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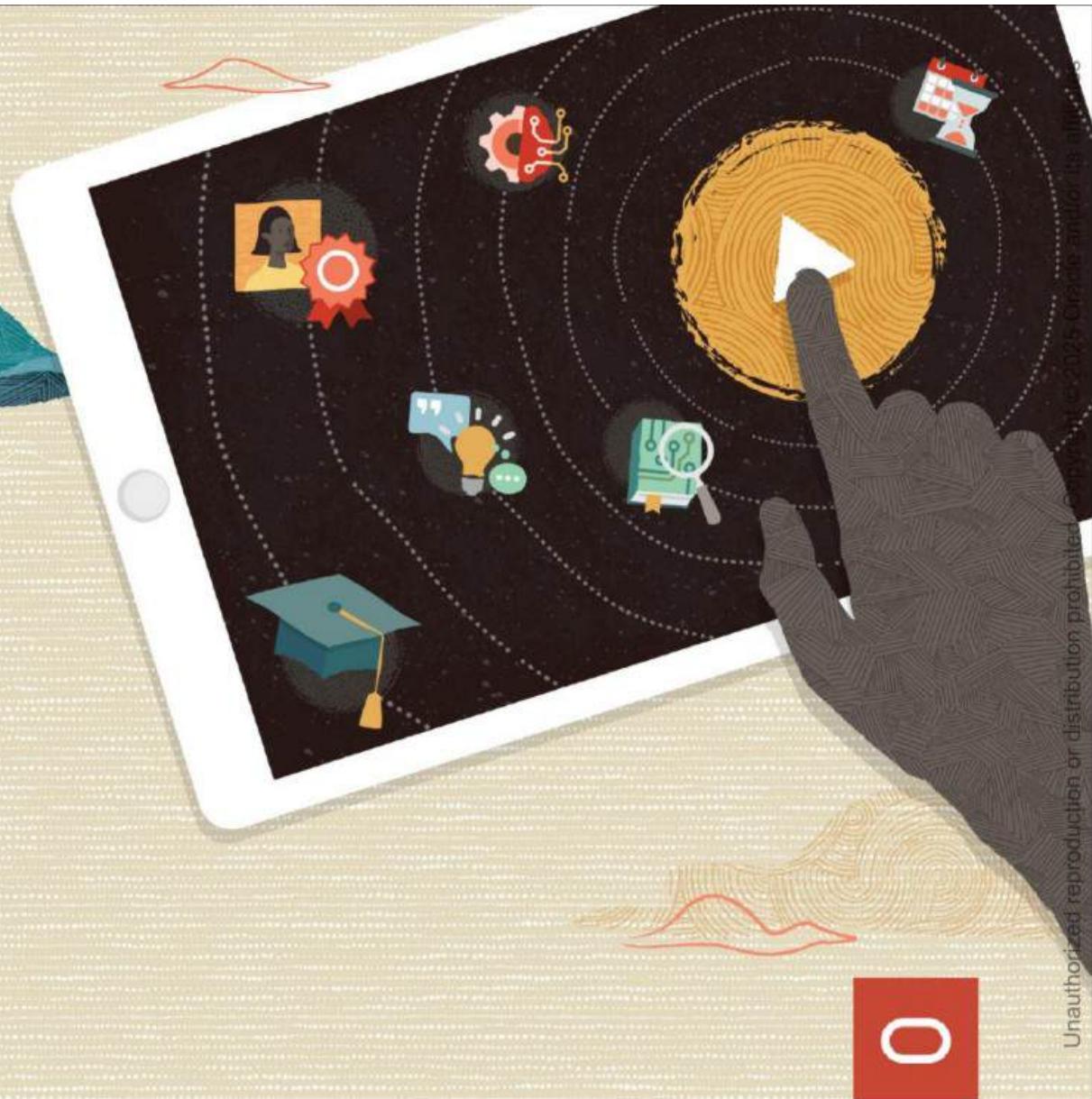
University

Oracle Linux: System Administration on Oracle Cloud Infrastructure

Student Guide

S1111828GC10

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Oracle Cloud Infrastructure

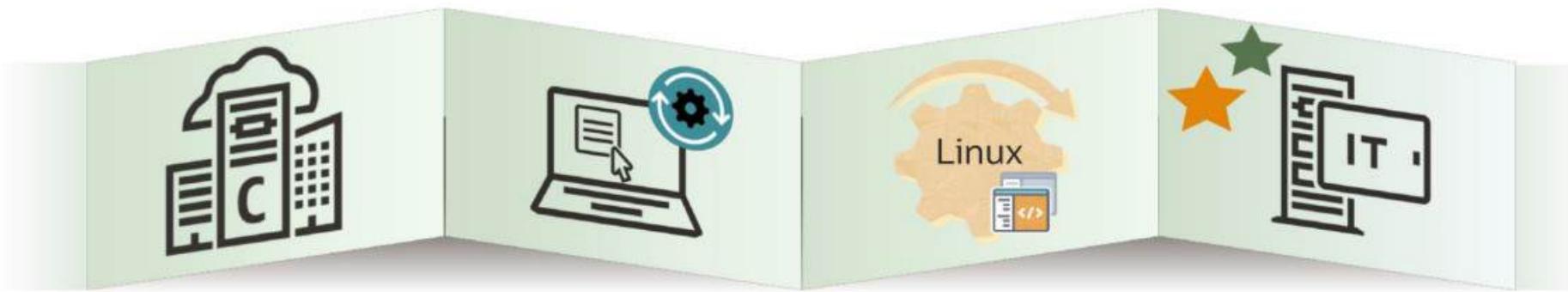
Oracle Linux: System Administration on Oracle Cloud Infrastructure

Course Introduction

Serge Moiseev - Cloud Delivery Lead
Oracle University



Course Topics



Oracle Cloud
Infrastructure

Introduction to
Oracle Linux

OS
Management

Administering
Instances on OCI

Course Lessons



Oracle Cloud Infrastructure

Introduction to Oracle Linux

OS Management

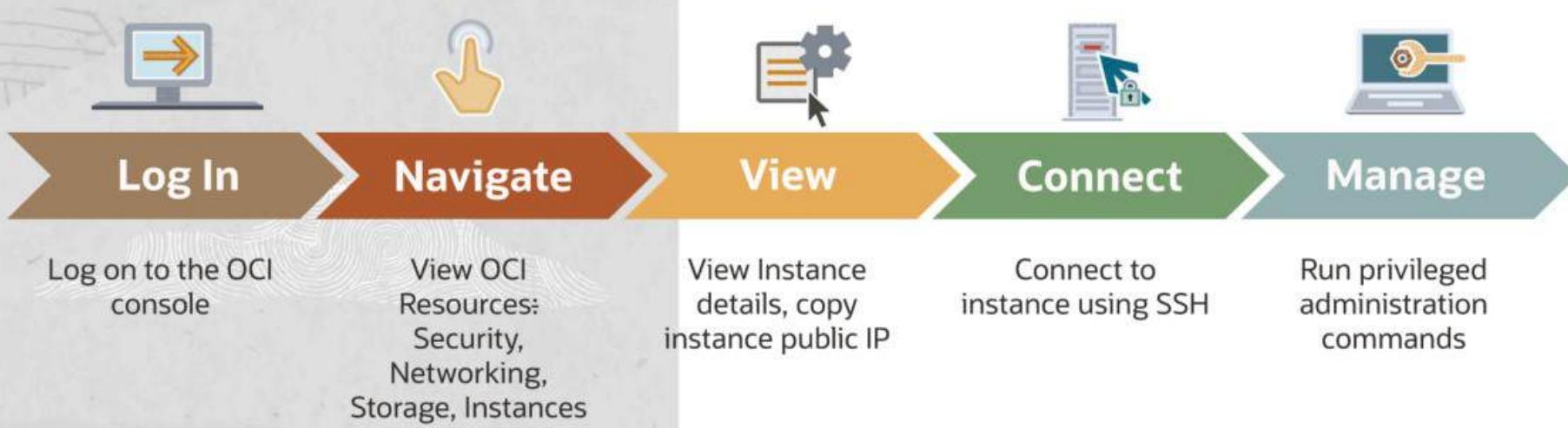
Patching and GUI Configuration

Managing iSCSI and OCFS Storage



OCI Linux Administration Demo

In This Demo





OCI Console Demo

In This Demo



Oracle Cloud Infrastructure

Oracle Linux: System Administration on Oracle Cloud Infrastructure

Foundations of OCI

Serge Moiseev - Cloud Delivery Lead
Oracle University



Objectives

OCI Regions and Availability Domains

Tenancy and Compartments

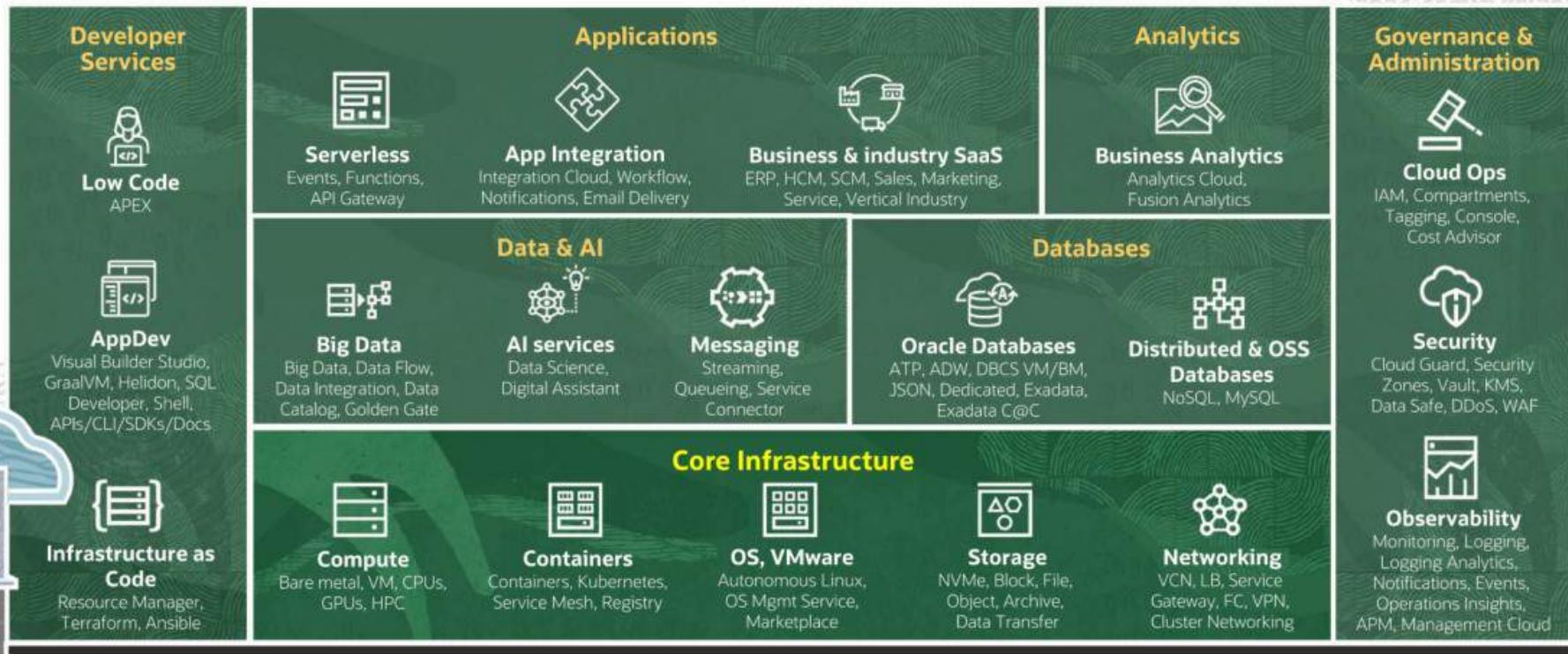
Compute Instances, Networking, and Storage

Bare Metal Hosts and OCID

Creating and Launching an Instance

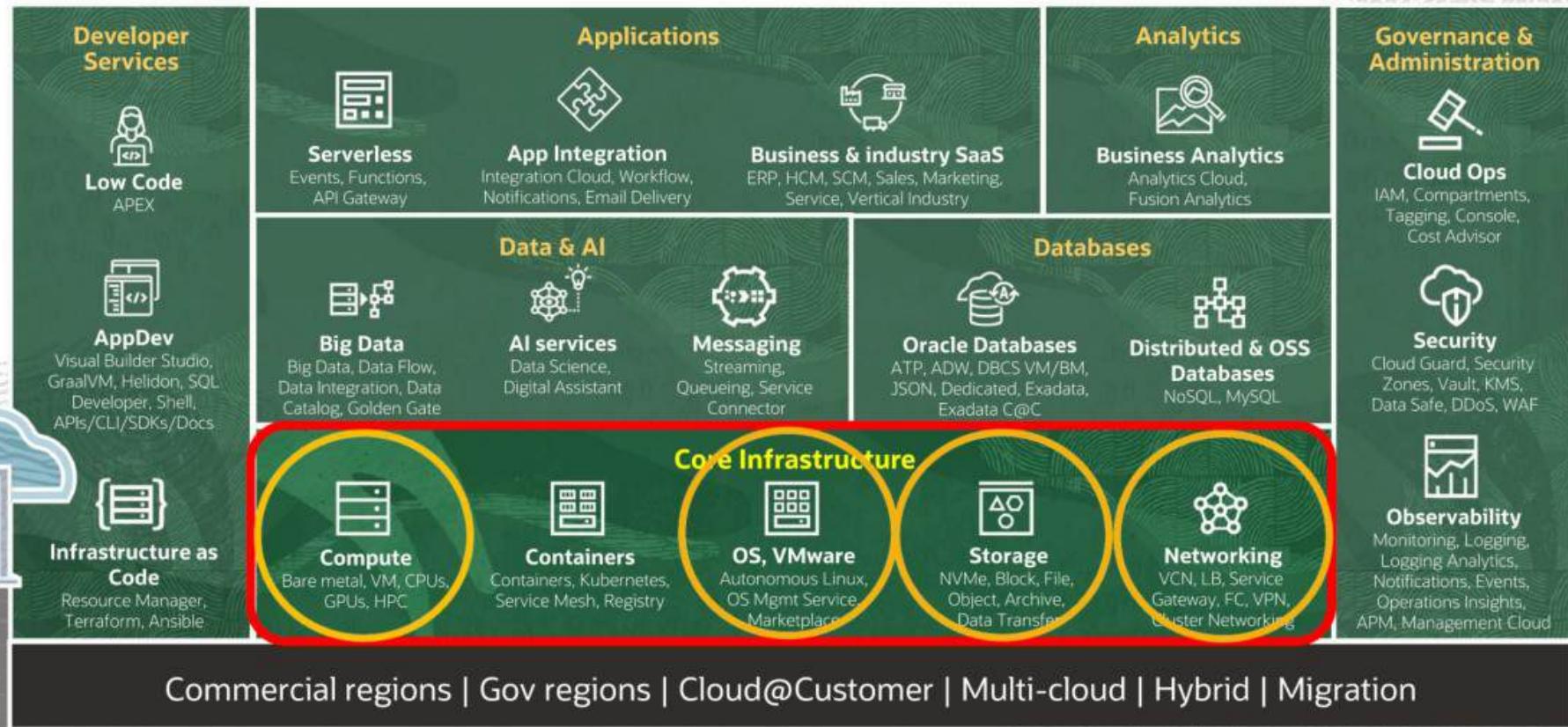


Complete Cloud Infrastructure Platform

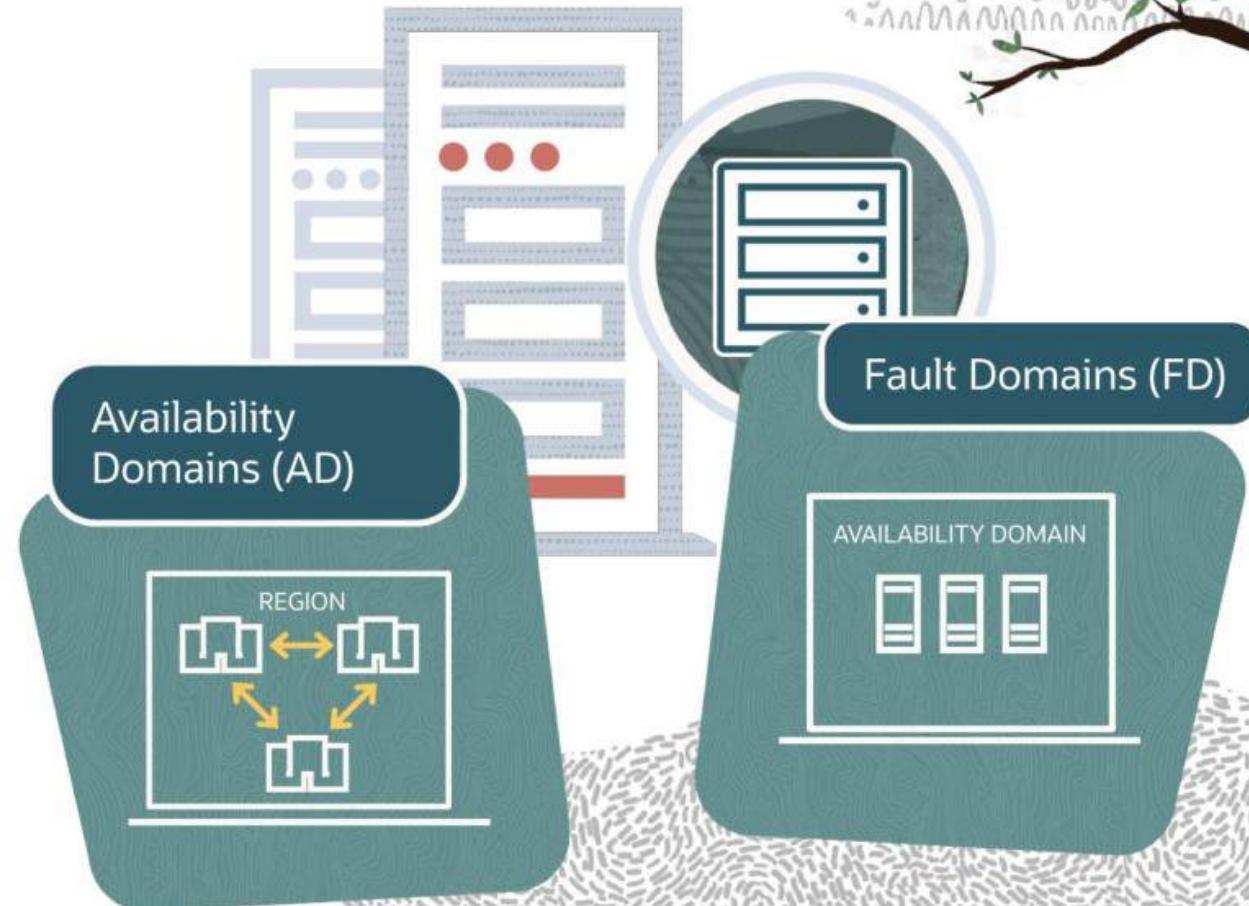
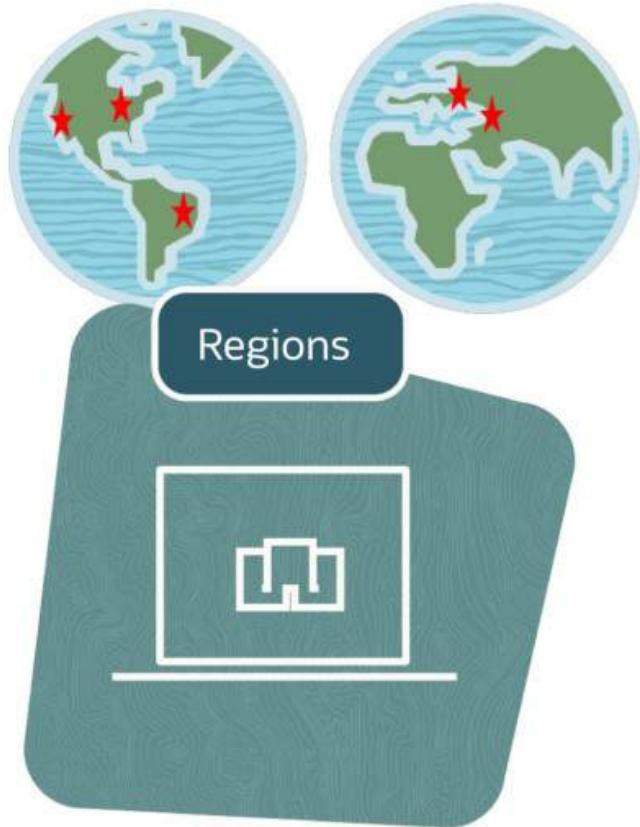


Commercial regions | Gov regions | Cloud@Customer | Multi-cloud | Hybrid | Migration

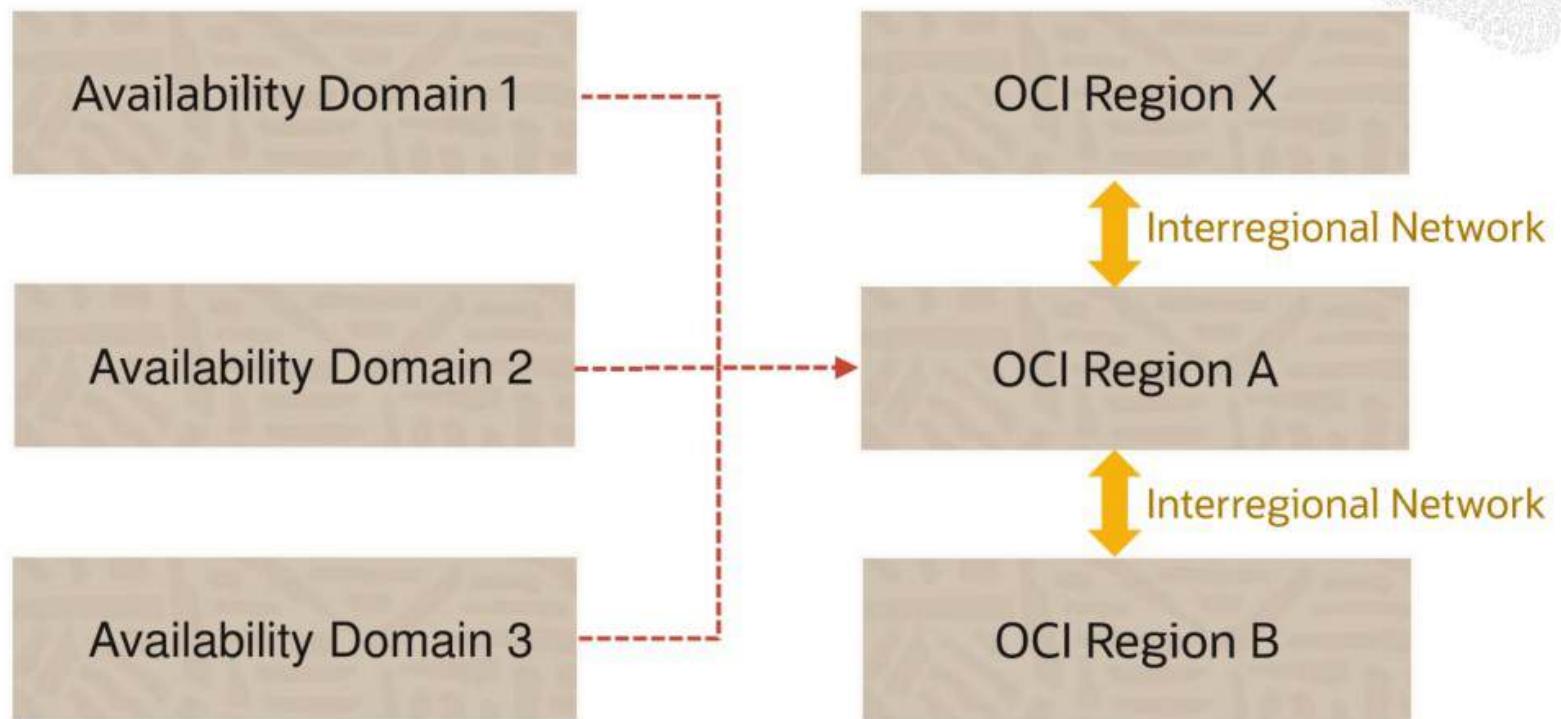
Complete Cloud Infrastructure Platform



OCI Architecture



Each OCI Region Comprises Three Availability Domains

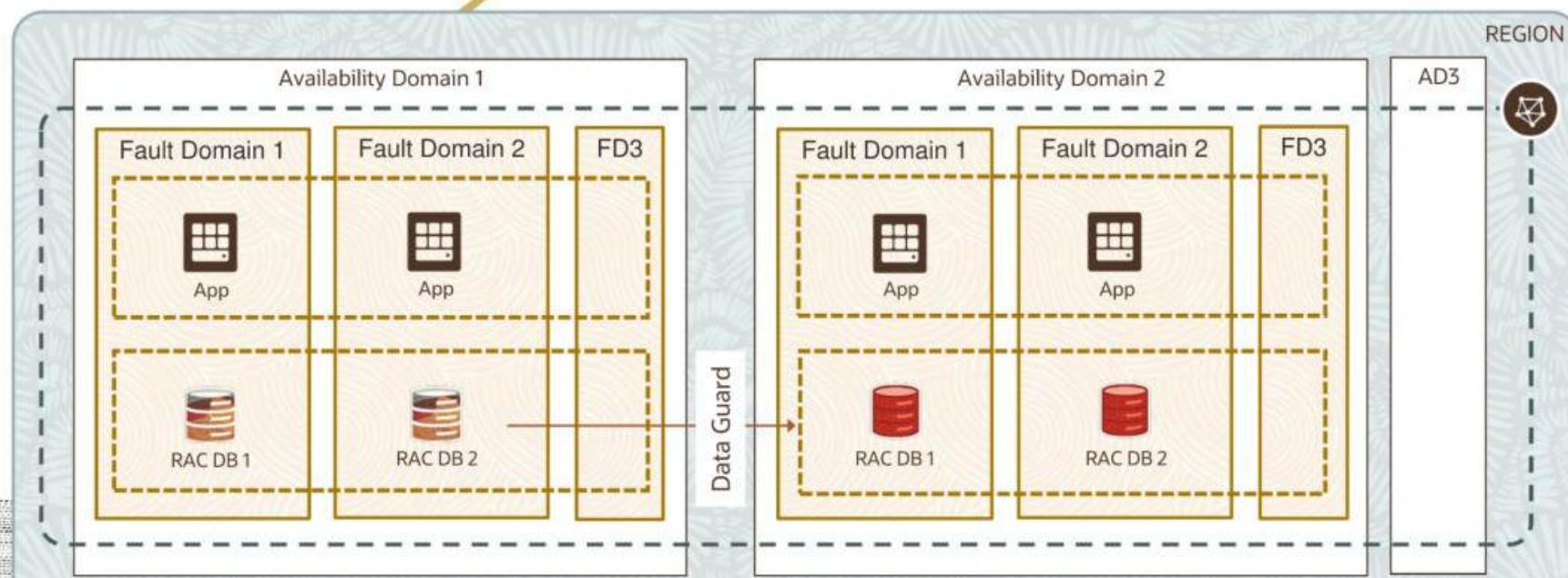


Avoid Single Points of Failure

Design your architecture to deploy instances that perform the same tasks

In different Fault Domains - in one AD region

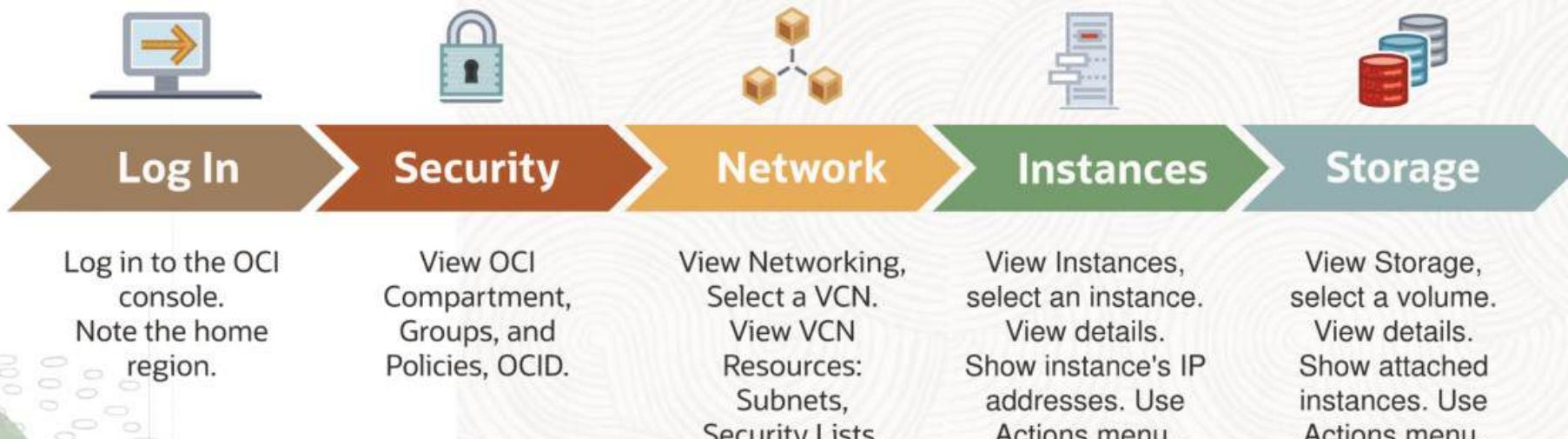
In different Availability Domains for multiple AD regions

