VMware Integrated OpenStack User's Guide

VMware Integrated OpenStack 5.1

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VMware Integrated OpenStack User's Guide

1

The *VMware Integrated OpenStack User's Guide* shows you how to perform cloud end-user tasks in VMware Integrated OpenStack, including how to create and manage instances, volumes, snapshots, images, and networks.

Intended Audience

This guide is for cloud users who want to work with an OpenStack deployment that is fully integrated with VMware vSphere®. To do so successfully, you should be familiar with the OpenStack components and functions.

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to http://www.vmware.com/support/pubs.

Log In to the VMware Integrated OpenStack Dashboard

2

You access the user and administrative controls for your VMware Integrated OpenStack deployment through the VMware Integrated OpenStack dashboard. The dashboard enables you to create and manage instances, images, user accounts, and volumes, among other tasks.

To log in to the dashboard, you must obtain the host name or IP address for the VMware Integrated OpenStack dashboard from your OpenStack operator. This is the public virtual IP created when deploying up the VMware Integrated OpenStack in vSphere.

Prerequisites

- Verify that you have a user account that was set up by an administrative user.
- Verify that you have a browser with JavaScript and cookies enabled.

Procedure

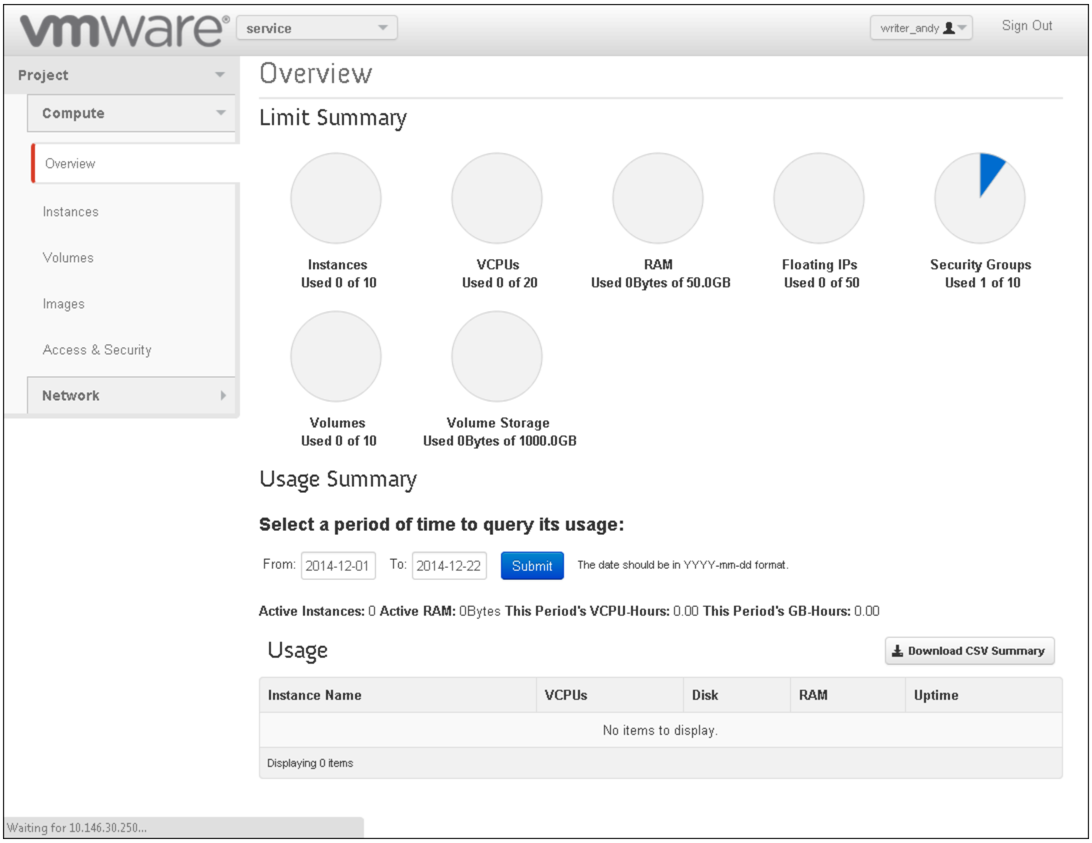
1. In a browser window, navigate to the host name or IP address for the VMware Integrated OpenStack dashboard.

   A certificate warning might appear the first time you access the URL. To bypass the warning, verify the certificate or add an exception.

2. On the Log In page, enter the domain name, your user name and password.
3. Click **Sign In**.

   You are now logged in. The Project tab appears, opened to the default Overview page.

Figure 2-1. VMware Integrated OpenStack Overview Page



Overview

Limit Summary

Instances
Used 0 of 10

VCPUs
Used 0 of 20

RAM
Used 0Bytes of 50.0GB

Floating IPs
Used 0 of 50

Security Groups
Used 1 of 10

Volumes
Used 0 of 10

Volume Storage
Used 0Bytes of 1000.0GB

Usage Summary

Select a period of time to query its usage:

From: 2014-12-01 To: 2014-12-22 Submit The date should be in YYYY-mm-dd format.

Active Instances: 0 **Active RAM:** 0Bytes **This Period's VCPU-Hours:** 0.00 **This Period's GB-Hours:** 0.00

Usage

Instance Name	VCPUs	Disk	RAM	Uptime
No items to display.				
Displaying 0 items				

Waiting for 10.146.30.250...

Working with Images

3

In the OpenStack context, an image is a file that contains a virtual disk from which you can install an operating system on a virtual machine. You create an instance in your OpenStack cloud by using one of the images available.

