



## Cisco vWAAS in Cloud Computing Systems

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This chapter contains the following sections:

- [Cisco vWAAS in Cloud Computing Systems](#)
- [Cisco vWAAS in Microsoft Azure](#)
- [Cisco vWAAS in OpenStack](#)

### Cisco vWAAS in Cloud Computing Systems

Cisco vWAAS is a cloud-ready WAN optimization solution that is fully interoperable with WAAS appliances, and can be managed by a common central manager or virtual central manager. The vWAAS cloud computing solution includes these features:

- On-demand orchestration that responds to the creation or movement of application server VMs.
- Minimal network configuration, including in a dynamic environment.
- Designed for scalability, elasticity, and multi-tenancy support.
- Designed for minimal network configuration in a dynamic environment.

### Cisco vWAAS in Microsoft Azure

This section contains the following topics:

- [About Cisco vWAAS in Microsoft Azure](#)
- [Operating Considerations for Cisco vWAAS in Microsoft Azure](#)
- [Upgrade/Downgrade Considerations for Cisco vWAAS in Microsoft Azure](#)
- [Deploying Cisco vWAAS in Microsoft Azure](#)

### About Cisco vWAAS in Microsoft Azure

Azure is a Microsoft Cloud that provisions virtual machines (VMs) on the Microsoft Hyper-V hypervisor. vWAAS in Azure is part of WAAS support for Office 365, and is an end-to-end solution with enterprise branch offices.

- vWAAS in Azure is available for vWAAS Version 6.2.1x and later, and is supported for vWAAS-200, vWAAS-750, vWAAS-1300, vWAAS-2500, vWAAS-6000, and vWAAS-12000v.

- vWAAS in Azure is not supported for vWAAS-50000.

Table 10-1 shows the platforms supported for Cisco vWAAS in Microsoft Azure.

**Table 10-1** Microsoft Azure VM Sizes for Cisco WAAS vWAAS Models

vWAAS Model	Maximum Connections	Data Disk	Minimum Azure VM Size
vWAAS-200	200	160 GB	D2_v2 (2 cores, 7GB)
vWAAS-750	750	250 GB	D2_v2 (2 cores, 7GB)
vWAAS-1300	1300	300 GB	D2_v2 (2 cores, 7GB)
vWAAS-2500	2500	400 GB	D3_v2 (4 cores, 14GB)
vWAAS-6000	6000	500 GB	D3_v2 (4 cores, 14GB)
vWAAS-12000	12000	750 GB	D3_v2 (4 cores, 14GB)

## Operating Considerations for Cisco vWAAS in Microsoft Azure

This section contains the following topics:

- [vWAAS in Microsoft Azure and WAAS Interoperability](#)
- [Operating Limitations for vWAAS in Microsoft Azure](#)

### vWAAS in Microsoft Azure and WAAS Interoperability

Note the following operating considerations for Cisco vWAAS in Microsoft Azure:

- vWAAS in Azure is available for all vWAAS models, for WAAS Version 6.2.1 and later.
- You can display and identify an Azure vWAAS device on the WAAS Central Manager or the CLI:
  - On the WAAS Central Manager, navigate to the **Manage Devices** screen. The vWAAS in Azure device type is displayed as **OE-VWAAS-AZURE**.
  - On the CLI, use either the **show version EXEC** command or the **show hardware EXEC** command. Output for both commands will include device ID, shown as **OE-VWAAS-AZURE**.
- vWAAS in Azure communicates with the WAAS Central Manager in the same ways as physical appliances communicate with the Central Manager.

A vWAAS in Azure device is displayed on the WAAS Central Manager as AZURE-VWAAS. To display vWAAS in Azure devices, navigate to **Home > Devices > All Devices**. The Device Type column shows all WAAS and vWAAS devices.



**Note** For vWAAS in Azure, the supported traffic interception method is PBR (Police-Based Routing); vWAAS in Azure does not support WCCP or AppNav interception methods.

- Registering the vWAAS in Azure to the WAAS Central Manager:
  - If you register the vWAAS with the WAAS Central Manager using a private IP address, following the usual vWAAS registration process described in [Configuring vWAAS Settings](#) of Chapter 2, “Configuring and Cisco vWAAS and Viewing vWAAS Components.”

- If you register the vWAAS with the WAAS Central Manager using a public IP address, you must specify the public address of the vWAAS in the WAAS Central Manager Device Activation screen (navigate to **Devices** > *device-name* > **Activation**).



**Note** After you have registered the vWAAS in Azure device to the WAAS Central Manager, you must configure the public IP address of the Central Manager. The vWAAS in Azure device can contact the Central Manager only by using the public IP address of the registration. To set the public IP address of the WAAS Central Manager:

1. In the WAAS Central Manager, navigate to **Home** > **Devices** > *Primary-CM-Device* > **Configure** > **Network** > **NatSettings**.
2. In the NAT IP field, enter the public IP address of the Central Manager.

## Operating Limitations for vWAAS in Microsoft Azure

Note the following operating limitations for Cisco vWAAS in Microsoft Azure:

- vWAAS auto-registration is not supported, because Microsoft Azure uses DHCP to configure VMs with IP address and Azure fabric server IP address. There will be operational issues if you deploy a separate DHCP server for auto-registration.

Functionality similar to auto-registration is available by providing the WAAS CM IP address during VM provisioning. The vWAAS VM will try to register with this WAAS CM during provisioning.

- Microsoft Azure does not support GRE, IPv6, or Jumbo Frames, therefore vWAAS in Azure does not support these features.



**Note** For vWAAS in Azure, the supported traffic interception method is PBR (Police-Based Routing); vWAAS in Azure does not support WCCP or AppNav interception methods.