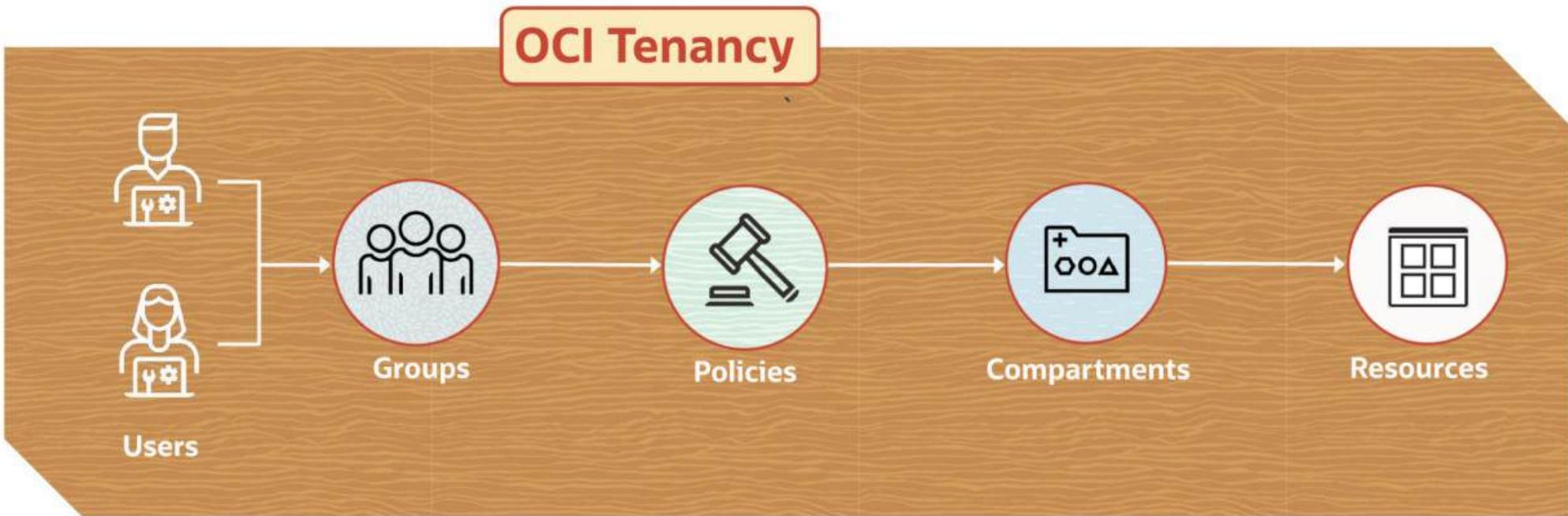




OCI Walk-Through Demo

In This Demo





OCI Identity Concepts

Resources

Cloud objects





Compartment



Collection
of related
resources

Tenancy/ Root Compartment

Compartment Network



Virtual Cloud
Network



Load
Balancer

Compartment Storage



Block
Storage



File
Storage



Object
Storage

Isolate and
control
access

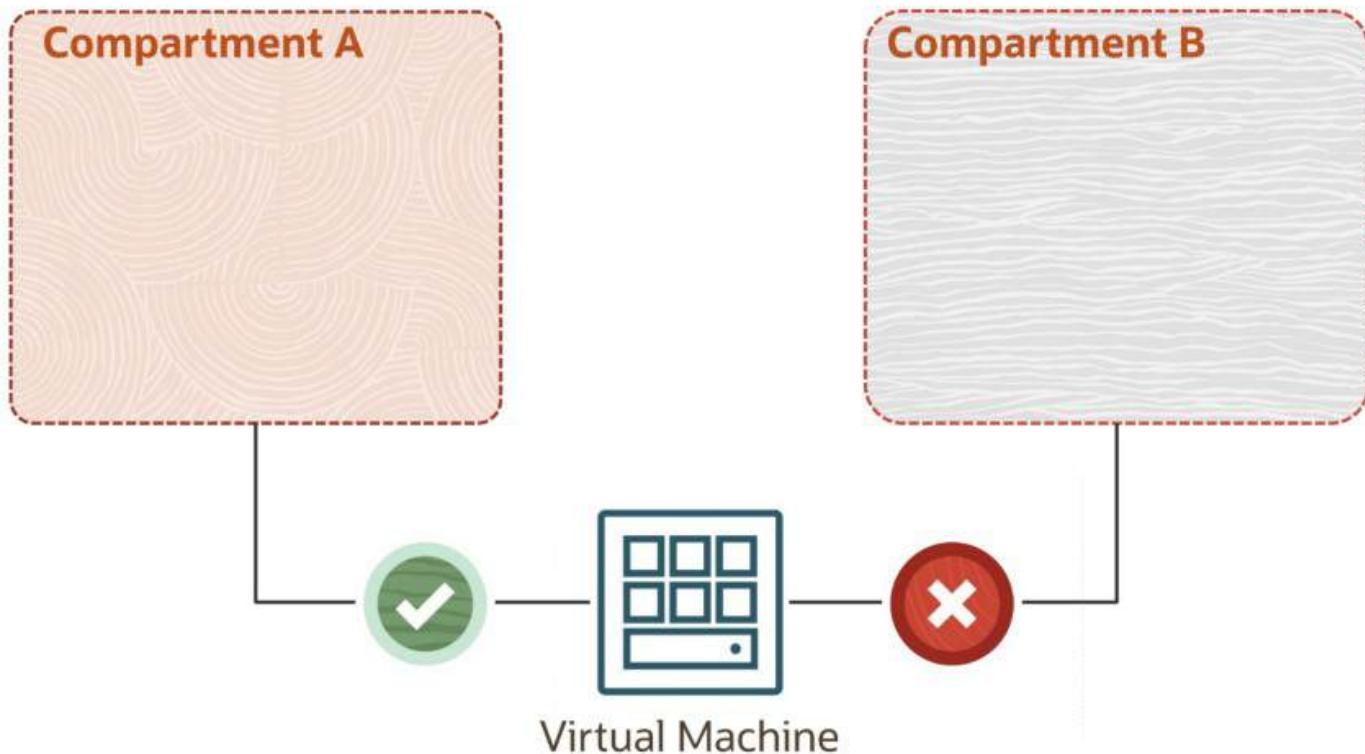
Root Compartment can hold all the cloud resources



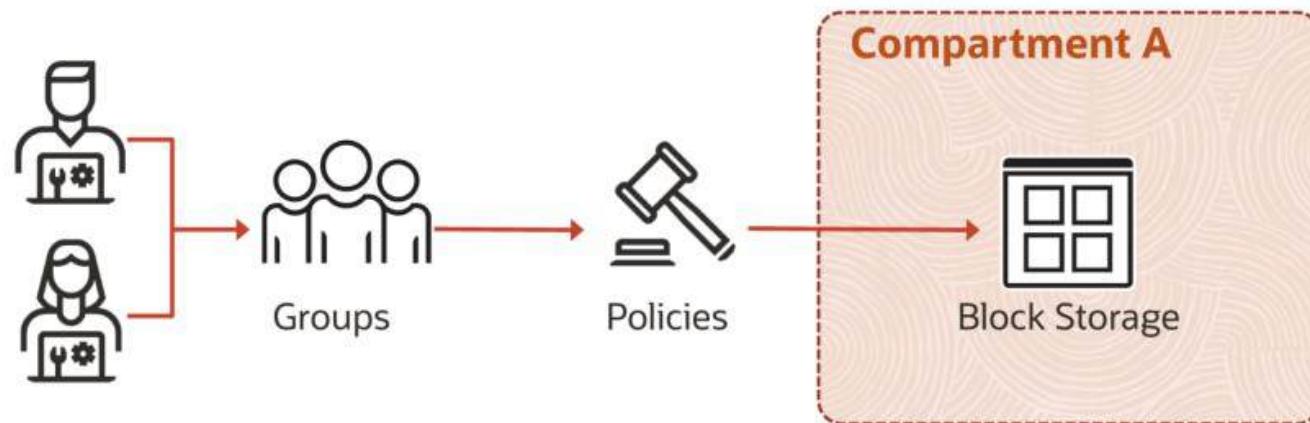
Best practice: Create dedicated compartments to isolate resources.

Resource Compartments

Each resource belongs to a single compartment



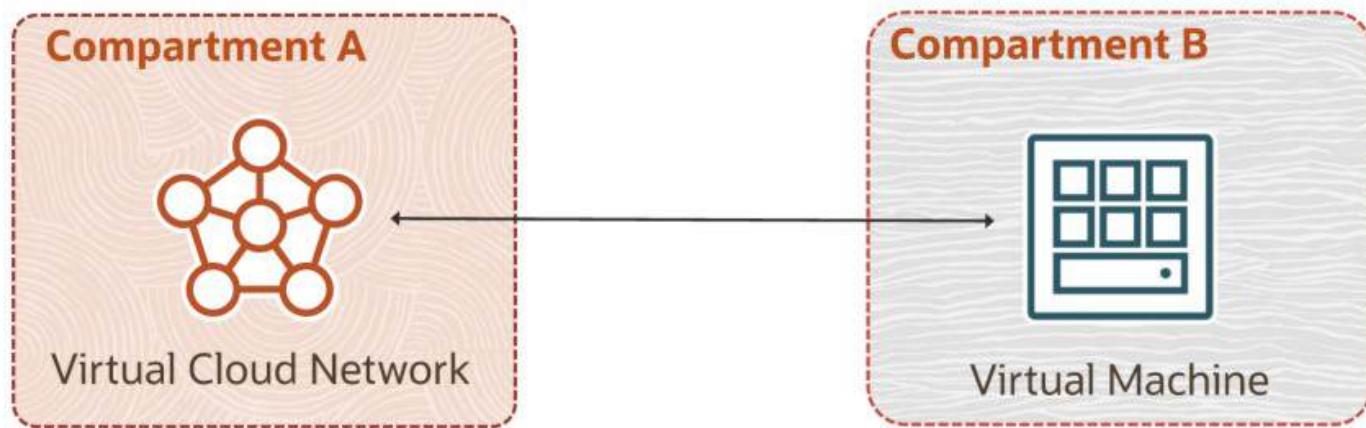
Compartments Access



Users + Policies = Access to Compartments

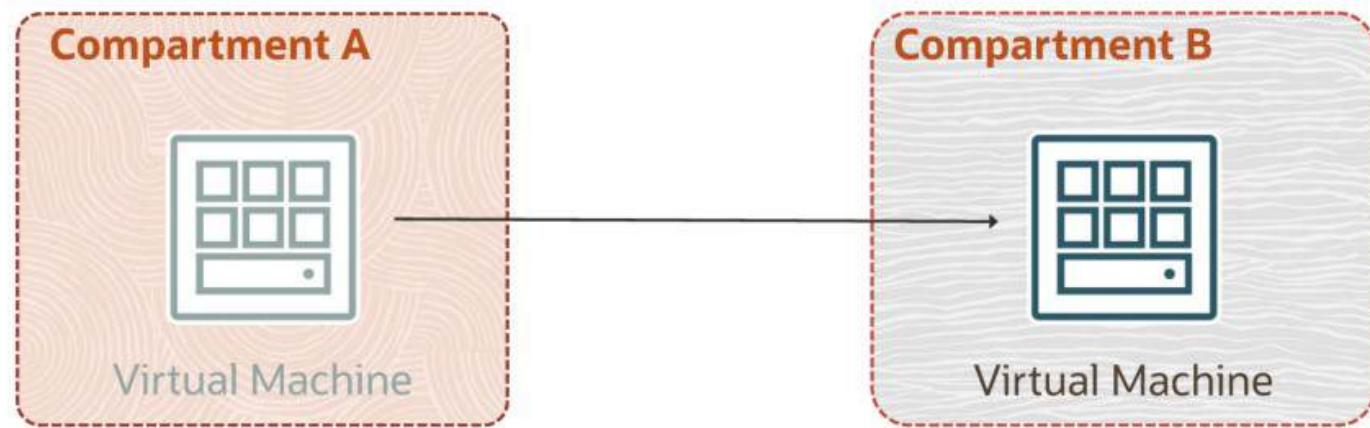
Interaction of Resources

Resources can interact with other resources in different compartments.

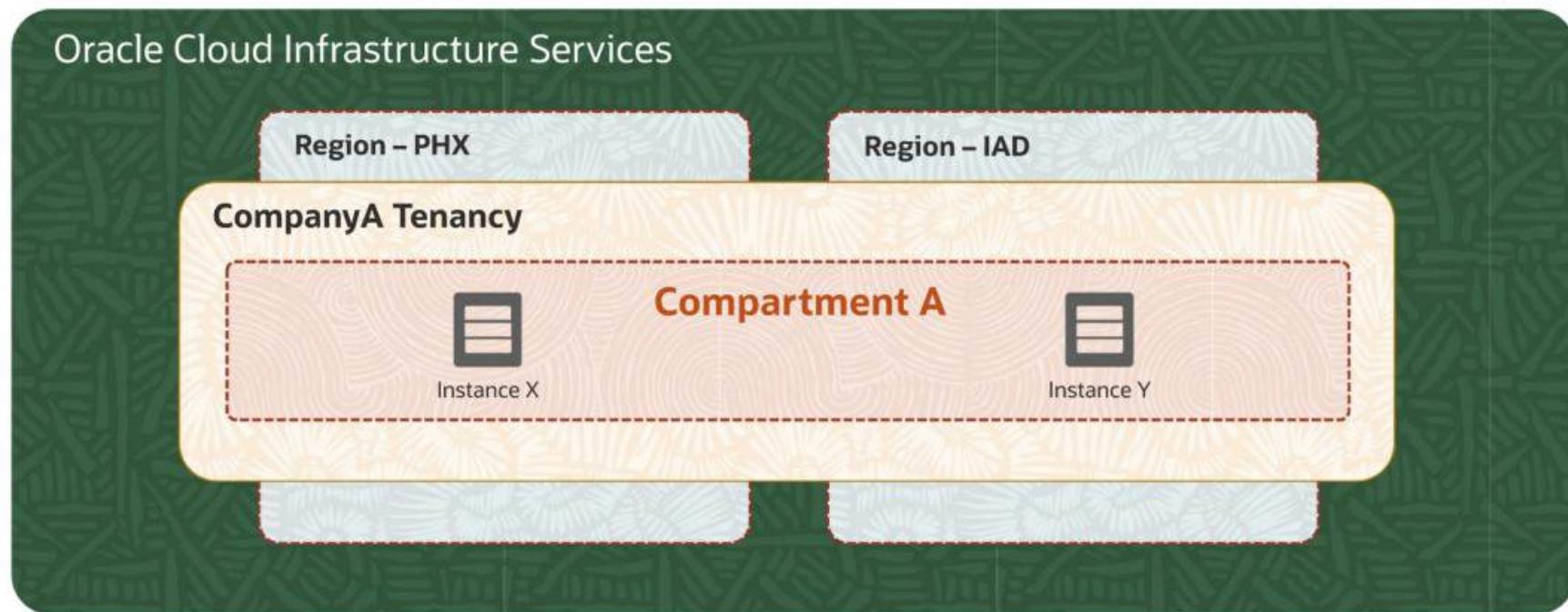


Movement of Resources

Resources can be moved from one compartment to another.

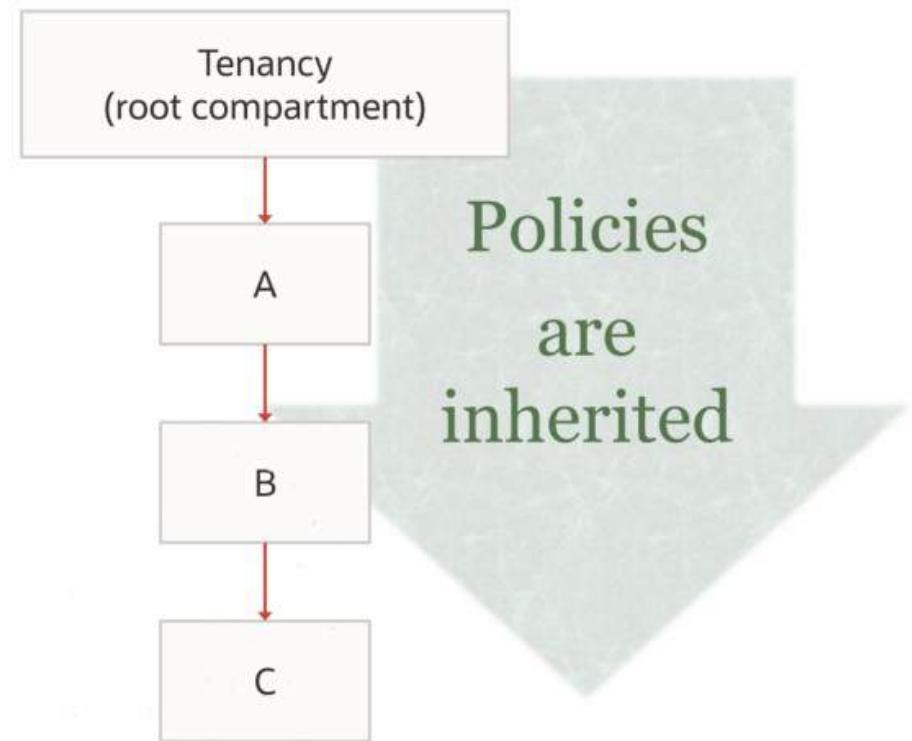


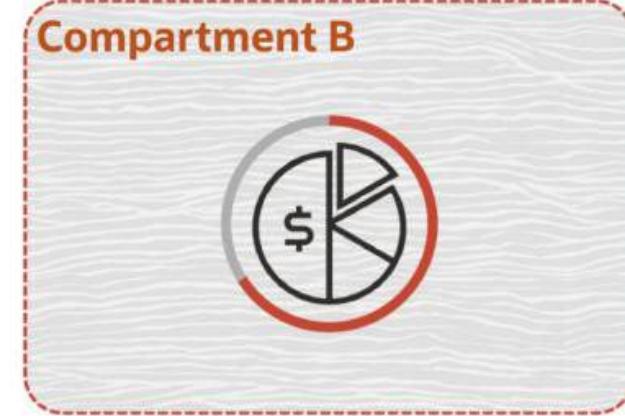
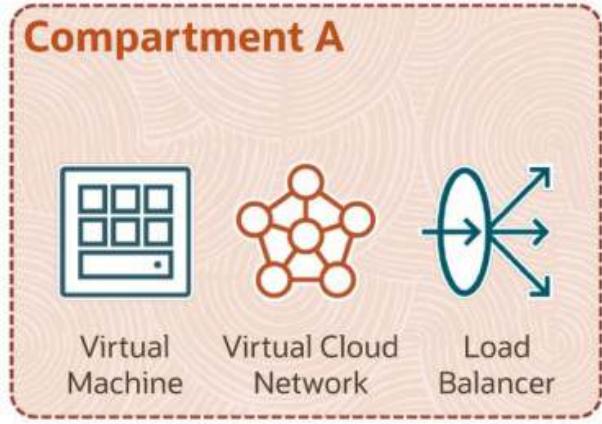
Multiple Regions



Resources from multiple regions can be in the same compartment.

Nested Compartments



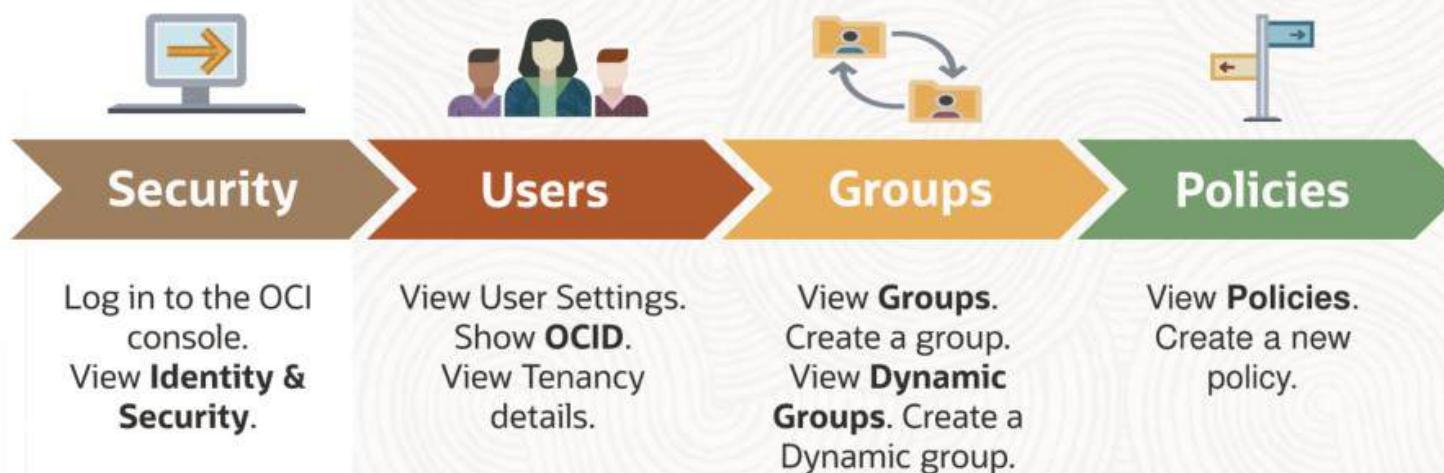


Set Quotas and Budgets on Compartments

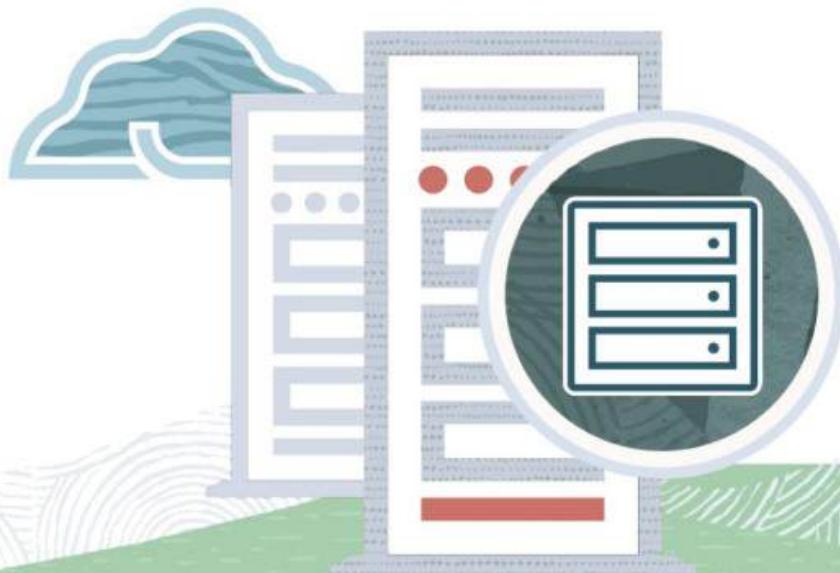


Compartment Demo

In This Demo



Compute



Virtual Machines

Bare Metal Servers



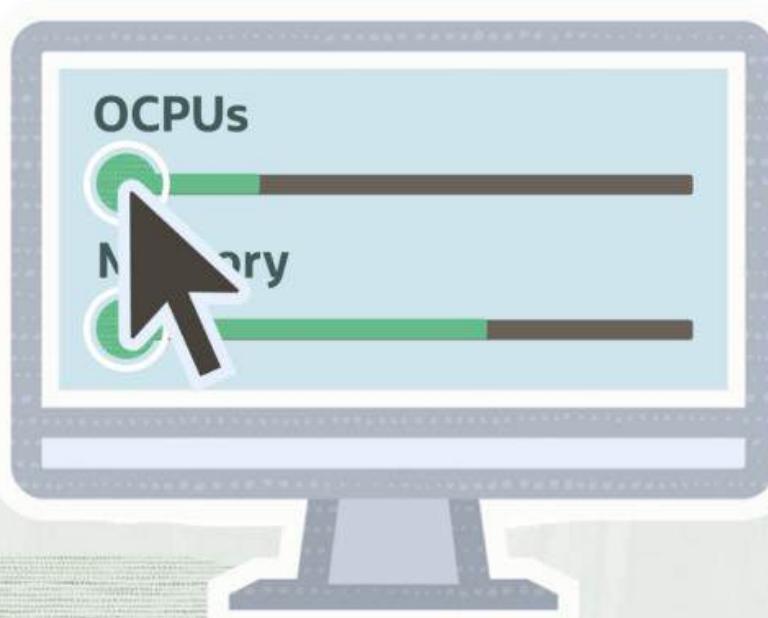
Oracle Cloud Infrastructure

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Flexible Shapes



Select the right machine type by using our flexible shapes.





Virtual Machine

- Managed by OCI.
- Most common.
- Flexible or Fixed shapes.



Bare Metal

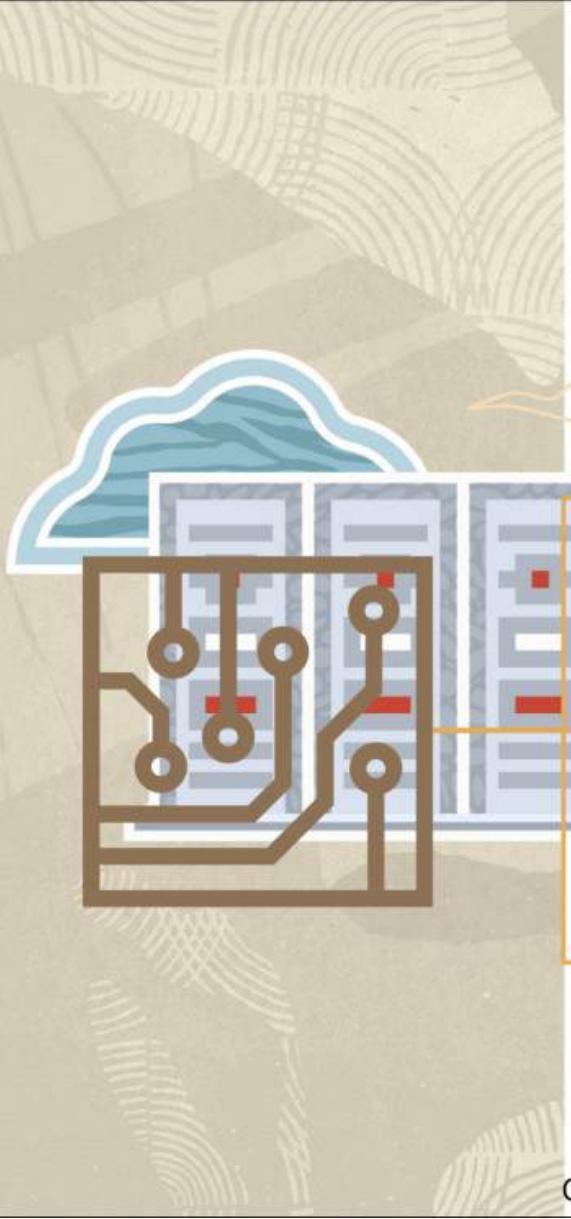
- Dedicated server.
- High performance.
- Specialized workloads.
- Fixed shapes only.



Dedicated Host

- Single-tenant VM host.
- Mix any compatible VM shapes.
- Fixed shapes only.





AMD
Flexible OCPU count. AMD processors.

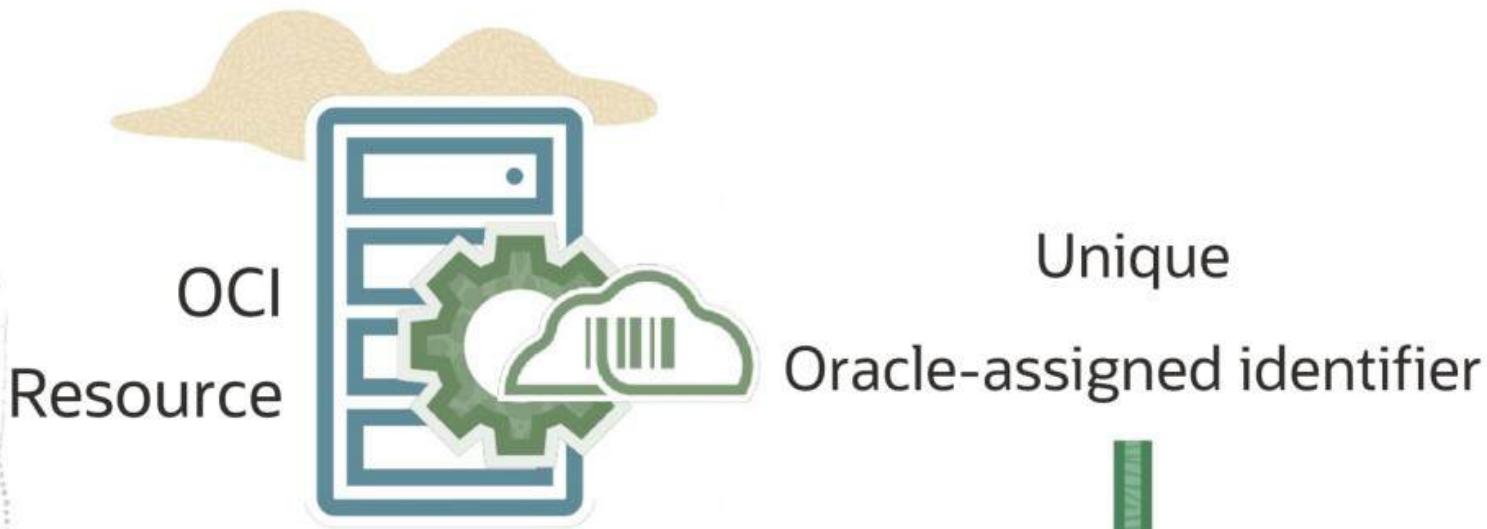
intel
Current generation Intel processors.

