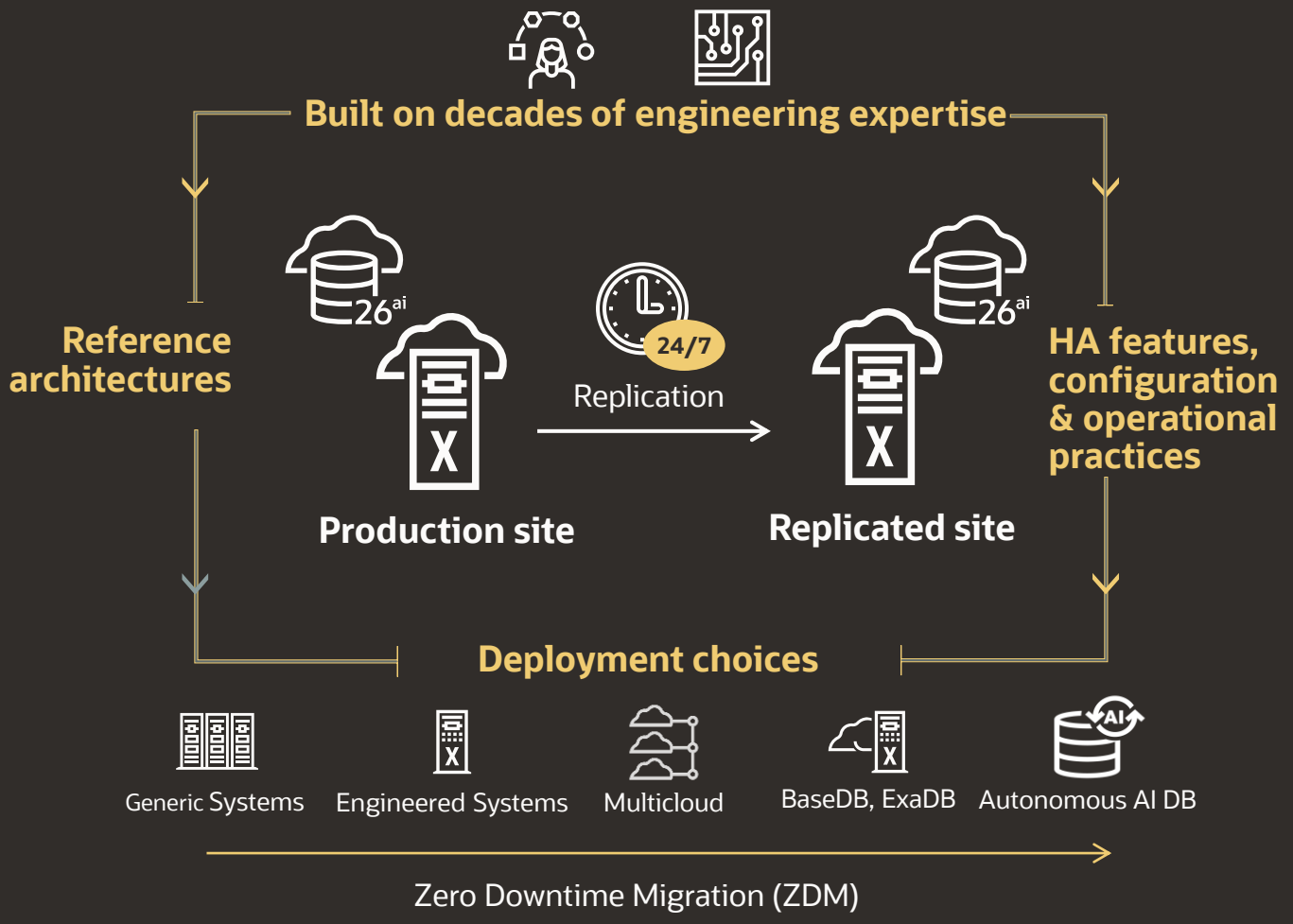
ORACLE

Oracle Fleet Patching and Provisioning 26ai

Technical Presentation

Oracle Maximum Availability Architecture (MAA)

Ultra-resilient availability tiers for all applications



High performance

Resource Management
Database In-Memory
True Cache

Continuous availability

Application Continuity
Online Redefinition
Edition-based Redefinition

Data protection

Flashback
RMAN
ZDLRA+ ZRCV

Active replication

Active Data Guard
Full Stack DR
GoldenGate

Scale out & Lifecycle

RAC
Globally Distributed AI Database
FPP
Real Application Testing

Next-Gen MAA Reference Architectures

High availability tiers for the Oracle AI Database, uniquely engineered for resilience

Bronze:
- Local HA RTO - Mins to 1 Hour
- Regional DR RTO - Hrs to Days
- RPO < 15 min

Dev, test, prod

Single Instance, Backup & Restore

Silver:
- Local HA RTO - Secs to Mins
- Regional DR RTO - Hrs to Days
- RPO < 15 min

Prod/departmental

Bronze +

High Availability with RAC or Data Guard

Gold:
- Local HA RTO < 60 secs
- Regional DR RTO < 5 min
- RPO – Zero or near-zero

Business-critical

Silver with RAC +

DB replication with Active Data Guard with automatic failover

Platinum:
- Local HA RTO < 10 secs
- Regional DR RTO < 30 secs
- RPO – Zero or near-zero

Mission-critical

Gold +

Active Data Guard with Oracle AI Database 26ai on Exadata, OR
GoldenGate with Oracle Database 19c on Exadata

Diamond (NEW):
- Local HA RTO < 3 secs
- Regional DR RTO < 3 secs
- RPO – Zero or near-zero

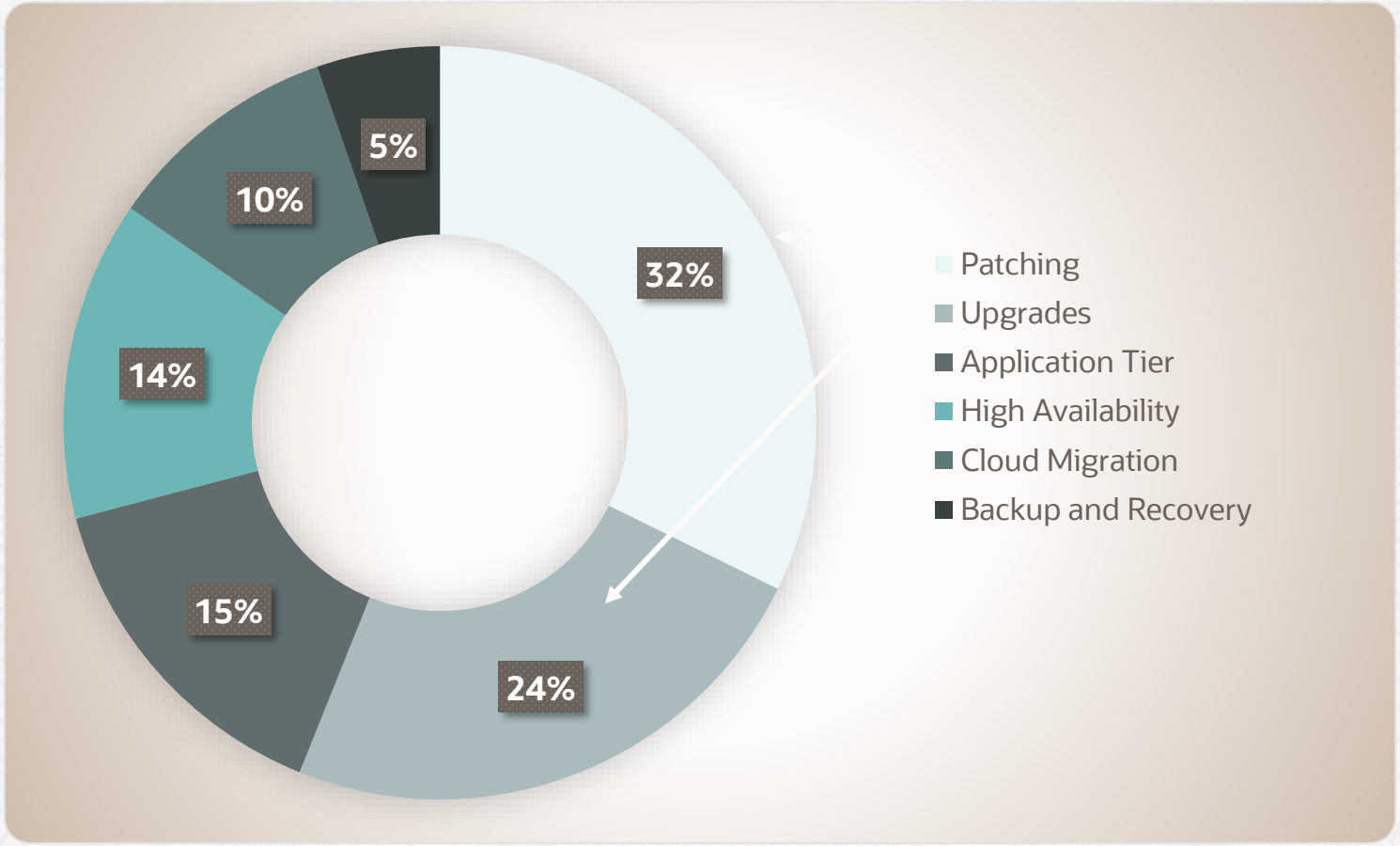
Extreme availability

GoldenGate 26ai replicas, *each running*:

Oracle AI Database 26ai
+ RAC on Exadata
+ (Active) Data Guard

OR
Globally Distributed Database with Raft Replication

Planned Maintenance – a major pain point*



*Maximum Availability Architecture (MAA) Customer Summit survey results

Lifecycle management challenges

Top lifecycle management challenges

Keeping up with updates is time-consuming

Quarterly & Monthly patches are released to reduce risk of :

- Security issues
- Functional issues

Maintenance windows are difficult to obtain from application owners

Non-rolling patching requires longer downtime windows

Patching is a complex and labor intensive activity

Expanding fleets need more personnel to maintain

Keeping software releases standardized is difficult

Configuration drift can lead to unexpected results and avoidable downtime

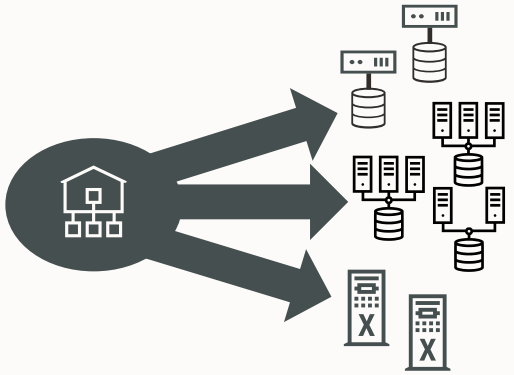
Fleet Patching and Provisioning

Automating out-of-place patching of the Oracle Database and Exadata Stack

FPP Installation types

FPP Local Mode

FPP



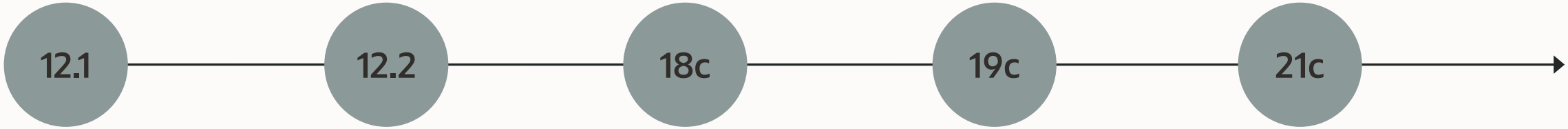
Start small
DB and GI patching in local cluster
Zero configuration needed
Custom user scripts are possible
Resumable actions

Complete Lifecycle Management
Full functionality
Rich feature set
Centralized Management
Centralized Image repository

Some history

A brief History of Fleet Patching and Provisioning

Pioneers in Gold Image based Patching



- First release of Rapid Home Provisioning (RHP) as part of Grid Infrastructure
- DB Home Provisioning
- Database Patching

- Grid Infrastructure Support (deployment, patching, upgrade)
- Database Major Upgrades (with DBUA)

- Zero Downtime Upgrade
- REST APIs
- Exadata Support
- Dry-run evaluation
- Drift Reporting
- Authentication Plugins
- Command Scheduler
- Local Mode (DB patching and GI patching)

- Renamed to FPP
- Zero Downtime Oracle Grid Infrastructure Patching
- PDB Patching and Relocation
- Oracle Restart Support
- Automated Session Draining
- Server Peering
- Autoupgrade integration

- Autoupgrade integration
- Exadata patching enhancements

What's New in Oracle FPP 26ai

New In 26ai

Exadata Full Stack Patching enhancements

Full Data Guard Maintenance Automation

Oracle Fleet Patching & Provisioning 26ai

Support for RAC Two Stage Rolling Updates

Backup restore and relocation FPP server

Store images as zip files

Move pre and post check enhancements (CVU, Exachk, Datapatch)

Scheduler improvements

Exadata Live Update Support

Archiving & unarchiving of gold images

Local mode without Java Container

Single server DB Rolling patching

Transfer working copies as ZIP files

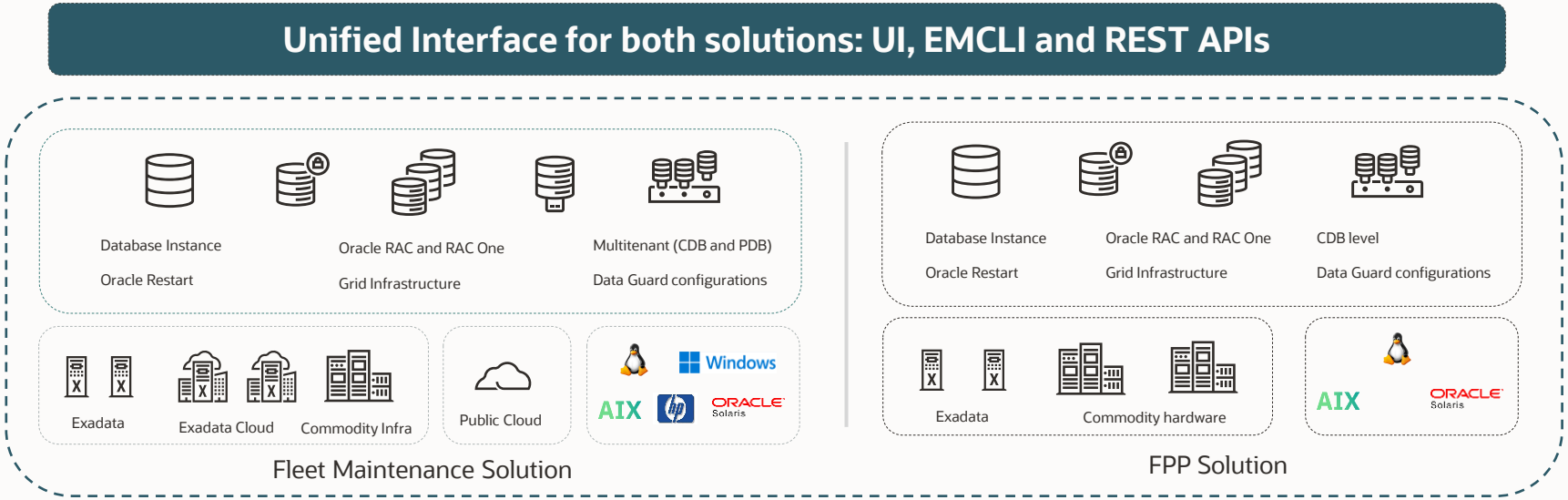
Online Database patching

Oracle Update Advisor integration

Add tags to resources for easy filtering and scheduling

Enterprise Manager Database Lifecycle Management

Unified user experience for Fleet Maintenance and FPP



Guided Intelligent Workflows

- Smart security patch recommendations
- Automated risk assessment
- End-to-end automation to create, deploy, and update gold images to affected targets

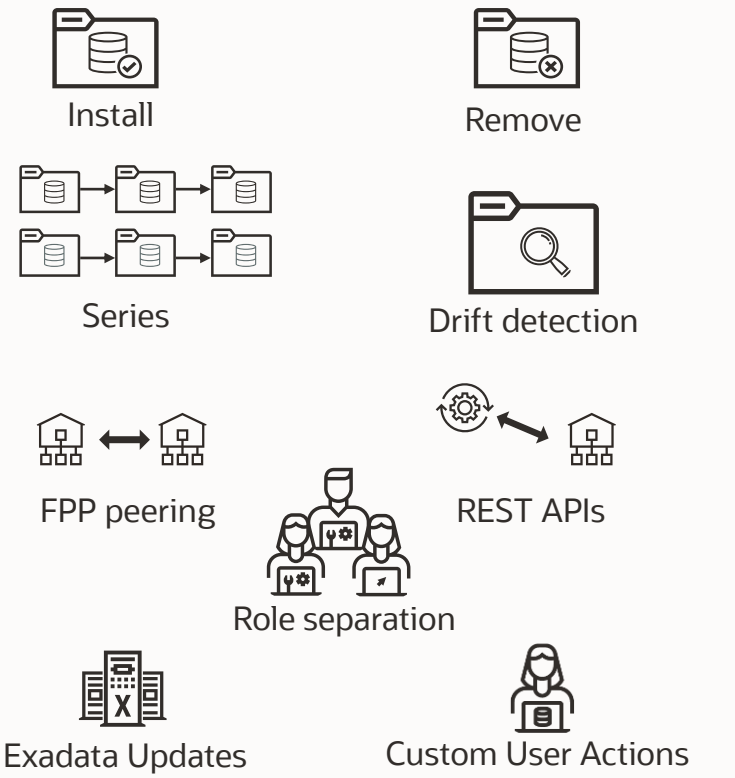
Robust Operational Control

- Supports both Fleet and FPP operations
- Consistent interfaces – REST APIs, EMCLI and UI
- Patch lifecycle operations scheduling
- Troubleshoot, retry, and resume with procedure activity

