8

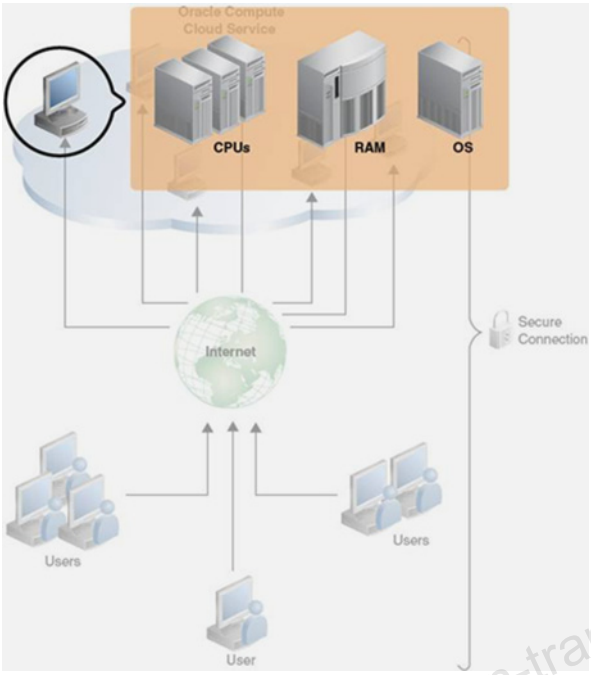
Oracle Compute Cloud Service Instances

Objectives

After completing this lesson, you should be able to:

- Describe the features and uses of Oracle Compute Cloud Service instances
- Explain how SSH keys are used
- Generate an SSH key pair and upload the public key
- Use the Create Instance wizard to create an instance

What Is an Instance?



In Oracle Compute Cloud Service, an instance is a virtual machine that runs a specific operating system and has the CPU and memory resources that you specify.

Oracle Compute Cloud Service provides a number of machine images that you can use to create an instance. A machine image is a template of a virtual hard disk of a specific size with an installed operating system. For example, you can select a machine image that will create an instance running the Oracle Linux operating system.

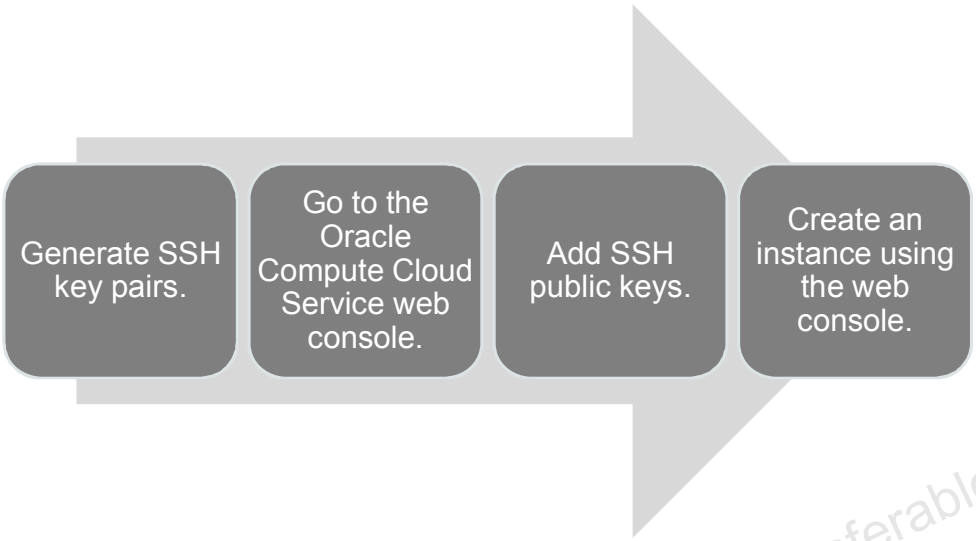
Oracle Compute Cloud Service also provides a number of predefined shapes that you can use. A shape is a carefully designed combination of processor and memory limits that specifies the number of CPUs and the amount of RAM to be allocated to an instance. When you select a shape, your instance is created with the corresponding number of Oracle Compute Units (OCPUs).

An OCPU provides CPU capacity equivalent to one physical core of an Intel Xeon processor with hyper threading enabled. Each OCPU corresponds to two hardware execution threads, known as vCPUs.

You can create instances by using the Oracle Compute Cloud Service web console. While creating your instance, you can specify network access configurations to enable you to log in to your instance remotely. You can also add persistent block storage to your instance.