The VMware Integrated OpenStack image service component natively supports images that are packaged in the ISO, OVA, and VMDK formats. You can also import RAW, QCOW2, VDI, and VHD images, which are automatically converted to the VMDK format during the image creation process.

This chapter includes the following topics:

Import Images Using the GUI

You can import images in the VMware Integrated OpenStack dashboard.

The following image formats are supported:

- VMDK
- ISO
- OVA
- RAW
- QCOW2
- VDI
- VHD

Note ISO images cannot be used to create volumes.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select your project from the drop-down menu in the title bar.

3 Select **Project > Compute > Images** and click **Create Image**.

4 Configure the image.

Option	Action
Image Name	Enter a name for the image.
Image Description	Enter a description for the image.
Image Source	Select the image file.
Format	Select **ISO** or **VMDK**. For images in other formats, including OVA, RAW, QCOW2, VDI, or VHD, select **VMDK** as the disk format.
Disk Adapter Type	For VMDK images, select the adapter type.
Minimum Disk (GB)	Specify the minimum disk size for the image in gigabytes.
Minimum RAM (MB)	Specify the minimum RAM for the image in megabytes.
Protected	Select **Yes** to prevent the image from being deleted.

5 (Optional) Click **Next** and configure metadata for the image.

6 Click **Create Image**.

What to do next

You can launch OpenStack instances using the imported image. See Start an OpenStack Instance from an Image.

In the **Actions** column next to an image, you can also edit the image, update its metadata, delete the image, or create a volume from the image.

Import Images Using the CLI

You can import images using the command-line interface on the OpenStack Management Server.

The following image formats are supported:

- VMDK
- ISO
- OVA
- RAW
- QCOW2
- VDI
- VHD

Note ISO images cannot be used to create volumes.

Procedure

1 Log in to the OpenStack Management Server as `viouser`.

2 Load the credentials file for your user account.

```
source user-credentials.rc
```

3 Run the `openstack image create` command to obtain, define, and import the image.

```
openstack image create image-name --disk-format {vmdk | iso} --container-format bare --file image-file {--public | --private} [--property vmware_adaptertype="vmdk-adapter-type" [--property vmware_disktype="{sparse | preallocated | streamOptimized}"] --property vmware_ostype="operating-system"
```

Option	Description
image-name	Enter the name of the source image.
--disk-format	Enter the disk format of the source image. You can specify `iso` or `vmdk`. For images in other formats, including OVA, RAW, QCOW2, VDI, or VHD, use `vmdk` as the disk format.
--container-format	Enter **`bare`**. The container format argument is not currently used by Glance.
--file	Specify the image file to upload.
{--public | --private}	Include `--public` to make the image available to all users or `--private` to make the image available only to the current user.
--property vmware_adaptertype	Specify the adapter type of the VMDK disk. If you do not include this parameter, the adapter type is determined by introspection. **Note** ■ For disks using paravirtual adapters, include this parameter and set it to **`paraVirtual`**. ■ For disks using LSI Logic SAS adapters, include this parameter and set it to **`lsiLogicsas`**.
--property vmware_disktype	Specify **`sparse`**, **`preallocated`**, or **`streamOptimized`**. If you do not include this parameter, the disk type is determined by introspection.
--property vmware_ostype	Specify the operating system on the image.

What to do next

You can launch OpenStack instances using the imported image. See Start an OpenStack Instance from an Image. You can also run the `openstack image list` command to see all images in your project.

Configure an Image for Windows Guest Customization

You can configure images for Windows guest customization by applying guest customization metadata.

Windows guest customization is an alternative to Cloudbase-Init. Do not use Windows guest customization metadata and Cloudbase-Init on the same image.

Prerequisites

- Install the appropriate version of Microsoft System Preparation (Sysprep) for each guest operating system that you want to customize.
- Install VMware Tools on the source image.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select your project from the drop-down menu in the title bar.
3. Select **Project > Compute > Images**.
4. Create a new Windows image or choose an existing image to customize.
5. Select **Update Metadata** next to the image that you want to use.
6. In the **Available Metadata** pane, expand **Guest Customization Options**.
7. Click the **Add** (plus sign) icon next to the metadata that you want to configure.

Option	Description
Auto logon count	Enter the number of times that the machine can be automatically logged in to as Administrator. You can increase this value above 1 if your configuration requires multiple reboots. This value might be determined by the list of commands executed by the `GuiRunOnce` command.
Automatic logon	Select the checkbox to automatically log in to the VM as Administrator.
Maximum number of connections	Enter the number of client licenses purchased for the Windows server being installed. **Note** This parameter is used only if the server licensing mode is set to `PerServer`.
Product Key	Enter the serial number to include in the answer file when mini-setup runs. **Note** If the guest operating system was installed using a volume-licensed CD, this parameter is not required.
Server licensing mode	Select **PerServer** or **PerSeat** as the server licensing mode.
Windows workgroup to join	Select the workgroup that the virtual machine will join.

8. Click **Save**.

When you launch instances from the image, the specified Windows guest customization options are applied.

Configuring Access and Security for Instances 4

Before you start instances, configure access and security settings. For example, SSH access and ICMP access are not enabled by default.

Security groups Enable users to ping and use SSH to connect to the instance. Security groups are sets of IP filter rules that define networking access and are applied to all instances in a project.

Key pairs SSH credentials that are injected into an instance when it starts. To use key pair injection, the image that the instance is based on must contain the cloud-init package. Each project must have at least one key pair. If you generated a key pair with an external tool, you can import it into OpenStack. You can use the key pair for multiple instances that belong to a project.

Floating IPs When you create an instance in OpenStack, it is assigned a fixed IP address in the network. This IP address is permanently associated with the instance until the instance is terminated. You can also attach to an instance a floating IP address whose association can be modified.

