NetApp

Manage ONTAP tools

ONTAP tools for VMware vSphere 9.13

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Mount datastore on additional hosts

Mounting a datastore provides storage access to additional hosts. You can mount the datastore on the additional hosts after you add the hosts to your VMware environment.

What you will need

You must ensure that the subnet details of all the networks to which the ESXi hosted is connected is entered in the `Kaminoprefs.xml`.

See Enabling datastore mounting across different subnets section.

Steps

1. From the vSphere Client Home page, click **Hosts and Clusters**.
2. In the navigation pane, select the datacenter that contains the host.
3. Repeat Step 2 for any additional hosts.
4. Right-click the host, and then select **NetApp ONTAP tools** > **Mount Datastores**.
5. Select the datastores that you want to mount, and then click **OK**.

Resize datastores

Resizing a datastore enables you to increase or decrease the storage for your virtual machine files. You might need to change the size of a datastore as your infrastructure requirements change.

About this task

If you want ONTAP tools to resize the containing volume when it resizes the VMFS datastore, you should not use the **Use existing volume** option under Storage attributes section when initially provisioning VMFS datastore, but instead let it automatically create a new volume for each datastore.

You can increase or decrease the size of an NFS datastore but for a VMFS datastore, you can only increase the size. Resizing of datastore is also supported for FlexGroup datastores with auto grow and shrink option. A FlexGroup that is part of a traditional datastore and FlexVol volume that is part of a vVols datastore cannot shrink below the existing size but can grow by 120% maximum. Default snapshots are enabled on these FlexGroup and FlexVol volumes.

> (i) If you are using All SAN Array (ASA) type storage platforms with ONTAP 9.9.1 or later, only then you can create vVols datastores with vmdk size greater than 16TB.

Steps

1. From the vSphere Client Home page, click **Hosts and Clusters**.
2. In the navigation pane, select the datacenter that contains the datastore.

3. Right-click the datastore and select **NetApp ONTAP tools** > **Resize non-vVols datastore**.

4. In the Resize dialog box, specify a new size for the datastore, and then click **OK**.

    You can run the **REDISCOVER ALL** option in the Storage Systems menu to manually update the storage listing under Storage Systems and dashboard, or wait for the next scheduled refresh.

Edit a vVols datastore

You can edit an existing VMware Virtual Volumes (vVols) datastore to change the default storage capability profile. The default storage capability profile is primarily used for Swap vVols.

Steps

1. From the vSphere Client page, click **Hosts and Clusters**.

2. Right-click the datastore, and then select **NetApp ONTAP tools** > **Edit Properties of vVols Datastore**.

    The Edit Properties of vVols Datastore dialog box is displayed.

3. Make the required changes.

    You can change the default storage capability profile for the vVols datastore by selecting a new profile from the drop-down list in the Edit vVols Datastore dialog box. You can also change the vVols datastore name and description.

    > (i) You cannot change the vCenter Server where the vVols datastore is located.

4. When you have made your changes, click **OK**.

    A message box asks whether you want to update the vVols datastore.

5. Click **OK** to apply your changes.

    A success message appears to inform that the vVols datastore has been updated.

Add storage to a vVols datastore

You can increase the available storage by using the Add Storage wizard to add FlexVol volumes to an existing VMWare Virtual Volumes (vVols) datastore.

About this task

When you add a FlexVol volume, you also have the option of changing the storage capability profile associated with that volume. You can either use the VASA Provider auto-generate feature to create a new profile for the volume, or you can assign one of the existing profiles to the volume.

(i)

- While expanding a vVols datastore with replication capabilities, you cannot create new FlexVol volumes but can only select pre-configured FlexVol volumes from the existing list.
- When cloning a protected virtual machine deployed on datastore with vVols replication fails due to insufficient space, then you should increase the FlexVol volume size.
- When a vVols datastore is created on a AFF or ASA cluster, then you cannot expand the datastore with another FlexVol volume that has auto generate storage capability profile.
  - You can expand the vVols datastore with FlexVol volumes that have pre-created storage capability profiles.