When your instance is ready, you can log in to your instance remotely from any physical location. You can then configure your instance to add users, mount block storage devices and write data, install applications, and so on. You can run any applications on your instance that are supported on the OS, and that you have licenses for.

How Do I Create an Instance from the Web Console?



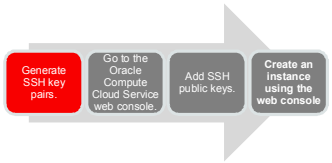
There are many ways that you can create instances and the associated networking and storage resources.

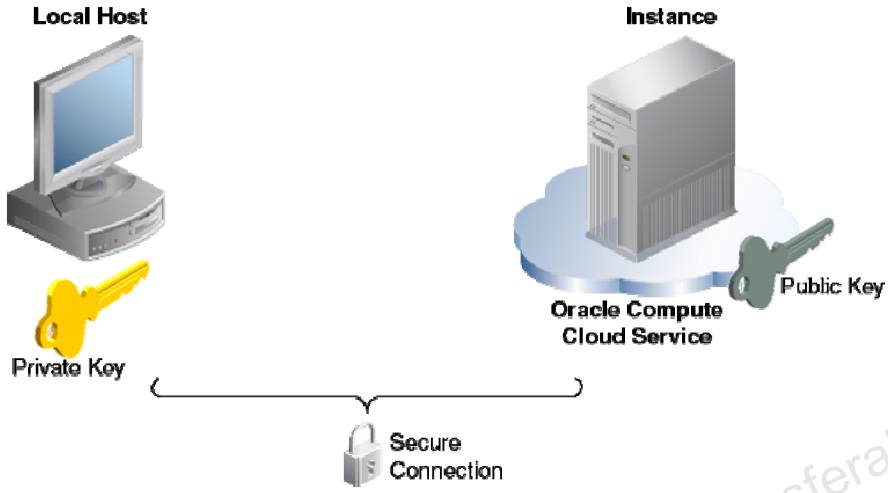
For example, you can create the required storage volumes first, and then create the instances to which the storage volumes should be attached. Alternatively, you can create instances first, and then create and attach the required storage volumes to the instances. Similarly, you can create security lists first, and then create instances and add them to the security lists; or you can create the instances first, and then create security lists and add instances to them.

Let's start with the simplest workflow.

1. Generate SSH key pairs.
2. Go to the Oracle Compute Cloud Service web console.
3. Add your SSH public keys.
4. Create an instance by using the web console.

What Is an SSH Key?





