



Integrated Cloud Applications & Platform Services

# Oracle Cloud IaaS: Compute and Storage Fundamentals

Activity Guide

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## Practice 5-1: Sign In to Compute Classic Cloud Service

### Overview

In this practice, you use your credentials to sign in to Oracle Cloud and go to the Compute Classic Cloud Service console.



## Practice 5-1 (Solution)

---

Before you can sign in to Oracle Cloud, you must have received an email with your user name, password, and identity domain.

To sign in to an Oracle Cloud service:

1. Sign in to the Oracle Cloud My Services application at <https://cloud.oracle.com/sign-in>.  
The Oracle Cloud My Services Dashboard page is displayed.
2. Click the dashboard menu button near the upper left corner of the page.  
The CLOUD SERVICES menu is displayed.
3. Select **Compute Classic**.  
The Compute Classic console is displayed.

## Practice 5-2: Explore the Compute Classic Web Console

---

### Overview

In this practice, you explore the Compute Classic web console.

### Tasks

Task - 1: Explore the Instances tab

Task - 2: Explore the Network tab

Task - 3: Explore the Storage tab

Task - 4: Explore the Orchestrations tab



## Practice 5-2 (Solution)

---

### Task – 1: Explore the Instances tab

1. On the Compute Classic console, click the **Instances** tab.
2. **Instances** tab displays list of instances, along with information about each instance such as Name, Status, OCPUs, Memory, Storage, and Tags.
3. To see more information about your instance, go to the instance that you want to view. From the menu, select **View**.

The instance details page shows all the details of the selected instance, such as the public and private IP addresses, and the storage volumes, security lists, and SSH keys associated with it. You can add or remove storage volumes and security lists from this page.

### Task – 2: Explore the Network tab

1. On the Compute Classic console, click the **Network** tab.
2. The left pane consists of the following tabs:
  - IP Network
  - Shared Network
  - Load Balancers
  - SSH Public Keys
  - VPN
  - Fast Connect

Click each of the tabs on the left pane and familiarize yourself with the options on each page.

### Task – 3: Explore the Storage tab

1. On The Compute Classic console, click the **Storage** tab.  
**Storage** page displays list of storage volumes, along with information about each storage volume such as Name, Restored From, Status, Size, Snapshots, and Attached To (Instance name).
2. To see more information about a storage volume, go to the storage volume that you want to view. From the menu, select **View**.

The storage details page shows all the details of the selected storage volume, such as the description, Property, status, size, bootable (or not), Availability Domain and the instance it is attached to.



#### Task – 4: Explore the Orchestrations tab

1. On the Compute Classic console, click the **Orchestrations** tab.  
All orchestrations are displayed, with information about their description, status, time and Resources.
2. **Orchestrations** page displays list of orchestrations. To view an orchestration, click on orchestration name

The orchestration details page shows you the details of the orchestration.

Note: On each tab, you can filter the list of objects according to their category or status. To list objects with a specific status (such as running, error, or stopped), click the **Show** menu and select the appropriate filter. To view objects of a specific category (such as PaaS, IaaS, or personal), click the **Category** menu and select the appropriate filter.

## Practice 5-3: Explore the Oracle Cloud Marketplace

---

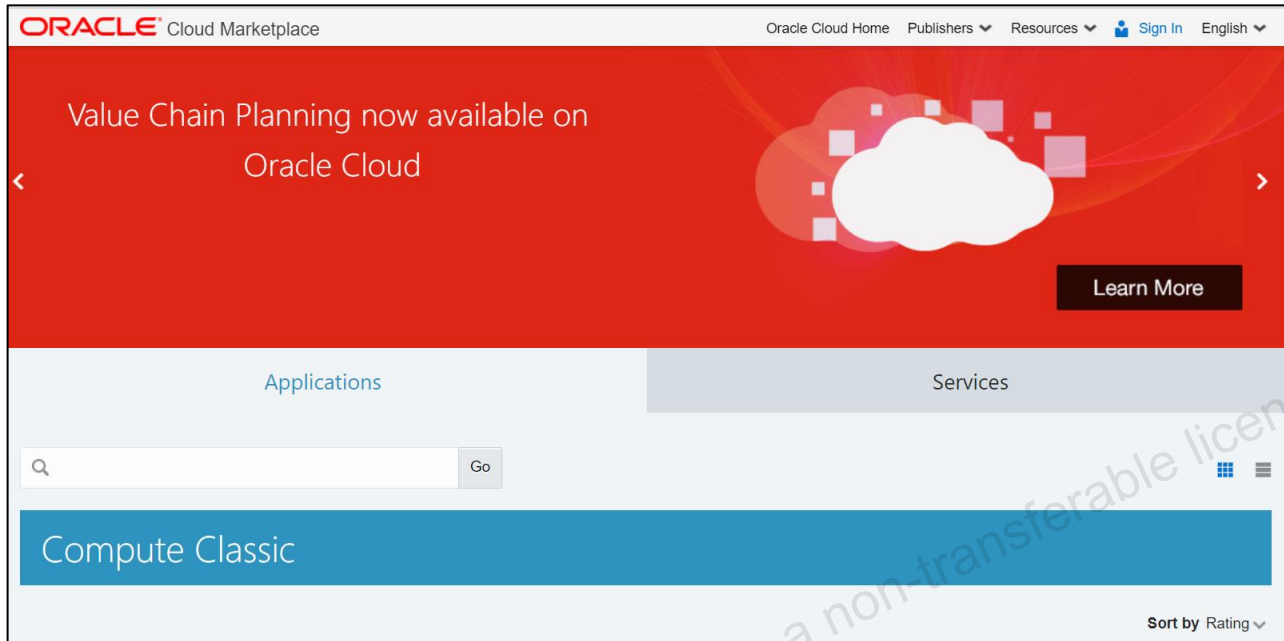
### Overview

In this practice, you explore Oracle Cloud Marketplace.



## Practice 5-3 (Solution)


1. Go to <http://cloud.oracle.com/marketplace/product/compute>.



2. Take a tour and see how many apps are available on Compute. Use the browse, search, filter, and sort options to find apps of your choice.



Watch videos and demos, follow the product news on social media, and read what customers are saying about the app.



WordPress Multisite Certified by Bitnami on OL 7

Blog software from the leading publisher

Compute Classic | Virtual Machines

★★★★★ (0)

Get App >

For more information, click here: [Listing Provider](#).

[f](#)
[t](#)
[in](#)
[p](#)
[e](#)

Overview

Ratings (0)

Provider

### App by Bitnami

WordPress Multisite image is secure, up-to-date, and pre-configured to work out of the box. Wordpress is the world's most popular blogging and content management platform. With WordPress Multisite, conserve resources by managing multiple blogs and websites from the same server and interface.

WordPress Multisite is the same software that powers Wordpress.com, enabling administrators to host and manage multiple websites from the same WordPress instance. These websites can all have unique domain names and can be customized by their owners, while sharing assets such as themes and plugins that are made available by the server admin. Updates to all sites can be pushed at once, ensuring that they are always kept safe and secure. With WordPress Multisite, content creators are still free to publish in the same WordPress interface they know and love, without having to worry about updates and backups. WordPress Multisite is great for organizations such as universities, corporations, and agencies that need to enable many people to host their own websites while giving overall control to a central administrator.

Why use Bitnami Certified Apps?

Bitnami certifies that our images are secure, up-to-date, and packaged using industry best practices.

With Bitnami you can trust what's in the app you're launching. We monitor all components and libraries for vulnerabilities, outdated components, and application updates. When one is reported, we update and release every affected listing within a couple days at most.

### Related Documents

User Guides

- FAQ
- WordPress Multisite Documentation

### Support

[Bitnami Community](#)  
[Bitnami Support Page](#)  
[Bitnami Support: Email](#)

Read about the system requirement for the app to be able to make the right choice.

### System Requirements

Oracle Cloud Infrastructure Classic

Minimum profile: General OC3 | 1 OCPU, 7.5 Gb RAM, 20 GB Local Disk

## Practice 7-1: Verifying Replication Policy

### Overview

In this practice, you will verify the replication policy set for your service instance.



## Practice 7-1 (Solution)

---

### Prerequisite


- You must be assigned the `Storage_Administrator` role

**Note:** If your account was created after March 2018, then once your Oracle Cloud Infrastructure Object Storage Classic subscription is activated, the replication policy for your account is set to any, by default.

With the any policy set by default at the account level, you can now create a container and set any authorized replication policy to the container.

