Make Database Patching Smart Again

Best Practices and Tips and Tricks

AOUG - Everything Cloud?

June 12, 2023

Mike Dietrich

Senior Director Product Management

Database Upgrade, Migration and Patching

MikeDietrich

@MikeDietrichDE

https://MikeDietrichDE.com

Daniel Overby Hansen

Senior Principal Product Manager

Cloud Migration

dohdatabase

@dohdatabase

https://dohdatabase.com

Episode 1

Release and Patching Strategy

105 minutes – Feb 4, 2021

Episode 2

AutoUpgrade to Oracle Database 19c

115 minutes – Feb 20, 2021

Episode 3

Performance Stability, Tips and Tricks and Underscores

120 minutes – Mar 4, 2021

Episode 4

Migration to Oracle Multitenant

120 minutes – Mar 16, 2021

Episode 5

Migration Strategies – Insights, Tips and Secrets

120 minutes – Mar 25, 2021

Episode 6

Move to the Cloud – Not only for techies

115 minutes – Apr 8, 2021

Recorded Web Seminars

https://MikeDietrichDE.com/videos

More than 30 hours of technical content,
on-demand, anytime, anywhere

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

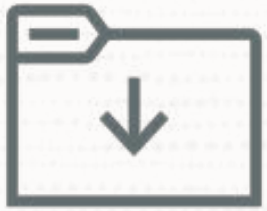
AutoUpgrade

Patching Basics

Patching Concepts

Grid Infrastructure Patching

Patching Insights

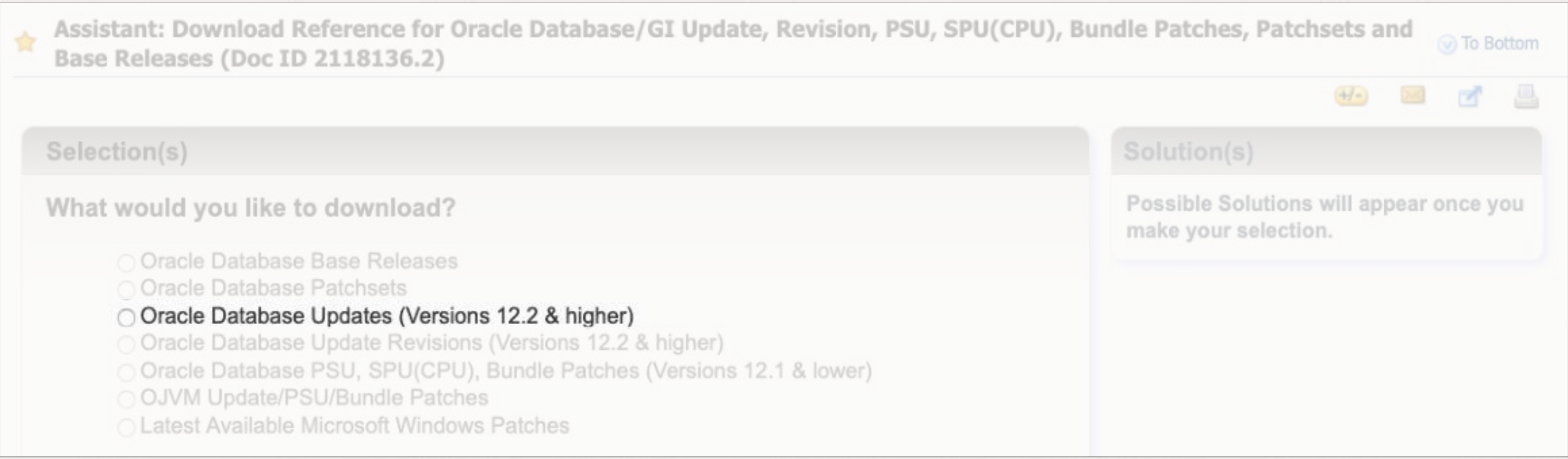


You always start with Oracle Database 19c base release

- Oracle Database 19.3.0

Apply the most recent Release Update

Use the Patch Download Assistant MOS Note: 2118136.2



You are missing out if you don't apply a recent Release Update

- Thousands of fixes
- >250 security fixes

Release Updates might be delayed

- Each quarter a Patch Availability Document is released with information on delayed patches
- Search for *Apr 2023 Patch Availability Document*

Timeline | Release Updates

	2021				2022				2023				2024		
	January	April	July	October	January	April	July	October	January	April	July	October	January	April	July
19c	19.10.0	19.11.0	19.12.0	19.13.0	19.14.0	19.15.0	19.16.0	19.17.0	19.18.0	19.19.0	19.20.0	19.21.0	19.22.0	19.23.0	19.24.0
21c		21.3.0	21.4.0	21.5.0	21.6.0	21.7.0	21.8.0	21.9.0	21.10.0	21.11.0	21.12.0	21.13.0	21.14.0	21.15.0	

Release Updates contain patches for Perl in Oracle Home

Release Updates contain patches for JDK in Oracle Home

- JDK patches are from *last* quarter
- If required, find up-to-date patches in JDK and PERL Patches for Oracle Database Home and Grid Home (Doc ID 2584628.1)

Release Updates contain time zone patches

- Database time zone file is not upgraded
- This applies to Oracle Database 19c only

Apply the most important patches

Always use Important Recommended One-Off Patches: MOS Note: 555.1

Recommended Patches for 19.18 DB Home

Below is the list of important patches to consider applying on top of 19.18. In addition to the relevant patches listed below, you should also review patches in Database PSU/BP/Update/Revision - Known Issues Primary Note(Doc ID 1227443.1) and Oracle Database Patches to Consider for 19c (Doc ID 2781612.2) which contains patches to consider for specific areas such as Data Pump, Golden gate etc.

Bug	Fixed in RU	Fixed in MRP	Description	Patches	NON ROLLING	Added
35037877 (replaces 20289608)			[SECURITY] EM patching may fail with ORA-4067	[list-patches]		20-APR-2023
32727143	19.19		[SQL EXECUTION] Transaction-level content isolation for transaction-duration global temporary tables	[list-patches]		20-APR-2023
34557500 (replaces 31544097)	19.19	DBMRP 19.17.0.0.230321, DBMRP 19.18.0.0.230321	[BLOCK TRACK] CTWR caused multiple instances to hung state on the RAC Standby DB	[list-patches]		20-APR-2023
34340632			[AQ] Smart Monitoring & Resiliency in AQ KGL Memory Usage To Help Message Cleanup And Prevent ORA-600 [KGL-HEAP-SIZE-EXCEEDED].	[list-patches]		14-APR-2023
35246710 (replaces 33803836)	19.19	DBMRP 19.18.0.0.230418	[BUFFER CACHE] High "Direct Path Read" Waits After 19.18 DBRU Patching	[list-patches]		08-APR-2023
34832725 (replaces			[SHRD CRSRS] ORA-4031 and / or High Shared Pool Latch Contention During Session Creation in	[list-		25-

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

AutoUpgrade

Patching Basics

Patching Concepts

Grid Infrastructure Patching

Patching Insights

Apply the Data Pump Bundle Patch

- Data Pump Recommended Proactive Patches For 19.10 and Above (Doc ID 2819284.1)

Data Pump Bundle Patch

Fewer Bugs

Important patches are included.

Monitor for bugs that affect many customers.

Faster Patching

The bundle patch changes the way Data Pump is patched. Subsequent patches apply faster.

