Cisco Intersight with NetApp ONTAP Storage

FlexPod

NetApp
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Cisco Intersight with NetApp Storage Quick Start Guide

In partnership with:

Introduction

NetApp and Cisco have partnered to provide Cisco Intersight, a single-pane view of the FlexPod ecosystem. This simplified integration creates a unified management platform for all components in the FlexPod infrastructure and FlexPod solution. Cisco Intersight allows you to monitor NetApp storage, Cisco compute, and VMware inventory. It also allows you to orchestrate or automate workflows to accomplish storage and virtualization tasks in tandem.

For more information, see TR 4883: FlexPod Datacenter with ONTAP 9.8, ONTAP Storage Connector for Cisco Intersight, and Cisco Intersight Managed Mode.

What's new

This section lists new features and functionality available for Cisco Intersight with NetApp ONTAP storage.

August 2022

> An upgrade to NetApp Active IQ Unified Manager 9.11 GA is required to ensure compatibility and full functionality with the latest release. For a list of known issues related to this release, see Known Issues.

- Updated cluster available capacity calculation to match System Manager
- Updated cluster General page to hide the performance metrics summary until performance data is populated
- Fixed cluster General page UI issue that occasionally caused the page to hang
- Added CIFS shares, CIFS services, Qtrees, and SVM SnapMirror policies to backend inventory.
- Added Shares and Qtrees to the UI navigation menu under the Logical inventory section
- Added Shares as a tab from a selected Storage VM
- Added CIFS Service information on the Storage VM General tab if the Storage VM is CIFS enabled
- Added a cluster Checks page that allow users to validate the configuration of NetApp storage systems adhere to best practices

July 2022

- Improved visuals for Cluster Data Reduction ratio now available under the Capacity Widget
- Added FC Interfaces tab to the Network Interfaces page

- Creating a new volume using the generic “New Storage Volume” task now sets volume space guarantee to none and snapshot reserve percent to 0%
- Comment field under the Edit Snapshot Policy task now optional and no longer mandatory
- Improved UI inventory and orchestration consistency
- Intersight capacity information under Cluster Capacity now consistent with System Manager
- Added checkbox under New Storage Virtual Machine task to display all parameters when creating a new management interface to improve usability
- Moved Protocols below Client Match, now consistent with System Manager
- Export policy general page now displaying Access Protocol(s)
- igroup removal now conditionally logged
- Added “Failover Policy” and "autorevert” parameters for NAS under New Storage NAS Data Interface and New Storage iSCSI Data Interface
- Rollback for New Storage NAS Smart Volume task now removes export policy if no other volumes are attached
- Made enhancements for Smart Volume and Smart LUN tasks

April 2022

To ensure compatibility and complete functionality with future releases, it is recommended that you upgrade your NetApp Active IQ Unified Manager to version 9.10P1.

- Added Broadcast Domain to Ethernet Port Detail page
- Changed the term “Aggregate” to “Tier” for the Aggregate and SVM within the user interface
- Changed the term "Cluster Status" to "Array Status"
- MTU filter now works for <,>,=,⇐,>= characters
- Added Network Interface Page to Cluster Inventory
- Added AutoSupport to Cluster Inventory
- Added `cdpd.enable` option to node
- Added an object for CDP neighbor
- Added NetApp workflow storage tasks within Cisco Intersight. See Use case 3 Custom workflows using designer-free form for a complete list of NetApp storage tasks.

January 2022

- Added event-based Intersight alarms for NetApp Active IQ Unified Manager 9.10 or above.

To ensure compatibility and complete functionality with future releases, it is recommended that you upgrade your NetApp Active IQ Unified Manager to version 9.10.

- Explicitly set each protocol enabled (true or false) for Storage Virtual Machine
- Mapped clusterHealthStatus state ok-with-suppressed to OK
- Renamed Health column to Cluster Status column under the Cluster list page
- Showing storage array “Unreachable” if the cluster is down or otherwise unreachable

- Renamed Health column to Array Status column under the Cluster General page
- SVM now has a “Volumes” tab that shows all the volumes for the SVM
- Volume has a snapshot capacity section
- Licenses now display correctly

October 2021

- Updated list of NetApp storage tasks available within Cisco Intersight. See Use case 3 Custom workflows using designer-free form for a complete list of NetApp storage tasks.
- Added Health column under the Cluster list page.
- Expanded details now available under the General page for a selected cluster.
- NTP Server table now accessible through the navigation pane.
- Added a new Sensors tab containing
the General page for the Storage Virtual Machine.
- VLAN and link aggregation group summary now available under the Port General page.
- Total Data Capacity column added under the Volume Total Capacity table.
- Latency, IOPS, and Throughput columns added under Average Volume Statistics, Average LUN Statistics, Average Aggregate Statistics, Average Storage VM Statistics, and Average Node Statistics tables

> The above performance metrics are only available for storage arrays monitored through NetApp Active IQ Unified Manager 9.9 or above.

Known Issues

- To ensure Intersight storage inventory data is unaffected during the data collection process, any unsupported ONTAP clusters (i.e., ONTAP 9.7P1) must be removed from the Active IQ Unified Manager (AIQUM).
- All claimed targets require a minimum AIQUM version of 9.11 for FlexPod Integrated System Interoperability queries to complete successfully.
- The Storage Inventory Checks page will not populate if the ONTAP cluster is added to AIQ-UM using an FQDN. Users must add ONTAP clusters to AIQ-UM using an IP address.

Requirements

Check that you meet the hardware, software, and licensing requirements for NetApp ONTAP storage integration with Cisco Intersight.

Hardware and software requirements

These are the minimum hardware and software components required to implement the solution. The components that are used in any particular implementation of the solution might vary based on customer requirements.

Component	Requirement details
NetApp ONTAP	ONTAP 9.7P1 and later
NetApp Active IQ Unified Manager	Latest version of NetApp Active IQ Unified Manager is required (currently 9.11 GA)
NetApp Storage Array	All ONTAP ASA, AFF, and FAS storage array supported for ONTAP 9.7P1 and later
Virtualization Hypervisor	vSphere 6.7 and later

Refer to Cisco Intersight Managed Mode for FlexPod for the minimum requirements of Cisco UCS Compute Components and UCSM version.