### Task – 1: Verifying Replication Policy

IDCS Account that has been assigned for you has Replication policy set already. Follow the below steps to find out the replication policy that is set for your Oracle Cloud Infrastructure Object Storage Classic account:

1. Sign in to the Oracle Cloud My Services application
2. Look for **Storage Classic**, and from the **Actions**  menu, select **Open Service Console**
3. Click **Account** tab, details of account are displayed in the **Account Information** pane
4. Look out for Georeplication Policy field

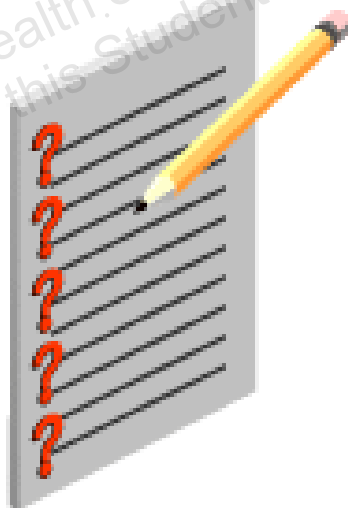
## Practice 8-1: Generate an SSH Key Pair

### Overview

In this practice, you generate SSH key pair on the Linux system that you will use to access your Compute Classic instance.

### Tasks

Generate an SSH key pair on Linux with the `ssh-keygen` command.



## Practice 8-1 (Solution)

### Task: Generate an SSH key pair on Linux with the `ssh-keygen` command

Use the following procedure to generate an SSH key pair on

1. Run the `ssh-keygen` command.

You can use the `-t` option to specify the type of key to create.

To create an RSA key, run:

```
ssh-keygen -t rsa
```

You can use the `-b` option to specify the length (bit size) of the key, as shown in the following example:

```
ssh-keygen -b 2048 -t rsa
```

2. The command prompts you to enter the path to the file in which you want to save the key.

A default path and file name is suggested in parentheses.

For example: `/home/user_name/.ssh/id_rsa`.

Enter the required path and the file name `<yourfirstname>_ssh_key_01`, and then press **Enter**.

3. The command prompts you to enter a passphrase. Enter `s1s2h3k4e5y6`.
4. When prompted, enter the passphrase again to confirm it.

The command generates an SSH key pair consisting of a public key and a private key, and saves them in the specified path. The file name of the public key is created automatically by appending `.pub` to the name of the private key file. For example, if the file name of the SSH private key is `id_rsa`, the file name of the public key would be `id_rsa.pub`.

**Note:** Wherever an SSH public key or an SSH private key is mentioned, use these keys name with the path you used in step 3:

**Public key:** `/home/username/.ssh/id_rsa.pub` or  
`/home/username/.ssh/<yourfirstname>_ssh_key_01.pub`

**Private key:** `/home/username/.ssh/id_rsa` or  
`/home/username/.ssh/<yourfirstname>_ssh_key_01`

Make a note of

- The file names of private and public keys
- The path of private and public keys
- The passphrase



## Practice 8-2: Create an Instance

---

### Overview

In this practice, you create an instance using QuickStarts.



## Practice 8-2 (Solution)

---

### Task: Launch the Create Instance wizard

1. On the Dashboard, for **Compute Classic**, go to the menu and click **Open Service Console**.
2. Go to the Network tab, on the left panel, click SSH Public Keys, Click Add SSH Public Key
3. Give a name for your key - `<yourfirstname>_ssh_public_key` (Uniquely identify it with your name or initials)
4. Click Select File, Select the location and the name where your public key file is.
5. It will fill in the Value field your key values. Confirm Enabled is checked. Click Add
6. Navigate to Instances tab, click on **Create Instance**. You see the Create Instance – QuickStarts Page.
7. In the Instance Name field, enter **<yourfirstname>\_instance\_01**.
8. In the **Oracle Linux** box for Oracle Linux 7.2, 1 OCPUs, 7.5 GB Memory, 128 GB Storage, confirm it is **Selected**.
9. In the **Select SSH Key** section, in the SSH Key field, drop down and select the name of your public key. Click **Create**.
10. Go to Orchestrations tab, look for the name of your instance, it should show the status of Starting. On the right side on the row of Orchestrations, you see the date and time with a circle arrow next to it. Click on the arrow to refresh. It may take a few minutes, maybe 5-10 minutes, to create your instance, keep refreshing every few minutes or so.
11. Your instance is ready when you see the status of Ready.

## Practice 8-3: View Your Instance

---

### Overview

In this practice, you view your instance on the Oracle Compute Cloud web console.



## Practice 8-3 (Solution)

---

After creating instances in Compute Classic, you can view a list of instances and get details of each instance.

1. Go to the Compute Classic console.
2. On the **Instances** tab, identify your instance. Click the round arrow to refresh so you know you are seeing the latest information.
3. To view detailed information about your instance, go to your instance and, from the menu, select **View**.
4. Note the data in the Information, Storage Volumes, IP Network Interfaces, and the SSH Public Keys sections.
5. In the case, that the SSH Key is not visible in the view, log out of cloud account and log back in.
6. Make a note of the instance's public IP address in the Information section. You'll need this IP address when you log in to your instance.

**Note:** With QuickStarts, networking is enable for SSH access. Hold off logging into your instance until we discuss networking in the coming chapter.

## Practice 8-4: Restart Your Instance

---

### Overview

In this practice, you will restart the instance that is currently running.

### Tasks

Identify your instance and restart it.



## Practice 8-4 (Solution)

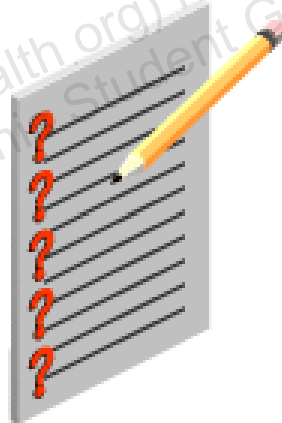
---

1. Go to the Compute Classic console.
2. On the **Instances** tab, identify the instance that you want to restart.
3. From the menu, select **Reboot**.

## Practice 9-1: Create an IP Reservation

### Overview

In this practice, you create an IP reservation from the Compute Classic web console.



## Practice 9-1 (Solution)

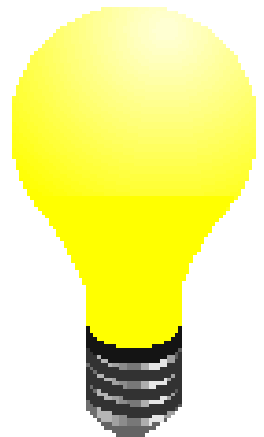
---

Create an IP reservation and associate it with an instance to ensure the same ip address will be assigned to the instance across reboots.

You will notice your current instance already has an ip address reserved for the instance.

You can create an ip address to use when creating other instance(s) in the future. To create an IP reservation:

1. Go to the Oracle Compute Classic web console.
2. Click the **Network** tab.
3. Expand IP Network tab in the left panel, click IP Network and then click on **IP Reservations**.
4. Click **Create IP Reservation**.
5. In the Name field, enter `<yourfirstname>_ip_reservation` and leave other options set to default values
6. Click **Create**.





## Practice 9-2: Configure Network Settings

---

### Overview

In this practice, you configure network settings on the Compute Classic web console.

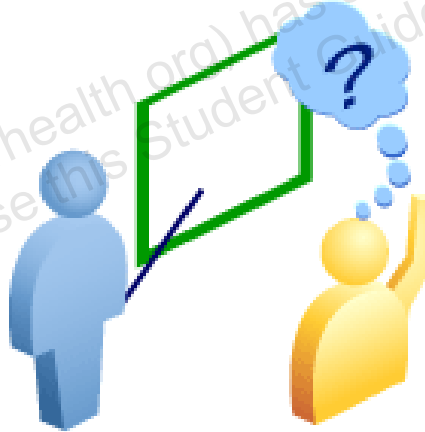
### Tasks

Task – 1: View Access Control List

Task – 2: Create a security IP list

Task – 3: View security rules

Task – 4: update /home/username/.ssh/config file ( for OU desktops)



## Practice 9-2 (Solution)

---

### Task – 1: View Access Control List

**Note:** With QuickStarts many things are done automatically to provide quick and easy provisioning in the cloud service.

The instance you created is already associated to a security list now called, Access Control List.

1. On the Compute Classic web console, click the **Network** tab.
2. On the left panel, Under IP Network – Click **Access Control List**.
3. Scroll down in the Name column and look for an access control list with the name of `<your compute instance name>_AccessControlList`.

**Note:** In this interface many things are done automatically to provide quick and easy provisioning in the cloud service.

The instance you created is already associated to a security list now called, Access Control List.

Note that the status is Enabled.

Under the Security Rules column, two rules are already associated with your Access List:

`<your compute instance name>_SecurityRule`  
`<your compute instance name>_SecurityRule_Egress`

### Task – 2: Create a security IP list

Anytime you create a cloud resource such as a virtual cloud network (VCN) or compute instance, you must specify which IAM (Identity and Access Management) compartment you want the resource in.

A security list provides a virtual firewall for an instance, with ingress and egress rules that specify the types of traffic allowed in and out.

Configuration in IP Network was done for you when you use QuickStarts to create your compute instance. You can use the options under IP Network to define only certain ip addresses will be able to access your compute instance. To create a security IP list of your own:

1. On the Compute Classic web console, click the **Network** tab.
2. Expand **Shared Network** tab in the left pane and click the **Security IP Lists**.
3. Click **Create Security IP List**.
4. In the Create Security IP List dialog box, enter the following details:
  - **Name:** `<yourfirstname>_secIPlist`.