125 fixes

Data Pump Bundle Patch for 19.19.0

MOS Note: 28192841

Bug	Description
Bug 28318139	ORA-31003 ERROR WHEN IMPORTING FULL DATABASE IN PARALLEL
Bug 28357349	SCHEMA LEVEL EXPORT/IMPORT CHANGES VIRTUAL COLUMN DEFINITION
Bug 28555193	DBMS_METADATA.GET_DDL CAPTURE INCORRECT STORAGE OPTIONS OF THE XML COLUMN ON GTT
Bug 28771564	DATAPUMP EXPORT INVOKED BY A PRIVILEGE USER EXECUTES A QUERY FOR V$OPEN_CURSOR
Bug 28990738	12.2 DBMS_METADATA.GET_DDL IS SLOW DUE TO SLOW ACCESS ON DICTIONARY VIEWS
Bug 29276889	ATP-D: DATA PUMP IMPORT FROM ATP-D INSTANCE TO A LOCAL DB INSTANCE FAILS
Bug 29543605	18.4 ADWC - ORA-39242: UNABLE TO EXPORT/IMPORT "LONG RAW" DATA TYPE
Bug 29613245	ORA-31684 ORA-39112 WITH FIX 28539085 AND VERSION=11.2
Bug 29959025	EXPDP RUNNING LONG TIME QUERYING KU$_SUBPARTITION_EST_VIEW WHEN PROCESSING TABLE_DATA
Bug 30155338	POSSIBLE DEADLOCK/TIMEOUT ERRORS DURING PARALLEL IMPORT WITH TABLE_EXISTS_ACTION=REPLACE
Bug 30157766	ORA-21560 DBMS_METADATA.FETCH_DDL IN 19C NOT IN 12.2
Bug 30430932	DBMS_METADATA NOT DISPLAYING THE SEMICOLON AND SLASH FOR TYPE SPECIFICATIONS
Bug 30582819	REMAP TABLESPACE IS NOT CONSIDERED FOR LOCAL TEMPORARY TABLESPACE DURING IMPDP
Bug 30662417	IMPDP WORKER TERMINATED WITH ORA-39029 AFTER MULTIPLE ORA-01775
Bug 30763851	IMPDP 11.2 TO 18C OR HIGHER HITS ORA-904 WHEN TABLES HAVE EXTENDED STATISTICS
Bug 30822078	IMPDP VERY SLOW DUE TO PROCESS REORDERING
Bug 30858671	18C DBMS_METADATA.GET_DDL FAILED WITH ORA-16000 IN READ ONLY MODE
Bug 30928455	DATA PUMP EXPORT (HITTING ORA-31637 WHILE RUNNING DATA PUMP-DPLOAD CONCURRENCY TEST IN SAME PDB
Bug 30944402	SELECT FROM MASTER TABLE RUNS SLOW DURING TABLE_DATA EXPORT WHEN THERE ARE MANY SUBPARTITIONS
Bug 30978304	ORA-20000 DURING IMPDP WITH STATS AND THE UNIQUE INDEX FOR THE PK IS NOT CREATED
Bug 31050896	PARALLEL DATAPUMP SLOW ON CONSTRAINTS
Bug 31174337	DBMS_METADATA.GET_DDL GENERATES NO KEYWORDS FOR NOT COMPRESSED INDEXES
Bug 31191614	TTS EXPDP QUERIES V$ENCRYPTED_TABLESPACES FOR EVERY TBS SLOWING DOWN PERFORMANCE
Bug 31200854	ADB-D: IMPORT PERFORMANCE OF PACKAGE_BODY
Bug 31393386	SPIN-OFF OF BUG# 31317961 FOR PARTIAL BACKOUT OF BUG# 27403988 FROM MAIN LABEL
Bug 31402031	DBMS_METADATA_UTIL THROWS AN INVALID CURSOR EXCEPTION.
Bug 31412130	ADBD:: COMPLETE FIX FOR 29543605 WHICH INCLUDES ALL THE MISSING FILES
Bug 31424070	APPSST19C: XTTS PDB - TABLE IMPORT/CREATION FAILED WITH ORA-39083 ORA-14334
Bug 31711479	ADB-S: ORA39126 AND ORA01031 WHILE IMPORT USING FA FULL DUMP INTO ADB-S
Bug 31725941	TOTAL ESTIMATION USING BLOCKS METHOD IS MISSING STARTING WITH 12.2
Bug 31830685	ZDM : IMPORT ADW-S DB LINK MIGRATION THROWS INTERNAL ERROR
Bug 32096059	IMPDP TO 19C USING EXPORT DUMP OF 11.2.0.4 HANGS WITH ENQ: TM - CONTENTION
Bug 32370367	EXPDP IN 19.7 THREE TIMES SLOWER THAN IT WAS IN 11.2.0.4
Bug 32452792	DBMS_METADATA.GET_DDL GETS WRONG OUTPUT FROM 12.2.0.1. TESTED TILL 19.3.0.0
Bug 32512780	PROCOBJ PLSQL SCRIPTS ARE NOT EXCLUDED ON IMPORT WITH EXCLUDE=TAG
Bug 32647307	ADB-D:: PACKAGE BODIES IMPORT SLOWER AFTER AUTONOMOUS REFRESH TO 19.10DBRU
Bug 32731035	ATPD MIGRATION:ORA-04021: TIMEOUT OCCURRED WHILE WAITING TO LOCK OBJECT
Bug 33163877	ATPD MIGRATION:IMPDP HITS TABLE OR VIEW DOES NOT EXIST ON SOME DATAPUMP RELATED TABLES
Bug 33204663	TCH19C :: ORA-39139: DATA PUMP DOES NOT SUPPORT XMLTYPE OBJECTS WHEN DOING XTTS WITH BINARY XML STORAGE
Bug 33297599	UNUSED XMLTYPE/CLOB COLUMNS CAUSE IMPORT FAILURE
Bug 33346378	REWRITE DATA PUMP PATCH LOCKING TEST: TKDPATCHRAC.TSC
Bug 33448450	TCH19C :: ORA-01647: TABLESPACE 'APPS_TS_TX_DATA' IS READ-ONLY, CANNOT ALLOCATE SPACE
Bug 33470563	METADATA API FAILS TO RECOGNIZE TAB CHARACTER AS DELIMITER WHEN PARSING SOURCE LINES OF TYPE OBJECT
Bug 33498804	DATAPUMP IMPORT IGNORES EXCLUDE AND INCLUDE VALUES FOR TAGS FOR IMPORT CALLOUTS
Bug 33660169	CONSOLIDATED BUG FOR DATA PUMP AQ FIXES 31338354, 31844376, 31868443 FOR 19.10 AND LATER
Bug 33720650	TCH19C :: OCI-21500: INTERNAL ERROR CODE [QMCXDGETQNAMEINFO2], [14003] IN XMLTYPE CLOUMN TYPE
Bug 33735435	TRACKING BUG FOR COMBO OF 32759991 32878145 32919937 32984678 (REPLACEMENT FOR MINI MLR 33407604)
Bug 34052641	END_PLUGTS_BLK OBJECT TYPE MISSING FROM FULL TTS EXPORT WHEN INCLUDE SPECIFIED
Bug 34525626	TRACKING BUG TO MERGE 33599275 AND 33498804 SO CAN BE BACKPORTED TOGETHER TO 19.16

Why aren't these fixes included in an RU?

Data Pump Bundle Patch currently is not RAC Rolling and Standby-First Installable

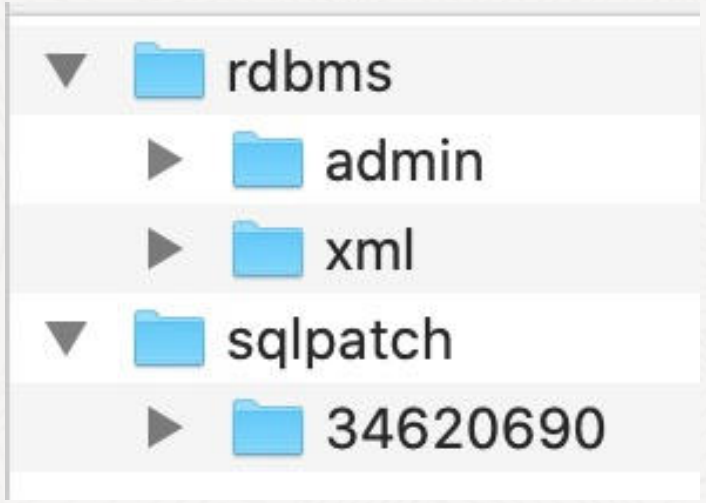
But you can apply it online

Data Pump Bundle Patch Contents

Bundle Patch contains only:

- SQL
- PL/SQL
- XML

But it does not contain any files
which require a compilation/make of rdbms



It can be applied online

Once applied, Data Pump Bundle Patch speeds up future patching significantly

Importing a complete application with data goes from almost 2,5 hours to 48 minutes – by just applying the Data Pump Bundle Patch

Global provider of financial services

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

AutoUpgrade

Patching Basics

Patching Concepts

Grid Infrastructure Patching

Patching Insights

We made upgrading easy.
Now we make patching just as easy.

AutoUpgrade functionality extended to patching

Always use the latest version of AutoUpgrade

Download from My Oracle Support (2485457.1)

```
$ cat DB19.cfg

patch1.source_home=/u01/app/oracle/product/19.0.0.0/dbhome_19_18_0
patch1.target_home=/u01/app/oracle/product/19.0.0.0/dbhome_19_19_0
patch1.sid=DB19


$ java -jar autoupgrade.jar -config DB19.cfg -mode deploy
```


Patching

USE

Familiar interface

Console

Logging

ANALYZE

Prechecks

Datapatch Checks

Summary report

PROTECT

Resumable

Restoration

Restore point

Fallback

AUTOMATE

`srvctl`

`/etc/oratab`

Files

Datapatch

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

AutoUpgrade

Patching Basics

Patching Concepts

Grid Infrastructure Patching

Patching Insights

Basic Facts | What Is In A Patch

FILES

New or changed executables, libs or files

```
bin/oracle
bin/srvctl
oracore/zoneinfo/timezone_34.dat
```

Apply and rollback scripts

```
sqlpatch/.../nnn_apply.sql
sqlpatch/.../nnn_rollback.sql
```

SQL
PL/SQL

New or changed objects

```
alter table sys.tab$ ...
create index sys.i_tab1 ...
create or replace package sys.dbms_scheduler ...
```


Basic Facts | How To Apply A Patch

`$ORACLE_HOME/OPatch`

```
[oracle@hol ~]$ cd $ORACLE_HOME/OPatch
[oracle@hol OPatch]$ ls -l
total 164
drwxr-x---. 6 oracle dba    68 Apr 22  2020 auto
drwxr-x---. 2 oracle dba    31 Apr 22  2020 config
-rwxr-x---. 1 oracle dba   589 Apr 22  2020 datapatch
-rwxr-x---. 1 oracle dba   627 Apr 22  2020 datapatch.bat
drwxr-x---. 2 oracle dba    90 Apr 22  2020 docs
-rwxr-x---. 1 oracle dba 23550 Apr 22  2020 emdpatch.pl
drwxr-x---. 2 oracle dba  4096 Apr 22  2020 jlib
drwxr-x---. 5 oracle dba  4096 Mar 26  2020 jre
drwxr-x---. 9 oracle dba  4096 Apr 22  2020 modules
drwxr-x---. 5 oracle dba    58 Apr 22  2020 ocm
-rwxr-x---. 1 oracle dba 49462 Apr 22  2020 opatch
-rwxr-x---. 1 oracle dba  1442 Apr 22  2020 opatchauto
-rwxr-x---. 1 oracle dba   393 Apr 22  2020 opatchauto.cmd
-rwxr-x---. 1 oracle dba 16412 Apr 22  2020 opatch.bat
-rwxr-x---. 1 oracle dba  4290 Apr 22  2020 opatch_env.sh
-rw-r-----. 1 oracle dba  2551 Apr 22  2020 opatch.pl
drwxr-x---. 4 oracle dba    62 Apr 22  2020 opatchprereqs
-rwxr-x---. 1 oracle dba  3159 Apr 22  2020 operr
-rwxr-x---. 1 oracle dba  4218 Apr 22  2020 operr.bat
-rw-r-----. 1 oracle dba  3177 Apr 22  2020 operr_readme.txt
drwxr-x---. 2 oracle dba    19 Apr 22  2020 oplan
drwxr-x---. 3 oracle dba    21 Apr 22  2020 oracle_common
drwxr-x---. 3 oracle dba    24 Apr 22  2020 plugins
-rw-r-----. 1 oracle dba  2980 Apr 22  2020 README.txt
drwxr-x---. 2 oracle dba  4096 Apr 22  2020 scripts
-rw-r-----. 1 oracle dba    27 Apr 22  2020 version.txt
```