- WAAS/vWAAS with Akamai Connect is not supported for vWAAS in Azure.

## Upgrade/Downgrade Considerations for Cisco vWAAS in Microsoft Azure

Consider the following upgrade/downgrade guidelines for Cisco vWAAS in Microsoft Azure:

- The procedure for upgrading or downgrading vWAAS in Azure, for all vWAAS models except vWAAS-50000, is the same as for any other WAAS device.
- Downgrading a device or device group for vWAAS in Azure to a WAAS Version earlier than Version 6.2.1 is not supported.

## Deploying Cisco vWAAS in Microsoft Azure

This section contains the following topics:

- [Deployment Options for Cisco vWAAS in Microsoft Azure](#)
- [Provisioning the vWAAS VM in Microsoft Azure](#)
- [Deploying vWAAS in Microsoft Azure](#)

## Deployment Options for Cisco vWAAS in Microsoft Azure

There are two major deployment options for Cisco vWAAS in Microsoft Azure:

- A SaaS application, such as an enterprise application where you control hosting of the application.  
In this type of deployment, both the application server and Cisco vWAAS can be put in the Azure cloud just as in a private cloud. The vWAAS is very close to the server, and tied to the server movement. In this case, the traffic flow is very similar to that in a normal enterprise data center deployment.
- A SaaS application such as Office 365, where you do not control hosting of the application  
In this type of deployment, you do not have control over the application in the cloud; you control only the vWAAS. In this case, traffic from the CSR in the branch is tunneled to the CSR in Azure, which is then redirected to the vWAAS. A Destination Network Address Translation (DNAT) is performed to get the traffic back to the CSR in the Azure cloud from the SaaS application. For more information on Office 365 and WAAS, see [Accelerate Microsoft Office 365 Shared Deployments with Cisco WAAS WAN Optimization](#).

## Provisioning the vWAAS VM in Microsoft Azure



**Note** To deploy vWAAS in Azure, you need a Microsoft Azure Pay-As-You-Go subscription. Subscription procedure and billing information are available on the Microsoft Azure website.

To provision the vWAAS VM in Microsoft Azure, follow these steps:

- Step 1** Login to the Microsoft Azure portal.
- Step 2** Navigate to **New > Compute > Virtual Machine > From Gallery**.  
The **Create a Virtual Machine/Choose an Image** screen is displayed.
- Step 3** At the **Create a Virtual Machine/Choose an Image > My Images** screen, select the vWAAS Azure image for your system.  
The **Create a Virtual Machine/Virtual Machine Configuration** screen is displayed.
- Step 4** In the Virtual Machine Name field, enter the name of the VM you want to create. Use only letters and numbers, up to a maximum of 15 characters.
- Step 5** In the Tier field, select **Standard**.
- Step 6** At the Size dropdown list, select the Azure VM size for your system. [Table 10-2](#) shows the minimum Azure VM size for each vWAAS model available for provisioning in the Tier field.

**Table 10-2** Microsoft Azure VM Sizes for Cisco WAAS vWAAS Models

vWAAS Model	Maximum Connections	Data Disk	Minimum Azure VM Size
vWAAS-200	200	160 GB	D2_v2 (2 cores, 7GB)
vWAAS-750	750	250 GB	D2_v2 (2 cores, 7GB)
vWAAS-1300	1300	300 GB	D2_v2 (2 cores, 7GB)
vWAAS-2500	2500	400 GB	D3_v2 (4 cores, 14GB)



**Note** Use the Microsoft Azure Tier field to select an Azure VM for the vWAAS models shown in [Table 10-2](#). For vWAAS-6000 and vWAAS-12000, you must use the template to specify the Azure VM. For more information, see [Deploying Cisco vWAAS in Microsoft Azure](#). For Azure VM sizes for vWAAS-6000 and vWAAS-12000, see [Table 10-1](#).

- Step 7** In the New User Name field, enter your user name.
- Step 8** In the New Password field, enter your password.
- Step 9** In the Confirm field, re-enter your password.
- Step 10** (Optional) If your system uses SSH key-based authentication:
- Check the **Upload compatible SSH key for authentication** checkbox.
  - At the Certificate field, browse for the certificate file for your system.
- Step 11** (Optional) If your system requires a password, check the **Provide a password** checkbox.
- Step 12** Click the right arrow at the lower right of the screen to proceed to the next screen.  
The next **Create a Virtual Machine/Virtual Machine Configuration** screen is displayed.
- Step 13** At the Cloud Service dropdown list, select **Create a Cloud Service**.
- Step 14** In the Cloud Service DNS Name field, enter the name of the VM that you created in [Step 4](#).  
In the naming style of Azure VMs, the DNS name has **cloudapp.net** automatically appended to it.
- Step 15** At the Region/Affinity Group/Virtual Network dropdown list, choose a location that is in close proximity to the resources you want to optimize, such as East US or North Europe.  
The Region/Affinity Group/Virtual Network setting determines the location of the VM within the Azure cloud data centers.
- Step 16** At the Storage Account dropdown list, select **Use an automatically generated storage account**.
- Step 17** At the Availability Set dropdown list, choose **(None)**.
- Step 18** Click the right arrow at the lower right corner of the screen to proceed to the next screen.  
The **Virtual Machines/Virtual Machine Instances** screen is displayed
- Step 19** By default, the **Install the VM Agent** check box is checked.
- Step 20** In the Endpoints section:
- Add an endpoint for **SSH (port 22)**
  - Add an endpoint for **HTTPS (port 443)**
- Step 21** Click the checkmark at the lower right corner of the screen to proceed for provisioning vWAAS.  
The **Virtual Machines/Virtual Machine Instances** screen is displayed, showing the newly-created VM with an initial status of *Starting (Provisioning)*.
- Step 22** The process takes a few minutes before the VM status is displayed as running.
- Step 23** Select the vWAAS VM.
- Step 24** Attach the data disks. See [Table 10-2](#) for data disk sizes for Azure VMs.
- Step 25** Stop and then start the VM, so that it picks up the attached disks.  
Your VM is ready to be deployed, with end-to-end setup.

