

Database Fleet Maintenance

Standardization at Scale

October, 2016

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Program Agenda

- 1 Business Challenges
- 2 Fleet Maintenance – Overview
- 3 Licensing
- 4 Customer Case Studies
- 5 Summary

Business Challenges

- Applications face business and security risks
 - Slow to uptake new database features
 - Databases are NOT at recommended patch level
 - Fail compliance requirements
- Spiraling maintenance costs
 - Long testing cycle for Upgrade process - depriving resources for application development
 - More experienced DBAs needed – lack of automation, reliability and scalability
- Longer downtimes for applications leading to revenue losses

...Managers report that their departments and resources still tend to be mired in low-level database administration tasks, such as performing upgrades, fixes and patches, Data management departments need to increase their output and productivity. ...IT and data managers need to make innovation a larger part of their jobs.

- IOUG IT Resources Survey, 2014

Oracle Database Patching

What are our customers looking for?

- **Patch and Upgrade** complete Database product family including Data Guard, DBs on ODA and Exadata
- **Scale** - Patch large number of Databases with **minimal downtime**
- Mass **automation** - multiple targets with multiple patches in a single downtime
- **Flexibility** for Application owners and **Centralized Control** for Administrators

Database **Fleet** Maintenance

Simplified software configuration standardization at scale

Complete Automation

Scalability

Total Control

Full Support

- End to end, covers Patching , Upgrades

- Mass deployment, reduced downtime

- Centralized, Self service maintenance

- Support all DBs (Multitenant & Cloud Ready)



Standalone
Databases



Real Application
Clusters



Data Guard



Multitenant
(PDBs)



Database
Appliance (ODA)*



Exadata*



Database Cloud
(DBaaS) **

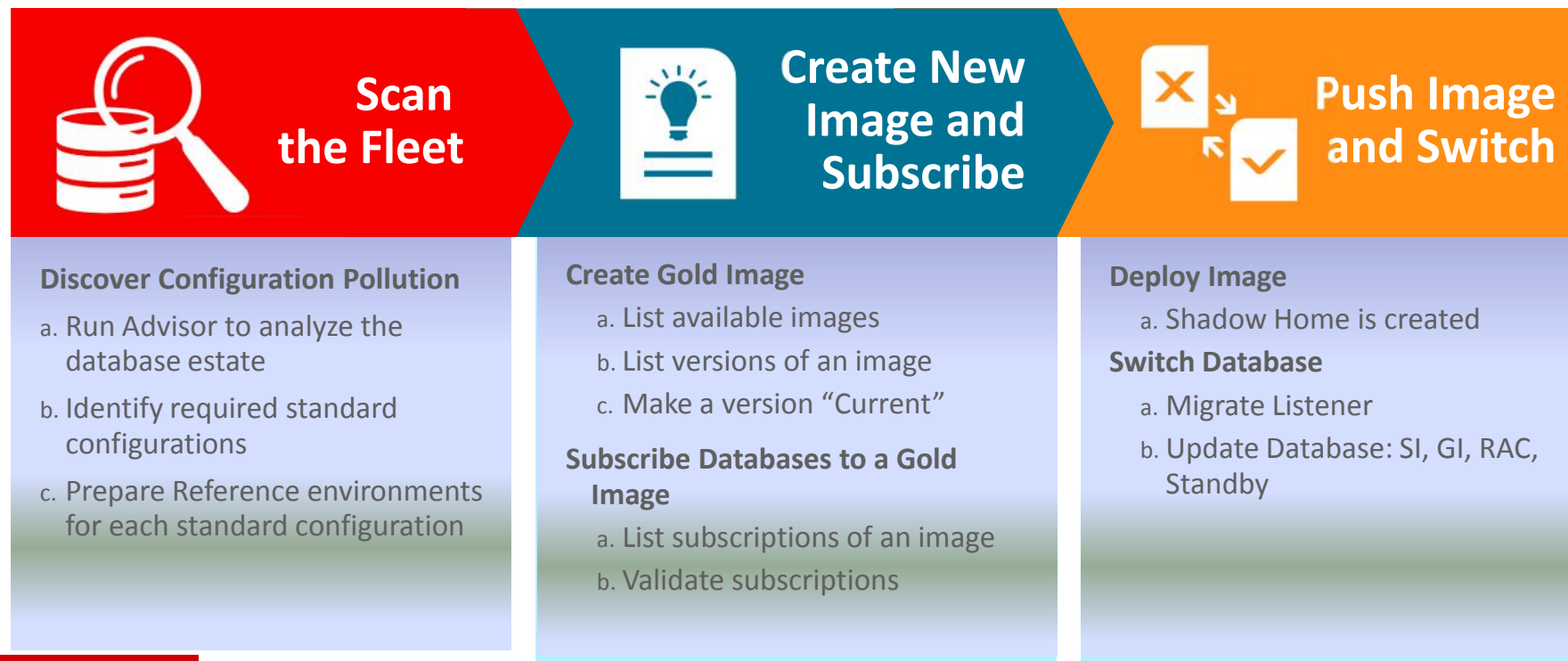
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Database **Fleet** Maintenance