Overview

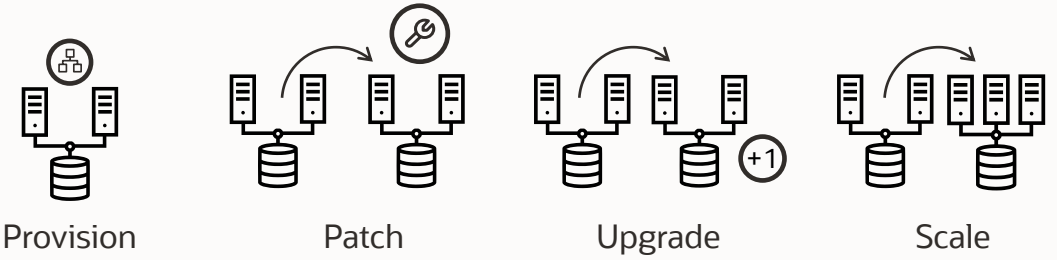
Central mode Fleet Patching and Provisioning – Benefits

Rich feature set



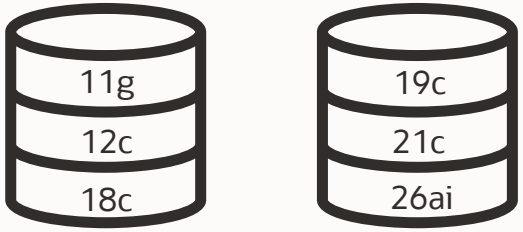
Oracle Database (SI, RAC, RACONE)

Oracle Grid Infrastructure



Fleet Patching and Provisioning (FPP) supported platforms

Oracle AI Database and Grid Infrastructure



- Single instance
- Oracle Restart
- Oracle RAC One
- Oracle RAC

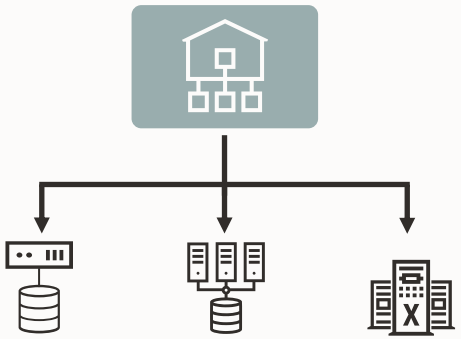
BM

VM

Non-CDB

CDB/PDB

FPP server



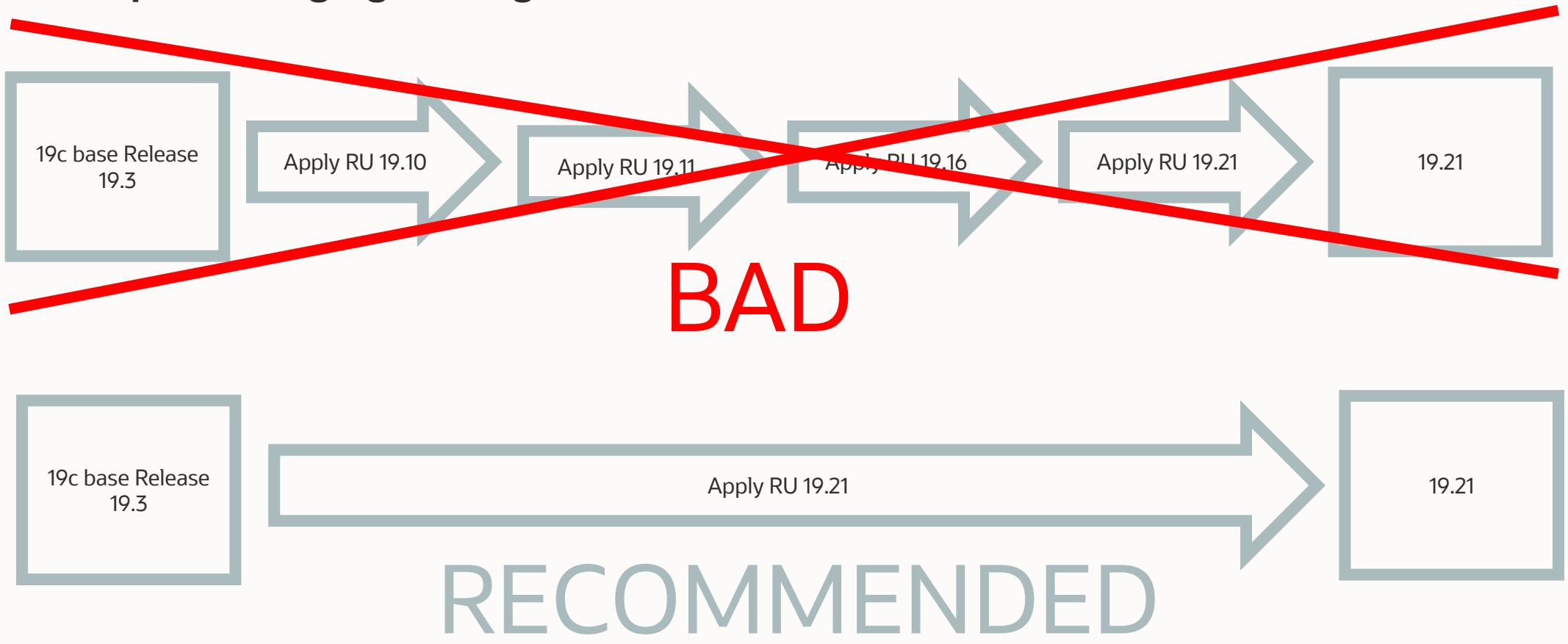
- Generic Software
- Customizable

Multi-OS

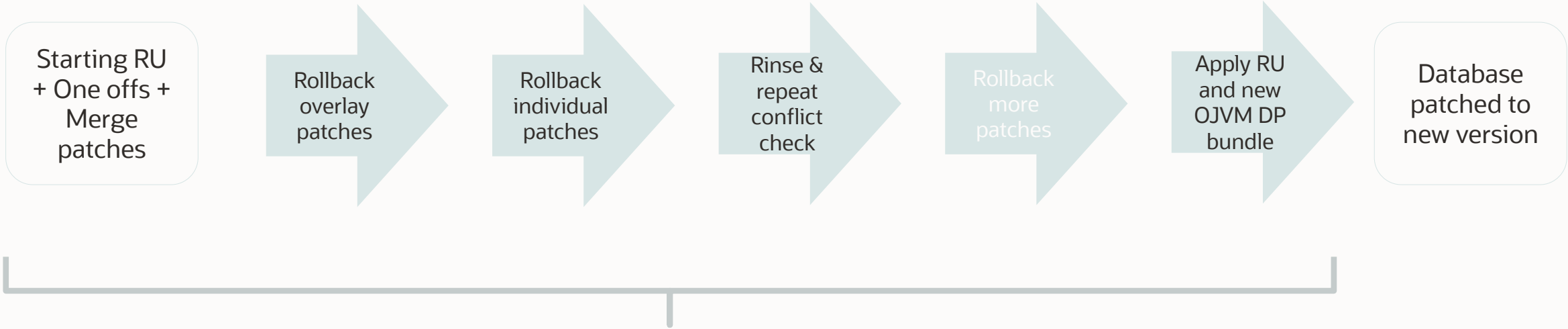
Workflow and Methodology

Recommended strategy for gold image creation

Example creating a gold image for 19.16



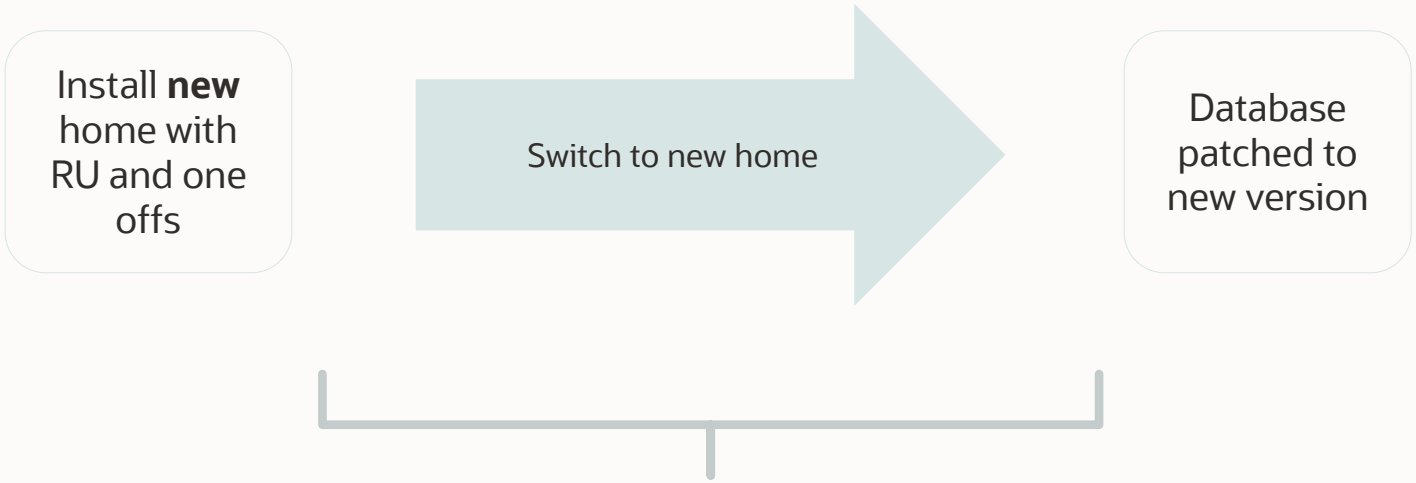
In-place patching



Database instance down during rollback and instance stop/start and datapatch apply

Example from https://mikedietrichde.com/2024/01/10/the-downsides-of-in-place-patching-and-a-patching-lab/

Out-of-place patching

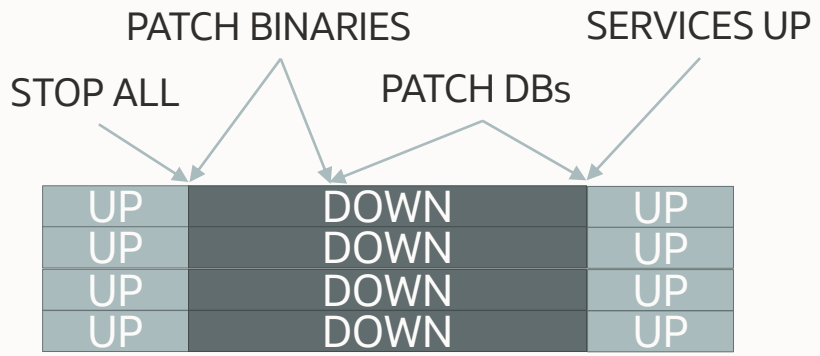


Database instance down for instance reboot and datapatch execution

FPP uses out-of-place patching

Leading the way to standardization and rolling patching

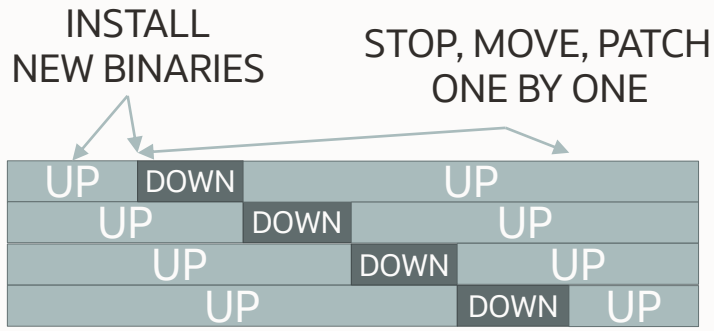
In-place patching:



- No easy rollback
- Long downtime
- Complex process
- Error prone
- Standards not enforced

Out-of-place patching:

ORACLE RECOMMENDED<



- Easy rollback
- Shorter downtime
- **Build binaries once** and use everywhere
- Easier Planning
- Built-in standardization

How to get gold images

19c

Create yourself check :

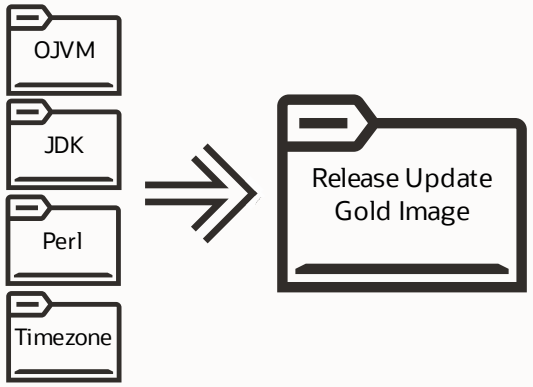
https://blogs.oracle.com/maa/post/fpp-by-example-part-3-creating-gold-images

Create MOS ticket and outsource to support

Creating Gold Image for Oracle Database and Grid Infrastructure Installations (Doc ID 2915366.2)

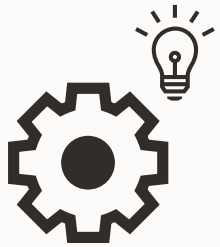
26ai

RUs are distributed as Full versions



Use Oracle Update Advisor

Get Software Health Status and downloadable recommended image

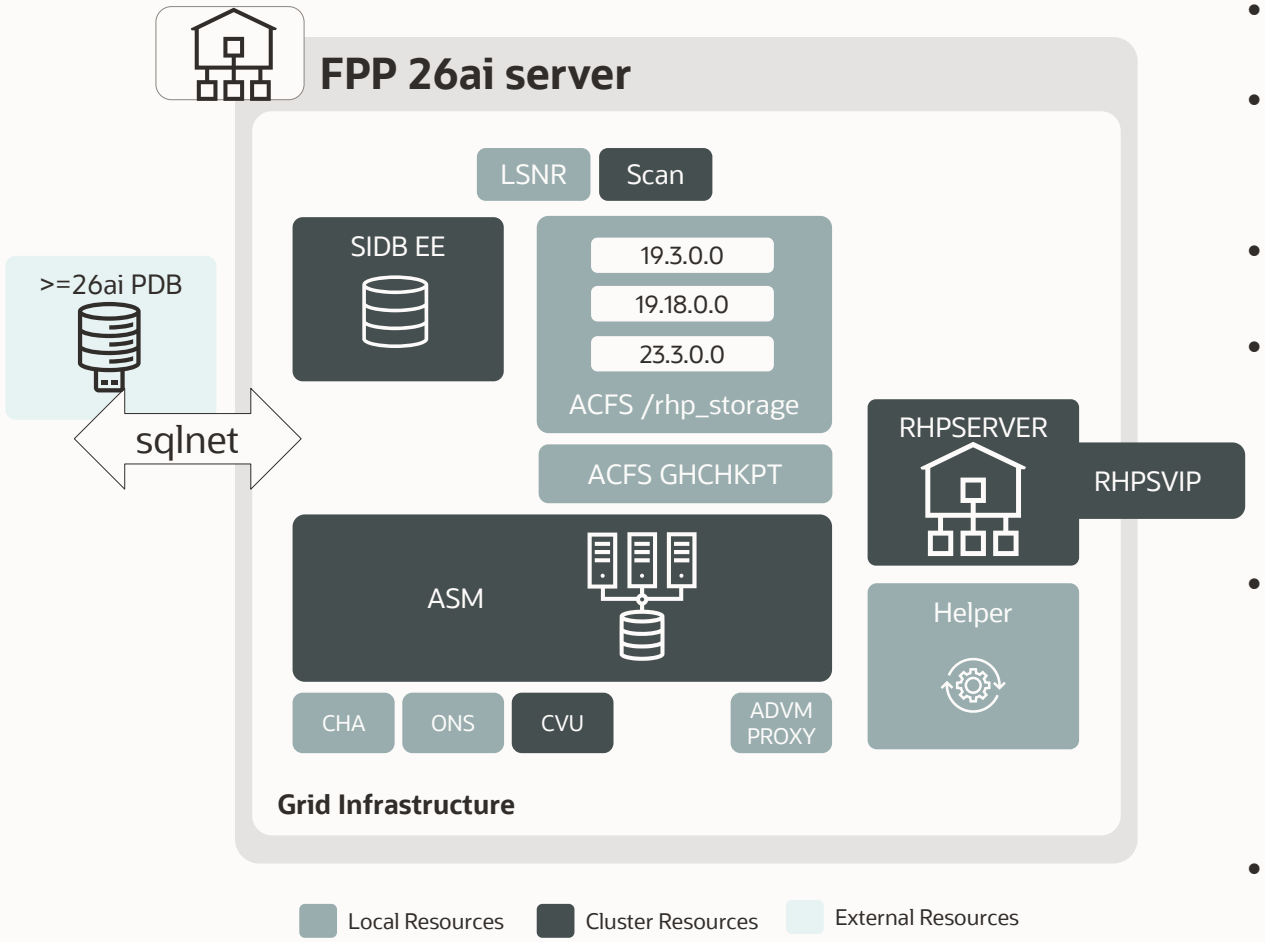


Workflow

Architecture and concepts

FPP server architecture 26ai

New In 26ai



- Server installed, ready to host Grid Infrastructure
  Required firewall ports are open between FPP server and targets
- As from 26ai metadata can be stored in :
  - Single Instance Oracle EE database (Limited license included)
  - Oracle Database of choice RAC (One)
- Remove the local automaton

```
# srvctl remove rhpserver -f
```

- Create the Oracle EE Single Instance Database

```
$GRID_HOME/crs/install/reposScript.sh
-db_home=database_home -mode="Install"
-diskgroup=disk_group_name
```

- Configure and start the RHPSERVER (as root)