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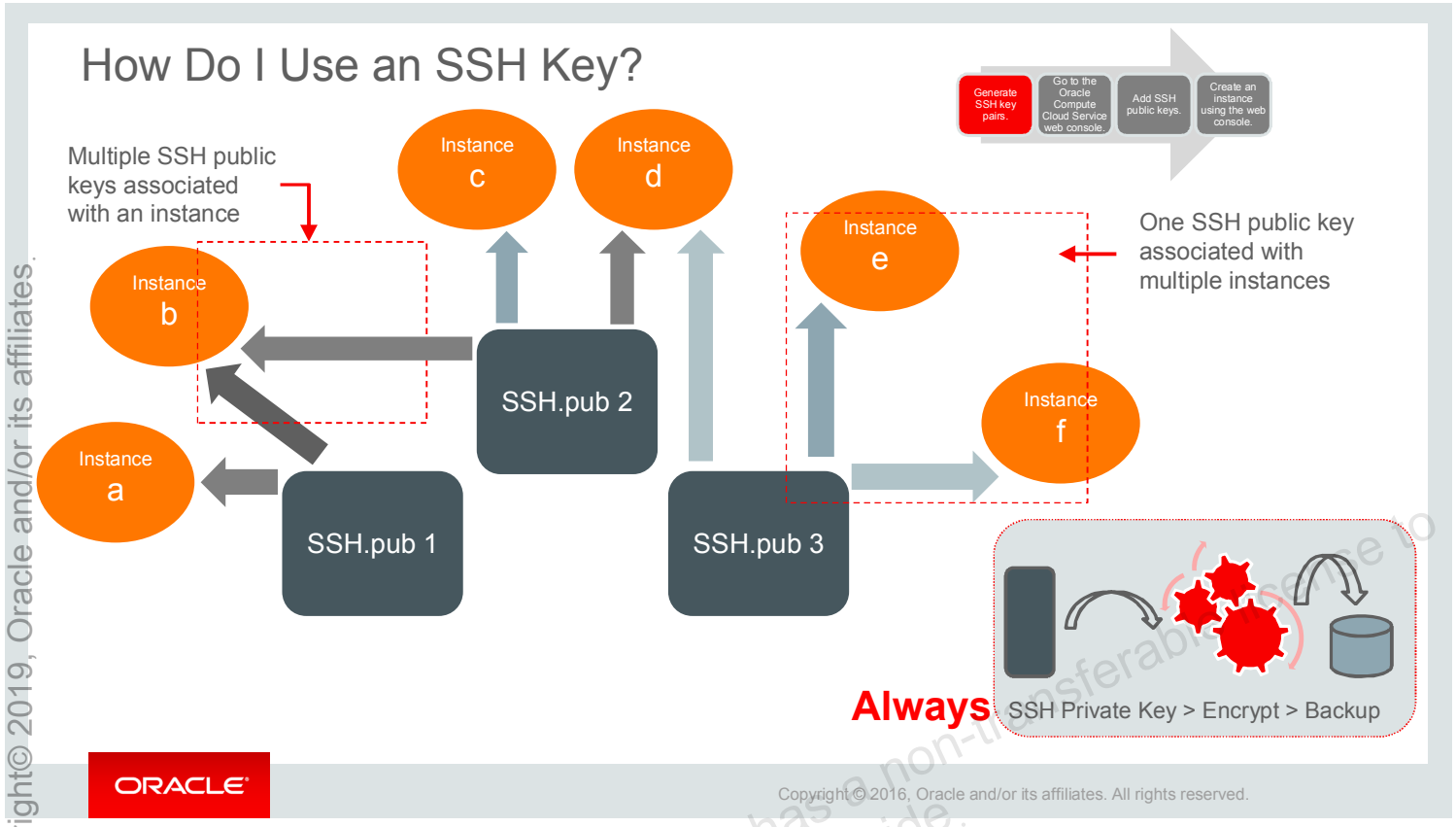
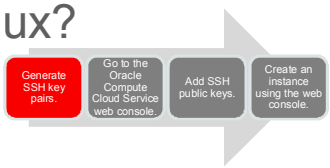
Using SSH Keys

- SSH stands for Secure Shell.
- SSH is a cryptographic network protocol that uses two keys, a public key and a private key, to provide secure communication between two computers.
- Before creating instances, generate at least one SSH key pair and ensure that the private key is available on each host that you will use to access instances.
- The public key must be stored on the instance that you want to access.
- When you log in to the instance by using SSH, you must provide the private key that matches a public key associated with the instance.



- You can associate multiple SSH public keys with an instance.
- You can associate an SSH public key with multiple instances.
- Always back up an encrypted copy of your private SSH keys, and keep the keys secure.

How Do I Generate an SSH Key Pair on Linux?



1. Run the ssh-keygen command
   `ssh-keygen -t rsa`
2. Enter the required path and select file name
3. The command prompts you to enter a passphrase

The command generates an SSH key pair

Private key: `example_filename`
Public key : `example_filename.pub`

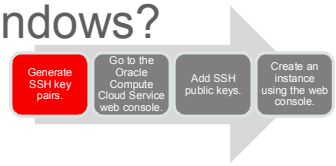
- Run the ssh-keygen command.
  - You can use the -t option to specify the type of key to create.
  - To create an RSA key, run: ssh-keygen -t rsa
  - You can use the -b option to specify the length (bit size) of the key, as shown in the following example:
  - ssh-keygen -b 2048 -t rsa
- The command prompts you to enter the path to the file in which you want to save the key.
  - A default path and file name are suggested in parentheses.
  - For example: /home/user_name/.ssh/id_rsa.
  - Enter the required path and select file name and then press Enter.
- The command prompts you to enter a passphrase.
  - 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.

Make a note of

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

How Do I Generate an SSH Key Pair on Windows?

