

ORACLE

# Exadata Cloud Patching

Get Started – Tips and best practices

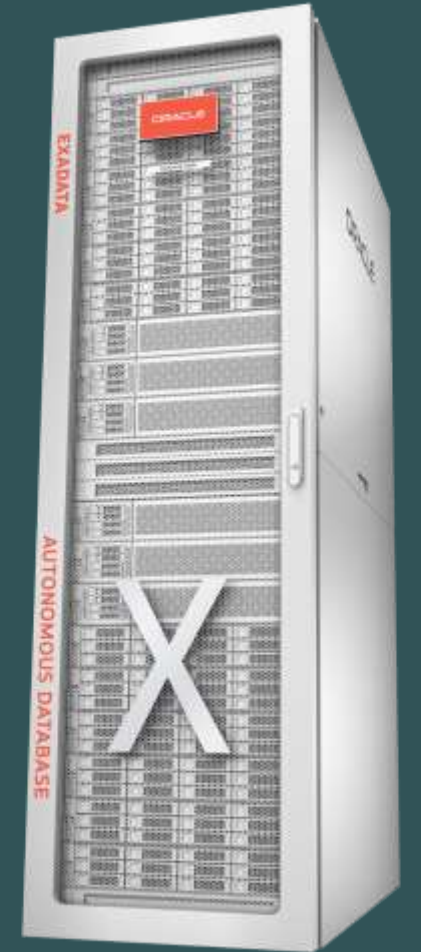
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**Marcel Lamarca**

Exadata Cloud Specialist

Oracle, Alliances and Channels LAD

April, 2024



SQL> select \* from person where name = 'Marcel Lamarca'




## MARCEL LAMARCA

Exadata Cloud Specialist

Upgrade, Utilities, Patching, Performance & Migrations

 [marcel-lamarca](https://www.linkedin.com/in/marcel-lamarca)

 marcel.lamarca@oracle.com

### About My Career

- 22 Years dedicated to study and support Oracle Databases.
- 12 Years working with Exadata (On-prem, C@C and Cloud Services) .
- 5 Year working for Oracle do Brasil
- 2 Year on Alliances LAD knowledge Team

### Certifications

#### Oracle Cloud Specialist (OCS)

- Exadata Database Machine X9M Certified Specialist
- OCI Foundation 2020 / 2023
- Oracle Autonomous Database Administrator Professional 2019 / 2023
- Oracle Cloud Database Migration and Integration 2021
- OCI Cloud Certified Architect Associate 2022
- OCI Cloud Certified Architect Professional 2022
- OCI Multi-Cloud Architect Professional 2023
- Oracle Database Services Certified Professional 2023

#### Oracle Certified Professional (OCP)

- Oracle Database certified professional 10g, 11g, 12c and 19c.
- Mysql 8.0 Database Administrator Certified Professional

#### Oracle Certified Specialist (OCE)

- Grid/RAC Database Administrator 11g
- Oracle Golden Gate 12c Certified Implementation Specialist



# Agenda

1

Why Patch your Exdata Cloud ?

2

Patching Domo components

3

Patching DomU components

4

Resources

5

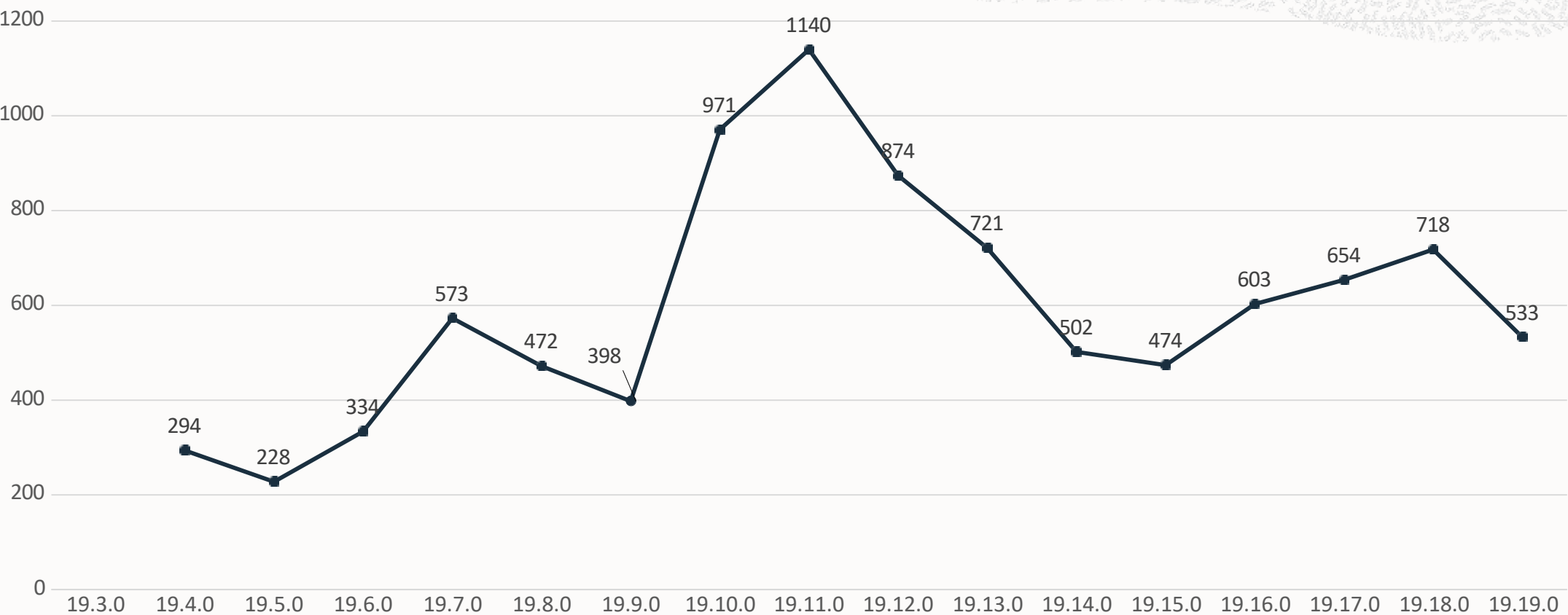
Demos



# Why Patch your Exdatata Cloud ?



# Oracle 19c Release update contents



[Database 19 Release Updates and Revisions Bugs Fixed Lists \(Doc ID 2523220.1\)](#)



## • Exadata Critical Issues

[MOS DOC 1270094.1](#)


#	Applies to	Issue	Fix or Workaround	Date
IB9	Sun Datacenter InfiniBand Switch 36 software 2.2.15-1 and lower	Bug 30303098 - Excessive network traffic on the management network, such as that caused by a broadcast storm, can lead to simultaneous reset of all InfiniBand switches, causing an InfiniBand network outage and/or database node evictions.	Fixed in 2.2.16. See <a href="#">Document 2773989.1</a> for details. Review issue DB49 before updating InfiniBand Switch software.	2021-May-04
IB8	Sun Datacenter InfiniBand Switch 36 software 2.2.6, 2.2.7, and 2.2.8 with network partitioning configured.	<a href="#">Bug 27611791</a> - When InfiniBand network partitioning is in use and the Primary subnet manager (SM) receives a constant flood of P_Key violation traps, the current partition policy may be reset to the default partition policy, which causes connection failure amongst servers communicating in the non-default partition(s). This can lead to dismounted ASM disk groups and node evictions.	Fixed in 2.2.9. See <a href="#">Document 2413649.1</a> for details. Review issue EX38 below for additional detail.	2018-Jun-29
IB7	Sun Datacenter InfiniBand Switch 36 software 2.1.5 and earlier.	<a href="#">Bug 17482244</a> - If the Primary subnet manager (SM) on an InfiniBand switch becomes overloaded one of the standby SMs will become a second Primary SM. After the original Primary SM becomes active again and the switches negotiate to return back to having a single Primary SM, some database servers and/or storage servers may no longer be able to communicate on the InfiniBand network, which can lead to node eviction or cluster outage.	Fixed in 2.1.6. See <a href="#">Document 2400204.1</a> for details.	2018-Jun-14
IB6	Sun Datacenter InfiniBand Switch 36 software 2.1.x through 2.2.7.	<a href="#">Bug 26678971</a> - The real time clock (RTC) on an InfiniBand switch may become corrupt, which may cause the switch to become unbootable when attempting to upgrade.	Fixed in 2.2.8. See <a href="#">Document 2309926.1</a> for details.	2017-Sep-27
IB5	Sun Datacenter InfiniBand Switch 36 software 2.1.8 and earlier	<a href="#">Bug 23528420</a> - InfiniBand switches may experience high CPU utilization after receiving a malformed POST request via HTTP or HTTPS, which may result in subnet manager unable to get CPU to respond to network management duties, which can lead to database server or storage server eviction. Such requests are often initiated by a security scan tool.	Fixed in 2.2.2. See <a href="#">Document 2169026.1</a> for details.	2016-Aug-11
IB4	Sun Datacenter InfiniBand Switch 36 software 2.1.3-4 (supplied with Exadata 11.2.3.3.0) when connected to Exalogic Virtual environment over the InfiniBand network.	Bug 17936962 - Invalid pkey values in partition definitions in Exalogic Virtual environments prevents add or delete members of a partition.  Note: From Exadata perspective, this issue <u>only</u> applies when an Exalogic Virtual environment is connected to Exadata via the InfiniBand network.	Apply April PSU to Exalogic prior to Exadata InfiniBand switch upgrade to 2.1.3-4. Review <a href="#">Document 1301247.1</a> for additional details about Exalogic April PSU.  Prior to Exalogic April PSU availability, the recommendation was to apply patch 18034691. Details are available in <a href="#">Document 1630396.1</a> . Note that patch 18034691 is not compatible with patch 18175326, which may be applied to address guest vServers connectivity issues (see <a href="#">Document 1615444.1</a> ). Both issues are fixed in Exalogic April PSU.[This section is not visible to customers.]	2013-Dec-16






# Before upgrading, apply the most important patches

- In addition, use Patches to consider for 19c : MOS Note: [2781612.2](#)

 **Oracle Database Patches to Consider for 19c (Doc ID 2781612.2)**

Visibility: EXTERNAL  (4)

Getting Started

Performance

GoldenGate

Oracle Text

Platform Specific

HA

DNFS

Data Pump

Search This Document

When applying Database patches, Oracle recommends that you take a 3-tiered step-by-step approach.