Basic Facts | How To Apply A Patch

`opatch`  Applies binaries to an Oracle Home — All instances are down

`datapatch`  Applies SQL and PL/SQL changes to a database — Database is up

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

AutoUpgrade

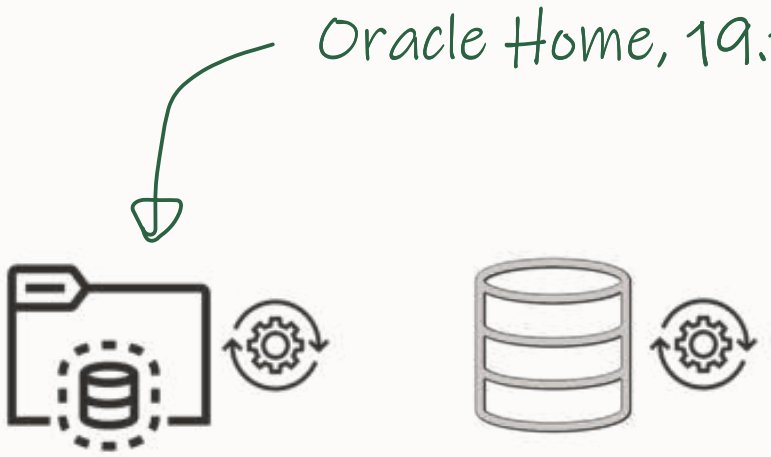
Patching Basics

Patching Concepts

Grid Infrastructure Patching

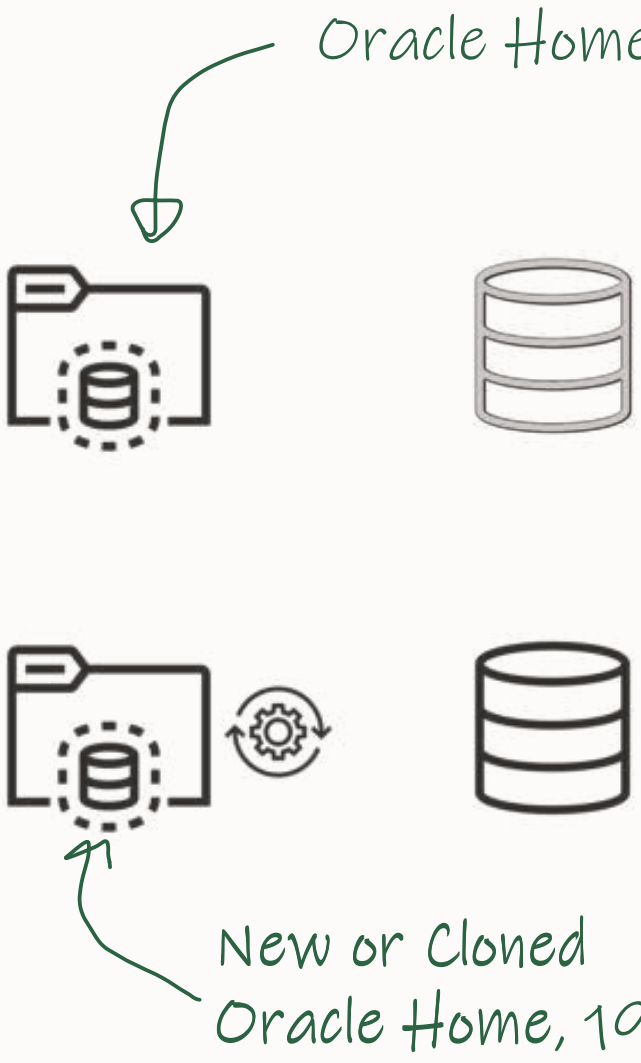
Patching Insights

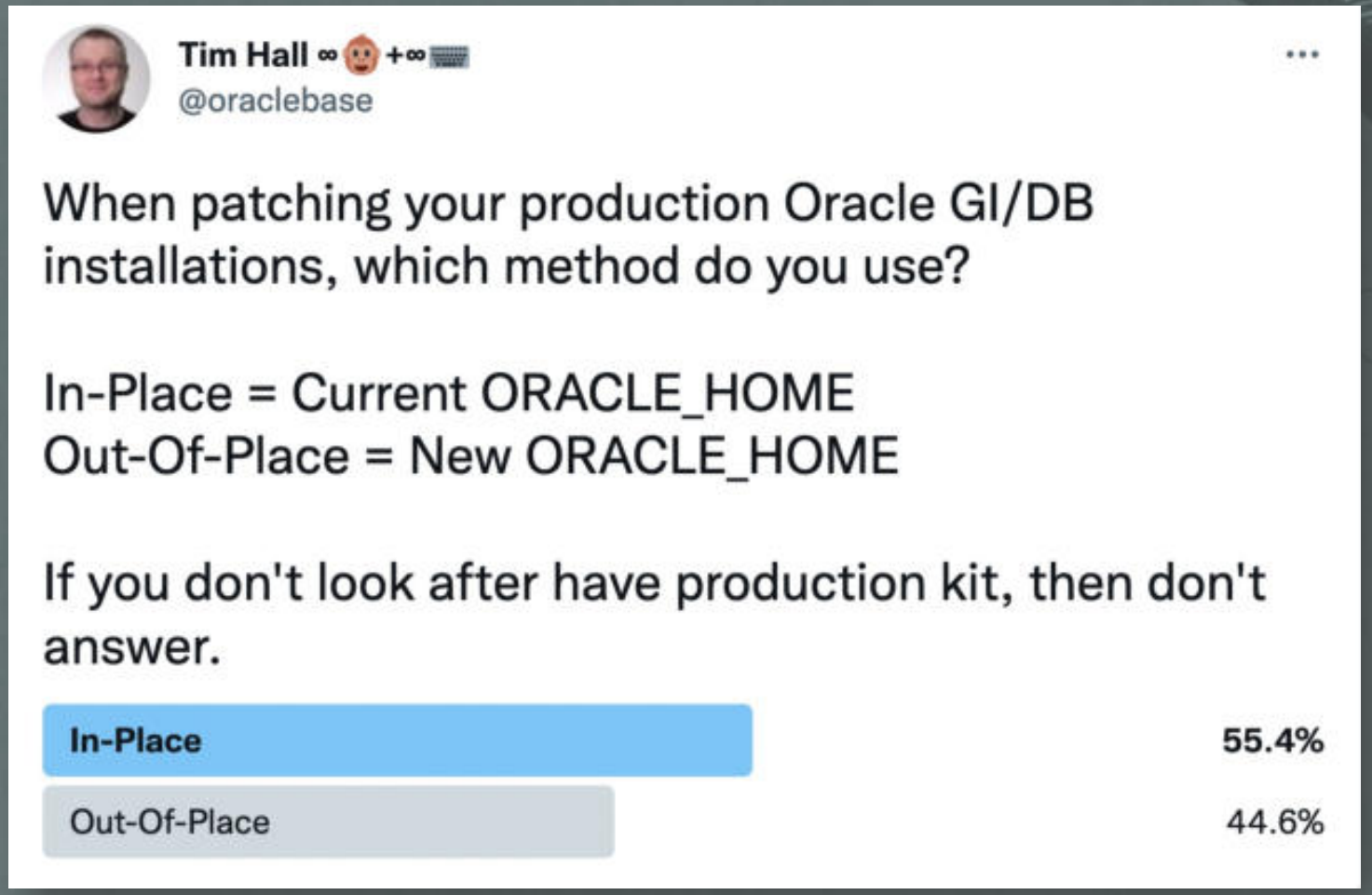
Patching Concepts | In-Place Patching




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

Patching Concepts | Out-of-Place Patching





Twitter

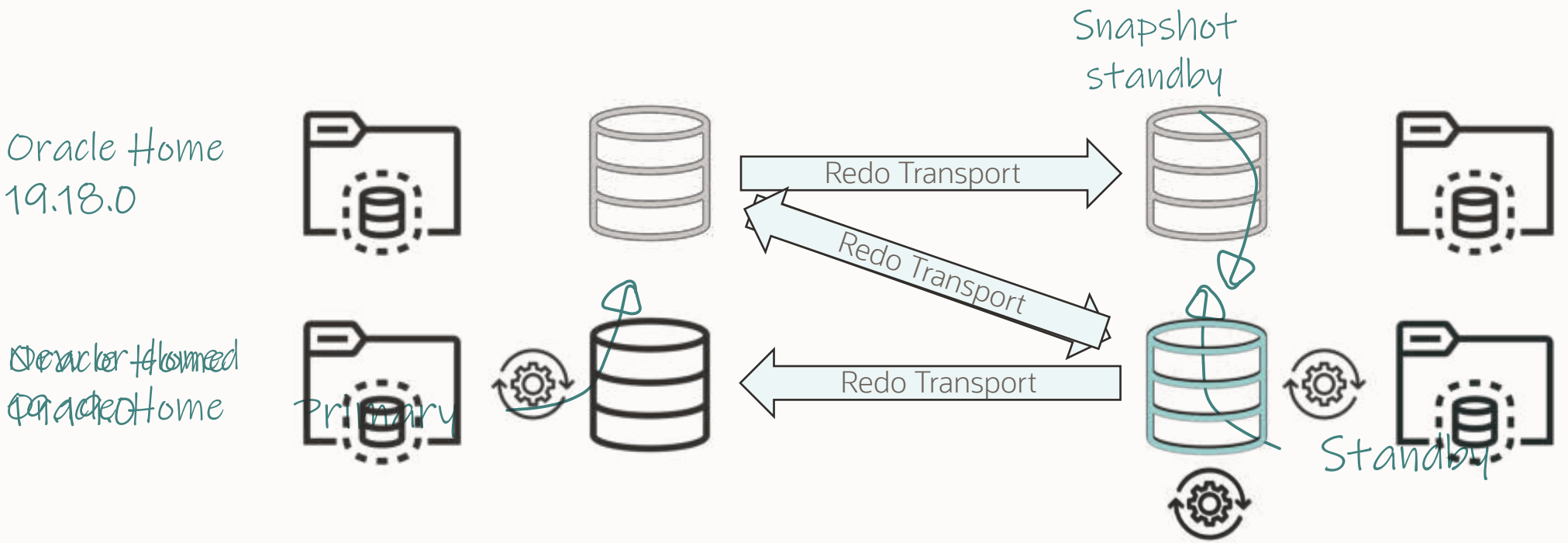
Always patch out-of-place

- Minimize downtime
- Avoid conflicts *surprise*
- Easier rollback
- Use brand-new Oracle Home to avoid the need for rolling off patches before applying new ones

Safely test and verify patches with Standby-First Patch Apply

- Oracle Patch Assurance - Data Guard Standby-First Patch Apply (Doc ID 1265700.1)

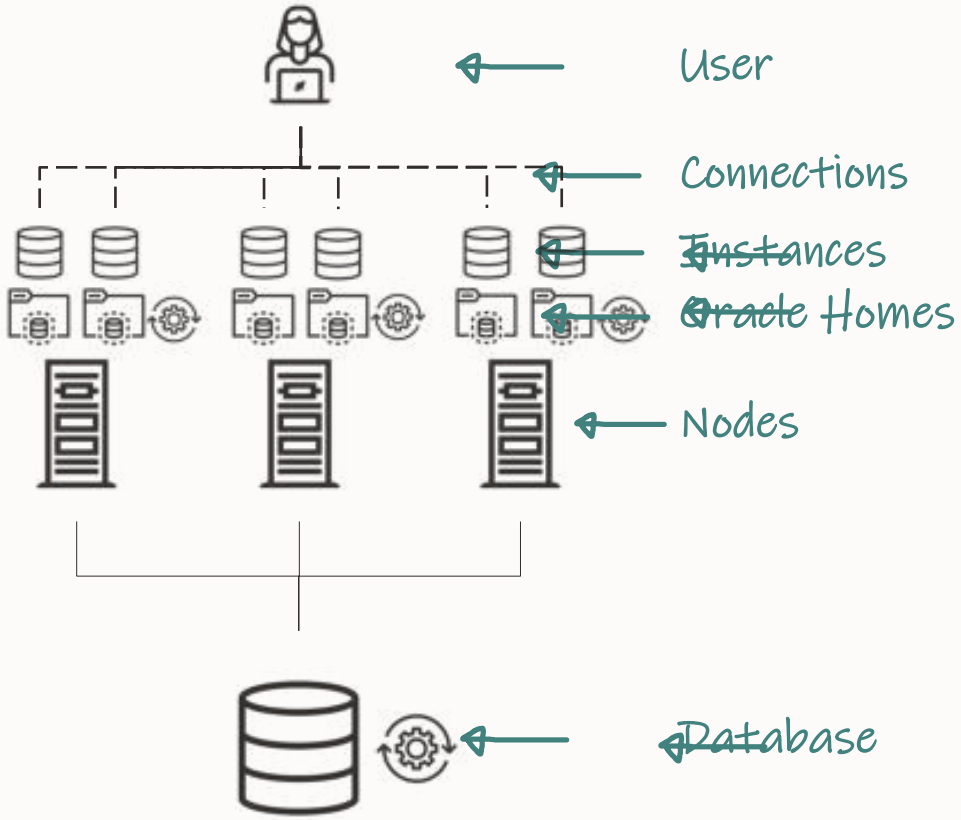
Patching Concepts | Standby-First Patch Apply




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

