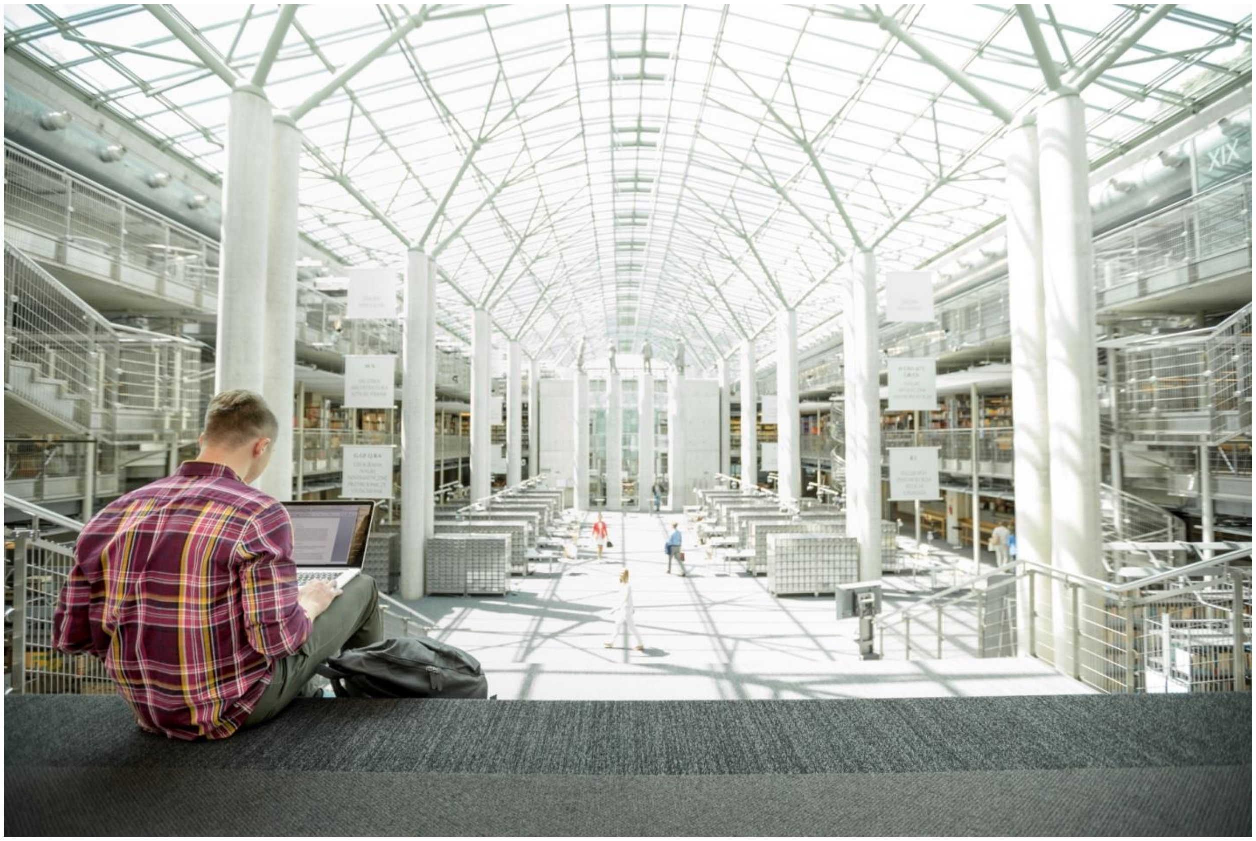

Cisco HyperFlex with Veeam Availability Suite for Multisite Deployments

Deployment Guide for Data Protection of Multisite Cisco HyperFlex Deployments through Veeam Availability Suite 9.5 Update 2 and Cisco UCS S3260 Storage Server

Last Updated: March 6, 2018

About the Cisco Validated Design Program

The Cisco Validated Design (CVD) program consists of systems and solutions designed, tested, and documented to facilitate faster, more reliable, and more predictable customer deployments. For more information visit

http://www.cisco.com/go/designzone.

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Executive Summary

The Cisco HyperFlex™ Systems solution together with Veeam Availability Suite gives customers a flexible, agile, and scalable infrastructure that is protected and easy to deploy. Building on top of the Cisco HyperFlex HX Data Platform’s built-in protection tools, Veeam Availability Suite expands the protection of your data with local and remote backups, VM-level replication and Backup Copy jobs. Today’s data centers are heterogeneous, and most administrators want to avoid siloed data protection for each application or infrastructure stack. Customers need data protection to work across the enterprise and for recovery to be self-service, easy, and fast—whether the data is local or remote.

Cisco and Veeam have partnered to deliver a joint solution which enables backup, restore and replicate, virtualized workloads running on Cisco HyperFlex , utilizing Veeam Availability Suite deployed on Cisco UCS S3260 Storage Server and Cisco UCS C240 LFF Rack Server. Ensure fast, reliable backup and recovery of virtual machines, critical data and applications with a data protection solution that provides enterprise availability, business agility, and operational efficiency. Veeam and Cisco's solution helps customers realize the full potential of virtualization and converged infrastructures by simplifying management to minimize risk, decrease downtime, and easily adapt to business demands. IT administrators can leverage policy-based controls for smarter data protection to recover the data they want, when they want it, enabling organizations to confidently deploy a high performance, compatible solution that has been tested and validated by Cisco and Veeam experts.

The Veeam Availability Solution for Cisco UCS is a best-of-breed solution that is the perfect answer for customers requiring an advanced, enterprise-class data availability solution for their virtual environments that is simple to order, deploy and manage. In addition, it can easily expand over time as the need increases. It provides fast, flexible and reliable recovery of virtualized applications and data bringing virtual machine backup and replication together in a single solution with award-winning support.

This Cisco Validated Design (CVD), Data Protection for Multisite Cisco HyperFlex with Veeam Availability Suite, is a certified solution built on a modern architecture that delivers fast, reliable recovery, reduced total cost of ownership (TCO) and a better user experience, and addresses the challenge of delivering agile protection for Cisco HyperFlex platform. This solution utilizes Cisco components such as Cisco UCS Manager, Cisco Fabric Interconnect 6248UP, Cisco HyperFlex Data Platform, Cisco HyperFlex HX220c and HX240c nodes, Cisco Nexus 9000 series networking and Cisco UCS S3260 Storage Server.

This document, details on protection of Multisite Cisco HyperFlex deployments with Veeam Availability Suite and Cisco UCS S3260 Storage Server, is in continuation of Deployment Guide for Cisco HyperFlex with Veeam Availability Suite which details on the protection of HyperFlex Cluster in a single site deployment.

A Cisco Validated Design (CVD) and pre-validated reference architectures facilitate faster, more reliable, and more predictable customer deployments:

- Each CVD has been extensively tested, validated, and documented by Cisco and partner experts
- CVD's minimize both integration and performance risks to ensure always-on availability in the enterprise

From design to configuration, instructions to bill of materials (BOMs), CVDs provide everything businesses need to deploy the solutions in the most efficient manner; everything is clearly and precisely laid out.

Solution Overview

Introduction

Designed specifically for virtual environments, Data Protection for Cisco HyperFlex with Veeam Availability Suite is integrated with VMware vSphere, helping ensure consistent and reliable virtual machine recovery.

The Cisco HyperFlex solution delivers next-generation hyperconvergence in a data platform to offer end-to-end simplicity for faster IT deployments, unifying computing, networking, and storage resources. The Cisco HyperFlex solution is built on the Cisco Unified Computing System™ (Cisco UCS®) platform and adheres to a data center architecture supporting traditional, converged, and hyperconverged systems with common policies and infrastructure management. The Cisco HyperFlex HX Data Platform is a purpose-built, high-performance, distributed file system delivering a wide range of enterprise-class data management and optimization services. This platform redefines distributed storage technology, expanding the boundaries of hyperconverged infrastructure with its independent scaling, continuous data optimization, simplified data management, and dynamic data distribution for increased data availability. This agile system is easy to deploy and manage, scales as your business needs change, and provides the first level of data availability. However, as with most systems, a second layer of protection that is equally agile is recommended. Veeam Availability Suite can meet this need.

Veeam is an industry leader within the data protection market. In the era of Digital Transformation, Veeam recognizes the new challenges companies across the globe face in enabling the Always-On Enterprise™, a business that must operate 24.7.365. To address this, Veeam has pioneered a new market of Availability for the Always-On Enterprise by helping organizations meet today's service-level objectives, enabling recovery of any IT service and related applications and data within seconds and minutes. Veeam consistently pushes the envelope in bringing sophisticated backup and disaster recovery functionality to enterprises and cloud providers

Veeam delivers efficient virtual machine (VM) backup and replication to dramatically lower the recovery time objective (RTO) and recovery point objective (RPO), for RTPO™ of <15 minutes for ALL applications and data. Veeam replication between HyperFlex clusters, both local and distributed, provides site-level DR. Veeam also provides backup and recovery at the VM- and item-level for instant recovery from more common, day-to-day problems. These isolated Veeam managed backups, stored on secondary storage, cloud or tape, allow organizations to meet both internal and external data protection and recovery requirements.

Audience

The intended audience for this document includes, but is not limited to, sales engineers, field consultants, professional services, IT managers, partner engineering, and customers looking to provision backup and recovery of virtualized application on Cisco HyperFlex Clusters deployed across data centers or in several Remote Offices, across different geographies.

Purpose of this Document

This document elaborates on design ,deployment and configuration procedures for protecting multisite Cisco HyperFlex deployments with Veeam Availability Suite and Cisco UCS S3260 Storage Server.

Solution Summary

This solution for Cisco HyperFlex and Cisco UCS S3260 Storage Server with Veeam Availability Suite delivers reliable and fast Backup and Replication of application VMs residing on multisite Cisco HyperFlex Clusters. The solution extends across the following:

- HyperFlex clusters deployed in Remote Office/Branch Office (ROBO)

- HyperFlex Cluster deployed in multiple Data Center with each Data Center having local repository to backup application VM through Veeam Availability Suite and Cisco UCS S3260 Storage Server

This solution can be accurately sized in accordance with present demands of enterprise deployments and thereafter can be scaled as per the future growth projections.

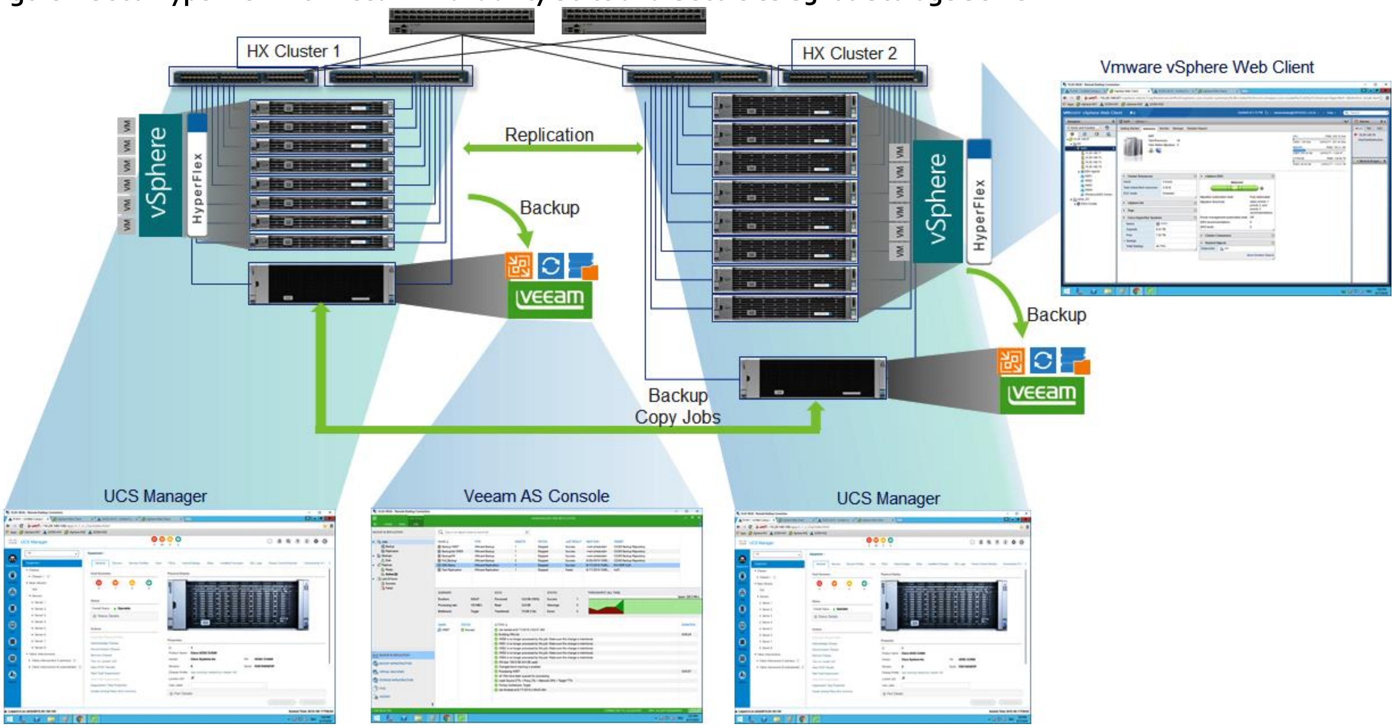
Veeam Availability Suite comprises of Veeam Repository, Veeam Proxy and Veeam Backup Server all reside on a single Cisco UCS S3260 Storage Server which provides up to 600 TB of raw storage capacity. Replication of application VM is executed to a separate Cisco HyperFlex Cluster.

Application VM deployed on HyperFlex ROBO Clusters are replicated through Cisco UCS C240 M4 LFF Rack Server to HyperFlex cluster on Primary Data Center using Veeam Availability Suite.

Figure 1 provides a high-level view of Cisco HyperFlex with Cisco S3260 Storage Server and Veeam Availability Suite and elaborates on the following:

- Replication of application VMs across Cisco HyperFlex Clusters through Veeam Availability Suite
- Backup of application VMs on Cisco S3260 Storage Server
- Protection of Backups with Backup copy jobs across Data Center through Veeam Availability Suite
- Management end points for Cisco HyperFlex, Cisco UCS S3260 Storage Server and Veeam Availability Suite

Figure 1 Cisco HyperFlex with Veeam Availability Suite and Cisco UCS S3260 Storage Server



Technology Overview

This CVD for Cisco HyperFlex with Veeam Availability Suite for Multisite Deployments, uses the following infrastructure and software components:

- Cisco Unified Computing System (Cisco UCS)
- Cisco HyperFlex Data Platform
- Cisco Nexus 9000
- Veeam Availability Suite 9.5 Update 2
- Windows 2016 Datacenter Edition for Veeam Availability Suite

This deployment guide uses the following models of above mentioned infrastructure components:

- Cisco UCS S3260 Storage Server
- Cisco UCS C240 M4 LFF Rack Server
- Cisco UCS HX220c M4 Node
- Cisco UCS HX240c M4 Node
- Cisco UCS 6200 Series Fabric Interconnects (FI)
- Cisco Nexus 9300 Series Platform Switches

The other optional software and hardware components of this deployment solution are:

- Cisco UCS Central provides a scalable management platform for managing multiple, globally distributed Cisco UCS domains with consistency by integrating with Cisco UCS Manager (USCM) to provide global configuration capabilities for pools, policies, and firmware. Cisco UCS Central platform eliminates disparate management environments. It supports up to 10,000 Cisco UCS servers (blade, rack, and Mini) and Cisco HyperFlex Systems. You can manage multiple Cisco UCS instances or domains across globally-distributed locations.

- Veeam Enterprise Manager provides a single “pane of glass” management for a globally dispersed Backup and Replication environment. It collects data from the backup servers and enables you to run backup and replication jobs across the entire back-up infrastructure and edit and clone jobs using a single job as a template. It also provides reporting data for various areas (for example, all jobs performed within the last 24 hours or 7 days, all VMs engaged in these jobs, and so on). Using indexing data consolidated on one server, Veeam Backup Enterprise Manager provides advanced capabilities to search for VM guest OS files in VM backups created on all backup server (even if they are stored in repositories on different sites), and recover them in a single click. Search for VM guest OS files is enabled through Veeam Backup Enterprise Manager itself; to streamline the search process, you can optionally deploy a Veeam Backup Search server in your backup infrastructure.

- Veeam WAN Accelerator is a dedicated component of the backup infrastructure responsible for global data caching and data deduplication. On each WAN accelerator, Veeam Backup and Replication installs the Veeam WAN Accelerator Service responsible for WAN acceleration tasks.

The above components are integrated using component and design best practices to deliver an integrated infrastructure for Enterprise and cloud data centers.

The next section provides a technical overview of the hardware and software components of the present solution design.

Cisco Unified Computing System

Cisco brings 30 years of breadth, leadership, and vision to guide businesses through networking and infrastructure challenges. Cisco's Unified Computing System (UCS) continues Cisco's long history of innovation in delivering integrated systems that deliver business results. Cisco UCS integrated infrastructure solutions speed up IT operations today and create the modern technology foundation needed for the critical business initiatives of tomorrow.

The Cisco Unified Computing System is a next-generation data center platform that unites compute, network, and storage access. The platform, optimized for virtual environments, is designed using open industry-standard technologies and aims to reduce total cost of ownership (TCO) and increase business agility. The system integrates a low-latency, lossless 10 Gigabit Ethernet unified network fabric with enterprise-class, x86-architecture servers. It is an integrated, scalable, multi chassis platform in which all resources participate in a unified management domain.

The main components of Cisco Unified Computing System are:

- **Computing**—The system is based on an entirely new class of computing system that incorporates rack-mount and blade servers based on Intel Xeon Processors.
- **Network**—The system is integrated onto a low-latency, lossless, 10-Gbps unified network fabric. This network foundation consolidates LANs, SANs, and high-performance computing networks which are separate networks today. The unified fabric lowers costs by reducing the number of network adapters, switches, and cables, and by decreasing the power and cooling requirements.
- **Virtualization**—The system unleashes the full potential of virtualization by enhancing the scalability, performance, and operational control of virtual environments. Cisco security, policy enforcement, and diagnostic features are now extended into virtualized environments to better support changing business and IT requirements.
- **Storage access**—The system provides consolidated access to both (Storage Area Network) SAN storage and Network Attached Storage (NAS) over the unified fabric. By unifying the storage access the Cisco Unified Computing System can access storage over Ethernet, Fibre Channel, Fibre Channel over Ethernet (FCoE), and iSCSI. This provides customers with choice for storage access and investment protection. In addition, the server administrators can pre-assign storage-access policies for system connectivity to storage resources, simplifying storage connectivity, and management for increased productivity.
- **Management**—The system uniquely integrates all system components which enable the entire solution to be managed as a single entity by the Cisco UCS Manager (UCSM). The Cisco UCS Manager has an intuitive graphical user interface (GUI), a command-line interface (CLI), and a robust application programming interface (API) to manage all system configuration and operations.

The Cisco Unified Computing System is designed to deliver:

- A reduced Total Cost of Ownership and increased business agility.
- Increased IT staff productivity through just-in-time provisioning and mobility support.
- A cohesive, integrated system which unifies the technology in the data center. The system is managed, serviced and tested as a whole.
- Scalability through a design for hundreds of discrete servers and thousands of virtual machines and the capability to scale I/O bandwidth to match demand.
- Industry standards supported by a partner ecosystem of industry leaders

Cisco Unified Computing System Components

Cisco Fabric Interconnects

The Cisco UCS 6200 Series Fabric Interconnect is a core part of the Cisco Unified Computing System, providing both network connectivity and management capabilities for the system. The Cisco UCS 6200 Series offers line-rate, low-latency, lossless 10 Gigabit Ethernet, Fibre Channel over Ethernet (FCoE) and Fibre Channel functions.

The Cisco UCS 6200 Series provides the management and communication backbone for the Cisco UCS C-Series and HX-Series rack-mount servers, Cisco UCS B-Series Blade Servers and Cisco UCS 5100 Series Blade Server Chassis. All servers and chassis, and therefore all blades, attached to the Cisco UCS 6200 Series Fabric Interconnects become part of a single, highly available management domain. In addition, by supporting unified fabric, the Cisco UCS 6200 Series provides both the LAN and SAN connectivity for all blades within its domain.

From a networking perspective, the Cisco UCS 6200 Series uses a cut-through architecture, supporting deterministic, low-latency, line-rate 10 Gigabit Ethernet on all ports, 1Tb switching capacity, 160 Gbps bandwidth per chassis, independent of packet size and enabled services. The product family supports Cisco low-latency, lossless 10 Gigabit Ethernet unified network fabric capabilities, which increase the reliability, efficiency, and scalability of Ethernet networks. The Fabric Interconnect supports multiple traffic classes over a lossless Ethernet fabric from a server through an interconnect. Significant TCO savings come from an FCoE-optimized server design in which network interface cards (NICs), host bus adapters (HBAs), cables, and switches can be consolidated.

Cisco UCS 6248UP Fabric Interconnect

The Cisco UCS 6248UP 48-Port Fabric Interconnect is a one rack unit (1 RU) 10 Gigabit Ethernet, FCoE and Fiber Channel switch offering up to 960-Gbps throughput and up to 48 ports. The switch has 32 1/10-Gbps fixed Ethernet, FCoE and FC ports and one expansion slot.

Figure 2 Cisco UCS 6248UP Fabric Interconnect

Cisco UCS S3260 Storage Server

The Cisco UCS® S3260 Storage Server, is a modular, high-density, high-availability dual-node rack server well suited for service providers, enterprises, and industry-specific environments. It provides dense, cost-effective storage to address your ever-growing data needs. Designed for a new class of data-intensive workloads, it is simple to deploy and excellent for applications for big data, data protection, software-defined storage environments, scale-out unstructured data repositories, media streaming, and content distribution.

Some of the key features of Cisco UCS S3260 Storage Server are:

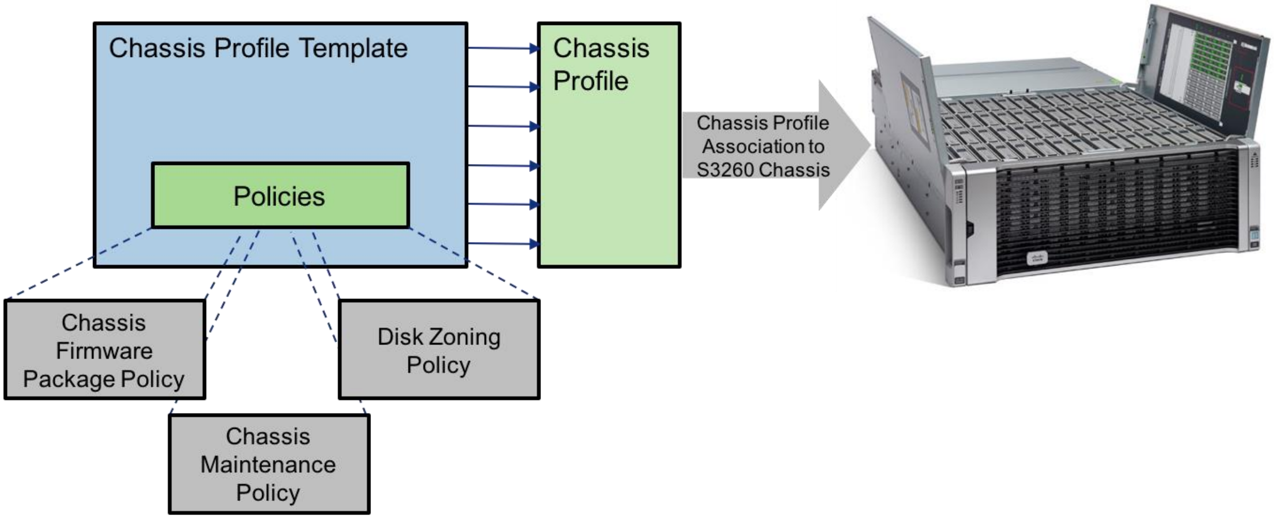
- Dual 2-socket server nodes based on Intel Xeon processor E5-2600 v2 or v4 CPUs with up to 36 cores per server node
- Up to 512 GB of DDR3 or DDR4 memory per server node (1 TB total)
- Support for high-performance Non-Volatile Memory Express (NVMe) and flash memory
- Massive 600-TB data storage capacity that easily scales to petabytes with Cisco UCS Manager
- Policy-based storage management framework for zero-touch capacity on demand
- Dual-port 40-Gbps system I/O controllers with Cisco UCS Virtual Interface Card (VIC) 1300 platform embedded chip
- Unified I/O for Ethernet or Fibre Channel to existing NAS or SAN storage environments
- Support for Cisco bidirectional (BiDi) transceivers, with 40-Gbps connectivity over existing 10-Gbps cabling infrastructure

For more information, see: http://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-c-series-rack-servers/datasheet-c78-735611.html

Figure 3 Cisco UCS C3260 M4 Rack Server

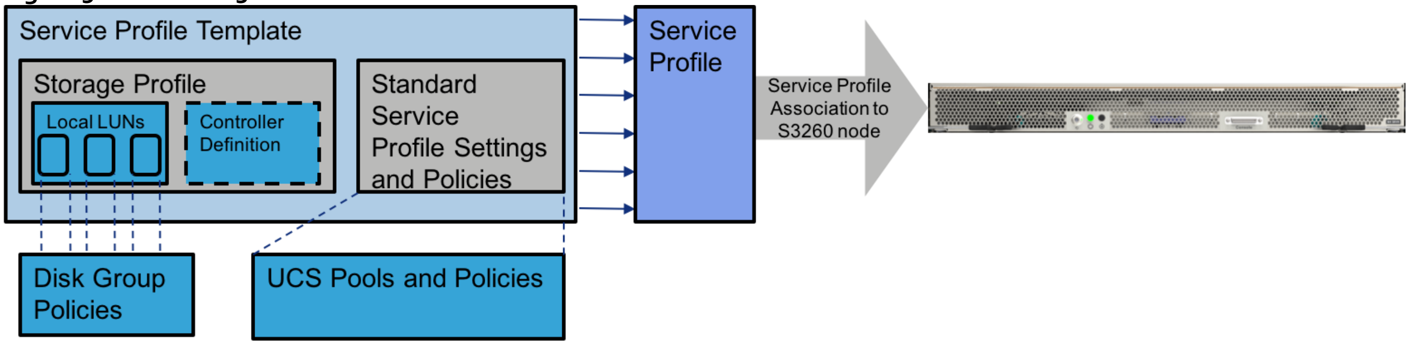
The S3260 can be CIMC managed, or Cisco UCS Manager managed as a registered Chassis with the Cisco UCS Fabric Interconnects. When the S3260 is Cisco UCS Manager managed, the Chassis will use a Chassis Profile can be generated from template, and will contain specifications for Firmware and Maintenance policies as well as the Disk Zoning Policy. The Disk Zoning Policy will be used to set how disk slot allocation occurs between server nodes.

Figure 4 Cisco UCS S3260 Chassis Profile Association


Chassis Profile Template
Policies
Chassis Profile
Chassis Profile Association to S3260 Chassis
Chassis Firmware Package Policy
Disk Zoning Policy
Chassis Maintenance Policy

Server Nodes in a Cisco UCS Manager managed S3260 are configured in nearly the same manner as standard Cisco UCS B-Series and Cisco UCS Manager managed Cisco UCS C-Series servers. The Server Nodes will use Service Profiles that can be provisioned from template, but will need to have a Storage Profile set within the Service Profile to be able to access the disk slots made available to it by the Disk Zoning Policy set within the Chassis Profile of the Chassis the Node is hosted within.

Figure 5 Cisco UCS S3260 Server Node Service Profile Association



Within the Storage Profile there are two main functions, Local LUN creation that will be specified by Disk Group Policies, which are set within the Storage Profile. The LUNs created from the Disk Group Policies will have options of RAID 0, 1, 5, 6, 10, 50, or 60 and will allow the selection of type, quantity, or manual specification of slot the disk should be used from, as well as drive configuration policies of the LUN. S3260 M3 server nodes will use a Controller Definition, which will set how the PCH Controller should handle the rear facing SSDs of the S3260 Chassis. The Controller Definition is specific to the SSD drives allocated to the node by the PCH Controller and will have valid settings of RAID 0, 1, or no RAID.

Cisco HyperFlex HX-Series Nodes

A HyperFlex cluster requires a minimum of three HX-Series nodes. Data is replicated across at least two of these nodes, and a third node is required for continuous operation in the event of a single-node failure. The HX-Series nodes combine the CPU and RAM resources for hosting guest virtual machines, with the physical storage resources used by the HyperFlex software. Each HX-Series node is equipped with one high-performance SSD drive for data caching and rapid acknowledgment of write requests and is also is equipped with up to the platform’s physical capacity of spinning disks for maximum data capacity.

Cisco HyperFlex HX220c-M4S Node

The Cisco HyperFlex HX220c-M4S rackmount server is one rack unit (1 RU) high and can mount in an industry-standard 19-inch rack. This small footprint configuration contains a minimum of three nodes with six 1.2 terabyte (TB) SAS drives that contribute to cluster storage capacity, a 120 GB SSD housekeeping drive, a 480 GB SSD caching drive, and two Cisco Flexible Flash (FlexFlash) Secure Digital (SD) cards that act as mirrored boot drives.

Figure 6 HX220c-M4S Node

Cisco HyperFlex HX240c-M4SX Node

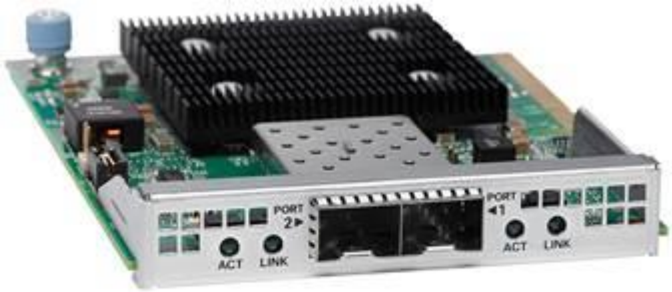
The Cisco HyperFlex HX240c-M4S rackmount server is two rack unit (2 RU) high and can mount in an industry-standard 19-inch rack. This capacity optimized configuration contains a minimum of three nodes, a minimum of fifteen and up to twenty-three 1.2 TB SAS drives that contribute to cluster storage, a single 120 GB SSD housekeeping drive, a single 1.6 TB SSD caching drive, and two FlexFlash SD cards that act as mirrored boot drives.

Figure 7 HX240c-M4SX Node

Cisco VIC 1227 MLOM Interface Card

The Cisco UCS Virtual Interface Card (VIC) 1227 is a dual-port Enhanced Small Form-Factor Pluggable (SFP+) 10-Gbps Ethernet and Fibre Channel over Ethernet (FCoE)-capable PCI Express (PCIe) modular LAN-on-motherboard (mLOM) adapter installed in the Cisco UCS HX-Series Rack Servers (**Error! Reference source not ound.**). The mLOM slot can be used to install a Cisco VIC without consuming a PCIe slot, which provides greater I/O expandability. It incorporates next-generation converged network adapter (CNA) technology from Cisco, enabling a policy-based, stateless, agile server infrastructure that can present up to 256 PCIe standards-compliant interfaces to the host that can be dynamically configured as either network interface cards (NICs) or host bus adapters (HBAs). The personality of the card is determined dynamically at boot time using the service profile associated with the server. The number, type (NIC or HBA), identity (MAC address and World Wide Name [WWN]), failover policy, and quality-of-service (QoS) policies of the PCIe interfaces are all determined using the service profile.

Figure 8 Cisco VIC 1227 mLOM Card



Cisco HyperFlex Converged Data Platform Software

The Cisco HyperFlex HX Data Platform is a purpose-built, high-performance, distributed file system with a wide array of enterprise-class data management services. The data platform's innovations redefine distributed storage technology, exceeding the boundaries of first-generation hyperconverged infrastructures. The data platform has all the features that you would expect of an enterprise shared storage system, eliminating the need to configure and maintain complex Fibre Channel storage networks and devices. The platform simplifies operations and helps ensure data availability. Enterprise-class storage features include the following:

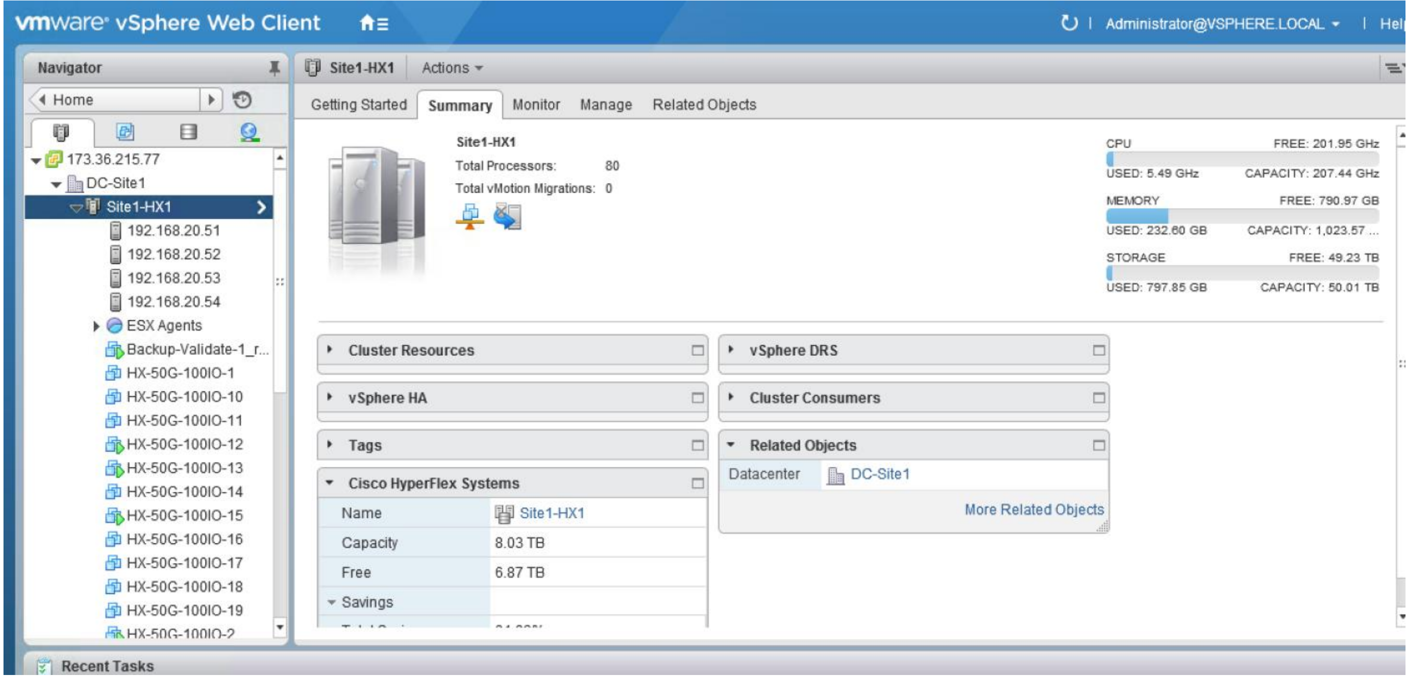
- **Replication** of all written data across the cluster so that data availability is not affected if single or multiple components fail (depending on the replication factor configured).
- **Deduplication** is always on, helping reduce storage requirements in which multiple operating system instances in client virtual machines result in large amounts of duplicate data.
- **Compression** further reduces storage requirements, reducing costs, and the log- structured file system is designed to store variable-sized blocks, reducing internal fragmentation.
- **Thin provisioning** allows large volumes to be created without requiring storage to support them until the need arises, simplifying data volume growth and making storage a "pay as you grow" proposition.

- **Fast, space-efficient clones** rapidly replicate virtual machines simply through metadata operations.
- **Snapshots** help facilitate backup and remote-replication operations: needed in enterprises that require always-on data availability.

Cisco HyperFlex HX Data Platform Administration Plug-in

The Cisco HyperFlex HX Data Platform is administered through a VMware vSphere web client plug-in. Through this centralized point of control for the cluster, administrators can create datastores, monitor the data platform health, and manage resource use. Administrators can also use this data to predict when the cluster will need to be scaled.

Figure 9 vCenter HyperFlex Web Client Plugin



Site1-HX1

Total Processors: 80

Total vMotion Migrations: 0

CPU FREE: 201.95 GHz
USED: 5.49 GHz CAPACITY: 207.44 GHz

MEMORY FREE: 790.97 GB
USED: 232.60 GB CAPACITY: 1,023.57 ...

STORAGE FREE: 49.23 TB
USED: 797.85 GB CAPACITY: 50.01 TB

Datacenter: DC-Site1

Cisco HyperFlex Systems

Name	Site1-HX1
Capacity	8.03 TB
Free	6.87 TB
Savings	

Cisco HyperFlex HX Data Platform Controller

A Cisco HyperFlex HX Data Platform controller resides on each node and implements the Cisco HyperFlex HX Distributed Filesystem. The storage controller runs in user space within a virtual machine intercepting and handling all I/O from guest virtual machines. The storage controller VM uses the VMDirectPath I/O feature to provide PCI pass-through control of the physical server's SAS disk controller. This method gives the controller VM full control of the physical disk resources, utilizing the SSD drives as a read/write caching layer, and the HDDs as a capacity layer for distributed storage. The controller integrates the data platform into VMware software through two preinstalled VMware ESXi vSphere Installation Bundles (VIBs):

- **IOvisor:** The IOvisor is deployed on each node of the cluster and acts as a stateless NFS proxy that looks at each IO request and determines which cache vNode it belongs to and routes the IO to the physical node that owns that cache vNode. In the event of a failure, the IOvisor transparently handles it and will retry the same request to another copy of the data based on new information it receives. Decoupling the IOvisor from the controller VM enables access to the distributed filesystem and prevents hotspots. Compute-only nodes, and VMs continue to perform storage IO in the event of a disk, SSD, or even a storage controller failure.
- **VMware API for Array Integration (VAAI):** This storage offload API allows vSphere to request advanced file system operations such as snapshots and cloning. The controller implements these operations through the manipulation of metadata rather than actual data copying, providing rapid response, and thus rapid deployment of new environments.

Data Operations and Distribution

The Cisco HyperFlex HX Data Platform controllers handle all read and write operation requests from the guest VMs to their virtual disks (VMDK) stored in the distributed datastores in the cluster. The data platform distributes the data across multiple nodes of the cluster, and across multiple capacity disks of each node, per the replication level policy selected during the cluster setup. This method avoids storage hotspots on specific nodes, and on specific disks of the nodes, and thereby also avoids networking hotspots or congestion from accessing more data on some nodes versus others.

Replication Factor

Enterprise class hyperconverged solutions should have three copies of data blocks across any three data nodes. This helps to ensure high availability during rare failure events such as single node failure and disk failure or during software and firmware upgrades, performed on a HX System. Thus three copies, or a replication factor of 3 (RF=3), is a default setting and also a recommended best practice for HyperFlex systems.

- **Replication Factor 3:** For every I/O write committed to the storage layer, 2 additional copies of the blocks written will be created and stored in separate locations, for a total of 3 copies of the blocks. Blocks are distributed in such a way as to ensure multiple copies of the blocks are not stored on the same disks, nor on the same nodes of the cluster. This setting can tolerate simultaneous failures of 2 disks, or 2 entire nodes without losing data and resorting to restore from backup or other recovery processes.

- **Replication Factor 2:** For every I/O write committed to the storage layer, 1 additional copy of the blocks written will be created and stored in separate locations, for a total of 2 copies of the blocks. Blocks are distributed in such a way as to ensure multiple copies of the blocks are not stored on the same disks, nor on the same nodes of the cluster. This setting can tolerate a failure of 1 disk, or 1 entire node without losing data and resorting to restore from backup or other recovery processes.

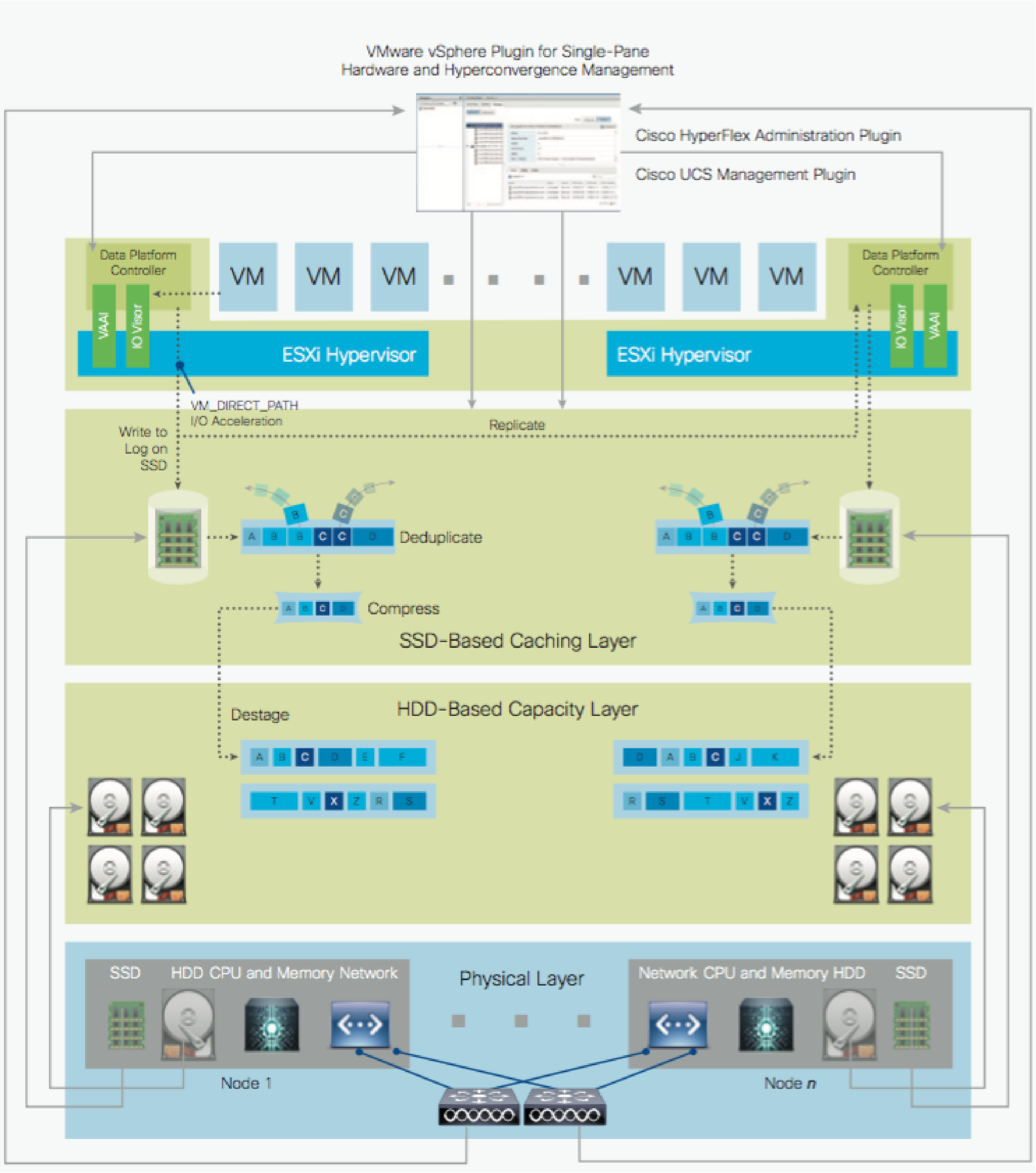
Data Write Operations

For each write operation, data is written to the local caching SSD on the node where the write originated, and replica copies of that write are written to the caching SSD of the remote nodes in the cluster, per the replication factor setting. For example, at RF=3 a write will be written locally where the VM originated the write, and two additional writes will be committed in parallel on two other nodes. The write operation will not be acknowledged until all three copies are written to the caching layer SSDs. Written data is also cached in a write log area resident in memory in the controller VM, along with the write log on the caching SSDs (Figure 10). This process speeds up read requests when reads are requested of data that has recently been written.

Data Destaging, Deduplication and Compression

The Cisco HyperFlex HX Data Platform constructs multiple write caching segments on the caching SSDs of each node in the distributed cluster. As write cache segments become full, and based on policies accounting for I/O load and access patterns, those write cache segments are locked and new writes roll over to a new write cache segment. The data in the now locked cache segment is destaged to the HDD capacity layer of the node. During the destaging process, data is deduplicated and compressed before being written to the HDD capacity layer. The resulting data after deduplication and compression can now be written in a single sequential operation to the HDDs of the server, avoiding disk head seek thrashing and accomplishing the task in the minimal amount of time (Figure 10). Since the data is already deduplicated and compressed before being written, the platform avoids additional I/O overhead often seen on competing systems, which must later do a read/dedupe/compress/write cycle.

Figure 10 HyperFlex HX Data Platform Data Movement



Data Read Operations

For data read operations, data may be read from multiple locations. For data that was very recently written, the data is likely to still exist in the write log of the local platform controller memory, or the write log of the local caching SSD. If local write logs do not contain the data, the distributed filesystem metadata will be queried to see if the data is cached elsewhere, either in write logs of remote nodes, or in the dedicated read cache area of the local and remote SSDs. Finally, if the data has not been accessed in a significant amount of time, the filesystem will retrieve the data requested from the HDD capacity layer. As requests for reads are made to the distributed filesystem and the data is retrieved from the HDD capacity layer, the caching SSDs populate their dedicated read cache area to speed up subsequent requests for the same data. This multi-tiered distributed system with several layers of caching techniques, insures that data is served at the highest possible speed, leveraging the caching SSDs of the nodes fully and equally.

Cisco HyperFlex Storage Integration with Veeam

Veeam Backup & Replication integrates with HyperFlex by calling Cisco's native snapshot APIs which improve the performance of backup and replication of VMware vSphere VMs hosted on Cisco HyperFlex. HyperFlex snapshots leverage VMware vSphere Storage APIs Array Integration (VAAI), which enables VMware vSphere ESXi hosts to communicate with storage devices and offload storage operations such as snapshot creation and cloning to the storage controller. Veeam Backup & Replication can use HyperFlex Snapshots for VM data processing, which helps speed up backup and replication operations, reduce impact of backup and replication activities on the production environment and improve Recovery Point Objectives (RPO). During the Backup or Replication process, Veeam processes application aware consistency with the Agentless VM Ingest processing and uses the HyperFlex Snapshots to preserve this stage for backup. Cisco's integration into VMware allow Veeam to completely avoid the usage of VMware VM Snapshots. For more details, please visit Cisco HyperFlex Data Platform Backup Integration Guide.

Veeam Availability Suite

Veeam is an industry leader within the data protection market. In the era of Digital Transformation, Veeam recognizes the new challenges companies across the globe face in enabling the Always-On Enterprise™, a business that must operate 24.7.365. To address this, Veeam has pioneered a new market of Availability for the Always-On Enterprise by helping organizations meet today's service-level objectives, enabling recovery of any IT service and related applications and data within seconds and minutes. Veeam consistently pushes the envelope in bringing sophisticated backup and disaster recovery functionality to enterprises and cloud providers.

Backup

Veeam Backup & Replication operates at the virtualization layer and uses an image-based approach for VM backup. To retrieve VM data, no agent software needs to be installed inside the guest OS. Instead, Veeam Backup & Replication leverages vSphere snapshot capabilities and Application Aware Processing. When a new backup session starts, a snapshot is taken to create a cohesive point-in-time copy of a VM including its configuration, OS, applications, associated data, system state and so on. Veeam Backup & Replication uses this point-in-time copy to retrieve VM data. Image-based backups can be used for different types of recovery, including full VM recovery, VM file recovery, Instant VM Recovery, file-level recovery and application item recovery.

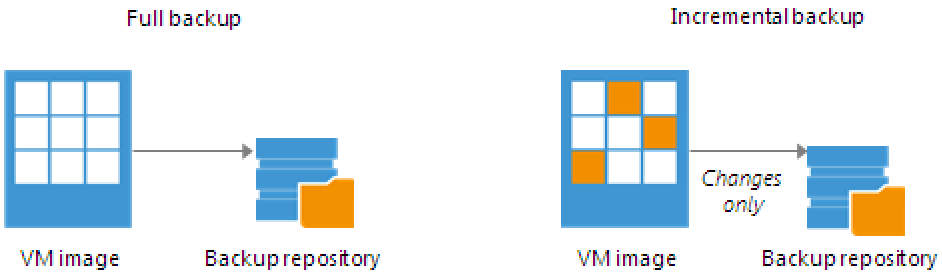
Use of the image-based approach allows Veeam Backup & Replication to overcome shortfalls and limitations of traditional backup. It also helps streamline recovery verification and the restore process — to recover a single VM, there is no need to perform multiple restore operations. Veeam Backup & Replication uses a cohesive VM image from the backup to restore a VM to the required state without the necessity for manual reconfiguration and adjustment. In Veeam Backup & Replication, backup is a job-driven process where one backup job can be used to process one or more VMs. A job is a configuration unit of the backup activity. Essentially, the job defines when, what, how and where to back up. It indicates what VMs should be processed, what components should be used for retrieving and processing VM data, what backup options should be enabled and where to save the resulting backup file. Jobs can be started manually by the user or scheduled to run automatically. The resulting backup file stores compressed and deduplicated VM data. Compression and Deduplication is done by the Veeam Proxy server.

Regardless of the Backup method you use, the first run of a job creates a full backup of VM image. Subsequent job runs are incremental — Veeam Backup & Replication copies only those data blocks that have changed since the last backup job run. To keep track of changed data blocks, Veeam Backup & Replication uses different approaches, including VMware's Changed Block Tracking (CBT) technology.

Changed Block Tracking

To perform incremental backup, Veeam Backup & Replication needs to know which data blocks have changed since the previous job run.

Figure 11 Change Block Tracking



For VMware VMs with hardware version 7 or later, Veeam Backup & Replication employs VMware vSphere Changed Block Tracking (CBT) — a native VMware feature. Instead of scanning VMFS, Veeam Backup & Replication queries CBT on vSphere through VADP and gets the list of blocks that have changed since the last run of this particular job. Use of CBT increases the speed and efficiency of block-level incremental backups. CBT is enabled by default; if necessary, you can disable it in the settings of a specific backup job.

Restore

Veeam Backup & Replication offers a number of recovery options for various disaster recovery scenarios:

- **Veeam Explorer** enables you to restore Single Application specific items
- **Instant VM Recovery** enables you to instantly start a VM directly from a backup file
- **Full VM recovery** enables you to recover a VM from a backup file to its original or another location
- **VM file recovery** enables you to recover separate VM files (virtual disks, configuration files and so on)
- **Virtual drive restore** enables you to recover a specific hard drive of a VM from the backup file, and attach it to the original VM or to a new VM
- **Windows file-level recovery** enables you to recover individual Windows guest OS files (from FAT, NTFS and ReFS file systems)
- **Multi-OS file-level recovery** enables you to recover files from 15 different guest OS file systems

Veeam Backup & Replication uses the same image-level backup for all data recovery operations. You can restore VMs, VM files and drives, application objects and individual guest OS files to the most recent state or to any available restore point.

Veeam Explorer

Veeam Explorers are tools included in all editions of Veeam Backup & Replication. As of v9 and restore application items directly from VM backups and replicas. It provides fast and effortless Active Directory, Exchange, SharePoint, SQL Server and Oracle recovery without needing to provision extra storage, deploy agents, restore an entire virtual machine (VM) for granular recovery or spin anything up in an isolated network. This includes powerful, easy-to-use and affordable eDiscovery and granular recovery for:

- **Microsoft Active Directory:** Search and restore all Active Directory object types (e.g., users, groups, computer accounts, contacts, expiring links), Group Policy Objects (GPOs), Active Directory-integrated Microsoft DNS records and Configuration Partition objects.

- **Microsoft Exchange:** Get instant visibility into Exchange 2010, 2013 and 2016 backups, advanced search capabilities and quick recovery of individual Exchange items (e.g., emails, contacts, notes, etc.), Online Archive mailboxes, Purges folder support and hard-deleted (i.e., permanently deleted) items; eDiscovery features include detailed export reports and export size estimation based on query search criteria.
- **Microsoft SharePoint:** Get instant visibility into SharePoint 2010, 2013 and 2016 backups, search for and quickly restore full SharePoint sites, item permissions and specific files. Export recovered items directly to their original SharePoint server or send them as an email attachment.
- **Microsoft SQL Server:** Get fast transaction- and table-level recovery of SQL databases, including agentless transaction log backup and replay, so you can restore your SQL databases to a precise point in time and achieve low RTPO.
- **Oracle:** Get transaction-level recovery of Oracle databases including agentless transaction log backup, so you can restore your Oracle databases to a precise point in time, self-service restore and restore via PowerShell.

Each Explorer has a corresponding User guide.

Instant VM Recovery

With instant VM recovery, you can immediately restore a VM into your production environment by running it directly from the backup file. Instant VM recovery helps improve recovery time objectives (RTO), minimize disruption and downtime of production VMs. It is like having a "temporary spare" for a VM; users remain productive while you can troubleshoot an issue with the failed VM.

When instant VM recovery is performed, Veeam Backup & Replication uses the Veeam vPower technology to mount a VM image to an ESX(i) host directly from a compressed and deduplicated backup file. Since there is no need to extract the VM from the backup file and copy it to production storage, you can restart a VM from any restore point (incremental or full) in a matter of minutes.

After the VM is back online you can use VMware storage vMotion to migrate the VM back to production storage.

VM Object Recovery

Veeam Backup & Replication can help you to restore specific VM files (.vmdk, .vmx and others) if any of these files are deleted or the datastore is corrupted. This option provides a great alternative to full VM restore, for example, when your VM configuration file is missing and you need to restore it. Instead of restoring the whole VM image to the production storage, you can restore the specific VM file only. Another data recovery option provided by Veeam Backup & Replication is restore of a specific hard drive of a VM. If a VM hard drive becomes corrupted for some reason (for example, with a virus), you can restore it from the image-based backup to any good-to-know point in time.

Replication

To help ensure efficient and reliable data protection in your virtual environment, Veeam Backup & Replication complements image-based backup with image-based replication. Replication is the process of copying a VM from its primary location (source host) to a destination location (redundant target host). Veeam Backup & Replication creates an exact copy of the VM (replica), registers it on the target host and maintains it in sync with the original VM.

Replication provides the best recovery time objective (RTO) and recovery point objective (RPO) values, as you actually have a copy of your VM in a ready-to-start state. That is why replication is commonly recommended for the most critical VMs that need minimum RTOs. Veeam Backup & Replication provides means to perform both onsite replication for high availability (HA) scenarios and remote (offsite) replication for disaster recovery (DR) scenarios. To facilitate replication over WAN or slow connections, Veeam Backup & Replication optimizes traffic transmission — it filters out unnecessary data blocks (such as, duplicate data blocks, zero data blocks or blocks of swap files) and compresses replica traffic. Veeam Backup & Replication also allows you to apply network throttling rules to prevent replication jobs from consuming the entire bandwidth available in your environment.

