Resizing Cache and Snapshot Disks of the Nasuni Filer
Nasuni Corporation – Boston, MA

Overview

This document explains how to resize the cache and snapshot (copy-on-write or COW) disks for the Nasuni Filer on the following platforms: VMware ESX/ESXi, Microsoft Hyper-V, Microsoft Azure, and Amazon EC2. Nasuni also offers hardware appliances for organizations with larger cache needs.

Cache size depends on a variety of factors, including the nature of the data set, the aggregate capacity available, the type of Internet connection (slow connections might require a larger cache), and tolerance for latency when retrieving files. The Nasuni Professional Services team helps you to determine the cache size most appropriate for your sites.

The snapshot (copy-on-write or COW) disk is used during the snapshot process. If any writes to the Nasuni Filer occur during a snapshot, the previous data from the cache disk is copied to the COW disk, and the new data is written to the cache disk. Hence, the term "copy-on-write". This allows new writes to take place at any time, even during the snapshot process.

Each disk can be resized independently of the other.

When you resize the cache, Nasuni recommends that the cache disk be no more than four times the size of the snapshot (copy-on-write or COW) disk. Failure to adhere to the suggested ratio can result in failed snapshots.

> *Note: Cache size has no effect on the cost of Nasuni services. The Nasuni license is based on the storage used, not on cache size.*

> *Note: To add cache space by configuring additional cache disks, contact Nasuni Technical Support.*

> *Warning: Always back up or snapshot your virtual machine environment before making any changes to the cache disks or any other virtual machine resource.*

Considerations for configuring the cache

This section discusses points to consider when configuring the cache.

Cache disk and copy-on-write (COW) disk (aka snapshot disk)

The size of the copy-on-write (COW) disk is determined by how much data can change while a snapshot is running. For example, a heavily used file server, where a lot of data can change while a snapshot is running, might need a larger copy-on-write (COW) disk than a server used mainly for backups, where the snapshot is scheduled for a time when the backup isn't running.

However, if the copy-on-write (COW) disk is too small, then a snapshot might fail, then try again. The snapshot will eventually succeed, but this is very inefficient.

Keeping data locally (cache resident)

To keep some or all data cache resident, the size of the non-reserved part of the cache must be larger than the total amount of data that you want to keep locally, including metadata. The size of the cache disk must be large enough for the cache. You can then bring all the data into the cache, and pin the volume in the cache.

Different Nasuni Filers for different uses

Different uses of the Nasuni Filer might have different optimum configurations of the cache. For example, the usage pattern for ordinary user access is different from the usage pattern for backups or data mining. To ensure that each use case receives the most suitable configuration, you can set up different Nasuni Filers for different uses. The Nasuni Filer is intelligent and does its best to adapt to any use, but you can help guarantee the best behavior for each use case by isolating the use cases on different Nasuni Filers.

Here are some examples of different uses for Nasuni Filers:

- Performing migrations: Minimize pinned volumes, infrequent snapshots.

- Primary file server: Pin volumes of commonly accessed files, moderate Quality of Service, regular snapshots.

- Hot standby for Disaster Recovery: Minimize pinned volumes, enable Auto Cache, frequent syncs.

- High-performance application: Pin volumes of commonly accessed files, high Quality of Service, regular snapshots.

Cache Specifications

The default cache size on disk is 250 GB for a VM platform.

The following table lists the maximum cache size (by platform) that is supported by the Nasuni Filer.

Virtual Platform	Maximum Cache Size
VMware ESXi 5.5 and above NOT using VMFS-5	2 TiB
VMware ESXi 5.5 and above	62 TiB (using VMFS-5) 64 TiB (using physical Raw Disk Mapping (RDM) (aka "pass through disks"))
Microsoft Hyper-V	2 TiB (Server 2008) 1 EiB (using "pass through disks") (Server 2008) 64 TiB (using VHDX) (Server 2012) 64 TB (Server 2012 R2)
Microsoft Azure	4,095 GiB (Nasuni Filers support the Microsoft Azure maximum size for a single disk, which is currently 4,095 GiB.)
Amazon EC2	1 TiB for hard disks, 16 TiB for SSDs

