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Cisco and Hitachi Adaptive Solutions: Leveraging Hitachi Storage with Cisco Intersight for Consolidated Management and Automation

Reference Architecture Guide

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Revision history

Changes	Date
Initial release	December 23, 2021

Reference Architecture Guide

Cisco Systems Inc. (Cisco) and Hitachi Ltd. (Hitachi) have been providing integrated platform solutions by combining Cisco's globally proven server and networking equipment with Hitachi's highly reliable Virtual Storage Platform (VSP series) storage systems since 2019. Starting in March 2021, Cisco Intersight, a SaaS-based operational management platform, added support for the management of Hitachi's VSP series.

In traditional data center (DC) operations, infrastructure managers administrating servers, storage, network, and other infrastructure devices use separate management software for each type of infrastructure. In other words, because infrastructure managers need to perform separate operations on their respective infrastructure devices, the process of setting up and maintaining configurations has led to the creation of management tool silos. In such a siloed environment, operations are time consuming and it is difficult to respond promptly to the needs of the end user. Furthermore, when using separate management software for each infrastructure component, setting up and maintaining a complex environment requires the infrastructure administrator to make detailed settings for each component and the number of operating screens tends to increase, leading to an increased workload for the administrator.

Using Intersight as an integrated operations management tool in conjunction with VSP storage systems is an effective solution for these challenges. Because Intersight can present the information about the complete infrastructure in a single screen, you can eliminate silos in the process of creating and maintaining infrastructure configurations, while still taking advantage of the superior performance and operational capabilities a VSP brings to the datacenter. Using Intersight workflows, it is also possible to reduce the operational overhead caused by a large number of different operating screens as well as the problem of long operation times caused by siloed management tools.

This white paper examines the effectiveness of the integrated management using Intersight. In order to perform a quantitative comparison with and without using Intersight, we first measured the operation time and the number of operating screens involved in the management of an environment using conventional management tools, and then again using Intersight. Our verification tests show that using Intersight as an integrated management tool reduces the time required to set up a virtual environment or change the configuration in order to create clones by more than 10 minutes, thus enabling faster operations than traditional methods. These operations are performed multiple times in the daily routine of a DevOps development, where services are deployed and updated in response to a fast-changing market. When creating a virtual environment or cloning data twice a day, it is possible to reduce the required time by approximately 90 to 100 hours over the span of a year. In addition, since Intersight enables operations from a single management screen, the number of screens required for operations can be reduced by more than 80% compared to the conventional management tools. This means that using Intersight as an integrated management environment reduces the operations burden of infrastructure managers and streamlines operations management.

Introduction

Since 2019 Hitachi has been combining high-performance servers and network equipment from Cisco with Hitachi's highly reliable VSP storage systems in a converged platform solution called "Cisco and Hitachi Adaptive Solutions for Converged Infrastructure" (Adaptive Solutions). With the introduction of Adaptive Solutions, end users can reduce the complex task of designing and evaluating a system, and quickly and easily deploy a highly reliable infrastructure required for systems that support real-time data analysis using AI and other state-of-the-art technologies. In addition, leveraging the technologies and know-how cultivated by both companies over many years can improve the stability of system operations. In March 2021, Cisco added support for Hitachi's VSP series storage systems to Intersight, their SaaS-type operations management platform, thus further improving the benefits of Adaptive Solutions by providing administrators a single tool to manage their datacenter.

Integrated IT Operations management platform with Cisco Intersight

This section describes integrated IT operations.

Intersight features

Cisco Intersight is a platform with a series of software services, delivered using a subscription-based licensing model for integrated infrastructure management. It uses industry-standard encryption and security protocols for all data transfers. Important security aspects are addressed by the fact that infrastructure devices are connected via standard HTTPS port 443 and only communicate with Intersight using HTTPS with Transport Layer Security (TLS), an established cryptographic scheme.

Thus, infrastructure administrators can use Intersight via the cloud, to safely and securely manage infrastructure devices in globally dispersed DCs, regardless of their location.

Intersight Outlook

Recently, container technology has been attracting attention as a platform for digital transformation (DX) to provide flexibility in response to rapidly changing IT requirements and business transformation. In addition, to manage infrastructure safely and efficiently, the demand for Infrastructure as code (IaC), which enables you to express the state of the infrastructure in code and manage accordingly, is increasing every day. Intersight incorporates the latest technologies, including Kubernetes for container management, and integrates with Hashicorp's Terraform in the field of IaC.

Hitachi Virtual Storage Platform features

The environment surrounding storage is changing every day, and storage capabilities must be flexible to address business needs. For example, businesses require storage that is stable, provides high performance, and reliable data management. The Hitachi Virtual Storage Platform (VSP) series uses an OS optimized for Flash storage (Storage Virtualization Operating System RF: SVOS RF) across all models, and the architecture has been revamped to provide stable throughput even in environments with rapidly changing access patterns and spikes in data volume. Hitachi enables robust storage for critical end-user data through the use of pioneering RAID configurations that distribute redundant data across drives, as well as a memory backup function that safely protects cache data and system configuration information in the event of a power outage.

The VSP series provides local replication features that have proven in enterprise environments to not impact the I/O performance of data volumes used for the core business. A remote replication feature enables stable data transfer to remote locations, which has been gaining trust from domestic and international end users over the years. Furthermore, the VSP series also provides many additional features that can be used based on end-user requirements, including a storage hierarchy that automatically migrates data in real time to the optimal storage tier according to the frequency of access, storage virtualization capabilities, and Thin Provisioning capabilities that enable you to define large volumes in advance to simplify volume capacity planning for the use cases that are difficult to predict.

Conventional methods and tools

The example of Creating and changing the configuration of a virtualized environment is used to demonstrate the challenges in designing, creating, monitoring, and maintaining the configuration. A VMware environment is used as an example of the virtual environment.

The following table shows the list of operations and the corresponding infrastructure when using VSP as storage to construct a virtualized environment, assuming the use of conventional operations management tools.

In conventional DC operations, infrastructure managers handling infrastructure devices such as servers, storage, and networks must use separate management software for each piece of equipment because there is no software that integrates the management of infrastructure. In other words, because infrastructure managers must perform separate operations on each piece of infrastructure equipment, siloed environments are created, which can be a challenge. Furthermore, such types of environments increase operation time and makes it difficult to respond promptly to the needs of end users.

In addition, when setting up an environment using management software, there is a tendency to increase the number of operating screens because it is necessary to make detailed settings. Therefore, the number of operation screens becomes an issue that increases the workload for the infrastructure administrator. The management issues mentioned previously are listed in the following table.

There are other operations that are impacted besides creating an environment, such as expansion of data regions and data cloning.

Table 1 Operations required to create a virtual environment

Step	Content	Infrastructure equipment used
1	Create logical volumes for VMFS in the VSP	Storage
2	Create a host group in the VSP	Storage
3	Set host group security switches	Storage
4	Set the logical path between the host and the VSP and connect the logical volumes to the host	Storage
5	Create VSAN configuration and zoning on the Fibre Channel switches	SAN network
6	Create VMFS on ESXi	Server
7	Deploy VMs using OVA files	Server

Note: A host group is a VSP feature that enables you to group multiple hosts according to the operating system or purpose when connecting to the same port of a VSP. A security switch is a feature that protects VSP LUs from unauthorized access. If multiple hosts connect to the same port of a VSP, it is possible to specify access permissions for each host group based on the Initiator WWN.

Table 2 Challenges with conventional operations management

#	Challenge	Cause
1	Siloed processes to set up environments and change configurations	There is no software to manage infrastructure equipment in an integrated manner, and it is necessary to operate infrastructure equipment separately.
2	Difficult to respond to needs of end users	Because of the silos of the environment construction and the configuration change process.
3	Complex to operate	Setting up an environment using management software for each component requires several advanced settings.

Solution overview

This section shows how the combination of Intersight and VSP can provide a solution to the challenges described previously.

