

VMware Integrated OpenStack Administrator Guide

VMware Integrated OpenStack 1.0.0

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About This Book

The *VMware Integrated OpenStack Administrator Guide* shows you how to perform VMware Integrated OpenStack cloud administrative tasks in the VMware Integrated OpenStack, including how to create and manage projects, users accounts, flavors, images, and networks.

Intended Audience

This guide is for cloud administrators who want to create and manage resources 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>.

About VMware Integrated OpenStack

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With VMware Integrated OpenStack, you can implement OpenStack services on your existing VMware vSphere implementation.

You deploy VMware Integrated OpenStack through the Integrated OpenStack Manager vApp in vCenter.

The Integrated OpenStack Manager provides a workflow that guides you through and completes the VMware Integrated OpenStack deployment process. With Integrated OpenStack Manager, you can specify your management and compute clusters, configure networking, and add resources. Post-deployment, you can use Integrated OpenStack Manager to add components or otherwise modify the configuration of your VMware Integrated OpenStack cloud infrastructure.

This chapter includes the following topics:

- [“VMware Integrated OpenStack System Requirements,”](#) on page 7
- [“OpenStack Instances in vSphere Web Client,”](#) on page 10
- [“Monitor OpenStack Instances in the vSphere Web Client,”](#) on page 13

VMware Integrated OpenStack System Requirements

Before you begin the VMware Integrated OpenStack deployment tasks, your system must comply with all hardware, software, networking, and storage requirements.

Hardware Requirements for VMware Integrated OpenStack

The hardware requirements are based on the number of VMs used for each component. For example, two VMs are used for load balancing, each of which requires two CPUs for a total requirement of four CPUs. The requirements vary depending on whether your OpenStack deployment uses vSphere Distributed Switch (VDS) or NSX-V with the Networking component.

Core VMware Integrated OpenStack Components

Component	VMs	CPU	RAM (GB)	Disk Space (GB)
Integrated OpenStack Manager	1	2 (2 per VM)	4 (4 per VM)	25
Load balancing service	2	4 (2 per VM)	8 (4 per VM)	40 (20 per VM)
Database service	3	12 (4 per VM)	48 (16 per VM)	240 (80 per VM)
Memory cache service	2	4 (2 per VM)	32 (16 per VM)	40 (20 per VM)
Message queue service	2	8 (4 per VM)	32 (16 per VM)	40 (20 per VM)
Controllers	2	16 (8 per VM)	32 (16 per VM)	160 (80 per VM)

Component	VMs	CPU	RAM (GB)	Disk Space (GB)
Compute service (Nova CPU)	1	2 (2 per VM)	4 (4 per VM)	20 (20 per VM)
DHCP service (VDS deployments only)	2	8 (4 per VM)	32 (16 per VM)	40 (20 per VM)
TOTAL	15	56	192	605

NSX-V Components

Additional CPU, RAM, and disk space is required for NSX-V components if they are deployed with VMware Integrated OpenStack.

Table 2-1. NSX-V Components

Component	VMs	CPU	RAM	Disk Space
NSX-V Controller	3	12 (4 per VM)	12 GB (4 per VM)	60 GB (20 per VM)
NSX-V Manager	1	4 (4 per VM)	12 GB (12 per VM)	60 GB (60 per VM)
NSX-V Edge (see note below)	Varies: created on demand.	1 per Edge DHCP VM, 2 per Edge router VM	512 MB per Edge DHCP VM, 1 per Edge router VM	512 MB per Edge DHCP VM, 1 per Edge router VM
TOTAL	4 plus Edge requirements	16 plus Edge requirements	24 GB plus Edge requirements	120 GB plus Edge requirements

When you create a logical subnet or logical router, a new Edge VM is dynamically created to serve this request if an existing Edge node cannot.

Software Requirements for VMware Integrated OpenStack

Before you begin the VMware Integrated OpenStack deployment tasks, the software components must meet all of the version prerequisites for vSphere, ESXi hosts, and the NSX-V product.

Requirement	Description
vSphere version	<ul style="list-style-type: none"> ■ vSphere 5.5 Update 2 Enterprise Plus ■ vSphere 6 Enterprise Plus
ESXi hosts	<ul style="list-style-type: none"> ■ Version 5.5 Update 2 ■ Eight or more logical processes on each host. ■ The vCenter and all ESXi hosts intended for the VMware Integrated OpenStack deployment must use the same Network Time Protocol (NTP) server. ■ Verify that the ESXi host firewalls are configured to allow gdbserver access. Typically, the port range is 5900-5964.
NSX-V	Consult with VMware for the preferred version.

Storage Requirements for NSX-V Deployments

Storage requirements vary depending on your deployment configuration. Different nodes and clusters can share datastores. For example, during the installation process, you can specify the same datastore for the Compute and Image Service nodes.