Replication is a job-driven process with one replication job used to process one or more VMs. You can start the job manually every time you need to copy VM data or, if you want to run replication unattended, create a schedule to start the job automatically. Scheduling options for replication jobs are similar to those for backup jobs.

WAN Acceleration

WAN accelerators are optional components in the replication infrastructure. You can use WAN accelerators if you replicate VMs over a slow connection or over the WAN.

In the replication process, WAN accelerators are responsible for global data caching and deduplication. To use WAN acceleration, you must deploy two WAN accelerators in the following manner:

- The source WAN accelerator must be deployed in the source side, close to the backup proxy running the source-side Data Mover Service.
- The target WAN accelerator must be deployed in the target side, close to the backup proxy running the target-side Data Mover Service.

Deployment Types

Veeam Backup & Replication supports a number of replication scenarios that depend on the location of the target host and the data transport path.

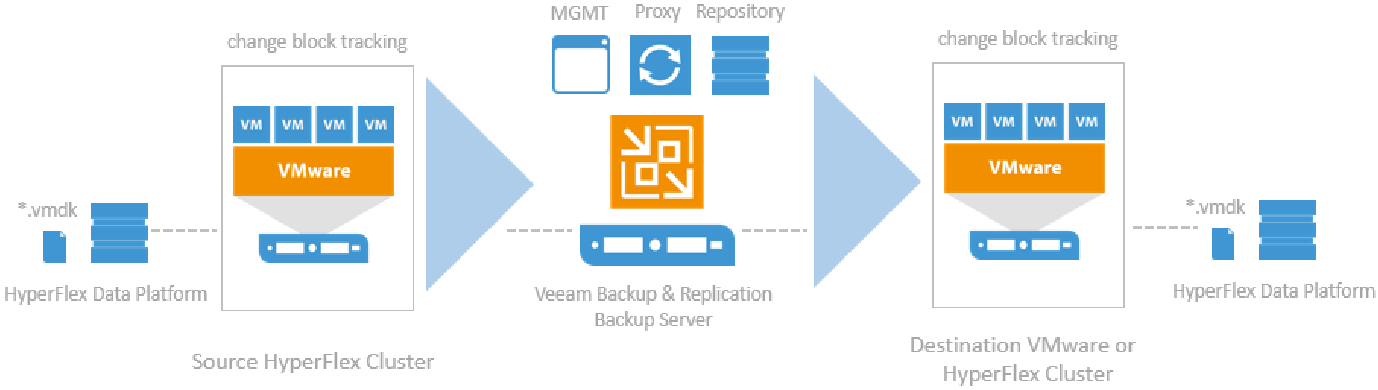
Onsite Replication

If the source host and the target host are located in the same site, you can perform onsite replication.

Onsite replication requires the following replication infrastructure components:

- **Backup proxy**. In the onsite replication scenario, the source-side Data Mover Service and the target-side Data Mover Service are started on the same backup proxy. The backup proxy must have access to the backup server, source host, target host and backup repository holding replica metadata.
- **Backup repository** for storing replica metadata

Figure 12 Veeam Backup & Replication Components and Data Movement



In the onsite replication scenario, Veeam Backup & Replication does not perform data compression. Replication traffic is transferred uncompressed between the two Data Mover Services started on the same backup proxy.

Offsite Replication

If the source host is located in the primary site and the target host is located in the DR site, you can perform offsite replication.

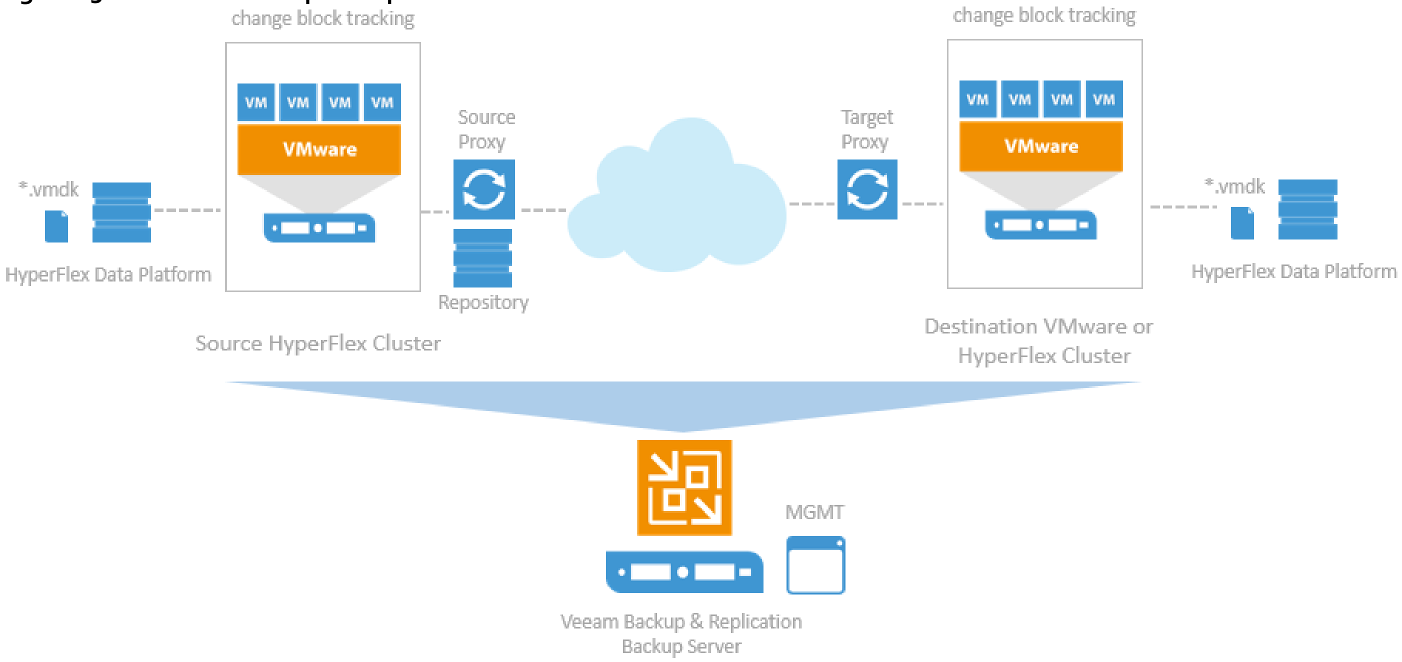
Offsite replication can run over two data paths:

- Direct data path
- Through a pair of WAN accelerators

Direct Data Path

The common requirement for offsite replication is that one Data Mover Service runs in the production site, closer to the source host, and another Data Mover Service runs in the remote DR site, closer to the target host. During backup, the Data Mover Services maintain a stable connection, which allows for uninterrupted operation over the WAN or slow links.

Figure 13 Veeam Direct path replication



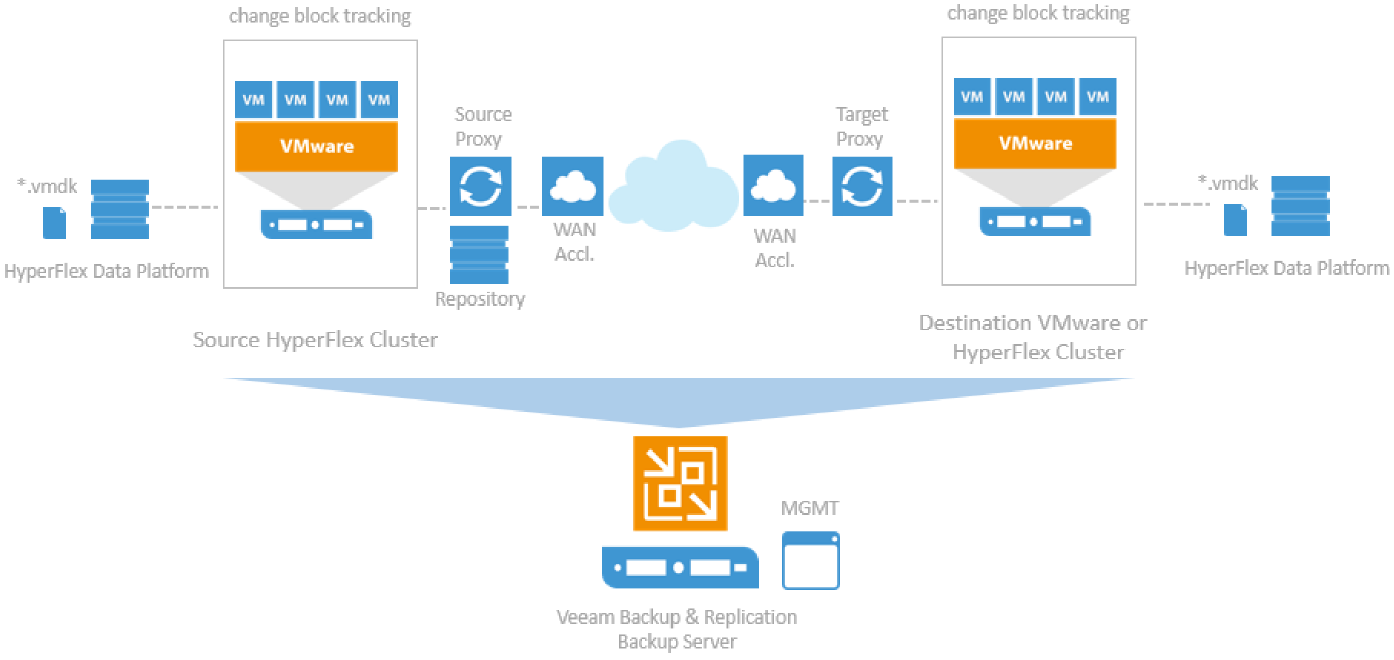
WAN Accelerators

If you have a high latency WAN link, you can replicate VM data through a pair of WAN accelerators. WAN accelerators provide advanced technologies to optimize VM data transfer:

- Global data caching and deduplication
- Resume on disconnect for uninterrupted data transfer

WAN accelerators add a new layer in the backup infrastructure — a layer between the source-side Data Mover Service and the target-side Data Mover Service. The data flow goes from the source backup proxy via a pair of WAN accelerators to the target backup proxy that, finally, transports VM data to the target host.

Figure 14 Veeam Replication through WAN Accelerators



Failover and Failback

In case of software or hardware malfunction, you can quickly recover a corrupted VM by failing over to its replica. When you perform failover, a replicated VM takes over the role of the original VM. You can fail over to the latest state of a replica or to any of its good known restore points.

In Veeam Backup & Replication, failover is a temporary intermediate step that should be further finalized. Veeam Backup & Replication offers the following options for different disaster recovery scenarios:

- You can perform **permanent failover** to leave the workload on the target host and let the replica VM act as the original VM. Permanent failover is suitable if the source and target hosts are nearly equal in terms of resources and are located on the same HA site.
- You can perform **failback** to recover the original VM on the source host or in a new location. Failback is used in case you failed over to a DR site that is not intended for continuous operations and would like to move the operations back to the production site when the consequences of a disaster are eliminated.

Veeam Backup & Replication supports failover and failback operations for one VM and for several VMs. In case one or several hosts fail, you can use failover plans to restore operations with minimum downtime.

Failover-Plans

If you have a number of VMs running interdependent applications, you need to failover them one by one, as a group. To do this automatically, you can prepare a failover plan.

In a failover plan, you set the order in which VMs must be processed and time delays for VMs. The time delay is an interval of time for which Veeam Backup & Replication must wait before starting the failover operation for the next VM in the list. It helps to ensure that some VMs, such as a DNS server, are already running at the time the dependent VMs start. The failover plan must be created in advance. In case the primary VM group goes offline, you can start the corresponding failover plan manually. When you start the procedure, you can choose to fail over to the latest state of a VM replica or to any of its good known restore points.

Planned Failover

If you know that your primary VMs are about to go offline, you can proactively switch the workload to their replicas. A planned failover is smooth manual switching from a primary VM to its replica with minimum interrupting in operation. You can use the planned failover, for example, if you plan to perform datacenter migration, maintenance or software upgrade of the primary VMs. You can also perform planned failover if you have an advance notice of a disaster approaching that will require taking the primary servers offline.

Failback

If you want to resume operation of a production VM, you can fail back to it from a VM replica. When you perform failback, you get back from the VM replica to the original VM, shift your I/O and processes from the target host to the production host and return to the normal operation mode.

If you managed to restore operation of the source host, you can switch from the VM replica to the original VM on the source host. If the source host is not available, you can restore the original VM to a new location and switch back to it.

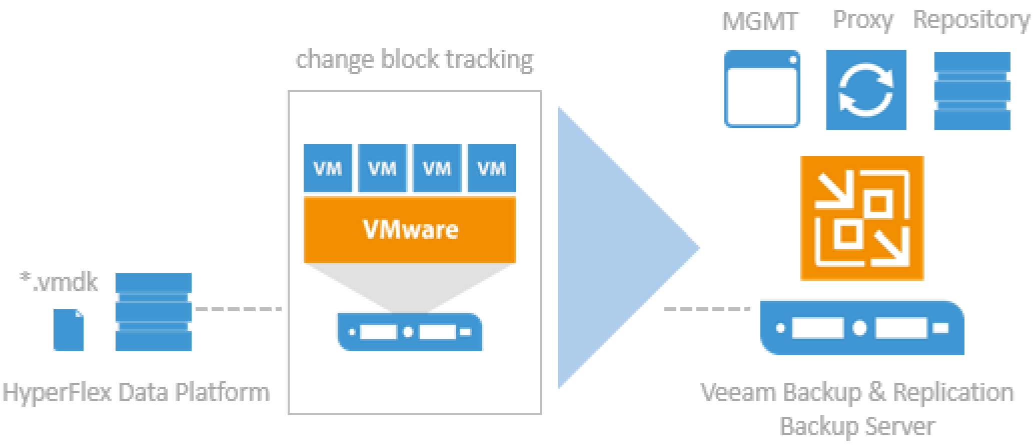
Backup Server

Components

Veeam Availability Suite combines the backup, restore and replication capabilities of Veeam Backup & Replication™ with the advanced monitoring, reporting and capacity planning functionality of Veeam ONE™. Veeam Availability Suite delivers everything you need to reliably protect and manage your Cisco HyperFlex VMware environment. Veeam Backup & Replication is a modular solution that lets you build a scalable backup infrastructure for environments of different sizes and configuration. The installation package of Veeam Backup & Replication includes a set of components that you can use to configure the backup infrastructure. Some components are mandatory and provide core functionality; some components are optional and can be installed to provide additional functionality for your business and deployment needs. You can co-install all Veeam Backup & Replication components on the same machine, physical or virtual, or you can set them up separately for a more scalable approach.

Figure 15 shows an overview on the main Veeam components.

Figure 15 Veeam Backup & Replication Components



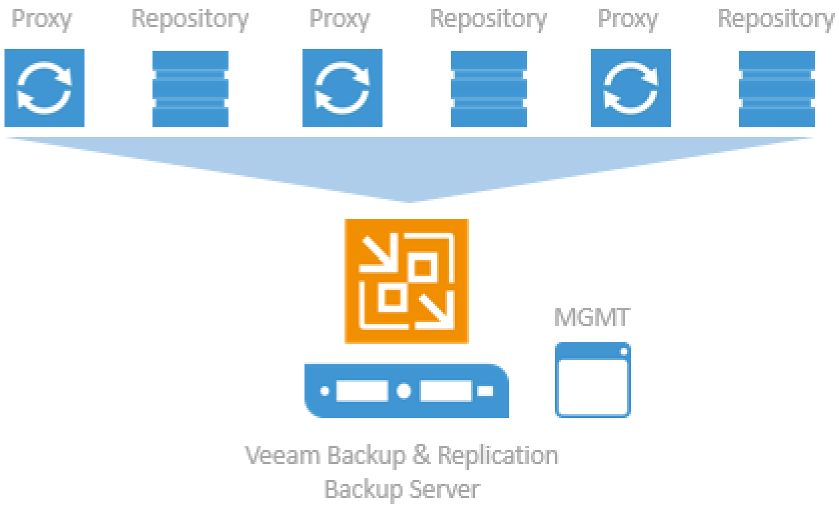
Backup Server

The backup server is a Windows-based physical or virtual machine on which Veeam Backup & Replication is installed. It is the core component in the backup infrastructure that fills the role of the "configuration and control center". The backup server performs all types of administrative activities:

- **Coordinates** backup, replication, recovery verification and restore tasks
- **Controls** job scheduling and resource allocation
- **Manages** all Proxy and Repository servers and other components of the backup infrastructure

The backup server is used to set up and manage backup infrastructure components as well as specify global settings for the backup infrastructure.

Figure 16 Veeam Backup Server Management



In addition to its primary functions, a newly deployed backup server also performs the roles of the default backup proxy and the backup repository.

The backup server uses the following services and components:

- **Veeam Backup Service** is a Windows service that coordinates all operations performed by Veeam Backup & Replication such as backup, replication, recovery verification and restore tasks. The Veeam

Backup Service runs under the Local System account or account that has the Local Administrator permissions on the backup server.

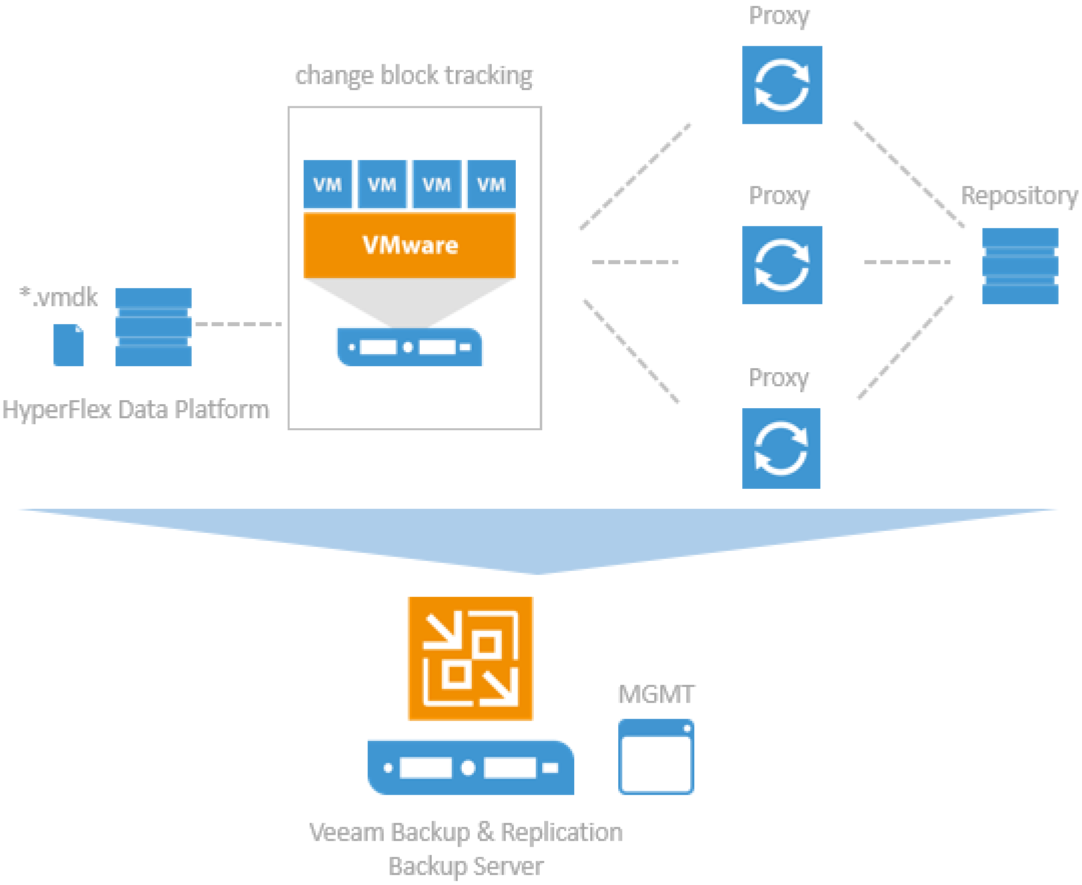
- **Veeam Backup Shell** provides the application user interface and allows user access to the application's functionality.
- **Veeam Guest Catalog Service** is a Windows service that manages guest OS file system indexing for VMs and replicates system index data files to enable search through guest OS files. Index data is stored in the Veeam Backup Catalog — a folder on the backup server. The Veeam Guest Catalog Service running on the backup server works in conjunction with search components installed on Veeam Backup Enterprise Manager and (optionally) a dedicated Microsoft Search Server.
- **Veeam Backup SQL Database** is used by Veeam Backup Service, Veeam Backup Shell and Veeam Guest Catalog Service to store data about the backup infrastructure, jobs, sessions and so on. The database instance can be located on a SQL Server installed either locally (on the same machine where the backup server is running) or remotely.
- **Veeam Backup PowerShell Snap-In** is an extension for Microsoft Windows PowerShell 2.0. Veeam Backup PowerShell adds a set of cmdlets to allow users to perform backup, replication and recovery tasks through the command-line interface of PowerShell or run custom scripts to fully automate operation of Veeam Backup & Replication.
- **Backup Proxy Services**. In addition to dedicated services, the backup server runs a set of data mover services.

Backup Proxy

The backup proxy is an architecture component that sits between data source and target and is used to process jobs and deliver backup traffic. In particular, the backup proxy tasks include retrieving VM data from the production storage, compressing, deduplicating and sending it to the backup repository (for example, if you run a backup job) or another backup proxy (for example, if you run a replication job). As the data handling task is assigned to the backup proxy, the backup server becomes the “point of control” for dispatching jobs to proxy servers.

The role of a backup proxy can be assigned to a dedicated Windows server (physical or virtual) in your environment. You can deploy backup proxies both in the primary site and in remote sites. To optimize performance of several concurrent jobs, you can use a number of backup proxies. In this case, Veeam Backup & Replication will distribute the backup workload between available backup proxies.

Figure 17 Veeam Distributed Proxy Server Deployment



Use of backup proxies lets you easily scale your backup infrastructure up and down based on your demands. Backup proxies run light-weight services that take a few seconds to deploy. The primary role of the backup proxy is to provide an optimal route for backup traffic and enable efficient data transfer.

The backup proxy uses the following services and components:

- **Veeam Installer Service** is an auxiliary service that is installed and started on any Windows server once it is added to the list of managed servers in the Veeam Backup & Replication console. This service analyses the system, installs and upgrades necessary components and services depending on the role selected for the server.
- **Veeam Data Mover Service** is responsible for deploying and coordinating executable modules that act as "data movers" and perform main job activities on behalf of Veeam Backup & Replication, such as communicating with VMware Tools, copying VM files, performing data deduplication and compression and so on.

Backup Repository

A backup repository is a location used by Veeam Backup & Replication jobs to store backup files, copies of VMs and metadata for replicated VMs. By assigning different repositories to jobs and limiting the number of parallel jobs for each one, you can balance the load across your backup infrastructure.

You can configure one of the following types of backup repositories:

- **Microsoft Windows server with local or directly attached storage.** The storage can be a local disk, directly attached disk-based storage (such as a USB hard drive), or iSCSI/FC SAN LUN in case the server is connected into the SAN fabric.

- **Linux server with local, directly attached storage or mounted NFS.** The storage can be a local disk, directly attached disk-based storage (such as a USB hard drive), NFS share, or iSCSI/FC SAN LUN in case the server is connected into the SAN fabric.

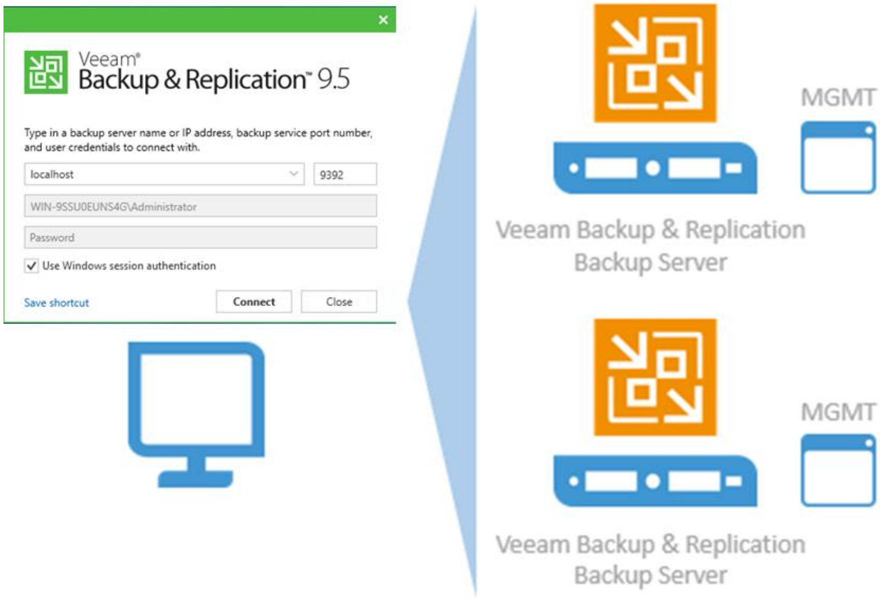
- **CIFS (SMB) share**. SMB share cannot host Veeam Data Mover Services. For this reason, data to the SMB share is written from the gateway server. By default, this role performed by a backup proxy that is used by the job for data transport.

- **Deduplicating storage appliance**. Veeam Backup & Replication supports different deduplicating storage appliances.

Backup & Replication Console

The Veeam Backup & Replication console is a separate client-side component that provides access to the backup server. The console is installed locally on the backup server by default. You can also use it in a standalone mode — install the console on a dedicated machine and access Veeam Backup & Replication remotely over the network. The console lets you log into Veeam Backup & Replication and perform all kinds of data protection and disaster recovery operations as if you are working on the backup server.

Figure 18 Veeam Backup & Replication Console



Type in a backup server name or IP address, backup service port number, and user credentials to connect with.

localhost 9392

WIN-9SSU0EUNS4G\Administrator

Password

☑ Use Windows session authentication

Veeam®
Backup & Replication™ 9.5
Save shortcut
Connect
Close
MGMT
Veeam Backup & Replication
Backup Server
MGMT
Veeam Backup & Replication
Backup Server

You can install as many remote consoles as you need so that multiple users can access Veeam Backup & Replication simultaneously. Veeam Backup & Replication prevents concurrent modifications on the backup server.

Backup Proxy

Transport Modes

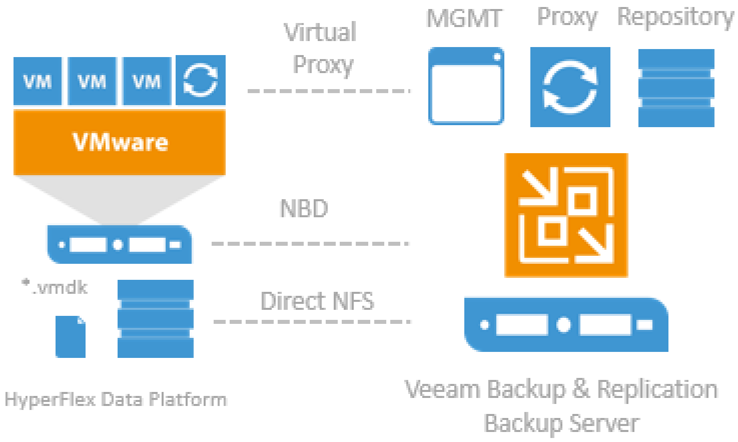
Job efficiency and time required for job completion greatly depends on the transport mode. The transport mode is a method that is used by the Veeam Data Mover Service to retrieve VM data from the source and write VM data to the target.

For data retrieval, Veeam Backup & Replication offers the following modes:

- Direct storage access

- Virtual appliance
- Network

Figure 19 Veeam Backup & Replication Transport Modes



In the **Direct storage access** mode, Veeam Backup & Replication reads/writes data directly from/to the storage system where VM data or backups are located. With the Direct NFS access mode for Cisco HyperFlex, Veeam Backup & Replication bypasses the ESX(i) host and reads/writes data directly from/to NFS datastores. To do this, Veeam Backup & Replication deploys its native NFS client on the backup proxy and uses it for VM data transport. VM data still travels over the LAN but there is no load on the ESX(i) host.

The **Virtual appliance mode** is recommended if the role of a backup proxy is assigned to a VM. In the Virtual appliance mode, Veeam Backup & Replication uses the VMware SCSI HotAdd capability that allows attaching devices to a VM while the VM is running. During backup, replication or restore disks of the processed VM are attached to the backup proxy. VM data is retrieved or written directly from/to the datastore, instead of going through the network.

The **Network** mode can be used with any infrastructure configuration. In this mode, data is retrieved via the ESX(i) host over the LAN using the Network Block Device protocol (NBD). The Network mode is the recommended data transport mode to be used with Cisco HyperFlex in combination with Native HX Snapshots. To take the full advantage of the mode a 10Gbit/s Ethernet is mandatory.

Veeam Repository Sizing

When estimating the amount of required disk space, you should know the following:

- Number of backup VMs
- Total size of VMs and the data change rate
- Frequency of backups
- Retention period for backups
- Will jobs use forward or reverse incremental
- Frequency of active and synthetic fulls

Also, when testing is not possible beforehand, you should make assumptions on compression and deduplication ratios, change rates, and other factors. The following figures are typical for most deployments; however, it is important to understand the specific environment to find out possible exceptions:

- Data reduction thanks to Compression and Deduplication is usually 2:1 or more; it is common to see 3:1 or better, but you should always be conservative when estimating required space.
- Typical daily change rate is between 2 and 5% in a mid-size or enterprise environment; this can greatly vary among servers; some servers show much higher values. If possible, run monitoring tools like Veeam ONE to have a better understanding of the real change rate values.
- Include additional space for one-off full backups.
- Include additional space for backup chain transformation (forward forever incremental, reverse incremental) – at least the size of a full backup multiplied by 1.25x.
- Using the numbers above, you can estimate required disk space for any job. Besides, always leave plenty of extra headroom for future growth, additional full backups, moving VMs, restoring VMs from tape.

A repository sizing tool that can be used for estimation is available at http://vee.am/rps. Note that this tool is not officially supported by Veeam, and it should be used "as is", but it is nonetheless heavily used by Veeam Architects and regularly updated.

Solution Design

Data Protection for Cisco HyperFlex with Veeam Availability Suite is designed to deliver reliable backup and recovery solution with low recovery time objectives (RTOs) and recovery point objectives (RPOs) for all applications and data residing in virtual machines within the HyperFlex environment.

In addition to reliable backup and recovery of application data and VMs the solution provides the following:

- Granular recovery of virtual machines and files
- Ability to automatically verify every backup, VM and replica
- Instant VM recovery of failed VM in less than two minutes
- Multiple backup end points such as tape drives, on cloud or on local repository
- SureBackup and SureReplica for Backup and Replication verification
- Storage Integration of Cisco HyperFlex with Veeam Backup & Replication

This section elaborates on the deployment architecture and design considerations to protect application data through Veeam Availability Suite. The application VMs can reside, across multiple HyperFlex across Data Centers or HyperFlex Clusters deployed in a Remote Office Branch Office (ROBO)

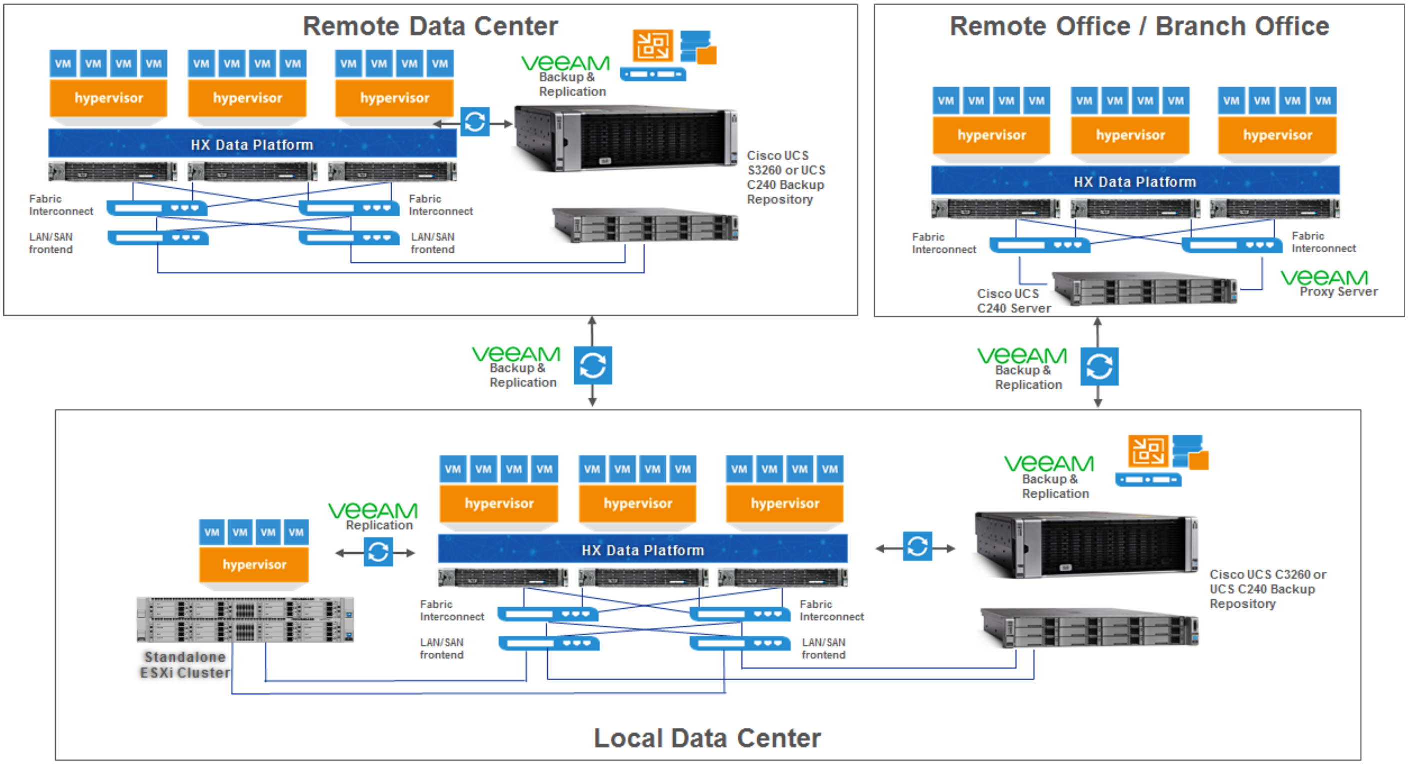
The key deployment scenarios to protect Cisco HyperFlex cluster with Veeam Availability Suite are listed as below

- Cisco HyperFlex Single Site Backup and Replication
- Cisco HyperFlex Remote office - Branch Office Replication
- Cisco HyperFlex multisite Backup and Replication

The detailed implementation to protect Cisco HyperFlex in a single Data Center, please refer to the Cisco HyperFlex with Veeam Availability Suite.

Figure 20 illustrates the end-to-end deployment scenarios for Cisco HyperFlex with Veeam Availability Suite.

Figure 20 Deployment Overview: Multisite and Remote Office deployment of Cisco HyperFlex with Veeam Availability Suite



Remote Office - Branch Office Replication for Cisco HyperFlex

Several organizations today have Remote office and Branch offices (ROBO) spread across geographies, which provide localized data availability and allow businesses to execute critical workloads locally. ROBO deployments typically require fewer compute and storage resources with just few servers running workloads to support local needs. Organizations have several ROBO deployments spread across regions and a major challenge faced by these deployments is provisioning of application availability, deployed remotely.

The present design overcomes these challenges, by providing Replication of application VMs deployment in Remote Offices through Veeam Availability Suite. Application VMs in ROBO deployments are replicated to the primary Data Center and hence provide Failover and Fail Back at all times. This requires minimal infrastructure requirements and the replication is executed by Veeam Proxy installed just in a Virtual Machine. Moreover, it allows ensuring remote sites are in compliance, and reducing IT management time at remote offices.

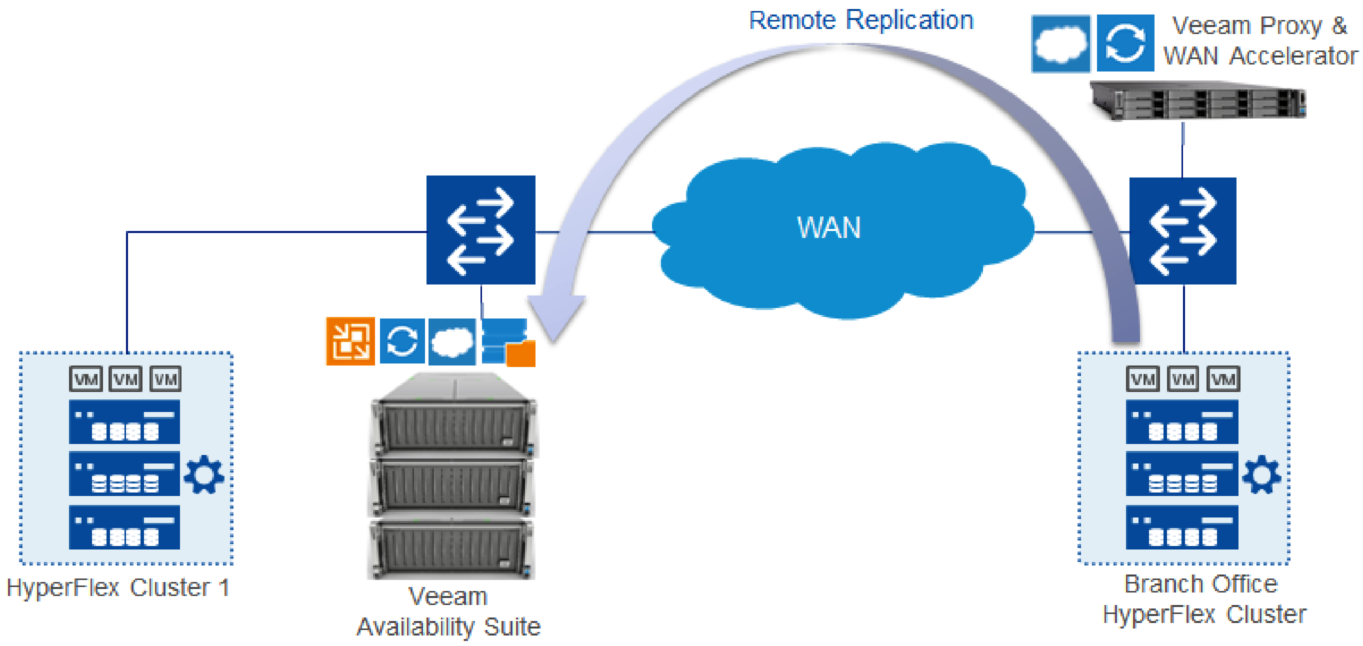
The key deployment features of ROBO Replication for Cisco HyperFlex are:

- Veeam Application Server, Veeam Proxy and Veeam Repository reside on either Cisco UCS S3260 or Cisco UCS C240 M4 server located in the Primary Data Center.
- Backup of HyperFlex Cluster VMs in Primary Data Center through Veeam Proxy and Veeam Backup Server.
- Replication of application VMs on Cisco HyperFlex Cluster located in Remote Office is executed on Veeam Availability Suite located in Primary Data Center.
- A Veeam Proxy Server is installed in the Remote Office. This could be installed either on a bare metal server or on a Virtual Machine. In present design, Veeam Proxy Server is installed in a Cisco UCS C240 M4 Server located in Remote Office. The choice of either a virtual machine or physical server for Veeam Proxy is dependent on several factors such as:

- Number of Replication jobs executed on ROBO deployment.
- Deployment of Veeam WAN Accelerator on the Remote Site. Customers can deploy Veeam WAN Accelerator, which allows faster replication and backup of application VMs. It is required to deploy Veeam WAN Accelerator on a Cisco UCS C240 M4 LFF with SSDs for WAN Accelerator Cache.

Figure 21 illustrates the use case for Replication of application VM on ROBO site to the Primary Data Center.

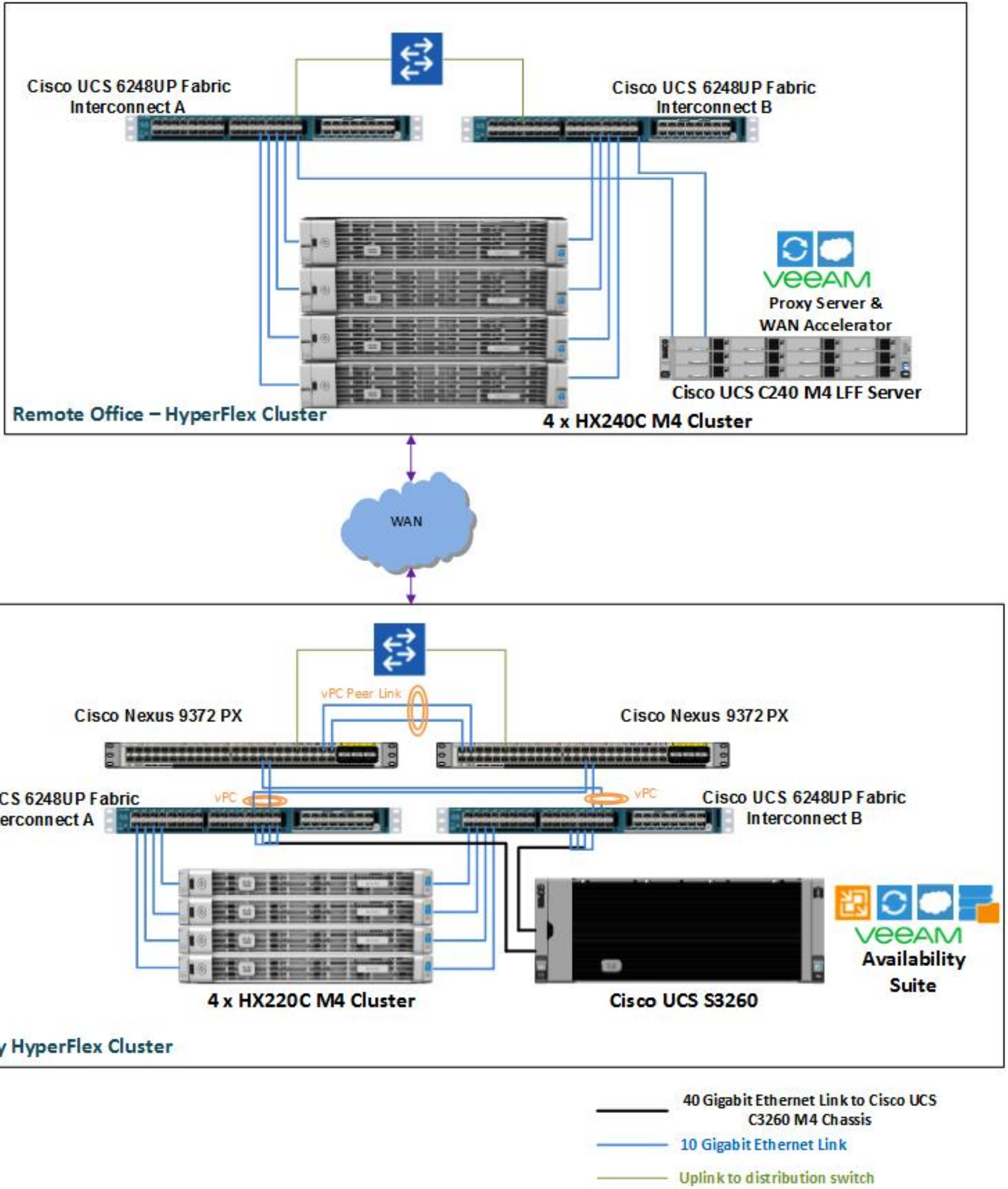
Figure 21 Remote Office - Branch Office Replication for Cisco HyperFlex



Deployment Architecture

This section elaborates on the reference architecture for Veeam AS with Cisco HyperFlex exiting in Remote Office locations. Figure 22 details the physical topology of the present deployment.

Figure 22 Deployment Architecture: Remote Office Branch Office Replication for Cisco HyperFlex


Cisco UCS 6248UP Fabric Interconnect A
Cisco UCS 6248UP Fabric Interconnect B
Veeam
Proxy Server & WAN Accelerator
Cisco UCS C240 M4 LFF Server
Remote Office – HyperFlex Cluster
4 x HX240C M4 Cluster
WAN
vPC Peer Link
Cisco Nexus 9372 PX
Cisco Nexus 9372 PX
vPC
vPC
Cisco UCS 6248UP Fabric Interconnect A
Cisco UCS 6248UP Fabric Interconnect B
Veeam
Availability Suite
4 x HX220C M4 Cluster
Cisco UCS S3260
Primary HyperFlex Cluster
40 Gigabit Ethernet Link to Cisco UCS C3260 M4 Chassis
10 Gigabit Ethernet Link
Uplink to distribution switch

The solution detailed in the figure above includes Primary HyperFlex Cluster and Hyper Flex Cluster deployed in Remote Office. The application VMs are replicated through Veeam Availability Suite on Cisco UCS S3260 Storage server located in the Primary Data Center.

The details on the deployment are as follows:

- Primary HyperFlex Cluster
- Veeam Application Suite 9.5 Update 2 deployed on Cisco UCS S3260 Storage Server. This includes Veeam Repository, Veeam Backup Server and the Veeam Proxy Server.
- Cisco UCS S3260 Storage Server is directly attached to a pair of Cisco UCS 6200 Series Fabric Interconnects (FI)
- Cisco HX Cluster with Cisco HX Data Platform 2.5 (1b) and VMWare Hypervisor 6.0 update 3. This is the primary HX Cluster wherein the application VMs reside.
- Cisco HX Cluster and Cisco UCS S3260 Storage server are connected to the same pair of Fabric Interconnects
- The backup of the application VMs are created on UCS S3260 repository through Veeam AS
- Cisco Nexus 9300 switches
- Remote Office Branch Office deployment (ROBO)
- Cisco HX Cluster with Cisco HX Data Platform 2.5 (1b) and VMWare Hypervisor 6.0 update 3. This cluster provisions application VMs deployed in Remote Office location.
- Replication of the application VM on Remote Office are created on HX Cluster located in Primary Data Center
- Cisco UCS 6200 Series Fabric Interconnects
- Veeam Proxy Server and Veeam WAN Accelerator are deployed on Cisco UCS C240 M4 LFF Rack Server. As mentioned, Veeam Proxy Server can be deployed on a VM, but it is recommended to have Veeam Proxy Server deployed on a bare metal server

Multisite Backup and Replication for Cisco HyperFlex

Multisite Backup and Replication comprises of distributed deployment scenarios for large geographically dispersed virtual environments with multiple backup servers installed across different sites. These backup servers can be federated under Veeam Backup Enterprise Manager; an optional component that provides centralized management and reporting for these servers through a web interface. Veeam Availability Suite for large multi-site Data Centers allows customers to more efficiently execute VM Backup Copy jobs across the WAN network.

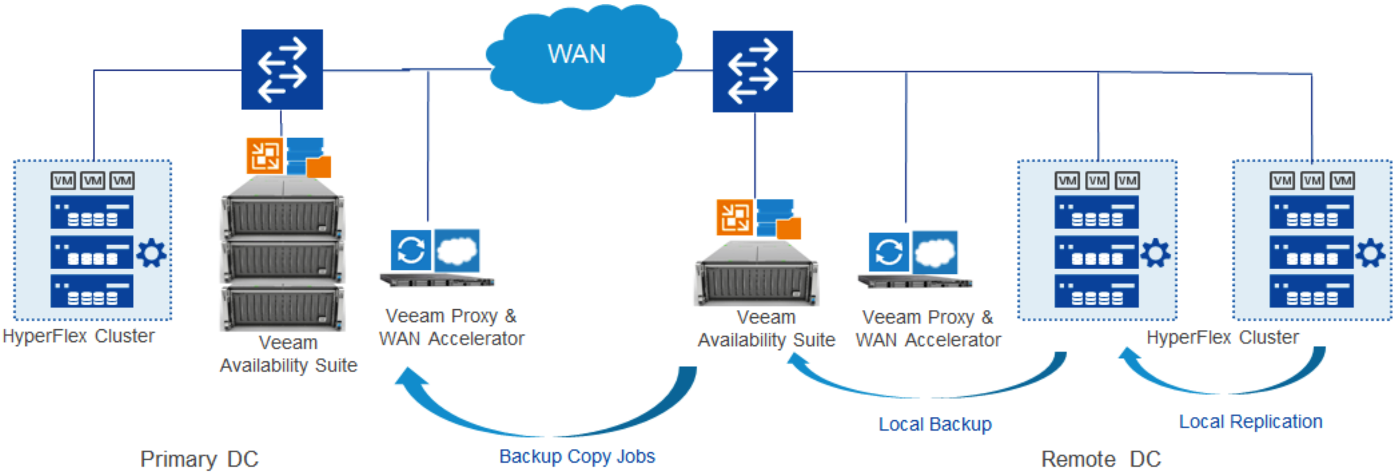
The key deployment features for Multisite Backup and Replication for Cisco HyperFlex are:

- Application VMs residing either on the Primary Data Center or on Remote Data Centers are backed up and replicated through Veeam Availability Suite deployed on Cisco S3260 Storage Server
- The distributed deployment environment is spread across geographies and can be managed through Veeam Backup Enterprise Manager — an optional component that provides centralized management and reporting for distributed Veeam Backup servers through a web interface
- The backup repository is replicated from remote Data Center repository to Primary Data Center repository through Veeam Availability Suite utilizing Veeam backup copy jobs
- Application VMs can be replicated either to HyperFlex cluster within the same Data Center or to HyperFlex cluster in the Primary Data Center.
- Backup Copy jobs can be executed across S3260 storage server. This allows high availability of backups during backup server failures in either of the Data Center.

- Veeam WAN Accelerators are deployed in Primary and Remote sites, which reduce the amount of data that needs to flow back and forth across the WAN by using caching and data compression techniques. This allows reduction in the bandwidth required for transferring backups and replicas over the WAN. Built-in WAN Acceleration dramatically reduces the bandwidth required for transferring backups and replicas over the WAN. A WAN accelerator reduces the amount of data that needs to flow back and forth across by caching duplicate files (or parts of files) so they can be referenced in global cache instead of having to be sent across the WAN again

Figure 23 illustrates the key uses cases for Backup and Replication for application VMs residing in multisite HyperFlex deployment.

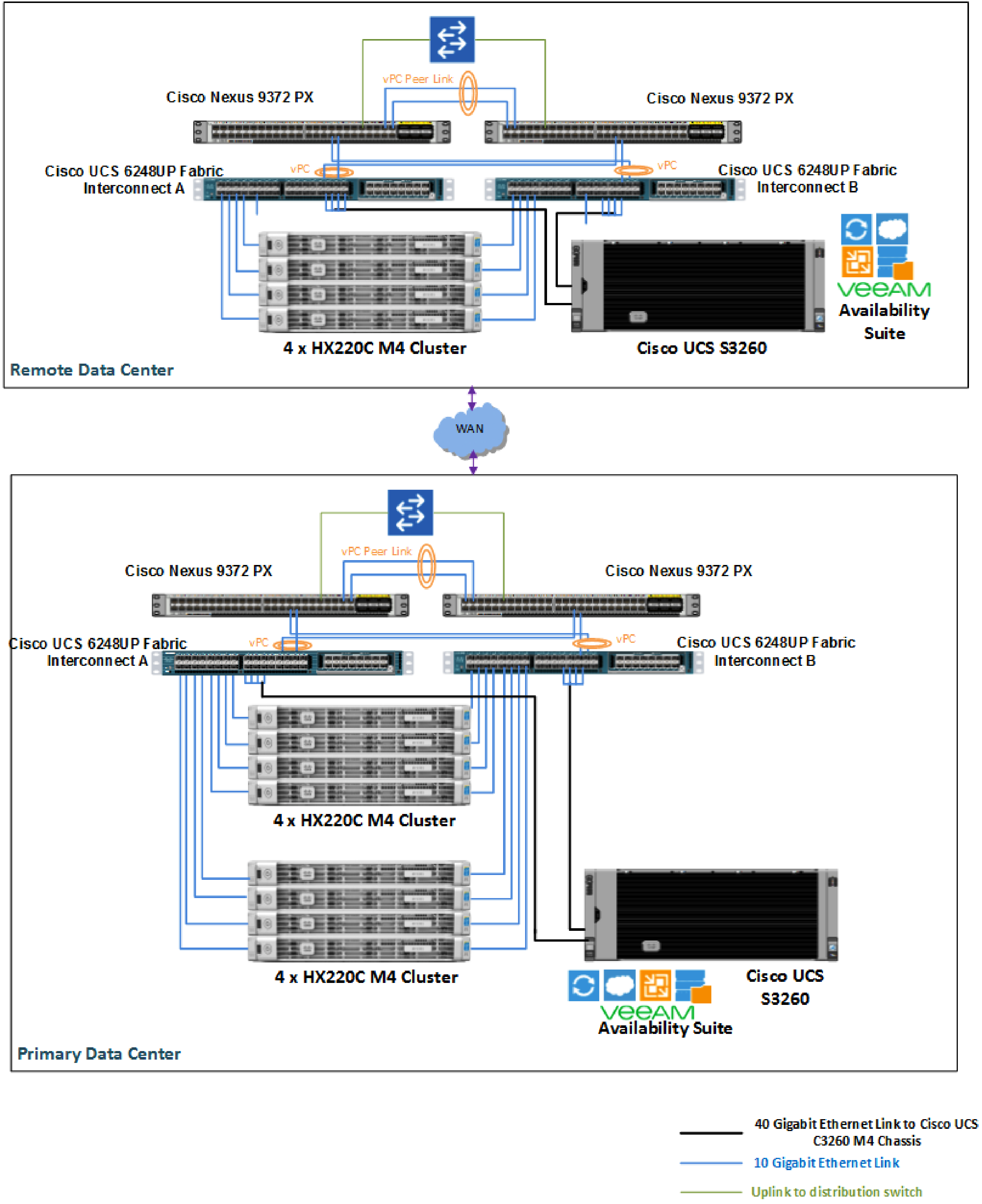
Figure 23 Multisite Backup and Replication for Cisco HyperFlex



Deployment Architecture

This section describes the reference architecture for Veeam AS with in a multisite Cisco Hyper Flex deployment. Figure 24 details the reference architecture.

Figure 24 Deployment Architecture: Multisite backup and replication for Cisco HyperFlex



The solution detailed in the figure above includes Primary and Remote Data Centers running virtualized applications on either Converged Infrastructure or Cisco HyperFlex Clusters. This deployment supports a combination of Converged and Cisco Hyper Flex Data Clusters with replication and backup on Cisco UCS S3260 Storage Server.

