

Unified Compute Platform RS – A Turnkey OEM Co-Engineered Private Cloud Solution Powered by VMware Cloud Foundation and Hitachi Virtual Storage Platform

A Reference Architecture Design and Configuration Guide

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Revision history

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<ul style="list-style-type: none">▪ Updated the illustration in the Solution overview section.	November 2024
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A Reference Architecture Design and Configuration Guide

Executive summary

Hitachi Unified Compute Platform RS (UCP RS) is a co-engineered [Broadcom Value-Added OEM \(VAO\)](#) solution that delivers a turnkey out-of-box on-prem cloud experience, combining the scale and agility of public cloud with the security, resiliency, and performance of private cloud, across any workload types and their respective SLAs.

Use this design and configuration guide to bring up your UCP RS system, which integrates the following:

- Hitachi Unified Compute Platform RS
- VMware Cloud Foundation
- Hitachi Unified Compute Platform (UCP) Advisor
- Hitachi Virtual Storage Platform

As you demand ever-faster delivery of new business services, there is the complexity and cost of deploying and managing the technology resources to support them. While moving some workloads to the public cloud is common practice, enterprise workloads, including business-critical and mission-critical applications, are untouchable and reign supreme on-premises. Many IT departments spend almost a quarter of their time and resources evaluating and installing increasingly disparate hardware components. Furthermore, the lack of a unified management framework and the need for highly specialized individuals who can design, configure, optimize, test, and manage each component, increases your cost, complexity and risk.

Hitachi Vantara and VMware by Broadcom have collaborated to address these on-premises challenges by introducing Hitachi Unified Compute Platform RS (UCP RS), a VMware Cloud Foundation (VCF) co-engineered solution. The purpose of a VCF co-engineered solution is to bring value to our mutual customers through reduced time-to-value (TTV), reduced total cost of ownership (TCO), increased agility, and enterprise-grade security and compliance. This is achieved by aligning the UCP RS design with VCF best practices according to VCF VMware Validated Solutions (VVS) specifications, delivering Hitachi and VMware firmware and software updates within a committed release cycle while streamlining the lifecycle management experience for updating critical components, providing monitoring of these critical components across the full stack, and automating key operational tasks to maximize consistency and increase IT agility.

Our co-engineered solution helps you run all virtualized workloads and business applications. Ordered as a single quote with the full BOM (hardware + software), and with its pre-validated, pre-built, and pre-assembled stack of compute, storage, and networking components, the solution delivers a hybrid cloud environment with predictable high performance, resiliency, and reliability. Coupled with a tightly integrated software architecture that enables full-stack deployment, operations, management, orchestration, monitoring, diagnostics, support, and lifecycle management, UCP RS is the simplest and most reliable path to private cloud, transforming a traditional data center into a modernized software-defined data center without the pain of dealing with long project delays and cost overruns.

In addition, while other VCF implementations only leverage VMware vSAN as the sole software-defined storage option, Hitachi Vantara has optimized its VCF co-engineered solution by natively integrating its enterprise-grade Virtual Storage Platform (VSP) SAN storage into the management framework and across the data plane to achieve the highest level of performance and availability, and the most efficient capacity utilization. This unique differentiator provides the flexibility of using the right storage platform for each individual workload being deployed in your hybrid cloud, to meet your business needs and service level objectives (SLOs).

Finally, our Global Support and Services team provides comprehensive support for Full Stack software and hardware under the umbrella of One Support.

Solution overview

Gone are the days of just having DIY private clouds with multi-tier Lego blocks plagued with inconsistencies and project delays. Hitachi Unified Compute Platform RS (UCP RS) is a true turnkey “Co-Engineered” on-prem cloud solution, delivering an unprecedented out-of-box cloud experience, combining the scale and agility of public cloud with the security, resiliency, and performance of private cloud.

This solution integrates VMware Cloud Foundation (VCF) with Hitachi infrastructure and Hitachi software. At the heart lies Hitachi Unified Compute Platform Advisor, which provides unified and federated management of compute, network, and storage devices. Hitachi UCP Advisor seamlessly integrates software and hardware infrastructure life cycle automation and observability.

UCP Advisor with VMware SDDC Manager automates provisioning, management, and lifecycle management of software and hardware across Intel/AMD compute, Broadcom/Cisco networking, Nvidia GPUs and supported Hitachi Virtual Storage Platform (VSP) models, on Hitachi Unified Compute Platform RS. Provisioning new VMFS datastores from VSP is as easily and as quickly done as using a vSAN datastore, because UCP Advisor is able to manage Fibre Channel fabrics and host groups, and the VSP storage resources.

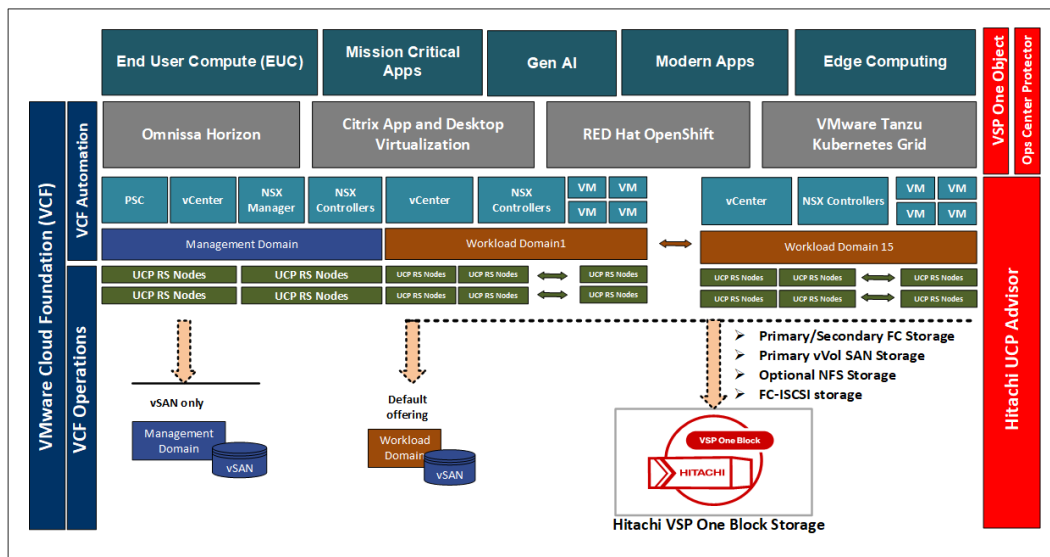
When dealing with large scale automation, this solution manages vSphere and Kubernetes clusters reliably within workload domains hosting thousands of virtual machines, and containers powering current and modern workloads. This is achieved through the [UCP Advisor REST API](#), the [SDDC Manager API](#), and the use of the VMware APIs for Storage Awareness (VASA, with supported VSP models. Hitachi Storage (VASA) Provider for VMware vCenter, or Hitachi VASA Provider, enables software-defined storage integration into the VMware Storage Policy-Based Management (SPBM) framework, to automate VM storage placement. In addition, SDDC Manager integrates with the Hitachi VASA Provider and can create vVols datastore as part of workload domain creation. Integration like this enables seamless vVols integration into VCF delivering a cohesive vSAN, VMFS/FC, and vVols user experience.

Hitachi Unified Compute Platform RS

Hitachi Unified Compute Platform RS has automation that enables the deployment of an entire cloud infrastructure in hours, not weeks or months, accelerating the time to value with a rapid and repeatable deployment process across all of your datacenter sites. Once deployed, the co-engineered and integrated management plane provides the following automated, policy-based IT operations:

- Move your workload across data centers to meet changing business needs.
- Manage your applications across private and public cloud from a common toolset to simplify operations.
- Scale your data center without increasing IT headcount.
- Automate your data center with policies to run IT at the speed of your business.
- Automate software-defined storage deployment with both VMware vSAN and Hitachi VSP.
- Automate software-defined networking deployment with VMware NSX.

The following figure shows the combination of Hitachi Unified Compute Platform RS with VMware Cloud Foundation.



Solution benefits

Hitachi Unified Compute Platform RS provides the following advancements and benefits:

- Deploy private cloud on top of advanced Hitachi Unified Compute Platform Hyperconverged and SAN-attached Converged compute clusters, available with a wide range of CPU, memory, and drive configurations to meet your workload needs, provide flexibility, and simplify growth.
- Accelerate time to market.
- Lower total cost of ownership.
- Increased security with tight integration into vSphere Lifecycle Manager (vLCM) to ensure that the latest firmware for EFI and IO Cards are consistently applied, alongside latest drivers and ESXi patch binaries, to reduce the risk of cyberattacks.
- Enhanced Data Protection capabilities using VMware Site Recovery Manager (SRM) with Hitachi Universal Replicator and TrueCopy (UR/TC) on Hitachi VSP storage, enabling disaster recovery automation between two sites with a Recovery Point Objective (RPO) below 5 minutes (VMware Live Recovery Protected VM add-on subscription required for SRM).
- Enhanced High Availability with Hitachi VSP global-active device for enterprise-grade stretched clusters between two metropolitan-spanned datacenters running UCP RS.
- Optimal Multiple Availability Domain topology via 3-datacenter (3DC) multi-site protection when combining global-active device across a pair of metro-clustered UCP RS sites with UR/TC on a third site hosting another UCP RS.
- Enhanced Ransomware Recovery with Hitachi VSP immutable snapshots and Hitachi Thin Image Advanced (available on VSP One Block storage options), and using VMware Live Recovery's Ransomware Recovery and Cloud Disaster Recovery features (VMware Live Recovery Capacity add-on subscription required).
- Future-proof your infrastructure to run any application on virtualized, cloud native, or artificial intelligence or machine learning workloads.
- Support external SAN storage on Hitachi Virtual Storage Platform.
- Have complete end-to-end management, including compute nodes, storage, and networking, with Hitachi Unified Compute Platform Advisor.
- Optimize performance and eliminate over-provisioning costs with a highly configurable and integrated infrastructure.
- Support high availability and reliability with enterprise-class hardware components and preconfigured resilient architectures.
- Achieve data resilience and scalability using VMware vSAN and the industry-leading Hitachi Virtual Storage Platform with hybrid and all-flash arrays.

Hitachi Unified Compute Platform Advisor provides end-to-end management with the following benefits:

- Upgrade the compute BIOS and upgrade the BMC and component (NIC, HBA, and controller) firmware by an automatic process.
- Provision compute nodes, storage, Ethernet, and Fibre Channel switches from a single, unified management interface for federated system management.
- Upgrade your switch configuration, management settings, and firmware.
- Integrate with VMware products, such as VMware vRealize Orchestration and VMware vRealize Log Insight, manage a multi-site VMware infrastructure, and link multiple VMware vCenter Server installations.
- Provision and manage external storage.

Solution components

These are the key hardware and software components used in the Hitachi Unified Compute Platform RS solution with VMware Cloud Foundation.

Hardware components

These are the key hardware components that this solution uses.

Compute

Hitachi Unified Compute Platform RS server Family	Chassis	Hitachi Unified Compute Platform Server Model	Cache	Capacity
Hitachi Unified Compute Platform RS Server DS120 series	1U	Hitachi Advanced Server DS120 (hybrid)	SATA SSD	SAS HDD
		Hitachi Advanced Server DS120 (all flash)	NVMe, SATA	SATA SSD
Hitachi Unified Compute Platform RS Server DS220 series	2U	Hitachi Advanced Server DS220 (hybrid)	SATA SSD	SAS III
		Hitachi Advanced Server DS220 (all flash)	Optane, NVME	SAS SSD, NVME
Hitachi Unified Compute Platform RS HA800 series	1U	Hitachi Advanced Server HA805 G3	SAS	SATA

Hitachi Unified Compute Platform RS server Family	Chassis	Hitachi Unified Compute Platform Server Model	Cache	Capacity
	1U	Hitachi Advanced Server HA810 G3	SAS, SATA, NVME	SAS, SATA, NVME
	1U	Hitachi Advanced Server HA815 G3	NVME	NVME
Hitachi Unified Compute HA800 series	2U	Hitachi Advanced Server HA820 G3	SAS, SATA, NVME	SAS, SATA, NVME
	2U	Hitachi Advanced Server HA825 G3	NVME	NVME

See the following links for the latest updated Hitachi Unified Compute Platform RS Ready node details.

- [VMware Compatibility Guide - vsanosa](#)
- [VMware Compatibility Guide - vsanesa](#)

Available Fibre Channel SAN storage options

- Hitachi Virtual Storage Platform One Block (VSP One Block 24, VSP One Block 26, VSP One Block 28)
- Hitachi Virtual Storage Platform 5000 series
- Hitachi Virtual Storage Platform E1090 series

Hitachi Virtual Storage Platform

[Hitachi Virtual Storage Platform](#) is a highly scalable, true enterprise-class storage system that can virtualize external storage and provide virtual partitioning and quality of service for diverse workload consolidation. With the industry's only 100 percent data availability guarantee, Virtual Storage Platform delivers the highest uptime and flexibility for your block-level storage needs.

Hitachi Virtual Storage Platform can be integrated with VMware Cloud Foundation with the following options:

- Management Workload Domain + vSAN (Hitachi offered storage can be added as required as external storage).
- VI Workload Domain + Hitachi offered storage (using Fibre Channel, iSCSI, FC-NVMe, NFS, vVols) / vSAN.



Note: For more information about configuring storage for iSCSI and FC-NVMe, see [Appendix A: Configure iSCSI \(on page 57\)](#) and [Appendix B: Configure NVMe over Fabrics in a Fibre Channel environment \(on page 58\)](#).

It can even go further, using Virtual Storage Platform as the principal datastore if the workload domain is not the same as the management domain. VMware Cloud Foundation mandates the use of VMware vSAN for the management domain.

Unified Compute Platform RS is the only VAO co-engineered solution that supports natively Fibre Channel, iSCSI, and NVMeoFC SAN storage with the built-in Virtual Storage Platform (VSP), thanks to our tight integration into VMware Aria, Storage Policy based Management (SPBM), vSphere Lifecycle Manager (vLCM), VMware Site Recovery Manager (SRM), and vCenter. Notably, UCP Advisor greatly simplifies storage operations tasks by automating the workflows to connect vSphere cluster nodes from a given VCF Workload Domain to Hitachi VSP storage (such as a VMFS-FC datastore), while also handling Brocade G620/720 Fibre Channel switch configuration tasks such as FC Zoning to ensure proper data path isolation from other workload domains and ensure best practices for IO multi-pathing! UCP Advisor will guide you in the process to carve out the LUNs from the VSP and present them to the proper UCP RS compute nodes (grouped as vSphere DRS cluster) in the respective workload domain.

While you can technically present the LUNs to all available hosts in the Hitachi Unified Compute Platform RS environment, Fibre Channel storage connectivity is not typical for the hosts in the management domain. Access to Hitachi Virtual Storage Platform using Fibre Channel is the main use case for virtual infrastructure workload domains and VMware Horizon virtual machines.

The following table shows supported Fibre Channel SAN storage with Hitachi Virtual Storage Platform on Hitachi Unified Compute Platform RS.

Storage	Direct Connect	Dedicated	Sold With UCP RS
Hitachi Virtual Storage Platform One Block	Yes	Yes	Yes
Hitachi Virtual Storage Platform 5000 series	Yes	Yes	Yes
Hitachi Virtual Storage Platform E1090 series	Yes	Yes	Yes

Hitachi Virtual Storage Platform One Block

Hitachi Virtual Storage Platform One Block is a high-performance storage solution designed for enterprises. It combines robust features with scalability and reliability. Hitachi Virtual Storage Platform One Block streamlines data management, reduces carbon emissions, and makes everything clear. It simplifies data in the cloud era. Hitachi Virtual Storage Platform One Block exclusively combines a common data plane, a common control plane and now a common data fabric for applications to consume on one platform.

The legendary reliability of Hitachi Vantara products for mission-critical, enterprise-class workloads is made possible by patented technologies, including global-active device for active-active clustering across storage in two distant locations, ensuring continuous data availability even during catastrophic events.

Hitachi Virtual Storage Platform Thin Image Advanced snapshots create instant point-in-time copies for data protection, application testing, and data mining. Thin Image Advanced snapshots store only the changed data, so the storage capacity required for each snapshot copy is significantly reduced. Thin Image Advanced eliminates threat exposure with always-available copies of production data and actively defends structured data against ransomware.

Hitachi Virtual Storage Platform supports Adaptive Data Reduction (ADR), which increases effective capacity without slowing storage performance. VSP One Block continuously analyzes data during writes and selects and switches between real-time and deferred processing for data reduction.

Hitachi Virtual Storage Platform 5000 Series

Hitachi Virtual Storage Platform 5000 series provides high performance, high availability, and reliability for enterprise-class data centers and features the industry's most comprehensive suite of local and remote data protection capabilities, including true active-active metro-clustering. When combined with server virtualization, storage virtualization supports applications at cloud scale while reducing complexity.

Hitachi Virtual Storage Platform 5000 series is the first storage in the industry to offer a mixed NVMe, SCM solid-state disk (SSD), serial-attached SCSI (SAS) SSD, and HDD environment that can not only scale up in capacity but also scale out for performance. Hitachi Virtual Storage Platform 5000 series models include the industry leading Hitachi Virtual Storage Platform 5100 and Hitachi Virtual Storage Platform 5500 models and the newest Hitachi Virtual Storage Platform 5200 and Hitachi Virtual Storage Platform 5600 models.

Hitachi Virtual Storage Platform E1090 series

The Hitachi Virtual Storage Platform E1090 (VSP E1090) storage system is a high-performance, large-capacity data storage system. The VSP E1090 all-flash arrays (AFAs) support NVMe and SAS solid-state drives (SSDs). The VSP E1090H hybrid models can be configured with both SSDs and hard disk drives (HDDs).

The hybrid architecture allows for greater scalability and provides data-in-place migration support. The storage systems offer superior performance, resiliency, and agility, featuring response times as low as 41 μ s, all backed up with the industry's first and most comprehensive 100% data availability guarantee.

The Hitachi Virtual Storage Platform E series innovative active-active controller architecture protects your business against local faults while mitigating performance issues as well as providing all enterprise features of the VSP 5000 series in a lower cost form factor to satisfy midrange customer needs and business requirements.