AMPERE
Arm-based processor.

Leverage Choice of Processors



How to identify an OCI resource



Oracle Cloud ID (OCID)

ocid1.<RESOURCE TYPE>.<REALM>.[REGION]..FUTURE USE.<UNIQUE ID>

Example OCIDs



Tenancy

ocid1.**tenancy**.oc1..aaaaaaaaaa
ba3pv6wkcr4jqae5f44n2b2m2yt
2j6rx32uzr4h25vqstifsfdsq



Block Volume

ocid1.**volume**.oc1.eu-frankfurt-
1.abtheljrwqbqhmad266kljreyhbd4p
z3lmcwb4por6yigvx6lmxymneyevhja



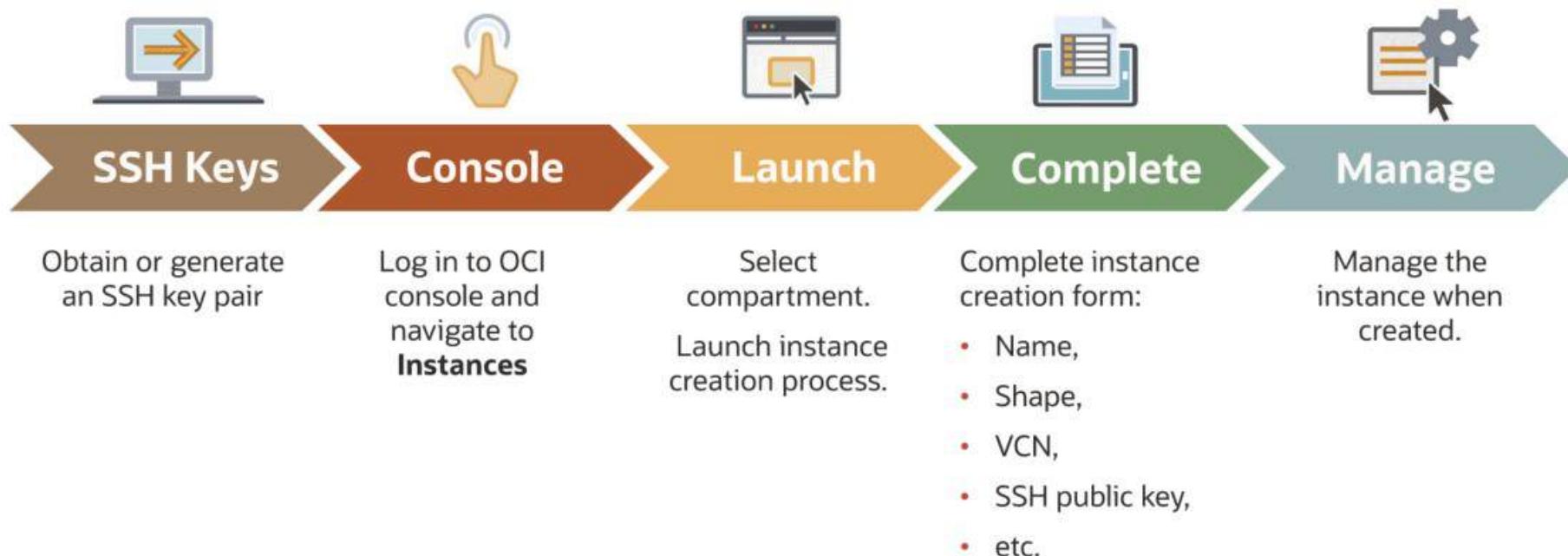
Compute Shapes and OCID Demo

In This Demo



- Log in to OCI console.
- Select **Compute**.
- View Instances.
- View Shapes.
- Select an instance.
- View Details: AD, FD, Region, **OCID**.
- View Resources.
- View VCN.
- View a Subnet.
- View Security Lists.
- View Boot Volume.
- View Attached block volumes.
- Attach a new block volume.

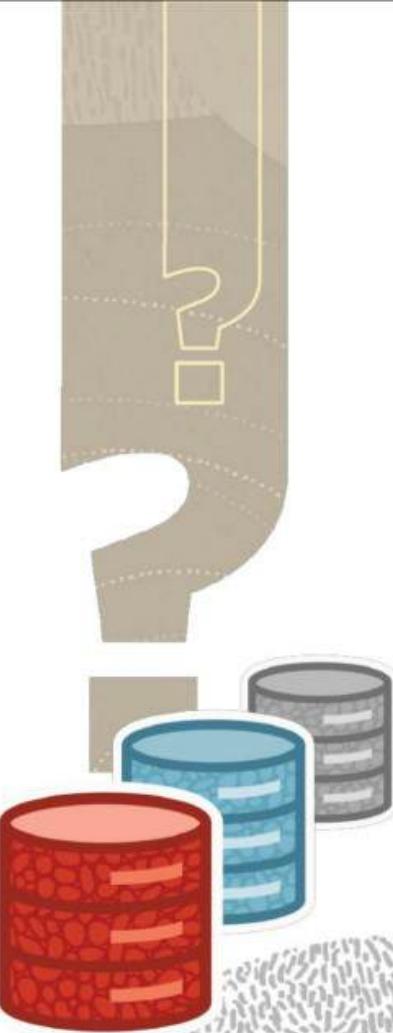
Creating an Instance in OCI



Persistent v/s non-persistent?

What type of data?
Database, videos, audio, photos, text

Performance?
Max capacity, IOPS, throughput



Storage Requirements

Durability?

of copies of data

Connectivity?

Local v/s network; how does the app access the data?

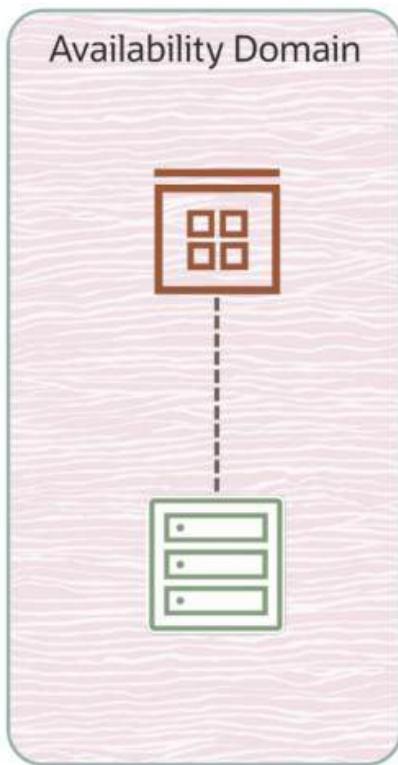
Protocol

Block v/s File v/s HTTPs

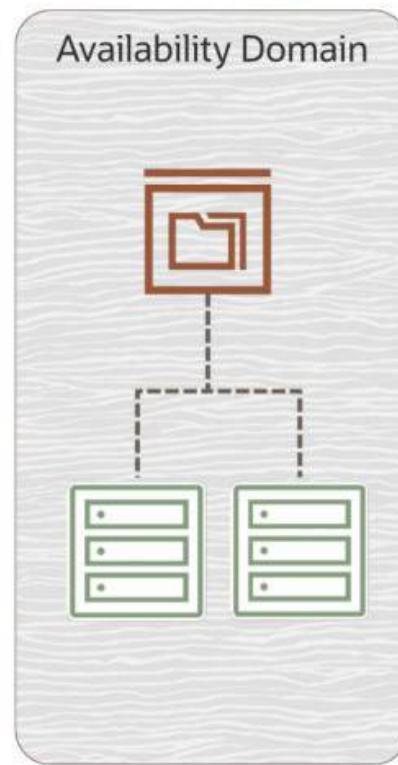
Local NVMe



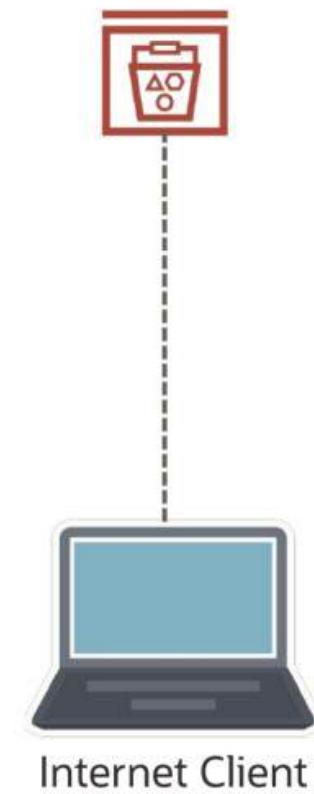
Block Volume



File Storage



Object Storage



OCI Storage Services



Create an Instance Demo

In This Demo



Locate the SSH key pair.

Log in to OCI console and navigate to **Instances**

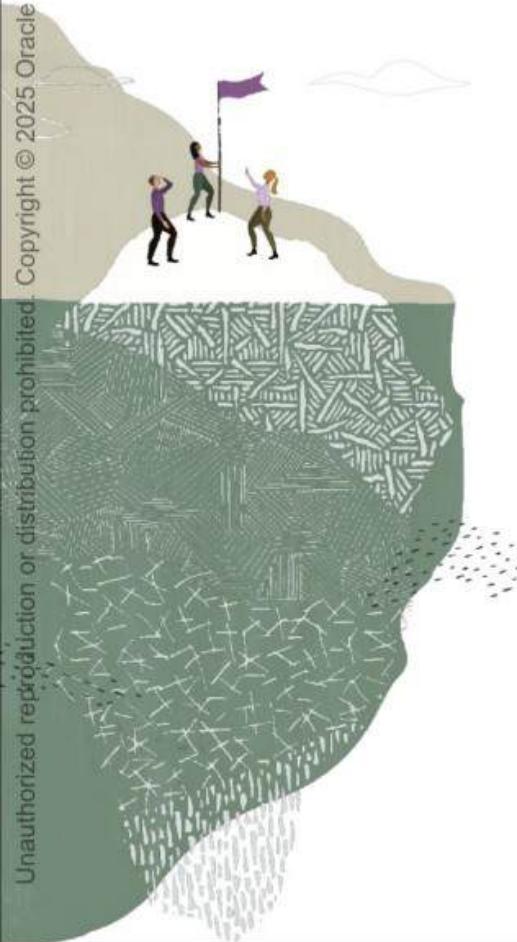
Launch instance creation process.
Select OCI compartment.

Complete instance creation form:

- Name,
- Shape,
- VCN,
- SSH public key,
- etc.

Manage the instance when created.

Summary



OCI Regions and Availability Domains

Tenancies and Compartments

Compute Instances, Networking, and Storage

Bare Metal Hosts and OCID

Creating and Launching an Instance

Oracle Cloud Infrastructure

Oracle Linux: System Administration on Oracle Cloud Infrastructure

Introduction to Oracle Linux

Serge Moiseev - Cloud Delivery Lead
Oracle University



Objectives

Linux Architecture and Linux Kernel

OCI Cloud Shell and Command Line

Accessing Linux Hosts on OCI with SSH

Using VIM to Edit Files and Creating a Simple Script

Managing Users and Groups



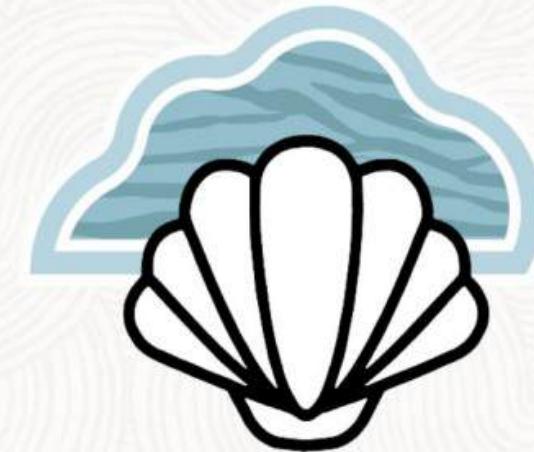
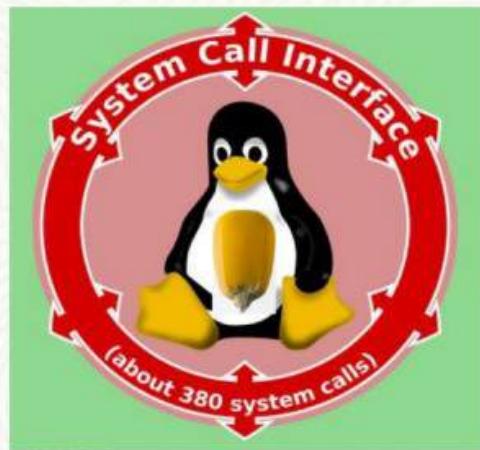


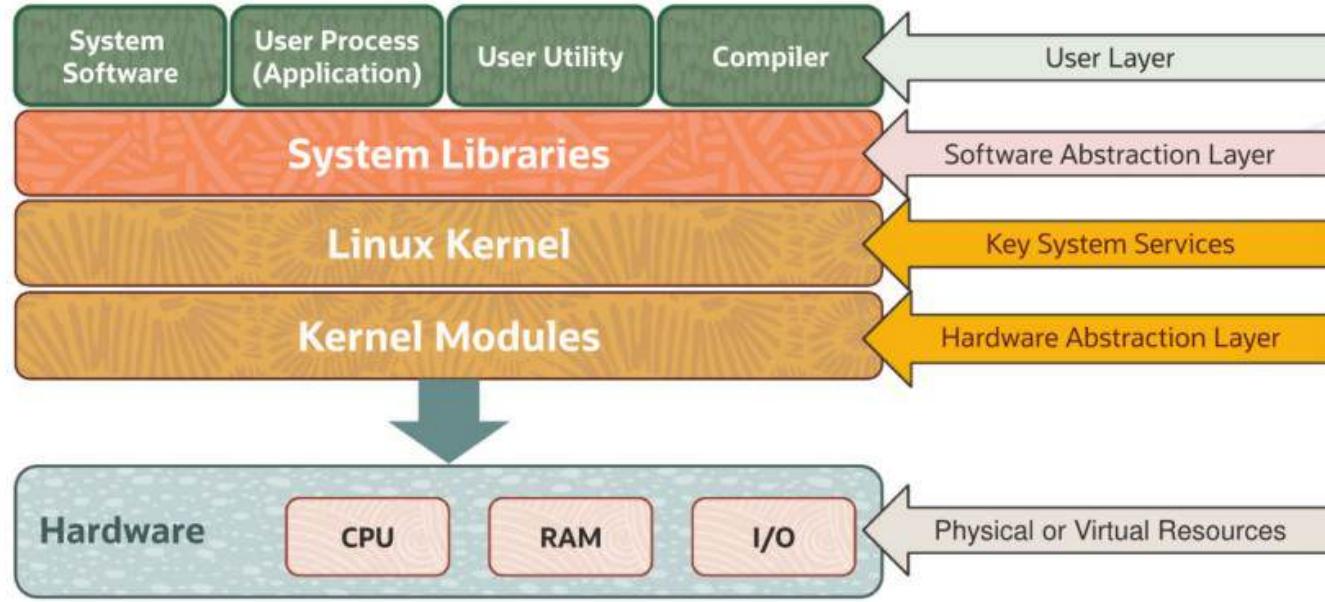
OCI Resources Demo

In This Demo



Linux Architecture, Kernel, and OCI Cloud Shell





Linux OS Architecture

The operating system implements a **layered** architecture



Oracle Cloud Shell



Shell is a command line interpreter: Oracle Cloud Shell offers Linux terminal command line to interact with the OCI resources right in your web browser.



Runs in a small Linux VM on OCI: Supports standard Linux utilities and commands. Includes latest OCI CLI and 5 GB of storage.

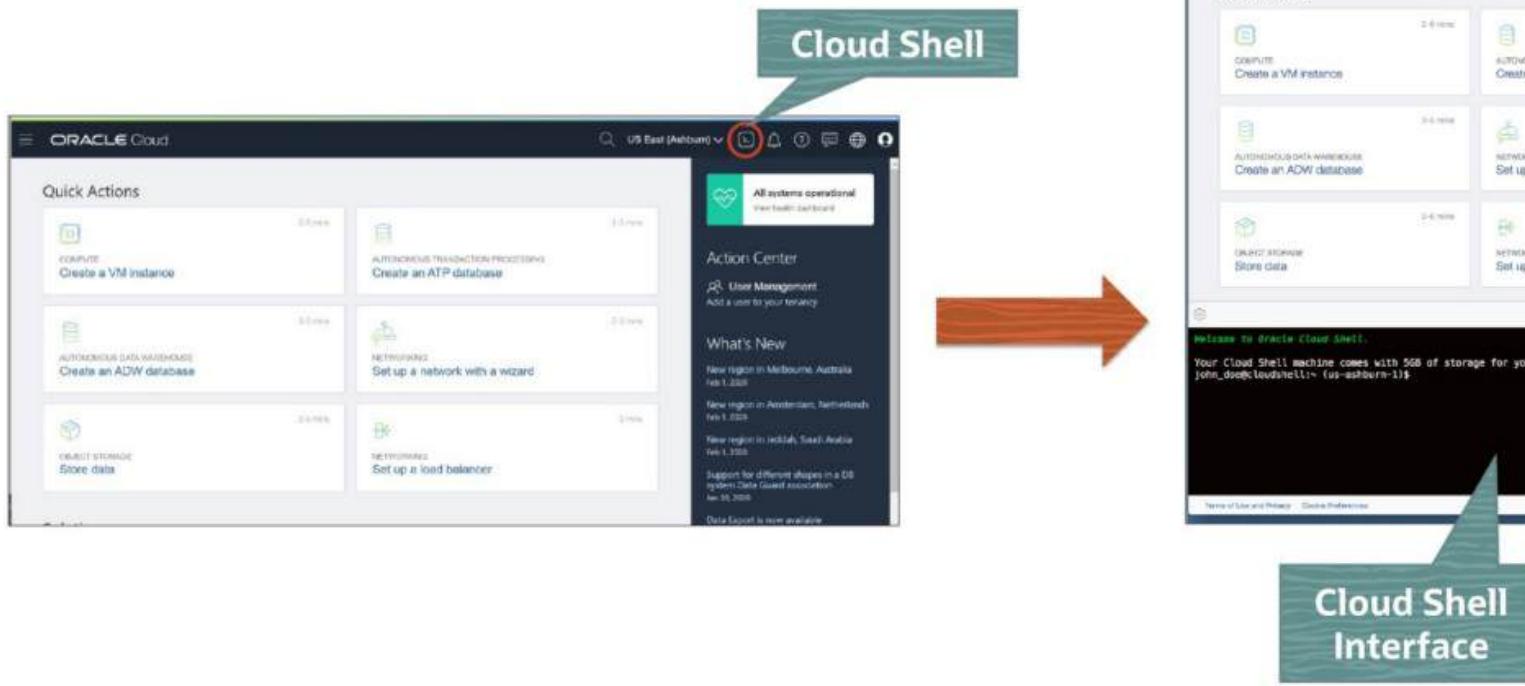


Is dedicated to the current user: Completely independent from other users' sessions. Cloud Shell VM does not count towards your OCI resources. It stays active throughout an OCI console session.



OCI Cloud Shell Connection

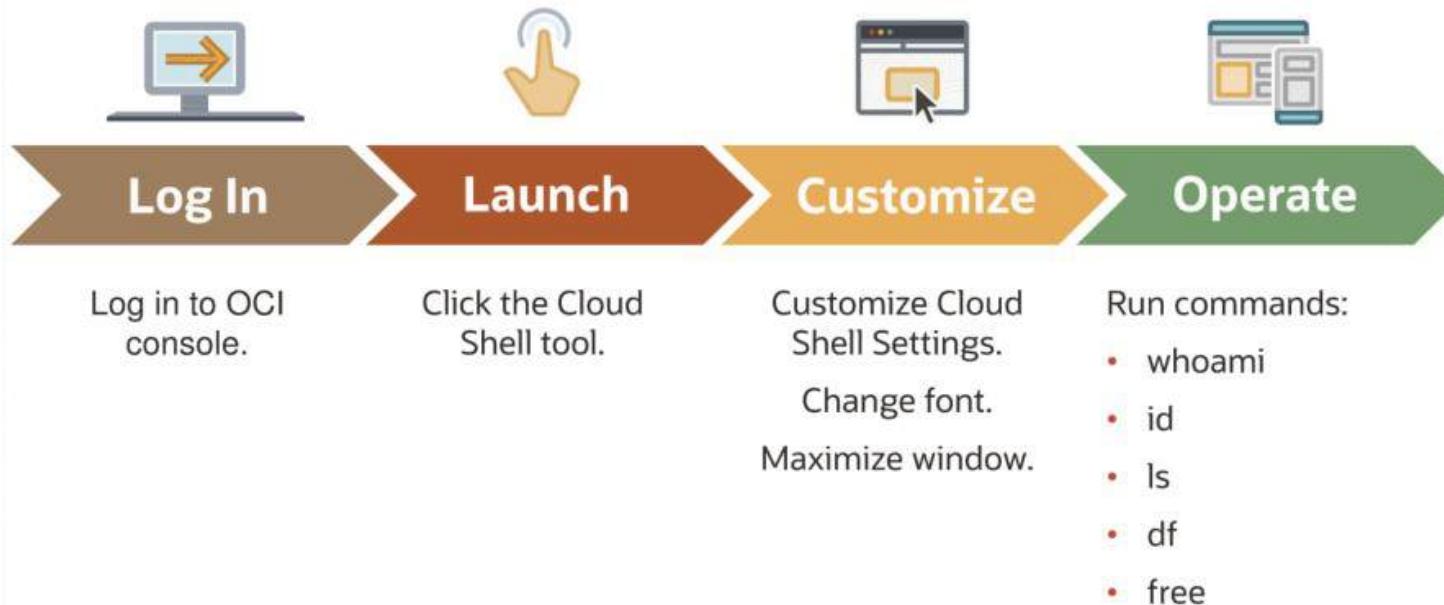
- To connect to Cloud Shell, navigate to
 - Console → Cloud Shell





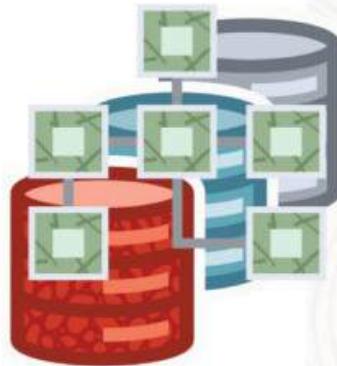
OCI Cloud Shell Demo

In This Demo



Linux File System

and Instance Access on OCI



Linux File System Is Hierarchical



“ / ” The root directory contains the entire Linux file system

Similar to UNIX, all files and directories are contained in the root.



Arbitrary levels of subdirectories may exist

Linux system administrators are allowed to manage files and directories in the root location.



Users are given permissions to work in the specific subdirectories

Each user controls a home directory and may be allowed access in other directories by an administrator.



Files and directories are protected by access permissions

Permissions are inherited from user environment defaults. Permissions are modified by assigning numeric or mnemonic access control pattern.

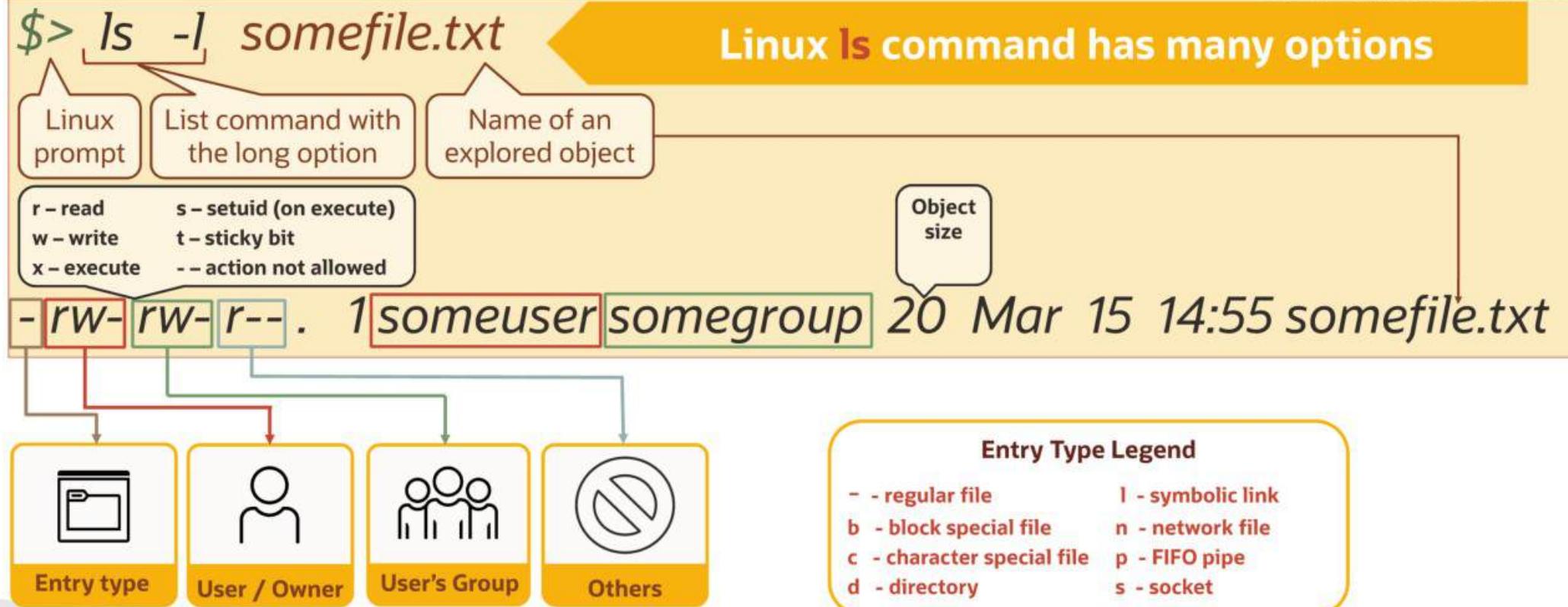


An Object Access Control pattern listing contains ten positions

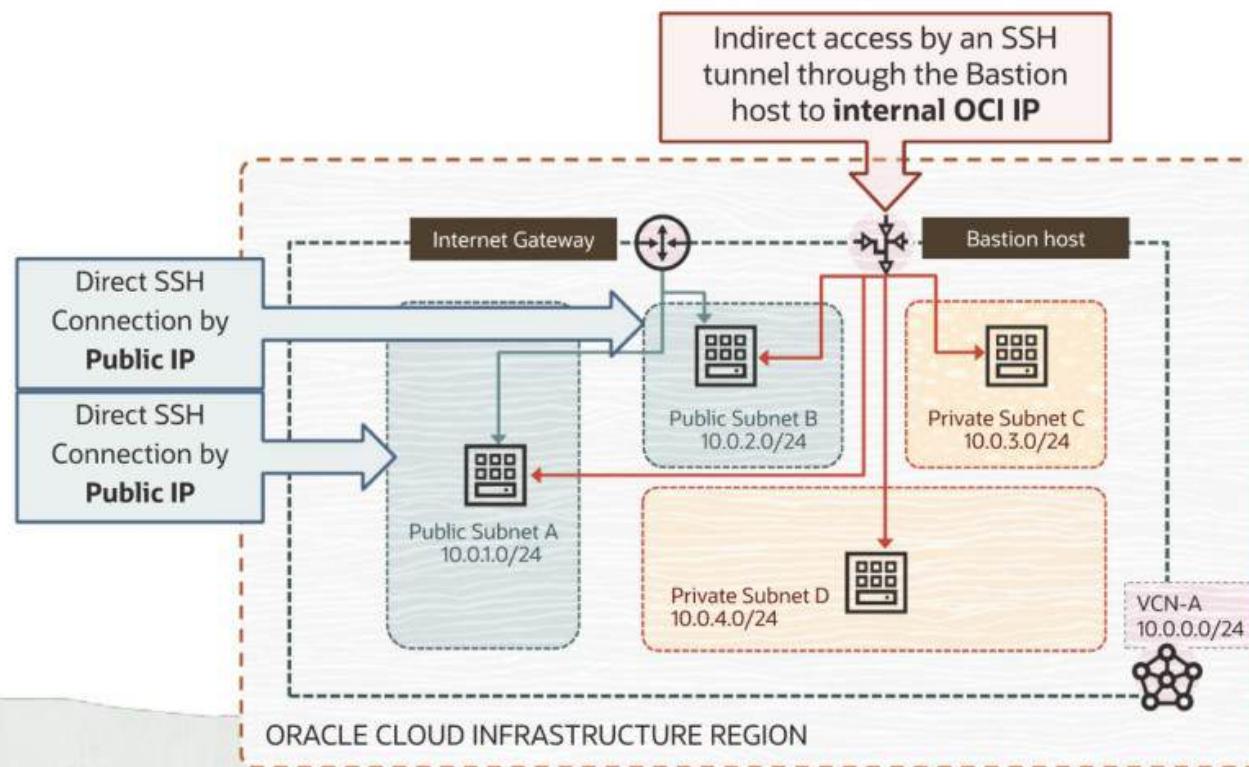
Each position has its own special meaning.



