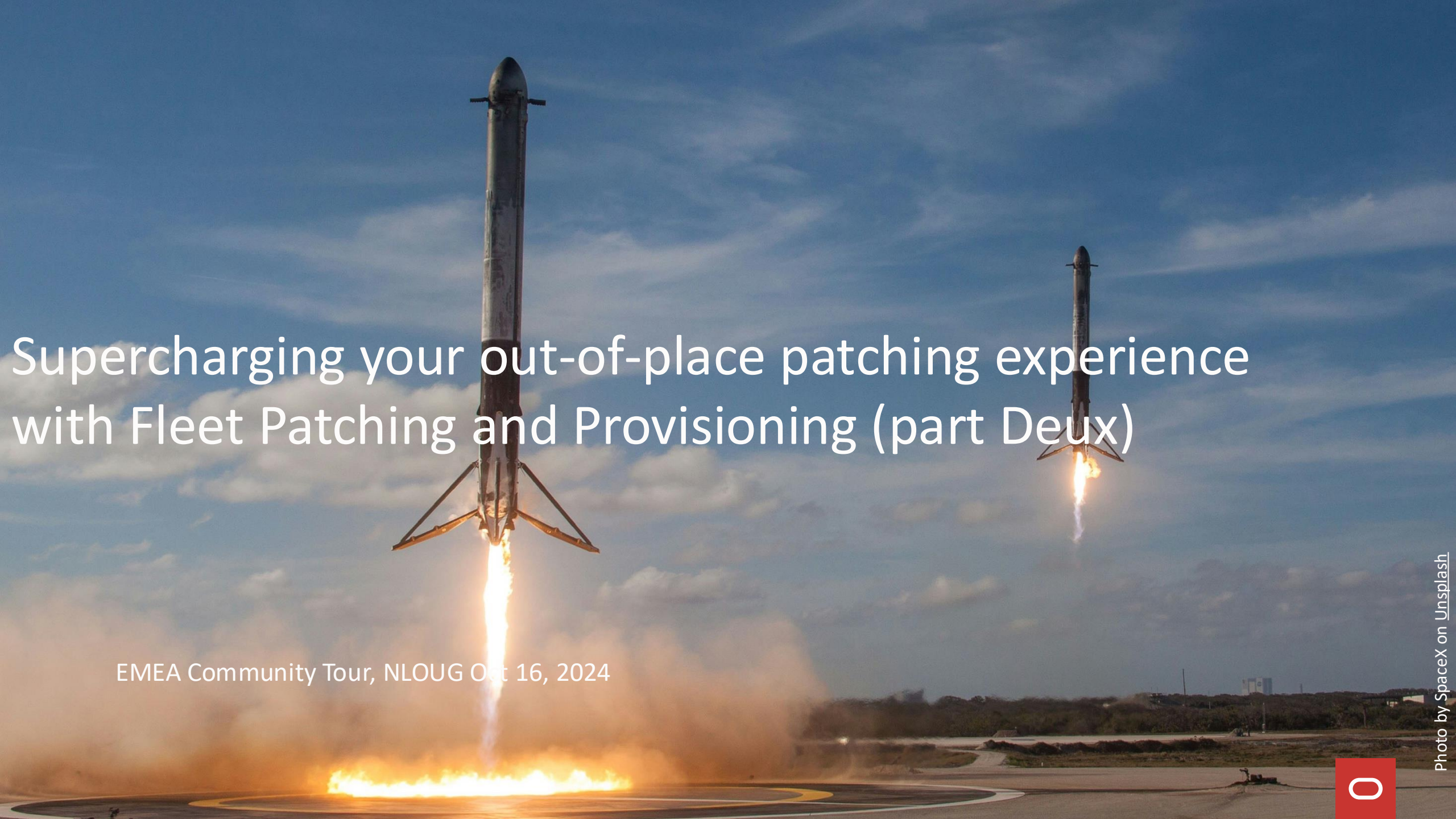

Supercharging your out-of-place patching experience with Fleet Patching and Provisioning (part Deux)

EMEA Community Tour, NLOUG Oct 16, 2024

Photo by SpaceX on Unsplash

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Exadata MAA

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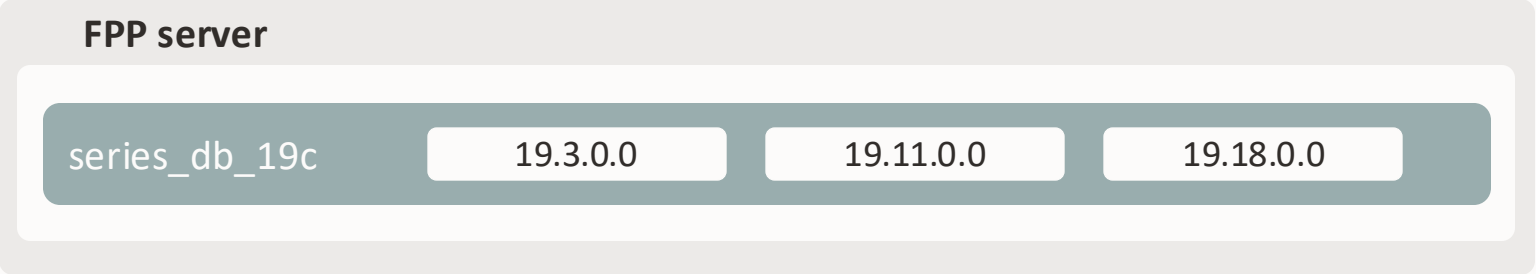
@pfierens

https://philippefierens.eu

Advanced options

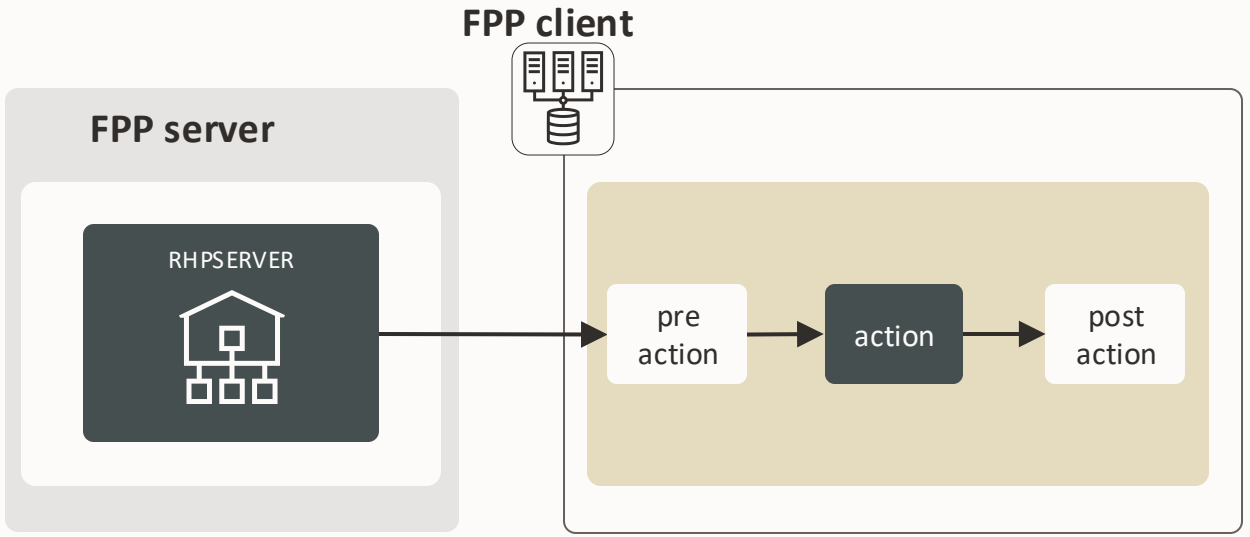
Image series

- 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:secret;Role:Normal" \
      -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
```

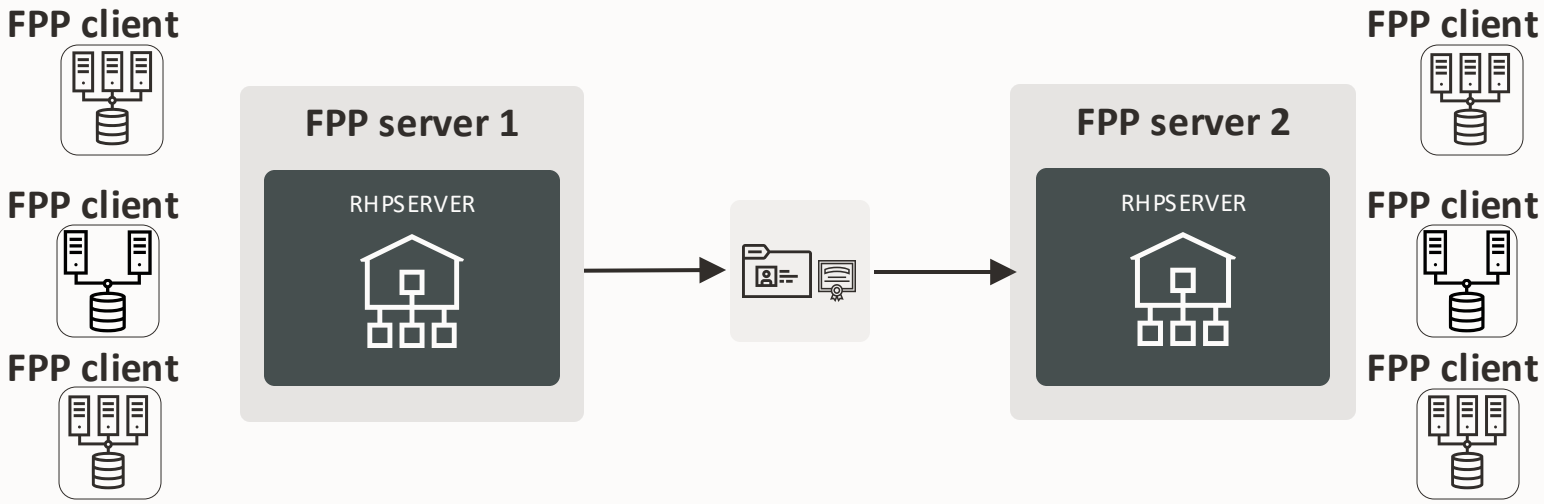
Drift reporting