- **IP List:** Enter a comma-separated list of the subnets (in CIDR format) or IPv4 addresses for which you want to create the security IP list. Enter the IP address of your computer/landing pad that you will use to ping your instance, if you have access to it. Otherwise enter **0.0.0.0**.
- **Description:** Security IP list with my computer IP address.

5. Click **Create**.

**Note:** You can use the predefined security IP list `/oracle/public/public-internet` as the source in security rules to permit traffic from any host on the Internet.

### Task – 3: View security rules

Security rules are firewall rules, which you can use to permit traffic between Compute Classic instances in different security lists, as well as between instances and external hosts.

**Note:** The new interface already associated security rules to the instance you created.

Configuration in IP Network was done for you when you use QuickStarts to create your compute instance, you will not need to create a security rules.

Two security rules are already created,

```
<your compute instance name>_SecurityRule for ssh connection, and
<your compute instance name>_SecurityRule_Egress,
and are associated to your access control list of
<your compute instance name>_AccessControlList.
```

### Task – 4: Update the `~/.ssh/config` file

**Note:** Do the steps in this task only if you are doing the practices on an Oracle assigned classroom machine. You will need to configuration communication with the Oracle proxy server.

- Add the following entries to `~/.ssh/config` file under user home directory.

**Note:** Create the config file if does not exist

```
Host <public IP of instance>
ProxyCommand nc -X connect -x ges-proxy.us.oracle.com:80 %h %p
GSSAPIAuthentication no
```

- ssh to your instance using the command  
`ssh opc@<public IP of instance> -i <ssh private key>`

## Practice 9-3: Log In to Your Instance

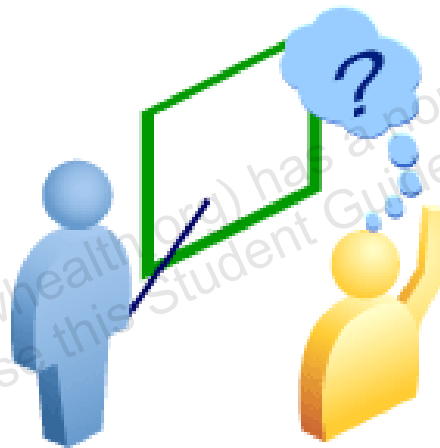
---

### Overview

In this practice, you log in to your Compute Classic Cloud Service instance.

### Tasks

Log in to your instance from your Linux system using `ssh`.



## Practice 9-3 (Solution)

---

### Task: Log in to your instance from your Linux system

1. Use SSH to log in to your instance as the default user, `opc`, by using the following command:

```
ssh opc@ip_address -i private_key
```

In this command, `ip_address` is the public IP address of the instance, and `private_key` is the full path and name (`<yourfirstname>_ssh_key_01.ssh`) of the file that contains the private key corresponding to the public key associated with the instance that you want to access.

2. When prompted, key in the passphrase `s1s2h3k4e5y6`.

When you are logged in as the default user, `opc`, use the `sudo` command to run administrative tasks.

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## Practice 10-1: Create a Block Storage Volume

### Overview

In this practice, you create a block storage volume from the Compute Classic web console.

### Tasks

Go to the Compute Classic web console and create a block storage volume from the **Storage** tab.

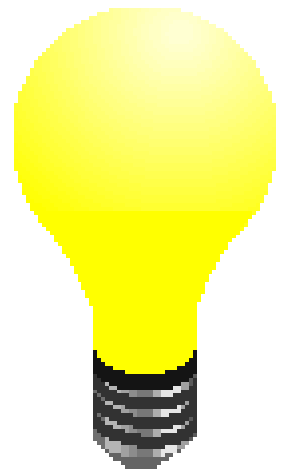


## Practice 10-1 (Solution)

---

### Task: Create a block storage volume

1. Go to the Compute Classic console.
2. Click the **Storage** tab.
3. Click **Create Storage Volume**. The Create Storage Volume wizard starts.
4. Select or enter the required information:
  - **Name:** <yourfirstname>\_storage\_vol\_01.
  - **Boot Image:** To make this storage volume a boot disk, you would select a machine image in the **Boot Image** field. Leave this field blank for now.
  - **Size:** Enter 5 GB.
  - **Storage Property:** /storage/default.
  - **Placement:** Auto
  - **Description:** Storage volume for data and applications.
5. Click **Create**.





## Practice 10-2: Attach a Block Storage Volume to an Existing Instance

---

### Overview

In this practice, you add a block storage volume to an existing instance from the Compute Classic web console.

### Tasks

Task – 1: Attach a block storage volume to an existing instance.

Task – 2: Identify the device name of the storage volume on the instance.

Task – 3: Create a file system on storage volume.

Task – 4: Mount the storage volume on the instance.

Task – 5: Use the storage volume.



## Practice 10-2 (Solution)

---

### Task – 1: Add a block storage volume to an existing instance

1. Go to the Compute Classic web console.
2. Click the **Storage** tab.
3. Identify the storage volume that you want to attach (`<yourfirstname>_storage_vol_01`). From the menu, select **Attach to Instance**.
4. Select the instance `<yourfirstname>_instance_01`.
5. The **Attach as Disk #** field is filled automatically with the next available index at which the volume can be attached. Accept the default. Make a note of the disk number. You will need it when you mount the storage volume on the instance.
6. Click **Attach**.

## Task – 2: Identify the device name of the storage volume on the instance

1. After attaching a storage volume to an instance, identify the disk number of the storage volume.

2. Log in to the instance using SSH.

3. List the devices available on your instance:

```
ls /dev/xvd*
```

Device names start from `/dev/xvdb` and are determined by the index number that you assigned when you attached the storage volumes. For example, if you attached a storage volume at index 1, the volume gets the device name, `/dev/xvdb`. The storage volume at index 2 would be `/dev/xvdc`, the storage volume at index 3 would be `/dev/xvdd`, and so on.

4. Identify the device name corresponding to the index number that you noted earlier. Most likely you attached your block volume as device #2. So the device name corresponding to the index number 2 will `/dev/xvdc`.

### Task – 3: Create a file system on the storage volume

Use a tool such as `mkfs` to create a file system on the storage volume. For example, to create an `ext3` file system on `/dev/xvdc`, run the following command:

```
sudo mkfs -t ext3 /dev/xvdc
```

Note: If the Extended File System utilities are not available on your instance, a message such as the following is displayed:

```
mkfs.ext3: No such file or directory
```

To install the Extended File System utilities, run the following command:

```
sudo yum install e4fsprogs
```

After the Extended File System utilities are installed, rerun the `mkfs` command.

## Task – 4: Mount the storage volume on the instance

A mount point is a directory on an accessible filesystem.

A filesystem is a hierarchy of directories that is used to organize files on a computer system.

1. Create a mount point on your instance. To create the mount point `/mnt/store`, run the following command:

```
sudo mkdir /mnt/store
```

2. Mount the storage volume on the mount point that you created on your instance. To mount the device `/dev/xvdc` at the `/mnt/store` directory, run the following command:

```
sudo mount /dev/xvdc /mnt/store
```

3. To make the mount persist across instance restarts, edit the `/etc/fstab` file and add the mount point as an entry in that file.

Example of the content of the `/etc/fstab` file:

```
-bash-4.1$ cat /etc/fstab
#
# /etc/fstab
# Created by anaconda on Mon Jun 10 07:01:06 2013
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=d69d8e28-fbdf-4e98-93cf-1f8d4bf52ae3 / ext4 defaults,barrier=0 1 1
UUID=5950368c-7bf0-45f6-a2b7-d53d3f3bcfa7 /boot ext4 defaults 1 2
UUID=f33bccba-2510-48fe-b82f-05543b3a30cf swap swap defaults 0 0
/tmp /var/tmp none bind 0 0
tmpfs /dev/shm tmpfs defaults,nodev,nosuid,noexec 0 0
devpts /dev/pts devpts gid=5,mode=620 0 0
sysfs /sys sysfs defaults 0 0
proc /proc proc defaults 0 0
```

Add the details of the storage volume as an entry in this file. The command to obtain details of the storage volume is discussed in the next section.

The columns in the `/etc/fstab` file correspond to these fields:

Field 1: Block device or remote filesystem

Field 2: Mount point for the filesystem

Field 3: Type of the filesystem

Field 4: Mount options associated with the filesystem (run `sudo man mount` command for these options)

Field 5: Used by `dump` command (Value 1: dump; Value 0: do not dump)

Field 6: Used by `fsck` program to determine the order of filecheck at reboot time (1: root filesystem; 2: other filesystems; 0: does not need check)

Note: For the purpose of this lab, you don't have to add an entry in `fstab` as you will be detaching the device after this lab.

