10

Oracle Cloud Computing

Lesson Objectives

After completing this lesson, you should be able to:

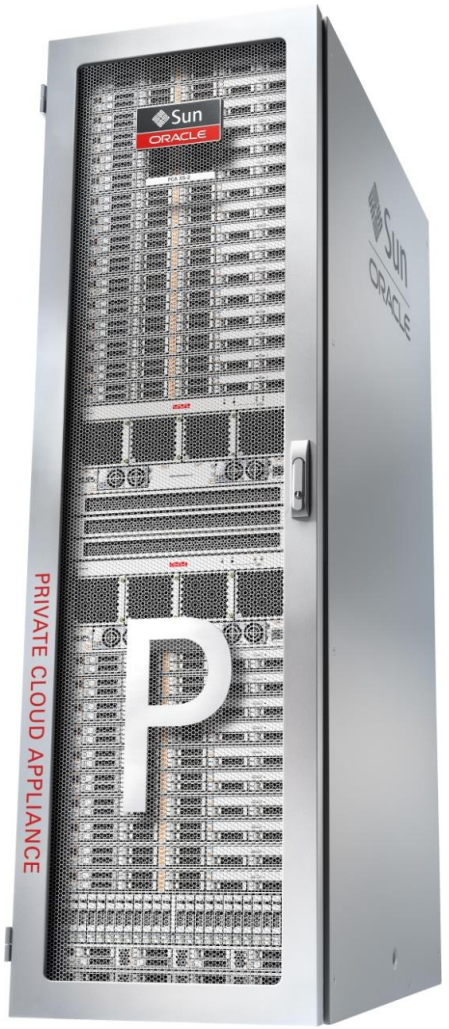
- Describe Infrastructure as a Service (IaaS)
- Describe Oracle Private Cloud Appliance
- Describe Oracle OpenStack
- Describe Oracle Cloud Infrastructure
- Describe Key Concepts and Terms Used in Oracle Cloud Infrastructure
- Describe Oracle-Provided Images and Available Shapes in Oracle Cloud Infrastructure
- Describe the Task Flow to Launch an Oracle Cloud Infrastructure Instance
- Create an Oracle Cloud Infrastructure Virtual Cloud Network and Subnet
- Launch an Oracle Cloud Infrastructure Instance
- Attach an Oracle Cloud Infrastructure Block Storage Volume to an Instance

What Is Infrastructure as a Service (IaaS)?

- It is a form of cloud computing that provides infrastructure services over the Internet.
- It is required by all applications, databases, and middleware deployments.
- Users can access:
  - Computer processors
  - Storage
  - Networks
  - Other infrastructure resources
- IaaS is one of three “service models” in cloud computing. The other two are:
  - SaaS – Software as a Service
  - PaaS – Platform as a Service

What Is Oracle Private Cloud Appliance?

- It is preconfigured for stability, high availability, and automation.
- Orchestration software automatically handles new server hardware.
- It supports provisioning of Infrastructure and Platform as a Service (IaaS and PaaS) on demand.
- Private Cloud Appliance Virtualization
  - Focus on services, not managing hardware
  - Created to handle demanding workloads
  - Unified support for the software solution stack
- The Private Cloud Appliance simplifies application deployment and management.



What Is Oracle OpenStack?

- Oracle OpenStack is a cloud management software for managing large pools of compute, storage, and networking resources.
- Based on an OpenStack community release, Oracle OpenStack is an enterprise-grade solution for managing an entire IT environment.
- It rapidly deploys Oracle and third-party applications across shared compute, network, and storage resources.
- It accelerates application deployment with self-service VM creation.

What Are Oracle Cloud Infrastructure Services?

Set of complementary cloud services that enable you to build and run a wide range of applications and services in a highly-available hosted environment.

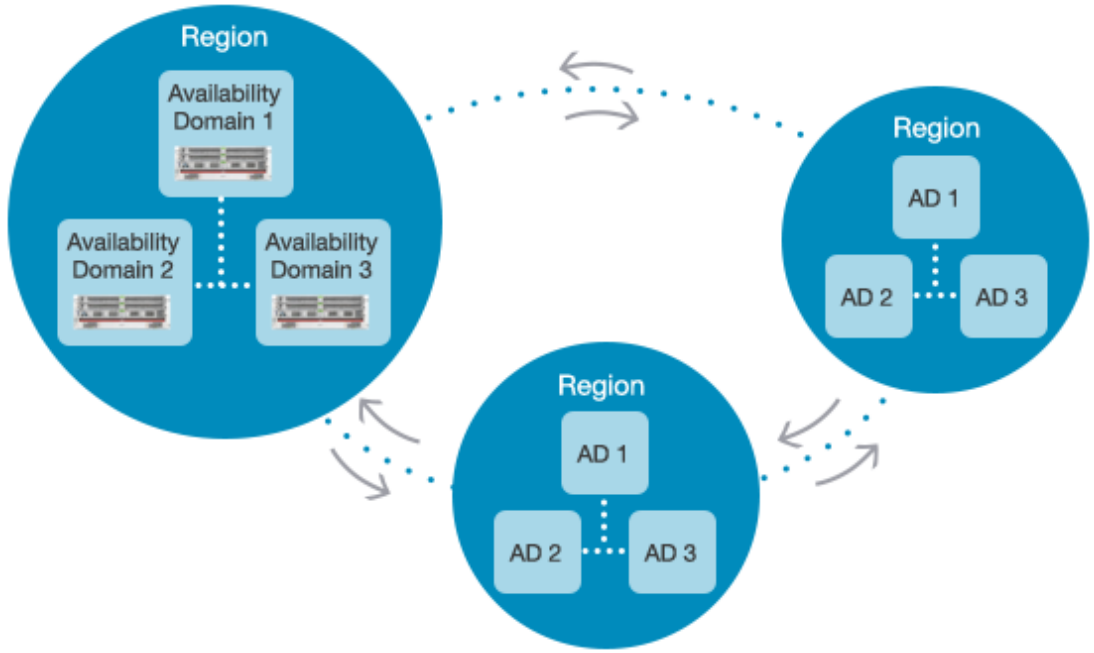
- Compute Service
  - Provision and manage bare metal compute instances or virtual machine instances.
- Networking Service
  - Create and manage the network components for your cloud resources.
- Block Volume Service
  - Provides high-performance network storage capacity.
- Database Service
  - Build, scale, and secure Oracle databases with license-included pricing.