Simplified Software Configuration Standardization at Scale



Database Fleet Maintenance

1. Detect “Configuration Pollution”

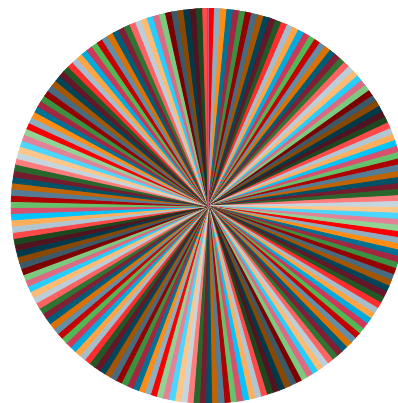
Advisor scans the fleet for configuration variations provides recommendations to standardize.

You can use images to manage your database software

- Reduce the number of different software versions and patches across enterprise
- Streamline and automate software upgrades and patching
- Keep current with software versions and patches available from Oracle

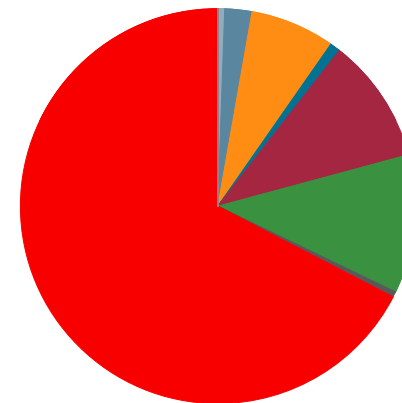
Analysis of Your Enterprise (2693 database installations)

Current Software Configurations (295)



Analysis: 1 in every 6 Oracle Home are different

Recommended Software Configurations (8)



Criteria Used: Platform, Release, Product

Series: Oracle Database
Release: 11.2.0.4.0
Platform:226
Group: Oracle Homes
Value: 201

To get started, use Database Image Advisor. The database image advisor helps you group database and define an image for each group.