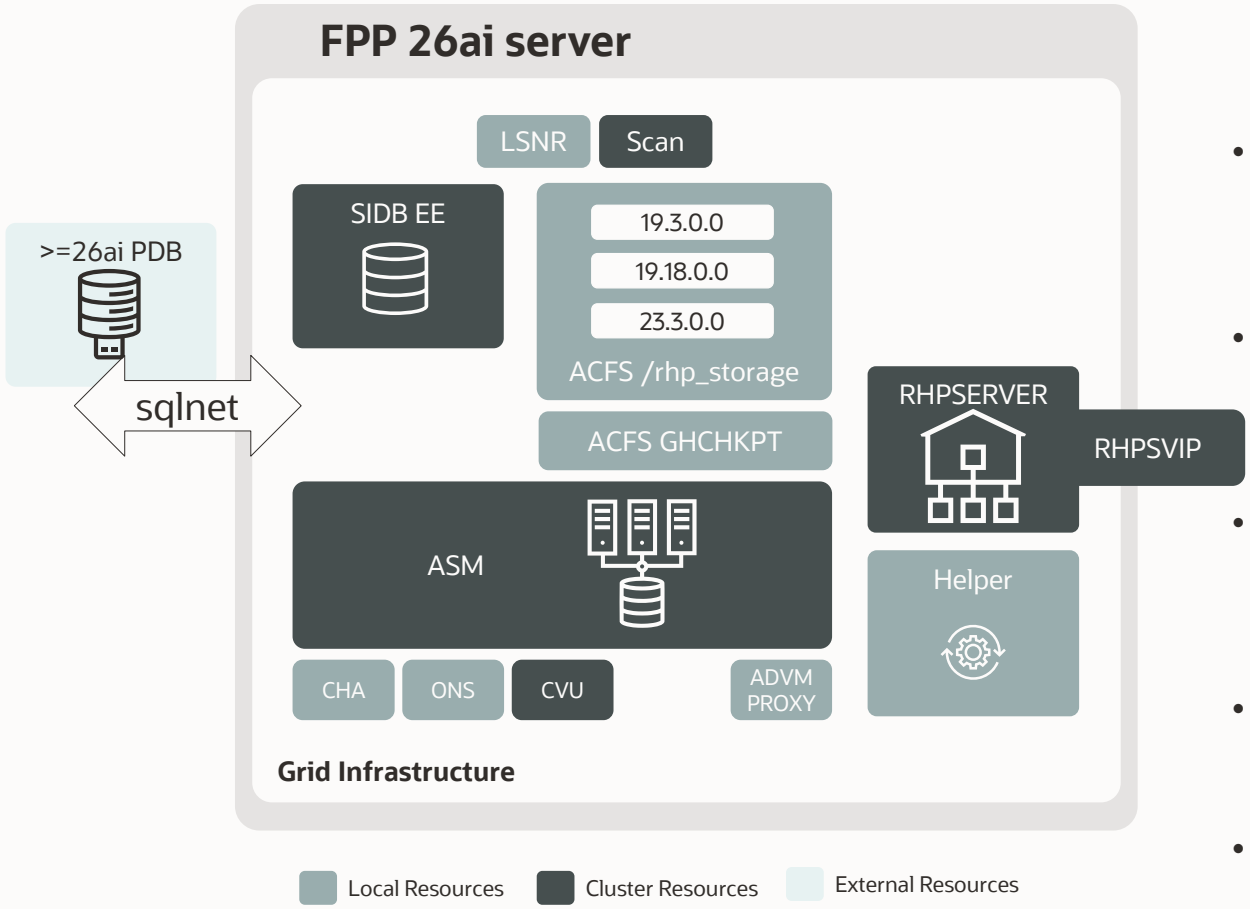
```
# srvctl add rhpserver -storage /rhp_storage
-diskgroup data -rhpsvip_address xxx.xxx.xxx.xxx
-dbType FPPDB
# srvctl start rhpserver
```

- Start working with RHPCTL

```
# rhpctl import image -image DB233_Base \
  -zip /tmp/LINUX.X64_233000_db_home.zip \
  -imagetype ORACLEDBSOFTWARE
```

FPP server architecture 26ai

New In 26ai



- The **RHPSVIP** is needed by RHPCLIENT clusters, it acts as APP VIP for the RHPSERVER with a floating IP address. It simplifies networking firewall flows.
- The **RHPSERVER** orchestrates the tasks, invoking external processes and services. It listens to ports TCP 8894 (HTTPS) and TCP 8896 (JMX RMI) runs in a Micronoid container
- The **HELPER** is present on all FPP Servers and Clients nodes and executes local tasks under the supervision of the RHPSERVER
- FPP uses the GHSUSER23 schema in **Oracle EE single instance DB or External Oracle Database** to store the metadata of everything related to FPP. (Working Copies, Images, Credentials, Audit…)
- The **GHCHKPT** is used to persist the status of tasks so that a restart can pick up from that point.
- The **/rhp_storage/image** mount point contains the ACFS file systems that host copies and snapshots of images and working copies

FPP upgrade from 19c to 26ai

New In 26ai

1st option

Self Upgrade

Metadata from GIMR exported

Imported in a new Single Instance Enterprise Edition Database running on FPP server

2nd option

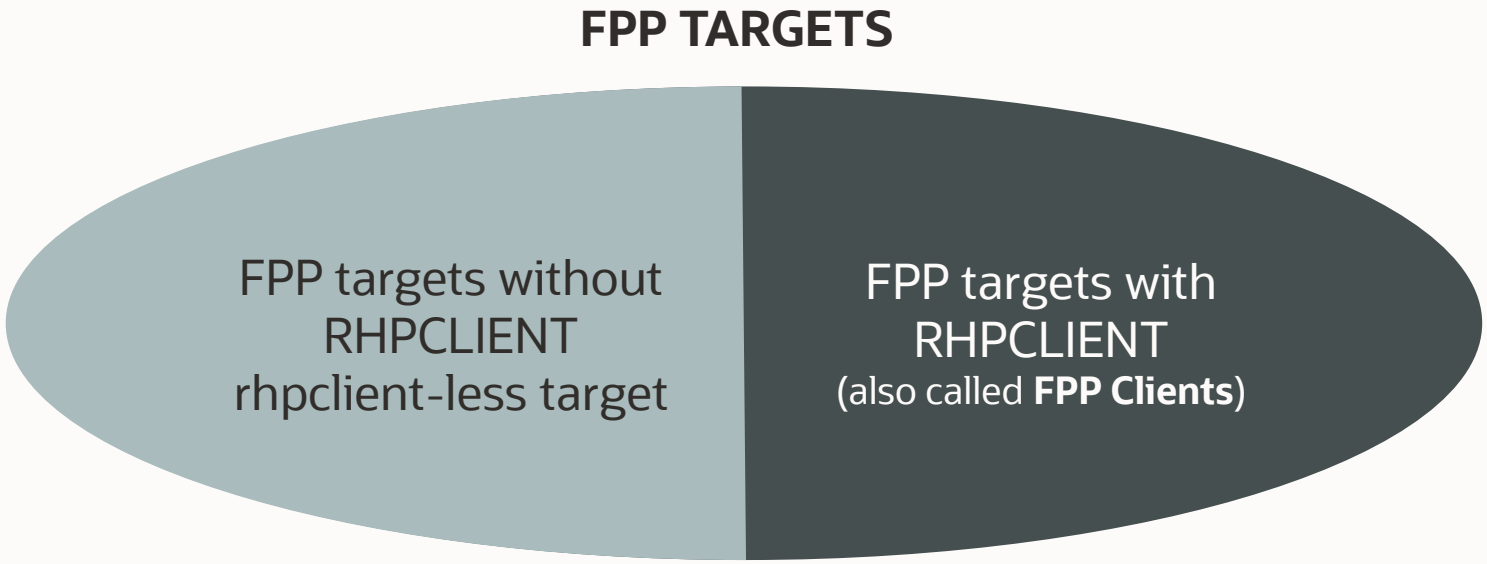
Fresh Install of 26ai FPP server

Switch clients one by one to new FPP server

Import images

Register old workingcopy

Target Types

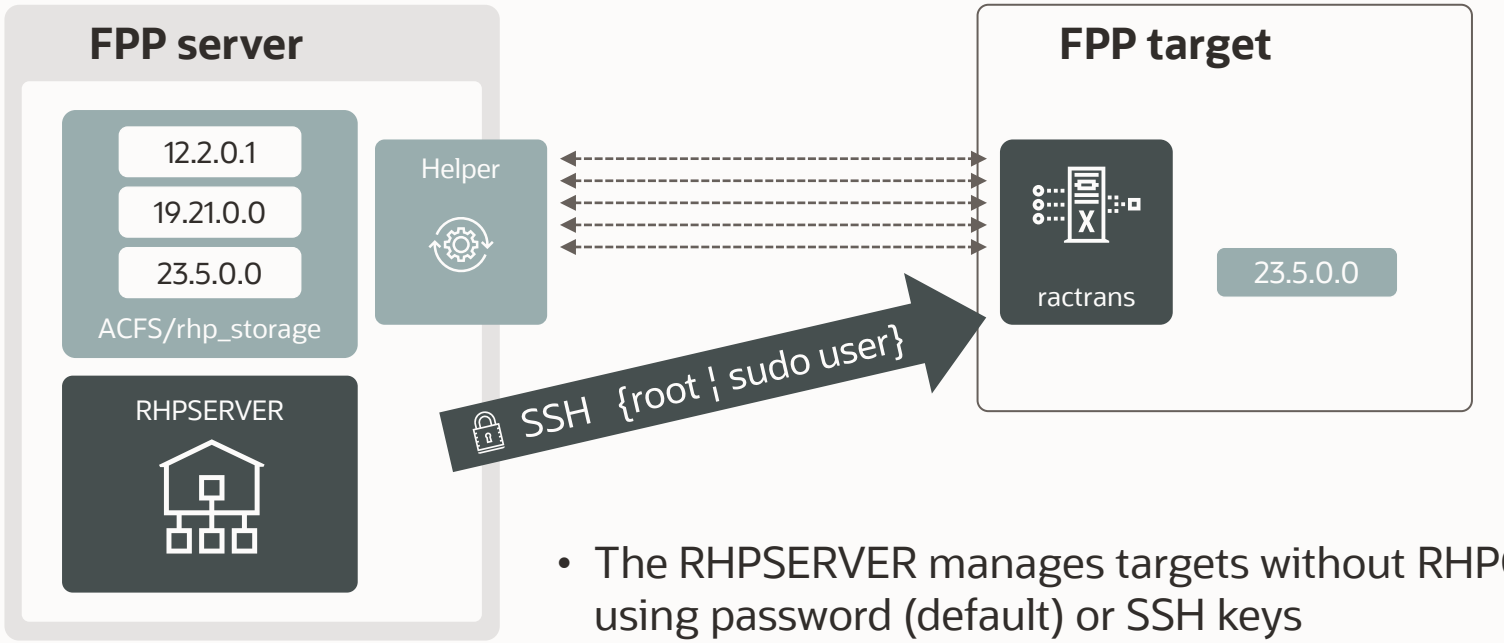


- **GI 12.1 or non-GI target deployments**
- Operations initiated from FPP server only
- Connection via remote SSH commands

- **Grid Infrastructure Clusters release 12.2+**
- Operations initiated from FPP server or client
- Connection via JMX and local processes
- Supports some additional capabilities compared to non-RHPC targets

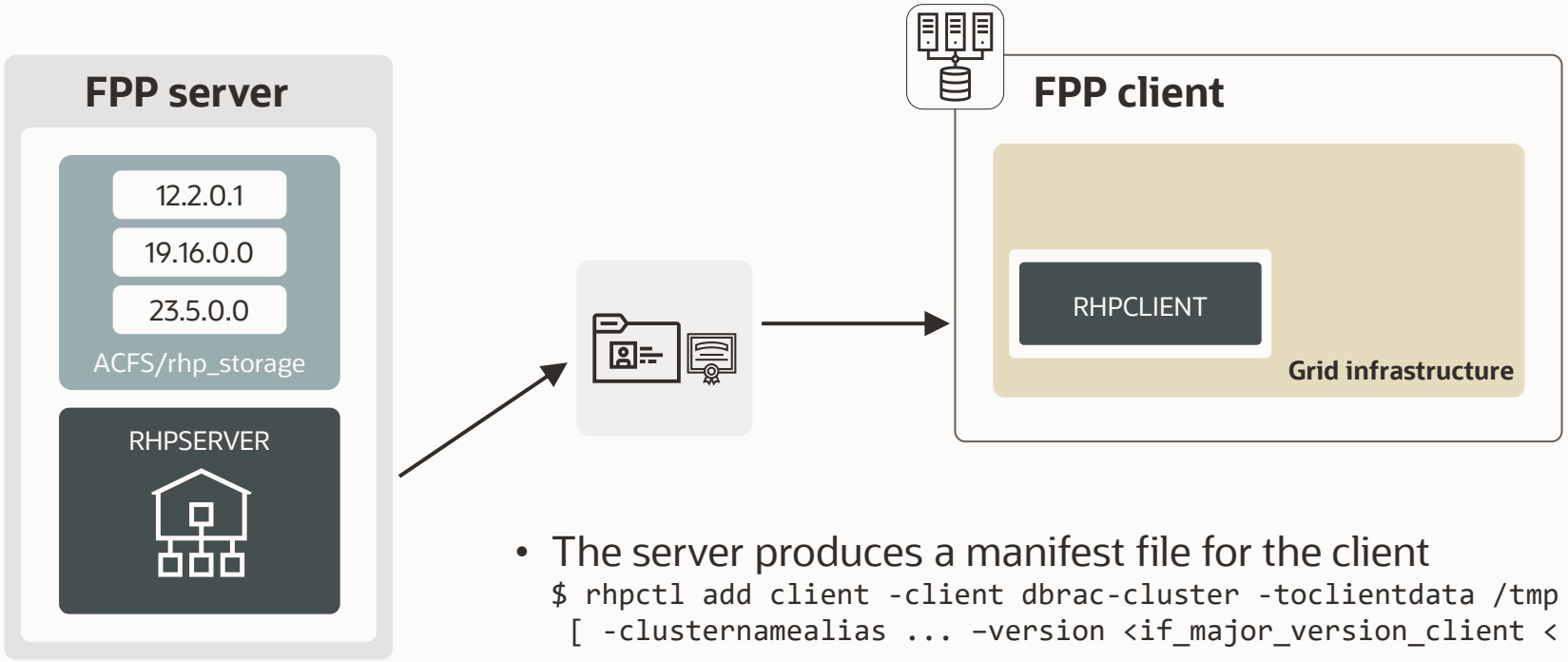
Getting started

FPP targets without RHPCLIENT



- The RHPSERVER manages targets without RHPCLIENT through SSH using password (default) or SSH keys
- Named credentials are stored in the FPP Server OCR
- Working copies are transferred to the target using «ractrans»
  `$ rhpctl add workingcopy -image … -path … -workingcopy … -targetnode … -root`
- The progress is tracked thanks to a listener on the FPP Server.

Adding FPP clients



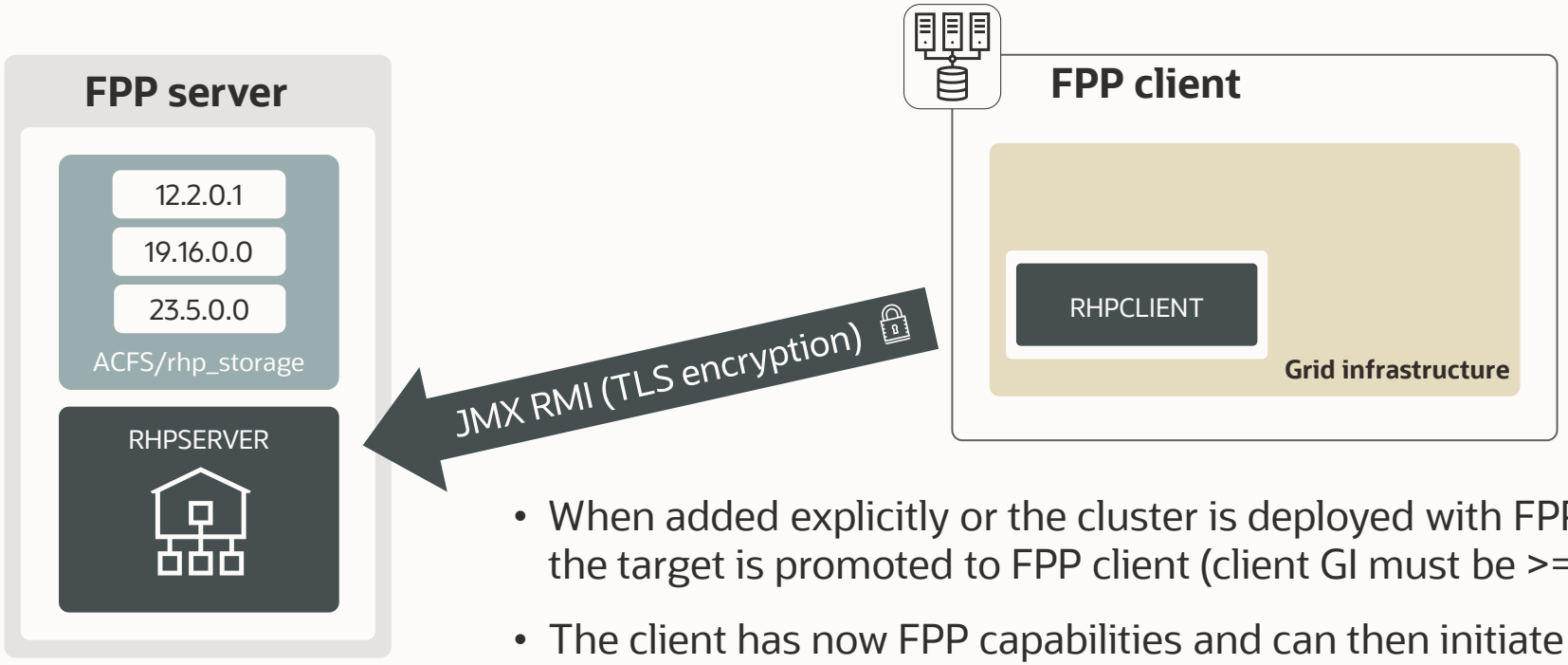
- The server produces a manifest file for the client

```
$ rhpctl add client -client dbrac-cluster -toclientdata /tmp
 [ -clusternamealias ... –version <if_major_version_client < major_version server>]
```

- It must be copied on the client, which uses it to connect to the server (as root)

```
# srvctl add rhpclient -clientdata /tmp/dbrac-cluster-cluster.xml
$ srvctl start rhpclient
$ rhpctl query server
    Rapid Home Provisioning Server (RHPS): fpps01
    Storage base path: /rhp_storage
    Disk Groups: DATA
    Port number: 8896
```