File Listing Explained



Linux Hosts in OCI



Accessing Linux Host in OCI



- ✓ Hosts with a public IP can be accessed directly using SSH
- ✓ Look up the IP address using OCI portal Instances information
- ✓ Create SSH connection using the private key related to the instance's public key



- ✓ Hosts without a public IP can only be accessed through a bastion host
- ✓ A bastion host offers SSH jump connection to internal IP addresses; improves security
- ✓ Create an SSH tunnel through the bastion host to the desired OCI internal IP

Direct Access by IP Address

Direct Secure Shell Connection



Requirements

An available SSH private key related to the instance's public key

Public IP address of the instance to connect



Example

```
ssh -i /home/myuser/keys/my_private_key opc@<instance_public_IP>
```

User **opc** is preconfigured for the instance



Switch to another user identity after connecting

Use **sudo** to change identity: `sudo -u <another_username>`

Indirect Access Through a Bastion Jump Host

- The Bastion offers an SSH bridge to the internal IP addresses



Requirements

An available SSH private key related to the instance's public key

Public IP address of the bastion host and the internal IP address of the instance to connect



Tunnelling command example: `ssh -i /home/myuser/keys/my_private_key -o \\ ProxyCommand="ssh -W %h:%p -i /home/myuser/keys/my_private_key \\ opc@<bastion_IP>" opc@<instance_internal_IP>`



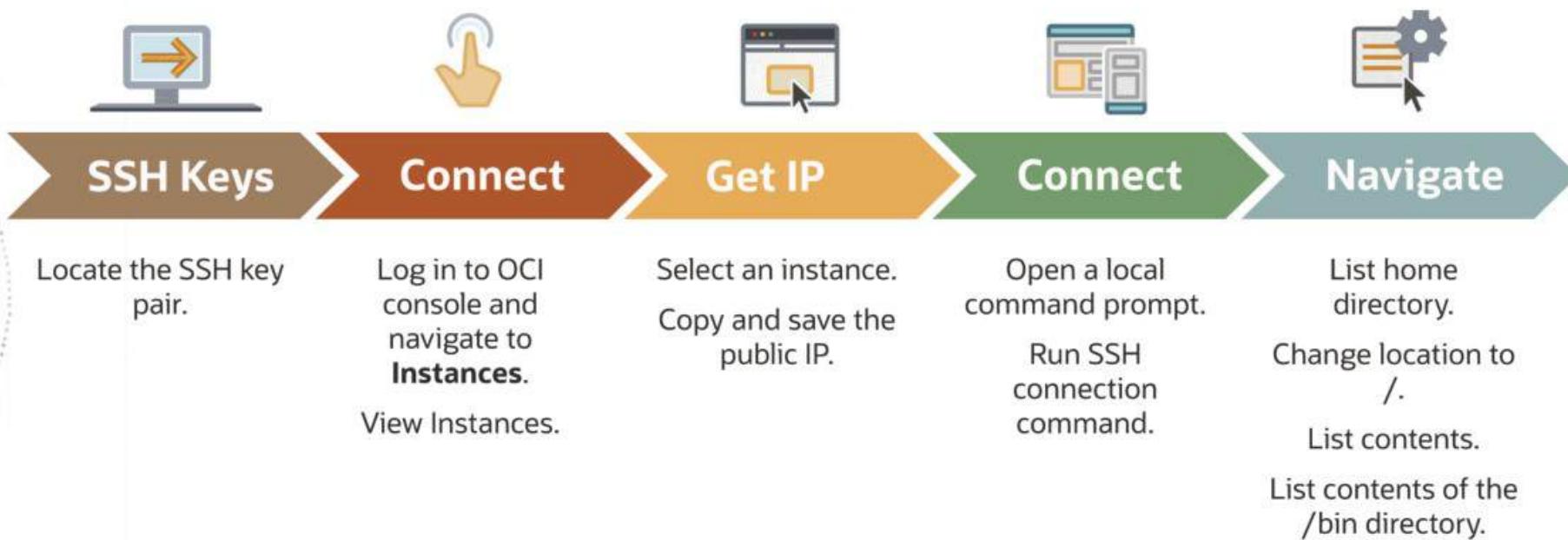
Switch to another user after connecting

Use **sudo**: `sudo -u <another_username>`



Connecting with SSH

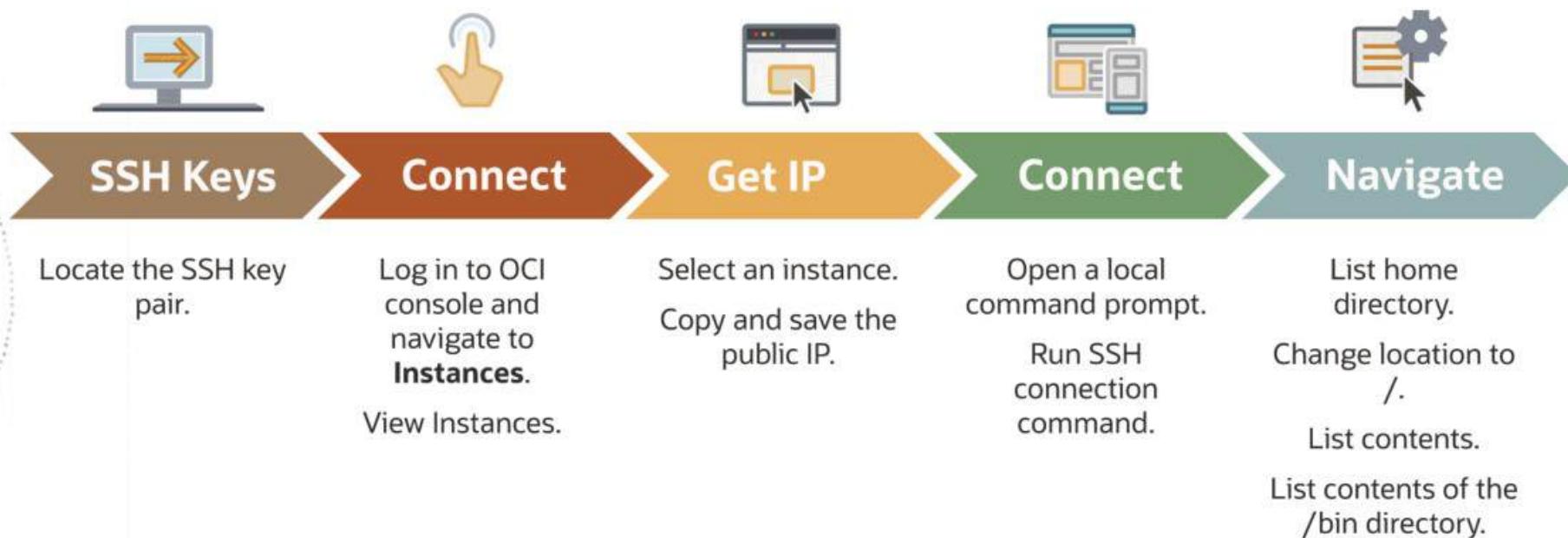
In This Demo





Connecting with SSH

In This Demo



VIM Editor



vi Improved

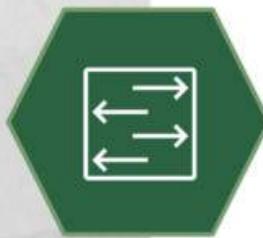
VIM Editor at a Glance



VIM can be used to view files when invoked as “view *some_file*”.



Normal invocation is either “vi”, or “vim” with the file name to edit.



VIM can switch between “browse” and “insert” modes. Enter `ESC+:+w+q` sequence to save the edited contents.

Working with the VIM Editor

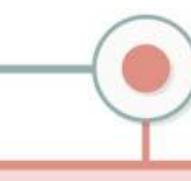


Viewing

\$> **view** somefile.txt

```
File Edit View Search Terminal Help  
$>view somefile.txt  
  
File Edit View Search Terminal Help  
demo text - this is a sample text file  
simply to show the basic VIM commands  
It can be deleted when no longer needed  
---> end of this sample file  
  
"somefile.txt" [readonly] 7L, 149C
```

File size

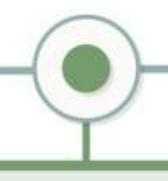


Browsing Text

\$> **vi** somefile.txt

Use navigation keys while in the "browse"

```
File Edit View Search Terminal Help  
$>vi somefile.txt █  
  
File Edit View Search Terminal Help  
demo text - this is a sample text file  
simply to show the basic VIM commands  
It can be deleted when no longer needed  
---> end of this sample file  
  
"somefile.txt" 7L, 149C 7,28 All
```



Insert Mode

From "browse" mode:
press either: "i", "o", or "a".
Navigation keys also work.

```
File Edit View Search Terminal Help  
demo text - this is a sample text file █  
simply to show the basic VIM commands  
It can be deleted when no longer needed  
---> end of this sample file  
  
-- INSERT -- 1,39 All
```

Return to the "browse" mode by pressing **ESC** key.

Steps to Create a Script



Launch editor

```
$> vi myscript.sh
```



**Write and save
the script file**

Add script
commands



**Set execute
permission**

```
$> chmod a+x \  
myscript.sh
```

Run the script:

```
$> ./myscript.sh
```



Editing with VIM Editor Demo

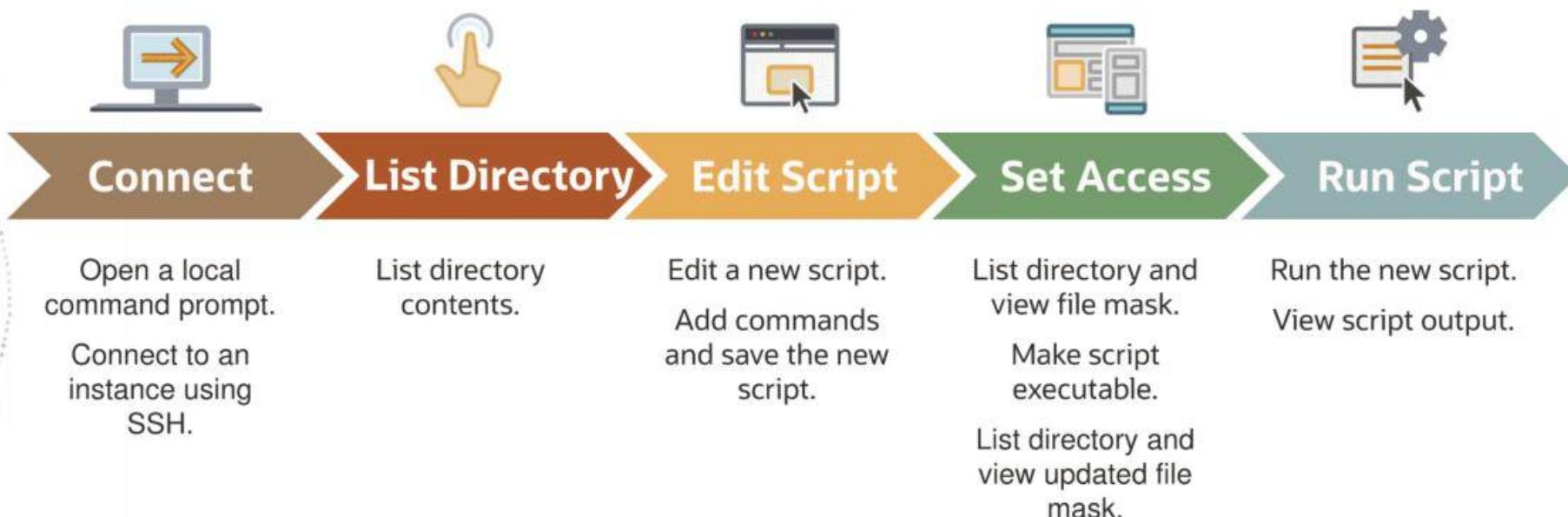
In This Demo





Creating a Script Demo

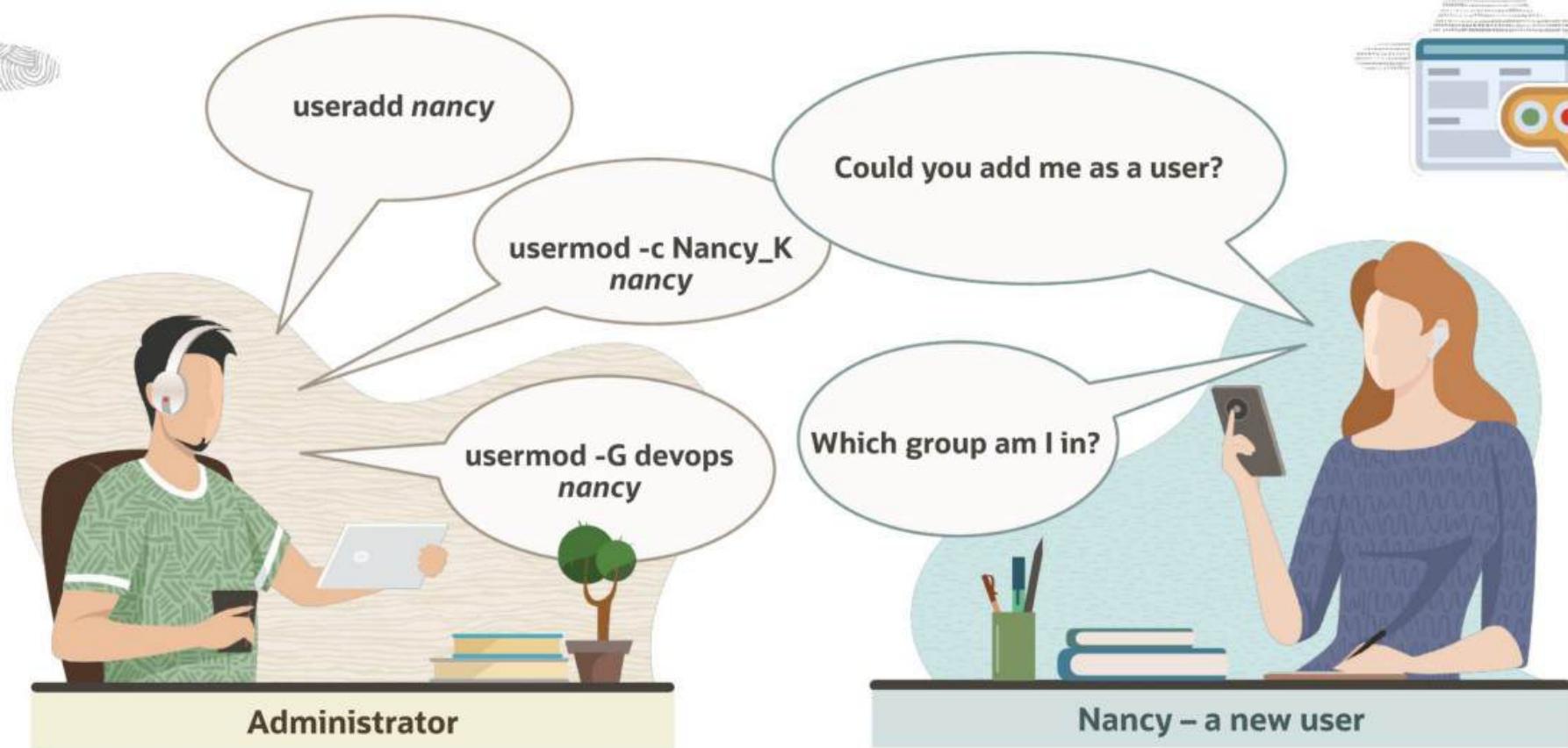
In This Demo



Manage Users and Groups



How to Create and Manage Users and Groups?



Exclusive to privileged users!



User and Group Management Command-Line Tools

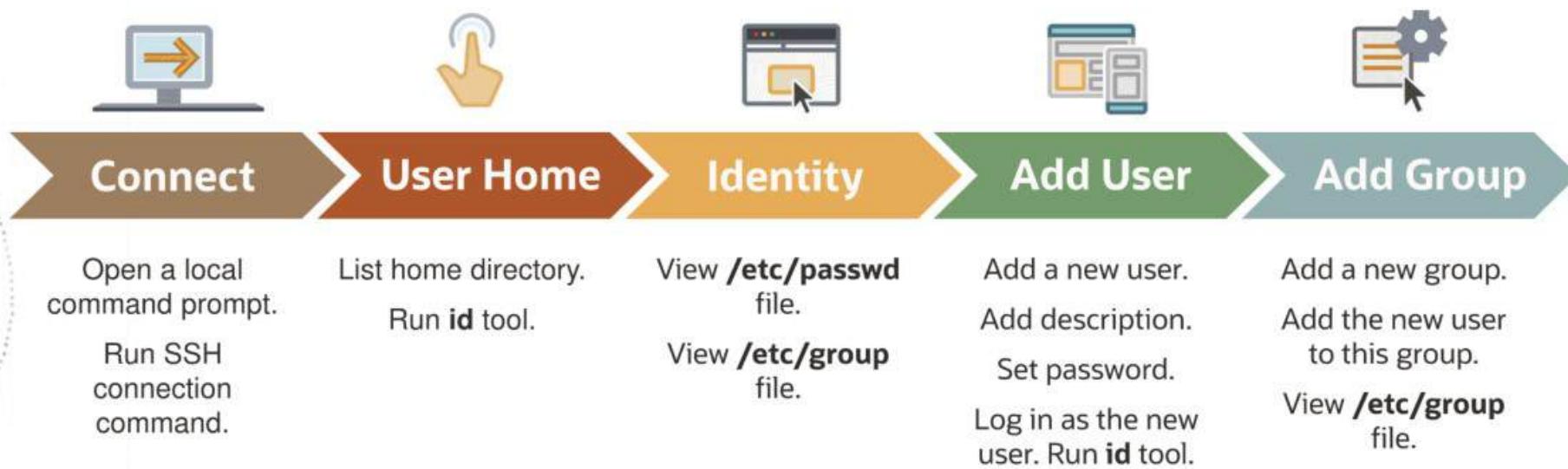
User Management	Group Management	Related Files Store
<ul style="list-style-type: none">› Add with useradd› Modify with usermod› Delete with userdel› To view: whoami and id› Set or change password with passwd	<ul style="list-style-type: none">› Add with groupadd› Delete with groupdel› Add user with useradd -G› Modify with groupmod› View membership with groups	<ul style="list-style-type: none">› User data in /etc/passwd› Group data in /etc/group› Secure group data in /etc/gshadow› User login defaults for new users : /etc/login.defs

Not restricted to
privileged users



Users and Groups Demo

In This Demo



Summary



Linux Architecture and Linux Kernel

OCI Cloud Shell and Command Line

Using the VIM Editor to Edit Files and Creating a Simple Script

Accessing Linux Hosts on OCI with SSH

Managing Users, Groups, and Permissions

Oracle Cloud Infrastructure

Oracle Linux: System Administration on Oracle Cloud Infrastructure

Operating System Management

Serge Moiseev – Cloud Delivery Lead
Oracle University



Objectives



Enabling OCI Utilities

Using OS Management for Linux on OCI

Working with OS Compliance

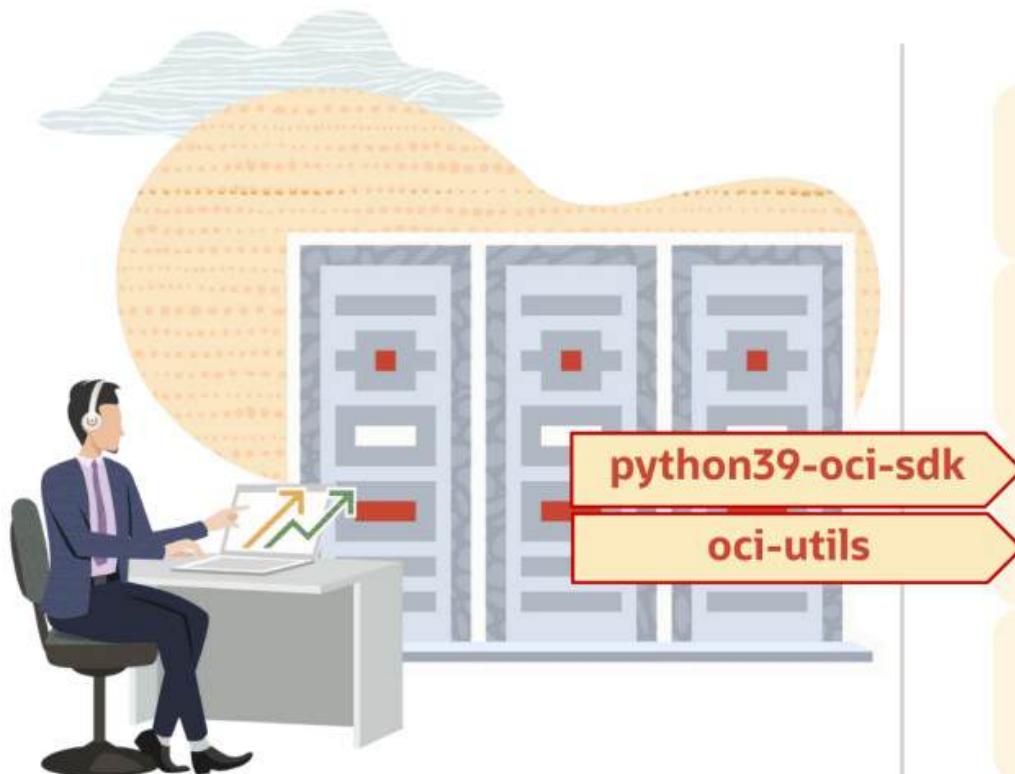


Enabling OCI Utilities



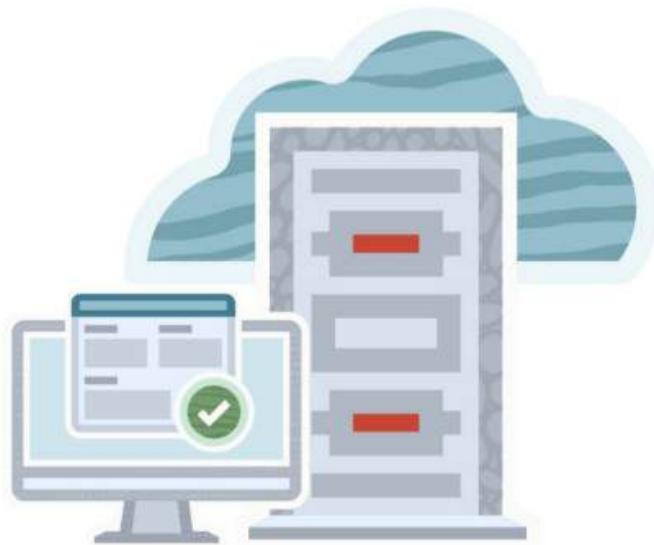
**oci-metadata
oci-iscsi-config
oci-network-config
oci-public-ip
oci-growfs**

OCI Utilities



- Support interactions between the OS and the OCI
- Preinstalled by default on Oracle Linux 9 OCI images
- Require OCI Python SDK and OCI Utilities packages
- Use Oracle Linux 9 **dnf** tool to install on custom OS images.

Validating OCI Utilities



Validate required packages:

```
dnf list python39-oci-sdk oci-utils
```

If not present, install using privileged account:

```
sudo dnf install python39-oci-sdk oci-utils
```

Check **ocid** service – it should start on boot:

```
service ocid status
```

Enable and ensure automatic start on boot:

```
sudo service ocid start
```

```
sudo service ocid enable
```

Configuring OCI Utilities



OCI Console: Capture OCID for the user, OCID for the Tenancy, and the OCI Region name.

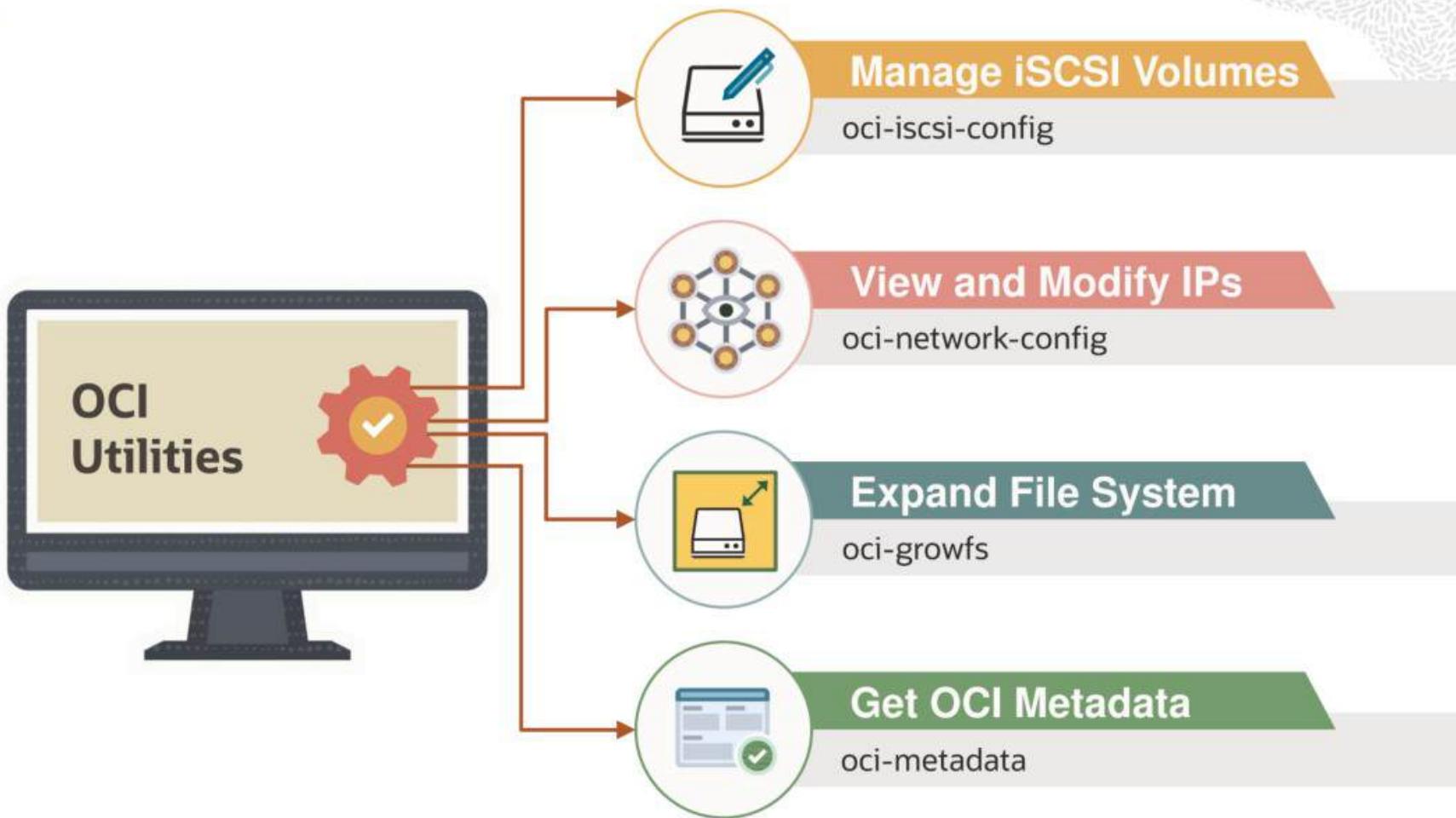


Linux terminal: Run `oci setup config` and enter the captured values from before. Data is stored by default in `/root/.oci/config` location.



SSL Keys: Select **N** to use the existing key pair, **Y** to create a new key pair. Keys are stored by default in `/root/.oci` location.

Use Cases for OCI Utilities



Use Cases for OCI Utilities

Create, attach, detach, or delete detached volumes.

View and modify network properties VNICs, IPs.

Expand the root file system to full OCI allocated size.

View and update instance's OCI metadata.



Manage iSCSI Volumes

oci-iscsi-config



View and Modify IPs

oci-network-config



Expand File System

oci-growfs



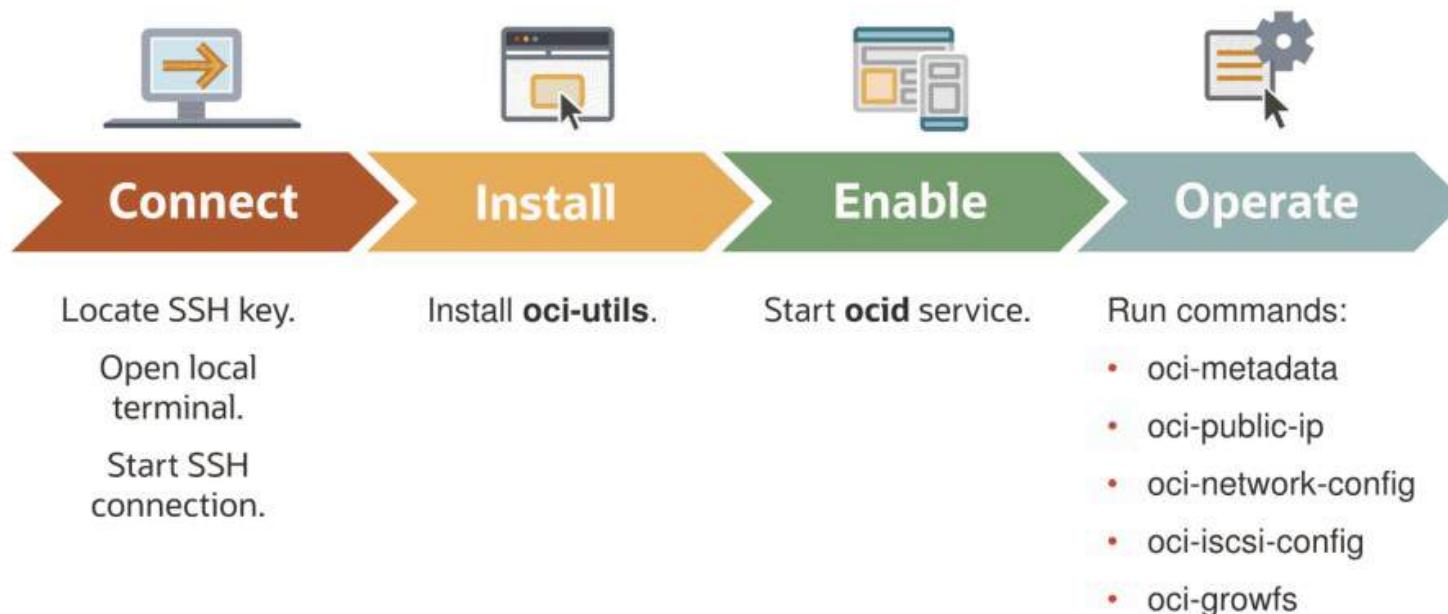
Get OCI Metadata

oci-metadata



Demo: Enabling OCI Utilities

In This Demo



OS Management Hub



**Discover Updates
Select Updates
Apply Updates
Group Instances Together**

OS Management: Ease of Use



Keep Up-to-date

Ensure instances have latest patches and updates.