Database **Fleet** Maintenance

2. Create Images and Subscribe

A. Define end states for software as Images and Versions.



* Current / Latest version

Database **Fleet** Maintenance

2. Create Images and Subscribe

B. Subscribe targets/pools to the images



* Current / Latest version

Database **Fleet** Maintenance

3. Propagate Changes and Switch with Ease



* Current / Latest version

Database Fleet Maintenance

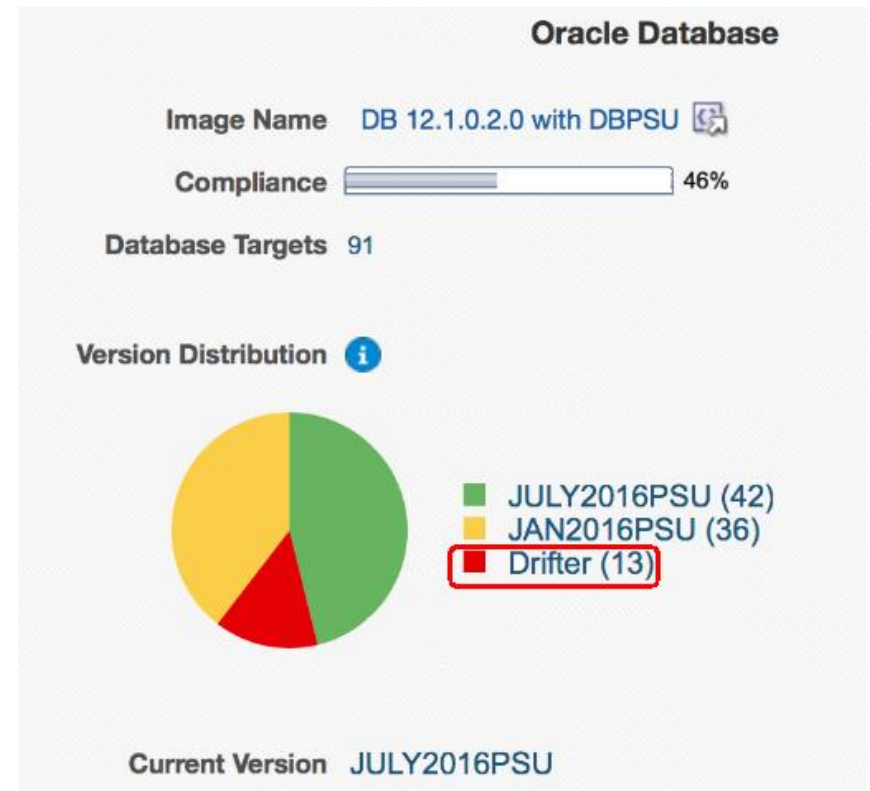
Manage Exceptions and Emergencies

- Allows emergency, ad-hoc patching.
- Ad-hoc is more an exception than a norm, its tracked as 'Drifter'
- Reconcile the Drifters either by rolling the changes to a new version of the image or override it with the latest version.



Drifter Target

Update to new
version or rollback
to older



Database **Fleet** Maintenance

emcli Verbs: **db_software_maintenance** & **db_cloud_maintenance**



Prepare Gold Image:

- createSoftwareImage: Create/Update a Gold Image
- getImages: Lists all available images
- getVersions: Lists all Versions
- updateVersionStatus: Makes a Version “current”

Subscribe:

- subscribeTarget: Subscribes list of DB targets to a Gold Image
- getImageSubscriptions: for Verification of subscription

Stage/Deploy:

“purpose=DEPLOY_GI_SOFTWARE/DEPLOY_RAC_SOFTWARE”:
Deploys software in shadow Oracle Home for list of provided targets

Switch/Update:

“purpose=UPDATE_GI/UPDATE_RAC”: Switches databases and Grid Infra to shadow Oracle Home for list of provided targets

“dataguard_role=standby/primary”

Switch Back/Rollback:

“purpose=ROLLBACK_GI/ROLLBACK_RAC”: Switches back to old Oracle Home

Cleanup:

“purpose=CLEANUP_GI_SOFTWARE/CLEANUP_RAC_SOFTWARE”:
Cleans up unused Oracle Homes to release space back