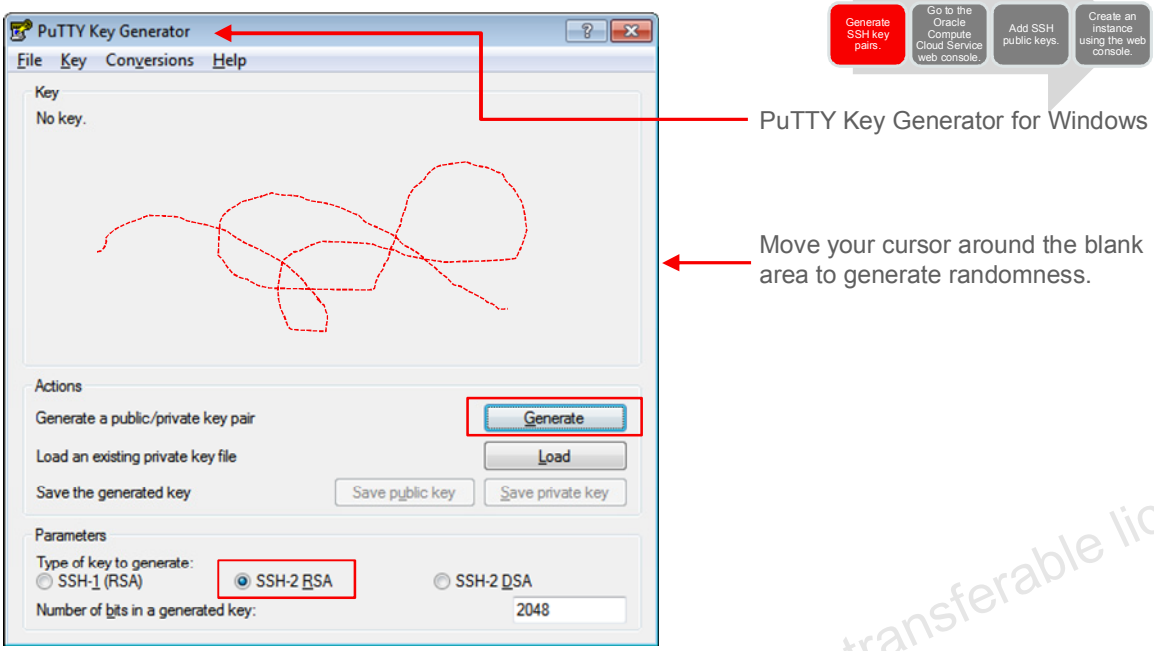


Install PuTTY

1. Reach the main download site http://www.putty.org
2. Locate `putty.zip`, download it.
3. Unzip the package and install.
4. On your computer, check at the path `C:\Program Files(x86)\PuTTY` for `putty.exe` and `puttygen.exe`, the two utilities we will use in the practices.

Now generate the SSH key pair

How Do I Generate an SSH Key Pair on Windows?

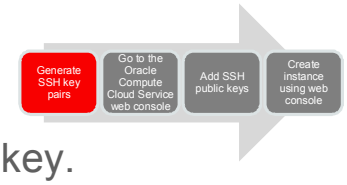


To generate an SSH key pair by using the PuTTY Key Generator, perform the following steps:

1. Find puttygen.exe in the PuTTY folder on your computer, for example, C:\Program Files (x86)\PuTTY.
2. Double-click puttygen.exe to open it.
3. Accept the default key type, SSH-2 RSA. SSH-2 is the most recent version of the SSH protocol (and it is incompatible with SSH-1). RSA and DSA are algorithms for computing digital signatures.
4. Set the “Number of bits in a generated key” to 2048 bits, if it is not already set to that value. This sets the size of your key and thus the security level. A minimum of 2048 bits is recommended for SSH-2 RSA.
5. Click Generate.
6. Move your cursor around the blank area to generate randomness.

Note: The dotted red line in the image is for illustration purposes only. It does not appear in the generator pane as you move the cursor.

Saving the SSH Private Key on Windows

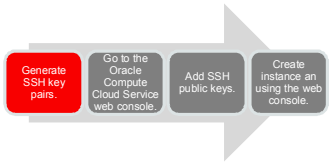


1. The generated key appears under the Public key.
2. The key comment is the name of the key.
3. Password-protect your key, and enter and confirm a key passphrase.
4. Save the private key in PPK format.
5. Save the key in OpenSSH format.
6. Give it the same name as the PPK format. Use the `.ssh` extension.

Saving a Private Key of the SSH Key Pair Using the PuTTY Key Generator on Windows

1. The generated key appears under the Public key for pasting into the OpenSSH authorized_keys file.
2. The key comment is the name of the key that you will use to identify it. You can keep the generated key comment or create your own.
3. Enter a Key passphrase and enter it again for Confirm passphrase.
4. Save the private key of the key pair in PuTTY's Private Key (PPK) format.
5. To save the key in OpenSSH format, open the Conversions menu and select Export SSH key.
6. Give it the same name as the key that you saved in PPK format in the previous step. You can also use any extension (or no extension), but let's use .ssh, to make it clear what format it is.