This chapter includes the following topics:

Working with Security Groups

A security group is a set of IP address filtering rules that define networking access for instances in a project. Security group rules are project-specific.

Each OpenStack project has a default security group. All instances in a project are included in the default security group unless you specify a different security group for them. By default, the default security group permits outgoing traffic but denies all incoming traffic to instances.

To change IP address filtering rules for instances in your project, you can create a new security group with the desired rules or modify the rules set in the default security group.

Note For NSX-T Data Center deployments, each port can have a maximum of nine security groups.

Create a Security Group

Security groups are sets of IP filter rules that define networking access and are applied to all instances within a project. You can either modify the rules in the default security group or create a security group with custom rules.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select the project from the drop-down menu in the title bar.
3. Select **Project > Compute > Access & Security**.
4. Click the **Security Groups** tab.
5. Click **Create Security Group**.
6. Enter a name and description for the new group, and click **Create Security Group**.

   The new group appears in the list on the **Security Group** tab.
7. Configure the rules for the new group.
   a. Select the new security group and click **Manage Rules**.
   b. Click **Add Rule**.
   c. From the **Rule** drop-down menu, select the rule to add.

      The subsequent fields might change depending on the rule you select.
   d. If applicable, specify **Ingress** or **Egress** from the **Direction** drop-down menu.
   e. After you complete the rule definition, click **Add**.
8. Configure additional rules if necessary.
9. Click the **Access & Security** tab to return to the main page.

Modify the Rules for an Existing Security Group

You can modify a security group by adding and removing rules assigned to that group. Rules define which traffic is allowed to instances that are assigned to the security group.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select the project from the drop-down menu in the title bar.
3. Select **Project > Compute > Access & Security**.

4 Click the **Security Groups** tab.

5 Select the security group to modify and click **Manage Rules**.

6 To remove a rule, select the rule and click **Delete Rule**.

7 To add a rule, click **Add Rule** and select the custom rule to add from the **Rule** drop-down menu.

Option	Description
Custom TCP Rule	Used to exchange data between systems and for end-user communication.
Custom UDP Rule	Used to exchange data between systems, for example, at the application level.
Custom ICMP Rule	Used by network devices, such as routers, to send error or monitoring messages.
Other Protocol	You can manually configure a rule if the rule protocol is not included in the list.

a From the **Remote** drop-down list, select **CIDR** or **Security Group**.

b If applicable, select **Ingress** or **Egress** from the **Direction** drop-down menu.

For TCP and UDP rules, you can open either a single port or a range of ports. Depending on your selection, different fields appear below the Open Port list.

c Select the kind of access to allow.

Option	Description
CIDR (Classless Inter-Domain Routing)	Limits access only to IP addresses within the specified block.
Security Group	Allows any instance in the specified security group to access any other group instance. You can choose between IPv4 or IPv6 in the Ether Type list.

8 Click **Add**.

The new rule appears on the Manage Security Group Rules page for the security group.

Enabling SSH and ICMP Access

You can modify the default security group to enable SSH and ICMP access to instances. The rules in the default security group apply to all instances in the currently selected project.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Access & Security**.

4 Click the **Security Groups** tab, select the default security group, and click **Manage Rules**.

5 Click **Add Rule** and configure the rules to allow SSH access.

Control	Value
Rule	SSH
Remote	CIDR
CIDR	0.0.0.0/0

To accept requests from a particular range of IP addresses, specify the IP address block in the CIDR text box.

Instances will now have SSH port 22 open for requests from any IP address.

6 Click **Add**.

7 From the Manage Security Group Rules page, click **Add Rule** and configure the rules to allow ICMP access.

Control	Value
Rule	All ICMP
Direction	Ingress
Remote	CIDR
CIDR	0.0.0.0/0

8 Click **Add**.

Instances will now accept all incoming ICMP packets.

Working with Key Pairs

Key pairs are SSH credentials that are injected into an instance when it starts.

To use key pair injection, the image that the instance is based on must contain the cloud-init package. Each project should have at least one key pair. If you generated a key pair with an external tool, you can import it into OpenStack. You can use the key pair for multiple instances that belong to a project.

Add a Key Pair

Key pairs are SSH credentials that are injected into an instance when it starts. You can create or import key pairs.

You must provide at least one key pair for each project.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Access & Security**.

4 Click the **Key Pairs** tab, which lists the key pairs available for the current project.

5 Click **Create Key Pair**.

6 Enter a name for the new key pair, and click **Create Key Pair**.

7 Download the new key pair at the prompt.

8 On the main **Key Pairs** tab, confirm that the new key pair is listed.

Import a Key Pair

Key pairs are SSH credentials that are injected into an instance when it starts. You can create or import key pairs.

You must provide at least one key pair for each project.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Access & Security**.

4 Click the **Key Pairs** tab, which lists the key pairs available for the current project.

5 Click **Import Key Pair**.

6 Enter the name of the key pair.

7 Copy the public key to the Public Key text box and click **Import Key Pair**.

8 Return to the main **Key Pairs** tab to confirm that the imported key pair is listed.

Allocate a Floating IP to an Instance

You can attach a floating IP address to an instance in addition to the fixed IP address that is assigned when it is created. Unlike fixed IP addresses, you can modify floating IP address associations at any time, regardless of the state of the instances involved.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Access & Security**.

4 Click the **Floating IPs** tab, and click **Allocate IP to Project**.

5 Choose the pool from which to pick the IP address and click **Allocate IP**.

6 Click **Associate** in the Floating IPs list and configure the floating IP associations settings.

Option	Description
IP Address	Click the plus sign to add an IP address.
Ports to be associated	Select a port from the list. The list shows all the instances with their fixed IP addresses.