```
$ 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
"29445548,29254623,29540327,29774362,30134746,30160625,30534662,29512125,29942275,30855101,31306261,3135921
5,30895577,29224710,26716835,31668872,32165759,32069696,32032733,30889443,30674373,32167592,32523206,294157
74,28777073,32124570,31247838,29540831,32892883,31776121,33223248,33563137,33184467,31844357,32327201"
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
```

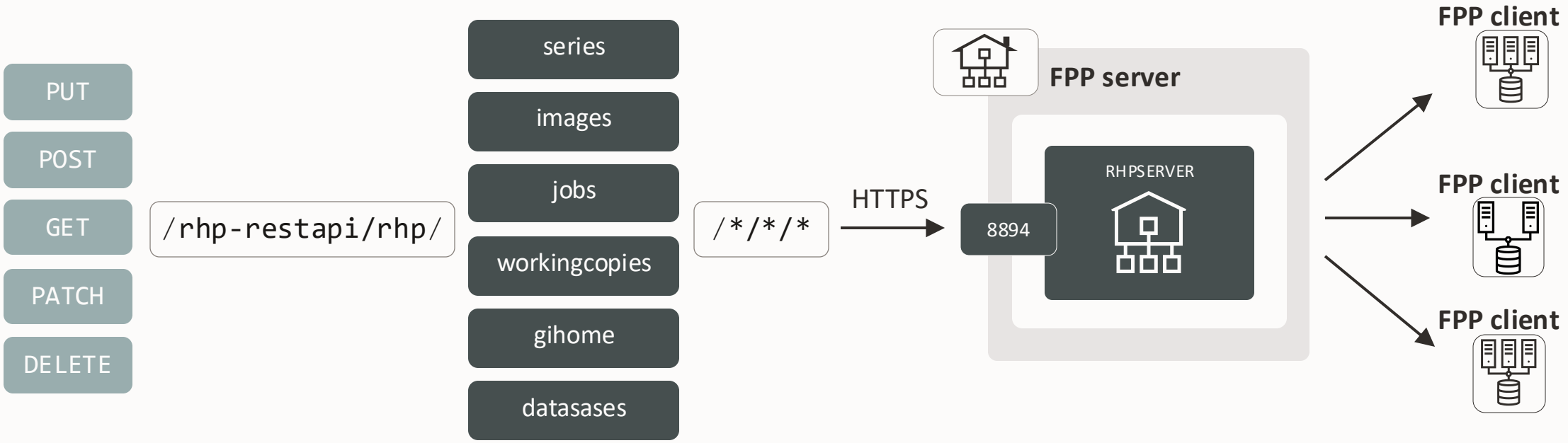

Server peering concept



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

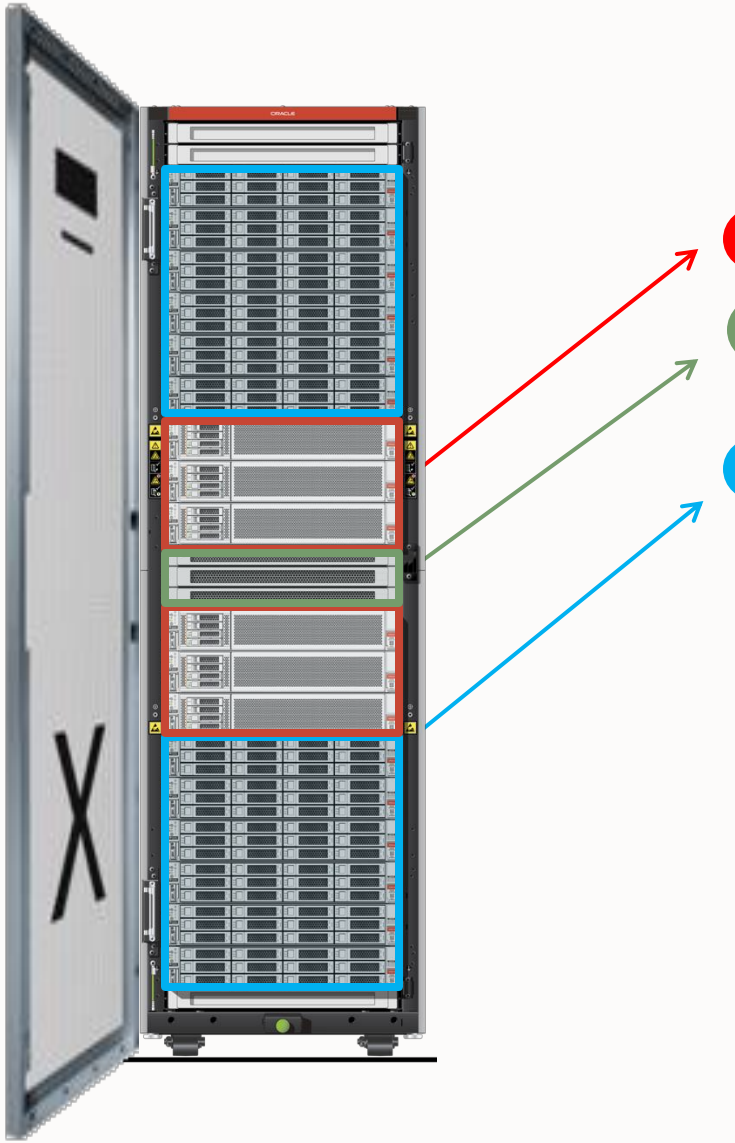
- Images are synced between the two peering servers : uniform images across regions
- Sync Direction can be chosen / configured

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

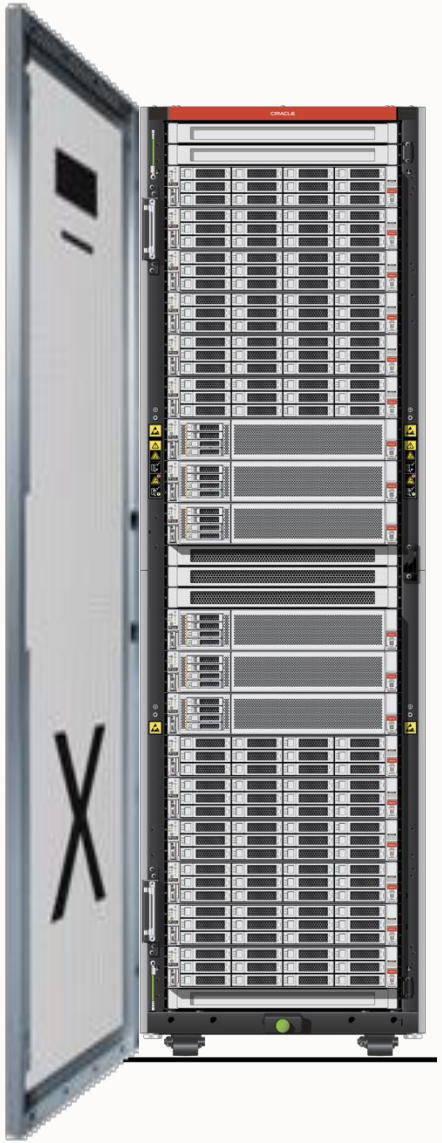


Exadata software patching :

- 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

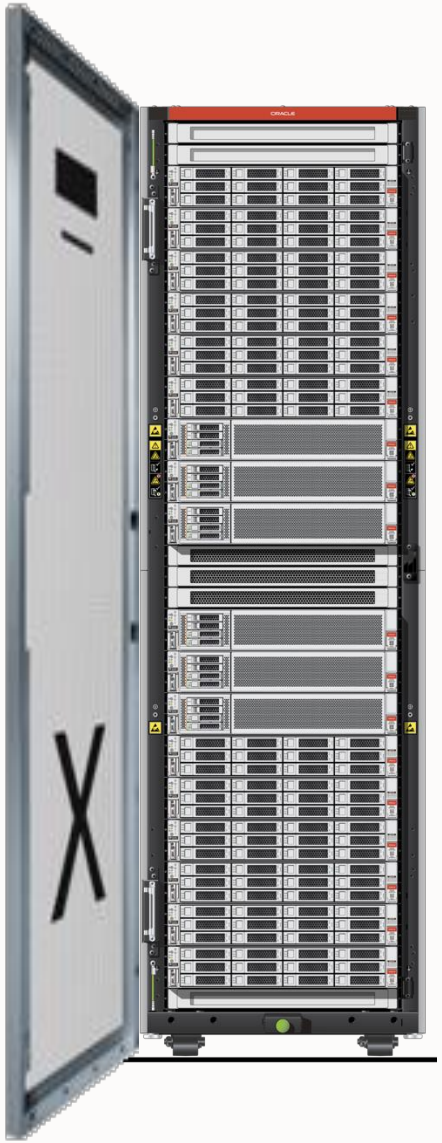
Exadata Software Patching Flow



- Check 888828.1 and download the necessary binaries, always download the latest patchmgr (patch 21634633)

- Import the binaries into FPP
