



NetApp[®] AltaVault[™] Cloud Integrated Storage 4.4

Installation and Service Guide for Virtual Appliances

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CHAPTER 1 Installation overview

This chapter provides an overview of AltaVault appliances.

Supported AltaVault virtual appliance models

AltaVault virtual appliances are available in the following models: AVA-v2, AVA-v8, AVA-v16 and AVA-32. Models vary by local storage capacity, which ranges from 2 TB to 32 TB.

Hypervisor requirements

AltaVault virtual appliances are available for VMware ESXi, Linux KVM, and Microsoft Hyper-V. For a list of supported hypervisor versions, see the [Interoperability Matrix Tool \(IMT\)](#).

For KVM, the hypervisor must include the following software packages: kvm, qemu-kvm, libvirt, and virt-manager.

Hardware requirements

The following table displays the minimum mandatory hardware requirements supported for AltaVault virtual appliances.

| Component | Description |
|---------------|------------------------------|
| Virtual CPUs | 4 minimum for AVA-v2 |
| | 4 minimum for AVA-v8 |
| | 8 minimum for AVA-v16 |
| | 12 minimum for AVA-v32 |
| Physical CPUs | Intel® E5-2680v2™ or similar |

| Component | Description |
|------------|---|
| Memory | <p>Minimum requirements:</p> <p>AVA-v2: requires 6GB of RAM</p> <p>AVA-v8: requires 24GB of RAM</p> <p>AVA-v16: requires 48GB of RAM</p> <p>AVA-v32: requires 96GB of RAM</p> <hr/> <p>Note: For systems experiencing heavy loads, provisioning additional memory can help the overall system operation.</p> <hr/> |
| Networking | 10 GigE network adapters are supported on all AVA models |
| Disk | <p>AVA-v2: 2.5 TB:</p> <ul style="list-style-type: none"> • 2 TB for data cache • 500 GB for system metadata <p>AVA-v8: 10 TB:</p> <ul style="list-style-type: none"> • 8 TB for data cache • 2 TB for system metadata <p>AVA-v16: 20 TB:</p> <ul style="list-style-type: none"> • 16 TB for data cache • 4 TB for system metadata <p>AVA-v32: 40 TB:</p> <ul style="list-style-type: none"> • 32 TB for data cache • 8TB for system metadata <p>In addition:</p> <ul style="list-style-type: none"> • Minimum 150 GB for the AltaVault OS disk. • Use RAID-6 high throughput disk subsystem. Use separate disk subsystems from the one used for backed-up servers. • Disk space provisioned beyond the above limits will not be utilized. <hr/> |

About hardware requirements

When configuring an AVA-v8 with 8 TB of usable cache, for example, the virtual machine should have a disk LUN mapped that provides extra capacity to store the meta data that the system generates. In order to get the maximum of 8 TB usable, provision a disk LUN of 10 TB (10,000,000,000,000 bytes or 10 TB base 10).

Virtual appliance deployment guidelines

- Use at least a Gigabit link (1 Gbps) for interfaces.
- Do not share virtual switches.
- Always reserve virtual CPUs:
 - Reserve the number of virtual CPUs and also reserve the number of clock cycles (in terms of CPU MHz).

- Reserve the number of virtual CPUs and the percentage of allocated CPU for VM.
- Do not over-provision the physical CPUs. The total virtual CPUs needed by all running VMs should not be greater than the physical CPUs on the system.
- Use a server-grade CPU for the Hyper-V host.
- Always reserve RAM:
 - Reserve the RAM that is needed by the AltaVault virtual appliance model plus 5 percent more for the Hyper-V overhead.
 - Do not enable Dynamic Memory for the AltaVault virtual appliance.
 - Use high memory weight for the memory attached to the VM.
- Do not over-provision physical RAM as the AltaVault will only utilize the amount of memory specified above.
- Do not use low-quality storage for the data store disk. The disk store should support a high number of Input/Output Operations Per Second (IOPS). For example, use high performance storage such as NAS, SAN (Storage Area Network), or DAS (Direct Attached Storage).
- Always use thick-provisioned LUNs for the data partition for the cache.
- Use a dedicated physical drive for the Virtual AltaVault datastore. Sharing this drive with other VMs can impact the overall performance of the AltaVault virtual appliance.
- AltaVault appliances cannot be moved using vMotion or other similar virtual machine tools. These tools can disrupt the configuration of the AltaVault.
- AltaVault virtual appliances require a static MAC address. The MAC address for the primary interface should not change.
- When using Hyper-V, do not use dynamic MAC addresses for AltaVault virtual appliances.