Cisco Intersight licensing requirements

Cisco Intersight is licensed on a subscription basis with multiple license editions from which to choose. Capabilities increase with the different license types. You can purchase a subscription duration of one, three, or five years and choose the required Cisco UCS Server volume tier for the selected subscription duration. Each Cisco endpoint automatically includes a Cisco Intersight Base at no additional cost when you access the Cisco Intersight portal and claim a device.

You can purchase any of the following higher-tier Intersight licenses using the Cisco ordering tool:

- **Cisco Intersight Essentials.** Essentials includes all functionality of the Base tier with the additional features including Cisco UCS Central and Cisco IMC Supervisor entitlement, policy-based configuration with Service Profiles, firmware management, and evaluation of compatibility with the Hardware Compatibility List (HCL).
- **Cisco Intersight Advantage.** Advantage offers all features and functionality of the Base and Essentials tiers. It includes storage widgets, storage inventory, storage capacity, and storage utilization, and cross-domain inventory correlation across physical compute, physical storage, and virtual environments (VMware ESXi).
- **Cisco Intersight Premier.** In addition to the capabilities provided in the Advantage tier, Cisco Intersight Premier offers Private Cloud Infrastructure-as-a-Service (IaaS) orchestration across Cisco UCS, and third-party systems, including virtual machines (VMs) (VMware vCenter) and physical storage (NetApp storage).

For more information about the features covered by various licensing tiers, go to Cisco Licensing.

Before you begin

To monitor and orchestrate NetApp storage from Cisco Intersight, you need NetApp Active IQ Unified Manager and Cisco Intersight Assist Virtual Appliance installed in the vCenter environment.

Install or Upgrade NetApp Active IQ Unified Manager

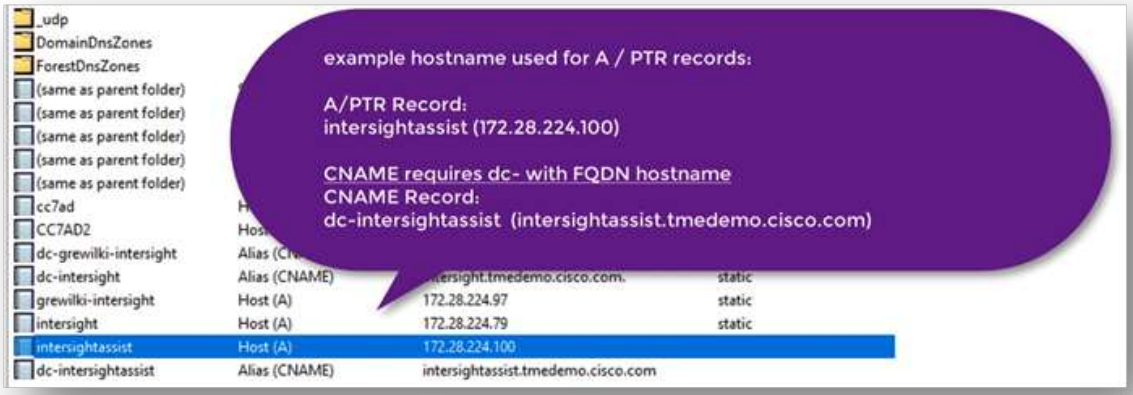
Install or upgrade to Active IQ Unified Manager (latest version is required, currently 9.11 GA) if you have not done so. For instructions, go to the NetApp Active IQ Unified Manager Documentation.

Install Cisco Intersight Assist Virtual Appliance

Ensure that you meet the Cisco Intersight Virtual Appliance Licensing, System, and Network requirements.