7 Click **Associate**.

8 (Optional) To disassociate a floating IP address from an instance, click the **Floating IPs** tab, and click **Disassociate** in the Actions column for the IP address. .

9 To release the floating IP address back into the pool of addresses, click **More** and select **Release Floating IP**.

10 Click the **Floating IPs** tab and select the IP address.

11 Click **Release Floating IPs**.

5 Working with Networks

The OpenStack Networking service provides a scalable system for managing the network connectivity in an OpenStack cloud deployment. It can react to changing network needs, for example, creating and assigning new IP addresses. You can also configure logical routers to connect the different networks within your VMware Integrated OpenStack deployment.

For more information about how to manage networks, see the *VMware Integrated OpenStack Administrator Guide*.

This chapter includes the following topics:

Create a Network

The OpenStack Networking service component is a scalable system for managing network connectivity within your VMware Integrated OpenStack deployment. With the VMware Integrated OpenStack dashboard, you can quickly create logical networks.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select the project from the drop-down menu in the title bar.
3. Select **Project > Network > Networks**.

   The Networks page lists the networks that are currently configured.
4. Click **Create Network**.
5. On the **Network** tab, enter a name for the new network.
6. (Optional) Select **Admin State** to have the network forward packets.
7. Click **Next**.

8 Configure the subnet.

Option	Action
Create Subnet	Select to create a subnet. You do not have to specify a subnet when you create a network, but if you do not, attached instances receive an Error status. To create a network without a subnet, deselect **Create Subnet**.
Subnet Name	(Optional) Enter a name for the subnet.
Network Address	If you create a subnet associated with the new network, specify the IP address for the subnet using the CIDR format, for example, 192.168.0.0/24.
IP Version	Select IPv4 or IPv6 from the drop-down menu.
Gateway IP	Enter the IP address for a specific gateway.
Disable Gateway	(Optional) Select to disable a gateway IP address.

9 Click **Next** to access the settings on the **Subnet Detail** tab.

10 (Optional) if you selected the Create Subnet option on the previous tab, enter the subnet settings.

Option	Description
Enable DHCP	(Optional) Select this option to enable DHCP. Consult with your network administrator.
Allocation Pools	Specify IP address pools for use by devices in the new network.
DNS Name Servers	Specify DNS servers for the new network.
Host Routes	Specify the IP address for the host routes.

11 Click **Create**.

When you start a new instance, this network will be available.

Create a Router

With the VMware Integrated OpenStack dashboard, you can create logical routers. You use logical routers to connect the networks in your OpenStack deployment.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Network > Routers**.

The Routers page lists the routers that are currently configured.

4 Click **Create Router**.

5 Provide a name for the router and click **Create Router**.

The new router appears in the list on the Routers page. You can now complete the router configuration.

6 Click **Set Gateway** in the Actions column of the new router.

7 Select a network from the drop-down menu, and click **Set Gateway**.

   The Router Name and Router ID text boxes are automatically populated.

8 Connect the router to a private network.

   a Click the router name on the Routers page.

   b Click **Add Interface**.

   c Select a subnet from the drop-down menu.

   d (Optional) Enter the router interface IP address for the selected subnet.

      If you do not set this value, the first host IP address in the subnet is used by default.

   e Click **Add Interface**.

You successfully created the router. You can view the new topology on the Network Topology page.

Create a DNS Zone

If OpenStack Designate (DNS as a service) is configured for your environment, you can create DNS zones and record sets on demand using the VMware Integrated OpenStack dashboard.

Prerequisites

Verify that your cloud administrator has enabled Designate for your environment. For more information, see "Enable the Designate Component" in the *VMware Integrated OpenStack Installation and Configuration Guide*.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select your project from the drop-down menu in the title bar.

3 Select **Project > DNS > Zones** and click **Create Zone**.

   If the **DNS** option does not appear, Designate has not been enabled.

4 Specify the parameters for your DNS zone and click **Submit**.

Option	Description
Name	Enter your DNS zone. The value must end with a period (.).
Description	Enter details about the zone.
Email Address	Enter the email address of the zone owner.
TTL	Specify the time to live (TTL) in seconds for records in the zone.
Type	Select whether to create a primary or secondary zone.

5 Click **Create Record Set**.

6 Specify the parameters for your record set and click **Submit**.

Option	Description
Type	Select the type of record set. The following values are supported: ■ A (address record) ■ AAAA (IPv6 address record) ■ CNAME (canonical name record) ■ MX (mail exchange record) ■ PTR (pointer record) ■ SPR (sender policy framework) ■ SRV (service locator) ■ SSHFP (SSH public key fingerprint) ■ TXT (text record)
Name	Enter the domain name for the record set. The value must end with a period (.).
Description	Enter details about the record set.
TTL	Specify the TTL in seconds for records in the record set.
Records	Specify one or more records to include in the record set. Click **Add Record** to add multiple records.

You can create one or more record sets for each zone.

What to do next

You can click the name of your zone on the **DNS Zones** page to view information about it. Click the down arrow next to **Create Record Set** and select **Update** or **Delete** to modify or remove your zone. On the **Record Sets** tab, you can update or delete the record sets in your zone.

Configuring LBaaS v2.0

You can enable LBaaS v2.0 to distribute incoming requests among designated instances.

Load balancer as a service (LBaaS) v2.0 gives you the ability to create load balancers on demand, ensuring that workloads are shared predictably among instances and system resources are used more effectively.

The LBaaS configuration process also creates a health monitor and associates it with the LBaaS pool. The health monitor is a Neutron service that checks whether the instances are still running on the specified protocol and port.