Database **Fleet** Maintenance

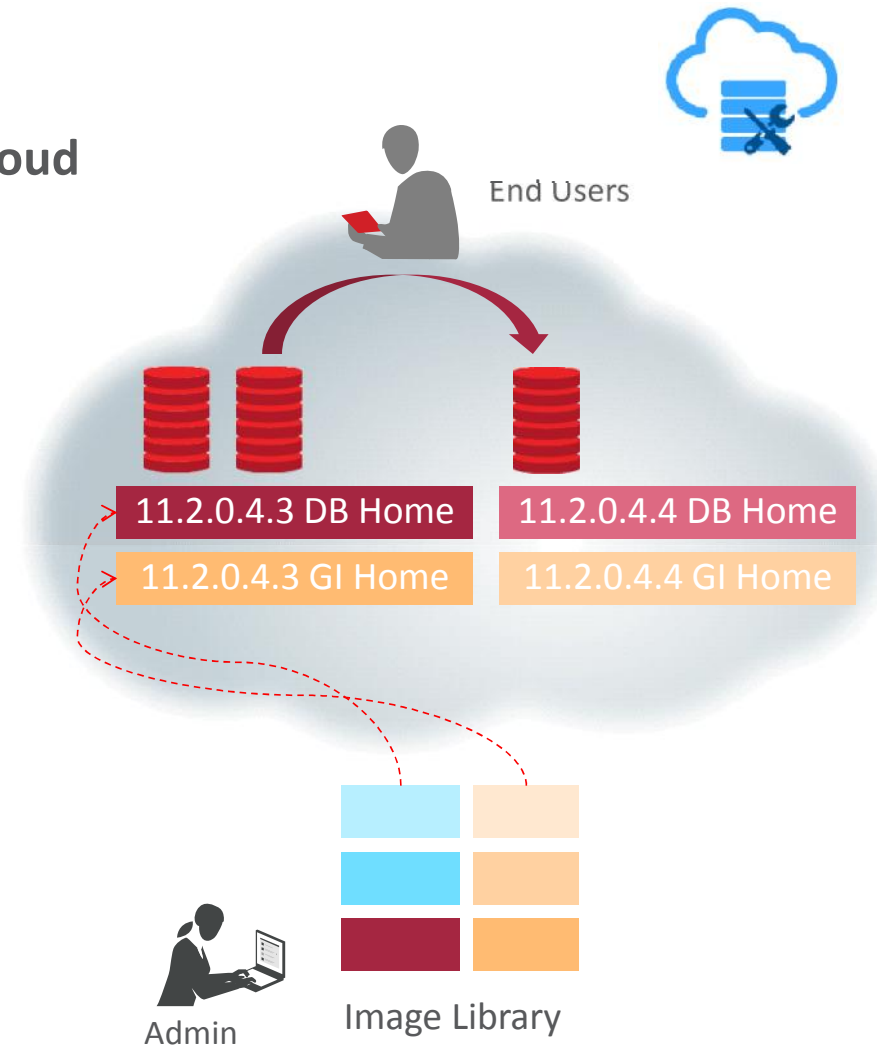
Self service enabled maintenance for Database Cloud

Process

1. Pools subscribe to images
2. New images automatically get deployed to servers in the pool
3. Activate the image
4. Self Service users or Admin can choose to migrate DBs over to the new home