Supported techniques for changing the size of a disk

There are several techniques for changing size of cache or snapshot disks:

Disk	Supported Technique	VMware	Hyper-V	Azure	EC2
Cache	Configure additional cache disks	Increase *	Increase *	Increase *	Increase *
Cache	VM user interface	Increase	Increase		
COW	VM user interface	Increase	Increase		
Cache	New Filer, then Disaster Recovery	Increase/ Decrease	Increase/ Decrease	**	Increase/ Decrease
COW	New Filer, then Disaster Recovery	Increase/ Decrease	Increase/ Decrease	**	Increase/ Decrease
COW	Shut down Filer, delete COW, create new COW, restart Filer	Increase/ Decrease	Increase/ Decrease	Increase/ Decrease ***	Increase/ Decrease

* To add cache space by configuring additional cache disks, contact Nasuni Technical Support.

** If you add another disk, the largest disk becomes the cache disk. The second largest disk becomes the COW disk.

** You cannot delete the built-in COW disk, but you can add a new COW disk of a different size. The largest unused disk becomes the new COW disk. Note that this requires assistance from Nasuni Support for configuration.

Using the VM user interface to increase the size of the cache disk or copy-on-write (COW) disk

On the VMware ESX/ESXi and Microsoft Hyper-V virtual platforms, you can increase the size of the cache disk and the COW disk.

> *Note: There must be sufficient disk space in the datastore to increase the size of the disk.*

> *Caution: Perform a manual snapshot before changing the size of the disk.*

> *Note: You must shut down the virtual machine to change the size of the disk.*

> *Note: Nasuni recommends using Thick provisioning for all virtual disks for performance reasons. On the VMware virtual platform, Nasuni recommends Thick Provision Eager Zeroed.*

vSphere Client platform

> *Note: If you have taken a VMware snapshot, you cannot change the size of the disk. You must delete the snapshot first.*

To change the size of the disk on the vSphere Client platform, follow these steps:

1. Launch the VMware vSphere Client. The VMware vSphere Client login window appears.

2. Log in to the vSphere Client with a valid IP address and your user name and password. The vSphere Client opens.

3. In the pane on the left, expand the host to display the list of virtual machines.

4. Click the name of your Nasuni Filer. This is the name you entered when you installed the Nasuni Filer. Information about your Nasuni Filer appears in the right pane.

5. If the virtual machine is running, then shut down the virtual machine using these steps:

    a. On the **Console** tab, click in the command line area.

    b. Press **Enter**.

    c. Enter the login name and password for the service console. The default login name is `service` and the default password is `service`.

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       d. Enter shutdown.

       e. Confirm the shutdown by entering yes.

The virtual machine shuts down.

6.   On the **Getting Started** tab, click **Edit virtual machine settings**.

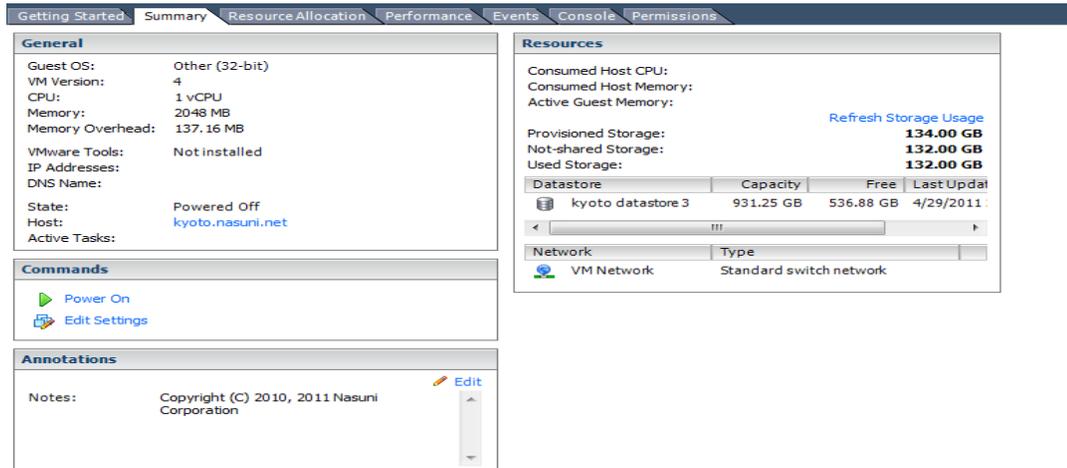Alternatively, on the **Summary** tab, click **Edit Settings**.