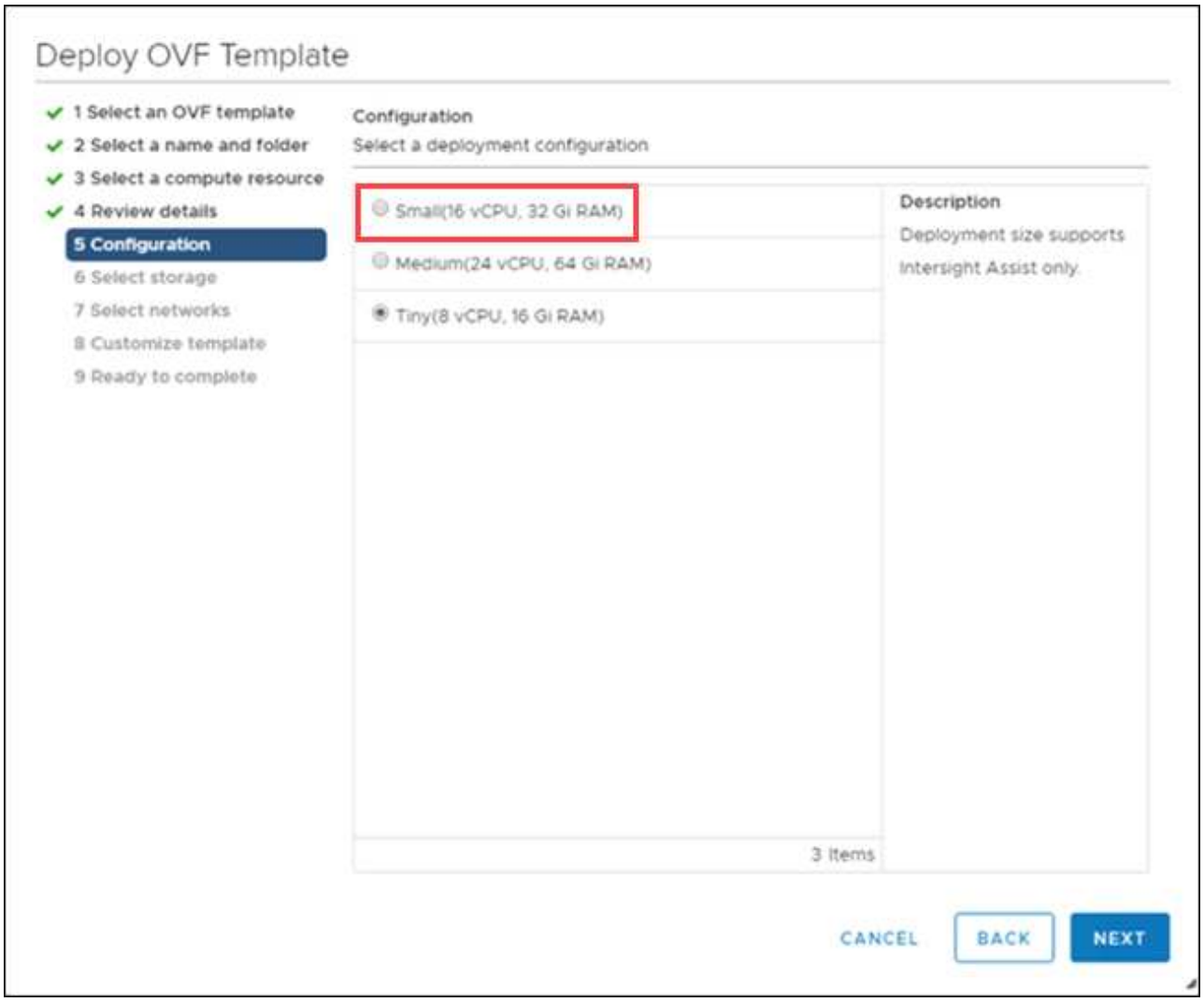
Steps

1. Create a Cisco Intersight Account.
   Visit https://intersight.com/ to create your Intersight account. You must have a valid Cisco ID to create a Cisco Intersight account.
2. Download the Intersight Virtual Appliance at software.cisco.com. For more information, go to the Intersight Appliance Install and Upgrade Guide.
3. Deploy the OVA. DNS and NTP are required to deploy the OVA.
   a. Configure DNS with A/PTR and CNAME Alias records prior to deploying the OVA. See the example below.

