONFLICT CHECKER TOOL 2/2

Release: Oracle Database 19.12.0.0.0 DBRU

Platform: Linux x86-64

Language: American English

[Read Me](#) [Download](#) [Add to Plan](#)

[Analyze with OPatch...](#)

All-time Downloads **14** [View Trends](#)

[Discuss this patch in the community](#)



### Analyze for Conflicts

To analyze for conflicts (Learn How)

- Upload your Oracle Home Inventory file
- Select patches to analyze against your current installation
- The analysis will reveal any issues with installing the listed patches

Cancel [Analyze for Conflict](#)

\* Platform: Linux x86-64

Oracle Home Inventory: [Attach File...](#)

No file attached. Note: Conflict checking can occur between selected patches, but these will not be compared to installed patches.

\* Patch: [Add Patch...](#)

Patch Name	Description	Product	Release	Platform
32411167	ORA-00600 QCTOHR-BFL DURING P...	Oracle Database - Enter...	19.12.0.0.0DBRU	Linux x86-64
35042068	DATABASE RELEASE UPDATE 19.19.0...	Oracle Database - Enter...	19.0.0.0.0	Linux x86-64



### Analyze for Conflicts

Patch Conflict Found

[Exit](#) [View Original Patches](#)

**Issues to Resolve (1)**

Patch conflict found. Click the "Request Patch" button to request a new patch.

Issue	Solution
Patch 32411167 cannot be applied because it requires patch 32904851 which is not installed.	

**Informational Message(s) (None)**

Informational messages during the last analysis.

* Patch Name	Reason	Description
No Informational Messages Found		

**Download Patches (None)**

[Download All](#)

* Patch Name	Description	Release	Platform
No conflict free patches were found.			



# INSTALLATION

## 34 GET LATEST OPATCH VERSION

- Download latest OPatch version from My Oracle Support (**Patch ID 6880880**)
  - Choose correct version corresponding to your Oracle version

Patch Name	Description	Release	Platform (Language)
6880880	OPatch 12.2.0.1.37 for DB 21.0.0.0.0 (Apr 2023) (Patch)	21.0.0.0.0	Linux x86-64 (American English)
6880880	OPatch 12.2.0.1.37 for DB 20.0.0.0.0 (Apr 2023) (Patch)	20.0.0.0.0	Linux x86-64 (American English)
6880880	OPatch 12.2.0.1.37 for DB 19.0.0.0.0 (Apr 2023) (Patch)	19.0.0.0.0	Linux x86-64 (American English)
6880880	OPatch 12.2.0.1.37 for DB 18.0.0.0.0 (Apr 2023) (Patch)	18.0.0.0.0	Linux x86-64 (American English)
6880880	OPatch version 13.9.3.3.0 for EMCC 13.x customers Only (not for FMW 12c) (Patch)	13.9.0.0.0	Generic Platform (American English)
6880880	OPatch version 13.2.0.0.0 for FMW 12.1.3 release (JUL 2014) (Patch)	13.2.0.0.0	Generic Platform (American English)
6880880	OPatch 12.2.0.1.37 for DB 12.2.0.1.0 (Apr 2023) (Patch)	12.2.0.1.0	Linux x86-64 (American English)
6880880	OPatch version 13.9.3.0.0 for JCS (12.2.1.2.x) customers for enabling application of PSU patches (Patch)	12.13.9	Generic Platform (American English)
6880880	OPatch 12.2.0.1.37 for DB 12.1.0.1.0 (Apr 2023) (Patch)	12.1.0.1.0	Linux x86-64 (American English)
6880880	OPatch 11.2.0.3.41 for DB 11.2.0.0.0 (Apr 2023) (Patch)	11.2.0.0.0	Linux x86-64 (American English)

## 35 INSTALLATION 1/2

- Unzip archive to your Oracle Home directory as its owner (e.g., oracle)
  - Only applicable for OPatch versions lower than 13
  - In the case of a Grid Infrastructure installation, root is required, because of the directory ownership

```
$> unzip -d /tmp p6880880_210000_Linux-x86-64.zip  
$> mv $ORACLE_HOME/OPatch $ORACLE_HOME/OPatch.old  
$> mv /tmp/OPatch $ORACLE_HOME
```



More details can be found in MOS notes 274526.1 and 2411544.1.