Saving the SSH Public Key on Windows

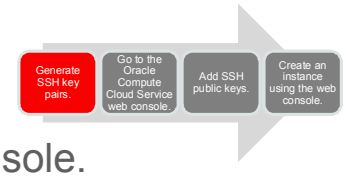


1. Select all the characters under the Public key.
2. Right-click and select Copy from the shortcut menu.
3. Open a text editor and paste the characters.
4. Save the key by using the same root name. Add a `.pub` extension.

Saving a Public Key of the SSH Key Pair Using the PuTTY Key Generator on Windows

1. In the PuTTY Key Generator, select all the characters under “Public key for pasting into OpenSSH authorized_keys file.”
2. Right-click somewhere in the selected text and select Copy from the context menu.
3. Open a text editor and paste the characters, just as you copied them. Start at the first character in the text editor, and do not insert any line breaks.
4. Save the key as a text file, using the same root name as you used for the private key. Add a .pub extension. You can give it any extension you want, but .pub is a useful convention to indicate that this is a public key.

I've Generated the SSH Key Pair. What's Next?



1. Go to the Oracle Compute Cloud Service console.
2. Start the Create Instance wizard.

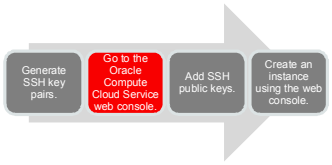
Go to the Oracle Compute Cloud Service console:

- Sign in to the Oracle Cloud My Services application at https://cloud.oracle.com/sign-in. The Oracle Cloud My Services Dashboard page appears.
- Click near the upper-left corner of the page. The CLOUD SERVICES menu is displayed.
- Select Oracle Compute Cloud Service. The Oracle Compute Cloud Service console is displayed.
- Click Create Instance to start the Create Instance wizard.

When you create an instance using the Create Instance wizard, one or more orchestrations are created automatically to manage the instance and its associated resources. For example, if you use the Create Instance wizard to create an instance and attach a storage volume to it, then two separate orchestrations are created, one for the instance and the other for the storage volume. A master orchestration is also created and both orchestrations are nested in the master orchestration.

You'll learn more about creating and using orchestrations in Lesson 12, Oracle Compute Cloud Service Orchestrations.

Create Instance Wizard - Image Page



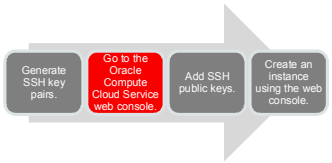
- Select `OL-6.6-20GB-x11-RD` or a similar Oracle-provided Oracle Linux image.
- The latest image list entry is selected by default.
- The image specifies the OS and disk size of the instance.
- Click the button to go to the next page.

On the Image page of the Create Instance wizard, select `OL-6.6-20GB-x11-RD` or a similar Oracle-provided Oracle Linux image.

If there are multiple entries in an image list, the latest entry is selected by default. You can select an earlier entry from the drop-down list.

After selecting an image, you can click Review and Create to accept the default settings and create your instance. For now, let's see how you can use the other pages in the Create Instance wizard to customize the instance.

Create Instance Wizard - Shape Page



- Select the OC3 shape.
- The shape specifies the OCPU and memory resources to be allocated to the instance.
- Click the button to go to the next page.

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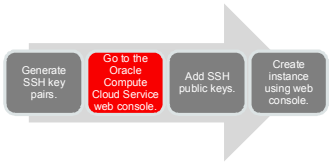
On the Shape page, select the shape that you want to use. The shape specifies the OCPU and memory resources to be allocated to the instance.

Create Instance Wizard – Instance Page



- High Availability Policy: Retain default HA Policy, Active.
- Name: Specify a name for the instance.
- Label: Enter a label.
- Description: Enter a description.
- Tags: Leave this field blank for now.
- DNS Hostname Prefix: Leave this field blank for now.
- Public IP Address: Select Auto Generated.
- Security Lists: Leave this field blank for now.
- SSH Keys: Add the SSH Public Key that you generated earlier.
- Custom Attributes: Leave this field blank for now.

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On the Instance page, select or enter the following information:

Select a High Availability Policy.

- If you retain the default HA policy, Active, then the orchestration monitors the status of your instance and if your instance crashes, the orchestration recreates it automatically.
- If you specify the HA policy Monitor, then the orchestration monitors the status of your instance. If your instance crashes, the status of the orchestration gets updated to Error. However, your instance isn't re-created automatically.
- If you specify the HA policy None, then the orchestration doesn't monitor the status of your instance.