For information about storage requirements per VM in a typical VMware Integrated OpenStack deployment, see [“Hardware Requirements for VMware Integrated OpenStack,”](#) on page 7.

Storage requirements vary depending on whether you deploy with NSX-V or VDS networking.

Storage Requirements for NSX-V Deployments

NSX-V Controller, Manager, and Edge nodes affect the storage needs in an NSX-V deployment.

Cluster	Storage Requirements (GB)	Notes
Management	665	<p>The storage requirement calculation is based on the following nodes:</p> <ul style="list-style-type: none"> ■ OpenStack Manager (1 node) ■ Load Balancers (2 nodes) ■ Database (3 nodes) ■ Memory Cache (2 nodes) ■ Message Queue (2 nodes) ■ Controllers (2 nodes) ■ NSX-V Controller (3 nodes) ■ NSX-V Manager (1 node)
Compute	20	<p>Value is per cluster.</p> <p>Each Compute cluster contains a single Compute node. To add capacity, add clusters.</p>
NSX-V Edge	1.5	<p>Value is per node.</p> <p>Storage requirements for the NSX-V Edge cluster vary. When you create a logical subnet or router but an existing NSX-V Edge node cannot serve the request, an additional node is dynamically created.</p> <p>NOTE Creating a dedicated cluster for the NSX-V Edge nodes is a best practice to optimize performance. In an alternative deployment, you can include the NSX-V Edge nodes in the Management cluster.</p>

Storage Requirements for VDS Deployments

DHCP nodes affect the storage needs in a VDS deployment.

Cluster	Storage Requirements (GB)	Notes
Management	585	<p>The storage requirement calculation is based on the following service nodes:</p> <ul style="list-style-type: none"> ■ OpenStack Manager (1 node) ■ Load Balancers (2 nodes) ■ Database (3 nodes) ■ Memory Cache (2 nodes) ■ Message Queue (2 nodes) ■ Controllers (2 nodes) ■ DHCP Controller (2 nodes)
Compute	20	<p>Value is per cluster.</p> <p>Each Compute cluster contains a single Compute node. To add capacity, add clusters.</p>

Required NSX-V Parameters

When you are deploying VMware Integrated OpenStack with NSX-V for the Networking component, you must configure the NSX-V nodes in advance.

When you install VMware Integrated OpenStack, you must provide the following information.

Property	Description
Username	User name for accessing the NSX-V Manager node.
Password	Password for accessing the NSX-V Manager node.
Transport Zone	Name of the default transport zone.
Edge Cluster	The name of the cluster containing the Edge nodes.
vSphere Distributed Switch for Edge VTEP	The VDS from the NSX-V configuration.
Port Group for External Network	The port group created on a VLAN specifically for the External network. You created this port group as part of the process of preparing to deploy VMware Integrated OpenStack with NSX-V.

OpenStack Instances in vSphere Web Client

The VMs you create in your VMware Integrated OpenStack deployment appear in your vCenter inventory. Many restrictions apply to how you manage and work with OpenStack VMs.

In most cases, you must manage such VMs in the OpenStack dashboard or CLI rather than in the vSphere Web Client.

OpenStack Features Supported in vSphere

vSphere supports certain OpenStack features.

OpenStack Feature	Supported in vSphere
Launch	YES
Reboot	YES
Terminate	YES
Resize	YES
Rescue	YES
Pause	NO
Un-pause	NO
Suspend	YES
Resume	YES
Inject Networking	
Inject Networking is supported only when the following conditions are present:	
<ul style="list-style-type: none"> ■ With nova network in Flat mode ■ With Debian- or Ubuntu-based virtual machines ■ At boot time 	YES
Inject File	NO
Serial Console Output	YES
RDP Console	NO
Attach Volume	YES
Detach Volume	YES
Live Migration	YES
	Only in the same cluster.
Snapshot	YES

OpenStack Feature	Supported in vSphere
iSCSI	YES
Fibre Channel	YES Supported through vSphere datastores
Set Admin Pass	NO
Get Guest Info	YES
Set Host Info	YES
Glance Integration	YES
Service Control	YES
VLAN Networking	YES
Flat Networking	YES
Security Groups	NO vSphere Web Client supports Security Groups when using the Quantum NVP plugin.
Firewall Rules	NO
Routing	YES
Config Drive	YES
Evacuate or Host Maintenance Mode	YES
Volume Swap	NO
Volume Rate Limiting	NO

VM Operations in OpenStack

The following table maps VMware Integrated OpenStack and vSphere VM operations, and provides recommendations about where best to perform the operation. If you create a VM in VMware Integrated OpenStack, manage that VM in VMware Integrated OpenStack.