Eliminate silos using Intersight integrated management

As an integrated management platform, Intersight integrates and manages infrastructure devices, including UCS servers as well as Hitachi VSP series storage systems. Infrastructure managers can view information on servers, storage, and network equipment from a single screen, thereby contributing to the elimination of silos in the process of setting up new environments. Even when the operation management is split between multiple administrators for different infrastructure equipment, Intersight provides a single UI that can be managed centrally, thus making it easy to exchange information and reduce communication time between different administrators.

Improved agility when using Intersight workflows to automate creation and configuration changes

The Orchestration feature provided by Intersight reduces operational complexity and improves agility by automating operations such as such as constructing virtual environments and changing configurations.. Infrastructure administrators can use the Workflow Designer to combine tasks and simple workflows from the Workflow Designer list to automate DC operations.

Note: Tasks are functions in Intersight used to perform certain operations; a Workflow refers to a number of tasks arranged to perform a certain operation.

Reducing operational load with Intersight workflows

Infrastructure administrators can create Intersight workflows in advance and then use these workflows when the same operation is run repeatedly. The operation to re-run the workflow is very simple; it only involves pressing the execution button, and the operation can be run automatically. Therefore, it is possible to reduce the operational load of the infrastructure administrator because it removes the need to transition between the operation screens of the management software of each piece of infrastructure equipment when using conventional operations management.

Furthermore, once a workflow has been created and verified by an experienced administrator, it also enables the delegation of repetitive tasks to less experienced team members.

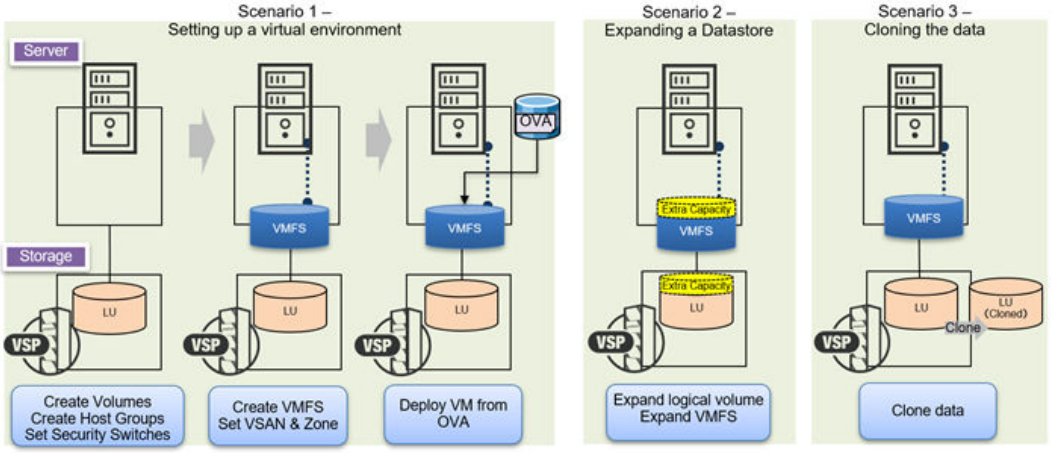
Note: In order to perform automation using Intersight Workflows, these workflows have to be created in advance using the Workflow Designer. A workflow as used in this evaluation can be created in about 30 minutes. For a detailed description of Workflow Designer, see Implementing Intersight (on page 17).

Validation scenarios

This section examines the solutions outlined in sections Improved agility when using Intersight workflows to automate creation and configuration changes (on page 7) and Reducing operational load with Intersight workflows (on page 7), and makes a quantitative comparison between the traditional operational management method and the integrated management method using Intersight.

The process of creating a virtual environment and changing the configuration will be used to validate and compare an integrated management method using Intersight against a conventional operations management method. The validation was performed using three VMware environment automation scenarios as shown in the following figure.

The validation was carried out using a remote connection. See Remote connection to infrastructure equipment using Intersight (on page 17) for instructions on how to remotely connect to an infrastructure managed with Intersight.



Scenario 1: Setting up a virtual environment

Providing virtual environments to end users is an operation performed on a daily basis for DC operations and DevOps development. The following operations were used to build the virtual environment:

Procedure

1. Create a logical volume on a VSP

   Create a logical volume in a VSP to store the data of the virtual environment.
2. Create a host group in a VSP

   Group the hosts with a host group to connect multiple hosts to a single storage port on a VSP.
3. Set security information for a host group

   Set the Initiator information (World Wide Name: WWN) of the servers allowed to access the logical volumes on the VSP and restrict access to VSP servers from the unregistered Initiators.
4. Connect logical volumes to the host

5. Configure VSAN and zoning for Fibre Channel switches

   Configure VSAN and zoning for the Fibre Channel connections between the host servers and the VSP storage system.
6. Build VMFS on ESXi

   Create a VMFS on the VSP logical volumes that are recognized by ESXi to store virtual environment data.
7. Deploy VMs using OVA file

   OVA is used to deploy the VMS which then run in the virtual environment.

Scenario 2: Expanding a datastore

A virtual environment can be used for big data analysis using AI. In this case, the amount of data handled can exceed the forecast made at the time of creating the virtual environment. To avoid running out of space, the capacity of the datastore must be expanded. In this scenario, a VMFS is used as a datastore. Therefore, to expand the capacity of the VMFS containing the datastore, perform the following operations:

Procedure

1. Expand the capacity of logical volumes in storage
2. Add the extended logical volumes to VMFS

Scenario 3: Cloning the data

Creating data clones of virtual environments is often used in DC operations and DevOps development for data archiving and to evaluate development environments. DevOps developers in particular are looking for a quick method to clone data, as they use data clones to build, test, and deliver data.

In this scenario, the following operations were used:

Procedure

1. Create a logical volume on the storage system as the target for the clone
2. Clone data of the virtual environments to the target volume

Validation method

For each scenario described previously, we measured and compared the speed and efficiency of the conventional operations management method with that of the integrated management method using Intersight.

The validation uses the aspects shown in the following table to evaluate the agility and efficiency benefits obtained by linking Intersight and VSP storage. The agility of each management method is evaluated by measuring operation time. The efficiency of operations for each management method is evaluated based on the number of operating screens required with each type of management software.

Actually, the validation was a comparison of the speed and efficiency of the integrated management system including Intersight automation with that of the conventional operations management method. Therefore, the integrated management method with Intersight uses an Intersight Workflow prepared in advance.

Table 3 Parameters used to evaluate Intersight

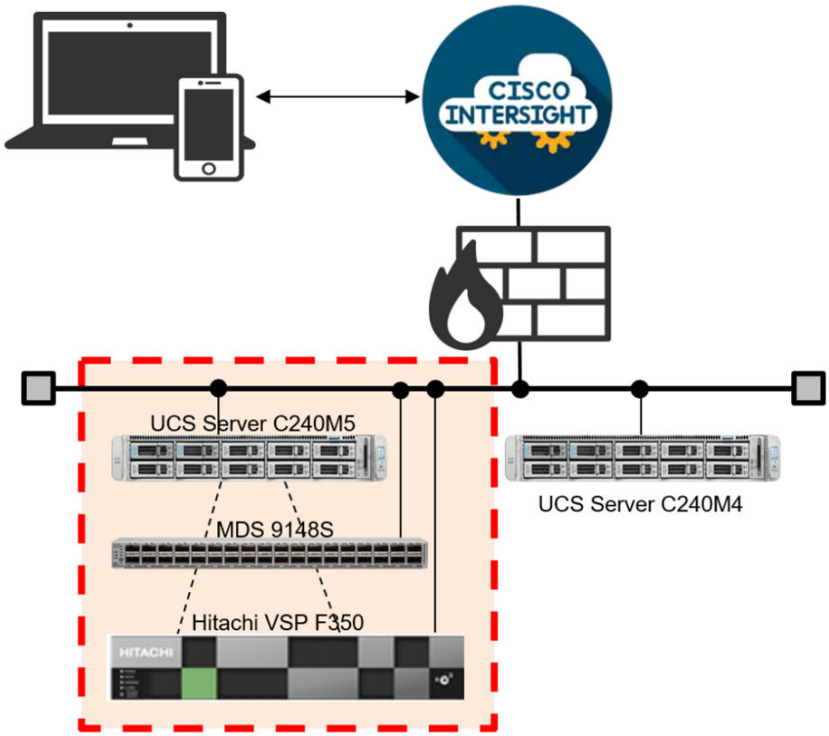
#	Evaluation parameters	Details
1	Operation time	Total operation time including the time to set input values.
2	Number of operation screens used by management software	Number of screens related to the operation, such as setting the input values.