Network switches

All listed leaf, spine, and management switches in this solution can be replaced by any other VMware vSphere-supported network switches from vendors such as Cisco, Arista, and Extreme.

This design guide is not to maximum scale, but it is well-balanced for a typical enterprise-scale deployment. The choice of switch models is based on a scale of five racks, each containing 32 dual-ported 10 Gbps NICs on Hitachi Unified Compute Platform RS. Network speed, inter-rack bandwidth, maximum node per rack, and maximum number of racks may differ with the leaf and spine switch models and the required port configuration.

You can select alternative switches to create a well-balanced building block as described in the following selection. Also, the building blocks can be expanded to more racks so there are more compute nodes by using larger spine switches with more ports and bandwidth. There is no limit to how many racks you can have and nodes that can be supported from a hardware perspective. Hitachi Unified Compute Platform RS is only limited by VMware maximum specifications. See <https://docs.vmware.com/en/VMware-Cloud-Foundation/index.html> to learn more about VMware Cloud Foundation.

- Cisco Nexus switches

The Cisco Nexus switch product line provides a series of solutions that make it easier to connect and manage disparate data center resources with software-defined networking (SDN). Leveraging the Cisco Unified Fabric, which unifies storage, data, and networking (Ethernet/IP) services, the Nexus switches create an open, programmable network foundation built to support a virtualized data center environment.

The following network switches are used in the UCP RS solution:

- Nexus 92348GC (1 G Mgmt) management switch
- Cisco Nexus 93180YC-FX (10/25G) Leaf Switch
- Cisco Nexus 9332C (100G) Spine Switch
- Cisco Nexus 93180YC-FX3 (10/25G) Leaf Switch
- Cisco Nexus 93600GC (100G) Spine Switch
- Cisco Nexus 93600CD-GX (100G) Spine 10/25G or Leaf 100G Switch
- Cisco Nexus 9316D-GX (400G) Spine Switch
- Cisco Nexus 93180YC-FX3H (10/25G) Leaf Switch

- Brocade switches from Broadcom

Brocade and Hitachi Vantara have partnered to deliver storage networking and data center solutions. These solutions reduce complexity and cost, as well as enable virtualization and cloud computing to increase business agility.

Brocade Fibre Channel switches deliver industry-leading performance with seventh generation 64 Gbps Fibre Channel interfaces, simplifying scale-out network architectures. Get the high-performance, availability, ease of management, and support for the next generation of Hitachi Virtual Storage Platform storage systems on a solid storage network foundation that can grow as your needs grow.

The following storage network switches are used in the UCP RS solution:

- Brocade G620 Fibre Channel SAN Switches
- Brocade G720 Fibre Channel SAN Switches

Software components

These are the key software components used in this environment.

Use VMware Cloud Foundation to deploy and run a private cloud on top of Hitachi Unified Compute Platform hyperconverged solution with VMware vSAN. It provides an integrated cloud infrastructure (compute, storage, networking and security) and cloud management service to run enterprise applications in private and public cloud environments.

See <https://docs.vmware.com/en/VMware-Cloud-Foundation/index.html> to learn more about VMware Cloud Foundation.

The following table shows the UCP RS software stack and versions which includes VCF and UCP Advisor.

Software Component	Version	Build Number
VMware Cloud Builder	5.1	22688368
VMware SDDC Manager	5.1	22688368
VMware vCenter Appliance	8.0 Update 2a	22617221
VMware ESXi	8.0 Update 2	22380479
VMware vSAN	8.0 Update 1	22443122
VMware NSX	4.1.2.1	22667789
VMware Aria Suite	8.14	22630473
Hitachi Unified Compute Platform Advisor	4.6.0	-

See the following for the latest software and hardware versions of Hitachi UCP RS co-engineered solution.

[Hitachi Unified Compute Platform RS for VMware Interoperability Matrix](#)

VMware Cloud Foundation

VMware Cloud Foundation streamlines infrastructure management, accelerates business outcomes, and provides a robust foundation for both traditional and modern applications across private and public environments.

VMware Cloud Foundation components

VMware Cloud Foundation delivers a natively integrated software-defined data center stack that includes the core infrastructure virtualization, vSphere, vSAN and NSX. Here are some key components of VMware Cloud Foundation:

- VMware Cloud Builder: VMware Cloud Builder automates the deployment of the Management domain in VCF.
- SDDC Manager: SDDC Manager is the automation engine that orchestrates all the software-defined data center infrastructure components. It handles tasks like deployment, configuration, and lifecycle management (LCM) of vCenter, NSX, and Aria. It unifies multiple clusters as multiple Workload Domains.

- vSphere: vSphere uses virtualization to transform individual data centers into aggregated computing infrastructures that include CPU, storage, and networking resources. VMware vSphere manages these infrastructures as a unified operating environment and provides you with the tools to administer the data centers that participate in that environment.
- vSAN: Aggregates local data storage devices to create a shared storage pool across all hosts in the vSAN cluster, simplifying storage configuration and virtual machine provisioning. Using vSAN removes the need for external shared storage and simplifies storage configuration and virtual machine provisioning.
- vSAN Witness Appliance: The vSAN Witness Appliance serves as a witness host. Unlike a general-purpose ESXi host, it doesn't run virtual machines. Its sole purpose is to support vSAN by storing metadata in case of site failures and acting as a tiebreaker.
- NSX: NSX is focused on providing networking, security, automation, and operational simplicity for emerging application frameworks and architectures.
- VMware Aria Suite: VMware Aria Suite Lifecycle simplifies the deployment, management, and upgrade of VMware Aria Suite products. It provides content lifecycle management, license usage metering, and best practice alignment for Aria Suite users.

See the VCF5.1 Release Notes at [VMware Cloud Foundation 5.1 Release Notes](#) for a list of relevant components included in the BOM for additional information.

Introducing vSAN ESA with VMware Cloud Foundation

vSAN Express Storage Architecture (ESA) is an optional, alternative architecture within VMware vSAN. It is designed to achieve new levels of efficiency, scalability, and performance. The ESA is optimized to exploit the full potential of the very latest in hardware and unlocks new capabilities. Storage policy-based data compression offers up to 4x better compression ratios per 4KB data block than the vSAN OSA. It leverages high-performing NVMe storage devices certified for use with ESA. vSAN ESA is capable of simplified management, and smaller failure domains by removing the construct of disk groups. vSAN ESA enhances storage capabilities within VCF, offering better performance and scalability.

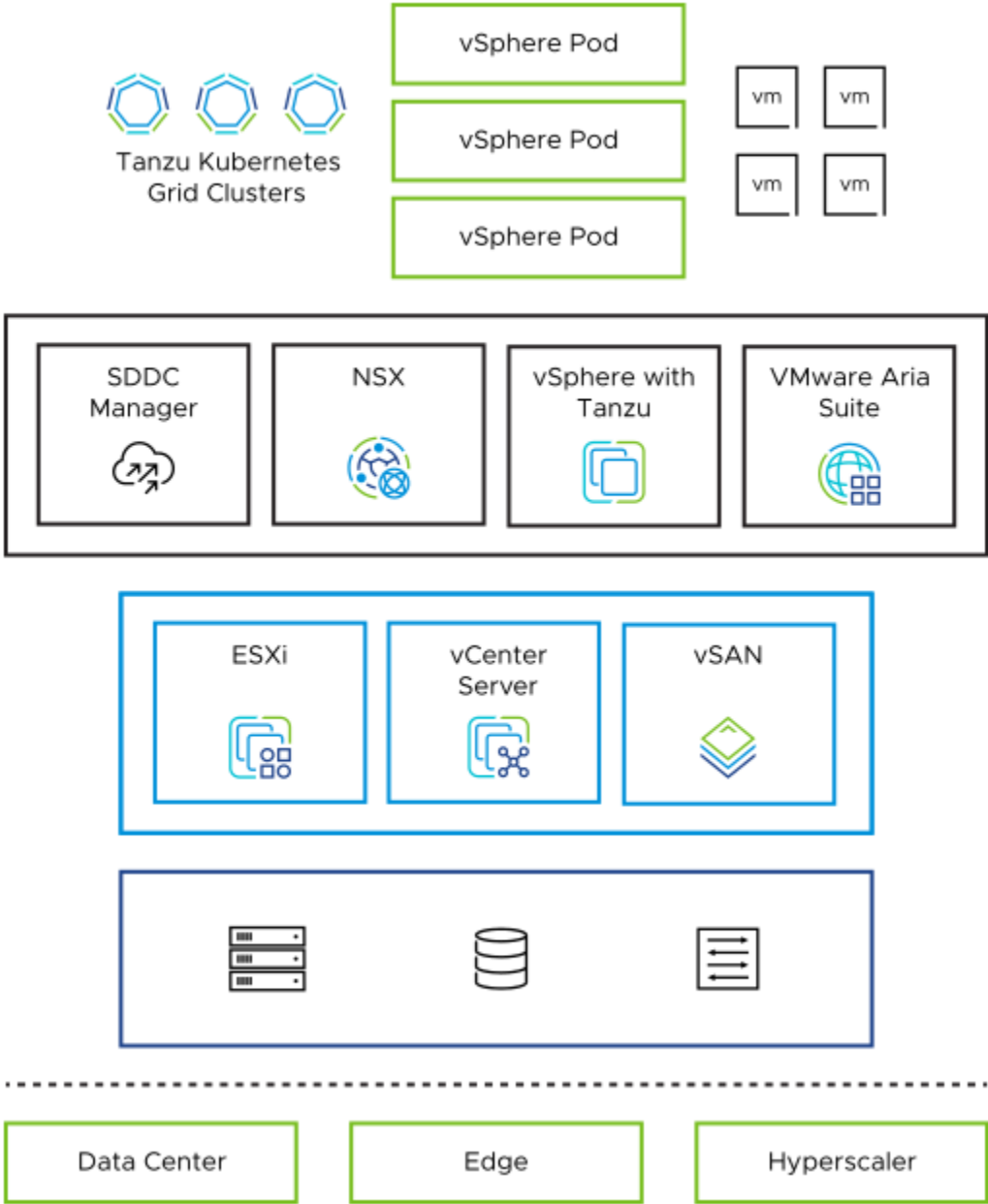
VMware Cloud Foundation Workload Domains

Both Management Workload Domain and VI Workload Domains are logical units within the VMware Cloud Foundation system that organizes compute, network, and storage resources.

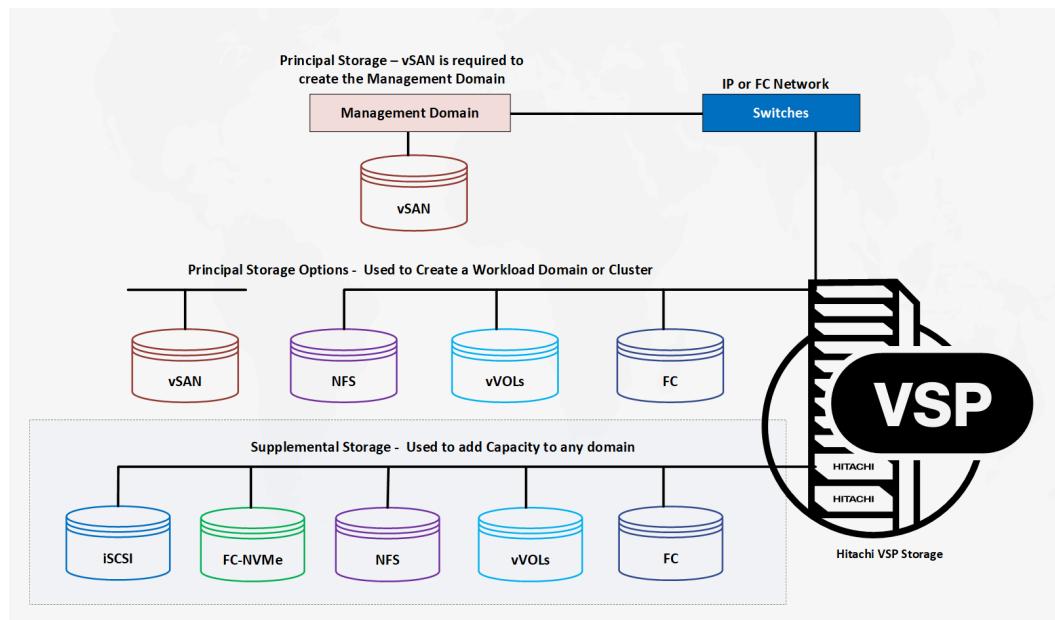
Management Workload Domains handle essential services, while VI Workload Domains distribute resources for specific workloads. They are isolated for security and flexibility. Management WLDs are isolated from VI Workload Domains, ensuring granular security and management options.

VI Workload Domains distribute resources for specific workloads within VMware Cloud Foundation. VI Workload Domains allow flexible resource allocation and workload isolation such as different storage options like vSAN, NFS, VMFS on Fibre Channel, or vVols storage. Each VI Workload Domain has its own vCenter Server, separate from the management Workload Domain. VI Workload Domains can share an existing NSX Manager cluster or deploy a new one, based on update methods (vLCM images or baselines).

The following figure shows the standard architecture of VMware Cloud Foundation.



The following figure shows the storage options for VMware Cloud Foundation Workload Domains.



Hitachi Unified Compute Platform Advisor

Hitachi Unified Compute Platform Advisor (UCP Advisor) is a comprehensive cloud infrastructure management and automation software. It enables IT agility and simplifies Day 0-N operations for edge, core, and cloud environments. Specifically, UCP Advisor integrates with VMware vSphere Lifecycle Manager (vLCM), serving as infrastructure automation and management software for all Hitachi Converged, Hyperconverged (HCI), and Integrated Systems. This integration streamlines operations and enhances visibility across your hybrid and private cloud infrastructure.

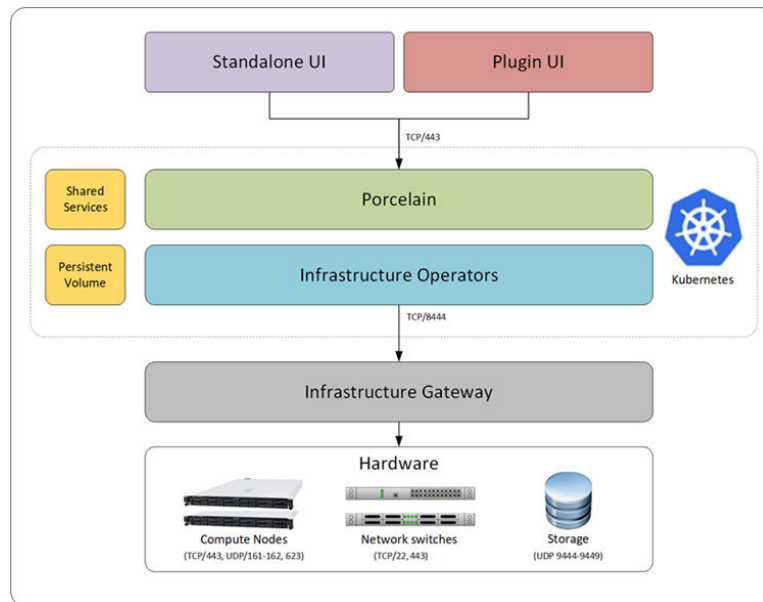
The centralized management plane enables remote, federated management for the entire portfolio of converged, hyperconverged, and storage data center infrastructure solutions to improve operational efficiency and reduce management complexity. Its intelligent automation services accelerate infrastructure deployment and configuration, significantly minimizing deployment risk and reducing provisioning time and complexity, automating hundreds of mandatory tasks.

UCP Advisor improves predictability with guided lifecycle management capabilities for the complete data center infrastructure stack, including servers and switches from Arista, Brocade, and Cisco, and non-disruptively patches and upgrades infrastructure. It provides deep integration with VMware management software, improving administrator productivity with intuitive and intelligent operations and automation. It complements VMware Aria suite software to further streamline the administration and automation of software-defined data center (SDDC).

Automated workflows deliver IT agility using UCP Advisor REST APIs and VMware Aria Operations and when used with VMware Aria Automation, enable self-services multi-cloud environments. It provides comprehensive visibility and monitoring of the infrastructure for collective insight into health and operational efficiency. It automates network configuration operations and system monitoring including generating reports for compliance. Customers also have direct access to all SDDC component management including Aria Suite products. UCP Advisor and the integrations with VMware Aria Operations provide rich log analytics and auditability enabling comprehensive visibility of the infrastructure for better resource planning.

Hitachi Unified Compute Platform Advisor provides a single control panel to manage crucial tasks and many other useful capabilities.

The following figure shows the architecture diagram of Hitachi Unified Compute Platform Advisor.



Single instances of Unified Compute Platform Advisor can support all VMware Cloud Foundation Workload Domains and respective underlying clusters because Unified Compute Platform Advisor can communicate with multiple VMware vCenter instances.

The key management and deployment benefits include the following:

- Provides a single management interface for all physical and virtual infrastructure resources.
- Provisions and manages physical and virtual storage.
- Manages virtual networking, including synchronization to the physical network switch.
- Deploys and manages physical compute servers.
- Provisions onboard storage, compute and network configuration, and imports configurations using a single file.
- Automates datastore provisioning (volume creation on storage, zoning, and HBA rescanning).
- Accomplishes complex IT operations and workflows, such as smart provisioning and data replication.
- Manages business continuity details regarding backup and data replication scenarios.
- Enables the ability to view and manage multisite VMware infrastructure and link multiple VMware vCenter Server instances in your Unified Compute Platform RS solution.

- Provides inventory of VMware vSAN, SAN, and local drive information for each compute node.
- Intelligently automates and orchestrates provisioning with Hitachi Ops Center Automator. Integration enables IT process automation and smart infrastructure provisioning capabilities. UCP Advisor leverages the available smart provisioning workflows and templates.

UCP Advisor deployment and configuration

Hitachi Unified Compute Platform Advisor uses the following virtual machines, each with different resource requirements:

- UCP Advisor controller virtual machine — the following table shows the controller virtual machine resource requirements.