vSphere Feature	OpenStack Counterpart	Exposed through OpenStack API	Where to Perform this Operation
Create a virtual machine	Launch instance	YES	OpenStack dashboard
Reboot	Reboot	YES	OpenStack dashboard or vSphere Web Client
Delete	Terminate	YES	OpenStack dashboard
Resize	Resize	YES	OpenStack dashboard
Pause	Pause	YES	OpenStack dashboard or vSphere Web Client
Unpause	Un-pause	YES	OpenStack or vSphere Web Client
Pause	Suspend	YES	OpenStack dashboard
Resume	Resume	YES	OpenStack dashboard
Serial Console Output	Serial Console Output	YES	OpenStack dashboard or vSphere Web Client
RDP Console	RDP Console		OpenStack dashboard or vSphere Web Client
Add Disk	Attach Volume	YES	OpenStack dashboard

vSphere Feature	OpenStack Counterpart	Exposed through OpenStack API	Where to Perform this Operation
Remove Disk	Detach Volume	YES	OpenStack dashboard
vMotion	Live Migration	YES	vSphere Web Client Because OpenStack has no concept of clusters, migrating VMs through OpenStack can cause breaks, perform VM migrations by using vMotion.
Snapshot	Snapshot	YES	OpenStack dashboard or vSphere Web Client
Functions available through VMware Tools .	Get Guest Info/Get Host Info	YES	OpenStack dashboard or vSphere Web Client For vSphere Web Client, this function is available with VMware Tools.
Distributed Port Groups	VLAN Networking or Flat Networking	YES	OpenStack dashboard
Function available through VMware Tools.	Config Drive	NO	OpenStack dashboard or vSphere Web Client For vSphere Web Client, this function is available with VMware Tools.
InstallVMware Tools in a VM	Install VMware Tools in a VM	NO	OpenStack dashboard or vSphere Web Client

vCenter Features Not Supported in the OpenStack API

Direct parity does not exist between OpenStack features and vSphere features. The the OpenStack API does not support the following vCenter features.

- Adding a host to a cluster

OpenStack cannot add a host to a cluster in vSphere.

- Migrating VMs

The OpenStack Live Migration API is not supported. Use vCenter for VM migration within a single cluster. Do not migrate VMs between clusters.

- Putting a host into maintenance mode

You place a host in maintenance mode to service it, for example, to install more memory. A host enters or leaves maintenance mode only as the result of a user request. No such function exists in OpenStack. See the vSphere documentation for instructions about entering and exiting maintenance mode.

- Resource Pools

A resource pool in vSphere is a logical abstraction for flexible management of resources, such as CPU and memory. OpenStack has no equivalent to a resource pool.

- vSphere snapshots

vCenter supports OpenStack snapshots, but vSphere snapshots are distinct and are not supported in the OpenStack API.

Monitor OpenStack Instances in the vSphere Web Client

You can view and monitor instance activity and metadata in the vSphere Web Client.

Prerequisites

Verify that VMware Integrated OpenStack is deployed and operational.

Verify that you or another user has started instances in VMware Integrated OpenStack.

Procedure

- 1 In the vSphere Web Client, go to the **Home > Inventories** panel, click the VMware Integrated OpenStack icon.

- 2 Expand the Inventory view until you expose the instance VMS in the compute cluster.

The instance VMs are identified by their UUIDs.

- 3 Select an instance VM and click the **Summary** tab.

The Summary tab displays the portlets common to VMs in the vSphere Web Client. The OpenStack VM and Tags portlets contain details about instances created in OpenStack.

- 4 Locate the OpenStack VM portlet.

This portlet displays the following information about the selected instance.

Property	Description
Instance Name	Instance name as it appears in VMware Integrated OpenStack.
Tenant Name	Name of the OpenStack project in which the instance was started.
Flavor	The template used to create the instance. A flavor is a preset configuration that defines the compute, memory, and storage capacity of an instance. When you create an instance, you configure the server by selecting a flavor.
User Name	The OpenStack user that started the instance.
Status	Instance status: ACTIVE,
Network	The OpenStack network where the instance is deployed.

- 5 Locate the Tags portlet.

This portlet displays the following information about the selected instance.

Category	Tag Description
OpenStackUsers	The OpenStack user that started the instance.
OpenStackTenants	The OpenStack project in which the user started the instance.
OpenStackInstances	The UUID for the instance.
OpenStackFlavors	The flavor used to create the instance.

- 6 (Optional) Use the vSphere Web Client to search for and filter OpenStack instances.

- a In the vSphere Web Client Search field, enter one of the tag values in the Tags portlet.

For example, to find all instances created using the default m1.tiny flavor, enter **m1.tiny**.

The **Related Objects** tab appears with a list of all the OpenStack instances that match the search criteria.

- b Click on the name of any instance to open the Summary tab for that instance.