What Are Oracle Cloud Infrastructure Services?

- Identity and Access Management (IAM) Service
  - Control access to Oracle Cloud Infrastructure Services.
- Load Balancing Service
  - Create a highly available load balancer within your virtual cloud network (VCN).
- Object Storage Service
  - Provides high throughput storage for unstructured data.
- Audit Service
  - Audit log events for security audits, to track usage, and to help ensure compliance.

Key Concepts and Terms Used in Oracle Cloud Infrastructure

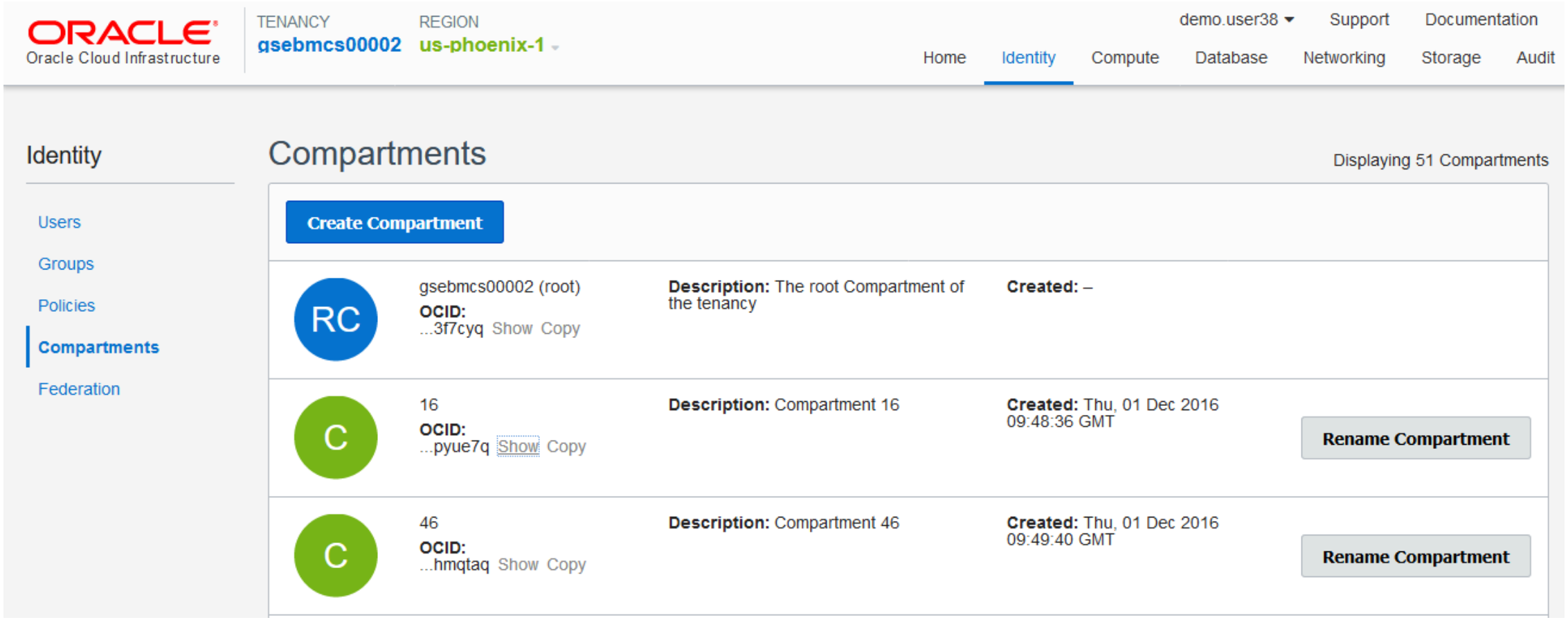
- Regions and Availability Domains
  - Bare metal services are physically hosted in Regions and Availability Domains.
  - A Region is a localized geographic area composed of several Availability Domains.
  - An Availability Domain is one or more data centers located within a region.
  - Availability Domains are isolated from each other, fault tolerant, and very unlikely to fail simultaneously.