The infrastructure components remain same for both Primary and Remote Data Center. The details about the key infrastructure components deployed to validate this setup are as follows:

- Veeam Availability Suite 9.5 Update 2 is deployed on Cisco UCS S3260 Storage Server. This includes Veeam Repository as the primary repository for all backup jobs across distributed data centers. Veeam Repository and Veeam Backup Server are installed on Cisco UCS S3260 servers.
- Veeam Proxy Server and Veeam WAN Accelerator are deployed on a separate Cisco UCS C220 M4 server.
- Cisco HX Cluster with Cisco HX Data Platform 2.5 (1b) and VMWare Hypervisor 6.0 update 3. This is the primary HX Cluster wherein all the application VMs reside.
- Cisco HX Cluster and Cisco UCS S3260 Storage server are connected to the same pair of Fabric Interconnects
- The backup of the application VMs are created on Cisco UCS S3260 repository through Veeam AS
- Application VMs are replicated either to standalone ESXI Cluster or the Secondary HX Cluster residing in the same Data Center or Campus
- Cisco Nexus 9300 switches

Design Considerations

This section elaborates on the design considerations for Backup and Replication of Application VM on HyperFlex with Veeam Availability Suite and Cisco S3260 Storage Server

Unified Management

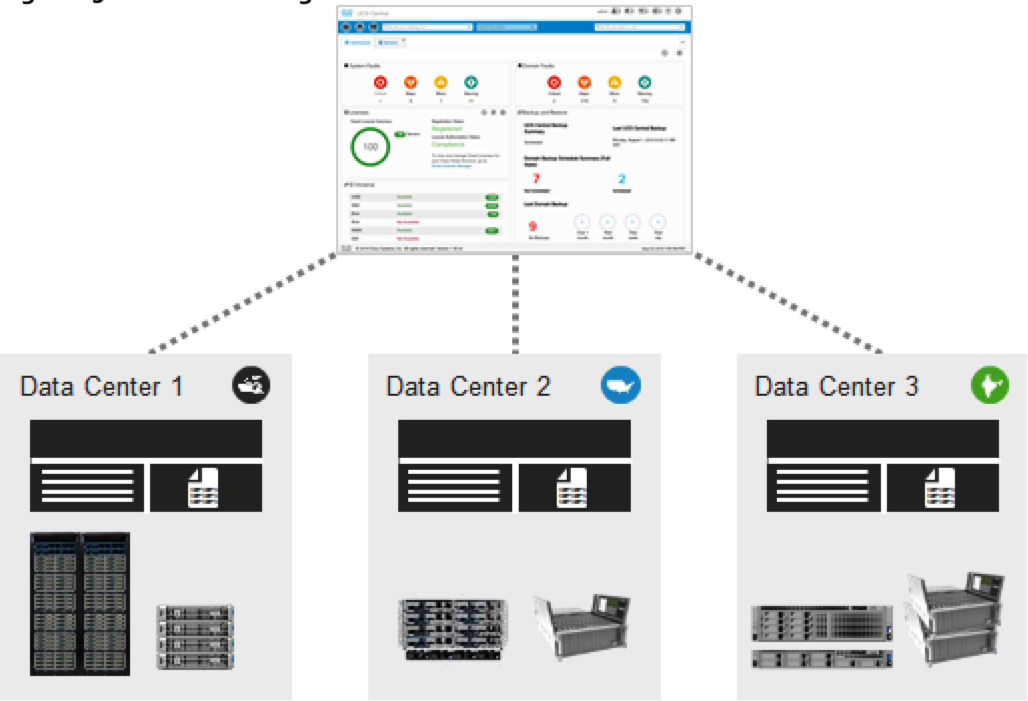
Cisco UCS Manager can manage B-series blade servers, C-series rack servers and S3260 Stroage Servers under the same Cisco UCS domain. This feature, along with stateless computing makes compute resources truly hardware agnostic.

Moreover, Cisco UCS Central Software extends the policy-based functions and concepts of Cisco UCS Manager across multiple Cisco Unified Computing System (Cisco UCS) domains in one or more physical locations. This allows hardware configuration from a single UCS Central window, across multiple UCS domains, either in same Data Center or across Data Centers.

Cisco Unified Computing System™ (Cisco UCS) management helps significantly reduce management and administration expenses by automating routine tasks to increase operational agility. Cisco UCS management provides enhanced storage management functions for the Cisco UCS S3260 and all Cisco UCS servers. Cisco UCS Manager supports Storage profiles give you flexibility in defining the number of storage disks and the roles and uses of these disks and other storage parameters.

Figure below, elaborates om the single management window through UCS Central.

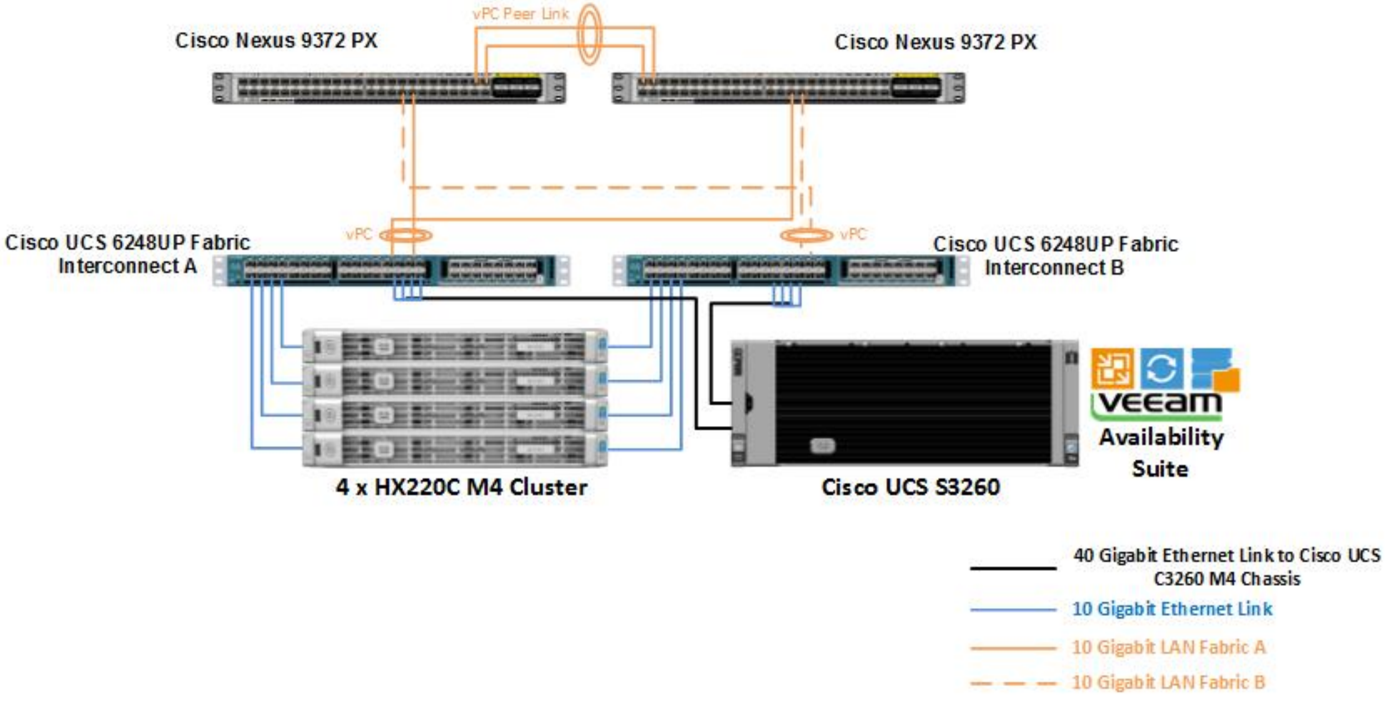
Figure 25 Unified Management across Data Centers



Network

The network design is shown in the figure below.

Figure 26 Network Design for Primary Data Center



The LAN network provides network reachability to the applications hosted on Cisco UCS servers in the data center. The infrastructure consists of a pair of Cisco Nexus 9372 PX switches deployed in NX-OS standalone mode. Redundant 10Gbps links from each Cisco Nexus switch are connected to ports on each FI and provide 20Gbps of bandwidth through each Cisco Nexus. Virtual PortChannels (vPCs) are used on the Cisco Nexus links going to each FI. Jumbo Frames are also enabled in the LAN network to support backup and replication of application VMs on Veeam Server.

The design also uses the following best practices:

- Jumbo frames on unified fabric links between Cisco UCS and fabric interconnects
- QoS policy for traffic prioritization on the unified fabric
- Port-channels with multiple links are used in the unified fabric for higher aggregate bandwidth and redundancy

The Veeam AS is deployed on Cisco UCS 3260 Storage Server and provides an aggregated bandwidth of 80 Gbps for VM backup and Replication. The present deployment supports Veeam AS on Cisco UCS C240 M4 LFF server connected to common pair of Fabric interconnects and provides network throughput of up to 40 Gbps.

WAN Acceleration for Backup and Replica

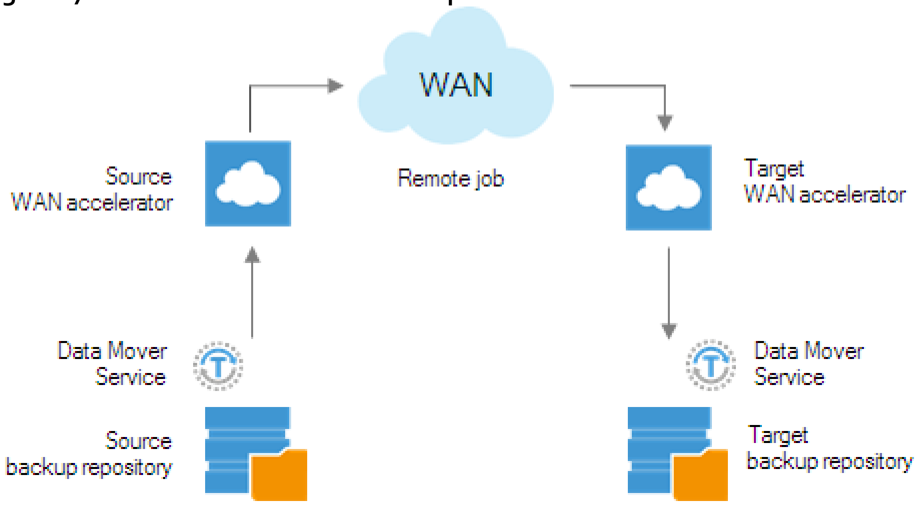
Remote Site Backup and Replication always involves moving large volumes of data between remote sites. The most common problems that backup administrators encounter during Remote Site Backup and Replication are:

- Insufficient network bandwidth to support VM data traffic
- Transmission of redundant data

Veeam Backup and Replication offers the WAN acceleration technology that helps optimize data transfer over WAN. Built-in WAN Acceleration utilizes global caching, variable block length data fingerprinting and traffic compression to significantly reduce bandwidth requirements, while multiple WAN optimization ensures that available bandwidth is leveraged to its fullest potential.

Figure below elaborates on the WAN Acceleration for faster Backup and Replication jobs across distributed Data Centers.

Figure 27 WAN Accelerators on Backup Infrastructure



In the present design, Veeam WAN Acceleration is utilized for Remote Site Backup and Replication. It is recommended to have a caching layer such as SSD to create global cache across the Primary and Remote Site; WAN Accelerator is installed on a Cisco UCS S3260 Storage Server.

Veeam Backup Enterprise Manager Console

Veeam Enterprise Manager is intended for centralized reporting and management of multiple backup servers. It provides delegated restore and self-service capabilities as well as the ability for users to request Virtual Labs from backup administrators. It provides a central management point for multiple backup servers from a single interface. Enterprise Manager is also a part of the data encryption and decryption processes implemented in the Veeam solution. For best practices, Veeam recommends deploying Enterprise Manager in the following scenarios:

- It is recommended to deploy Enterprise Manager if you are using encryption for backup or backup copy jobs. If you have enabled password loss protection (http://helpcenter.veeam.com/backup/em/index.html?em_manage_keys.html) for the connected backup servers backup files will be encrypted with an additional private key which is unique for each instance of Enterprise Manager. This will allow Enterprise Manager administrators to unlock backup files using a challenge/response mechanism effectively acting as a Public Key Infrastructure (PKI).

- If an organization has Remote Office/Branch Office (ROBO) deployments, then leverage Enterprise Manager to provide site administrators with granular restore access via web UI (rather than providing access to the Backup and Replication console).

- In enterprise deployments, delegation capabilities can be used to elevate the first line support to perform in-place restores without administrative access.

- For deployments spanning multiple locations with stand-alone instances of Veeam Backup and Replication, Veeam Enterprise Manager will be helpful in managing licenses across these instances to ensure compliance.

- Enterprise Manager is required when automation is essential to delivering IT services — to provide access to the Veeam RESTful API.

Veeam Transport Mode for HX Cluster

The best practice is to utilize the HyperFlex and Veeam Storage integration which enables VMware vSphere ESXi hosts to communicate with storage devices and offload storage operations such as snapshot creation and cloning to the HyperFlex storage controller. This allows space efficient and nearly instant snapshots without performance impact.

Customers can allow Veeam Backup & Replication to read data from Cisco HyperFlex snapshots in the following transport modes

- Direct Storage access
- Virtual appliance
- Network.

The recommended mode is Direct Storage access which uses the NFS protocol to directly connect to the HyperFlex data store. It provides the best performance and the lowest overhead on ESXi hosts. In this mode, Veeam Backup & Replication bypasses the ESXi host and reads/writes data directly from/to the HyperFlex data store over the "Storage Controller Data Network".

The present design utilizes Veeam and HyperFlex Stroage Integration feature. The validation of Backup with Direct Storage Access is detailed in section Backup VM on HX Cluster with HyperFlex and Veeam Storage Integration.

For Further details on implementation of HyperFlex and Veeam Integration, refer to Cisco HyperFlex Data Platform Backup Integration Guide.

Veeam Proxy Server Distribution

This section elaborates on the recommendations for placement of Veeam proxy servers across Remote Offices and multi site for backup and replication jobs. Customers should be cautious on selecting a Veeam Proxy as a virtual or baremetal, as having several virtual proxies on a single site may lead to excessive Windows licensing and high manageability cost but may provide high availability of backup and replication jobs as compared to a single baremetal server proxy. Veeam proxy deployed in a physical sever would provide several physical cores for parallel processing of Backup and Replication jobs , few Veeam proxies to manage, less Windows licensing cost but in the event of failed single server proxy, it would lead to single point of failure.

Proxy Distribution for HyperFlex ROBO Replication

Veeam Backup and Replication provides replication of application VM on HyperFlex Cluster deployed on a Remote Office to the Primary HyperFlex Cluster. The Solution Design is elaborated in the previous section Remote Office - Branch Office Replication for Cisco HyperFlex.

In this design the Veeam Proxy Server can be selected as a virtual proxy or a baremtal proxy. Customer should consider following recommendations for the Veema proxy Selection.

- In the event , customers want to utilize Veeam WAN accelarators , it is recommended to have a Veeam Proxy as a baremetal C240 M4 LFF server. This allows caching tier through the boot SSDs on the server. The replication job does require minimal local storage , hence The C240 M4 LFF server for Replication is equipped with two 4 TB SATA drives.
- With the selection of Bare metal Proxy on Remote Site, customers can enable local Backups on the Remote Office ,C240 M4 LFF server can be expanded upto 12 X 6 TB SATA drives which provides optimum storage for Remote Office Backups. Pls note, to protect the Backups on Remote Office, customers should execute Backup Copy jobs to the Primary Data Center, thus allowing restoration of application VM on the primary Data Center.

- With several Remotes offices and very few VMs on each office being replicated to the Pirmary Site, customers can choose to have a virtual proxy deployed on the HX Cluster. Administrators should be cautious on the utilization of HX Cluster by application VMs. The performance of replication jobs may degrade during high utilization of HX Cluster by application workloads.

The validation for the Replication of Remote Office HyperFlex deployed with baremetal proxy is detailed in section Remote Office / Branch Office VM Replication.

Proxy Distribution for Multisite HyperFlex Deployments

Veeam Backup and Replication provides backup replication of application VM on HyperFlex Cluster deployed on a HyperFlex Cluster deployed across Data Centers. The Solution Design is elaborated in the previous section Multisite Backup and Replication for Cisco HyperFlex.

In this deployment, each of the Veeam Backup servers across the data center are deployed on a physical Cisco UCS C240 M4 LFF or S3260 Storage server. The Veeam Proxy is deployed on the same backup server. Some of the important design consideration for the location of Veeam Proxy in multisite HyperfFlex deployments are

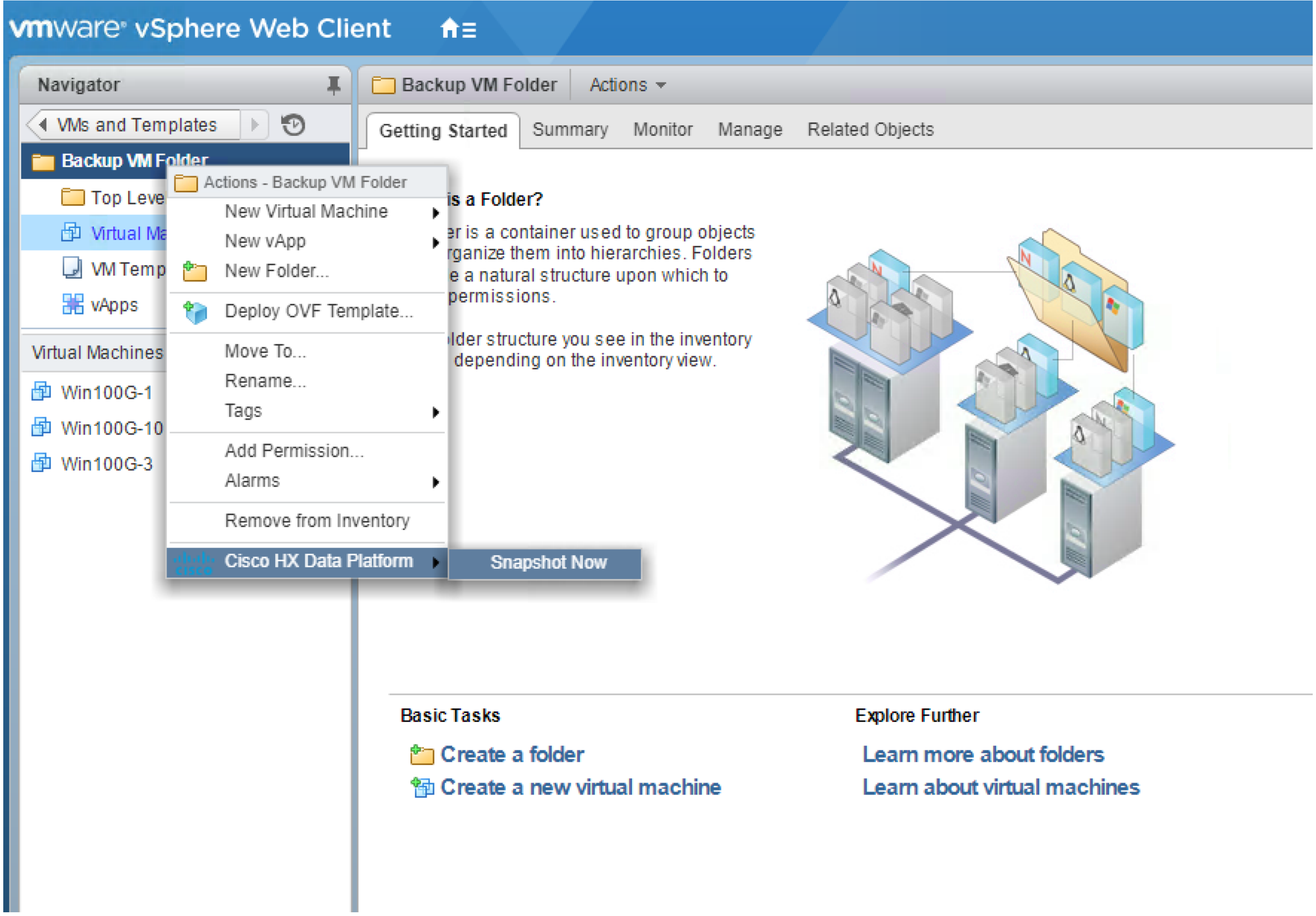
- Backup through Veeam for application VM residing on HyperFlex cluster utilizes Veeam and HyperFlex Storage Integration which enables HX native snapshot and backup through HyperFlex storage network. This provides offloading of overhead for snapshot from ESXi Host to HyperFlex Storage Controler. It also enables distribution of Backup traffic to each of HyperFlex storage networks on ESXi nodes. One of the requirements for this feature is Veeam Proxy should have access to private HyperFlex Storage network.

- In cases where the Proxy Server is connected to the same Fabric Interconnect of HyperFlex Cluster, customers can easily create vNIC on Proxy server which has same VLAN as that of the HyperFlex Storage Network. The configuration details are describes in section Cisco UCS S3260 Configuration. The selection of proxy and Backup server on same baremetal server, connected to Fabric Interconnect of HyperFlex Cluster allows ease of deployment, scalability of parallel backup with up to 36 jobs (maximum number of physical cores on Cisco UCS C240 M4 LFF) and faster backup time, as having Backup and Proxy server on same physical server, allows minimal latencies between proxy and Backup Server.

For large parallel backup jobs and decreased backup time, it is recommended to deploy Veeam Proxy and Backup Server on the same Cisco UCS C240 M4 LFF or S3260 storage sever, connected to Fabric Interconnect of HyperFlex Cluster.

- For scenarios where Veeam Proxy is unable to access the HyperFlex Storage network, Veeam will fall back to the VMWare REDO log based snapshots. To avoid this, make sure that the first snapshot of VM is a HX native snapshot. Customers can easily add all the application VMs to a VM folder and execute a HX based snapshot with a single-click through HX Plugin for VSphere web client. The process is illustrated in Figure 28.

Figure 28 Adding Application Virtual Machines to a VM Folder and Execute a Cisco HX Data Platform Snapshot Now



The validation of Backup and Replication for application VMs in multisite HyperFlex deployments are detailed in section Backup VM on HX Cluster with HyperFlex and Veeam Storage Integration.

Veeam Backup Copy Jobs

You should protect your backups on either the Primary data center or Remote data center through Veeam Backup Copy jobs, executed across backup locations. In this design, Backup Copy jobs are executed across two data centers, making sure you can always restore your backups during complete failure of backups in either of the data centers.

- See section Backup Copy Jobs Across Data Centers for Backup copy job configuration and validation details.
- The configuration and validation of restoration of Backup copies during failure of either Data Center is detailed in section Restore Backup Copy Job VM to DR Site.

Deployment Hardware and Software

Table 1 lists the software revisions used throughout this document.

Software Versions

Table 1 Software Revisions

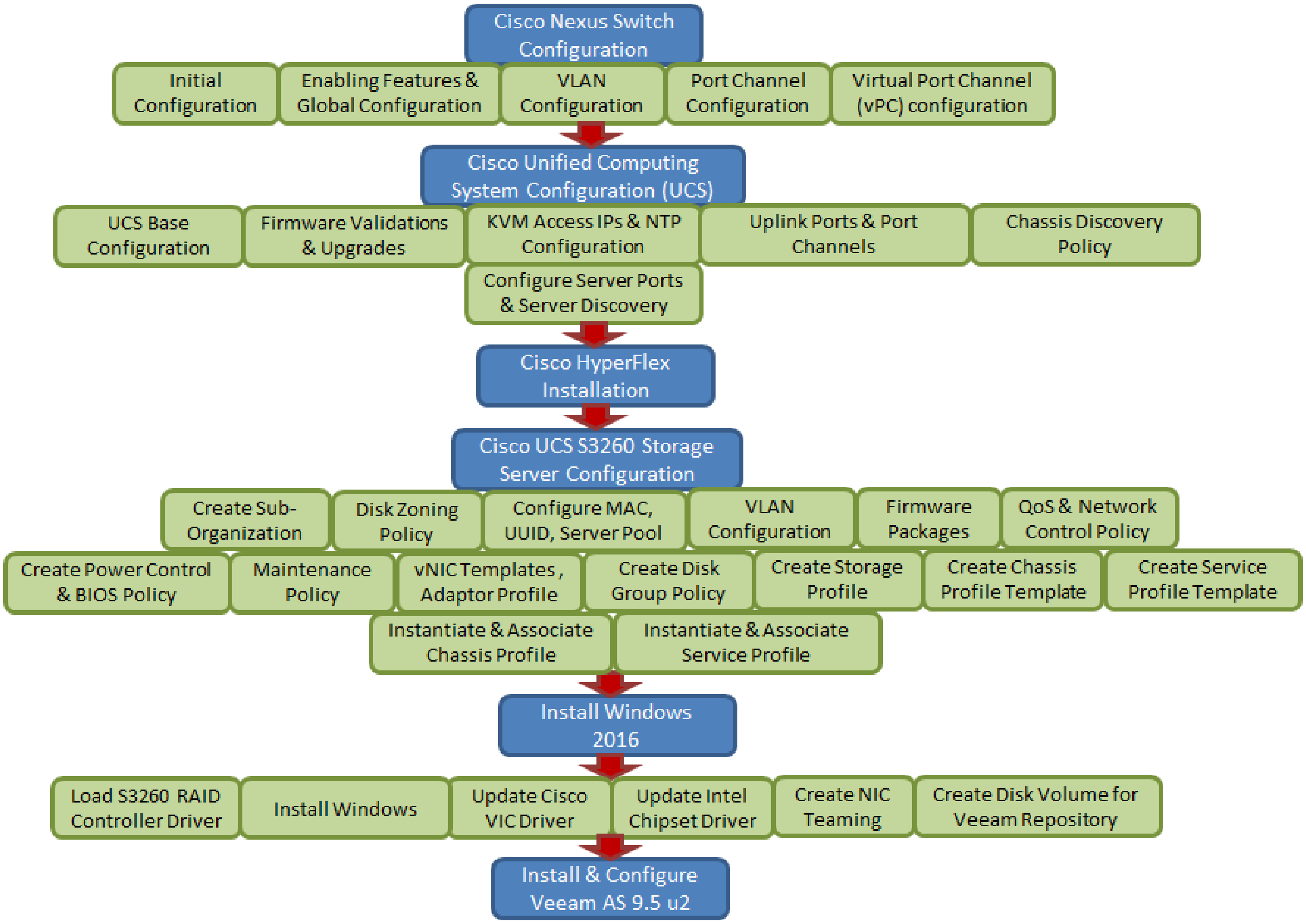
	Components	Software Version	Comments
Compute & Storage	Cisco UCS S3260 M4 Storage Server	3.1(3c)	Directly managed through Fabric Interconnect. Veeam AS is installed on the same. Provides Storage Veeam Repository
	Cisco HX220c M4		Hyper Converged node for HX Cluster
	Cisco HX240c M4		Hyper Converged Node for HX Cluster
Management	Cisco UCS Manager	3.1(3c)	UCS Management for all servers directly attached to Fabric Interconnects
Backup and Replication	Veeam Availability Suite	9.5 update 2	Pre-configured with Veeam Backup Server, Veeam Proxy , Veeam Repository
	Operating System	Windows 2016 DataCenter Edition	
Hyper Converged Software	Cisco HX Data Platform	HX Data Platform Release 2.5 (1b)	
Virtualization	VMWare VSphere	6.0 U3	
	VMWare vCenter	6.0 U3	
Network	Cisco Nexus 9372PX (N9k-9372PX)	6.1(2)I3(4b)	Cisco Platform Switch for ToR, MoR, EoR deployments; Provides connectivity to users and other networks and deployed in NX-OS Standalone mode
	Cisco UCS 6248UP FI	3.1(3c)	Fabric Interconnect with embedded UCS Manager

Configuration Guidelines

This CVD provides the details to configure a Cisco UCS S3260 Storage Server setup with Veeam 9.5, providing backup, restore and replication of a VM deployed in a Cisco HyperFlex infrastructure.

Figure 29 illustrates the high-level procedures and steps for this installation.

Figure 29 Installation Workflow


Cisco Nexus Switch Configuration
Initial Configuration
Enabling Features & Global Configuration
VLAN Configuration
Port Channel Configuration
Virtual Port Channel (vPC) configuration
Cisco Unified Computing System Configuration (UCS)
UCS Base Configuration
Firmware Validations & Upgrades
KVM Access IPs & NTP Configuration
Uplink Ports & Port Channels
Chassis Discovery Policy
Configure Server Ports & Server Discovery
Cisco HyperFlex Installation
Cisco UCS S3260 Storage Server Configuration
Create Sub-Organization
Disk Zoning Policy
Configure MAC, UUID, Server Pool
VLAN Configuration
Firmware Packages
QoS & Network Control Policy
Create Power Control & BIOS Policy
Maintenance Policy
vNIC Templates , Adaptor Profile
Create Disk Group Policy
Create Storage Profile
Create Chassis Profile Template
Create Service Profile Template
Instantiate & Associate Chassis Profile
Instantiate & Associate Service Profile
Install Windows 2016
Load S3260 RAID Controller Driver
Install Windows
Update Cisco VIC Driver
Update Intel Chipset Driver
Create NIC Teaming
Create Disk Volume for Veeam Repository
Install & Configure Veeam AS 9.5 u2

Cisco Nexus A and Cisco Nexus B identifies the pair of Cisco Nexus switches that are configured. The Cisco UCS Fabric Interconnects are similarly configured. Additionally, this document details the steps for provisioning.

To indicate that you should include information pertinent to your environment in a given step, <text> appears as part of the command structure. See the following example for the `network port vlan create` command:

Usage:

```
network port vlan create ?
   [-node] <nodename>                    Node
   { [-vlan-name] {<netport>|<ifgrp>}    VLAN Name
   |   -port {<netport>|<ifgrp>}         Associated Network Port
[-vlan-id] <integer> }              Network Switch VLAN Identifier
```

Example:

```
network port vlan -node <node01> -vlan-name a0a-<vlan id>
```

This document is intended to enable you to fully configure the customer environment. In this process, various steps require you to insert customer-specific naming conventions, IP addresses, and VLAN schemes, as well as to record appropriate MAC addresses.

Table 2 describes the VLANs necessary for deployment as outlined in this guide. Table 3 lists the configuration variables that are used throughout this document. This table can be completed based on the specific site variables and used in implementing the document configuration steps.

Table 2 Necessary VLANs

VLAN Name	VLAN Purpose	VLAN ID Used in Validating This Document
hx-inband-mgmt	ESXi host management interfaces HX Storage Controller VM management interfaces HX Storage Cluster roaming management interface Veeam Network	3175
hx-storage-data	ESXi host storage vmkernel interfaces HX Storage Controller storage network interfaces HX Storage Cluster roaming storage interface	3172
hx-vm-data	Guest VM network interfaces	3174
hx-vmotion	ESXi host vMotion vmkernel interfaces	3173
Native-VLAN	VLAN to which untagged frames are assigned	1
Multisite -VLAN	VLAN which allows communication across Primary and Remote DataCenter. This VLAN is not required when hx-inband-mgmt VLAN allows communication across Data Center	215

Table 3 Configuration Variables

Variable	Description
<<var_password>>	Global default administrative password
<<var_nexus_A_hostname>>	Cisco Nexus A host name
<<var_nexus_A_mgmt0_ip>>	Out-of-band Cisco Nexus A management IP address
<<var_nexus_A_mgmt0_netmask>>	Out-of-band management network netmask
<<var_nexus_A_mgmt0_gw>>	Out-of-band management network default gateway
<<var_nexus_B_hostname>>	Cisco Nexus B host name
<<var_nexus_B_mgmt0_ip>>	Out-of-band Cisco Nexus B management IP address
<<var_nexus_B_mgmt0_netmask>>	Out-of-band management network netmask
<<var_nexus_B_mgmt0_gw>>	Out-of-band management network default gateway
<<var_ib_mgmt_vlan_id>>	In-band management network VLAN ID
<<var_timezone>>	FlexPod time zone (Example: America/New_York)
<<var_global_ntp_server_ip>>	NTP server IP address for out-of-band mgmt.
<<var_switch_a_ntp_ip>>	NTP server IP address for Nexus 9372 Switch A
<<var_switch_b_ntp_ip>>	NTP server IP address for Nexus 9372 Switch B
<<var_ib-mgmt_vlan_netmask_length>>	Length of IB-MGMT-VLAN Netmask (Example: /24)

Network Switch Configuration

This section provides detailed steps to configure the Cisco Nexus 9000s to use in a Veeam environment.

Follow these steps precisely because failure to do so could result in an improper configuration.

For detailed configuration details, refer to Cisco Nexus 9000 Series NX-OS Interfaces Configuration Guide.

Physical Connectivity

Follow the physical connectivity guidelines as covered in section Deployment Architecture.

Cisco Nexus Base

This section describes how to configure the Cisco Nexus switches to use in a base Veeam environment. This procedure assumes that you are using Cisco Nexus 9000 7.0(3)I4(2).

The following procedure includes setting up the NTP distribution on the In-Band Management VLAN. The interface-vlan feature and NTP commands are used in this set up. This procedure also assumes the default VRF will be used to route the In-Band Management VLAN.

Set Up Initial Configuration

Cisco Nexus 9372PX A

To set up the initial configuration for the Cisco Nexus A switch on <<var_nexus_A_hostname>>, complete the following steps:

Configure the Switch

On initial boot and connection to the serial or console port of the switch, the NX-OS setup should automatically start and attempt to enter Power on Auto Provisioning.

1. Abort Power on Auto Provisioning and continue with normal setup? (yes/no) [n]: yes
2. Do you want to enforce secure password standard (yes/no): yes
3. Enter the password for "admin": <<var_password>>
4. Confirm the password for "admin": <<var_password>>
5. Would you like to enter the basic configuration dialog (yes/no): yes
6. Create another login account (yes/no) [n]: Enter
7. Configure read-only SNMP community string (yes/no) [n]: Enter
8. Configure read-write SNMP community string (yes/no) [n]: Enter
9. Enter the switch name: <<var_nexus_A_hostname>>
10. Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]: Enter
11. Mgmt0 IPv4 address: <<var_nexus_A_mgmt0_ip>>

12. Mgmt0 IPv4 netmask: <<var_nexus_A_mgmt0_netmask>>
13. Configure the default gateway? (yes/no) [y]: Enter
14. IPv4 address of the default gateway: <<var_nexus_A_mgmt0_gw>>
15. Configure advanced IP options? (yes/no) [n]: Enter
16. Enable the telnet service? (yes/no) [n]: Enter
17. Enable the ssh service? (yes/no) [y]: Enter
18. Type of ssh key you would like to generate (dsa/rsa) [rsa]: Enter
19. Number of rsa key bits <1024-2048> [1024]: Enter
20. Configure the ntp server? (yes/no) [n]: y
21. NTP server IPv4 address: <<var_global_ntp_server_ip>>
22. Configure default interface layer (L3/L2) [L2]: Enter
23. Configure default switchport interface state (shut/noshut) [noshut]: shut
24. Configure CoPP system profile (strict/moderate/lenient/dense/skip) [strict]: Enter
25. Would you like to edit the configuration? (yes/no) [n]: Enter
26. Review the configuration summary before enabling the configuration.
27. Use this configuration and save it? (yes/no) [y]: Enter

Cisco Nexus 9372PX B

To set up the initial configuration for the Cisco Nexus B switch on <<var_nexus_B_hostname>>, complete the following steps:

Configure the Switch

On initial boot and connection to the serial or console port of the switch, the NX-OS setup should automatically start and attempt to enter Power on Auto Provisioning.

1. Abort Power on Auto Provisioning and continue with normal setup? (yes/no) [n]: yes
2. Do you want to enforce secure password standard (yes/no): yes
3. Enter the password for "admin": <<var_password>>
4. Confirm the password for "admin": <<var_password>>
5. Would you like to enter the basic configuration dialog (yes/no): yes
6. Create another login account (yes/no) [n]: Enter
7. Configure read-only SNMP community string (yes/no) [n]: Enter
8. Configure read-write SNMP community string (yes/no) [n]: Enter
9. Enter the switch name: <<var_nexus_B_hostname>>
10. Continue with Out-of-band (mgmt0) management configuration? (yes/no) [y]: Enter
11. Mgmt0 IPv4 address: <<var_nexus_B_mgmt0_ip>>
12. Mgmt0 IPv4 netmask: <<var_nexus_B_mgmt0_netmask>>
13. Configure the default gateway? (yes/no) [y]: Enter

14. IPv4 address of the default gateway: <<var_nexus_B_mgmt0_gw>>
15. Configure advanced IP options? (yes/no) [n]: Enter
16. Enable the telnet service? (yes/no) [n]: Enter
17. Enable the ssh service? (yes/no) [y]: Enter
18. Type of ssh key you would like to generate (dsa/rsa) [rsa]: Enter
19. Number of rsa key bits <1024-2048> [1024]: Enter
20. Configure the ntp server? (yes/no) [n]: y
21. NTP server IPv4 address: <<var_global_ntp_server_ip>>
22. Configure default interface layer (L3/L2) [L2]: Enter
23. Configure default switchport interface state (shut/noshut) [noshut]: shut
24. Configure CoPP system profile (strict/moderate/lenient/dense/skip) [strict]: Enter
25. Would you like to edit the configuration? (yes/no) [n]: Enter
26. Review the configuration summary before enabling the configuration.
27. Use this configuration and save it? (yes/no) [y]: Enter

Cisco Nexus Switch Configuration

> The steps detailed below are for reference only. If HyperFlex and Cisco Nexus 9000 are already configured, then the following steps are not required.

Enable Licenses

Cisco Nexus 9372PX A and Cisco Nexus 9372PX B

To license the Cisco Nexus switches, complete the following steps:

1. Log in as admin.
2. Run the following commands:

```
config t

feature interface-vlan

feature lacp

feature vpc

feature lldp
```

Set Global Configurations

Cisco Nexus 9372PX A and Cisco Nexus 9372PX B

To set global configurations, complete the following step on both switches:

1. Run the following commands to set global configurations:

```
spanning-tree port type network default
```

```
spanning-tree port type edge bpduguard default
spanning-tree port type edge bpdufilter default
port-channel load-balance src-dst l4port
ntp server <<var_global_ntp_server_ip>> use-vrf management
ntp master 3
ip route 0.0.0.0/0 <<var_ib-mgmt-vlan_gateway>>
copy run start
```

Create VLANs

Cisco Nexus 9372PX A and Cisco Nexus 9372PX B

To create the necessary virtual local area networks (VLANs), complete the following step on both switches:

1. From the global configuration mode, run the following commands:

```
vlan <<var_veeam-network>>
name hx-inband-mgmt
exit
vlan <<native_vlan>>
name Native-VLAN
exit
vlan <<hx-storage-data>>
name hx-storage-data exit
vlan << hx-vm-data>>
name hx-vm-data
exit
vlan << hx-vmotion>>
name hx-vmotion
exit
vlan << Multisite-VLAN>>
name Multisite-VLAN
exit
```

Add NTP Distribution Interface

Cisco Nexus 9372PX A

1. From the global configuration mode, run the following commands:

```
ntp source <<var_switch_a_ntp_ip>>
```

```
interface Vlan <<var_ib-mgmt_vlan_id>>

ip address <<var_switch_a_ntp_ip>>/<<var_ib-mgmt_vlan_netmask_length>>

no shutdown

exit
```

Cisco Nexus 9372PX B

1. From the global configuration mode, run the following commands:

```
ntp source <<var_switch_b_ntp_ip>>

interface Vlan<<var_ib-mgmt_vlan_id>>

ip address <<var_switch_ib_ntp_ip>>/<<var_ib-mgmt_vlan_netmask_length>>

no shutdown

exit
```

Create Port Channels

Cisco Nexus 9372PX A and Cisco Nexus 9372PX B

To create the necessary port channels between devices, complete the following step on both switches:

1. From the global configuration mode, run the following commands:

```
interface Po10

description vPC peer-link

exit

interface Eth1/51-52

channel-group 10 mode active

no shutdown

exit

interface Po13

description <<var_ucs_6248_clustername>>-a

exit

interface Eth1/25

channel-group 13 mode active

no shutdown

exit

interface Po14

description <<var_ucs_6248_clustername>>-b

exit
```

```
interface Eth1/26
channel-group 14 mode active
no shutdown
exit
copy run start
```

Configure Port Channel Parameters

> Cisco virtual PortChannels (vPC) allows a device to connect to two different physical Cisco Nexus switches using a single logical Cisco PortChannel interface.

Cisco Nexus 9372PX A and Cisco Nexus 9372PX B

To configure port channel parameters, complete the following step on both switches:

1. From the global configuration mode, run the following commands:

```
interface Po10
switchport mode trunk
switchport trunk native vlan 2
switchport trunk allowed vlan << var_veeam-network >>
spanning-tree port type network
exit
interface Po13
switchport mode trunk
switchport trunk native vlan 2
switchport trunk allowed vlan << var_veeam-network
spanning-tree port type edge trunk
mtu 9216
exit
interface Po14
switchport mode trunk
switchport trunk native vlan 2
switchport trunk allowed vlan << var_veeam-network
spanning-tree port type edge trunk
mtu 9216
exit
copy run start
```

Configure Virtual Port Channels

Cisco Nexus 9372PX A

To configure virtual port channels (vPCs) for switch A, complete the following step:

1. From the global configuration mode, run the following commands:

```
vpc domain <<var_nexus_vpc_domain_id>>
role priority 10
peer-keepalive destination <<var_nexus_B_mgmt0_ip>> source <<var_nexus_A_mgmt0_ip>>
peer-switch
peer-gateway
auto-recovery
delay restore 150
exit
interface Po10
vpc peer-link
exit
interface Po13
vpc 13
exit
interface Po14
vpc 14
exit
copy run start
```

Cisco Nexus 9372PX B

To configure vPCs for switch B, complete the following step:

1. From the global configuration mode, run the following commands.

```
vpc domain <<var_nexus_vpc_domain_id>>
role priority 20
peer-keepalive destination <<var_nexus_A_mgmt0_ip>> source <<var_nexus_B_mgmt0_ip>>
peer-switch
peer-gateway
auto-recovery
delay restore 150
exit
```

```
interface Po10
vpc peer-link
exit
interface Po13
vpc 13
exit
interface Po14
vpc 14
exit
copy run start
```

Uplink into Existing Network Infrastructure

Depending on the available network infrastructure, several methods and features can be used to uplink the environment. If an existing Cisco Nexus environment is present, it is recommended to use vPCs to uplink the Cisco Nexus 9372PX switches included in the present environment into the infrastructure. The previously described procedures can be used to create an uplink vPC to the existing environment. Make sure to run copy run start to save the configuration on each switch after the configuration is completed.

Cisco UCS S3260 Storage Server and HyperFlex Configuration

Cisco UCS Base Configuration

This deployment details the configuration steps for the Cisco UCS 6248UP Fabric Interconnects (FI) in a design that supports both HyperFlex (HX) Cluster and Cisco UCS S3260 Storage Server. The base configuration of Cisco UCS will remain similar for both Cisco HX and Cisco UCS S3260 Storage Server.

Perform Initial Setup of Cisco UCS 6248UP Fabric Interconnects

This section describes the steps to configure the Cisco Unified Computing System (Cisco UCS) to use in a HyperFlex environment. These steps are necessary to provision the Cisco HyperFlex and Cisco UCS S3260 Storage Server and should be followed precisely to avoid improper configuration.

Cisco UCS 6248UP Fabric Interconnect A

To configure Fabric Interconnect A, complete the following steps:

1. Make sure the Fabric Interconnect cabling is properly connected, including the L1 and L2 cluster links, and power the Fabric Interconnects on by inserting the power cords.
2. Connect to the console port on the first Fabric Interconnect, which will be designated as the A fabric device. Use the supplied Cisco console cable (CAB-CONSOLE-RJ45=), and connect it to a built-in DB9 serial port, or use a USB to DB9 serial port adapter.
3. Start your terminal emulator software.
4. Create a connection to the COM port of the computer’s DB9 port, or the USB to serial adapter. Set the terminal emulation to VT100, and the settings to 9600 baud, 8 data bits, no parity, 1 stop bit.
5. Open the connection just created. You may have to press ENTER to see the first prompt.
6. Configure the first Fabric Interconnect, using the following example as a guideline:

```
          ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of
the system. Only minimal configuration including IP connectivity to
the Fabric interconnect and its clustering mode is performed through these steps.

Type Ctrl-C at any time to abort configuration and reboot system.
To back track or make modifications to already entered values,
complete input till end of section and answer no when prompted
to apply configuration.


Enter the configuration method. (console/gui) ? console

Enter the setup mode; setup newly or restore from backup. (setup/restore) ? setup

You have chosen to setup a new Fabric interconnect. Continue? (y/n): y

Enforce strong password? (y/n) [y]: y

Enter the password for "admin":
Confirm the password for "admin":

Is this Fabric interconnect part of a cluster(select 'no' for standalone)? (yes/no) [n]: yes

Enter the switch fabric (A/B) []: A
Enter the system name:  FI-HX1

Physical Switch Mgmt0 IP address : 10.29.149.98

Physical Switch Mgmt0 IPv4 netmask : 255.255.255.0

IPv4 address of the default gateway : 10.29.149.1

Cluster IPv4 address : 10.29.149.100

Configure the DNS Server IP address? (yes/no) [n]: yes

  DNS IP address : 171.70.168.183

Configure the default domain name? (yes/no) [n]: yes

  Default domain name : hx1.lab.cisco.com

Join centralized management environment (UCS Central)? (yes/no) [n]: no

Following configurations will be applied:

  Switch Fabric=A
  System Name=FI-HX1
  Enforced Strong Password=no
  Physical Switch Mgmt0 IP Address=192.168.20.13
  Physical Switch Mgmt0 IP Netmask=255.255.255.0
  Default Gateway=192.168.20.1
  Ipv6 value=0
  DNS Server=171.70.168.183
  Domain Name=hx1.lab.cisco.com

  Cluster Enabled=yes
  Cluster IP Address=12.168.20.15
  NOTE: Cluster IP will be configured only after both Fabric Interconnects are initialized

Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no): yes
Applying configuration. Please wait.

Configuration file – Ok
```

Cisco UCS 6248UP Fabric Interconnect B

To configure Fabric Interconnect B, complete the following steps:

1. Connect to the console port on the first Fabric Interconnect, which will be designated as the B fabric device. Use the supplied Cisco console cable (CAB-CONSOLE-RJ45=), and connect it to a built-in DB9 serial port, or use a USB to DB9 serial port adapter.
2. Start your terminal emulator software.
3. Create a connection to the COM port of the computer's DB9 port, or the USB to serial adapter. Set the terminal emulation to VT100, and the settings to 9600 baud, 8 data bits, no parity, 1 stop bit.
4. Open the connection just created. You may have to press ENTER to see the first prompt.
5. Configure the second Fabric Interconnect, using the following example as a guideline:

```
         ---- Basic System Configuration Dialog ----

This setup utility will guide you through the basic configuration of
the system. Only minimal configuration including IP connectivity to
the Fabric interconnect and its clustering mode is performed through these steps.
```

```
  Type Ctrl-C at any time to abort configuration and reboot system.
  To back track or make modifications to already entered values,
  complete input till end of section and answer no when prompted
  to apply configuration.


  Enter the configuration method. (console/gui) ? console

  Installer has detected the presence of a peer Fabric interconnect. This Fabric interconnect
will be added to the cluster. Continue (y/n) ? y

  Enter the admin password of the peer Fabric interconnect:
    Connecting to peer Fabric interconnect... done
    Retrieving config from peer Fabric interconnect... done
    Peer Fabric interconnect Mgmt0 IPv4 Address: 192.168.20.13
    Peer Fabric interconnect Mgmt0 IPv4 Netmask: 255.255.255.0
    Cluster IPv4 address          : 192.168.20.15

    Peer FI is IPv4 Cluster enabled. Please Provide Local Fabric Interconnect Mgmt0 IPv4 Address

  Physical Switch Mgmt0 IP address : 192.168.20.14


  Apply and save the configuration (select 'no' if you want to re-enter)? (yes/no): yes
  Applying configuration. Please wait.

Configuration file - Ok
```

Cisco UCS Setup

Log in to Cisco UCS Manager

To log in to the Cisco Unified Computing System (UCS) environment, complete the following steps:

1. Open a web browser and navigate to the Cisco UCS fabric interconnect cluster address.
2. Click the Launch UCS Manager link to download the Cisco UCS Manager software.
3. If prompted to accept security certificates, accept as necessary.
4. When prompted, enter `admin` as the user name and enter the administrative password.
5. Click Login to log in to Cisco UCS Manager.

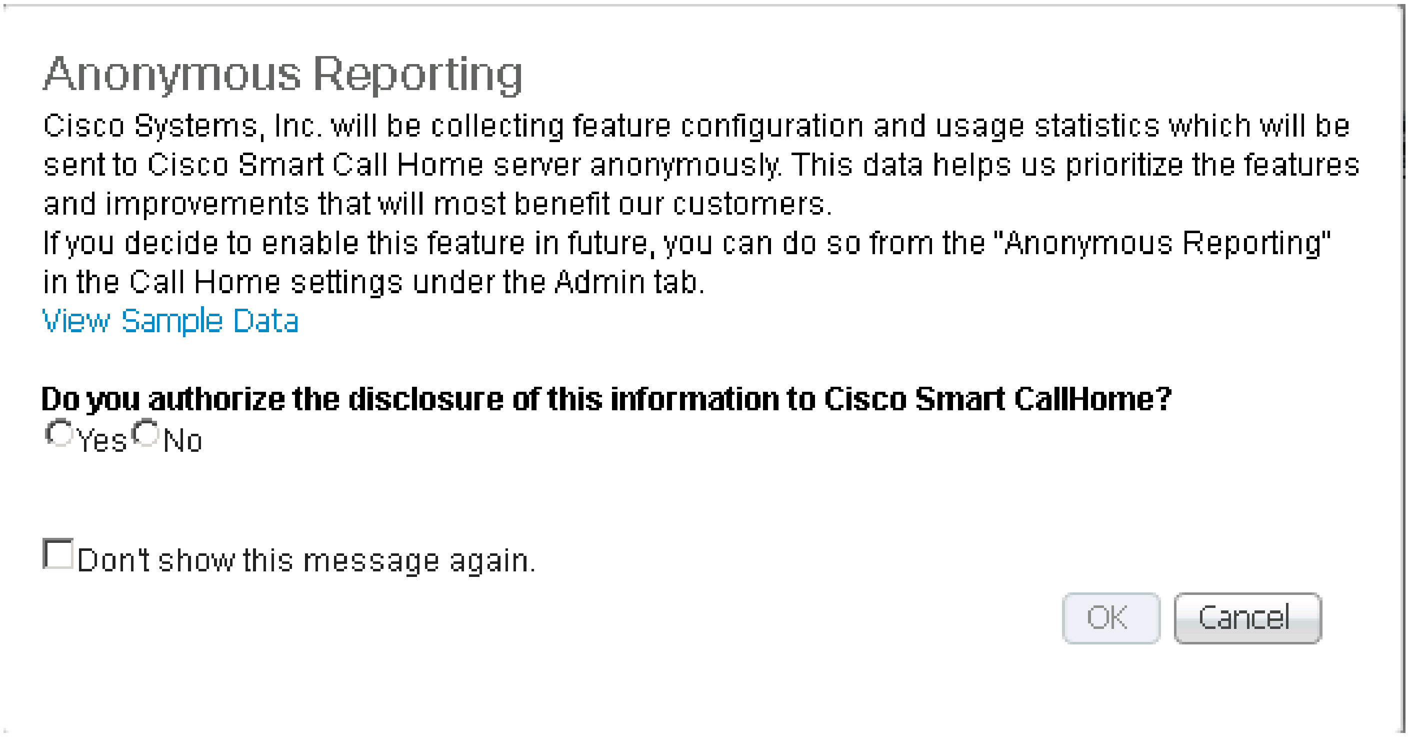
Upgrade Cisco UCS Manager Software to Version 3.1(3c)

This document assumes you are using Cisco UCS 3.1(3c). To upgrade the Cisco UCS Manager software and the Cisco UCS Fabric Interconnect software to version 3.1(3c), refer to Cisco UCS Manager Install and Upgrade Guides.

Anonymous Reporting

To create anonymous reporting, complete the following step:

1. In the Anonymous Reporting window, select whether to send anonymous data to Cisco for improving future products:



Anonymous Reporting

Cisco Systems, Inc. will be collecting feature configuration and usage statistics which will be sent to Cisco Smart Call Home server anonymously. This data helps us prioritize the features and improvements that will most benefit our customers.
If you decide to enable this feature in future, you can do so from the "Anonymous Reporting" in the Call Home settings under the Admin tab.

Do you authorize the disclosure of this information to Cisco Smart CallHome?

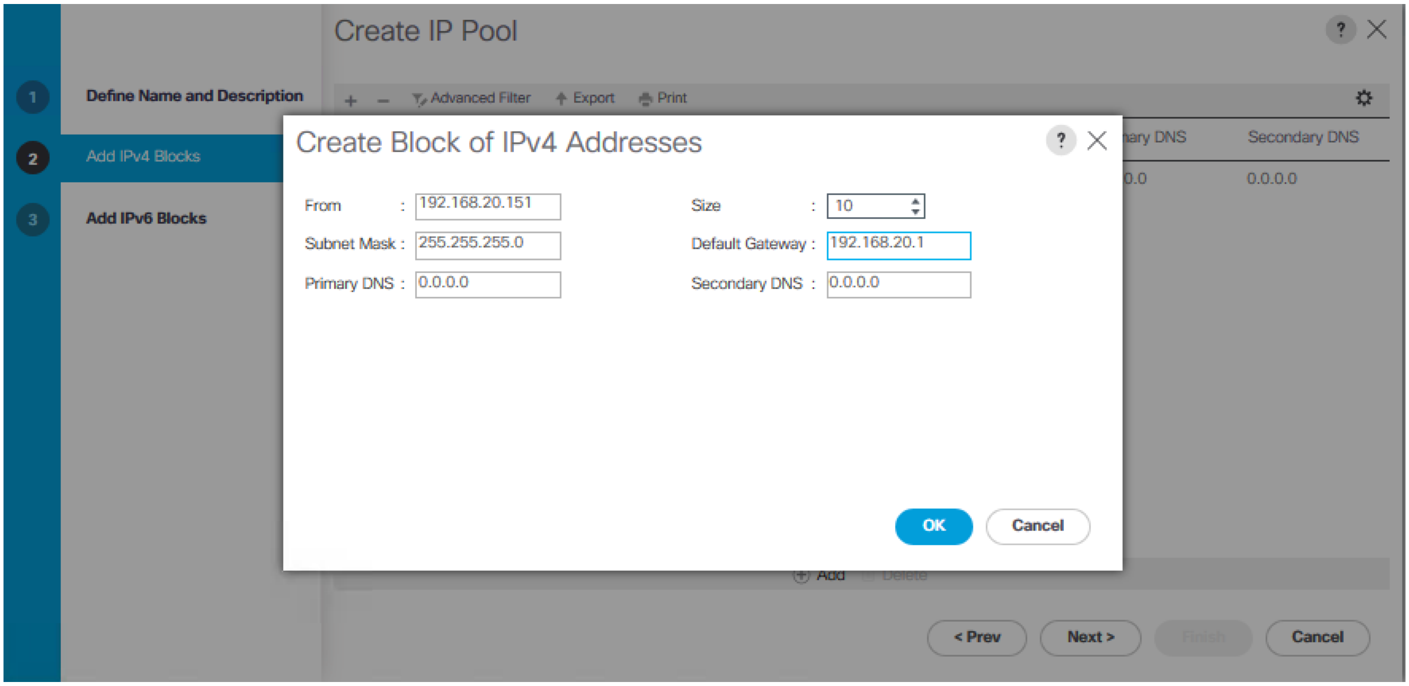
○Yes ○No

□Don't show this message again.