- Use rhp commands to :
  - Apply the Exadata Update
  - Update GI and DB
  - Combine Compute Node + GI update

Exadata Software Patching Flow



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  - Update GI and DB
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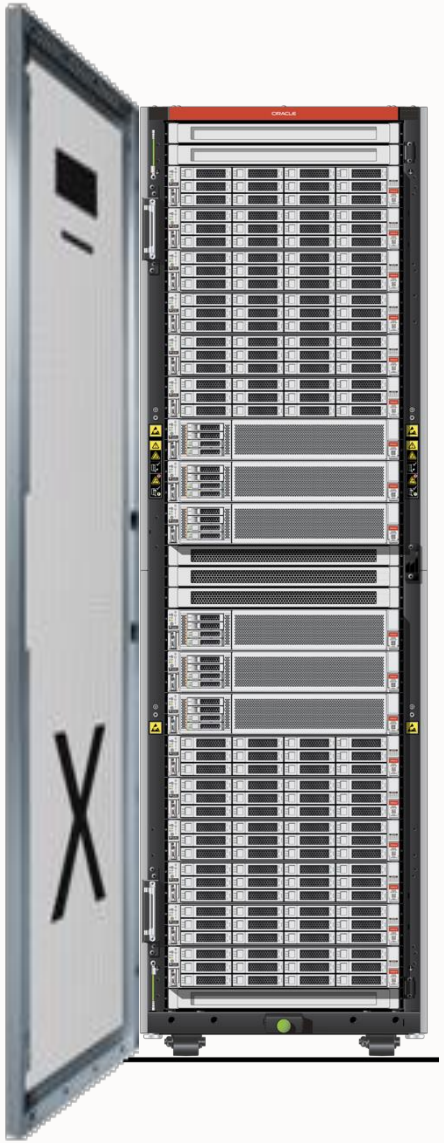
FPP Exadata patching concepts



FPP leverages `patchmgr` to patch your Exadata rack

Currently rolling patching only

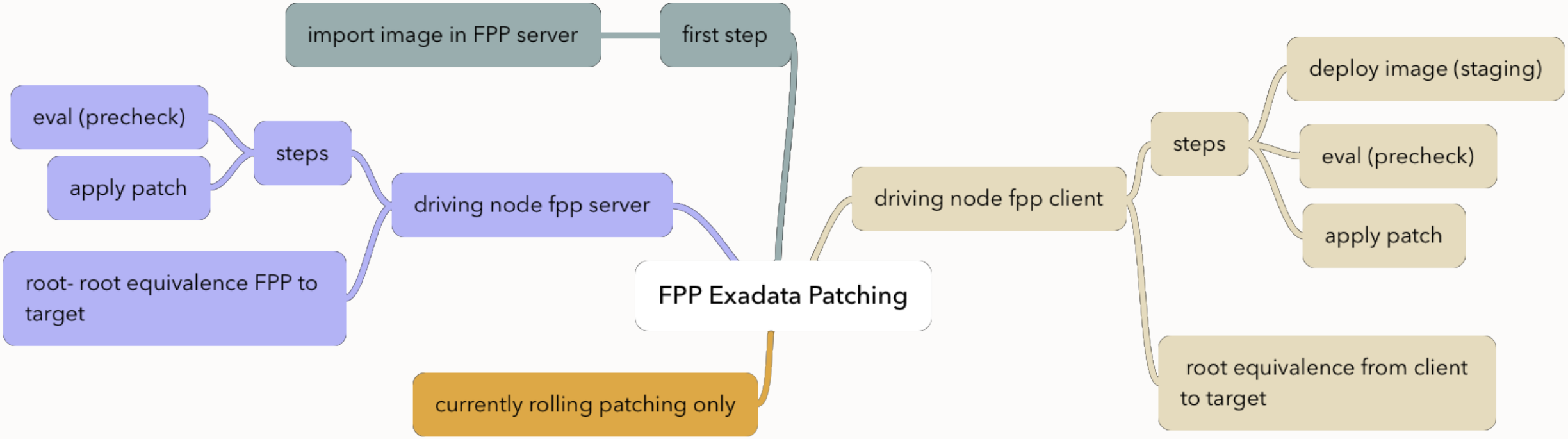
Driving node : node where `patchmgr` runs

Driving node can be :

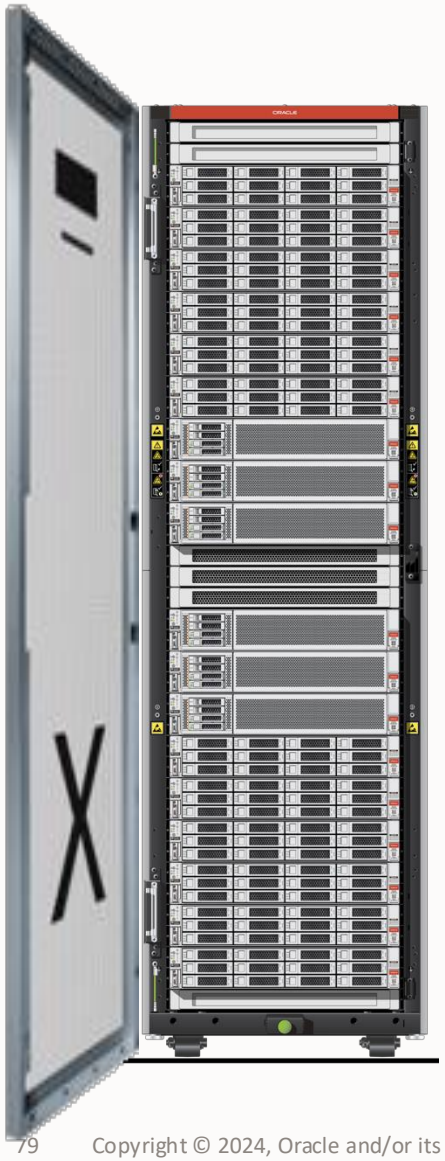
- FPP client with access to components to patch
- FPP server

New In 23ai

FPP Exadata patching concepts

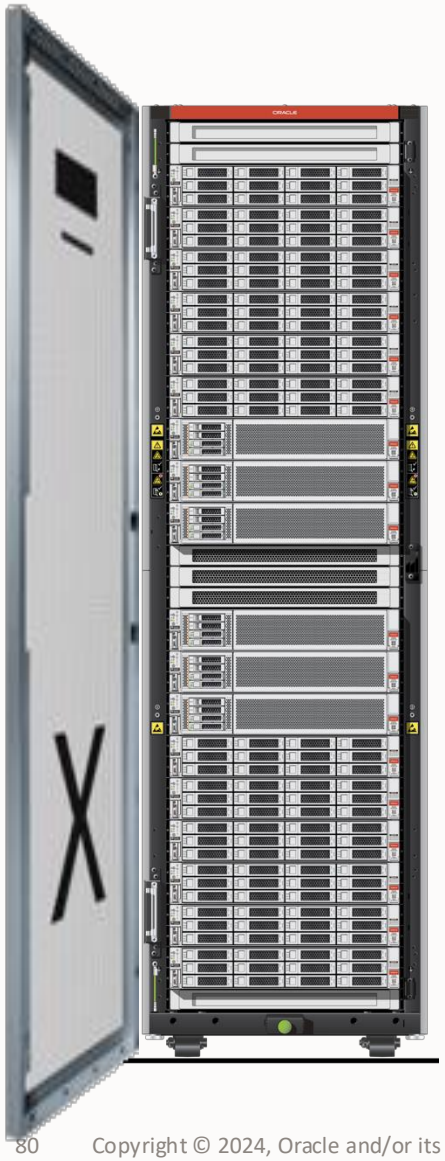


Exadata Software Patching with FPP



- Fully supported
  - KVM Host / Dom0
  - Baremetal
  - domU /KVM Guest

Importing Exadata Images

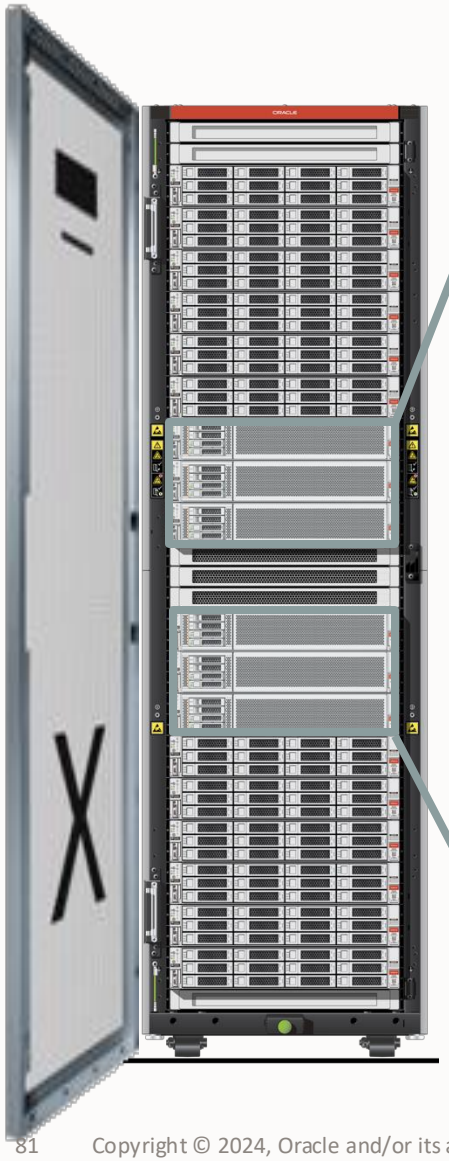


Copy zip images related to the component you want to patch separate directory and import,
patchmgr is bundled with IB and RoCE switches and Cell Storage Servers it needs to be downloaded separately compute nodes