Selective Update

Update one instance or a group of instances.



Choose Update Schedule

Apply updates right away or schedule for later.

Eliminate the guesswork – what to update?

Accessing OS Management Hub Functions

The image shows two screenshots of the OCI Console interface. The left screenshot displays the main menu with a yellow arrow pointing to the 'Observability & Management' section, which is highlighted with a blue bar. A second yellow arrow points to the 'OS Management Hub' option under this section. The right screenshot shows the 'Instances' page for a specific instance named 'lab-node1'. The instance status is 'Running'. A red dashed box highlights the 'lab-node1' name. A yellow arrow points to the 'OS Management' tab at the bottom of the instance details panel.

✓ OCI Console – main menu

✓ Select:

Observability & Management → OS Management Hub

Home
Compute
Storage
Networking
Oracle Database
Databases
Analytics & AI
Developer Services
Identity & Security
Observability & Management

OS Management Hub

- Overview
- Software sources
- Groups
- Lifecycle environments
- Instances
- Events
- Jobs
- Reports
- Profiles

lab-node1 Running

Instance details

Details Networking Storage Security Management **OS Management**

View OS Management Hub status:
Compute → Instances

✓ Select and click an instance.

✓ Click **OS Management**.

OS Management Hub: Requirements

- Software sources and OS Management Hub (OSMH) Profiles must be defined.
- IAM policies and groups for Tenancy and Compartment must be configured.
 - Policies and groups can be configured manually.
 - Much easier to use the OSMH Policy Advisor
 - > All groups and policies are set up for you.
- Enable and start OS Management Hub Agent.

OS Management Hub Agent

Enabled

Running

Tenancy administrator role is required.

Set up

Policy advisor

- ① Review current setup
- ② Review groups and policies

Checking the current OS Management Hub onboarding status of your compartment. [Learn more](#)

Problems identified

- Not configured: **osmh-instances** dynamic group in the **default** domain for instances in the **smoiseev** compartment.

Policy advisor

- ① Review current setup
- ② Review groups and policies

The following groups and policies will be **created**. Existing items are listed for completeness.

User groups and dynamic group

The user groups that administer and operate the OS Management Hub service and the dynamic group of instances to manage.

User groups and dynamic group	Action
osmh-admins	No action
osmh-operators	No action
osmh-instances	Configure

OS Management Hub: Root Compartment Resources



User groups:
osmh-admins, osmh-operators



Dynamic group:
osmh-instances (compute instances)



Policy: osmh-policies



[OS-lab-Linux9](#) Select OL9 sources for lab use
Software sources and profiles

Allow group default/osmh-admins to manage osmh-family in tenancy
Allow group default/osmh-admins to manage management-agents in tenancy
Allow group default/osmh-admins to manage management-agent-instances in tenancy
Allow group default/osmh-admins to use appmgmt-family in tenancy
Allow group default/osmh-admins to read metrics in tenancy
Allow group default/osmh-admins to read osmh-profiles in tenancy when using OSMH
Allow group default/osmh-admins to read osmh-software-sources in tenancy
Allow group default/osmh-operators to read osmh-family in tenancy
Allow group default/osmh-operators to use appmgmt-family in tenancy
Allow group default/osmh-operators to read metrics in tenancy
Allow group default/osmh-operators to read osmh-profiles in tenancy when using OSMH
Allow group default/osmh-operators to read osmh-software-sources in tenancy
Allow dynamic-group default/osmh-instances to {OSMH_MANAGED_INSTANCE_ID} in tenancy
Allow dynamic-group default/osmh-instances to use metrics in tenancy

OS Management Hub: User Compartment Policy



**User compartment
Policy:** osmh-policies



**Root compartment
Dynamic group:** osmh-instances rules

```
instance.compartment.id = 'ocid1.tenancy.oc1..aaaaaaaaaxy6bh46cdnlfpaibasc6dc'
```

```
all {resource.type='managementagent', resource.compartment.id='ocid1.tenancy.o
```

```
instance.compartment.id = 'ocid1.compartment.oc1..aaaaaaaaazjccegjdi5juafojgv9'
```

```
all {resource.type='managementagent', resource.compartment.id='ocid1.compart
```

User-compartment scoped

```
ALLOW GROUP GRPlab.user02 TO MANAGE instance-agent-plugins IN COMPARTMENT
ALLOW GROUP Default/osmh-admins TO MANAGE osmh-family IN COMPARTMENT
ALLOW GROUP Default/osmh-admins TO MANAGE management-agents IN COMPARTMENT
ALLOW GROUP Default/osmh-admins TO MANAGE management-agent-instances IN COMPARTMENT
ALLOW GROUP Default/osmh-admins TO USE appmgmt-family IN COMPARTMENT
ALLOW GROUP Default/osmh-admins TO READ metrics IN COMPARTMENT
ALLOW GROUP Default/osmh-operators TO READ osmh-family IN COMPARTMENT
ALLOW GROUP Default/osmh-operators TO USE appmgmt-family IN COMPARTMENT
ALLOW GROUP Default/osmh-operators TO READ metrics IN COMPARTMENT
ALLOW DYNAMIC-GROUP Default/osmh-instances TO {OSMH_MANAGED_INSTANCE_ID}
ALLOW DYNAMIC-GROUP Default/osmh-instances TO USE metrics IN COMPARTMENT
ALLOW DYNAMIC-GROUP Default/osmh-instances TO {MGMT_AGENT_DEPLOYMENT_ID}
ALLOW DYNAMIC-GROUP Default/osmh-instances TO {APPMGMT_MONITORING_ID}
ALLOW DYNAMIC-GROUP Default/osmh-instances TO {INSTANCE_READ_INSPECTOR_ID}
ALLOW DYNAMIC-GROUP Default/osmh-instances TO {APPMGMT_WORKLOAD_ID}
```

OS Management: Instance Details

Details Networking Storage Security Management OS Management

Overview View Patches and updates available

Use the OS Management Hub service to manage updates and patches on compute instances.

Available updates Security 11 Bug 6 Enhancement 0 Other 0

Operating system Oracle Linux 9.5

Kernel 5.15.0-307.178.5.el9uek.aarch64

Effective kernel 5.15.0-307.178.5.el9uek.aarch64

Scheduled jobs Scheduled 0

Details View OS Management Hub details

17 Available updates
11 security, 6 bug fixes

Update Run immediately or schedule for later

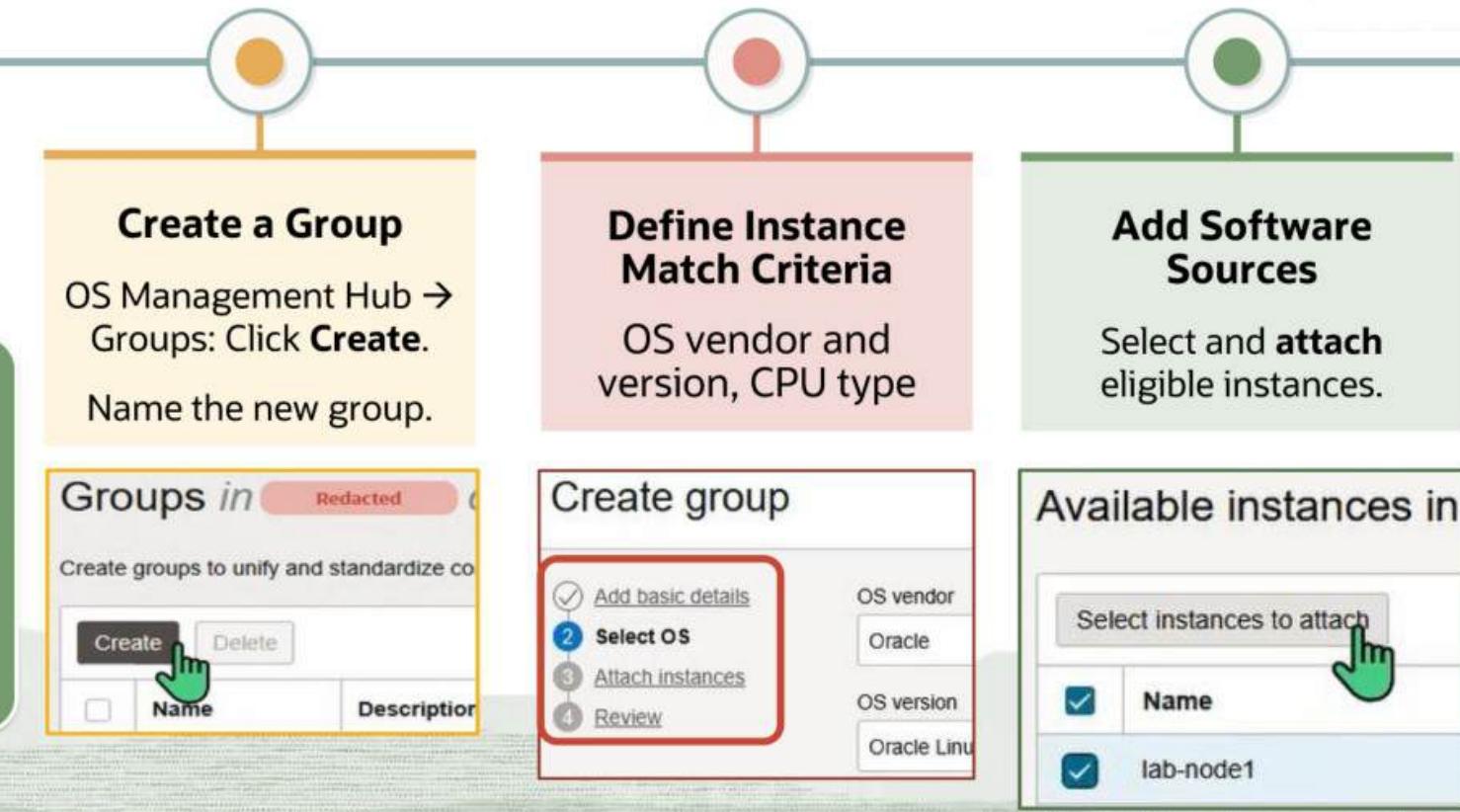
Schedule Run immediately Schedule

	Name	Available version	Installed version	Architecture	Type
<input type="checkbox"/>	glibc	2.34-125.0.1.el9_5.8	2.34-125.0.1.el9_5.3	aarch64	Security
<input type="checkbox"/>	glibc-all-langpacks	2.34-125.0.1.el9_5.8	2.34-125.0.1.el9_5.3	aarch64	Security

Grouping Instances with the Same OS and CPU Type



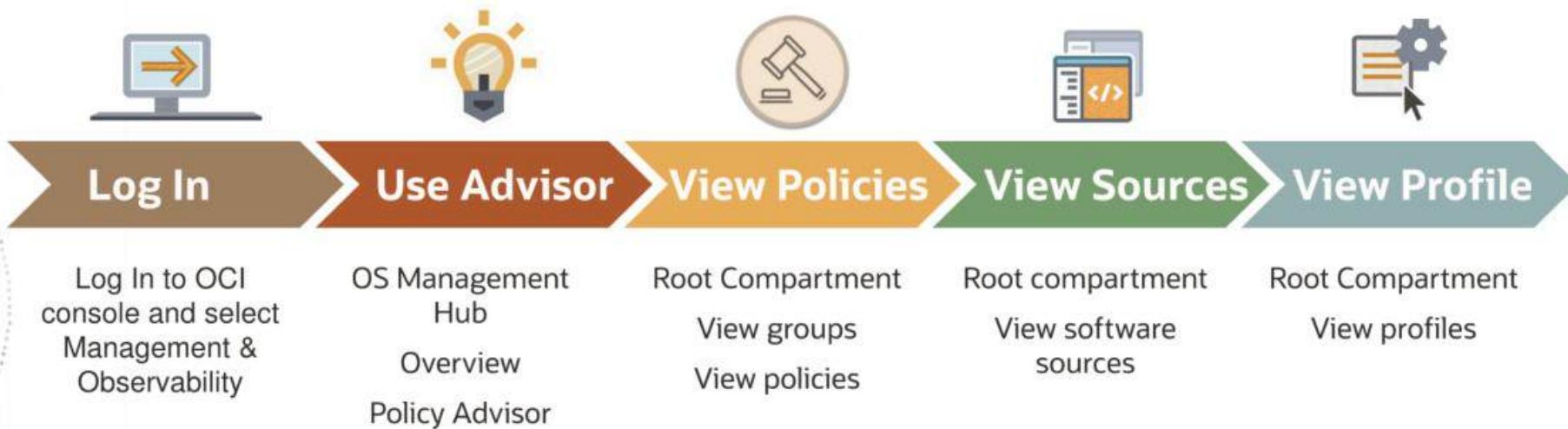
OSMH agent must be running on all eligible instances.





Demo: OS Management Hub Prerequisites

In This Demo

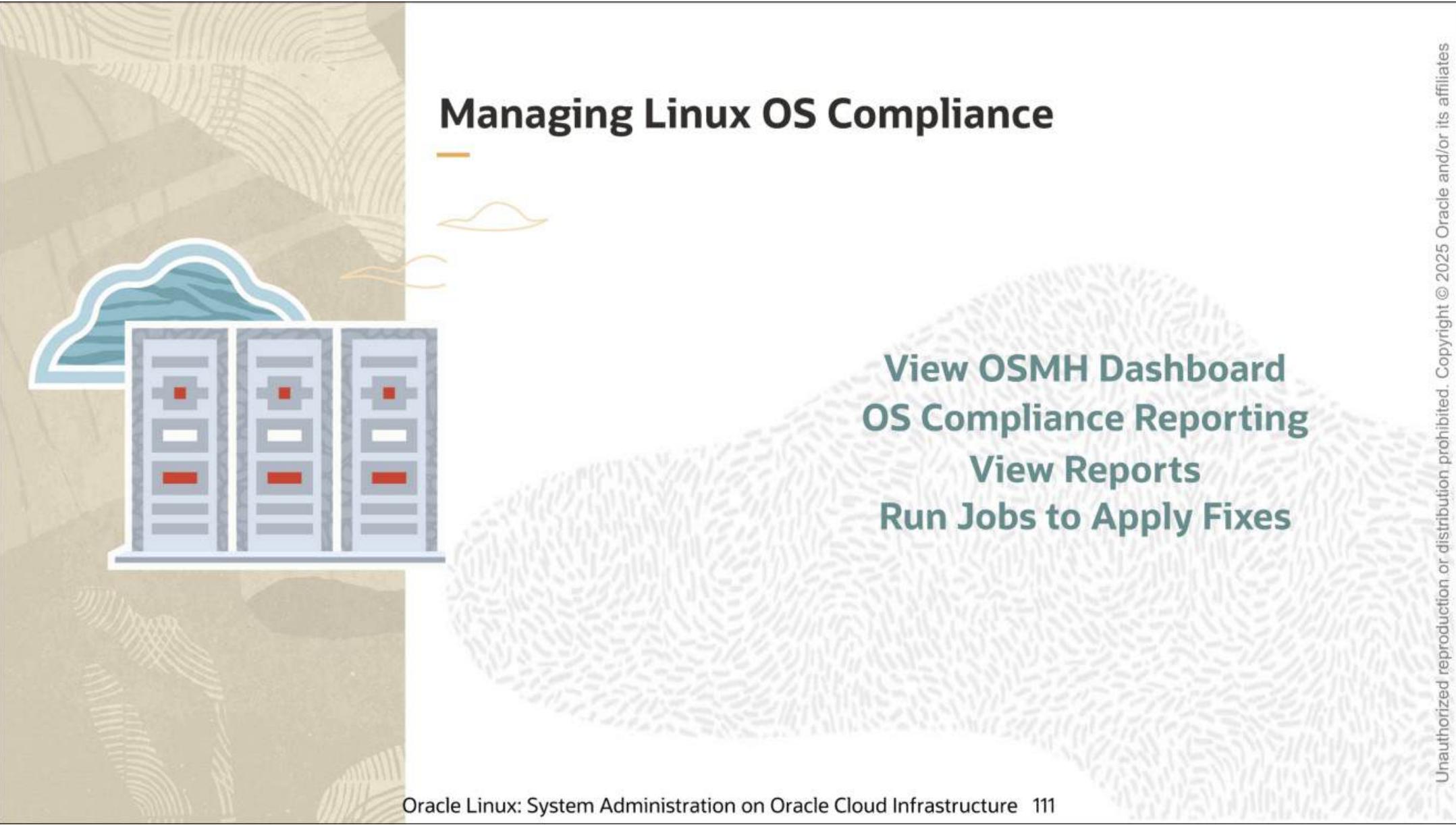




Demo: OS Management Hub Setup

In This Demo





Managing Linux OS Compliance

**View OSMH Dashboard
OS Compliance Reporting
View Reports
Run Jobs to Apply Fixes**

Checking OS Security and Compliance

How do I ensure security and compliance of my Linux instances?

Where do I get the report?

Will get right to it!
Any prerequisites?



Linux Administrator

OS Management Hub Dashboard shows the compliance state of all instances.

OS Management Hub provides detailed reports.



Support Specialist

OCI OS Management Hub is required!

Viewing Compliance Information

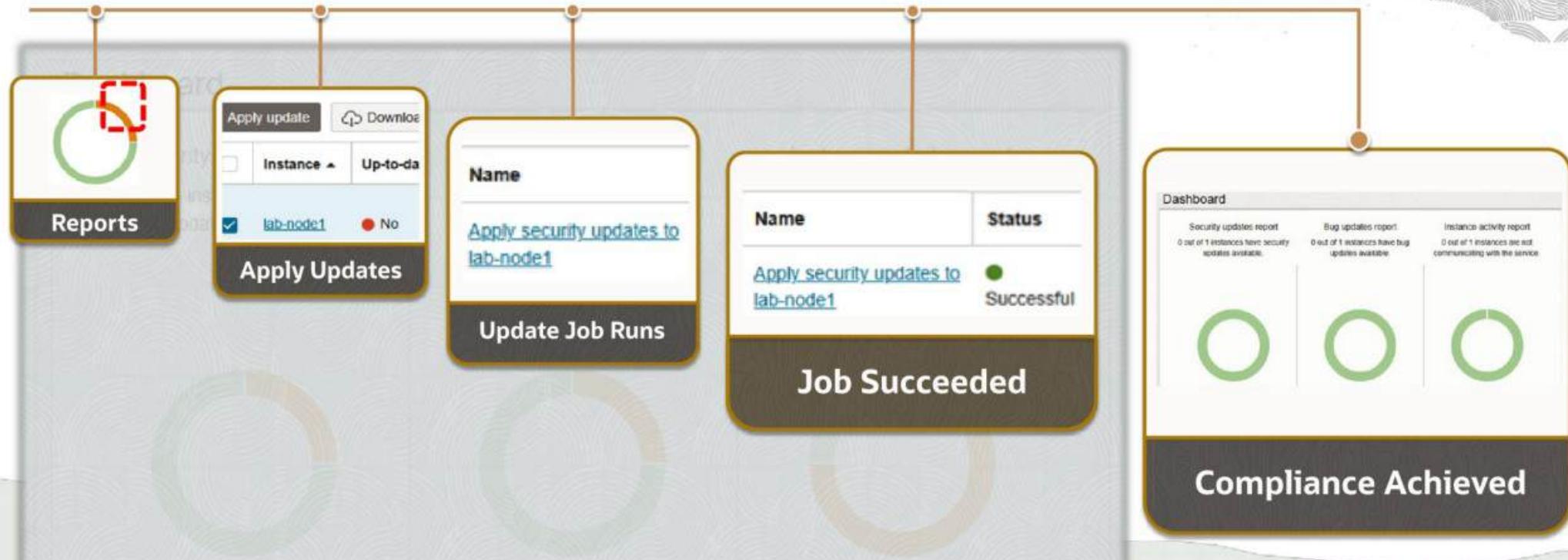
- OS Management Hub → Dashboard
- Tiles show status of all instances:
 1. Security updates
 2. Bug updates
 3. Connected instance OSMH agents
- Click the tiles to view report details.
- OS Management Hub → Reports offer an even more detailed view.

Instance's OSMH Agent must be active!

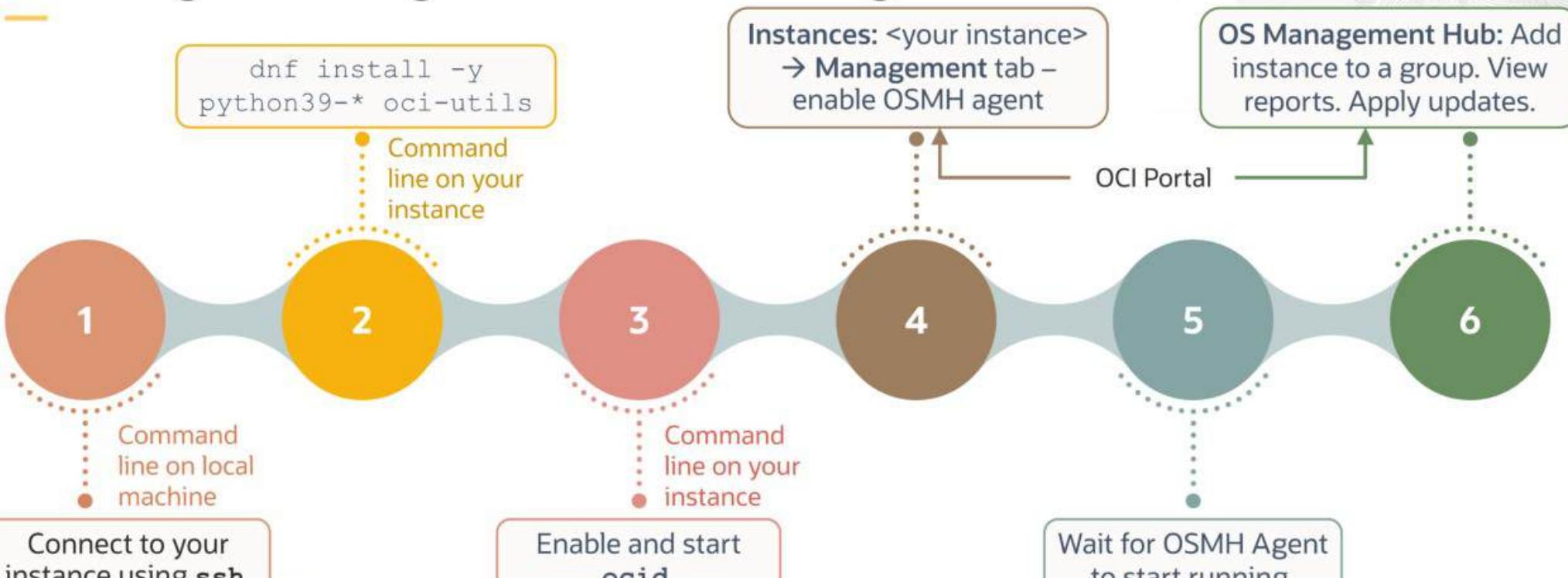
The screenshot shows the Oracle OS Management Hub interface. The top part is the Dashboard, which includes three tiles: 'Security updates report' (2 out of 2 instances have security updates available), 'Bug updates report' (2 out of 2 instances have bug updates available), and 'Instance activity report' (0 out of 2 instances are not communicating with the service). Below the dashboard is the 'Reports' section. A red box highlights the 'Security updates report' table. This table lists two nodes: 'lab-node2' and 'lab-node1', both marked as 'No' (indicating they are not up-to-date). Each node has a count of 3 advisories. The table includes columns for Instance, Up-to-date status, Advisories/Updates, and Group. Below this table is another table showing detailed CVE information for each advisory, including the advisory ID, CVE numbers, description, and issue date.

Advisory	CVE	Description	Issue date
ELSA-2025-4341	CVE-2025-21927 CVE-2024-44990 CVE-2024-42292 CVE-2024-42322 CVE-2024-46826	kernel security update	Wed, Apr 30, 2025, 00:00:00 UTC
ELSA-2025-4244	CVE-2025-0395	glibc security update	Mon, Apr 28, 2025, 00:00:00 UTC
ELSA-2025-3937	CVE-2024-53150	kernel security update	Thu, Apr 17, 2025, 00:00:00 UTC

Verifying Compliance and Installing Updates



Enabling and Using Instance's OSMH Agent



OSMH Agent status and Dashboard updates take several minutes.

Adding Instance to Group in OS Management Hub



Managing Group Members Together

- Reboot or update group members.
- View group reports: Security, Bug fixes.
- See which updates have been applied.
- View status of all related jobs.

The screenshot displays a user interface for managing group members. At the top, there are two overlapping dropdown menus for actions: one for 'lab-node1' and one for 'lab-node2'. Both menus include options for 'Attach instance', 'Detach instance', 'Reboot', and 'Create update job'. A green cursor points to the 'Create update job' button for 'lab-node2'. Below these menus, the 'Reports' section is visible, containing 'Security updates report' and 'Bug updates report'. The 'Bug updates report' table shows two entries: 'ELBA-2025-33115' (Synopsis: python-oci-sdk bug fix update) and 'ELBA-2025-33334' (Synopsis: python-oci-sdk bug fix update). The 'Up-to-date' column for both nodes is marked as 'No'. In the bottom section, the 'Jobs' table lists a single scheduled job: 'Update cloud-init-23.4-19.0.2.el9_5.6.noarch.rpm for lab-node2' (Type: Update package).

Instance	Up-to-date	Advisories/Updates
lab-node1	No	44
lab-node2	No	44

Jobs		
Scheduled jobs	Group scheduled jobs	In progress jobs
Delete		
Name	Type	
Update cloud-init-23.4-19.0.2.el9_5.6.noarch.rpm for lab-node2	Update package	



Example Job and Logs

Jobs in C02 compartment

Create a job to schedule updates for one or more instances.