Avoid downtime with RAC Rolling Patching

Patching Concepts | RAC Rolling




```
$ $ORACLE_HOME/OPatch/opatchauto
```

- Clone Oracle Home
- Patch Oracle Home
- Move to new Oracle Home
- Execute datapatch

Release updates are **always**:

Standby-First installable

RAC Rolling installable

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

AutoUpgrade

Patching Basics

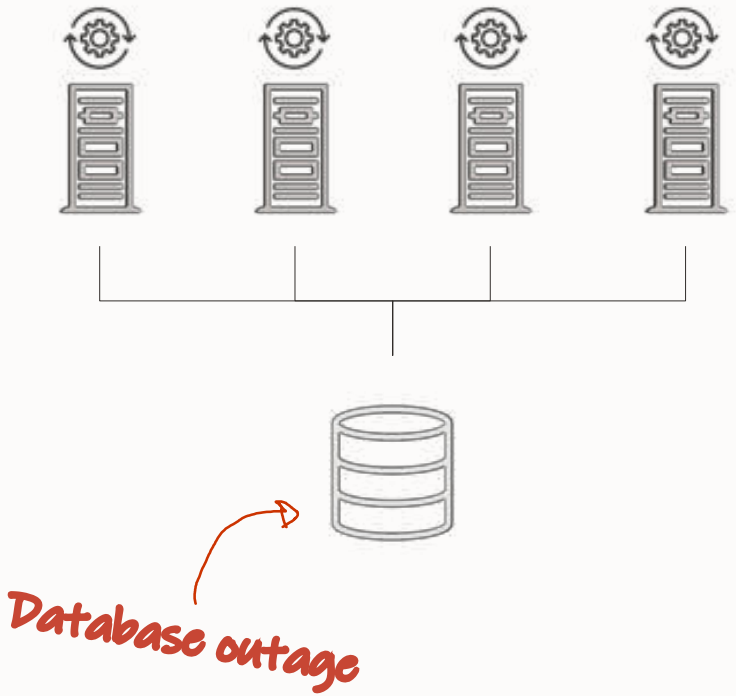
Patching Concepts

Grid Infrastructure Patching

Patching Insights

The following patching strategies
apply to Oracle Database patching as well

Grid Infrastructure | Patching Strategies

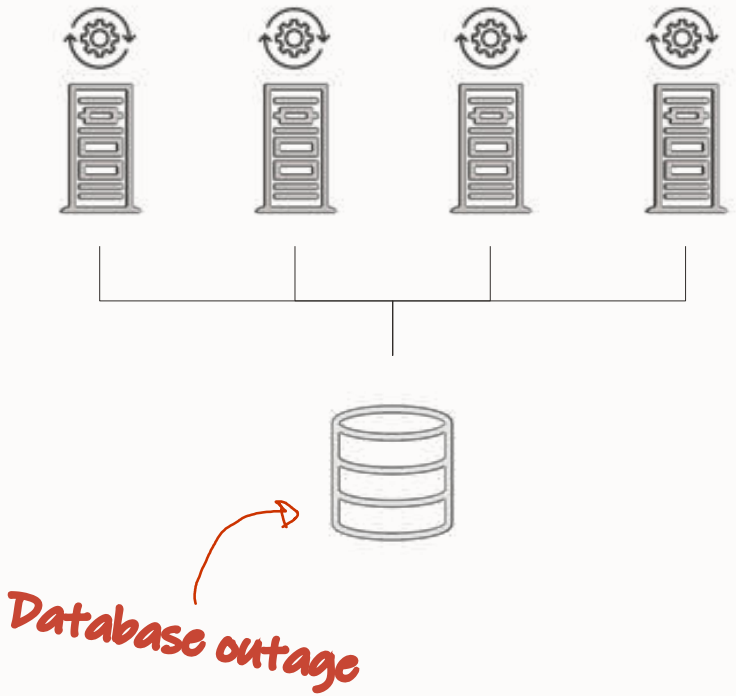


ALL NODE

- All nodes patched at one time
- One long database outage
- Works for all patches, including non-rolling
- Cluster at full capacity except for outage

Rolling Patch - OPatch Support for RAC (Doc ID 244241.1)

Grid Infrastructure | Patching Strategies

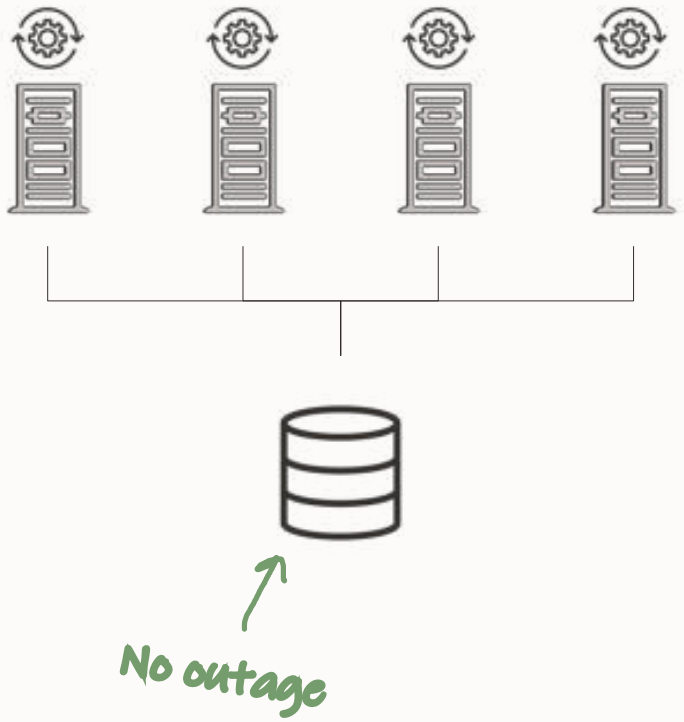


MINIMUM DOWNTIME

- Nodes patched in two batches
- One short database outage
- Works for all patches, including non-rolling
- Other nodes must handle workload while another batch is patched