## Task – 5: Use the storage volume

1. After the storage volume is mounted, you can access the storage volume by going to the mount point directory.

For example, if the device `/dev/xvdc` is mounted at the path `/mnt/store`, any access of the Storage Volume further occurs via path `/mnt/store`.

```
sudo ls -l /mnt/store
```

This lists all the files and directories currently available on the device `xvdc`. Any file stored in the directory path `/mnt/store` is effectively stored on the `/dev/xvdc` storage volume.

2. To view the size and utilization of the Storage Volume, use the command `sudo df`.



## Practice 10-3: Detach a Block Storage Volume from an Instance and Delete It

---

### Overview

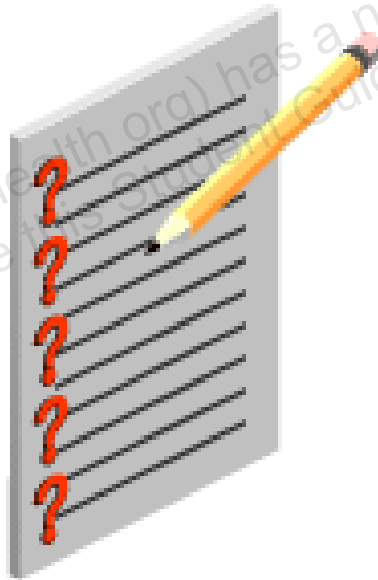
In this practice, you detach the block storage volume from the instance and delete it. You should unmount the volume before detaching it from the instance.

### Tasks

Task 1 – Unmount the block storage volume from the instance.

Task 2 – Detach the block storage volume from the instance.

Task 3 – Delete the block storage volume.



## Practice 10-3 (Solution)

---

### Task – 1: Unmount the block storage volume from the instance

Before you detach a storage volume from your instance, you must unmount the storage volume.

To unmount a storage volume:

1. Identify the disk number of the storage volume that you want to unmount.
  - a) ssh to the instance.
  - b) List the devices available on your instance and their mount points:

```
sudo df -hT
```
  - c) Identify the device name corresponding to the disk number that you want to unmount, and note the mount point for that device.
2. Run the **umount** command. To unmount the device mounted at `/mnt/store`, run the following command:

```
sudo umount /mnt/store
```

Note: this command will show “not mounted” message as we have not mounted the storage volume in Practice 10-2, Task 4.
3. If you had defined this mount point in the `/etc/fstab` file, then edit `/etc/fstab` and remove the mount point.



## Task – 2: Detach the block storage volume from the instance

1. Go to the Compute Classic console.
2. Click the **Storage** tab.
3. Go to the storage volume that you want to detach (<yourfirstname>\_storage\_vol\_01). From the menu, select **Detach Instance**.

Alternatively, you can also detach a storage volume from the Instances page:

1. Go to the Compute Classic console.
2. On the Instances page, identify the instance that you want to update (<yourfirstname>\_instance\_01). From the menu, select **View**.
3. On the instance details page, identify the storage volume that you want to detach (<yourfirstname>\_storage\_vol\_01). From the menu, select **Detach Storage Volume**.

### Task – 3: Delete the block storage volume

Ensure that the storage volume that you want to delete is not attached to any instance.

For the purpose of this practice, **DO NOT delete** the block storage volume as you will need it in later labs. The steps are here for your references.

To delete a storage volume:

1. Go to the Compute Classic console.
2. Click the **Storage** tab.
3. Go to the storage volume that you want to delete. From the menu, select **Delete**.

**Note:** You may require restarting the instance for the storage volume to get detached.



## Practice 11-1: Create a Bootable Storage Volume

### Overview

In this practice, you create a bootable storage volume from the Compute Classic web console.

## Practice 11-1 (Solution)

---

To create a bootable storage volume:  
Go to the Compute Classic console.

Click the **Storage** tab.

Click **Create Storage Volume**.

Enter or select the following:

- **Name:** Enter an appropriate name. `<yourfirstname>_bootable_vol_01`.
- **Boot Image:** Select **OL\_7.2\_UEKR3\_x86\_64** or a similar Oracle provided Oracle Linux image.
- **Size:** It will automatically fill in the size of the volume that will hold the image.
- **Storage Property:** Select **/storage/default**.
- **Placement:** Auto
- **Description:** **Bootable Storage Volume**.

Click **Create**.

## Practice 11-2: Create an Instance Using a Bootable Storage Volume

---

### Overview

In this practice, you create an instance with a bootable storage volume using the Oracle Compute Cloud Service web console.



## Practice 11-2 (Solution)

Note: For the purpose of this practice, you will create a compute instance with the customize option and with a network configuration of Shared Network.

### Launch the Create Instance Wizard

- Go to the Oracle Compute Cloud Service console.
- On the Instances page, click **Create Instance**.
- On the Create Instance page, click **Customize**.

#### Step – 1: Image page

- Select **OL\_7.2\_UEKR4\_x86\_64** or a similar Oracle provided Oracle Linux image.  
**Note:** The image you provide here needs to match the image you use to create the bootable storage volume in the step above
- Click the button to go to the next page.



#### Step - 2: Shape page

- Select **OC3** shape.
- Click the button to go to the next page.

#### Step - 3: Instance page

Select or enter the following information:

- **High Availability Policy:** Select **Active**.
- **Name:** Enter **<yourfirstname>\_bootinstance**.
- **Label:** Enter **Instance with bootable storage volume**.
- **Description:** Leave this field blank.

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- **Tag:** Leave this field blank.
- **SSH Keys:** Select `<yourfirstname>_ssh_public_key`.
- **Custom Attributes:** Leave this field blank.
- Click the button to go to the next page.

#### Step - 4: Network page

- For Network Options, uncheck IP Network, and **check - Shared Network**.
- **Public IP Address:** Select **Auto Generated**.
- **Security Lists:** Leave this field blank.
- Click the button to go to the next page.

#### Step - 5: Storage page

Notice it will try to create a storage volume with your instance name\_storage and boot drive is checked.

You will use the bootable volume you created to create this instance

- For the current volume, go to menu – select **Update**, uncheck boot drive. Notice disk becomes #2 as it will be the second disk for your instance.
- Click **Update**  
Notice it creates a storage name Root, with Disk #0
- Click **Attach Existing Volume**
- Select `<yourfirstname>_bootable_vol_01`.
- Select the **Boot Drive** option.
- Click **Add**.

Notice your boot volume is now Disk #1 for your instance

In the case, that you cannot uncheck the Boot Drive when attempting to attach existing volume, instead of using the boot drive you created in 11-1 to create the instance, you will create one and use it to create the instance with.

When you remove this instance, the bootable volume that is created with the instance will be removed as well.

To create a bootable volume when creating a new instance:

Do the following for Step 5 instead of the steps above.

- For the current volume, go to menu – select **Update**, uncheck boot drive.  
Notice disk becomes #2 as it will be the second disk for your instance.
- Click **Update**.
- Click **Add New Volume**.
  - Name: `<yourfirstname>_bootable_vol_02`.  
You are keeping the above bootable volume to use in later lab.
  - Size: The size for the drive will be filled in automatically with the size for the image.
  - Storage Property: Select /storage/default.
  - Check Boot Drive.
  - Click **Add**

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- Click the button to go to the next page.

#### Step - 6: Create Instance Wizard – Review page

On the Review page, verify the information that you have entered, and then click **Create**.

Go to Orchestrations tab, look for the name of your instance, it should show the status of Starting.

On the right side on the row of Orchestrations, you see the date and time with a circle arrow next to it. Click on the arrow to refresh. It may take a few minutes, maybe 5-10 minutes, to create your instance, keep refreshing every few minutes or so.



## Practice 11-3: Log in to the instance

---

### Overview

In this practice, you access your instance.



## Practice 11-3 (Solution)

---

### Task – 1: Create an IP reservation:

Before you can connect to this instance you will need to configure network setting.

Create an IP reservation and associate it with an instance to enable access to the instance from the public Internet. Though you will not use the ip address for this instance you will use it in the next lab.

1. Go to the Oracle Compute Classic web console.
2. Click the **Network** tab.
3. Expand Shared Network tab in the left panel, click on **IP Reservations**.
4. Click **Create IP Reservation**.
5. In the Name field, enter `<yourfirstname>_ip_reservation` and leave other options set to default values
6. Click **Create**.

### Task – 2: Create a Security List to enable pings

1. On the Compute Classic web console, click the **Network** tab.
2. Expand **Shared Networks** tab in the left pane and click the **Security Lists**.
3. Click **Create Security List**.
4. Enter or select the required details:
  - **Name:** `<yourfirstname>_seclist_enable_pings`.
  - **Inbound policy:** Deny(Drop packets, no reply)
  - **Outbound policy:-** Permit(Allow packets)
  - **Description:** Security List to enable pings from my computer to my instance.
5. Click **Create**.

### Task – 3: Create a Security List to enable ssh

1. On the Compute Classic web console, click the **Network** tab.
2. Expand **Shared Networks** tab in the left pane and click the **Security Lists**.
3. Click **Create Security List**.
4. Enter or select the required details:
  - **Name:** <yourfirstname>\_seclist\_enable\_ssh.
  - **Inbound policy:** Deny(Drop packets, no reply)
  - **Outbound policy:-** Permit(Allow packets)
  - **Description:** Security List to enable ssh access from my computer to my instance.
5. Click **Create**.