**LEVEL 1: Apply latest quarterly patches:**

- Apply latest quarterly updates using [Master Note for Database Proactive Patch Program \(Doc ID 888.1\)](#)

**LEVEL 2: Apply Critical/Recommended patches:**

- - For Exadata environments: [Exadata Critical Issues \(Doc ID 1270094.1\)](#)
  - For Database environments:
    - Customers on Linux x86-64 - Apply the latest [Monthly Recommended Patches - MRP \(Doc ID 2898740.1\)](#) for the specific RU
    - For customers on other platforms, apply critical patches using [Oracle Database 19c Important Recommended One-off Patches \(Doc ID 555.1\)](#)

**LEVEL 3: Apply additional patches based on features or focus areas:**

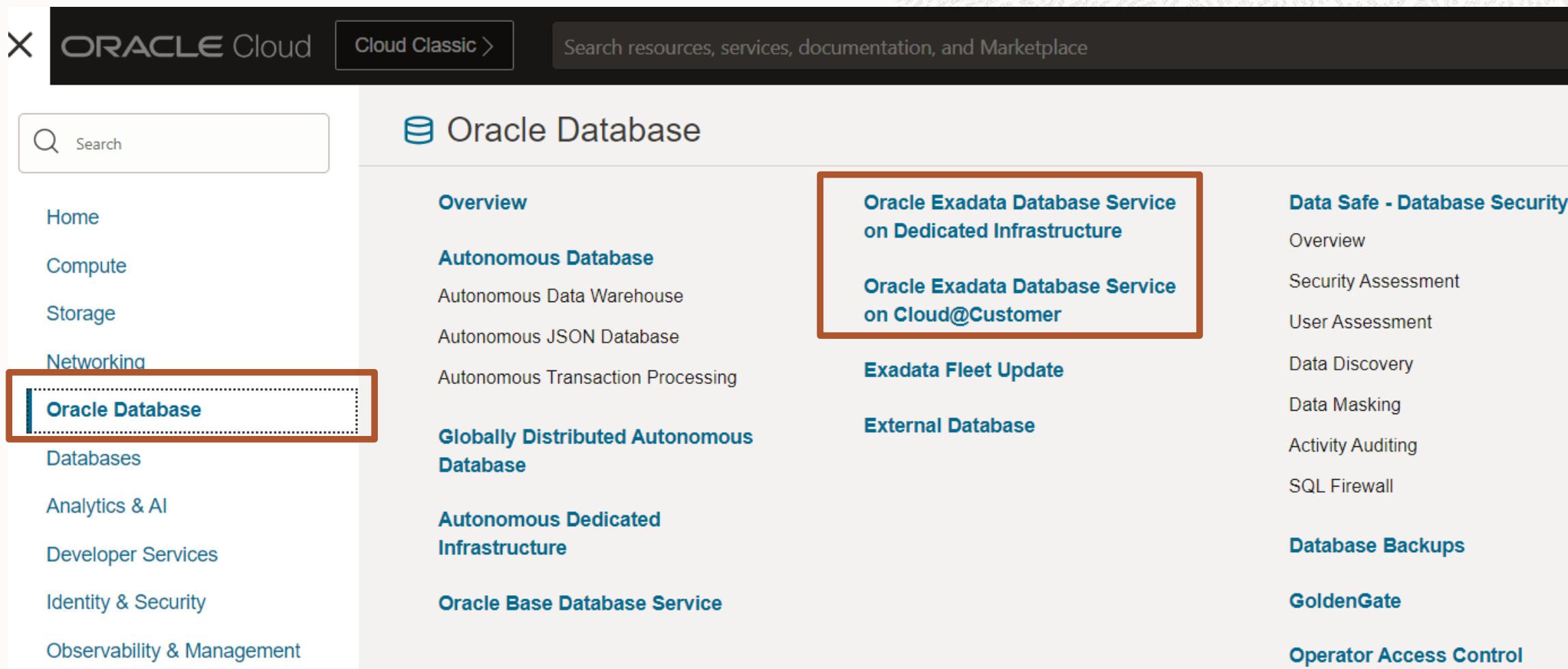
- Use the tabs in this document for quick access to additional feature based patches

# Exadata Cloud Architecture





# Exadata Cloud on the OCI Menu



The screenshot displays the Oracle Cloud console interface. At the top, the header includes the Oracle Cloud logo, a 'Cloud Classic' link, and a search bar. The left sidebar contains a navigation menu with options: Home, Compute, Storage, Networking, **Oracle Database** (highlighted with a red box), Databases, Analytics & AI, Developer Services, Identity & Security, and Observability & Management. The main content area is titled 'Oracle Database' and lists various database services. The 'Oracle Exadata Database Service on Cloud@Customer' option is highlighted with a red box. Other services listed include 'Oracle Exadata Database Service on Dedicated Infrastructure', 'Exadata Fleet Update', 'External Database', 'Data Safe - Database Security', 'Database Backups', 'GoldenGate', and 'Operator Access Control'.

**Oracle Cloud** Cloud Classic > Search resources, services, documentation, and Marketplace

Search

Home

Compute

Storage

Networking

**Oracle Database**

Databases

Analytics & AI

Developer Services

Identity & Security

Observability & Management

**Oracle Database**

**Overview**

**Autonomous Database**

Autonomous Data Warehouse

Autonomous JSON Database

Autonomous Transaction Processing

**Globally Distributed Autonomous Database**

**Autonomous Dedicated Infrastructure**

**Oracle Base Database Service**

**Oracle Exadata Database Service on Dedicated Infrastructure**

**Oracle Exadata Database Service on Cloud@Customer**

**Exadata Fleet Update**

**External Database**

**Data Safe - Database Security**

Overview

Security Assessment

User Assessment

Data Discovery

Data Masking

Activity Auditing

SQL Firewall

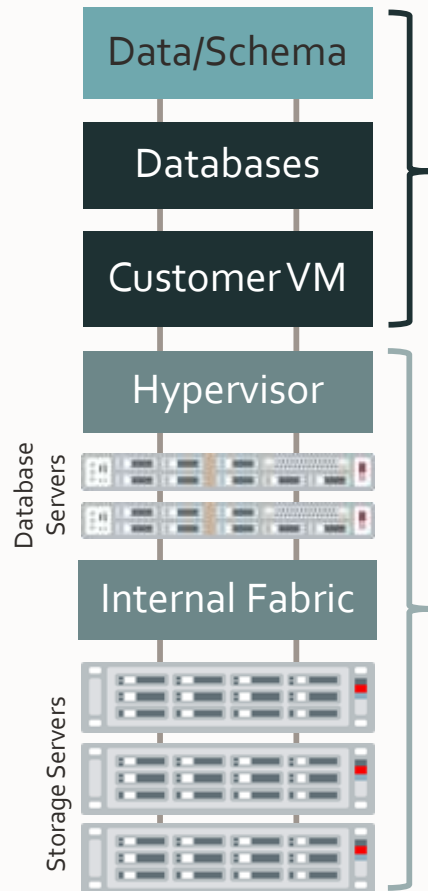
**Database Backups**

**GoldenGate**

**Operator Access Control**



# Exadata Cloud Domo Vs DomU



## DOMU

- Customer manages VMs and Databases using Cloud Automation (UI / APIs)
- Automation to create, delete, patch, backup, scale up/down, etc.
- Runs all supported Oracle Database versions 12.1.0.2, 12.2.0.1, 19c and 21c
- Customer controls access to customer VM
- Customer can install and manage additional software in customer VM
- Oracle staff are not authorized to access customer VM

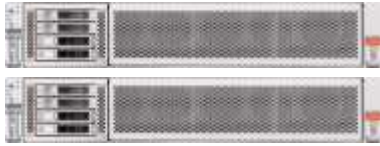
## DOMo

- Hypervisor, database and storage servers, storage network
- Patching, security scans, security updates
- Monitoring and maintenance
- Customer not authorized to access Oracle infrastructure