## Deploying vWAAS in Microsoft Azure

This section has the following topics:

- [Deploying vWAAS VM and Data Disk with the VHD Template](#)
- [Deploying vWAAS VM with Template and Custom VHD from the Microsoft ARM Portal](#)
- [Deploying vWAAS VM Using Windows Powershell](#)
- [Verifying the vWAAS in Azure Deployment](#)

### Deploying vWAAS VM and Data Disk with the VHD Template

To deploy the vWAAS VM and data disk with the VHD template, follow these steps:

- 
- Step 1** Copy **vwaas.vhd** to the storage account using AzCopy.  
The AzCopy command parameters are:
- **Source:** The local folder address on the Windows device where the VHD file is stored.
  - **Dest:** The location of the container on the Azure cloud storage account.
  - **Destkey:** The Azure cloud storage account key.
- Step 2** Use the template to deploy the vWAAS VM.  
The vWAAS VM is deployed with the data disk.
- Step 3** Log in with your username and password.
- Step 4** (Optional) To verify deployment details such as CMS registration and WAAS Central Manager address, see [Verifying the vWAAS in Azure Deployment](#).
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### Deploying vWAAS VM with Template and Custom VHD from the Microsoft ARM Portal

To deploy the vWAAS VM with a template and custom VHD from the Microsoft Azure Resource Manager (ARM) portal, follow these steps:

- 
- Step 1** *Prerequisite:* Verify that the vWAAS VM is provisioned in Azure, including the creation of a storage account and a VM location in Azure specified. For more information, see [Provisioning the vWAAS VM in Microsoft Azure](#).
- Step 2** Copy **vwaas.vhd** to the storage account using Azcopy.
- Step 3** Use the template to deploy the vWAAS VM.
- Step 4** At the Microsoft ARM portal, navigate to **New > Template Deployment > Edit Template**.
- Step 5** Copy the template <<? from which location, or ? from flash>>
- Step 6** Paste the template here.
- Step 7** For the parameters, enter the values for your system, such as resource group and resource group location, and whether or not to deploy the vWAAS VM in a new or existing virtual network.
- Step 8** Accept the Terms and Conditions.
- Step 9** Click Create.
- Step 10** The vWAAS VM is deployed.

- Step 11** Log in with your username and password.
- Step 12** (Optional) To verify deployment details such as CMS registration and WAAS Central Manager address, see [Verifying the vWAAS in Azure Deployment](#).
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## Deploying vWAAS VM Using Windows Powershell


To deploy the vWAAS VM using Windows Powershell, follow these steps:

- 
- Step 1** *Prerequisite:* Verify that the vWAAS VM is provisioned in Azure, including the creation of a storage account and a VM location in Azure specified. For more information, see [Provisioning the vWAAS VM in Microsoft Azure](#).
- Step 2** Deploy vWAAS on Microsoft Hyper-V. For information on this deployment procedure, see Chapter 5, “Cisco vWAAS on Microsoft Hyper-V”.
- Step 3** Run the **azure\_predeploy.sh** script in Hyper-V, to set the necessary Azure parameters.
- Step 4** Export the flash VHD from the Hyper-V disk location to the storage account in Azure, using AzCopy.
- Step 5** Use Windows Powershell commands to specify the following parameters:
- Use the **deployName** command to specify the deployment name.
  - Use the **RGName** command to specify the resource group.
  - Use the **locName** command to specify the location.
  - Use the **templateURI** command to specify the template file.
- Step 6** Use the **New-AzureRmResourceGroup -Name \$RGName -Location \$locName** Powershell command to create the resource group.
- Step 7** Use the **New-AzureRmResourceGroupDeployment** Powershell cmdlet to deploy vWAAS in Azure. To complete the deployment, specify values for the following parameters:
- `userImageStorageAccountName`
  - `userImageStorageContainerName`
  - `userImageVhdName`
  - `osType`
  - `vmName`
  - `adminUserName`
  - `adminPassword`
- Step 8** After you enter these parameters, vWAAS in Azure is deployed. The system displays provisioning information, including deployment name, provisioning state, date/time, and mode.
- Step 9** Log in with your username and password.
- Step 10** (Optional) To verify deployment details such as CMS registration and WAAS Central Manager address, see [Verifying the vWAAS in Azure Deployment](#).
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## Verifying the vWAAS in Azure Deployment

[Table 10-3](#) provides a checklist for verifying the vWAAS VM deployment in Microsoft Azure.