Figure 1: Edit Settings on the Summary tab.

Alternatively, right-click the name of your Nasuni Filer in the list of virtual machines, then select **Edit Settings** from the drop-down list.

The **Virtual Machine Properties** dialog box appears.

7. On the **Hardware** tab, select the desired disk in the **Hardware** list on the left side.
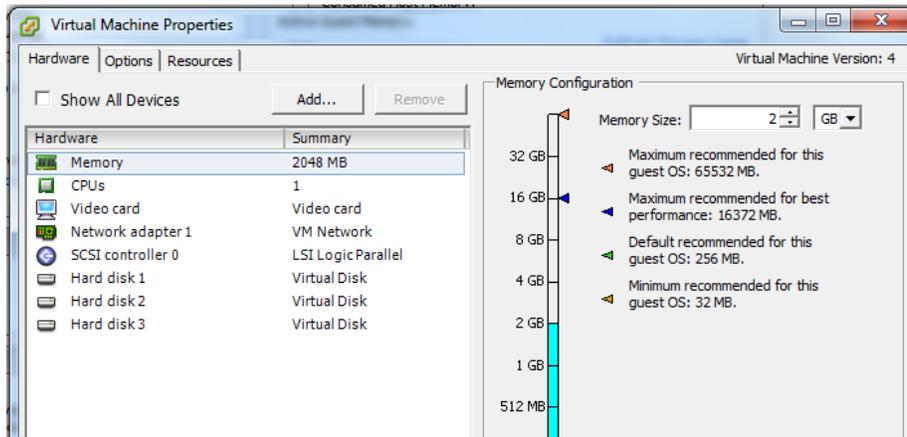

Figure 2: Hardware tab.

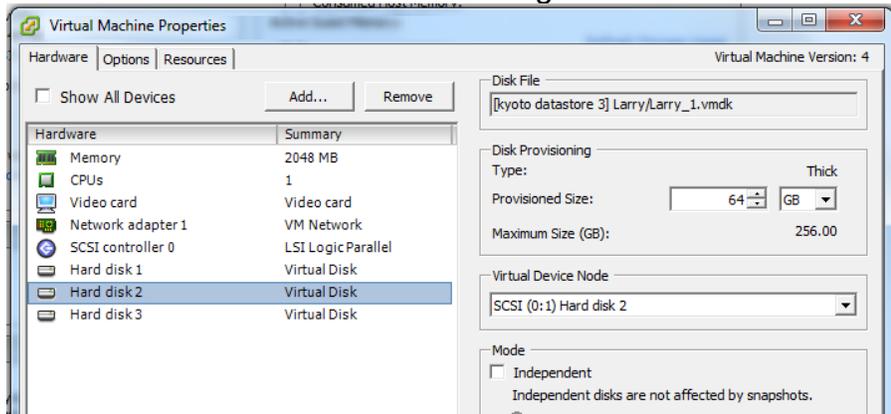The cache disk is disk 2 and is the largest hard disk.

Figure 3: Cache disk (hard disk 2).