Resource	Minimum Requirement
Operating system	CentOS 7.6
RAM	6 GB
CPU	2 vCPUs (default)
Disk	100 GB (thin provisioned disk)
Network	1 vNIC (connect to management VLAN VMXNET3)

- UCP Advisor Gateway virtual machine — the following table shows the gateway virtual machine resource requirements.

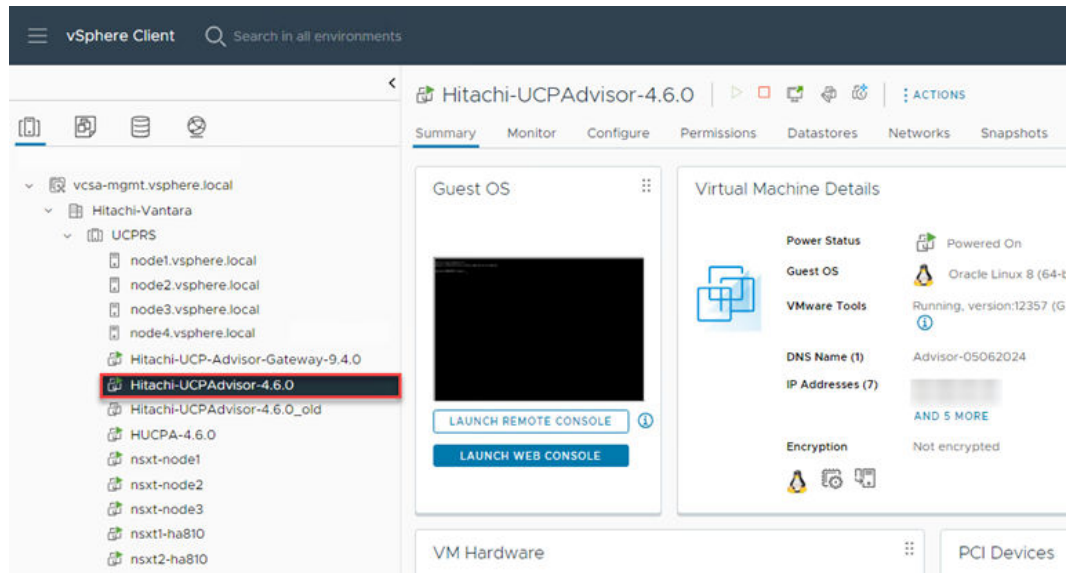
Resource	Minimum requirement
Operating system	CentOS 7.6
RAM	2 GB (default)
CPU	2 vCPUs (default)
Disk	40 GB (thin provisioned disk)
Network	1 vNIC (connect to management VLAN VMXNET3)

UCP Advisor VM deployment

Use this procedure to deploy Hitachi UCP Advisor VM in vCenter under the management cluster of a VMware Cloud Foundation Management Domain. This task is typically performed by the Hitachi Vantara field engineer, after the VCF Bring-up process is completed, and SDDC Manager is online. See [Solution deployment \(on page 35\)](#) for details.

Procedure

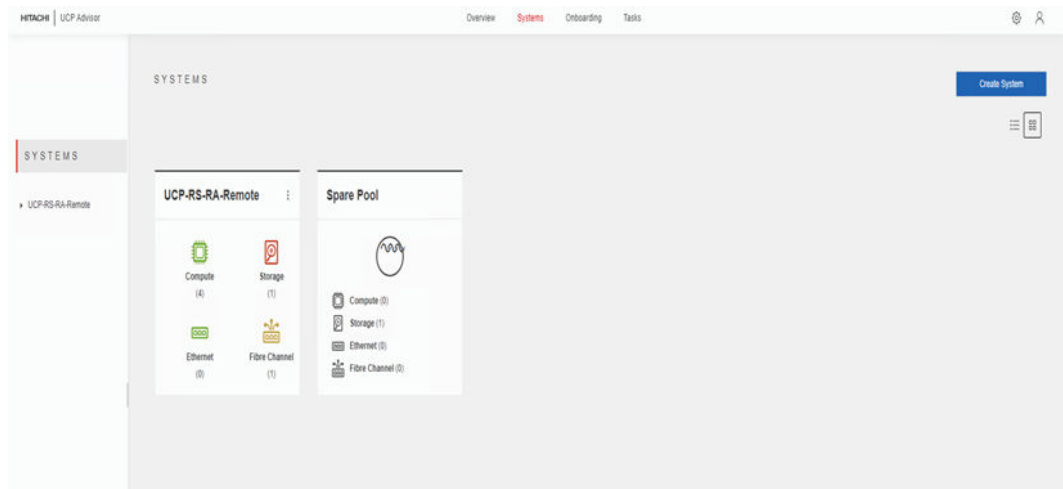
1. Deploy the Hitachi Unified Compute Platform Advisor ova.



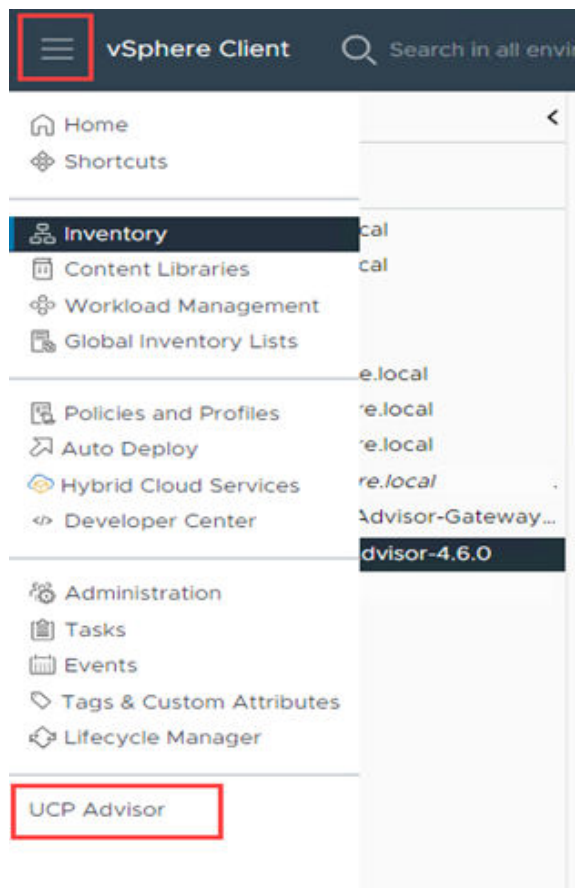
2. After the UCP Advisor VM is deployed, log in to the VM and run the installer with the specified command.

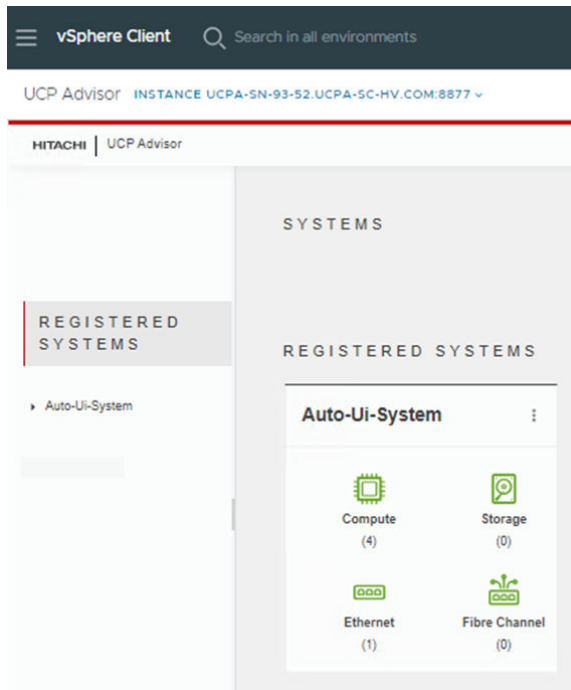
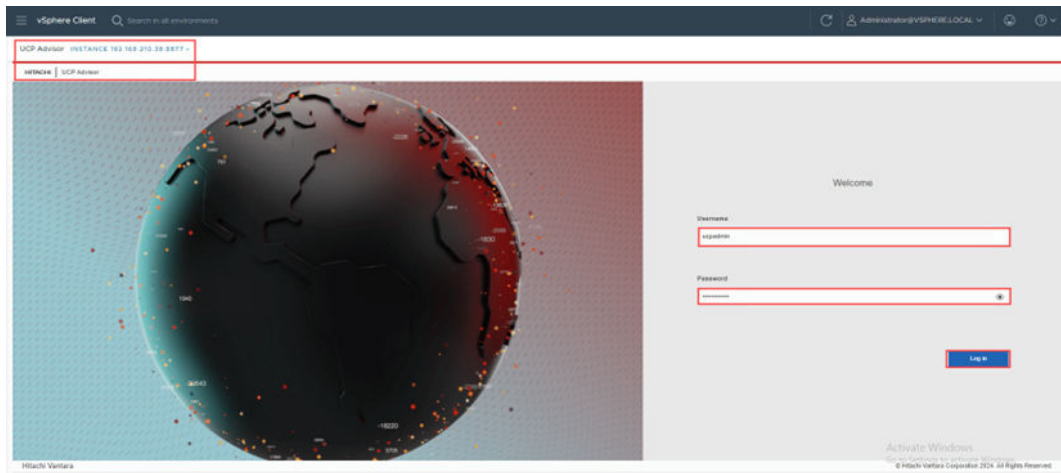
```
[ucpadmin@Hitachi-UCPAdvisor-4 installer]$
[ucpadmin@Hitachi-UCPAdvisor-4 installer]$
[ucpadmin@Hitachi-UCPAdvisor-4 installer]$
[ucpadmin@Hitachi-UCPAdvisor-4 installer]$ sudo ./installer -m 192.168.210.35 -u ucpadmin -p Hitachi2024! -s 192.168.210.36
====Step 1/2: Get information of the host====
Checking in node [192.168.210.35] with user [ucpadmin]
  Getting hostname for node 192.168.210.35
  Getting OS information for node 192.168.210.35
  Getting user information for node 192.168.210.35
  Getting time zone information for node 192.168.210.35
  Getting CPU information for node 192.168.210.35
  Getting memory information for node 192.168.210.35
  Getting disk information for node 192.168.210.35
Checking in the provided deployment configurations
====Step 2/2: Validate deployment configurations====
Validating provided deployment configurations
  Validating node count configurations
  master_nodes(192.168.210.35) have command_devices as []
  command_devices to be used are: []
  A command device has not been entered. This might be correct if there are no command devices configured.
Validating node 192.168.210.35 against deployment requirements
  Node 192.168.210.35 OS is valid
  Node 192.168.210.35 user is valid
  Node 192.168.210.35 CPU is valid
  Node 192.168.210.35 memory is valid
  Node 192.168.210.35 disk is valid
Preparing UCP Advisor installation
  Getting cluster application version of cluster 192.168.210.35
  Preparing Kubernetes cluster bootstrap
  Disabling firewall on node 192.168.210.35
  Cleaning up node 192.168.210.35: Kubernetes and UCPA
  Uploading the Kubernetes package to host 192.168.210.35
  air-gap-k8s-1.29.0.tar_ [====>] in 31s (23695995.6/s, eta: 2:03)
```

The following illustration shows the Hitachi UCP Advisor dashboard.



The following illustration shows how to log in to Hitachi Unified Compute Platform Advisor from vCenter.



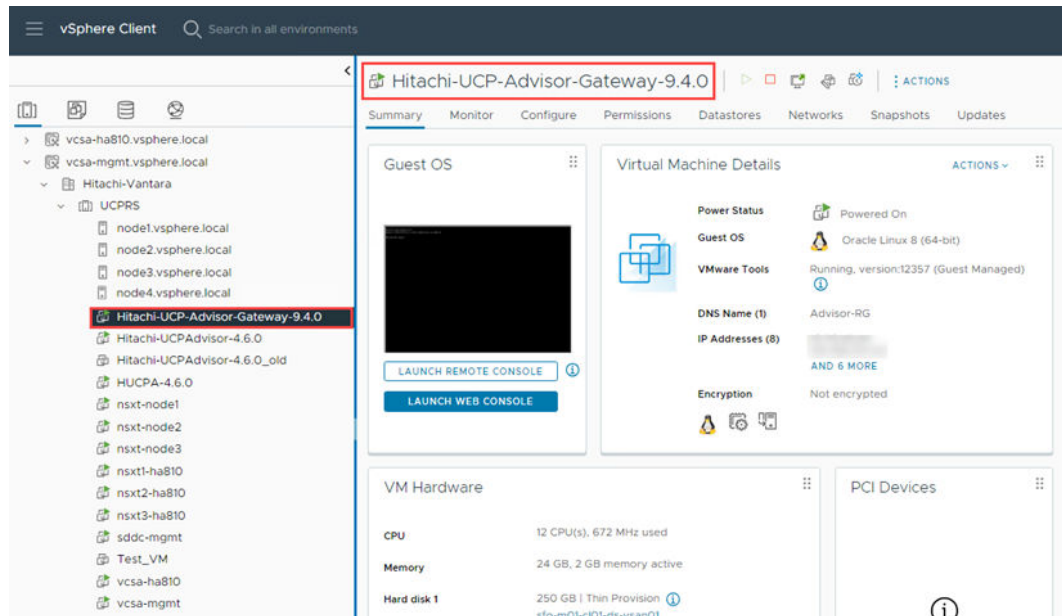


Deploy a UCP Advisor Gateway VM

Use this procedure to deploy a UCP Advisor Gateway VM.

Procedure

1. Deploy the Hitachi UCP Advisor Gateway VM using the ova file from the bundle `Hitachi-UCP-Advisor-Gateway-9.4.0.ova`.
2. Provide all the details to deploy the remote Hitachi UCP Advisor Gateway VM.



3. After Hitachi UCP Advisor Gateway VM is deployed copy the air gapped file `ucpadvisor-cpuma-air-gapped-v4.6.0.dev-666.tar.gz` provided with the bundle.
4. Untar the file and run the installer with specified command as shown.

```

ucpadmin@Advisor-RG-~/installer
installer/scripts/prep_kong_upgrade.sh
installer/scripts/trigger_refresh_conversion.sh
installer/scripts/chg_gateway_ip.sh
installer/scripts/patchvcenter.sh
installer/scripts/import_keycloak.sh
installer/scripts/export_keycloak.sh
installer/scripts/remove_roles.sh
installer/scripts/update_timezone.sh
installer/scripts/AddLdapsCertificateToKeycloak.sh
installer/yaml/
installer/yaml/_yaml.cpython-36m-x86_64-linux-gnu.so
[ucpadmin@Advisor-RG ~]$ ls -lrt
total 6050624
-rwxr-xr-x. 1 ucpadmin ucpadmin 5921 Apr 17 13:40 reset_network
-rw-rw-r--. 1 ucpadmin ucpadmin 6195823061 Jun 3 05:22 ucpadvisor-cpuma-air-gapped-v4.6.0.dev-666.tar.gz
drwxrwxr-x. 13 ucpadmin ucpadmin 4096 Jun 6 03:29 installer
[ucpadmin@Advisor-RG ~]$ cd installer/
[ucpadmin@Advisor-RG installer]$ ls -lrt
total 13648
-rwxr-xr-x. 1 ucpadmin ucpadmin 15688 Jun 9 2014 libkeyutils.so.1
-rwxr-xr-x. 1 ucpadmin ucpadmin 68192 Nov 20 2015 libbz2.so.1
-rwxr-xr-x. 1 ucpadmin ucpadmin 157424 Nov 5 2016 liblzma.so.5
-rwxr-xr-x. 1 ucpadmin ucpadmin 402384 Aug 1 2017 libpcre.so.1
-rwxr-xr-x. 1 ucpadmin ucpadmin 174576 Sep 6 2017 libcrypto.so.5
-rwxr-xr-x. 1 ucpadmin ucpadmin 285136 Aug 8 2019 libreadline.so.6
-rwxr-xr-x. 1 ucpadmin ucpadmin 32328 Mar 31 2020 libffi.so.6
-rwxr-xr-x. 1 ucpadmin ucpadmin 155744 Mar 31 2020 libselinux.so.1
-rwxr-xr-x. 1 ucpadmin ucpadmin 88720 Sep 29 2020 libgcc_s.so.1
-rwxr-xr-x. 1 ucpadmin ucpadmin 15856 Sep 30 2020 libcom_err.so.2
-rwxr-xr-x. 1 ucpadmin ucpadmin 3144192 Nov 16 2020 libpython3.6m.so.1.0
-rwxr-xr-x. 1 ucpadmin ucpadmin 90176 Feb 2 2021 libz.so.1
-rwxr-xr-x. 1 ucpadmin ucpadmin 67104 Dec 2 2021 libkrb5support.so.0
-rwxr-xr-x. 1 ucpadmin ucpadmin 967840 Dec 2 2021 libkrb5.so.3
-rwxr-xr-x. 1 ucpadmin ucpadmin 210784 Dec 2 2021 libk5crypto.so.3
-rwxr-xr-x. 1 ucpadmin ucpadmin 320720 Dec 2 2021 libksapi_krb5.so.2
-rwxr-xr-x. 1 ucpadmin ucpadmin 470328 Mar 28 2022 libssl.so.10
-rwxr-xr-x. 1 ucpadmin ucpadmin 2520920 Mar 28 2022 libcrypto.so.10
-rwxr-xr-x. 1 ucpadmin ucpadmin 173320 Mar 29 2022 libexpat.so.1
-rw-r--r--. 1 ucpadmin ucpadmin 681 Jun 1 23:57 logging.conf
-rwxr-xr-x. 1 ucpadmin ucpadmin 63088 Jun 1 23:57 libffi-d58a691e.so.8.1.0
-rwxr-xr-x. 1 ucpadmin ucpadmin 856432 Jun 1 23:57 _cffi_backend.cpython-36m-x86_64-linux-gnu.so
-rw-r--r--. 1 ucpadmin ucpadmin 3524 Jun 1 23:57 config.toml
-rw-r--r--. 1 ucpadmin ucpadmin 786953 Jun 1 23:57 base_library.zip
drwxr-xr-x. 2 ucpadmin ucpadmin 51 Jun 1 23:58 yaml
drwxr-xr-x. 2 ucpadmin ucpadmin 4096 Jun 1 23:58 scripts
drwxr-xr-x. 2 ucpadmin ucpadmin 45 Jun 1 23:58 nacl
drwxr-xr-x. 2 ucpadmin ucpadmin 4096 Jun 1 23:58 lib-dynload
-rwxr-xr-x. 1 ucpadmin ucpadmin 2831696 Jun 1 23:58 installer
drwxr-xr-x. 5 ucpadmin ucpadmin 135 Jun 1 23:58 grapheme
drwxr-xr-x. 2 ucpadmin ucpadmin 4096 Jun 1 23:58 files
drwxr-xr-x. 2 ucpadmin ucpadmin 179 Jun 1 23:58 cryptography-36.0.2.dist-info
drwxr-xr-x. 3 ucpadmin ucpadmin 20 Jun 1 23:58 cryptography
drwxr-xr-x. 2 ucpadmin ucpadmin 40 Jun 1 23:58 certifi
drwxr-xr-x. 2 ucpadmin ucpadmin 29 Jun 1 23:58 crypt
-rwxr-xr-x. 2 ucpadmin ucpadmin 4096 Jun 2 00:13 packages
[ucpadmin@Advisor-RG installer]$ sudo ./installer -m 10.76.45.44 -u ucpadmin -p Hitachi2024!