[Create update job](#)

Scheduled jobs

In progress jobs

Completed jobs

[Rerun failed job](#)

Completed jobs

Log output

Resources

- Associated resources
- Log messages**
- Error messages

Log messages

View options

Time stamp

Wed, May 14, 2025, 20:17:31 UTC

```
This system is receiving updates from OSMH.
Last metadata expiration check: 3:10:38 ago on Wed May 14 17:05:22 2025.
> >
-----
Package Arch Version Repository Size
=====
Upgrading:
cloud-init noarch 23.4-19.0.2.el9_5.6 ol9_appstream 2.0 M

Transaction Summary
-----
Upgrade 1 Package

Total download size: 2.0 M
Downloading Packages:
```

<input type="checkbox"/>	Name	Type	Time created	Status	⋮
<input checked="" type="checkbox"/>	Update cloud-init-23.4-19.0.2.el9_5.6.noarch.rpm for lab-node2	Update package	Wed, May 14, 2025, 20:15:54 UTC	● Successful	⋮
<input checked="" type="checkbox"/>	Attach instances to lab-group-OL9	Update	Tue, May 13, 2025, 21:49:21 UTC	● Successful	⋮
<input checked="" type="checkbox"/>	Update 2 packages for lab-node1	Update package	Tue, May 13, 2025, 21:45:01 UTC	● Successful	⋮



Demo: Viewing Instance Compliance

In This Demo



Summary



Enabling OCI Utilities

Using OS Management for Linux on OCI

Working with OS Compliance

Oracle Cloud Infrastructure

Oracle Linux: System Administration on Oracle Cloud Infrastructure

Patching and GUI Configuration

Serge Moiseev - Cloud Delivery Lead
Oracle University



Objectives

Finding Linux patches to be applied

Applying patches online with Oracle Ksplice

Enabling GUI for Oracle Linux on OCI

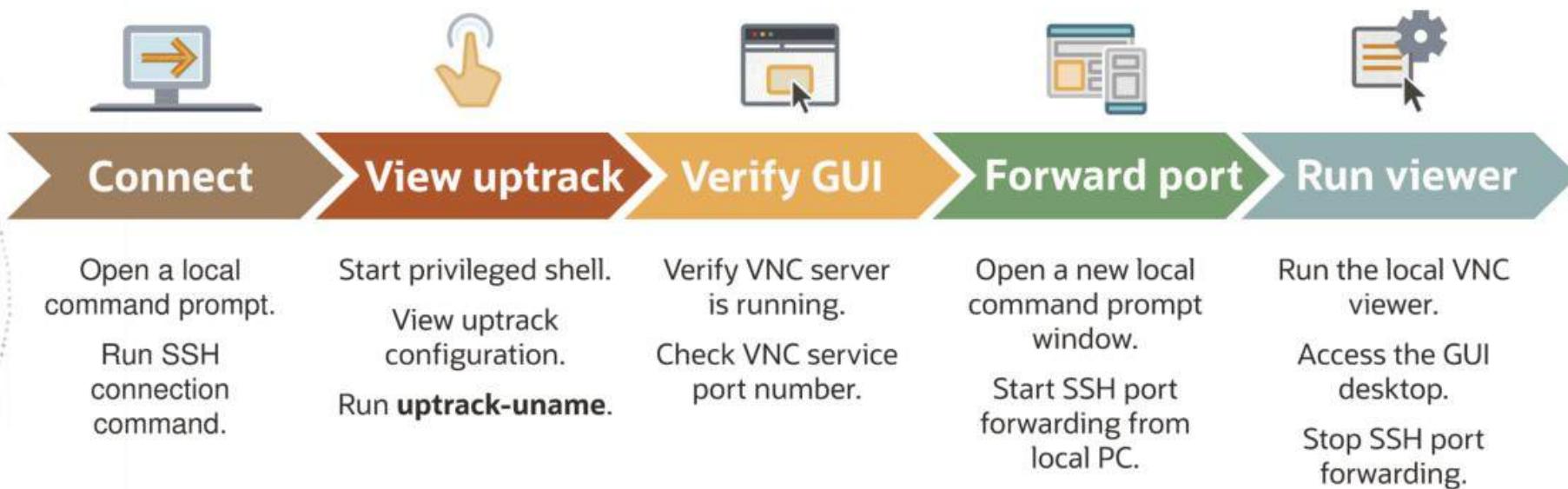
Configuring VNC server access





Ksplice and VNC Demo

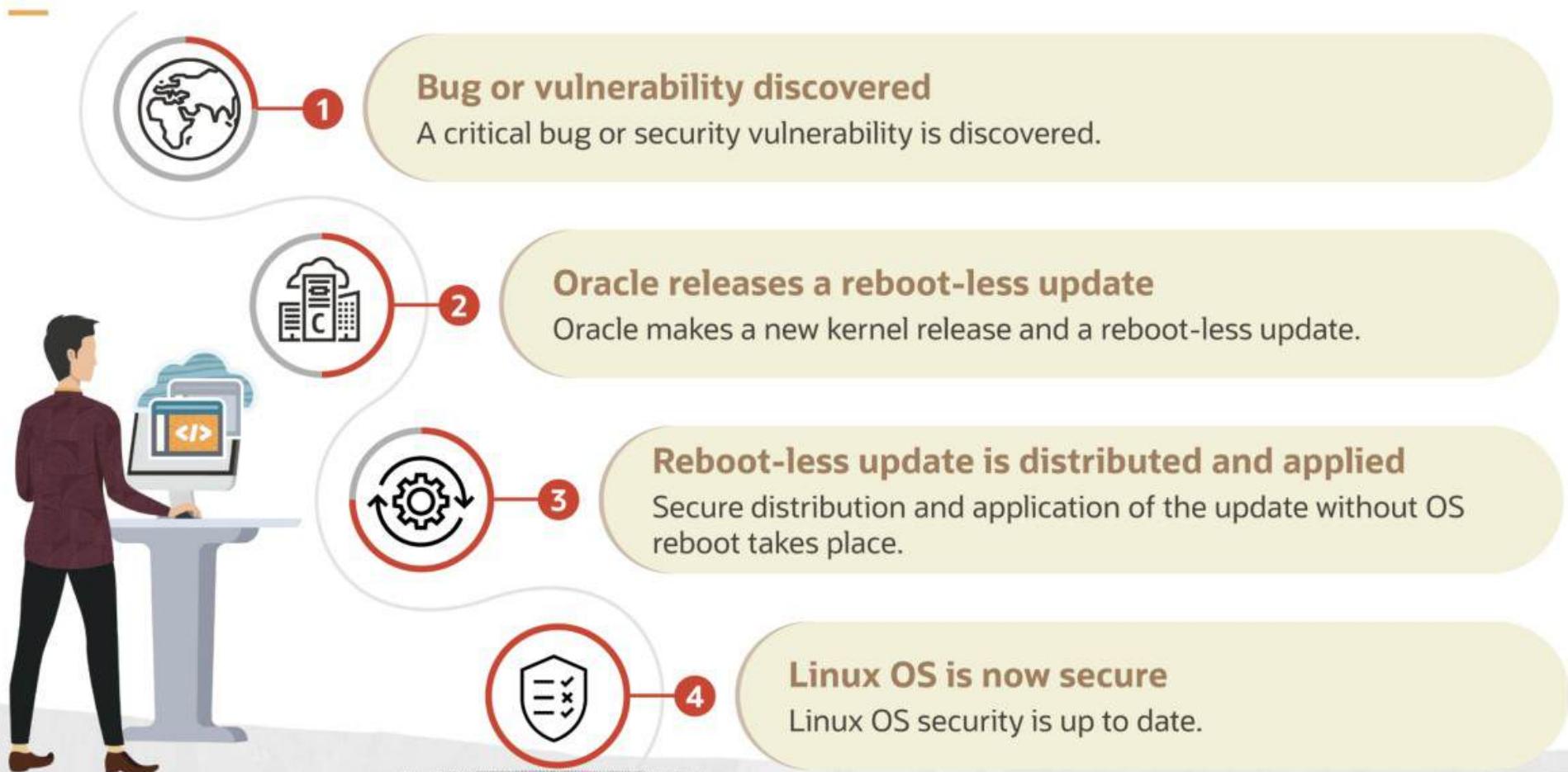
In This Demo



Patching with Ksplice

Zero downtime patching

Zero Downtime Security Patching with Ksplice



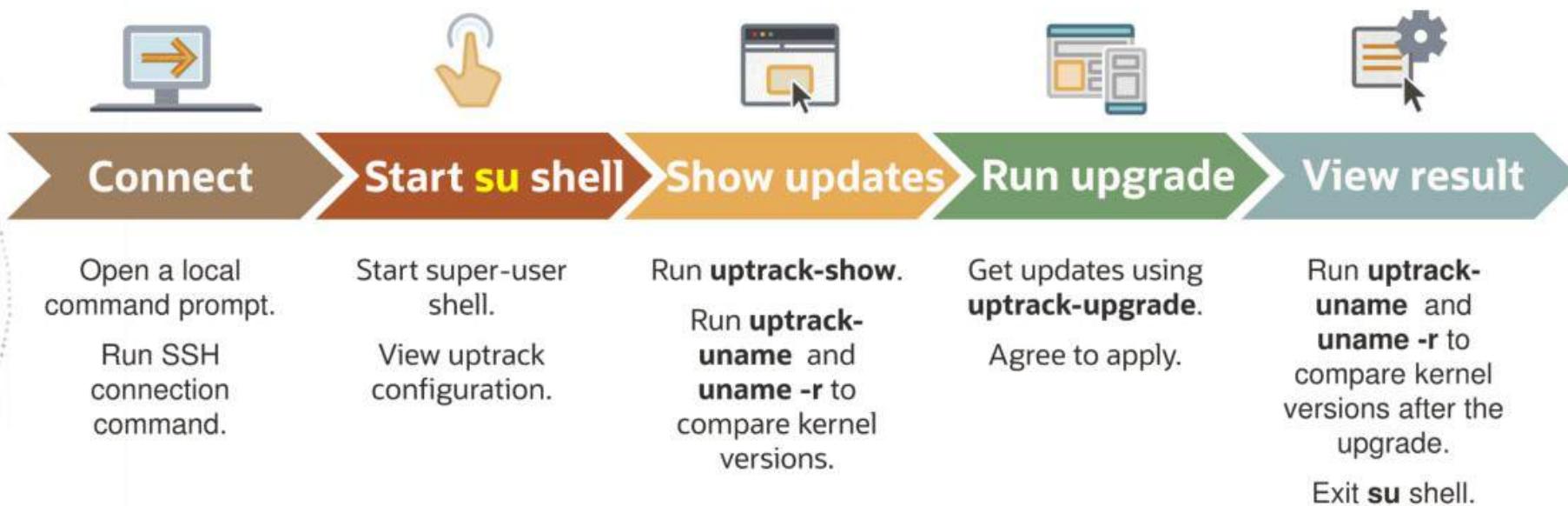
Dedicated OCI Ksplice Resources





Using Ksplice Demo

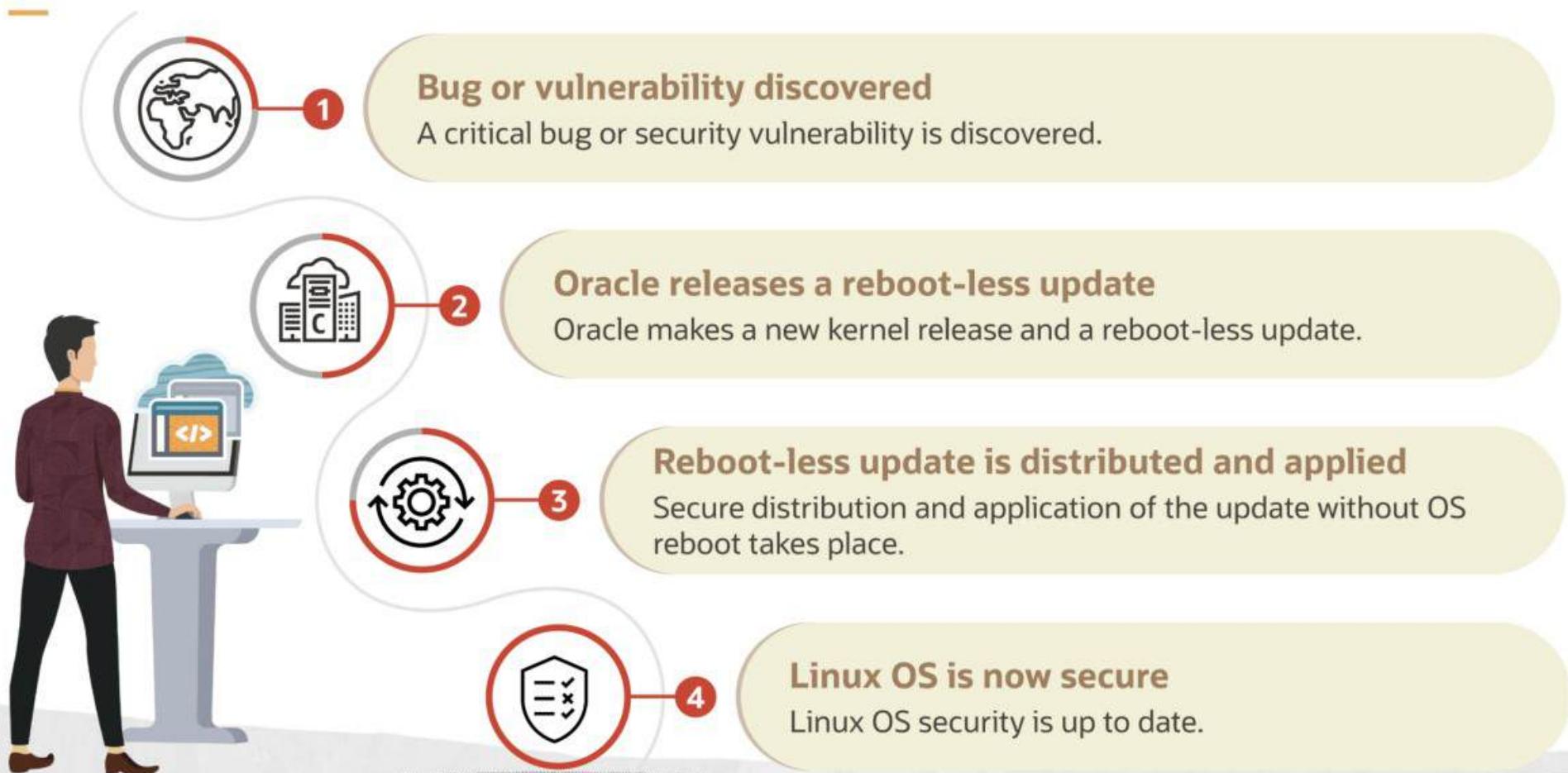
In This Demo



Patching with Ksplice

Zero downtime patching

Zero Downtime Security Patching with Ksplice



Dedicated OCI Ksplice Resources





Using Ksplice Demo

In This Demo



Connect

Open a local command prompt.
Run SSH connection command.



Start su shell

Start super-user shell.
View uptrack configuration.



Show updates

Run **uptrack-show**.
Run **uptrack-
uname** and
uname -r to
compare kernel
versions.



Run upgrade

Get updates using
uptrack-upgrade.
Agree to apply.



View result

Run **uptrack-
uname** and
uname -r to
compare kernel
versions after the
upgrade.
Exit **su** shell.

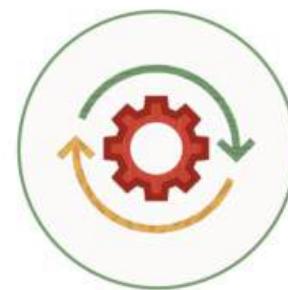
Enabling GUI and Configuring VNC Access

**Install Server with GUI
Configure VNC Access**

GUI on OCI Linux Instance Use Cases



Web browser use
Working with consoles,
tools: Prometheus, Istio

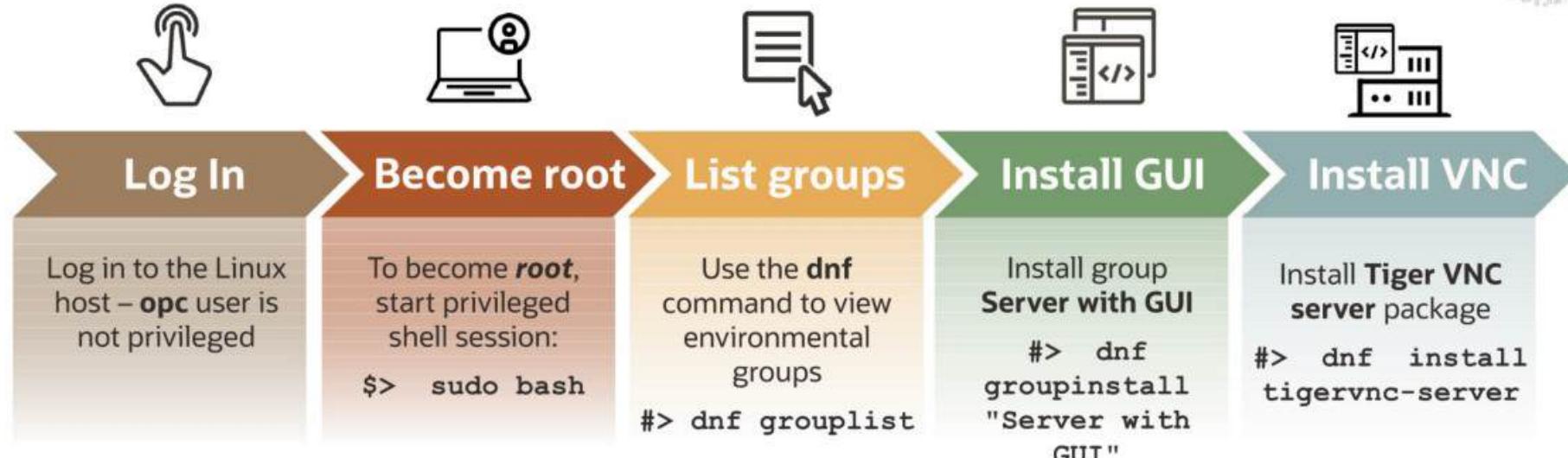


Setup and configure:
Linux Server with GUI
and VNC service

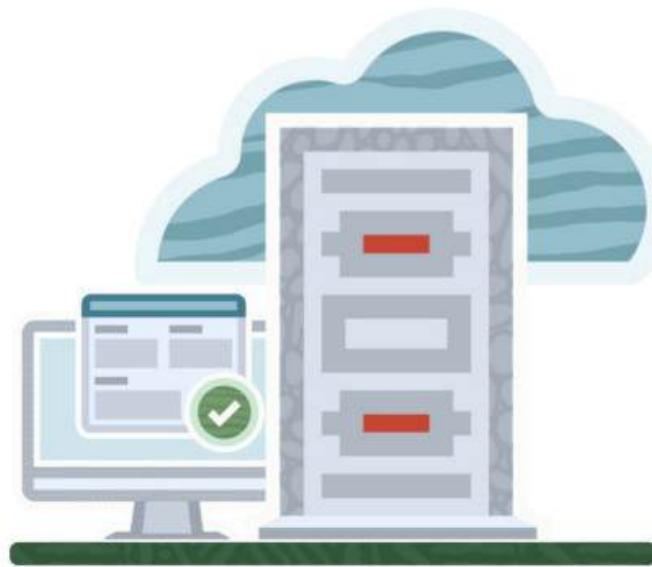


Access Linux Desktop
using VNC Viewer

Install Linux Services for GUI



Configure VNC for the **opc** User



-
-
-
-

Confirm the **opc** user's identity and home directory

```
$> whoami ## should be opc
```

Set and confirm VNC password for the **opc** user

```
$> vncpasswd ## 'no' to read-only prompt
```

Edit VNC service unit file as superuser, if needed

First copy, then edit **vncserver@:1.service**

Reload updated services and start the VNC service

```
$> sudo systemctl daemon-reload
```

```
$> sudo systemctl enable --now \
vncserver@:1
```

Enable VNC service auto-start

Configure VNC Server Properties



TigerVNC User assignment

This file assigns users to specific VNC display numbers.
The syntax is <display>=<username>. E.g.:

:2=andrew
:3=lisa
:1=opc

~
~
~

"/etc/tigervnc/vncserver.users" [Modified] line 3 of 10 --30%--

Map user

VNC Viewer: Connection Details

VNC server: localhost:5901

Options... Load... Save As...

Connect

Start VNC

VNC authentication

This connection is not secure

?

Password:

Cancel OK

```
## Default settings for VNC servers started by the vncserver service
#
# Any settings given here will override the builtin defaults, but can
# also be overridden by ~/.vnc/config and vncserver-config-mandatory.
#
# See the following manpages for more details: vncserver(1) Xvnc(1)
#
# Several common settings are shown below. Uncomment and modify to your
# liking.

# securitytypes=vncauth,tlsVNC
# desktop=sandbox
# geometry=2000x1200
# localhost
# alwaysShared

# Default to GNOME session
# Note: change this only when you know what you are doing
session=gnome
geometry=1440x900
```

"/etc/tigervnc/vncserver-config-defaults" [Modified] line 21 of 21 --100%--

Set defaults

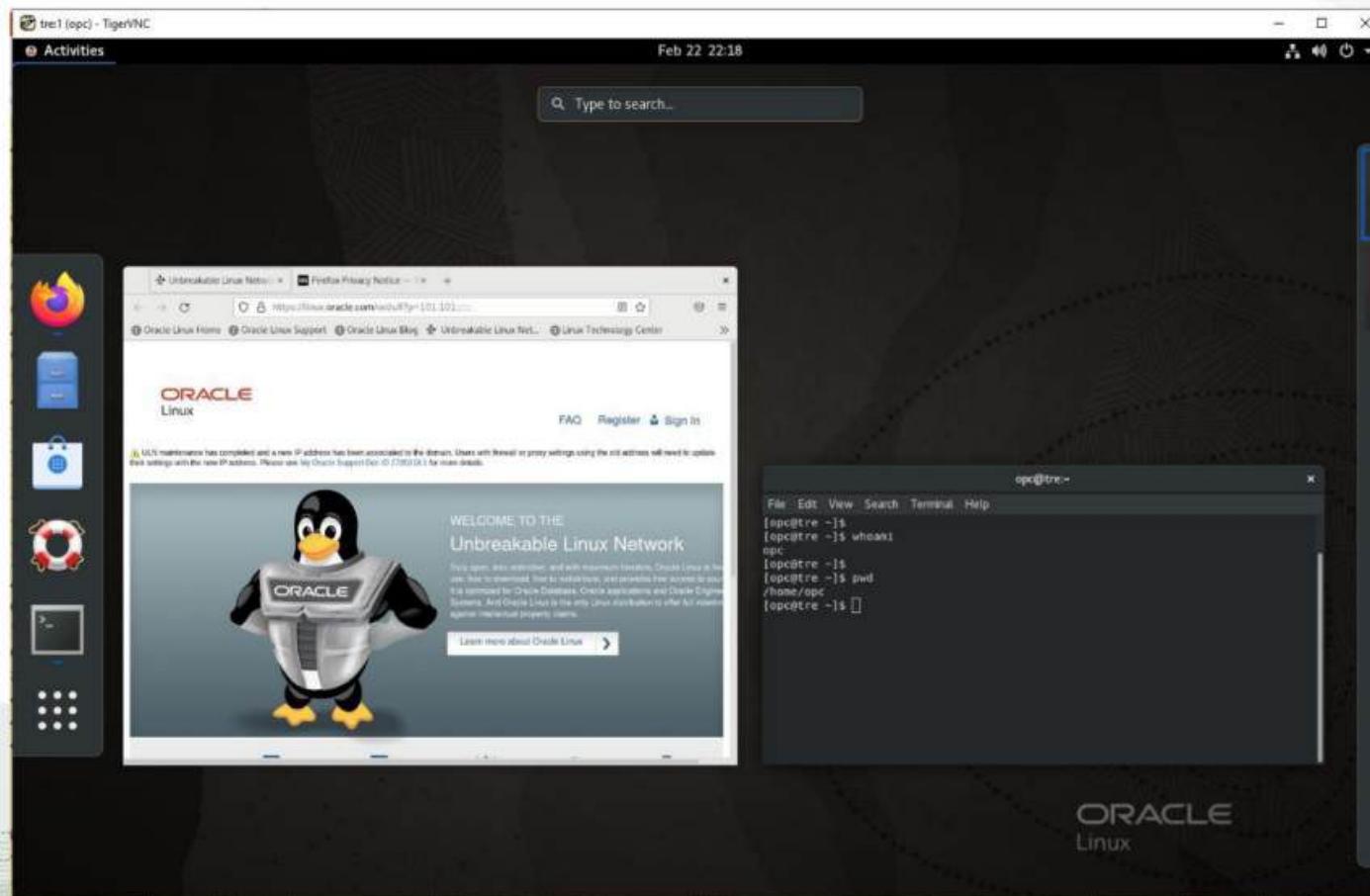
Open SSH tunnel

```
>ssh -L 5901:localhost:5901 -i one_key opc@1 IP redacted 73
```

VNC Server @:1 listens on port 5901

Keep open until VNC connection is no longer needed

Welcome to Linux Desktop!



Optional: Enable Unsecure VNC Access – No Traffic Encryption



View firewall rules

```
$> sudo firewall-cmd  
--list-all
```



Allow VNC access

```
$> sudo firewall-cmd  
--add-service=vnc-server --permanent
```



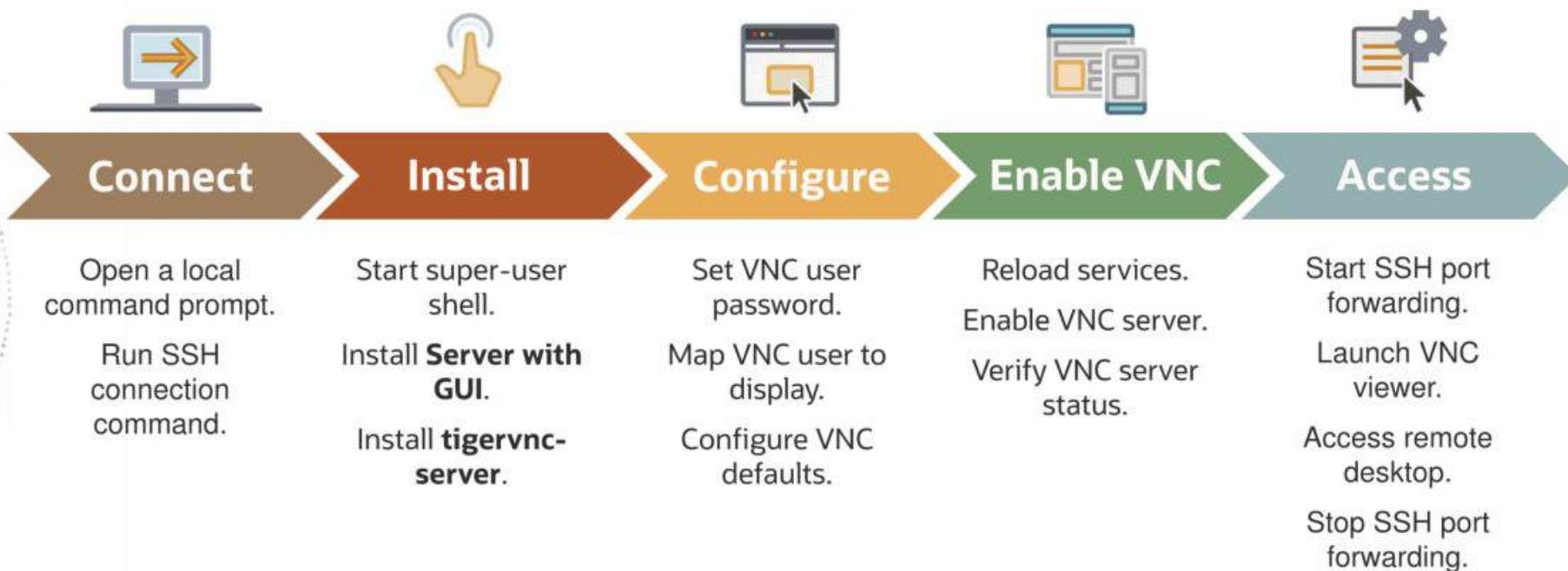
Start VNC client

Enter IP address of the instance and VNC password

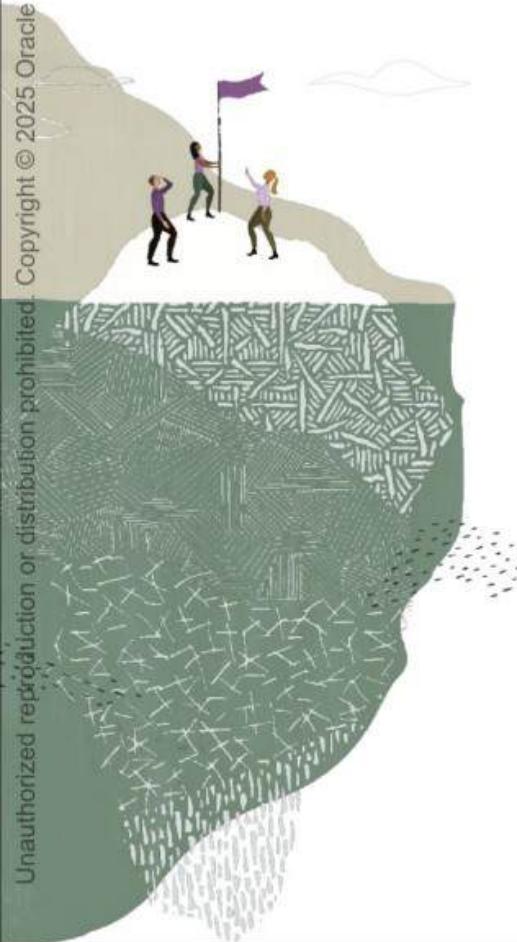


VNC Set Up Demo

In This Demo



Summary



Finding Linux Patches to be Applied

Applying Patches Online with Ksplice

Enabling GUI for Oracle Linux on OCI

VNC Server Configuration

Oracle Cloud Infrastructure

Oracle Linux: System Administration on Oracle Cloud Infrastructure

Managing iSCSI and OCFS Storage

Serge Moiseev - Cloud Delivery Lead
Oracle University



Objectives

Using OCI Utilities to Manage iSCSI Storage

Configuring a Linux iSCSI Target and an Initiator

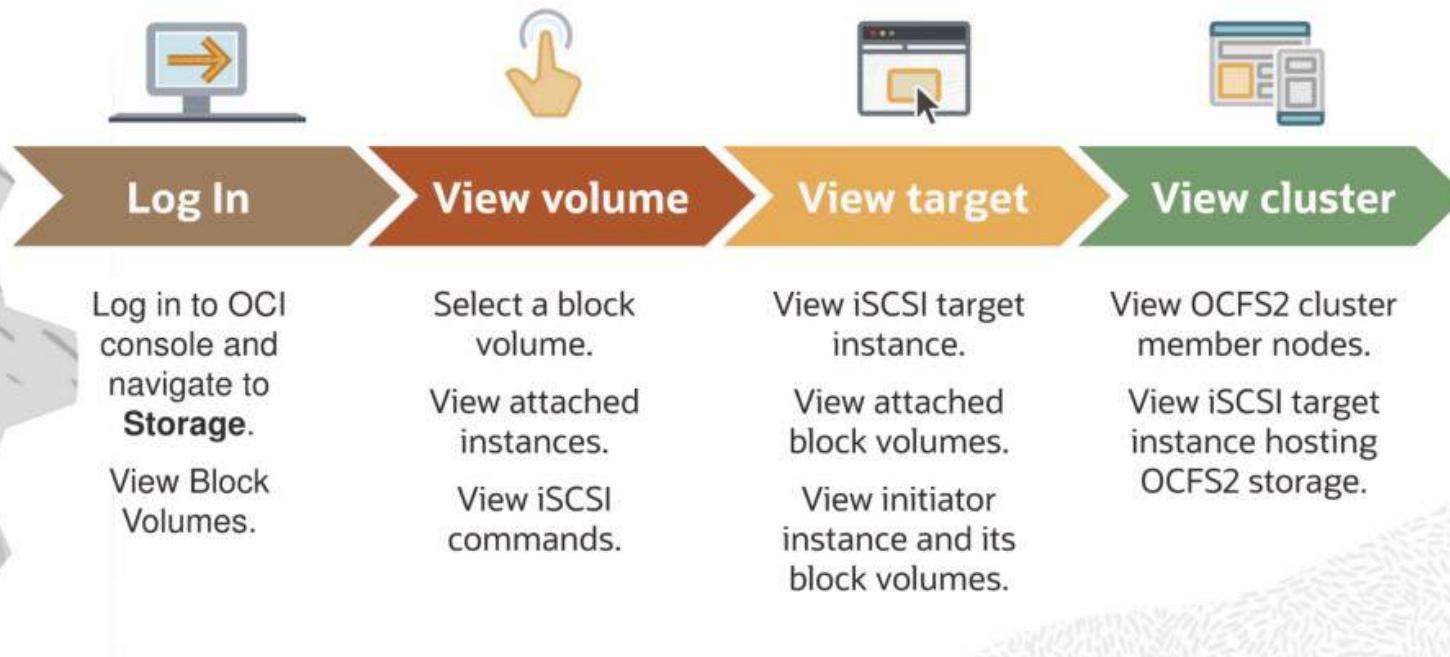
Configuring and Testing an OCFS Cluster



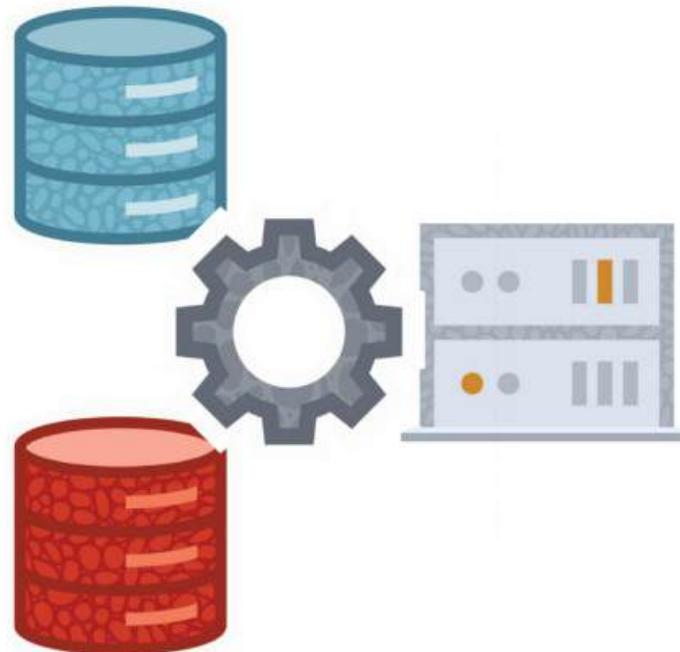


Storage Management Demo

In This Demo



OCI Utilities for iSCSI Storage Management



Managing iSCSI Volumes

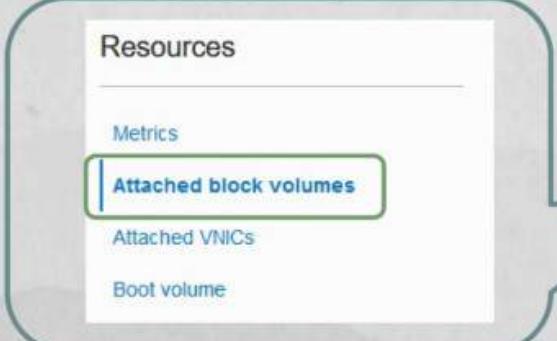


Prepare to Use iSCSI Utilities

Keys are used for create and destroy actions; not needed to attach or detach



#> systemctl status ociid



Create an API key pair

Verify active OCID service

OCI console: Instance Resources

Sample iSCSI Commands

Attached block volumes

[Block volumes](#) provide high-performance network storage to support a broad range of I/O intensive workloads.