Adding Capacity and Components in vSphere Web Client

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You can add compute clusters and datastores to an existing VMware Integrated OpenStack deployment. You can also manually add the optional Object Storage (Swift) components.

This chapter includes the following topics:

- [“Adding the Object Storage Component,”](#) on page 15
- [“Add a New Compute Cluster,”](#) on page 18

Adding the Object Storage Component

After you deploy your OpenStack cloud infrastructure by using the Integrated OpenStack Manager, you can add the optional Object Storage component.

With OpenStack Object Storage, you can create redundant, scalable data storage using clusters of standardized servers to store petabytes of accessible data. Object Storage uses a distributed architecture with no central point of control, providing greater scalability, redundancy, and permanence. Objects can be written to multiple hardware devices, with the OpenStack software responsible for ensuring data replication and integrity across the cluster. Storage clusters scale horizontally by adding new nodes. Should a node fail, OpenStack replicates the content from other active nodes.

IMPORTANT Although the Object Storage component can be added as an optional component to your VMware Integrated OpenStack deployment, VMware does not support it.

Deploy the Object Storage Component

The optional Object Storage component is loaded when you deploy the Integrated OpenStack Manager vApp. It requires separate configuration to deploy it.

You configure and deploy the Object Storage component through the VM console.

Prerequisites

Configure and create your VMware Integrated OpenStack cloud.

Procedure

- 1 Open the console for the Identity Service component.

2 Create the administrative user for authentication by the Identity Service component.

- a Use the
- `user-create`
- command to create the user.

```
$ keystone user-create \
  --name=object_admin \
  --pass=object_pw \
  --email=admin@example_objectstorage.com
```

- b Give the newly created user administrative privileges.

```
$ keystone user-role-add \
  --user=object_admin \
  --tenant=service \
  --role=admin
```

3 Create a service entry for the Object Storage service.

```
$ keystone service-create \
  --name=vio_object \
  --type=object-store \
  --description="VIO Object Storage"
```

```
+-----+-----+
| Property | Value |
+-----+-----+
| description | VIO Object Storage |
| id | eede9296683e4b5ebfa13f5166375ef6 |
| name | vio_object |
| type | object-store |
+-----+-----+
```

The service `id` value is automatically generated.

4 Create an API endpoint for the Object Storage service.

Parameter	Description
<code>service-id</code>	Use the service <code>id</code> value generated in Step 3 .
<code>publicurl</code>	Provide the URL for the public API.
<code>internalurl</code>	Provide the URL for the internal API.
<code>adminurl</code>	Provide the URL for the administrative API.

The following example uses the controller hostname. The Identity Service uses a different port for the administrative API.

```
$
keystone endpoint-create \
  --service-id=$(keystone service-list | awk '/ identity / {print $2}') \
  --publicurl=http://controller:5000/v2.0 \
  --internalurl=http://controller:5000/v2.0 \
  --adminurl=http://controller:35357/v2.0
```

```
+-----+-----+
| Property | Value |
+-----+-----+
| adminurl | http://controller:35357/v2.0 |
| id | 11f9c625a3b94a3f8e66bf4e5de2679f |
| internalurl | http://controller:5000/v2.0 |
+-----+-----+
```

```

| publicurl | http://controller:5000/v2.0 |
| region   | regionOne |
| service_id | 15c11a23667e427e91bc31335b45f4bd |
+-----+-----+

```

What to do next

After you deploy the Object Storage component, you can install and configure the related nodes.

Install and Configure Object Storage Nodes

The Object Storage component requires dedicated nodes for content storage and replication. The Object Storage component works on any file system that supports Extended Attributes (XATTRS).

You configure and deploy the Object Storage nodes through the VM console.

Prerequisites

Deploy the optional Object Storage component

Procedure

- 1 In the Object Storage VM console, obtain and install the storage node packages.

```
# apt-get install swift swift-account swift-container swift-object xfsprogs
```

- 2 Set up the XFS volume on each device to be used for storage.

```
# fdisk /dev/sdb
# mkfs.xfs /dev/sdb1
# echo "/dev/sdb1 /srv/node/sdb1 xfs noatime,nodiratime,nobarrier,logbufs=8 0 0"
>> /etc/fstab
# mkdir -p /srv/node/sdb1
# mount /srv/node/sdb1
# chown -R swift:swift /srv/node
```

This example uses `/dev/sdb` as an example device.

A best practice is to use a single partition per drive. For example, in a server with twelve disks you can use one or two disks for the operating system. You then partition the other ten or eleven disks with a single partition, and format them in XFS.