Table 10-3 Checklist for Verifying the vWAAS in Azure Deployment

Task	Description
Viewing vWAAS in Azure vWAAS devices	<ul style="list-style-type: none"> <li>On the WAAS Central Manager, navigate to the <b>Manage Devices</b> screen. The vWAAS in Azure device type is displayed as <b>OE-VWAAS-AZURE</b>.</li> <li>On the WAAS CLI, use either the <b>show version EXEC</b> command or the <b>show hardware EXEC</b> command. Output for both commands will include device ID, shown as <b>OE-VWAAS-AZURE</b>.</li> </ul>
Viewing Boot Information and Diagnostics	On the Azure portal, navigate to <b>Virtual Machines &gt; VM &gt; Settings &gt; Boot Diagnostics</b> on the Azure portal.
Verifying CMS Registration	<p>If the Centralized Management System (CMS) is enabled, use the <b>show cms device status name</b> command to display status for the specified device or device group.</p> <p> <b>Note</b> After you have registered the vWAAS in Azure device to the WAAS Central Manager, you must configure the public IP address of the Central Manager. The vWAAS in Azure device can contact the Central Manager only by using the public IP address of the registration. To set the public IP address of the WAAS Central Manager:</p> <ol style="list-style-type: none"> <li>In the WAAS Central Manager, navigate to <b>Home &gt; Devices &gt; Primary-CM-Device &gt; Configure &gt; Network &gt; NatSettings</b>.</li> <li>In the NAT IP field, enter the public IP address of the Central Manager.</li> </ol>
Verifying WAAS Central Manager Address	Use the <b>show running-config</b> command to display information about all WAAS device.

**Note**

Whenever ARP cache(s) are cleared or the vWAAS is rebooted, packets may not be forwarded to the next hop in Azure cloud. To ensure that packets are successfully forwarded, use the **ping EXEC** command to update the ARP cache table.

## Cisco vWAAS in OpenStack

This section contains the following topics:

- [Operating Considerations for vWAAS in OpenStack](#)
- [Upgrade/Downgrade Guidelines for Cisco vWAAS in OpenStack](#)
- [Deploying Cisco vWAAS in OpenStack](#)



## Operating Considerations for vWAAS in OpenStack

Consider the following operating guidelines for vWAAS in OpenStack:

- vWAAS in OpenStack is supported for vWAAS for WAAS Version 6.4.1b and later.
- vWAAS in OpenStack is supported for all vWAAS and vCM models that are supported on KVM on CentOS.
- On the Central Manager, vWAAS devices in OpenStack are displayed as OE-VWAAS-OPENSTACK.
- All vWAAS models for vWAAS in OpenStack are deployed with a single, unified OVA. Here are examples of the unified OVA and NPE OVA package filenames for vWAAS in OpenStack:
  - OVA—Cisco-KVM-vWAAS-Unified-6.4.1-b-33.tar.gz
  - NPE OVA—Cisco-KVM-vWAAS-Unified-6.4.1-b-33-npe.tar.gz

## Upgrade/Downgrade Guidelines for Cisco vWAAS in OpenStack

Consider the following upgrade/downgrade guidelines for Cisco vWAAS in OpenStack:

- The procedure for upgrading or downgrading vWAAS in OpenStack is the same as for any other WAAS device.
- Downgrading a device or device group for vWAAS in OpenStack to a WAAS Version earlier than Version 6.4.1b is not supported.

## Deploying Cisco vWAAS in OpenStack

This section contains the following topics:

- [Guidelines for Deploying vWAAS in OpenStack](#)
- [Procedure for Deploying vWAAS in OpenStack](#)

## Guidelines for Deploying vWAAS in OpenStack

Consider the following guidelines to deploy Cisco vWAAS in OpenStack:

- vWAAS in OpenStack is deployed for vWAAS on KVM. For more information on vWAAS on KVM, see the chapter “[Cisco vWAAS on RHEL KVM and KVM CentOS](#)”.

For vWAAS on KVM for WAAS Version 6.4.x and later, Cisco provides a single, unified OVA or NPE OVA package for each hypervisor type, which can be used with all vWAAS models for that hypervisor. Here are examples of the unified OVA and NPE OVA package filenames for vWAAS on KVM:

- OVA—Cisco-KVM-vWAAS-Unified-6.4.1-b-33.tar.gz
- NPE OVA—Cisco-KVM-vWAAS-Unified-6.4.1-b-33-npe.tar.gz

For more information about this unified OVA package, see [Unified OVA Package for vWAAS on KVM for WAAS Version 6.4.1 and Later](#).

- After vWAAS in OpenStack is operational on a device, you can use the WAAS CM or the WAAS CLI to display the OpenStack device.

- The WAAS CM displays the following information for the device:  
The OpenStack device is displayed in the **Devices > All Devices** listing under Device Type as OE-VWAAS-OPENSTACK.  
The OpenStack device is displayed in the **Devices > device-name > Dashboard** as OE-VWAAS-OPENSTACK.
- Use the **show hardware** command to display the device, as well as other system hardware status information such as startup date and time, the run time since startup, microprocessor type and speed, and a list of disk drives.

## Procedure for Deploying vWAAS in OpenStack

To deploy vWAAS in OpenStack, follow these steps:

- Step 1** Copy the unified OVA to a directory on the host machine.
- Step 2** Untar the OVA using the following command, shown below and in [Figure 10-1](#).

```
tar -xvf Cisco-KVM-vWAAS-Unified-6.4.1b-b-11.tar.gz
```