[Attach block volume](#)

Name	State	Volume type	Device path	Type	Access	Size	VPU	Multipath	Created
C16_subC_vol_1 <small>Always Free</small>	Attached	Block volume	/dev/oracleoci/oraclevldb	iscsi	Read/write	50 GB	10	No	2023-09-12T10:00:00Z

[View block volume details](#) ⋮

Connect

```
sudo iscsiamd -m node -o new -T iqn.2015-12.com.oracleiaas:268 [REDACTED] 0f  
sudo iscsiamd -m node -o update -T iqn.2015-12.com.oracleiaas:26 [REDACTED] [REDACTED]  
sudo iscsiamd -m node -T iqn.2015-12.com.oracleiaas:26 [REDACTED] b0f90b3d -
```

Disconnect

```
sudo iscsiamd -m node -T iqn.2015-12.com.oracleiaas:26 [REDACTED] b0f90b3d -  
sudo iscsiamd -m node -o delete -T iqn.2015-12.com.oracleiaas:26 [REDACTED]
```

IP address and port: [\[REDACTED\] 2.3260 Copy](#)

Volume IQN: [iqn.2015-12.com.oracleiaas:26 \[REDACTED\] 90b3d Copy](#)

iSCSI commands & information

Copy attachment OCID

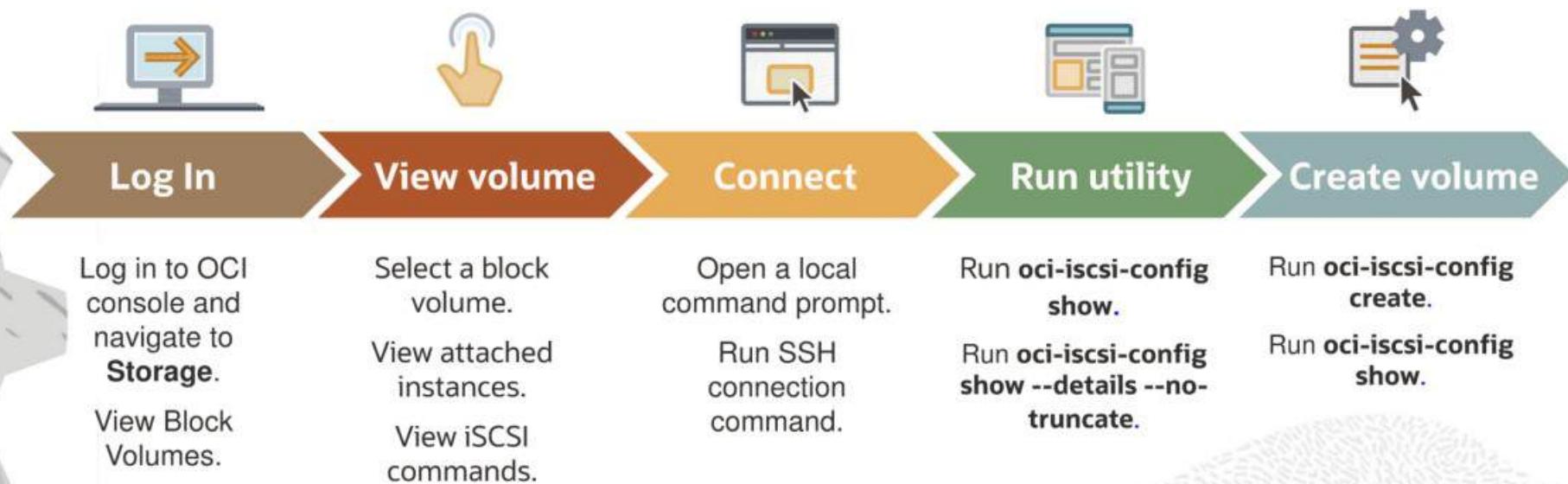
Copy resource OCID

[Detach](#)

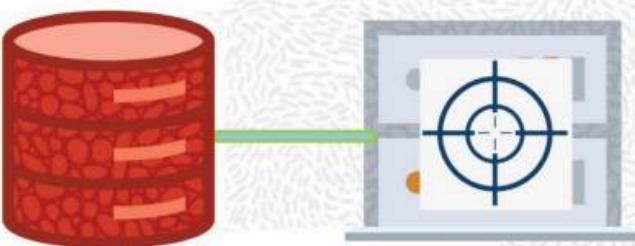


Volume Management Demo

In This Demo



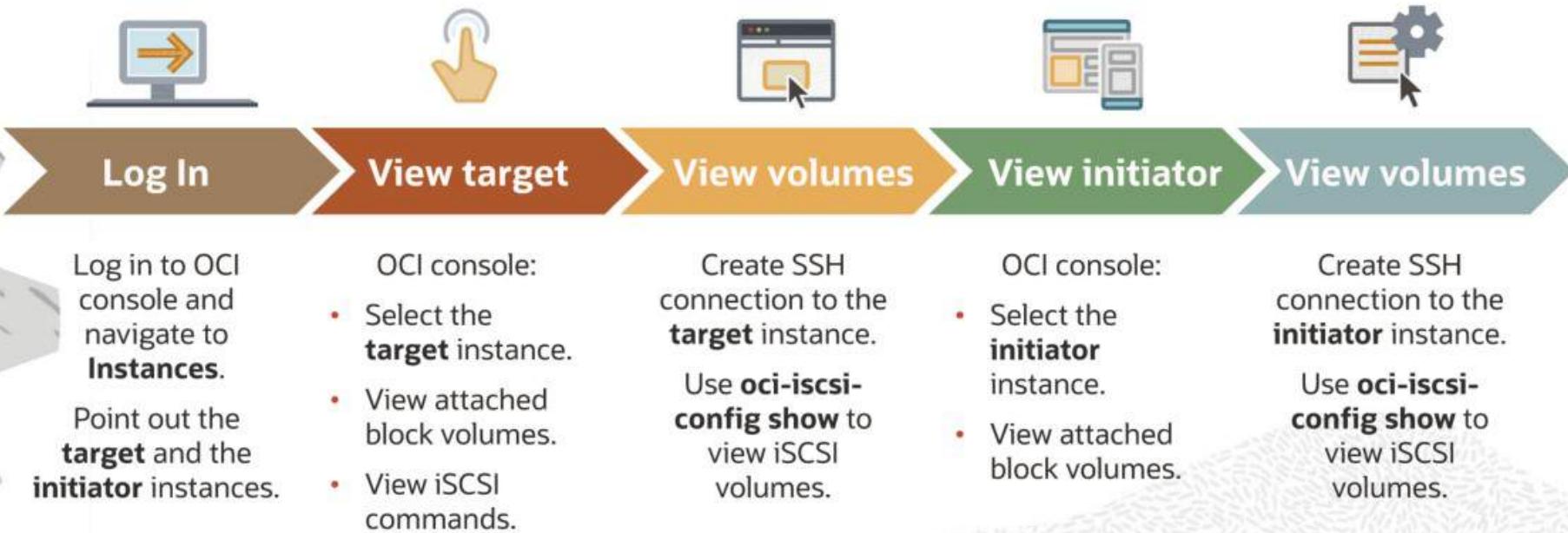
Configure iSCSI Target



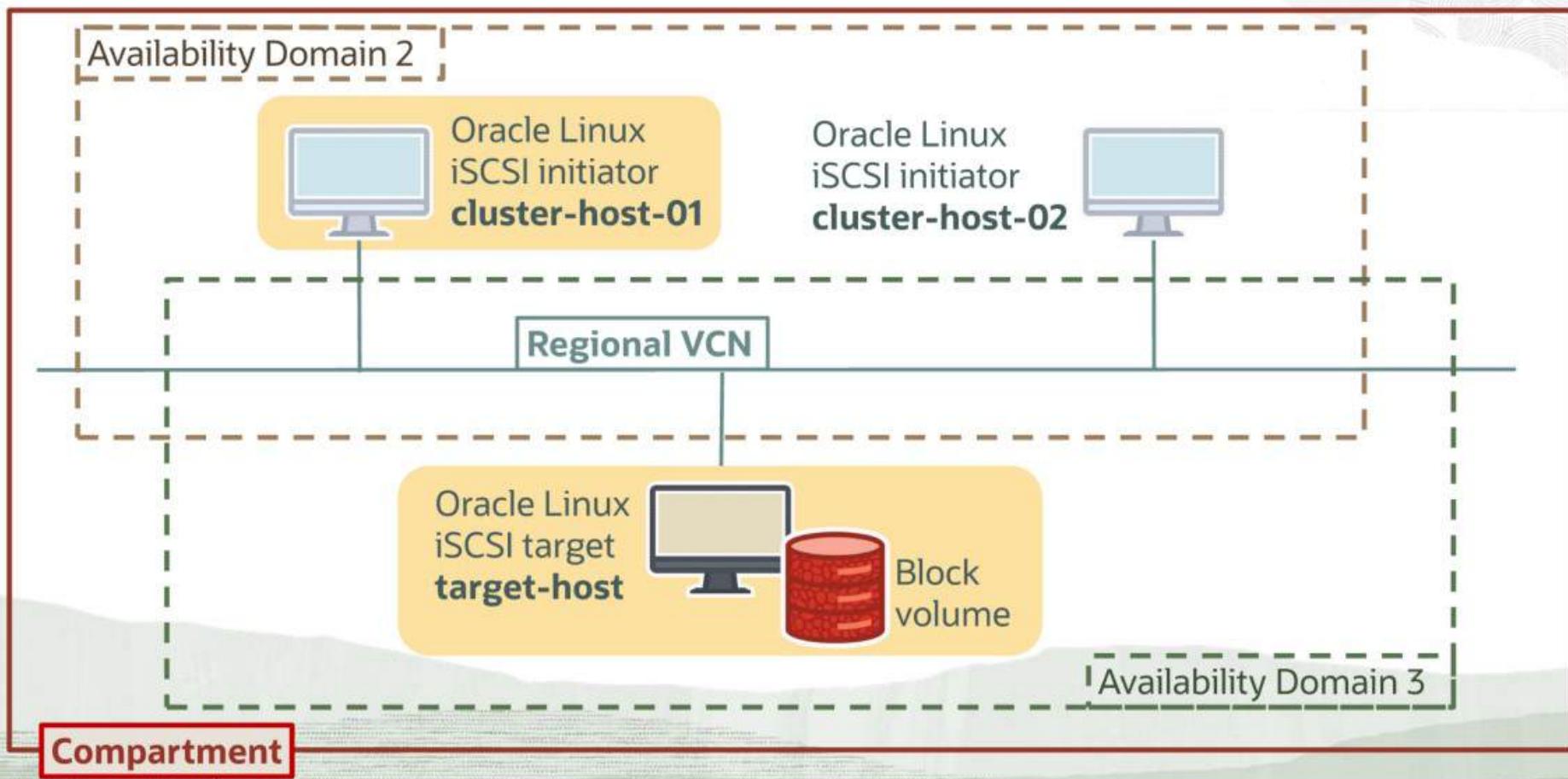


iSCSI Target and Initiator Demo

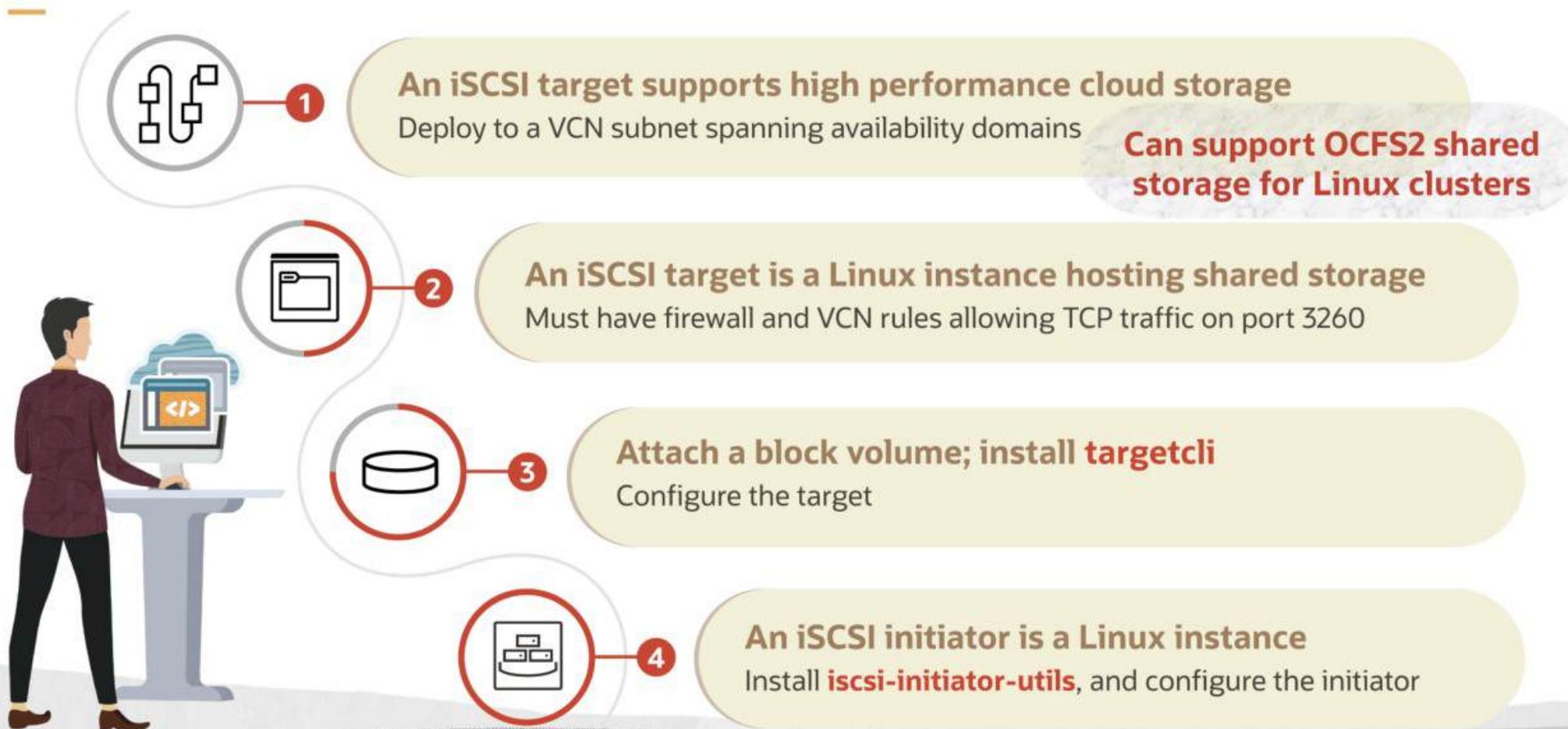
In This Demo



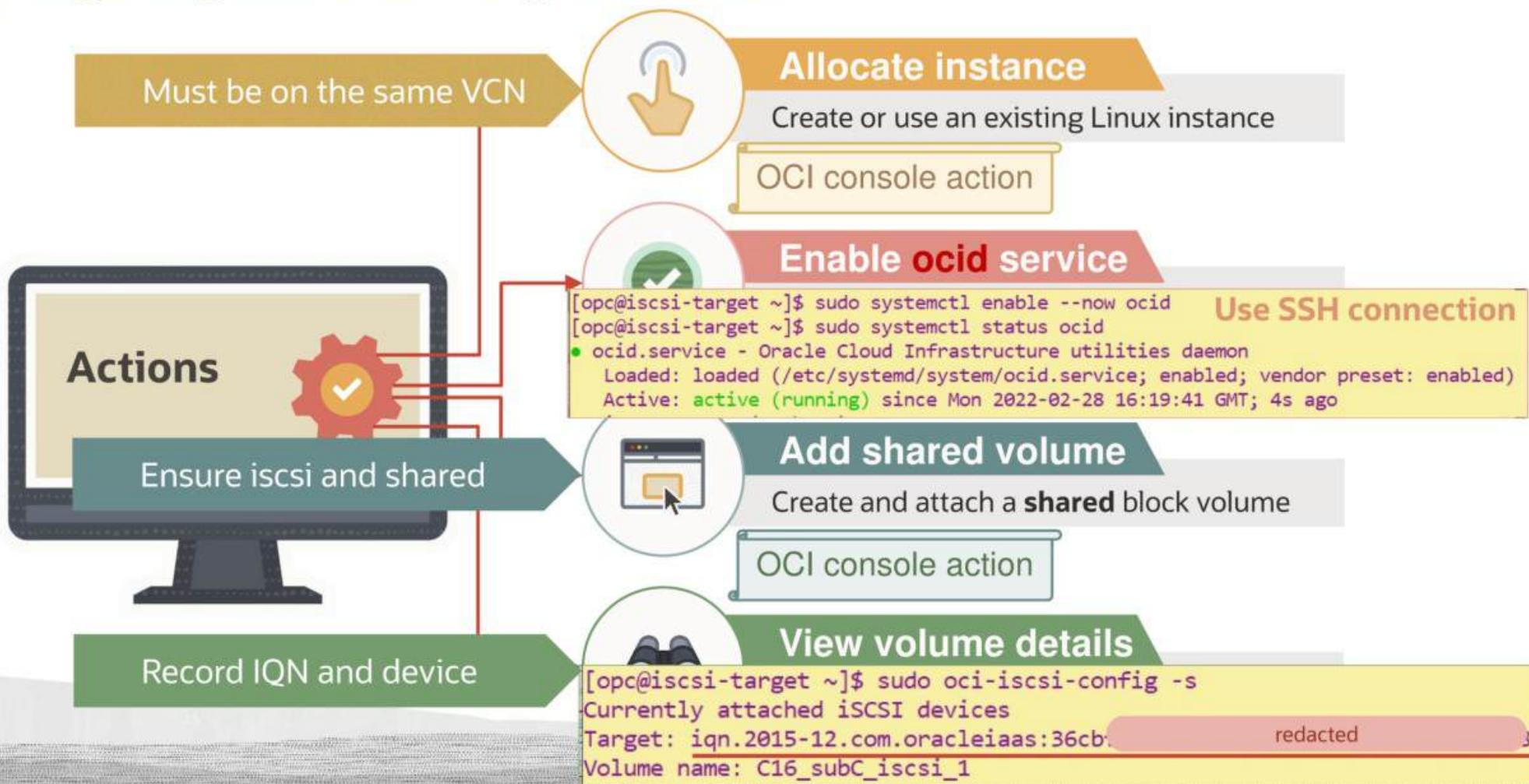
iSCSI Target and Initiator Topology



Prepare an iSCSI Target and Initiator Hosts



Configuring the iSCSI Target Instance



Perform targetcli Tool Setup



Install the targetcli package:

```
$> sudo [-E] dnf install -y targetcli  
Use -E for proxy connection through bastion
```



Run the targetcli tool:

```
$> sudo targetcli  
/> cd backstores/block
```



Use device name to create the storage object:

```
/backstores/block> create name=ocfs2 dev=/dev/sdb  
Created block storage object ocfs2 using /dev/sdb.
```

Using the targetcli Tool



The illustration shows a person in a yellow shirt and blue pants holding a large magnifying glass. The lens of the magnifying glass is focused on a server rack. Inside the magnifying glass, there is a gear icon.

Create

```
/> cd /iscsi  
/iscsi> create iqn.2015-12.com.oracleiaas:36cb...  
Created target iqn.2015-12.com.oracleiaas:36cb... redacted  
Created TPG 1.  
Global pref auto_add_default_portal=true  
Created default portal listening on all IPs (0.0.0.0), port 3260.  
/iscsi> cd iqn.2015-12.com.oracleiaas:36cb...
```

ACLs

```
/iscsi/iqn.2015-12.com.oracleiaas:36cb...> cd tpg1/acls
```

Node ACL

```
.../acls> create iqn.2015-12.com.oracleiaas:36c...  
/iscsi/iqn.2015-12.com.oracleiaas:36cb...> create iqn.2015-12.com.oracleiaas:36cb...  
Created Node ACL for iqn.2015-12.com.oracleiaas:36cb... redacted
```

targetcli operations

Disable Authentication Requirement

```
/iscsi/iqn.20...a38/tpg1/acls> cd ..  
/iscsi/iqn.20...206e2a38/tpg1> set attribute authentication=0  
Parameter authentication is now '0'.  
/iscsi/iqn.20...206e2a38/tpg1> set attribute generate_node_acls=1  
Parameter generate_node_acls is now '1'.  
/iscsi/iqn.20...206e2a38/tpg1> cd luns  
/iscsi/iqn.20...a38/tpg1/luns> create /backstores/block/octfs2  
Created LUN 0.  
Created LUN 0->0 mapping in node ACL iqn.2015-12.com.oracleiaas:36cbfb2  
/iscsi/iqn.20...a38/tpg1/luns>
```

Arbitrary name

Complete iSCSI Target Configuration



Set location to root

```
/iscsi/iq..a38/t  
pg1/luns> cd /
```

```
/> ls  
o- / ..  
  o- backstores ..  
  o- block ..  
    | o- ocfs2 ..  
    |   o- alias ..  
    |   o- default_tg_pt_gp ..  
  o- fileio ..  
  o- pscsi ..  
  o- ramdisk ..  
o- iscsi ..  
o- iqn.2015-12.com.oracleisass:36cbfb26-b136-494d-b936-f142206e2a38  
  o- tpg1 ..  
    o- acls ..  
    | o- iqn.2015-12.com.oracleisass:36cbfb26-b136-494d-b936-f142206e2a38 ..  
    |   o- mapped_lun0 ..  
    o- luns ..  
      o- lun0 ..  
      o- portals ..  
        o- 0.0.0.0:3260 ..  
o- loopback ..  
o- vhost ..  
/>
```



View information

```
/> ls
```



Review and save configuration

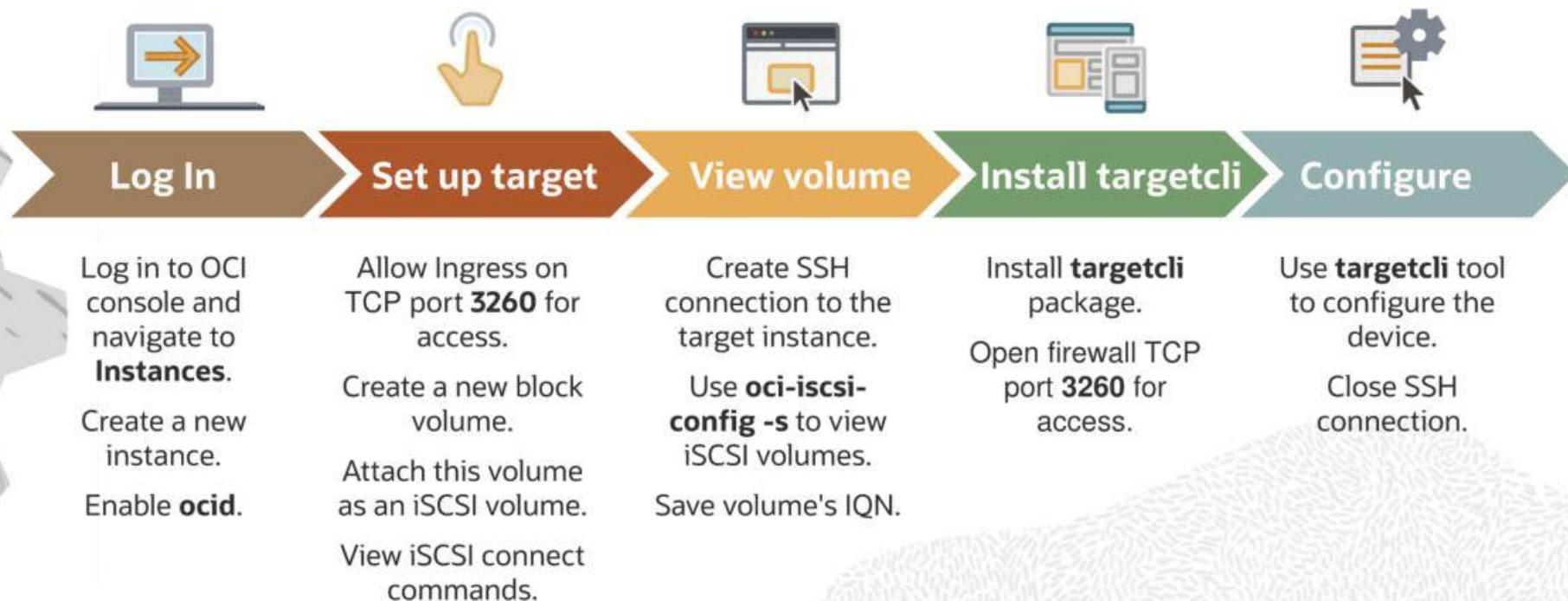
```
/> saveconfig  
/> exit
```

```
/> saveconfig  
Configuration saved to /etc/target/saveconfig.json  
/> exit  
Global pref auto_save_on_exit=true  
Last 10 configs saved in /etc/target/backup/.  
Configuration saved to /etc/target/saveconfig.json
```



Configure iSCSI Target Demo

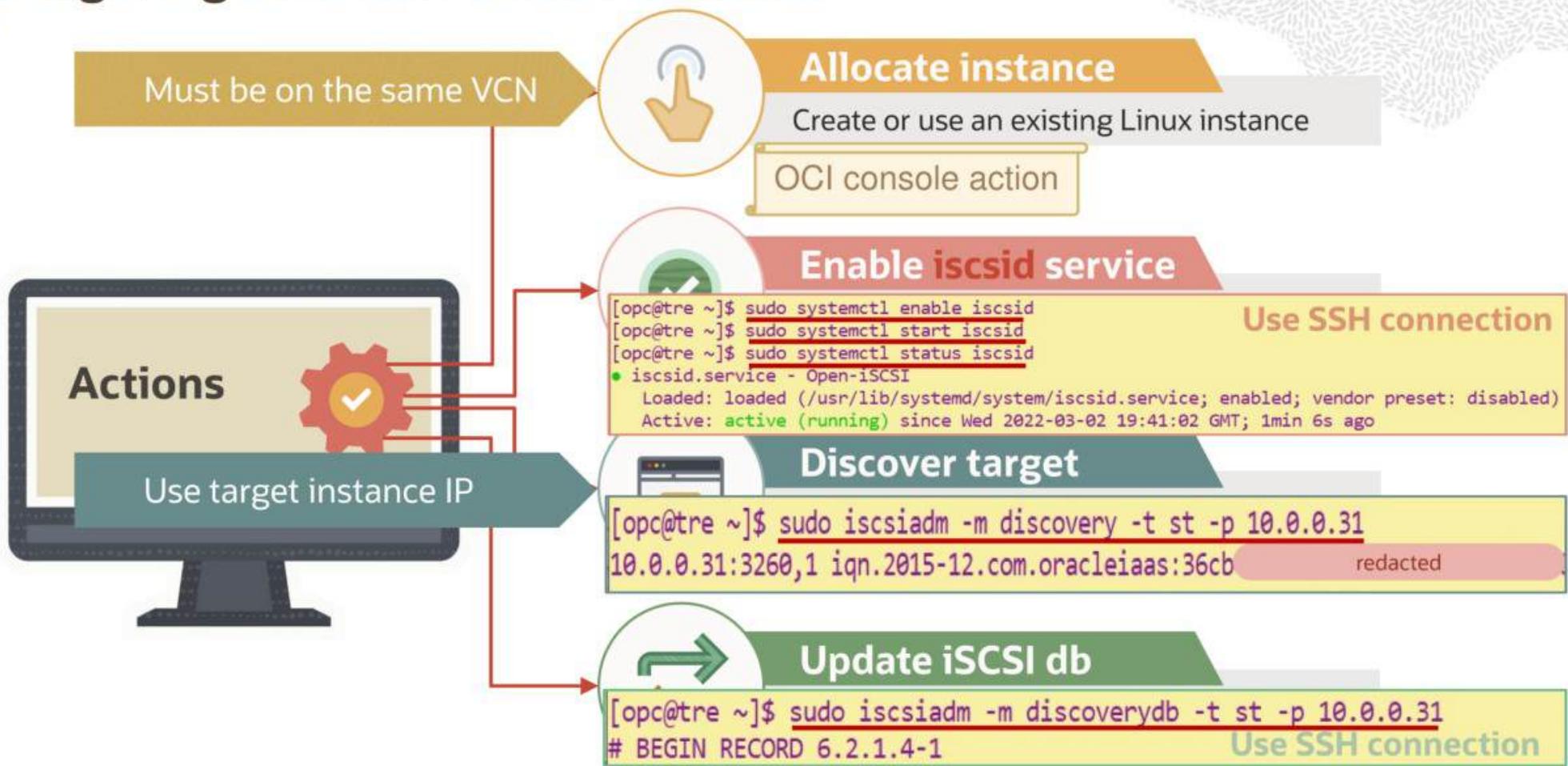
In This Demo



Configure iSCSI Initiator



Configuring an iSCSI Initiator Instance



Complete the iSCSI Initiator Configuration

Edit Configuration

```
$> sudo vi /etc/iscsi/initiatorname.iscsi
```



Replace IQN

- IQN value from the iSCSI target
 - Save and exit the editor

- May have to repeat discovery steps

Restart and Verify

Restart the `iscsid` service

```
$> sudo systemctl  
restart iscsid
```



Verify device availability

```
$> sudo fdisk -l | grep sdb
```



Connect and Use iSCSI Share

The volume is now available.
Partition, format,
and mount as needed.