Validation environment

This section describes the physical and logical configuration and application integration for this solution.

Physical configuration

The following figure shows the configuration environment used for this verification and the following table shows the equipment details.



To clearly separate operations, this verification used two UCS C240 servers: a UCS M4 server as a management server, and a UCS M5 server for the actual workload. The UCS M5 and VSP F350 were connected using an MDS switch, enabling IO access from the UCS M5 server to the VSP F350. Both UCS servers, the MDS switch, and VSP F350 were connected to the management network to enable management operations from UCS M4 to UCS M5, MDS, and VSP F350. The UCS M4 was connected to the Internet via a firewall configured to allow HTTP and HTTPS only for outbound communication.

In this validation, the Orchestration function of Intersight was used to automate the initial setup and configuration changes for the infrastructure outlined by the red box in the previous figure. When working with Intersight, there is no additional physical equipment required besides the equipment listed. Once the equipment is linked with Intersight, it is possible to use any communication terminal to monitor, manage, and operate the target environment.

Table 4 Equipment used in verification

#	Component	Product Name	Version	Purpose
1	UCS Server	UCS C240 M5 Cisco IMC Software	4.1 (1f)	Application Server
2		UCS C240 M4 Cisco IMC Software	4.0 (4l)	Management server
3	Storage	Hitachi VSP F350	88-07-01-20/00	Storage for virtual environment
4	Cisco MDS	MDS 9148S	8.4(2a)	For SAN fabric

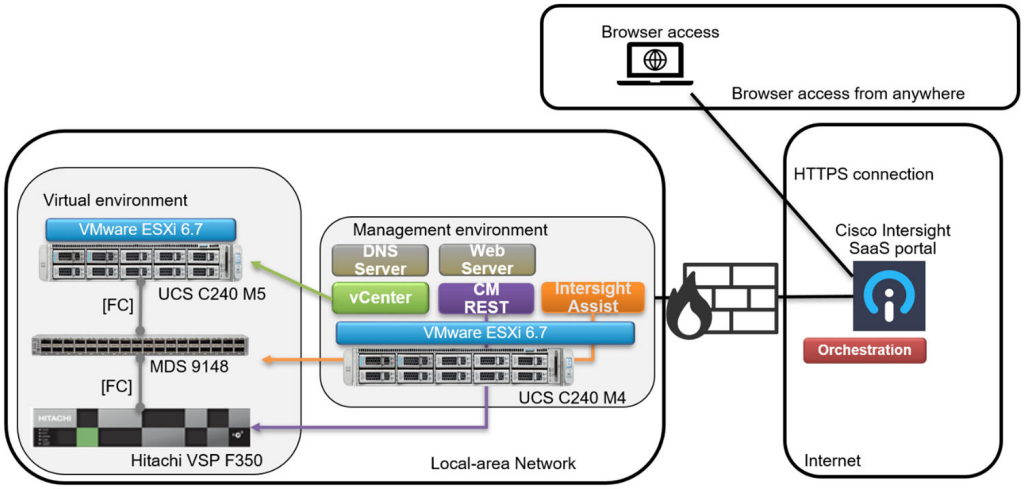
Logical configuration and application integration

This validation uses various Cisco products as well as a Hitachi VSP F350 and VMware vCenter. To operate and manage non-Cisco products such as VSP and vCenter from Intersight, an Intersight Assist must be configured in the DC. Also, in order to use the Intersight Orchestration function for VSP and vCenter, it is necessary to install a vCenter Server Appliance (VCSA) and the Hitachi Configuration Manager REST API Server (CM REST server), as shown in the following table.

Table 5 Management components needed in combination with Intersight

#	Purpose	Required components
1	Management and operation of ESXi and VMs	Intersight Assist, vCSA
2	Management and operation of the VSP F350	Intersight Assist, CM REST Server
3	Management and configuration of the SAN fabric environment	Intersight Assist, NX-OS

The VSP F350 and vCenter shown in the following figure perform configuration change orders from Intersight through the CM REST Server or VCSA, respectively, depending on the Intersight Orchestration function's purpose. For information on how to create the Intersight Workflow used in this validation, see Create an Intersight Workflow (on page 19).



The following table shows version information for each component used in this validation. An Intersight Premier license is required to perform Orchestration functions on a VSP. See the Intersight Help Center for details regarding the Intersight licensing scheme.

Table 6 Validation component version information

#	Component	Version
1	Intersight	—
2	CM REST	10.5.0-00
3	vCenter	6.7
4	ESXi	6.7
5	Web Server	—
6	DNS	—
7	OVA	RHEL 7.6

Validation results

This section provides the validation results for each scenario, demonstrating the speed and efficiency gains when using Intersight integrated with VSP storage.

Scenario 1: Setting up a virtual environment

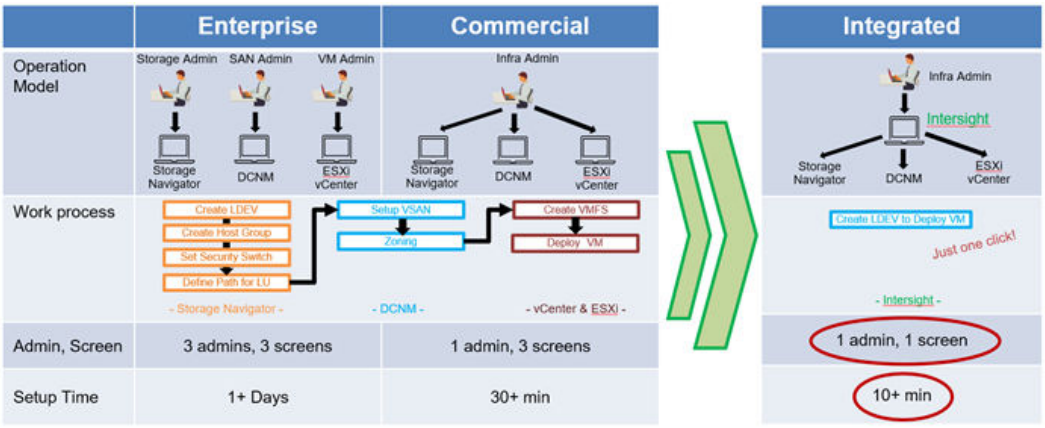
When using a conventional operations management method, a virtual environment is created using different management software for each component - server, storage, and networking equipment. In this case, the total time from configuring the VSP to deploying the VM using vCenter takes 18 minutes, as shown in the following table. The operation management of large-scale systems often involves separate administrators for each type of infrastructure. This requires communication and a handover between administrators, and setting up a new environment can take from a few hours to even days. On the other hand, using an integrated management method with Intersight and its Orchestration function enables you to automate the process from the creation of logical volumes on the VSP to the deployment of VMs. In this case, the whole process from setting input parameters to the completion of VM deployment can be done in five minutes. Thus, the integrated management method using Intersight enables you to reduce the operation time by 13 minutes compared to the conventional operations management method. In a DevOps environment, an operation such as setting up a virtual environment occurs several times per day. Assuming a virtual environment is created twice a day, applying the integrated management method using Intersight reduces the workload by roughly 100 hours per year.

As for the number of screens required, with the conventional operations management method, each type of management software tends to increase the number of input and configuration screens because it is possible to configure detailed aspects of the equipment. Therefore, up to 16 screens are needed when creating a virtual environment with the conventional method. In addition, for operations using multiple infrastructure components, such as setting up a virtual environment, it is necessary to keep information, such as logical volume number and Initiator WWN, obtained in one step for re-use in a later step. On the other hand, the integrated management method using Intersight enables you to set up a virtual environment using a single screen using a single Workflow created in advance. Therefore, it is not necessary for the infrastructure administrator to keep and re-use configuration details, thus reducing the workload.