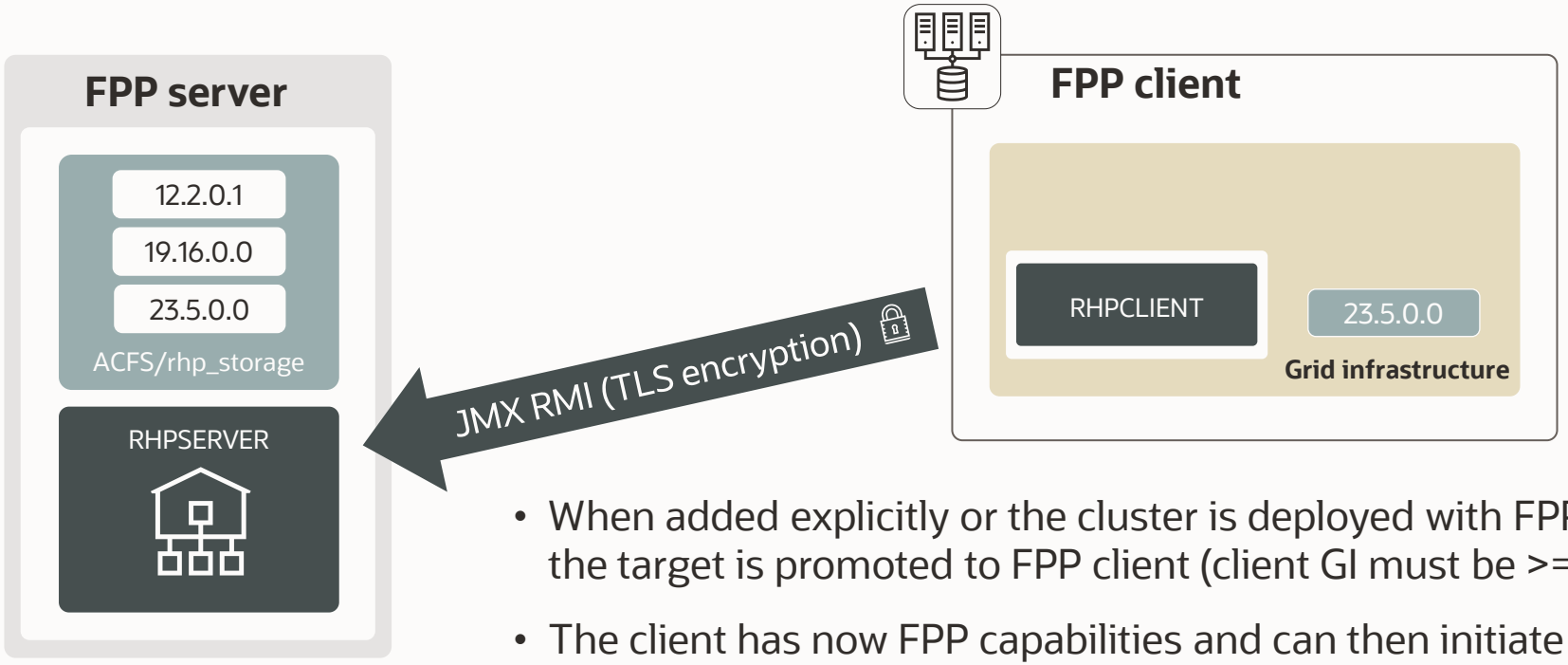
FPP clients



- When added explicitly or the cluster is deployed with FPP, the target is promoted to FPP client (client GI must be >= 12.2)
- The client has now FPP capabilities and can then initiate its own operations
- FPP client and server can communicate through TLS encrypted JMX:RMI. SSH is not needed anymore, root credentials or sudo also not needed.
- file transfer via “ractrans".

```
rhpctl add workingcopy -image … -path … -workingcopy … -client …
```

FPP clients



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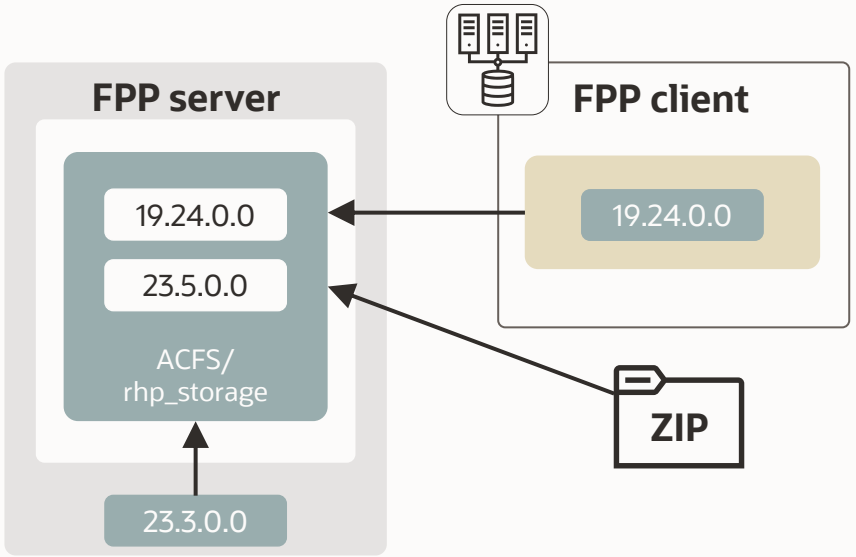
```
rhpctl add workingcopy -image … -path … -workingcopy … -client …
```

Importing images

rhpctl import image



- From zip file
- From existing unmanaged home (local or remote)

- Recommended to :
  1) Import on the FPP server itself, using local home or zip
  2) Start from base release 19.3 (for 19c) then apply RU's and one offs

Check https://blogs.oracle.com/maa/post/fpp-by-example-part-3-creating-gold-images

In 26ai RUs are always full versions
Custom images with one-offs on a specific RU can be asked via MOS

Creating Gold Image for Oracle Database and Grid Infrastructure Installations (Doc ID 2915366.2)

Importing images - Example

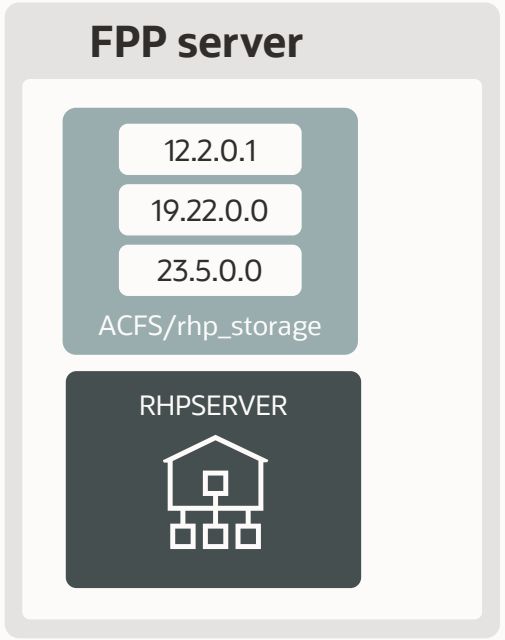
```
rhpctl import image -image gi_19_24_0 -path /u01/app/19.0.0.0/grid -imagetype ORACLEGISOFTWARE
fpps01.pub.fpplivelab.oraclevcn.com: Audit ID: 4
fpps01.pub.fpplivelab.oraclevcn.com: Creating a new ACFS file system for image " gi_19_24_0" ...
fpps01.pub.fpplivelab.oraclevcn.com: Copying files...
fpps01.pub.fpplivelab.oraclevcn.com: Copying home contents...
fpps01.pub.fpplivelab.oraclevcn.com: Changing the home ownership to user grid...
fpps01.pub.fpplivelab.oraclevcn.com: Changing the home ownership to user grid...


rhpctl import image -image db_19_24_0 -path /u01/app/oracle/product/19.0.0.0/dbhome_1
fpps01.pub.fpplivelab.oraclevcn.com: Audit ID: 5
fpps01.pub.fpplivelab.oraclevcn.com: Creating a new ACFS file system for image " db_19_24_0" ...
fpps01.pub.fpplivelab.oraclevcn.com: Copying files...
fpps01.pub.fpplivelab.oraclevcn.com: Copying home contents...
fpps01.pub.fpplivelab.oraclevcn.com: Changing the home ownership to user oracle...
fpps01.pub.fpplivelab.oraclevcn.com: Changing the home ownership to user grid...
```

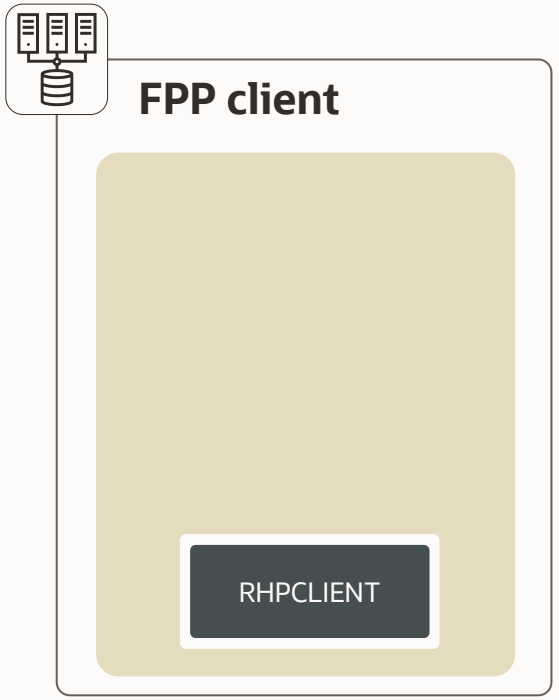

Querying images - Example

```
rhpctl query image -image gi_19_24_0
fpp19c-c11.sub01171652351.lab.oraclevcn.com: Audit ID: 1775
Image name: GI_1924_0
Owner: grid@dbSysmzylwmqq
Site: dbSysmzylwmqq
Access control: USER:grid@dbSysmzylwmqq
Access control: ROLE:OTHER
Access control: ROLE:GH_IMG_PUBLISH
Access control: ROLE:GH_IMG_ADMIN
Access control: ROLE:GH_IMG_VISIBILITY
Parent Image:
Software home path: /rhp/images/iGI_1924_0612605/.ACFS/snaps/iGI_1924_0/swhome
Image state: PUBLISHED
Image size: 11248 Megabytes
Image Type: ORACLEGISOFTWARE
Image Version: 19.0.0.0.0:19.24.0.0.0
Groups configured in the image:
OSDBA=oinstall,OSASM=oinstall,OSBACKUP=oinstall,OSDG=oinstall,OSKM=oinstall,OSRAC=oinstall
Image platform: Linux_AMD64
Interim patches installed: 34697081,36414915,36538667,36758186,36648174,36590554,36587798,36582781
Contains a non-rolling patch: FALSE
Complete: TRUE
```


Patching and Provisioning

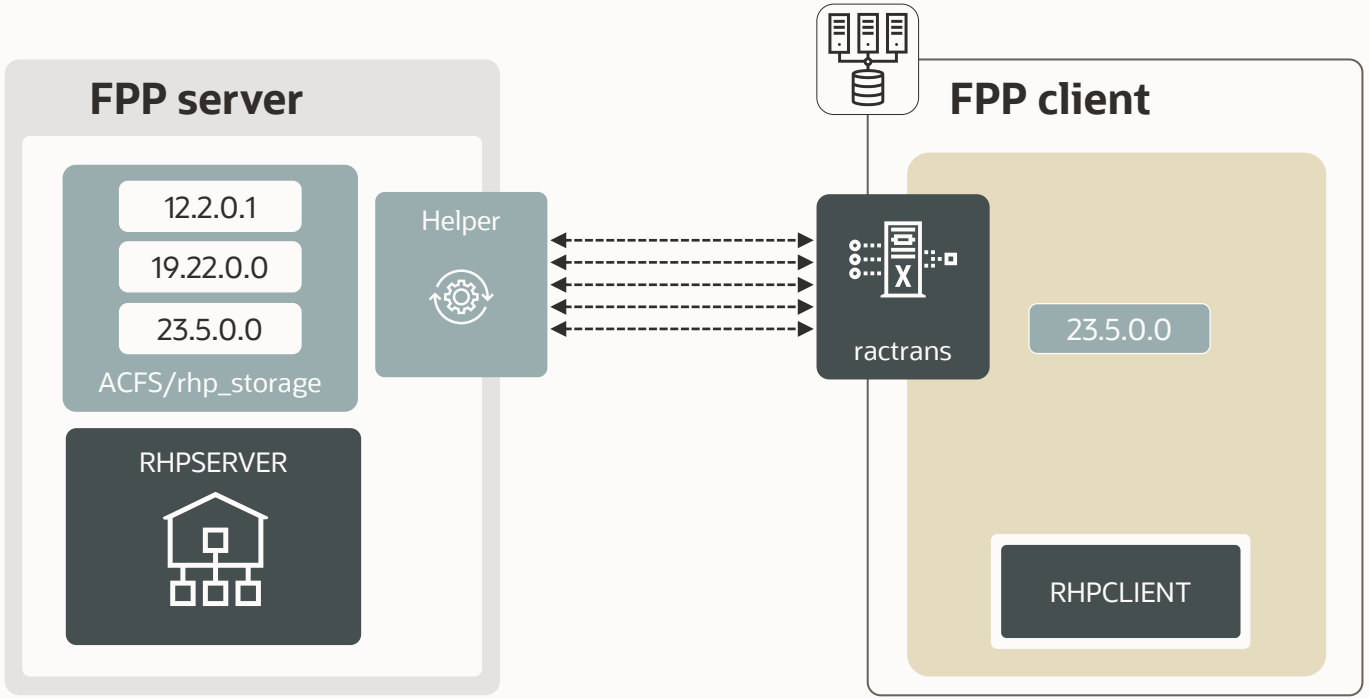
Adding workingcopies with LOCAL storagetype





- Filesystem existence and size are not managed by FPP
- The Oracle Home will be on a local filesystem (must provision on all cluster nodes)
- Whether client (JMX) or not (SSH), the transfer is done via ractrans.
- Minimum 6 ports needed, configurable with:
  `srvctl modify rhpserver -port_range <range>`

Adding workingcopies with LOCAL storagetype



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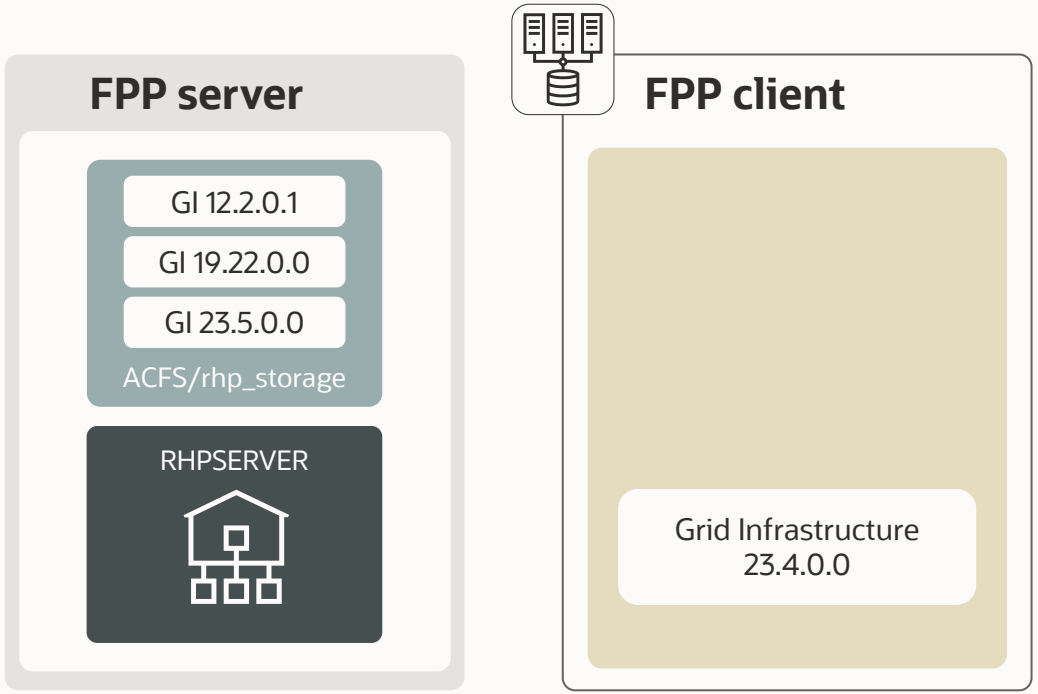
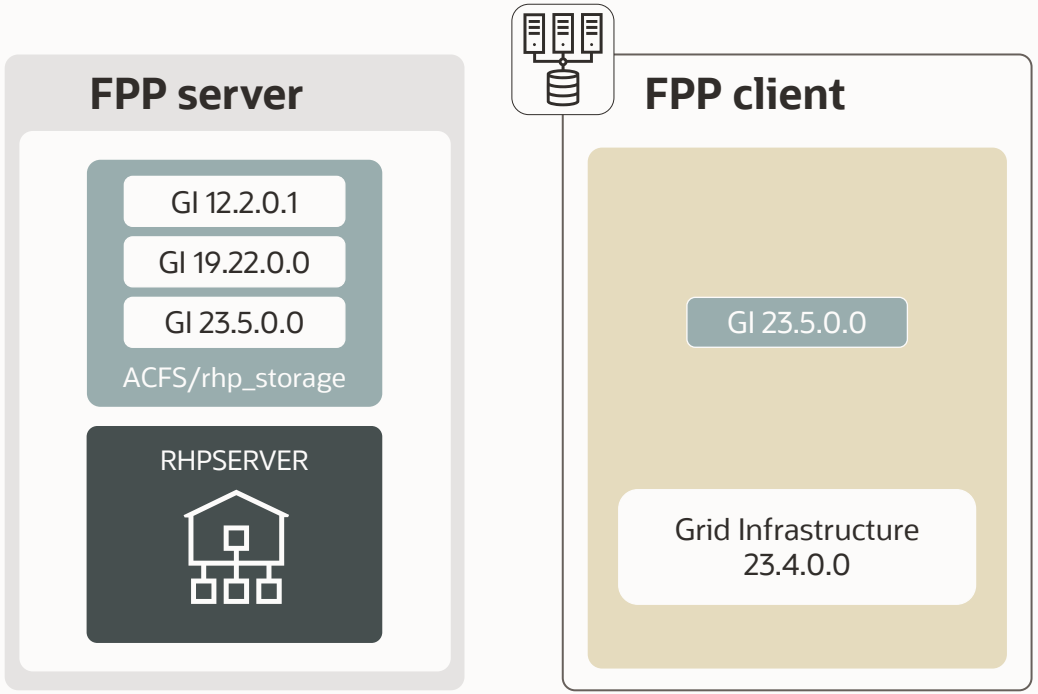
Adding grid infrastructure workingcopy to an existing server/cluster