Establish iSCSI session. Use "&" for background.

```
[opc@tre ~]$ sudo iscsiadm -m node -l &  
[1] 819009
```

```
[opc@tre ~]$ Logging in to [iface: default, target: iqn.2015-02.oracle.  
Logging in to [iface: default, target: iqn.2015-12.com.oracleiaas:36cb1]
```

Verify disk share visibility. Appear as **/dev/sdc*** in this example.

```
[opc@tre ~]$ ls -l /dev/disk/by-path  
total 0  
lrwxrwxrwx. 1 root root 9 Mar 2 22:35 ip-10.0.0.31:3260-iscsi-  
06e2a38-lun-0 -> ../../sdc  
lrwxrwxrwx. 1 root root 10 Mar 2 22:35 ip-10.0.0.31:3260-iscsi-  
06e2a38-lun-0-part1 -> ../../sdc1
```

```
[opc@tre ~]$ sudo fdisk /dev/sdc
```

```
Welcome to fdisk (util-linux 2.32.1).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.
```

```
Command (m for help): p  
Disk /dev/sdc: 50 GiB, 53687091200 bytes, 104857600 sectors  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 4096 bytes  
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes  
Disklabel type: dos  
Disk identifier: 0xba64c0df
```

Device	Boot	Start	End	Sectors	Size	Id	Type
/dev/sdc1		2048	4196351	4194304	2G	83	Linux

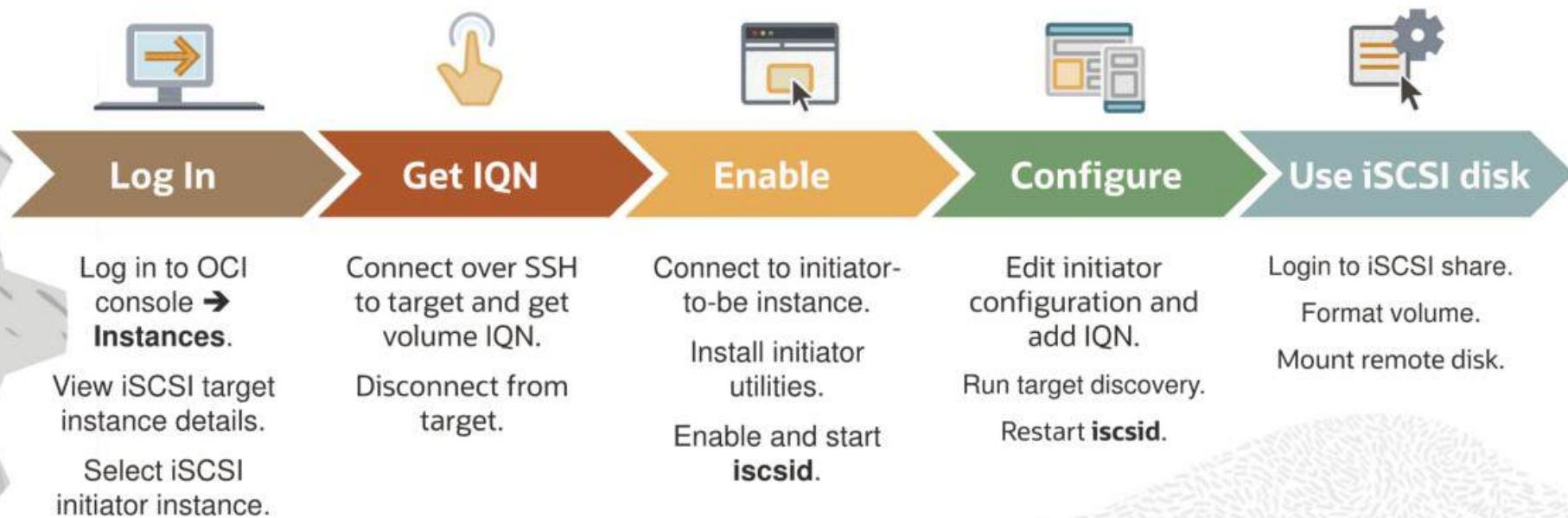
Initialize and mount with **-o _netdev** option

```
$> sudo mkdir /mnt/share  
$> sudo mkfs -t ext4 /dev/sdc1  
$> sudo mount /dev/sdc1 -o _netdev /mnt/share
```

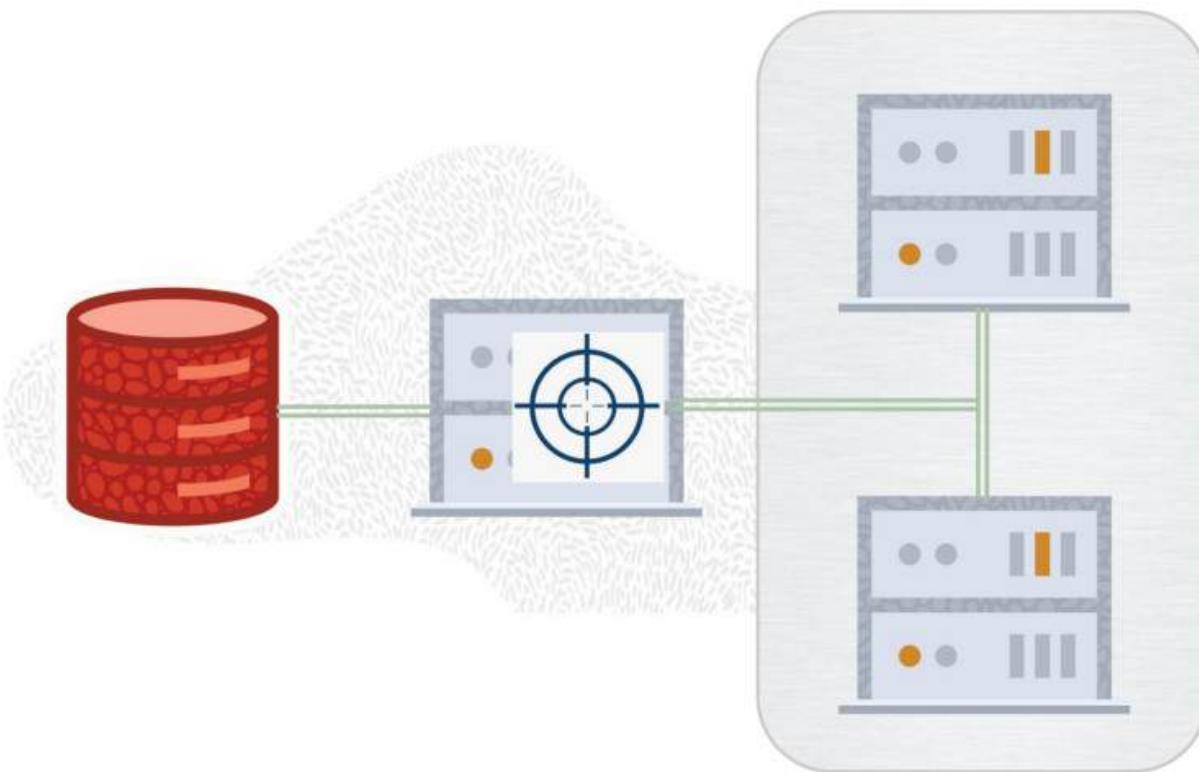


Set up an iSCSI Initiator Demo

In This Demo



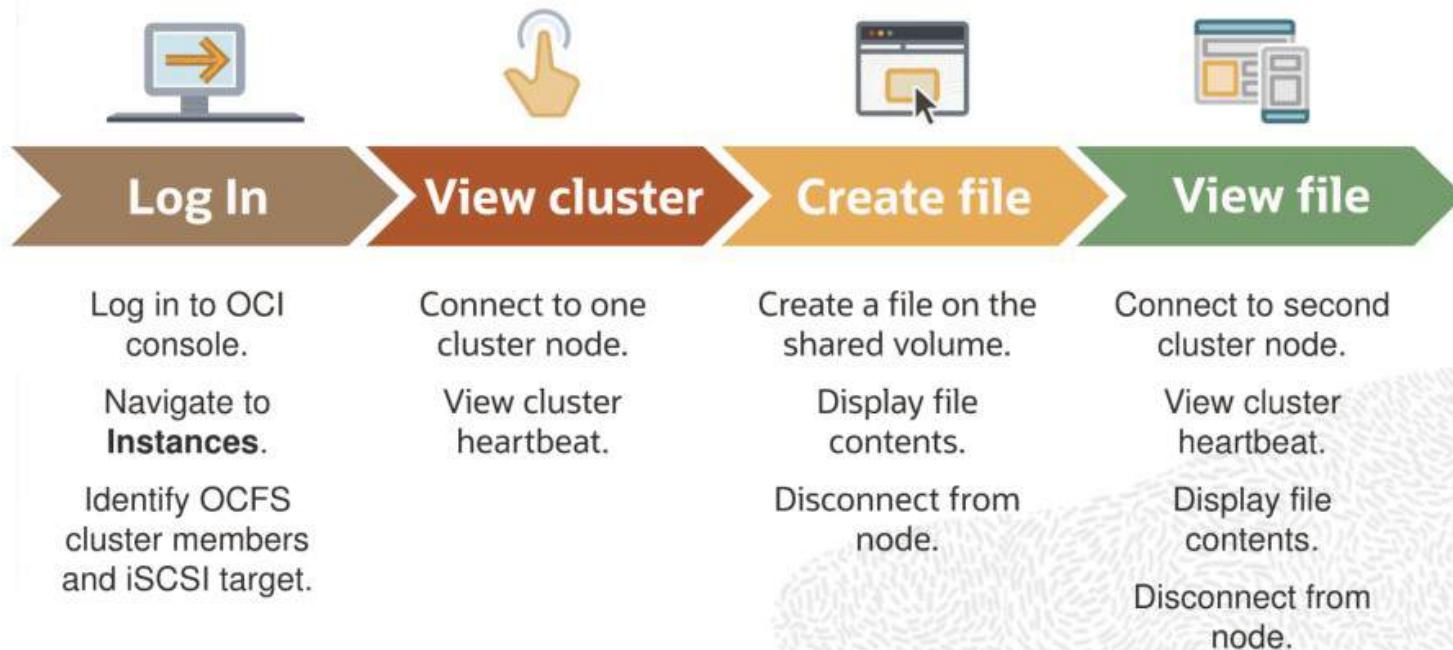
Configure and Test OCFS Cluster





OCFS Cluster Demo

In This Demo

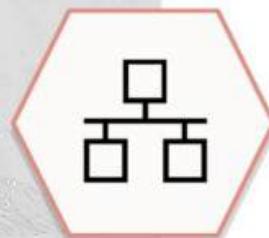


What Is Oracle Cluster File System Version 2?

A general-purpose shared filesystem that can be used by almost all applications



Offers failover or cache-coherent parallel I/O from multiple cluster nodes



Supports Oracle RAC databases, middleware clusters among other uses

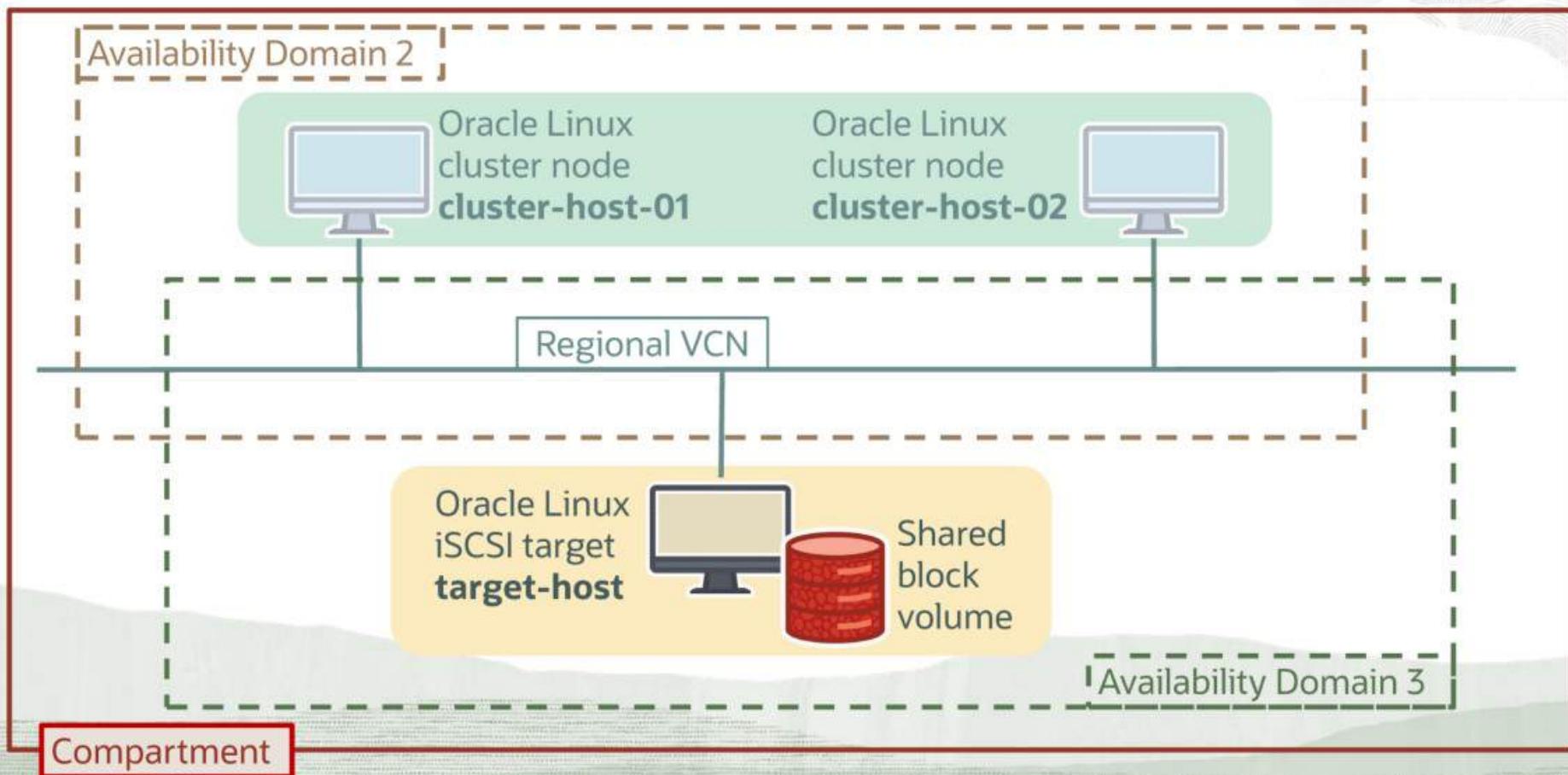


Shared network filesystem

**Intended to be used with clusters
UEK Kernels R6+ only**

High availability and performance

OCFS2 Topology Example



Set Up an OCFS2 Cluster

Steps to configure an OCFS2 cluster include:

- Creating an Oracle Linux **firewalld** rule and an OCI VCN rule:
to allow TCP traffic on port 7777. Reload firewall rules after adding.

<input type="checkbox"/> No	10.0.0.0/16	TCP	All	7777	TCP traffic for port s: 7777	Port for OCFS cluster communications	⋮
-----------------------------	-------------	-----	-----	------	---------------------------------	---	---

```
opc@cluster-node $> sudo firewall-cmd --permanent --zone=public --add-port=7777/tcp
```

- Installing **ocfs2-tools**:
using **sudo dnf** installer utility for this task.

```
opc@cluster-node $> sudo dnf install ocfs2-tools -y
```

- Creating the cluster:
using **sudo o2cb add-cluster <cluster_name>**. (One of the hosts only.)

```
opc@cluster-node $> sudo o2cb add-cluster myOLcluster
```



On each
cluster
node

Configure OCFS2 Cluster Members



Add each cluster member:

```
$> sudo o2cb add-node myOLcluster node-name-1 --ip <IP-1>  
$> sudo o2cb add-node myOLcluster node-name-2 --ip <IP-2>
```



Cluster configuration file is created:

View it in /etc/ocfs2/cluster.conf



Create path and copy configuration to the other

node: \$> sudo mkdir /etc/ocfs2

Copy or create the configuration file cluster.conf there.



Repeat on Each Cluster Node

\$> sudo /sbin/o2cb.init configure

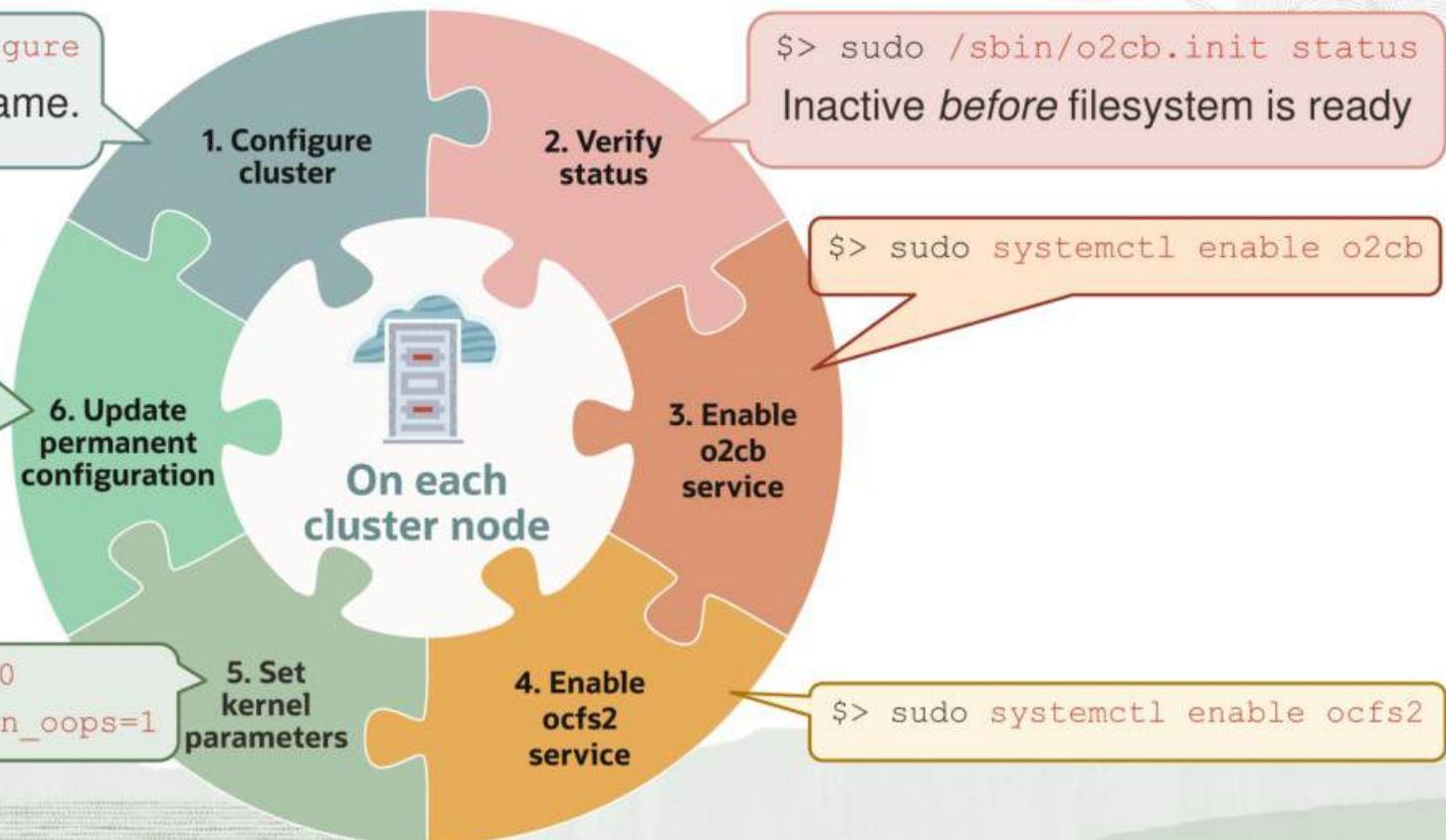
Answer "y" and enter cluster name.

Add permanent parameters
to `/etc/sysctl.conf`

`kernel.panic=30`

`kernel.panic_on_oops=1`

\$> sudo sysctl kernel.panic=30
\$> sudo sysctl kernel.panic_on_oops=1



Prepare and Mount Shared Volume – First Node

1 Create labelled file system on shared volume or partition :

```
$> sudo mkfs.ocfs2 -L label /dev/<partition>
```



2 Create or select mount point:

```
$> sudo mkdir /mount-path
```



3 Mount shared volume partition:

```
$> sudo mount -L label /mount-path
```

```
[opc@due ~]$ sudo /sbin/o2cb.init status
Driver for "configfs": Loaded
Filesystem "configfs": Mounted
Stack glue driver: Loaded
Stack plugin "o2cb": Loaded
Driver for "ocfs2_dlmfs": Loaded
Filesystem "ocfs2_dlmfs": Mounted
Checking O2CB cluster "ocfs2cluster": Online
```

Verify status – should be Active:

```
$> sudo /sbin/o2cb.init status
```

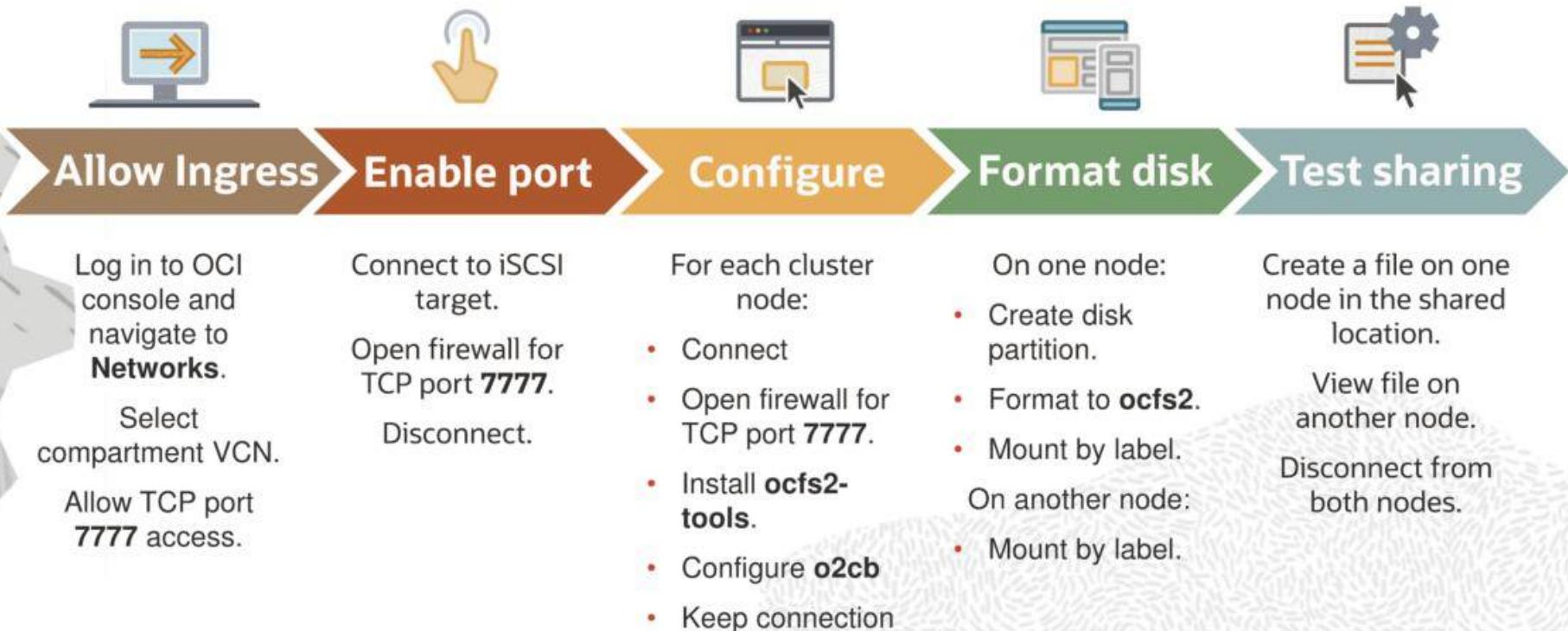
```
Heartbeat mode: Local
Checking O2CB heartbeat: Active
Debug file system at /sys/kernel/debug: mounted
```

4

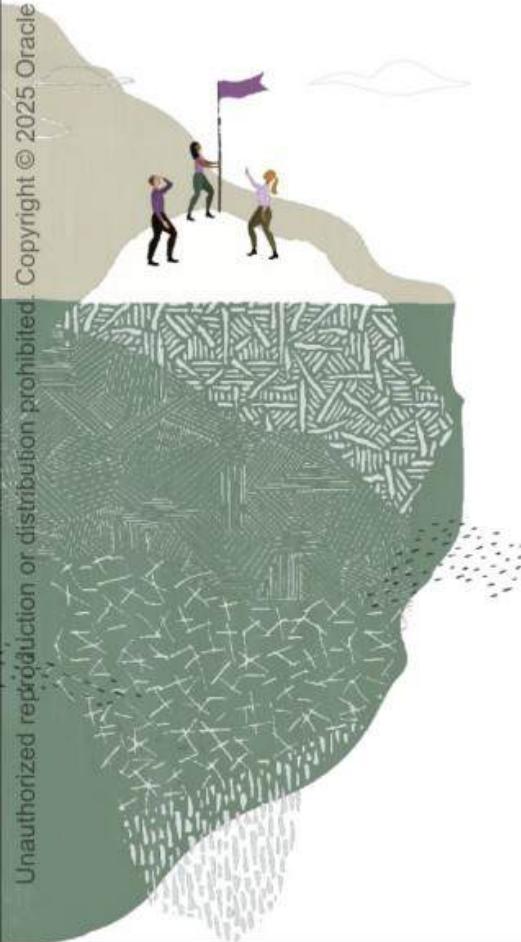


OCFS Cluster Setup Demo

In This Demo



Summary



Using OCI Utilities to Manage iSCSI Storage

Configuring a Linux iSCSI Target and an Initiator

Configuring and Testing an OCFS2 Cluster

Summary



Oracle Cloud Infrastructure Review

Introduction to Oracle Linux

OS Management

Patching and GUI Configuration

Managing iSCSI and OCFS Storage