The copy-on-write (COW) disk is the second-largest hard disk.
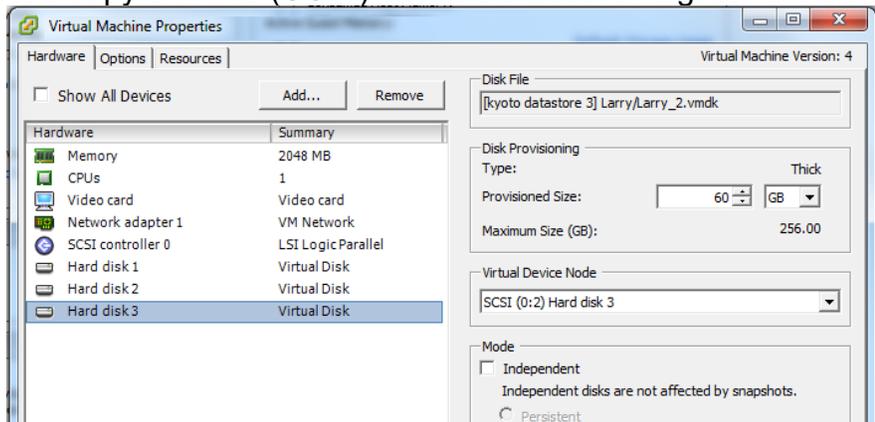

Figure 4: Copy-on-write (COW) or snapshot disk.

Information about the selected hard disk appears on the right side.

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8. Enter or select the new **Provisioned Size**. The Provisioned Size must be less than or equal to the displayed **Maximum Size** of that hard disk. The new Provisioned Size must be greater than the previous Provisioned Size.

    For details on the size of the cache disk, see **Cache Specifications** on page 3.

    Note: *If necessary, it is possible to reduce the size of the copy-on-write disk. To do this, shut down the Nasuni Filer (see the Nasuni Filer Administration Guide for instructions), delete the existing copy-on-write disk, create a new copy-on-write disk with the desired size, and then restart the Nasuni Filer.*

9. Click **OK**. The size of the selected hard disk changes to the specified size.

10. On the **Getting Started** tab, click **Power on the virtual machine**.

    Alternatively, on the **Summary** tab, click **Power On**.

    Alternatively, right-click the name of your Nasuni Filer in the list of virtual machines, then select **Power** from the drop-down list, then select **Power On** from the drop-down list.

    The virtual machine powers on. After a significant cache resize, the operations after powering on can take some time, with some performance impact during that period. The progress of the cache resize is visible on the Nasuni Filer user interface.

Hyper-V Manager platform (pre-2012)

To change the size of the disk on the Hyper-V Manager platform, follow these steps:

1. Launch Hyper-V Manager.

2. In the **Virtual Machines** list, click the name of your Nasuni Filer. This is the name you entered when you installed the Nasuni Filer. Information about your Nasuni Filer appears.

3. If the virtual machine is running, then follow these steps:

    a. In the **Virtual Machines** list, right-click the name of your Nasuni Filer, then select **Shut Down** from the drop-down list.

        Alternatively, in the **Virtual Machines** list, select the name of your Nasuni Filer, then click **Shut Down** in the list of actions on the right side.

        The **Shut Down Machine** dialog box appears.

    b. Click **Shut Down**. The virtual machine shuts down.

4. In the **Virtual Machines** list, right-click the name of your Nasuni Filer, then select **Settings** from the drop-down list.

    Alternatively, in the **Virtual Machines** list, select the name of your Nasuni Filer, then click **Settings** in the list of actions on the right side.

    The **Settings** dialog box appears.

5. In the **Hardware** list on the left side, select the desired hard drive.

    The default label for the cache hard drive is "Hard Drive Cache.vhd". The cache hard drive is the largest hard drive. The default label for the copy-on-write (COW) hard drive is "Hard Drive Cow.vhd".

    Information about the selected hard drive appears on the right side.

6. Click **Edit**. The **Edit Virtual Hard Disk Wizard** dialog box appears.

7. Select **Expand**, then click **Next**.

8. Enter the **New size** of the disk. The "New size" must be less than or equal to the displayed **Maximum** size of that hard disk. The "New size" must be greater than the previous size. Then click **Next**.

    When you resize the cache, Nasuni recommends that the cache disk be no more than four times the size of the snapshot (copy-on-write or COW) disk.

    For details on the size of the cache disk, see **Cache Specifications** on page 3.