Enter a name for the instance.

Note that the full name of an instance consists of several parts. If you specify a name in the Create Instance wizard, the full name of the instance would be in the format: /Compute identity_domain/user/name_you_specify/id. If you do not specify a name in the wizard, the full name would be in the format: /Compute-identity_domain/user/id. In either case, id is an autogenerated ID.

Enter a label for the instance.

- Enter a label that is meaningful and that you can use to identify the instance easily later. Try to assign a unique label for each instance.

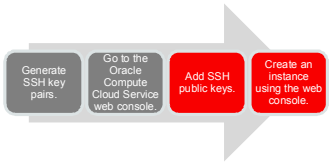
Associate a Public IP Address with the instance.

- If you want to connect to this instance over the Internet, then select either Auto Generated or Persistent Public IP Reservation.
- If you select an autogenerated public IP address, the IP address persists while the instance is running, but will change if you delete the instance and create it again later.
- To associate a permanent public IP address with the instance, select Persistent Public IP Reservation.
- To create an IP Reservation, click Create IP Reservation. Enter a name for the IP reservation and then click Create.
- If you don't want your instance to be accessed over the Internet, then you don't need to associate a public IP address with it. In the Public IP Address list, select None.

Specify the SSH keys that you want to associate with this instance.

- To add a new SSH public key, click Add SSH Public Key. Enter a name for the SSH public key, paste the public key in the Value field, and then click Add. The
- SSH public key is added and appears in the list of SSH keys that you want to associate with the instance.

Create Instance Wizard – Storage Page



- Retain the default boot disk that is used to boot the instance.
- Review Page
  - Verify information.
- Click Create
  - Instance is created.

On the Storage page, you can attach data storage volumes and bootable storage volumes to your instance, if required.

The Storage page shows the default boot disk that is used to boot your instance. You can attach existing storage volumes to your instance, if required, or create storage volumes and attach them to the instance. You can also choose to remove the default boot disk. If you do so and if you don't specify a persistent storage volume as the boot drive, a nonpersistent boot disk is used to boot the instance.

For now, retain the default settings on Storage page.

Can I Create an Instance Using an App from Oracle Cloud Marketplace?

1. Sign in to Oracle Cloud Marketplace at https://cloud.oracle.com/marketplace/product/compute.
2. Browse the available apps or search for an app.
3. Select an App.
4. Click Get App.
5. Accept the terms of use.
6. Select your account.
7. Submit the request.
8. After your request is confirmed, to create an instance, click Start Compute Console. The Create Instance wizard starts.

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To use an app from Oracle Cloud Marketplace:

1. Go to Oracle Cloud Marketplace at https://cloud.oracle.com/marketplace/product/compute.
2. Search for the app that you want to use, or browse the available apps.
3. Select the app that you want to use by clicking it. You're directed to a page with more information about the selected app.
4. Click Get App.
5. Accept the terms of use and click Next.
   - If you see a message asking you to enable permission settings by clicking Preferences in your Oracle Compute Cloud Service account, follow the instructions to enable the setting. Then return to Oracle Cloud Marketplace and click Get App for your image again.
6. Select your account from the drop-down list.
7. Review the information on the Review screen and click Submit Request.
8. On the Confirmation screen, after your request is confirmed, to create an instance right away, click Start Compute Console. The Create Instance wizard starts.

Now you can follow the steps described earlier in this lesson to create an instance using the app that you selected.

After an app is added to an account, any user in that account (or identity domain) can use the app to create an instance. Just select the app from the list of images while creating your instance or while creating a bootable storage volume.

How Do I Know If My Instance Is Running?

1. Go to the web console.
2. The Instances tab lists your instances.
3. Check that your instance is listed with the status Running.
4. From the menu, select View to see details of your instance.