### Task – 4: Add an instance to your security lists

1. On the Compute Classic web console, click the **Instances** tab.

On the Instances page, go to <yourfirstname>\_bootinstance. From the menu, select **View**.

2. On the instance details page, click **Add to Security List**.
3. Select the <yourfirstname>\_seclist\_enable\_pings security list and click **Add**.

On the instance details page, click **Add to Security List** again

4. Select the <yourfirstname>\_seclist\_enable\_ssh security list and click **Add**.

## Task – 5: Create a security IP list

1. On the Compute Classic web console, click the **Network** tab.
2. Expand **Shared Network** tab in the left pane and click the **Security IP Lists**.
3. Click **Create Security IP List**.
4. In the Create Security IP List dialog box, enter the following details:
  - **Name:** `<yourfirstname>_secIPlist`.
  - **IP List:** Enter a comma-separated list of the subnets (in CIDR format) or IPv4 addresses for which you want to create the security IP list. Enter the IP address of your computer/landing pad that you will use to ping your instance, if you have access to it. Otherwise enter **0.0.0.0**.
  - **Description:** Security IP list with my computer IP address.
5. Click **Create**.

**Note:** You can use the predefined security IP list `/oracle/public/public-internet` as the source in security rules to permit traffic from any host on the Internet.

## Task – 6: Create security rules

- The security applications that you want to use in your security rule are **pings** and **ssh**.
- The security list for which you want to create the security rule. Use `<yourfirstname>_seclist_enable_pings` and `<yourfirstname>_seclist_enable_ssh`.
- Either a security IP list or a security list that you want to use as the source in the security rule. Use `<yourfirstname>_secIPlist` or the predefined security IP list `/oracle/public/public-internet`.

### Task – 6.1: Create a security rule for pings

1. On the Compute Classic web console, expand **Shared Network** tab in the left pane and click the **Security Rules**.
2. Click **Create Security Rule**.
3. Enter or select the following:
  - **Name:** `<yourfirstname>_secrule_ping`.
  - By default, new security rules are enabled. Keep it enabled.
  - **Security Application:** Select **pings**.

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- **Source:** Select **Security IP List** button. Select the predefined security IP list **public-internet** from the dropdown
- **Destination:** Select **Security List** button. Select the `<yourfirstname>_seclist_enable_pings` security list.
- **Description:** Security rule to allow my computer to ping the instance

4. Click **Create**.

## Task – 6.2: Create a security rule for ssh

1. On the Compute Classic web console, expand **Shared Network** tab in the left pane and click the **Security Rules**.
2. Click **Create Security Rule**.
3. Enter or select the following:
  - **Name:** `<yourfirstname>_secrule_ssh`.
  - By default, new security rules are enabled. Keep it enabled.
  - **Security Application:** Select **ssh**.
  - **Source:** Select **Security IP List** button. Select the predefined security IP list **public-internet** from the dropdown
  - **Destination:** Select **Security List** button. Select the `<yourfirstname>_seclist_enable_ssh` security list.
  - **Description:** Security rule to allow my computer to ssh to the instance
4. Click **Create**.

## Task – 7: Verify that you can ping your instance

1. Note the public IP address of your instance.
2. Open a terminal.
3. Ping your instance using its public IP address as follows:
 

```
ping ip_address
```
4. The instance will respond with packets of data.

## Task – 8: Update the ~/.ssh/config file

1. Add the following entries to .ssh/config file under user home directory.
  - Perform this action only if you are using an OU classroom setup to access the cloud instance.
  - Host <public IP of instance>  
ProxyCommand nc -X connect -x ges-proxy.us.oracle.com:80 %h %p  
GSSAPIAuthentication no
2. ssh to your instance using the command
  - ssh opc@<public IP of instance> -i <ssh private key>

## Practice 11-4: Test the Persistence of the Bootable Storage Volume

---

### Overview

In this practice, you test the persistence of the bootable storage volume. To do this, make changes to the boot volume, then delete the instance that uses the boot disk. Next, re-create the instance using the same boot disk and verify that changes made to the boot volume persist.



## Practice 11-4 (Solution)

1. Log into the instance via SSH to change the parameter `kernel.panic`
2. Make changes to bootable storage volume

- Run the command:

```
sudo vi /etc/sysctl.conf
```

Update `/etc/sysctl.conf` changing

`kernel.panic = 1`

to

`kernel.panic = 0`

- Save the change and quit the session

3. Delete the existing instance associated with the bootable storage volume
  - Go to the Oracle Compute Cloud Service console.
  - On the **Instances** page, identify the instance `<yourfirstname>_bootinstance`.
  - Click the **Orchestrations** tab.
  - Go to the orchestration that controls the instance that you want to delete. The orchestration name is of the format `<your_instance_name>_bootinstance`. From the menu, select **Stop / Terminate**.
  - After you respond with Yes, you will see the status of your instance is Stopping.
  - Refresh until you see the status of Stopped.
4. Re-create the instance by restarting the instance orchestration.
  - Go to the Oracle Compute Cloud Service console.
  - Click the **Orchestrations** tab.
  - Go to the orchestration that controls the instance that you want to create. From the menu, select **Start**.
  - You will know the instance is started when it has a status of Ready in Orchestrations, and a status of Running in Instance.
  - Verify the security lists for the instance. You may need to add back the security lists.
5. After the instance is created, check if the changes made to the bootable storage volume persist
  - Log in to the instance using `ssh`.
  - Run the command:

```
sysctl -a | grep kernel.panic
```

- Multiple rows are returned in the output including `kernel.panic = 0` thus confirming that the bootable storage volume is persistent.



## Practice 11-5: Delete the instance

---

### Overview

In this practice, you delete an instance.



## Practice 11-5 (Solution)

---

1. Go to the Compute Classic console.
2. Click the **Orchestrations** tab.
3. Go to the orchestration that controls the instance that you want to delete. The orchestration name is of the format `<yourfirstname>_bootinstance`. From the menu, select **Terminate**.
4. Once terminated, in the menu click **Delete**.

## Practice 12-1: Create an Instance Using Orchestration

### Overview

In this practice, you create an instance using an orchestration.

### Tasks

- Task – 1: Check that the prerequisite objects are available
- Task – 2: Build your orchestration using JSON
- Task – 3: Upload the orchestration to Compute Classic



## Practice 12-1 (Solution)

---

**Task – 1: Check that the following prerequisite objects are available. You will reference these objects in your orchestration JSON file.**

1. An SSH public key on Compute Classic, with the corresponding private key on the system that you will use to access your instance. Use `<yourfirstname>_ssh_public_key`.
2. A bootable storage volume. You can use the bootable storage volume `<yourfirstname>_bootable_vol_01` that you had created in Lesson 11. When you delete your instance, the bootable storage volume is not deleted.
3. A block storage volume. Create another block storage volume (refer practice 10) now with the name `<yourfirstname>_storage_vol_02`.
4. An IP reservation. You can use the IP reservation `<yourfirstname>_ip_reservation` that you created in Practice 11.
5. Security lists.  
You can use the security lists `<yourfirstname>_seclist_enable_pings` and `<yourfirstname>_seclist_enable_ssh` that you created for SSH access to your instance in Practice 11.

**Note:** Update the status of the security rule `<yourfirstname>_secrule` to **Enable**.

For the orchestration script if you are not able to figure the `<identity_domain>/<user>/` parameters download an existing orchestration script. To download click the orchestration tab at the top. From the breadcrumb beside an existing instance click download.

## Task – 2: Build your orchestration using JSON

1. Edit the following sample orchestration JSON script.

## Sample Orchestration for Creating a Single Instance

You can use the following sample orchestration as a starting point for building your first orchestration.

```
{
  "description": "Simple oplan with an ssh key and a security list",
  "name": "/Compute-
<identity_domain>/<user>/<yourfirstname>_first_orchestration",
  "oplane": [
    {
      "label": "simple_oplan",
      "obj_type": "launchplan",
      "objects": [
        {
          "instances": [
            {
              "imagelist": "/oracle/public/OL_7.2_UEKR4_x86_64",
              "label": "My_First_Orchestration_Instance",
              "name": "/Compute-
<identity_domain>/<user>/<yourfirstname>_FirstOrchestration_Instance",
              "networking": {
                "eth0": {
                  "seclists": [
                    "/Compute-<identity_domain>/<user>/<yourfirstname>_seclist_enable_pings",
                    "/Compute-<identity_domain>/<user>/<yourfirstname>_seclist_enable_ssh"
                  ],
                  "nat": "ipreservation:/Compute-
<identity_domain>/<user>/<yourfirstname>_ip_reservation"
                }
              },
              "shape": "oc3",
              "storage_attachments": [
                {
                  "index": 1,
                  "volume": "/Compute-
<identity_domain>/<user>/<yourfirstname>_bootable_vol_01"
                },
                {
                  "index": 2,
                  "volume": "/Compute-
<identity_domain>/<user>/<yourfirstname>_storage_vol_02"
                }
              ],
              "boot_order": [1],
```