```


This is a lightweight ova compared to the Hitachi Advisor ova (the Hitachi Advisor ova is k8s and the Hitachi UCP Advisor Gateway VM is k3s).

Manage UCP systems in UCP Advisor

Overview and definition of a UCP System

A UCP System in UCP Advisor is a logical construct that maps physical hardware infrastructure to a given VCF Workload Domain, in order to group and simplify vSphere DRS cluster-level management of networking vLAN, FC SAN Zoning, FC Host Group Mapping, SW+HW Lifecycle Management, and storage provisioning tasks, ensuring complete data path and communication path isolation against other VCF Workload Domains. This provides another layer of security and privacy, that can be further augmented by also leveraging the VMware vDefend Firewall add-on or the VMware vDefend Firewall with Advanced Threat Prevention add-on for VCF, which enable granular micro-segmentation policies of complex modern applications.

Create a new UCP system and add the UCP RS compute nodes for creating a VCF Workload Domain

After UCP Advisor is installed, you can add UCP systems and onboard compute devices, storage devices, Ethernet switches, and Fibre Channel switches to the UCP system.

You must have *UCPAdminRole* permissions to perform this operation.

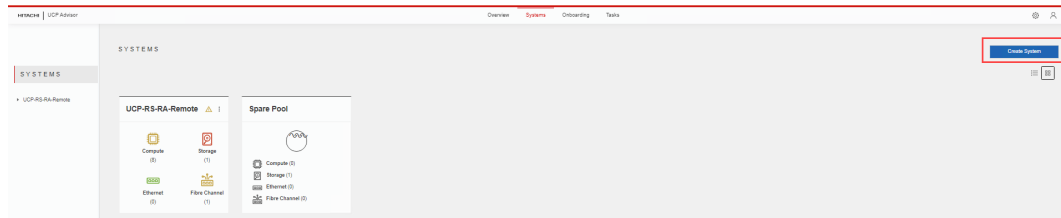
Log in to UCP Advisor as an administrator.



Note: If you are unable to log in, your username must be added to a user group that has been assigned a UCP Advisor role.

Create a UCP System in UCP Advisor

1. From the Dashboard, click Systems > Create System.



2. Enter the following:

- System Name: Enter a common name used to refer to the UCP system that you want to add.
- Model: Select a UCP system model: *UCP RS* (rack scale).
- Serial Number: Enter the serial number or descriptor ID for the UCP system.
- Infrastructure Gateway Address: Enter the IP address or host name for the UCP Advisor VM.

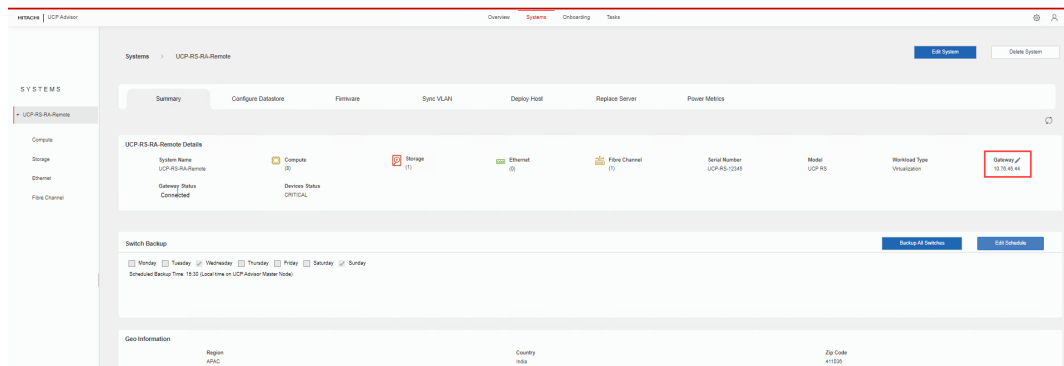


Note: If you are deploying UCP Advisor in multiple sites, then enter the IP address or host name for the UCP Advisor Gateway VM.

- Region: Select the region where the system is physically located.
 - Country: Select the country where the system is physically located.
 - Zip Code: Enter the postal zip code where the system is physically located.
3. Click Submit. You can monitor the status of the task on the Task console.
 4. Configure the Infrastructure Gateway host credentials for the new system.
 - a. Open the system you just created.
 - b. On the Summary tab, click the Infrastructure Gateway Edit icon, and then enter the Infrastructure Gateway host credentials.



Note: For a multisite deployment, enter the ucpadmin credentials for the external Gateway VM.



- c. Click Submit.

Add compute, storage and network devices to the new UCP system

Users with ucpAdminRole permissions, such as ucpadmin, can use an onboarding worksheet (CSV file) to automatically add compute nodes, storage systems, Ethernet switches, and Fibre Channel switches to a UCP system.



Note: Verify that you have ucpAdminRole permissions for the devices that you want to add.

Prepare an onboarding worksheet that specifies the configuration details for the devices and labels that you want to onboard.

In most cases, an onboarding worksheet was prepared for you during the installation process, but you can edit it or create a new one to add devices and labels, or to change the configuration. If you create your own onboarding worksheet, then ensure that the number of columns in your worksheet matches the number of columns in the sample onboarding worksheet that is included in the installation media kit.

Manually enter the connection information for the devices, and then save the worksheet as a CSV file. Verify that the device usernames have the appropriate administrator-level role and that the passwords contain only allowed characters

1. From the main menu, click Onboarding.
2. Select the UCP system where you want to add the devices.
3. Upload the onboarding worksheet with the devices that you want to add.

- a. Click Choose File, and then do one of the following:
 - Drag-and-drop the onboarding CSV file onto the Upload Files box.
 - Click the Upload Files box, and then browse to the onboarding worksheet.
 - b. Click Upload.
4. Review the onboarding worksheet information, and then click Submit.

The devices are added to the UCP system. The storage devices and the network switches are assigned to the partner. You can verify the details in the Tasks tab.

Manually add devices

You can manually add storage systems, compute nodes, and Ethernet and Fibre Channel switches, as needed, to a UCP system.

To manually add a compute node to a UCP system:

- Verify that the device user credentials are assigned administrator role: *Administrator*.
 - Verify that the IPv4 or FQDN address of the BMC and ESXi belong to the same compute node.
 - Verify that the compute node firmware is the supported version.
 - For Hitachi HA800 G3 series server models, verify that the IPMI/DCMI over LAN field under the Network section in Security - Access Settings is enabled. For additional information, see your server's user documentation.
1. Browse to the UCP system where you want to add a compute node.
 2. Select Compute > Add Compute Device
 3. Enter the following:
 - BMC Address: Enter the BMC IPv4 or FQDN address for the compute device.
 - BMC Username: Enter the BMC username for the compute device.
 - BMC Password: Enter the BMC password for the compute device.
 - ESXi Address: (Optional) Enter the ESXi host IPv4 or FQDN address for the compute device.
 - ESXi Username: (Optional) Enter the ESXi host username for the compute device.
 - ESXi Password: (Optional) Enter the ESXi host password for the compute device.
 - Management Server: (Optional) Select the Management Server option to identify the node type as *Management*. Leave it unselected to identify it as *Compute*.
 4. Click Submit.

The designated compute nodes are added to UCP System in Advisor. These compute nodes are ready to onboard the VCF environment to create new workload domains using SDDC Manager.

Add a storage system

You can manually add a storage system to a UCP system.

Verify that the device user credentials are assigned administrator role: *Administrator User Group*.

1. Browse to the UCP system where you want to add a storage system.
2. Select Storage > Add Storage Device
3. Enter the following:
 - Management Address: Enter the SVP address for the storage system.
 - Serial: Enter the serial number for the storage system.
 - Username: Enter the username identifying the user adding the storage system. The user must belong to a user group that has administrator privileges to create user accounts.
 - Password: Enter the password for the user adding the storage system. The password can have alphanumeric characters and the following symbols: hyphen (-), period (.), at mark (@), underscore (_), backslash (\), and comma (,).
4. Click Submit.

Add an Ethernet switch

You can manually add an Ethernet switch to a UCP system.

For multitenancy, the new Ethernet switch is assigned to a partner. See [Multitenancy](#) for more information.

- Verify that the device user credentials are assigned administrator role: *network-admin*.
 - For Arista switches, verify that the management SSH and API http-commands are enabled. See [Enabling Arista switch management SSH and API http commands](#).
 - For Cisco switches, verify that HTTPS protocol is enabled. See [Enabling HTTPS protocol on Cisco switches](#).
1. Browse to the UCP system where you want to add an Ethernet switch.
 2. Select Ethernet > Add Ethernet Switch.
 3. Enter the following:
 - Address: Enter the IP address for the Ethernet switch.
 - Username: Enter the username identifying the user adding the Ethernet switch. The user must belong to a user group that has administrator privileges.
 - Password: Enter the password for the user adding the Ethernet switch.
 - Management Ethernet: (Optional) Select this option if the switch you are adding is a management Ethernet switch.
 - Rack Label: (Optional) Enter a rack label for the switch.
 4. Click Submit.

Add a Fibre Channel switch

You can manually add a Fibre Channel switch to a UCP system.

For multitenancy, the new Fibre Channel switch is assigned to a partner. See [Multitenancy](#) for more information.

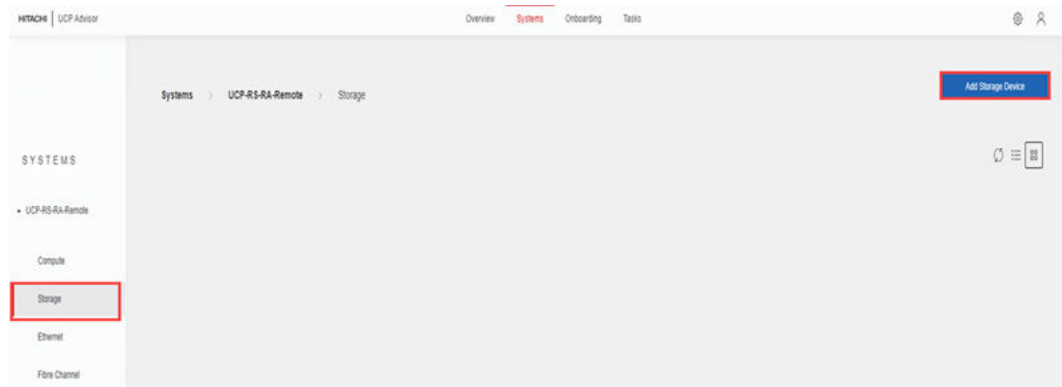
Verify that the device user credentials are assigned the administrator role: *network-admin*.

1. Browse to the UCP system where you want to add a Fibre Channel switch.
2. Select Fibre Channel > Add Fibre Channel Switch
3. Enter the following:
 - Management Address: Enter the IP address for the Fibre Channel switch being added.
 - Username: Enter the username identifying the user adding the Fibre Channel switch. The user must belong to a user group that has administrator privileges.
 - Password: Enter the password for the user adding the Fibre Channel switch.
4. Click Submit.

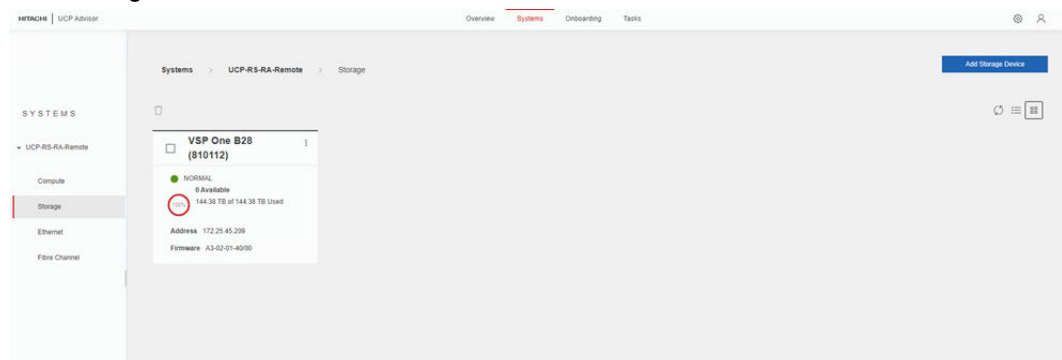
Onboard Hitachi Virtual Storage Platform One Block to Hitachi UCP Advisor

Procedure

1. Log in to Hitachi UCP Advisor and navigate to **Storage** from the dashboard.
2. Click **Add Storage Device**.



3. Provide the storage device serial number and click **Add**.
The storage device will be listed as shown.



See the latest version of the following UCP Advisor documents for more information:

Hitachi Unified Compute Platform (UCP) Advisor Software Installation Guide at [https://docs.hitachivantara.com/search/all?query=Unified+Compute+Platform+\(UCP\)+Advisor+Software+Installation+Guide&content-lang=en-US](https://docs.hitachivantara.com/search/all?query=Unified+Compute+Platform+(UCP)+Advisor+Software+Installation+Guide&content-lang=en-US)

Hitachi Unified Compute Platform (UCP) Advisor Administration Guide at [https://docs.hitachivantara.com/search/all?query=Unified+Compute+Platform+\(UCP\)+Advisor+administration+Guide&content-lang=en-US](https://docs.hitachivantara.com/search/all?query=Unified+Compute+Platform+(UCP)+Advisor+administration+Guide&content-lang=en-US)

Manage VLANs on an Ethernet switch using UCP Advisor

The currently active VLANs are shown in the VLANs list. The list is ordered by VLAN ID. You can view VLAN information, including name, status, type, and associated ports. You must manually refresh the VLAN list after adding, editing, or deleting a VLAN.

Add a VLAN to an Ethernet switch

You can add a VLAN to a Leaf-Spine switches. If you want the new VLAN to be configured on all spine and leaf switches, then you must perform the task twice by selecting one spine switch or one leaf switch at a time and check the Update Paired Switch option.

1. Browse to the **Manage** tab on the Ethernet switch where you want to add a VLAN.
2. Click **Add**, and then enter the following:
 - **Name:** (Optional) Enter a name for the VLAN.
 - **VLAN ID:** Enter the VLAN ID.
 - **Update Paired Switch:** Specify if the paired switch is to be updated.
 - **Ports:** (Optional) Select the ports to be associated with the VLAN.



Note: Ports that belong to a port channel are disabled.

3. Click **Submit**.

It might take up to five minutes for the VLAN to be added. You can monitor the status of the task on the Tasks console.

Edit a VLAN on an Ethernet switch

You can add or remove ports to or from a VLAN by editing a VLAN.

1. Browse to the **Manage** tab on the Ethernet switch where you want to edit a VLAN.
2. Click the **Actions** menu for the VLAN that you want to edit.
3. Select **Edit**.
4. Add the following options, as needed:
 - **Update Paired Switch:** Specify if the paired switch is to be updated.
 - **Ports:** (Optional) Select/deselect the ports to be added or removed to or from the VLAN.
5. Click **Submit**.



Note: Ports that belong to a port channel are disabled.

Delete a VLAN from an Ethernet switch

1. Browse to the **Manage** tab on the Ethernet switch where you want to delete a VLAN
2. Click the **Actions** menu for the VLAN that you want to delete.
3. Select **Delete**.
4. Specify whether or not you want to delete the paired VLAN. The default selection is Yes.
5. Click **Submit**.

Set a native VLAN

You can set a VLAN as the native VLAN on Ethernet switch ports.



Note: Setting and removing a native VLAN is not supported on VLAN ports belonging to a port channel. That is, this operation will ignore VLAN ports belonging to a port channel.

1. Browse to the **Manage** tab on the Ethernet switch.
2. Click the **Actions** menu for the VLAN that you want to set as native.
3. Select **Set Native VLAN**.
4. Set the **Is Native** option to Yes.
5. Click **Submit**.

Remove a native VLAN

You can remove a native VLAN on Ethernet switch ports.



Note: Setting and removing a native VLAN is not supported on VLAN ports belonging to a port channel. That is, this operation will ignore VLAN ports belonging to a port channel.

1. Browse to the **Manage** tab on the Ethernet switch.
2. Click the **Actions** menu for the VLAN that you want to unset as native.
3. Click **Set Native VLAN**.
4. Set the **Is Native** option to No.
5. Click **Submit**.
6. Click the **Refresh VLAN** icon to manually refresh the VLAN list.

Tag a VLAN to a subscriber

You can tag a VLAN to a subscriber.

Before you begin: The subscriber must be registered in UCP Advisor.

1. Browse to the **Manage** tab on the Ethernet switch where you want to tag a VLAN to a subscriber.
2. From the **Actions** menu for the VLAN that you want to tag, click **Tag Subscriber to VLAN**.

3. Select the subscriber from the **Subscriber** list and click **Submit**.



Note: You cannot tag a reserved VLAN to a subscriber.

Untag a VLAN from a subscriber

You can untag a VLAN from a subscriber.

1. Browse to the **Manage** tab on the Ethernet switch where you want to untag a VLAN from a subscriber.
2. From the **Actions** menu for the VLAN that you want to untag, click **Untag VLAN from Subscriber**.
3. Enter Untag, and click **Submit**.

Manage VLAN policies

You can create, edit, apply, and delete VLAN configuration policies for Ethernet switches.