# Exadata Cloud Infrastructure Patch components process

## Database Nodes

---



- Patch starts on **Database Nodes** and can take up to **120 min** per server to be completed
- Customers can choose between **rolling** and **no rolling** upgrade mode
- Can cause total or Partial unavailability
- Is a best practice to check scan-listener configuration before any infrastructure patch

## RDMA



- There is no unavailability during ROCE switch
- Is the last Exadata Cloud hardware to be patched

## Storage Nodes

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- For Storage servers, 60 minutes is considered for each node
- Storage nodes patching process does not cause unavailability
- Storage Disks are put offline between the process
- Oracle reboots every Storage node when the process is finished

## Checking ASM disk status on +ASM Instance

```
SQL> SELECT
lower(FAILGROUP) as cell_name,
TO_CHAR(MIN(MOUNT_DATE), 'DD/MM/YYYY HH24:MI:SS') MIN_MOUNT_DATE,
TO_CHAR(MAX(MOUNT_DATE), 'DD/MM/YYYY HH24:MI:SS') MAX_MOUNT_DATE,
COUNT (CASE WHEN MODE_STATUS = 'OFFLINE' THEN 1 ELSE NULL END) DISK_OFFLINE,
COUNT (CASE WHEN MODE_STATUS = 'SYNCING' THEN 1 ELSE NULL END) DISK_SYNCING
FROM V$ASM_DISK
GROUP BY FAILGROUP
ORDER BY 1;
```

- Failgroup with **MOUNT\_DATE** on the current date and all disks ONLINE, indicates that the Storage server in question has already been updated
- **DISK\_OFFLINE** > 0, the Storage server in question is being updated
- **DISK\_SYNCING** > 0, Storage server has just been upgraded and the disks are being rebalanced before the upgrade process moves on to the next Storage server (if not the last one in the list).

# Maintenance

**Maintenance Method Preference:** Rolling  
**Quarterly Maintenance Schedule:** Custom schedule  
**Maintenance type:** Release update (RU)  
**Next Quarterly Maintenance:** Sat, May 25, 2024, 13:00:00 UTC [View](#)  
**Next Security Maintenance:** System is up to date [View](#)  
**Customer Support Identifier (CSI):** --  
**Primary Contact:** Diego Teruel

**Version** ⓘ  

**DB Server Version:** 23.1.10.0.0.240208 (240407.1) ⓘ  
**Storage Server Version:** 23.1.12.0.0.240322

# Exadata Infrastructure Security Maintenance

Your Exadata Infrastructure is scheduled for security maintenance at 2023-08-06 05:00.

**Status:** ● Scheduled  
**Type:** Monthly Security Maintenance  
**OCID:** ...m44gcq [Show](#) [Copy](#)  
**Exadata Infrastructure:** [osc-lad-exacc6](#)  
**Target DB Server Version:** 22.1.10.0.0.230422 (230704) ⓘ  
**Target Storage Server Version:** 22.1.11.0.0.230516 ⓘ  
**Maintenance Method:** Online  
**Scheduled Start Time:** Sun, Aug 6, 2023, 05:00:00 UTC  
**Total Estimated Maintenance Time:** 3 hours 15 minutes ⓘ

Quarter 1	Quarter 2	Quarter 3	Quarter 4
✓ JANUARY	✓ APRIL	✓ JULY	✓ OCTOBER
✓ FEBRUARY	✓ MAY	✓ AUGUST	✓ NOVEMBER
✓ MARCH	✓ JUNE	✓ SEPTEMBER	✓ DECEMBER



# Domo maintenance time history through OCI Console

Exadata Infrastructure Maintenance

Maintenance

Maintenance History

Estimated Maintenance Time Details

Total Estimated Maintenance Time: 7 hours ⓘ

Database Servers Estimated Maintenance Time: 3 hours

Order	Display name	Status	Estimated Time	Custom action timeout ⓘ	Number of VMs impacted ⓘ	Number of AVMs impacted ⓘ
1	dbServer-1	Scheduled	1 hour 30 minutes	0 minutes	3 <a>Show Details</a>	1 <a>Show Details</a>
2	dbServer-2	Scheduled	1 hour 30 minutes	0 minutes	3 <a>Show Details</a>	1 <a>Show Details</a>

Showing 2 Items

Storage Servers Estimated Maintenance Time: 3 hours ⓘ

Network Switches Estimated Maintenance Time: 1 hour

Maintenance History

Exadata Infrastructure:

Title	State	Target Database Server Version ⓘ	Target Storage Server Version ⓘ	Start Time	End Time	Type	Scheduling
<a href="#">Exadata Infrastructure Security Maintenance</a>	<div>Succeeded</div>	230607	22.1.11.0.0.230516	Tue, Jul 4, 2023, 05:00:14 UTC	Tue, Jul 4, 2023, 07:32:25 UTC	Monthly	Planned ⋮
<a href="#">Exacc Infra Maintenance</a>	<div>Succeeded</div>	22.1.10.0.0.230422	22.1.10.0.0.230422	Sat, May 27, 2023, 13:00:24 UTC	Sat, May 27, 2023, 16:12:26 UTC	Quarterly	Planned ⋮
<a href="#">Exadata Infrastructure Security Maintenance</a>	<div>Succeeded</div>	230508	22.1.10.0.0.230422	Thu, May 25, 2023, 10:16:39 UTC	Thu, May 25, 2023, 10:29:37 UTC	Monthly	Planned ⋮





# Exadata Cloud Security Patch Trace on OCI Console

Overview

Oracle Exadata Database Service on Cloud@Customer

Exadata Infrastructure

Infrastructure Details

Work Requests

Work Request Details

WR

SUCCEEDED

Apply ExaCC Exadata Infrastructure Security Maintenance

Work request information

Apply ExaCC Exadata Infrastructure Security Maintenance

Succeeded

100% complete

Operation: Apply ExaCC Exadata Infrastructure Security Maintenance

Accepted: Thu, Apr 25, 2024, 05:17:14 UTC

Started: Thu, Apr 25, 2024, 05:17:24 UTC

Finished: Thu, Apr 25, 2024, 05:47:06 UTC

OCID: ...b3njqa Show Copy

Compartment: [REDACTED]

Resources

Log messages

Error messages

Associated resources

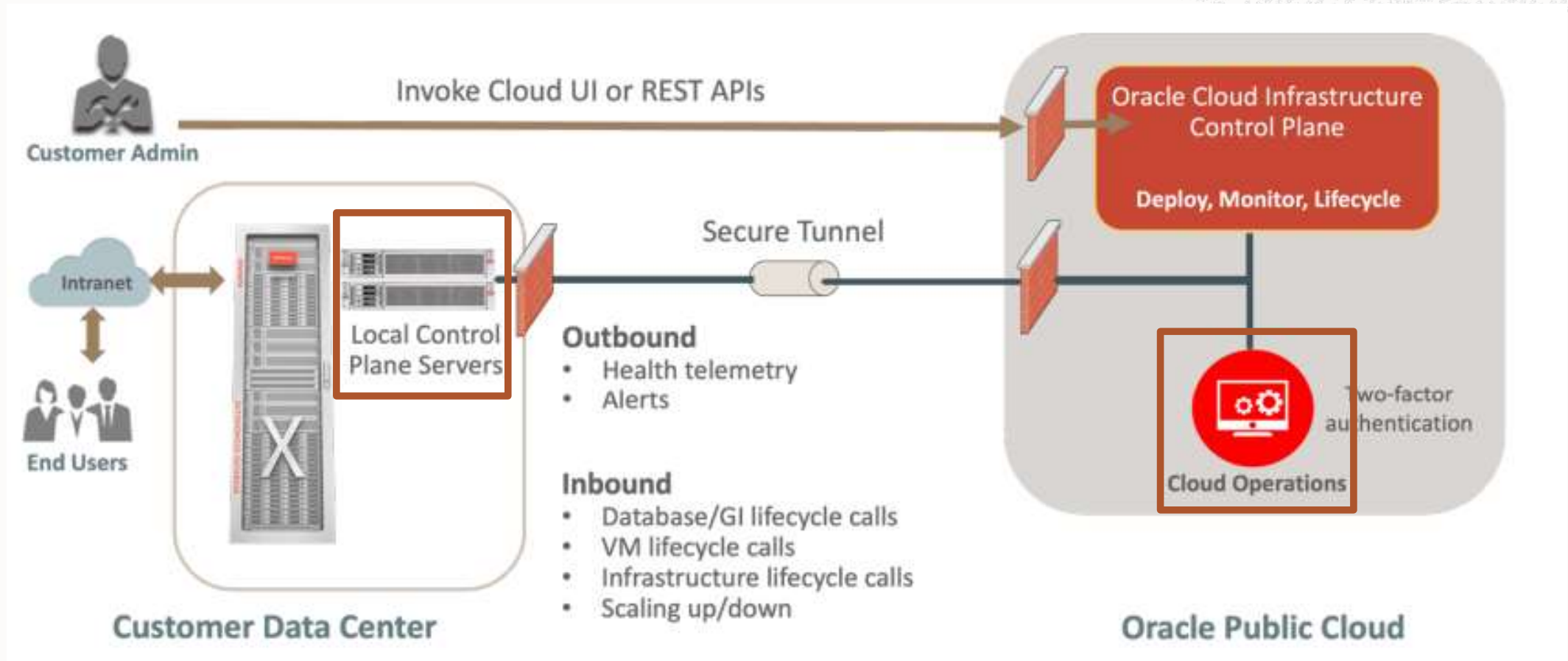
Log messages

Message	Timestamp (UTC)
Finishing Apply ExaCC Security Maintenance	Thu, Apr 25, 2024, 05:47:06 UTC
ExaCC storage server maintenance completed successfully	Thu, Apr 25, 2024, 05:47:03 UTC
ExaCC storage server maintenance started	Thu, Apr 25, 2024, 05:41:32 UTC
[No Title] ExaCC DB server maintenance completed successfully	Thu, Apr 25, 2024, 05:41:31 UTC
dbServer-2 maintenance ended	Thu, Apr 25, 2024, 05:41:31 UTC