```
mkdir –p /u01/app/staging/21_2_18/BM_DOMU
cp p34694885_212000_Linux-x86-64.zip /u01/app/staging/21_2_18/BM_DOMU
cp p21634633_221300_Linux-x86-64.zip /u01/app/staging/21_2_18/BM_DOMU

[root@scaj0802bda03vm002 BM_DOMU]# unzip -l p34694885_212000_Linux-x86-64.zip
Archive:  p34694885_212000_Linux-x86-64.zip
  Length      Date    Time    Name
---------  ---------- -----   ----
1574918144  11-11-2022 18:49   exadata_ol7_base_repo_21.2.18.0.0.221111.1.iso
   824113  11-16-2022 20:18   README.html
---------                     -------
1575742257                     2 files
```

```
rhpctl import image -image imgname  -imagetype EXAPATCHSOFTWARE
  -version 21.2.18.0.0.221111.1 -path /u01/app/staging/21_2_18/BM_DOMU
```

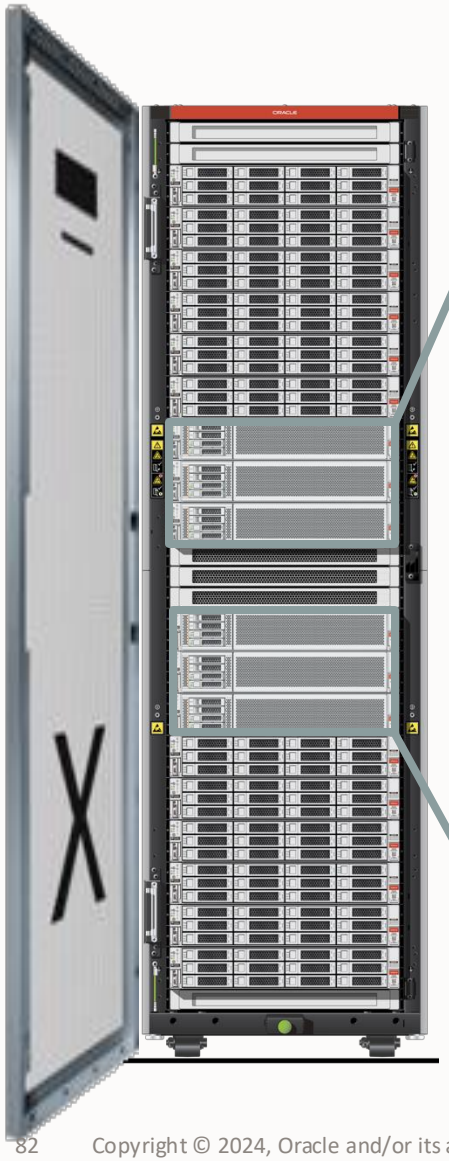
Compute Node Patching with FPP from FPP client



```
rhpctl deploy image -image imgname -client cluster-c3
  -path /u01/app/staging/21_2_16/BM_DOMU

rhpctl update exadata -dbnodes "nodelist"
  -image imgname -iso_repo iso_name.zip
  [-batches "nodelist"] -client cluster-c3 [-patchmgrloc patchmgrloc]
  [-patchmgrargs "-ignore_alerts"] -eval

rhpctl update exadata -dbnodes "nodelist"
  -image imgname -iso_repo iso_name.zip
  [-batches "nodelist"] -client cluster-c3 [-patchmgrloc patchmgrloc]
  [-patchmgrargs "-ignore_alerts" ]-backup

rhpctl update exadata -dbnodes "nodelist"
  -image imgname -iso_repo iso_name.zip
  [-batches "nodelist"] -client cluster-c3 [-patchmgrloc patchmgrloc]
  [-patchmgrargs "-nobackup -ignore_alerts"]

ssh equivalence needed :
root@RHPC -> root@computenodes
```

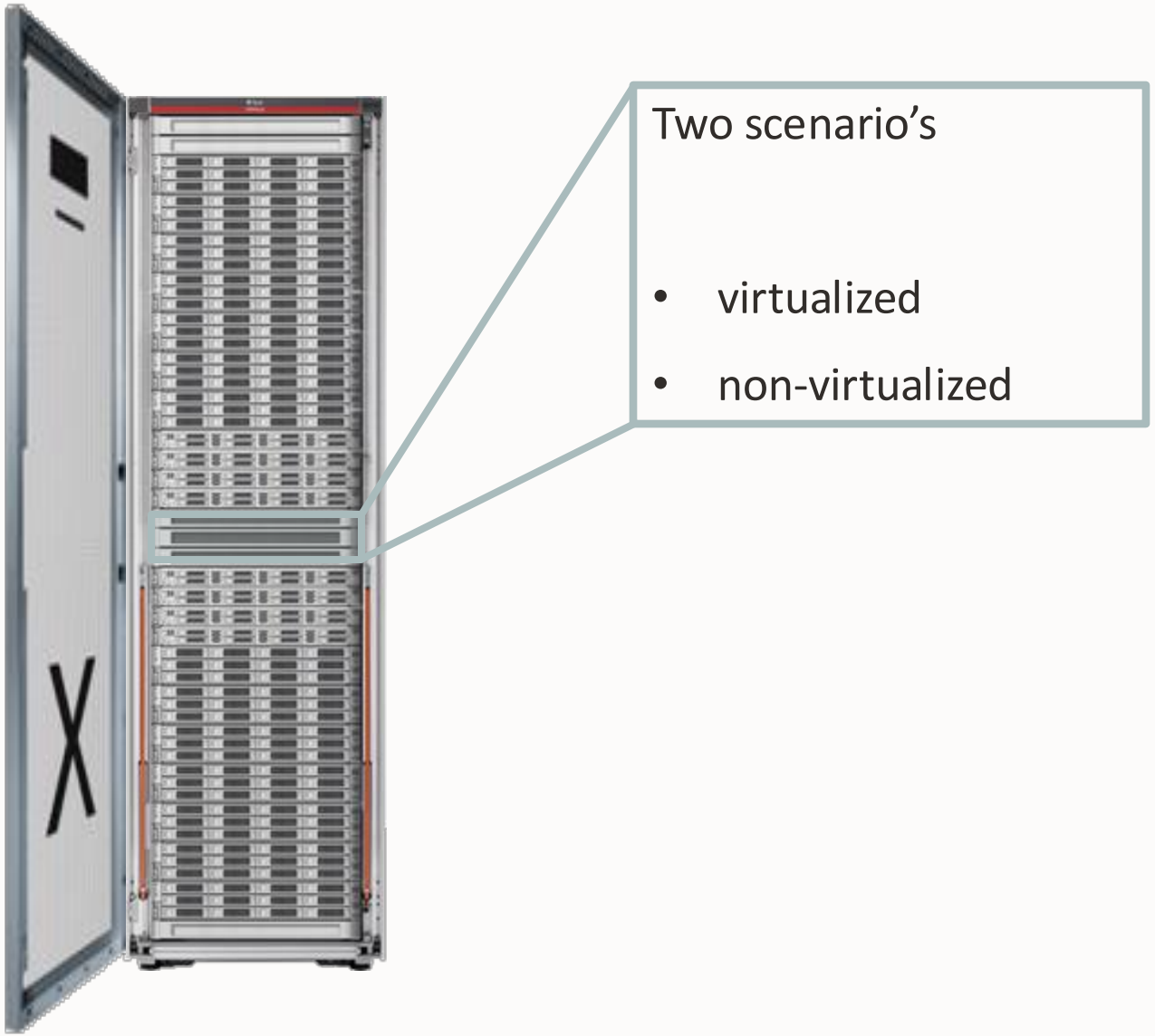
Compute Node Patching with FPP from FPP server (both virtual/BM)

New In 23ai



```
rhpctl update exadata -dbnodes "nodelist"
-image imgname -iso_repo iso_name.zip
  [-batches "nodelist"] –server
  [-patchmgrloc patchmgrloc]
  [-patchmgrargs "-ignore_alerts"] -eval

rhpctl update exadata -dbnodes "nodelist"
-image imgname -iso_repo iso_name.zip
  [-batches "nodelist"] –server
  [-patchmgrloc patchmgrloc]
  [-patchmgrargs "-ignore_alerts"] -backup

rhpctl update exadata -dbnodes "nodelist"
-image imgname -iso_repo iso_name.zip
  [-batches "nodelist" -server
  [-patchmgrargs "-nobackup -ignore_alerts"]

ssh equivalence needed :
root@RHPS -> root@computenodes
```

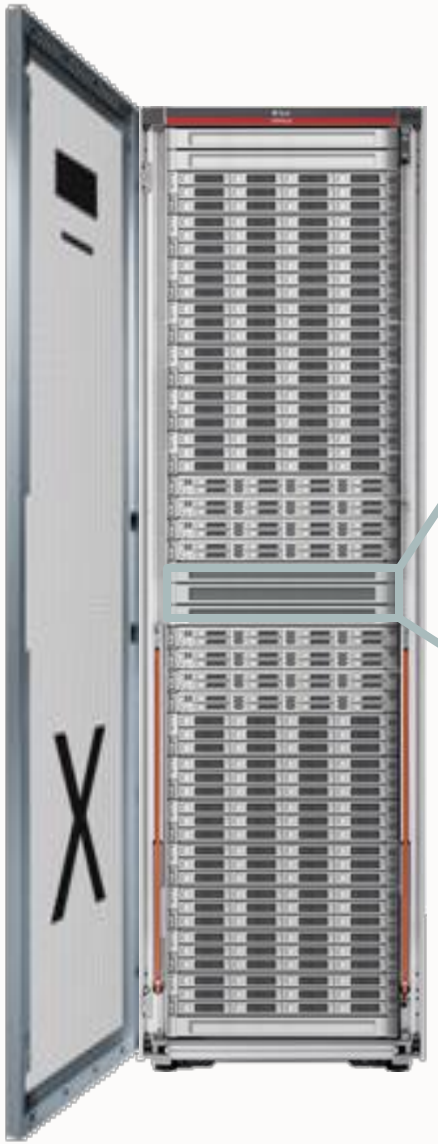
Infiniband switch Patching with FPP



Two scenario’s

- virtualized
- non-virtualized

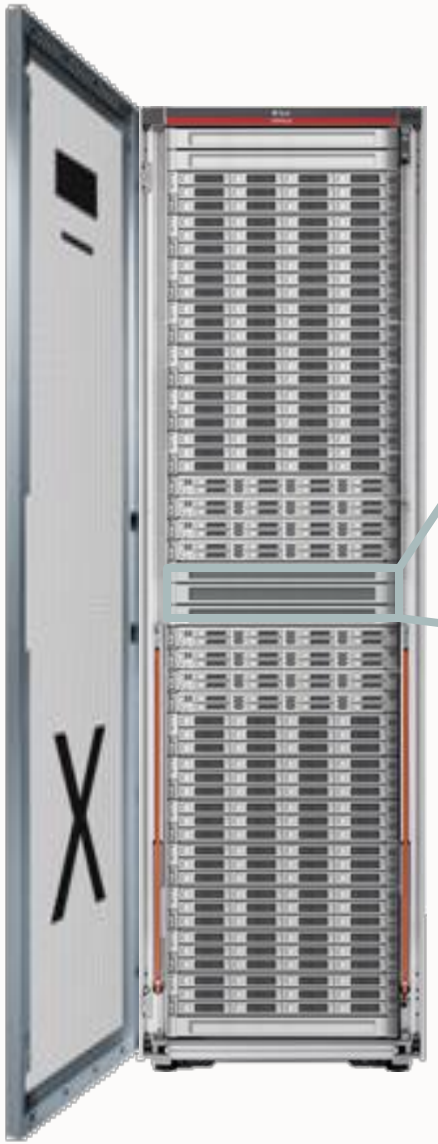
Infiniband Switch (Baremetal) Patching from FPP Client