Note: VLAN policy management requires the Advanced Edition license.

Solution design

Hitachi Unified Compute Platform RS can start as a single rack but can be extended to support multi-rack scenarios. One of the advantages of Unified Compute Platform RS is that it has no limit as to how many racks and nodes can be supported, as long as it complies with VMware maximums.

Each rack can accommodate the following:

- Up to a maximum of 32 Hitachi Unified Compute Platform HC V120 systems as compute nodes
- 2 leaf switches to provide network connectivity for all the hosts on each rack
- Spine switches to provide inter-rack connectivity and to connect the entire solution to your corporate network
- A management network on each rack to handle all out-of-band traffic

One benefit of Unified Compute Platform RS is flexibility. To cover all your requirements, it supports mixed and matched compute nodes. For example, to have separated clusters, which have more VMware vSAN capacity space besides high performance all-flash all-NVMe clusters, add a Unified Compute Platform HC hybrid system to this solution. You can leverage Hitachi Unified Compute Platform HC V225G for workload domains that require graphic resources into a Hitachi Unified Compute Platform RS solution that already contains all-flash and hybrid Hitachi Unified Compute Platform HC systems.

Another benefit of Unified Compute Platform RS is the ability to have SAN-based datastores on this solution. VMware Cloud Foundation offers VMware vSAN storage by default. By adding an HBA to Unified Compute Platform HC compute nodes, this solution seamlessly supports Hitachi Virtual Storage Platform, not only for extending storage space along with available vSAN capacity, but also offering separated storage tiers for different datastores. For example, use a vSAN datastore to keep the VMDK files containing operating systems, and use a Virtual Storage Platform datastore for mission-critical applications.

This SAN-based advantage helps you measure your storage requirements by type and size so that you have a variety of options for your underlying storage layer. You have more freedom to select the storage space you need based on the type of workload domains.

Hitachi Virtual Storage Platform offers all-NVMe, all-flash, and hybrid SAN-based datastore options to support a broad range of needs. The storage rack holds either a Virtual Storage Platform F or VSP G series system. Using Virtual Storage Platform in Hitachi Unified Compute Platform RS is optional.

From a networking perspective, two leaf switches provide network connectivity for hosts on the top of each rack. Spine switches in this solution provide inter-rack connectivity and connect the entire solution to your corporate network using uplink ports. Manage all out-of-band management traffic using a management switch on each rack.

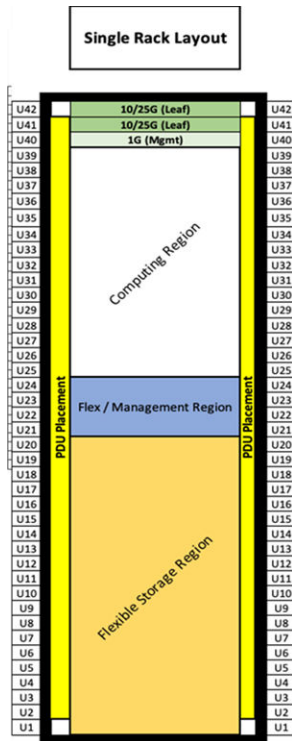
For example, in a 4+1 rack scenario, there are four compute racks plus one rack with Hitachi Virtual Storage Platform:

- The maximum number of supported compute nodes in a 4+1 rack scenario is 128 (4 × 32).
- Add a required HBA to the Unified Compute Platform HC compute nodes to have access to the Fibre Channel external storage. They are connected to the Virtual Storage Platform using Fibre Channel connections through two SAN switches for redundancy.
- There are 8 leaf switches, 2 on the top of each rack, to provide network connectivity for all the hosts.
- There is a pair of spine switches to provide inter-rack connectivity plus connectivity to your corporate network.

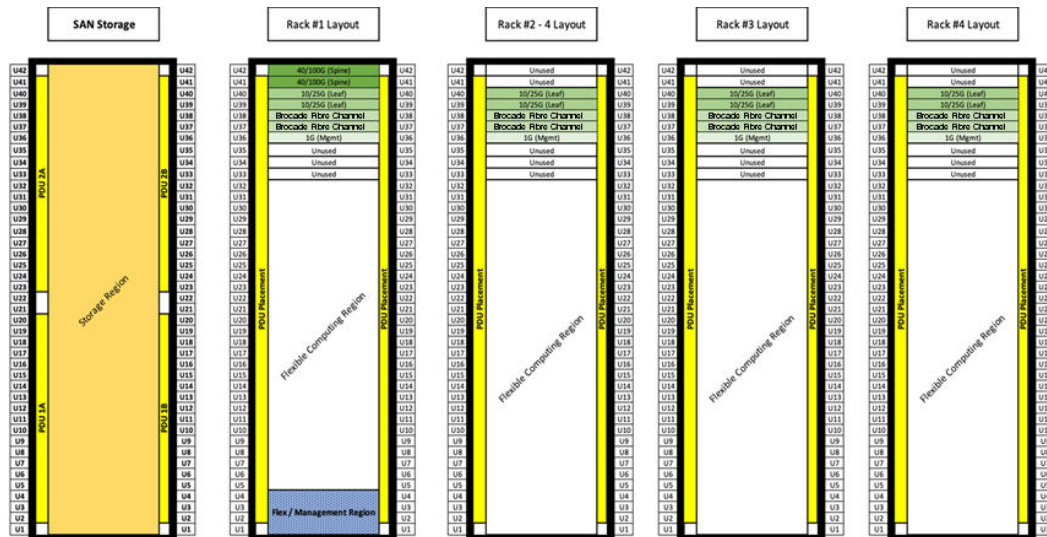
UCP RS has single rack and multi-rack designs that scale from four compute nodes in one rack to 128 compute nodes spread across four racks that are inter-connected using top-of-rack switching. The following figures show rack layout examples for UCP RS single rack and multi-rack solutions. In the following single rack high-level configuration, the maximum number of supported 1U vSAN-ready nodes is 19, four of which can be configured as management nodes. Within the management/computing region, both 1U and 2U vSAN-ready nodes can be intermixed, but not to exceed 19 total RU.

In general, a multi-rack high-level configuration uses Brocade G620/G720 Fibre Channel switches, and HBAs are optional components to connect the customer's SAN storage to the UCP RS environment. The maximum number of supported 1U vSAN-ready nodes is 128, four of which can be configured as management nodes. Within the management/computing region, both 1U and 2U vSAN-ready nodes can be intermixed, but not to exceed 32 total RU per rack.

The following figure shows the single rack design of Hitachi Unified Compute Platform RS.



The following figure shows the multi-rack design of Hitachi Unified Compute Platform RS.

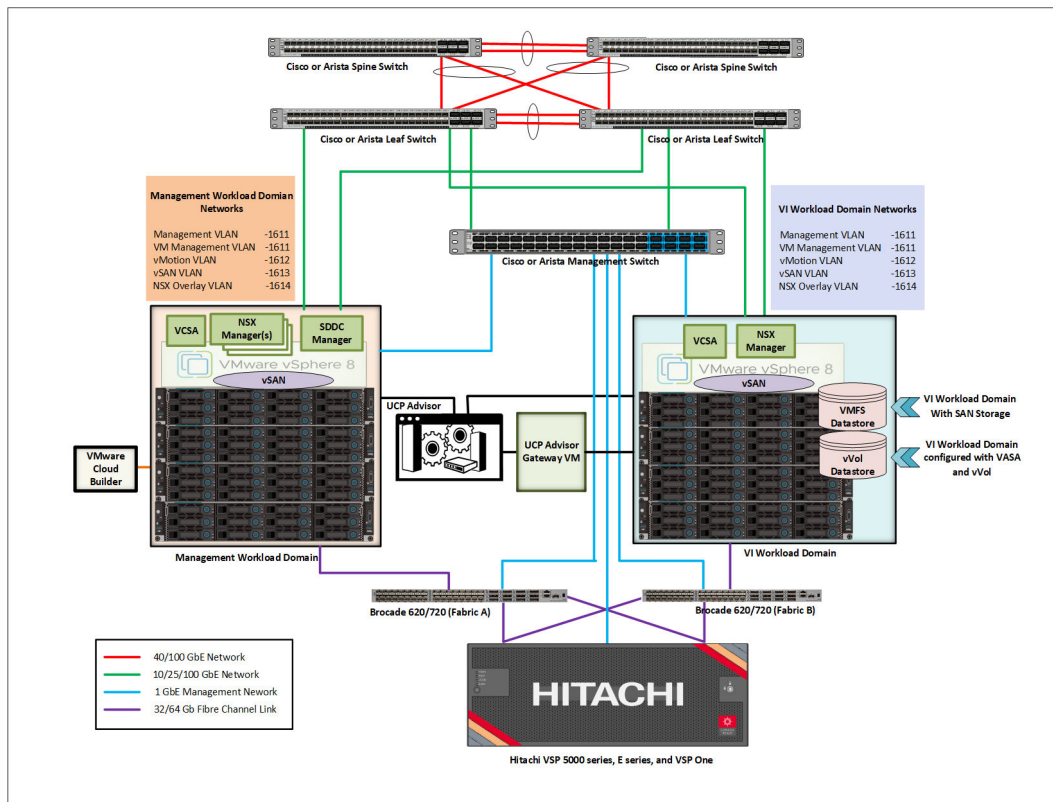


The following are the main use cases to have a Virtual Storage Platform datastore on this solution:

- For use as an additional capacity expansion, in case more capacity is required than available in the vSAN.
- In case of workload migration, where existing VMDK images containing operating systems or databases are moved from an older VMware vSphere infrastructure into a new VMware Cloud Foundation Workload Domain, minimizing any data migration impact.

- When you need a separated storage tier. For example, have the VMware vSAN datastore host the virtual machine's operating system VMDK disks for easier patch and upgrade, while Virtual Storage Platform hosts VMDKs on a VMFS datastore or P-RDMS for mission-critical applications. This is when you trust Virtual Storage Platform for either high performance or higher availability and resiliency.
- For use as a principal, reliable, and high performance datastore for mission critical applications.

The following illustration shows the complete architecture of the solution (VCF, VSP, and UCP Advisor).



Solution deployment

This solution deployment demonstrates the process of Hitachi Virtual Storage Platform One Block integration with Hitachi Unified Compute Platform RS Nodes and VMware Cloud Foundation using Hitachi UCP Advisor. With the current release of VMware Cloud Foundation, VMware vSAN is required for the Management Workload Domain.

For the workload domains, the following storage options can be used in this Hitachi Unified Compute Platform RS with VMware Cloud Foundation co-engineered solution.

- Option 1 — VI Workload Domain using a VMware vSAN datastore
- Option 2 — VSP One Block storage as a secondary datastore available for any Workload Domain

- Option 3— VSP One Block storage as a principal datastore available for any VI Workload Domain except the Management Domain
- Option 4 – Workload Domain using a vVol datastore, available for any Workload Domain except the Management Domain – supported on VSP 5000 Series, and VSP E-series

The following sections cover the deployment of VMware Cloud Foundation Management Workload Domain and the other storage options with VI Workload Domain:

- [Management Workload Domain with vSAN storage \(on page 36\)](#)
- [VI Workload Domain using a VMware vSAN datastore \(on page 38\)](#)
- [Hitachi Virtual Storage Platform One Block storage \(Fibre Channel\) as a secondary datastore \(on page 40\)](#)
- [Hitachi Virtual Storage Platform One Block storage \(Fibre Channel\) as a principal datastore \(external only\) \(on page 45\)](#)
- [Workload Domain using a vVol datastore \(Hitachi VSP using a Fibre Channel protocol endpoint\) \(on page 47\)](#)

Management Workload Domain with vSAN storage

Before you begin

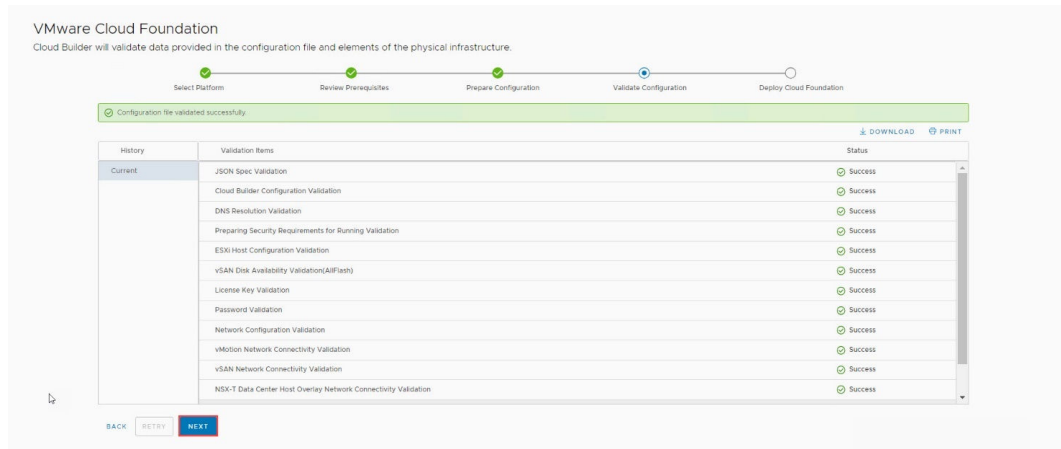
The bring-up process is used to deploy VMware Cloud Foundation's management Workload Domain on top of the UCP RS solution. Before starting the bring-up process, VMware Cloud Foundation needs to meet the following requirements.

- Complete the VMware Cloud Foundation Deployment Parameters guide.
- Identical hardware (CPU, Memory, NICs, SSD/HDD, etc) within the management cluster is highly recommended.
- ESXi is freshly installed on each host. The ESXi version matches the build listed in the Cloud Foundation bill of materials and Interoperability Matrix (the UCP Toolkit enables this by default).
- Local storage that has been designated for the vSAN capacity tier must be tagged and indicated as capacity.
- All hosts must be configured and be in synchronization with a central time server (NTP).
- All hosts and elements are configured with a DNS server for name resolution.
- A new certificate needs to be generated on the ESXi host when the default "localhost" name is renamed to the DNS host name unless it is already done by the UCP Toolkit.
- SSH needs to be enabled.
- Deploy the VMware Cloud Builder OVA and VMware Cloud Foundation networks should be reachable to VMware Cloud Builder.

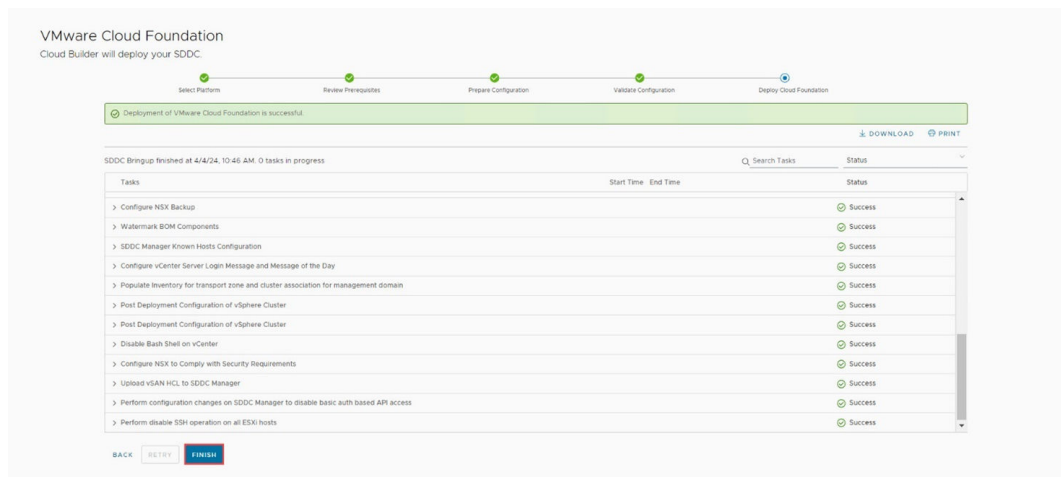
Procedure

1. After Deploying the VMware Cloud Builder (VCB), browse to the IP Address.
2. Log in to Cloud Builder.
3. Select the **VMware Cloud Foundation** and click **Next**.

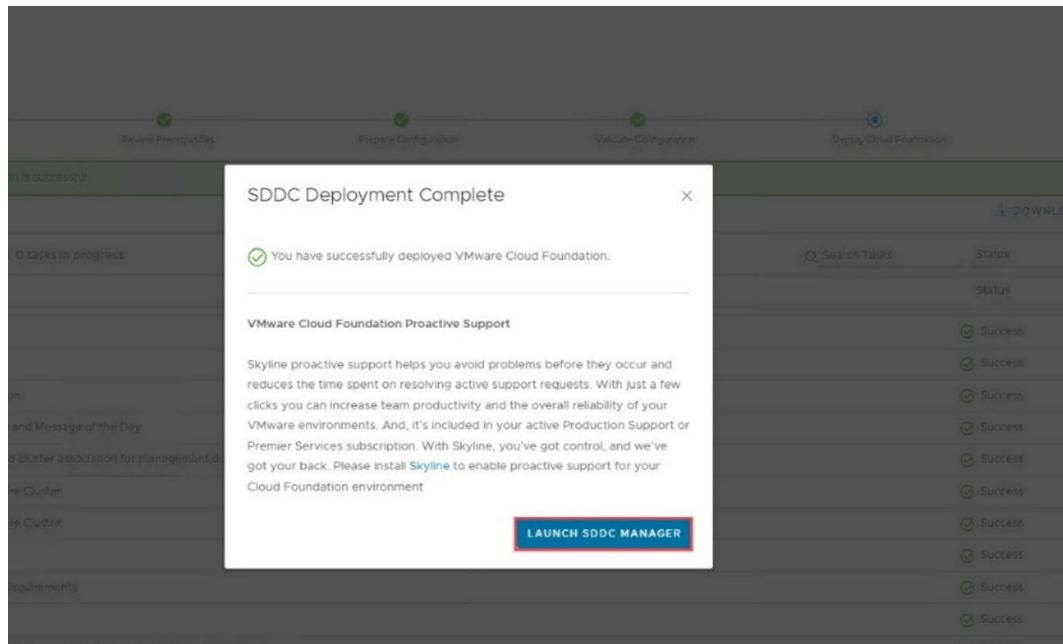
4. Accept the license agreement and click **Next**.
5. Upload the updated *Deployment Parameter Guide* and click **Next**.
The bring-up process will start, and it validates all the configured settings.
6. Click **Next** after successful validation.