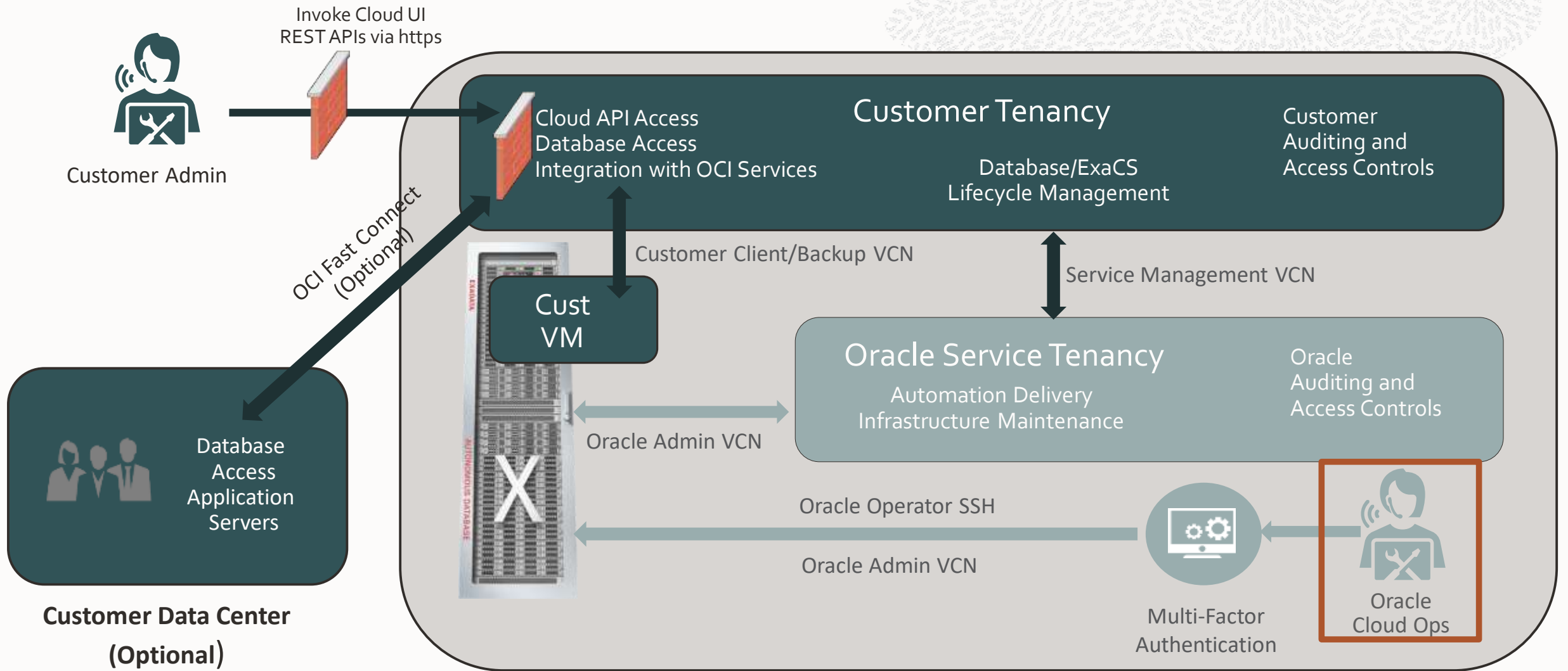
15

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# Exadata Cloud@Customer Operations sample



# Exadata Cloud Service ExaCS Architecture



# Oracle Database Timeline



# Oracle Database Supported on Exadata Cloud

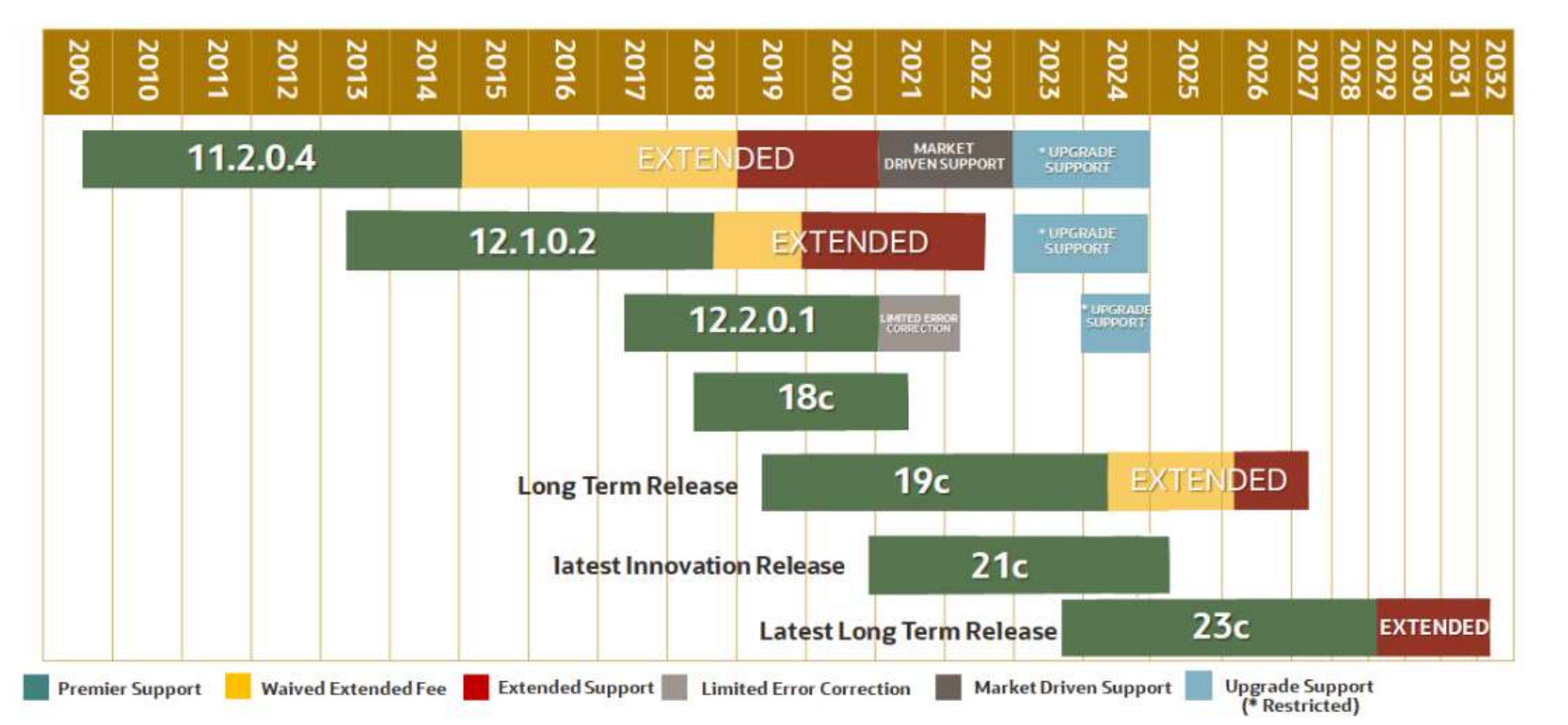
**19<sup>c</sup>** **ORACLE<sup>®</sup>**  
Database

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- Enterprise Edition – 19c Last Long Term Release
- Enterprise Edition – 21c Innovation Release

# Oracle Database Releases and timeline

My Oracle Support Official Note (Doc ID 742060.1)