Key Concepts and Terms

- Tenancy
  - A Tenancy is a secure and isolated partition within Oracle Cloud Infrastructure where you can create, organize, and administer your cloud resources.
  - Oracle creates a Tenancy for your company when you sign up for Oracle Cloud Infrastructure.
  - Your Tenancy is the root Compartment that holds all your cloud resources.
- Compartments
  - Compartments allow you to organize and control access to your Oracle Cloud Infrastructure resources.
  - Although you can see the list of all compartments, you must be granted permissions on a compartment to see or take action on its resources.
  - You can create additional Compartments within the Tenancy (root compartment).
  - When you create a Oracle Cloud Infrastructure resource, you must specify which compartment you want the resource to belong.

Key Concepts and Terms



Key Concepts and Terms

- Instance
  - An instance is a compute host running in the cloud.
  - Bare metal compute instances run on bare metal servers without a hypervisor.
    - You maintain sole control of the physical CPU, memory, and Network Interface Card.
    - You do not share the physical machine with any other tenants.
  - Managed Virtual Machine (VM) instances are also available for workloads that don't require dedicated physical servers or the high-performance of bare metal instances.
- Image
  - The image is a template of a virtual hard drive that defines the operating system and other software for an instance, for example Oracle Linux.
  - When you launch an instance, you define its characteristics by choosing its image.
- Shape
  - The shape specifies the number of CPUs and amount of memory allocated to the instance, and specifies if the instance is a bare metal instance or a VM instance.

Oracle-Provided Images and Available Shapes

Image	Name	Description
Oracle Linux 7 Unbreakable Enterprise Kernel Release 4	Oracle-Linux-7.*x*-<*date*>-<*number*>	The Unbreakable Enterprise Kernel (UEK) is Oracle's optimized operating system kernel for demanding Oracle workloads. X7 shapes are supported in the latest image version. For more information, see Oracle-Provided Image Release Notes.
Oracle Linux 6 Unbreakable Enterprise Kernel Release 4	Oracle-Linux-6.*x*-<*date*>-<*number*>	The Unbreakable Enterprise Kernel (UEK) is Oracle's optimized operating system kernel for demanding Oracle workloads. X7 shapes are not supported with this image.
CentOS 7	CentOS-7-<*date*>-<*number*>	CentOS is a free, open-source Linux distribution suitable for use in enterprise cloud environments. For more information, see https://www.centos.org/. X7 shapes are not supported with this image.
CentOS 6	CentOS-6.*x*-<*date*>-<*number*>	CentOS is a free, open-source Linux distribution that is suitable for use in enterprise cloud environments. For more information, see https://www.centos.org/. X7 shapes are not supported with this image.

Bare Metal Shapes

Shape	Instance Type	OCPU	Memory (GB)	Local Disk (TB)	Network Bandwidth*	Maximum VNICs Total**
BM.Standard1.36	Standard compute capacity	36	256	Block storage only	10 Gbps	16
BM.HighIO1.36	High I/O compute capacity	36	512	12.8TB NVMe SSD	10 Gbps	16

VM Shapes

VMs are an option that provides flexibility in compute power, memory capability, and network resources for lighter applications. You can use Block Volume to add network-attached block storage as needed.

Shape	OCPU	Memory (GB)	Local Disk (TB)	Network Bandwidth*	Maximum VNICs Total**
VM.Standard1.1	1	7	Block Storage only	Up to 600 Mbps	2
VM.Standard1.2	2	14	Block Storage only	Up to 1.2 Gbps	2