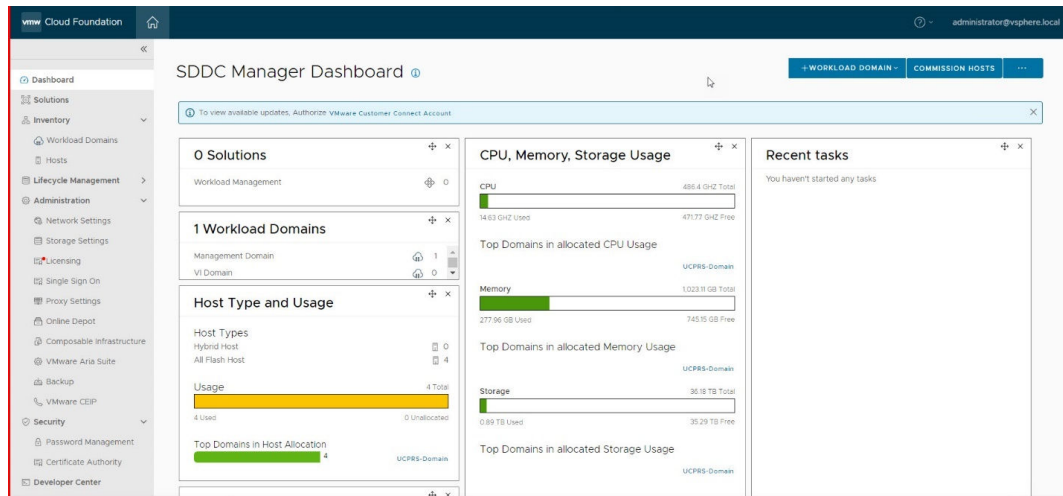
7. Click **Finish** after the deployment is completed.



The following pop-up will appear after successful deployment.



The following illustration shows the SDDC Manager Dashboard and vCenter.



VI Workload Domain using a VMware vSAN datastore

Before you begin

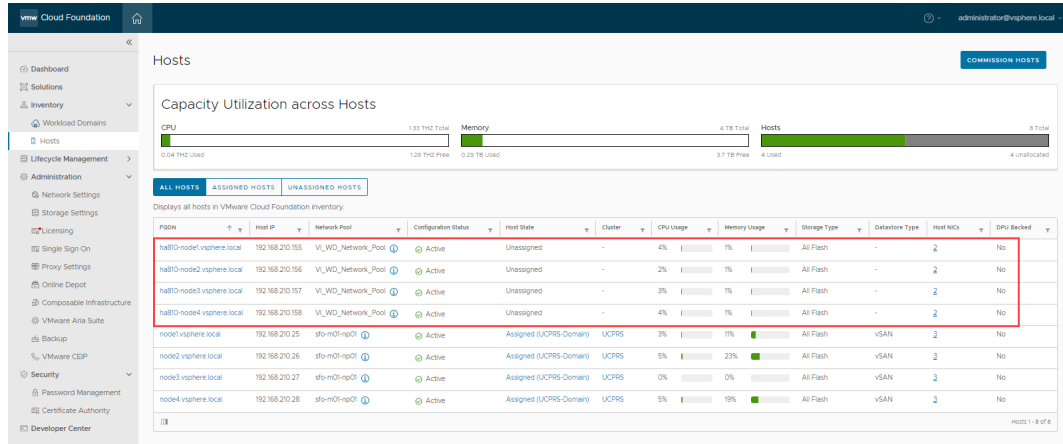
Before creating the Workload Domain, make sure that compute nodes, storage, and networks are already onboarded to UCP Advisor for management and additional configuration steps because the UCP system will have the same compute nodes which will be the part of workload domain as well. This will help make the VCF workload environment identical and manageable from a single panel of the UCP Advisor central UI.

In this deployment the workload domain and the management domain both use vSAN datastores. The network pool can be created, or you can use the existing network pool because it uses the same storage option. Before creating the workload domain you need to complete the management domain as mentioned in the previous section.

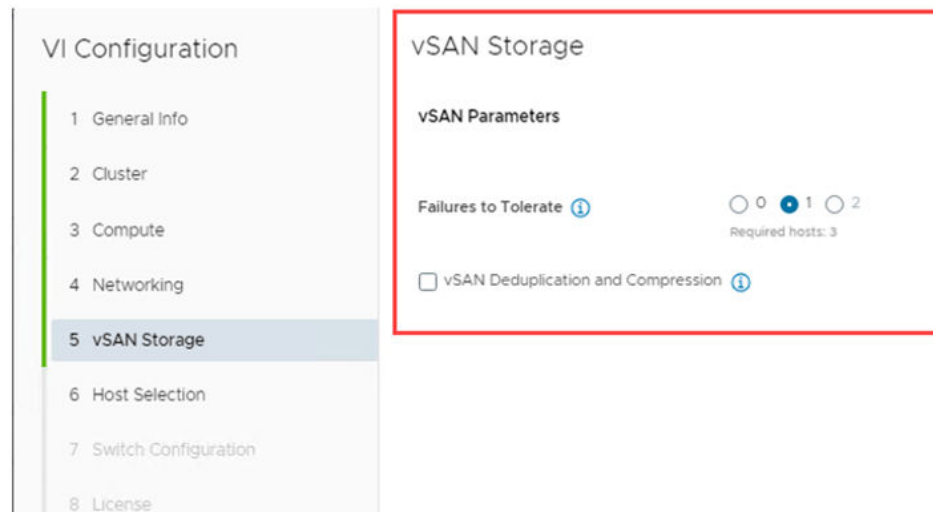
Use the following procedure to create a VI Workload Domain using the vSAN datastore as a principal storage.

Procedure

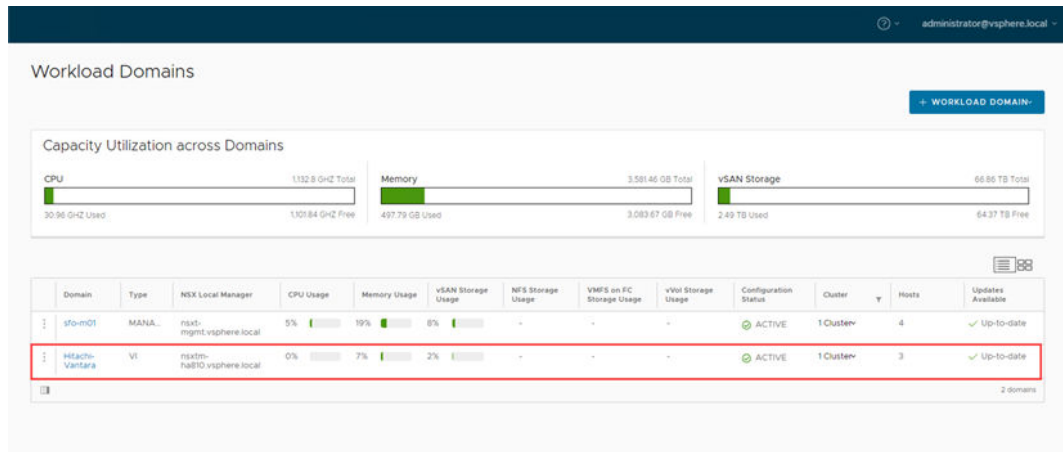
1. Onboard the Hitachi Unified Compute Platform vSAN ready nodes to the SDDC manager inventory.



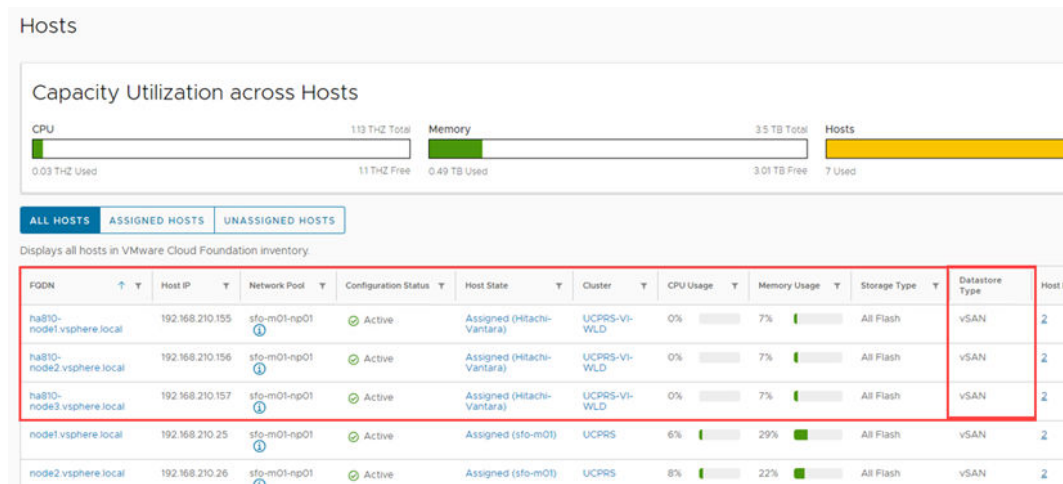
2. Create the VI Workload Domain from the SDDC Manager Dashboard and provide the necessary details. vSAN storage is automatically selected when creating the VI Workload Domain.



3. The created workload domain is visible under the **Workload Domains** tab.



4. The vSAN storage type is visible under the **Datastore type** in the **Hosts** section.



Hitachi Virtual Storage Platform One Block storage (Fibre Channel) as a secondary datastore

VMware Cloud Foundation supports Hitachi Virtual Storage Platform as external storage and VMware vSAN as a principal datastore. In a Hitachi Unified Compute Platform RS solution, Fibre Channel storage can be used as secondary storage for any type of workload domain.

Before you begin

1. Create a Workload Domain and VI Workload Domain.

Before configuring Fibre Channel storage the Management Workload Domain and VI Workload Domain should be created. See [Management Workload Domain with vSAN storage \(on page 36\)](#) and [VI Workload Domain using a VMware vSAN datastore \(on page 38\)](#).

2. Configure VSP storage and create a Fibre Channel datastore using UCP Advisor.

To create a SAN-based datastore, configure Virtual Storage Platform in UCP Advisor. Connect selected hosts to Virtual Storage Platform redundantly using SAN switches. Configure aliases and zoning on both SAN switches from UCP Advisor. Complete all

SAN switch configuration, storage provisioning, and management using the Hitachi UCP Advisor central control panel as follows:

- a. Add HBAs to Unified Compute Platform RS compute nodes.
- b. Connect Unified Compute Platform RS compute nodes to SAN switches redundantly.
- c. Configure SAN switches.
- d. Create Fibre Channel zones .

After Fibre Channel storage configuration, use this procedure to create a Fibre Channel datastore.

Procedure

1. From UCP Advisor use the **Provision Datastore** option to create the Fibre Channel storage for the datastore.

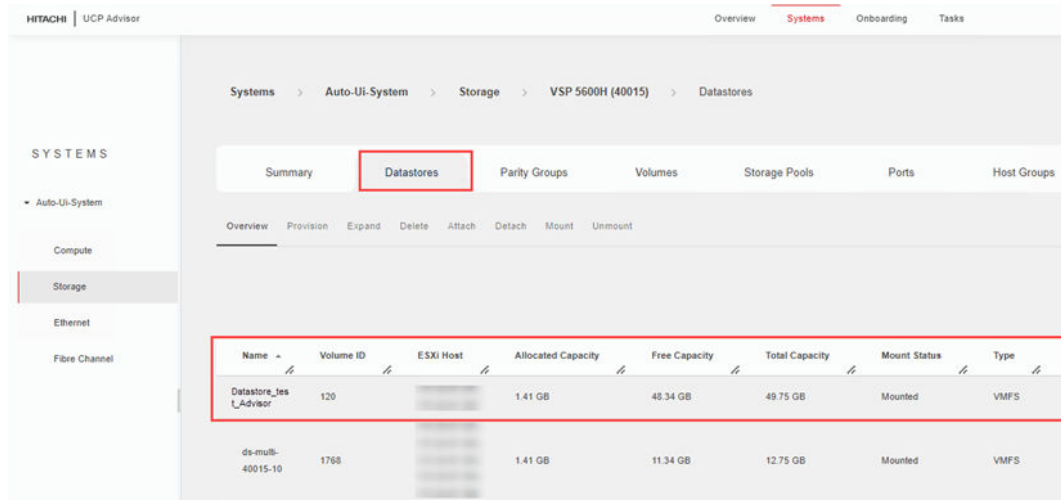
The screenshot shows the 'Provision Datastore' configuration page in the Hitachi UCP Advisor interface. The page title is 'Provision Datastore' and it includes a sub-header 'This will create and provision a new VMFS Datastore'. The configuration fields are as follows:

- Datastore Name***: Datastore-Engg-0
- Datastore Capacity (GB)***: 50
- Storage System***: 40015
- Storage Pool***: (6) MT-Asish (HDP)
- Protocol**: FC NVMe-oF

The 'Single Datastore' radio button is selected. The left sidebar shows the 'Storage' section is active under the 'Fibre Channel' category.

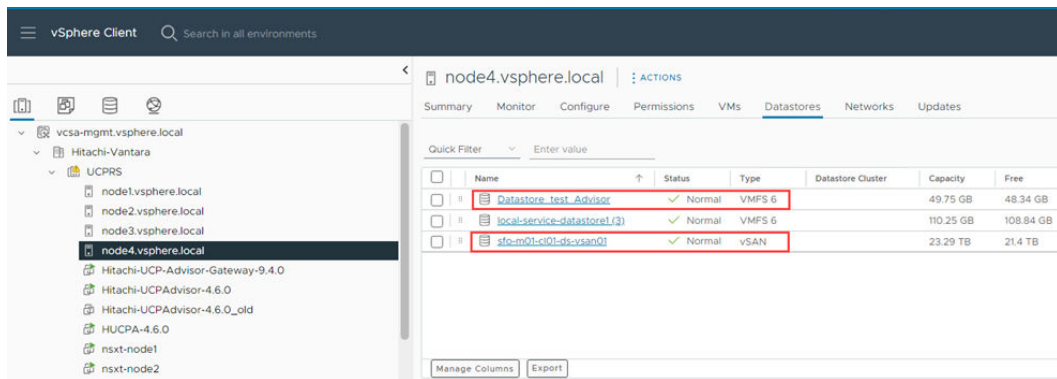
2. After the Fibre Channel datastore provisioning is completed, it is visible under the **Datastores** section.

Delete VCF Workload Domains and respective UCP systems in UCP Advisor



Result

After the datastore is created using UCP Advisor, two datastores are available for workload domains where one is a principal datastore (vSAN) and the other datastore is secondary (Fibre Channel) from Hitachi Virtual Storage Platform storage as shown.



Delete VCF Workload Domains and respective UCP systems in UCP Advisor

Use these procedures to remove VCF Workload Domains and UCP systems in UCP Advisor.

Delete a Workload Domain and decommission compute nodes

Use this procedure to delete a VI Workload Domain from the SDDC Manager UI.

Before you begin

- If a vSAN datastore is attached to the workload domain:
 - Migrate all workload/VMs to another datastore and unmount the vSAN datastore from the vCenter.
- If other datastores are (FC/NFS/vVol) attached to the workload domain:
 - Migrate the virtual machines.
 - Make sure there are no workloads/VMs presented in the workload domain (within the cluster or outside of the cluster).

Procedure

1. In the navigation pane, click **Inventory > Workload Domains**.
2. Click the vertical ellipsis (three dots) next to the VI workload domain you want to delete and click **Delete Domain**.
3. Select **Delete Domain** and click **Delete Workload Domain**.

Result

After the workload domain is deleted, the clusters within that workload domain are deleted and the hosts are returned to the free pool with a need cleanup host state.

Deleting a VI workload domain also removes the components associated with the VI workload domain from the management domain. This includes the vCenter Server instance and the NSX Manager cluster instances.



Note: If the NSX Manager cluster is shared with any other VI Workload Domains, it will not be deleted.

The network pools used by the workload domain are not deleted as part of the VI Workload Domain deletion process and must be deleted separately.

Decommission UCP RS compute nodes**Procedure**

1. In the navigation pane, click **Inventory > Hosts**.
2. Click **Unassigned Hosts**.
3. Select the hosts you want to decommission.
4. Click **Decommission Selected Hosts**.
5. Click **Confirm**.

Remove Fibre Channel storage from the UCP system

Remove connected storage from a workload domain before proceeding to remove it from the UCP system.

You can delete a datastore to remove it from an cluster in a workload domain.



Note: You cannot delete datastores that are part of a replication pair (for example, global-active device from within UCP Advisor).

Procedure

1. Complete all the vCenter-related tasks.
2. Verify that a vCenter is registered and attached to the UCP system.
3. Browse to the storage system where you want to delete a datastore.
4. Select **Datstores > Delete**.
5. Enter the following:
 - Storage System: The storage system where you want to delete the datastore.
 - Datastore: The datastore name of the datastore you want to delete.
 - Delete Volume: Select the "Delete Volume" option to delete the volume along with the datastore.
6. Click **Submit**.

Remove compute nodes from the UCP system

You can remove a compute device from active management in a UCP system and place it in the spare pool.

Before you begin

If you have tagged a subscriber to the compute device, untag the subscriber from the compute device.

Procedure

1. Browse to the UCP system where you want to remove a compute device, and then click **Compute**.
2. Locate the compute device that you want to remove, and then select its activation checkbox.
3. Click the **Remove Compute Device** icon.
4. Verify that the compute device that you want to remove is listed as the item being removed.
5. Enter **Remove**, and then click **Submit**.

Result

The device is removed from the UCP system and placed in the spare pool.

Delete a UCP system

You can delete a UCP system from the inventory managed by UCP Advisor.

Before you begin

If you have tagged a subscriber to a compute device or other device resources, you must untag the subscriber before deleting the UCP system.

Procedure

1. Browse to the UCP system that you want to delete.

2. Click **Delete System**.
3. Verify that the UCP system you want to delete is listed as the item being deleted.
4. Enter **Delete**, and then click **Submit**.