Steps

1. On the vSphere Client Home page, click **Hosts and Clusters**.
2. Right-click the vVols datastore, and then select **NetApp ONTAP tools** > **Expand Storage of vVol Datastore**.
3. On the Expand Storage of vVols Datastore page, you can either add an existing FlexVol volume to the vVols datastore, or create a new FlexVol volume to add to the database.

If you select…	Perform the following…
Select volumes	a. Select the FlexVol volumes that you want to add to the vVols datastore. b. In the Storage Capability Profiles column, use the drop-down list to either create a new profile based on the FlexVol volumes, or select one of the existing profiles. The auto-generate feature creates a profile based the storage capabilities that are associated with that FlexVol volume. For example: disk type, high availability, disaster recovery, performance features, and deduplication.
Create new volumes	a. Enter the name, size, and storage capability profile for the FlexVol. The aggregates are selected by the system based on the storage capability profile selected. b. Select the **Auto Grow** option and provide the maximum size. c. Click **ADD** to add the FlexVol to the list of volumes.

Reminder: All FlexVol volumes in a vVols datastore must be from the same storage virtual machine (SVM, formerly known as Vserver).

After you create a FlexVol volume, you can edit it by clicking the **Modify** button. You can also delete it.

4. Select a default storage capability profile to be used during virtual machine creation, and then click **Next** to review the summary of the storage added to vVols datastore.

5. Click **Finish**.

Result

The wizard adds the storage that you specified to the vVols datastore. It displays a success message when it finishes.

> (i) The Expand Storage of vVols Datastore wizard automatically handles any ESXi host storage rescans or any other significant operations that are required. Because a vVols datastore is a logical entity controlled by VASA Provider, adding the FlexVol volume is the only thing you need to do to enlarge the capacity of your storage container.

Remove storage from a vVols datastore

If a VMware Virtual Volumes (vVols) datastore has multiple FlexVol volumes, you can remove one or more of the FlexVol volumes from the vVols datastore without deleting the datastore.

About this task

A vVols datastore exists as long as at least one FlexVol volume is available on the datastore. If you want to delete a vVols datastore in a HA cluster, then you should first unmount the datastore from all hosts within the HA cluster, and then delete the residing .vsphere-HA folder manually using vCenter Server user interface. You can then delete the vVols datastore.

Steps

1. From the vSphere Client Home page, click **Hosts and Clusters**.

2. Right-click the vVols datastore that you want to modify, and then select **NetApp ONTAP tools** > **Remove Storage from vVols Datastore**.

   The Remove Storage from vVols Datastore dialog box is displayed.

3. Select the FlexVol volumes that you want to remove from the vVols datastore, and click **Remove**.

4. Click **OK** in the confirmation dialog box.

> (i) If you select all of the FlexVol volumes, an error message is displayed, indicating that the operation will fail.

Mount a vVols datastore

You can mount a VMware Virtual Volumes (vVols) datastore to one or more additional hosts by using the Mount vVols Datastore dialog box. Mounting the datastore provides storage access to additional hosts.

Steps

1. From the vSphere Client Home page, click **Hosts and Clusters**.

2. Right-click the datastore that you want to mount, and then select **NetApp ONTAP tools** > **Mount vVols Datastore**.

The Mount vVols Datastore dialog box is displayed, which provides a list of the hosts that are available in the datacenter where you can mount the datastore. The list does not include the hosts on which the datastore has already been mounted, hosts that are running ESX 5.x or earlier, or hosts that do not support the datastore protocol. For example, if a host does not support the FC protocol, you cannot mount an FC datastore to the host.

> ⓘ Even though the vSphere Client provides a mount dialog box for the vCenter Server, you must always use the VASA Provider dialog box for this operation. VASA Provider sets up access to storage systems that are running ONTAP software.

3. Select the host on which you want to mount the datastore, and then click **OK**.

Manage virtual machines

Considerations for migrating or cloning virtual machines

You should be aware of some of the considerations while migrating existing virtual machines in your datacenter.

Migrate protected virtual machines

You can migrate the protected virtual machines to:

- Same vVols datastore in a different ESXi host
- Different compatible vVols datastore in same ESXi host
- Different compatible vVols datastore in a different ESXi host

If virtual machine is migrated to different FlexVol volume, then respective metadata file also gets updated with the virtual machine information. If a virtual machine is migrated to a different ESXi host but same storage then underlying FlexVol volume metada file will not be modified.