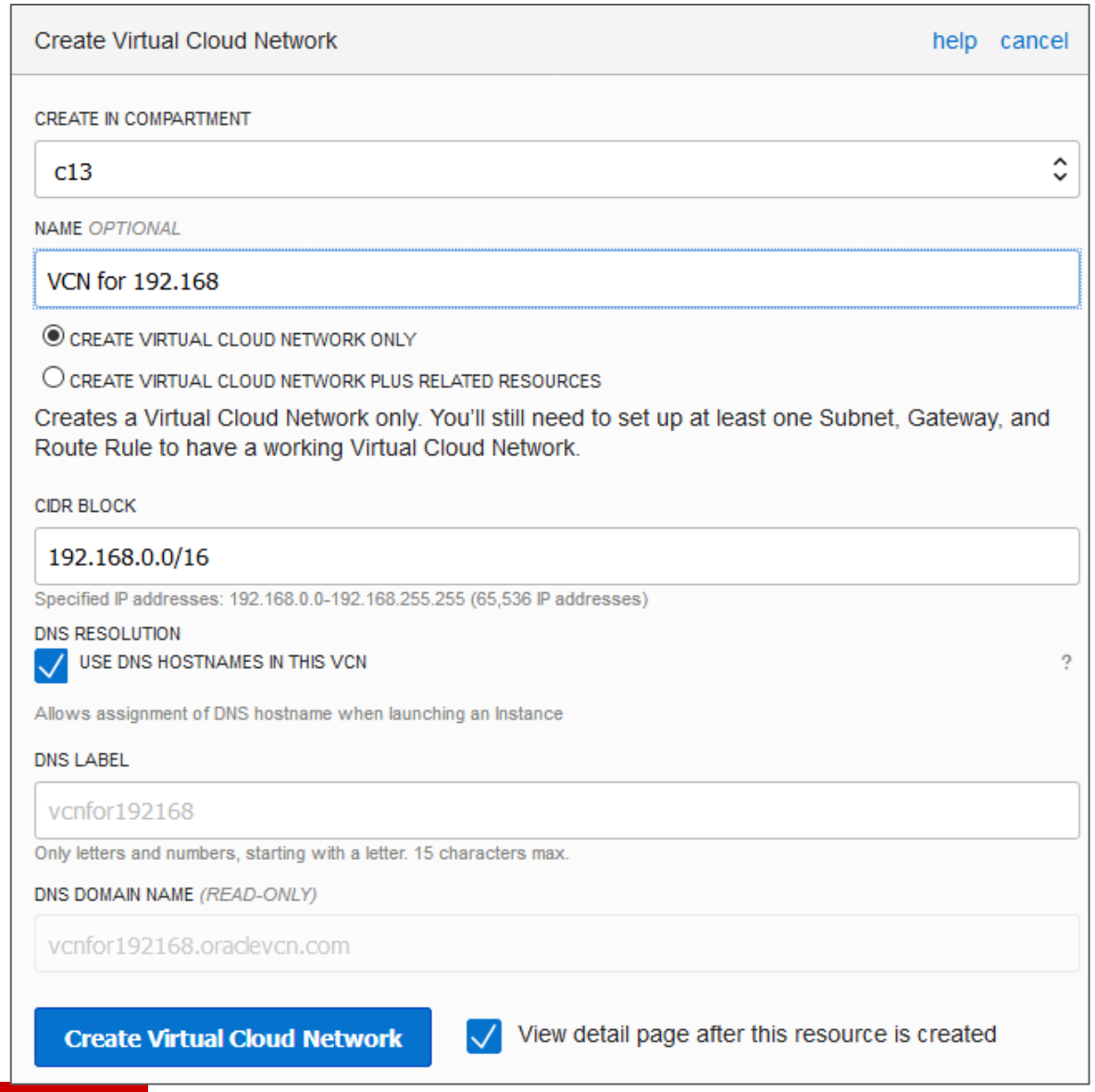
Key Concepts and Terms

- Virtual Cloud Network (VCN)
  - A VCN is a virtual version of a traditional network on which your instances run.
  - VCN includes subnets, route tables, and gateways.
  - VCN resides within a region but subnets can belong to different Availability Domains.
  - VCN can have an optional Internet Gateway to handle public traffic.
  - VCN can have an optional IPSec VPN connection to securely extend your on-premises network.
- Block Volume
  - A virtual disk that provides persistent block storage space for instances.
  - You can move block volumes from one instance to another without loss of data.
- Object Storage
  - A storage architecture that allow you to store and manage data as objects.
  - Data files can be of any type and up to 50 GB in size.

Task Flow to Launch an Oracle Cloud Infrastructure Instance

- Create an SSH key pair.
- Create or choose a compartment for your resources.
- Create or choose a VCN (virtual cloud network).
- Create a Subnet for the VCN.
- Launch an instance.
- Connect to your instance.
- Provision and manage block storage volumes (optional)
  - Add a block storage volume
  - Attach the volume to an instance
  - Connect a volume to an instance's guest OS

Setting up a Virtual Cloud Network (VCN)



To display this screen:

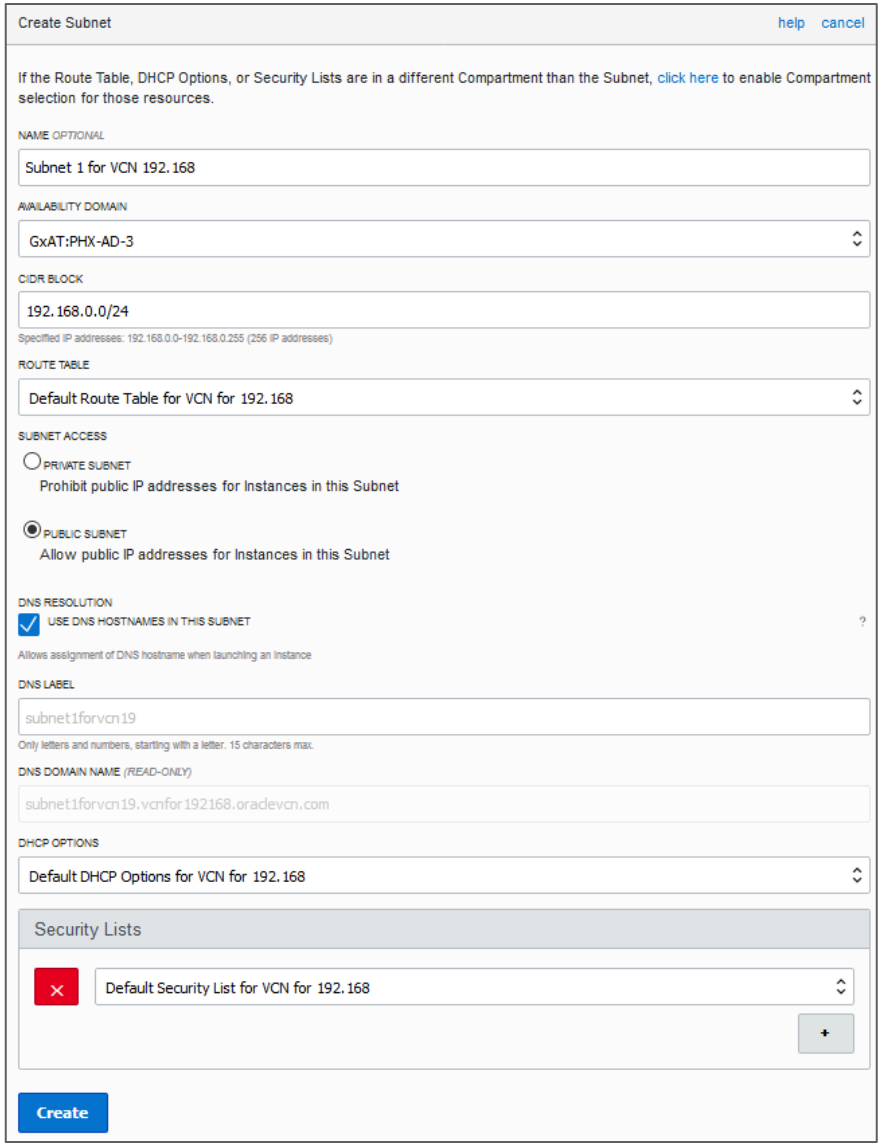
1. Click Networking
2. Click Virtual Cloud Networks
3. Click Create Virtual Cloud Network