Isolation & Flexibility: Users to move to new software version on their terms

Track real time compliance



Database **Fleet** Maintenance

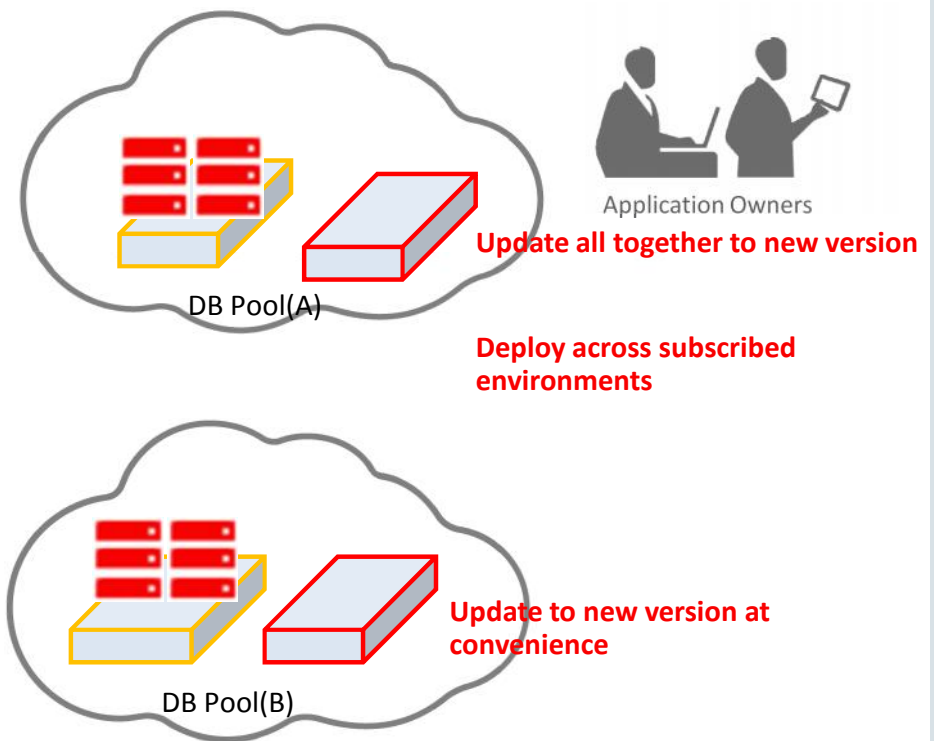
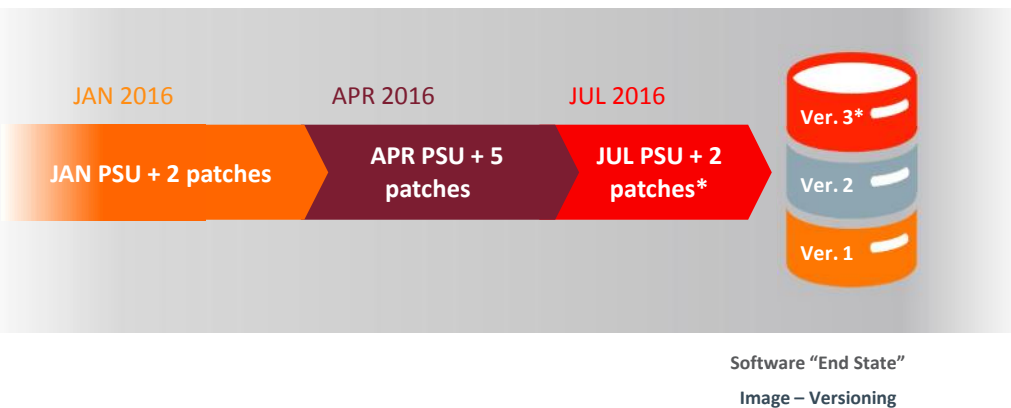
New! Simplified software configuration standardization at scale



3

Propagate & Activate New Images, Switch Databases at leisure

Create Shadow Homes with new images for all participating Pools, Activate the New Homes. Schedule database services to switch to new Oracle Home Images.



Oracle Database Patching

Solution Summary

	Process	Impact
 OPatch / Scripting	•Numerous manual steps	•Low success rate and error prone •One DB at a time •Longer Maintenance windows •Example: 2 weeks for 10 clusters
 Conventional Patching	•Patch recommendations from MOS •Patch Plans for distinctive configurations •Analyze to identify conflicts & request MLRs •Execution using OPatch / OPlanDB	•Multiple steps in execution •Longer Maintenance windows •Example: 4 Days for 4 distinct configurations – Total 10 clusters
 Fleet Maintenance	•Patch Reference Environment •Upload as Gold Image •Subscribe DB to Image •Push image and Switch	Fewer Steps Concurrent Execution Shorter Maintenance Windows Easily Scalable Example: < 4 hours for patching 10 clusters

Database **Fleet** Maintenance for Exadata

- Exadata Patching [EM 13c] for firmware
 - UI driven firmware patching introduced in 13.1
 - Quarterly Full Stack Patches
- Database patching
 - Fleet Maintenance is applicable to Exadata, similar to non-Exadata platforms



Firmware Patching

- ✓ Compute Nodes
- ✓ Storage Server Cells
- ✓ InfiniBand Network Switches

Fleet Maintenance Licensing

Database Lifecycle Management and Cloud Management Pack for DB

	DBLM	CMP4DB
Create an Image	✓	
Deploy an Image	✓	
Admin Driven Switchover to Image	✓	
Image Compliance / Reporting	✓	
Image Subscription	✓	
Fleet Operations - Administrative	✓	
Fleet Operations – Self Service enabled		✓
Self Service enabled Database Update		✓