Table 7 Validation results for setting up a virtual environment (Intersight vs Conventional)

#	Evaluation parameter	Integrated management using Intersight	Conventional method (vCenter/VSP/ MDS)
1	Operating time	Total: ~ 5 minutes	VSP configuration: ~11 minutes MDS configuration(NX-OS): ~ 2 minutes VM tasks (vCenter): ~ 5 minutes

#	Evaluation parameter	Integrated management using Intersight	Conventional method (vCenter/VSP/ MDS)
			Total: ~18 minutes
2	Number of screens	1 screen	16 screens



Scenario 2: Expanding a datastore

To increase the capacity of the VMFS used to store the virtual environment data, the capacity of the logical volumes in VSP must be extended, and then the VMFS capacity must be adjusted to match the increased capacity on the VSP. Under the conventional operations management method, the infrastructure administrator performs the VMFS capacity expansion using different management software for the server and the VSP. As shown in the following table, it takes 4 minutes for the VSP operation and 2 minutes for the vCenter operation, for a total of 6 minutes. On the other hand, the integrated management scheme using Intersight can reduce this time by half.

Similar to the previous operation to set up a virtual environment, it is possible to create a Workflow in advance and use the Workflow to perform the VMFS extensions. Using Intersight, it is again possible to use a single operation screen and reduce the workload for the administrator.

Table 8 Validation results for datastore expansion (Intersight vs Conventional)

#	Evaluation parameters	Integrated Management using Intersight	Conventional Method (vCenter/VSP)
1	Operating time	3 minutes	▪ VSP tasks: 4 minutes ▪ vCenter tasks: 2 minutes ▪ Total: 6 minute
2	Number of screens	1 screen	7 Screens

Scenario 3: Cloning the data

To clone the data of a virtual environment, it is necessary to create a new volume for the clone in the VSP and then clone the data. Using the conventional operations management method, these operations take 12 minutes, as shown in the following table. On the other hand, using the integrated management method with Intersight, this can be accomplished in 1 minute and 15 seconds. The creation a of virtual environment is reduced by 13 minutes, and data cloning is reduced by 10 minutes and 45 seconds.

As for the number of operating screens, with the conventional operation management method it takes eight screens to create data clones. This is because the VSP management software is designed around mission-critical systems and enables infrastructure administrators to accurately select detailed input parameters, involving multiple confirmation screens.

There are use cases in a DevOps environment where developers and infrastructure administrators create data clones from a production environment as part of the build, test, and delivery cycle. In this case, it is important to be able to create data clones easily and quickly. Using Intersight, it is possible to hide the expertise required to operate the VSP and the complexity of the management software within the Workflow. To create a data clone, it is sufficient to specify the logical volume of the source and the capacity of the target logical volume. Therefore, the number of operation screens and the operation time can be greatly reduced.

Again, in a DevOps environment, developers and infrastructure administrators perform data cloning operations several times per day. Assuming a development process that requires data cloning twice a day, an integrated management method using Intersight in combination with a VSP storage system can save approximately 90 hours per year.

Intersight provides a default task called "Copy Hitachi Volume" to create data clones. The combination of Intersight and Hitachi Virtual Storage Platform (VSP) can provide tremendous value when there is a need to clone data quickly.

Table 9 Validation results for data cloning operation (Intersight vs Conventional)

#	Evaluation parameters	Integrated management using Intersight	Conventional method (vCenter/VSP)
1	Operating time	1 minute 15 seconds	VSP tasks: 12 minutes Total: 12 minutes
2	Number of screens	1 screen	8 screens

Note: Data cloning using Intersight is only possible with the VSP series. Data cloning using Intersight with third-party storage is not supported.

Conclusion

Intersight is an integrated operations management platform that is not only for UCS servers, but also other non-Cisco infrastructure devices that include VSP storage systems. It enables you to understand the information of infrastructure equipment from a single dashboard, and you can set up and change environment configurations, thus eliminating the silos caused by conventional operations management methods. With Intersight management the following is realized:

- Intersight Workflows reduce the complexity of operations and improve agility. When an Intersight Workflow is created in advance, you can run the same operation repeatedly by initiating the Workflow.
- Multiple operation screens can be eliminated as required by conventional operations management methods, and the operations burden is reduced.
- Less specialized team members can repeatedly run workflows once they have been created and verified by an experienced administrator.

With the help of three scenarios related to the creation of a virtual environment and subsequent configuration changes, this white paper validated and compared the integrated management method using Intersight with the conventional operations management method. Two aspects, "Operation Time" and "Number of management software operation screens" were used as criteria for the evaluation. Here are the main observations of the validation:

- The integrated management method using the automation functionality of Intersight can significantly reduce the time required to perform these operations compared with the conventional operations management method.
- Assuming operations where virtual environments are built or data is cloned twice a day, it is possible to save about 100 hours per year building virtual environments, and about 90 hours per year when cloning data.
- The integrated management method with Intersight Workflows enables using a single screen, and the number of operations screens can be reduced by about 80% compared to the conventional operations management method.

Note that cloning is a unique feature when using a combination of Intersight and VSP, and Intersight does not support cloning with storage from other vendors. As a result, the combination of Intersight and VSP provides new value beyond regular DC operations, as it enables developers in a DevOps environment to easily clone data themselves without depending on infrastructure administrators.

Therefore, the integrated management method using Intersight is a solution that can reduce the operating burden and simplify operations management by reducing the number of operating screens required by infrastructure administrators.

Implementing Intersight

This section describes the procedures for implementing Intersight.

Remote connection to infrastructure equipment using Intersight

This section describes how to use Intersight to access infrastructure devices remotely.

Note:

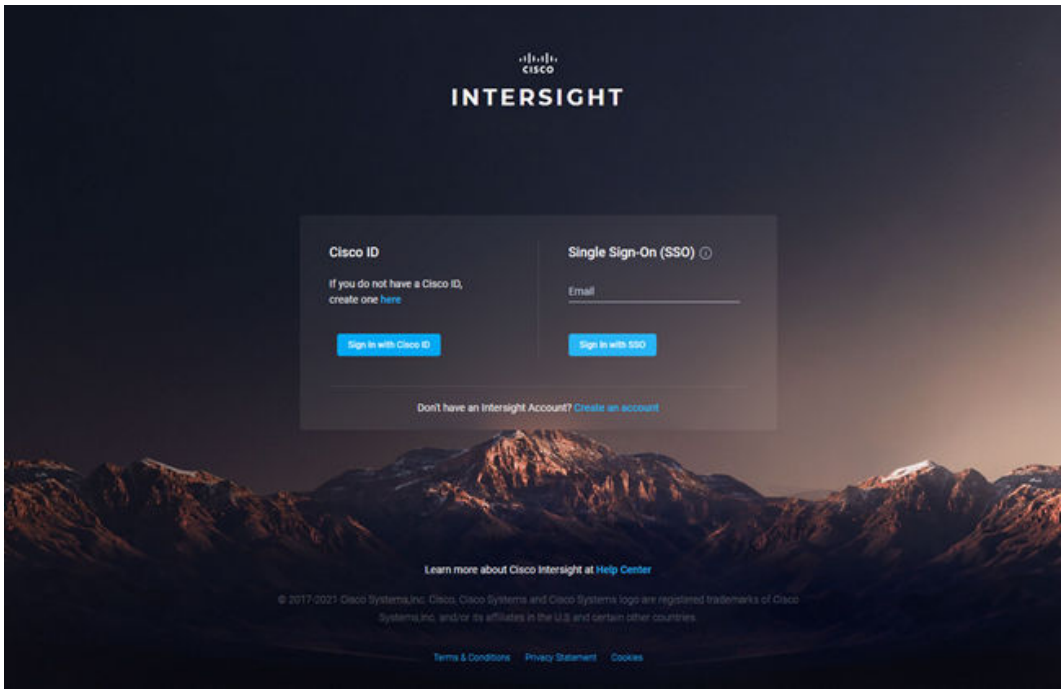
- To access Intersight, a sign-in either using a Cisco ID or a Single Sign-on (SSO) is required. For this solution, a Cisco account was created and the Cisco ID used to sign in.
- As a prerequisite, infrastructure equipment must be registered in Intersight in advance. See Intersight Help Center for information on how to register your infrastructure equipment.