Clone protected virtual machines

You can clone protected virtual machines to the following:

- Same container of same FlexVol volume using replication group

  Same FlexVol volume's metadata file is updated with the cloned virtual machine details.

- Same container of a different FlexVol volume using replication group

  The FlexVol volume where the cloned virtual machine is placed, the metadata file gets updated with the cloned virtual machine details.

- Different container or vVols datastore

  The FlexVol volume where the cloned virtual machine is placed, the metadata file gets updated virtual machine details.

VMware presently does not support virtual machine cloned to a VM template.

Clone-of-Clone of a protected virtual machine is supported.

Virtual Machine Snapshots

Presently only virtual machine Snapshots without memory are supported. If virtual machine has Snapshot with memory, then the virtual machine is not considered for protection.

You also cannot protect unprotected virtual machine that has memory Snapshot. For this release, you are expected to delete memory snapshot before enabling protection for the virtual machine.

Migrate traditional virtual machines to vVols datastores

You can migrate virtual machines from traditional datastores to Virtual Volumes (vVols) datastores to take advantage of policy-based VM management and other vVols capabilities. vVols datastores enable you to meet increased workload requirements.

What you will need

You must have ensured that VASA Provider is not running on any of the virtual machines that you plan to migrate. If you migrate a virtual machine that is running VASA Provider to a vVols datastore, you cannot perform any management operations, including powering on the virtual machines that are on vVols datastores.

About this task

When you migrate from a traditional datastore to a vVols datastore, the vCenter Server uses vStorage APIs for Array Integration (VAAI) offloads when moving data from VMFS datastores, but not from an NFS VMDK file. VAAI offloads normally reduce the load on the host.

Steps

1. Right-click the virtual machine that you want to migrate, and then click **Migrate**.

2. Select **Change storage only**, and then click **Next**.

3. Select a virtual disk format, a VM Storage Policy, and a VVol datastore that matches the features of the datastore that you are migrating, and then click **Next**.

4. Review the settings, and then click **Finish**.

Migrate virtual machines with older storage capability profiles

If you are using the latest version of ONTAP tools for VMware vSphere, then you should migrate your virtual machines that are provisioned with the "MaxThroughput MBPS" or "MaxThroughput IOPS" QoS metrics to new VVol datastores that are provisioned with the "Max IOPS" QoS metrics of the latest version of ONTAP tools.

About this task

With the latest version of ONTAP tools, you can configure QoS metrics for each virtual machine or virtual machine disk (VMDK). The QoS metrics were earlier applied at the ONTAP FlexVol volume level and were shared by all of the virtual machines or VMDKs that were provisioned on that FlexVol volume.

Starting with the 7.2 version of ONTAP tools, the QoS metrics of one virtual machine is not shared with other

virtual machines.

> ⓘ You must not modify the existing VM Storage Policy as the virtual machines might become non-compliant.

Steps

1. Create vVols datastores by using a new storage capability profile with the required "Max IOPS" value.
2. Create a VM Storage Policy, and then map the new VM Storage Policy with the new storage capability profile.
3. Migrate the existing virtual machines to the newly created VVol datastores by using the new VM Storage Policy.

VASA cleanup

Use the steps in this section to perform VASA cleanup.

> ⓘ it is recommended that you remove any vVols datastores before performing the VASA Cleanup.

Steps

1. Unregister the plugin by going into `https://OTV_IP:8143/Register.html`
2. Verify that the plugin is no longer available on the vCenter.
3. Shutdown the ONTAP tools for VMware vSphere VM
4. Delete the ONTAP tools for VMware vSphere VM

Modify ESXi host settings using ONTAP tools

You can use the dashboard of ONTAP tools for VMware vSphere to edit your ESXi host settings.

What you will need

You must have configured an ESXi host system for your vCenter Server instance.

If there is an issue with your ESXi host settings, the issue is displayed in the ESXi Host Systems portlet of the dashboard. You can click the issue to view the host name or the IP address of the ESXi host that has the issue.