Rolling Patch - OPatch Support for RAC (Doc ID 244241.1)

Grid Infrastructure | Patching Strategies

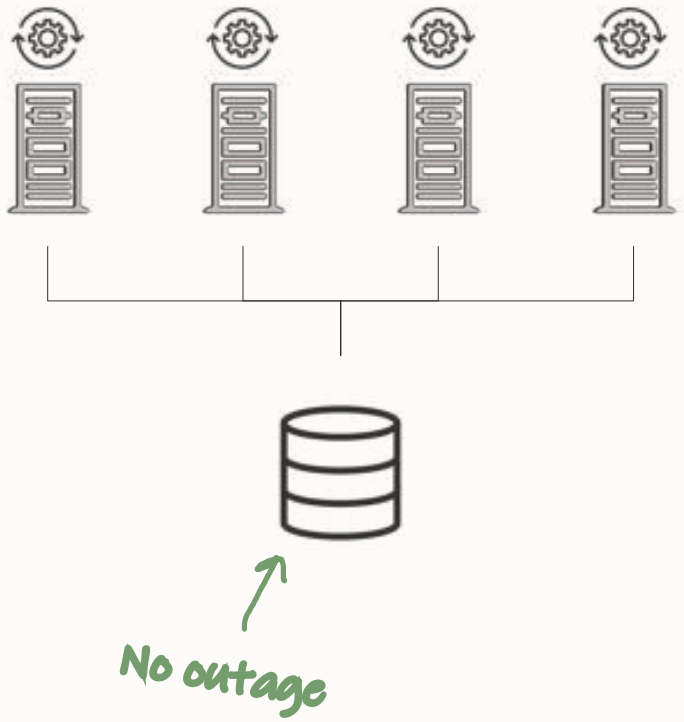


ROLLING

- Each node patched separately
- No database outage
- Patch must be RAC rolling installable
- Other nodes must handle workload while one node is patched

Rolling Patch - OPatch Support for RAC (Doc ID 244241.1)

Grid Infrastructure | Patching Strategies



ROLLING IN GROUPS

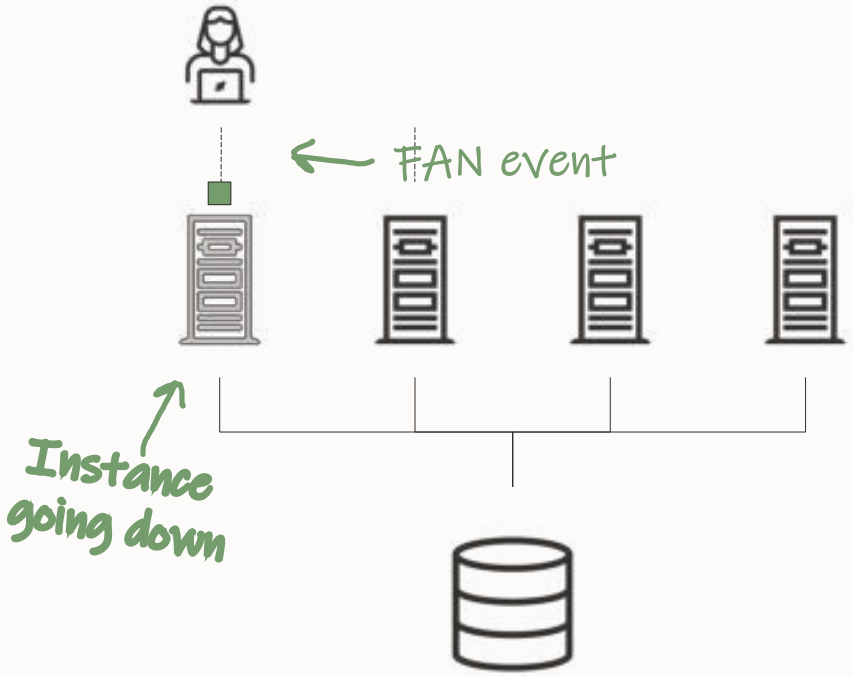
- Patch a subset together
- Useful when draining is a problem
- No database outage
- Patch must be RAC rolling installable
- Other nodes must handle workload while one node is patched

Rolling Patch - OPatch Support for RAC (Doc ID 244241.1)

Rolling installation of patches is preferred, but requires effective draining

- Optionally, consider a *batched* approach

Grid Infrastructure | Draining



DRAINING

- Allows users to finish their work and reconnect to another instance
- New sessions connect to other instances
- Sessions that don't drain in time are forcefully terminated
- Controlled by drain_timeout parameter in `srvctl` and `DBMS_SERVICE`

Patching Methods

1 In-place

Replaces existing Oracle Home

Uses `opatchauto`

2 Out-of-place

Creates a new Oracle Home

Uses `opatchauto` or `gridSetup`

Use out-of-place patching

- Minimize downtime
- Minimize risk during outage
- Easier rollback
- Also for Oracle Restart

top tips

PATCHING SUCCESS

Cluster Verification Utility

Patch Level

Application Continuity

OPatch

Use CVU before and after patching

Preferably through EXAchk or ORAchk

Identifies potential issues

Light-weight, non-intrusive

Always use the latest version

top tips

PATCHING SUCCESS

Cluster Verification Utility

Patch Level

Application Continuity

OPatch

- Apply patches regularly
- Apply recent Release Updates
- Apply MRPs
- Keep GI and DB patch levels in sync

top tips

PATCHING SUCCESS

Cluster Verification Utility

Patch Level

Application Continuity

OPatch

Completely hide interruptions from users

Hides planned and unplanned events

Comply with MAA guidelines

See also Transparent Application Continuity

top tips

PATCHING SUCCESS

Cluster Verification Utility

Patch Level

Application Continuity

OPatch

Always use the latest version of OPatch

Use in GI and DB homes

Make database patching

SMART AGAIN

Installation and Patches

Data Pump Bundle Patch

AutoUpgrade

Patching Basics

Patching Concepts

Grid Infrastructure Patching

Patching Insights

The Database Patching Process

FIND

Find the right bundle and one-off patches

INSTALL

Download and install the patches

APPLY

Apply the patches to the database

Always use the latest OPatch

If OPatch takes too long, use out-of-place patching with a brand-new Oracle Home

- Avoid cloned Oracle Homes and in-place patching
- Also avoids rolling off patches before applying new ones

Reusing Oracle Home leads to:

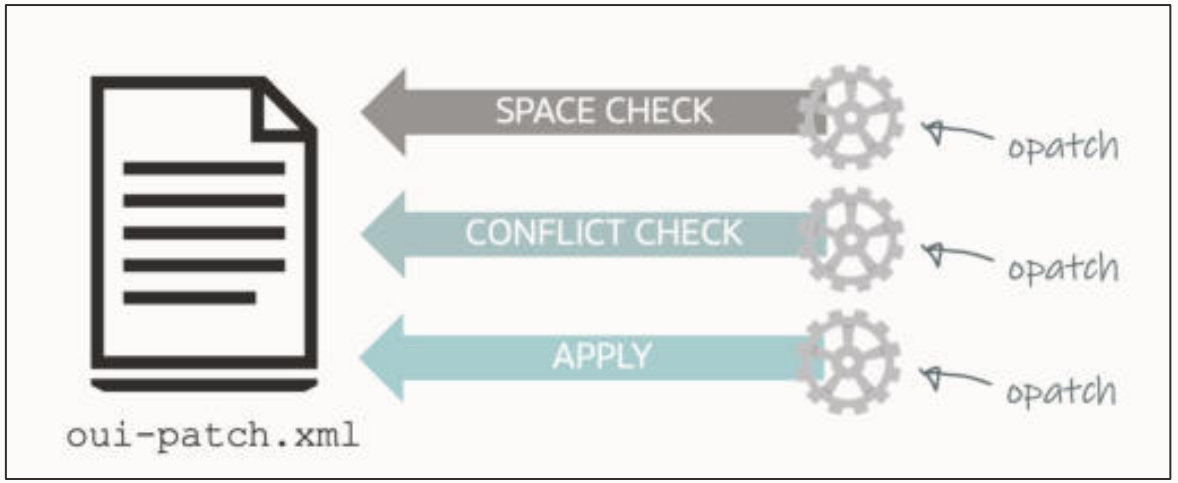
- Disk footprint increases
- Patching runtime increases

Patching Performance

Root cause for long `opatch` runtime

`opatch` maintains an ever-growing patch history in `$ORACLE_HOME/inventory/ContentsXML/oui-patch.xml`

This file gets queried multiple times and can delay patching massively



Remove old patches from Oracle Home using `opatch util deleteinactivepatches`

- Available in OPatch version 37
- Execute after patching and Oracle Home cloning
- For scripting use `-silent`

Patching Performance | Clean Up Example

Oracle Home, 19.3.0

Apply Release Update 19.6.0

Apply Release Update 19.7.0

Apply Release Update 19.8.0

...