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```

        "sshkeys": [
            "/Compute-
<identity_domain>/<user>/<yourfirstname>_ssh_public_key"
        ]
    }
}
]
}
]
}
]
}
}

```

2. In the sample JSON provided here, replace `/Compute-<identity_domain>/<user>` with your own identity domain and user name.
3. Replace `<yourfirstname>` placeholder with your name
4. Save the orchestration file on your computer with the file name `<yourfirstname>_orchestration_01.json`
5. Validate your JSON script  
You can do this by using a third-party tool, such as JSONLint, or any other validation tool of your choice. If your JSON syntax is not valid, an error message is displayed when you upload the orchestration.

**Note:**

- Oracle does not support or endorse any third-party JSON-validation tool.
- Choose the image `OL_7.2_UEKR4_x86_64` or a similar Oracle-provided Oracle Linux image.

Your orchestration file is now ready.

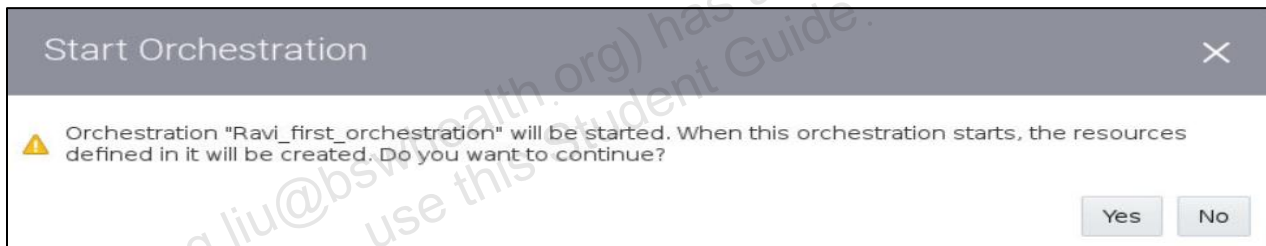
### Task – 3: Upload the orchestration to Compute Classic

1. Go to the Compute Classic console.
2. Click the **Orchestrations** tab.
3. Click **Upload Orchestration** and select the orchestration file `yourfirstname_orchestration_01.json`
4. Click **Upload**
5. When the orchestration is successfully uploaded, it is listed on the Orchestrations page.



Name	Description	Status	Time	Resources
v1 Ravi_first_orchestration	Simple opian with an ssh key and a security list	Stopped		

6. Click on the Action menu of your orchestration and click on **Start**.
7. Click on **Yes** in the Start Orchestration window



**Note:** If your JSON syntax is not valid, an error message is displayed after you upload the orchestration.

- You will have to delete the orchestration. From the menu, click **Delete**.
- Using an editor on modify the JSON file to correct the error, and upload the file again

8. Check if all the pre-requisite objects have been created and are in active state.

When you start an orchestration, its status changes to Starting and the objects defined in the orchestration are provisioned. When all the objects have been created, the status of the orchestration changes to Ready.

If the orchestration cannot create an object, its status changes to Error. An orchestration might transition from the Error to the Ready state when it completes creating all the specified objects.

If the status of your orchestration continues to show **Error**, then stop the orchestration, by clicking **Terminate** in the menu. Identify and fix the issue in an offline copy of the orchestration JSON file, upload the modified orchestration file, and start the orchestration.

- You will have to delete the orchestration. From the menu, click **Delete**.



- Using an editor, modify the JSON file to correct the error, modified orchestration file, and start the orchestration again.

**Note:** If you receive an error related to IP Reservation then remove the below lines of code and try:

```
"nat": "ipreservation:/Compute-  
<identity_domain>/<user>/<yourfirstname>_ip_reservation"
```

## Practice 12-2: Monitor Your Orchestration

---

### Overview

In this practice, you monitor your orchestration on the Compute Classic web console and verify that your instance has been created. Verify that you can ping the instance.



## Practice 12-2 (Solution)

---

1. Go to the Compute Classic console.
2. Click the **Orchestrations** tab. All orchestrations are displayed, with information about their description and status.  
**Note:** You can filter the list of orchestrations according to their category or status.
3. Go to the orchestration `<yourfirstname>_first_orchestration`. From the menu, select **View**. The orchestration details page shows you the details of the current state of the orchestration, including return parameters, in JSON format.
4. When the status of the orchestration is **Ready**, your instance is running. To verify the status of your instance, go to the **Instances** page. Your instance should be listed with the status **Running**.
5. Go to the instance page and assign public IP
6. Verify that you can ping the instance from your computer.
  - Note the public IP address of your instance.
  - Open a terminal on your computer.
  - Ping your instance using its public IP address as follows:

```
ping ip_address
```
  - The instance will respond with packets of data.
7. Verify you can connect to your instance with SSH.

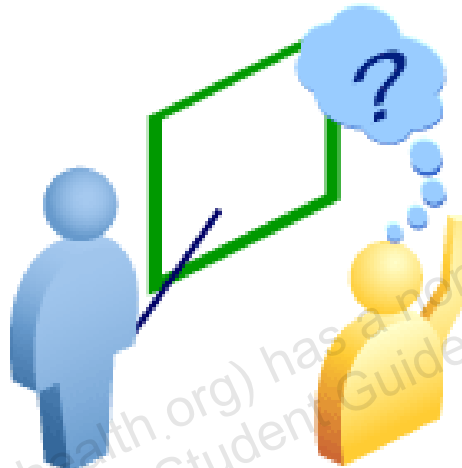
```
ssh opc@ip_address -i private_key
```

## Practice 12-3: Stop and Restart the Orchestration

---

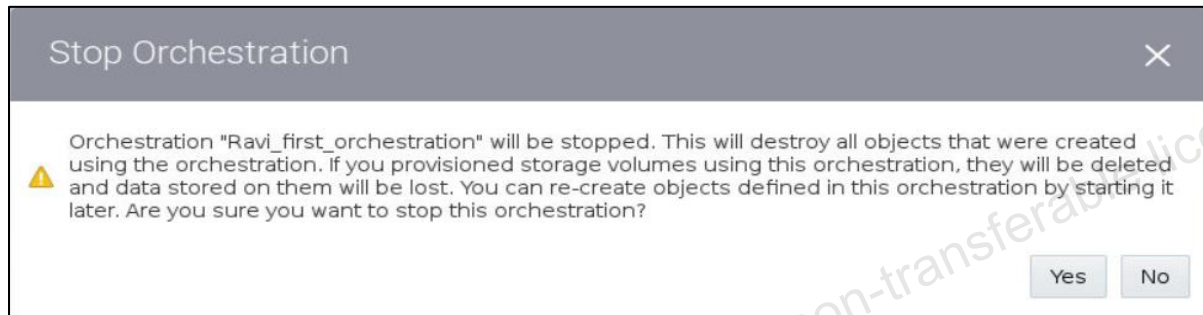
### Overview

In this practice, you stop and restart the orchestration that is in the **Ready** state.



## Practice 12-3 (Solution)

1. Go to the Compute Classic console.
2. Click the **Orchestrations** tab.
3. Go to the orchestration `<yourfirstname>_first_orchestration`. From the menu, select **Terminate**.
4. Click in the Stop Orchestration window



The status of the orchestration changes to **Stopping**.

After all objects have been deleted, the status of the orchestration changes to **Stopped**.

5. Click the **Instances** tab. Verify that the instance created by the orchestration has disappeared from the list of instances.
6. Click the **Storage** tab. Verify that storage volumes referenced in the orchestration are still listed.
7. Click the **Network** tab. Verify that network objects like IP reservation and security list referenced in the orchestration are still listed.
8. Go to the orchestration `<yourfirstname>_first_orchestration`. From the menu, select **Start**.
9. Click **Yes** on the Confirmation window
10. Click the **Instances** tab. Verify that the instance created by the orchestration is running.

## Practice 12-4: Delete Your Instance

---

### Overview

In this practice, you will delete your instance from the Compute Classic web console by stopping the corresponding orchestration.

## Practice 12-4 (Solution)

---

1. Go to the Compute Classic console.
2. Go to the **Orchestrations** tab.

Select the orchestration that controls the instance that you want to delete. The orchestration name is `<yourfirstname>_first_orchestration`. From the menu, select **Terminate**. Once the status is **Stopped**, from the menu click **Delete**.

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## Practice 14-1: Request an Authentication Token

### Overview

In this practice, you request an authentication token.

### Tasks

Task – 1: Gather account details.

Task – 2: Use cURL to request a token.



## Practice 14-1 (Solution)

---

You request an authentication token and construct the authentication URL for your account.

### Assumptions

- You know your Oracle Cloud user name and password.
- cURL is installed and configured in the landing pad assigned to you.

## Task – 1: Gather your account details

1. Look for Storage Classic service in the Dashboard
2. Click on the Action menu and Select **View Details**
3. Copy the **Identity Service Id**, **REST Endpoint (permanent)** and **Auth V1 Endpoint** fields values from Additional Information section and store it in a text file, we will need this information to make REST calls using cURL

Additional Information			
Plan	Oracle Cloud Infrastructure Object Storage Classic	Identity Service Id	idcs-cc3c7c939e97857ec55aa44
Service Start Date	6-Dec-2017	Status	Active
Subscription ID	1699992	Buyer	raghu.viswanathan@oracle.com
Service Instance ID	588436050	REST Endpoint (Permanent)	https://Storage-ed4e4fb8a6f2e1d01b744a08d5f.stora
Customer Account	Oracle India Private Limited - Intern...	REST Endpoint	https://ocuocictrng6.storage.oraclecloud.com/v1/Storage-oci
CSI Number	21485398	Auth V1 Endpoint	https://ocuocictrng6.storage.oraclecloud.com/auth/v1.0

## Task – 2: Request an authentication token

1. Open a terminal and run the following cURL command:

### Notes:

- Replace the User Name and Password placeholders with your login credentials
- Replace Identity Service ID placeholder with the Identity Service ID that you copied in the previous step
- Replace the Auth V1 Endpoint URL placeholder with the Auth V1 Endpoint URL that you copied in the previous step
- Enter the command on a single line