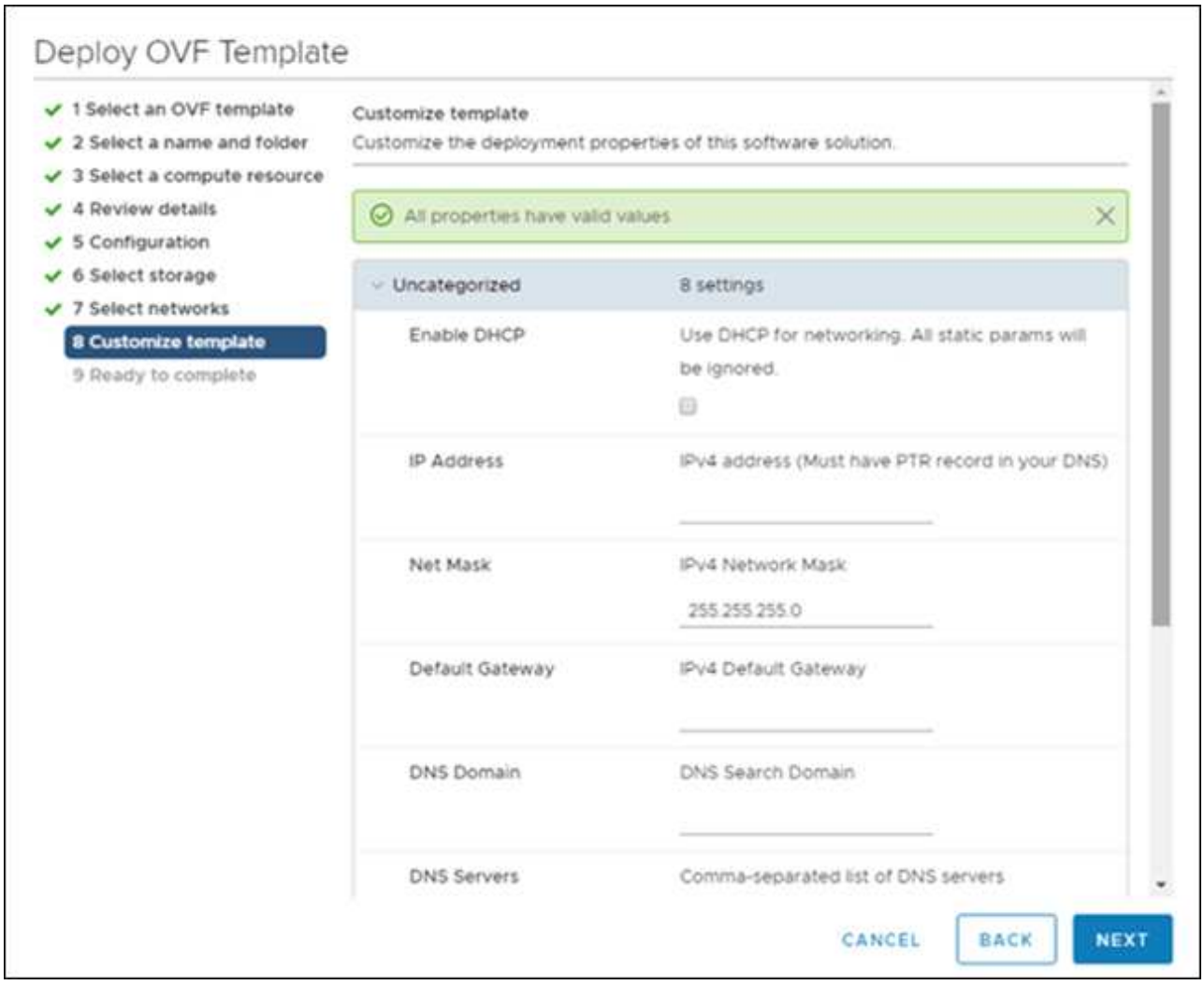


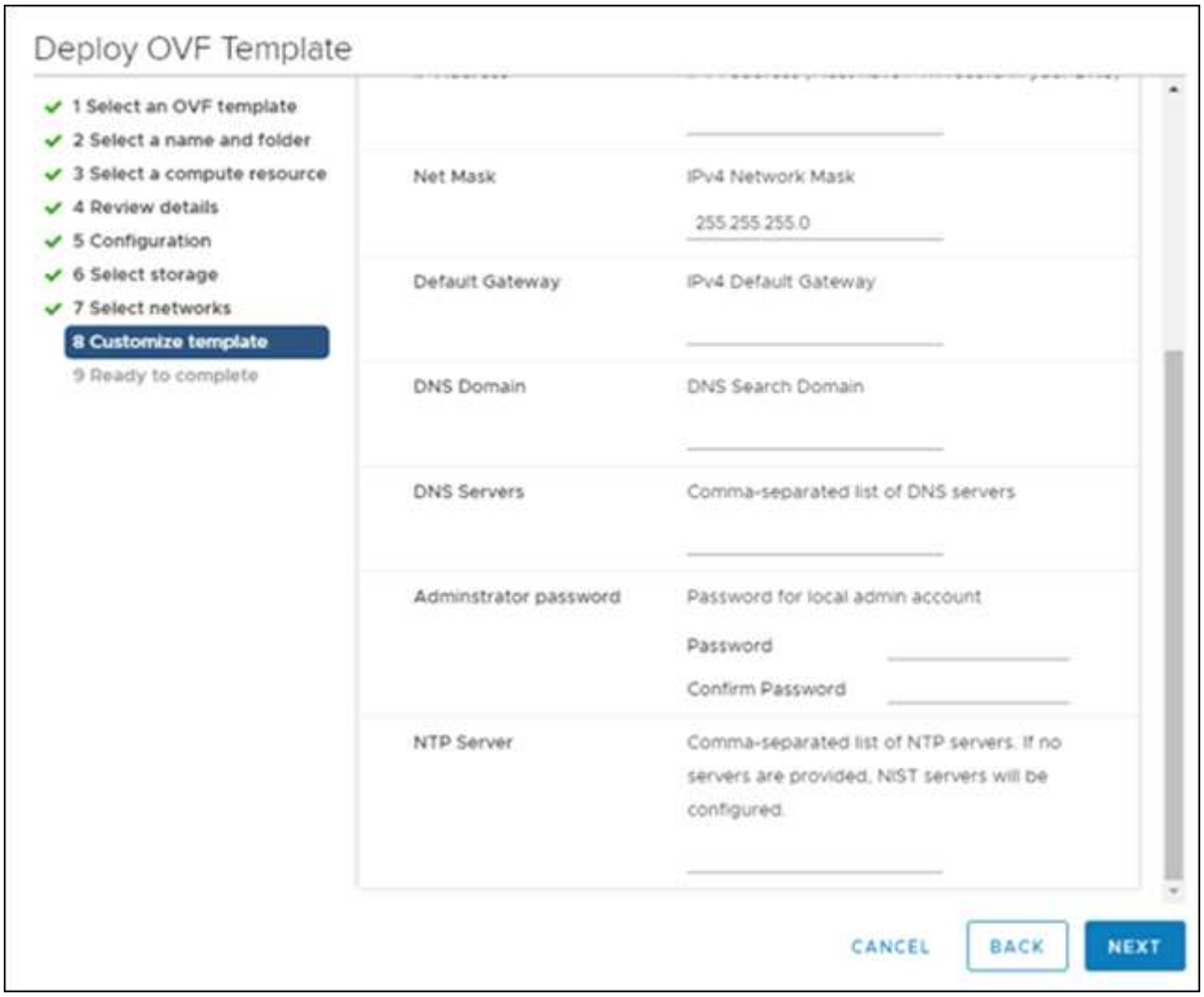
   b. Choose the appropriate configuration size (Tiny, Small, or Medium) based on your OVA deployment requirements for Intersight Virtual Appliance.

      TIP: For a two-node ONTAP cluster with a large number of storage objects, NetApp recommends that you use the Small (16 vCPU, 32 Gi RAM) option.



c. On the **Customize Template** page, customize the deployment properties of the OVF template. The administrator password is used for the local users: admin(`webUI/cli/ssh`).


Deploy OVF Template
1 Select an OVF template
2 Select a name and folder
3 Select a compute resource
4 Review details
5 Configuration
6 Select storage
7 Select networks
8 Customize template
9 Ready to complete
Customize template
Customize the deployment properties of this software solution.
All properties have valid values
Uncategorized
8 settings
Enable DHCP
Use DHCP for networking. All static params will be ignored.
IP Address
IPv4 address (Must have PTR record in your DNS)
Net Mask
IPv4 Network Mask
255.255.255.0
Default Gateway
IPv4 Default Gateway
DNS Domain
DNS Search Domain
DNS Servers
Comma-separated list of DNS servers
CANCEL
BACK
NEXT



d. Click **Next**.

4. Post-deploy the Intersight Assist Appliance.

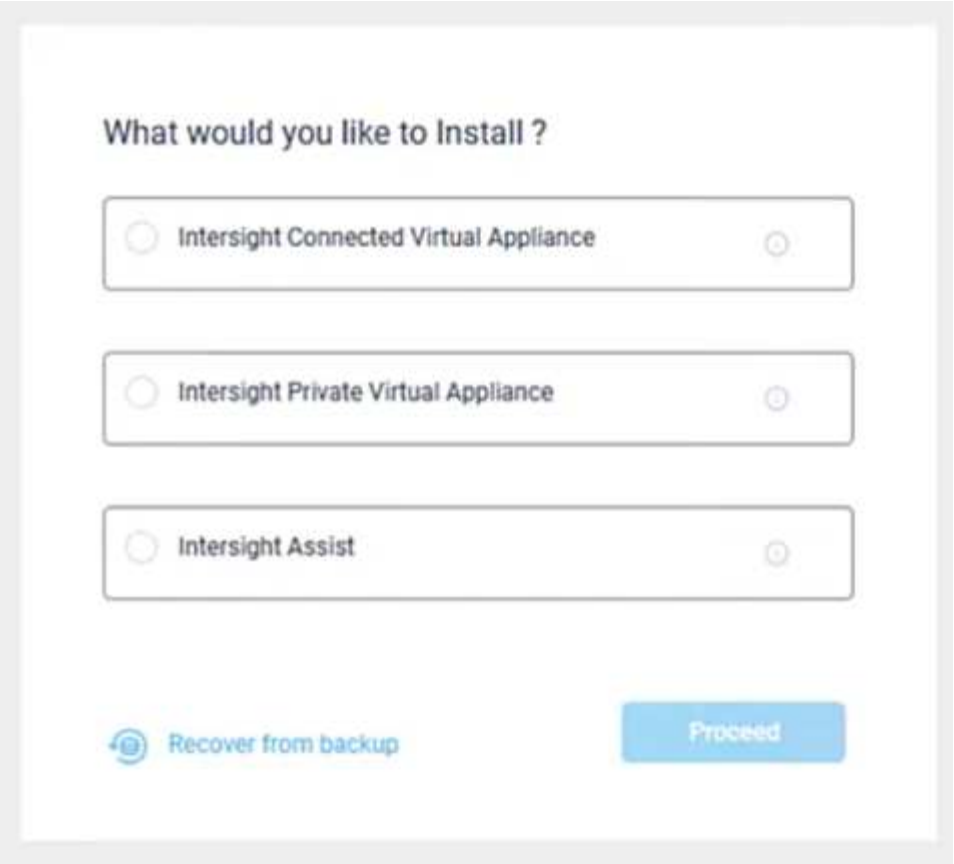
   a. Navigate to https://FQDN-of-your-appliance to complete the post-install set-up of your appliance.