CHAPTER 2 Installing AltaVault virtual appliance on Microsoft Hyper-V

Deploying AltaVault virtual appliance on Microsoft Hyper-V

Note: Before you install the Virtual AltaVault virtual appliance, verify that your system meets the requirements and addresses the guidelines provided in “[Installation overview](#)” on page 5.

Downloading the VM package and running the AltaVault script

1. Download the VM package from <https://mysupport.netapp.com>.
2. Unzip the package.
3. If a virtual switch does not exist, you must create one, see “[Configuring virtual switches](#)” on page 11.
4. Open a Windows PowerShell session, change to the directory of the unzipped package, and enter the following commands:

```
w2k12r2 > Set-ExecutionPolicy Unrestricted
Do you want to change the execution policy? : y
w2k12r2 > ALTAVault_INSTALL.ps1
```

Note: w2k12r2 refers to Windows 2012 R2, which is the Hyper-V server.

5. Complete the configuration as described in the table below.

| Question | Response |
|--|--|
| Do you want to run? | r |
| Please enter the VM name: | Provide a name for the VM. |
| Please enter the location to install the VM: | Enter the location where you want to install the VM. |
| Please enter number of Virtual Processors: | Specify the number of virtual CPUs as required by the VM being deployed. |

| Question | Response |
|---|---|
| Please enter the amount of RAM (GB): | Specify the amount of RAM as required by the VM being deployed. |
| Please enter vSwitch name to attach Primary or blank to skip: | Specify the virtual switch created for use with the primary interface of the VM. |
| Please enter vSwitch name to attach e0a or blank to skip: | Specify the virtual switch created for use with the e0a interface of the VM or <enter>. |
| Please enter vSwitch name to attach e0b or blank to skip: | Specify the virtual switch created for use with the e0b interface of the VM or <enter>. |
| Please enter vSwitch name to attach e0c or blank to skip: | Specify the virtual switch created for use with the e0c interface of the VM or <enter>. |

Configuring the VM using the Hyper-V Manager

1. Open Hyper-V Manager.
2. From the left pane, under Hyper-V Manager, select the machine name of the VM that was created.
3. From the right pane, under Virtual Machines, select the name of the virtual machine.
4. Right-click on the name, and select Settings. The Settings page appears.
5. To add a hard drive to the IDE controller, from the left pane, select **IDE Controller 0**.
6. From the right pane, under IDE Controller, select Hard Drive, and click **Add**.
7. From the right pane, under Hard Drive, ensure that the Location is set to 1, and the Virtual hard disk radio button is selected.
8. Click **New** to launch the New Virtual Hard Disk Wizard.
9. When the Virtual Hard Disk Wizard starts, click **Next**.
10. From the New Virtual Hard Disk Wizard page, select the **VHDX disk format** radio button.
11. Click **Next**.
12. Select the **Fixed size** radio button and click **Next**.
13. From the New Virtual Hard Disk Wizard, under Specify Name and Location, click **Browse**, and navigate to the location.
14. Click **Next**.
15. Select the **Create a new blank virtual hard disk** radio button and specify the size.
16. Click **Next**.
17. Select Summary to review your configuration settings and then click **Finish**.

Configuring virtual switches

1. Open the Virtual Switch Manager.
2. Under Virtual Switches, select **New virtual network switch**.
3. Under Create virtual switch, select the type of virtual switch that you want to create, and click **Create Virtual Switch**.

The new virtual switch displays on the left under Virtual Switches.

4. Complete the configuration as described in this table.

| Control | Description |
|-----------------|---|
| Name | Specify the name of the virtual switch. |
| Notes | Optionally, specify notes that apply to the virtual switch. |
| Connection type | Select the switch type of the virtual switch configuration that was not provided during the installation script. Use the Hyper-V switch manager to configure the v-switch that need to be connected to the interface. |
| VLAN ID | Identifies the V host to use with this virtual switch. Leave the box unchecked for Enable virtual LAN identification for the management operating system. |

5. Click **Apply**.
6. To confirm your changes, click **Yes**.

Starting a virtual machine

1. Power on the virtual machine.

When you start the AltaVault virtual appliance for the first time, the initial bootup process can take several minutes. During this time, the system does not display any debugging message on the console, and you might incorrectly interpret that the system has stopped responding. Do not hard power reset the appliance during initial bootup; this will corrupt the file system (indicated by the following error in the system logs):

```
Jul 21 15:55:40 localhost rbtinit: mount: can't find /data in /etc/fstab or /etc/mtab
Jul 21 15:55:50 altavault statsd[3083]: [statsd.NOTICE]: Alarm triggered for rising error for event datastore_disk
```

Note: If you inadvertently interrupted the AltaVault virtual appliance boot process (described above), you will need to delete and then add the second disk again and wait until the system completes its boot process.