- GI working copies can only be LOCAL
- GI Software copy works like database software copies
- FPP detects users and groups and assign correct ownership
- A GI stack already exists, the install is «software_only»

Adding grid infrastructure workingcopy to an existing server/cluster



- GI working copies can only be LOCAL
- GI Software copy works like database software copies
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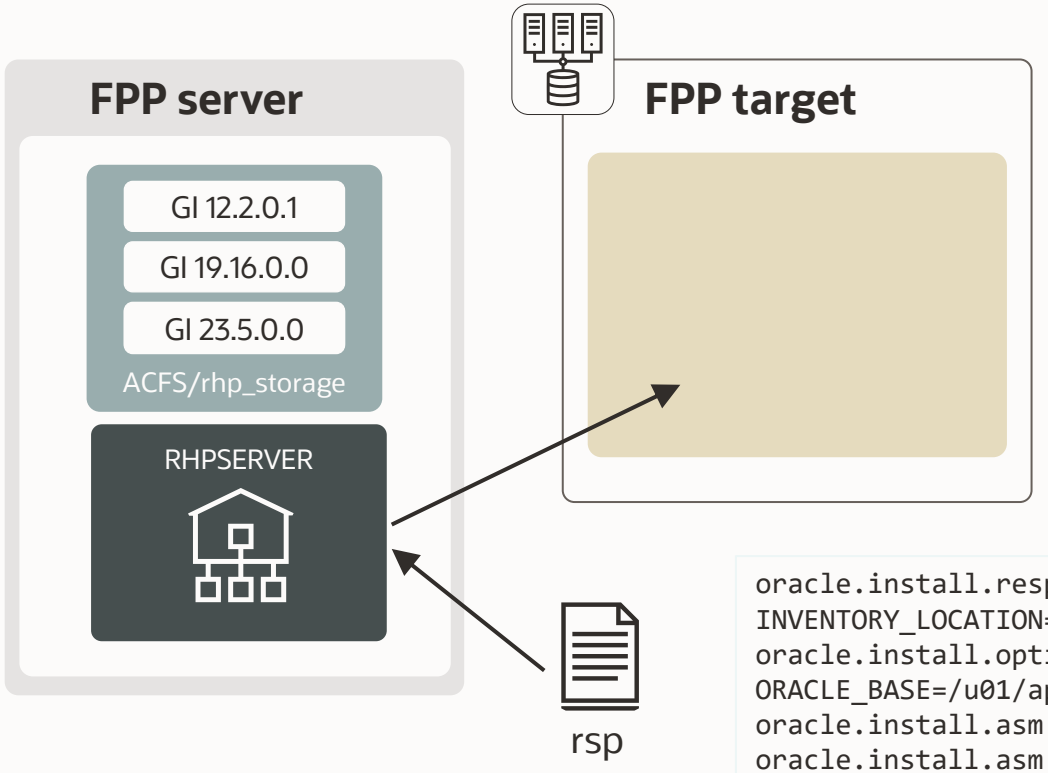
- A GI stack already exists, the install is «software_only»

```
rhpctl add workingcopy –workingcopy <workingcopy_name>
  -image <image_name> \
  -oraclebase <..> -softwareonly \
  -path <..>
```

Adding grid infrastructure workingcopy to a new server/cluster



- A responsfile can be provided to configure the cluster
- GI Software is copied
- FPP takes care of installing and configuring the cluster

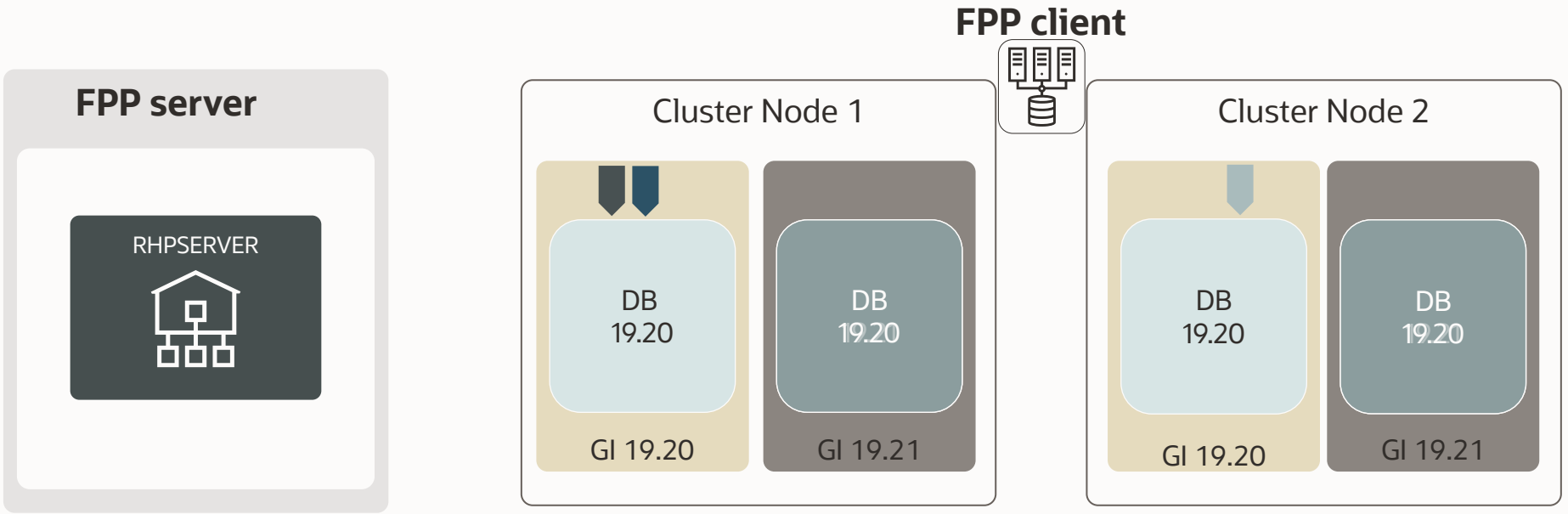
```
oracle.install.responseFileVersion=/oracle/install/rspfmt_crsinstall_response_schema_v19.0.0
INVENTORY_LOCATION=/u01/app/oraInventory
oracle.install.option=HA_CONFIG
ORACLE_BASE=/u01/app/grid
oracle.install.asm.OSDBA=dba
oracle.install.asm.OSOPER=oper
oracle.install.asm.OSASM=asmadmin
oracle.install.asm.SYSASMPassword=
oracle.install.asm.diskGroup.name=DATA
oracle.install.asm.diskGroup.redundancy=EXTERNAL
oracle.install.asm.diskGroup.AUSize=4
oracle.install.asm.diskGroup.disks=/dev/oracleasm/asm-disk1
oracle.install.asm.diskGroup.diskDiscoveryString=/dev/oracleasm/*
oracle.install.asm.monitorPassword=
```

Example: Deployment of an Oracle Restart environment

```
[grid@fpps01 ~]$ rhpctl add workingcopy -workingcopy WC_gi_19_24_0_FPPC   -image gi_19_24_0 -responsefile ~/fppc.rsp \
  -path /u01/app/grid/WC_gi_19_24_0_FPPC -user oracle -oraclebase /u01/app/oracle \
  -targetnode fppc -sudouser opc -sudopath /bin/sudo -ignoreprereq

Enter user "opc" password:
fpps01.pub.fpplivelab.oraclevcn.com: Storing metadata in repository for working copy "WC_gi_19_24_0_FPPC" ...
fpps01.pub.fpplivelab.oraclevcn.com: Creating snapshot "tmpgi_19_24_0WC_gi_19_24_0_FPPC" ...
fpps01.pub.fpplivelab.oraclevcn.com: Changing the home ownership to user oracle...
fpps01.pub.fpplivelab.oraclevcn.com: Copying software contents to Local File System ...
fpps01.pub.fpplivelab.oraclevcn.com: Changing the home ownership to user oracle...
[ . . . ]
fppc: As a root user, execute the following script(s):
fppc:   1. /u01/app/oraInventory/orainstRoot.sh
fppc:   2. /u01/app/grid/WC_gi_19_24_0_FPPC/root.sh
fppc: ..................................................   100% Done.
fpps01.pub.fpplivelab.oraclevcn.com: Successfully executed clone operation.
fpps01.pub.fpplivelab.oraclevcn.com: Executing root script on nodes [fppc].
fppc: Changing permissions of /u01/app/oraInventory.
fppc: Adding read,write permissions for group.
fppc: Removing read,write,execute permissions for world.
fppc:
fppc: Changing groupname of /u01/app/oraInventory to oinstall.
fppc: The execution of the script is complete.
fpps01.pub.fpplivelab.oraclevcn.com: Successfully executed root script on nodes [fppc].
fpps01.pub.fpplivelab.oraclevcn.com: Executing configuration script on nodes [fppc]
fpps01.pub.fpplivelab.oraclevcn.com: Successfully executed configuration script on nodes [fppc]
fpps01.pub.fpplivelab.oraclevcn.com: Executing root script on nodes [fppc].
fppc: Check /u01/app/grid/WC_gi_19_24_0_FPPC/install/root_fppc_2021-03-31_13-24-06-546102180.log for the output of root script
fpps01.pub.fpplivelab.oraclevcn.com: Successfully executed root script on nodes [fppc].
fpps01.pub.fpplivelab.oraclevcn.com: Executing post configuration script on nodes [fppc]
fpps01.pub.fpplivelab.oraclevcn.com: Successfully executed post configuration script on nodes fppc]
fpps01.pub.fpplivelab.oraclevcn.com: Oracle home provisioned.
fpps01.pub.fpplivelab.oraclevcn.com: Working copy creation completed.
```

Grid patching

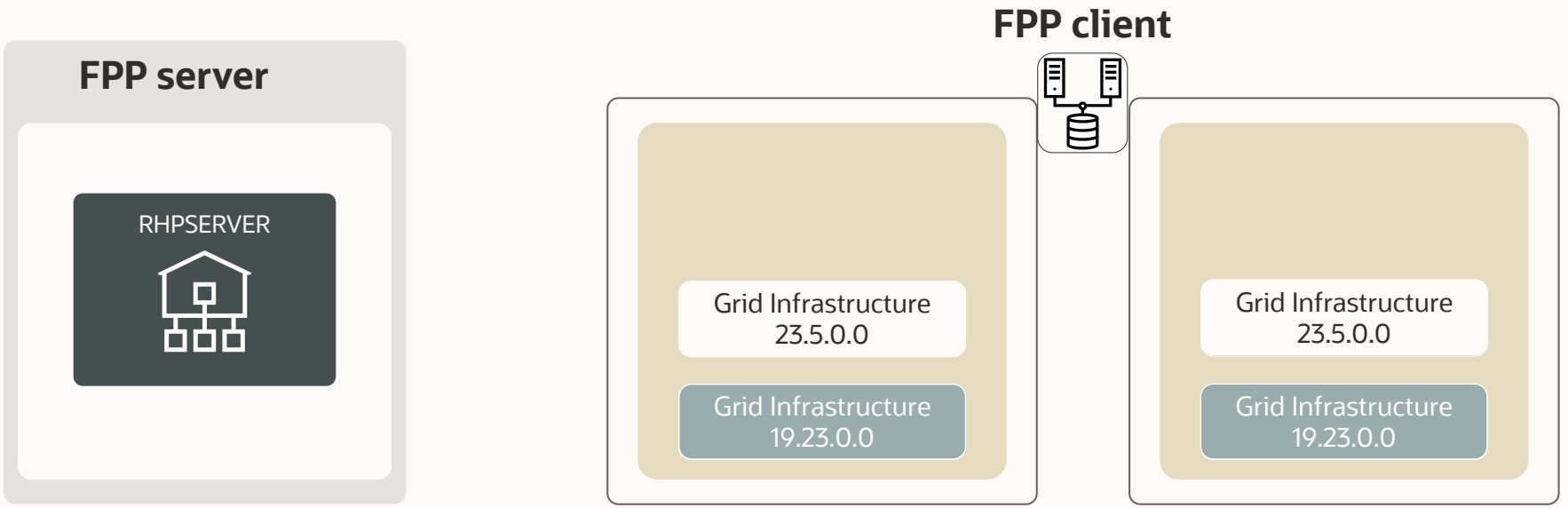
Rolling patching to new grid home




```
rhpctl move gihome \
  -destwc WC_gi192000_cl1 \
  -sourcewc WC_gi192100_cl1 \
  -drain_timeout 600
```

- Rolling by default
- Automated datapatch execution
- Service Drain Timeout honored
- Optionally possible to patch "Vertically" GI + DB in one flow

Grid infrastructure upgrade




```
rhpctl upgrade gihome \
  -sourcewc WC_gi19230_cl1 \
  -destwc WC_gi23400_cl1
```

Adding workingcopies FPP Client vs rhpclient-less target

FPP Client

Rhpclient-less target

```
rhpctl add workingcopy –image <img_name> -workingcopy <wc_name>
-oraclebase <oracle_base> -path <oracle_home> -user <oracle_home_user>
-groups OSDBA=dba,…,OSKM=dba,OSRAC=dba
```

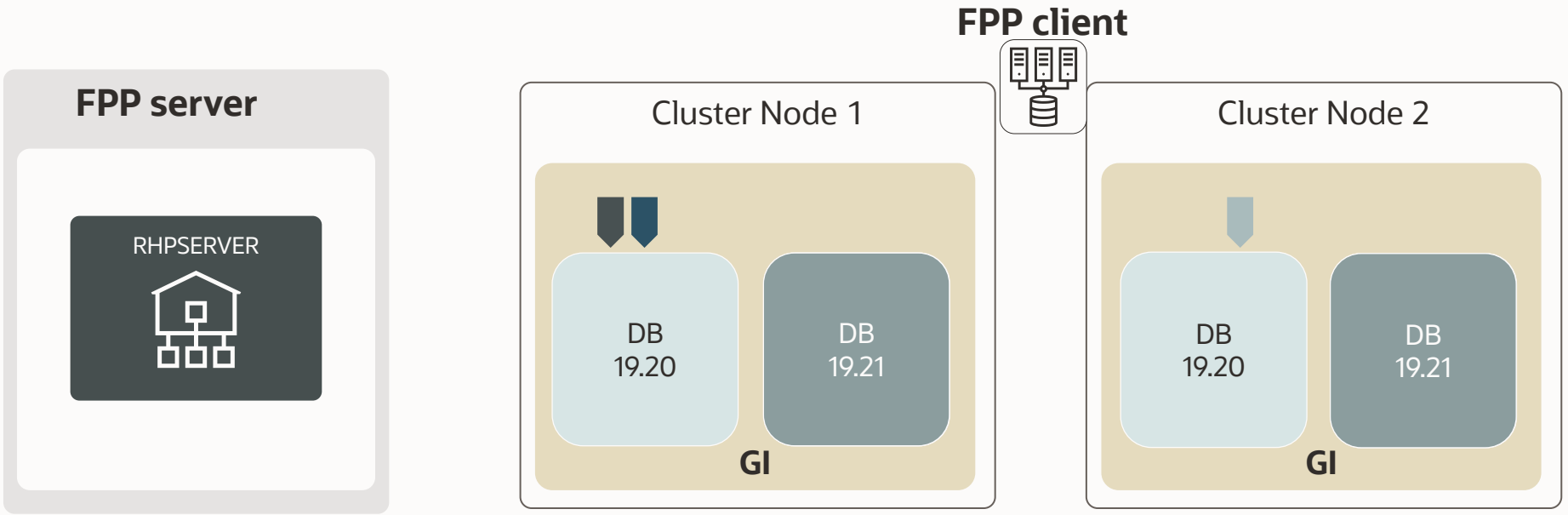
```
-client <client_name>
```

```
-targetnode target
-root | -cred cred_name | -sudouser
sudo_username | -auth sshkey
-arg1 user:ssh_user
-arg2 identity_file:path_to_identity_file
-arg3 sudo_location:path_to_sudo_binary
```

Unless the environment is well standardized always specify the groups

Database patching

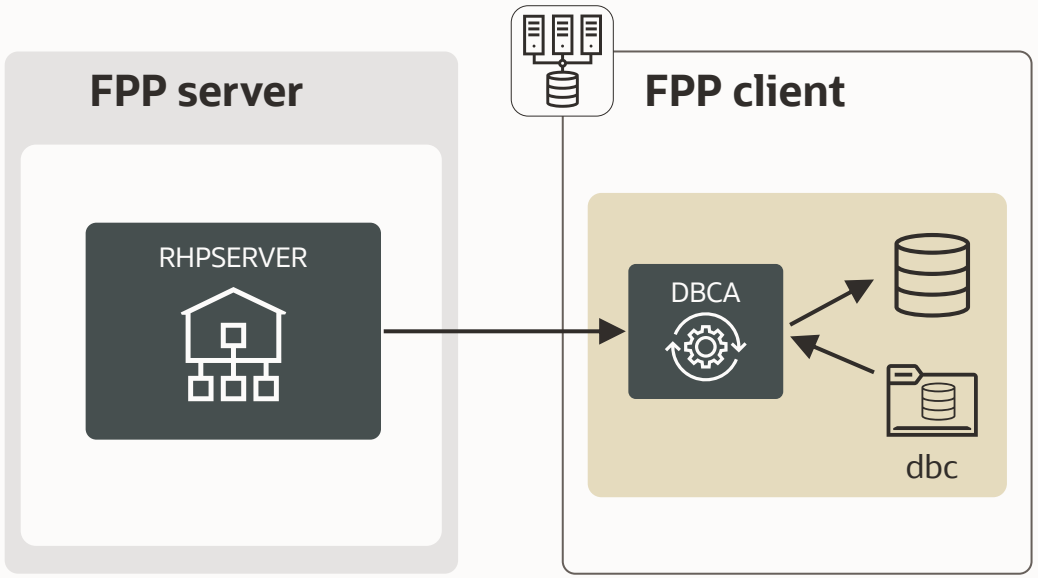
Rolling patching to new database home




```
rhpctl move database \
  -sourcewc WC_db192000_cl1 \
  -patchedwc WC_db192100_cl1 \
  -drain_timeout 600
```

- Rolling by default
- Automated datapatch execution
- Service Drain Timeout honored
- Optionally possible to patch "Vertically" GI + DB in one flow

Provisioning databases



- FPP can provision SINGLE Instance, RAC, RACONENODE databases to FPP Clients
- It executes database creation assistant (DBCA)
- Template files must exist either in the Gold Image or locally on the FPP Client