```
rhpctl deploy image -image imgname -client cluster-c3
  -path /u01/app/staging/deploy_ibswitch_21216

rhpctl update exadata –ibswitches "switchlist"
  -image -client cluster-c3
  -fromnode "clusternode" -eval

rhpctl update exadata –ibswitches "switchlist"
  -image imgname -client cluster-c3
  -fromnode "clusternode"

ssh equivalence need:
root@clusternode -> root@IBSwitches
```

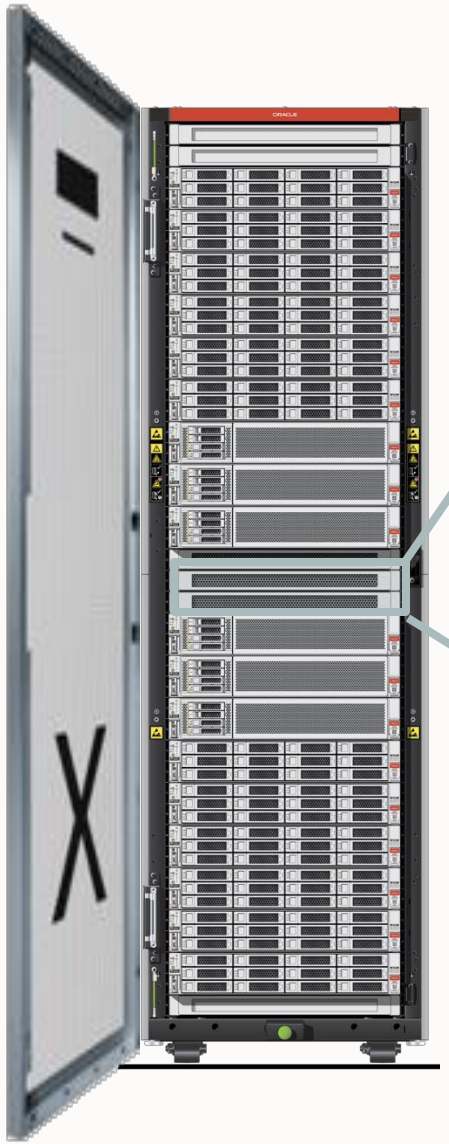
Infiniband Switch (domU) Patching from FPP Server

New In 23ai



```
rhpctl update exadata –ibswitches "switchlist"
  -image imgname –server –patchmgrdrivingsystem "dom0node"
  -fromnode "FPP Server Node" -eval

rhpctl update exadata –ibswitches "switchlist"
  -image imgname –server –patchmgrdrivingsystem "dom0node"

ssh equivalence needed :
root@RHPS -> root@patchmgr_driving_node (dom0) -> root@IBSwitches
```

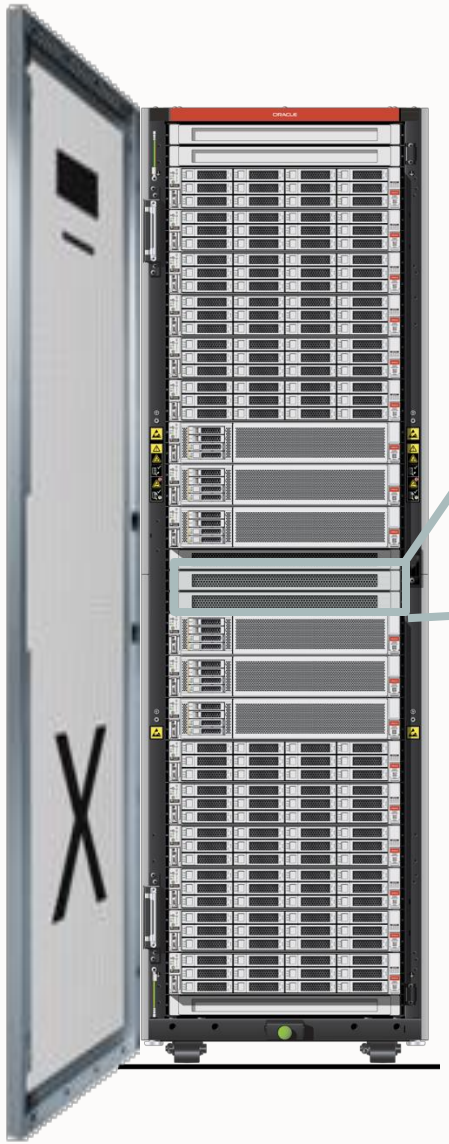
RoCE Switch Patching from FPP Client



```
rhpctl deploy image -image imgname -client cluster-c3
  -path /u01/app/staging/deploy_roceswitch_21216

rhpctl update exadata –roceswitches "switchlist"
  -image -client cluster-c3
  -fromnode "clusternode" -eval

rhpctl update exadata –roceswitches "switchlist"
  -image imgname -client cluster-c3
  -fromnode "clusternode"

ssh equivalence needed :
root@clusternode -> root@RoCESwitches
```

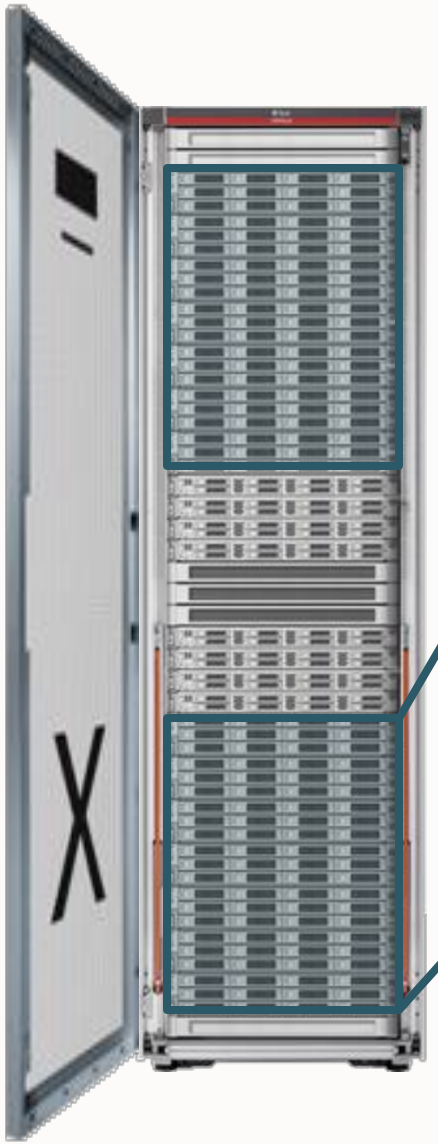
RoCE Switch Patching from FPP Server

New In 23ai



```
rhpctl update exadata –roceswitches "switchlist"
  -image imgname –server
  -eval

rhpctl update exadata –roceswitches "switchlist"
  -image imgname –server

ssh equivalence needed :
root@RHPS -> root@RoCESwitches
```

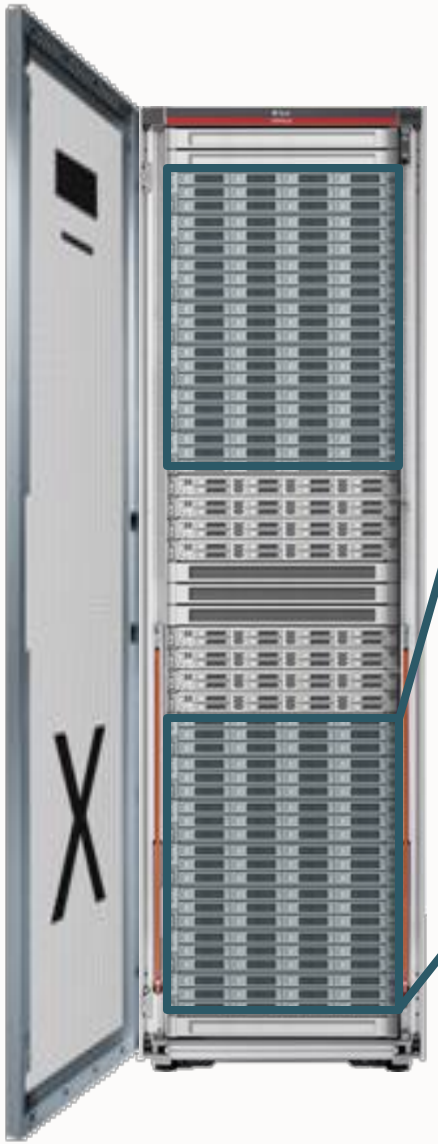
Exadata Software Patching with FPP



Storage Cell patching, current status:

- Driving node
  - Compute node
  - FPP server
- Only rolling patching

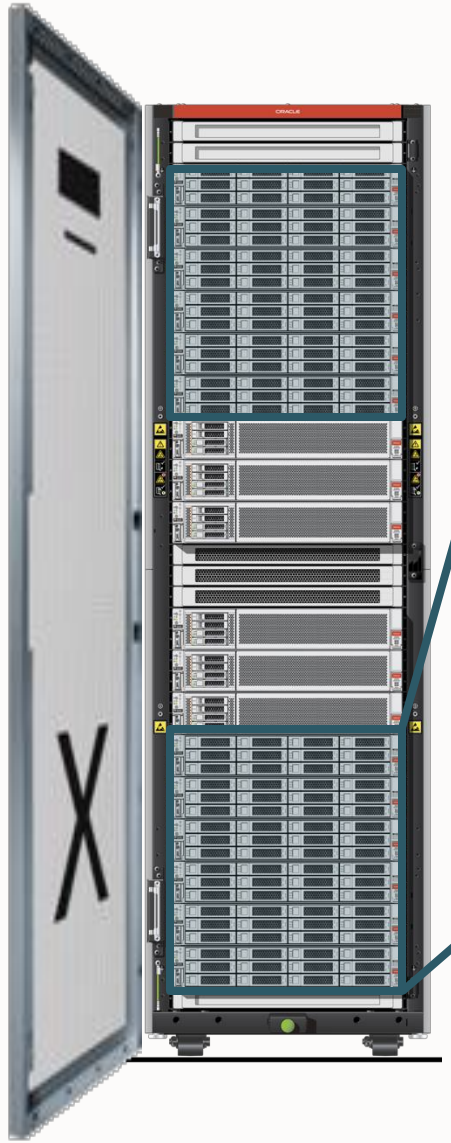
Storage Server Software Patching from FPP Client