Add Block IP Addresses for KVM Access

To create a block of IP addresses for in band server Keyboard, Video, Mouse (KVM) access in the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select Pools > root > IP Pools.
3. Right-click IP Pool ext-mgmt and select Create Block of IPv4 Addresses.
4. Enter the starting IP address of the block, the number of IP addresses required, and the subnet and gateway information.



Create Block of IPv4 Addresses

From : 192.168.20.151

Size : 10

Subnet Mask : 255.255.255.0

Default Gateway : 192.168.20.1

Primary DNS : 0.0.0.0

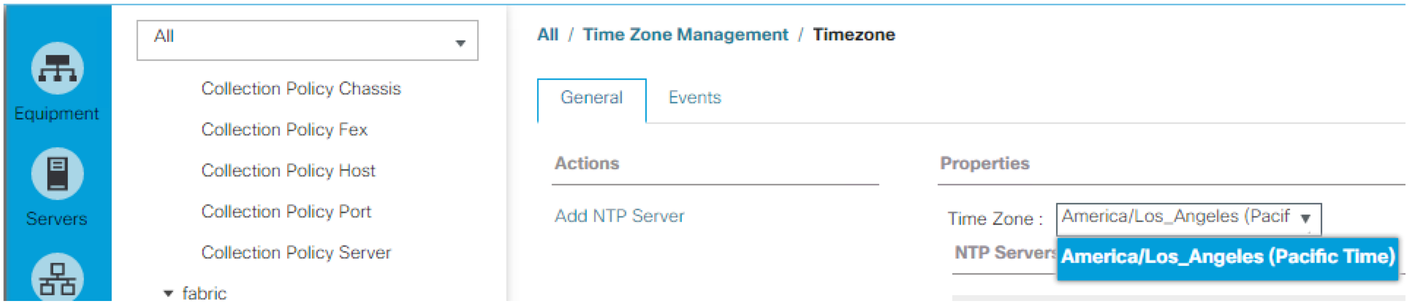
Secondary DNS : 0.0.0.0

5. Click OK to create.
6. Click OK in the confirmation message.

Synchronize Cisco UCS to NTP

To synchronize the Cisco UCS environment to the NTP server, complete the following steps:

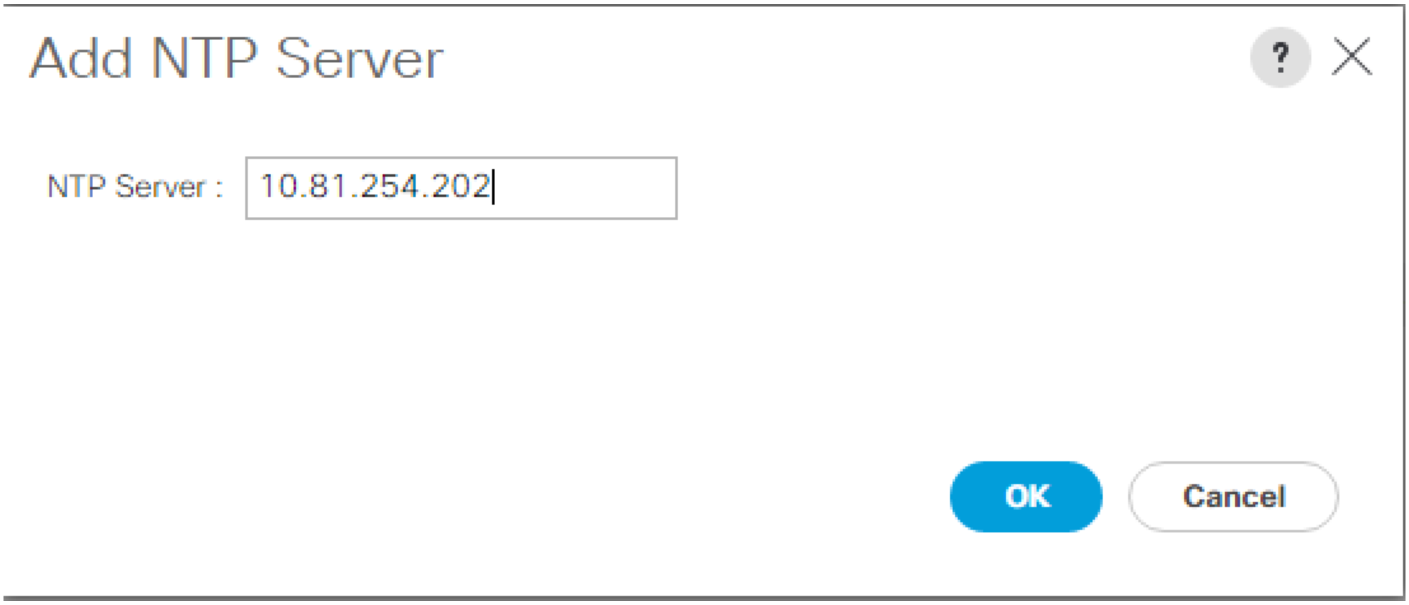
1. In Cisco UCS Manager, click the Admin tab in the navigation pane.
2. Select All > Timezone Management.



Time Zone : America/Los_Angeles (Pacif

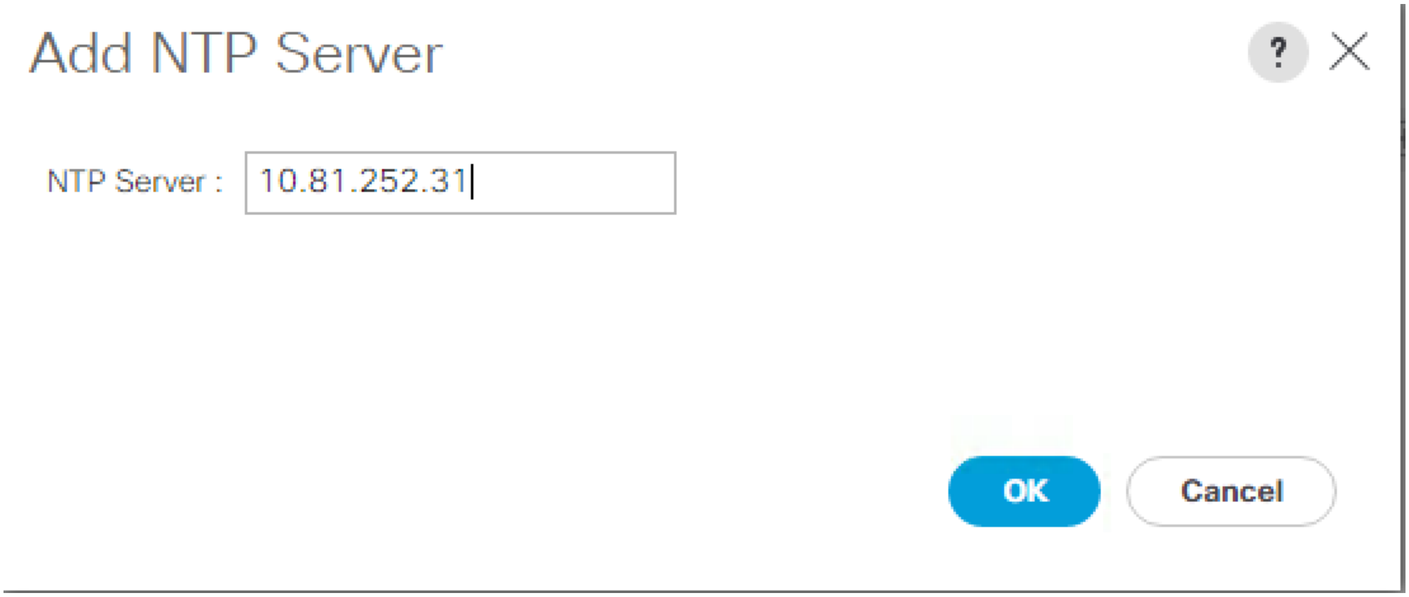
America/Los_Angeles (Pacific Time)

3. In the Properties pane, select the appropriate time zone in the Timezone menu.
4. Click Save Changes and then click OK.
5. Click Add NTP Server.
6. Enter <<var_switch_a_ntp_ip>> and click OK.


Add NTP Server

NTP Server : 10.81.254.202

7. Click Add NTP Server.
8. Enter <<var_switch_b_ntp_ip>> and click OK.


Add NTP Server

NTP Server : 10.81.252.31

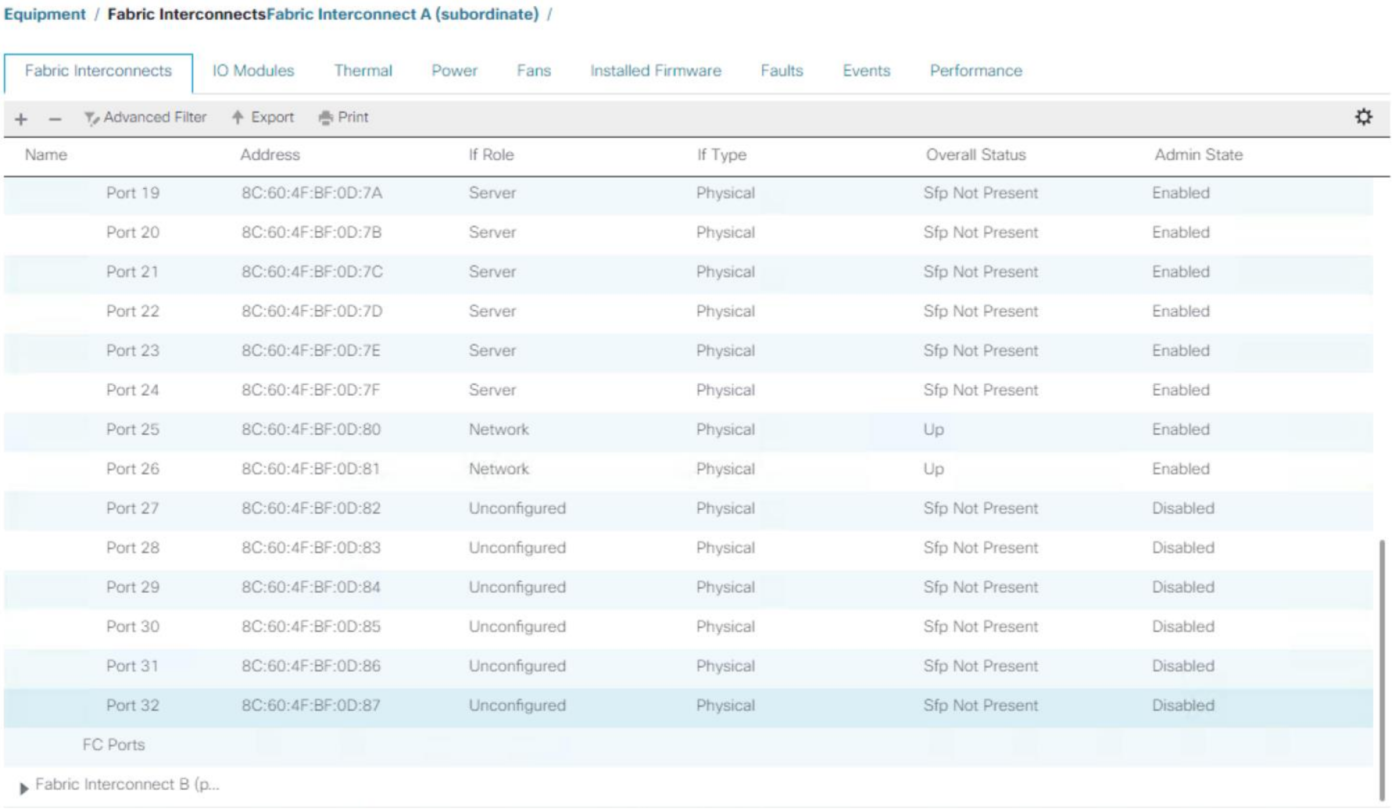
9. Click OK.

Uplink Ports

The Ethernet ports of a Cisco UCS 6248UP Fabric Interconnect are all capable of performing several functions, such as network uplinks or server ports, and more. By default, all ports are unconfigured, and their function must be defined by the administrator. To define the specified ports to be used as network uplinks to the upstream network, complete the following steps:

1. In Cisco UCS Manager, click the Equipment tab in the navigation pane.
2. Select Fabric Interconnects > Fabric Interconnect A > Fixed Module or Expansion Module 2 as appropriate > Ethernet Ports.

3. Select the ports that are to be uplink ports, right click them, and click Configure as Uplink Port.
4. Click Yes to confirm the configuration and click OK.
5. Select Fabric Interconnects > Fabric Interconnect B > Fixed Module or Expansion Module 2 as appropriate > Ethernet Ports.
6. Select the ports that are to be uplink ports, right-click them, and click Configure as Uplink Port.
7. Click Yes to confirm the configuration and click OK.
8. Verify all the necessary ports are now configured as uplink ports.



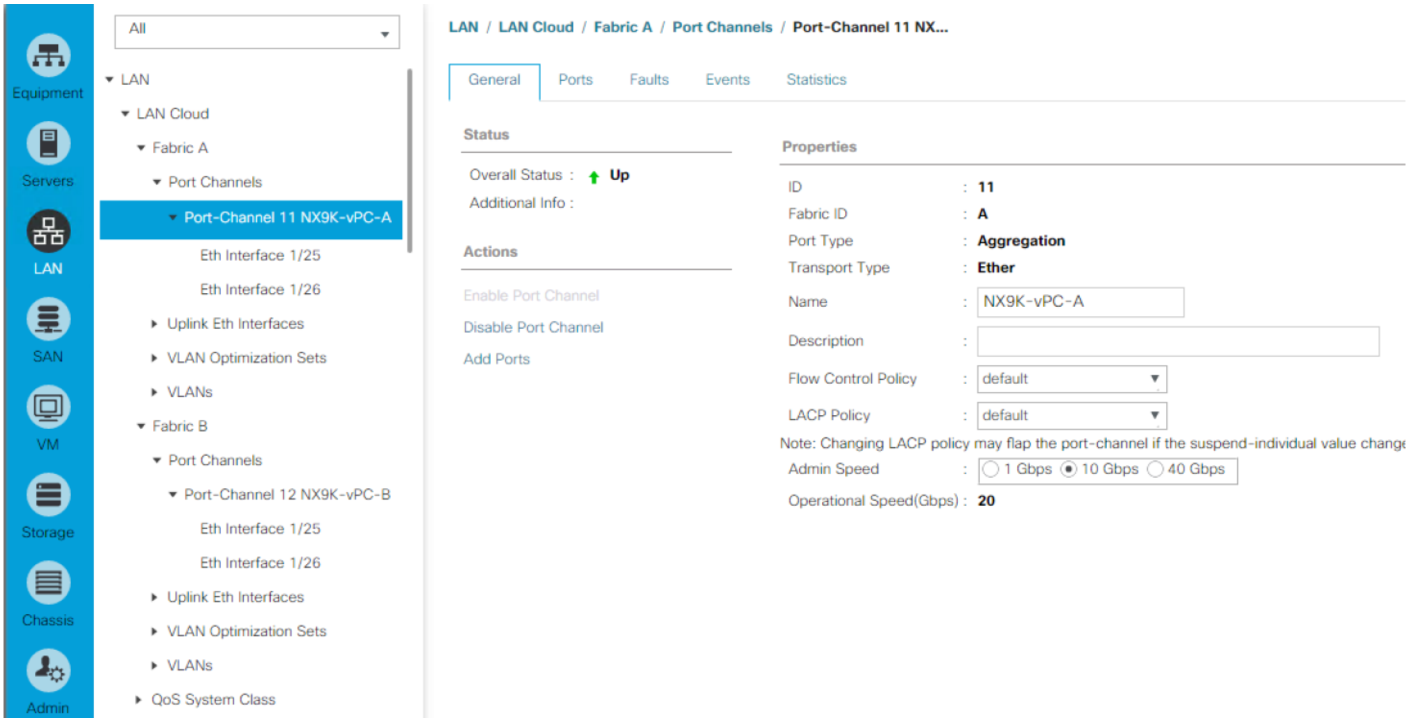
Name	Address	If Role	If Type	Overall Status	Admin State
Port 19	8C:60:4F:BF:0D:7A	Server	Physical	Sfp Not Present	Enabled
Port 20	8C:60:4F:BF:0D:7B	Server	Physical	Sfp Not Present	Enabled
Port 21	8C:60:4F:BF:0D:7C	Server	Physical	Sfp Not Present	Enabled
Port 22	8C:60:4F:BF:0D:7D	Server	Physical	Sfp Not Present	Enabled
Port 23	8C:60:4F:BF:0D:7E	Server	Physical	Sfp Not Present	Enabled
Port 24	8C:60:4F:BF:0D:7F	Server	Physical	Sfp Not Present	Enabled
Port 25	8C:60:4F:BF:0D:80	Network	Physical	Up	Enabled
Port 26	8C:60:4F:BF:0D:81	Network	Physical	Up	Enabled
Port 27	8C:60:4F:BF:0D:82	Unconfigured	Physical	Sfp Not Present	Disabled
Port 28	8C:60:4F:BF:0D:83	Unconfigured	Physical	Sfp Not Present	Disabled
Port 29	8C:60:4F:BF:0D:84	Unconfigured	Physical	Sfp Not Present	Disabled
Port 30	8C:60:4F:BF:0D:85	Unconfigured	Physical	Sfp Not Present	Disabled
Port 31	8C:60:4F:BF:0D:86	Unconfigured	Physical	Sfp Not Present	Disabled
Port 32	8C:60:4F:BF:0D:87	Unconfigured	Physical	Sfp Not Present	Disabled

Uplink Port Channels

If the Cisco UCS uplinks from one Fabric Interconnect are to be combined into a port channel or vPC, you must separately configure the port channels using the previously configured uplink ports. To configure the necessary port channels in the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Under LAN > LAN Cloud, click to expand the Fabric A tree.
3. Right-click Port Channels underneath Fabric A and select Create Port Channel.
4. Enter the port channel ID number as the unique ID of the port channel.
5. Enter the name of the port channel.
6. Click Next.
7. Click each port from Fabric Interconnect A that will participate in the port channel, and click the >> button to add them to the port channel.

8. Click Finish.
9. Click OK.
10. Under LAN > LAN Cloud, click to expand the Fabric B tree.
11. Right-click Port Channels underneath Fabric B and select Create Port Channel.
12. Enter the port channel ID number as the unique ID of the port channel.
13. Enter the name of the port channel.
14. Click Next.
15. Click each port from Fabric Interconnect B that will participate in the port channel, and click the >> button to add them to the port channel.
16. Click Finish.
17. Click OK.
18. Verify the necessary port channels have been created. It can take a few minutes for the newly formed port channels to converge and come online.



Status

Overall Status : Up

Additional Info :

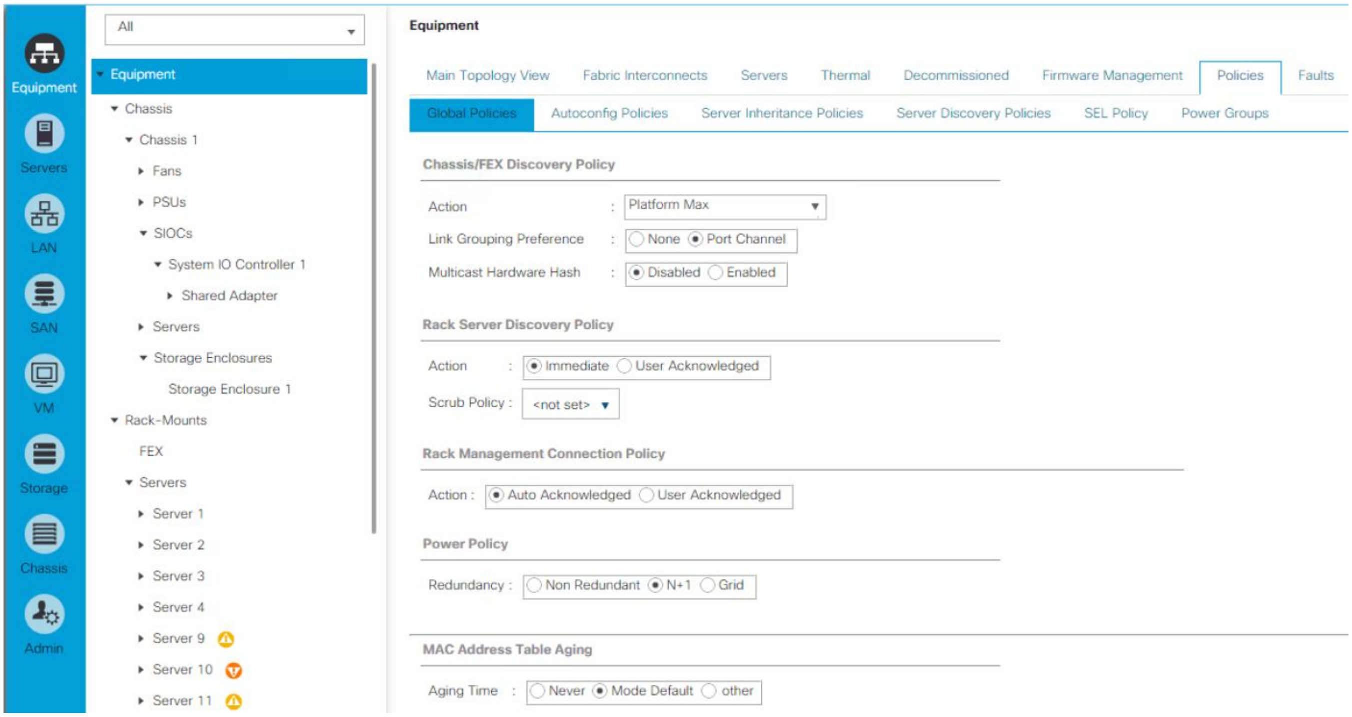
Properties

ID : 11
Fabric ID : A
Port Type : Aggregation
Transport Type : Ether
Name : NX9K-vPC-A
Description :
Flow Control Policy : default
LACP Policy : default
Note: Changing LACP policy may flap the port-channel if the suspend-individual value change
Admin Speed : ○ 1 Gbps ● 10 Gbps ○ 40 Gbps
Operational Speed(Gbps) : 20

Edit Chassis Discovery Policy

Setting the discovery policy simplifies the addition of Cisco UCS B-Series chassis and of additional fabric extenders for further C-Series connectivity. To modify the chassis discovery policy, complete the following steps:

1. In Cisco UCS Manager, click the Equipment tab in the navigation pane and select Equipment in the list on the left.
2. In the right pane, click the Policies tab.
3. Under Global Policies, set the Chassis/FEX Discovery Policy to match the number of uplink ports that are cabled between the chassis or fabric extenders (FEXes) and the fabric interconnects.
4. Set the Link Grouping Preference to Port Channel.



Chassis/FEX Discovery Policy

Action : Platform Max

Link Grouping Preference : ○ None ● Port Channel

Multicast Hardware Hash : ● Disabled ○ Enabled

Rack Server Discovery Policy

Action : ● Immediate ○ User Acknowledged

Scrub Policy : <not set>

Rack Management Connection Policy

Action : ● Auto Acknowledged ○ User Acknowledged

Power Policy

Redundancy : ○ Non Redundant ● N+1 ○ Grid

MAC Address Table Aging

Aging Time : ○ Never ● Mode Default ○ other

5. Click Save Changes.
6. Click OK.

Server Ports

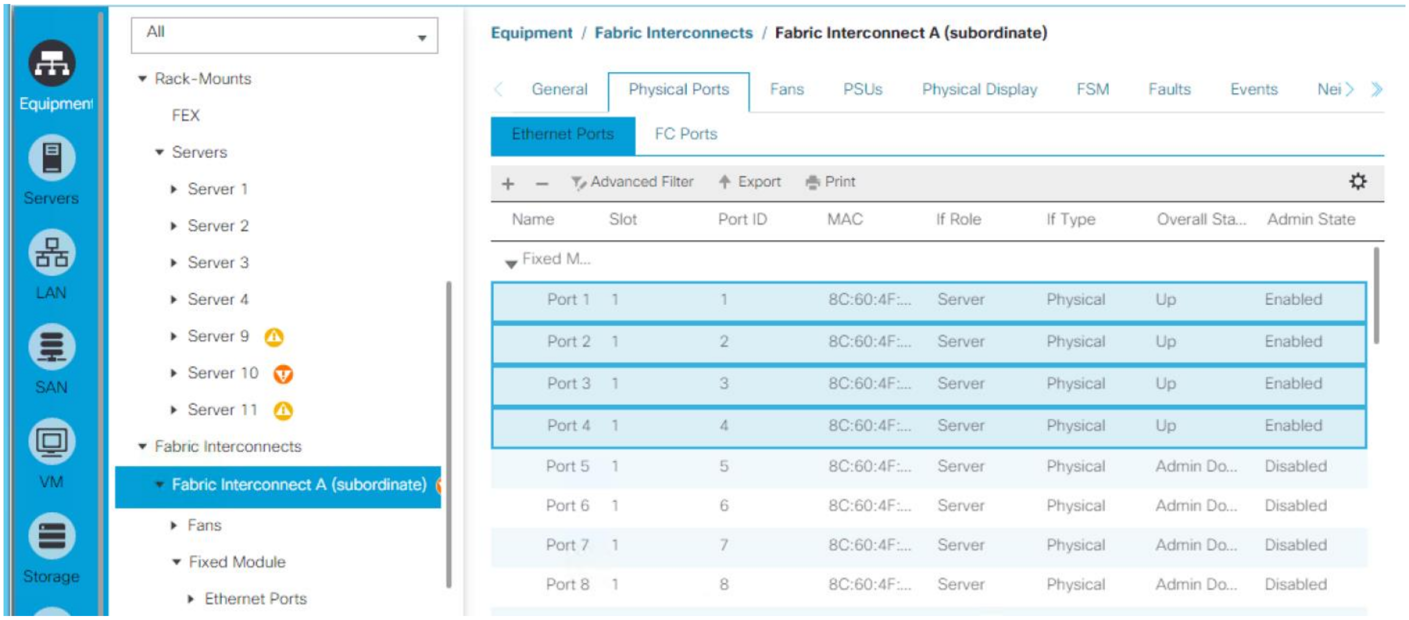
The Ethernet ports of a Cisco UCS Fabric Interconnect connected to the rack-mount servers, or to the blade chassis or to Cisco UCS S3260 Storage Server must be defined as server ports. When a server port is activated, the connected server or chassis will begin the discovery process shortly afterwards. Rack-mount servers, blade chassis, and S3260 chassis are automatically numbered in the order which they are first discovered. For this reason, it is important to configure the server ports sequentially in the order you wish the physical servers and/or chassis to appear within Cisco UCS Manager. For example, if you installed your servers in a cabinet or rack with server #1 on the bottom, counting up as you go higher in the cabinet or rack, then you need to enable the server ports to the bottom-most server first, and enable them one-by-one as you move upward. You must wait until the server appears in the Equipment tab of Cisco UCS Manager before configuring the ports for the next server. The same numbering procedure applies to blade server chassis.

To define the specified ports to be used as server ports, complete the following steps:

1. In Cisco UCS Manager, click the Equipment tab in the navigation pane.
2. Select Fabric Interconnects > Fabric Interconnect A > Fixed Module or Expansion Module 2 as appropriate > Ethernet Ports.
3. Select the first port that is to be a server port, right-click it, and click Configure as Server Port.
4. Click Yes to confirm the configuration and click OK.
5. Select Fabric Interconnects > Fabric Interconnect B > Fixed Module or Expansion Module 2 as appropriate > Ethernet Ports.
6. Select the matching four ports as chosen for Fabric Interconnect A which would be configured as Server Port.

Cisco UCS S3260 storage server has two 40Gbps port per server node whereas Cisco UCS FI 6248UP has 10 Gbps ports. Therefore each of the 40 Gb ports on S3260 is connected to four 10Gbps ports on each of Fabric Interconnect 6248UP, through a QSFP to four SFP+ active optical breakout cable.

7. Click Yes to confirm the configuration and click OK.
8. Repeat step 6-7 for Fabric Interconnect B
9. Wait for a brief period, until the rack-mount server appears in the Equipment tab underneath Equipment > Rack Mounts > Servers, or the chassis appears underneath Equipment > Chassis.

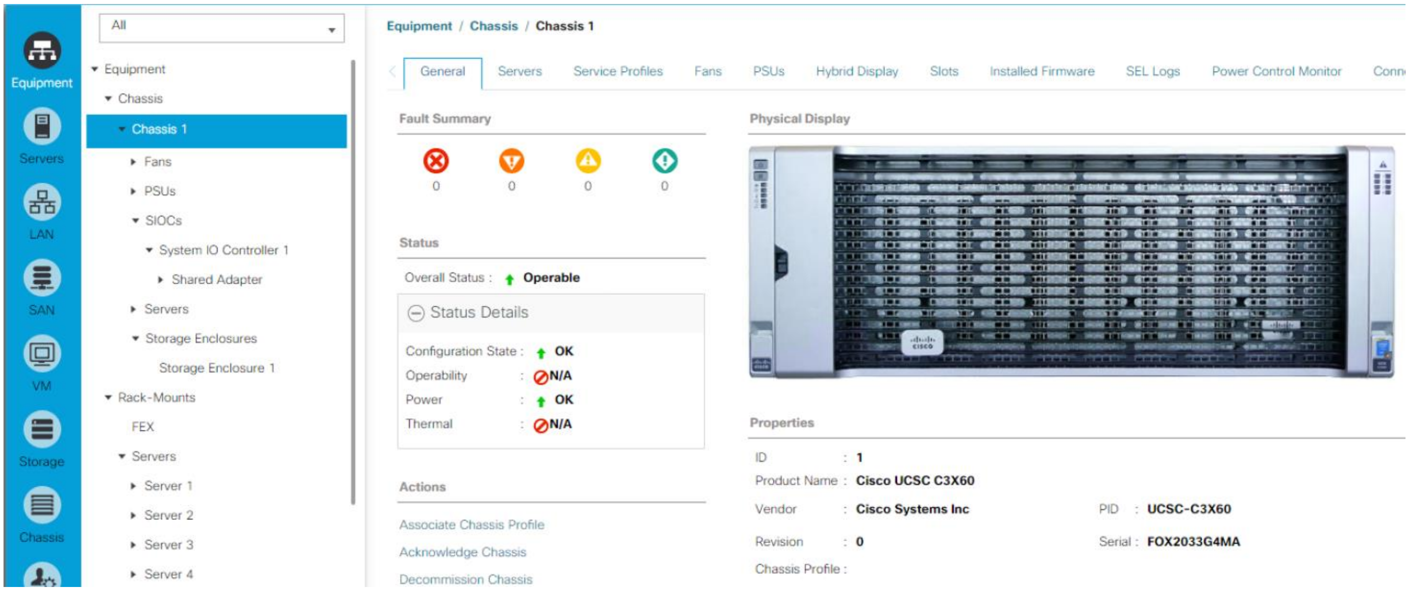


Name	Slot	Port ID	MAC	If Role	If Type	Overall Sta...	Admin State
Port 1	1	1	8C:60:4F:...	Server	Physical	Up	Enabled
Port 2	1	2	8C:60:4F:...	Server	Physical	Up	Enabled
Port 3	1	3	8C:60:4F:...	Server	Physical	Up	Enabled
Port 4	1	4	8C:60:4F:...	Server	Physical	Up	Enabled
Port 5	1	5	8C:60:4F:...	Server	Physical	Admin Do...	Disabled
Port 6	1	6	8C:60:4F:...	Server	Physical	Admin Do...	Disabled
Port 7	1	7	8C:60:4F:...	Server	Physical	Admin Do...	Disabled
Port 8	1	8	8C:60:4F:...	Server	Physical	Admin Do...	Disabled

Server Discovery

As previously described, when the server ports of the Fabric Interconnects are configured and active, the servers connected to those ports will begin a discovery process. During discovery the servers' internal hardware inventories are collected, along with their current firmware revisions. Before continuing with the HyperFlex and Cisco UCS S3260 storage server installation processes, wait for all of the servers to finish their discovery process and show as unassociated servers that are powered off, with no errors. To view the servers' discovery status, complete the following steps:

1. In Cisco UCS Manager, click the Equipment tab in the navigation pane and click Equipment in the top of the navigation tree on the left.
2. In the properties pane, click the Servers tab.
3. Click the Chassis > Chassis1 Tab and view the Chassis status in the Overall Status column.
4. When the chassis is discovered, the S3260 storage server is displayed as shown below:



Equipment / Chassis / Chassis 1

Status

Overall Status : Operable

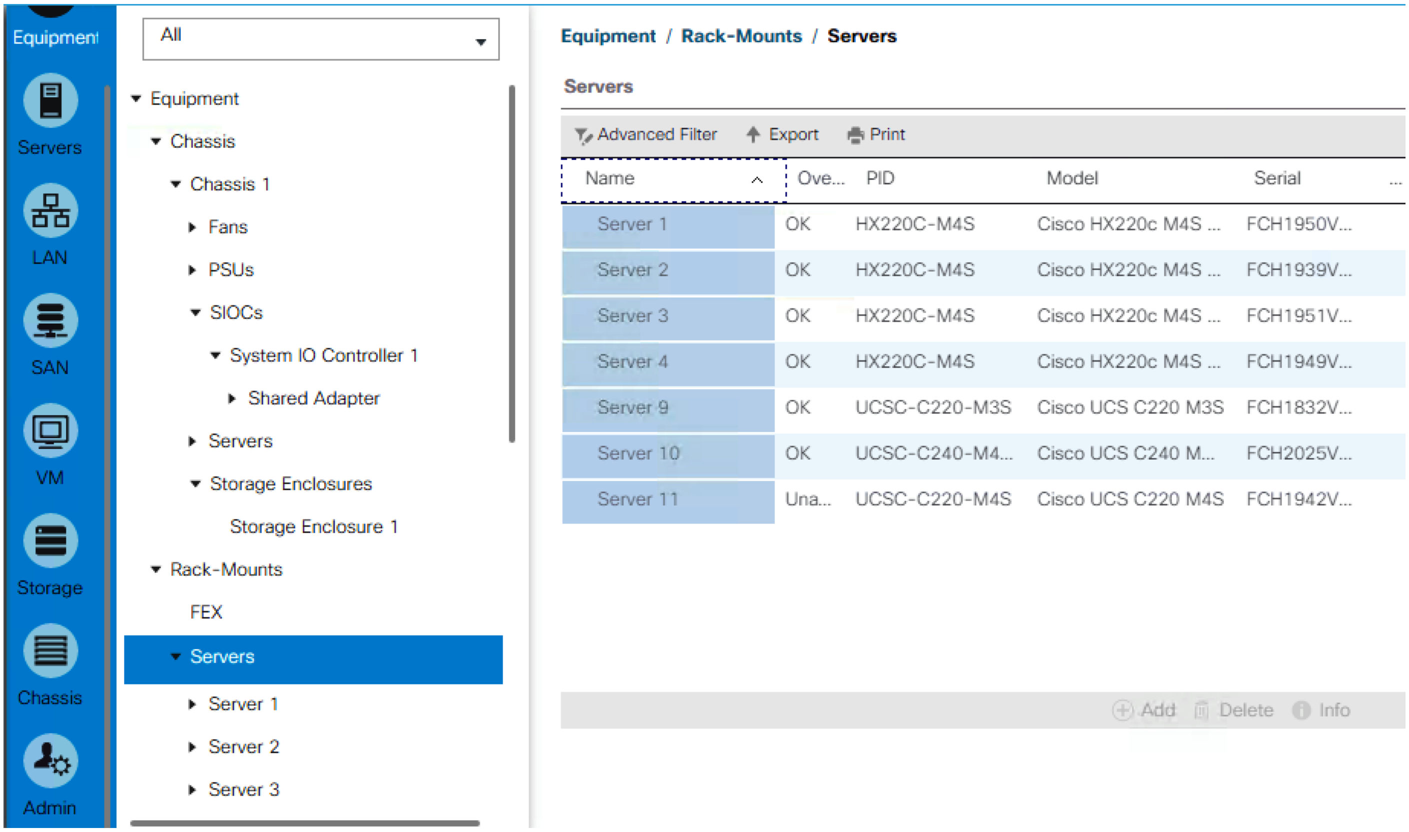
Status Details

Configuration State : OK
Operability : N/A
Power : OK
Thermal : N/A

Properties

ID : 1
Product Name : Cisco UCSC C3X60
Vendor : Cisco Systems Inc
PID : UCSC-C3X60
Revision : 0
Serial : FOX2033G4MA
Chassis Profile :

5. Click the Rack-Mount Servers or Storage Server sub-tab as appropriate, and view the servers' status in the Overall Status column. Below are HX Servers for four node HyperFlex Cluster:



Equipment / Rack-Mounts / Servers

Servers

Name	Ove...	PID	Model	Serial
Server 1	OK	HX220C-M4S	Cisco HX220c M4S ...	FCH1950V...
Server 2	OK	HX220C-M4S	Cisco HX220c M4S ...	FCH1939V...
Server 3	OK	HX220C-M4S	Cisco HX220c M4S ...	FCH1951V...
Server 4	OK	HX220C-M4S	Cisco HX220c M4S ...	FCH1949V...
Server 9	OK	UCSC-C220-M3S	Cisco UCS C220 M3S	FCH1832V...
Server 10	OK	UCSC-C240-M4...	Cisco UCS C240 M...	FCH2025V...
Server 11	Una...	UCSC-C220-M4S	Cisco UCS C220 M4S	FCH1942V...

HyperFlex Installation

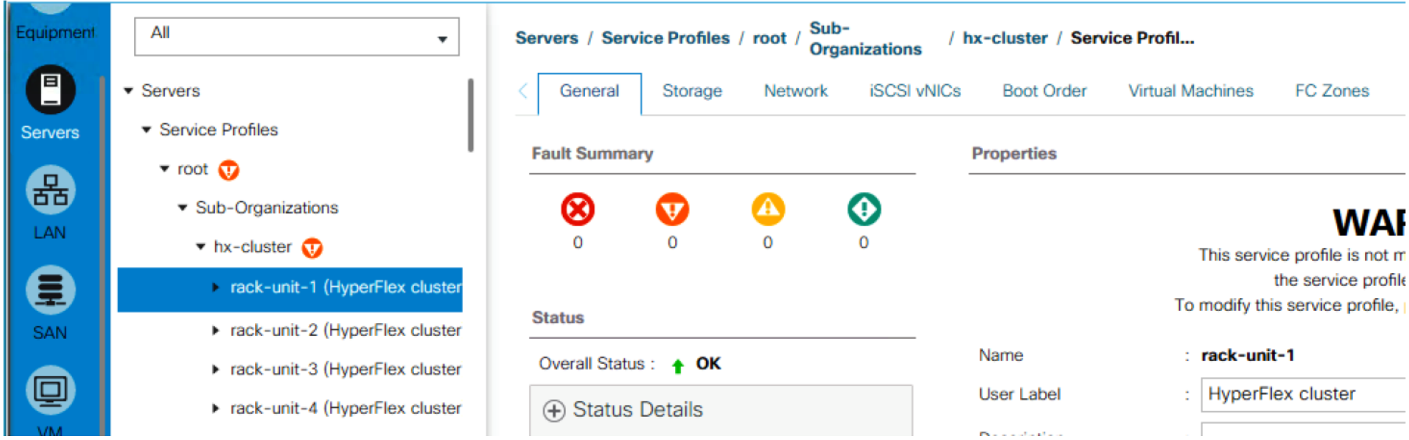
The Cisco HyperFlex software is distributed as a deployable virtual machine, contained in an Open Virtual Appliance (OVA) file format. The HyperFlex OVA file is available for download at www.cisco.com.

When the OVA is installed, the HyperFlex installer is accessed via a webpage using your local computer and a web browser. The HyperFlex Installer configures Cisco UCS and deploys the HyperFlex Data Platform on a Cisco

UCS Cluster. To configure Cisco UCS for HyperFlex and then install HyperFlex Data Platform, refer to Cisco HyperFlex Deployment Guide.

As shown in Figure 30, the present setup is deployed with four node HyperFlex Cluster with HX220C-M4 nodes.

Figure 30 Cisco UCS Manager Summary for a Four Node HX Cluster


Equipment
Servers
LAN
SAN
VM
All
Servers
Service Profiles
root
Sub-Organizations
hx-cluster
rack-unit-1 (HyperFlex cluster
rack-unit-2 (HyperFlex cluster
rack-unit-3 (HyperFlex cluster
rack-unit-4 (HyperFlex cluster
Servers / Service Profiles / root / Sub-Organizations / hx-cluster / Service Profil...
General
Storage
Network
iSCSI vNICs
Boot Order
Virtual Machines
FC Zones
Fault Summary
0
0
0
0
Properties
WAI
This service profile is not m
the service profil
To modify this service profile,
Status
Status Details

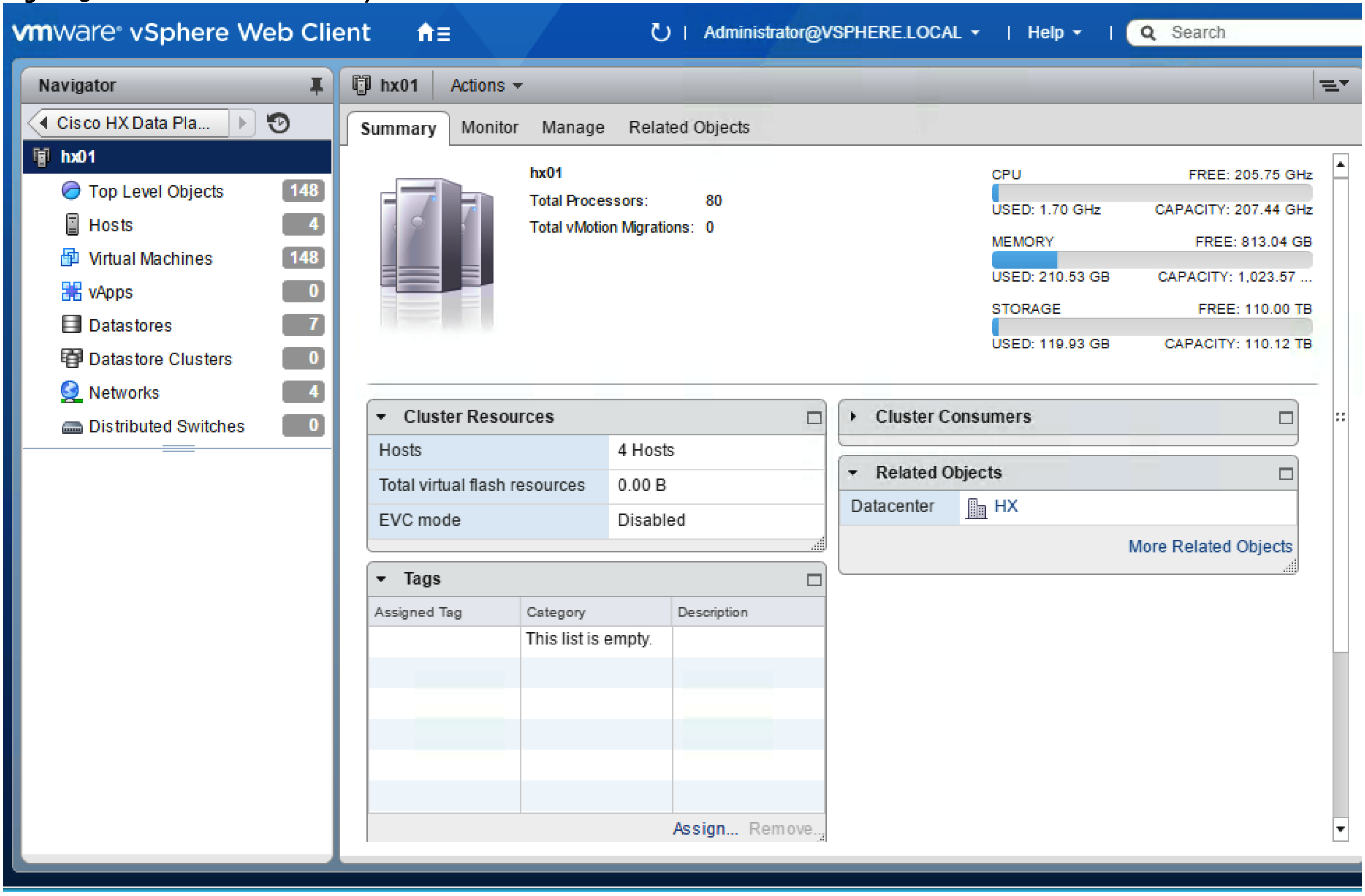
Overall Status : OK

Name : rack-unit-1

User Label : HyperFlex cluster

Figure 31 details the HyperFlex Cluster summary through the HX vCenter Plugin.

Figure 31 HX Cluster Summary



Top Level Objects	148
Hosts	4
Virtual Machines	148
vApps	0
Datastores	7
Datastore Clusters	0
Networks	4
Distributed Switches	0

hx01

Total Processors: 80

Total vMotion Migrations: 0

CPU FREE: 205.75 GHz
USED: 1.70 GHz CAPACITY: 207.44 GHz

MEMORY FREE: 813.04 GB
USED: 210.53 GB CAPACITY: 1,023.57 ...

STORAGE FREE: 110.00 TB
USED: 119.93 GB CAPACITY: 110.12 TB

Cluster Resources

Hosts	4 Hosts
Total virtual flash resources	0.00 B
EVC mode	Disabled

Related Objects

Datacenter	HX

More Related Objects

Tags

Assigned Tag	Category	Description
	This list is empty.	

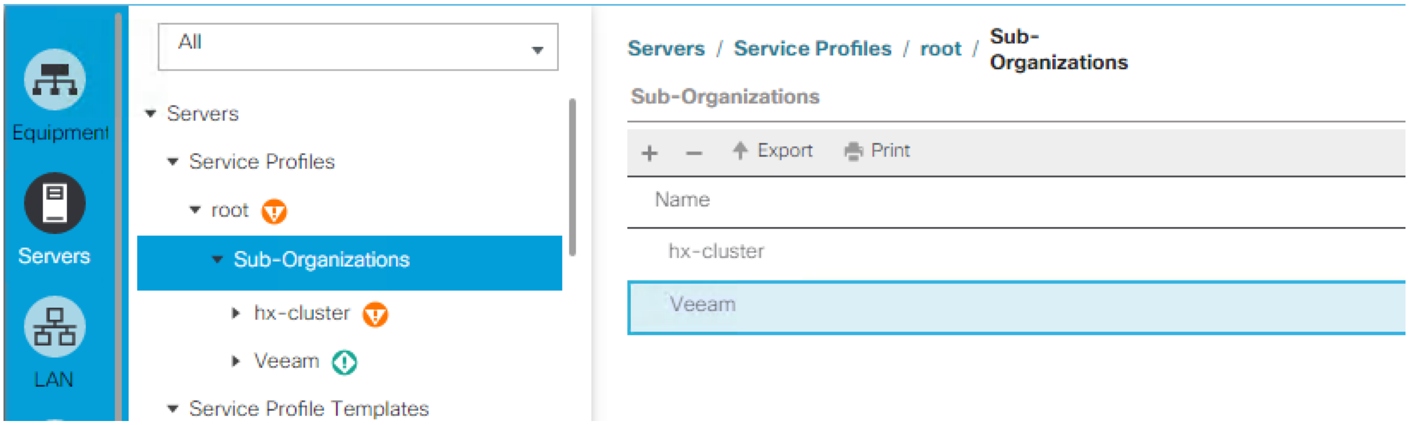
Cisco UCS S3260 Configuration

This section details the steps for the Cisco UCS configuration for the S3260 Storage Server. These steps are independent of the Cisco UCS configuration for HX Cluster.

Create Sub-Organization

In this setup, there are two sub-organizations under the root, each for HX and Veeam Infrastucture. Sub-organizations help to restrict user access to logical pools and objects in order to facility security and to provide easier user interaction. For Veeam Backup infrastructure, create a sub-organization as "Veeam." To create a sub-organization, complete the following steps:

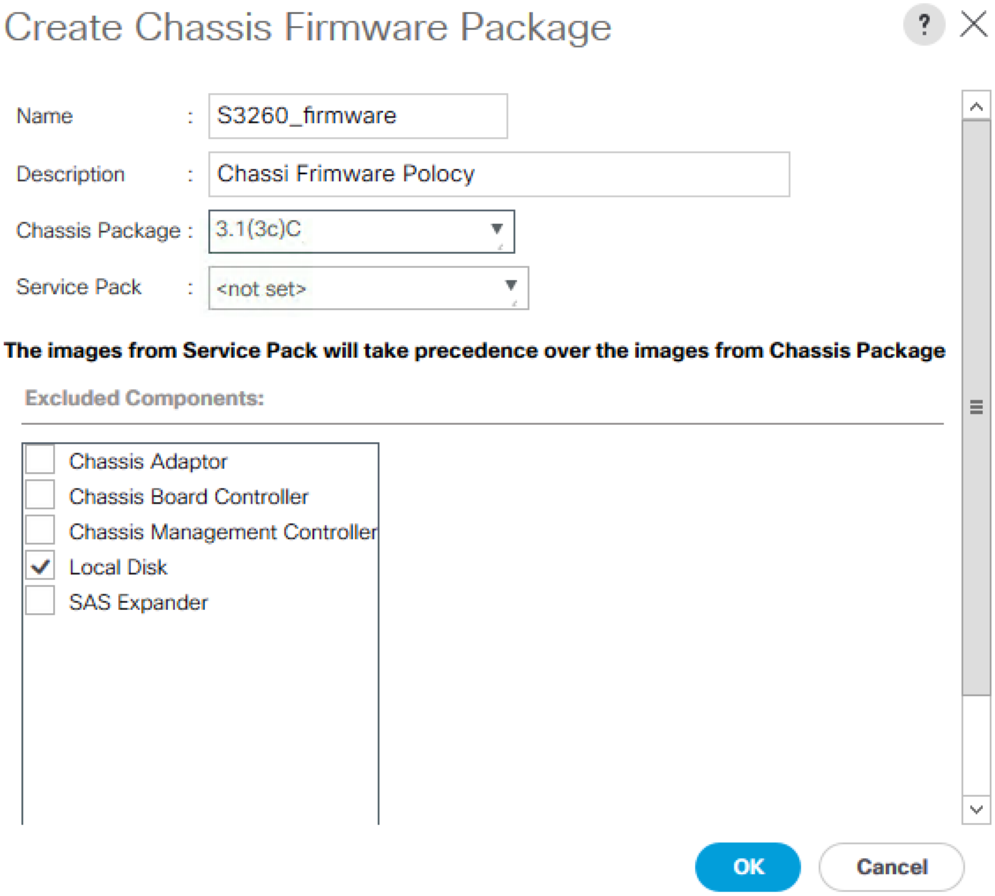
1. In the Navigation pane, click the Servers tab.
2. In the Servers tab, expand Service Profiles > root. You can also access the Sub-Organizations node under the Policies or Pools nodes.
3. Right-click Sub-Organizations and choose Create Organization.



Create Chassis Firmware Packages

To create S3260 Chassis Firmware packages, complete the following steps:

1. In the Navigation pane, click the Chassis tab.
2. In the Chassis tab, expand Policies > root > sub-Organizations > Veeam.
3. Right-click Chassis Firmware Packages and select Create Chassis Firmware Packages.
4. Enter S3260_FW_Package as the Package name.
5. Select 3.1(3c)C from the Chassis Package drop-down.
6. Click OK.


Create Chassis Firmware Package

Name : S3260_firmware

Description : Chassi Frimware Polocy

Chassis Package : 3.1(3c)C

Service Pack : <not set>

The images from Service Pack will take precedence over the images from Chassis Package

Excluded Components:

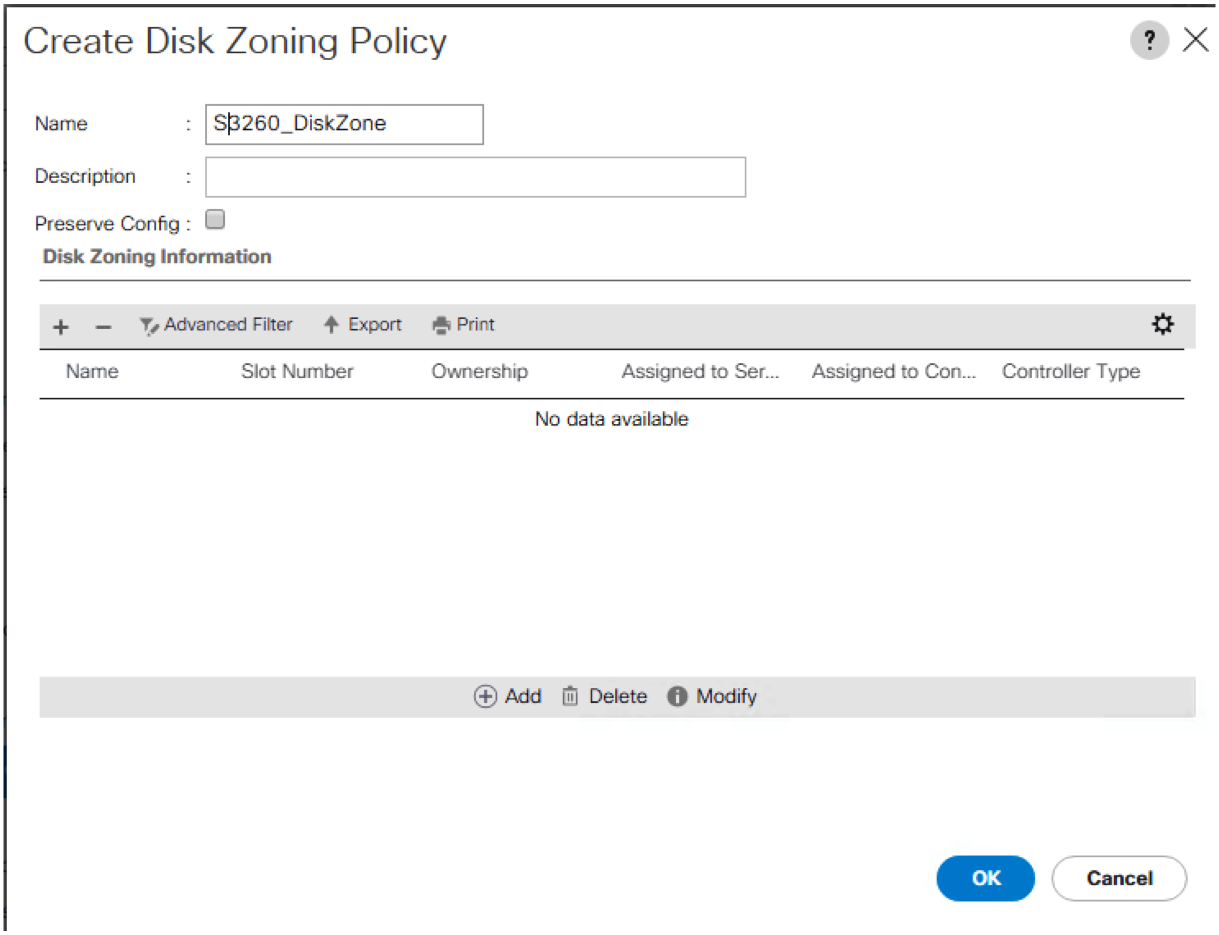
- □ Chassis Adaptor
- □ Chassis Board Controller
- □ Chassis Management Controller
- ☑ Local Disk
- □ SAS Expander

Create Disk Zoning Policy

You can assign disk drives to the server nodes using disk zoning. Disk zoning can be performed on the controllers in the same server or on the controllers on different servers.