Steps

1. From the vSphere Client Home page, click **ONTAP tools**.
2. Edit the ESXi host settings.

If you want to edit the ESXi host settings from…	Do this…

Issues displayed	a. Click the issue in the ESXi Host Systems portlet.
	b. Click the ESXi host names for which you want to modify the settings.
	c. Right-click the ESXi host name, and click **NetApp ONTAP tools** > **Set Recommended Values**.
	d. Modify the required settings, and then click **OK**.
vSphere Client home page	a. Click **Menu** > **Hosts and Clusters**.
	b. Right-click the required ESXi host, and select **NetApp ONTAP tools** > **Set Recommended Value**.
	c. Click **OK**.
ESXi host Systems portlet	a. Click the **Traditional dashboard** tab in the Overview section of ONTAP tools.
	b. Click **Edit ESXi Host Settings**.
	c. Select the ESXi host name in the Host settings and status tab for which you want to modify the settings, and click **NEXT**.
	d. Select the required settings in the Recommended host settings tab, and then click **Next**.
	e. Review your selection in the Summary tab, and then click **FINISH**.

Access ONTAP tools maintenance console

Overview of ONTAP tools maintenance console

You can manage your application, system, and network configurations by using the maintenance console of the ONTAP tools. You can change your administrator password and maintenance password. You can also generate support bundles, set different log levels, view and manage TLS configurations, and start remote diagnostics.

You must have installed VMware tools after deploying ONTAP tools to access the maintenance console. You should use `maint` as the user name and the password you configured during deployment to log in to the maintenance console of the ONTAP tools. You should use **nano** for editing the files in maint or root login console.

> ⓘ You must set a password for the `diag` user while enabling remote diagnostics.

You should use the **Summary** tab of your deployed ONTAP tools to access the maintenance console. When

you click , the maintenance console starts.

Console Menu	Options
Application Configuration	1. Display server status summary 2. Start Virtual Storage Console service 3. Stop Virtual Storage Console service 4. Start VASA Provider and SRA service 5. Stop VASA Provider and SRA service 6. Change 'administrator' user password 7. Re-generate certificates 8. Hard reset database 9. Change LOG level for Virtual Storage Console service 10. Change LOG level for VASA Provider and SRA service 11. Display TLS configuration 12. Generate Web-Cli Authentication token 13. Start ONTAP tools plug-in service 14. Stop ONTAP tools plug-in service 15. Start Log Integrity services 16. Stop Log Integrity services 17. Change database password
System Configuration	1. Reboot virtual machine 2. Shutdown virtual machine 3. Change 'maint' user password 4. Change time zone 5. Add new NTP server You can provide an IPv6 address for your NTP server. 6. Enable SSH Access 7. Increase jail disk size (/jail) 8. Upgrade 9. Install VMware Tools

Network Configuration	1. Display IP address settings
	2. Change IP address settings
	You can use this option to change the IP address post deployment to IPv6.
	3. Display domain name search settings
	4. Change domain name search settings
	5. Display static routes
	6. Change static routes
	You can use this option to add an IPv6 route.
	7. Commit changes
	8. Ping a host
	You can use this option to ping to an IPv6 host.
	9. Restore default settings
Support and Diagnostics	1. Generate support bundle
	2. Access diagnostic shell
	3. Enable remote diagnostic access

Virtual Storage Console and VASA Provider log files

You can check the log files in the `/opt/netapp/vscserver/log` directory and the `/opt/netapp/vpserver/log` directory when you encounter errors.

The following three log files can be helpful in identifying problems:

- `cxf.log`, containing information about API traffic into and out of VASA Provider *kaminoPrefs.xml, containing information about ONTAP tools settings

- `vvolvp.log`, containing all log information about VASA Provider

The maintenance menu of ONTAP tools for VMware vSphere enables you to set different log levels for your requirement. The following log levels are available:

- Info
- Debug
- Error
- Trace

When you set the log levels, the following files are updated:

- ONTAP tools server: `kamino.log` and `vvolvp.log`

- VASA Provider server: `vvolvp.log`, `error.log`, and `netapp.log`

In addition, the VASA Provider web command-line interface (CLI) page contains the API calls that were made, the errors that were returned, and several performance-related counters. The web CLI page is located at `https://<IP_address_or_hostname>:9083/stats`.