```
curl -v -X GET -H "X-Storage-User: Storage-<Identity Service ID>:<User Name>"  
-H "X-Storage-Pass: <Password>" <Auth V1 Endpoint URL>
```

For Example:

```
curl -v -X GET -H "X-Storage-User: Storage-idcs-cc3c7c939e97857ec55aa44:  
jack.jones@example.com" -H "X-Storage-Pass: PASSWORD"  
https://ocuocictrng21.storage.oraclecloud.com/auth/v1.0
```

2. The following is an example of the output of this command, with certain key lines highlighted. Note that if the request includes the correct credentials, it returns the HTTP/1.1 200 OK response.

```
[oracle@edwarlp0 ~]$ curl -v -X GET -H "X-Storage-User: Storage-idcs-cc3c7c939e564609bell1d257ec55aa44:ora037" -H "X-Storage-Pass: M43kS900e" https://ocuocitrng6.storage.oraclecloud.com/auth/v1.0
* About to connect() to proxy ges-proxy.us.oracle.com port 80 (#0)
* Trying 141.146.28.70...
* Connected to ges-proxy.us.oracle.com (141.146.28.70) port 80 (#0)
* Establish HTTP proxy tunnel to ocuocitrng6.storage.oraclecloud.com:443
> CONNECT ocuocitrng6.storage.oraclecloud.com:443 HTTP/1.1
Host: ocuocitrng6.storage.oraclecloud.com:443
User-Agent: curl/7.29.0
Proxy-Connection: Keep-Alive
X-Storage-User: Storage-idcs-cc3c7c939e564609bell1d257ec55aa44:ora037
X-Storage-Pass: M43kS900e
>
< HTTP/1.0 200 Connection established
< X-RBT-SCAR: 10.206.82.2:71422062:1000
<
* Proxy replied OK to CONNECT request
* Initializing NSS with certpath: sql:/etc/pki/nssdb
* CAfile: /etc/pki/tls/certs/ca-bundle.crt
* Capath: none
* Server certificate:
  subject: CN=*.storage.oraclecloud.com,OU=Oracle CSEC CHICAGO,O=Oracle Corporation,L=Redwood City,ST=California,C=US
  start date: Sep 11 00:00:00 2017 GMT
  expire date: Dec 11 23:59:59 2018 GMT
  common name: *.storage.oraclecloud.com
  issuer: CN=Symantec Class 3 Secure Server CA - G4,OU=Symantec Trust Network,O=Symantec Corporation,C=US
> GET /auth/v1.0 HTTP/1.1
> User-Agent: curl/7.29.0
Host: ocuocitrng6.storage.oraclecloud.com
Accept: */*
X-Storage-User: Storage-idcs-cc3c7c939e564609bell1d257ec55aa44:ora037
X-Storage-Pass: M43kS900e
>
< HTTP/1.1 200 OK
date: 1526647017.967
X-Auth-Token: AUTH tk105a0a826d2f0dcf4aa6b56877c8016c
X-Storage-Token: AUTH tk105a0a826d2f0dcf4aa6b56877c8016c
X-Storage-Url: https://uscom-central-1.storage.oraclecloud.com/v1/Storage-idcs-cc3c7c939e564609bell1d257ec55aa44
Content-Length: 0
Server: Oracle-Storage-Cloud-Service
* Connection #0 to host ges-proxy.us.oracle.com left intact
```

### 3. From the output of the command that you just ran, note the following:

- The value of the X-Storage-Url header.

This value is the REST endpoint URL of the service. You will use this URL when you create containers.

In the example output, the service REST endpoint is `https://uscom-central-1.storage.oraclecloud.com/v1/Storage-identity_domain>`.

- The value of the X-Auth-Token header.

This value is the authentication token, which you will use when you create containers and objects. Note that the authentication token expires after 30 minutes, after which you should request a fresh token.

## Practice 15-1: Create Containers

### Overview

In this project, you create three containers, verify that they were successfully created, and show a list of containers.

### Tasks

Task – 1: Request an authentication token.

Task – 2: Create three containers.

Task – 3: Verify containers were created.

Task – 4: List containers.



## Practice 15-1 (Solution)

---

### Task – 1: Obtain your authentication token

1. Open a terminal and request your token by using the following curl command:

```
curl -v -X GET -H "X-Storage-User: Storage-<Identity Service ID>:<User Name>"  
-H "X-Storage-Pass: <Password>" <Auth V1 Endpoint URL>
```

**Note:** This is the same command that you executed in Practice 14-1. Replace all the place holders and execute.

REMINDER: Your authenticated token expires 30 minutes after you request it.

## Task – 2: Create Containers

1. Create a container named `myFirstContainer` using your authenticated token and the REST Endpoint(Permanent) URL(copied in Practic 14-1)

```
curl -v -s -X PUT -H "X-Auth-Token: <X-Auth-Token>" <REST  
Endpoint(Permanent)>/myFirstContainer
```

Note: Replace the placeholders and run the curl command

For Example:

```
curl -v -s -X PUT -H "X-Auth-Token: AUTH_tk105a0a826d2f0dcf4aa6b56877c8016c"  
https://Storage-  
ed4e4fb8a6f24563894d01b744a08d5f.storage.oraclecloud.com/v1/Storage-  
ed4e4fb8a6f24563894d01b744a08d5f/myFirstContainer
```

2. Repeat step #1 two more times to create containers: `mySecondContainer` and `myThirdContainer`

### Task – 3: Verify that your container was created

1. Run the following cURL command:

```
curl -v -s -X GET -H "X-Auth-Token: AUTH_ myGeneratedNumber" <REST  
Endpoint (Permanent)>/myFirstContainer
```

**For Example:**

```
curl -v -s -X GET -H "X-Auth-Token: AUTH_tk45501d12b21c714b93470992ecf9a535"  
https://Storage-  
ed4e4fb8a6f24563894d01b744a08d5f.storage.oraclecloud.com/v1/Storage-  
ed4e4fb8a6f24563894d01b744a08d5f/myFirstContainer
```

2. If the request is completed successfully, it returns the HTTP/1.1 204 No Content response, as shown in the following:

```
* HTTP/1.1 or later with persistent connection, pipelining supported  
< HTTP/1.1 204 No Content  
< X-Container-Object-Count: 0
```

3. Repeat step #1 two more times to verify that container mySecondContainer and myThirdContainer were successfully created.



## Task – 4: List containers

1. Run the following cURL command:

```
curl -v -X GET -H "X-Auth-Token: AUTH_ myGeneratedNumber" <REST  
Endpoint(Permanent)>?limit=50
```

For Example:

```
curl -v -X GET -H "X-Auth-Token: AUTH_tk45501d12b21c714b93470992ecf9a535"  
https://Storage-  
ed4e4fb8a6f24563894d01b744a08d5f.storage.oraclecloud.com/v1/Storage-  
ed4e4fb8a6f24563894d01b744a08d5f?limit=50
```

**Note:** You should see the three containers you created in Task – 2 otherwise increase the limit.

## Practice 15-2: Create Objects

---

### Overview

In this project, you delete, show lists of objects in containers, and download an object.

### Tasks

Task – 1: Split large files.

Task – 2: Create objects.

Task – 3: List objects in a container.

Task – 4: Download an object.

## Practice 15-2: (Solution)

---

### Task – 1: Split Large Files

Before adding objects in containers, if the file size of the object you want to add is greater than 5GB, split it into smaller segments.

- Use the `split` command to split a large file into smaller chunks.

**Note:** If you don't have a large file to upload, use the `dd` command to create a large file. For example, to create a 10 GB file, run the following command:

```
dd if=/dev/zero of=test.img bs=1M count=10000
```

- Split the large file into smaller 2GB chunks.