See Integration Hitachi Virtual Storage Platform with Cisco Intersight for information on how to register a VSP with Intersight.

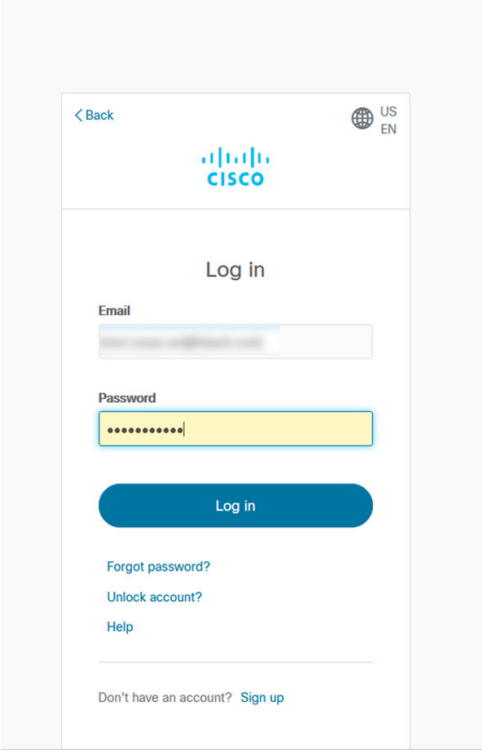
Procedure

1. Access https://intersight.com/

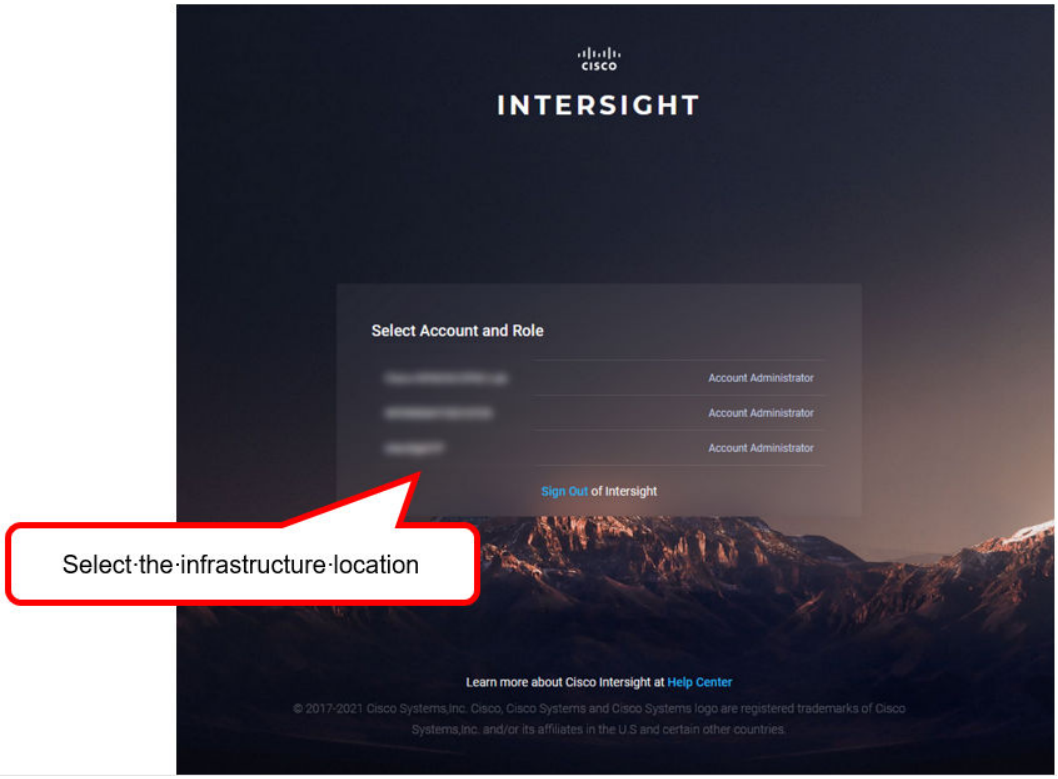
   When the login screen is displayed, select **Sign In with Cisco ID**.



2. Log in by entering your pre-registered Cisco ID (email address, password).



3. Intersight enables you to manage equipment at multiple locations. In that case, select the appropriate infrastructure that you want to work with from **Select Account and Role**.



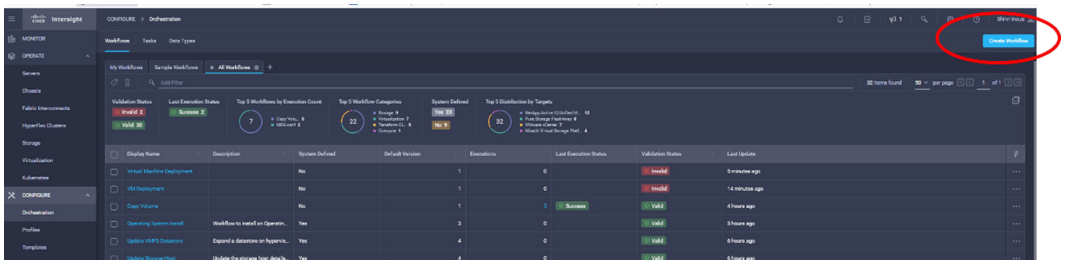
Note: To use the Intersight Orchestration function, you must configure Intersight Assist.

Create an Intersight Workflow

This section explains how to create a Workflow using the Intersight Workflow Designer.

Procedure

1. Select **Orchestration** from the Intersight dashboard. After you transition to the Orchestration screen, the **Create Workflow** button appears in the upper right corner of the screen. Click this button to create a new Workflow.



2. Enter an appropriate name in the **Display name** field.
3. A flowchart appears on the Workflow Designer screen, which enables you to select Tasks, Workflows, and Operations from the tools list on the left-hand side of the screen. Drag and drop any of these items onto the flowchart as needed.