## 36 INSTALLATION 2/2

- OPatch 13 and higher (Nextgen) provides a **Java based installer**
  - **Requires a JDK** to run, but the JDK of the target Oracle Home can be used
  - Currently used by the Enterprise Manager Cloud Control and Fusion Middleware

```
$> unzip -d /tmp p6880880_139000_Generic.zip
$> $ORACLE_HOME/jdk/bin/java -jar /tmp/6880880/opatch_generic.jar \
-silent oracle_home=$ORACLE_HOME
```

# FEATURES

## 38 ONLINE PATCHING 1/2

- Introduced with 11.1.0.6, but first delivered with 11.2.0.2
- **No instance shutdown or relink** of Oracle Binaries required
  - Internally **oradebug** is used to install and enable the patch
  - A **new shared library is mapped** into the address space of the Oracle processes
  - Pointer of static variables/functions are resolved to the right memory location
- Sub-directory **online** contains binary file \*.pch
- Formula to calculate memory overhead
  -  Linux/Unix:  $(\# \text{ of processes} + 1) * \text{size of .pch file}$
  -  Windows:  $\text{size of .pch file}$
- OPatch versions after 11.1.0.6 support installation of online patches

## 39 ONLINE PATCHING 2/2

- Syntax

```
$> $ORACLE_HOME/OPatch/opatch apply online \  
    -connectString <SID>:<Username>:<Password>[:<Node>],...
```

- Provide a connect string to the local database and its remote instances (RAC)
- If multiple databases are running in the Oracle Home, provide the connect string to one of them and enable the patch for the other databases afterwards

```
$> $ORACLE_HOME/OPatch/ util EnableOnlinePatch \  
    -connectString <SID>:<Username>:<Password>[:<Node>],...  
    -id <ID>,...
```



Check with opatch query if the patch can be online applied.

## 40 OUT-OF-PLACE PATCHING 1/2

- Available for Oracle 12cR2 and higher

```
$> opatchauto apply -outofplace <Path>/<Patch No>
```

- Makes a **copy of each Oracle Home**, which is going to be patched
- **Reduces the downtime**, because databases are run, while the new Oracle Home is patched
  - Databases are switched to the new Oracle Home automatically
  - Afterwards, datapatch is run
- The preparation of the new Oracle Home and the actual switch of can be split

```
$> opatchauto apply -prepare-clone  
$> opatchauto apply -switch-clone
```



/etc/oratab is not updated with the new Oracle Home Path.



## 41 OUT-OF-PLACE PATCHING 2/2

OPatchauto session is initiated at Tue Nov 21 19:53:42 2017

System initialization log file is /u00/app/oracle/product/12.2.0.1-OEMREP/cfgtoollogs/opatchautodb/systemconfig2017-11-21\_07-53-51PM.log.

Session log file is /u00/app/oracle/product/12.2.0.1-OEMREP/cfgtoollogs/opatchauto/opatchauto2017-11-21\_07-53-57PM.log

The id for this session is WM6L

Please press ENTER button to accept system generated default clone path.

Please enter clone path [/u00/app/oracle/product/12.2.0.1-OEMREP\_2 ] :

/u00/app/oracle/product/12.2.0.1.171017-OEMREP

...

Copying the files from the existing oracle home /u00/app/oracle/product/12.2.0.1-OEMREP to a new location. Please wait...

Clone of oracle home /u00/app/oracle/product/12.2.0.1-OEMREP is /u00/app/oracle/product/12.2.0.1.171017-OEMREP on host oemcc01

Copying the files from the existing oracle home /u00/app/oracle/product/12.2.0.1-OEMREP to a new location is successful.

...

Bringing down database service on home /u00/app/oracle/product/12.2.0.1.171017-OEMREP

Following database has been stopped and will be restarted later during the session: oemrep\_site1

Database service successfully brought down on home /u00/app/oracle/product/12.2.0.1.171017-OEMREP

...