Change the administrator password

You can change the administrator password of ONTAP tools post deployment using the maintenance console. Password expires after 90 days.

> (i) After changing the administrator password in ONTAP tools maintenance console, if SRA is enabled and configured on ONTAP tools, perform the **Updating SRA Credentials** procedure provided in ONTAP tools for VMware vSphere Quick Start section. Failing to follow these instruction results in errors reported on SRM.

Steps

1. From the vCenter Server, open a console to the ONTAP tools.
2. Log in as the maintenance user.
3. Enter 1 in the maintenance console to select Application Configuration.
4. Enter 6 to select **Change 'administrator' user password**.
5. Enter a password with minimum eight characters and maximum 30 characters. The password must contains a minimum of one upper, one lower, one digit, and one special character. Password expiry warning is shown after 75 days of resetting the password. The new password cannot be same as the last used password. You need to change the password every 90 days.

   If you do not follow the password recommendations, the maintenance console option is limited to change password. When the password has expired, you are prompted to change the password.

6. Enter y in the confirmation dialog box.

Configure VASA Provider to work with SSH

You can set up VASA Provider to use SSH for secure access by configuring the ONTAP tools .

About this task

When you configure SSH, you must log in as the maintenance user. This is because root access to VASA Provider has been disabled. If you use other login credentials, you cannot use SSH to access VASA Provider.

Steps

1. From the vCenter Server, open a console to the ONTAP tools.
2. Log in as the maintenance user.
3. Enter 3 to select **System Configuration**.
4. Enter 6 to select **Enable SSH Access**.

5. Enter `y` in the confirmation dialog box.

Configure remote diagnostic access

You can configure ONTAP tools to enable SSH access for the diag user.

What you will need

The VASA Provider extension must be enabled for your vCenter Server instance.

About this task

Using SSH to access the diag user account has the following limitations:

- You are allowed only one login account per activation of SSH.
- SSH access to the diag user account is disabled when one of the following happens:
  - The time expires.

    The login session remains valid only until midnight the next day.

  - You log in as a diag user again using SSH.

Steps

1. From the vCenter Server, open a console to ONTAP tools for VMware vSphere appliance virtual machine.
2. Log in as the maintenance user.
3. Enter `4` to select Support and Diagnostics.
4. Enter `3` to select Enable remote diagnostics access.
5. Enter `y` in the Confirmation dialog box to enable remote diagnostic access.
6. Enter a password for remote diagnostic access.

Collect the log files

You can collect log files for ONTAP tools for VMware vSphere from the option available in the ONTAP tools graphical user interface (GUI). Technical support might ask you to collect the log files to help troubleshoot a problem.

About this task

If you need VASA Provider log files, you can generate a support bundle from the Vendor Provider Control Panel screen. This page is part of the VASA Provider maintenance menus, which are accessible from the virtual appliance's console.

```
https://vm_ip:9083
```

You can collect the ONTAP tools for VMware vSphere Log files by using the "Export ONTAP tools for VMware vSphere Logs" feature in the ONTAP tools GUI. When you collect a ONTAP tools for VMware vSphere Log bundle with VASA Provider enabled, the ONTAP tools for VMware vSphere Log bundle will also have the VP logs. The following steps tell you how to collect the ONTAP tools for VMware vSphere Log files:

Steps

1. From the ONTAP tools home page, click **Configuration** > **Export ONTAP tools for VMware vSphere Logs**.

   This operation can take several minutes.

2. When prompted, save the file to your local computer.

   You can then send the *.zip* file to technical support.

Manage syslog

Use syslog to send system logs to centralized logging server.

About this task

From ONTAP tools for VMware vSphere 9.12 onwards, the ONTAP tools removes the earlier 2.0 syslog APIs. They contain new 3.0 syslog related APIs which support mutual authentication. Follow the steps below to setup syslog.

Steps

1. Run *POST /2.0/security/user/login to obtain* a session ID.
2. Run *POST /3.0/appliance-management/logging-client-certificate* by passing the sessionid received in the above response.

   This generates certificates for the VP server as well as the ONTAP tools server.