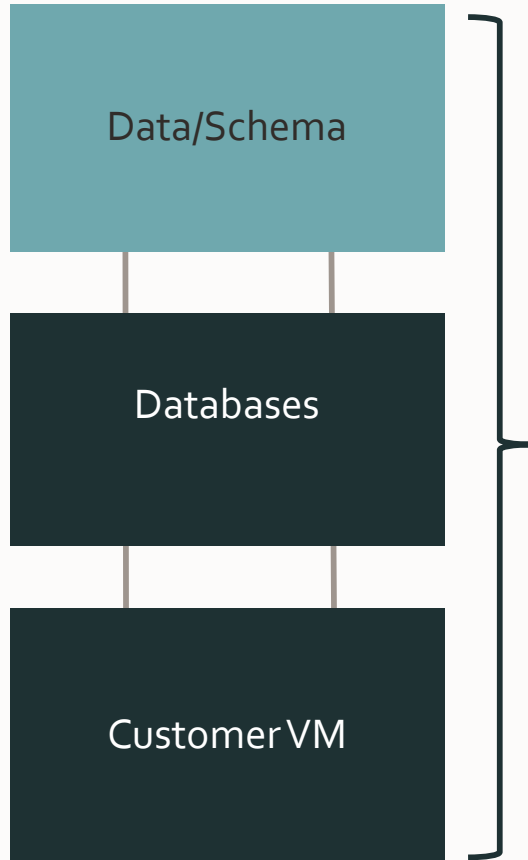




# Patching DomU components



# Customer is responsible for any DomU patch



- Oracle **dbaascli** (tooling) upgrade and can be configured automatically
- Oracle Linux **DomU** Image using **patchmgr** or **OCI Console**
- **Oracle Home** can be updated through **Dbaascli** or **OCI Console**
- **Grid Home** can updated through **OCI Console** or **Dbaascli**
- **One-off Patching** may be required in case any specific issue is not fixed on bundle patch's

# Dbascli Tooling



Step 1. # sudo -s

```
Step 2. # rpm -qa|grep -i dbaastools
dbaastools-version number-release_number
```

```
Step 3. # dbaascli patch tools list
```

```
Step 4. # dbaascli dbpatchm --run -list tools
```

```
NFO: cdb is set to : yes
```

```
INFO: dbversion detected : 12102
```

```
INFO: patching type : psu
```

Patchid : 17.4.3.1.0 171129.0000

```
Patchid : 17.4.3.1.0 171213.0000 <<<<<<<<<<<<<< Latest Version
```

```
Step 5. # dbaascli patch tools apply --patchid LATEST
```



# Lear how to keep your dbaascli up to date

[Doc ID 2350471.1](#)

## ★ How to upgrade DBAAS Cloud Tooling using dbaascli (Doc ID 2350471.1)

### In this Document

[Goal](#)

[Solution](#)

[Steps to Upgrade the Cloud Tooling using dbaascli](#)

[References](#)

### APPLIES TO:

Oracle Database Cloud Service - Version N/A to N/A [Release 1.0]  
Information in this document applies to any platform.

### GOAL

This document covers the steps to upgrade dbaas cloud tooling using dbaascli

### SOLUTION

Cloud tooling include the fixes for existing issues and new features so it is highly recommended to upgrade the cloud tooling once new version or release is available. Steps given below help to upgrade it to the higher version.

Note: When updating the cloud tooling on database deployments hosting a Data Guard configuration, you must perform the following steps on both nodes; that is, on the one hosting the primary database and on the one hosting the standby database.

#### Steps to Upgrade the Cloud Tooling using dbaascli

1. Connect as the opc user to the compute node. Check [Connecting to a Compute Node Through Secure Shell \(SSH\)](#)
2. Start a root user command shell

```
sudo -s  
#
```

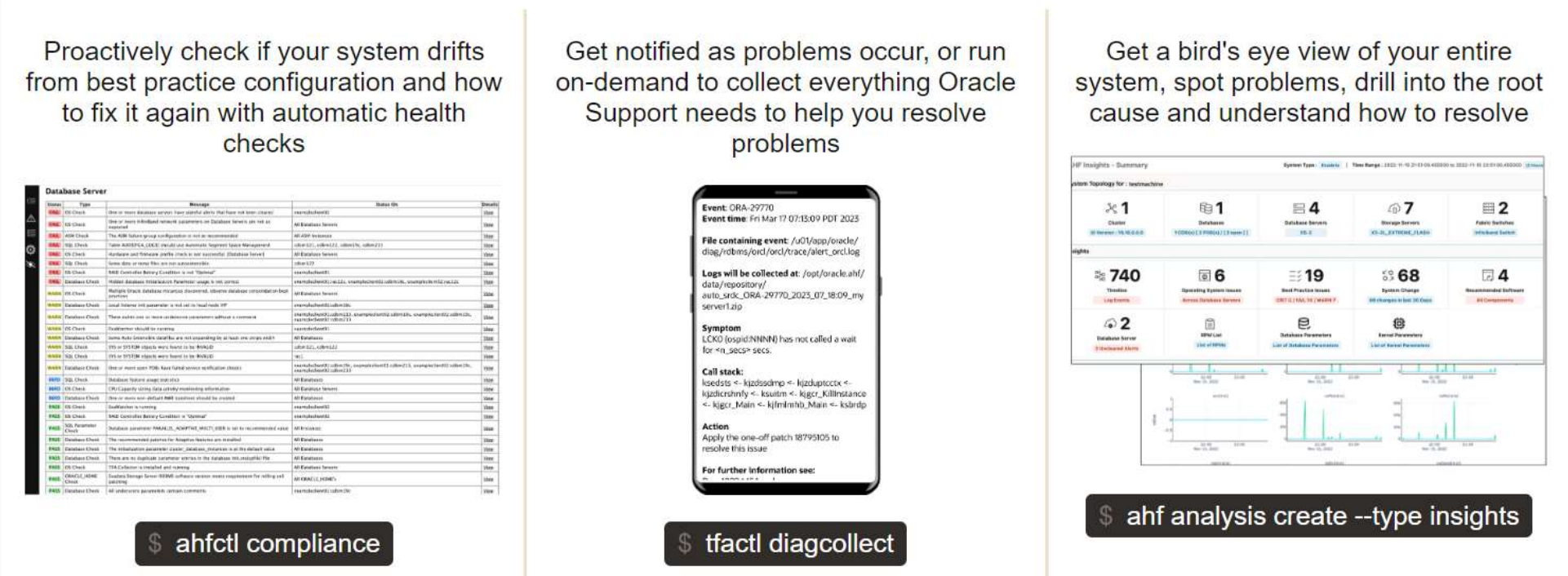


# Exadata Troubleshooting tools





[USER GUIDE](#)
[FAQ](#)
[SUPPORT](#)



- **Oracle Exadata Database Machine Exachk (Doc ID [1070954.1](#))**

## PURPOSE

This document describes how to obtain, install, execute, and update Exachk for Oracle Exadata Database Machine based implementations. It also describes common use cases and best practices to ensure that your Exadata deployment and configurations remain compliant with Exadata Maximum Availability Architecture (MAA) best practices.

## SCOPE

This document applies to all Oracle Exadata Database Machine based implementations:

- Exadata Cloud at Customer, Exadata Cloud Service, and Autonomous Database Services
- Exadata On-Premises
  - Bare Metal
  - Virtual Machines

## DETAILS

### Exachk Overview

Exachk holistically evaluates Exadata Database Machine engineered systems.

It includes:

- Configuration checks for Database Servers, Storage Servers, and Network Fabric Switches:
  - Firmware
  - Operating System (e.g. Oracle Linux)
  - Exadata software
  - Grid Infrastructure and ASM
  - Database
- MAA Scorecard:
  - MAA Configuration Review
  - Exadata Software Planner
  - Exadata Critical Issue alerts
- Automatic Correction (when applicable):
  - Configuration Correction
  - Critical Issue Avoidance
- Prerequisite checks for DB and GI software updates
- Prerequisite checks for DB and GI upgrades
- Prerequisite checks for application continuity readiness



# Exachk evaluates Exadata Database Machine Engineered Systems

- Firmware
- Operating System (e.g. Oracle Linux)
- Exadata software / Grid Infrastructure and ASM / Database
- MAA Configuration Review / Exadata Software Planner
- Exadata Critical Issue alerts / Critical Issue Avoidance
- Prereq checks for DB and GI software updates

Exachk Critical Issue Exposure Report (sample)

CRITICAL	Storage Server Check	System is exposed to Exadata Critical Issue EX51	All Storage Servers	<a href="#">View</a>
PASS	Database Server Check	System is not exposed to Exadata Critical Issue EX50	All Database Servers	<a href="#">View</a>

★ Exadata Critical Issues (Doc ID 1270094.1)

EX51	Storage servers running Exadata version 18.1.10, 18.1.11, or 18.1.12 using IORM to manage flash cache	Bug 29288067 - When I/O Resource Management (IORM) is configured to manage flash cache on storage servers, the cellsrv process may crash with error ORA-600 [FCGroupDesc::decLocalCnt_underflow].	Fixed in Exadata 18.1.13. See Document 2511918.1 for details.
------	---	---	---

Late-breaking issues - **MOS Alerts for Hot Topics** (See How To MOS 793436.2)

ORACLE

# Exadata Cloud Exachk commands

```
# exachk

# ahfctl version -all


# cat /etc/oracle.ahf.loc

# exachk -profile exatier1

# exachk -get all -id autostart

# dbaascli admin updateAHF

# exachk -excludecheck
9CC87B4EC33DAE8AE053D598EB0A65EF
```



```
[-a]
[-v]
[-debug]
[-nodaemon]
[-f]
[-upgrade]
[-noupgrade]
[-testemail all |
"NOTIFICATION_EMAIL=comma-delimited list of
email addresses"] [-sendemail
"NOTIFICATION_EMAIL=comma-delimited list of
email addresses"]
[-dbserial]
[-dbparallel [n]]
[-dbparallelmax]
```





# Never update AHF using traditional methods

**Note:**

**Do not download AHF from here for Cloud systems .**

AHF on Cloud systems is maintained by Cloud Tools, follow instructions in the [Exadata Cloud Services Documentation](#).