Apply Release Update 19.18.0

Patching Performance | Clean Up Example

Before

`oui-patch.xml`

1001 lines

Cleanup

`opatch util deleteinactivepatches`

After

`oui-patch.xml`

136 lines

Patching runtime:

19m 22s

Patching runtime:

4m 20s

1

Unzip new Oracle Home

Download base release from oracle.com

2

Update OPatch

Download from Oracle Support

3

Install Oracle Home and patches

Attach Oracle Home and apply patches in one operation

```
./runInstaller -applyRU ... -applyOneOffs ...
```

Check blog post for details

Run unattended using `-silent`

The Database Patching Process

FIND

Find the right bundle and one-off patches

INSTALL

Download and install the patches

APPLY

Apply the patches to the database

Patching a Database

1

Start database in new Oracle Home

Start in normal open
Open all PDBs

2

Complete patching with `datapatch`

Found in `$ORACLE_HOME/OPatch`
One database per invocation
Multiple datapatch sessions in parallel
Datapatch User Guide (Doc ID 2680521.1)

Analyze the database for patching readiness

- Datapatch Sanity Checks
- Datapatch User Guide (Doc ID 2680521.1)
- Executed by AutoUpgrade in analyze mode
- Work in progress

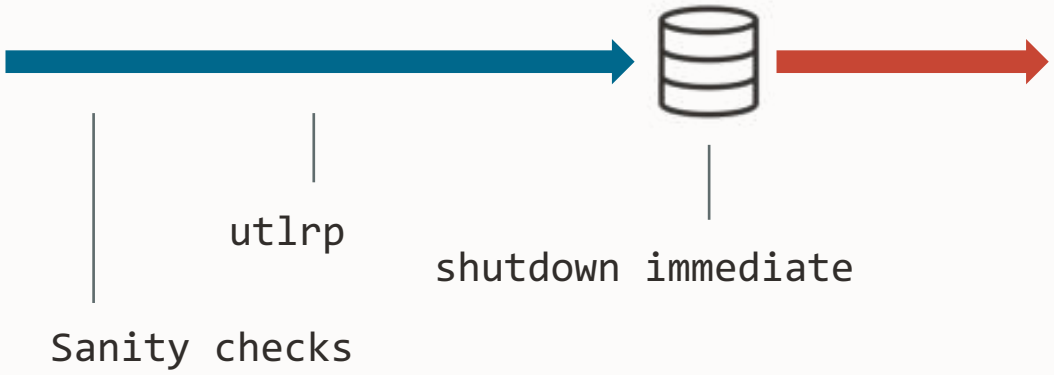
```
$ ./datapatch -sanity_checks

...

Check: DB Components status - OK
Check: PDB Violations - OK
Check: System invalid objects - OK
Check: Tablespace Status - OK
Check: Backup jobs - OK
Check: Temp Datafile exists - OK
Check: Datapump running - OK
Check: Container status - OK
Check: Encryption wallet - OK
Check: Dictionary statistics gathering - OK
Check: Scheduled Jobs - NOT OK (WARNING)
  Message: There are current running or scheduled jobs set to run on the next hour.
  Scheduled jobs may have an impact when run during patching.
  :
    JOB_NAME,NEXT_RUN_DATE,SCHEMA_NAME,STATE
    CLEANUP_TRANSIENT_PKG,23-MAY-23 11.08.53.000000 AM +01:00,APPUSER,SCHEDULED
```

Recompile invalid objects
before invoking datapatch

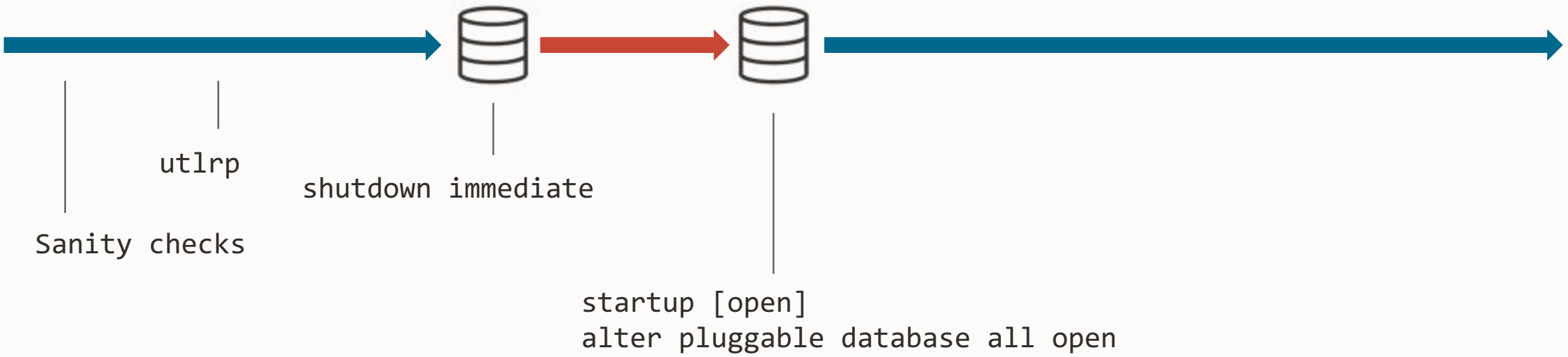
Patching Timeline



The database must be open
Only open PDBs are patched

- Upgrade mode or restricted session is not needed

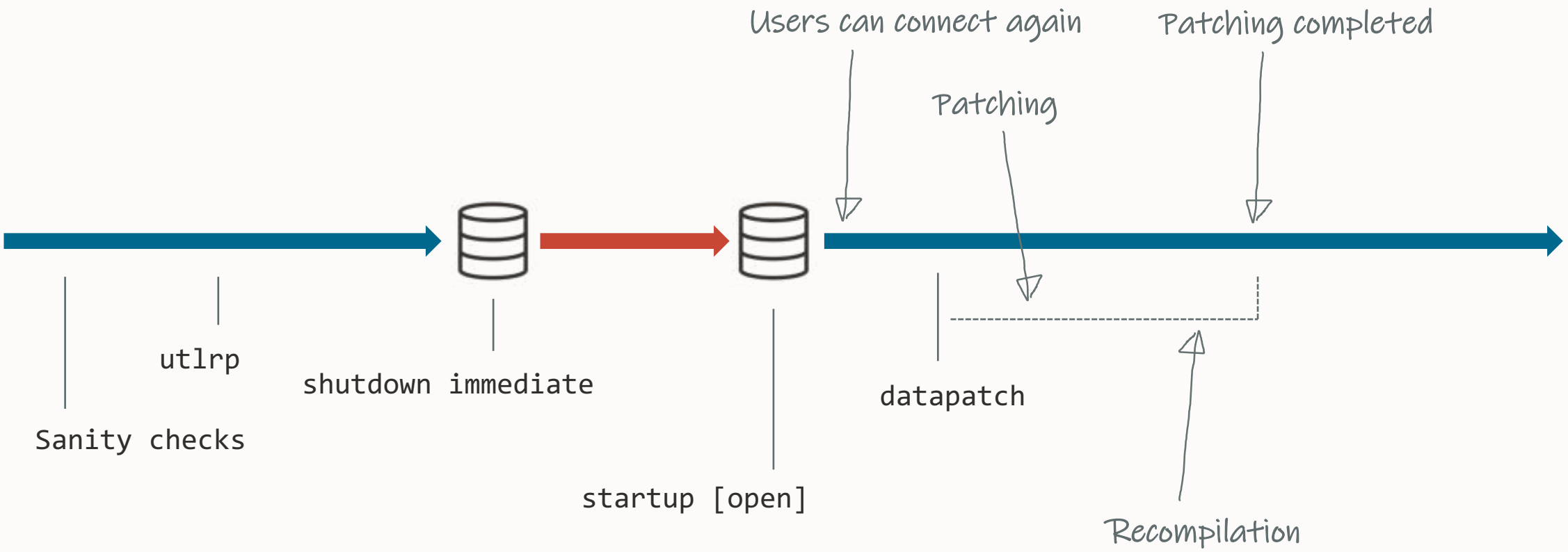
Patching Timeline



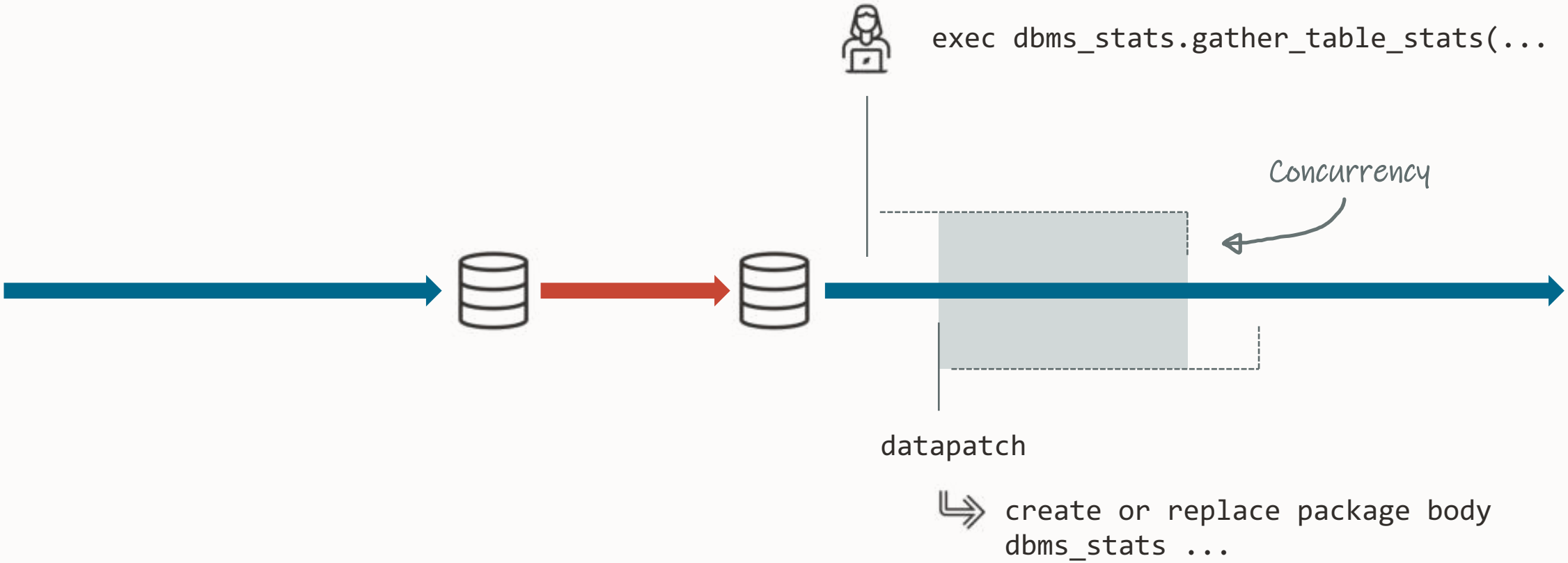
You can run datapatch while users are connected to the database