3. Copy both the certificates to your syslog server and make them trusted on the syslog server.

   Here is an example on how to do it for syslog-ng docker:

   - JSON unescape both the certificates and copy the pem formatted certs to the ca.d directory
   - `openssl x509 -noout -hash -in vsccert.pem` the result is a hash (for example 6d2962a8)
   - `ln -s vsccert.pem 6d2962a8.0` this creates a symbolic link to the certificate as hash with suffix .0
   - start the syslog server

4. Run *PATCH /3.0/appliance-management/syslog-config* API by passing the server IP, port, pattern(OPTIONAL), log_level and the syslog server's public certificate.

Logs are routed to the specified syslog server.

Monitor performance of datastores and vVols reports

Overview of ONTAP tools datastore and vVols reports

You can use the ONTAP tools console **Reports** menu to view pre-defined reports for all the datastores managed by a selected ONTAP tools instance in a particular vCenter Server. You can perform operations such as sorting and exporting reports.

Reports display detailed information about datastores and virtual machines, that enables you to review and identify potential issues with datastores and virtual machines in your vCenter Server

You can view, sort, and export reports.

ONTAP tools provide the following pre-defined reports:

- Datastore Report
- Virtual Machine Report
- vVols Datastore Report
- vVols Virtual Machine Report
- Log Integrity Report

Datastore Reports

The datastore reports provide detailed information about traditional datastores and the virtual machines that are created on these datastores.

The traditional dashboard enables you to review and identify potential issues with the datastores and virtual machines in your vCenter Server. You can view, sort, and export reports. The data for the traditional datastores and virtual machines report is provided by the vCenter Server. But due to the introduction of FlexGroup backed datastore support, some metrics such as latency, throughput, and IOPS are obtained from ONTAP.

> (i) File monitoring is not supported for FlexGroup datastores configured on direct storage virtual machines (SVMs).

The datastore provides the following pre-defined reports:

- Datastore Report
- Virtual Machine Report

Datastore Report

The Datastore Report menu provides information on the following parameters for datastores:

- Name of the datastore
- Type of datastore: NFS and VMFS
- Volume style

  The volume style can either be a FlexVol volume or a FlexGroup volume.

- Free space
- Used space
- Total space
- Percentage of space utilized
- Percentage of space available
- IOPS

  The report displays the IOPS for the datastore.

- Latency

  The report displays the latency information for the datastore.

  You can also verify the time at which the report was generated. The Datastore Report menu enables you to organize the report as per your requirement, and then export the organized report using the **Export to CSV** button. The datastore names in the report are links that navigate to the Monitor tab of the selected datastore, where you can view the datastore performance metrics.

Virtual Machine Report

The Virtual Machine Report menu provides the performance metrics for all the virtual machines that use datastores provisioned by ONTAP tools for a selected vCenter Server. The virtual machine metrics displayed in the Virtual Machine Reports is historical data that is collected every 30 minutes for virtual machines on traditional datastores. The "Last refresh time" and "Next refresh time" are added to the table to provide details on when the data was collected and when will be the next data collection.

- Name of the virtual machine
- Datastore name
- Volume style

  The volume style can be either a FlexVol volume or a FlexGroup volume.

- Source

  The source to gather details for the virtual machine can be either ONTAP or vCenter Server.

- Latency

  The report displays the latency for virtual machines across all datastores associated with the virtual machines.

- IOPS
- Throughput
- Committed capacity

  The report displays the value for the committed capacity for a virtual machine.

- Host

  The report displays the host systems on which the virtual machine is available.

- Uptime

  The report displays the time for which the virtual machine is powered on and is available on an ESXi host.

- Power state

  The report displays whether the virtual machine is powered on or powered off.

Each virtual machine name in the report is a link to the Monitor tab of the selected virtual machine. You can sort the virtual machine report as per your requirement and export the report in a .CSV file, and save the report on your local system. The timestamp of the report is also appended to the saved report.

For virtual machines that are backed by FlexGroup volumes, when new virtual machine is powered on, files are registered for monitoring on ONTAP. The historical metrics for Latency, Throughput and IOPS are obtained when VM reports are accessed from ONTAP.

vVols reports

vVols reports display detailed information about VMware Virtual Volumes (vVols) datastores and the virtual machines that are created on these datastores. The vVols dashboard enables you to review and identify potential issues with the vVols datastores and virtual machines in your vCenter Server.