Latest certified AHF versions for cloud services:

<b>Exadata Cloud@Customer (ExaCC)</b>	23.5.0
<b>Exadata Cloud Service (ExaCS)</b>	23.5.0
<b>Database Cloud Service (DBCS)</b>	23.5.0



# DomU – Linux Image



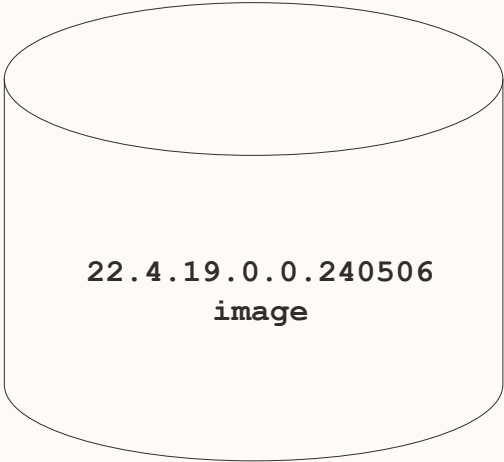




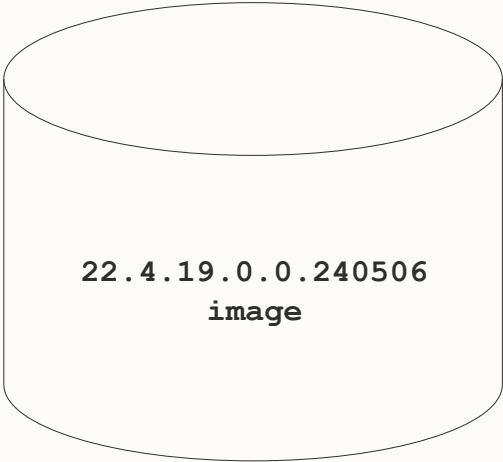
**VM Cluster node 1**



**VM Cluster node 2**



**VM Cluster node 3**



# Patching DomU Linux Image via OCI Console



VM

Overview

Scale Up/Down

Add SSH Keys

Update Linux Type

VM Cluster Information

General Information

VM Cluster Resource Allocation

VM Cluster

Database Home

Network

Version

Overview

Exadata Cloud@Customer

Updates

VM Cluster & Database Patches

Updates

Update History

List Scope

Compartment

atpmgmt (root)

Updates in atpmgmt (root) Compartment

VM Cluster: [scaqar01adm0304-clu7](#)

Update description	State	Component	Type	Version	Last Successful Precheck	Release Date
Virtual Machine OS Update to 21.2.0.0.0.210524	Available	Exadata Image	Update	21.2.0.0.0.210524	-	Precheck

Apply Exadata OS Image Update

Copy OCID





# Updating Exadata Database Server Software using the patchmgr

[Doc ID 1553103.1](#)

KnowledgeRCACustomer ExceptionsCMSService RequestsPatches & UpdatesCertificationsSystemsCollectorSettingsXNS

Patch: 21634633 >

Patch Search

Patch Simple Search Results

View ▾

Detach

Patch Name	Description
21634633	DBSERVER.PATCH.ZIP DBNU - ARU PLACEHOL

Close

★

⚙️

**Patch 21634633: DBSERVER.PATCH.ZIP ORCHESTRATOR PLUS DBNU - ARU PLACEHOLDER**

Last Updated

16-Jun-2023 07:30 (1+ month ago)

Product

Oracle Exadata Storage Server Software (More...)

Release

Oracle Exadata Storage Server 23.1.3.0.0

Platform

Linux x86-64

Size

536.4 MB

Download Access

Software

Classification

General

Patch Tag

Bugs Resolved by This Patch

List of bugs fixed is not available. Consult the Readme.

View Related Knowledge to this Patch

Release

Oracle Exadata Storage Server 23.1.3.0.0

Platform

Linux x86-64

Language

American English

Read Me

Download

Add to Plan ▾

Analyze with OPatch...

All-time Downloads

366

View Trends

Discuss this patch in the community

## Step – 1 Download the most recent *patchmgr* version





DETAILS

Current Software Versions for Exadata Cloud Deployments

The versions in the table below represent the latest certified and available VM software for updating Exadata and Grid Infrastructure/Database software on systems already provisioned. Customers may update systems already provisioned to the latest certified version as desired. Certified versions for new provisioning revise less frequently, hence **systems newly provisioned may deploy with an earlier certified release** than what is shown in the table.

Note: Date code fields in version numbers (e.g. 180717) are in YYMMDD format.

Cloud Platform	Latest Certified Exadata Version	Latest Certified GI/DB Version
Exadata Database Service on Dedicated Infrastructure	22.1.11.0.0.230516	19.19.0.0.230418 18.22.0.0.230418 12.2.0.1.230418 12.1.0.2.230418 11.2.0.4.230418
Exadata Database Service on Cloud@Customer <sup>1</sup>	22.1.11.0.0.230516	19.19.0.0.230418 18.22.0.0.230418 12.2.0.1.230418 12.1.0.2.230418 11.2.0.4.230418
Gen 1 Exadata Cloud at Customer <sup>1</sup> (Oracle Exadata Database Cloud Machine)	22.1.11.0.0.230516	19.19.0.0.230418 <sup>2</sup> 18.22.0.0.230418 12.2.0.1.230418 12.1.0.2.230418 11.2.0.4.230418

Step 2 – Download the Image /iso version you chose for the upgrade





# How to update the Exadata Image (OS) Linux

[Doc ID 2391164.1](#)

★ **How to update the Exadata Image (OS) in Exadata Cloud at Customer (Doc ID 2391164.1)**

**In this Document**

[Goal](#)

[Solution](#)

[Gather Requirements](#)

[Decide and Configure the Driving System](#)

[Prechecking the Environments](#)

[Backing Up the OS](#)

[Patching the OS](#)

[Rolling back the Update](#)

[References](#)

**APPLIES TO:**

Oracle Exadata Storage Server Software - Version 12.1.2.3.4 and later  
Oracle Database Exadata Cloud Machine - Version N/A and later  
Information in this document applies to any platform.

**GOAL**

The goal of this document is to guide a user of the Exadata Cloud at Customer in the patching of the Exadata Image (OS)

**SOLUTION**

Exadata Cloud:  
Updating the Database Compute Nodes

**Introduction**

Updating the Exadata Database Compute nodes is a process that entails patching the entire OS rather than just updating single packages. Updating the OS does not use a traditional “yum update” command but uses a cli tool called patchmgr. Through patchmgr, you can update the Exadata Database Compute nodes with an ISO image staged locally on the database compute node or on a separate infrastructure instance.

**Update Steps**

The following steps will go through updating the Exadata Database Compute nodes from 12.x.x.x to 18.1.4.

## Step 3 - Follow the steps described on this MOS note





# DomU – Linux Image Patching manually using patchmgr

Step 1. # imageinfo

Step 2. # ./patchmgr -dbnodes /root/patch/dbs\_group -**precheck** -iso\_repo  
/root/patch/p35129585\_221000\_Linux-x86-64.zip -target\_version **22.1.10.0.0.230422** -  
**nomodify\_at\_prereq**

Step 3. #./patchmgr -dbnodes /root/patch/dbs\_group -**backup** -iso\_repo  
/root/patch/p35129585\_221000\_Linux-x86-64.zip -target\_version **22.1.10.0.0.230422** -  
**allow\_active\_network\_mounts**

Step 4. #/patchmgr -dbnodes /root/patch/dbs\_group -**upgrade** -iso\_repo  
/root/patch/p35129585\_221000\_Linux-x86-64.zip -target\_version **22.1.10.0.0.230422** -  
**allow\_active\_network\_mounts -nobackup** [-rolling]

**!!! You can only start a rollback process under supervision of Oracle Support !!!**

Step 5. #/patchmgr -dbnodes /root/patch/dbs\_group -**rollback** -target\_version  
**21.2.13.0.0.220602**



# DomU – Patching Oracle Home

---



# What is installed in my Oracle Home ?



**\$ Opatch**

```
$ opatch lsinventory
```

```
$ opatch lspatches
```

**DBMS\_QOPATCH**

```
SQL> select xmltransform(dbms_qopatch.get_opatch_lsinventory, dbms_qopatch.get_opatch_xslt)
from dual;
```

## What is installed in my database?

```
SQL> select * from dba_registry_sqlpatch;
```

```
SQL> select * from cdb_registry_sqlpatch;
```

# Time Line | Release update

	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	




# Monthly Recommended Patches | Timeline

	2022						2023							
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6							
19.18.0				19.18.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6				
19.19.0							19.19.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6	
19.20.0										19.20.0	MRP1	MRP2	MRP3	MRP4
19.21.0													19.21.0	MRP1