9. Click **Finish**. The size of the disk changes to the specified size.

10. Click **OK**. The **Settings** dialog box closes.

11. In the **Virtual Machines** list, right-click the name of your Nasuni Filer, then select **Start** from the drop-down list.

    Alternatively, in the **Virtual Machines** list, select the name of your Nasuni Filer, then click **Start** in the list of actions on the right side.

    The virtual machine restarts. After a significant cache resize, the operations after powering on can take some time, with some performance impact during that period. The progress of the cache resize is visible on the Nasuni Filer user interface.

Hyper-V Manager platform (2012)

To change the size of the cache disk on the Hyper-V Manager 2012 platform, follow these steps:

1. Launch Hyper-V Manager.

2. In the **Virtual Machines** list, click the name of your Nasuni Filer. This is the name you entered when you installed the Nasuni Filer. Information about your Nasuni Filer appears.

3. If the virtual machine is running, then follow these steps:

   a. In the **Virtual Machines** list, right-click the name of your Nasuni Filer, then select **Shut Down** from the drop-down list.

      Alternatively, in the **Virtual Machines** list, select the name of your Nasuni Filer, then click **Shut Down** in the list of actions on the right side.

      The **Shut Down Machine** dialog box appears.

   b. Click **Shut Down**. The virtual machine shuts down.

4. In the **Virtual Machines** list, right-click the name of your Nasuni Filer, then select **Settings** from the drop-down list.
   Alternatively, in the **Virtual Machines** list, select the name of your Nasuni Filer, then click **Settings** in the list of actions on the right side.
   The **Settings** dialog box appears.

5. In the **Hardware** list on the left side, select the cache hard drive. The default label for the cache hard drive is "Cache.vhd". The cache disk is the largest hard disk. Information about that hard drive appears on the right side.

6. Click **Edit**. The **Edit Virtual Hard Disk Wizard** dialog box appears.

7. Navigate to the location of the hard disk, then click **Next**.

8. On the **Choose Action** screen, select **Expand**, then click **Next**.

9. Enter the **New size** of the cache disk in GB. The "New size" must be less than or equal to the displayed **Maximum** size of that hard disk. The "New size" must be greater than the previous size. Then click **Next**. See **Cache Specifications** on page 3 for details on the size of the cache disk.

10. Click **Finish**. The size of the cache disk changes to the specified size.

11. Click **OK**. The **Settings** dialog box closes.

12. In the **Virtual Machines** list, right-click the name of your Nasuni Filer, then select **Start** from the drop-down list.
Alternatively, in the **Virtual Machines** list, select the name of your Nasuni Filer, then click **Start** in the list of actions on the right side.
The virtual machine restarts. After a significant resize, the operations after powering on can take some time, with some performance impact during that period. The progress of the resize is visible on the Nasuni Filer user interface.

Using the Disaster Recovery procedure to change the size of the cache disk or copy-on-write (COW) disk

On all virtual platforms, you can change the size of the cache disk and the COW disk using the Disaster Recovery procedure.

First, create a new Nasuni Filer on the platform. The new Nasuni Filer should have the correct size of cache and COW disks.

Next, perform a manual snapshot on the existing Nasuni Filer, then shut down the existing Nasuni Filer.

Finally, perform a Disaster Recovery procedure to the new Nasuni Filer.

Using a new COW disk to change the size of the COW disk

On all virtual platforms, you can change the size of the COW disk by creating a new COW disk.

First, perform a manual snapshot on the existing Nasuni Filer, then shut down the existing Nasuni Filer.

Next, on all platforms except the Microsoft Azure platform, delete the existing COW disk.

Then, create a new COW disk with the correct size.

Finally, restart the Nasuni Filer.

On the Microsoft Azure platform, the largest unused disk becomes the new COW disk. Note that this requires assistance from Nasuni Support for configuration.

Conclusion

Understanding your cache and snapshot resizing requirements, will help you optimize the performance of Nasuni Filer. If you have other questions about the performance of the Nasuni Filer, or how it can benefit your organization, visit www.nasuni.com or contact the Product Evaluation Team at (800) 208-3418.

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