- 3 Create the `/etc/rsyncd.conf` file.

```
uid = swift
gid = swift
log file = /var/log/rsyncd.log
pid file = /var/run/rsyncd.pid
address = STORAGE_LOCAL_NET_IP
[account]
max connections = 2
path = /srv/node/
read only = false
lock file = /var/lock/account.lock
[container]
max connections = 2
path = /srv/node/
read only = false
lock file = /var/lock/container.lock
[object]
```

```

max connections = 2
path = /srv/node/
read only = false
lock file = /var/lock/object.lock

```

- 4 (Optional) Modify the `address` parameter to separate `rsync` and replication traffic to a replication network, and modify the value to `STORAGE_REPLICATION_NET_IP`.

```
address = STORAGE_REPLICATION_NET_IP
```

- 5 Save and close the `/etc/rsyncd.conf` file.
- 6 Open the `/etc/default/rsync` file for editing.
- 7 Change the value for the `RSYNC_ENABLE` parameter to `true`.

```
RSYNC_ENABLE=true
```

- 8 Save and close the `/etc/default/rsync` file.
- 9 In the Object Storage VM console, start the `rsync` service.

```
# service rsync start
```

IMPORTANT Because the `rsync` service requires no authentication, run the service on a local, private network.

- 10 Create the `recon` cache directory for the Object Storage component.

```
# mkdir -p /var/swift/recon
```

- 11 Set permissions for the new directory.

```
# chown -R swift:swift /var/swift/recon
```

This completes the node installation and configuration.

Add a New Compute Cluster

You can increase the number of compute clusters in your VMware Integrated OpenStack deployment to increase CPU capacity.

Prerequisites

Reconfigure a cluster with at least one host.

Procedure

- 1 In vCenter, select **Home > VMware Integrated OpenStack > Getting Started**.
- 2 Under Basic Tasks, click **Add Clusters to OpenStack**.
- 3 On the Add nova cluster page, select the cluster to add, and click **Next**.

The cluster you select must contain at least one host.

- 4 On the Review proposed configuration page, select the existing management VM, and click **Next**.
- 5 Select the datastores for the tenants in the new cluster, and click **Next**.
- 6 Review the proposed configuration, and click **Finish**.

- 7 Confirm that the new cluster is added to the OpenStack deployment.
 - a Navigate to the OpenStack datacenter.
 - b Select **Management Cluster > Management VM > Compute node**.

The newly added cluster appears in the Compute node.

OpenStack capacity increases based on the resources available in the additional cluster.

Update Your VMware Integrated OpenStack Deployment

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You update your VMware Integrated OpenStack deployment by applying patches by using the VMware Integrated OpenStack Manager vApp.

VMware provides updates in the form of Debian patches. Depending on the update, you might be required to apply the patch by using the VMware Integrated OpenStack Manager CLI.

Procedure

- 1 Download the Debian patch from VMware.
- 2 In the vSphere Web Client, select **Home > Inventories**, and click the VMware Integrated OpenStack icon.
- 3 Click the **Manage** tab and click the **Updates** tab..

The **Updates** tab lists added patches and indicates if they are installed.

- 4 Add the patch to the VMware Integrated OpenStack Manager by clicking the green plus sign + and browsing to the file location.
- 5 Select the patch and click **Choose**.

The patch appears in the list on the **Updates** tab.

- 6 Install the patch.

If you can install the patch by using the VMware Integrated OpenStack Manager vApp, the **Apply** option appears in the Patch Action column on the **Updates** tab.

If the **Apply** option does not appear in the Patch Action column, click **More details** in the Patch Description column to access instructions for installing patches by using the CLI.

After you install a patch, the value in the Patch Status column on the **Updates** tab changes to Installed.

Managing OpenStack Projects and Users

5

In VMware Integrated OpenStack, cloud administrators manage permissions through user, group, and project definitions. Projects in OpenStack equate to tenants in vSphere. You can assign users and user groups to more than one project.

Before you can create a user, you must create at least one project to which you can assign the user.

This chapter includes the following topics:

- [“Create an OpenStack Project,”](#) on page 23
- [“Modify a Project,”](#) on page 24
- [“Working with Security Groups,”](#) on page 25
- [“Create a Cloud User Account in OpenStack,”](#) on page 27
- [“Modify a User Account,”](#) on page 28

Create an OpenStack Project

Projects are the equivalent of tenants or accounts. They function as organizational units in the cloud to which you can assign users.

Prerequisites

Verify that you are logged in to the VMware Integrated OpenStack dashboard as a cloud administrator.

Procedure

- 1 Select the admin project from the drop-down menu in the title bar.
- 2 Select **Admin > Identity Panel > Projects**.
- 3 Click **Create Project**.
- 4 Click the **Project Info** tab and configure the project settings.

Setting	Description
Name	Project name.
Description	Optional description of the new project.
Enabled	New projects are enabled by default. Disabling a project prevents cloud users from accessing the project, prevents users from managing launching instances for the project, and can prevent users from logging in if they are assigned only to that project.