# Monthly Recommended Patches | Step-by-step

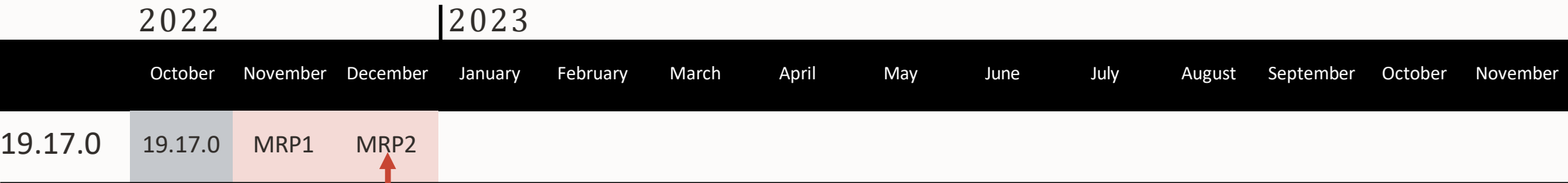
2022			2023											
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1												



Bug	Fixed in RU	Fixed in MRP	Description	Patches	NON ROLLING	Added
<a href="#">33896423</a>		DBMRP 19.17.0.0.221115	Flush Out Stale Antilocks and Convert kclcls_2 and kclantilock_17 to Soft Assert	<a href="#">[list-patches]</a>		01-SEP-2022
<a href="#">34333986</a>		DBMRP 19.17.0.0.221115	ORA-600 [KTUSCV1:CV Buf Too Big]/ [Kdbblkcheckerror] Block Corruption With Check Code 6127 After Migrating From Solaris to Linux	<a href="#">[list-patches]</a>		28-JUL-2022
<a href="#">30691454</a>		DBMRP 19.17.0.0.221115	DBHOME patching completely hung with kpdbhashtable_find multiple instance hang	<a href="#">[list-patches]</a>		22-JUL-2022



# Monthly Recommended Patches | Step-by-step



Bug	Fixed in RU	Fixed in MRP	Description	Patches	NON ROLLING	Added
<a href="#">34649727</a>			Linux: ORA-800 / Set Priority / DB Performance Merge Patch for 19.17 - 34286265 34318125	<a href="#">[list-patches]</a>		18-OCT-2022
<a href="#">33896423</a>		DBMRP 19.17.0.0.221115	Flush Out Stale Antilocks and Convert kclcls_2 and kclantilock_17 to Soft Assert	<a href="#">[list-patches]</a>		01-SEP-2022
<a href="#">34333986</a>		DBMRP 19.17.0.0.221115	ORA-600 [KTUSCV1:CV Buf Too Big]/ [Kdbblkcheckerror] Block Corruption With Check Code 6127 After Migrating From Solaris to Linux	<a href="#">[list-patches]</a>		28-JUL-2022
<a href="#">30691454</a>		DBMRP 19.17.0.0.221115	DBHOME patching completely hung with kpdbhashtable_find multiple instance hang	<a href="#">[list-patches]</a>		22-JUL-2022



# Monthly Recommended Patches | Step-by-step

	2022				2023									
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3										
19.18.0				19.18.0										



# Monthly Recommended Patches | Step-by-step

	2022				2023									
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3	MRP4									
19.18.0				19.18.0	MRP1									





# Monthly Recommended Patches | Step-by-step

	2022			2023										
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3	MRP4	MRP5								
19.18.0				19.18.0	MRP1	MRP2								



# Monthly Recommended Patches | Step-by-step

	2022				2023									
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6							
19.18.0				19.18.0	MRP1	MRP2	MRP3							
19.19.0							19.19.0							



# Mothly Recommended Patches | Step-by-step

	2022				2023									
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6							
19.18.0				19.18.0	MRP1	MRP2	MRP3	MRP4						
19.19.0							19.19.0	MRP1						



# Monthly Recommended Patches | Step-by-step

	2022						2023							
	October	November	December	January	February	March	April	May	June	July	August	September	October	November
19.17.0	19.17.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6							
19.18.0				19.18.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6				
19.19.0							19.19.0	MRP1	MRP2	MRP3	MRP4	MRP5	MRP6	
19.20.0										19.20.0	MRP1	MRP2	MRP3	MRP4
19.21.0													19.21.0	MRP1



# Patchin Oracle Home using OCI Console

Database Home: [dbhome 19c demo](#)

Oracle Provided Database Software Images

Custom Database Software Images

Patch Description	State	Version	Release Date	
Database Release Update : 19.19.0.0.230427 (Apr 2023)	● Available	19.19.0.0.0	Sun, May 7, 2023, 01:43:59 UTC	⋮
Displaying 1 Database Home patch				>

- Precheck
- Apply
- Copy OCID

## Confirm precheck

Are you sure you want to perform a precheck operation on the Database Home?

[Run Precheck](#) [Cancel](#)



# Patching Oracle Home Using OCI Console

WR

IN PROGRESS

Precheck DbHome Patch

Work request information

Precheck DbHome Patch

In progress

15% complete

Operation: Precheck DbHome Patch

Accepted: Mon, Jul 10, 2023, 20:06:12 UTC

OCID: ...qkztaa Show Copy

Started: Mon, Jul 10, 2023, 20:06:34 UTC

WR

SUCCEEDED

Precheck DbHome Patch

Work request information

Precheck DbHome Patch

Succeeded

100% complete

Operation: Precheck DbHome Patch

Accepted: Mon, Jul 10, 2023, 20:06:12 UTC

OCID: ...qkztaa Show Copy

Started: Mon, Jul 10, 2023, 20:06:34 UTC

Compartment:

Finished: Mon, Jul 10, 2023, 20:13:12 UTC



# Patching Oracle Home Using OCI Console

Database Home: [dbhome 19c demo](#)

Oracle Provided Database Software Images

Custom Database Software Images

Patch Description	State	Version	Release Date	
Database Release Update : 19.19.0.0.230427 (Apr 2023)	● Available	19.19.0.0.0	Sun, May 7, 2023, 01:43:59 UTC	<div>Precheck</div> <div>Apply</div> <div>Copy OCID</div>

Displaying 1 Database Home

Apply Database Home Patch

This operation patches the Database Home on the nodes of the VM cluster, one node at a time.

The instances for following databases may be restarted on the nodes as they get patched:  
Demo19c

Are you sure you want to patch this Database Home?

Last successful precheck was run at Sun, Jul 23, 2023, 16:31:49 UTC.

Apply Patch

Cancel

53

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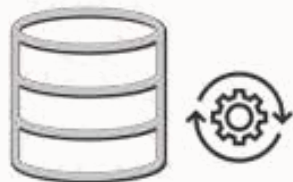


# DomU – Patching Oracle Home

---

# Pathing Concepts | In-Place Patching

Oracle-Home, 19.18  
19.18..0



```
#SQL> SHUTDOWN IMMEDIATE
```



# Pathing Concepts | Out-Of-Place Patching

Oracle Home,  
19.18.0



## Oracle Home, 19.18.0



Oracle Home,  
19.18.0



**New Oracle Home, 19.19.0**



Oracle Home,  
19.18.0



```
SQL> SHUTDOWN IMMEDIATE
```



**New Oracle Home, 19.19.0**

Oracle Home,  
19.18.0



```
SQL> SHUTDOWN IMMEDIATE
```



**New Oracle Home, 19.19.0**



Oracle Home,  
19.18.0



**New Oracle Home, 19.19.0**





Oracle Home,  
19.18.0



```
$ DATAPATCH
```

**New Oracle Home, 19.19.0**





Tim Hall ∞ 🤖 + ∞ 📺  
@oraclebase

...

When patching your production Oracle GI/DB installations, which method do you use?

In-Place = Current ORACLE\_HOME

Out-Of-Place = New ORACLE\_HOME

If you don't look after have production kit, then don't answer.

**In-Place**

**55.4%**

Out-Of-Place

44.6%

# DomU | Out-of-place Patching using dbaascli

Step 1. # dbaascli cswlib showImages

```
30.IMAGE_TAG=19.11.0.0.0  
VERSION=19.11.0.0.0  
DESCRIPTION=19c APR 2021 DB Image  
IMAGE_ALIASES=19000-191100,19000-APR2021
```

Step 2. # dbaascli dbhome create --version **19000**

Step 3. # dbaascli dbhome patch --oracleHome /u02/app/oracle/product/19.0.0.0/dbhome\_12 --targetVersion 19.11.0.0.0 **--executePrereqs**

Step 4. # dbaascli dbhome patch --oracleHome /u02/app/oracle/product/19.0.0.0/dbhome\_12 --targetVersion 19.11.0.0.0 **-skipDatapatch**

Step 5. # dbaascli database move --dbname testdb01 -ohome  
**/u02/app/oracle/product/19.0.0.0/dbhome\_12**

## DomU | Out-of-place Patching using dbaascli

Step 6. \$ORACLE\_HOME/OPatch/datapatch **-verbose**

Step 7. dbaascli dbhome **purge**

DBAAS CLI version 21.2.1.2.0

Executing command dbhome purge

Enter

1 - If you wish to enter homename to be purged

2 - If you wish to enter home path to be purged

2

Enter the home path

**/u02/app/oracle/product/19.0.0.0/dbhome\_2**

INFO: Removing Oracle Home /u02/app/oracle/product/19.0.0.0/dbhome\_2

# Applying Oracle Home bundle Patch in or Out-Of-Place

[MOS Note 2701789.1](#)

## ★ How to Apply Database Quarterly Patch on Exadata Cloud Service and Exadata Cloud at Customer Gen 2 (Doc ID 2701789.1)

### In this Document

[Goal](#)

[Solution](#)

[Prerequisites](#)

[Option 1 - Patching Individual Databases - Out of Place Patching](#)

[Option 2 - Patching a Database Home - Image Based Patching](#)

[Troubleshooting](#)

[References](#)

### APPLIES TO:

Oracle Database Cloud Exadata Service - Version N/A to N/A [Release 1.0]

Information in this document applies to any platform.