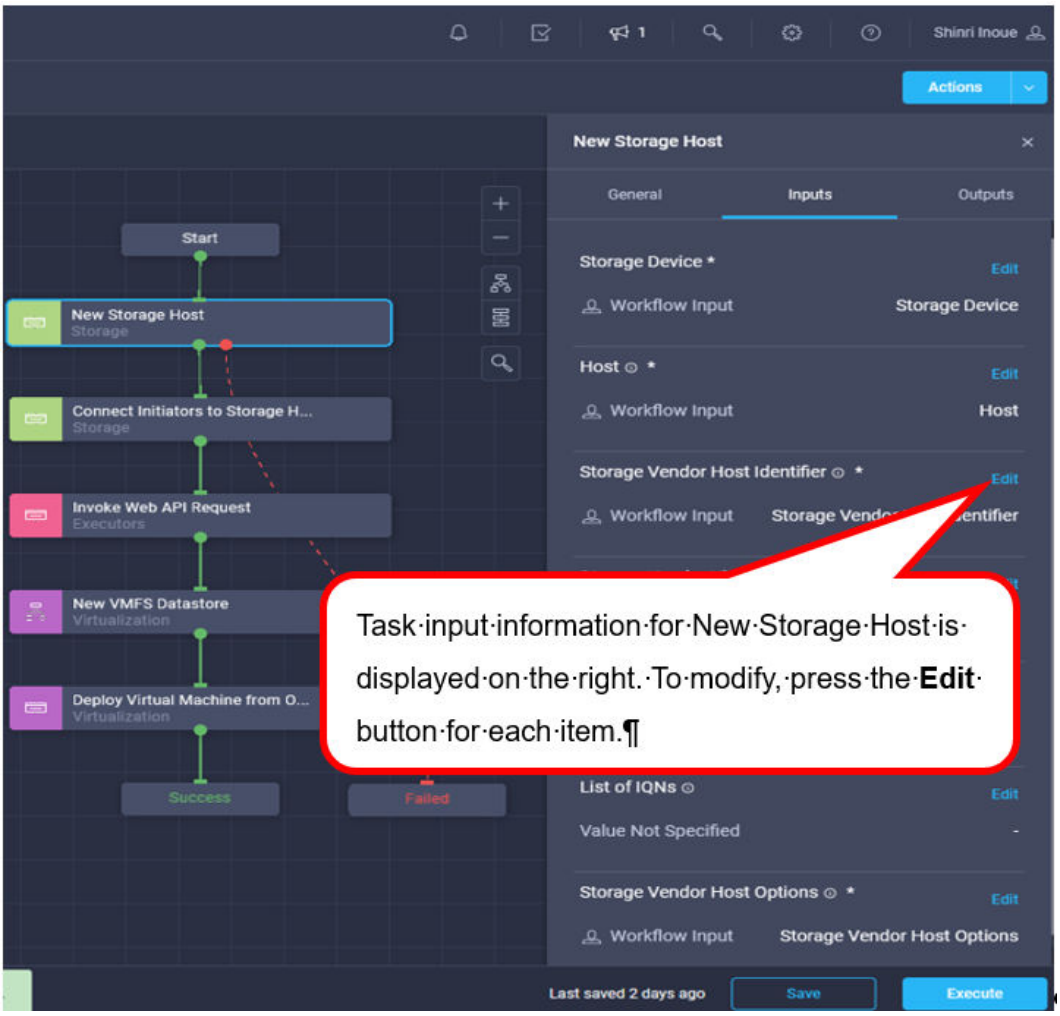
Table 10 Components used to build the workflow used for this validation

#	Component name	Classification	
1	New Storage Host	Tasks	
2	Connection Initiator to Storage Host	Tasks	
3	Invoke Web API Request	Tasks	
4	New VMFS Datastore	Workflows	
5	Deploy Virtual Machine from OVA or OVF	Tasks	

New Storage Host configuration

Procedure

1. Click **New Storage Host** and select the **Inputs** tab in the Workflow Designer to see the Task details on the right-hand side of the screen.

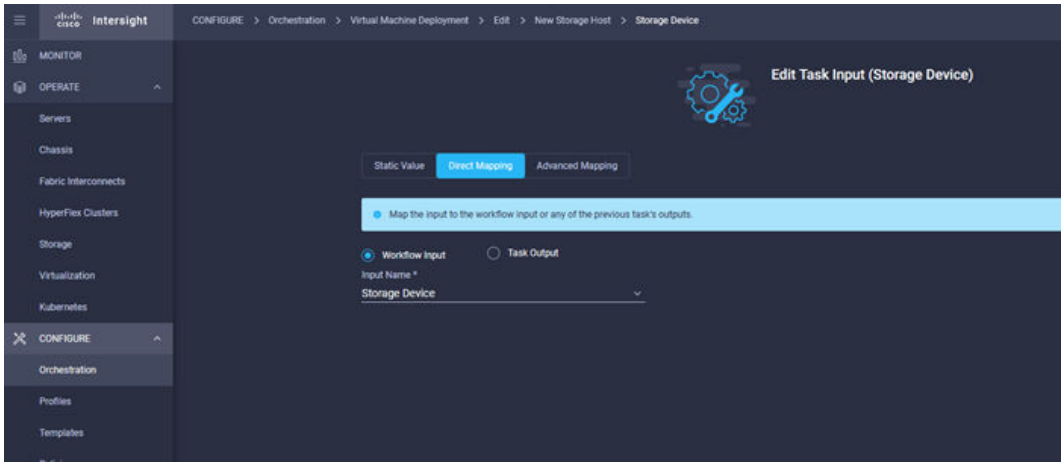


New Storage Host must be configured with the input information shown in the following table. This operation sets the required input values and the optional input values needed to achieve the operation.

Table 11 Configuration items for New Storage Host

Input information	Contents	Mandatory / Optional
Storage Device	Name of VSP to use	Mandatory
Host	The name of the Host Group (HG) to be created	Mandatory
Storage Vendor Host Identifier	Name of port used for HG	Mandatory
Storage Vendor Virtual Machine	N/A	Mandatory
List of WWNs	N/A	Optional
List of IQNs	N/A	Optional
Storage Vendor Host Options	HG options value	Mandatory

2. Storage Device settings: Click **Edit** next to Storage Device and select **Direct Mapping** > **Workflow Input**. Enter *Input Name* as the task name.



3. Host settings: Click **Edit** next to Host to transition to the edit screen. For the host settings, select **Workflow Input** from **Direct Mapping** and set **Input Name**.
4. Storage Vendor Host Identifier settings: Click **Edit** for the Storage Vendor Host Identifier to transition to the edit screen. As with the Storage Device settings, select **Workflow Input** from **Direct Mapping** and set **Input Name**.
5. Storage Vendor Virtual Machine settings: Click **Edit** for the Storage Vendor Virtual Machine to transition to the edit screen. As with the Storage Device settings, select **Workflow Input** from **Direct Mapping** and set **Input Name**.
6. List of WWNs settings: No configuration required.
7. List of IQNs settings: No configuration required.

8. Storage Vendor Host Options settings: Click **Edit** for the Storage Vendor Host Options to transition to the edit screen. As with the Storage Device settings, select **Workflow Input** from **Direct Mapping** and set **Input Name**.

Connect Initiators to Storage Host configuration

Procedure

1. Click **Connect Initiators to Storage Host** in the Workflow Designer and select the **Inputs** tab to see the task details on the right-hand side of the screen.

   The input information for **Connect Initiator to Storage Host** is shown in the following table. The input information is the same as the input information for **New Storage Host**, so configure it in the same manner.

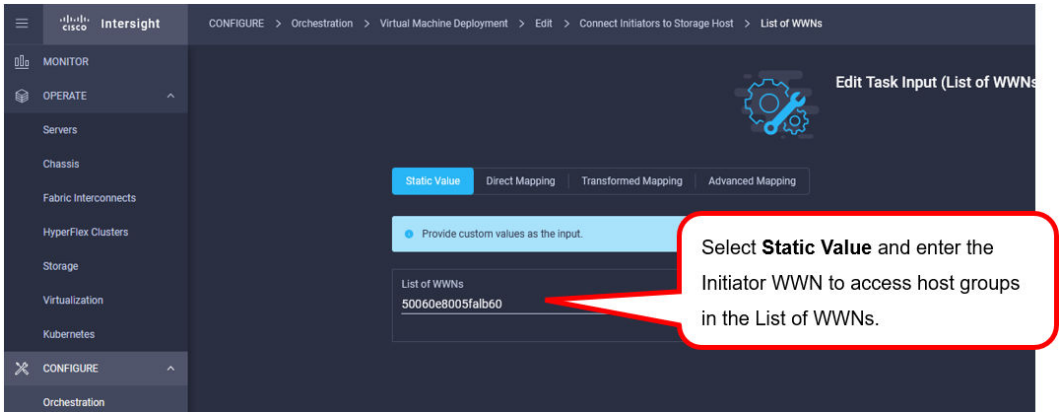
   Table 12 Configuration items for Connect Initiators to Storage Host

Input information	Contents	Mandatory/ Optional
Storage Device	Name of VSP to use	Mandatory
Host	The name of the HG to be used	Mandatory
Storage Vendor Host Identifier	Name of port used for HG	Mandatory
List of WWNs	Initiator WWN to allow access to HG	Optional
List of IQNs	N/A	Optional
Storage Vendor Virtual Machine	N/A	Mandatory

2. Setting the Storage Device: Click **Edit** on Storage Device to transition to the configuration screen. Set the input value in the same manner as the Storage Device was set in section New Storage Host configuration (on page 20). Alternatively, you can select the **Storage Device** from the drop-down menu.
3. Host setting: Click **Edit** next to **Host** to transition to the configuration screen. As for the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

   Note: This Input requires the name of the host group you created. Therefore, you can also select **Direct Mapping** or **Task Output** and enter the host information created by the **New Storage Host** procedure as an argument.