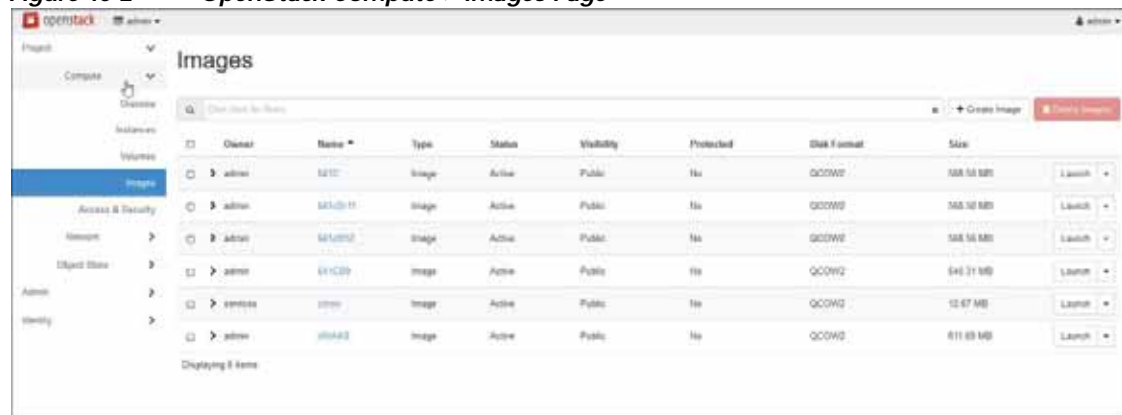
**Figure 10-1** Tar Command for vWAAS OpenStack OVA



```
linux qpaw:/home/b-11 # ls
Cisco-KVM-vWAAS-Unified-6.4.1b-b-11.npe.tar.gz  Cisco-KVM-vWAAS-Unified-6.4.1b-b-11.tar.gz
linux-qpaw:/home/b-11 # tar -xvf Cisco-KVM-vWAAS-Unified-6.4.1b-b-11.tar.gz
Disk-0.qcow2
Disk-1.qcow2
Disk-2.qcow2
launch.sh
vm.xml
ezdeploy.sh
ezdeploy_qstatus.exp
INSTRUCTIONS.TXT
OPENSTACK_INSTRUCTIONS.TXT
image_properties.xml
bootstrp-cfg.xml
akamai_disk.tar
model.txt
vwaas_install.sh
vwaas-admin-deny-config.xml
permit.xml
package.mf
```

- Step 3** Create the image.
- From the OpenStack Admin tab, open the Compute > Images page ([Figure 10-2](#)).

**Figure 10-2** OpenStack Compute > Images Page



- From the Images table listing, select the image for your system.
- To create the image, click **Create Image**.

**Step 4** Create the bootable volume.

From the OpenStack Admin tab, open the Compute > Create Volume page (Figure 10-3).

**Figure 10-3** OpenStack Create Volume Dialog Box: Creating Bootable Volume

- a. In the **Volume Name** field, enter the name of the vWAAS model and disk, for example, **vWAAS\_200\_disk0**.
- b. From the **Volume Source** drop-down list, choose **Image**.
- c. From the **Use image as a source** drop-down list, choose the build number for your system, for example, **641bB12 (568.6 MB)**.
- d. From the **Type** drop-down list, choose **iscsi**.
- e. From the **Size (GiB)** drop-down list, choose the size for this volume, for example, **4**.
- f. From the **Availability** drop-down list, choose **nova**.
- g. Click **Create Volume**.

**Step 5** Create nonbootable volumes.

From the OpenStack Admin tab, open the Compute > Create Volume page (Figure 10-4).

Figure 10-4 OpenStack Create Volume Dialog Box: Creating Nonbootable Volumes

**Create Volume**

**Volume Name**  
vWAAS\_200\_disk1

**Description**  
Description field is empty.

**Volume Source**  
No source, empty volume

**Type**  
iscsi

**Size (GiB) \***  
10

**Availability Zone**  
nova

**Description:**  
Volumes are block devices that can be attached to instances.

**Volume Type Description:**  
**iscsi**  
No description available.

**Volume Limits**  
Total Gibibytes (2,282 GiB) 4,000 GiB Available  
Number of Volumes (20) 40 Available

Buttons: Cancel, Create Volume

- In the **Volume Name** field, enter the name of the vWAAS model and disk, for example, **vWAAS\_200\_disk1**.
- From the **Volume Source** drop-down list, choose **No source, empty volume**.
- From the **Type** drop-down list, choose **iscsi**.
- From the **Size (GiB)** drop-down list, choose the size for this volume, for example, **10**.
- From the **Availability** drop-down list, choose **nova**.
- Click **Create Volume**.

**Step 6** On the OpenStack Compute > Volumes page, create all volumes related to your deployed model (Figure 10-5).

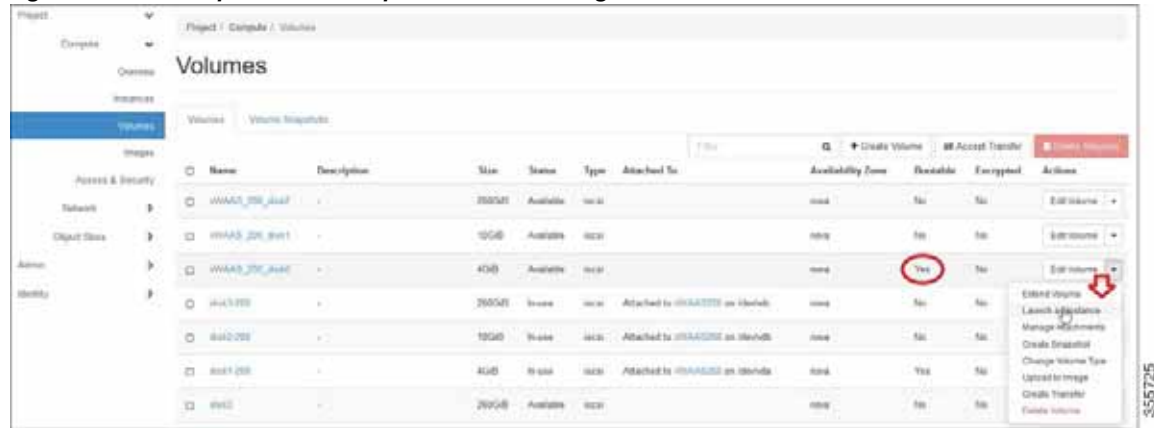
Name	Description	Size	Status	Type	Attached to	Availability Zone	Bootable	Encrypted	Actions
vWAAS_200_disk1		10 GiB	Available	iscsi		nova	No	No	[Edit Volume]
vWAAS_200_disk2		10 GiB	Available	iscsi		nova	No	No	[Edit Volume]
vWAAS_200_disk3		10 GiB	Available	iscsi		nova	No	No	[Edit Volume]

**Figure 10-5** Openstack Compute > Volumes Page: Create all volumes for deployed model



On the OpenStack Compute > Volumes page, create an instance with a bootable volume (Figure 10-6).