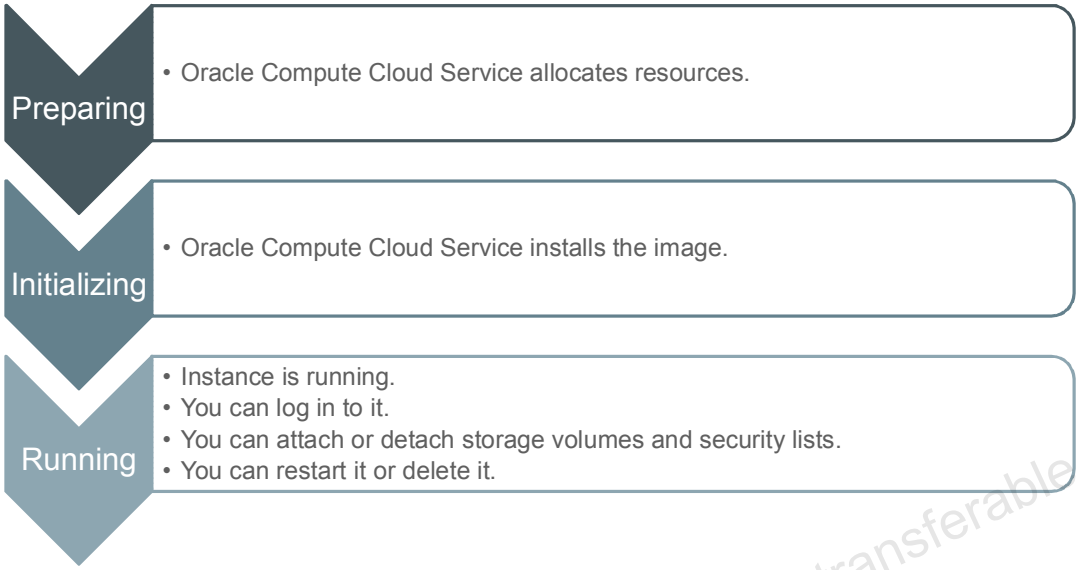
Monitoring Instances

After creating instances in Oracle Compute Cloud Service, you can view a list of your instances and get details of each instance.

1. Go to the Oracle Compute Cloud Service console and click the Instances tab.
2. The Instances page shows a list of instances, along with information about each instance.
   - **Tip:** You can filter the list of instances according to their category or status. To list instances with a specific status (such as running, error, or stopped), click the Show menu and select the appropriate filter. To view instances of a specific category (such as PaaS, IaaS, or personal), click the Category menu and select the appropriate filter.
3. To view detailed information about an instance, go to the instance that you want to view. From the menu, select View.
4. The instance details page shows all details related to 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.

You can also check the status of the orchestration on the Orchestrations tab. When your instance is running, the orchestration status is Ready.

Instance Life Cycle



An Oracle Compute Cloud Service instance can have one of the following statuses:

- When you create an instance, the initial status is Preparing. Oracle Compute Cloud Service allocates resources and prepares to create the instance.
- While the specified image is being installed, the state changes to Initializing.
- After the image is installed and the instance starts, the status changes to Running.

When an instance is in the Running status, you can log in to it and start using it. You can also attach or detach storage volumes and security lists using the web console. If required, you can restart your instance. When you are done with the instance, you can delete it.

At times, an instance can have the Error status. If this happens, see the error message to understand why the error occurred.

How Can I Log in to My Instance from Linux?

1. Make note of:
   - The public IP address of the instance
   - The path and file name of the private SSH key on your computer
2. Use SSH to log in to your instance as default opc user using the command:
   ```
   ssh opc@ip_address –i private_key
   ```
3. Key in the passphrase when prompted.

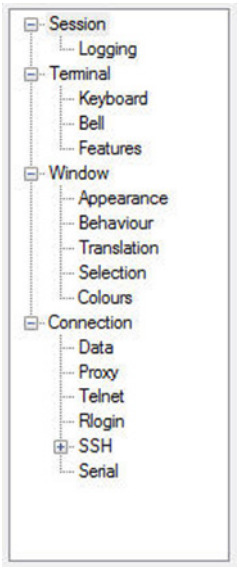
You can log in as the default user.

Note: At this point you will not be able to log in to your instance as you need to configure network settings. This will be explained in a later lesson.

- 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 file name of the file that contains the private key corresponding to the public key associated with the instance that you want to access.
- When prompted, key in the passphrase.

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

How Can I Log in to My Instance from Windows?



1. Open PuTTY.
2. Click Session > Hostname (or IP Address) > enter the public IP address of your instance.
3. Click Connection > expand SSH > click Auth > select the Private SSH Key File.
4. Click Connection > Data > Auto-login username field> enter the default username, `opc`.
5. Click Open.

Accessing an Instance as the opc User

1. Run PuTTY.
2. In the Category pane, click Session and in the Hostname (or IP Address) field, `enter the public IP address of your instance.`
3. In the Category pane, go to Connection, expand SSH, and click Auth. In the Private key file for authentication field, select the Private SSH Key File.
4. In the Category pane, go to Connection and click Data. In the Auto-login username field, enter the default username, `opc`.
5. Click Open.
6. When the terminal opens, key in the passphrase that was used to password-protect the private key.