4. Storage Vendor Host Identifier: Click **Edit** for the Storage Vendor Host Identifier to transition to the edit screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and select the appropriate Storage Vendor Host Identifier from the drop-down menu.
5. List of WWNs: Click **Edit** on List of WWNs to transition to the configuration screen. Select the **Static Value** tab and enter the WWN information into the **List of WWNs** field. **Click Update**.



Invoke Web API Request configuration

Procedure

1. Click **Invoke Web API Request** in the Workflow Designer and select the **Inputs** tab to see the task details on the right-hand side of the screen.

   The input information for the **Invoke Web API Request** procedure is shown in the following table. This procedure uses these parameters to create VSANs and zoning in the MDS switch.

Table 13 Configuration items for Invoke Web API Request

Input information	Contents	Mandatory/Optional
External Target	Name of MDS switch to use	Optional
Protocol	Type of Communication protocol	Optional
Method	REST API Method	Optional
URL	URL required for REST API Request	Mandatory
Headers	N/A	Optional
Cookies	N/A	Optional
Response Type	N/A	Optional
Body	The body of the REST API	Optional
Response Parser	N/A	Optional
Outcomes	N/A	Optional

Note: In order to parse the response values of the API call, Response Parser and Outcomes are needed, but the corresponding parameters are not set in this example. To analyze the response value, configure these values as needed.

2. External Target: Click **Edit** next to External Target to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
3. Protocol: Click **Edit** next to Protocol to transition to the configuration screen. Select **Static Value**, choose **HTTPS** from the pull-down for Protocol, and click **Update**.
4. Method: Click **Edit** next to Method to transition to the configuration screen. Select **Static Value**, choose **POST** in the Method field, and click Update.
5. URL: Click **Edit** next to URL to move to the configuration screen. Select **Static Value** and choose **/ins** in the URL field and click **Update**.

   Note: The URL used to access the REST API of the MDS switch must include */ins*. For more information, see the Cisco MDS Programing Guide.
6. Headers: No configuration required.
7. Cookies: No configuration required.
8. Response Type: No configuration required.
9. Body: Click **Edit** next to Body to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

   See Register an MDS switch in Intersight (on page 29) for instructions on how to create the JSON content that you enter in the Body field when running the workflow.
10. Response Parser: This example does not parse the response value, so this field is left blank. When parsing the response value, set as needed.
11. Outcomes: This example does not parse the response value, so this field is left blank. When parsing the response value, set as needed.

New VMFS Datastore configuration

Procedure

1. Click **New VMFS Datastore** in the Workflow Designer and select the **Inputs** tab to see the task details on the right-hand side of the screen.

   The input information for **New VMFS Datastore** is shown in the following table. This input information is the same as the input information for the New Storage Host, so you should configure it in the same manner as the New Storage Host configuration procedure.

Table 14 Configuration items for New VMFS Datastore

Input information	Contents	Mandatory/ Optional
Storage Device	Name of VSP to use	Mandatory
Storage Vendor Virtual Machine	-	Mandatory
Storage Vendor Aggregate	Name of the logical volume to be created on the VSP	Mandatory

Input information	Contents	Mandatory/ Optional
Storage Vendor Host Option	Host Mode for HG	Mandatory
Volume Capacity	Capacity of logical volume to be created	Mandatory
Storage Host	Name of the HG to be created	Optional
Storage Vendor Host Identifier	Name of port used for HG	Mandatory
Storage Host Group	N/A	Optional
LUN Prefix	LUN prefix for logical volumes to be created	Mandatory
LUN Number	LUN number of the logical volume to be created	Optional
LUN Capacity	The capacity of logical volume to be created	Mandatory
Operating System	OS type used for logical volume to be created	Mandatory
Hypervisor Manager	vCenter to be used	Mandatory
Datacenter	Datacenter name to use	Mandatory
Cluster	Cluster name to use	Optional
Host	Name of ESXi instance to use	Optional
Datastore Name	Name of the datastore to create	Mandatory
Datastore Type	Create VMFS format type (for example VMFS-5, VMFS-6).	Mandatory

2. Setting the Storage Device: Click **Edit** next to **Storage Device** to transition to the configuration screen. In the same manner as for Storage Device in section Connect Initiators to Storage Host configuration (on page 22), select **Workflow Input** and choose **Storage Device** from the pull-down menu.
3. Storage Vendor Virtual Machine: No configuration required.
4. Storage Vendor Aggregate: Click **Edit** next to **Storage Vendor Aggregate** to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
5. Storage Vendor Host Option: Click **Edit** next to **Storage Vendor Host Option** to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

6. Volume Capacity: Click **Edit** next to **Volume Capacity** to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
7. Storage Host: Click **Edit** next to **Storage Host** to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
8. Storage Vendor Host Identifier: Click **Edit** next to **Storage Vendor Host Identifier** to transition to the configuration screen. As with the Storage Device configuration, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
9. Storage Host Group: No configuration required.
10. LUN Prefix: Click **Edit** next to **LUN Prefix** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
11. LUN Number: Click **Edit** next to **LUN Number** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
12. LUN Capacity: Click **Edit** next to **LUN Capacity** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
13. Operating System: Click **Edit** next to **Operating System** to transition to the configuration screen. Select **Static Value** and select **Operating System** > **VMware** and click **Update**.
14. Hypervisor Manager: Click **Edit** next to **Hypervisor Manager** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
15. Datacenter: Click **Edit** next to **Datacenter** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
16. Cluster: Click **Edit** next to **Cluster** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
17. Host: Click **Edit** next to **Host** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

    Note: For New VMFS Datastore, the Host field is used to specify the ESXi instance to use. Be careful not to confuse it with the Host field in the New Storage Host task, where it refers to the Host Group information.

18. Datastore Name: Click **Edit** next to **Datastore Name** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
19. Datastore Type: Click **Edit** next to **Datastore Type** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

    Note: To set VMFS-6 at all times, select **Static Value** and select **VMFS-6** from the pull-down in the **Datastore Type** column and click **Update**.

Deploy virtual machines from an OVA or OVF

Procedure

1. Click **Deploy Virtual Machine from OVA or OVF** in the Workflow Designer and select the **Inputs** tab to see the task details on the right-hand side of the screen.

   The input information for **Deploy Virtual Machine from OVA or OVF** is shown in the following table. This input information is the same as the input information for the New Storage Host, so you should configure it in the same manner.

   Table 15 Configuration items for Deploy Virtual Machine from OVA or OVF

Input information	Contents	Mandatory/ Optional
Hypervisor Manager	Name of the vCenter to use	Mandatory
Datacenter	Name of the Datacenter to use	Optional
Cluster	Name of the Cluster to use	Optional
Host	Name of ESXi instance to use	Optional
Datastore	Name of the datastore to use	Mandatory
Folder	N/A	Optional
Resource Pool	N/A	Optional
Image URL	Specify the URL of the Image file (OVA file) to use	Mandatory
Virtual Machine	Name of new VM to be registered with ESXi	Optional
CPUs	Number of virtual CPU cores for new VM	Optional
Memory	Virtual memory capacity for the new VM	Optional
Power On	Information on whether to Power On a new VM after it is created	Optional
OVA Environment Spec	N/A	Optional

2. Hypervisor Manager: Click **Edit** next to **Hypervisor Manager** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
3. Datacenter: Click **Edit** next to **Datacenter** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
4. Cluster: Click **Edit** next to **Cluster** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

5. Host: Click **Edit** next to **Host** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

   For Deploy Virtual Machine from OVA or OVF, the Host field is used to specify the ESXi instance to use. Be careful not to confuse with the Host field in the New Storage Host task, where it refers to the Host Group information.
6. Datastore: Click **Edit** next to **Datastore** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
7. Folder: No configuration required.
8. Resource Pool: No configuration required.
9. Image URL: Click **Edit** next to **Image URL** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
10. Virtual Machine: Click **Edit** next to **Virtual Machine** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
11. CPUs: Click **Edit** next to **CPUs** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
12. Memory: Click **Edit** next to **Memory** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.
13. Power On: Click **Edit** next to **Power On** to transition to the configuration screen. As with the Storage Device settings, select **Direct Mapping** > **Workflow Input** and set **Input Name**.