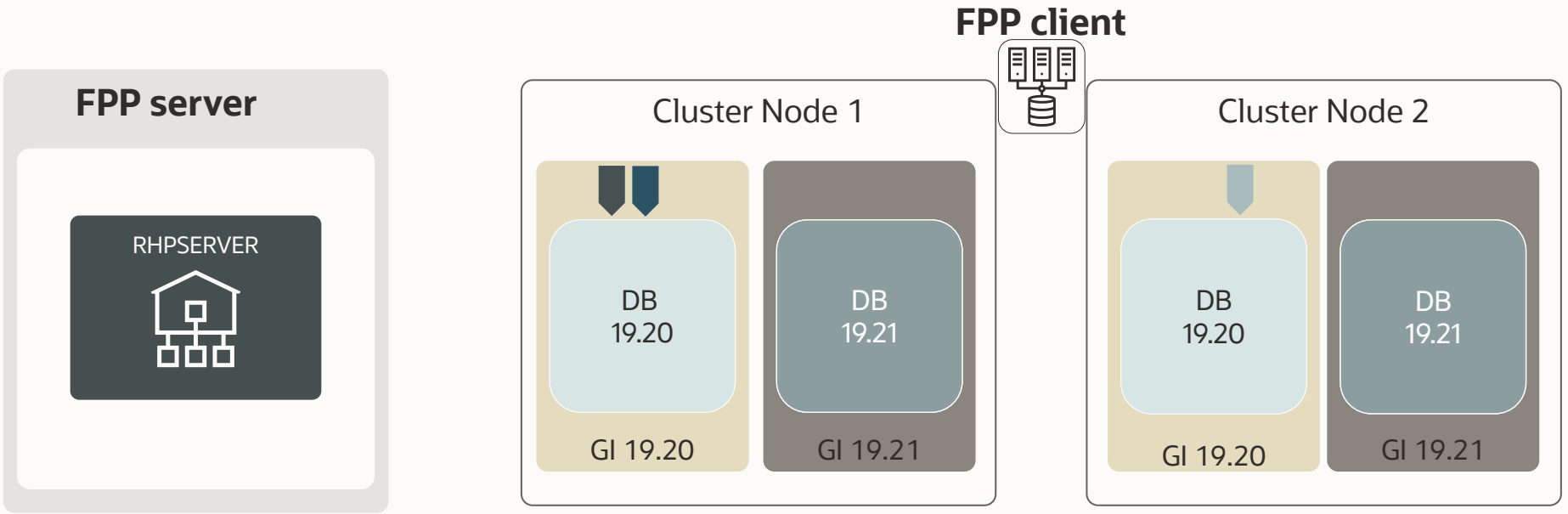
```
rhpctl add database -workingcopy <workingcopy> \
  -dbname <dbuqname> ... \
  –dbtemplate <template_file>
```

Provisioning databases

```
rhpctl add database \
  -workingcopy WC_db_19_12_0_oci_FPPC1_RHP \
  -dbname raccldb2_fra1nn \
  -datafileDestination DATA \
  -targetnode fppc1 \
  -dbtype RAC \
  -cdb \
  -dbtemplate db_19_12_0_oci:assistants/dbca/templates/seed_db.dbc
```

```
$ ls -tr /u01/app/oracle/cfgtoollogs/dbca/raccldb2_fra1nn
initraccldb2frTempOMF.ora.1115202092759  cloneDBCreation.log       catclust_catcon_77650.lst
raccldb2_fra1nn.log                      rmanUtil                 CreateClustDBViews.log
trace.log_2020-12-14_05-55-05PM          plugDatabase.log         lockAccount.log
initraccldb2frTempOMF.ora.1115202094834  ordlib0.log              utlrp0.log
rmanDeleteFiles.sql                      ordlib_catcon_75303.lst  utlrp_catcon_85815.lst
raccldb2_fra1nn0.log                     execemx0.log             postDBCreation.log
trace.log_2020-12-15_09-25-26AM          execemx_catcon_76689.lst raccldb2_fra1nn1.log
tempControl.ctl                          postScripts.log          trace.log_2020-12-15_09-45-48AM
CloneRmanRestore.log                     catclust0.log
```

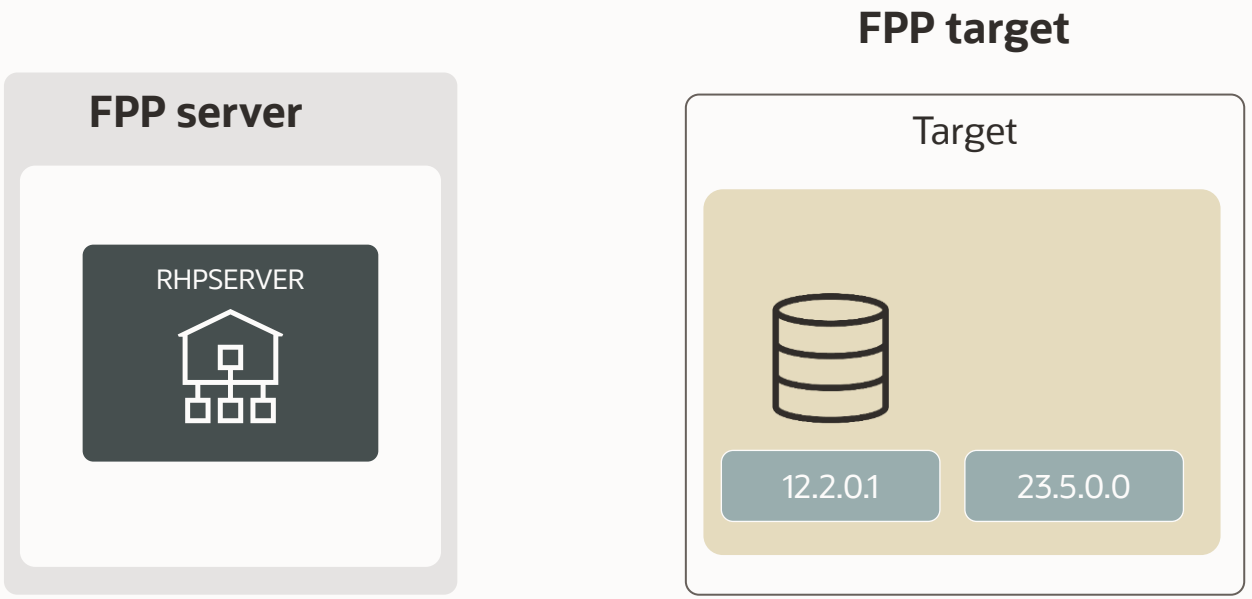
Vertical patching
Combined GI + DB patching




```
rhpctl move gihome -destwc WC_GI_1921_cl1 \
-sourcewc WC_GI_1920_cl1 -auto \
-dbhomes WC_DB_1920_cl1=WC_DB_1921_cl1 \
-drain_timeout 600
```

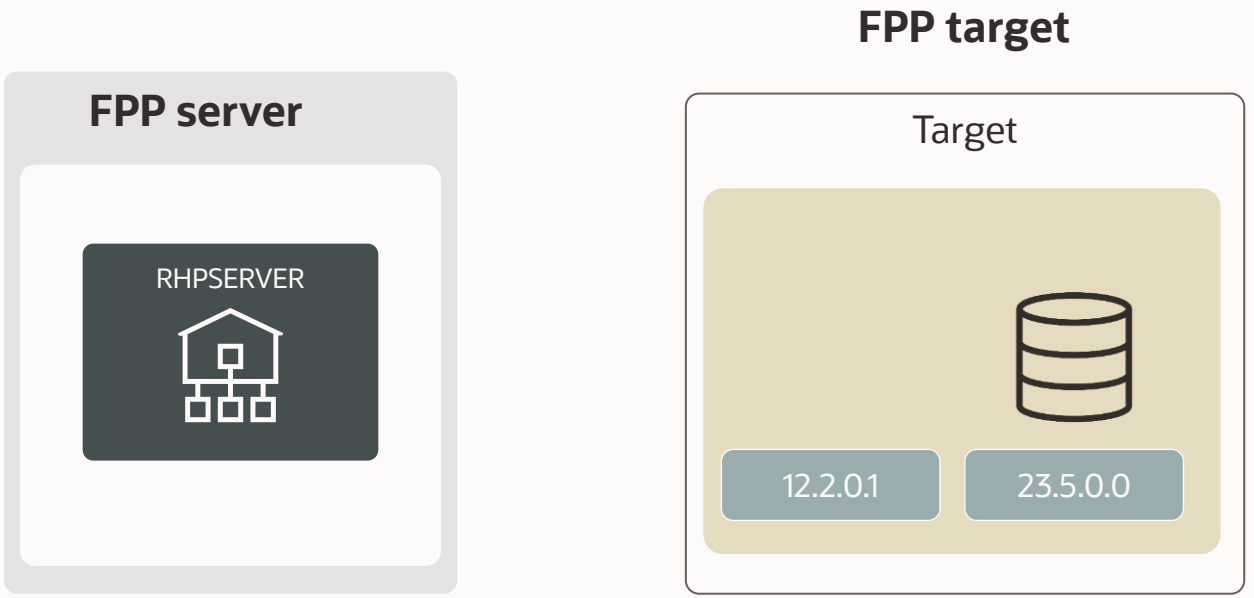
- Compute OS + GI patching possible on Exadata

Database upgrades




```
rhpctl upgrade database \
  -dbname single_fra1nn \
  -sourcewc WC_db12201_cl1 \
  -destwc WC_db2300_cl1 \
  -autoupg
  -upgtimezone YES | NO
  -grp YES | NO
  -restart
```

Database upgrades

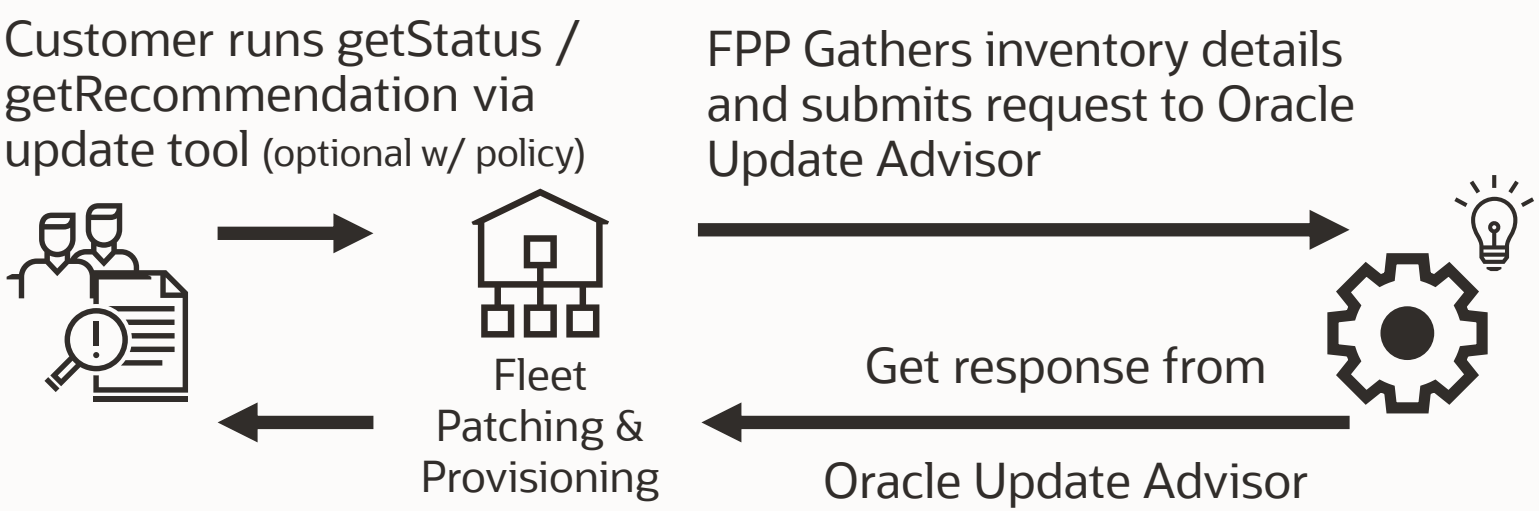



```
rhpctl upgrade database \
  -dbname single_fra1nn \
  -sourcewc WC_db12201_cl1 \
  -destwc WC_db23400_cl1 \
  -autoupg
  -upgtimezone YES | NO
  -grp YES | NO
  -restart
```

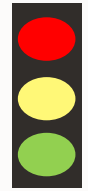
- Uses autoupgrade
  - Upgrade timezone as part of the process
  - Creates a guaranteed restore point
- Make sure to put the most recent `autoupgrade` version in the target image `?/rdbms/admin` check MOS note 2485457.1
- Multitenant conversion possible in 26ai
- Upgrade required downtime

Support for Oracle Update Advisor

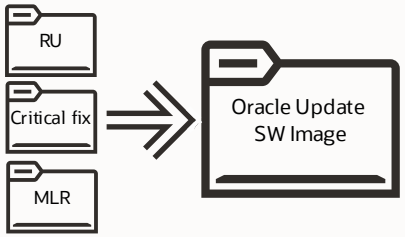
Oracle Update Advisor delivers a streamlined process and comprehensive framework for existing tools, simplifying the update process. It provides software update status, recommendations, and custom-built software images.



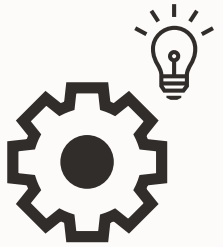
Oracle Update Advisor provides



- Software Status
  - Why Status != GREEN
- Software Recommendation
  - Retain existing fixes in current software
  - Include additional fixes
  - Adjusted per policy
- Software Image
  - Matching recommendation



Using Oracle Update Advisor in FPP (1)



1 Register with OUA*

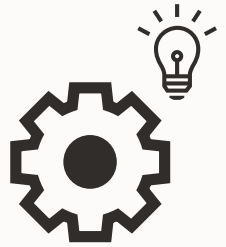
```
rhpctl manage updateadvisor -registeruser
-ssousername abc@xxx.com -csi 12345678
```

2 Get health status and recommendation

```
rhpctl evaluate patch
-image <image_name> | -path <path>
Performing software health check for image "GI239".

Software health status: "YELLOW"
Software health comment: "One cycle behind your
policy."
Software Type: "GI"
Current version: "23.9.0.25.7"
Recommended version: "23.26.0.0.0"
updateLag policy: LATEST (default)
applyFrequency policy: QUARTERLY (default)
```

* FPP Server or Local Mode client needs https (port 443) access to. transport.oracle.com

Using Oracle Update Advisor in FPP (2)



3 Get recommended Gold image

```
rhpctl evaluate patch –image <image>
–generateimage –importtoimage <new_image>
```

This creates a job that will download the image

```
rhpctl evaluate patch -image GI238 -generateimage -importtoimage GI26AI
Audit ID: 352
Operation "rhpctl evaluate patch" scheduled with the job ID "22".
```

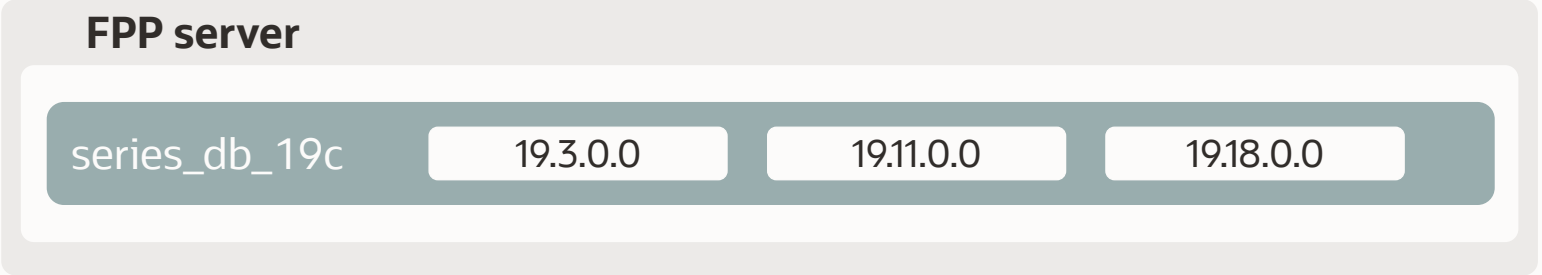
After a while the image is downloaded and imported in the FPP repository(check the job output)

```
Request id: 5120
Check back after estimated time: "2h"
…
Downloading image ...
Downloaded "2,098,843,661" bytes so far, continuing download...
Image downloaded succesfully at location "/rhp/images/ipatchplanimage18205/swhome".
The checksum of the downloaded image has been successfully validated...
Importing image  "GI26AI"...
```

Advanced options

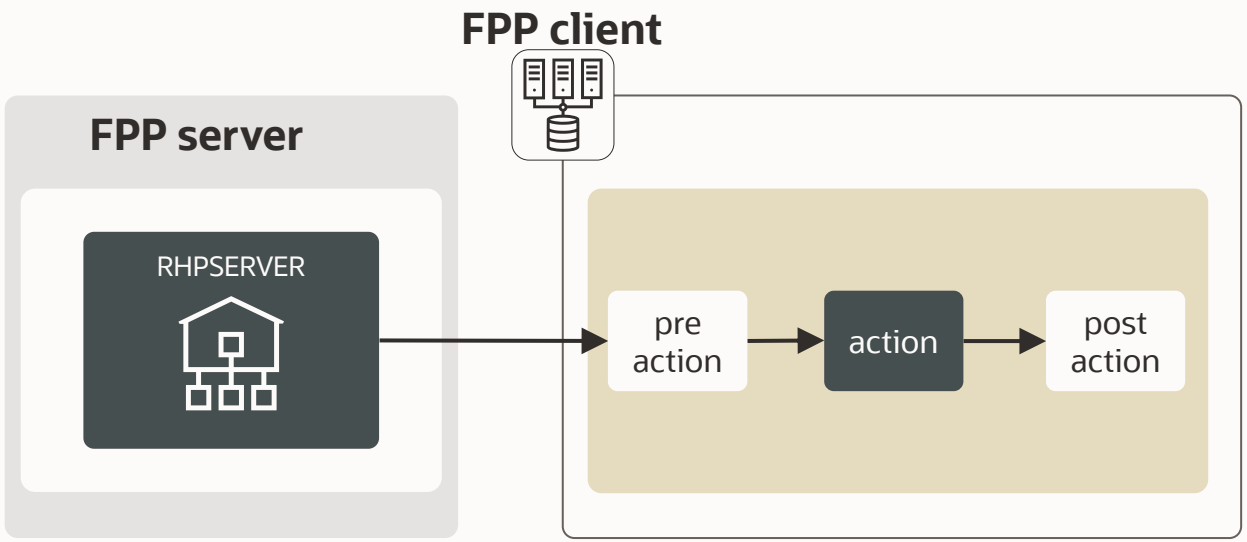
Image series

- Ordered list of images
- Users can subscribe and get notified via e-mail about new images
- Order is useful to get the latest image to patch the DBs




```
rhpctl add series -series series_db_19c
rhpctl insertimage series -series series_db_19c -image db_19_3_0
rhpctl insertimage series -series series_db_19c -image db_19_11_0
rhpctl insertimage series -series series_db_19c -image db_19_18_0
```