```
rhpctl deploy image -image imgname
  -client cluster-c3 -path /u01/app/staging/deploy_cellimage_21216

rhpctl update exadata -cells -image imgname -client cluster-c3
  [-patchmgrargs "-ignore_alerts"]
  [-batches "celllist"] -eval

rhpctl update exadata -cells -image imgname -client cluster-c3
  [-patchmgrargs "-ignore_alerts"]
  [-batches "celllist"]

Ssh equivalence need :
root@RHPC -> root@cells
```

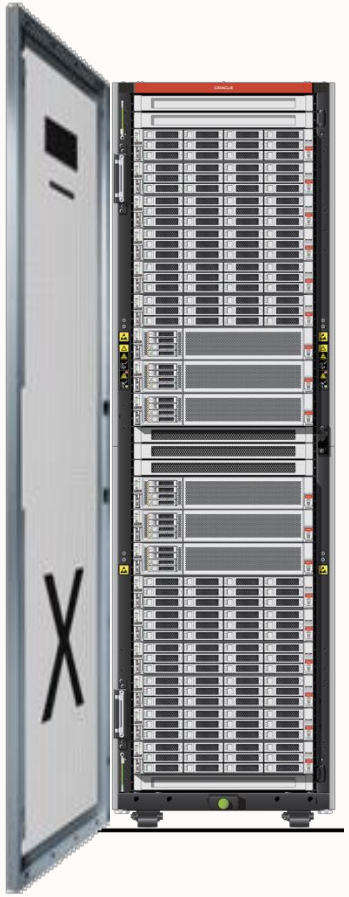
Storage Server Software Patching from FPP Server

New In 23ai



```
rhpctl update exadata -cells -image imgname
  -server
    [-patchmgrargs "-ignore_alerts"]
  -eval

rhpctl update exadata -cells -image imgname
   -server
   [-patchmgrargs "-ignore_alerts"]

Ssh equivalence need :
root@RHPS -> root@cells
```

Combined Exadata Software Patching/Update

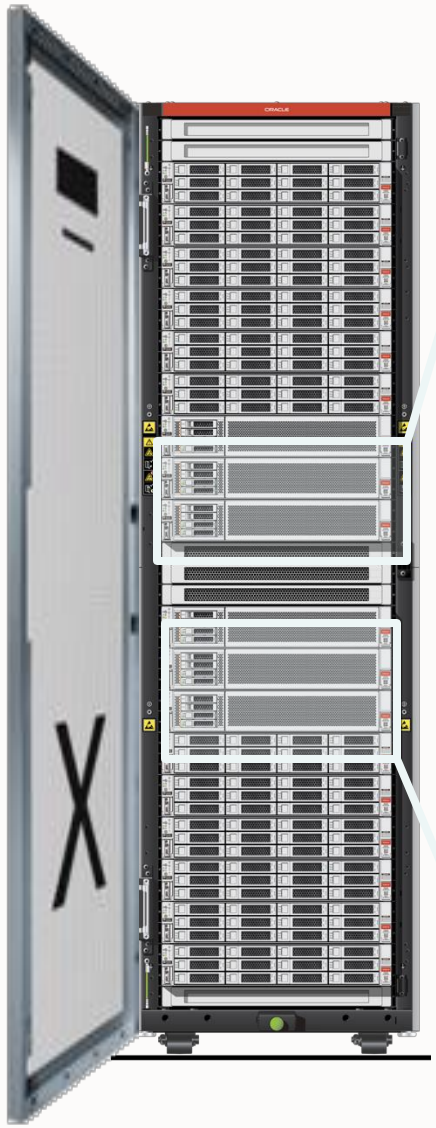


Patch/Update Type		12cR1	12cR2	18c	19c	21c	23ai
	DB	✓	✓	✓	✓	✓	✓
	GI		✓	✓	✓	✓	✓
	DomU			✓	✓	✓	✓
	Dom0/ KVMHost				✓	✓	✓
	RoCE Switches				✓	✓	✓
	Storage servers			✓	✓	✓	✓
	IB Switches			✓	✓	✓	✓

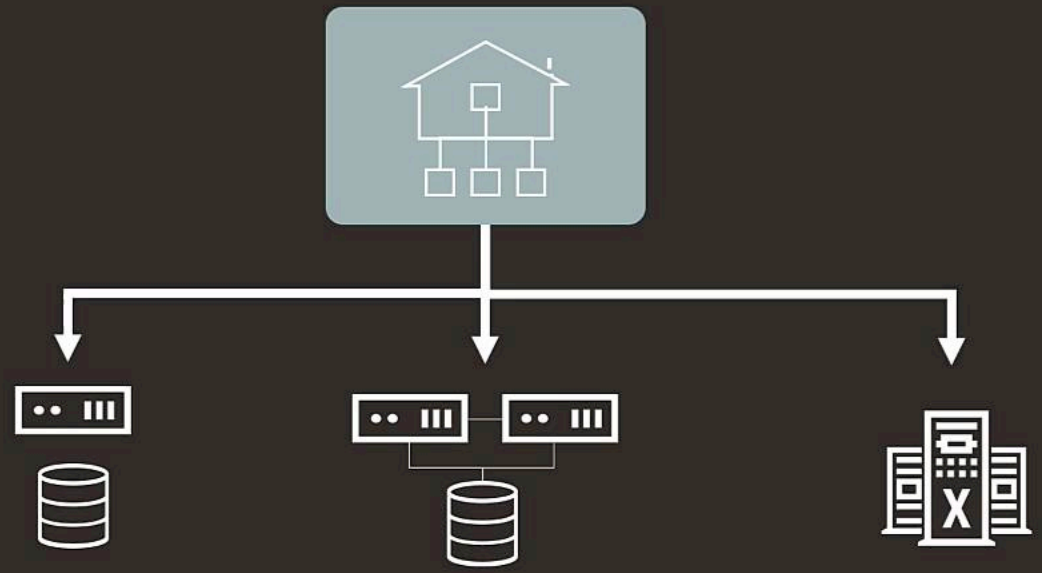
Interleaved GI+DB

Interleaved DomU+GI

Combined Compute + GI patching



```
rhpctl add workingcopy –image imgname –workingcopy wcname
  -path path –oraclebase oraclebase –storagetype LOCAL
  -softwareonly -client cluster-c3

rhpctl deploy image -image imgname -client cluster-c3
  -path /u01/app/staging/21_2_16/BM_DOMU

rhpctl move gihome -destwc wcname
 -sourcewc wcname -image imgname
 -iso_repo iso_name.zip
 -patchmgrloc patchmgrLoc
 [-batches "nodelist"]  [-patchmgrargs "-ignore_alerts"] -eval

rhpctl move gihome -destwc wcname
 -sourcewc wcname -image imgname
 -iso_repo iso_name.zip
 -patchmgrloc patchmgrLoc
 [-batches "nodelist"]  [-patchmgrargs "-ignore_alerts"]