**Figure 10-6** OpenStack Compute > Volumes Page: Create Bootable Volume



**Step 7** Launch the instance.

From the OpenStack Admin tab, open the Compute > Instances > Launch Instance page (Figure 10-7).

Figure 10-7 OpenStack Launch Instance &gt; Details Page

The screenshot displays the 'Launch Instance' details page in OpenStack. On the left, a sidebar lists configuration options: Details (selected), Source, Flavor, Networks, Network Ports, Security Groups, Key Pair, Configuration, Server Groups, Scheduler Hints, and Metadata. The main content area contains a form with the following fields:

- Instance Name:** A text input field containing 'vWAAS-200'.
- Availability Zone:** A dropdown menu with 'nova' selected. A tooltip above the field says 'Please fill out this field.'
- Count:** A dropdown menu with '1' selected.

At the top right, a message reads: 'Please provide the initial hostname for the instance, the availability zone where it will be deployed, and the instance count. Increase the Count to create multiple instances with the same settings.' Below this is a circular progress indicator for 'Total Instances (10 Max)' showing 50% completion. A legend indicates: 4 Current Usage (dark blue), 1 Added (medium blue), and 5 Remaining (light blue). At the bottom, there are buttons for 'Cancel', '< Back', 'Next >', and 'Launch Instance'.

- In the **Instance Name** field, enter the name of the vWAAS model, for example, **vWAAS-200**.
- From the **Availability** drop-down list, choose **nova**.
- From the **Count** drop-down list, choose **1**.
- Click **Launch Instance**.

**Step 8** Specify the flavor suitable for the selected vWAAS model. As noted on the OpenStack page (Figure 10-8), flavors manage the sizing for the compute, memory, and storage capacity of the instance. From the OpenStack Admin tab, open the Compute > Instances > Launch Instance > Flavor page (Figure 10-8).

Figure 10-8 OpenStack Launch Instance &gt; Flavor Page

Launch Instance

Flavors manage the sizing for the compute, memory and storage capacity of the instance.

Allocated

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
> vWAAS_200	2	4 GB	2 GB	2 GB	0 GB	Yes

Available 1 Select one

Click here for filters

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public
> m1.tiny	1	512 MB	1 GB	1 GB	0 GB	Yes
> m1.medium	2	4 GB	40 GB	40 GB	0 GB	Yes
> m1.small	1	4 GB	20 GB	20 GB	0 GB	Yes
> m1.large	4	12 GB	80 GB	80 GB	0 GB	Yes
> m1.xlarge	6	16 GB	160 GB	160 GB	0 GB	Yes
> vWAAS_6K	8	24 GB	4 GB	4 GB	0 GB	Yes
> vWAAS12K	12	48 GB	4 GB	4 GB	0 GB	Yes

Cancel < Back Next > Launch Instance

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**Step 9** Select the networks for the vWAAS.

From the OpenStack Admin tab, open the Compute > Instances > Launch Instance > Networks page (Figure 10-9).

Figure 10-9 OpenStack Launch Instance &gt; Networks Page

Launch Instance

Details

Source

Flavor

**Networks**

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Networks provide the communication channels for instances in the cloud.

▼ Allocated **7** Select networks from those listed below.

	Network	Subnets Associated	Shared	Admin State	Status	
↕ 1	> vWAAS_Public	vWAAS_ext	Yes	Up	Active	-
↕ 2	> vwaas_private	vWAAS_int	Yes	Up	Active	-

▼ Available **1** Select at least one network

Click here for filters.

	Network ^	Subnets Associated	Shared	Admin State	Status	
>	vWAAS_Network	vwaas_priv Ipv6-Private	Yes	Up	Active	+

✕ Cancel

< Back

Next >

Launch Instance

355728

**Step 10** Select the configuration drive to send model parameters.

From the OpenStack Admin tab, open the Compute > Instances > Launch Instance > Configuration page (Figure 10-10).



Figure 10-10 OpenStack Launch Instance &gt; Configuration Page

Launch Instance

Details

Source

Flavor

Networks

Network Ports

Security Groups

Key Pair

**Configuration**

Server Groups

Scheduler Hints

Metadata

You can customize your instance after it has launched using the options available here. "Customization Script" is analogous to "User Data" in other systems.

Customization Script Script size: 0 bytes of 16.00 KB

Load script from a file

Browse... No file selected.