      The installation process automatically begins. Installation can take up to one hour depending on bandwidth to Intersight.com. It can also take several seconds for the secure site to be operational after the VM powers on.

   b. During the post-deployment process, select the following option:

      - **Intersight Assist.** This deployment enables SaaS model to connect to Cisco Intersight.

      When selecting Intersight Assist, take note of the device ID and claim code before you continue.



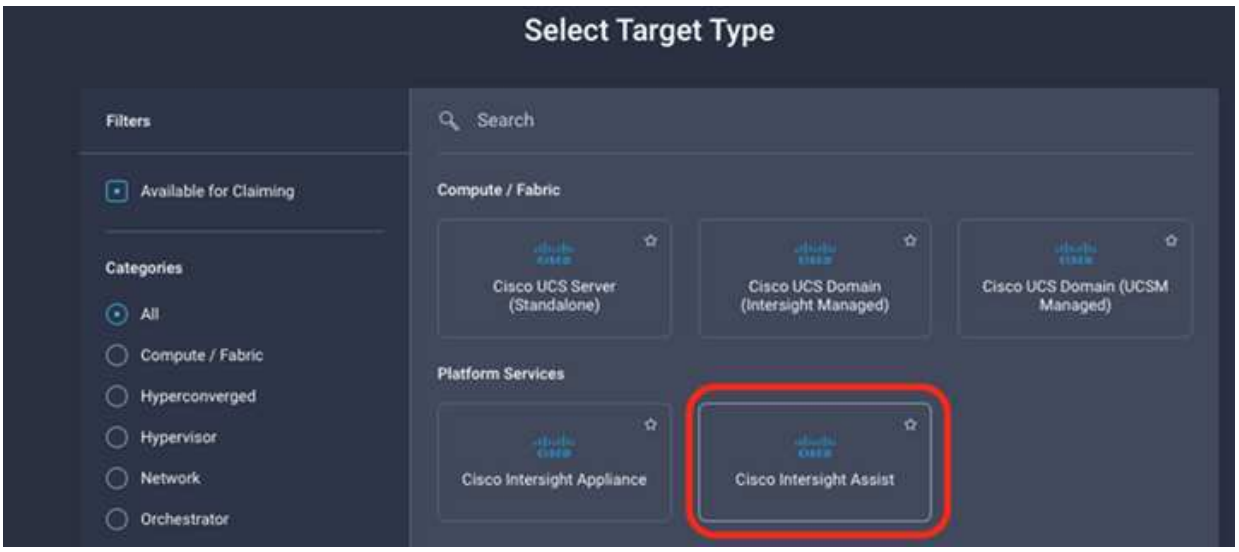
c. Click **Proceed**.

d. Select **Intersight Assist** and complete the following steps:

   i. Navigate to your SaaS Intersight account at https://intersight.com.

   ii. Click **Targets**, **Cisco Intersight Assist**, and then **Start**.

   iii. Claim the **Cisco Intersight Assist** appliance by copying and pasting the device ID and claim code from your newly deployed Intersight Assist virtual appliance.



   iv. Return to the **Cisco Intersight Assist** appliance and click **Continue.** You might need to refresh the browser.

The download and installation process begins. The binaries are transferred from Intersight Cloud to your on-prem appliance. Completion time varies depending on your bandwidth to the Intersight Cloud.

Configure AIQ UM proxy server for IMT service

If you are using a proxy server with AIQ UM for Cisco Intersight with NetApp ONTAP storage, you must configure the setup through the command line interface (CLI) to utilize the interoperability matrix tool service (IMT). You must use the Active IQ Unified Manager Virtual Machine (OVA) Diag shell to configure the AIQ UM proxy server settings.

For information on how to access the AIQ UM Diag shell, see How to access Active IQ Unified Manager Virtual Machine (OVA) DIAG shell

Steps

1. Log into the AIQ UM terminal and run the following command to log into um.

```
um cli login -u <um maintenance user name>
```

Example

```
um cli login -u admin
```

2. Set the `imt_proxy_host` and `imt_proxy_port` by running the following commands.

The IMT proxy is a separate configuration from AutoSupport (ASUP) proxy configurations.

```
um option set imt.https.proxy.host=<IMT_PROXY_HOST>
um option set imt.https.proxy.port=<IMT_PROXY_PORT>
```

Example

```
um option set imt.https.proxy.host=example-proxy.cls.eng.com
um option set imt.https.proxy.port=8200
```

IMT proxy server configurations do not support authentication.

3. View the IMT proxy details to verify the `proxy_host` and `proxy_port` settings through the following command.

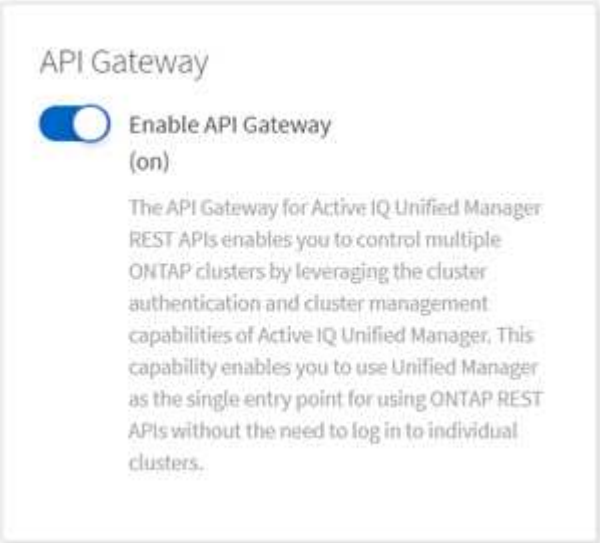
```
um option list |grep imt
```

Claim targets

After Cisco Intersight Assist is installed, you can claim your NetApp storage and virtualization devices. Return to the **Intersight Targets** page and add your vCenter and NetApp Active IQ Unified Manager targets. For more information about the claim process, watch the video Claim a Target via Cisco Intersight Assist.

Make sure that the NetApp Active IQ Unified Manager (AIQ UM) API Gateway is enabled.