To create S3260 Disk Zoning Policy, complete the following steps:

1. In the Navigation pane, click Chassis.
2. Expand Policies > root > Sub-Organizations > Veeam.
3. Right-click Disk Zoning Policies and choose Create Disk Zoning Policy.



Create Disk Zoning Policy

Name : S3260_DiskZone

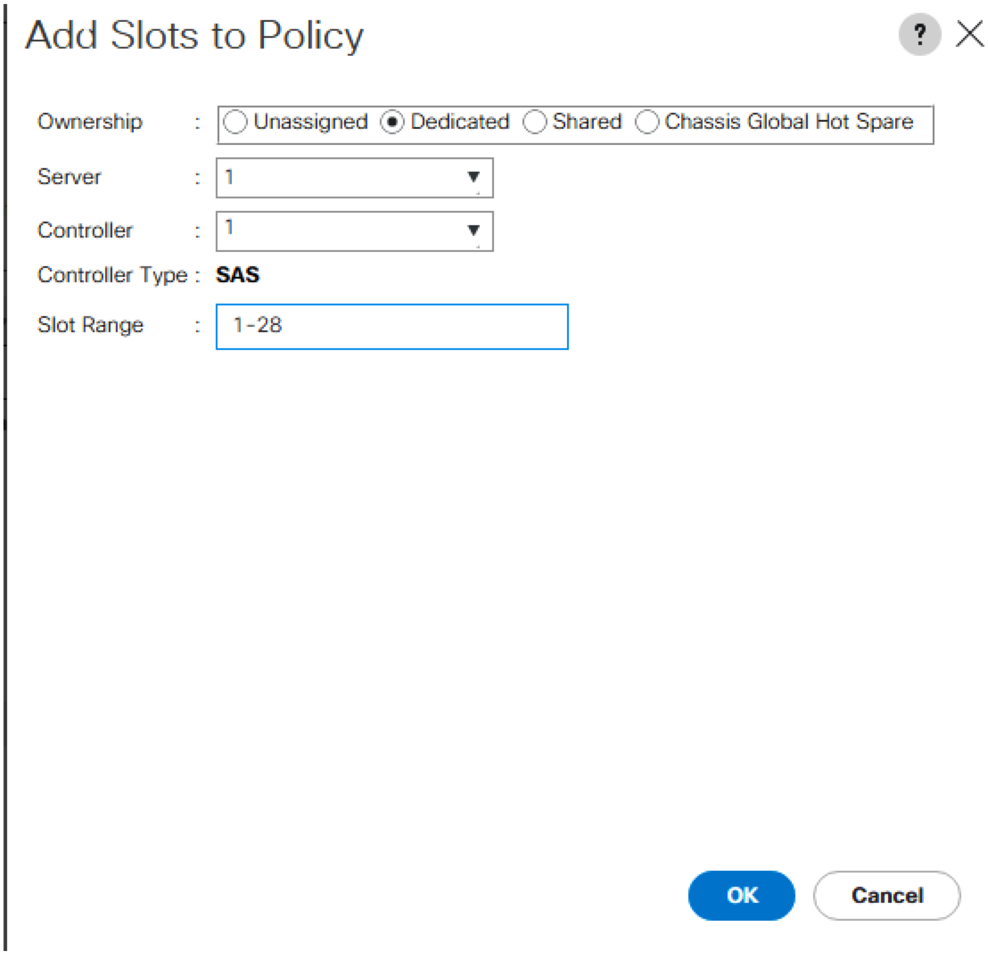
Description :

Preserve Config : □

Disk Zoning Information

Name	Slot Number	Ownership	Assigned to Ser...	Assigned to Con...	Controller Type
No data available					

4. Enter S3260_DiskZone as the Disk Zone Name.
5. In the Disk Zoning Information Area, click Add.
6. Select Ownership as Dedicated.
7. Select Server as 1 (disk is assigned to node 1 of the S3260 Storage server).
8. Select Controller as 1.
9. Slot range as 1-28 (in the present setup there are 28 X6 TB SAS drives).



Add Slots to Policy

Ownership : ○ Unassigned ● Dedicated ○ Shared ○ Chassis Global Hot Spare

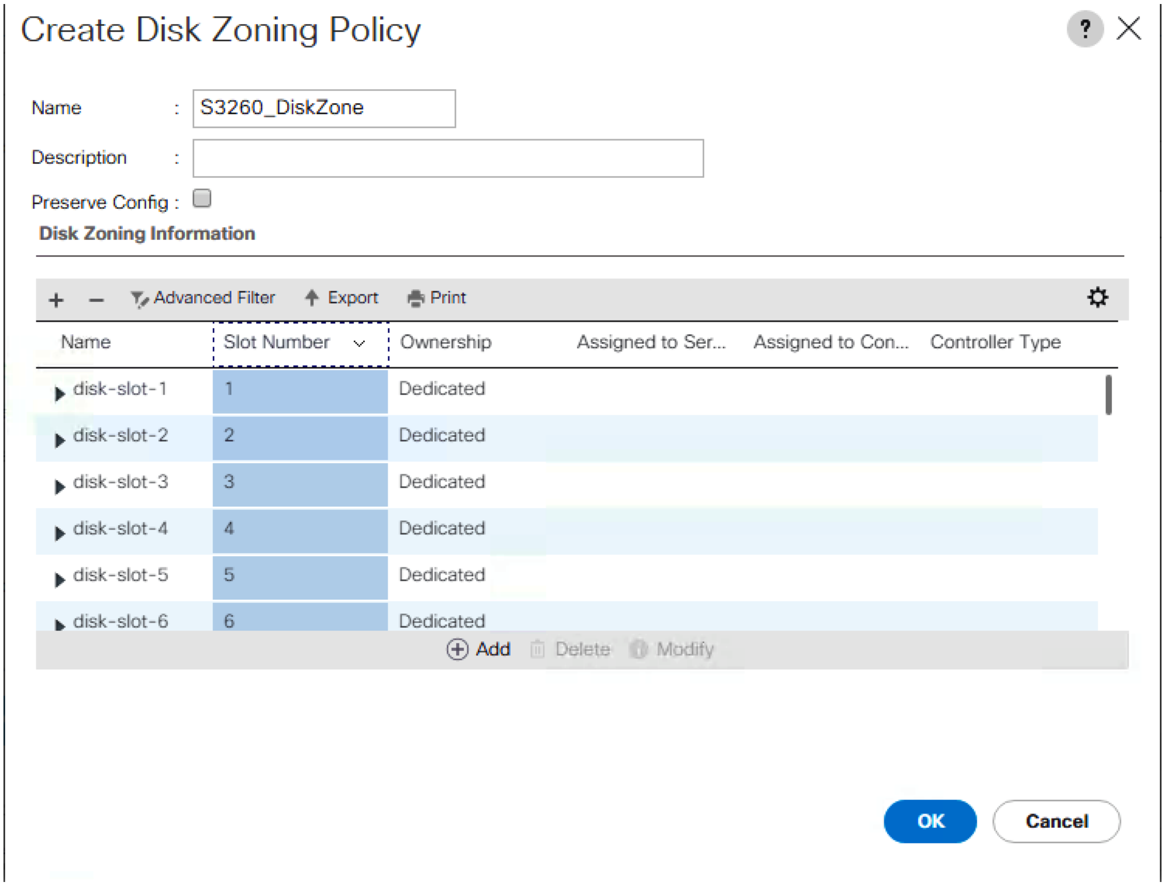
Server : 1

Controller : 1

Controller Type : **SAS**

Slot Range : 1-28

10. Click OK.
11. Click OK again to complete the Disk Zoning Configuration Policy.



Create Disk Zoning Policy

Name : S3260_DiskZone

Description :

Preserve Config : □

Disk Zoning Information

Name	Slot Number	Ownership	Assigned to Ser...	Assigned to Con...	Controller Type
disk-slot-1	1	Dedicated			
disk-slot-2	2	Dedicated			
disk-slot-3	3	Dedicated			
disk-slot-4	4	Dedicated			
disk-slot-5	5	Dedicated			
disk-slot-6	6	Dedicated			

Setting S3260 Disk to Unconfigured Good

To prepare all disks from the S3260 Storage Servers for storage profiles, the disks have to be converted from JBOD to Unconfigured Good. To convert the disks, complete the following steps:

1. Select the `Equipment` tab in the left pane of the Cisco UCS Manager GUI.
2. Go to Equipment >Chassis > Chassis 1 > Storage Enclosures > Enclosure1.
3. Select disks and right-click Set JBOD to Unconfigured Good.

Create MAC Address Pools

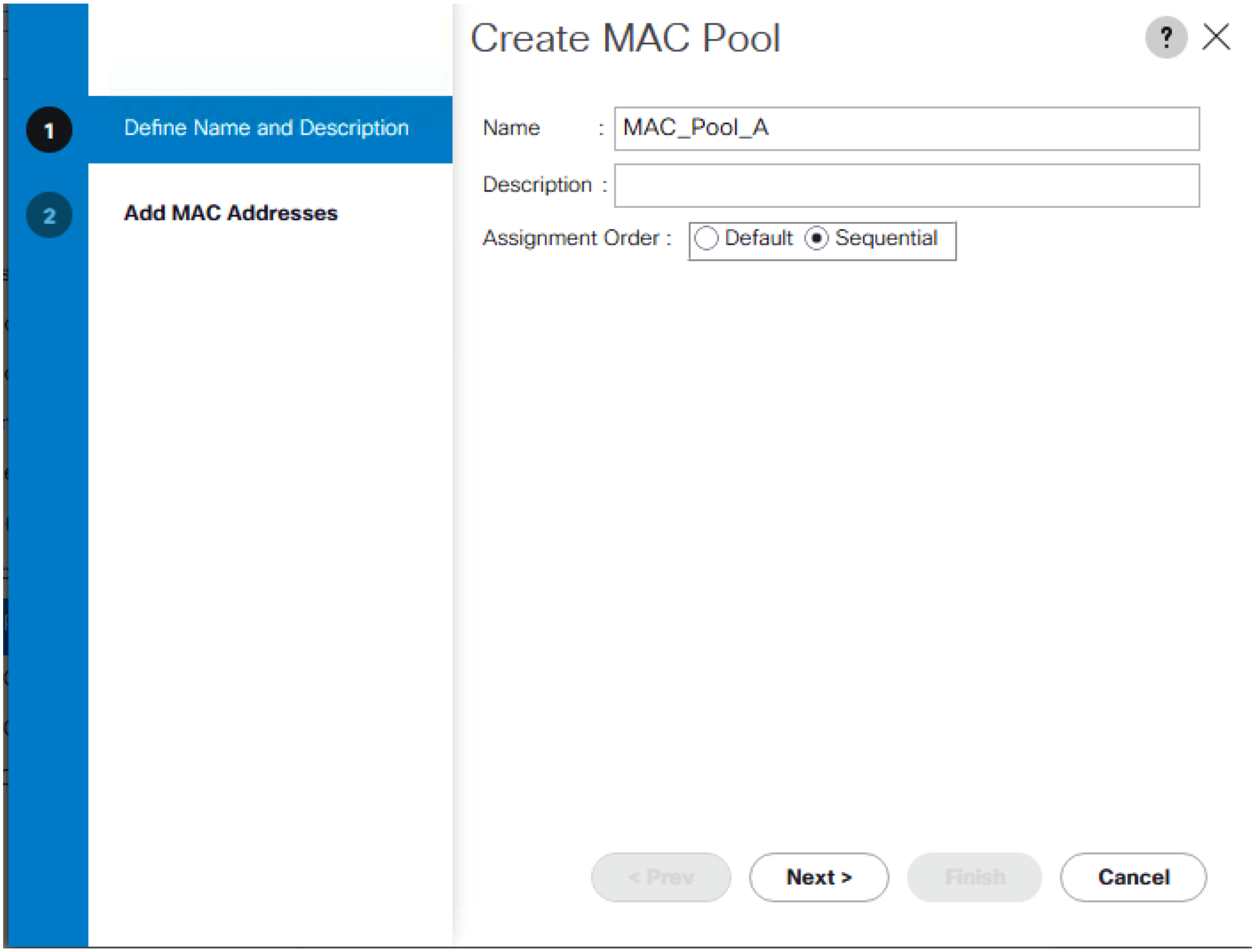
To configure the necessary MAC address pools for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select Pools > root > Sub-organizations > Veeam.

In this procedure, two MAC address pools are created, one for each switching fabric.

3. Right-click MAC Pools under the root organization.
4. Select Create MAC Pool to create the MAC address pool.
5. Enter `MAC_Pool_A` as the name of the MAC pool.
6. Optional: Enter a description for the MAC pool.

7. Select **Sequential** as the option for Assignment Order.



Create MAC Pool

Name : MAC_Pool_A

Description :

Assignment Order : ○ Default ● Sequential

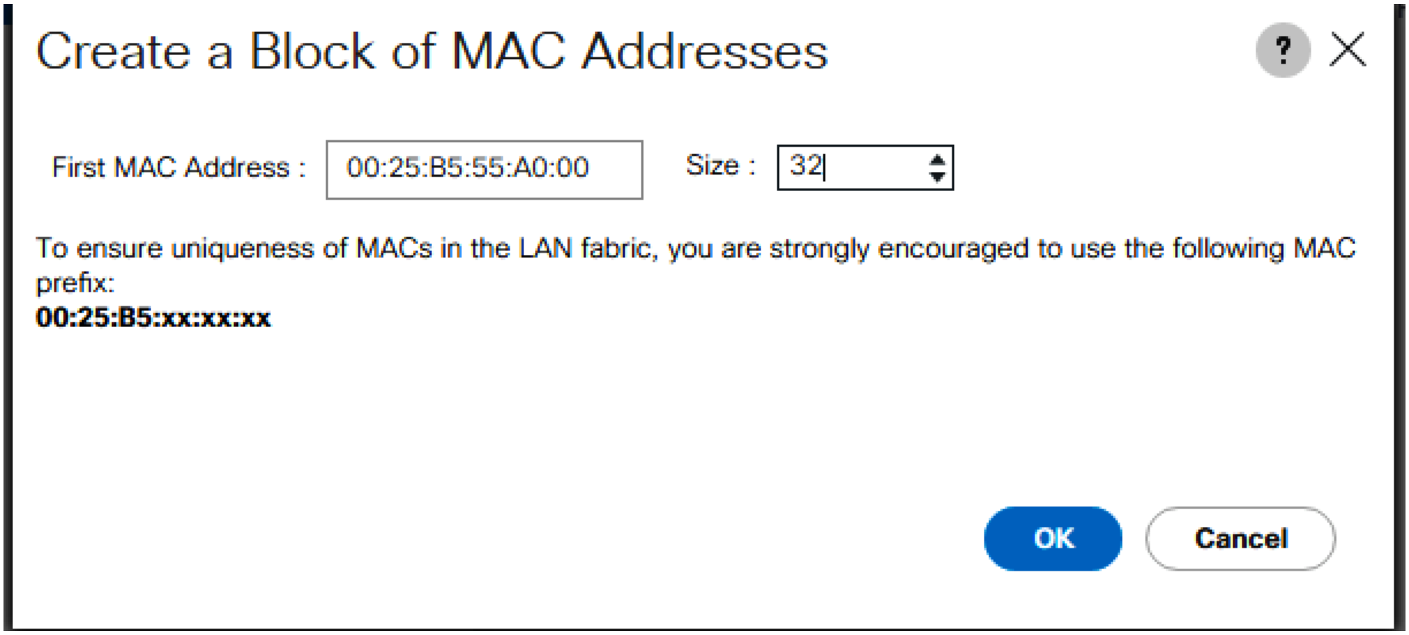
8. Click Next.

9. Click Add.

10. Specify a starting MAC address.

For the present solution, the recommendation is to place `A0` in the next-to-last octet of the starting MAC address to identify all of the MAC addresses as fabric A addresses.

11. Specify a size for the MAC address pool that is sufficient to support the available blade or server resources.



Create a Block of MAC Addresses

First MAC Address : 00:25:B5:55:A0:00

Size : 32

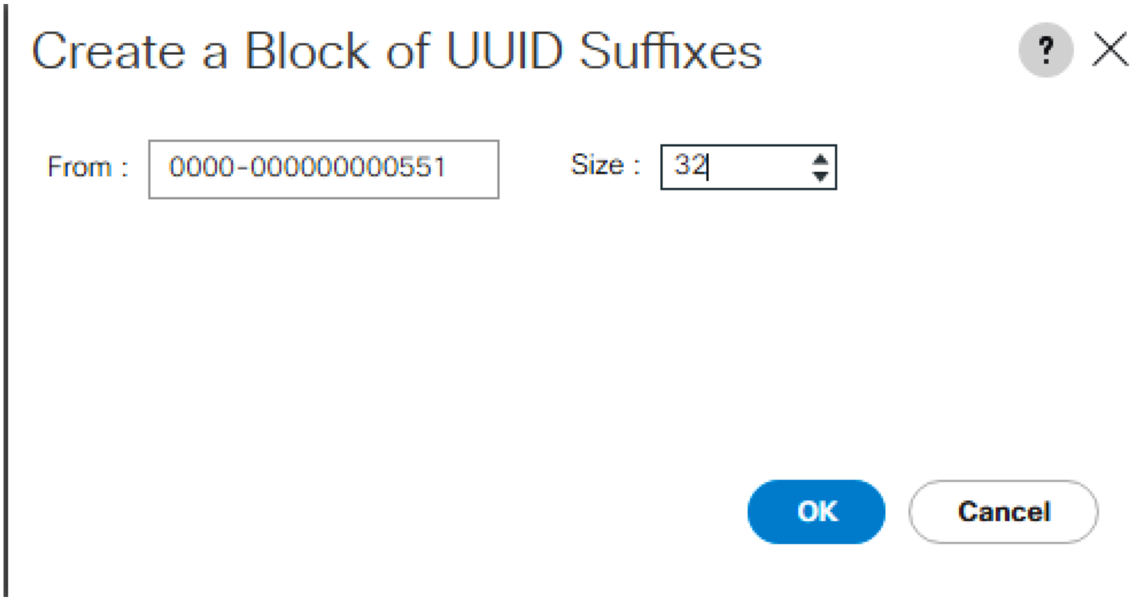
To ensure uniqueness of MACs in the LAN fabric, you are strongly encouraged to use the following MAC prefix:
00:25:B5:xx:xx:xx

12. Click OK.
13. Click Finish.

Create UUID Suffix Pool

To configure the necessary universally unique identifier (UUID) suffix pool for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Pools > root > Sub-Organizations >Veeam.
3. Right-click UUID Suffix Pools.
4. Select Create UUID Suffix Pool.
5. Enter UUID_Pool as the name of the UUID suffix pool.
6. Optional: Enter a description for the UUID suffix pool.
7. Keep the prefix at the derived option.
8. Select Sequential for the Assignment Order.
9. Click Next.
10. Click Add to add a block of UUIDs.
11. Keep the From field at the default setting.
12. Specify a size for the UUID block that is sufficient to support the available server resources.



Create a Block of UUID Suffixes

From : 0000-000000000551

Size : 32

13. Click OK.
14. Click Finish.
15. Click OK.

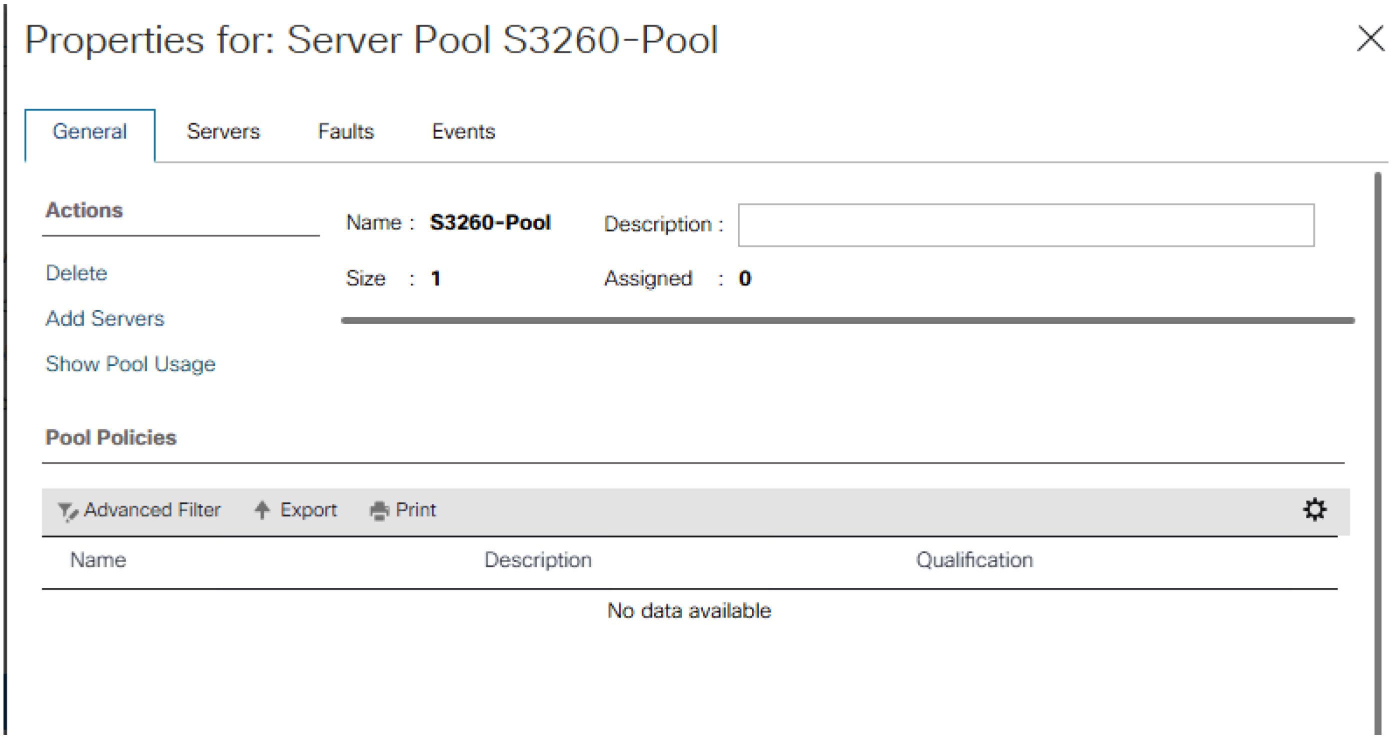
Create Server Pool

To configure the necessary server pool for the Cisco UCS environment, complete the following steps:

Consider creating unique server pools to achieve the granularity that is required in your environment.

---

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Pools > root.
3. Right-click Server Pools.
4. Select Create Server Pool.
5. Enter Infra_Pool as the name of the server pool.
6. Optional: Enter a description for the server pool.
7. Click Next.
8. Select S3260 server node to be used for and click >> to add them to the Infra_Pool server pool.



Properties for: Server Pool S3260-Pool

Actions

Name : **S3260-Pool**

Description :

Size : **1**

Assigned : **0**

Pool Policies

Name	Description	Qualification
No data available		

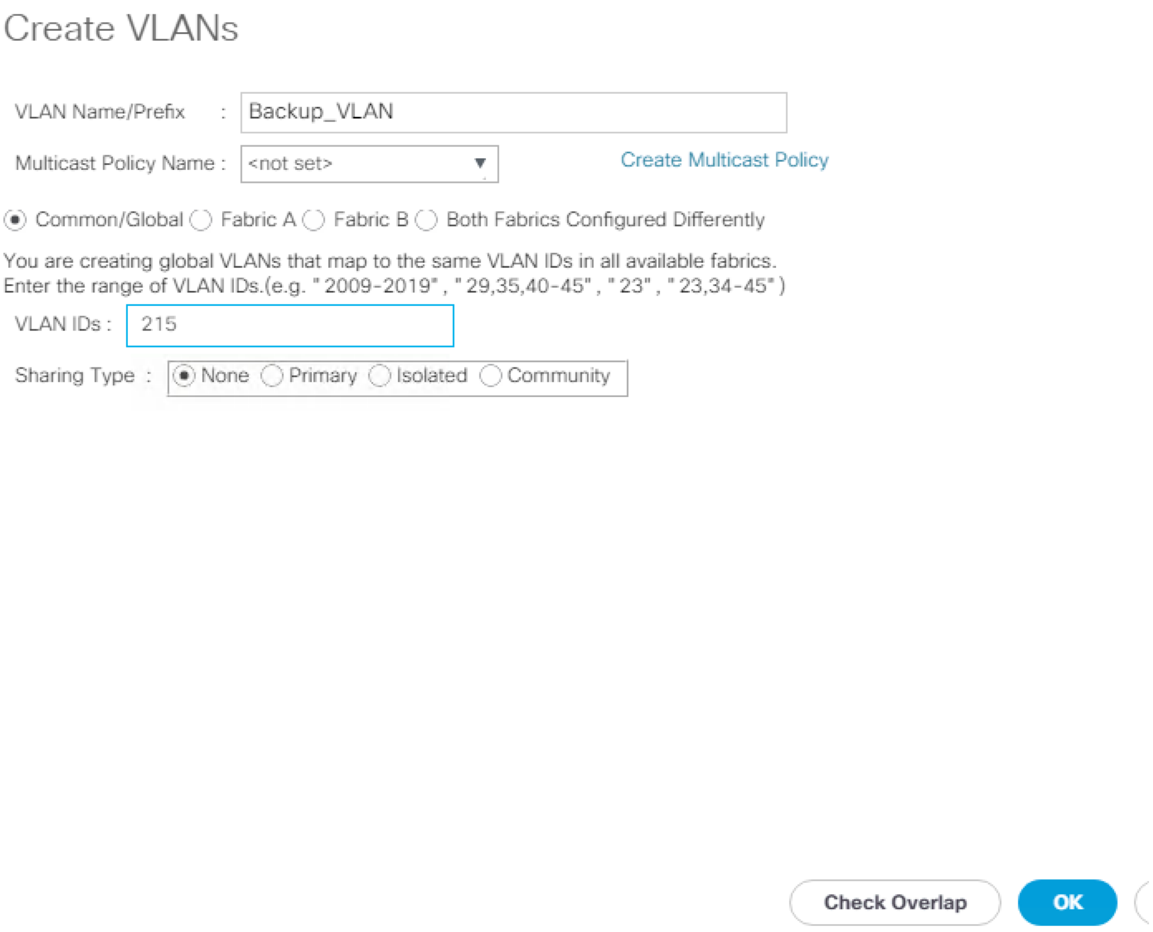
9. Click Finish.
10. Click OK.

Create VLANs

If HyperFlex is already configured, this step is not required. HX Management and Veeam network are on the same VLAN. We need to add multisite VLAN for communication across data center. If HX Management VLAN can communicate across Data Center, then addition of multisite VLAN is not required.

To configure the necessary virtual local area networks (VLANs) for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select LAN > LAN Cloud.
3. Right-click VLANs.
4. Select Create VLANs.
5. Enter hx-inband-mgmt as the name of the VLAN to be used as the native VLAN.
6. Keep the Common/Global option selected for the scope of the VLAN.
7. Keep the Sharing Type as None.
8. Click OK and then click OK again.
9. Repeat Step 3-8 to add backup VLAN as shown in the figure below:



Create VLANs

VLAN Name/Prefix : Backup_VLAN

Multicast Policy Name : <not set>

● Common/Global ○ Fabric A ○ Fabric B ○ Both Fabrics Configured Differently

You are creating global VLANs that map to the same VLAN IDs in all available fabrics.
Enter the range of VLAN IDs.(e.g. " 2009-2019" , " 29,35,40-45" , " 23" , " 23,34-45")

VLAN IDs : 215

Sharing Type : ● None ○ Primary ○ Isolated ○ Community

Create Host Firmware Package

Firmware management policies allow the administrator to select the corresponding packages for a given server configuration. These policies often include packages for adapter, BIOS, board controller, FC adapters, host bus adapter (HBA) option ROM, and storage controller properties.

To create a firmware management policy for a given server configuration in the Cisco UCS environment, complete the following steps:

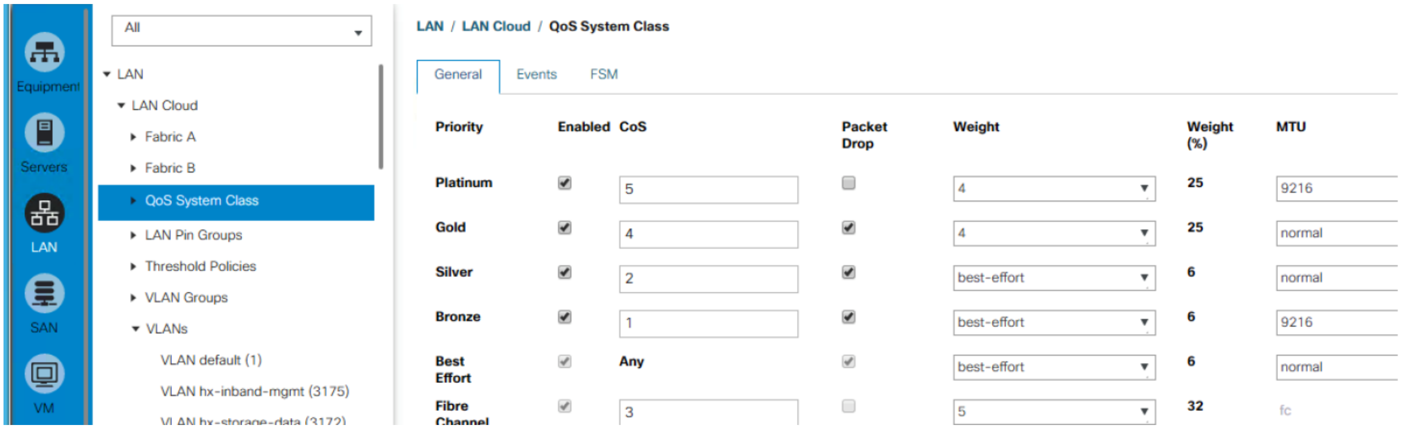
1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root >Sub-Organizations > Veeam.
3. Expand Host Firmware Packages.
4. Right-click and Select Create Host Firmware Package.
5. Select the version 3.1(3c)B for Blade and 3.1(3c)C for Rack Packages.
6. Click OK to add the host firmware package.

QoS Policy

To enable quality of service and create QoS policy in the Cisco UCS fabric, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.

2. Select LAN > LAN Cloud > QoS System Class.
3. In the right pane, click the General tab.
4. Make sure the Class of Service is configured as shown below. This is already created through the HyperFlex installer.

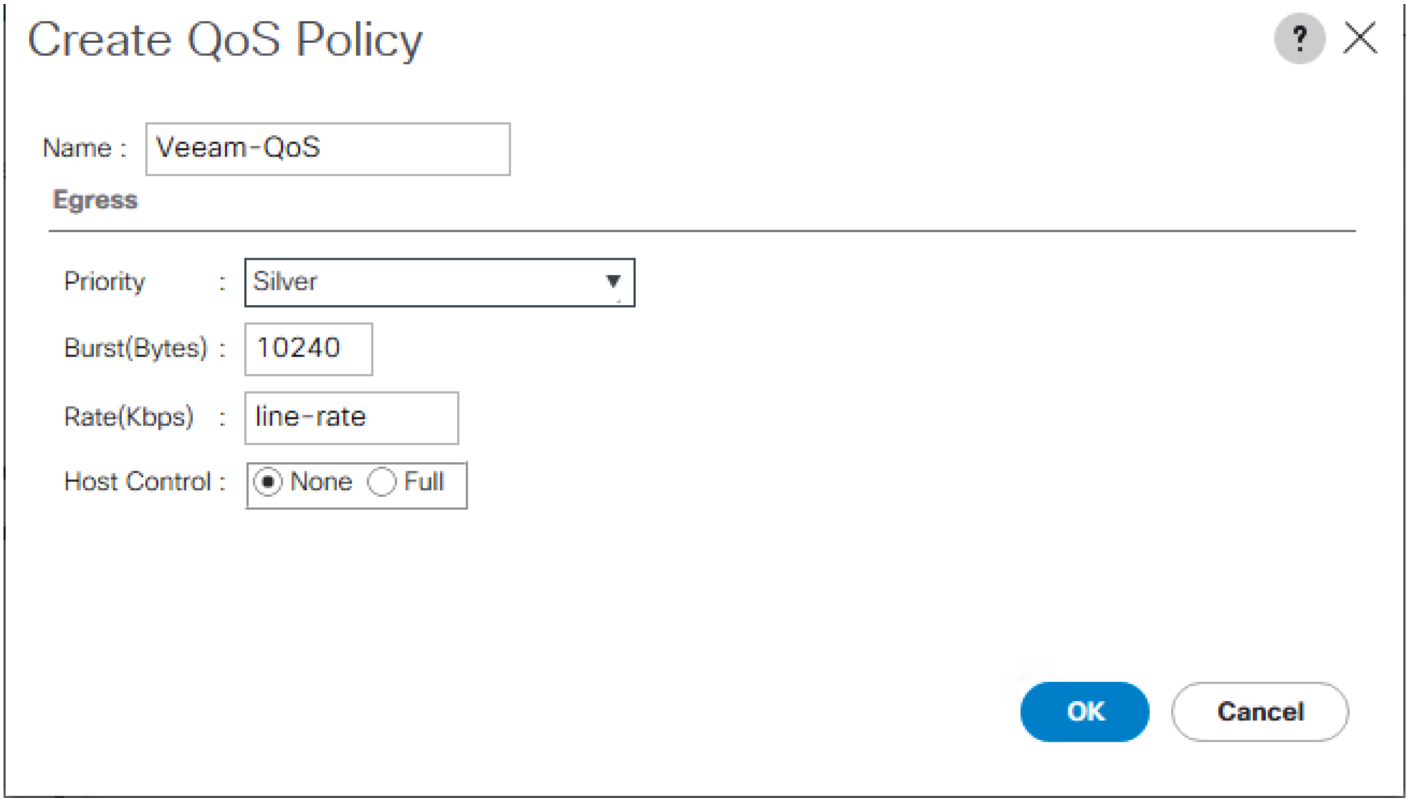


LAN / LAN Cloud / QoS System Class

Priority	Enabled	CoS	Packet Drop	Weight	Weight (%)	MTU
Platinum	☑	5	□	4	25	9216
Gold	☑	4	☑	4	25	normal
Silver	☑	2	☑	best-effort	6	normal
Bronze	☑	1	☑	best-effort	6	9216
Best Effort	☑	Any	☑	best-effort	6	normal
Fibre Channel	☑	3	□	5	32	fc

The QoS System Class describes are in alignment with the HyperFlex Infrastructure configuration.

5. In Cisco UCS Manager, click the LAN tab in the navigation pane.
6. Select LAN > Policies > root > Sub-Organizations> Veeam >QoS Policies.
7. Right-click QoS Policies and select Create QoS Policy.
8. Enter the name as 'Silver' and select Silver in the priority.
9. Click OK.



Create QoS Policy

Name : Veeam-QoS

Egress

Priority : Silver

Burst(Bytes) : 10240

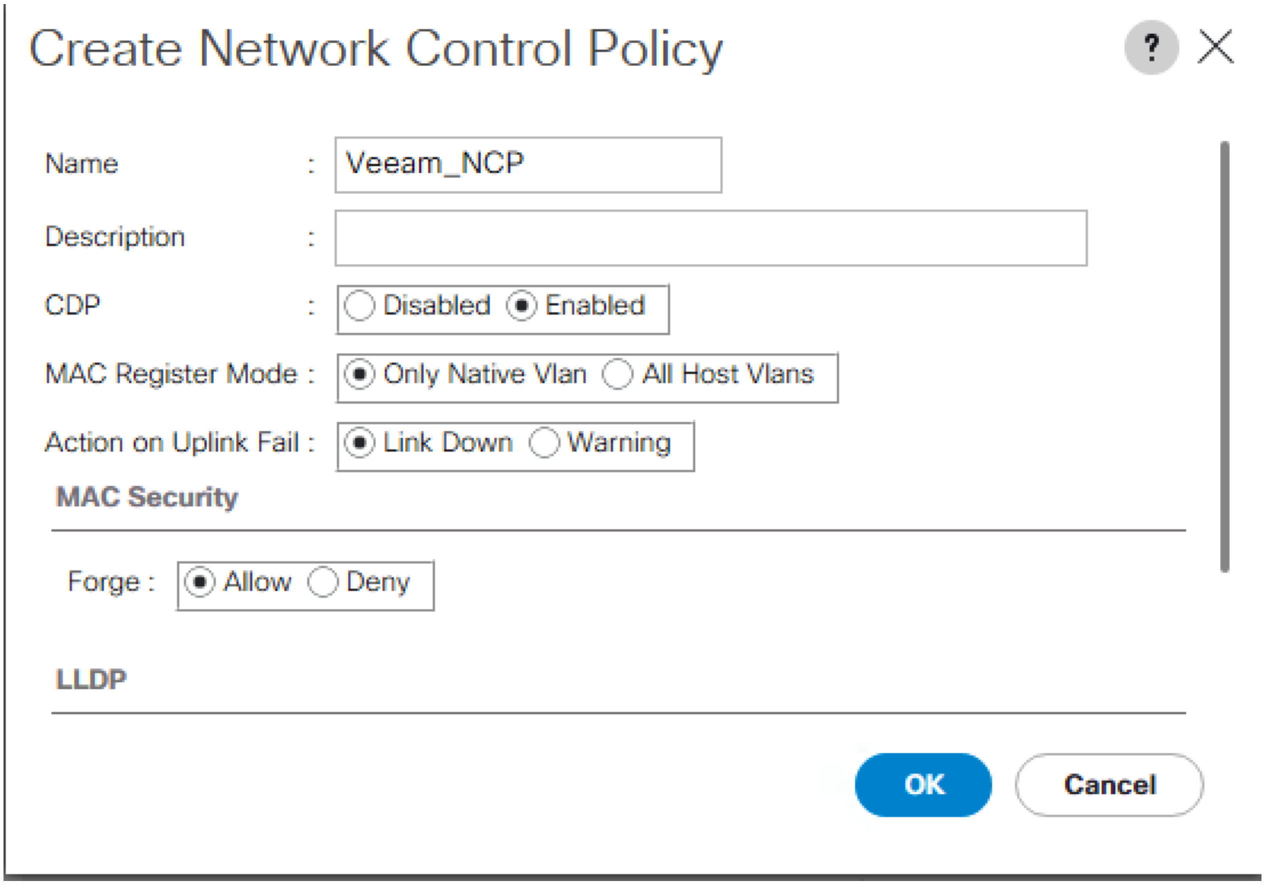
Rate(Kbps) : line-rate

Host Control : ● None ○ Full

Create Network Control Policy for Cisco Discovery Protocol

To create a network control policy that enables Cisco Discovery Protocol (CDP) on virtual network ports, complete the following steps:

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.
2. Select Policies > root >Sub-Organization > Veeam.
3. Right-click Network Control Policies.
4. Select Create Network Control Policy.
5. Enter Veeam_NCP as the policy name.
6. For CDP, select the Enabled option.
7. Click OK to create the network control policy.



Create Network Control Policy

Name : Veeam_NCP

Description :

CDP : ○ Disabled ● Enabled

MAC Register Mode : ● Only Native Vlan ○ All Host Vlans

Action on Uplink Fail : ● Link Down ○ Warning

MAC Security

Forge : ● Allow ○ Deny

LLDP

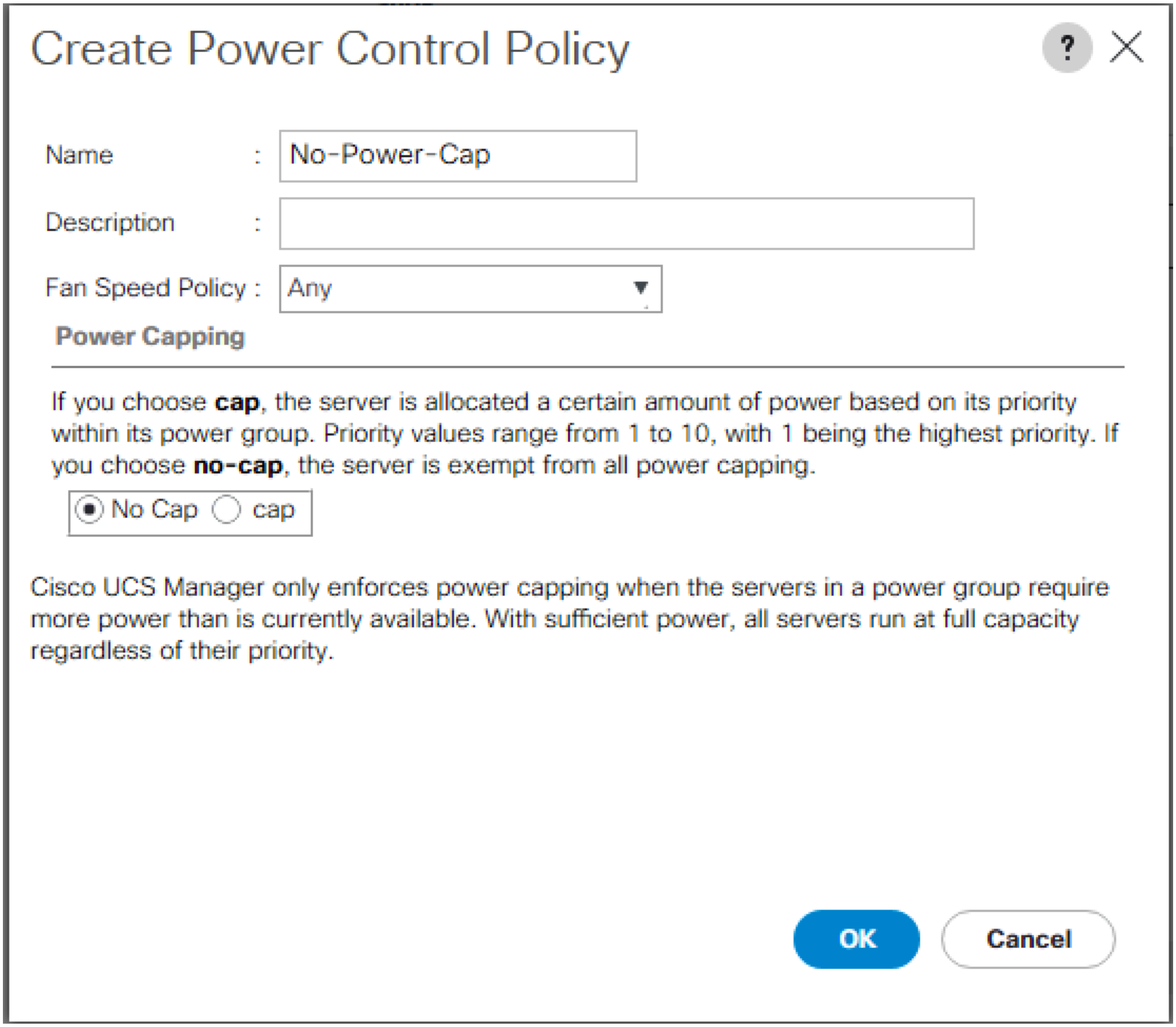
8. Click OK.

Create Power Control Policy

To create a power control policy for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root >Sub-Organizations >Veeam.
3. Right-click Power Control Policies.
4. Select Create Power Control Policy.

5. Enter No-Power-Cap as the power control policy name.
6. Change the power capping setting to No Cap.
7. Click OK to create the power control policy.
8. Click OK.



Create Power Control Policy

Name : No-Power-Cap

Description :

Fan Speed Policy : Any

Power Capping

If you choose **cap**, the server is allocated a certain amount of power based on its priority within its power group. Priority values range from 1 to 10, with 1 being the highest priority. If you choose **no-cap**, the server is exempt from all power capping.

● No Cap ○ cap

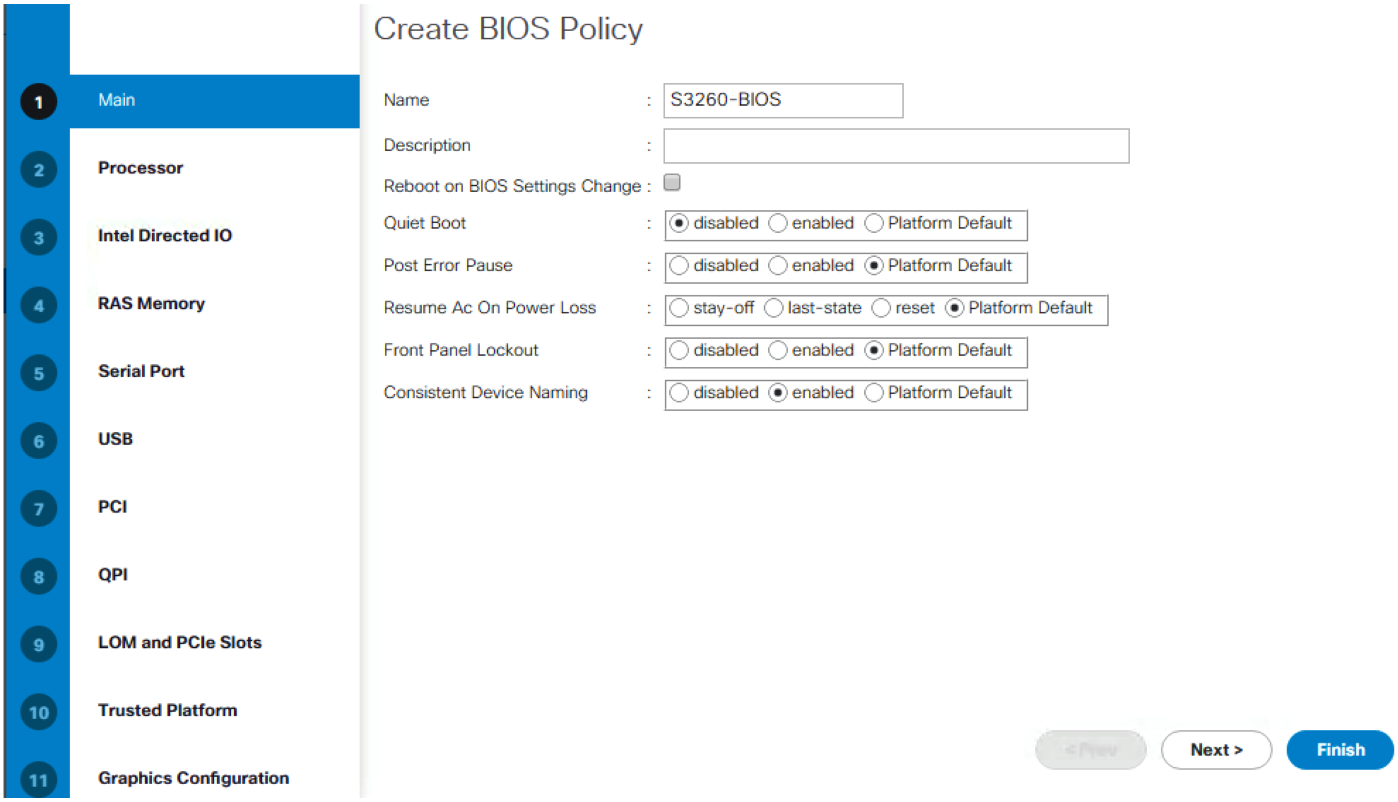
Cisco UCS Manager only enforces power capping when the servers in a power group require more power than is currently available. With sufficient power, all servers run at full capacity regardless of their priority.

Create Server BIOS Policy

To create a server BIOS policy for the Cisco UCS environment, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root > sub-Organizations >Veeam.
3. Right-click BIOS Policies.
4. Select Create BIOS Policy.

5. Enter S3260-BIOS as the BIOS policy name.
6. Change the Quiet Boot setting to disabled.
7. Change Consistent Device Naming to enabled.
8. Click Finish to create the BIOS policy.



Create BIOS Policy

Name : S3260-BIOS

Description :

Reboot on BIOS Settings Change : □

Quiet Boot : ● disabled ○ enabled ○ Platform Default

Post Error Pause : ○ disabled ○ enabled ● Platform Default

Resume Ac On Power Loss : ○ stay-off ○ last-state ○ reset ● Platform Default

Front Panel Lockout : ○ disabled ○ enabled ● Platform Default

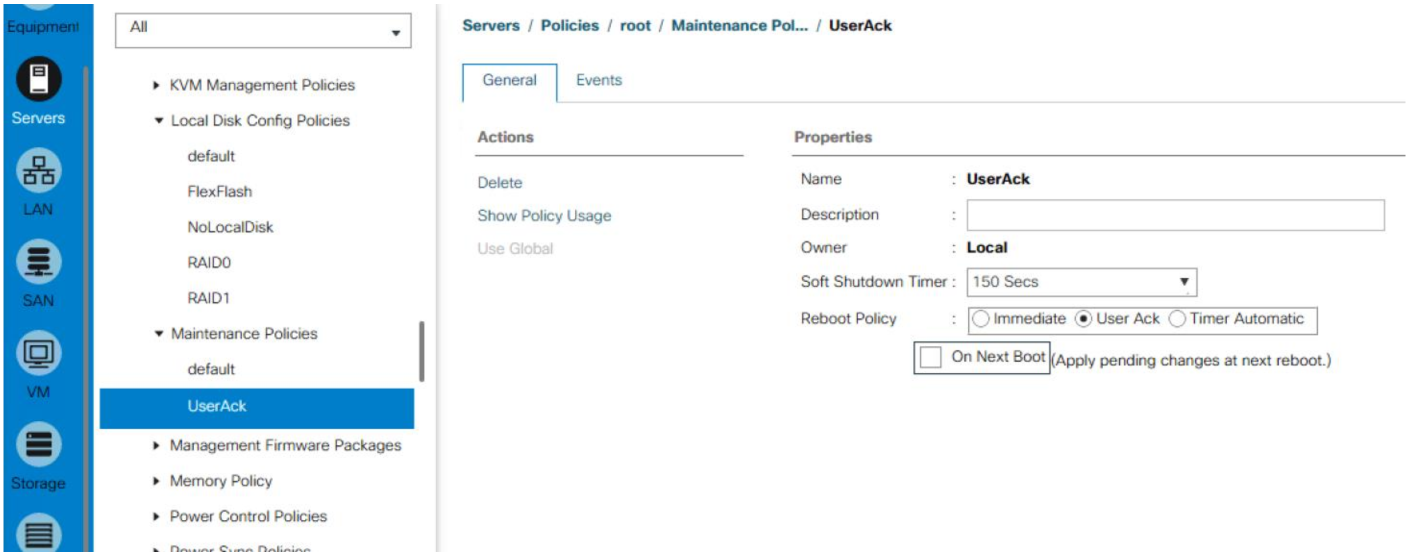
Consistent Device Naming : ○ disabled ● enabled ○ Platform Default

9. Click OK.

Create Maintenance Policy

To update the default Maintenance Policy, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root.
3. Right-click Maintenance Policies and Select Create Maintenance Policy.
4. Change the Reboot Policy to User Ack.
5. Optional: Click “On Next Boot” to delegate maintenance windows to server owners.



Servers / Policies / root / Maintenance Pol... / UserAck

Properties

Name : **UserAck**

Description :

Owner : **Local**

Soft Shutdown Timer : 150 Secs

Reboot Policy : ○ Immediate ● User Ack ○ Timer Automatic

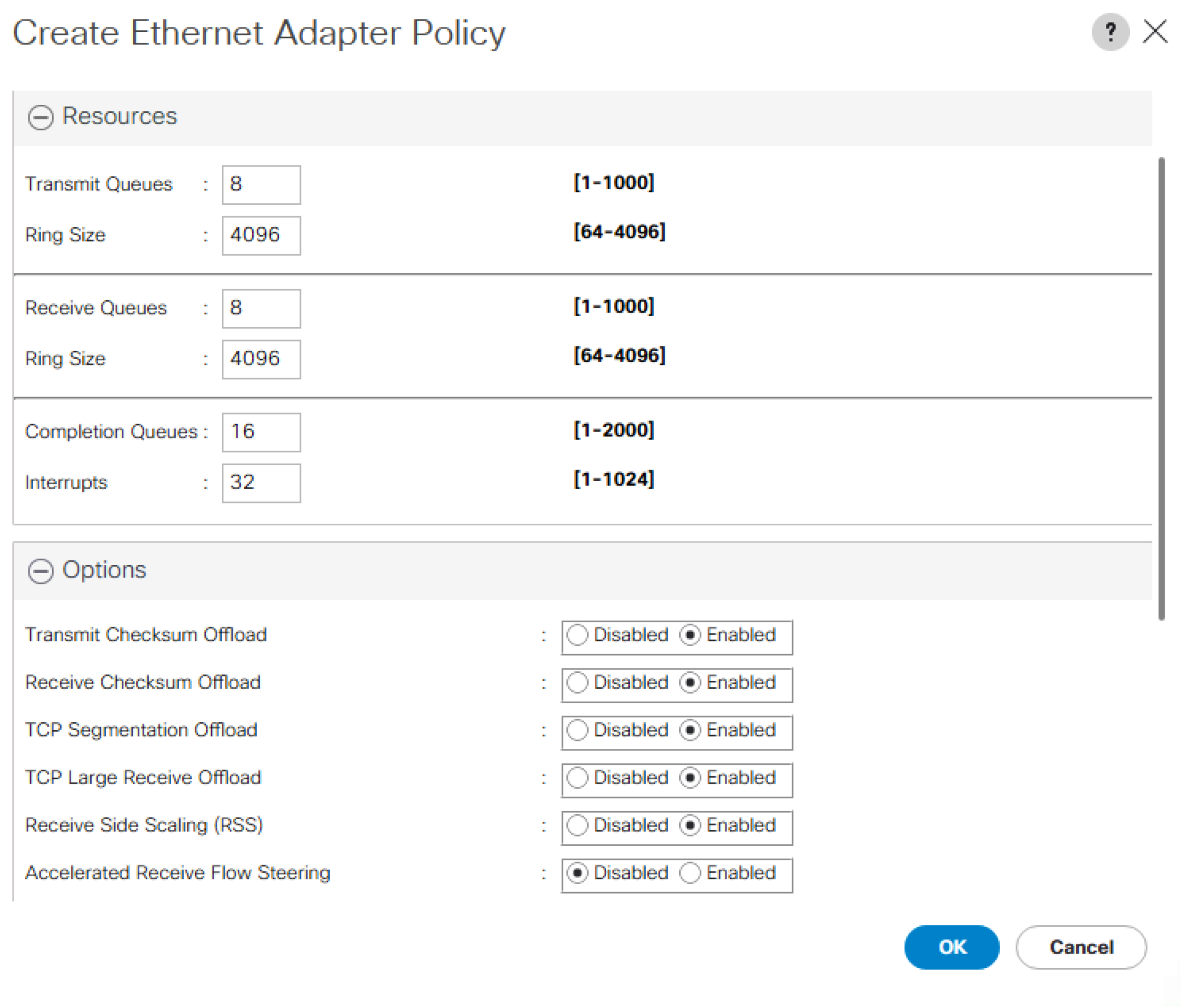
□ On Next Boot (Apply pending changes at next reboot.)