ssh equivalence need :
root@RHPC -> root@computenodes
```



Fleet Patching & Provisioning by Example

Combined (Vertical) patching Compute + GI

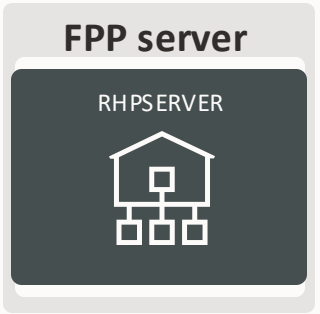
Exadata Software Patching with FPP

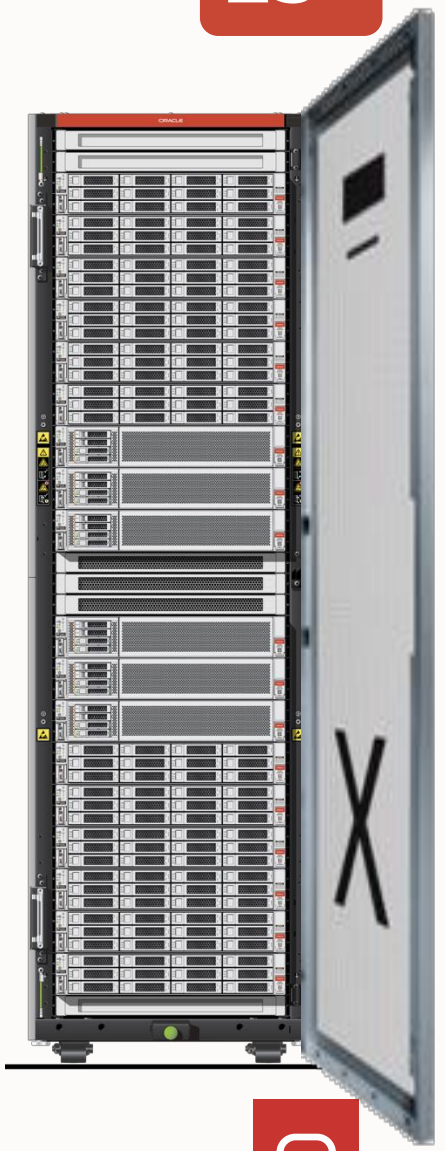
FPP server can be the driving node

New In 23ai

The Driving node is where `patchmgr` runs

In 23ai this can also be the FPP server itself (previously only on FPP client).





Exadata Live Update support

Increase security and minimize database server and VM reboots

New In 23ai

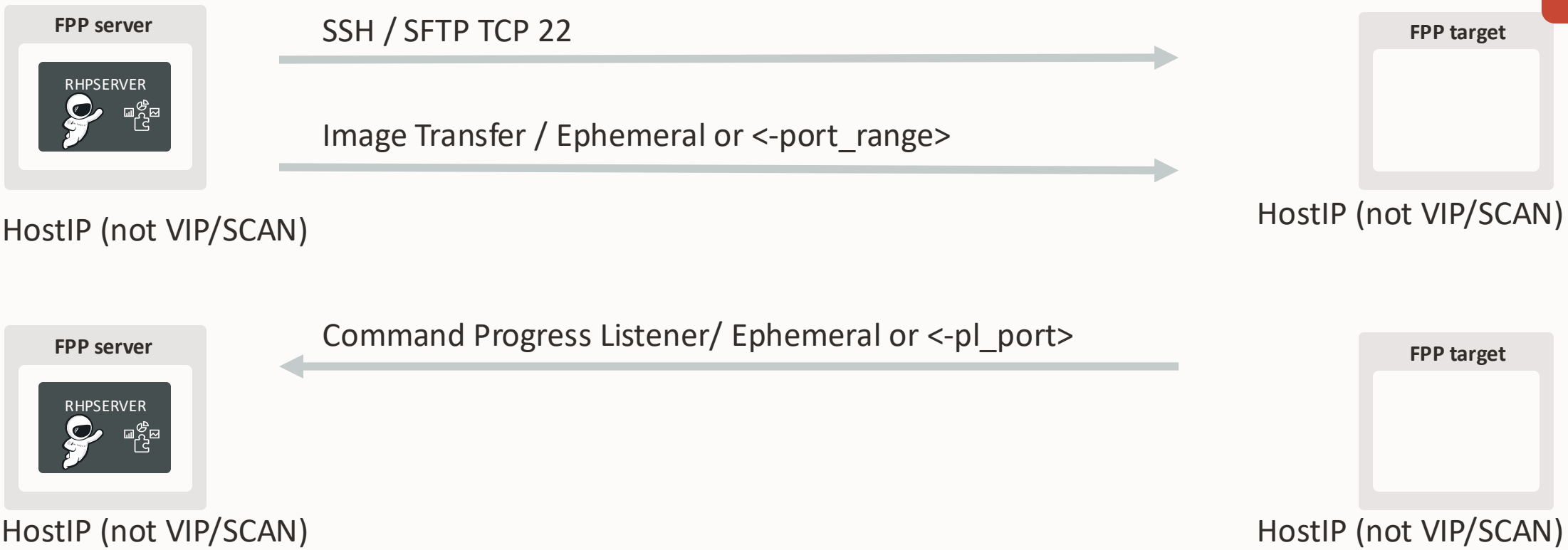
FPP supports Exadata Software 24ai [Exadata Live Update](#) feature


```
rhpctl update exadata -dbnodes <list of dbnodes> -iso_repo <file> -image
<image> -liveupdate {highcvss | allcvss | full}
```

Networking setup

Networking Flows to open : FPP Target

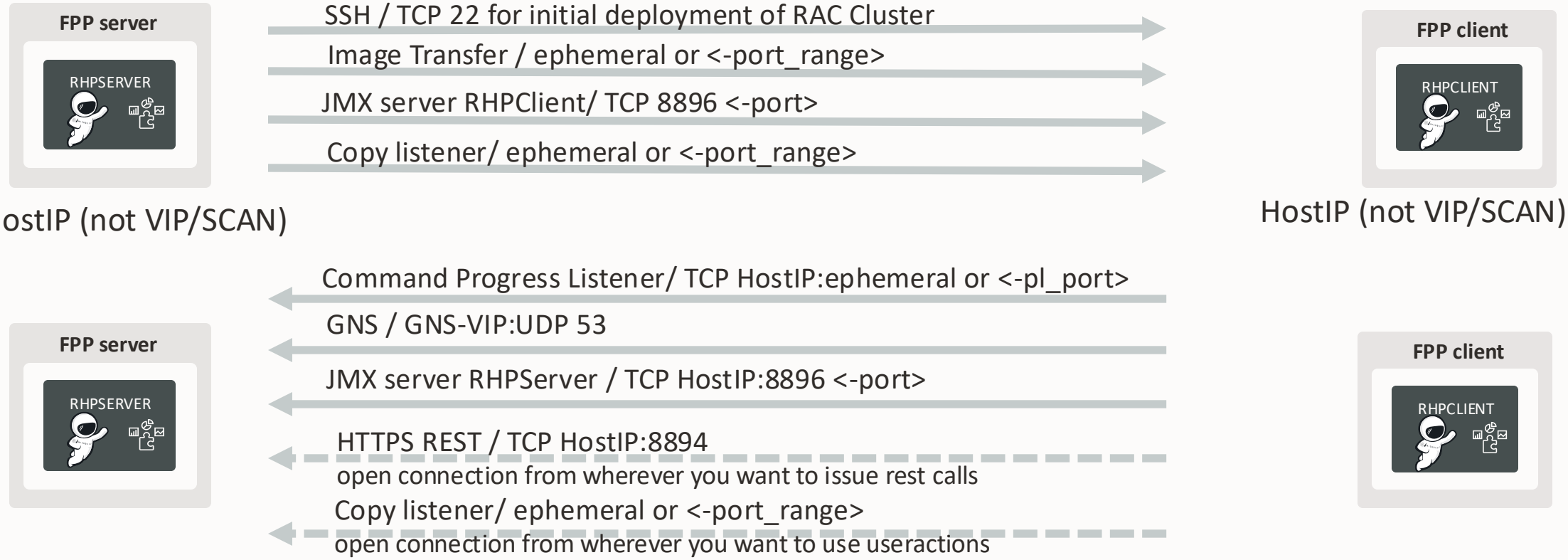
New In 23ai



To change Ports :

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

Networking Flows to open : FPP Client



GNS VIP

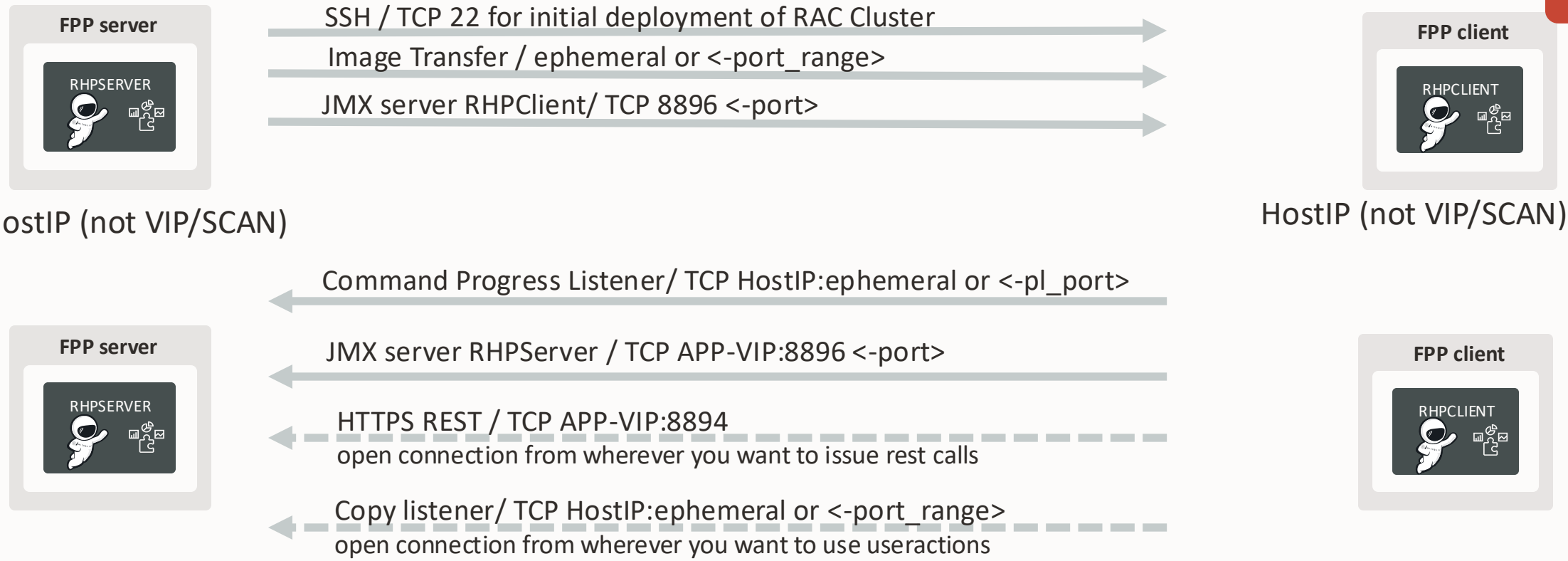
To change Ports :