- Details in blog post

Patching Timeline



Patching Timeline



Concurrency

- Datapatch waits 15 min to acquire a lock
  - On timeout, **`ORA-04021 timeout occurred while waiting to lock object`**
- Optionally, find blocking session and kill it
- Increase timeout using **`-ddl_lock_timeout`** *n*

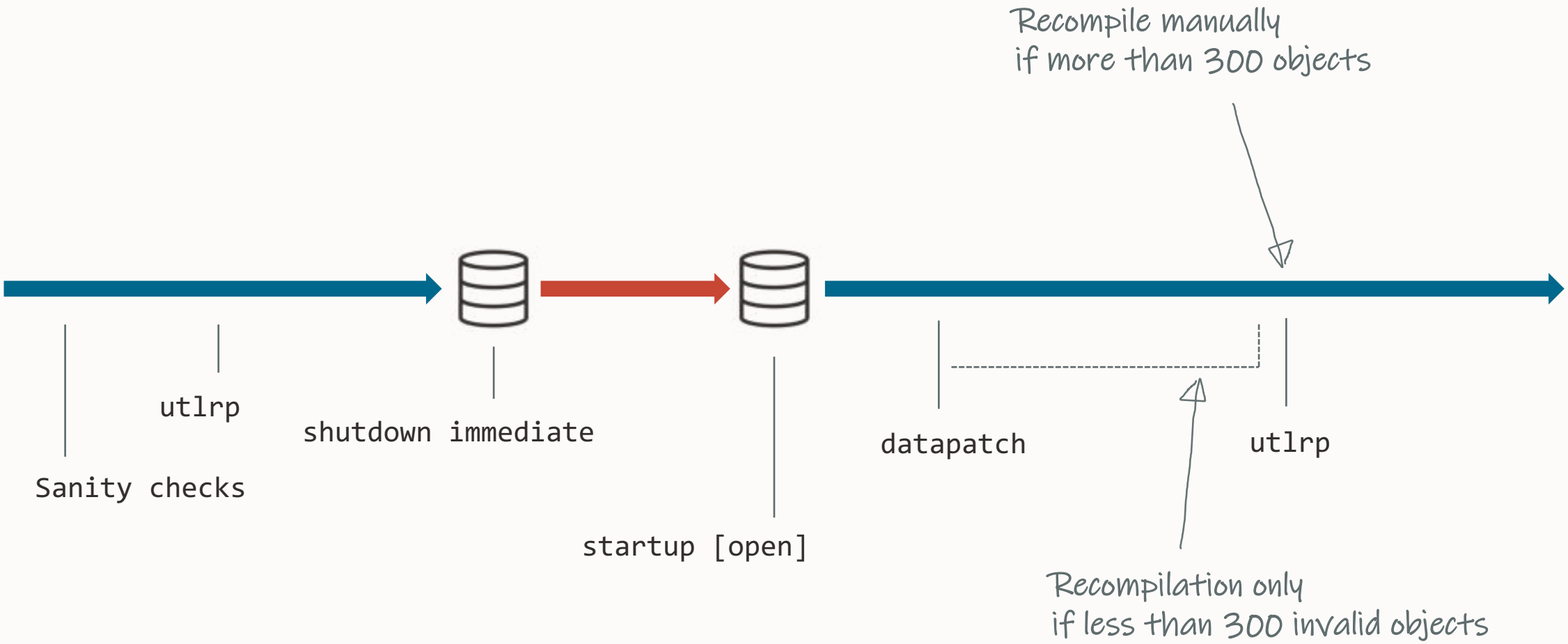
Datapatch uses `REGISTRY$SQLPATCH` to control the patching operations

- You can query `DBA_REGISTRY_SQLPATCH`

If in doubt run Datapatch again

- Datapatch only does what is needed
- You can run Datapatch as many times as you like

Patching Timeline



```
$ pwd
/u01/app/oracle/cfgtoollogs/sqlpatch/sqlpatch_485_2022_01_19_22_13_40

$ grep "recomp_threshold" *catcon* -A1

[CDB$ROOT] Invalid ORACLE_MAINTAINED objects: before patching=0, after patching=0, recomp_threshold=300
[CDB$ROOT] All ORACLE_MAINTAINED objects are VALID, recompilation not needed.
[PDB$SEED] Invalid ORACLE_MAINTAINED objects: before patching=0, after patching=0, recomp_threshold=300
[PDB$SEED] All ORACLE_MAINTAINED objects are VALID, recompilation not needed.
```

Datapatch | Patch Apply Sequence

`datapatch` 

1  Java patches

2  Bundle patches

3  One-off patches

Datapatch | Patch Rollback and Apply Queue

Binary Registry after `opatch`:

- Patch 444 – Java Patch
- Patch 555 – Bundle Patch
- Patch 666 – One-off Patch

Oracle Home

SQL Registry before `datapatch`:

- Patch 111 – Java Patch
- Patch 222 – Bundle Patch
- Patch 333 – One-off Patch

Database

```
$ ./datapatch
```

datapatch queue

Rollback:

Apply:

Rollback:

Cumulative: Patch 222 to 555 – Bundle Patch

Apply:

Datapatch | Rollback Script

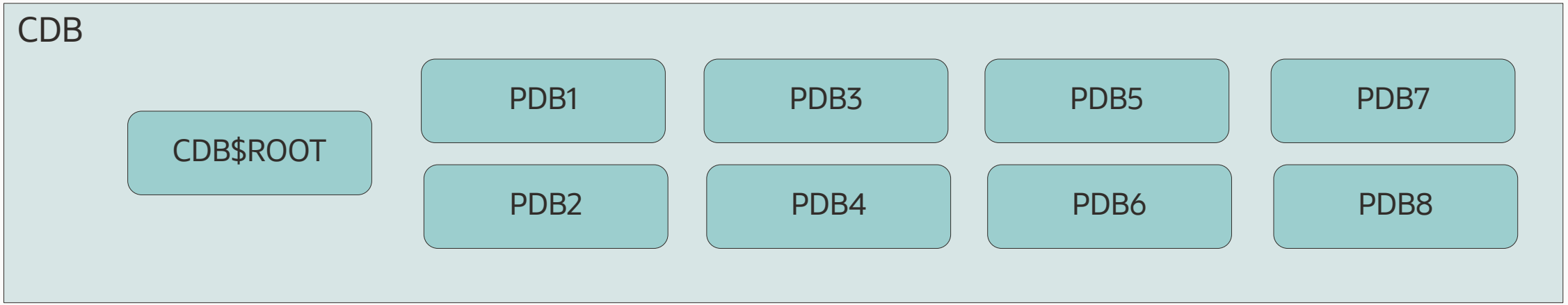
Apply/rollback scripts:

```
$ORACLE_HOME/sqlpatch/.../nnn_apply.sql
$ORACLE_HOME/sqlpatch/.../nnn_rollback.sql
```

Rollback scripts (zipped as BLOB):

```
SELECT  PATCH_DIRECTORY
FROM    REGISTRY$SQLPATCH
```