6. Click Save Changes.
7. Click OK to accept the change.

Create Adaptor Policy

To create adaptor policy, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Policies > root > Sub-Organizations > Veeam.
3. Right-click Adaptor Policies and Select Ethernet Adaptor Policy.
4. Enter name as veeam_adaptorpol.
5. Enter Transmit Queues = Receive Queues = 8 , Ring Size = 4096.
6. Enter Completion Queues = 16 and Interrupts = 32.
7. Under Options, make sure Receive Side Scaling (RSS) is enabled.
8. Click OK.



Create Ethernet Adapter Policy

Resources

Transmit Queues :	8	[1-1000]
Ring Size :	4096	[64-4096]
Receive Queues :	8	[1-1000]
Ring Size :	4096	[64-4096]
Completion Queues :	16	[1-2000]
Interrupts :	32	[1-1024]

Options

Transmit Checksum Offload :	○ Disabled ● Enabled
Receive Checksum Offload :	○ Disabled ● Enabled
TCP Segmentation Offload :	○ Disabled ● Enabled
TCP Large Receive Offload :	○ Disabled ● Enabled
Receive Side Scaling (RSS) :	○ Disabled ● Enabled
Accelerated Receive Flow Steering :	● Disabled ○ Enabled

To enable maximum throughout, it is recommended to change the default size of Rx and Tx Queues. RSS should be enabled, since it allows the distribution of network receive processing across multiple CPUs in a multiprocessor system.

Create vNIC Templates

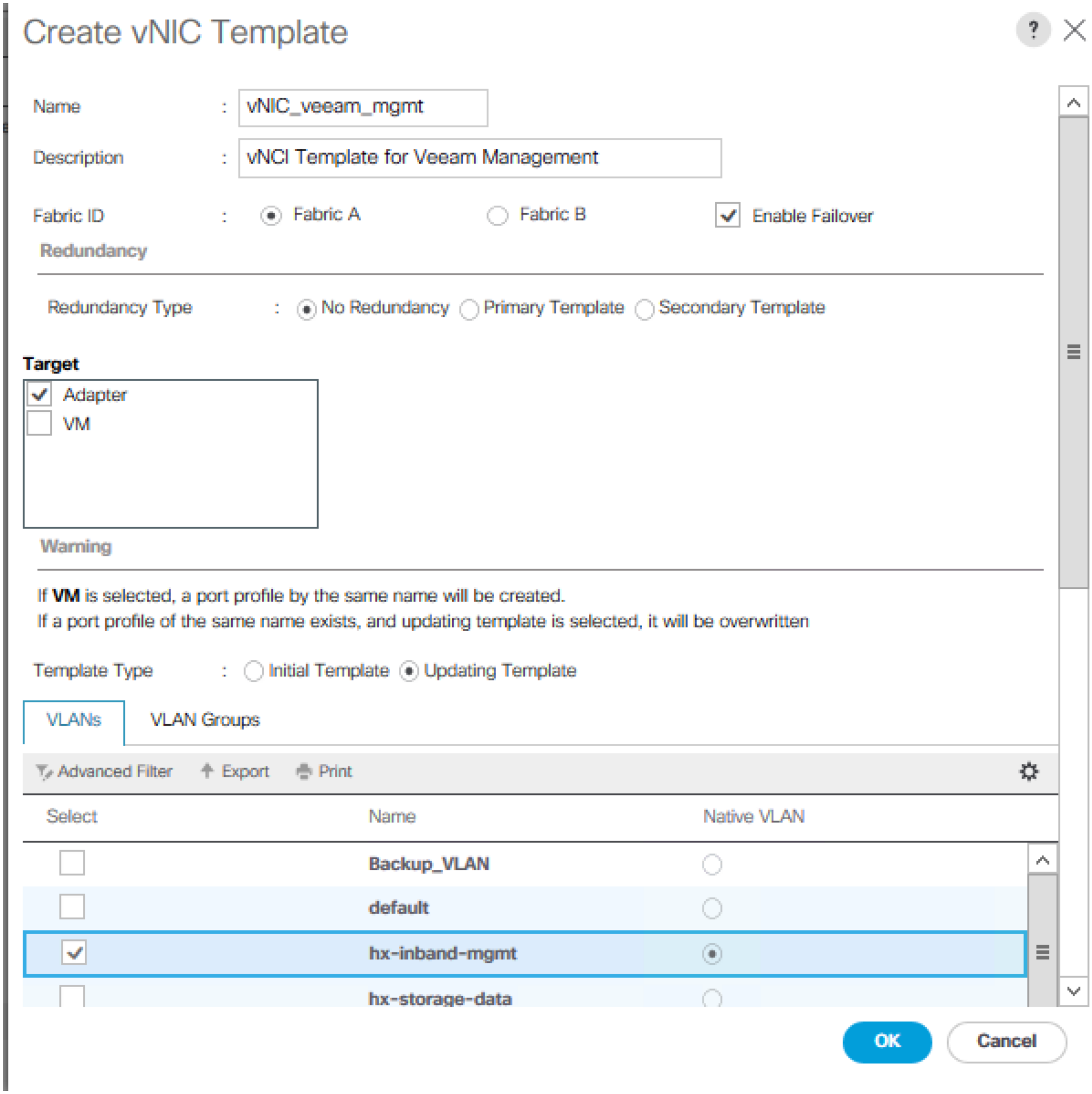
To create multiple virtual network interface card (vNIC) templates for the Cisco UCS environment, complete the following steps. A total of 3 vNIC Templates will be created.

- vNIC_veeam_mgmt – Veeam Management vNIC. This has the same VLAN as HX Management VLAN
- vNIC_intersite. This vNIC provides communication across DataCenter. The HX Management VLAN can communicate across data center; this vNIC is not required
- vNIC_storage. This vNIC provides communication for S3260 with HX Storage network. This is required for Cisco HyperFlex storage integration with Veeam

Create Data vNICs

1. In Cisco UCS Manager, click the LAN tab in the navigation pane.

2. Select Policies > root > Sub-Organizations > Veeam.
3. Right-click vNIC Templates.
4. Select Create vNIC Template.
5. Enter vNIC_veeam_mgmt as the vNIC template name.
6. Keep Fabric A selected.
7. Select the Enable Failover checkbox.
8. Select Updating Template as the Template Type.
9. Select Redundancy Type as No Redundancy
10. Under VLANs, select the checkbox for hx-inband-mgmt VLAN.



Create vNIC Template

Name : vNIC_veeam_mgmt

Description : vNCI Template for Veeam Management

Fabric ID : ● Fabric A ○ Fabric B ☑ Enable Failover

Redundancy

Redundancy Type : ● No Redundancy ○ Primary Template ○ Secondary Template

Target

☑ Adapter
□ VM

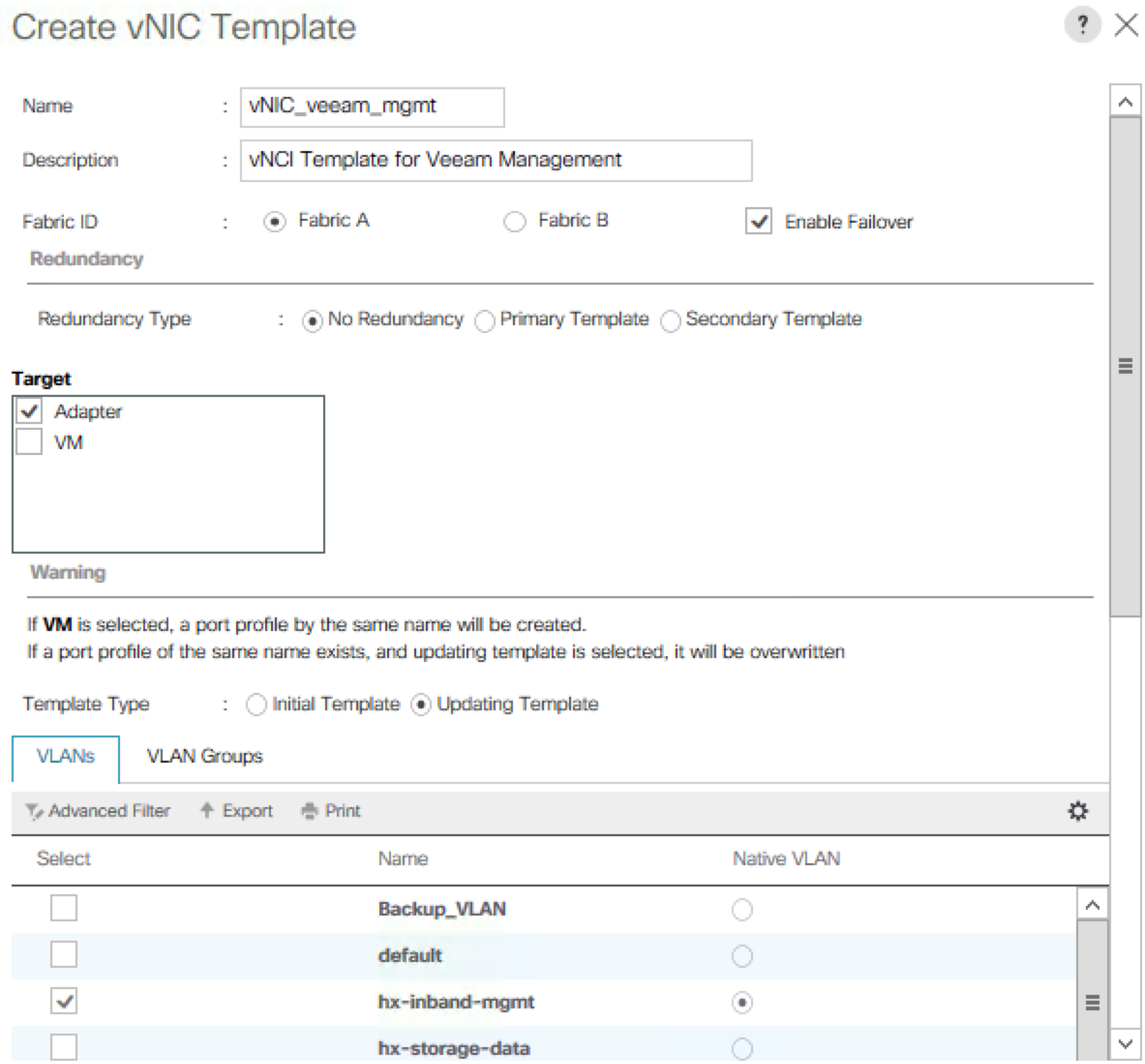
Warning

If **VM** is selected, a port profile by the same name will be created.
If a port profile of the same name exists, and updating template is selected, it will be overwritten

Template Type : ○ Initial Template ● Updating Template

Select	Name	Native VLAN
□	Backup_VLAN	○
□	default	○
☑	hx-inband-mgmt	●
□	hx-storage-data	○

11. Set hx-inband-mgmt as the native VLAN.
12. For MTU, enter 1500.
13. In the MAC Pool list, select MAC_Pool_A.
14. Make sure that vNIC_veeam_mgmt is pinned to Fabric A
15. In the Network Control Policy list, select Veeam_NCP.
16. Select QoS Policy as Silver.



Create vNIC Template

Name : vNIC_veeam_mgmt

Description : vNCI Template for Veeam Management

Fabric ID : ● Fabric A ○ Fabric B ☑ Enable Failover

Redundancy

Redundancy Type : ● No Redundancy ○ Primary Template ○ Secondary Template

Target

☑ Adapter

□ VM

Warning

If **VM** is selected, a port profile by the same name will be created.
If a port profile of the same name exists, and updating template is selected, it will be overwritten

Template Type : ○ Initial Template ● Updating Template

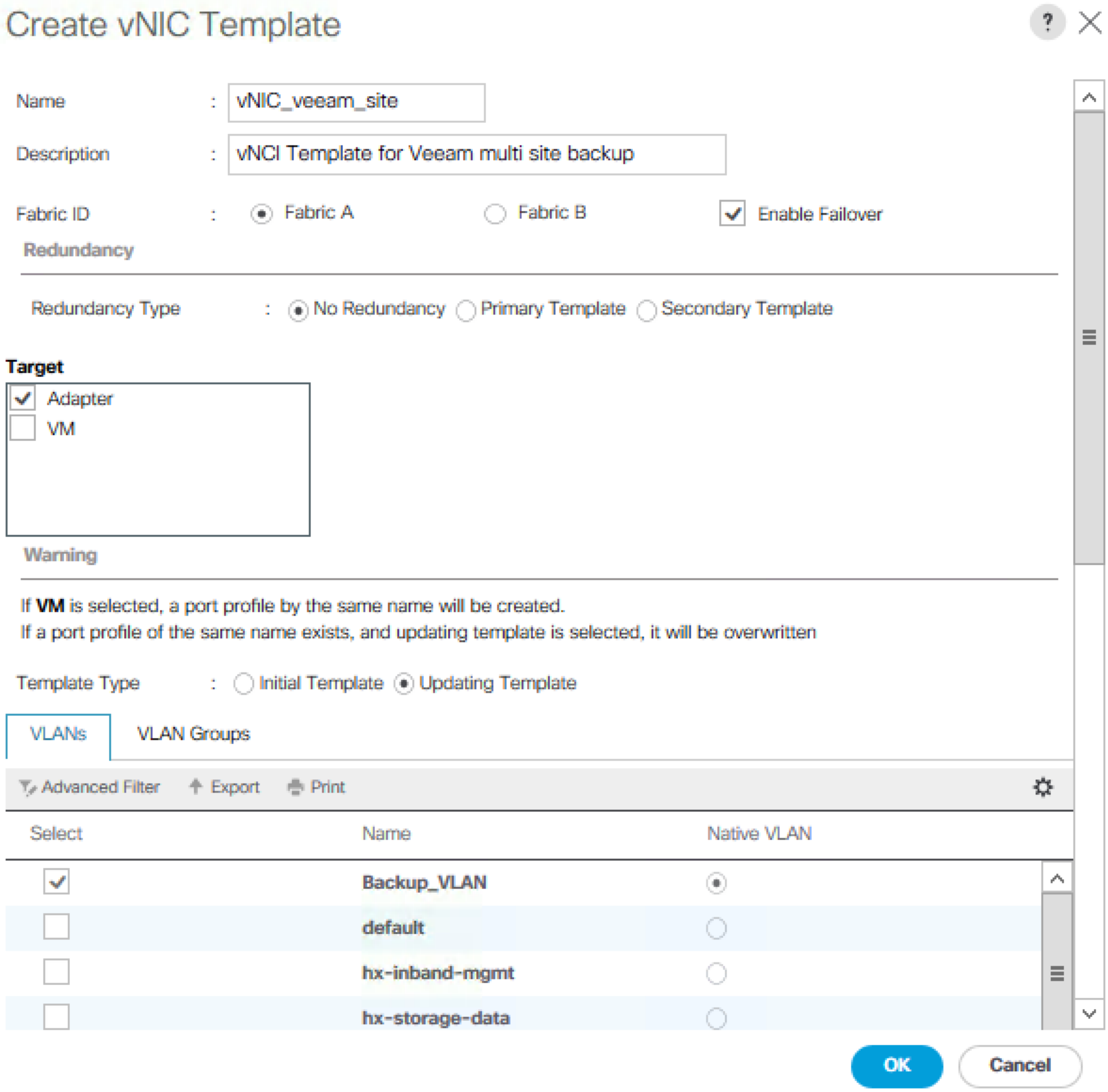
Select	Name	Native VLAN
□	Backup_VLAN	○
□	default	○
☑	hx-inband-mgmt	●
□	hx-storage-data	○

17. Click OK to create the vNIC template.
18. Click OK.

Repeat these steps for multisite VLAN template:

1. In the navigation pane, select the LAN tab.
2. Select Policies > root.
3. Right-click vNIC Templates.
4. Select Create vNIC Template
5. Enter vNIC_veeam_multisite as the vNIC template name.

6. Select Fabric A.
7. Select the Enable Failover checkbox.
8. Under Target, make sure the VM checkbox is not selected.
9. Select Redundancy Type as No Redundancy.
10. Select Updating Template as the template type.
11. Under VLANs, select the checkboxes for Backup_VLAN.
12. Set Backup_VLAN as the native VLAN.


Create vNIC Template

Name : vNIC_veeam_site

Description : vNCI Template for Veeam multi site backup

Fabric ID : ● Fabric A ○ Fabric B ☑ Enable Failover

Redundancy

Redundancy Type : ● No Redundancy ○ Primary Template ○ Secondary Template

Target

☑ Adapter
□ VM

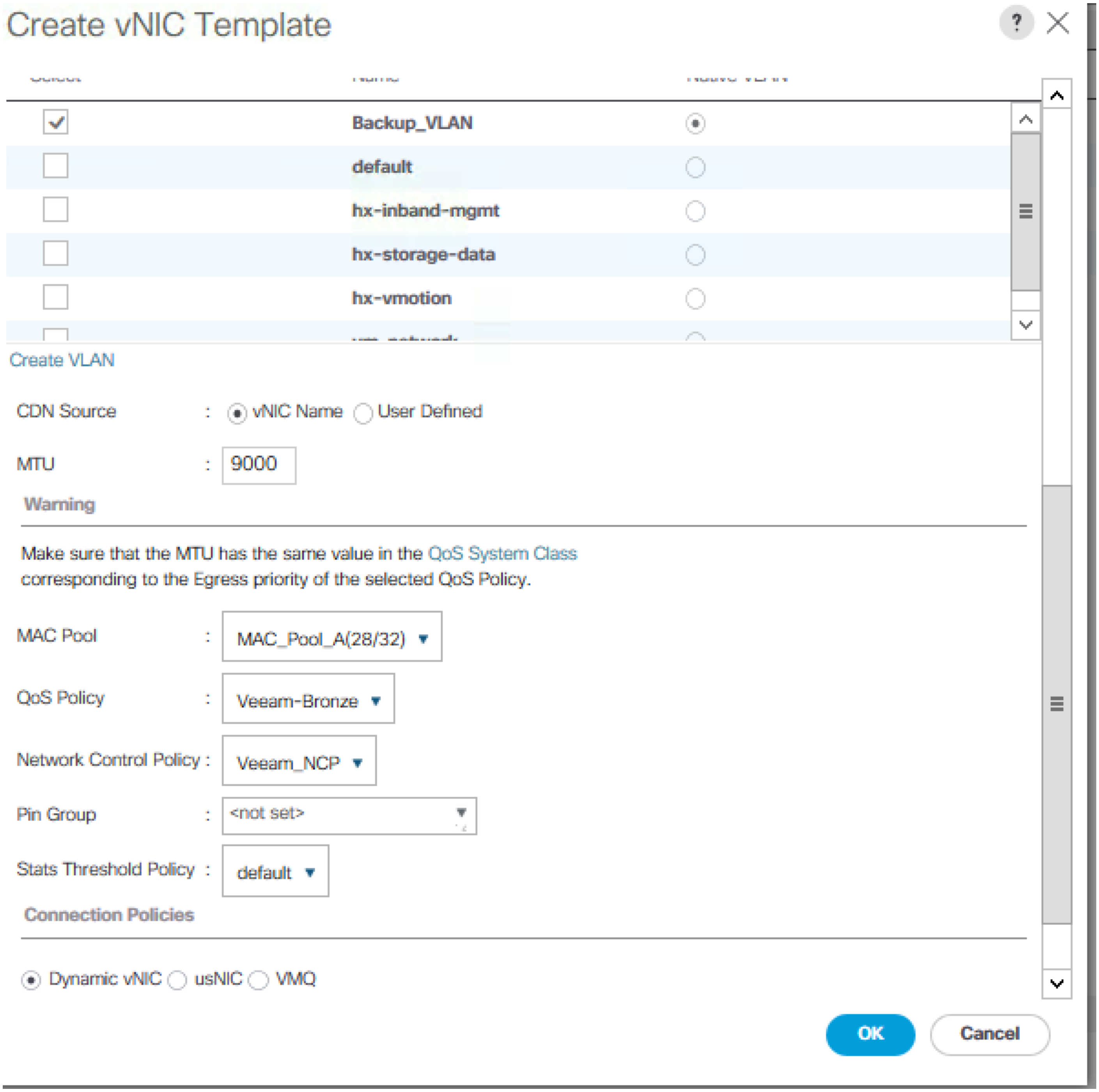
Warning

If **VM** is selected, a port profile by the same name will be created.
If a port profile of the same name exists, and updating template is selected, it will be overwritten

Template Type : ○ Initial Template ● Updating Template

Select	Name	Native VLAN
☑	Backup_VLAN	●
□	default	○
□	hx-inband-mgmt	○
□	hx-storage-data	○

13. Select vNIC Name for the CDN Source.
14. For MTU, enter 9000.
15. Select QoS Policy as Bronze.
16. In the MAC Pool list, select MAC_Pool_A.
17. In the Network Control Policy list, select Veeam_NCP.



Create vNIC Template

☑	Backup_VLAN	●
□	default	○
□	hx-inband-mgmt	○
□	hx-storage-data	○
□	hx-vmotion	○

Create VLAN

CDN Source : ● vNIC Name ○ User Defined

MTU : 9000

Warning

Make sure that the MTU has the same value in the QoS System Class corresponding to the Egress priority of the selected QoS Policy.

MAC Pool : MAC_Pool_A(28/32)

QoS Policy : Veeam-Bronze

Network Control Policy : Veeam_NCP

Pin Group : <not set>

Stats Threshold Policy : default

Connection Policies

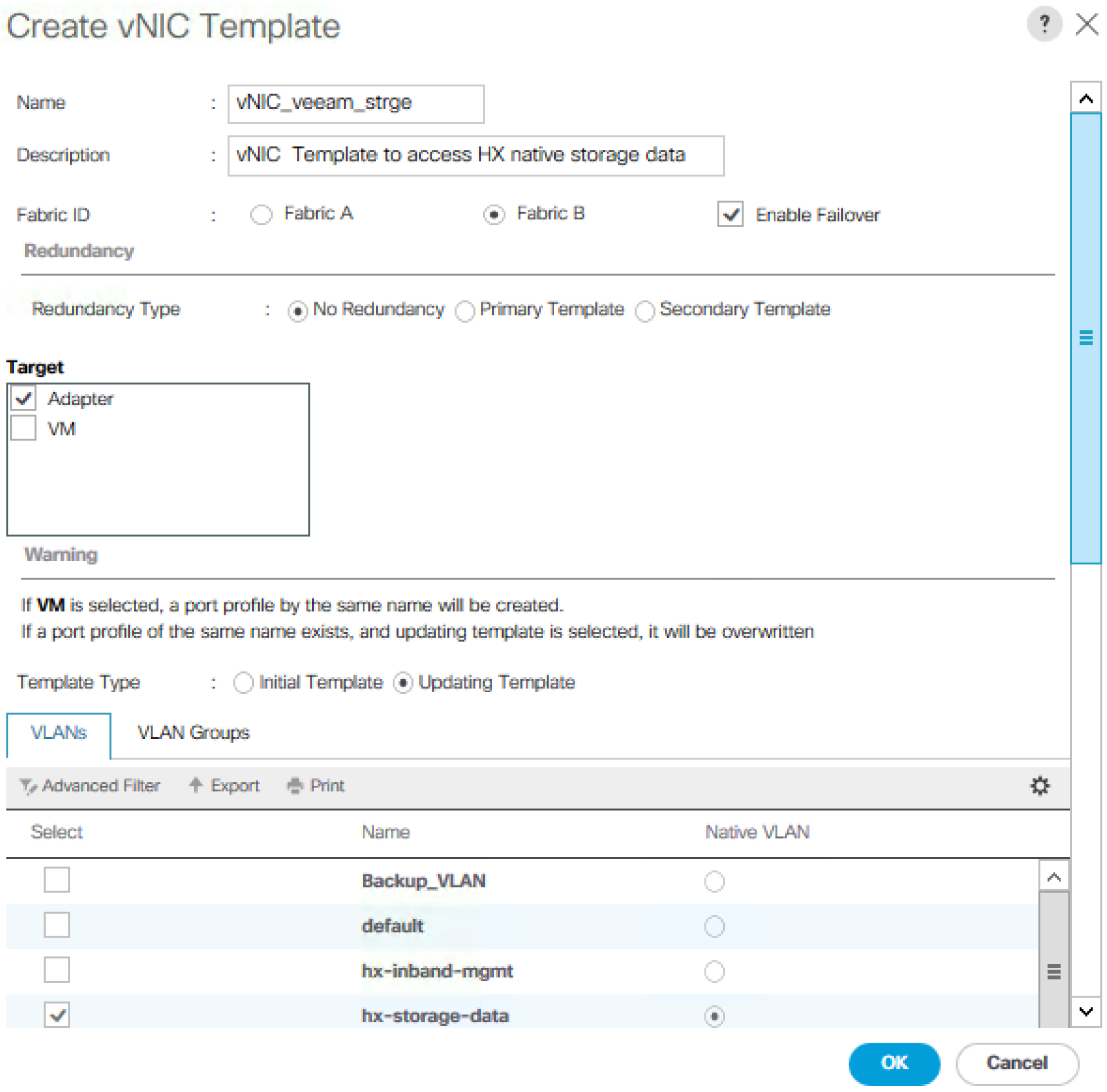
● Dynamic vNIC ○ usNIC ○ VMQ

18. Click OK to create the vNIC template.
19. Click OK.

Multisite vNIC is required only if HX Management VLAN does not have connectivity to Remote DataCenter. If the Management VLAN has access to remote data center, Replication or Backup copy traffic will be on the HX Management VLAN.

Repeat these similar steps for HXStorage vNIC template:

1. In the navigation pane, select the LAN tab.
2. Select Policies > root.
3. Right-click vNIC Templates.
4. Select Create vNIC Template
5. Enter vNIC_veeam_strge as the vNIC template name.
6. Make sure vNIC_veeam_strge is pinned to Fabric B. This is required as the HyperFlex storage network traffic is pinned to Fabric B. This avoids backup traffic on HX Storage VLAN traverse upstream switch.
7. Select the Enable Failover checkbox.
8. Under Target, make sure the VM checkbox is not selected.
9. Select Redundancy Type as No Redundancy.
10. Select Updating Template as the template type.



Create vNIC Template

Name : vNIC_veeam_strge

Description : vNIC Template to access HX native storage data

Fabric ID : ○ Fabric A ● Fabric B ☑ Enable Failover

Redundancy

Redundancy Type : ● No Redundancy ○ Primary Template ○ Secondary Template

Target

☑ Adapter
□ VM

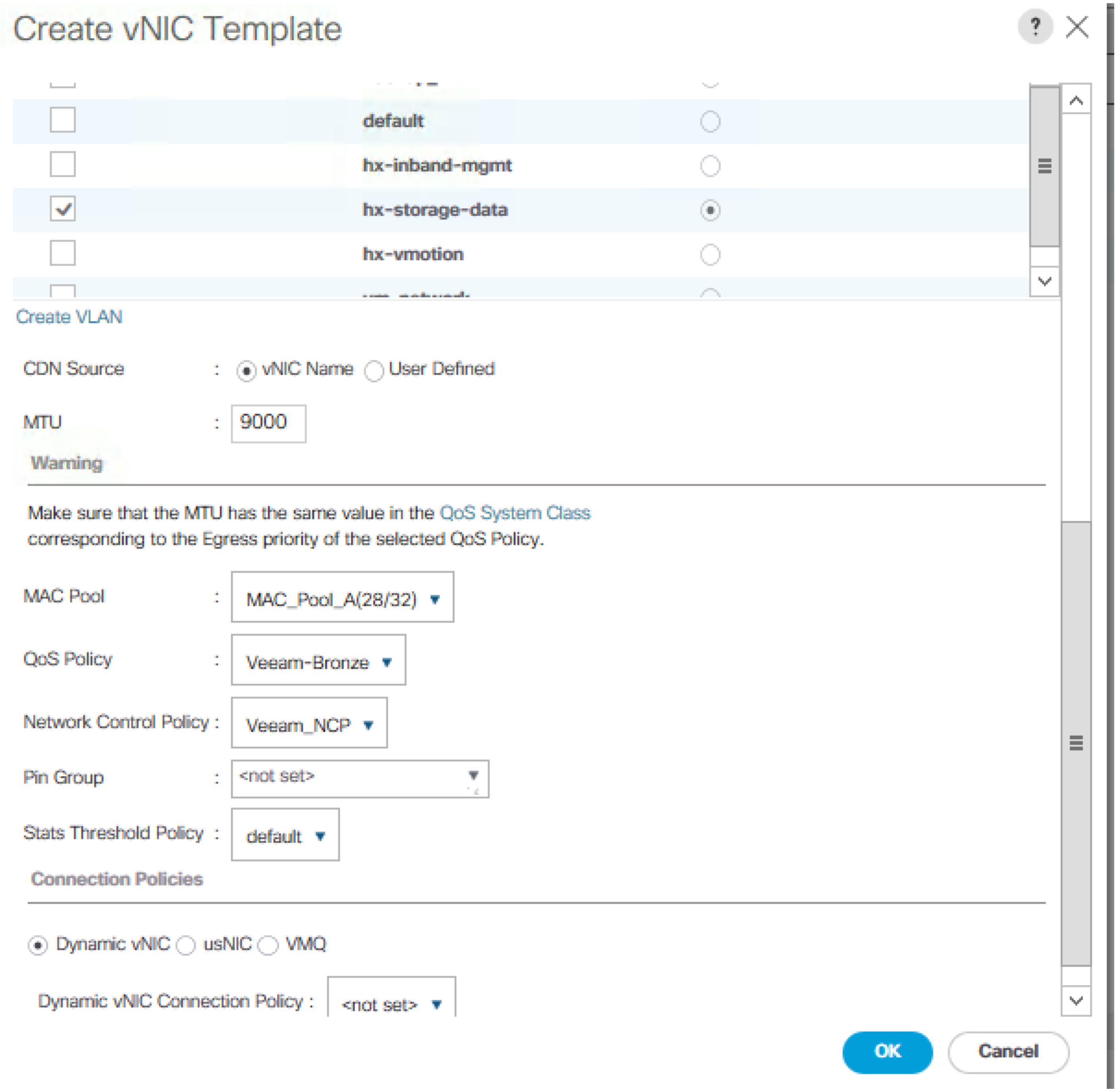
Warning

If **VM** is selected, a port profile by the same name will be created.
If a port profile of the same name exists, and updating template is selected, it will be overwritten

Template Type : ○ Initial Template ● Updating Template

Select	Name	Native VLAN
□	Backup_VLAN	○
□	default	○
□	hx-inband-mgmt	○
☑	hx-storage-data	●

11. Under VLANs, select the checkboxes for hx-storage-data.
12. Set hx-storage-Data as the native VLAN.
13. Select vNIC Name for the CDN Source.
14. For MTU, enter 9000.
15. Select QoS Policy as Bronze.
16. In the MAC Pool list, select MAC_Pool_A.
17. In the Network Control Policy list, select Veeam_NCP



Create vNIC Template

□	default	○
□	hx-inband-mgmt	○
☑	hx-storage-data	●
□	hx-vmotion	○

Create VLAN

CDN Source : ● vNIC Name ○ User Defined

MTU : 9000

Warning

Make sure that the MTU has the same value in the QoS System Class corresponding to the Egress priority of the selected QoS Policy.

MAC Pool : MAC_Pool_A(28/32)

QoS Policy : Veeam-Bronze

Network Control Policy : Veeam_NCP

Pin Group : <not set>

Stats Threshold Policy : default

Connection Policies

● Dynamic vNIC ○ usNIC ○ VMQ

Dynamic vNIC Connection Policy : <not set>

18. Click OK to create the vNIC template.
19. Click OK.

HX Storage VNIC on HX Storage VLAN is required for HyperFlex and Veeam Storage Integration.

Create Disk Group Policy

A storage profile encapsulates the storage requirements for one or more service profiles. LUNs configured in a storage profile can be used as boot LUNs or data LUNs, and can be dedicated to a specific server. You can also specify a local LUN as a boot device. The introduction of storage profiles allows you to do the following:

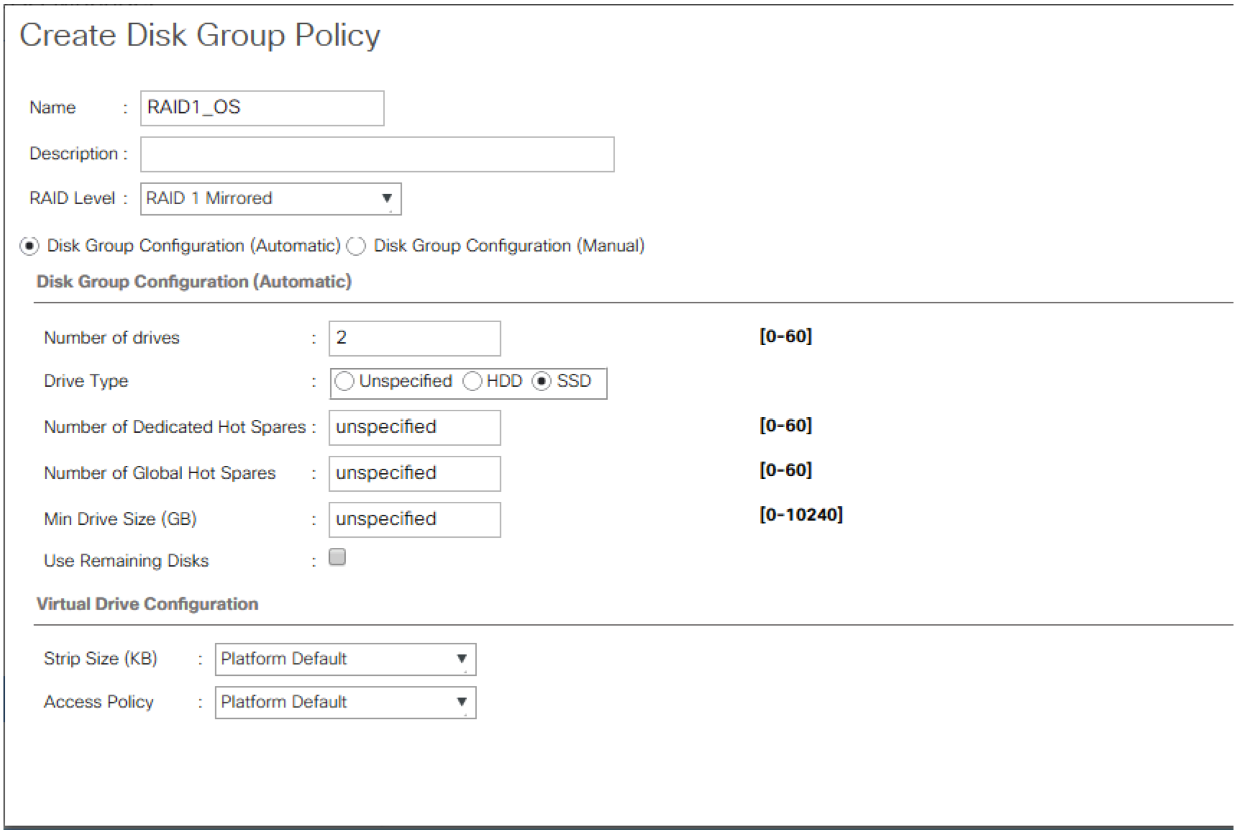
- Configure multiple virtual drives and select the physical drives that are used by a virtual drive. You can also configure the storage capacity of a virtual drive.
- Configure the number, type and role of disks in a disk group.
- Associate a storage profile with a service profile

Cisco UCS Manager's Storage Profile and Disk Group Policies are utilized to define storage disks; disk allocation and management in the Cisco UCS S3260 system. You will create two disk Group Policies as follows:

- RAID 1 from two Rear SSDs for OS Boot
- RAID60 from 28 HDD as defined under Disk Zoning Policy

To create a Disk Group Policy, complete the following steps:

1. In Cisco UCS Manager, click the Storage tab in the navigation pane.
2. Select Storage Policies > root >Sub-Organizations > Veeam >Disk Group Policies.
3. Right-click Disk Group Policy and Select Create Disk Group Policy.
4. Enter the name as RAID1_OS.
5. Select RAID Level as RAID1 Mirrored.
6. Number of drives as 2 and Drive Type as SSD.
7. Click OK.



Create Disk Group Policy

Name : RAID1_OS

Description :

RAID Level : RAID 1 Mirrored ▼

● Disk Group Configuration (Automatic) ○ Disk Group Configuration (Manual)

Disk Group Configuration (Automatic)

Number of drives	2	[0-60]
Drive Type	○ Unspecified ○ HDD ● SSD	
Number of Dedicated Hot Spares	unspecified	[0-60]
Number of Global Hot Spares	unspecified	[0-60]
Min Drive Size (GB)	unspecified	[0-10240]
Use Remaining Disks	□	

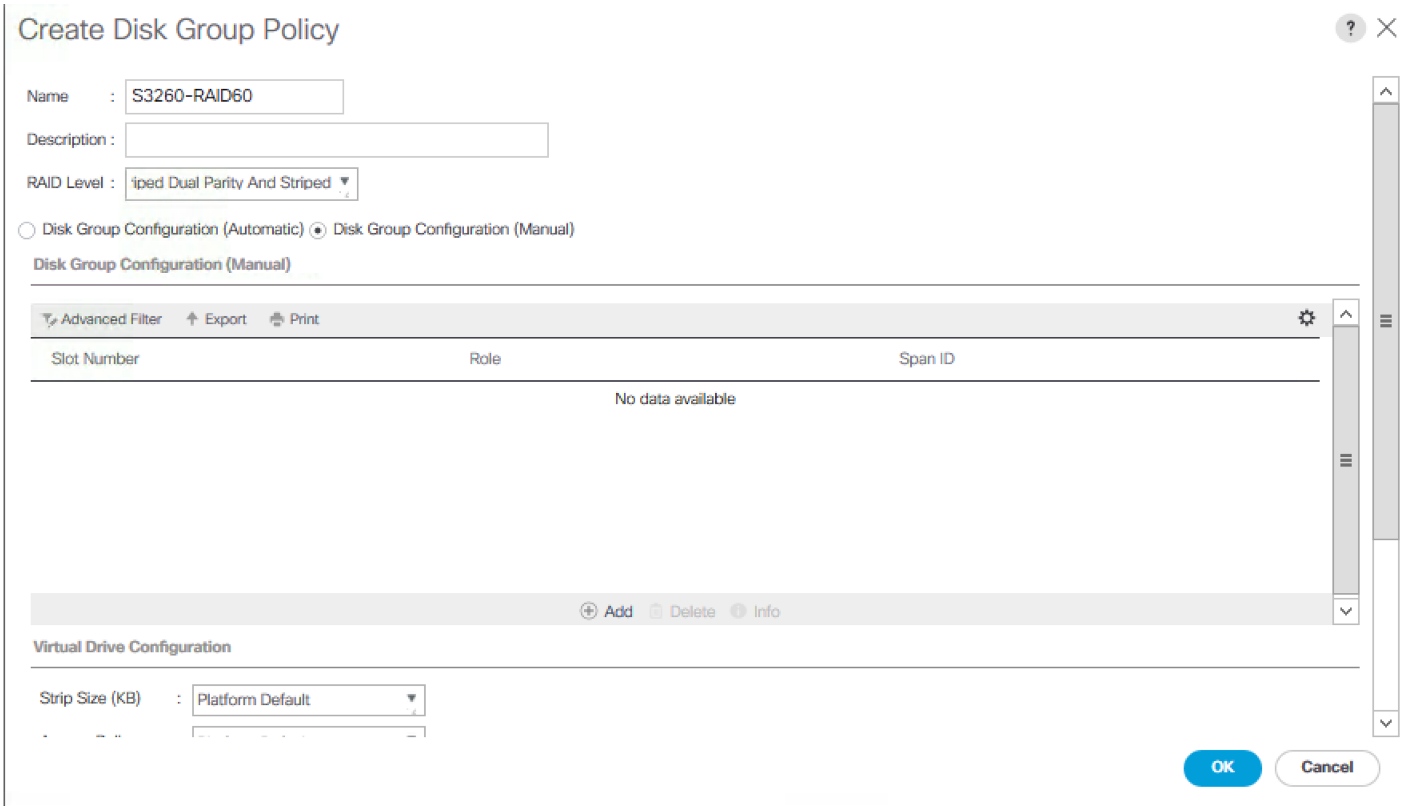
Virtual Drive Configuration

Strip Size (KB) : Platform Default ▼

Access Policy : Platform Default ▼

8. Create a second Disk Group Policy with RAID60.
9. Create a RAID60 with 28 HDDs.

10. For 28 DISK configuration of RAID60, you should have 2 SPANs and each SPAN should have 13 disks, including 1 DISK as Dedicated Hot Spare.
11. The remianing 2 DISK are allocated for Global Hot Spares.
12. Enter the name as S3260-RAID60, Select RAID60 from RAID Level and opt for Manual Disk Group Configuration.



Create Disk Group Policy

Name : S3260-RAID60

Description :

RAID Level : iped Dual Parity And Striped

○ Disk Group Configuration (Automatic) ● Disk Group Configuration (Manual)

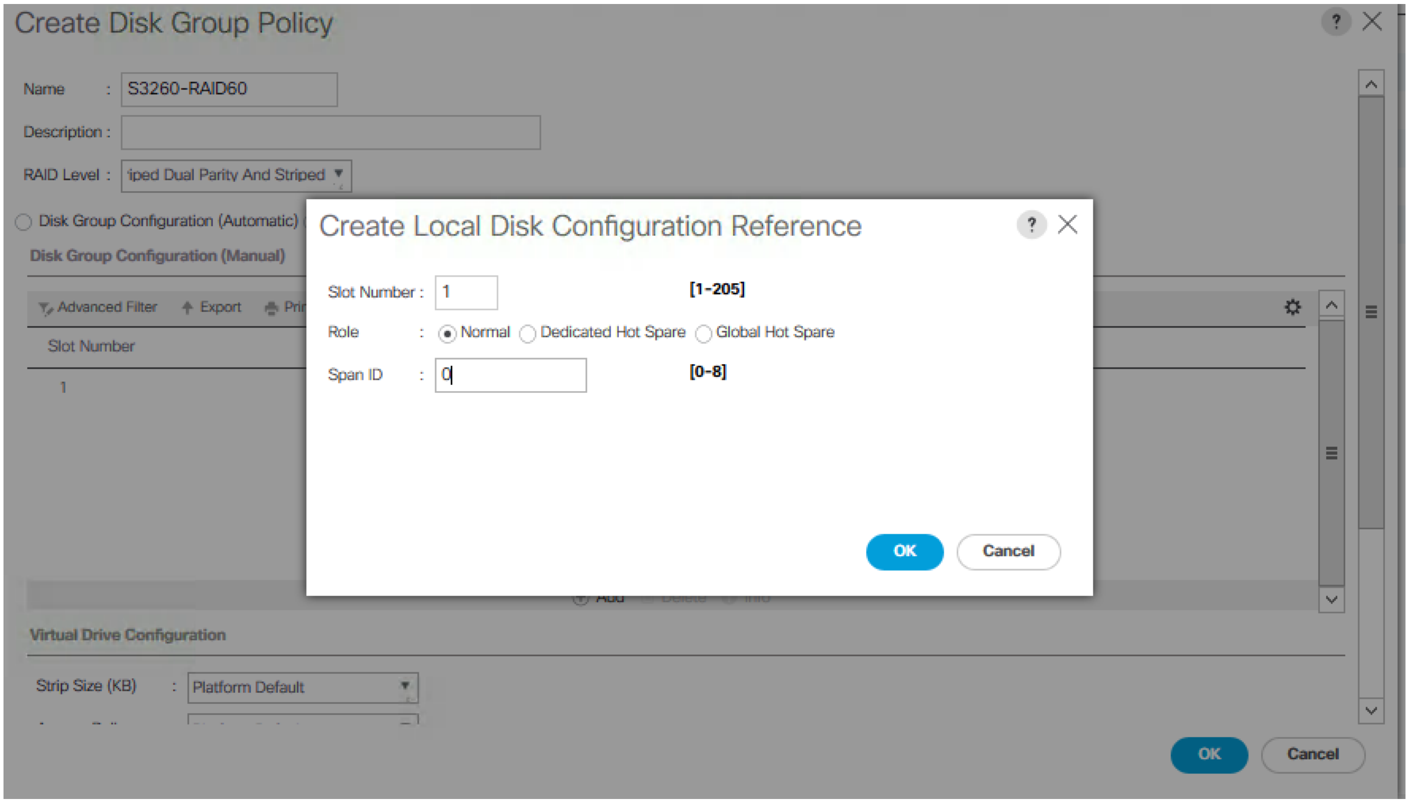
Disk Group Configuration (Manual)

Slot Number	Role	Span ID
No data available		

Virtual Drive Configuration

Strip Size (KB) : Platform Default

13. Click Add, enter the Slot Number as 1, Role as Normal, and Span ID as 0.



Create Disk Group Policy

Name : S3260-RAID60

Description :

RAID Level : iped Dual Parity And Striped

○ Disk Group Configuration (Automatic)

Disk Group Configuration (Manual)

Slot Number
1

Virtual Drive Configuration

Strip Size (KB) : Platform Default

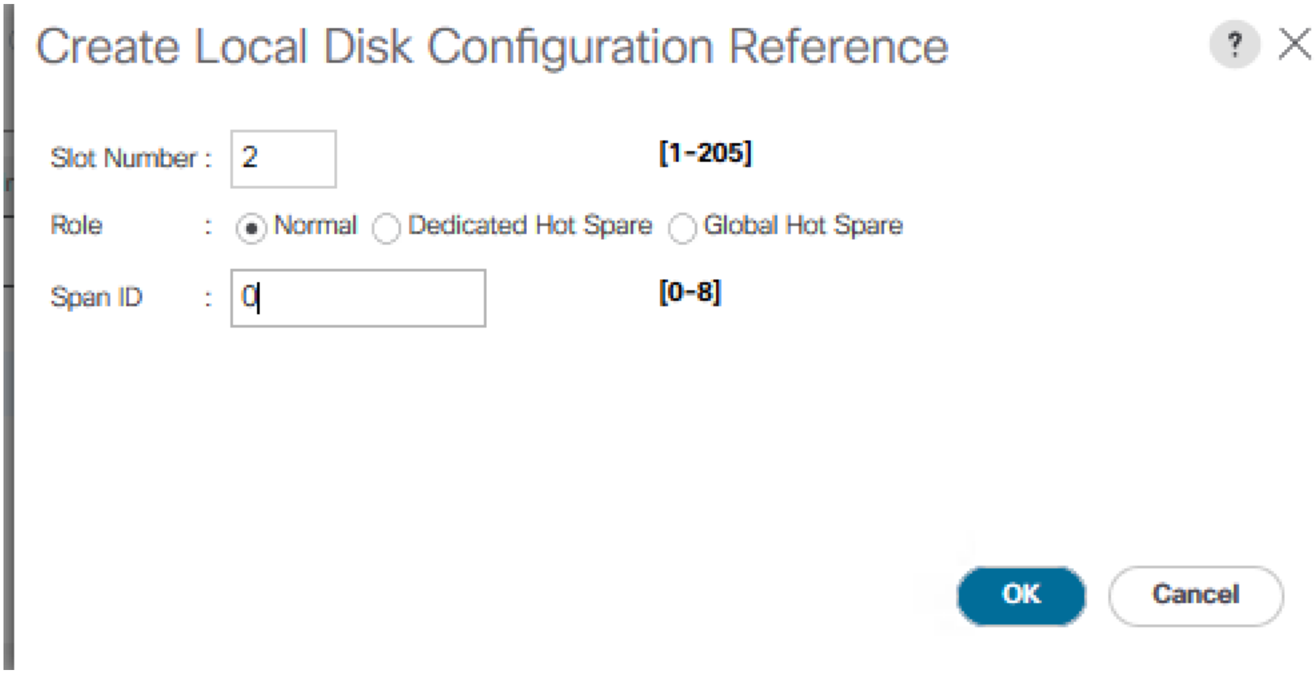
Create Local Disk Configuration Reference

Slot Number : 1 [1-205]

Role : ● Normal ○ Dedicated Hot Spare ○ Global Hot Spare

Span ID : 0 [0-8]

14. Repeat step 11 for Slot numbers 2 through 12 with Span ID 0.



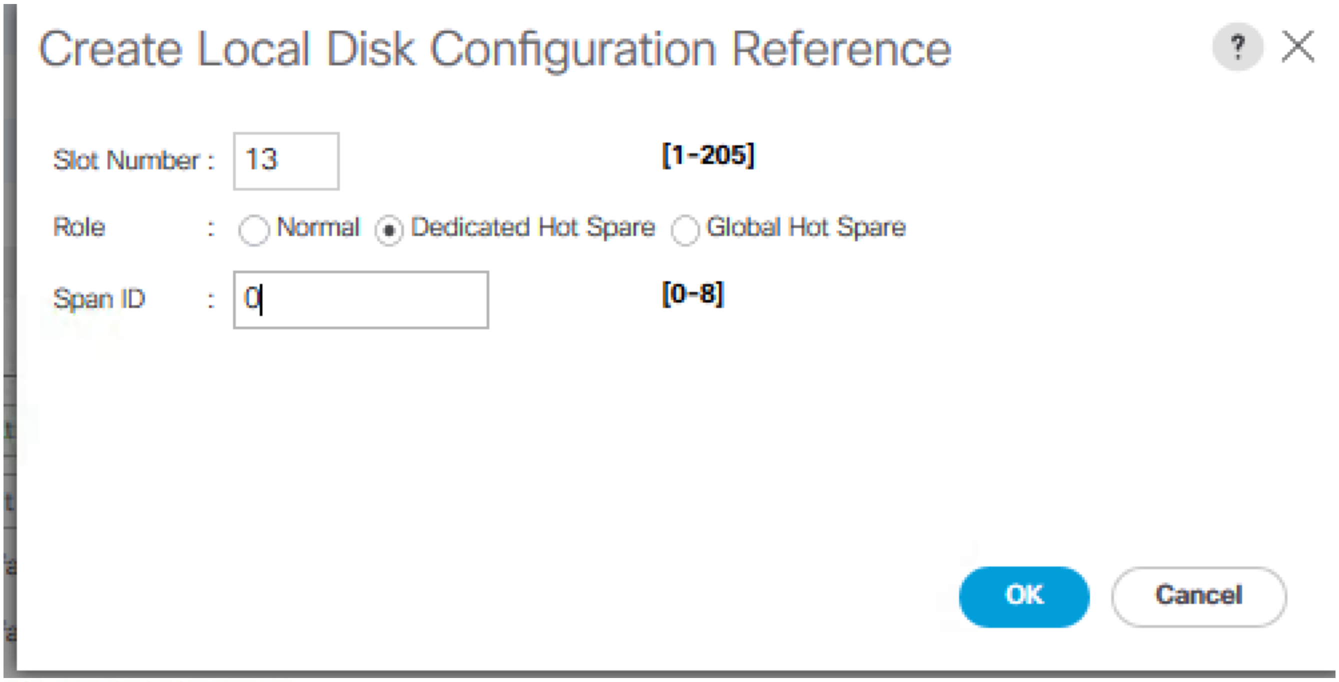
Create Local Disk Configuration Reference

Slot Number : 2 [1-205]

Role : ● Normal ○ Dedicated Hot Spare ○ Global Hot Spare

Span ID : 0 [0-8]

15. For Slot 13, select Role as Dedicated Hot Spare and Span Id as 0 and for Slot 14 select Role as Global Hot Spare and Span Id as ‘unspecified’.