What's on My Instance?

Your instance has the following default installations or configurations:

- Packages
- A default user
- Remote access
- Disk partitions
- Yum repositories
- Multiple languages

When you use an Oracle-provided Oracle Linux machine image to create your instance, your instance comes with the following packages and configuration:

Packages

- Development tools: Expect Java OpenJDK, GCC suite, GNU utilities, Perl, Ruby, Python, and so on.
- Basic X11 desktop
- Remote X11 access with VNC
- Xterm client
- Security and auditing with OpenSCAP and AIDE
- Integration with name services such as OpenLDAP, Kerberos, and NIS
- System administration tools
- Firefox and Elinks web browsers
- EMACs and vim editors

Users

A user named `opc` is created automatically. The `opc` user has `sudo` privileges and is configured for remote access over the SSH v2 protocol by using RSA keys. The SSH public keys that you specify while creating instances are added to the `/home/opc/.ssh/authorized_keys` file.
Note that `root` login is disabled.

Remote Access

Access to the instance is permitted only over the SSH v2 protocol. All other remote access services are disabled.

Disk Layout

- /boot: 500 MB
- swap: 4 GB
- / (root): Remainder

Oracle Linux Repositories Enabled for Yum Configuration

public_ol6_latest
public_ol6_UEK_latest
public_ol6_UEKR3_latest
Language Support
Arabic
Brazilian Portuguese
Chinese - Simplified
Chinese - Traditional
Czech
Danish
Dutch
Finnish
French
German
Greek
Hebrew
Hungarian
Italian
Japanese
Korean
Norwegian
Polish
Portuguese - Brazilian
Romanian
Russian
Slovak
Spanish
Swedish
Thai
Turkish

How Do I Stop, Restart, and Delete My Instance?

Restarting Your Instance:

1. Go to the Oracle Compute Cloud Service console.
2. On the Instances page, identify the instance that you want to delete.
3. From the menu, select Reboot.

Deleting Your Instance:

1. Go to the Oracle Compute Cloud Service console.
2. On the Instances page, identify the instance that you want to delete.
3. Click the Orchestrations tab.
4. Go to the orchestration that controls the instance that you want to delete. From the menu, select Stop.

Restarting an Instance

1. Go to the Oracle Compute Cloud Service console.
2. On the Instances page, identify the instance that you want to delete.
3. From the menu, select Reboot.

Deleting an Instance

Caution: When you delete an instance that uses a non-persistent boot disk, any changes you may have made to the boot disk after the instance was created are lost.

Note: Any storage volumes that are attached to an instance are detached (but not deleted) when you delete the instance. You must unmount attached storage volumes before deleting an instance.

To delete an instance, perform the following steps:

1. Go to the Oracle Compute Cloud Service console.
2. On the Instances page, identify the instance that you want to delete.
3. Click the Orchestrations tab.
4. Go to the orchestration that controls the instance that you want to delete. From the menu, select Stop.

Quiz

What is an instance? (Select all that apply.)

a. A virtual machine with its own hard disk, CPU, and memory, and with the OS installed on the hard disk
b. A virtual machine configured with your choice of CPU, memory, and OS, and accessed remotely over cloud
c. A virtual machine that runs a specific OS and has CPU, memory, and storage resources available from the cloud and that can be accessed remotely over the cloud

Quiz

Identify the correct sequence of steps for creating an instance.

a. Sign in to the Oracle Compute Cloud Services web console > Create an instance > Generate an SSH key pair > Add the SSH public keys to the instance.
b. Generate an SSH key pair > Use the SSH key pair to sign in to the Oracle Compute Cloud Services web console > Add the SSH public key to Oracle Compute Cloud Service > Create an instance.
c. Generate an SSH key pair > Sign in to the Oracle Compute Cloud Services web console > Add the SSH public keys > Create an instance.

Quiz

Which of the following can you install on your instance?

a. Any licensed software or applications
b. Operating System
c. Firmware
d. All of the above

Summary

In this lesson, you should have learned how to:

- Describe the features and uses of Oracle Compute Cloud Service instances
- Explain how SSH keys are used
- Generate an SSH key pair and upload the public key
- Use the Create Instance wizard to create an instance

Resource: Links

For more information about Oracle Compute Cloud Service, visit http://docs.oracle.com/cloud/latest/stcomputecs/index.html.