You can enable LBaaS v2.0 on VMware Integrated OpenStack deployments with NSX Data Center for vSphere or NSX-T Data Center networking.

Note The `admin_state` parameter for LBaaS pools is not supported on NSX Data Center for vSphere deployments, and setting the admin state of a pool to down has no effect. To prevent network traffic from reaching the members of a pool, set the admin state of each member to down.

Configure LBaaS Using the CLI

You can configure LBaaS using the command line interface on the active controller node.

LBaaS listeners can use HTTP, TCP, or terminated HTTPS. Terminated HTTPS listeners terminate TLS for incoming connections, and the TLS certificates and keys for these listeners are stored in Barbican. If you want to create terminated HTTPS listeners, contact your cloud administrator to determine whether you must configure the ACL to grant the `barbican` user access to the secrets for your project.

Prerequisites

- Create a public subnet and router on your network. For an NSX Data Center for vSphere deployment, the router type must be `exclusive`.

  Note You can create the load balancer on a tenant subnet, but you must assign it a floating IP address.

- Configure at least one client and at least two server instances.

Procedure

1. Log in to the OpenStack Management Server as `viouser`.
2. Log in to the controller node as `viouser`.
3. Load the credentials file for your user account.

   ```
   source user-credentials.rc
   ```

4. If you want to create terminated HTTPS listeners and need to configure the ACL, grant the `barbican` user access to your certificates, keys, and TLS containers.

   ```
   openstack acl user add -u barbican-uuid object-name
   ```

   Run this command one time for each certificate, key, and container in your project.

   You can run the `openstack user list` command to find the UUID of the barbican user. You can run the `openstack secret list` command to find certificate, key, and container names.

5. Create a load balancer.

   ```
   neutron lbaas-loadbalancer-create --name lb-name lb-subnet-id
   ```

   Only members of the specified subnet can be added to the LBaaS pool.

6. Create a listener for the new load balancer.

   ```
   neutron lbaas-listener-create --loadbalancer lb-name --protocol {HTTP | TCP | TERMINATED_HTTPS} --
   protocol-port port-num --name listener-name [--default-tls-container=tls-container-uuid]
   ```

   If you specify `TERMINATED_HTTPS` as the protocol, you must also provide the ID of the TLS container.

7 Create an LBaaS pool.

```
neutron lbaas-pool-create --lb-algorithm lb-method --listener listener-name --protocol {TCP |
HTTP} --name pool-name
```

The `--lb-algorithm` parameter accepts the following values.

Argument	Description
LEAST_CONNECTIONS	New client requests are sent to the server with the fewest connections.
ROUND_ROBIN	Each server is used in turn according to the weight assigned to it.
SOURCE_IP	All connections that originate from the same source IP address are handled by the same member of the pool.

8 Add at least two server instances to the LBaaS pool that you created.

```
neutron lbaas-member-create --subnet lb-subnet-id --address server1-ip --protocol-port 80 pool-
name
neutron lbaas-member-create --subnet lb-subnet-id --address server2-ip --protocol-port 80 pool-
name
```

9 Set up the health monitor.

```
neutron lbaas-healthmonitor-create --delay delay-seconds --type {HTTP | TCP | PING} --max-retries
number --timeout timeout-seconds --pool pool-name
```

Parameter	Description
--delay	Enter the time in seconds between sending probes to members.
--type	Specify **HTTP**, **TCP**, or **PING**.
--max-retries	Enter the number of connection failures allowed before changing the member status to INACTIVE.
--timeout	Enter the time in seconds that a monitor will wait for a connection to be established before it times out. The timeout value must be less than the delay value.
--pool	Specify the LBaaS pool that you created.

10 If you created the load balancer on a tenant subnet, associate a floating IP address with the load balancer.

11 (Optional) Send test requests to validate your LBaaS configuration.

a Log in to the OpenStack Management Server as `viouser`.

b Create a test `index.html` file.

c In the same directory, start a web server.

```
sudo python -m SimpleHTTPServer 80
```

d Log in to the client instance.

e Run the `wget` command and view whether your requests are being correctly load-balanced across the servers in the pool.

- For load balancing without TLS, run the following command:

  ```
  wget -O - http://mgmt-server-ip
  ```

- For load balancing with TLS, run the following command:

  ```
  wget -O - https://mgmt-server-ip
  ```

Configure LBaaS Using the GUI

You can configure LBaaS using the **Create a Load Balancer** wizard on the VMware Integrated OpenStack dashboard.

LBaaS listeners can use HTTP, TCP, or terminated HTTPS. Terminated HTTPS listeners terminate TLS for incoming connections, and the TLS certificates and keys for these listeners are stored in Barbican. If you want to create terminated HTTPS listeners, contact your cloud administrator to determine whether you must configure the ACL to grant the `barbican` user access to the secrets for your project.

Prerequisites

- Create a public subnet and router on your network. For an NSX Data Center for vSphere deployment, the router type must be `exclusive`.

  Note You can create the load balancer on a tenant subnet, but you must assign it a floating IP address.

- Configure at least one client and at least two server instances.

Procedure

1 If you want to create terminated HTTPS listeners and need to configure the ACL, grant the `barbican` user access to your certificates, keys, and TLS containers.

a Log in to the OpenStack Management Server as `viouser`.

b Load the credentials file for your user account.

```
source user-credentials.rc
```

c Configure the ACL.

```
openstack acl user add -u barbican-uuid object-name
```

Run this command one time for each certificate, key, and container in your project.

You can run the `openstack user list` command to find the UUID of the barbican user. You can run the `openstack secret list` command to find certificate, key, and container names.