- 5 (Optional) Add members to the project by selecting existing cloud users on the **Project Members** tab.

- 6 (Optional) Add groups of members to the project by selecting existing groups of cloud users on the **Project Groups** tab.
- 7 On the **Quota** tab, accept or modify the quota settings.
Quotas are operational limits that you can configure to manage how much system resources are available to a specific project. For example, you can optimize the cloud resources by controlling the number of gigabytes allowed for each tenant. Quotas can be enforced at both the project and user level.
- 8 Click **Create Project** at the bottom of the panel.

The VMware Integrated OpenStack dashboard assigns an ID to the new project, and the project is listed on the Projects page.

Modify a Project

You can update a project to change its name or description, and enable or temporarily disable it.

IMPORTANT Disabling a project can have negative consequences. For example, if a user is assigned to only that project, they cannot log in to the VMware Integrated OpenStack dashboard. Similarly, the project is not accessible by its members. Project instances continue running, so you must suspend or stop them manually. Project data is retained in case the project is enabled again.

Prerequisites

Verify that you are logged in to the VMware Integrated OpenStack dashboard as a cloud administrator.

Procedure

- 1 On the VMware Integrated OpenStack dashboard, select the admin project from the drop-down menu in the title bar.
- 2 Select **Admin > Identity Panel > Projects**.
- 3 Select the project to edit.
- 4 In the Actions column, click **More** and select **Edit Project** from the drop-down menu.
In the Edit Project dialog box, you can change the project's name and description, and enable and disable it.
- 5 Modify the project settings, and click **Save**.
- 6 (Optional) To change user assignments for a project, on the Projects page, click **Modify Users** for the project to modify..

Option	Action
Assign a user to the current project	Click the plus sign (+) for the user.
Remove a user from the current project,	Click the minus sign (-) for the user.

- 7 Click **Save**.
- 8 To delete one or more projects, return to the Projects page and select the projects to delete.

NOTE You cannot restore a deleted project.

- a Click **Delete Projects**.
- b At the prompt, confirm the deletion.

Working with Security Groups

A security group is a set of IP filter rules that define networking access and that you can apply to all instances in a project. Group rules are project-specific. Project members can edit the default rules for their group and add new rule sets.

You can use security groups to apply IP rules by creating a new security group with the desired rules or by modifying the rules set in the default security group.

About the Default Security Group

Each project in VMware Integrated OpenStack has a default security group that is applied to an instance unless another security group is defined and specified. Unless it is modified, the default security group denies all incoming traffic to your instance and permits only outgoing traffic. A common example is to edit the default security group to permit SSH access and ICMP access, so that users can log in to and ping instances.

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.

To modify an existing rule for a security group, see [“Modify the Rules for an Existing Security Group,”](#) on page 26

Procedure

- 1 Log in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- 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 as a cloud administrator.
- 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 as a cloud administrator.
- 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.

Create a Cloud User Account in OpenStack

Cloud users have a limited set of rights and privileges relative to cloud administrators. Cloud users are limited to the tenants to which they are assigned. Tenants are called projects in OpenStack. Cloud users can create and manage instances, create and manage volumes, create networks, and create new images, among other tasks.

Prerequisites

- Verify that you are logged in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- Verify that a configured OpenStack project is available. See [“Create an OpenStack Project,”](#) on page 23.

Procedure

- 1 On the VMware Integrated OpenStack dashboard, select the admin project from the drop-down menu in the title bar.
- 2 Select **Admin > Identity Panel > Users**.
- 3 Click **Create User**.
- 4 Configure the user settings.

Option	Description
User Name	Cloud user name.
Email	Valid email address for the new user.
Password/Confirm Password	Preliminary password for the new user.

Option	Description
Primary Project	Project to which the user is assigned. You cannot create a user account without assigning it to at least one project.
Role	Role to which the user is assigned. A role is a set of rights and privileges. A user assigned that role inherits those rights and privileges.

- 5 Click **Create User** at the bottom of the panel.

The VMware Integrated OpenStack dashboard assigns an ID to the user, and the user now appears on the Users page.

Modify a User Account

As a cloud administrator, you can enable, disable, and delete user accounts.

Prerequisites

Verify that your logged in to the VMware Integrated OpenStack dashboard as a cloud administrator.

Procedure

- 1 In the VMware Integrated OpenStack dashboard, select the admin project from the drop-down menu in the title bar.
- 2 Select **Admin > Identity Panel > Users**.

Option	Action
Enable or disable a user account.	<ol style="list-style-type: none"> a Select the user account to edit. b In the Actions column, click More and select Enable User or Disable User from the drop-down list.
Delete one or more user accounts.	<ol style="list-style-type: none"> a Select the user accounts to delete. b Click Delete Users. c At the prompt, confirm the deletion.