From the NetApp IQ Unified Manager, navigate to **Settings > General > Feature Settings**.



The following example shows the NetApp AIQ UM target being claimed from Cisco Intersight.

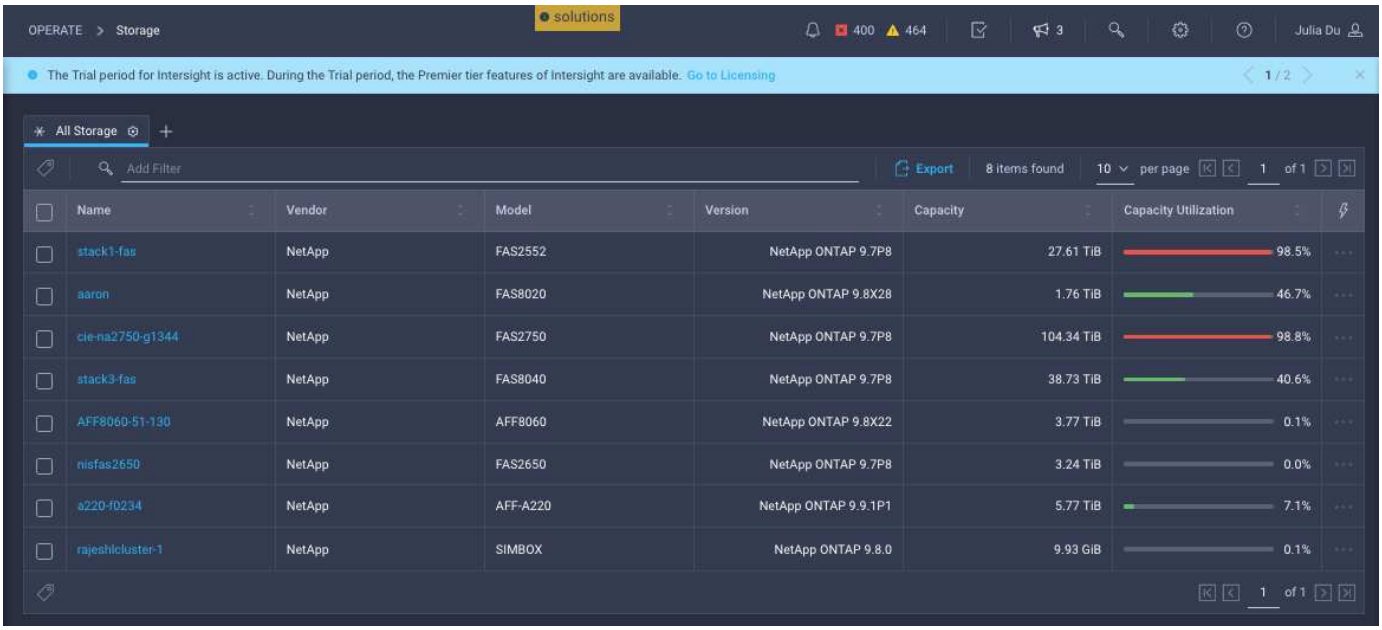
When you claim the NetApp AIQ UM target, all clusters managed by Active IQ Unified Manager are automatically added to Intersight.

Monitor NetApp storage from Cisco Intersight

After targets are claimed, NetApp storage widgets, storage inventory, and virtualization tabs become available if you have an Advantage tier license. Orchestration tabs are available if you have a Premier tier license.

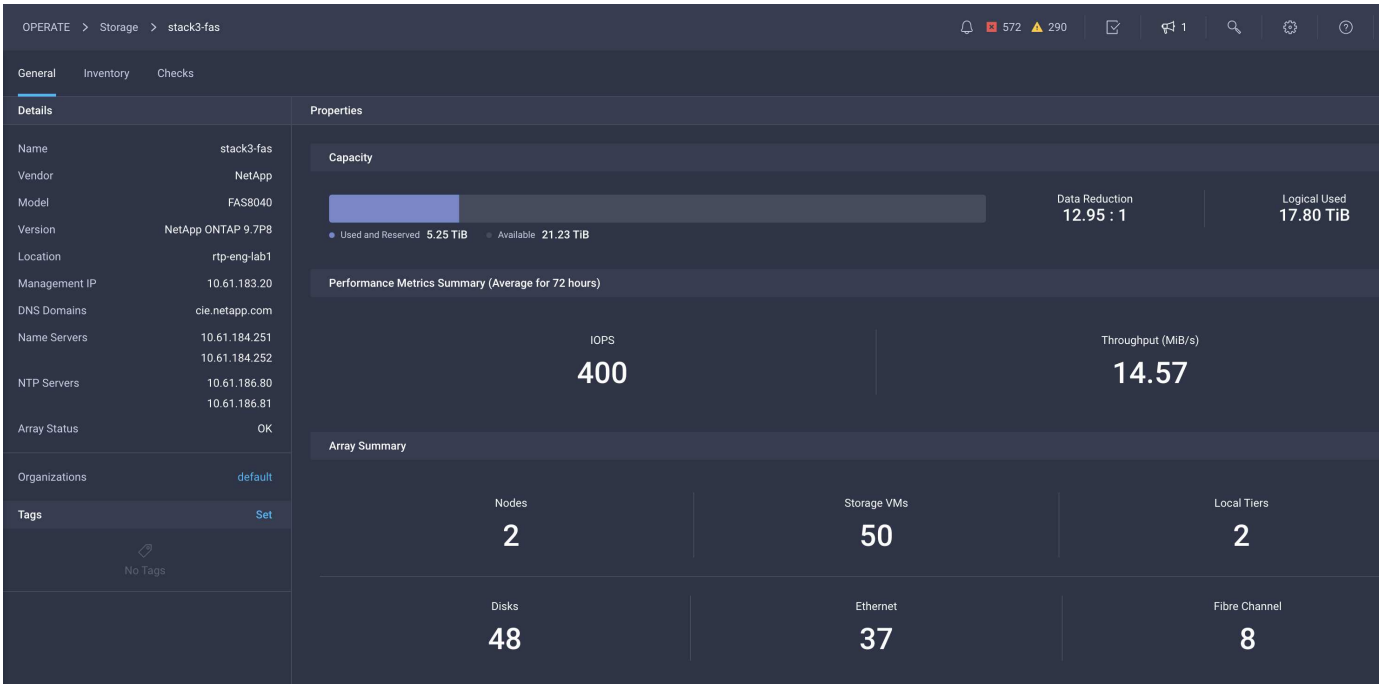
Storage inventory overview

The following screenshot displays the **Operate > Storage** screen.