2. Select the Console tab.

AltaVault virtual appliance starts and the login prompt displays.

Note: To release the cursor from the console, press Ctrl+Alt.

3. Log in to AltaVault virtual appliance using the default login, `admin`, and default password, `password`.
The initial configuration wizard displays.

Next steps

Go to the *NetApp AltaVault Cloud Integrated Storage Administration Guide* to complete the AltaVault deployment.

CHAPTER 3 Installing AltaVault virtual appliance on VMware ESXi

Deploying AltaVault virtual appliance on VMware ESXi

Note: Before you install the Virtual AltaVault virtual appliance, verify that your system meets the requirements and addresses the guidelines provided in “[Installation overview](#)” on page 5.

Downloading the VM package and deploying the OVA

The AltaVault virtual appliance image is an installable Open Virtual Appliance (OVA) package. The image contains the files necessary to create the virtual machine.

1. Download the OVA package at <https://mysupport.netapp.com>.
2. Install the package using the VMware vSphere web client. Alternatively, you can use the VMware OVF Tool.
3. From the Hosts and Clusters page, select Deploy OVF template.
4. Type a name for the virtual machine.
5. The AltaVault appliance comes with four network interfaces. Select the appropriate network setting for your environment.
6. Verify the deployment settings and click **Finish**.
7. Click **Close**.

The new virtual machine displays under the hostname or host IP address in the virtual machine inventory.

Configuring the VM using the vSphere web client

To add a hard disk to the virtual machine

1. From the vSphere web client, edit the virtual machine settings.
2. Add a new hard disk to the virtual machine.

3. Specify the disk size for the new virtual hard disk.

Allocate the recommended size for the second hard disk that you add to the AltaVault virtual appliance. Use RAID for a high-throughput disk subsystem. For details about AltaVault virtual appliance requirements, see “[Hardware requirements](#)” on page 5.

4. Save the configuration.

Starting a virtual machine

1. Power on the virtual machine.

When you start the AltaVault virtual appliance for the first time, the initial bootup process can take several minutes. During this time, the system does not display any debugging message on the console, and you might incorrectly interpret that the system has stopped responding. Do not hard power reset the appliance during initial bootup; this will corrupt the file system (indicated by the following error in the system logs):

```
Jul 21 15:55:40 localhost rbtinit: mount: can't find /data in /etc/fstab or /etc/mtab
Jul 21 15:55:50 altavault statsd[3083]: [statsd.NOTICE]: Alarm triggered for rising error for
event datastore_disk
```

Note: If you inadvertently interrupted the AltaVault virtual appliance boot process (described above), you will need to delete and then add the second disk again and wait until the system completes its boot process.

2. Select the Console tab.

AltaVault virtual appliance starts and the login prompt displays.

Note: To release the cursor from the console, press Ctrl+Alt.

3. Log in to AltaVault virtual appliance using the default login, `admin`, and default password, `password`.
The initial configuration wizard displays.

Next steps

Go to the *NetApp AltaVault Cloud Integrated Storage Administration Guide* to complete the AltaVault deployment.

CHAPTER 4 Installing AltaVault virtual appliance on Linux KVM

Deploying AltaVault virtual appliance on Linux KVM

Note: Before you install the Virtual AltaVault virtual appliance, verify that your system meets the requirements and addresses the guidelines provided in [“Installation overview” on page 5](#).

Note: Prior to installing the AltaVault virtual appliance, a bridged network needs to be configured so that AltaVault can connect to the public cloud. Refer to the following information:

https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Deployment_Guide/s2-networkscripts-interfaces_network-bridge.html

To install the AltaVault virtual appliance using the Linux Virtual Machine Manager

1. Download the VM package from <https://mysupport.netapp.com>, and extract it.
2. Open the Linux Virtual Machine Manager.
3. Click on the “Create a new virtual machine” icon right below the File menu.
4. In the New VM window, enter a name for the virtual machine and select “Import existing disk image.” Click **Forward** to continue.
5. Click **Browse** next to the “Provide the existing storage path” field.
6. Click **Browse Local**.
7. Select the .qcow2 file from the extracted files and click **Open**.
8. Click **Forward**.
9. In the “Choose Memory and CPU settings” page, configure the memory size to correspond with requirements specified on [“Hardware requirements” on page 5](#).
10. Click **Forward**.