Hitachi Virtual Storage Platform One Block storage (Fibre Channel) as a principal datastore (external only)

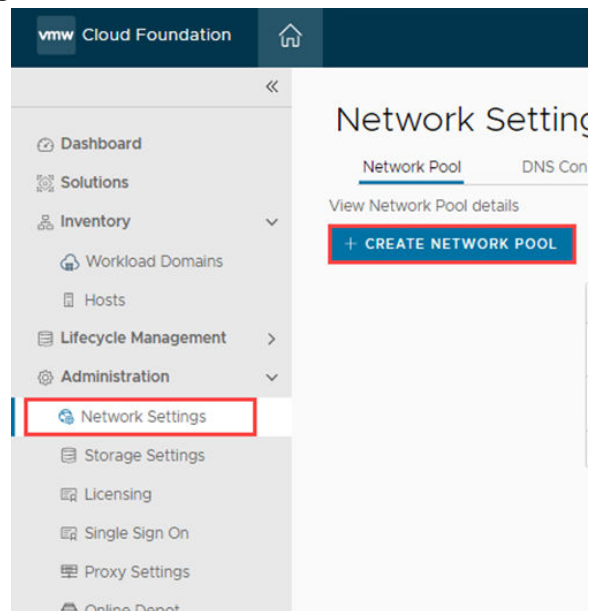
Before you begin

Before creating the new VI Workload Domain, the Management Domain should be created (to create a management workload domain, see [Management Workload Domain with vSAN storage \(on page 36\)](#)).

Use the following procedure to commission the new or designated hosts and create the network pool for new a VI Workload Domain using SDDC Manager.

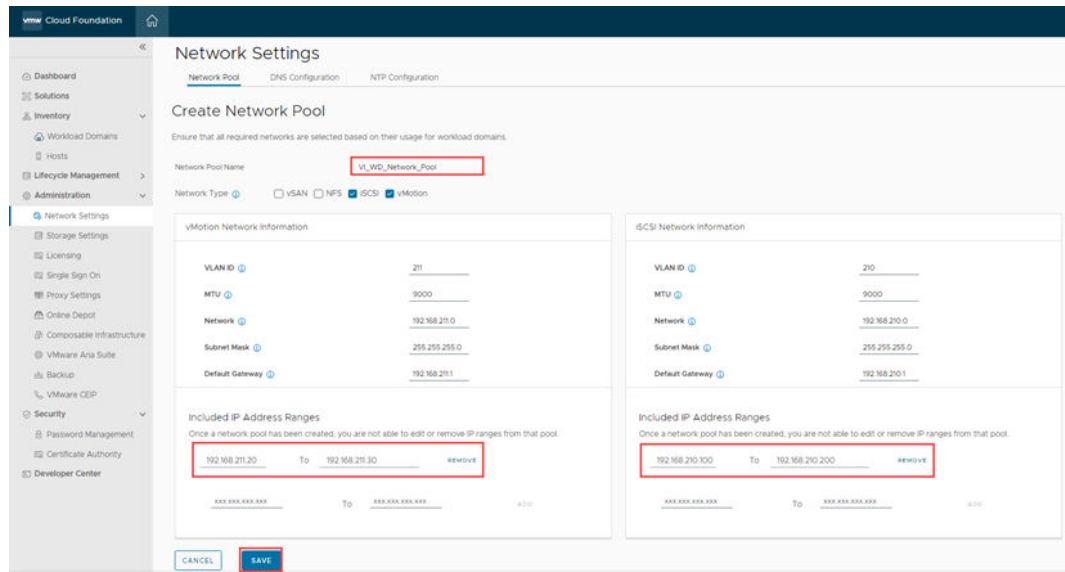
Procedure

1. Create a network pool for the new VI Workload Domain.
 - a. Log in to SDDC Manager and click **CREATE NETWORK POOL** under the **Network Settings** tab.

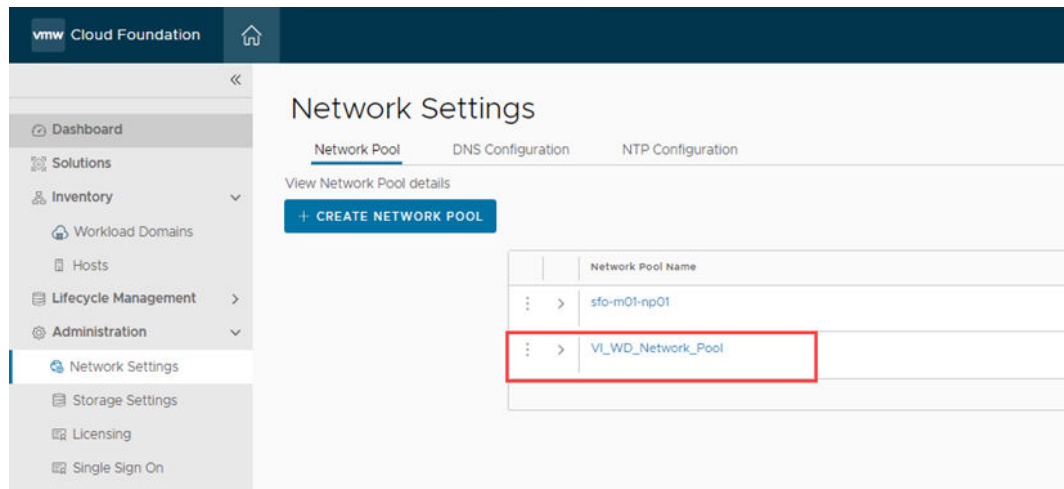


- b. Provide the Network Pool Name, select vMotion and iSCSI, fill the Network Information, and IP Address ranges.
- c. Click **Add** after providing the information.
- d. Click **Save**.

Hitachi Virtual Storage Platform One Block storage (Fibre Channel) as a principal datastore (external only)



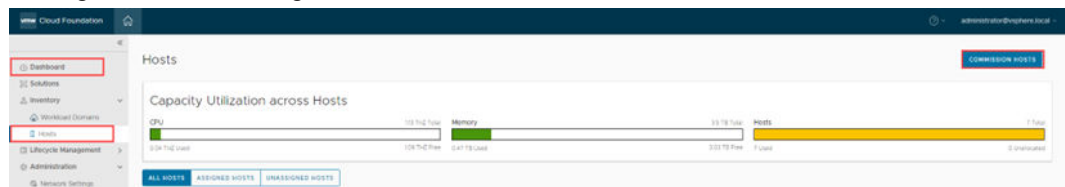
The network pool has been created.



2. Commission the Hitachi UCP RS compute nodes.

Commission hosts that have access to Hitachi Virtual Storage Platform (external Fibre Channel storage) for the new workload domain.

a. Log in to SDDC Manager, select **Hosts** and click **COMMISSION HOSTS**.



b. Select the **Storage Type** as **VMFS on FC**.

Host Addition and Validation

▼ Add Hosts

You can either choose to add host one at a time or download [JSON](#) template and perform bulk commission.

Add new Import

Host FQDN

Storage Type VSAN NFS VMFS on FC

Network Pool Name

User Name

Password

ADD

c. Configure Fibre Channel storage for a VI Workload Domain.

In contrast with VMware vSAN, which is managed from within VMware SDDC Manager, manage Fibre Channel storage and the SAN switch configuration independently outside of SDDC Manager. Complete all Fibre Channel storage provisioning and management operations, plus SAN switch configuration using Hitachi Unified Compute Platform (UCP) Advisor as follows:

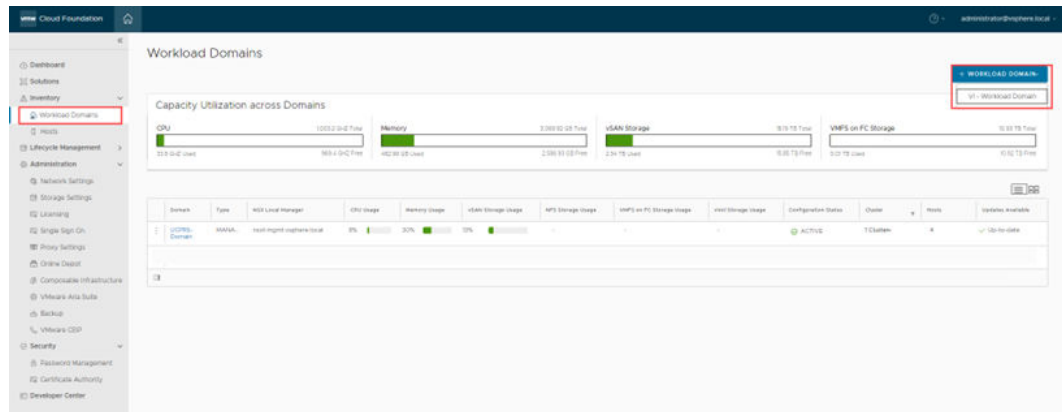
- Add Fibre Channel storage by adding HBAs to Hitachi Unified Compute Platform RS compute nodes.
- Configure Fibre Channel switches.
- Create aliases and zoning.
- Create provisioning pools and LDEVs.
- Create VMFS datastores.

Workload Domain using a vVol datastore (Hitachi VSP using a Fibre Channel protocol endpoint)

Use this procedure to create a principal datastore that resides on Fibre Channel external storage for a VI Workload Domain.

Procedure

1. Log in to SDDC Manager, navigate to **Workload Domains** and select **VI Workload Domain** from the dropdown menu.



2. In **Storage Selection**, select **VMFS on FC** and click **BEGIN**.

Storage Selection [?](#)

Select the type of storage you would like to use for this Workload Domain.

- vSAN
Configure vSAN based workload domain.
- NFS
Configure NFS based workload domain.
- VMFS on FC
Configure Fibre Channel based workload domain.
- vVol
Configure vVol based workload domain.

3. Provide the **VI Name**, **Organization Name**, and select the **SSO Domain**.

VI Configuration

General Info

Virtual Infrastructure Name

Organization Name

SSO Domain Create New SSO Domain Join Management SSO Domain

Lifecycle Management

Manage clusters in this workload domain using Baselines (deprecated)

- This option will set up clusters in this workload domain with vSphere Lifecycle Manager (vLCM) baselines (previously called vSphere Update Manager or VUM) instead of setting it up with a vLCM image.
- Note that vLCM Baselines are deprecated, and it is recommended to manage the lifecycle of the hosts in your environment by using vLCM images.
- Network offloading using SmartNICs is not supported on clusters managed by baselines.

CANCEL NEXT



Note: Select the **Lifecycle Management** check box when you are using a different server platform (for example DS as Management and HA for VI Workload Domain) where it can create its own image instead of using the existing one.

4. Provide the **Cluster Name** and select the **Image** (the **Image** option will not be available if the **Lifecycle Management** option is selected in the previous step).

VI Configuration

Cluster

Enter the details for the first cluster that will be created as default in this new workload domain.

Cluster Name

Image

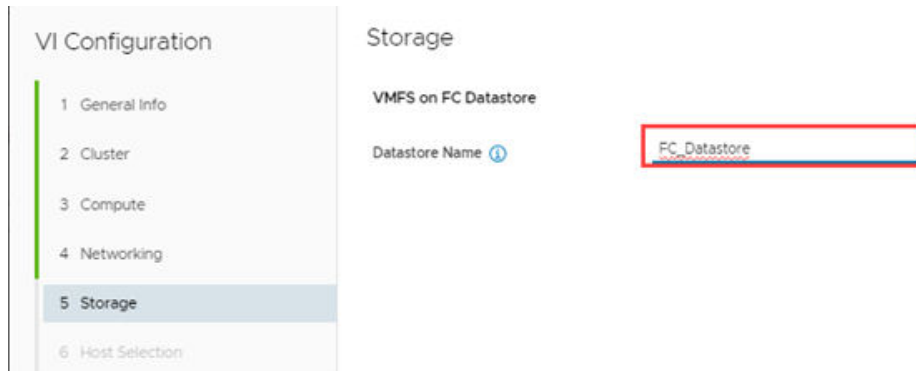
Showing only images with ESXi version 8.0.2-22380479.

ESXi Version 8.0.2-22380479	Vendor Addon <input type="text" value="Hitachi-D5xxxG2-Addon"/>	Components <input type="text" value="0 Components"/> Show Details	Firmware/Driver Addon <input type="text" value="No Firmware Addon"/>
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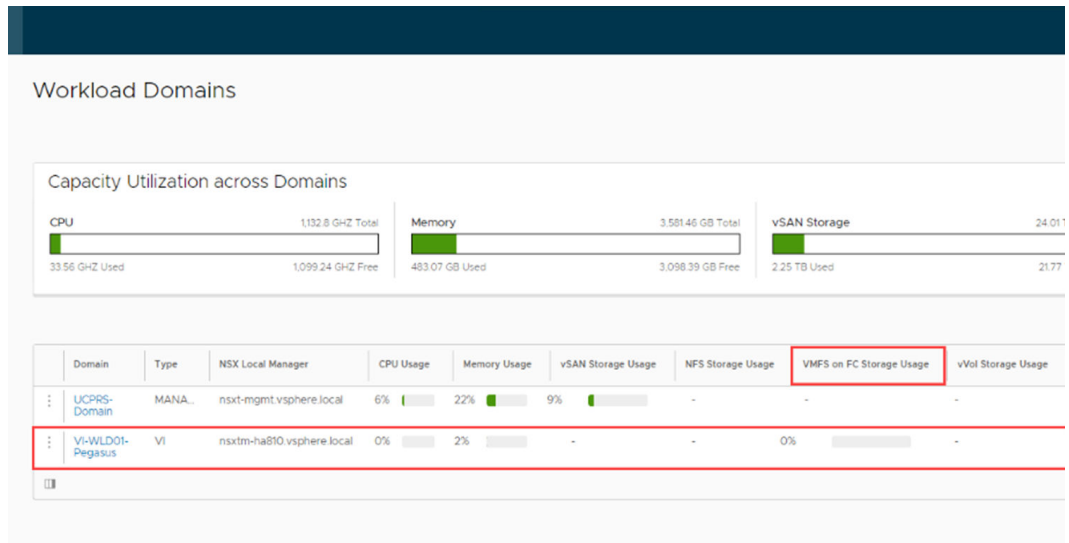
Follow further steps and provide the necessary information as required.

5. Click **Next**.
6. Select the FC Datastore storage in the Datastore Name as the primary storage option.

Workload Domain using a vVol datastore (Hitachi VSP using a Fibre Channel protocol endpoint)



After the deployment is completed successfully, it will be visible as a VI Workload Domain as shown.



The following is the view from the **Hosts** tab of SDDC manager after creation of the new VI Workload Domain. It provides an overview of the domain's associated components.

PODN	Host IP	Network Pool	Configuration Status	Host State	Cluster	CPU Usage	Memory Usage	Storage Type	Datastore Type	Host NDC	DRP Backed
na810-node1 vsphere.local		VL_WD_Network_Pool	Active	Assigned (VI-WLD01-Pegasus)	UCPRS-RA	0%	2%	All Flash	VMFS	2	No
na810-node2 vsphere.local		VL_WD_Network_Pool	Active	Assigned (VI-WLD01-Pegasus)	UCPRS-RA	0%	2%	All Flash	VMFS	2	No
na810-node3 vsphere.local		VL_WD_Network_Pool	Active	Assigned (VI-WLD01-Pegasus)	UCPRS-RA	0%	2%	All Flash	VMFS	2	No
node1 vsphere.local		stb-mch-nsx01	Active	Assigned (UCPRS-Domain)	UCPRS	5%	25%	All Flash	vSAN	3	No
node2 vsphere.local		stb-mch-nsx01	Active	Assigned (UCPRS-Domain)	UCPRS	8%	31%	All Flash	vSAN	3	No
node3 vsphere.local		stb-mch-nsx01	Active	Assigned (UCPRS-Domain)	UCPRS	6%	15%	All Flash	vSAN	3	No
node4 vsphere.local		stb-mch-nsx01	Active	Assigned (UCPRS-Domain)	UCPRS	4%	19%	All Flash	vSAN	3	No

Note: In addition to the Fibre Channel SAN storage option, Hitachi also offers iSCSI or Fibre Channel-NVMe. See [Appendix A: Configure iSCSI \(on page 57\)](#) and [Appendix B: Configure NVMe over Fabrics in a Fibre Channel environment \(on page 58\)](#) for more information.

Hitachi Storage Provider (VASA) for VMware Cloud Foundation

Hitachi Storage Provider for VMware Cloud Foundation (VASA Provider) is a virtual appliance that enables organizations to enable software-defined storage solutions for VMware vSphere Virtual Volumes (vVols) on Hitachi Virtual Storage Platform (VSP) systems and provide storage policy-based provisioning for both VMFS and vVols datastores.

Hitachi Storage Provider for VMware Cloud Foundation also allows VMware APIs for Storage Awareness (VASA) features to be used with Hitachi storage systems. VASA Provider allows policies to be made by making the storage attribute information available to be seen in vSphere. Hitachi VASA Provider supports the following:

- VMware vSphere Virtual Volumes (vVols) - This function constitutes the VASA Provider (VP) component of VMware Virtual Volumes (vVols), which allows vVols to be used with supported Hitachi storage systems in a 1:1 mapping enabling greater insight into virtual machine performance.
- VMware Virtual Machine File System (VMFS) - VASA allows storage capability information and alert notifications related to VMFS file systems to be generated automatically and displayed in vCenter Server.

VMware Storage Policy Based Management (SPBM) tags for devices backing VMFS file systems are provided, which associate the VMFS file systems with storage profiles and capabilities. These profiles allow storage policies to be configured in vSphere for VMFS file systems in addition to VMware vVols based on underlying storage capabilities. For example, in vCenter, a datastore can be assigned tags, such as "Encryption: Yes" which indicates the underlying storage system can provision vVols or LDEVs with encryption capabilities.



Note: vVol does not require UCP Advisor because it is tightly integrated into the VMware SPBM framework from the VASA Provider for supported Hitachi VSP storage models.