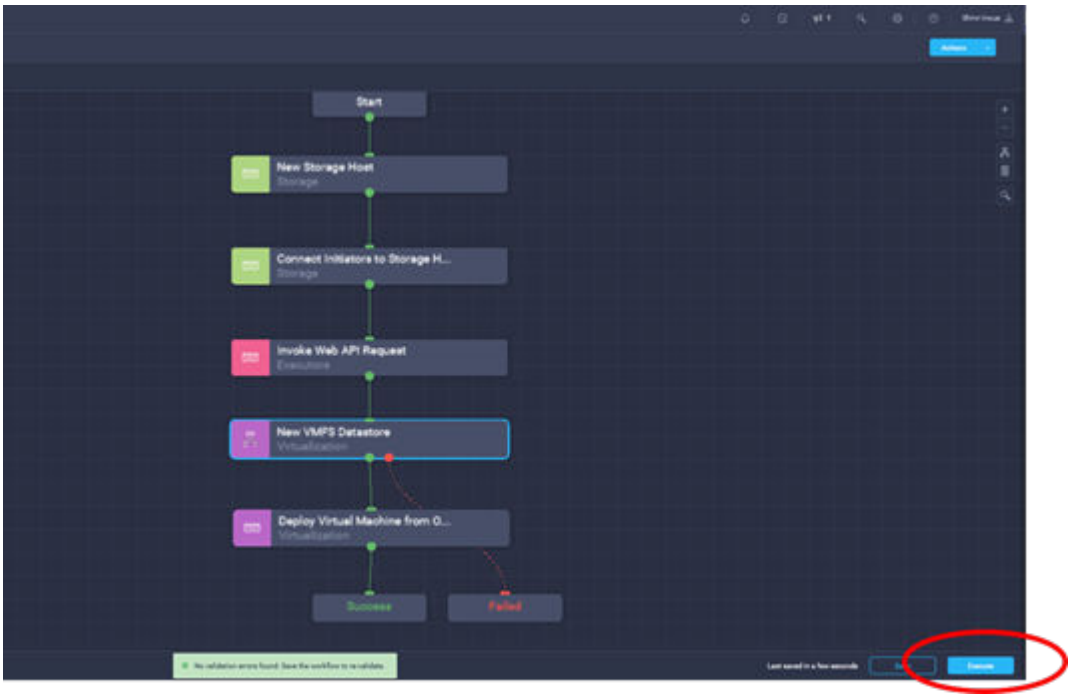
Note: If you want to always Power On newly created VMs, select Static Value and check Power On.

Intersight Workflow

This section explains how to run the previously created Workflow.

Procedure

1. Choose **Orchestration** from the Intersight main screen.
2. Click **Execute**.



3. Select **Default** from the organization pull-down.
4. Enter appropriate contents for each input field.

Register an MDS switch in Intersight

This section describes how to register an MDS switch in Intersight to prepare for configuration steps using the Invoke Web API Request tasks.

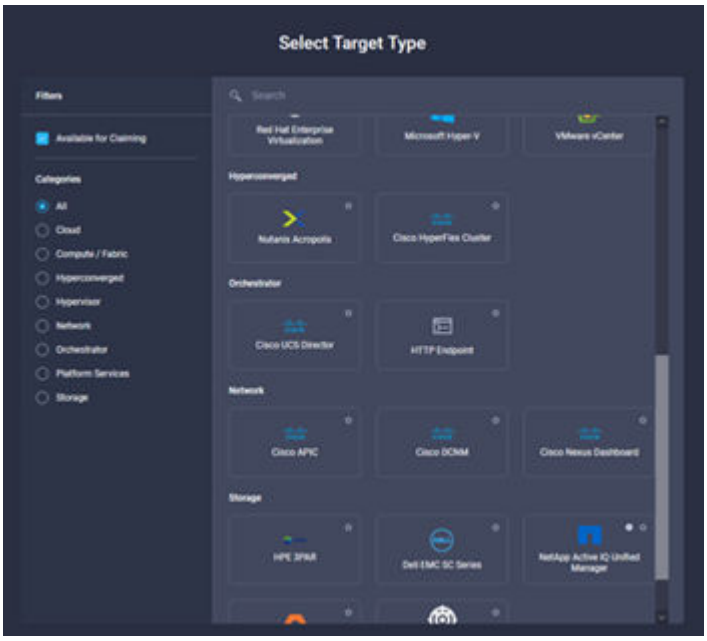
Procedure

1. Install Intersight Assist and connect with Intersight.
   Refer to Intersight Help Center for installation instructions.
2. On the MDS switch, enter the following commands to activate NX-API and HTTPS.

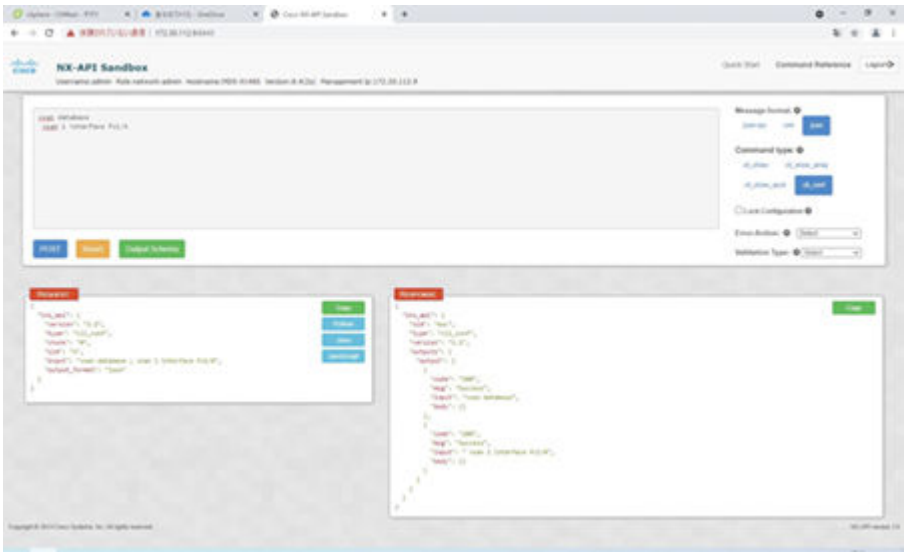
```
# configure terminal
# feature nxapi
# nxapi https port 8443
```

   Click **Claim Target** > **Targets**.

   Select **HTTP Endpoint** and register the MDS device.



3. Activate the NX-API Sandbox and convert the commands you plan to run on the MDS switch to JSON format.



Note: The MDS commands converted to JSON format are used as Body format in the Invoke Web API task.

References

1. Cisco and Hitachi Adaptive Solutions

   https://www.hitachivantara.com/en-us/pdf/white-paper/converged-infrastructure-powering-data-driven-enterprise-whitepaper.pdf

2. Cisco Intersight

   https://www.cisco.com/c/en/us/products/cloud-systems-management/cloud-operations/index.html

3. Cisco Intersight Help Center

   https://intersight.com/help

4. Integration Hitachi Virtual Storage Platform with Cisco Intersight

   https://www.hitachivantara.com/en-us/pdfd/architecture-guide/integrating-virtual-storage-platform-with-cisco-intersight.pdf

5. Cisco MDS 9000 Series Programmability Guide

   https://www.cisco.com/c/en/us/td/docs/switches/datacenter/mds9000/sw/8_x/programmability/cisco_mds9000_programmability_guide_8x/nx_api.html

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