User actions



- Pre or Post actions
- On one or all nodes
- On server or client

```
rhpctl add useraction -post -optype ADD_DATABASE  \
  -onerror CONTINUE \
  -useraction action_post_add_database \
  -actionscript /var/opt/dbascripts/action_post_add_database.sh \
  -runscope ONENODE
```

User actions: example script

```
#!/bin/sh
# convert parameters to variables
for i in "$@" ; do
    export $i
done

L_CRS_HOME=$(cat /etc/oracle/olr.loc | grep crs_home | awk -F= '{print $2}')
L_OH=$($L_CRS_HOME/bin/rhpctl query workingcopy -workingcopy $RHP_WORKINGCOPY -metadataonly | grep "Software
home path:" | awk '{print $NF}')
L_HOSTNAME=$($L_CRS_HOME/bin/olsnodes -l)
L_SID=$(echo $RHP_DBNAME | cut -c 1-8)

# add EMCC target
/var/opt/dbascripts/emcli/emcli add_target   -name="$RHP_DBNAME" \
      -type="oracle_database"    -host="$L_HOSTNAME" \
      -credentials="UserName:dbsnmp;password:\
      -properties="SID:$L_SID;Port:1521;OracleHome:$L_OH"

# register in RMAN catalog
export ORACLE_HOME=$L_OH
$L_OH/bin/rman target / catalog rman/secret@rcvcat <<EOF
  register database;
  exit
EOF
```

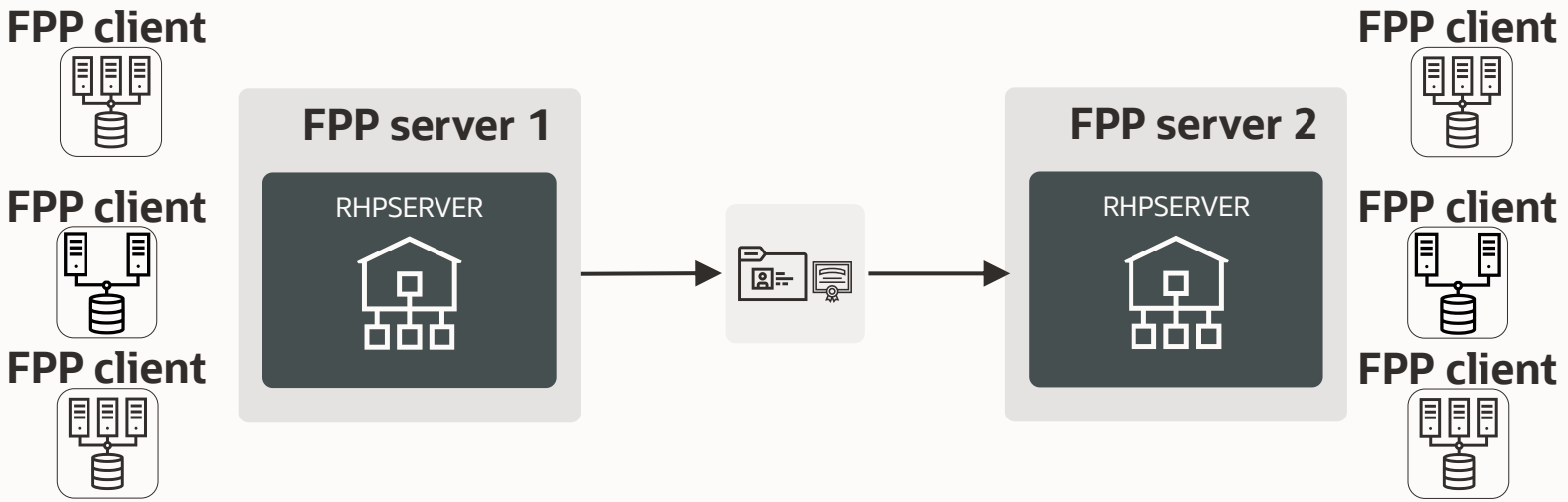
Drift reporting

```
$ rhpctl query image -drift
fpp19c-c12.sub01171652351.lab.oraclevcn.com: Audit ID: 857
Image "DB_1914_oci" with additional bug fixes on its working copies "33563137,31844357,33184467"
Image "DB_1914" with additional bug fixes on its working copies
"31306261,29224710,29445548,31359215,29415774,
32165759,28777073,31844357,29540327,30895577,33184467,30134746,32069696,32124570,31247838,31776121,
29774362,29512125,29254623,31668872,32032733,30534662,33223248,30855101,29540831,32327201,30889443,
26716835,30674373,29942275,32167592,33563137,32892883,32523206,30160625"


rhpctl query workingcopy -image DB_1914 -drift
fpp19c-c12.sub01171652351.lab.oraclevcn.com: Audit ID: 859
Working copy "WC_DB1914_fppc01_2" with additional bug fixes
"29445548,29254623,29540327,29774362,30134746,30160625,30534662,29512125,29942275,30855101,31306261,31359215,
30895577,29224710,26716835,31668872,32165759,32069696,32032733,30889443,30674373,32167592,32523206,29415774,2
8777073,32124570,31247838,29540831,32892883,31776121,33223248,33563137,33184467,31844357,32327201" fetched on
4/26/22 2:57 PM
```

Audit

```
$ rhpctl query audit -operation add -entity workingcopy
Audit ID: 37
Start time: 2021-08-11T15:35:25.852
Command executed: rhpctl add workingcopy -image db_19_12_0_oci -storagetype LOCAL -workingcopy
WC_db_19_12_0_oci_FPPC1 -user oracle -oraclebase /u01/app/oracle -client dbSys67uwrlqq -path
/u01/app/oracle/product/db_19_12_0_oci
End time: 2021-08-11T15:42:35.000
Command result: SUCCESS
User name: grid
Node name: fpps@dbSysxcfxydga
Target cluster: dbSys67uwrlqq

Audit ID: 47
Start time: 2021-08-14T15:49:40.166
Command executed: rhpctl add workingcopy -image db_19_12_0_giaas -storagetype RHP_MANAGED -workingcopy
WC_db_19_12_0_giaas_FPPC1_RHP -user oracle -oraclebase /u01/app/oracle -client dbSys67uwrlqq
End time: 2021-08-14T16:01:03.000
Command result: SUCCESS
User name: grid
Node name: fpps@dbSysxcfxydga
Target cluster: dbSys67uwrlqq
```

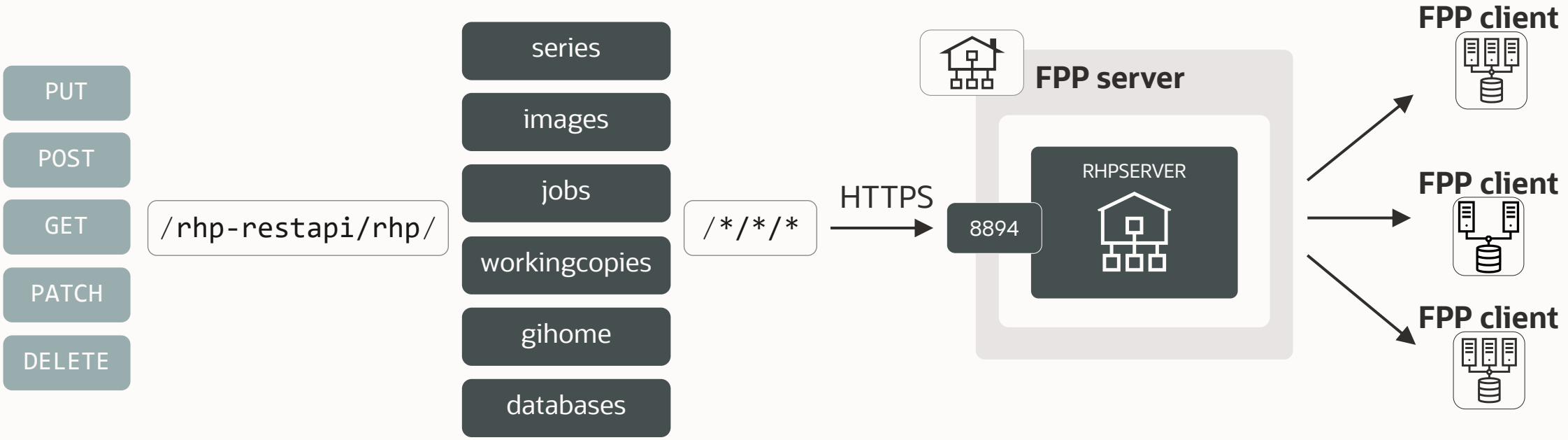

Server peering concept



- Used when you have different distant networks
  - Each FPP server has its own targets / clients
  - Reduces latency because server are closer to the clients

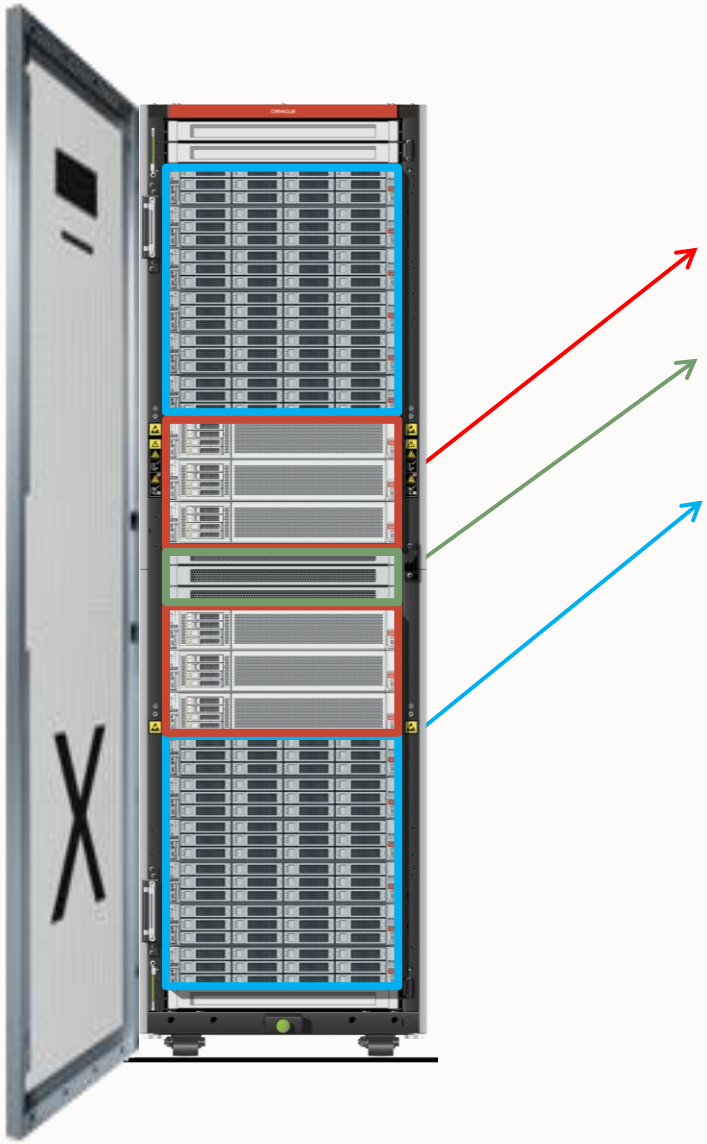
- Images are synced between the two peering servers : uniform images across regions
- Sync Direction can be chosen / configured

REST APIs



- Integrate FPP with Ansible, APEX, Rundeck, custom applications
- REST API documentation **REST APIs for Oracle Database** book https://docs.oracle.com/en/database/oracle/oracle-database/19/dbrst/

Exadata Software Patching



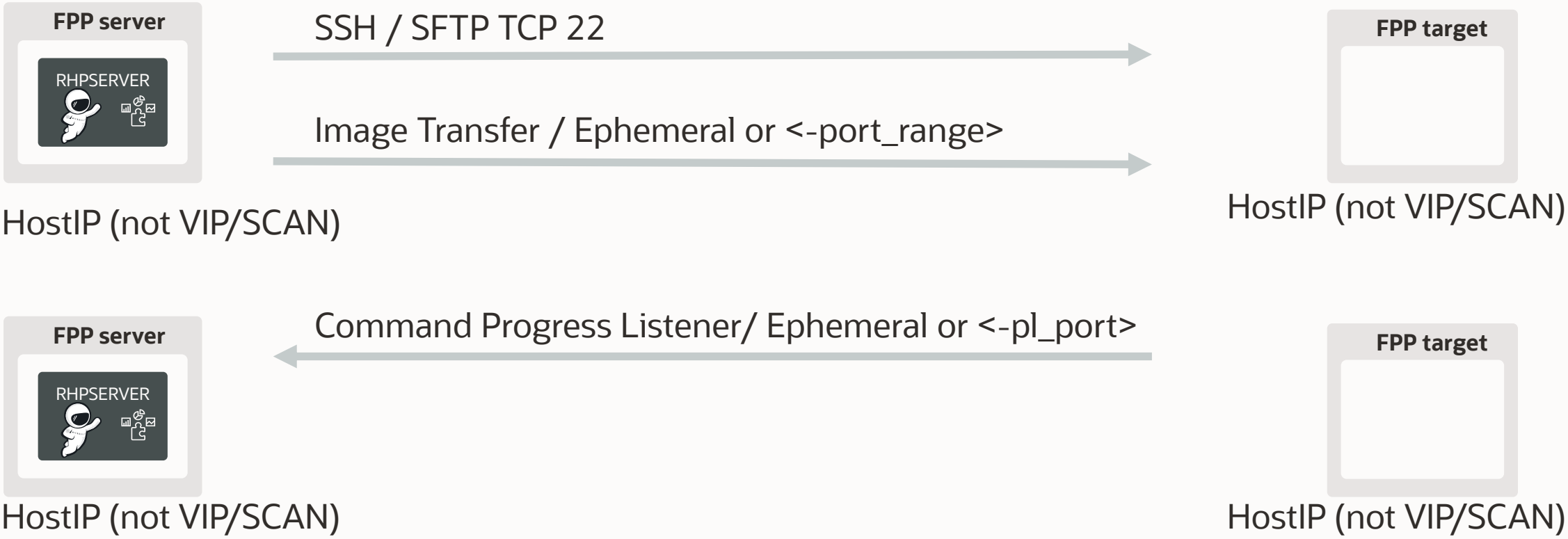
Exadata software patching :

- DB Nodes, Dom0, KVMHost, DomU, KVMGuest
- Network Switches (IB,RoCE)
- Storage Servers

- Vertical Patching : DB Node + GI Patching – with a single bounce of Grid Infrastructure and Database

Networking setup

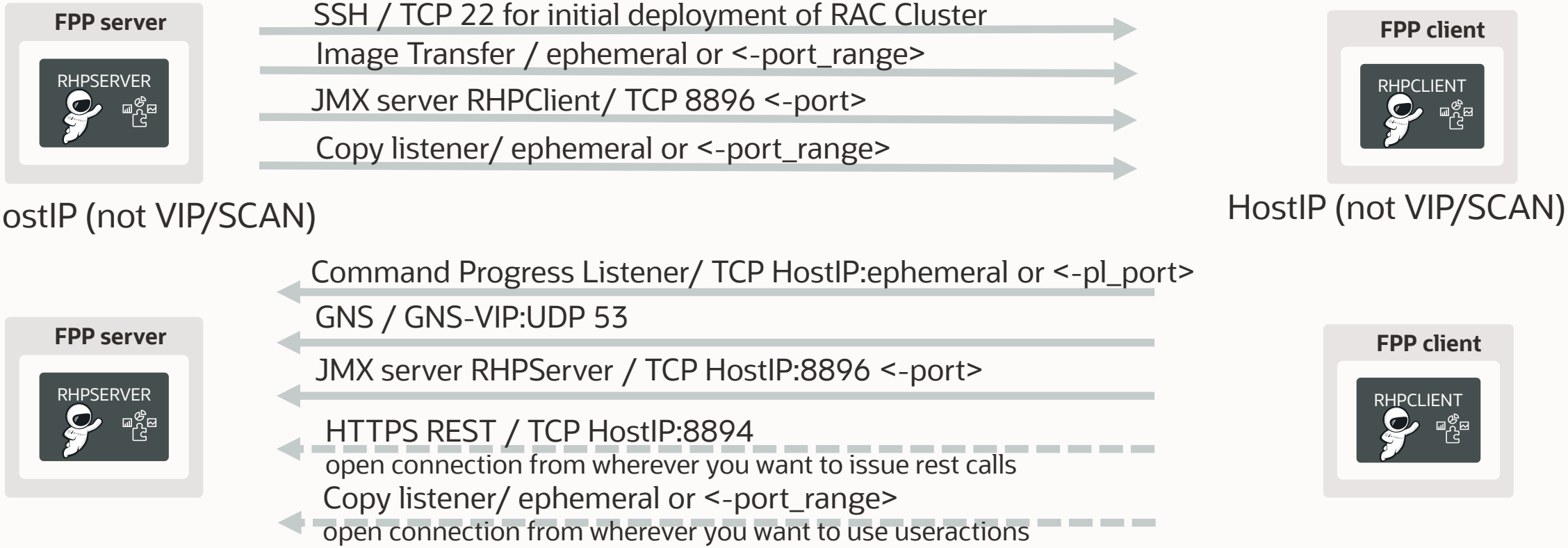
Networking Flows to open : FPP Target



To change Ports :

```
srvctl modify rhpserver -pl_port <portnumber>
srvctl modify rhpserver -port_range <port_number_range>
```