```
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 23ai APP-VIP

New In 23ai



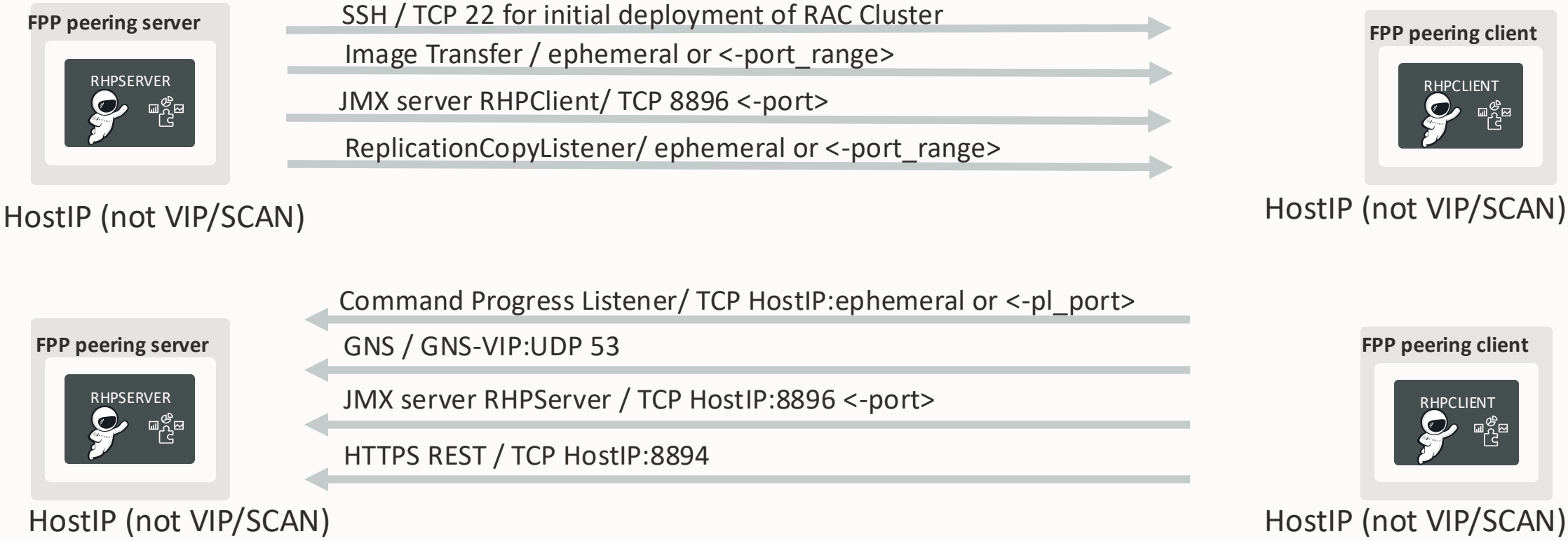
APP_VIP

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



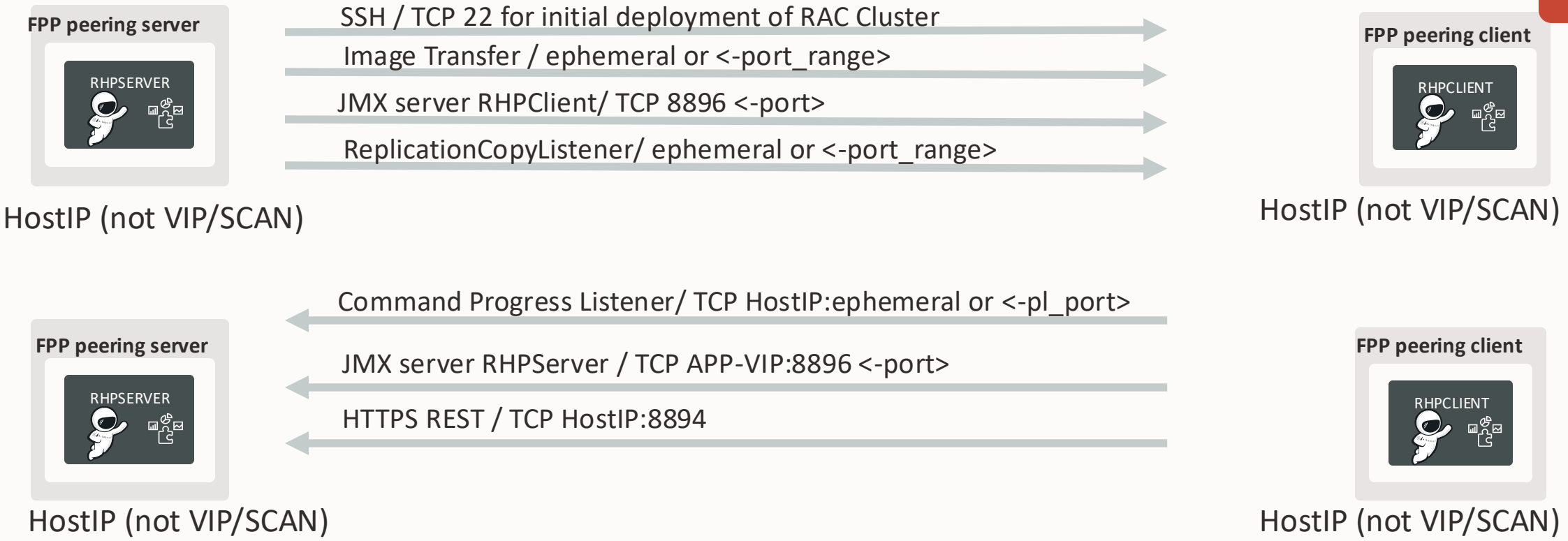
To change Ports :

```
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

New In 23ai



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.

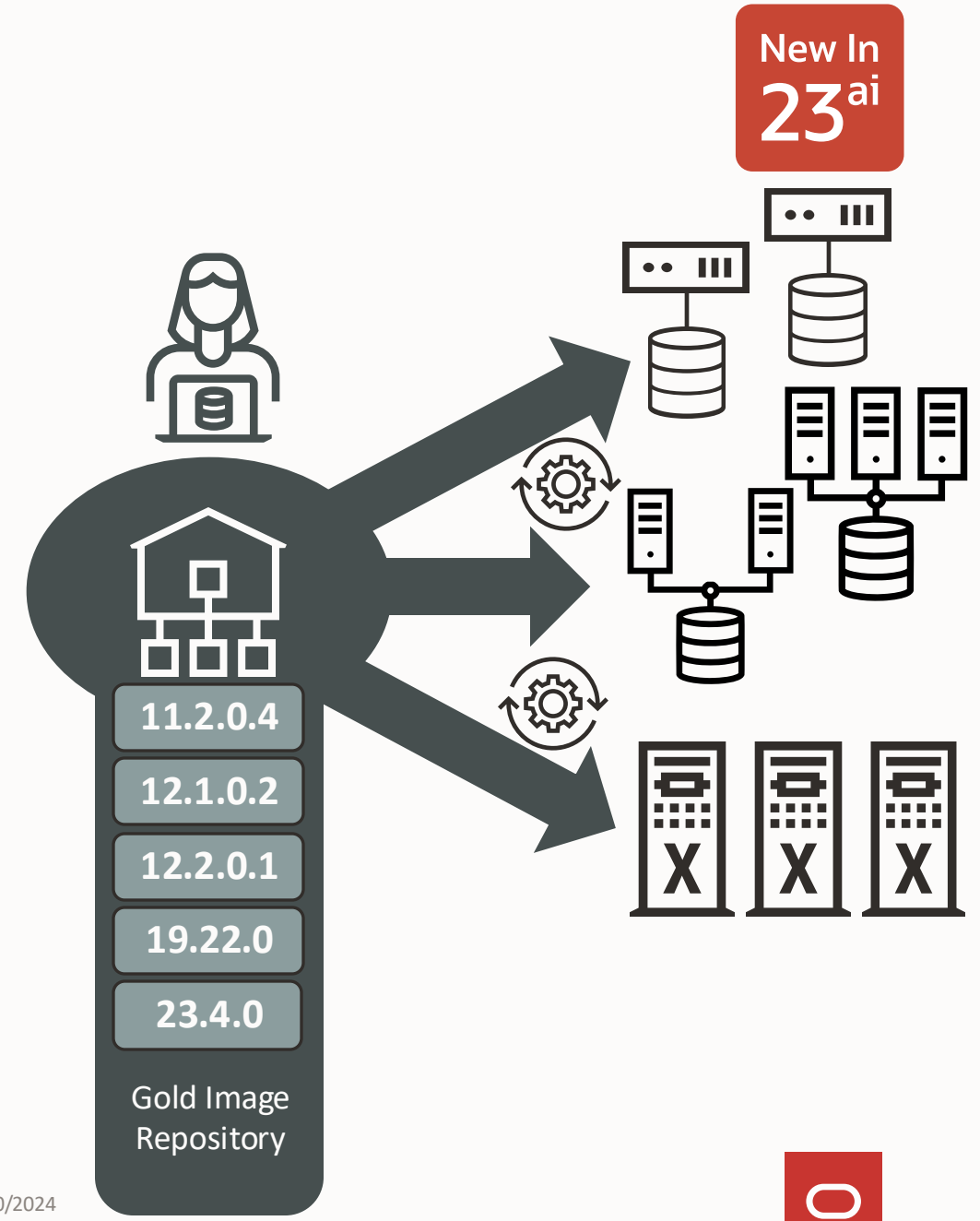
Fleet Patching & Provisioning

Automated Oracle software management

- Supports all Oracle deployments
  - Oracle Database, Grid Infrastructire,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



Thank you

Make sure to fill in the evaluation form