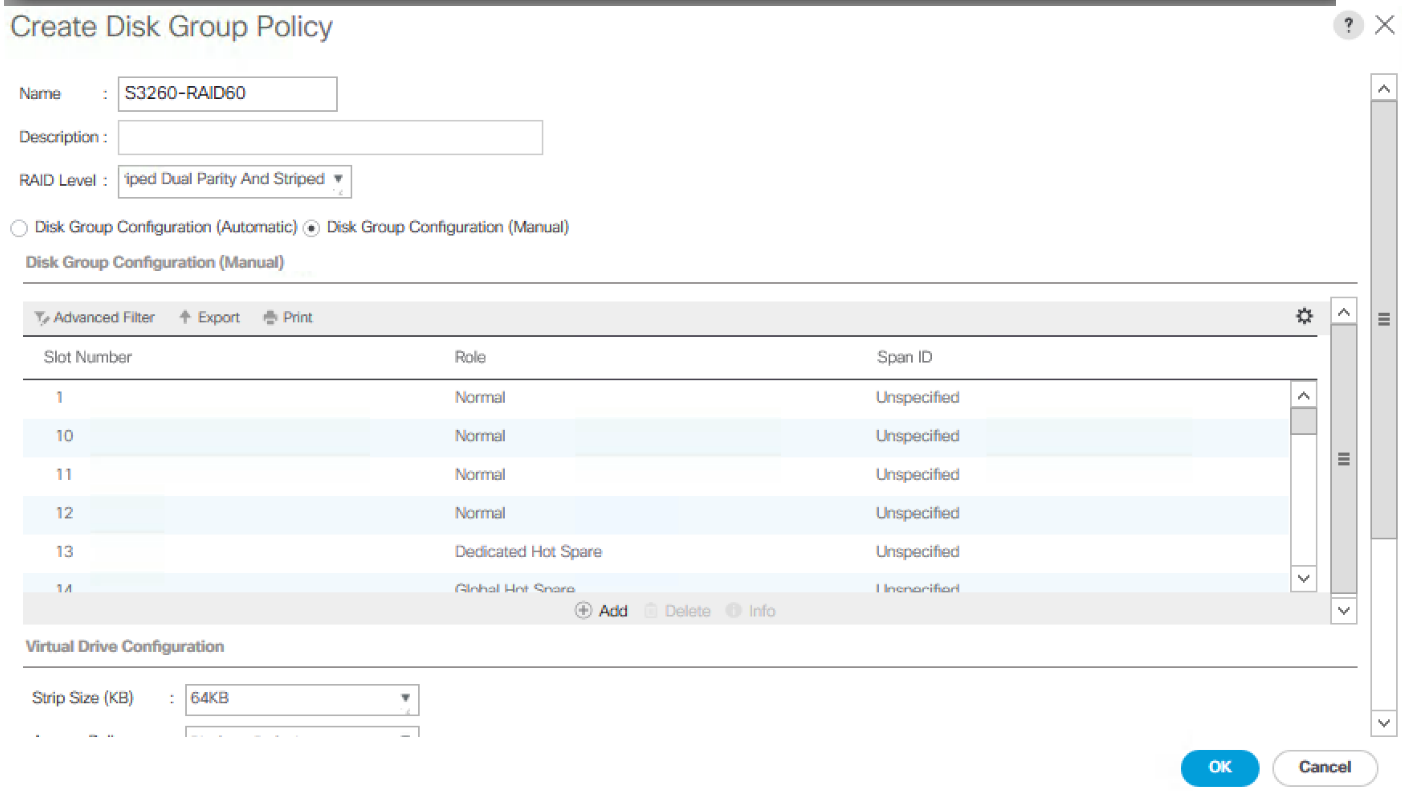


Create Local Disk Configuration Reference

Slot Number : 13 [1-205]

Role : ○ Normal ● Dedicated Hot Spare ○ Global Hot Spare

Span ID : 0 [0-8]



Create Disk Group Policy

Name : S3260-RAID60

Description :

RAID Level : iped Dual Parity And Striped

○ Disk Group Configuration (Automatic) ● Disk Group Configuration (Manual)

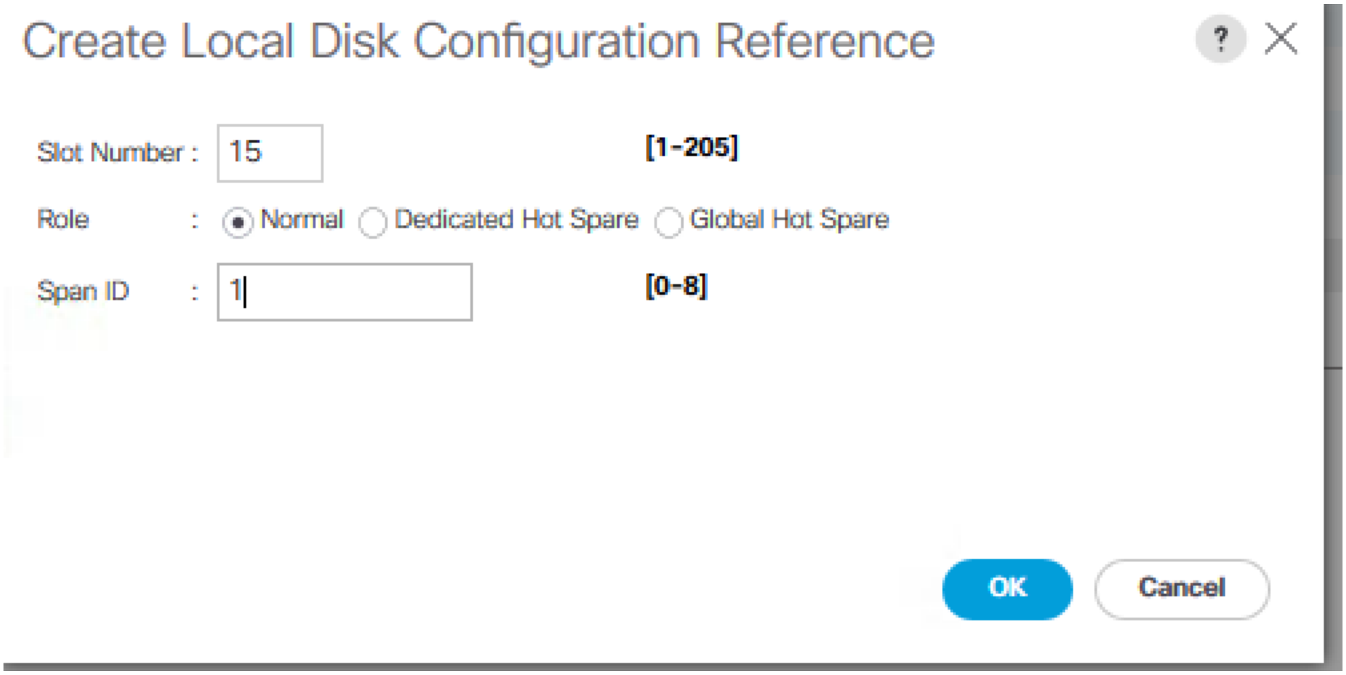
Disk Group Configuration (Manual)

Slot Number	Role	Span ID
1	Normal	Unspecified
10	Normal	Unspecified
11	Normal	Unspecified
12	Normal	Unspecified
13	Dedicated Hot Spare	Unspecified
14	Global Hot Spare	Unspecified

Virtual Drive Configuration

Strip Size (KB) : 64KB

16. Repeat Step 1 for Slot 15 through Slot 26 and enter Span ID as 1.

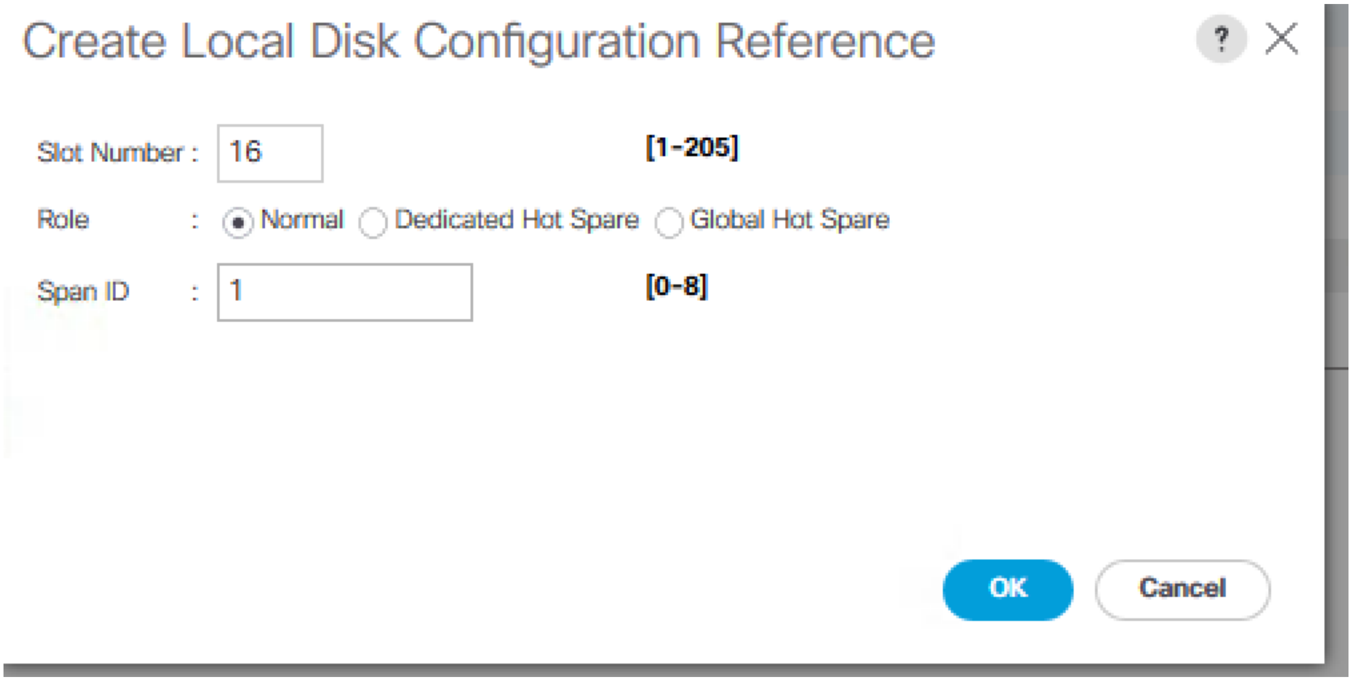


Create Local Disk Configuration Reference

Slot Number : 15 [1-205]

Role : ● Normal ○ Dedicated Hot Spare ○ Global Hot Spare

Span ID : 1 [0-8]

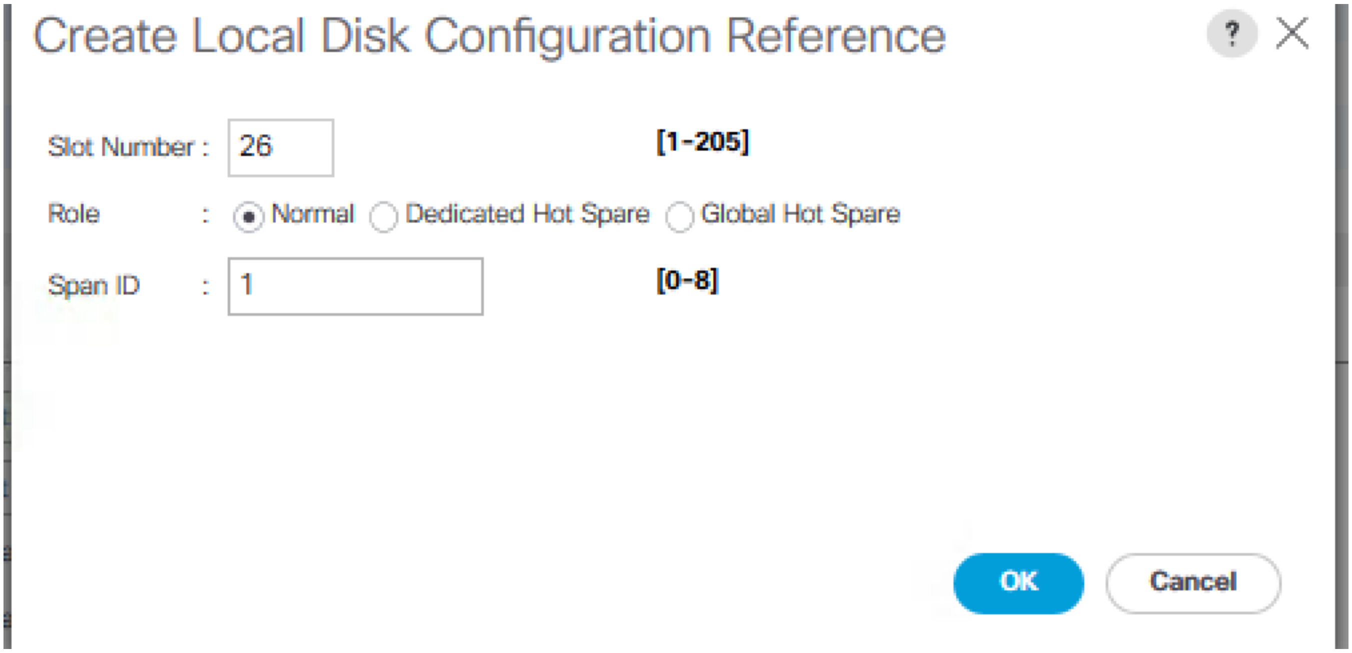


Create Local Disk Configuration Reference

Slot Number : 16 [1-205]

Role : ● Normal ○ Dedicated Hot Spare ○ Global Hot Spare

Span ID : 1 [0-8]



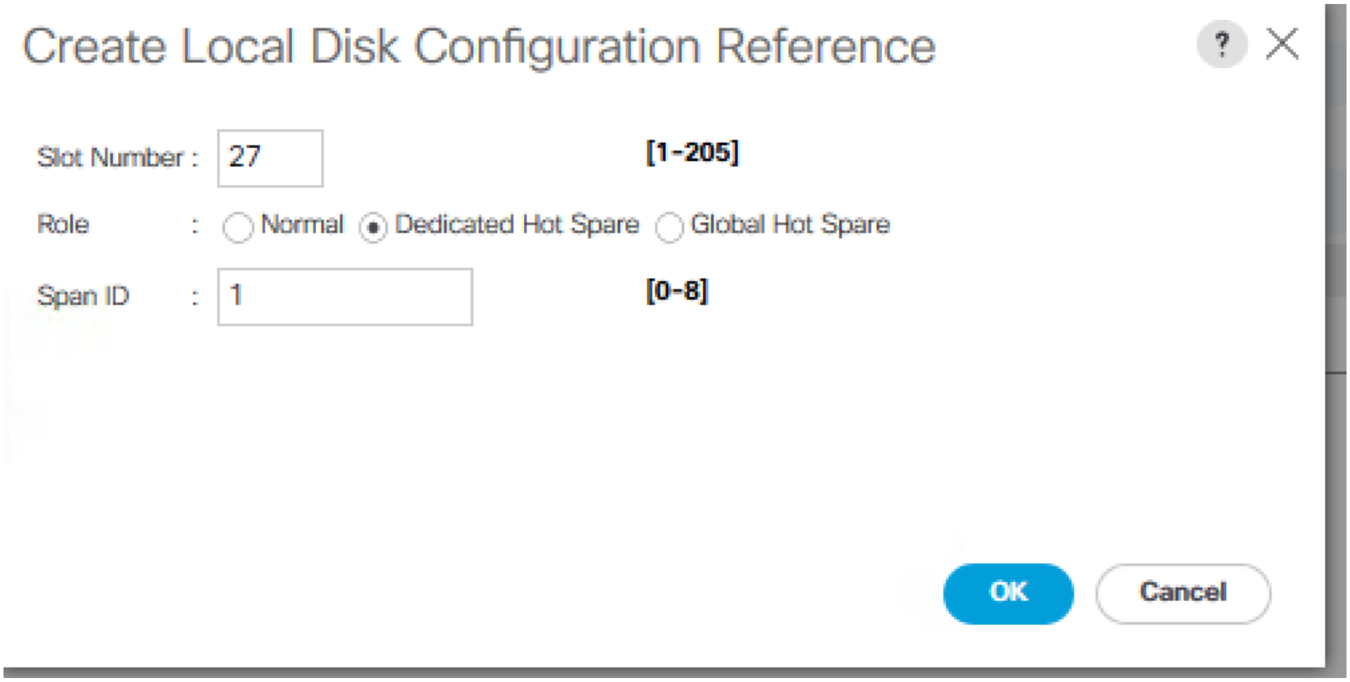
Create Local Disk Configuration Reference

Slot Number : 26 [1-205]

Role : ● Normal ○ Dedicated Hot Spare ○ Global Hot Spare

Span ID : 1 [0-8]

17. For Slot 27, select Role as Dedicated Hot Spare and SPAN ID as 1.



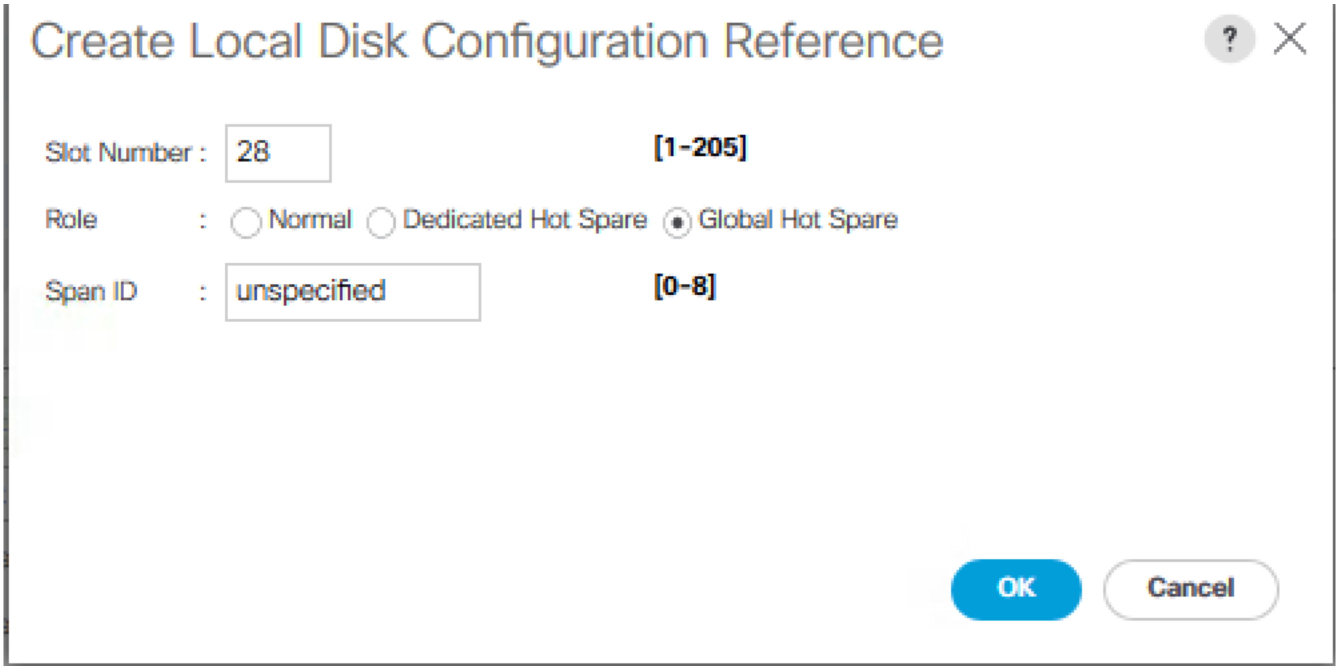
Create Local Disk Configuration Reference

Slot Number : 27 [1-205]

Role : ○ Normal ● Dedicated Hot Spare ○ Global Hot Spare

Span ID : 1 [0-8]

18. For Slot 28, select Role as Global Hot Spare and leave the Span ID as ‘unspecified’.



Create Local Disk Configuration Reference

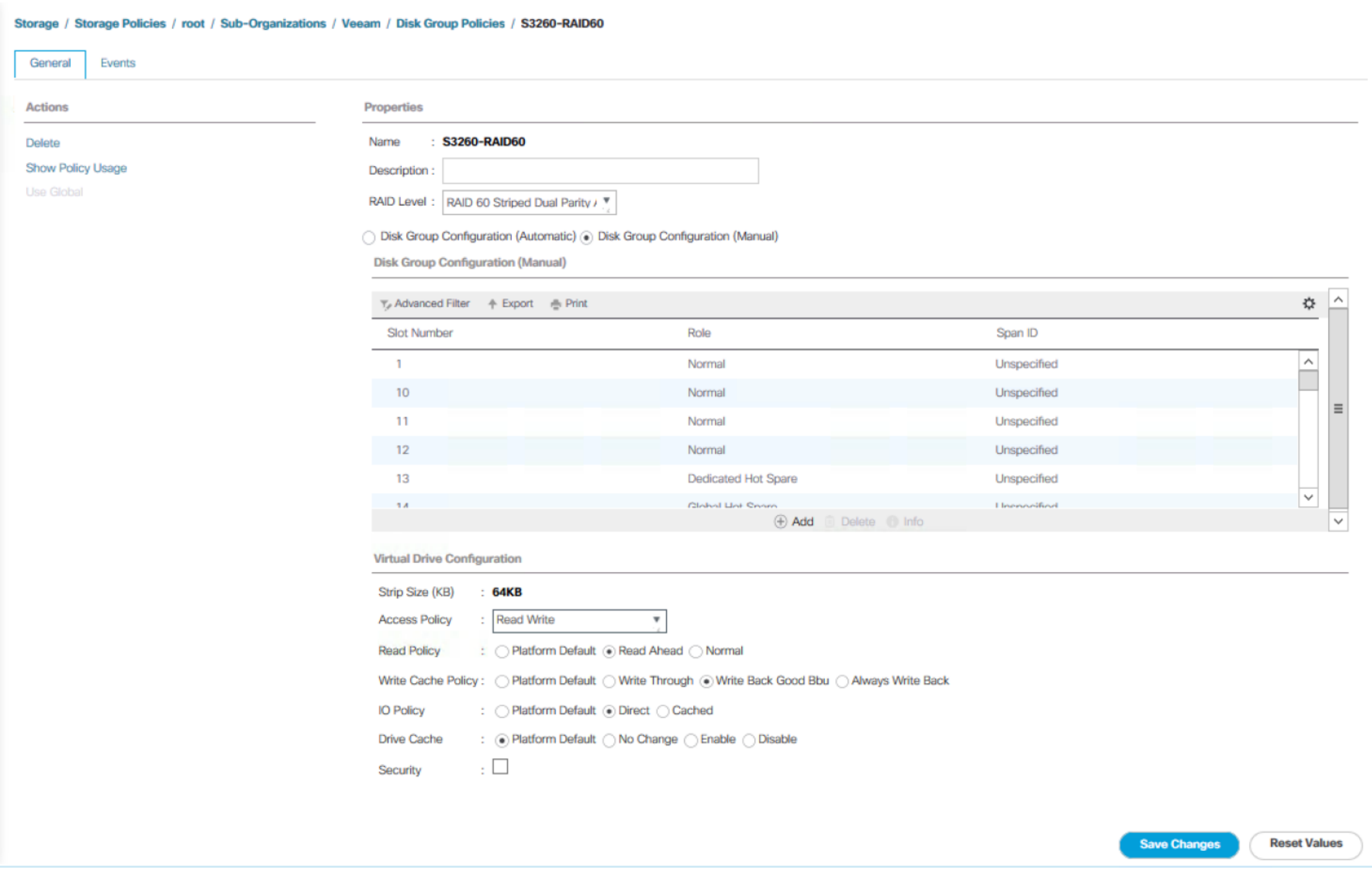
Slot Number : 28 [1-205]

Role : ○ Normal ○ Dedicated Hot Spare ● Global Hot Spare

Span ID : unspecified [0-8]

19. When you have configured all 28 Disk with 2 Spans, select Strip Size as 64KB,
20. Access Policy as ReadWrite.
21. Read Policy as Read Ahead.
22. Write Cache Policy as Write Back Good Bbu.
23. IO Policy as Direct.
24. Drive Cache Policy as Platform Default

The screenshot below shows the RAID60 configuration with 28 Disk and the suggested Virtual Drive Configuration:



Storage / Storage Policies / root / Sub-Organizations / Veeam / Disk Group Policies / S3260-RAID60

Name : S3260-RAID60

Description :

RAID Level : RAID 60 Striped Dual Parity /

○ Disk Group Configuration (Automatic) ● Disk Group Configuration (Manual)

Disk Group Configuration (Manual)

Slot Number	Role	Span ID
1	Normal	Unspecified
10	Normal	Unspecified
11	Normal	Unspecified
12	Normal	Unspecified
13	Dedicated Hot Spare	Unspecified
14	Global Hot Spare	Unspecified

Virtual Drive Configuration

Strip Size (KB) : 64KB

Access Policy : Read Write

Read Policy : ○ Platform Default ● Read Ahead ○ Normal

Write Cache Policy : ○ Platform Default ○ Write Through ● Write Back Good Bbu ○ Always Write Back

IO Policy : ○ Platform Default ● Direct ○ Cached

Drive Cache : ● Platform Default ○ No Change ○ Enable ○ Disable

Security : □

RAID Configuration for a different disk arrangement on Cisco UCS S3260 and Cisco UCS C240 M4 LFF servers are detail in the table below:

Table 4 RAID Configuration for Cisco UCS S3260 and C240 M4 LFF Server

	Replication	Small – 1	Small – 2	Medium -1	Medium -2	Large -1	Large-2
Raw Capacity	0	48 TB	72 TB	140TB	280 TB	560 TB	1680 TB
Minimum Usable Capacity	0	36 TB	54 TB	110TB	220 TB	440 TB	1320 TB
Storage	Replication only Appliance	12 x 4-TB SAS 7200-rpm drives 48 TB raw capacity 36 TB minimum usable capacity	12 x 6-TB SAS 7200-rpm drives 72 TB raw capacity 54 TB minimum usable capacity	14 x 10-TB SAS 7200-rpm drives 140 TB raw capacity 110 TB minimum usable capacity	28 x 10-TB SAS 7200-rpm drives 280 TB raw capacity 200 TB minimum usable capacity	56 x 10-TB SAS 7200-rpm drives 560 TB raw capacity 400 TB minimum usable capacity	168 x 10-TB SAS 7200-rpm drives 1680 TB raw capacity 1200 TB minimum usable capacity
Servers	1 Cisco UCS C240 M4 (LFF)	1 Cisco UCS C240 M4 (LFF)	1 Cisco UCS C240 M4 (LFF)	1 Cisco UCS S3260	1 Cisco UCS S3260	1 Cisco UCS S3260	3x Cisco UCS S3260

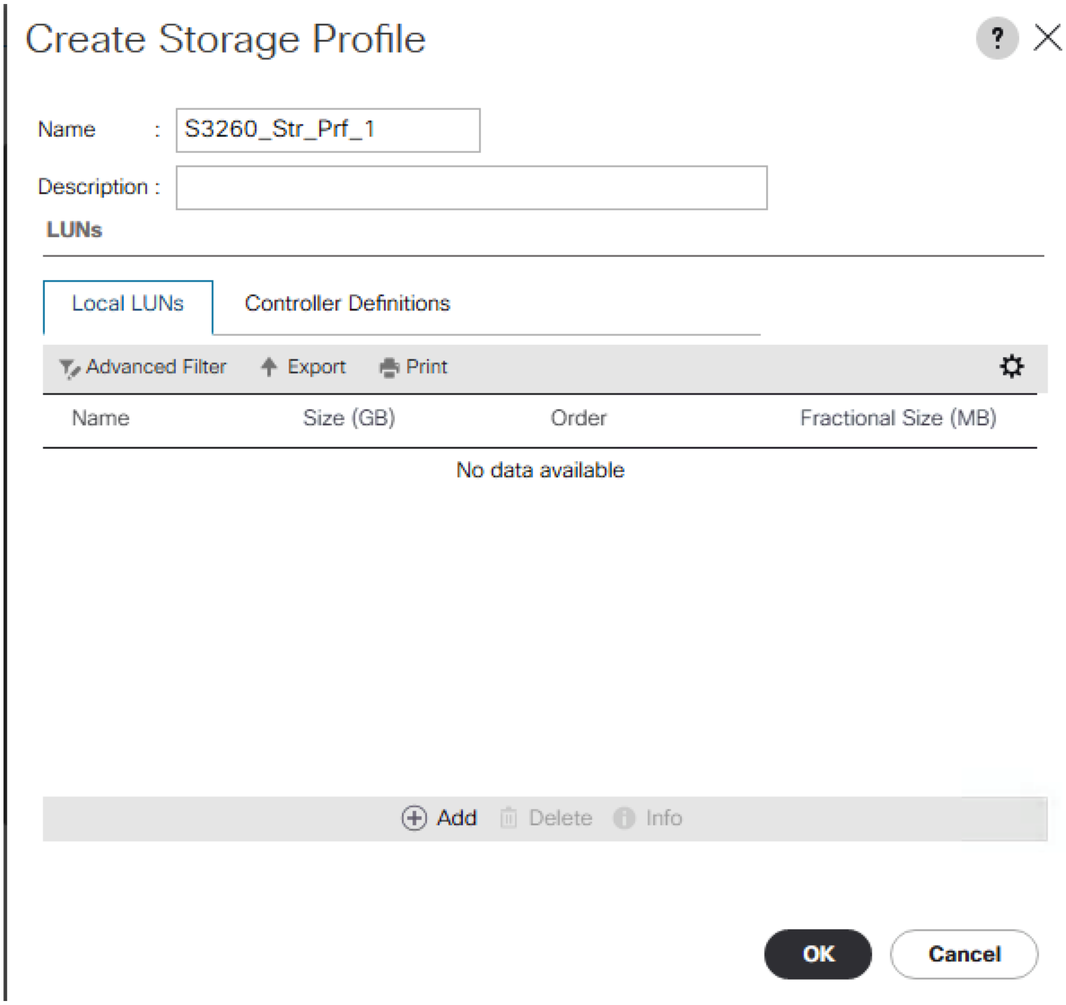
	Replication	Small – 1	Small – 2	Medium -1	Medium -2	Large -1	Large-2
CPU	Intel® Xeon® processor E5-2650 v4 (12 cores, 2.2 GHz, and 105W)	Intel® Xeon® processor E5-2650 v4 (12 cores, 2.2 GHz, and 105W)	Intel® Xeon® processor E5-2650 v4 (12 cores, 2.2 GHz, and 105W)	Intel® Xeon® processor E5-2650 v4 (12 cores, 2.2 GHz, and 105W)	Intel® Xeon® processor E5-2695 v4 (18 cores, 2.1 GHz, and 120W)	Intel® Xeon® processor E5-2695 v4 (18 cores, 2.1 GHz, and 120W)	Intel® Xeon® processor E5-2695 v4 (18 cores, 2.1 GHz, and 120W)
Memory	32GB	32 GB	32 GB	128 GB	128 GB	256 GB	256 GB per server Total: 768 GB
RAID Cache	1GB	1 GB	1 GB	4 GB	4 GB	4 GB	4 GB
RAID	RAID1	RAID 6	RAID 6	RAID 6	RAID 60	RAID 60	RAID 60
Maximum Bandwidth	2x 10 Gbps	2x 10 Gbps	2x 10 Gbps	2x 40 Gbps	2x 40 Gbps	2x 40 Gbps	2x 40 Gbps
Average Number of Virtual Machines	NA	70	100	225	450	900	2800

Storage efficiencies via Veeam Compression and Deduplication technologies can result in 50 percent or higher reduction in space utilization. Backup repositories on ReFS 3.0 volumes will also benefit from integration with the Block Clone API, reducing synthetic full creation time and dramatically reducing space consumption for the synthetic full. Overall space savings will vary depending on the environment.

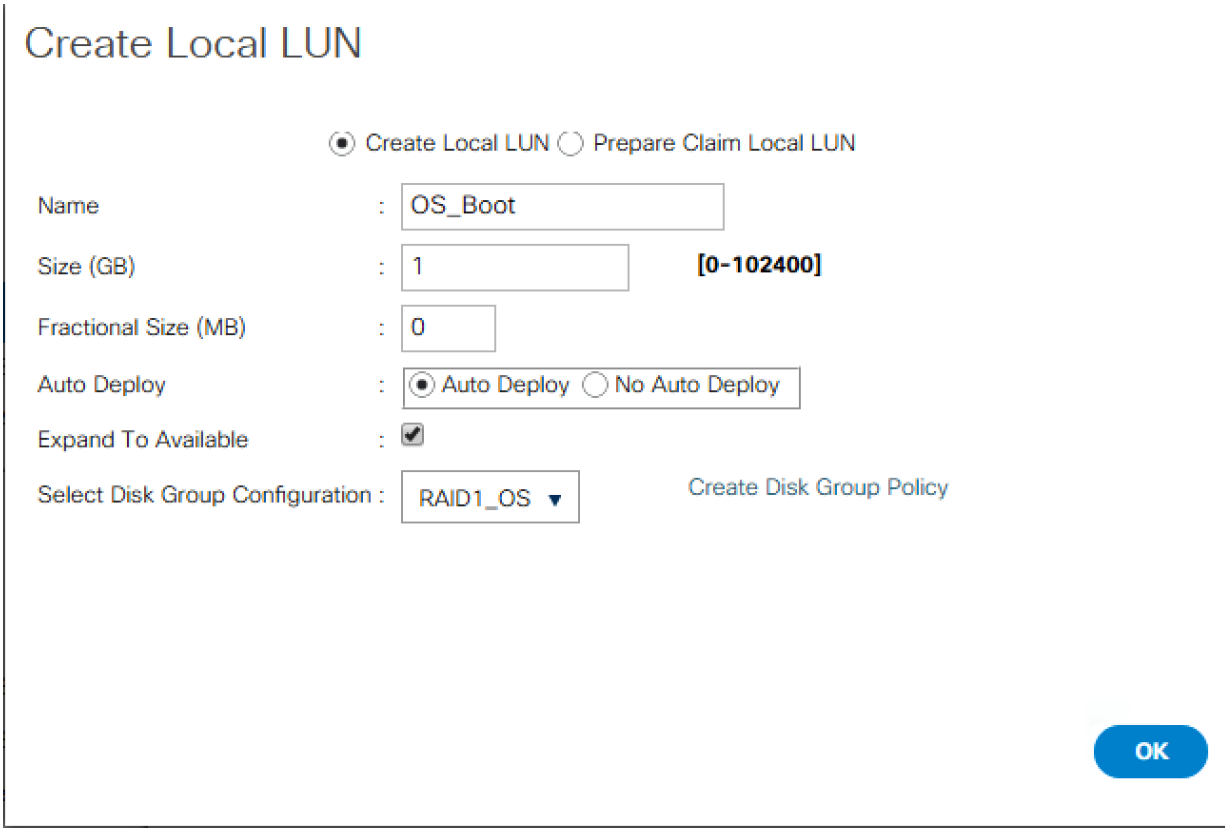
Create Storage Profile

To create Storage Profile for S3260, complete the following steps:

1. In Cisco UCS Manager, click the Storage tab in the navigation pane.
2. Select Storage Policies > root >Sub-Organizations >Veeam.
3. Right-click and Select Create Storage Profile.
4. Enter name as S3260_Str_Prf_1.
5. Under Local Lun Selection, click Add.



6. Enter Name as OS_Boot.
7. Check Expand to Available, this creates a single lun with maximum space available.
8. Select Disk Group Selection as ‘RAID1_OS’ and click OK.



Create Local LUN

● Create Local LUN ○ Prepare Claim Local LUN

Name : OS_Boot

Size (GB) : 1 [0-102400]

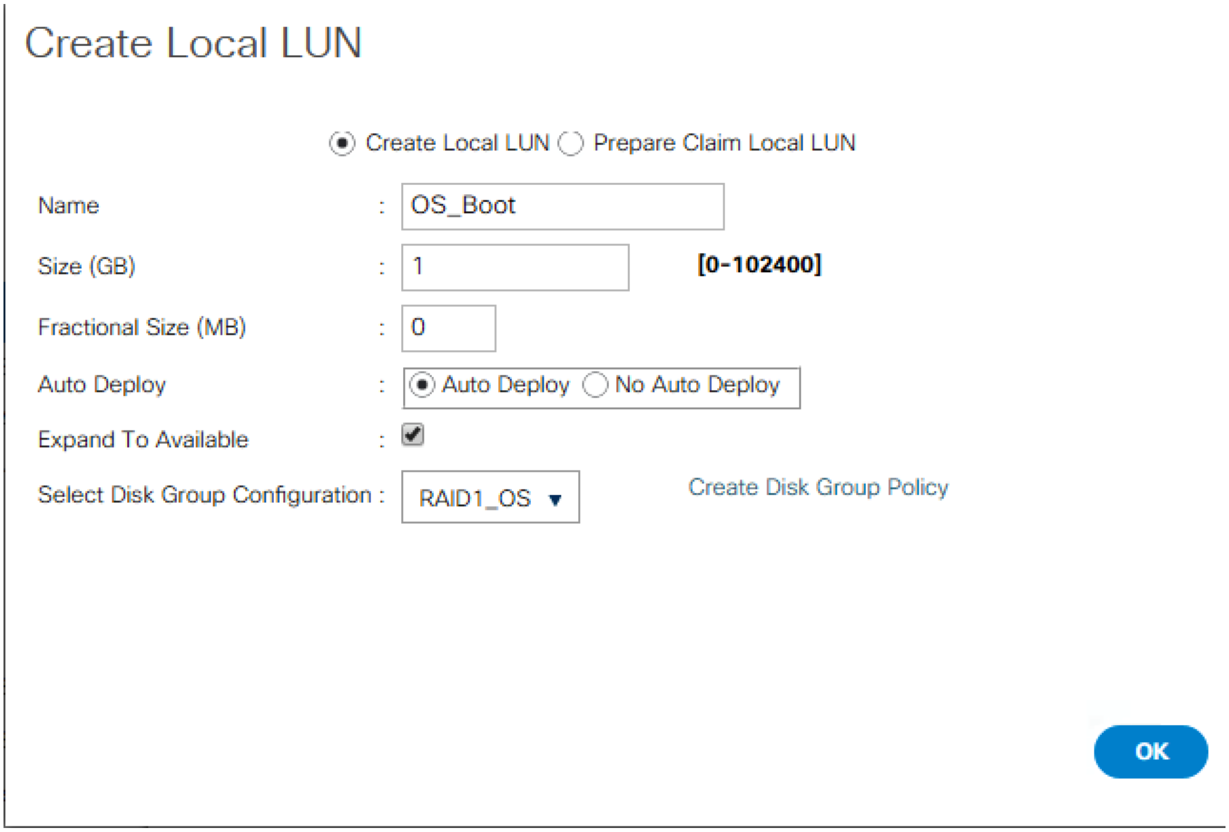
Fractional Size (MB) : 0

Auto Deploy : ● Auto Deploy ○ No Auto Deploy

Expand To Available : ☑

Select Disk Group Configuration : RAID1_OS

9. Click Add under Local LUN.
10. Enter Name as Veeam_Rep; this is the LUN used by Veeam Repository.
11. Check Expand to Available and Select Disk Group Configuration as ‘S3260-RAID60’.
12. Click OK.



Create Local LUN

● Create Local LUN ○ Prepare Claim Local LUN

Name : OS_Boot

Size (GB) : 1 [0-102400]

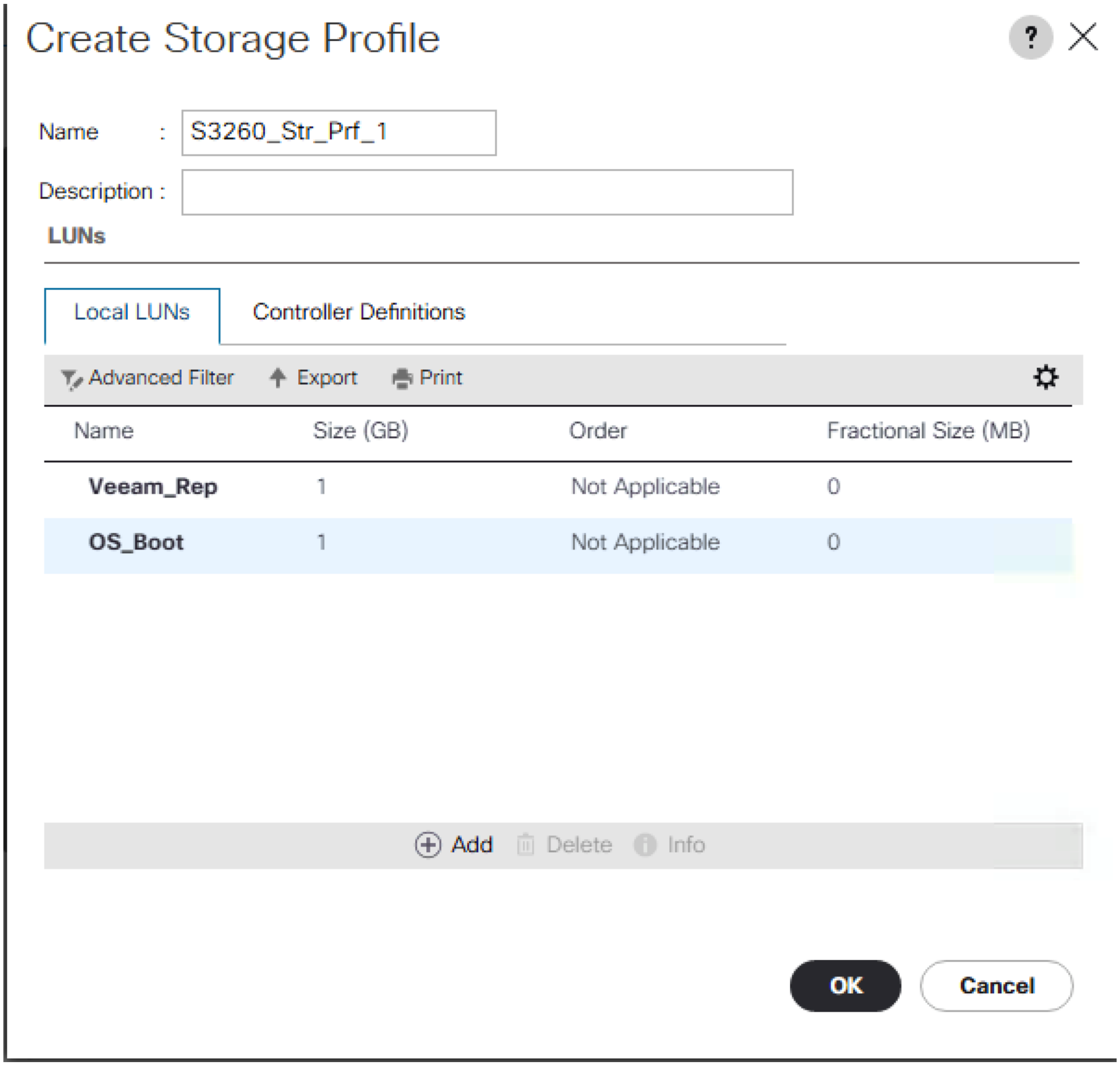
Fractional Size (MB) : 0

Auto Deploy : ● Auto Deploy ○ No Auto Deploy

Expand To Available : ☑

Select Disk Group Configuration : RAID1_OS

13. In Create Storage Profile, click OK.



Create Storage Profile

Name : S3260_Str_Prf_1

Description :

LUNs

Name	Size (GB)	Order	Fractional Size (MB)
Veeam_Rep	1	Not Applicable	0
OS_Boot	1	Not Applicable	0

Create Chassis Profile Template

A chassis profile defines the storage, firmware and maintenance characteristics of a chassis. You can create a chassis profile for the Cisco UCS S3260 Storage Server. When a chassis profile is associated to a chassis, Cisco UCS Central automatically configures the chassis to match the configuration specified in the chassis profile.

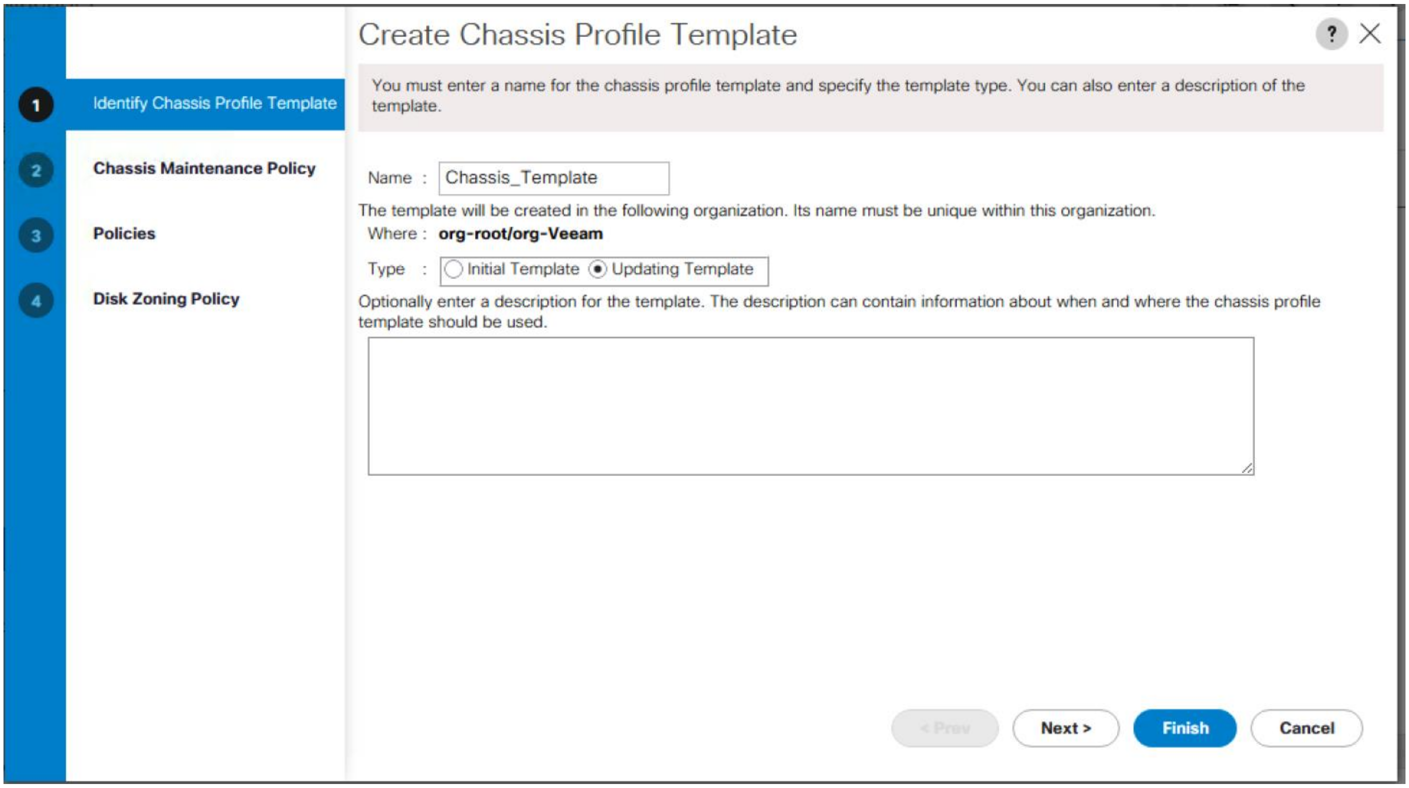
A chassis profile includes four types of information:

- Chassis definition—Defines the specific chassis to which the profile is assigned.
- Maintenance policy—Includes the maintenance policy to be applied to the profile.
- Firmware specifications—Defines the chassis firmware package that can be applied to a chassis through this profile.
- Disk zoning policy—Includes the zoning policy to be applied to the storage disks.

To create Chassis Profile Template for Cisco UCS S3260 storage server, complete the following steps:

1. In Cisco UCS Manager, click the Chassis tab in the navigation pane.
2. Select Chassis Profile Templates > root > Sub-Organizations > Veeam.

3. Right-click and select Create Chassis Profile Template.
4. Enter name as Chassis_Template.
5. Select Type as Updating Template.



Create Chassis Profile Template

You must enter a name for the chassis profile template and specify the template type. You can also enter a description of the template.

Name : Chassis_Template

The template will be created in the following organization. Its name must be unique within this organization.

Where : **org-root/org-Veeam**

Type : ○ Initial Template ● Updating Template

Optionally enter a description for the template. The description can contain information about when and where the chassis profile template should be used.

1 Identify Chassis Profile Template
2 Chassis Maintenance Policy
3 Policies
4 Disk Zoning Policy
< Prev
Next >
Finish
Cancel

6. Select default as the Maintenance Policy and click Next.
7. Select Chassis Firmware Package as ‘S3260_FW_Package’.
8. Select Disk Zoning Policy as ‘S3260_DiskZone” and click Finish.

Create Service Profile Template

With a service profile template, you can quickly create several service profiles with the same basic parameters, such as the number of vNICs and vHBAs, and with identity information drawn from the same pools.

> If you need only one service profile with similar values to an existing service profile, you can clone a service profile in the Cisco UCS Manager GUI.

For example, if you need several service profiles with similar values to configure servers to host database software, you can create a service profile template, either manually or from an existing service profile. You then use the template to create the service profiles.

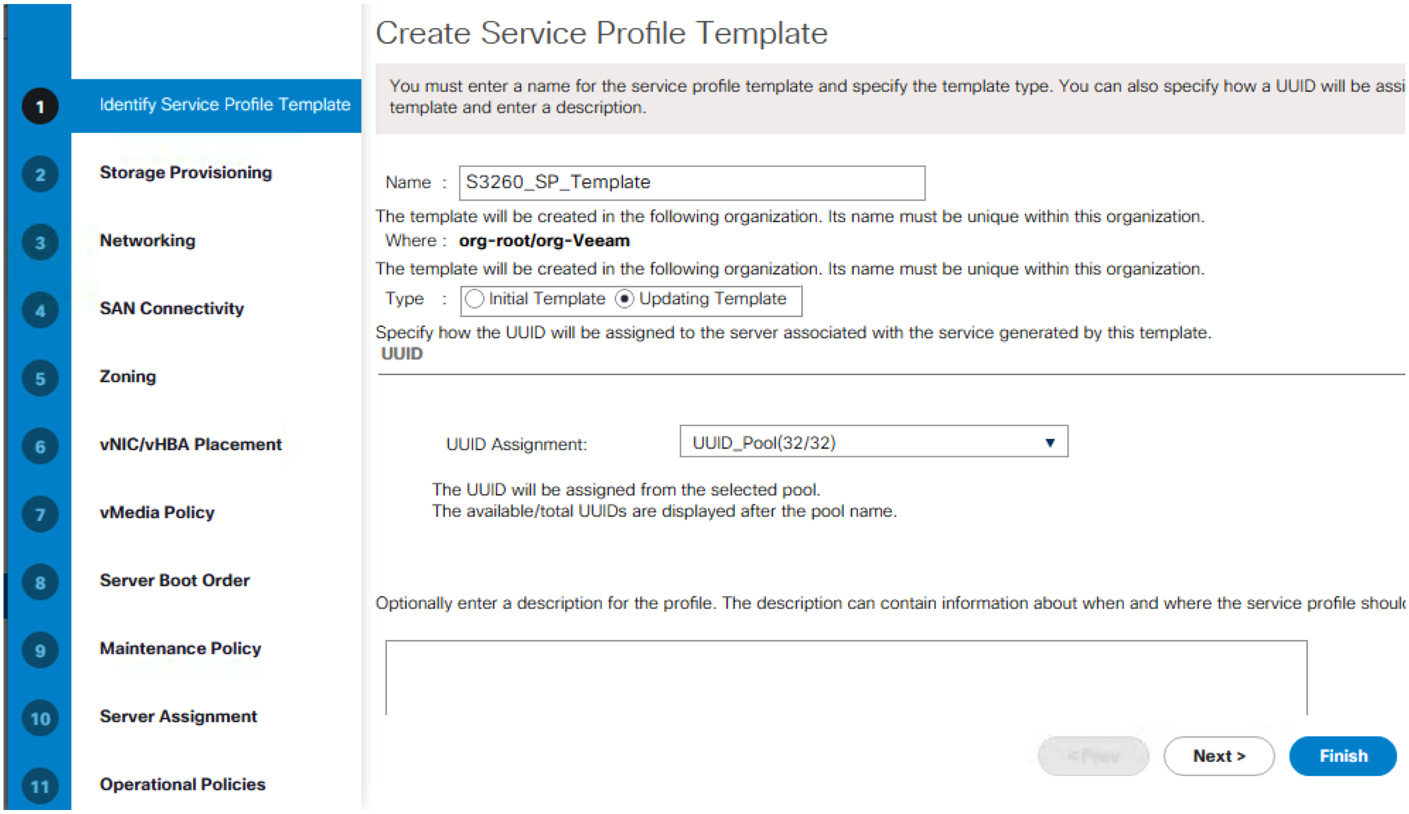
Cisco UCS supports the following types of service profile templates:

- **Initial template**: Service profiles created from an initial template inherit all the properties of the template. However, after you create the profile, it is no longer connected to the template. If you need to make changes to one or more profiles created from this template, you must change each profile individually.

- **Updating template**: Service profiles created from an updating template inherit all the properties of the template and remain connected to the template. Any changes to the template automatically update the service profiles created from the template.

To create the service profile template, complete the following steps:

1. In Cisco UCS Manager, click the Servers tab in the navigation pane.
2. Select Service Profile Templates > root >Sub-Organizations > Veeam.
3. Right-click Veeam.
4. Select Create Service Profile Template to open the Create Service Profile Template wizard.
5. Enter S3260_SP_Template as the name of the service profile template.
6. Select the “Updating Template” option.
7. Under UUID, select UUID_Pool as the UUID pool.



Create Service Profile Template

You must enter a name for the service profile template and specify the template type. You can also specify how a UUID will be assi template and enter a description.

Name : S3260_SP_Template

The template will be created in the following organization. Its name must be unique within this organization.

Where : **org-root/org-Veeam**

The template will be created in the following organization. Its name must be unique within this organization.

Type : ○ Initial Template ● Updating Template

Specify how the UUID will be assigned to the server associated with the service generated by this template.

UUID

UUID Assignment: UUID_Pool(32/32)

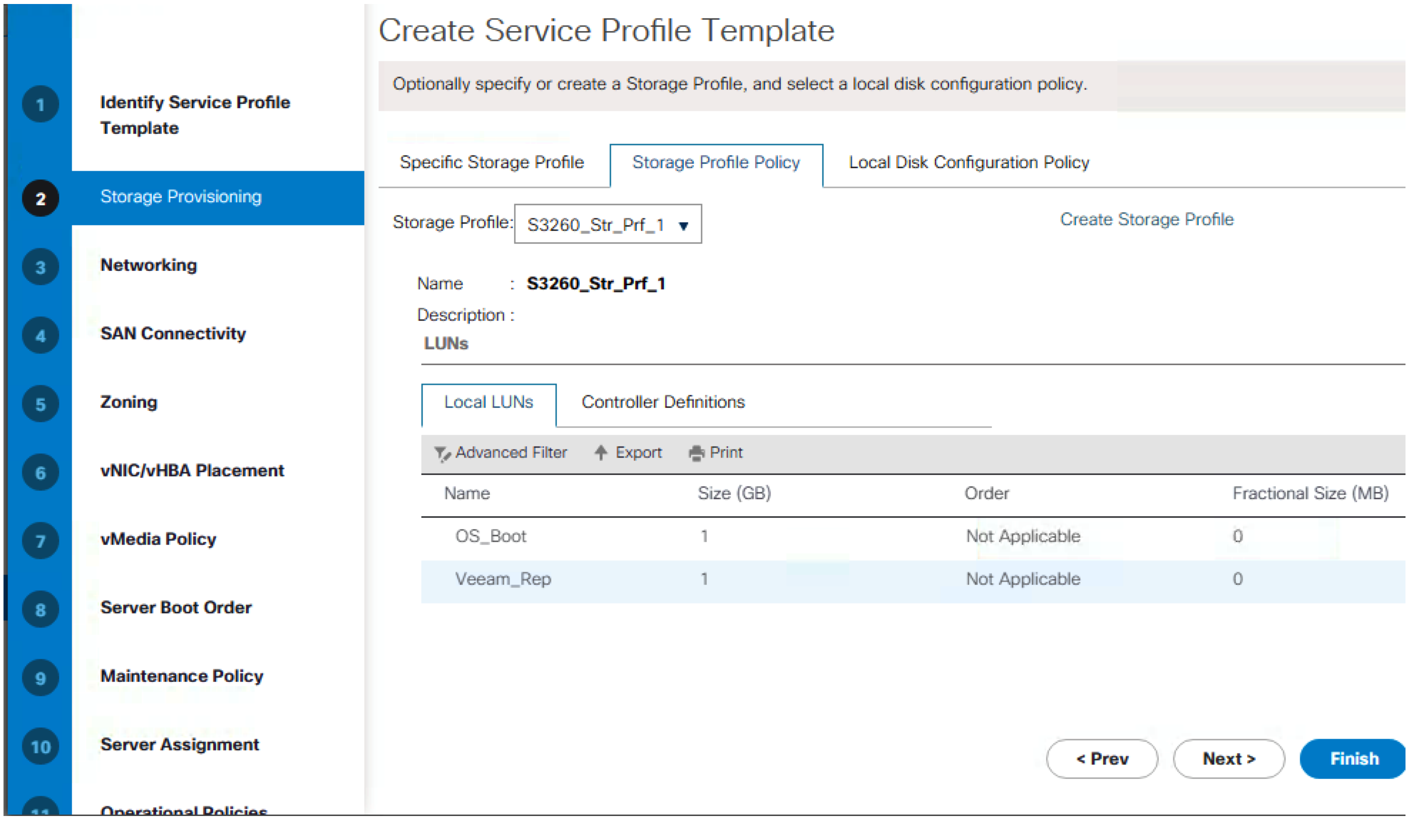
The UUID will be assigned from the selected pool.
The available/total UUIDs are displayed after the pool name.