You can view, organize, and export reports. The data for the vVols datastores and virtual machines report is provided by ONTAP.

vVols provides the following pre-canned reports:

- vVols Datastore Report
- vVols VM Report

vVols Datastore Report

The vVols Datastore Report menu provides information about the following parameters for datastores:

- vVols datastore name
- Free space
- Used space
- Total space
- Percentage of space utilized
- Percentage of space available
- IOPS
- Latency Performance metrics are available for NFS based vVols datastores on ONTAP 9.8 and later. You can also verify the time at which the report was generated. The vVols Datastore Report menu enables you to organize the report as per your requirement, and then export the organized report by using the **Export to CSV** button. Each SAN vVols datastore name in the report is a link that navigates to the Monitor tab of the selected SAN vVols datastore, which you can use to view the performance metrics.

vVols Virtual Machine Report

The vVols Virtual Machine Summary Report menu provides the performance metrics for all of the virtual machines that use the SAN vVols datastores that are provisioned by VASA Provider for ONTAP for a selected vCenter Server. The virtual machine metrics displayed in VM reports is historical data that is collected every 10 minutes for virtual machines on vVols datastores. "Last refresh time" and "Next refresh time" are added to the table to provide information on when data was collected and when will be the next data collection.

- Name of the virtual machine
- Committed capacity
- Uptime
- IOPS
- Throughput

The report displays whether the virtual machine is powered on or powered off.

- Logical space

- Host

- Power state

- Latency

  The report displays the latency for virtual machines across all of the vVols datastores that are associated with the virtual machines.

Each virtual machine name in the report is a link to the Monitor tab of the selected virtual machine. You can organize the virtual machine report according to your requirement, export the report in `.csv` format, and then save the report on your local system. The timestamp of the report is appended to the saved report.

Log Integrity Report

The Log Integrity Report shows the file integrity status. Log integrity is checked at scheduled intervals and the report is displayed in the Log Integrity Report tab. It also provides the status of the different audit files that are being rolled over.

The available log file status are:

- ACTIVE: Indicates the current active file to which the logs are written.

- NORMAL: Indicates that the archive file was not tampered or deleted.

- TAMPERED: Indicates that the file was modified after archival

- ROLLOVER_DELETE: Indicates that the file was deleted as part of log4j retention policy.

- UNEXPECTED_DELETE: Indicates that the file was deleted manually.

The ONTAP tools for VMware vSphere generates Audit logging for following:

- ONTAP tools service

  Audit log location for vscservice: */opt/netapp/vscservice/vsc-audit.log*. You can change the following parameters of the log integrity report in */opt/netapp/vscserver/etc/log4j2.properties* file:

  ◦ Max log size for roll over.

  ◦ Retention policy, the default value of this parameter is 10 files.

  ◦ File size, the default value of this parameter is 10MB before the files are archived. You need to restart the services for the new values to come into effect.

- VP service

  Audit log location for VP service: */opt/netapp/vpservice/vp-audit.log* The VP audit logs can be modified in the file */opt/netapp/vpserver/conf/log4j2.properties*. You need to restart the services for the new values to come into effect.

- Maint commands

  Audit log location for maintenance services: */opt/netapp/vscservice/maint-audit.log* Maint log files can be modified in the */opt/netapp/vscserver/etc/maint_logger.properties* file. When you change the default values, restart the server for the new values to come into effect.

The scheduler can be set up to check the audit logs on regular bases. The default value for the scheduler is one day. You can alter the value in */opt/netapp/vscserver/etc/maint_logger.properties* file.

Analyze performance data using the traditional dashboard

You can monitor the traditional datastores and virtual machines using the traditional dashboard of the ONTAP tools. The dashboard data enables you to analyze the datastore usage and to take corrective action to prevent the virtual machines from running into space-related constraints.

What you will need

You should select either the **Enable Storage I/O Control and statistics collection** or **Disable Storage I/O Control but enable statistics collection** option in the Configure Storage I/O Control dialog box. You can enable Storage I/O Control only if you have the Enterprise Plus license from VMware.

vSphere Resource Management

The traditional dashboard displays IOPS, space utilized, latency, and committed capacity metrics that are obtained from your vCenter Server. ONTAP provides aggregate space saving metrics to the traditional dashboard. You can view space saving for a specific aggregate. These performance parameters enable you to identify performance bottlenecks in the virtual environment and to take corrective action to resolve the issues.