2 Log in to the VMware Integrated OpenStack dashboard.

3 Select your project from the drop-down menu in the title bar.

4 Select **Project > Network > Load Balancers** and click **Create Load Balancer**.

5 Specify the name, description, IP address, and subnet and click **Next**.

Only members of this subnet can be added to the LBaaS pool.

6 Create a listener for the new load balancer and click **Next**.

If you select `TERMINATED_HTTPS` as the protocol, you must also provide the ID of the TLS container.

7 If you selected the `TERMINATED_HTTPS` protocol, specify one or more certificates for the listener and click **Next**.

8 Specify the name, description, and load balancing method for your LBaaS pool and click **Next**.

Supported load balancing methods are described as follows:

Method	Description
LEAST_CONNECTIONS	New client requests are sent to the server with the fewest connections.
ROUND_ROBIN	Each server is used in turn according to the weight assigned to it.
SOURCE_IP	All connections that originate from the same source IP address are handled by the same member of the pool.

9 Select the server and client instances to add to the load balancer pool and click **Next**.

10 Specify parameters for the health monitor and click **Next**.

Parameter	Description
Monitor type	Specify **HTTP**, **PING**, or **TCP**.
Interval	Enter the time in seconds between sending probes to members.
Retries	Enter the number of connection failures allowed before changing the member status to `INACTIVE`.
Timeout	Enter the time in seconds that a monitor will wait for a connection to be established before it times out. The timeout value must be less than the interval value.

If you select **HTTP**, you must also configure the HTTP method, expected status code, and URL.

11 Click **Create Load Balancer**.

12 If you created the load balancer on a tenant subnet, associate a floating IP address with the load balancer.

a Click the down arrow to the right of the load balancer and select **Associate Floating IP**.

b Select a floating IP address or pool and click **Associate**.

13 (Optional) Send test requests to validate your LBaaS configuration.

a Log in to the OpenStack Management Server as `viouser`.

b Create a test `index.html` file.

c In the same directory, start a web server.

```
sudo python -m SimpleHTTPServer 80
```

d Log in to the client instance.

e Run the `wget` command to view whether your requests are being correctly load-balanced across the servers in the pool.

```
wget -O - http://mgmt-server-ip
```

What to do next

You can open the load balancer and click **Create Listener** to add listeners to it.

Working with Instances in OpenStack

6

Instances are virtual machines that run in the cloud. You can launch instances, track their usage, and create snapshots.

This chapter includes the following topics:

Start an OpenStack Instance from an Image

When you start an instance from an image, OpenStack creates a local copy of the image on the compute node where the instance starts. You can observe OpenStack instances in vSphere as VMs, but you must manage them in OpenStack.

Prerequisites

Verify that images, flavors, block storage, and networks are configured and available to start an instance.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select the project from the drop-down menu in the title bar.
3. Select **Project > Compute > Images**.

   The Images page lists the images available to the current user.
4. In the Actions column of the image, click **Launch**.

5 On the **Details** tab .

Setting	Description
Availability Zone	Set by default to the availability zone that the cloud provider gives, for example: **nova**.
Instance Name	Name assigned to the VM. This value is a label and is not validated. When you create an instance, a UUID is assigned to the instance. When you view the VM in vSphere, you can identify the instance by the UUID but not by the instance name.
Flavor	Size of the instance to start. The cloud administrator defines and manages flavors.
Instance Count	Number of instances started. The default is **1**.
Instance Boot Source	Select **Boot from image**, and select the image from the list.

6 On the **Access & Security** tab of the Launch Instance dialog box .

Setting	Description
Key Pair	Specify a key pair. If the image uses a static root password or a static key set, you do not need to provide a key pair to start the instance, but using a key pair is a best practice.
Security Groups	Select the security groups to be assigned to the instance. Security groups are sets of rules that determine which incoming network traffic is forwarded to instances. If you did not create security groups, you can assign only the default security group to the instance.

7 On the **Networking** tab, click the **+** icon in the Available Networks field to add a network to the instance.

8 (Optional) On the **Post-Creation** tab, specify a customization script that runs after the instance launches.

9 On the **Advanced Options** tab, select the type of disk partition from the drop-down list.

Setting	Description
Automatic	The entire disk is a single partition and resizes.
Manual	Enables faster build times but requires manual partitioning.

10 Click **Launch**.

The new instance starts on a node in the Compute cluster.

11 To view the new instance, select **Project > Compute > Instances**.

The Instances page shows the instance name, its private and public IP addresses, size, status, task, and power state.

Start an OpenStack Instance from a Snapshot

You can start an instance from an instance snapshot. You can observe OpenStack instances in vSphere as VMs, but you can only manage them in OpenStack.

Prerequisites

Verify that you have configured images, flavors, block storage, and networks, and that they are available.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Images**.

The Images page lists the snapshots available to the current user.

4 In the Actions column of the snapshot, click **Launch**.

5 On the **Details** tab of the Launch Instance dialog box, configure the instance.

Setting	Description
Availability Zone	By default, this value is set to the availability zone that the cloud provider provides, for example, nova.
Instance Name	Assign a name to the VM. This value is a label and is not validated. When you create an instance, a UUID is assigned to the instance. When you view the VM in vSphere, you can identify it by the UUID but not by the instance name.
Flavor	Specify the size of the instance to start. The cloud administrator defines and manages flavors .
Instance Count	To start multiple instances, enter a value greater than 1. The default is 1.
Instance Boot Source	Select **Boot from snapshot**, and select the snapshot from the list.

6 On the **Access & Security** tab of the Launch Instance dialog box, configure access and security parameters by specifying a key pair and security group.