Working with Instances in OpenStack

Instances are virtual machines that run in the cloud.

As a cloud administrative user, you can manage instances for users in various projects. You can view, terminate, edit, perform a soft or hard reboot, create a snapshot from, and migrate instances. You can also view the logs for instances or start a VNC console for an instance.

For information about how to use the dashboard to start instances as an end user, see the *VMware Integrated OpenStack User's Guide*.

This chapter includes the following topics:

- [“Create a Snapshot from an Instance,”](#) on page 29
- [“Control the State of an Instance,”](#) on page 29
- [“Track Instance Use,”](#) on page 30

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 as a cloud administrator.
- 2 Select the admin project from the drop-down menu in the title bar.
- 3 Select **Admin > System Panel > Instances**.
- 4 In the Actions column, click **Create Snapshot**.

The snapshot appears on the Images & Snapshots page.

Control the State of an Instance

As a cloud administrative user, you can pause, unpaue, suspend, resume, soft or hard reboot, or terminate an instance.

Procedure

- 1 Log in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- 2 Select the admin project from the drop-down menu in the title bar.
- 3 Select **Admin > System Panel > Instances**.
- 4 Select the instance whose state you want to manage.

- 5 In the Actions column, click **More** and select the state from the drop-down menu.
Items that appear in red text are disabled.

Track Instance Use

You can track the use of instances for each project. You can track costs per month by showing metrics like the number of VCPUs, disks, RAM, and uptime of all of your instances.

Procedure

- 1 Log in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- 2 Select the admin project from the drop-down menu in the title bar.
- 3 Select **Admin > System Panel > Overview**.

The Overview page shows the usage summary and project-specific usage information. You can specify a period of time for the usage information. Optionally, you can download a CSV summary.

- 4 (Optional) Specify a period of time for reporting and click **Submit**.
- 5 (Optional) Click **Download CSV Summary** to download a report of the usage.

Working with Volume Types in OpenStack

7

Volumes are block storage devices that you attach to instances to enable persistent storage.

As a cloud administrative user, you can manage volumes and volume types for users in various projects. You can create and delete volume types, and you can view and delete volumes.

Cloud users can attach a volume to a running instance or detach a volume and attach it to another instance at any time. For information about how to use the dashboard to create and manage volumes as an end user, see the *VMware Integrated OpenStack User Guide*.

This chapter includes the following topics:

- [“Create a Volume Type,”](#) on page 31
- [“Delete a Volume Type,”](#) on page 31

Create a Volume Type

As a cloud administrative user, you can manage volumes and volume types for users.

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 **Admin > System Panel > Volumes**.

The Volumes page lists the volumes that are currently configured and available to the current user.

- 4 Click **Create Volume Type**.
- 5 Enter a name for the volume type, and click **Create Volume Type**.

Delete a Volume Type

As a cloud administrative user, you can manage volumes and volume types for users in projects.

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 **Admin > System Panel > Volumes**.

The Volumes page lists the volumes that are currently configured and available to the current user.

- 4 Select the volume types to delete.

- 5 Click **Delete Volume Types**.
- 6 At the prompt, confirm the deletion.

Managing Images for the Image Service

8

In the OpenStack context, an image is a file that contains a virtual disk from which you can install an operating system on a VM. You create an instance in your OpenStack cloud by using one of the images available. The VMware Integrated OpenStack Image Service component supports images that are packaged in the ISO, OVA, and VMDK formats.

If you have existing images in vSphere that you want to use in OpenStack, you can export them in one of the supported formats and upload them to the Image Service. If you obtain an image that is not in one of the supported formats, you can import it to vSphere and repackage it.

In addition to uploading the images, you must tag them so that VMware Integrated OpenStack and vSphere recognize the disk type. See [Upload Images to the Image Service by Using the CLI](#).

This chapter includes the following topics:

- [“Upload Images to the Image Service by Using the Dashboard,”](#) on page 33
- [“Modify Image Settings,”](#) on page 34
- [“Delete an Existing Image,”](#) on page 34

Upload Images to the Image Service by Using the Dashboard

You can create images directly in the VMware Integrated OpenStack dashboard.

Prerequisites

Verify that the images are packaged in the ISO, VMDK, or OVA format.

Procedure

- 1 Log in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- 2 Select the admin project from the drop-down menu in the title bar.
- 3 Select **Admin > System Panel > Images**.
- 4 On the Images page, click **Create Image**.
- 5 Configure the image.

Option	Action
Name	Enter a name for the new image.
Description	(Optional) Enter a description for the new image.
Image Source	Select the image source.
Disk Format	Select the disk format.
Disk Type	Select the disk type.