Disk Partition

Automatic

Configuration Drive

Cancel

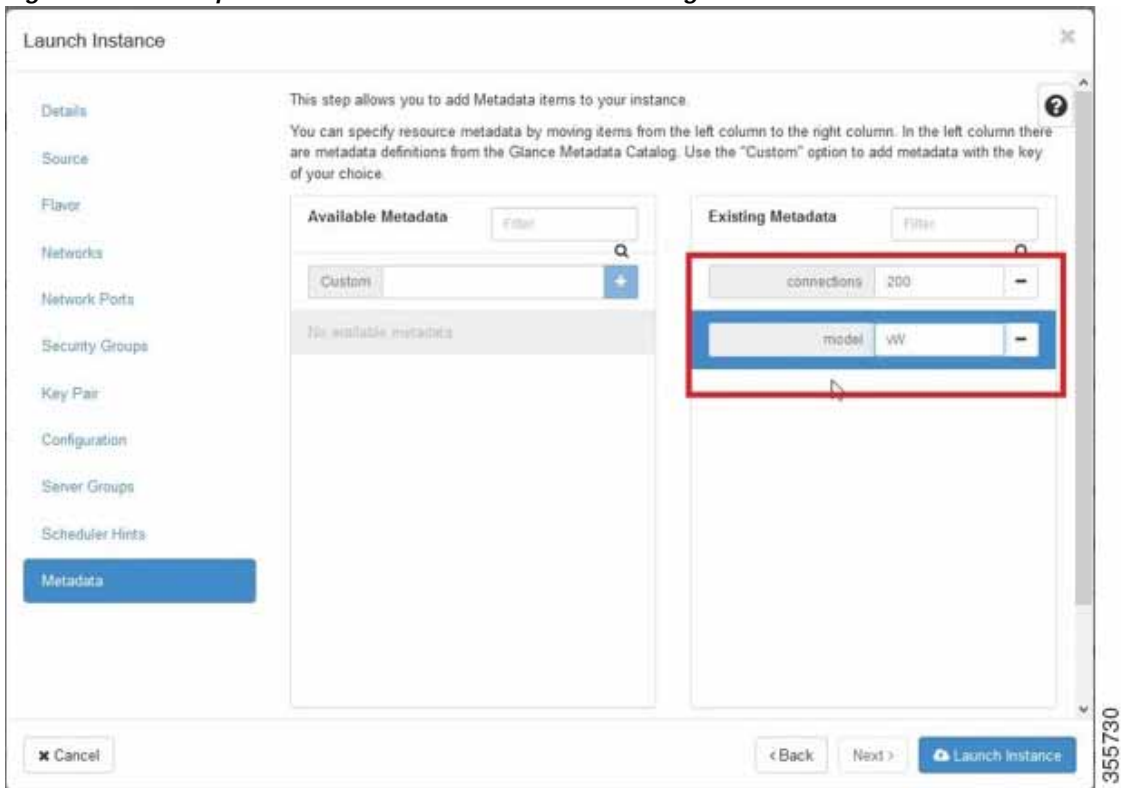
Back Next Launch Instance

- From the **Disk Partition** drop-down list, choose **Automatic**.
- Check the **Configuration Drive** check box.
- Click **Launch Instance**.

**Step 11** Provide model and connection information to deploy vWAAS in OpenStack metadata.

From the OpenStack Admin tab, open the Compute > Instances > Launch Instance > Metadata page (Figure 10-11).

Figure 10-11 OpenStack Launch Instance > Metadata Page

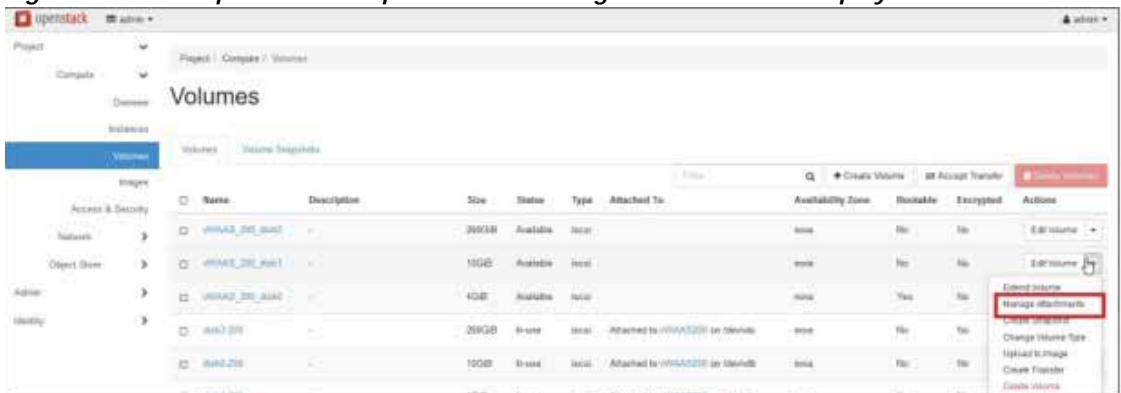


- a. Specify resource metadata by selecting and moving items from the Available Metadata column into the Existing Metadata column.

Step 12 Attach disks to the deployed instance.