Setting	Description
Key Pair	Specify a key pair. If the image uses a static root password or a static key set, you do not need to provide a key pair to launch the instance. A best practice is to use a key pair.
Security Groups	Select the security groups to assign to the instance. Security groups are sets of rules that determine which incoming network traffic is forwarded to instances. If you did not create security groups, you can assign only the default security group to the instance.

7 On the **Networking** tab of the Launch Instance dialog box, click the **+** icon in the Available Networks field to add a network to the instance.

8 (Optional) On the **Post-Creation** tab, specify a customization script that runs after the instance starts.

9 In the **Advanced Options** tab, select the type of disk partition from the drop-down menu.

Setting	Description
Automatic	The entire disk is a single partition and automatically resizes.
Manual	Enables faster build times but requires manual partitioning.

10. Click **Launch**.

    The new instance starts on a node in the Compute cluster.

11. To view the new instance, select **Project > Compute > Instances**.

    The **Instances** tab shows the instance name, its private and public IP addresses, size, status, task, and power state.

Connect to an Instance by Using SSH

To use SSH to connect to your instance, use the downloaded keypair file.

Procedure

1. Copy the IP address for your instance.
2. Use the `ssh` command to make a secure connection to the instance.

   For example:

   ```
   $ ssh –i MyKey.pem demo@10.0.0.2
   ```

3. At the prompt, enter `yes`.

Track Instance Use

You can track use for instances in each project. You can view instance metrics such as number of vCPUs, disks, RAM, and uptime.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select the project from the drop-down menu in the title bar.
3. Select **Project > Compute > Overview**.

   The Overview page shows use and limit information. You can also limit the information to a specific period of time lists and download a summary in the CSV format.

Create a Snapshot from an Instance

With snapshots, you can create new images from running instances.

You can create a snapshot of an instance directly from the Instances page.

Procedure

1. Log in to the VMware Integrated OpenStack dashboard.
2. Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Instances**.

   The Instances page lists the instances available to the current user.

4 In the Actions column, click **Create Snapshot**.

   The snapshot appears on the Images page.

Use Affinity to Control OpenStack Instance Placement

You can place instances using OpenStack server groups with an affinity or anti-affinity policy. Affinity indicates that all instances in the group must placed on the same host, and anti-affinity indicates that no instances in the group can be placed on the same host.

Prerequisites

Verify that the intended filter configuration does not conflict with any existing administrative configuration, such as DRS rules that manage instance placement on hosts.

Procedure

1 Log in to the OpenStack Management Server as `viouser`.

2 Load the credentials file for your user account.

```
source user-credentials.rc
```

3 Create a server group with the desired policy.

```
openstack server group create group-name --policy {affinity | anti-affinity}
```

Option	Description
group-name	Enter a name for the server group.
--policy	Enter `affinity` to place instances on the same host or `anti-affinity` to prevent instances from being placed on the same host.

4 When you launch an instance, pass the server group as a scheduler hint to implement affinity or anti-affinity.

```
openstack server create instance-name --image image-uuid --flavor flavor-name --nic net-
id=network-uuid --hint group=servergroup-uuid
```

What to do next

Confirm that the affinity rules and instances are configured correctly. In vCenter Server, select the compute cluster, open the **Configure** tab, and click **VM/Host Rules**.

Working with Volumes 7

Volumes are block storage devices that provide persistent storage for instances.

After you create a volume, you can attach it to a running instance. You can later detach the volume and attach it to a different instance. You can also create a snapshot of a volume, launch an instance from it, and upload it to Glance as an image.

This chapter includes the following topics:

Create a Volume

You create volumes and attach them to instances to provide persistent storage.

Prerequisites

If you want to create a volume from an image, upload the desired image. See Chapter 3 Working with Images.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select your project from the drop-down menu in the title bar.

3 Select **Project > Compute > Volumes** and click **Create Volume**.

4 Configure the volume.

Option	Description
Volume Name	Enter a name for the new volume.
Description	Enter a description for the volume.
Volume Source	Select **No source, empty volume**, **Snapshot**, **Image**, or **Volume**. If you select **Snapshot**, **Image**, or **Volume**, specify the desired object from the next drop-down list.
Type	If you selected **No source, empty volume** or **Image** as the volume source, select a volume type for the volume. For volumes whose source is a volume snapshot or another volume, the volume type is inherited from the source.

Option	Description
Size (GiB)	Enter the size of the volume in gibibytes.
Availability Zone	If you selected **No source, empty volume** or **Image** as the volume source, specify the availability zone in which to create the volume. For volumes whose source is a volume snapshot or another volume, the availability zone is inherited from the source.

5 Click **Create Volume**.

What to do next

In the **Actions** column to the right of the volume, you can perform the following actions:

- Click **Edit Volume** to modify the name and description of the volume and whether it is bootable.
- Click **Extend Volume** to increase the size of an unattached volume.
- Click **Launch as Instance** to create an instance using an unattached volume.
- Click **Manage Attachments** to attach the volume to or detach the volume from an instance.
- Click **Create Snapshot** to take a snapshot of the volume.

  Note Creating a snapshot of a volume attached to an instance can result in a corrupted snapshot. If possible, detach the volume before creating the snapshot.

- Click **Change Volume Type** to modify the volume type and migration policy.
- Click **Upload to Image** to upload the volume to Glance as an image.
- Click **Create Transfer** to assign ownership of an unattached volume to a different project. For details, see Transfer a Volume.
- Click **Delete Volume** to delete an unattached volume.
- Click **Update Metadata** to add, remove, or change volume metadata.

Transfer a Volume

You can assign ownership of an unattached volume to another project.

Prerequisites

Ensure that the volume that you want to transfer is not attached to an instance.