Multitenant

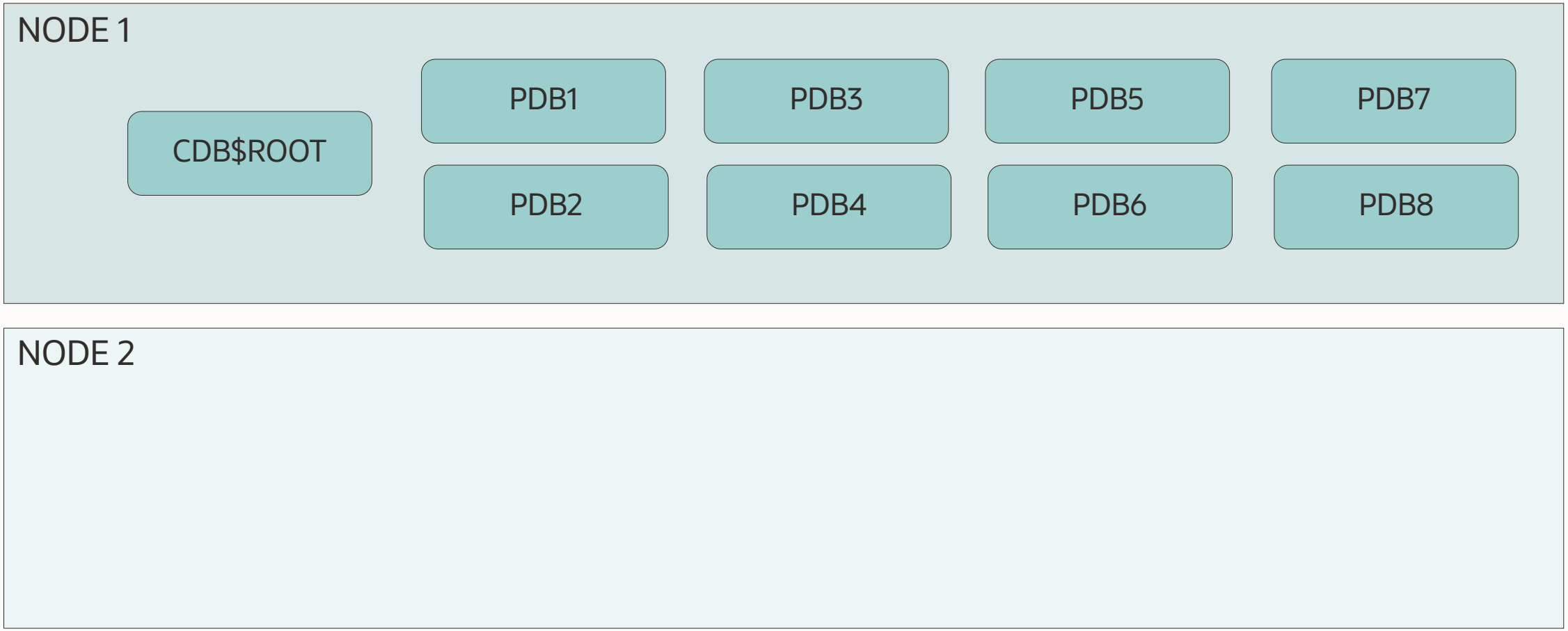


- Datapatch patches CDB$ROOT and PDB$SEED automatically
- Datapatch only patches open PDBs
  - `READ WRITE`, `READ ONLY`, or `UPGRADE`
- Datapatch determines parallel degree based on CPU count

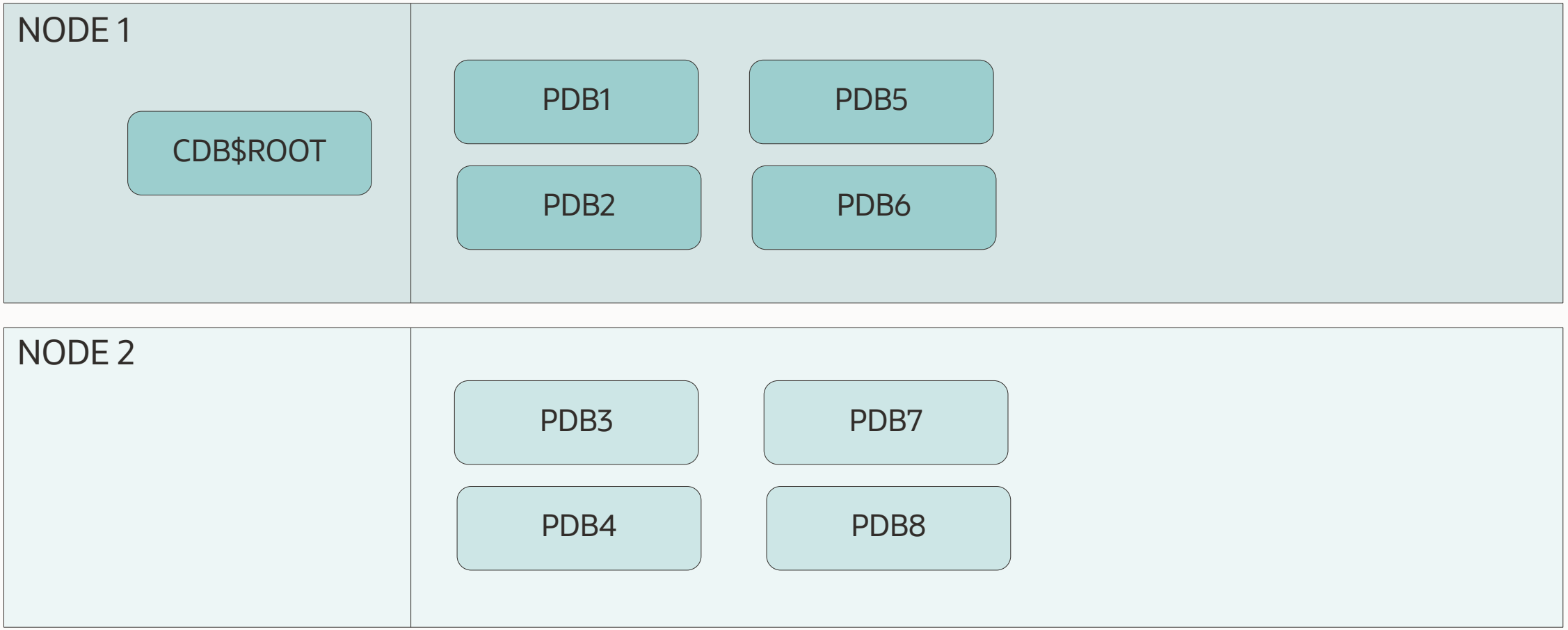
Significantly speed up patching using AutoUpgrade

- Applies to multitenant databases on RAC only

Distributed Patching



Distributed Patching



Distributed Patching

To enable distributed patching

```
$ cat RACCDB.cfg

upg1.source_home=/u01/app/oracle/product/19/dbhome_19_18
upg1.target_home=/u01/app/oracle/product/19/dbhome_19_19
upg1.sid=RACCDB
upg1.tune_setting=proactive_fixups=true,distributed_upgrade=true


$ java -jar autoupgrade.jar -config RACCDB.cfg -mode deploy
```

Upgrade to Oracle Database 19c

Always patch out-of-place

Apply Data Pump Bundle Patch

Keep DB and GI patch level in sync

Remove OJVM if not in use

Apply patches regularly

Use out-of-place patching with a brand-new Oracle Home

Less components, faster patching

Avoid downtime with RAC Rolling Patching

Complete a rolling patch as soon as possible

Significantly speed up patching using Distributed Patching

Apply Release Updates and MRPs

Always use the latest OPatch

Use Fleet Patching & Provisioning

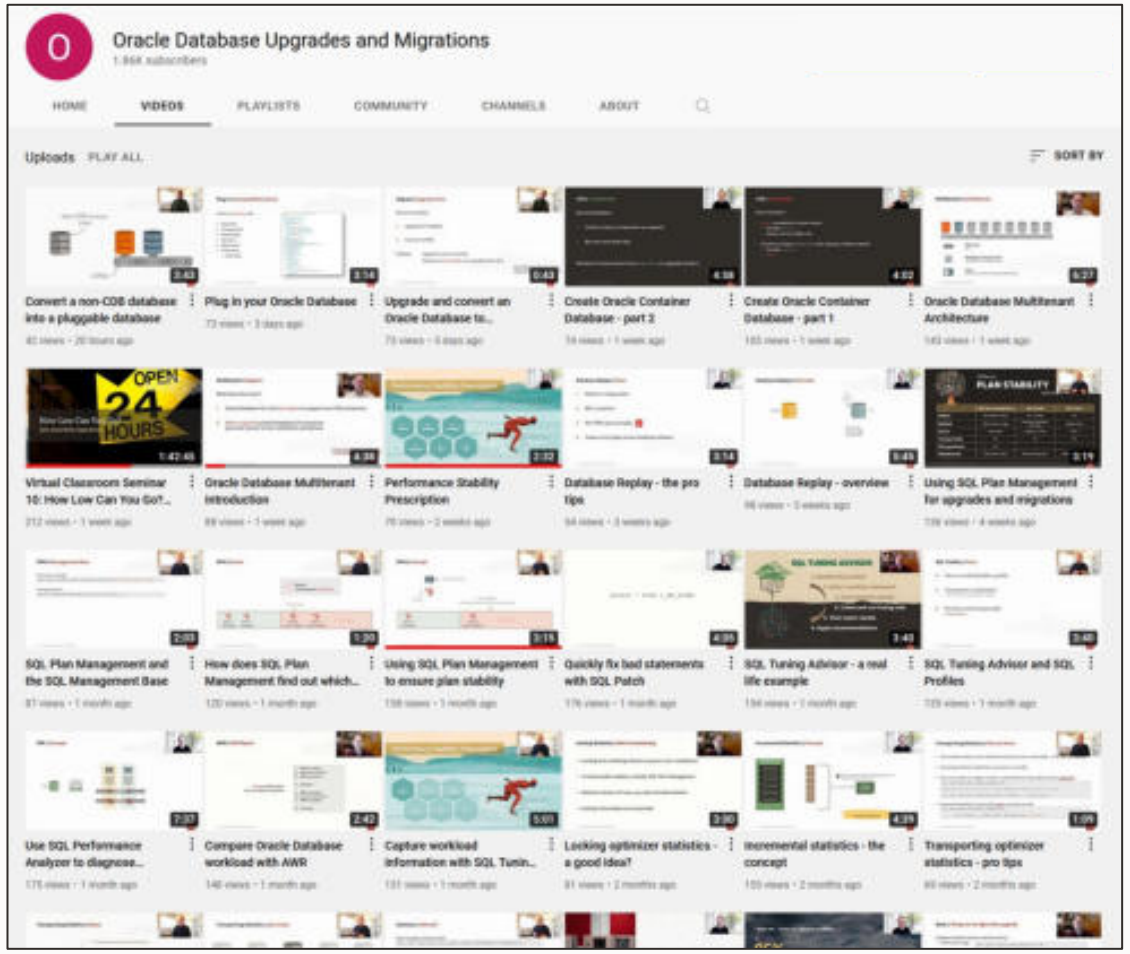
Use OPatch to remove inactive patches

`STARTUP UPGRADE` not needed for patching

Comply with Maximum Availability Architecture

Recompile invalid objects before invoking datapatch

YouTube | Oracle Database Upgrades and Migrations



Link

- 300+ videos
- New videos every week
- No marketing
- No buzzword
- All tech

SCAN ME

From SR to Patch

Insights into the Oracle Database Development Process

June 22, 2023 – 16:00 CEST

SCAN ME

THANK YOU