### GOAL

Patch an Exadata Cloud Services or Exadata Cloud at Customer Gen 2 Database

### SOLUTION

This document should be used to apply a higher quarterly Release Update to the databases and database homes of either an Exadata Cloud@Customer Gen 2 (ExaC@C) service or Exadata Cloud Service (ExaCS) service.

For Data Guard configurations, the primary and standby database must be patched separately and the standby database patching should be completed before patching the primary.

See Document [1265700.1](#) Oracle Patch Assurance - Data Guard Standby-First Patch Apply for full details on standby first patching.

It is supported to run with the standby database at a higher patch level for up to a month.



# Oracle Database one-off Patching





# Exadata Cloud and Interim software Update



- Should have at least an Exadata Infrastructure provisioned
- Option to only download the interim software updates via cloud automation
- To apply use the standard database update tools like Opatch utility
- No charges for object storage usage for the interim software updates that are stored
- Downloading the password-protected interim updates is not supported

# How To Download And Install The Latest OPatch(6880880) Version (Doc ID 274526.1)

## APPLIES TO:

Oracle Database Cloud Service - Version N/A and later  
Oracle Database - Standard Edition - Version 12.1.0.2 and later  
Oracle Universal Installer - Version 1.0.0.0.50 and later  
Oracle Database Exadata Express Cloud Service - Version N/A and later  
Oracle Database Cloud Exadata Service - Version N/A and later  
Information in this document applies to any platform.

## GOAL

This documents explains how to download and install the latest OPatch version.

## SOLUTION

1) Please download the latest OPatch version from My Oracle Support (**MOS**) using the next reference:

Patch [6880880](#)

[No Title]

Or using the next URL:

<https://updates.oracle.com/download/6880880.html>

2) In the "**Platform**" field select the relevant platform that corresponds to the Oracle product.

3) Click the **Download** button

2) Upload the opatch.zip file to your OS host and unzip it:



# DomU – Patching Grid Home



## DomU | Out-of-place Patching using dbaascli

Step 1. # dbaascli cswlib showImages

```
15.IMAGE_TAG=19.21.0.0.0  
VERSION=19.21.0.0.0
```

Step 2. # dbaascli grid patch --targetVersion 19.21.0.0 **--executePrereqs**

Step 3. # dbaascli grid patch --targetVersion 19.21.0.0

**!!! You can only start a rollback process under supervision of Oracle Support !!!**

Step 4. # dbaascli grid patch --targetVersion 19.21.0.0 **--rollback**

## Patching Grid Home using dbaascli :

### Patching Oracle Grid Infrastructure and Oracle Databases Using dbaascli

Learn to use the `dbaascli` utility to perform patching operations for Oracle Grid Infrastructure and Oracle Database on an Exadata Cloud Infrastructure system.

- [Patching Databases using dbaascli](#)

Using `dbaascli`, you can choose to patch a database by patching Oracle home, or by moving the database to an Oracle home with the desired patch level.

- [Patching Oracle Grid Infrastructure](#)

To apply a patch to Oracle Grid Infrastructure, use the `grid patch` command.

- [Listing Available Software Images and Versions for Database and Grid Infrastructure](#)

To produce a list of available supported versions for patching, use the `dbaascli cswlib showImages` command.

- [Performing a Precheck Before Patching Databases and Grid Infrastructure](#)

You can perform a prerequisites-checking operation (also called a "precheck") for the commands in this topic using the applicable precheck flag.



# Patching Grid Home using OCI Console

VM Cluster: [REDACTED]

Update description	State	Component	Type	Version	Last Successful Precheck	Release Date
Grid Infrastructure Release Update : 19.19.0.0.230427 (Apr 2023)	<div></div> Available	Grid Infrastructure	Patch	19.19.0.0.0	-	<div><div>Precheck</div><div>Apply Grid Infrastructure Patch</div><div>Copy OCID</div></div>

## Confirm precheck

Are you sure you want to perform a precheck operation on VM cluster?

Run Precheck

[Cancel](#)





# Patching Grid Home using OCI Console

IN PROGRESS

## Precheck VM Cluster GI Patch

Work request information

Precheck VM Cluster GI Patch

0% complete

In progress

SUCCEEDED

## Precheck VM Cluster GI Patch

Work request information

Precheck VM Cluster GI Patch

100% complete

Succeeded

**Operation:** Precheck VM Cluster GI Patch

**OCID:** ...2ldqya [Show](#) [Copy](#)

**Compartment:**

**Accepted:** Sun, Jul 23, 2023, 17:03:58 UTC

**Started:** Sun, Jul 23, 2023, 17:04:15 UTC

**Finished:** Sun, Jul 23, 2023, 17:08:40 UTC

74

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# Pathing Grid Home using OCI Console

VM Cluster: [redacted]

Update description	State	Component	Type	Version	Last Successful Precheck	Release Date
Grid Infrastructure Release Update : 19.19.0.0.230427 (Apr 2023)	Available	Grid Infrastructure	Patch	19.19.0.0.0	Sun, Jul 23, 2023, 17:15:39	Precheck
Grid Infrastructure Release Update : 19.18.0.0.230117 (Jan 2023)	Available	Grid Infrastructure	Patch	19.18.0.0.0	-	-

Apply Grid Infrastructure Patch

## Apply VM Cluster Patch

During patching, lifecycle operations on the VM cluster and its resources are temporarily unavailable.

Are you sure you want to patch VM cluster [redacted] running version 19.10.0.0.0 with version 19.19.0.0.0?



Last successful precheck was run at Sun, Jul 23, 2023, 17:10:49 UTC.

Apply Patch

[Cancel](#)



# Patching activity checklist

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- 1 Check Exadata Critical Issues MOS note and compare with you current version**  
Exadata Critical Issues (Doc ID 1270094.1)
- 2 Create a proactive Service Request on MOS**  
Create with at least 5 days before you maintenance window
- 3 Backup Entire environment**  
Backup : Grid Home, Oracle Home, Linux Image, Database, RAC Files
- 4 Run Exachk and troubleshooting tools before patching**  
Allows data to be stored securely without impacting performance
- 5 Upgrade dbaascli tool before any domU patch activity**  
Upgrade Dbaascli using MOS note (Doc ID 2350471.1)
- 6 Run Pre check before any patch activity**  
Run Prechk at lest 5 days before the patch activity thought **OCI Console** or **dbaascli**
- 7 Run another Exachk after activity**  
Compare after before and after patch report to check what changed

# Resources

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# Domo Patching link references

- Overview of Monthly Security Maintenance

<https://docs.oracle.com/en/engineered-systems/exadata-cloud-at-customer/ecccm/ecc-vw-maint-hist.html#GUID-A2008207-3683-424F-9279-F632BF4C9076>

- View or Edit a Scheduled Security Maintenance for Exadata Cloud@Customer Infrastructure

<https://docs.oracle.com/en/engineered-systems/exadata-cloud-at-customer/ecccm/ecc-vw-maint-hist.html#GUID-8C6CCAB3-8232-4B8F-B919-DDBBD2D76C11>



- **Exadata Critical Issues (Doc ID 1270094.1)**

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1270094.1>

- **Applying Oracle Home bundle Patch in or Out-Of-Place (Doc ID 27017891.1)**

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2701789.1>

- **Autonomous Health Framework (AHF) - Including TFA and ORAchk/EXAchk (Doc ID 2550798.1)**

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2550798.1>

- **Oracle Exadata Database Machine EXAchk (Doc ID 1070954.1)**

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1070954.1>

- **How To Download And Install The Latest OPatch(6880880) Version (Doc ID 274526.1)**

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=274526.1>

- **Configuring Automatic Cloud Tooling Updates**

<https://docs.oracle.com/en/cloud/paas/database-dbaas-cloud/csdbi/configure-automatic-cloud-tooling-updates.html>

# DomU - Patching link references

- How to Apply Database Quarterly Patch on Exadata Cloud Service and Exadata Cloud at Customer Gen 2 (Doc ID 2701789.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2701789.1>

- Updating Exadata Database Server Software using the DBNodeUpdate Utility and patchmgr (Doc ID 1553103.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1553103.1>

- Exadata Cloud Service Software Versions (Doc ID 2333222.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2333222.1>

- How to update the Exadata Image (OS) in the Exadata Cloud Service (OCI-C) (Doc ID 2380001.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2380001.1>

- How to update the Exadata Image (OS) in Exadata Cloud at Customer (Doc ID 2391164.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2391164.1>

- How to update the Exadata System Software (DomU) to 19 from 18 on the Exadata Cloud Service in OCI (Doc ID 2521053.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2521053.1>

- How to update the Exadata System Software Guest VM on the Exadata Cloud Service in OCI (Doc ID 2566035.1)

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=2566035.1>

# Thank you

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