The following screenshot shows the storage cluster overview.

> The following performance metric summary information will only display if the storage array is monitored through NetApp Active IQ Unified Manager 9.9 or above.

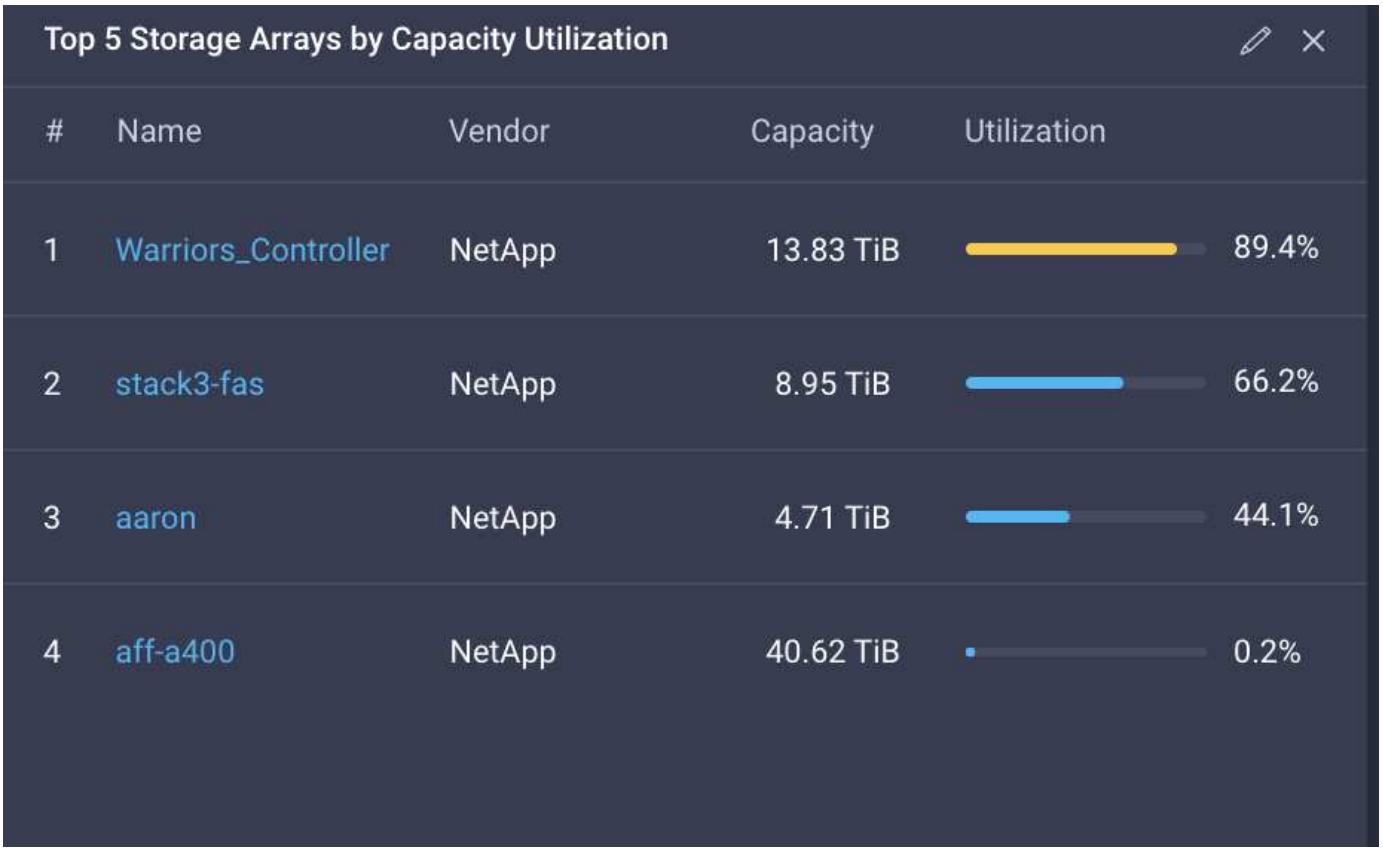


Storage widgets

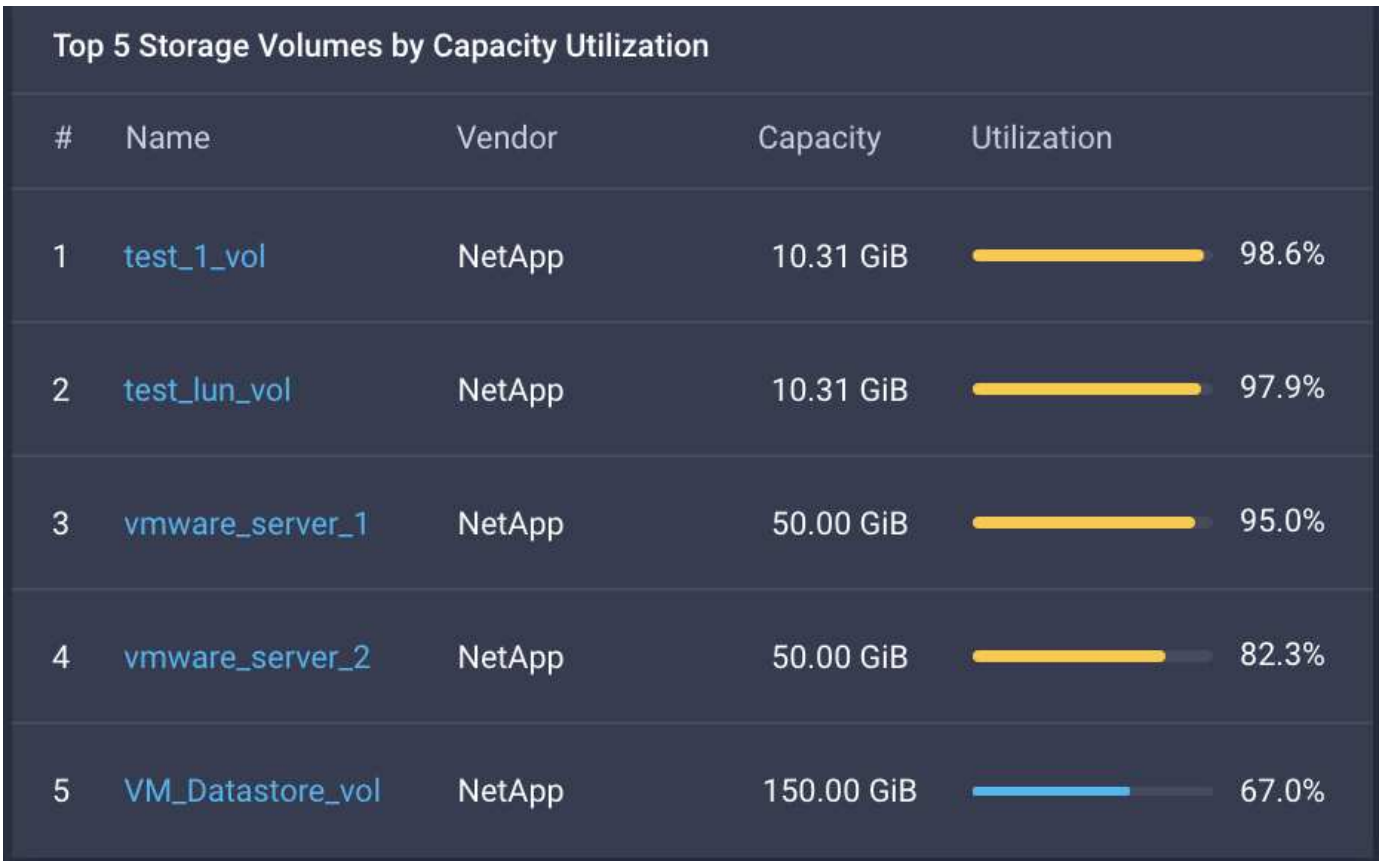
To view storage widgets, navigate to **Monitoring > Dashboards > View NetApp storage widgets**.