Hitachi UCP Advisor integration with vSphere LifeCycle Manager (vLCM) and Hardware Support Manager (HSM)

vSphere Lifecycle Manager (vLCM)

vSphere Lifecycle Manager vLCM simplifies lifecycle management in VMware vSphere by ensuring consistency across ESXi hosts within a cluster. It achieves this through a declarative model that enforces a desired state for ESXi hosts, including target ESXi versions, firmware versions, and driver versions. vLCM collaborates with hardware vendors to manage firmware and driver updates. These updates are accessed via the HSM.

These are some of the benefits of vLCM:

- Efficient upgrades
- Improved reliability
- Simplified maintenance

The following figure shows the features of vLCM.



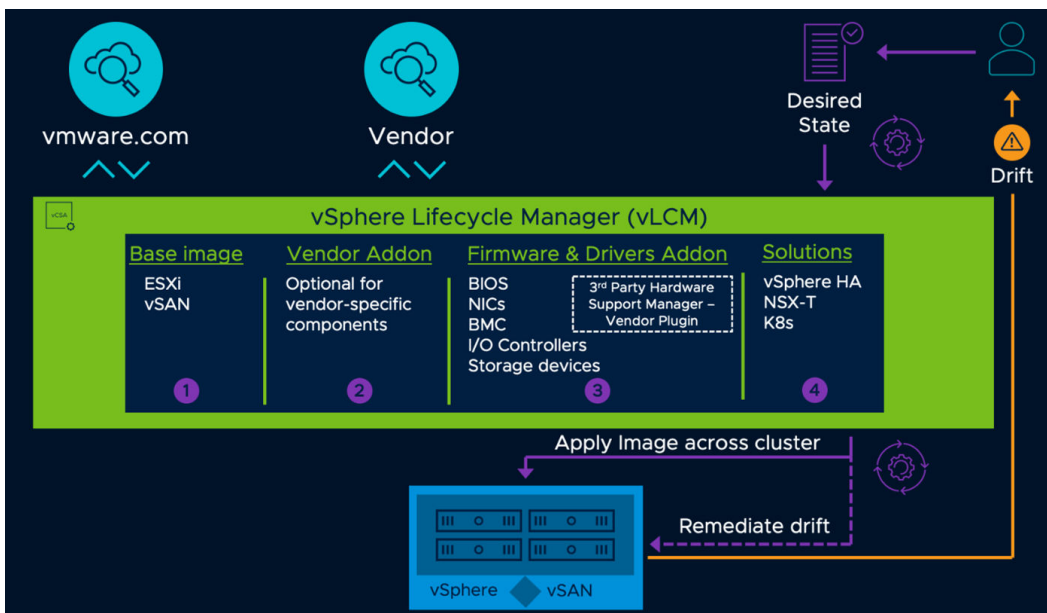
A cluster image consists of the following components:

- ESXi version: A Cluster base Image supports vSphere ESXi 7.0 or later.
- Vendor Add on (Optional): Vendor add-ons are additional components or extensions provided by hardware vendors to enhance vLCM functionality. These add-ons typically include vendor-specific drivers, firmware, and management tools. They allow vLCM to seamlessly integrate with specific hardware platforms.
- Firmware Integration (optional): Firmware integration refers to the seamless management of full-stack firmware updates for host devices within vLCM. These host devices include PCIe components (such as storage controllers and NICs), BIOS, and out-of-band management tools.

Hardware Support Manager (HSM)

Hardware Support Manager (HSM) is part of vLCM. It allows different server vendors to integrate with vLCM, supporting hardware firmware and driver upgrades. It includes a plug-in that registers itself as a vCenter Server extension.

The following figure shows the standard architecture of vLCM.



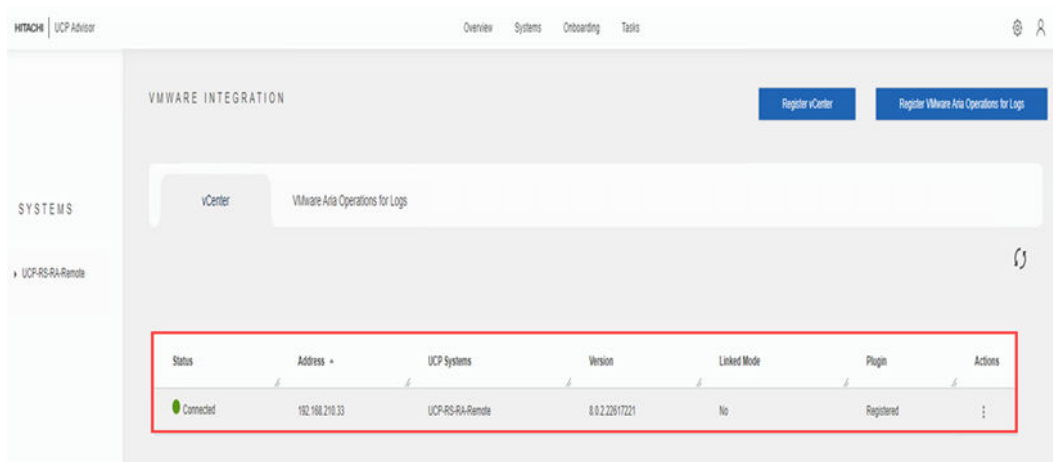
Upgrade firmware using vLCM and HSM

Hitachi UCP Advisor integrates into vSphere as an Hardware Support Manager (HSM) for vLCM, enhancing firmware and driver management. When you enable an HSM, vLCM gains awareness of the vendor's hardware components. This integration allows vLCM to manage firmware updates specific to that vendor's hardware.

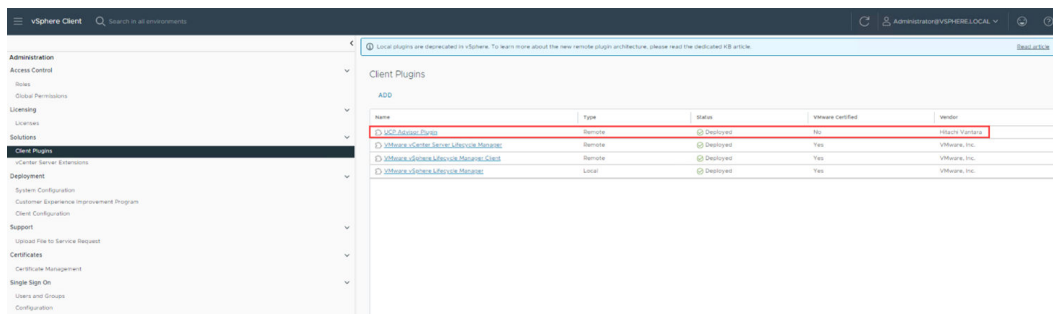
Register UCP Advisor as HSM provider in vCenter

1. Log in to Hitachi Unified Compute Platform Advisor, navigate to VMware Integration, and select vCenter.
2. Click Register vCenter.
3. Provide the vCenter details and click Register.

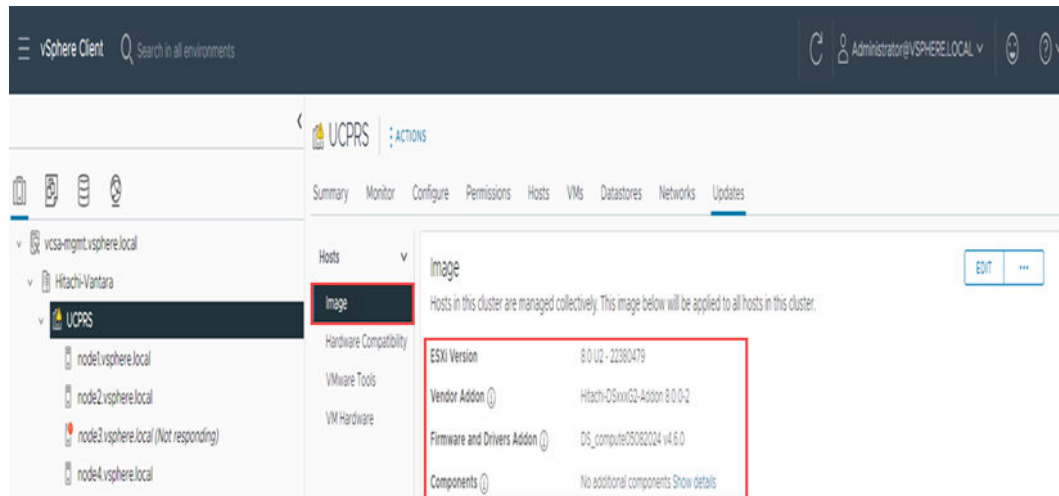
The vCenter is registered successfully.



The following illustration shows the integration of Hitachi UCP Advisor Plug In.



The cluster image should be visible under Vendor Addon in vCenter.



Solution validation

The following table lists the test scenarios completed to validate the solution.

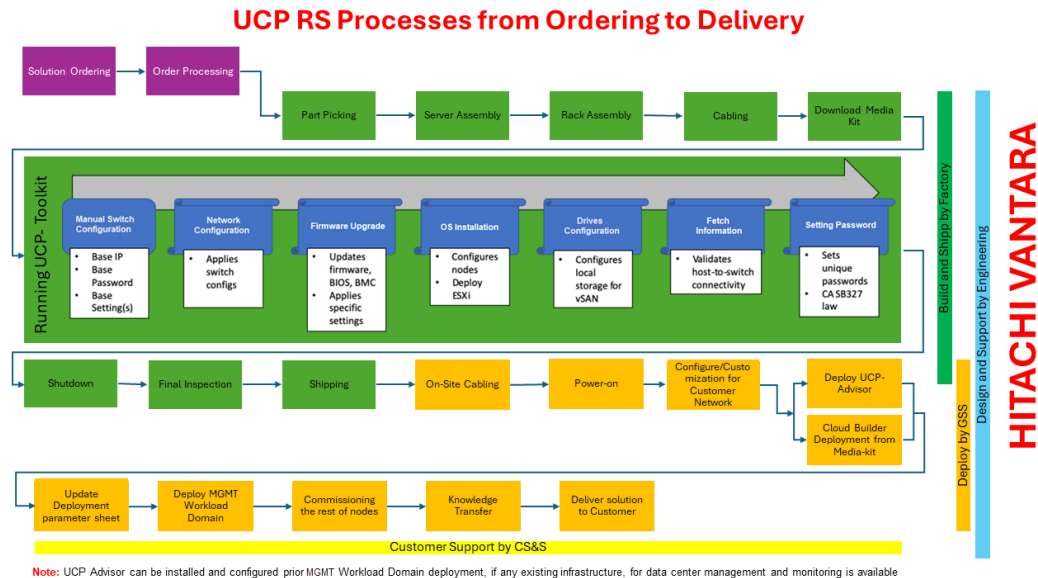
Note: Testing of this configuration was in a lab environment. Many factors affect production environments beyond prediction or duplication in a lab environment. Follow the recommended practice of conducting proof-of-concept testing for acceptable results in a non-production, isolated test environment that otherwise matches your production environment before your production implementation of this solution.

Test Scenarios	VMware vSAN Datastore	VSP One Block	Observed Behavior
Created Workload Domain with Hitachi VSP One storage as Principal datastore using UCP Advisor.	Yes	Yes	Managed all storage related operations using UCP Advisor.
Created a Workload Domain with vSAN as Principal and Hitachi VSP One storage as Secondary datastore using UCP Advisor.	Yes	Yes	Managed all storage related operations using UCP Advisor.
Created a Workload Domain with vSAN as Principal storage.	Yes	No	Deployed successfully.
Onboarded Hitachi VSP Storage and Hitachi UCP RS compute (DS/HA Server Platform) with UCP Advisor.	No	Yes	Onboarded successfully.

Test Scenarios	VMware vSAN Datastore	VSP One Block	Observed Behavior
Updated Firmware version of Hitachi UCP RS Compute (DS/HA Server Platform) BMC/BIOS/IO components using UCP Advisor.	NA	NA	Updated successfully.
Register UCP Advisor Plug In on Workload Domain associated vCenter.	NA	NA	Done successfully.
Integrated vLCM and HSM with UCP Advisor.	NA	NA	Done successfully.
Clone a virtual machine from a VMware vSAN datastore to a Hitachi Virtual Storage Platform datastore.	Yes	Yes	Done successfully.
Clone a virtual machine from a Virtual Storage Platform datastore to vSAN datastore.	Yes	Yes	Done successfully.
Migrate virtual machines located on a vSAN datastore to a Virtual Storage Platform datastore using Storage vMotion.	Yes	Yes	Virtual machines migrated from a vSAN datastore to a Virtual Storage Platform datastore successfully.
Commission and decommission additional hosts to Workload Domains.	Yes	Yes	Prepare the additional node for commission and add to the cluster through SDDC Manager and decommission post validation checks.

Solution order and delivery

The following illustration shows the UCP RS processes workflow from ordering to delivery.



The process from placing order and deliver solution to customer as follows:

1. Solution Ordering: Is done by the customer.
2. Order Processing: Starts from Hitachi Vantara.
3. Part Picking: Is done according to the order.
4. Server Assembly: Has been done according to the part and server order.
5. Rack Assembly: Servers are placed in the rack and work is started on the rack assembly.
6. Cabling: Is done in the rack per requirements.
7. Download Media kit: The Media kit is the downloadable file that has all the required software for servers, network switches, storage switches, and server I/O components.
8. Run the UCP-Toolkit: The UCP Toolkit consists of scripts used to configure different components as follows:
 - a. Switch configuration is completed using UCPToolkit which assigns the base IP, base passwords, and other required settings..
 - b. Required network configuration is done using UCPToolkit which requires switch configuration to manage spine/leaf switches.
 - c. UCPToolkit helps upgrade BMC/BIOS firmware of the server and I/O components.
 - d. UCPToolkit helps install ESXi on all the nodes.
 - e. UCPToolkit features helps to format all the drives from the server and assign tags for capacity drives (applicable to VCF v5.1 and prior).
 - f. UCPToolkit has the ability to provide information about cards installed and their ports.
 - g. UCPToolkit helps set the unique password for BMC/ILO and ESXi as well.
9. Shutdown: Shuts down all the equipment in the racks.
10. Final Inspection: Done before shipping equipment to the customer.
11. Shipping: After all inspections are done equipment will ship to the customer.
12. On Site Cabling: After the shipping process is done, and equipment reaches to customer, on site cabling is done.

13. Power ON: Power on all equipment.
14. Configure/Customization for Customer Network: Configure and customize the equipment and network according to customer needs.
15. Cloud Builder Deployment from the Media kit: Copy all required files from the Media kit and deploy the Cloud Builder.
16. Update Parameter Sheet: Update the parameter sheet according to the customer details and make ready for deployment.
17. Deploy Management Workload Domain: Use the Cloud builder and parameter sheet guide.
18. Commissioning the rest of the nodes: Commission the rest of the nodes if any.
19. Knowledge Transfer: Knowledge transfer will be done from the Hitachi Vantara engineer to the customer.
20. Deliver Solution to Customer: After all procedures are completed, the solution will be delivered and handed over to the customer.

Reference links

See the following documents for more information:

- [Unified Compute Platform RS with VMware Cloud Foundation Supports Metro Storage Cluster Datastores from Virtual Storage Platform Lab Validation Report](#)
- [VMware vSphere Virtual Volumes \(vVols\) with Hitachi Virtual Storage Platform Quick Start Guide](#)
- [VMware Compatibility Guide - VSAN OSA](#)
- [VMware Compatibility Guide - VSAN ESA](#)
- [Hitachi Unified Compute Platform RS for VMware Interoperability Matrix](#)
- [VMware Cloud Foundation 5.1 Release Notes](#)
- [Unified Compute Platform \(UCP\) Advisor Administration Guide](#)

Appendix A: Configure iSCSI

Use this procedure to create a dedicated iSCSI fabric. If using existing networks, ensure proper segmentation and Quality of Service (QoS) settings. Consider redundancy and failover mechanisms.

Procedure

1. iSCSI Initiators and Targets:
 - Configure iSCSI initiators (usually on servers) to connect to iSCSI targets (storage systems).
 - Obtain the iSCSI target IP addresses or DNS names.

2. Configure iSCSI Initiators:
 - On each server, install the iSCSI initiator software (for example, Microsoft iSCSI Initiator for Windows).
 - Add the iSCSI target IP addresses or DNS names to the initiator configuration.
 - Set up authentication (CHAP or mutual CHAP) if required.
3. Configure iSCSI Targets:
 - Access your storage system management interface (for example, Hitachi Vantara management console).
 - Create iSCSI target LUNs (Logical Unit Numbers) and assign them to specific servers.
 - Set access permissions (read-only or read-write) for each LUN.
4. Zoning and Security:
 - If using existing Fibre Channel switches, configure zoning to allow iSCSI traffic.
 - Ensure security measures (firewalls, ACLs) to protect iSCSI traffic.
5. Network Configuration:
 - Configure network interfaces on servers to connect to the iSCSI fabric.
 - Set the MTU (Maximum Transmission Unit) size for jumbo frames if needed.
6. Testing and Validation:
 - Verify connectivity between initiators and targets.

Appendix B: Configure NVMe over Fabrics in a Fibre Channel environment

NVMe over Fabrics (NVMe-oF) is an extended protocol that enables communication over a Fibre Channel fabric or an Ethernet fabric with NVMe. In a Fibre Channel environment, NVMe-oF technology supports the NVMe-oF communication protocol on Fibre Channel storage area networks (Fibre Channel-SAN) using existing Fibre Channel network devices.

To configure a system consisting of an open host and a storage system using the NVMe-oF communication protocol, register a logical volume of the storage system as a namespace on the NVM subsystem, and then configure a data I/O route from the host to the logical volume.

Conventional Fibre Channel and iSCSI require an LU mapping for a port to manage an access route between the host and the logical volume.

NVMe-oF, on the other hand, requires the following system components to be configured on the storage system between the host and the logical volume:

- NVM subsystem — A flash memory storage control system that supports the NVMe-oF communication protocol with one or more namespaces, and one or more communication ports (NVM subsystem ports).
- Namespace — A flash memory space formatted into a logical block.
- NVM subsystem port — A Fibre Channel port set to NVMe mode.

- Host identification (host NQN): Host name qualifier.
- Host-namespace path — Access permission to the namespace for each host NQN.
- Registered on the NVM subsystem.

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