> ⓘ File monitoring is not supported for FlexGroup datastores configured on direct storage virtual machines (SVMs).

The traditional dashboard of the ONTAP tools enables you to view either NFS datastores or VMFS datastores. You can click a datastore to navigate to the datastore details view that is provided by the vCenter Server instance to view and fix any issues with the datastores in your vCenter Server.

Steps

1. From the vSphere Client home page, click **ONTAP tools for VMware vSphere**.
2. Select the required vCenter Server using the **INSTANCE** selector to view the datastores.
3. Click **Overview > Traditional Dashboard**.

   The Datastores portlet provides the following details:

   ◦ The number of traditional datastores along with their performance metrics that are managed by ONTAP tools in your vCenter Server instance

   ◦ The top five datastores based on resource usage and performance parameters that can be modified, if required You can change the listing of the datastores based on the space utilized, IOPS, or latency and in the order required.

   The Virtual Machines portlet provides the following details:

   ◦ Number of virtual machines using NetApp datastores in your vCenter Server

   ◦ Top five virtual machines based on committed capacity, latency, IOPS, throughput, and uptime

   The IOPS and throughput data in the Virtual Machines portlet is available only for datastores created on FlexGroup backed volumes.

Analyze performance data using the vVols dashboard

You can monitor the performance and view the top five SAN and NAS VMware Virtual Volumes (vVols) datastores in your vCenter Server based on the parameters that you select by using the vVols dashboard of the ONTAP tools.

What you will need

- You should be using ONTAP 9.7 or later for your storage system.

The IOPS data that is provided by ONTAP is rounded off and displayed on the vVols dashboard. There might be a difference between the actual IOPS value that is provided by ONTAP and the IOPS value that is displayed on the vVols dashboard. ONTAP tools provides performance monitoring for NFS based vVols datastores.

- The vVols dashboard data is refreshed periodically, at an interval of 10 minutes.
- If you have added, modified, or deleted a storage system from your vCenter Server instance, then you might not notice any change in the data on the vVols dashboard for some time.
- The Total IOPS value that is displayed in the Overview portlet of the vVols dashboard is not a cumulative value of the Read IOPS value and Write IOPS value.
- NFS based data vVols provisioned on ONTAP 9.8 and above are automatically registered for performance monitoring in the vVols dashboard.

Steps

1. From the vSphere Client home page, click **ONTAP tools**.
2. Select the required vCenter Server using the **INSTANCE** selector to view the datastores.
3. Click **Overview > vVols Dashboard**.

   The Datastores portlet provides the following details:

   - The number of vVols datastores that are managed by VASA Provider in your vCenter Server instance
   - The top five vVols datastores based on resource usage and performance parameters You can change the listing of the datastores based on the space utilized, IOPS, or latency and in the order required.

4. View the details of the virtual machines using the Virtual Machines portlet.

   The Virtual Machines portlet provides the following details:

   - Number of virtual machines using ONTAP datastores in your vCenter Server
   - Top five virtual machines based on IOPS, latency, throughput, committed capacity, uptime, and logical space You can customize how the top five virtual machines are listed in the vVols dashboard.

vVols dashboard data requirements

You must verify some important requirements of the vVols dashboard to display dynamic details of the VMware Virtual Volumes (vVols) datastores and virtual machines.

The following table presents an overview of what you should verify if the vVols dashboard does not display the performance metrics for the provisioned SAN vVols datastores and virtual machines.

Considerations	Description
Storage system	- You are using ONTAP 9.7 or later. - You are using appropriate credentials for the storage system. - Your storage system is active and accessible. - The virtual machine that you selected must be using at least one vVols datastore, and I/O operations are executing on the disk of the virtual machine.

VASA Provider Disaster Recovery

If the VASA Provider (VP) virtual appliance has been lost, rendered inaccessible, or otherwise non-functional, you might have to perform a VP Disaster Recovery. For more information, see How to perform a VASA Provider Disaster Recovery - Resolution Guide