Procedure

- To initiate a transfer, perform the following steps:

  a Log in to the VMware Integrated OpenStack dashboard.

  b Select your project from the drop-down menu in the title bar.

  c Select **Project > Compute > Volumes**.

d In the **Actions** column next to the volume that you want to transfer, click **Create Transfer**.

e Enter a name for the transfer task and click **Create Volume Transfer**.

f Record or download the transfer ID and authorization key displayed on the **Volume Transfer Details** page and send this information to the user who will accept the transfer.

> **Important** After you close the **Volume Transfer Details** page, the transfer ID and authorization key can no longer be retrieved. If the transfer ID or authorization key are lost, you must cancel the transfer and initiate it again.

◆ To receive a transfer, perform the following steps:

a Log in to the VMware Integrated OpenStack dashboard.

b Select your project from the drop-down menu in the title bar.

c Select **Project > Compute > Volumes** and click **Accept Transfer**.

d Enter the transfer ID and authorization key that you received from the user who initiated the transfer.

e Click **Accept Volume Transfer**.

Working with Orchestration and Stacks

8

You can use the OpenStack Orchestration service to orchestrate multiple composite cloud applications. It supports the native OpenStack Heat Orchestration Template (HOT) format through a REST API, and the Amazon Web Services (AWS) CloudFormation template format through a Query API that is compatible with CloudFormation.

You use templates to create stacks. A stack configures the automated creation of most OpenStack resource types, including instances, floating IP addresses, volumes, security groups, and users.

With orchestration templates, application developers can define the parameters for automating the deployment of infrastructure, services, and applications. Templates are static files that you can use directly for creating a stack.

You can also create a stack that combines a template with an environment file. An environment file supplies a unique set of values to the parameters defined by the template. By using environment files with templates, you can create many unique stacks from a single template.

For information about how to create template and environment files, see the OpenStack documentation at http://docs.openstack.org/developer/heat/template_guide/index.html.

This chapter includes the following topics:

Start a New Orchestration Stack

With orchestration stacks, you can launch and manage multiple composite cloud applications. You start a new stack by specifying the template and environment files, and defining other operational settings, including user credentials, database access settings, and the Linux distribution.

Prerequisites

Verify that the template and environment file for the stack are created and available. For information about creating template and environment files, see the OpenStack documentation at http://docs.openstack.org/developer/heat/template_guide/index.html.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Orchestration > Stacks**.

The Stacks page lists the stacks available to the current user.

4 Click **Launch Stack**.

5 Select the template for the new stack.

Option	Description
Template Source	Select the template source: URL, File, or Direct Input.
Template URL or File or Data	Dynamically changes depending on what you select for Template Source. Enter the URL, browse to the file location, or paste the template text.
Environment Source	Select the environment source: URL, File, or Direct Input.
Environment URL or File or Data	Dynamically changes depending on what you select for Environment Source. Enter the URL, browse to the file location, or paste the template text.

6 Click **Next**.

7 Configure the new stack.

Option	Description
Stack Name	Name to identify the stack.
Creation Timeout (minutes)	Number of minutes before the launch of the stack times out.
Rollback On Failure	Select this check box to roll back changes if the stack fails to launch.
Password for user "demo"	Password for the default user after the stack is created.
DBUsername	Name of the database user.
Linux Distribution	Linux distribution that is used in the stack.
DB Root Password	Root password for the database.
Key Name	Key pair for logging into the stack.
DB Name	Name of the database.
DB Password	Password for the database.
Instance Type	Flavor for the instance.

8 Click **Launch** to create the stack.

9 (Optional) Verify that the new stack appears on the Stacks page.

10 (Optional) Click the stack to view the stack details.

Detail	Description
Topology	Visual topology of the stack.
Overview	Parameters and details of the stack.
Resources	Resources that the stack uses.
Events	Events related to the stack.

Modify an Orchestration Stack

You can modify a stack by updating the template file, environment file, or stack parameters.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Orchestration > Stacks**.

The Stacks page lists the stacks available to the current user.

4 Select the stack to update.

5 Click **Change Stack Template**.

6 (Optional) In the Select Template dialog box, modify the template or environment file selection.

7 Click **Next**.

8 (Optional) In the Update Stack Parameters dialog box, modify the parameter values.

9 Click **Update**.

10 (Optional) On the Stacks page, verify that the changes to the stack configuration are applied.

Delete an Orchestration Stack

When you delete a stack, you also delete the resources that that stack generates.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select the project from the drop-down menu in the title bar.

3 Select **Project > Compute > Orchestration > Stacks**.

The Stacks page lists the stacks available to the current user.

4 Select the stack to delete and click **Delete Stack**.

5 Confirm the action at the prompt.

6 (Optional) Verify that the deleted stack no longer appears on the Stacks page.

Working with Object Storage 9

If OpenStack Swift is configured for your environment, you can create containers and upload objects to them.

Important In VMware Integrated OpenStack 5.1, Swift is provided as a technical preview only. Running production workloads is not currently supported.

Prerequisites

Verify that your cloud administrator has created a Swift cluster. For more information, see "Adding the Swift Component" in the *VMware Integrated OpenStack Installation and Configuration Guide*.

Procedure

1 Log in to the VMware Integrated OpenStack dashboard.

2 Select your project from the drop-down menu in the title bar.

3 Select **Project > Object Store > Containers** and click **Container**.

4 Enter a name, and click **Submit**.

   The name of a container cannot include slashes (/).

5 Click the name of the container to open it.

6 (Optional) Click the **Folder** button to create a folder.

7 Click the **Upload** (up arrow) button to upload a file to the container.

What to do next

You can download or delete the files in your container. You can also click the down arrow next to any file to view details or select **Edit** to replace it with a different file.