Networking Flows to open : FPP Client



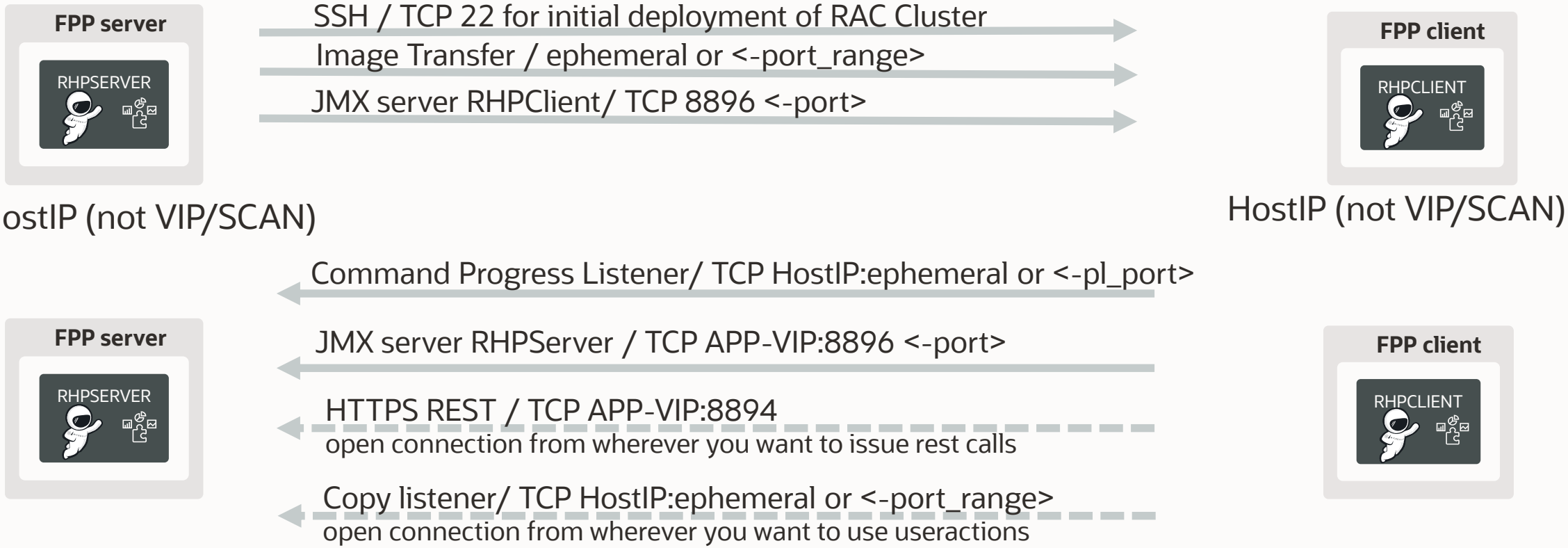
To change Ports :

```
srvctl modify rhpserver -pl_port <port_number>
srvctl modify rhpserver -port  <port_number>
srvctl modify rhpserver -port_range <port_number_range>
```

```
srvctl modify rhpclient -port  <port_number>
```

Networking Flows to open : FPP Client 26ai APP-VIP

New In 26ai



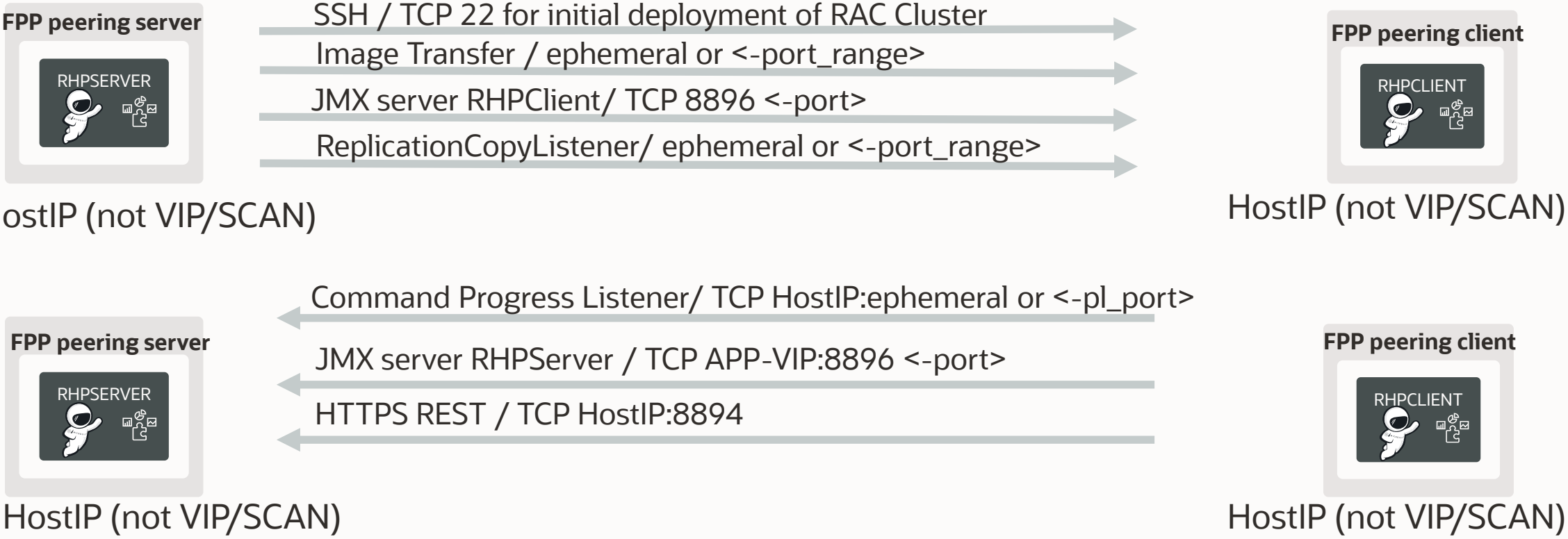
To change Ports :

```
srvctl modify rhpserver -pl_port <port_number>
srvctl modify rhpserver -port  <port_number>
srvctl modify rhpserver -port_range <port_number_range>
```

```
srvctl modify rhpclient -port  <port_number>
```

Networking Flows to open : FPP Peering

New In 26ai

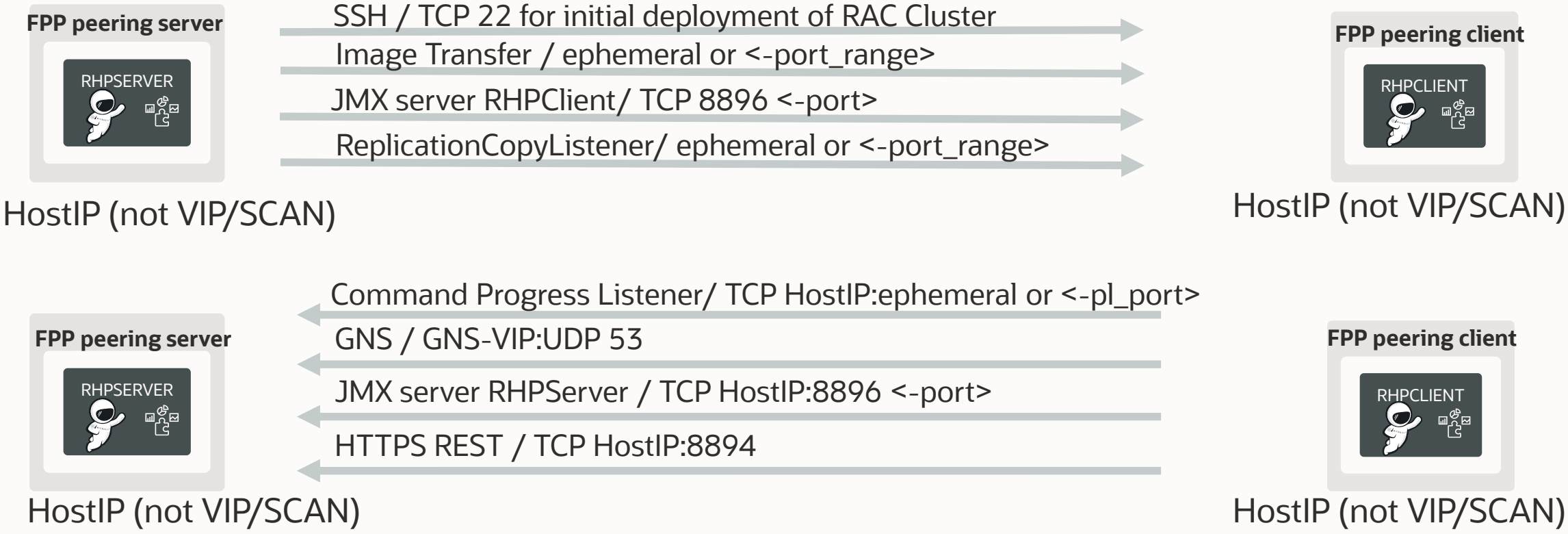


To change Ports :

```
srvctl modify rhpserver -pl_port <port_number>
srvctl modify rhpserver -port  <port_number>
srvctl modify rhpserver -port_range <port_number_range>
```

```
srvctl modify rhpserver -port  <port_number>
```

Networking Flows to open : FPP Peering



To change Ports :

```
srvctl modify rhpserver -pl_port <port_number>
srvctl modify rhpserver -port  <port_number>
srvctl modify rhpserver -port_range <port_number_range>
```

```
srvctl modify rhpserver -port  <port_number>
```

Licensing

Targets need to be licensed with either :

- Oracle RAC or RAC One Node licenses
- Oracle Database Lifecycle Management Pack for Single Instances

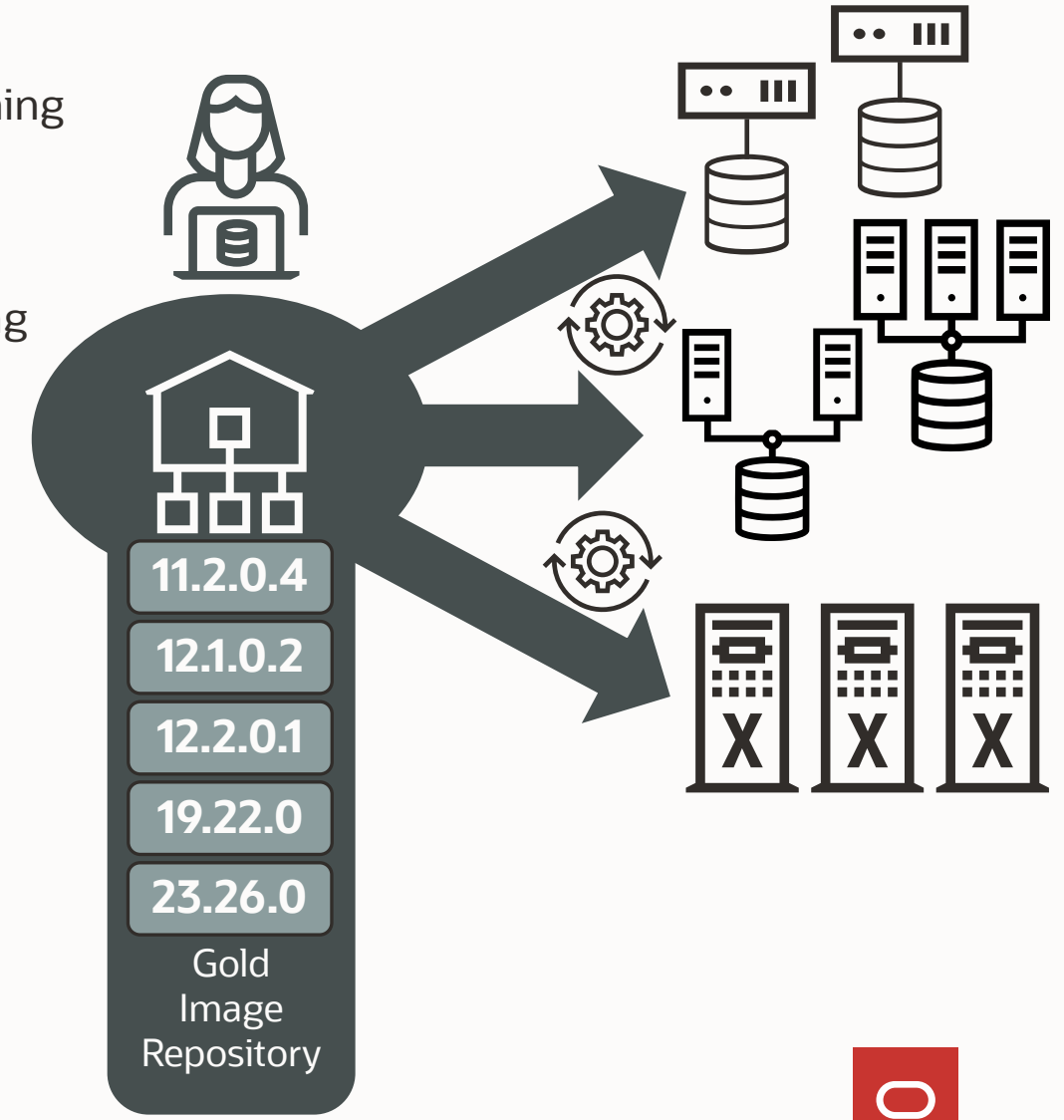
When using FPP through Enterprise Manager Oracle Database Lifecycle Management Pack is needed for all targets.

Fleet Patching & Provisioning

Automated Oracle software management

New In 26ai

- Supports all Oracle deployments
  - Oracle Database, Grid Infrastructure,full-stack Exadata patching
  - Licensed with Oracle RAC (One) or Database Lifecycle Management pack
- Provides effortless, repeatable, standardized out-of-place patching and provisioning automation for
  - Shorter downtime,easy rollback
  - "Build once deploy many"
- Includes advanced features such as:
  - Gold image drift detection
  - Full Oracle Data Guard automated patching
  - Advanced job scheduling
  - Custom user action for extensibility
  - Comprehensive Exadata Patching
  - Oracle MAA best practice application



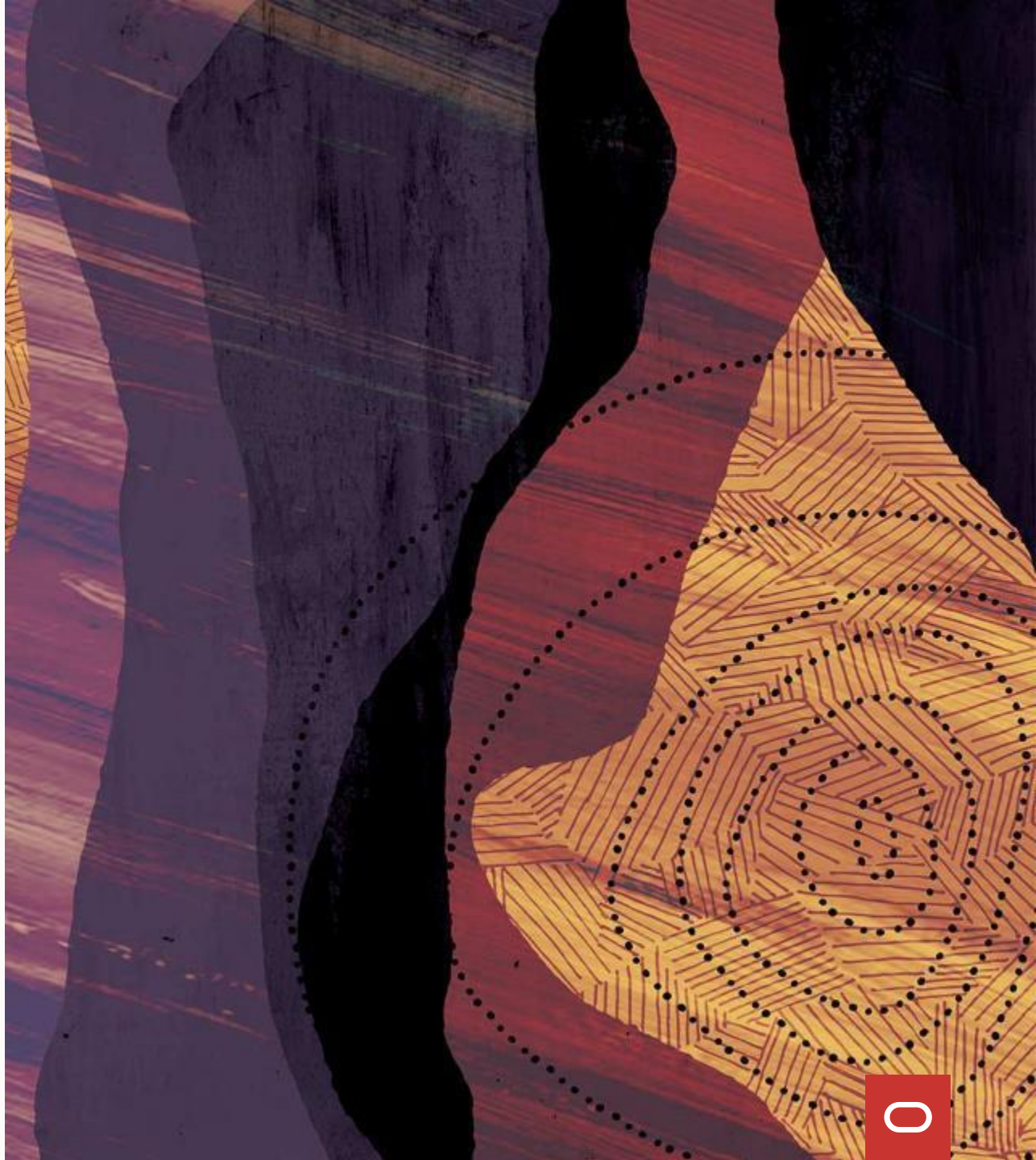
Additional information

Oracle fleet patching and provisioning landing page
https://www.oracle.com/goto/fpp

Oracle Fleet Patching and Provisioning Administrator's Guide
https://docs.oracle.com/en/database/oracle/oracle-database/26/fppad/index.html

FPP by Example Blog Series
https://blogs.oracle.com/maa/post/fleet-patching-provisioning-by-example-intro

Thank you

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