Modifying the database(s) to use new location home /u00/app/oracle/product/12.2.0.1.171017-OEMREP.

All database(s) modified successfully to run from new location home /u00/app/oracle/product/12.2.0.1.171017-OEMREP.

...

Out of place patching clone home(s) summary

---

Host : oemcc01

Actual Home : /u00/app/oracle/product/12.2.0.1-OEMREP

Clone Home Path : /u00/app/oracle/product/12.2.0.1.171017-OEMREP

...

Time taken to complete the session 32 minutes, 17 seconds

# MISCELLANEOUS

## 43 QUERYABLE OPATCH 1/2

- Introduced with 12.1.0.1
- PL/SQL package DBMS\_QOPATCH
  - Most **functions return XMLTYPE** as output
- Allows access to **opatch information within a database** using SQL and PL/SQL
  - Format the output using XMLTRANSFORM with the style-sheet provided by DBMS\_QOPATCH.GET\_OPATCH\_XSLT to get same output as opatch

```
SQL> SELECT XMLTRANSFORM(DBMS_QOPATCH.GET_OPATCH_LSINVENTORY, -  
> DBMS_QOPATCH.GET_OPATCH_XSLT) FROM DUAL;
```

## 44 QUERYABLE OPATCH 2/2

- OPatch information are accessed using **external table OPATCH\_XML\_INV** and a preprocessor file `$ORACLE_HOME/QOPatch/qopiprep.bat`
  - DIRECTORY objects OPATCH\_SCRIPT\_DIR and OPATCH\_LOG\_DIR are used
  - Check logfile `$ORACLE_HOME/QOPatch/opatch_log.log` in the case of errors

```
SQL> CREATE TABLE "SYS"."OPATCH_XML_INV"  
...  
ORGANIZATION EXTERNAL  
  ( TYPE ORACLE_LOADER  
    DEFAULT DIRECTORY "OPATCH_SCRIPT_DIR",  
    ( RECORDS DELIMITED BY NEWLINE CHARACTERSET  
      ...  
      preprocessor opatch_script_dir:'qopiprep.bat'  
      BADFILE opatch_script_dir:'qopatch_bad.bad'  
      LOGFILE opatch_log_dir:'qopatch_log.log'  
      FIELDS TERMINATED BY 'UIJSVTBOEIZBEFFQBL'  
      ...  
    ) LOCATION(  
      "OPATCH_SCRIPT_DIR":'qopiprep.bat'  
    )  
  ) REJECT LIMIT UNLIMITED;
```

## 45 AUTOMATIC FIX CONTROL PERSISTENCE (FCP)

- Since DB Proactive Bundle Patch January 2017, module bug fixes are included
  - Those bug fixes can lead to an execution plan change
  - Per default such fixes are in a disabled state
- PL/SQL package DBMS\_OPTIM\_BUNDLE can be used to (de)activate fixes

```
SQL> EXEC DBMS_OPTIM_BUNDLE.ENABLE_OPTIM_FIXES ( -  
>         action => 'ON|OFF', current_setting_precedence => 'YES|NO' -  
>         scope => 'MEMORY|SPFILE|BOTH|INITORA');
```

- Already enabled fixed retain their state after the installation of a new DPBP
- Changes are propagated to standby databases by redo
- Internally the **\_fix\_control parameter** is set with the enabled fixes

## 46 ENTERPRISE MANAGER

- Patch Management is integrated in Oracle Enterprise Manager Cloud Control
- Provides Patch recommendations for monitored targets
- Recommended to patch a large number of targets (parallel execution)
  - A newer version of OPatch can be downloaded automatically before a patch installation
  - Analyses the patch(es) for conflicts
- Requires a valid license for the **Oracle Provisioning and Patch Automation Pack**

# FURTHER INFORMATION

# 48 LINKS

- **OPatch User Guide**

[https://docs.oracle.com/cd/E73210\\_01/OPTCH/toc.htm](https://docs.oracle.com/cd/E73210_01/OPTCH/toc.htm)

- **My Oracle Support**

<https://support.oracle.com>



## 49 QUESTIONS AND ANSWERS



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