Provide parameters for the VCN

Click Create Virtual Cloud Network button to save

Create one or more Subnets for the VCN

Working with VCN Subnets



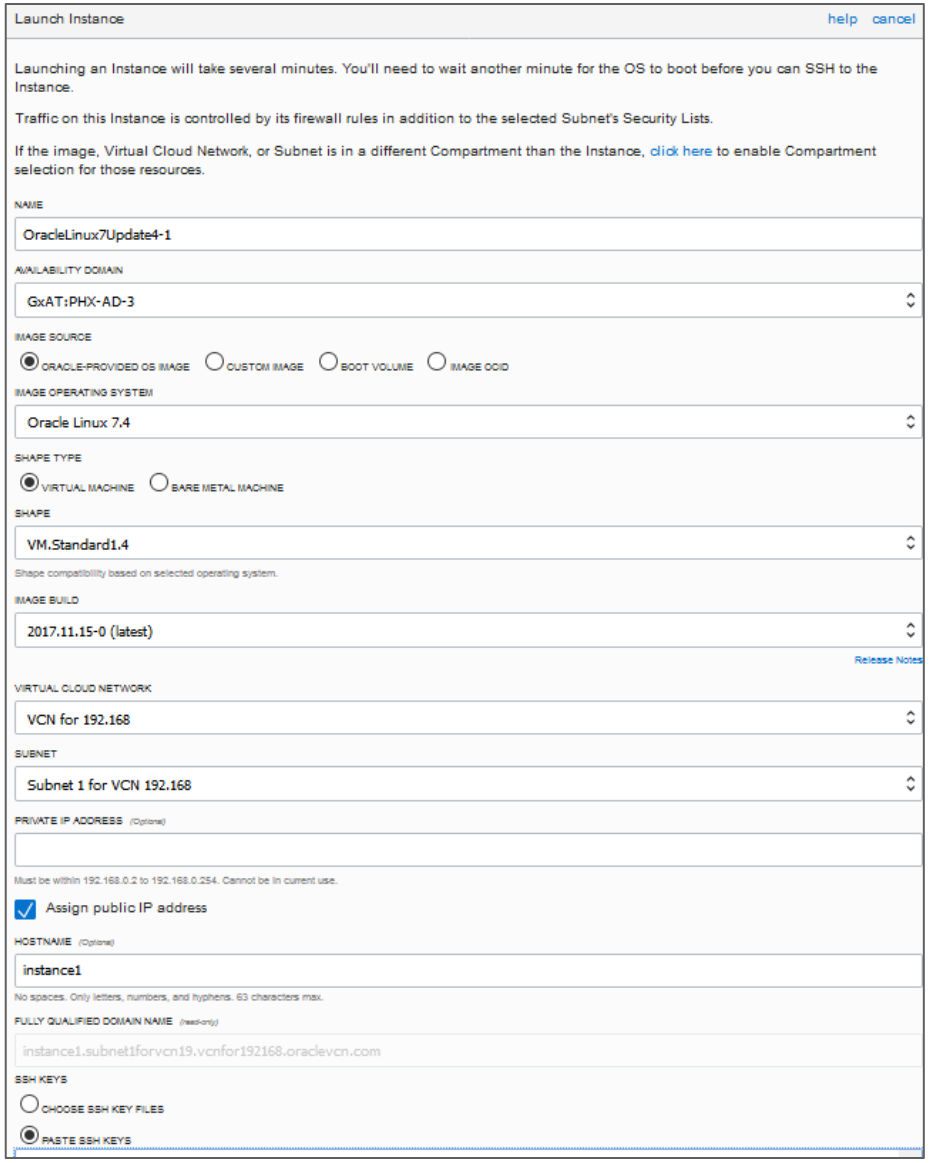
To display this screen:

1. Click Networking
2. Click Virtual Cloud Networks
3. Click an existing VCN from list
4. Click Create Subnet

Provide parameters for the Subnet

Click Create button to save

Launching an Instance



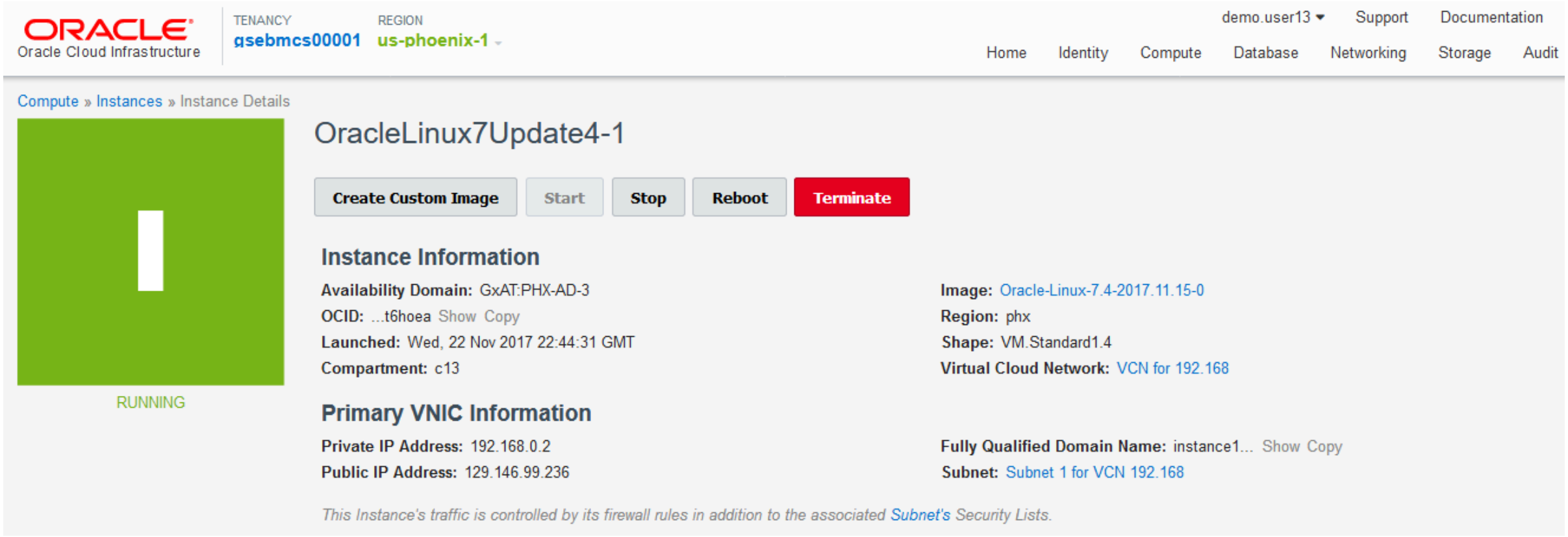
To display this screen:

1. Click Compute
2. Click Instances
3. Click Launch Instance

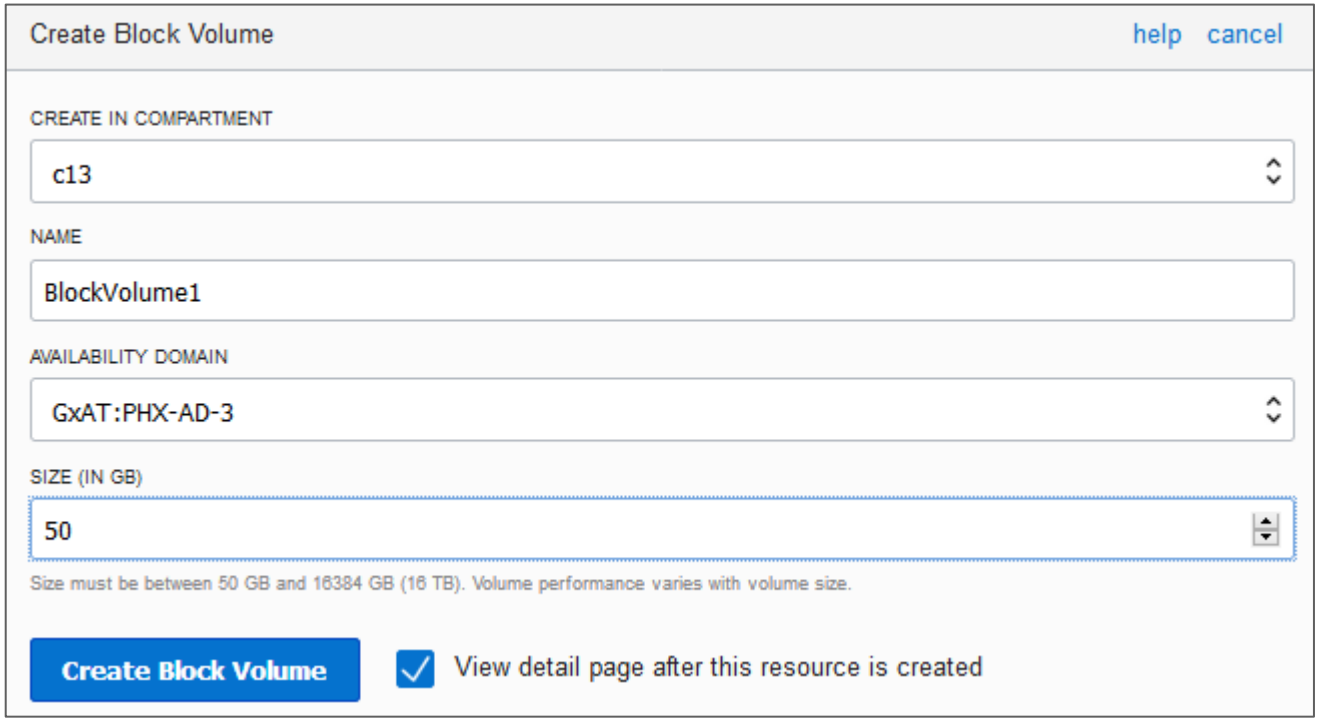
Provide parameters for the Instance

Click Launch Instance button (not shown) to save

Viewing Instance Details



Creating a Block Storage Volume



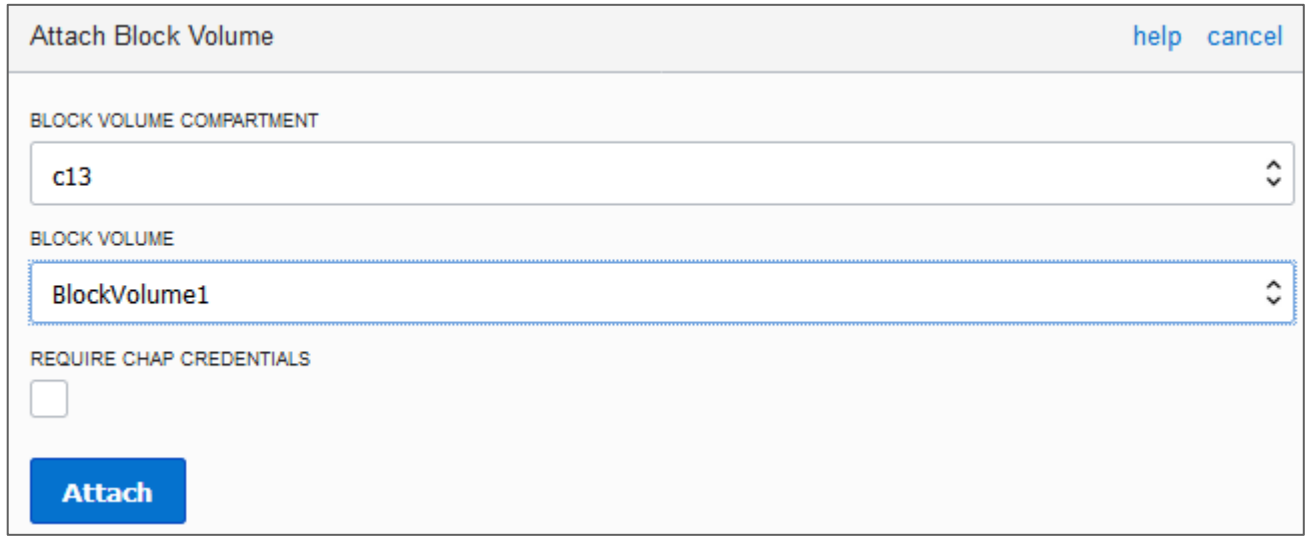
To display this screen:

1. Click Storage
2. Click Block Volumes
3. Click Create Block Volume

Provide parameters for the Volume

Click Create Block Volume to save

Attaching a Block Storage Volume to an Instance



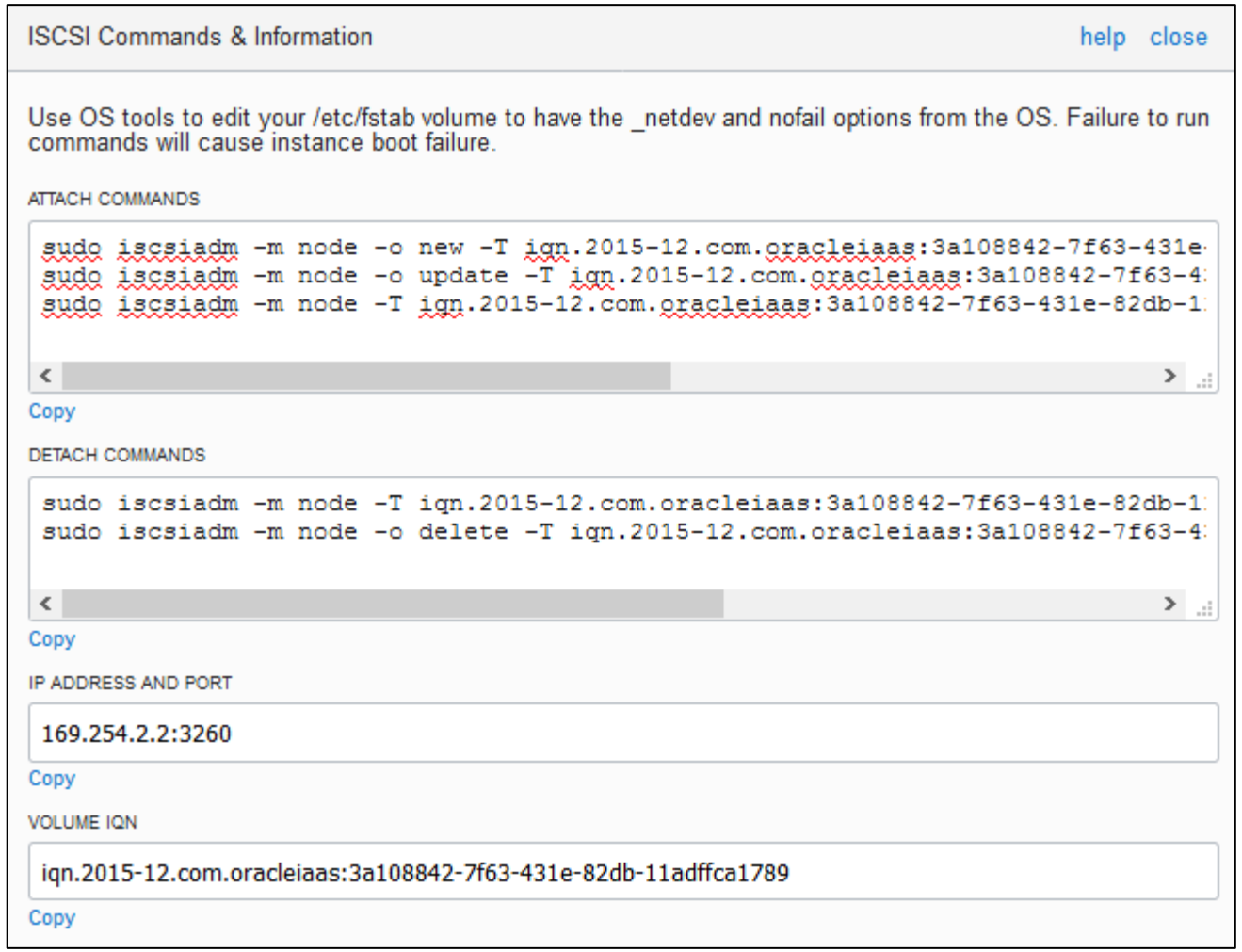
To display this screen:

1. Click Compute
2. Click Instances
3. Click the Name of the Instance to display the Instance Details
4. Click Attach Block Volume

Provide parameters for the Volume

Click Attach to save

Connecting a Block Storage Volume to an Instance's Guest OS



To display this screen:

1. Click Compute
2. Click Instances
3. Click the Name of the Instance to display the Instance Details
4. Scroll down to view the Attached Block Volumes
5. Click the Actions icon on your Block Volume's row
6. Click iSCSI Commands and Information menu option

Log on to your instance and run the three `iscsiadm` commands

Connecting a Block Storage Volume to an Instance's Guest OS

- Log on to your instance and issue the three `iscsiadm` commands:

```
[opc@instance1 ~]$ sudo iscsiadm -m node -o new -T ...
[opc@instance1 ~]$ sudo iscsiadm -m node -o update -T ...
[opc@instance1 ~]$ sudo iscsiadm -m node -T ...
```

- The `fdisk -l` command shows the newly attached disk, `/dev/sdb`, in this example:

```
[opc@instance1 ~]$ sudo fdisk -l |grep /dev
...
Disk /dev/sdb: 53.7 GB, 53687091200 bytes, 104857600 sectors
```

- You can then partition the new block device, create a file system on the device, create a mount point, and mount the new file system.
- Include the `_netdev` and `nofail` options on every non-root block volume in the `/etc/fstab` file.

Oracle Cloud Computing Resources

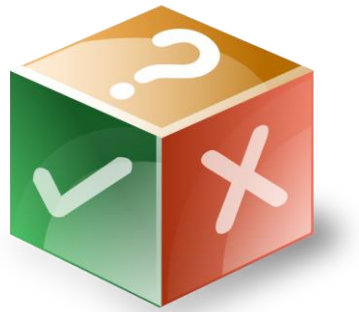
Refer to the following resources for further information about Oracle Cloud Computing:

- http://www.oracle.com/cloud
- https://cloud.oracle.com/home
- https://cloud.oracle.com/cloud-infrastructure
- https://docs.us-phoenix-1.oraclecloud.com/Content/home.htm
- https://education.oracle.com/cloud

Quiz

What of the following statements are true? (Select all that apply.)

a. Oracle Cloud Infrastructure are physically hosted in Regions and Availability Domains.
b. Oracle Cloud Infrastructure are physically hosted in Tenancies and Compartments.
c. When you sign up for Oracle Cloud Infrastructure, Oracle creates a tenancy for your company.
d. Compartments allow you to organize and control access to your cloud resources.



Quiz

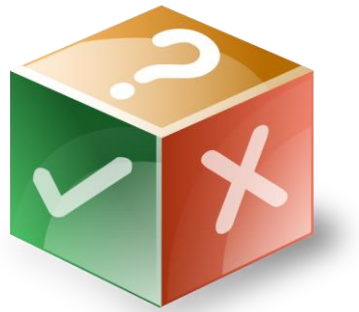
What of the following statements about Oracle Cloud Infrastructure instances are true? (Select all that apply.)

a. You need to set up at least one Virtual Cloud Network (VCN) before you can launch instances.

b. Bare metal compute instances run on bare metal servers without a hypervisor.

c. Managed Virtual Machine (VM) instances are also available for workloads that don't require dedicated physical servers or the high-performance of bare metal instances.

d. When launching an instance, you also need to select an image, a shape, a private IP address, and public IP address.



Summary

In this lesson, you should have learned how to:

- Describe Infrastructure as a Service (IaaS)
- Describe Oracle Private Cloud Appliance
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- Describe Key Concepts and Terms Used in Oracle Cloud Infrastructure
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