Database **Fleet** Maintenance

Simplified software configuration standardization at scale

Customer Stories

Customer Overview



Customer Thumbnail

- Insurance, Investments, Banking
- Revenue: US\$ 40.2 billion
- Employees: 34,000

Key Pains & Challenges

- Varied Cluster configurations and Version proliferation
- Severe Patching delays: 60 minutes per database
- Low Success factor (80%) when the required is 99.99%

Solution / Benefits

- Fleet Maintenance Patching
 - CLI based implementation
 - Scalable / concurrent patching enables shorter maintenance windows
 - Reliable patching with less reliance on experienced DBAs

Nationwide

Out of Place Patching with Fleet Maintenance



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	Deploy Homes	Switch
Manual		60 Minutes 1 DB at a time Experienced DBA Required
Scripted Patching	60+ Minutes + Patching Time 1 Home at a time	30 Minutes 1 DB at a time Experienced DBA Required
 Fleet Maintenance	20 Minutes with all patches Scalable Concurrency Possible	7-15 Minutes Scalable Concurrency Possible

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Patch More

1,400 Databases

180 Clusters

Less Time

7X Faster

Less Risk

**Patching
success rate
80% -> 99.99%**

Include: Topologies covered
Numbers in a patching event and patching window

“...the payoff will be significant ... instead of dedicating the entire DBA staff to constantly patch and coordinate schedules you will be able to patch more in less time with less risk.”

Customer Overview



Customer Thumbnail

- Healthcare Information Technology
- Revenue: US\$ 4.4 billion
- Associates: 22,000

Key Pains & Challenges

- Quarterly patching cadence
- Patching 1,600 Hosts and 2,500 Databases & 50 DBAs, takes 66 days
- Overlay/Merge/Interim patching
- Varied configuration caused by conventional patching

Solution / Benefits

- Fleet Maintenance based Patching
 - Known end-state driven (Gold Image)
 - Homogenous environment
 - All Homes on latest PSU
 - Cluster patching is 5x faster

	Process	Impact
Manual	DBA driven orchestration Merge patch request for conflicts Each Home considered independently	Patching success/failure depends on start-state of the Home DBAs need to maintain history of each home 2500 DBs with 50 DBAs → 66 days
Fleet Maintenance	DBAs kick off patching as an operation Right image is picked through subscription	2 weeks 1280 Hours saved per quarter 2-Node cluster patched in 25 minutes

Customer Overview



Customer Thumbnail

- E-Commerce
- Revenue: US\$ 9.24 billion
- Customers can accept payments in **100** currencies!

Key Pains & Challenges

- Standards enforcement
- Increasing internal and external Compliance audits
- Patching breaks uptime requirements

Solution / Benefits

- Fleet Maintenance based Patching
 - Known end-state driven (Gold Image)
 - Compliance tracking
 - Granular control
 - Centrally executed through EMCLI

PayPal

Out of Place Patching with Fleet Maintenance



	Process	Impact
Manual		DBA needs to have super user privileges Experienced DBA Required
Patch Plans	Multiple plans to cover all configurations EM driven process	Less error prone Cannot combine multiple patches End-state is different for each home
Fleet Maintenance	Concurrent patching Configuration standardization through Gold Image	10 Minutes per Node Downtime within contract

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Database **Fleet** Maintenance

Benefits

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Reduced Downtime

Quarterly PSU patching now takes **hours** in stead of weeks

Patch most no of databases in least amount of downtime!



Admin



End Users

Flexible

Self Service maintenance
Ability to choose What to patch and When



Automation at Scale

Mass deploy and make changes in bulk using EMCLI to patch **2000+** Production Homes



Transparent & Simple Administration

Dashboards, real time tracking, maintenance via clicks

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References

- [Enterprise Manager Page on O.com](#)
- [Cloud Management Page on OTN](#)
- [Cloud Administration Guide \(Documentation\)](#)
- **MOS Note:** EM12c Recommended Plug-Ins and Patches for DBaaS (1549855.1)

Integrated Cloud

Applications & Platform Services

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