- The following screenshot shows the Storage Version Summary widget.

- This screenshot shows the Top 5 Storage Arrays by Capacity Utilization widget.



- This screenshot shows the Top 5 Storage Volumes by Capacity Utilization widget.



Use cases

These are a few use case examples for monitoring and orchestration of NetApp storage from Cisco Intersight.

Use case 1: Monitoring NetApp storage inventory and widgets

When the NetApp storage environment is available in Cisco Intersight, you can monitor NetApp storage objects in detail from storage inventory and get an overview from storage widgets.

1. Deploy Intersight Assist OVA (OnPrem task in vCenter Environment).
2. Add NetApp AIQ UM devices in Intersight Assist.
3. Go to **Storage** and navigate through NetApp storage inventory.
4. Add **Widgets** for NetApp storage to your **Monitor Dashboard**.

   Here is a link to the video showing NetApp ONTAP Storage Monitoring Features from Cisco Intersight.

Use case 2: NetApp storage orchestration using Reference Workflows

When NetApp storage and vCenter environments are available in Cisco Intersight, you can execute end-to-end Reference Workflows available out of box that include storage and virtualization tasks.

1. Deploy Intersight Assist OVA (OnPrem task in vCenter Environment).
2. Add NetApp AIQ UM devices in Intersight Assist.
3. Add the vCenter target to Intersight via Intersight Assist.
4. Execute Reference Workflows available out of box.

   Here is a list of Reference Workflows:

   - New NAS Datastore
   - New Storage Export Policy
   - New Storage Host
   - New Storage Interface
   - New Storage Virtual Machine
   - New Virtual Machine
   - New VMFS Datastore
   - Remove NAS Datastore
   - Remove Storage Export Policy
   - Remove Storage Host
   - Remove VMFS Datastore
   - Update NAS Datastore
   - Update Storage Host
   - Update VMFS Datastore

Use case 3: Custom workflows using designer-free form

When the NetApp Storage and vCenter environments are available in Cisco Intersight, you can build custom workflows using the NetApp storage and virtualization tasks.

1. Deploy Intersight Assist OVA (OnPrem task in vCenter Environment)
2. Add NetApp AIQ UM devices in Intersight Assist.
3. Add vCenter target to Intersight via Intersight Assist.
4. Navigate to the **Orchestration** tab in Intersight.
5. Select **Create Workflow**.
6. Add storage and virtualization tasks to your workflows.

   Here are the NetApp storage tasks that are available from Cisco Intersight:

   - Add Storage Export Policy to Volume
   - Connect Initiators to Storage Host
   - Disconnect Storage Export Policy From Volume
   - Edit Aggregates for Storage Virtual Machine
   - Edit Storage Export Policy Rule
   - Edit Storage Snapshot Policy
   - Edit Storage Snapshot Policy Schedule
   - Expand Storage LUN
   - Expand Storage Volume
   - Find NetApp igroup LUN Map
   - Find Storage LUN by ID
   - Find Storage Volume by ID
   - New Storage Export Policy
   - New Storage Export Policy Rule
   - New NetApp Storage Fibre Channel Interface
   - New Storage Host
   - New Storage IP interface
   - New Storage LUN
   - New Storage LUN ID
   - New NetApp Storage NAS Smart Volume
   - New NetApp Storage Smart LUN
   - New Storage Snapshot Policy
   - New Storage Snapshot Policy Schedule
   - New Storage Virtual Machine
   - New Storage volume
   - New Storage Volume Snapshot

- Remove Storage export policy
- Remove Storage Export Policy Rule
- Remove Storage FC Interface
- Remove Storage host
- Remove Storage IP Interface
- Remove Storage LUN
- Remove Storage LUN ID
- Remove NetApp Storage Smart LUN
- Remove Storage Snapshot Policy
- Remove Storage Snapshot Policy Schedule
- Remove Storage Virtual Machine
- Remove storage volume
- Remove Storage Volume Snapshot
- Rename Storage Volume Snapshot

The New Storage NAS Smart Volume and New Storage Smart LUN tasks will only work with ONTAP 9.8 and above. ONTAP 9.7P1 is currently the minimum supported version.

To learn more about customizing workflows with NetApp storage and virtualization tasks, watch the video NetApp ONTAP Storage Orchestration in Cisco Intersight.

References

To learn more, see the following documents and websites:

TR 4883: FlexPod Datacenter with ONTAP 9.8, ONTAP Storage Connector for Cisco Intersight, and Cisco Intersight Managed Mode

Cisco Intersight Managed Mode for FlexPod

Cisco Intersight Getting Started Overview

Intersight Appliance Install and Upgrade Guide

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