11. Select the 'Customize configuration before install' checkbox. Continue to next step for additional selections.
12. Click **Advanced options** and select the bridged network.
13. Click **Finish**.
14. In the virtual machine window for your appliance, select "Disk 1."
15. Set the Storage format to qcow2 and click **Apply**.
16. Click **Add Hardware**.
17. In the Add New Virtual Hardware dialog, the Storage option is selected by default. Change the Device type to IDE Disk. Configure the disk size to correspond with requirements specified on ["Hardware requirements"](#) on page 5.
18. Click Finish.
19. In the Add New Virtual Hardware dialog, click **Add Hardware**.
20. To add additional network interface cards (NICs), click **Network**.
21. Click **Finish** to create the new NIC.
22. Repeat Steps 19 and 20 to add up 4 total NICs. These NICs represent the primary interface and e0a, e0b and e0c data interfaces as described in ["Deploying AltaVault virtual appliance on Linux KVM"](#) on page 15.
23. When you are done adding NICs, click **Begin installation**.

Starting a virtual machine

1. Power on the virtual machine.

When you start the AltaVault virtual appliance for the first time, the initial bootup process can take several minutes. During this time, the system does not display any debugging message on the console, and you might incorrectly interpret that the system has stopped responding. Do not hard power reset the appliance during initial bootup; this will corrupt the file system (indicated by the following error in the system logs):

```
Jul 21 15:55:40 localhost rbtinit: mount: can't find /data in /etc/fstab or /etc/mtab
Jul 21 15:55:50 altavault statsd[3083]: [statsd.NOTICE]: Alarm triggered for rising error for
event datastore_disk
```

Note: If you inadvertently interrupted the AltaVault virtual appliance boot process (described above), you will need to delete and then add the second disk again and wait until the system completes its boot process.

2. Select the Console tab.

AltaVault virtual appliance starts and the login prompt displays.

Note: To release the cursor from the console, press Ctrl+Alt.

3. Log in to AltaVault virtual appliance using the default login, `admin`, and default password, `password`.
The initial configuration wizard displays.

Next steps

Go to the *NetApp AltaVault Cloud Integrated Storage Administration Guide* to complete the AltaVault deployment.

APPENDIX A Upgrading and changing AltaVault virtual appliances

Upgrading software for AltaVault virtual appliances

For software upgrade instructions, refer to the *NetApp AltaVault Cloud Integrated Storage Administration Guide*. AltaVault does not support downgrading software versions.

Changing models of AltaVault virtual appliances

You can change models from your current model to either the AVA-v8, AVA-v16, or AVA-v32 if the model change falls within one of the following categories:

- Licensed installations
- 90-day trial period installations

Changing to a higher model for licensed installations

To change to a higher model, you must install a valid license key for the appropriate model.

To change the model using Hyper-V or ESXi

1. Install a new valid license key for the appropriate model. See Managing Licenses in the *NetApp AltaVault Cloud Integrated Storage Administration Guide*.
2. Shut down the AltaVault appliance from the Maintenance > Reboot/Shutdown page.
3. Edit the virtual machine settings for the appliance and provision the required CPU, memory and disk space for the model that you want to install. For AltaVault virtual appliance hardware requirements, see [“Hardware requirements” on page 5](#).
4. Power on the appliance. The appliance starts as an AVA-v8/AVA-16/AVA-32 depending on the license key entered.
Note: The previous license is now invalidated.

To change the model using KVM

1. Install a new valid license key for the appropriate model. See *Managing Licenses* in the *NetApp AltaVault Cloud Integrated Storage Administration Guide*.
2. Shut down the AltaVault appliance from the Maintenance > Reboot/Shutdown page.
3. From the hardware details information in KVM, identify the image Source path listed for IDE Disk 2.
4. Provision the required CPU and memory space for the AltaVault virtual appliance model that you want to install and click **Apply**.
5. Access the Linux system terminal and, using the path information acquired in Step 3, provision the disk space for the AltaVault virtual appliance model that you want to install. For example, to update the disk space to 10 TB for the specified path, enter the following command:

```
qemu-img resize /var/lib/libvirt/images/rtp-kvm-1.img +10T
```
6. Power on the appliance. The appliance starts as an AVA-8/AVA-16/AVA-32 depending on the model selected in Step 1.