```
split -b 2G test.img chunks
```

This command creates five 2GB files named `chunksaa`, `chunksab`... and so on.

## Task – 2: Create objects

1. Run the following curl command to create myRedObject1 in myFirstContainer:

```
curl -v -X PUT -H "X-Auth-Token: AUTH_myGeneratedNumber " -H "Content-Length: 0" <REST Endpoint (Permanent)>/myFirstContainer/myRedObject1
```

Example:

```
curl -v -X PUT -H "X-Auth-Token: AUTH_tka9789a6a0db17c853dff2b3b07399827" -H "Content-Length: 0" https://Storage-ed4e4fb8a6f24563894d01b744a08d5f.storage.oraclecloud.com/v1/Storage-ed4e4fb8a6f24563894d01b744a08d5f/myFirstContainer/myRedObject1
```

If the request is completed successfully, it returns the HTTP/1.1 201 Created response, as shown in the following example:

```
X-Auth-Token: AUTH_tka9789a6a0db17c853dff2b3b07399827
Content-Length: 0
HTTP/1.1 201 Created
```

2. Repeat step #1 to create myRedObject2 and myRedObject3 in myFirstContainer
3. Repeat step #1 to create myBlueObject1 and myBlueObject2 in mySecondContainer
4. Repeat step #1 to create myGreenObject1 in myThirdContainer

**Note:** Use parameter -T file\_path to create objects with files

Example:

```
curl -v -X PUT -H "X-Auth-Token: AUTH_tke2817f69fd8382ac846c3c0c552a6999" -T /home/oracle/mytextfile.txt https://Storage-ed4e4fb8a6f24563894d01b744a08d5f.storage.oraclecloud.com/v1/Storage-ed4e4fb8a6f24563894d01b744a08d5f/myFirstContainer/myFileObject
```

### Task – 3: List objects

1. Run the following cURL command to list objects in myFirstContainer:

```
curl -v -X GET -H "X-Auth-Token: AUTH_ myGeneratedNumber" <REST  
Endpoint (Permanent)>/myFirstContainer?limit=15
```

Example:

```
curl -v -X GET -H "X-Auth-Token: AUTH_tke2817f69fd8382ac846c3c0c552a6999"  
https://Storage-  
ed4e4fb8a6f24563894d01b744a08d5f.storage.oraclecloud.com/v1/Storage-  
ed4e4fb8a6f24563894d01b744a08d5f/myFirstContainer?limit=15
```

2. Repeat step #1 to list objects in mySecondContainer and myThirdContainer
3. You should see all the objects created in Task – 1.

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2. Your HTTP response should be: **HTTP/1.1 200 OK**

Example :

```
* HTTP/1.1 or later with persistent connection, pipelining supported
< HTTP/1.1 200 OK
< Accept-Ranges: bytes
< Last-Modified: Mon, 28 Mar 2016 17:29:05 GMT
< Etag: d41d8cd98f00b204e9800998ecf8427e
< X-Timestamp: 1459186144.00840
< X-Trans-Id: tx193046d85fd8437aa4a96-0056f96e1bga
< Date: Mon, 28 Mar 2016 17:47:07 GMT
< Connection: keep-alive
< X-Last-Modified-Timestamp: 1459186144.00840
< Content-Type: application/octet-stream;charset=UTF-8
< Content-Length: 0
* Server Oracle-Storage-Cloud-Service is not blacklisted
< Server: Oracle-Storage-Cloud-Service
<
* STATE: PERFORM => DONE handle 0x600057810; line 1645 (connection #0)
* Curl_done
0 0 0 0 0 0 0 0 --:--:-- 0:00:05 --:--:-- 0
* Connection #0 to host storage.us2.oraclecloud.com left intact
```

## Practice 15-3: Manage Containers and Objects

---

### Overview

In this project, you set up container metadata (ACLs), update objects metadata, and delete containers and objects.

### Tasks

Task – 1: Container – Provide write access for specified users.

Task – 2: Container – Provide read access and allow listing of objects.

Task – 3: Object – Update and obtain object metadata.

Task – 4: Delete an object.

Task – 5: Delete a container.

## Practice 15-3 (Solution)

---

**Task – 1: Provide write access for any user with the predefined role, `Storage_ReadWriteGroup` and the custom role, `myCustomRole`**

1. Run the following cURL command:

```
curl -v -X POST -H "X-Auth-Token: AUTH_myGeneratedNumber" -H "X-Container-Write: myDomain.Storage.Storage_ReadWriteGroup,myDomain.myCustomRole" https://storage.us2.oraclecloud.com/v1/Storage-myIdentityDomain/myFirstContainer
```

2. Your HTTP response should be: **HTTP/1.1 204 No Content**



## Task – 2: Provide read access for all hosts and also allowing listing of the objects in the container

1. Using your authenticated token use the following cURL command to create myFirstContainer:  

```
curl -v -X POST -H "X-Auth-Token: AUTH_myGeneratedNumber" -H "X-Container-Read:  
.r:*,.rlistings" https://storage.us2.oraclecloud.com/v1/Storage-  
myIdentityDomain/myFirstContainer
```
2. Your HTTP response should be: **HTTP/1.1 204 No Content**

### Task – 3: Update and obtain an object's metadata

1. Run the following cURL command:

```
curl -v -X POST -H "X-Auth-Token: AUTH_myGeneratedNumber" -H "X-Object-Meta-Language: english" https://storage.us2.oraclecloud.com/v1/Storage-myIdentityDomain/myFirstContainer/myRedObject1
```

2. Your HTTP response should be: **HTTP/1.1 202 Accepted**

3. Run the following cURL command:

```
curl -v -X HEAD -H "X-Auth-Token: AUTH_myGeneratedNumber" https://storage.us2.oraclecloud.com/v1/Storage-myIdentityDomain/myFirstContainer/myRedObject1
```

4. If you look through your output content, you will find that myRedObject1 now has a new metadata attribute:

```
X-Object-Meta-Language: english
```

## Task – 4: Delete an object

1. Run the following cURL command:

```
curl -v -X DELETE -H "X-Auth-Token: AUTH_myGeneratedNumber"  
https://storage.us2.oraclecloud.com/v1/Storage-  
myIdentityDomain/mySecondContainer/myBlueObject1
```

2. Your HTTP response should be: **HTTP/1.1 204 No Content**
3. Repeat step #1 and delete myBlueObject2 from mySecondContainer.

## Task – 5: Delete a container

1. The container must be empty. Make sure it is empty before moving to step 2.
2. Run the following cURL command to delete the container:  

```
curl -v -X DELETE -H "X-Auth-Token: AUTH_myGeneratedNumber"  
https://storage.us2.oraclecloud.com/v1/Storage-myIdentityDomain/mySecondContainer
```
3. Your HTTP response should be: **HTTP/1.1 204 No Content**

## Practice 16-1: Clean Up Your Environment

### Overview

In this practice, you clean up the Oracle Compute Cloud Service environment by deleting the resources that you have created. This is required before you attempt the final practice.

Delete the following objects:

- Your storage volumes
- Your IP reservation
- Your security lists
- Your security IP lists
- Your security rules
- Your orchestrations
- Your ssh public key

## Practice 16-1 (Solution)

---

1. Go to the Oracle Compute Cloud Service web console.
2. Click the **Orchestrations** tab. Go to the orchestration `<yourfirstname>_orchestration_01`. From the menu, select **Stop**.

- Click the **Instances** tab.

The page displays the list of instances. Verify that the instance `<yourfirstname>_FirstOrchestration_Instance` is deleted.

**Note:** Repeat the above mentioned steps for any other orchestrations that you have created during this course.

3. Click the **Network** tab.

The page displays the list of security rules. Go to `<yourfirstname>_secrule`. From the menu, click **Delete**.

- Click the **Security Lists** tab on the left pane.

The page displays the list of security lists. Go to `<yourfirstname>_seclist_enable_pings`. From the menu, click **Delete**.

Go to `<yourfirstname>_seclist_enable_ssh`. From the menu, click **Delete**.

- Click the **Security IP Lists** tab on the left pane.

The page displays the list of security IP lists. Select `<yourfirstname>_secIPlist`. From the menu, click **Delete**.

- Click the **IP Reservations** tab on the left pane.

The page displays the list of IP reservations. Select `<yourfirstname>_ip_reservation`. From the menu, click **Delete**.

- Click the **SSH Public Keys** tab on the left pane.

The page displays the list ssh keys. Select your ssh key from the list . From the menu, click **Delete**.

**Note:** Deleting ssh public key is not allowed when the instances using the same key are up and running.

4. Click the **Storage** tab.
  - The page displays the list of storage volumes. Select <yourfirstname>\_bootable\_vol\_01. From the menu, click **Delete**.
  - The page displays the updated list of storage volumes. Select <yourfirstname>\_storage\_vol\_02. From the menu, click **Delete**.
5. Click the **Orchestrations** tab.

The page displays the list of orchestrations. Select <yourfirstname>\_first\_orchestration. From the menu, click **Delete**.

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