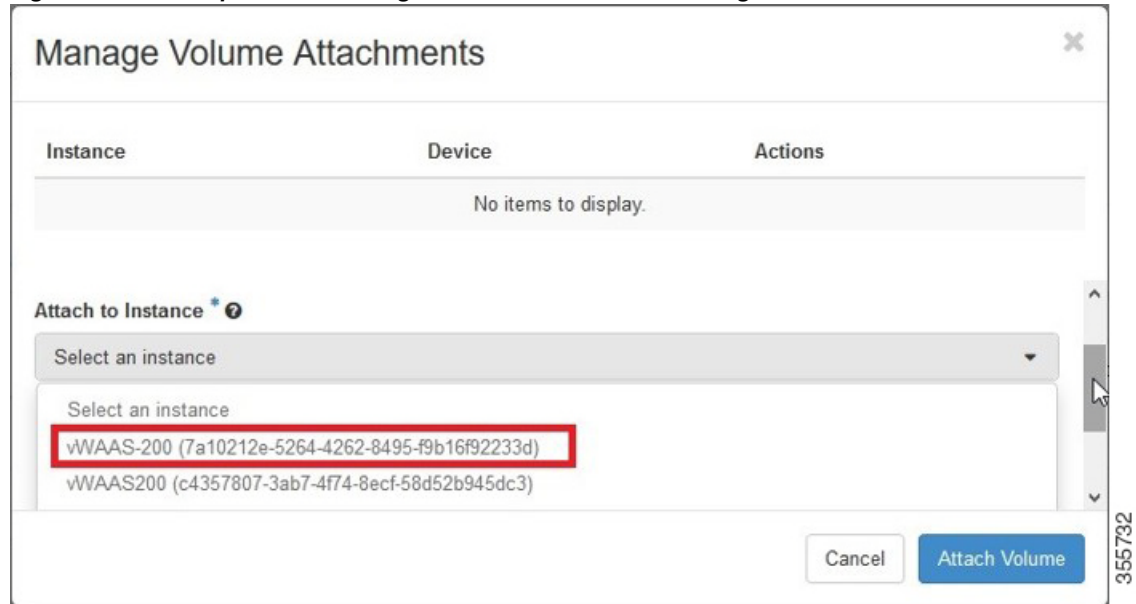
From the OpenStack Admin tab, open the Compute > Volumes page (Figure 10-12).

Figure 10-12 OpenStack Compute > Volumes Page: Attach disks to deployed instance



- a. From the **Edit Volume** drop-down list, choose **Manage Attachments**. The Manage Volume Attachments dialog box appears (Figure 10-13).

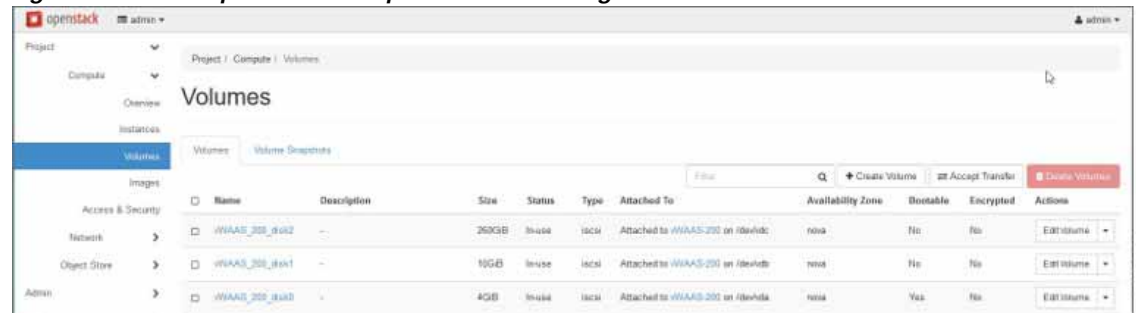
Figure 10-13 OpenStack Manage Volume Attachments Dialog Box



- b. From the **Select an instance** drop-down list, choose the instance to attach to the disk.
- c. Click **Attach Volume**.

**Step 13** After attaching the disks, the Compute > Volumes page displays the attached disks (Figure 10-14).

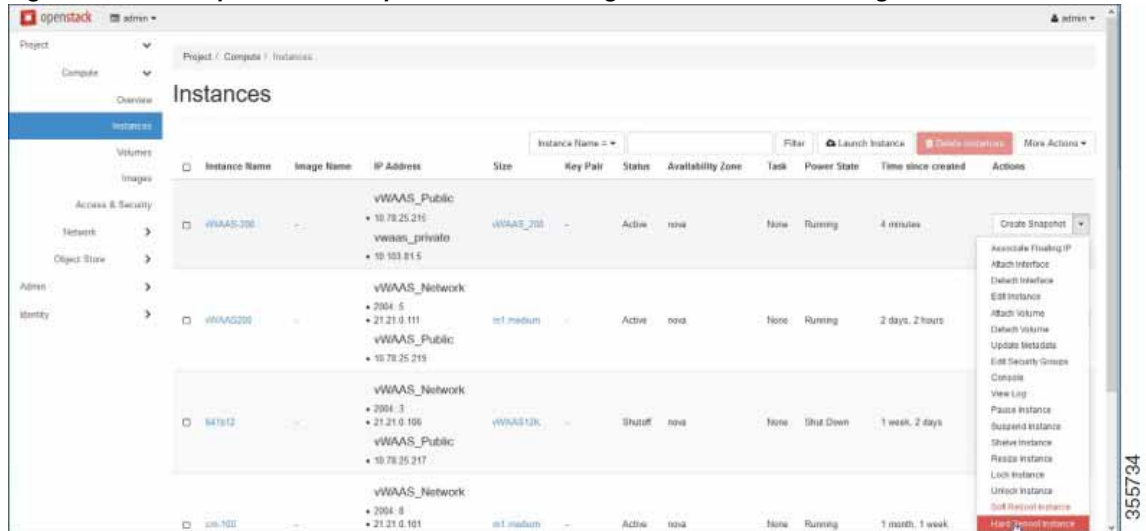
Figure 10-14 OpenStack Compute &gt; Volumes Page: List of attached disks



**Step 14** Reboot the system (hard reboot).

- a. After the system is rebooted, navigate to the Compute > Instances page.
- b. From the **Create Snapshot** drop-down list, choose **Hard Reboot Instance**.
- c. The Compute > Instances page displays the attached disks (Figure 10-15).

Figure 10-15 OpenStack Compute &gt; Instances Page: Attached disks listing



Step 15 From the Instances > Instance Console page, connect to the console to work on vWAAS (Figure 10-16).

Figure 10-16 OpenStack Instances &gt; Instance Console Page