Changing to a higher model during the 90-day trial period

When you install the AltaVault virtual appliance, the default AVA-v2 model is deployed.

To change the model using Hyper-V or ESXi

1. On the AltaVault virtual appliance, run the following CLI command:

```
license virtual-model <v8/v16/v32>
```
2. Stop the service and power off the virtual appliance.
3. Edit the virtual machine settings and provision the required CPU, memory and disk space for the AltaVault virtual appliance model that you want to install. For a list of system requirements, see [“Hardware requirements” on page 5](#).
4. Power on the appliance. The appliance starts as an AVA-8/AVA-16/AVA-32 depending on the model selected in Step 1.

To change the model using KVM

1. On the AltaVault virtual appliance, run the following CLI command

```
license virtual-model <v8/v16/v32>
```
2. Stop the service and power off the virtual appliance.
3. From the hardware details information in KVM, identify the image Source path listed for IDE Disk 2.
4. Provision the required CPU and memory space for the AltaVault virtual appliance model that you want to install and click **Apply**.

5. Access the Linux system terminal and, using the path information acquired in Step 3, provision the disk space for the AltaVault virtual appliance model that you want to install. For example, to update the disk space to 10 TB for the specified path, enter the following command:

```
qemu-img resize /var/lib/libvirt/images/rtp-kvm-1.img +10T
```

6. Power on the appliance. The appliance starts as an AVA-8/AVA-16/AVA-32 depending on the model selected in Step 1.

APPENDIX B Migrating AltaVault virtual appliances

Migrating from virtual SteelStore 3.x to virtual AltaVault 4.1.1

Migrating from SteelStore 3.x to AltaVault 4.1.1 involves exporting the configuration from the SteelStore, deploying a new AltaVault virtual machine, importing the configuration archive, and moving the data disk from the SteelStore to the AltaVault.

After the migration to AltaVault 4.1.1 is complete, you can upgrade to later versions of AltaVault software.

Note: All references to 3.x refer to SteelStore 3.x and 4.x refer to AltaVault 4.x. Only virtual appliances can be upgraded from 3.x to 4.x.

To migrate a SteelStore virtual machine to an AltaVault virtual machine

1. Ensure the 3.x virtual appliance is upgraded to the latest 3.x software version. For the latest SteelStore software versions, check the NetApp support site for available software downloads.
2. Choose Configure > Setup Wizard and export the configuration from 3.x and store it in a safe location.
3. Choose Maintenance > Reload/Shutdown to shut down the 3.x virtual appliance.
4. Using your hypervisor client, disassociate the datastore disk from the 3.x virtual machine. Make a note of the path to the disk file.

Note: Be careful not to delete the disk image. You will associate the disk image with the new VM in a later step.

5. Deploy a new 4.1.1 AltaVault virtual appliance from the OVA file.
Do not configure a second disk for the AltaVault appliance datastore, as you will import the 3.x appliance datastore instead. Start the VM after it has been deployed.
6. Log in to AltaVault virtual appliance using the default login, `admin`, and default password, `password`.
The initial configuration wizard displays.
7. Use the Import configuration wizard to import the configuration into the 4.1.1 VM:

- a. Go to the UI and select Configure > Setup Wizard.
 - b. Select Import Configuration.
 - c. Select the Import Shared Data Only option, while specifying the configuration file to import.
8. Reset the Megastore GUID on the 4.1.1 AltaVault virtual appliance by using the CLI commands:

```
hostname> enable
hostname# config t
hostname (config) # megastore guid reset
```

9. Shut down the AltaVault appliance from the Maintenance > Reboot/Shutdown page.
10. Using your hypervisor client, associate the existing 3.x datastore disk noted in Step 4 above with the 4.1.1 VM.
11. From your hypervisor client, power on the 4.1.1 VM.
12. Log in to the AltaVault VM and start the optimization service if its not already running:

```
hostname> enable
hostname# config t
hostname (config) # service enable
```

Note: The cloud configuration cannot be modified unless the local datastore is empty, therefore, it is important to import the configuration before attaching the disk from the SteelStore in Step 4.

13. Upgrade AltaVault software to the latest release. For software upgrade instructions, refer the *AltaVault Cloud Integrated Software Administration Guide*.

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