Option	Action
Adapter Type	Select the adapter type.
Architecture	Accept the default.
OS Type	Select the type of operating system.
Minimum Disk (GB)	Specify the minimum disk size for the image in GB.
Minimum RAM (GB)	Specify the minimum RAM for the image.
Public	Select to make the image visible and available to all tenants.
Protected	Select to prevent the image from being deleted.

- 6 Click **Create Image**.

The Images page now includes the newly added image.

The image is now ready for deployment in OpenStack instances.

Modify Image Settings

After an image is loaded, you can modify the image settings, such as image name, description, and the public and protected settings.

Procedure

- 1 Log in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- 2 Select the admin project from the drop-down menu in the title bar.
- 3 Select **Admin > System Panel > Images**.
- 4 Select the image to edit.
- 5 In the Actions column, select **More > Images**.
- 6 Modify the settings as necessary.
- 7 Click **Update Image**.

The Images page redisplay with the changed information.

Delete an Existing Image

Deleting an image is permanent and cannot be reversed. You must have administrative permissions to delete an image.

Procedure

- 1 Log in to the VMware Integrated OpenStack dashboard as a cloud administrator.
- 2 Select the admin project from the drop-down menu in the title bar.
- 3 Select **Admin > System Panel > Images**.
- 4 Select one or more images to delete.
- 5 Click **Delete Images**.
- 6 Confirm the deletion at the prompt.

Working with Flavors

In OpenStack, a flavor is a preset configuration that defines the compute, memory, and storage capacity of an instance. When you create an instance, you configure the server by selecting a flavor. Administrative users can create, edit, and delete flavors.

Do not delete any of the default flavors.

This chapter includes the following topics:

- [“Default Flavor Configurations,”](#) on page 35
- [“Create a Flavor,”](#) on page 35
- [“Delete a Flavor,”](#) on page 36

Default Flavor Configurations

The default OpenStack deployment provides five default flavors ranging from tiny to extra large.

Name	vCPUs	RAM (MB)	Disk (GB)
m1.tiny	1	512	1
m1.small	1	2048	20
m1.medium	2	4096	40
m1.large	4	8192	80
m1.xlarge	8	16384	160

Create a Flavor

Administrative users can create custom flavors.

Prerequisites

Verify that you are logged in to the VMware Integrated OpenStack dashboard as a cloud administrator.

Procedure

- 1 On the VMware Integrated OpenStack dashboard, select the admin project from the drop-down menu in the title bar.
- 2 Select **Admin > System Panel > Flavors**.
- 3 Click **Create Flavor**.

- 4 In the Create Flavor dialog box, configure the new flavor.

Parameter	Description
Name	Name for the flavor.
ID	Integer or a UUID4 value that identifies the flavor. If this parameter is left blank or has a value of auto , OpenStack automatically generates a UUID.
VCPUs	Number of virtual CPUs that an instance made from this flavor will use.
RAM MB	Megabytes of RAM for virtual machines made from this flavor.
Root Disk GB	Gigabytes of disk used for the root (/) partition in instances made from this flavor.
Ephemeral Disk GB	Gigabytes of disk space to use for the ephemeral partition. If unspecified, the value is 0 by default. Ephemeral disks offer machine local disk storage linked to the life cycle of a VM instance. When a VM is terminated, all data on the ephemeral disk is lost. Ephemeral disks are not included in snapshots.
Swap Disk MB	Megabytes of swap space to use. If unspecified, the default is 0.

- 5 Click **Create Flavor** at the bottom of the dialog box to complete the process.
- 6 (Optional) Specify which projects can access instances created from specific flavors.
 - a On the Flavors page, click **Edit Flavor** in the Actions column of the instance.
 - b In the Edit Flavor dialog box, click the **Flavor Access** tab.
 - c Use the toggle controls to select the projects that can access the instance.
 - d Click **Save**.
- 7 (Optional) Modify the settings of a specific flavor.
 - a On the Flavors page, click **Edit Flavor** in the Actions column of the instance.
 - b In the Edit Flavor dialog box, modify the settings in either the **Flavor Info** or **Flavor Access** tab.
 - c Click **Save**.

Delete a Flavor

You can manage the number and variety of flavors by deleting those that no longer meet users' needs, duplicate other flavors, or for other reasons.

NOTE You cannot undo the deletion of a flavor. Do not delete default flavors.

Prerequisites

You must be logged in to the VMware Integrated OpenStack dashboard as a cloud administrator to perform this task.

Procedure

- 1 In the VMware Integrated OpenStack dashboard, select the admin project from the drop-down menu in the title bar.
- 2 Select **Admin > System Panel > Flavors**.
- 3 Select the flavors to delete.
- 4 Click **Delete Flavors**.
- 5 At the prompt, confirm the deletion.

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