Optionally enter a description for the profile. The description can contain information about when and where the service profile shoul

8. Click Next.

Configure Storage Provisioning

1. Click Storage Profile Policy Tab and select S3260_Str_Prf_1 (as created under Storage Profile section).



Create Service Profile Template

Optionally specify or create a Storage Profile, and select a local disk configuration policy.

Storage Profile: S3260_Str_Prf_1

Name : S3260_Str_Prf_1

Description :

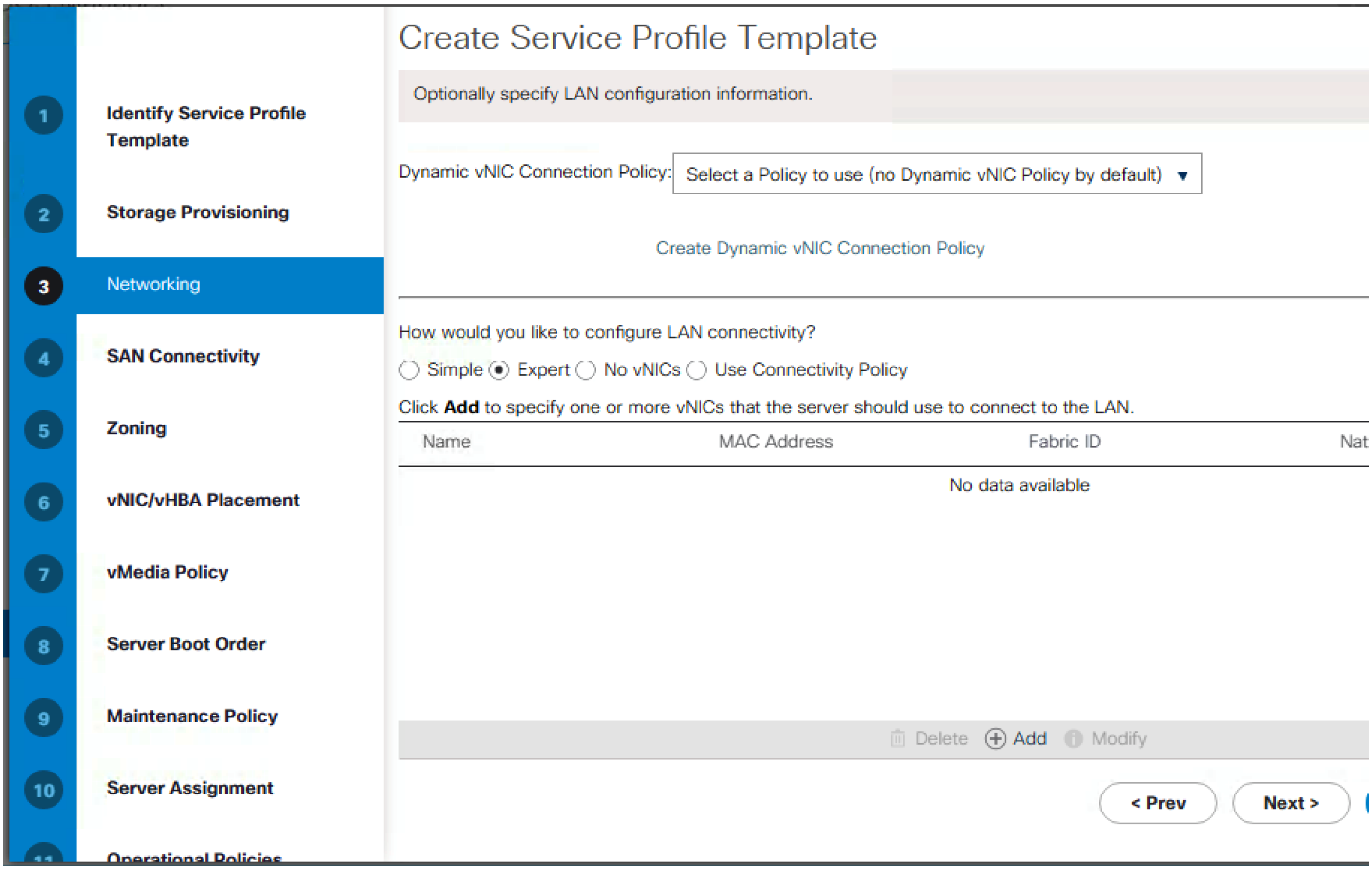
LUNs

Name	Size (GB)	Order	Fractional Size (MB)
OS_Boot	1	Not Applicable	0
Veeam_Rep	1	Not Applicable	0

2. Click Next.

Configure Networking Options

1. Keep the default setting for Dynamic vNIC Connection Policy.
2. Under ‘How would you like to configure LAN connectivity’, select Expert Mode.
3. Select the “Use Connectivity Policy” option to configure the LAN connectivity.



Create Service Profile Template

Optionally specify LAN configuration information.

Dynamic vNIC Connection Policy: Select a Policy to use (no Dynamic vNIC Policy by default)

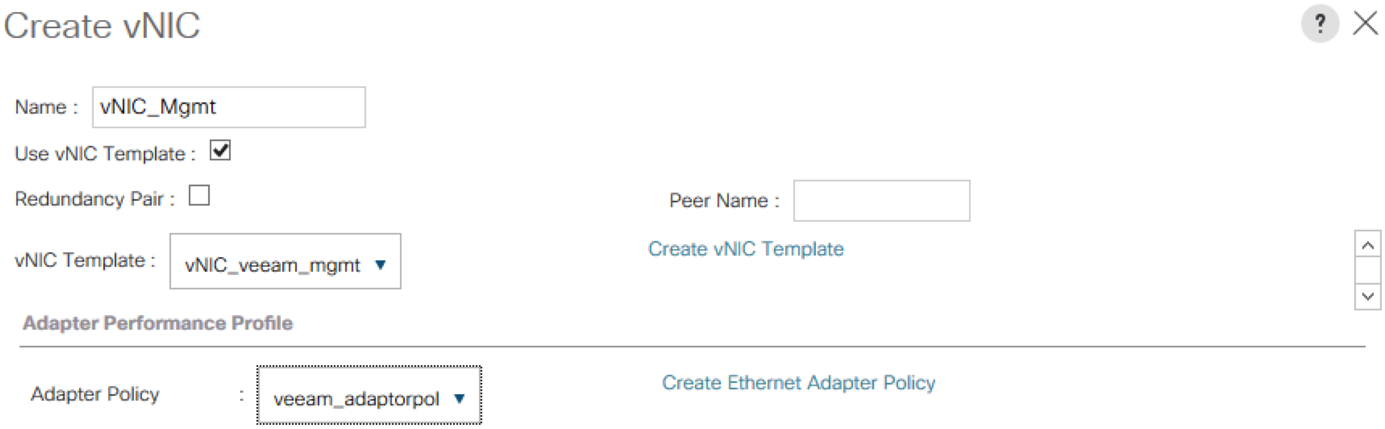
How would you like to configure LAN connectivity?

○ Simple ● Expert ○ No vNICs ○ Use Connectivity Policy

Click **Add** to specify one or more vNICs that the server should use to connect to the LAN.

Name	MAC Address	Fabric ID	Nat
No data available			

4. Click Add.
5. Under Create vNIC option, enter name as vnic_Mgmt.
6. Select use vNIC Template and choose vNIC_veeam_mgmt.
7. Under Adaptor Policy Select ‘veeam_adaptorpol’ and click OK.



Create vNIC

Name : vNIC_Mgmt

Use vNIC Template : ☑

Redundancy Pair : □

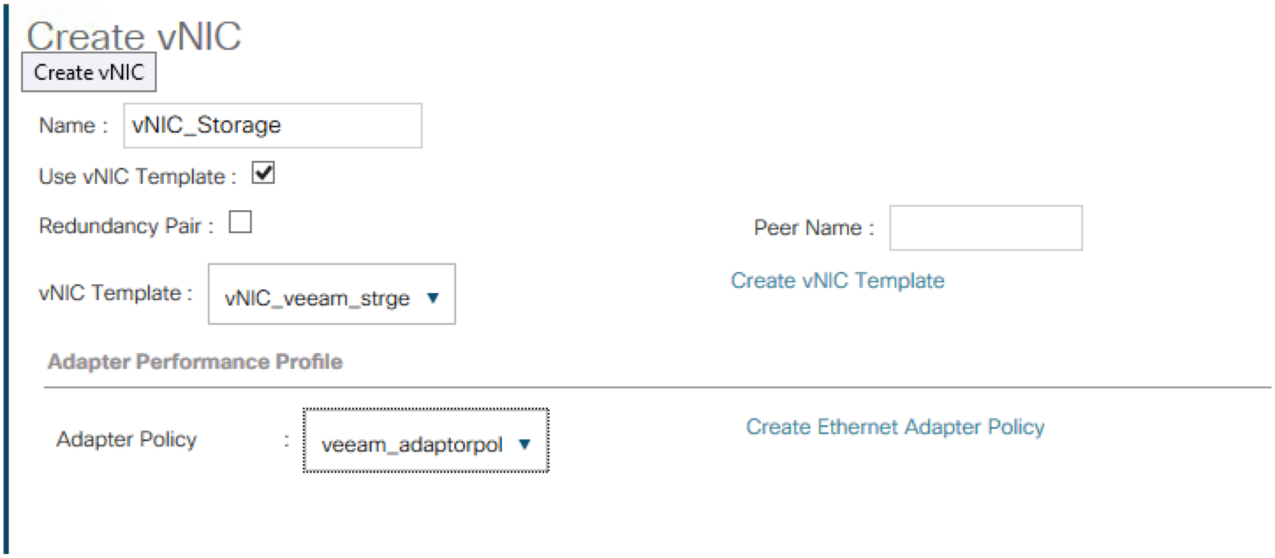
Peer Name :

vNIC Template : vNIC_veeam_mgmt

Adapter Performance Profile

Adapter Policy : veeam_adaptorpol

8. Repeat Step 1 to 7 and name the vNIC as vnic_Storage, vNIC Template as vNIC_veeam_strge and adaptor policy as Veeam_adaptorpol.



Create vNIC

Name : vNIC_Storage

Use vNIC Template : ☑

Redundancy Pair : □

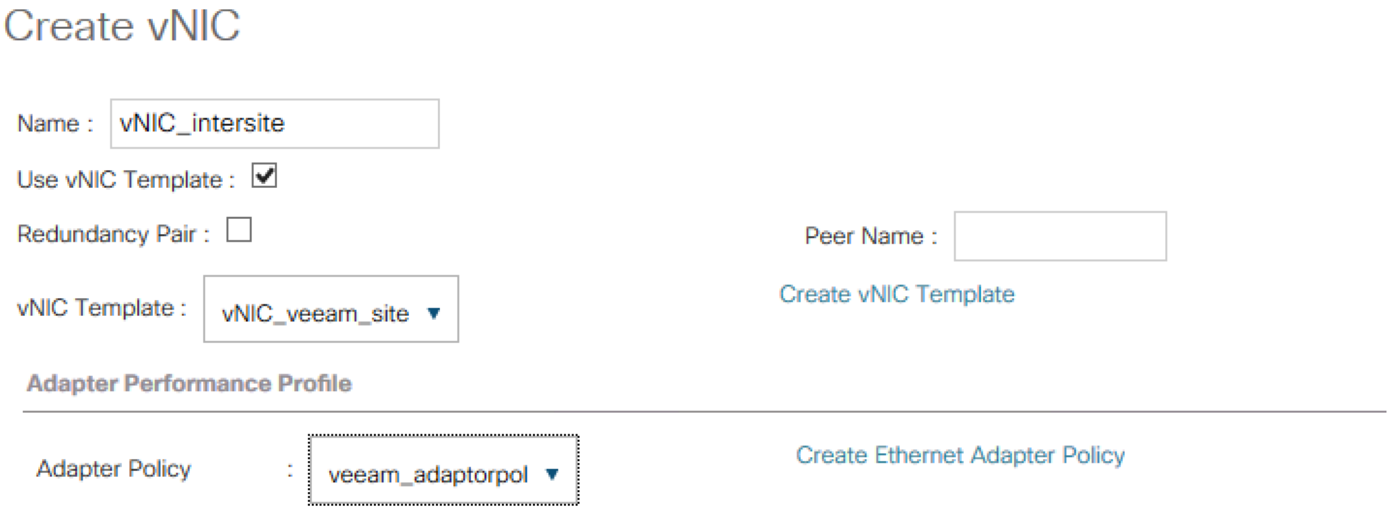
Peer Name :

vNIC Template : vNIC_veeam_strge ▼

Adapter Performance Profile

Adapter Policy : veeam_adaptorpol ▼

9. Repeat Step 1 to 7 and name the vNIC as vnic_intersite, vNIC Template as vNIC_veeam_site and adaptor policy as Veeam_adaptorpol.



Create vNIC

Name : vNIC_intersite

Use vNIC Template : ☑

Redundancy Pair : □

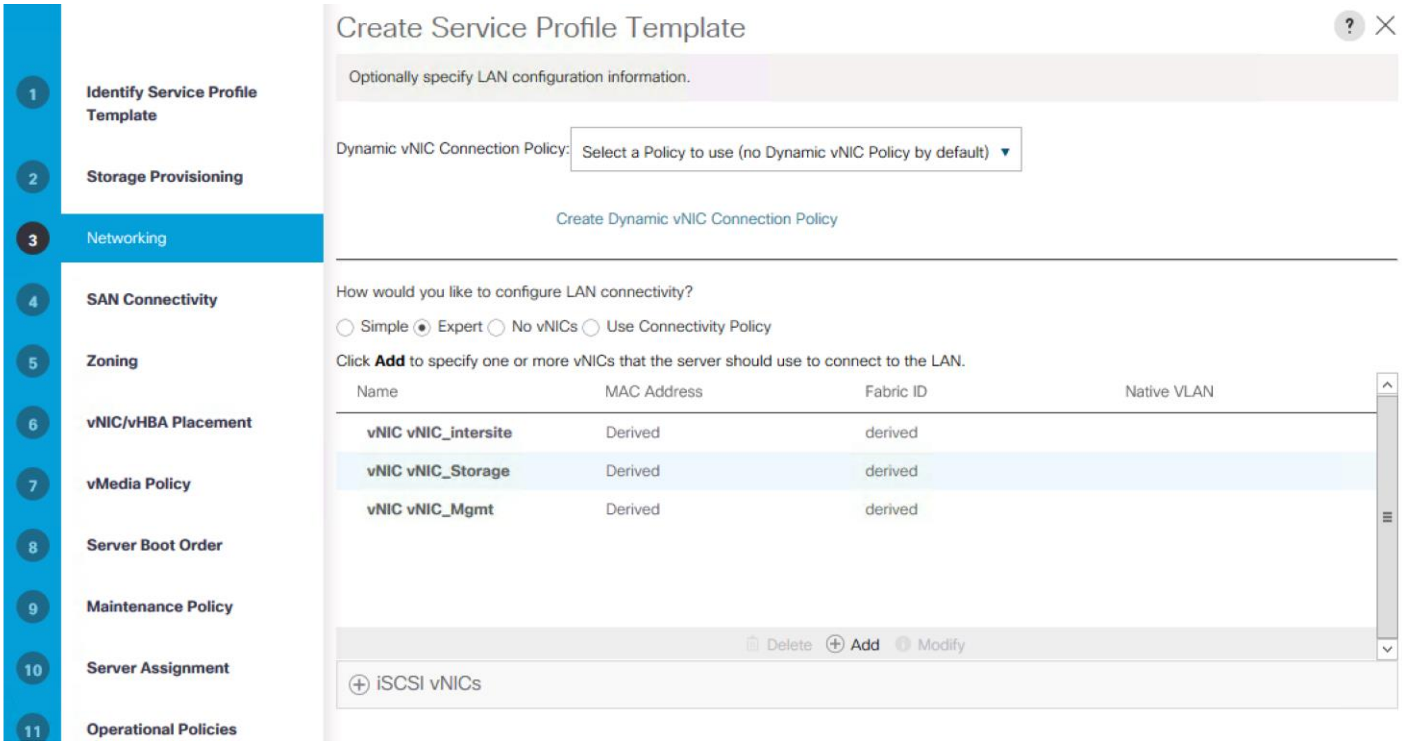
Peer Name :

vNIC Template : vNIC_veeam_site ▼

Adapter Performance Profile

Adapter Policy : veeam_adaptorpol ▼

Verify that there are 3 vNICs attached to the Service Profile adaptor.



Create Service Profile Template

Optionally specify LAN configuration information.

Dynamic vNIC Connection Policy: Select a Policy to use (no Dynamic vNIC Policy by default) ▼

Create Dynamic vNIC Connection Policy

How would you like to configure LAN connectivity?

○ Simple ● Expert ○ No vNICs ○ Use Connectivity Policy

Click **Add** to specify one or more vNICs that the server should use to connect to the LAN.

Name	MAC Address	Fabric ID	Native VLAN
vNIC vNIC_intersite	Derived	derived	
vNIC vNIC_Storage	Derived	derived	
vNIC vNIC_Mgmt	Derived	derived	

10. Click Next.

Table 5 lists the details of each vNIC.

Table 5 vNIC Configured for HX Multisite Backup and Replication

vNIC	Description
vnic_mgmt	Required to manage the Veeam Backup & Replication Server. This will exist on the HX Management VLAN.
vnic_Storage	Required for Cisco HyperFlex storage integration with Veeam. This feature requires Veeam Enterprise Plus license.
Vnic_intersite	This is required for backup and replication across data center. In case, HX Management VLAN can communicate across Data Center, this vNIC is not required.

Configure Storage Options

Skip the SAN Connectivity since you will use local storage for S3260 created through Storage Policy and Select No vHBAs.

Configure Zoning Options

1. Set no Zoning options and click Next.

Configure vNIC/HBA Placement

1. In the “Select Placement” list, leave the placement policy as “Let System Perform Placement”.

2. Click Next.

Configure vMedia Policy

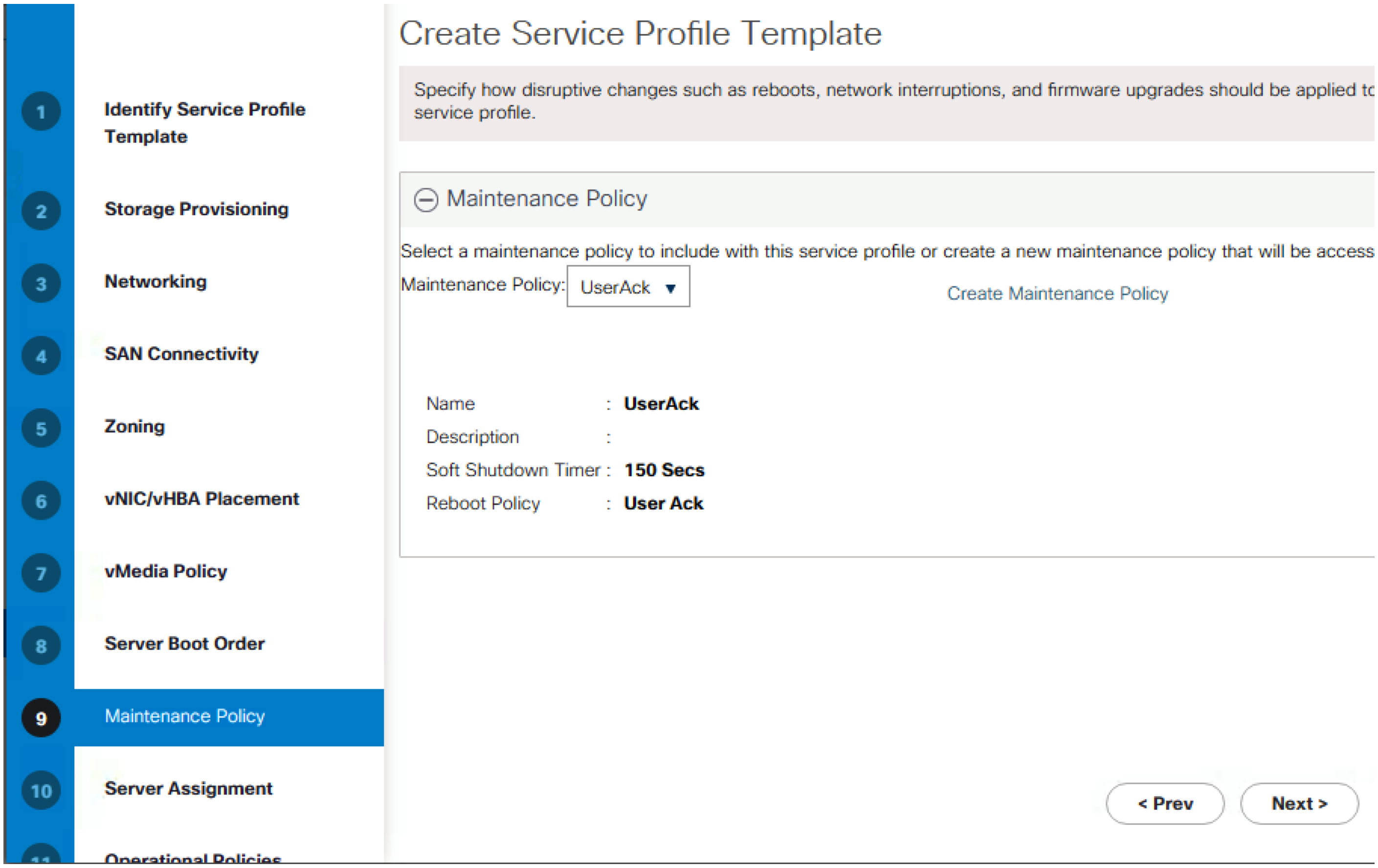
1. From the vMedia Policy, leave as default.
2. Click Next.

Configure Server Boot Order

1. Choose Default Boot Policy.

Configure Maintenance Policy

1. Change the Maintenance Policy to userAck.



Create Service Profile Template

Specify how disruptive changes such as reboots, network interruptions, and firmware upgrades should be applied tc service profile.

⊖ Maintenance Policy

Select a maintenance policy to include with this service profile or create a new maintenance policy that will be access

Maintenance Policy: UserAck ▾

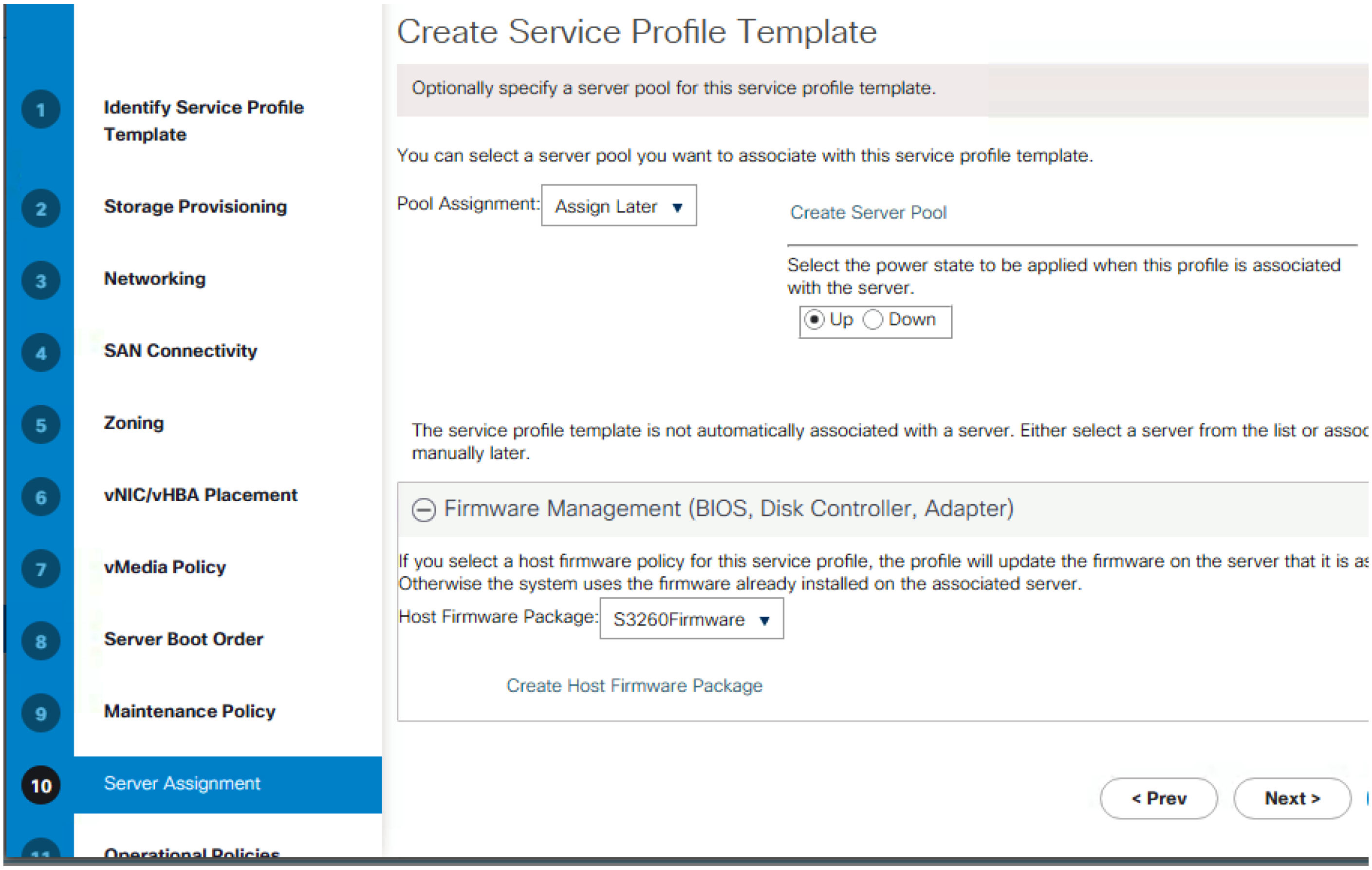
Name : UserAck
Description :
Soft Shutdown Timer : 150 Secs
Reboot Policy : User Ack

2. Click Next.

Configure Server Assignment

To configure server assignment, complete the following steps:

1. In the Pool Assignment list, select Assign Later.
2. Firmware Management at the bottom of the page select S3260Firmware as created in the previous section.



Create Service Profile Template

Optionally specify a server pool for this service profile template.

You can select a server pool you want to associate with this service profile template.

Pool Assignment: Assign Later ▾

Select the power state to be applied when this profile is associated with the server.

● Up ○ Down

The service profile template is not automatically associated with a server. Either select a server from the list or assoc manually later.

⊖ Firmware Management (BIOS, Disk Controller, Adapter)

If you select a host firmware policy for this service profile, the profile will update the firmware on the server that it is as Otherwise the system uses the firmware already installed on the associated server.

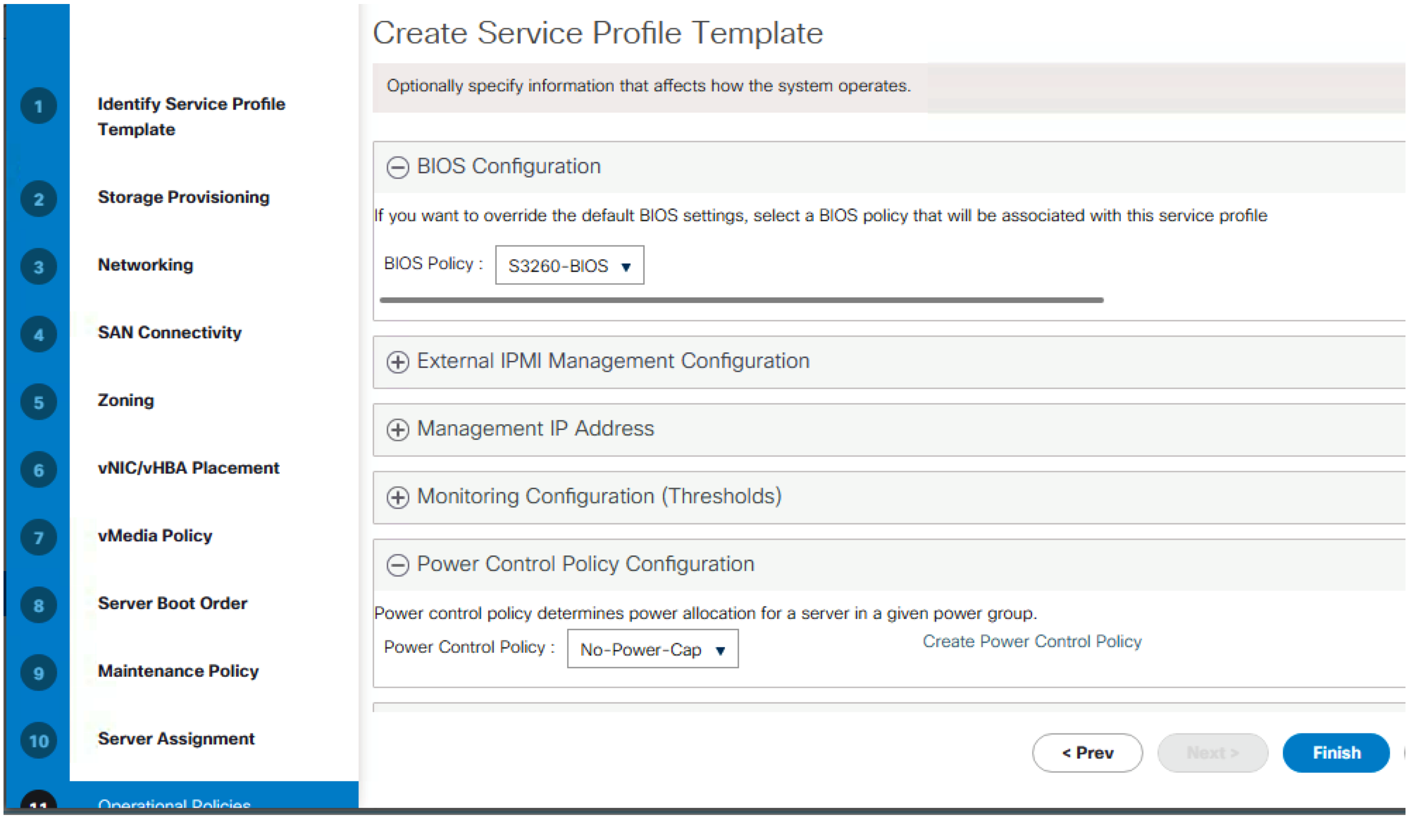
Host Firmware Package: S3260Firmware ▾

3. Click Next.

Configure Operational Policies

To configure the operational policies, complete the following steps:

1. In the BIOS Policy list, select S3260-BIOS.
2. Expand Power Control Policy Configuration and select No-Power-Cap in the Power Control Policy list.



Create Service Profile Template

Optionally specify information that affects how the system operates.

BIOS Configuration

If you want to override the default BIOS settings, select a BIOS policy that will be associated with this service profile

BIOS Policy : S3260-BIOS

Power Control Policy Configuration

Power control policy determines power allocation for a server in a given power group.

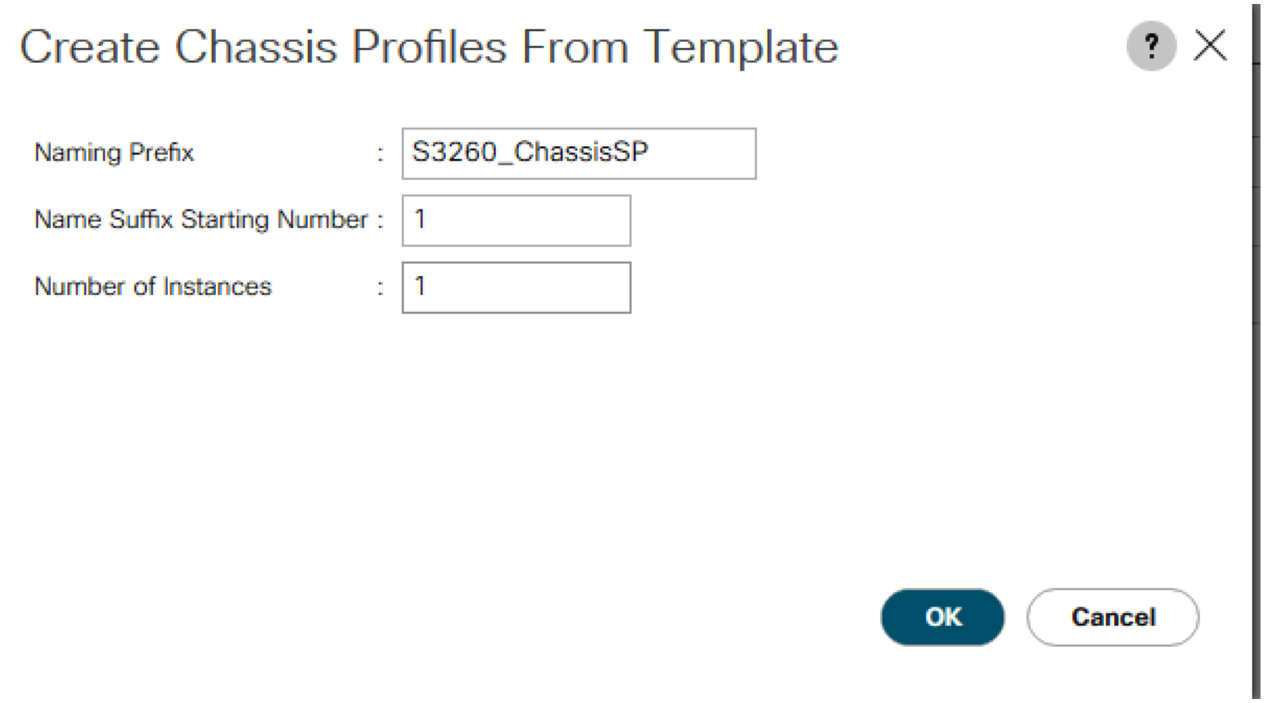
Power Control Policy : No-Power-Cap

3. Click Finish to create the service profile template.
4. Click OK in the confirmation message.

Create Chassis Profile

To create chassis profile from the chassis profile template, complete the following steps:

1. Click the Chassis tab in the navigation pane.
2. Select Chassis Profile Templates > root > Sub-Organizations > Veeam > Chassis Profile Template Chassis_Template.
3. Right-click Chassis Profile Template Chassis_Template and Select Create Chassis Profiles from Template
4. Enter S3260_Chassis_SP as the Chassis profile prefix.
5. Enter 1 as “Name Suffix Starting Number and 1 as Number of Instances.



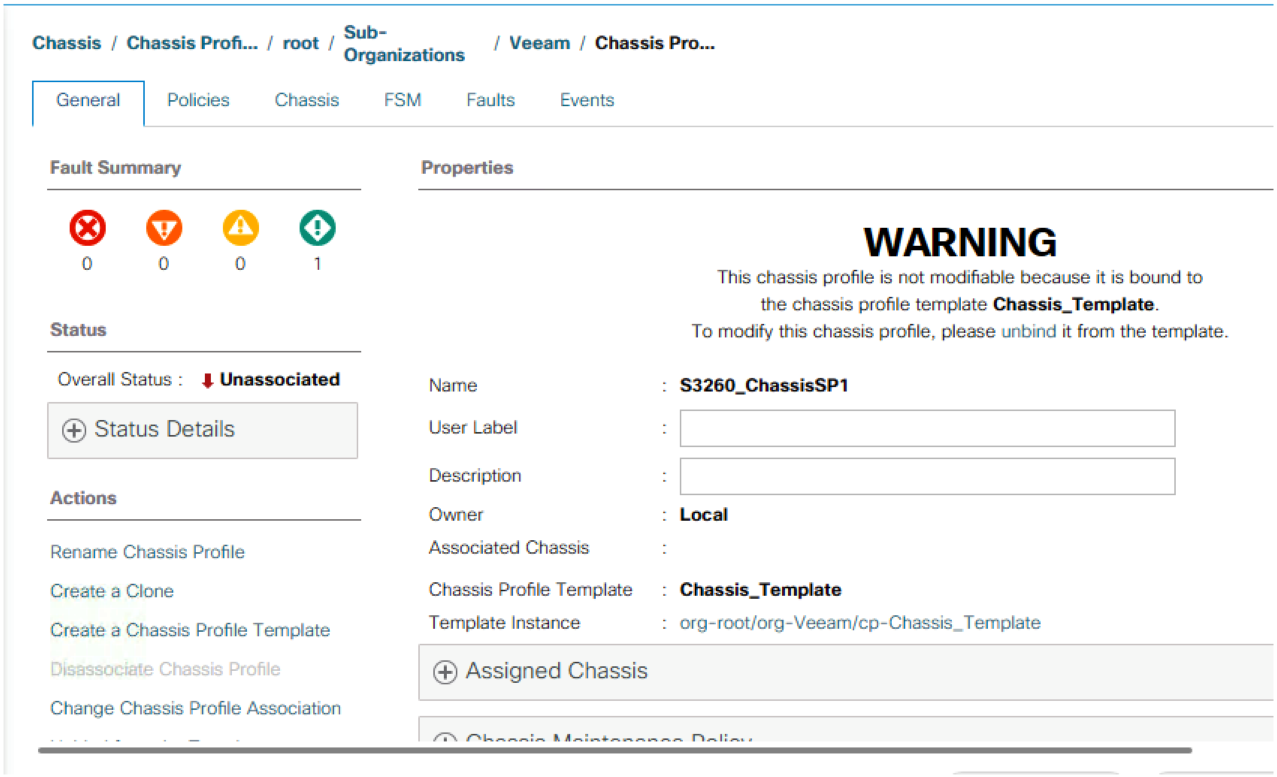
Create Chassis Profiles From Template

Naming Prefix : S3260_ChassisSP

Name Suffix Starting Number : 1

Number of Instances : 1

6. The screenshot below displays S3260_ChassisSP1 under Chassis > root > Sub_organizations > Veeam > Chassis Profile.



Chassis / Chassis Profi... / root / Sub-Organizations / Veeam / Chassis Pro...

Overall Status : Unassociated

WARNING

This chassis profile is not modifiable because it is bound to the chassis profile template **Chassis_Template**.

To modify this chassis profile, please unbind it from the template.

Name : **S3260_ChassisSP1**

User Label :

Description :

Owner : **Local**

Associated Chassis :

Chassis Profile Template : **Chassis_Template**

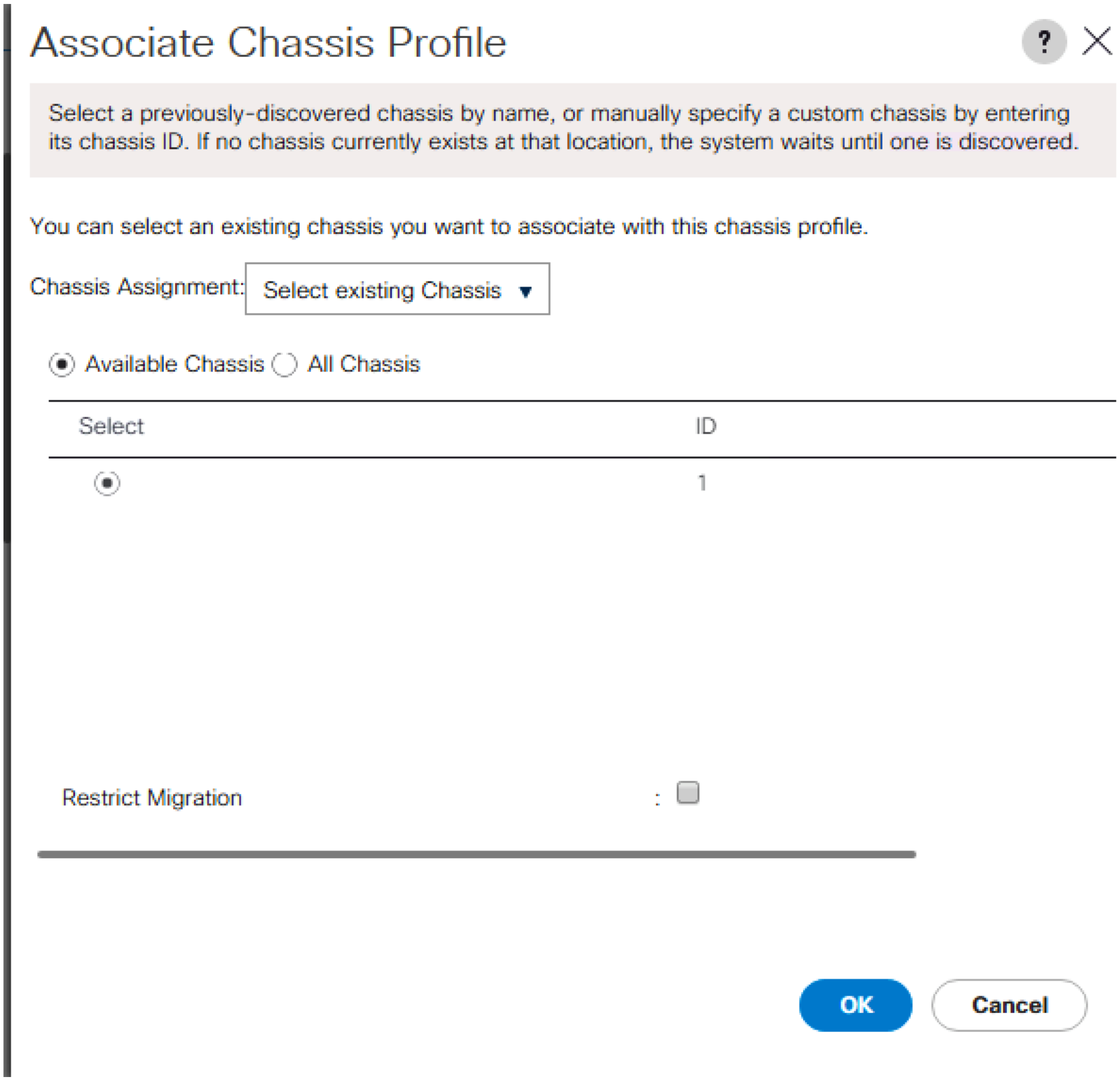
Template Instance : org-root/org-Veeam/cp-Chassis_Template

Associate Chassis Profile to S3260 Chassis

To Associate Chassis Profile to S3260 Chassis, complete the following steps:

1. Click the Chassis tab in the navigation pane.

2. Select Chassis Profiles > root > Sub-Organizations > Veeam.
3. Right-click ‘S3260_Chassis_SP1’ and select Change Chassis Profile Association.
4. In the Assignment tab, Select Existing Chassis.
5. Thereafter select the existing chassis.



Associate Chassis Profile

Select a previously-discovered chassis by name, or manually specify a custom chassis by entering its chassis ID. If no chassis currently exists at that location, the system waits until one is discovered.

You can select an existing chassis you want to associate with this chassis profile.

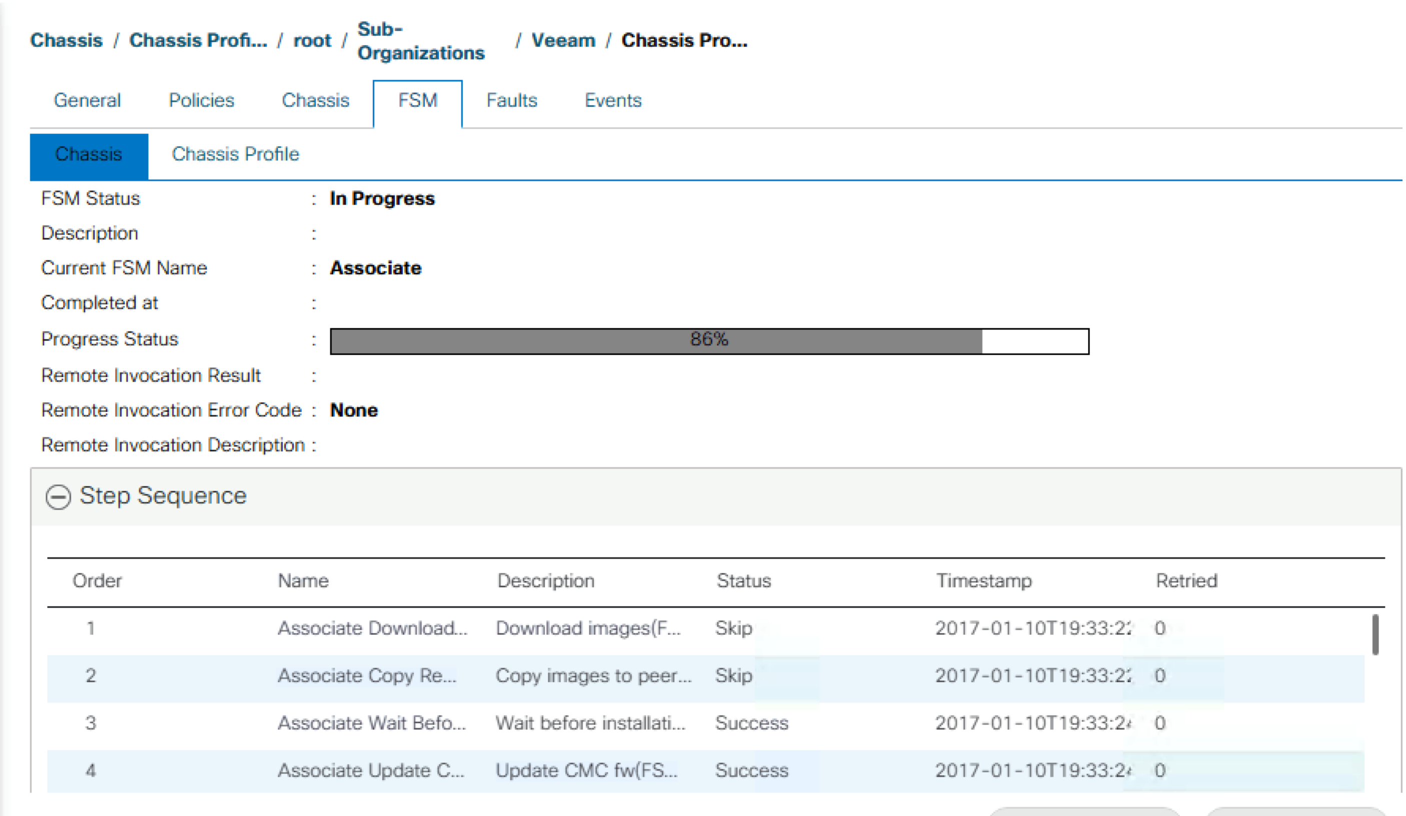
Chassis Assignment: Select existing Chassis ▾

● Available Chassis ○ All Chassis

Select	ID
●	1

Restrict Migration : □

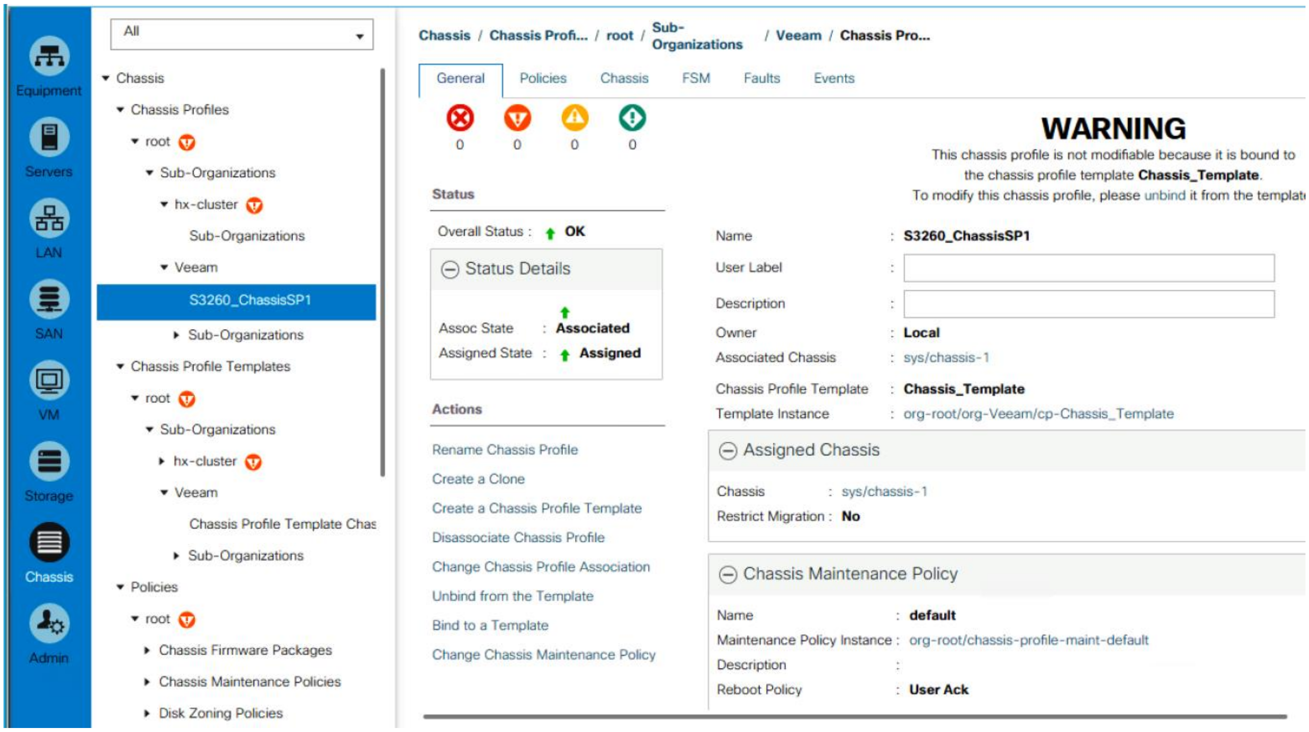
6. Click OK.
7. Since you have selected User Ack for the Maintenance Policy, you need to acknowledge Chassis Reboot for Chassis Profile Association.
8. On FSM Tab you will see the Association Status.


Chassis / Chassis Profi... / root / Sub-Organizations / Veeam / Chassis Pro...
General
Policies
Chassis
FSM
Faults
Events
Chassis
Chassis Profile
Step Sequence

FSM Status : **In Progress**
Description :
Current FSM Name : **Associate**
Completed at :
Progress Status : 86%
Remote Invocation Result :
Remote Invocation Error Code : **None**
Remote Invocation Description :

Order	Name	Description	Status	Timestamp	Retried
1	Associate Download...	Download images(F...	Skip	2017-01-10T19:33:2:	0
2	Associate Copy Re...	Copy images to peer...	Skip	2017-01-10T19:33:2:	0
3	Associate Wait Befo...	Wait before installati...	Success	2017-01-10T19:33:2	0
4	Associate Update C...	Update CMC fw(FS...	Success	2017-01-10T19:33:2	0

9. When the chassis is associated you will see the assigned status as Assigned.



WARNING

This chassis profile is not modifiable because it is bound to the chassis profile template **Chassis_Template**.
To modify this chassis profile, please unbind it from the templat

Status

Overall Status : **OK**

Status Details

Assoc State : **Associated**
Assigned State : **Assigned**

Actions

Name : **S3260_ChassisSP1**
User Label :
Description :
Owner : **Local**
Associated Chassis : sys/chassis-1
Chassis Profile Template : **Chassis_Template**
Template Instance : org-root/org-Veeam/cp-Chassis_Template

Assigned Chassis

Chassis : sys/chassis-1
Restrict Migration : **No**

Chassis Maintenance Policy

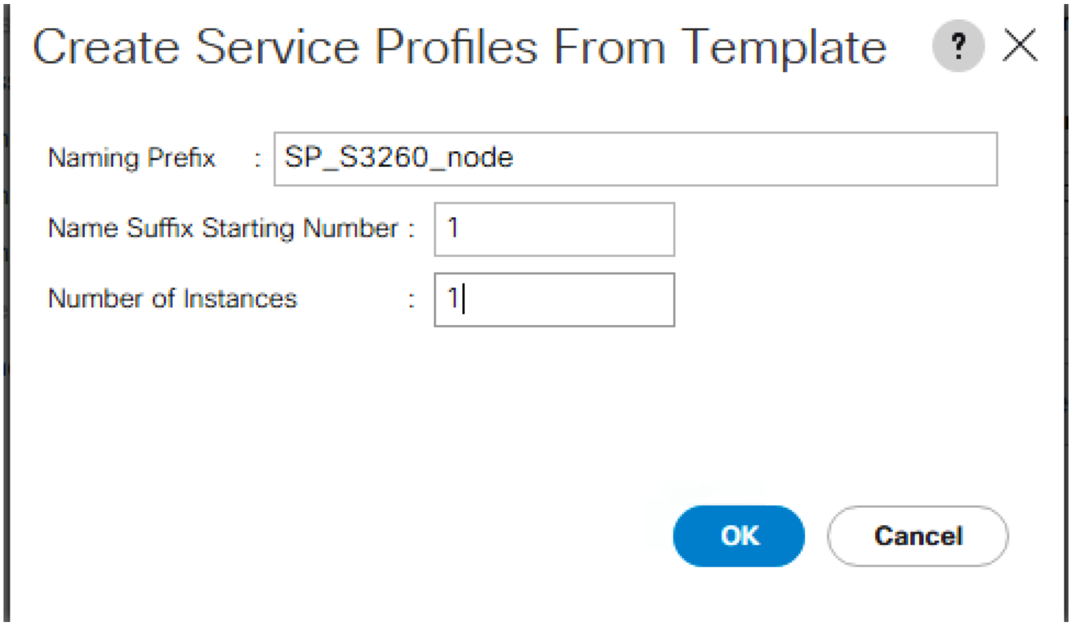
Name : **default**
Maintenance Policy Instance : org-root/chassis-profile-maint-default
Description :
Reboot Policy : **User Ack**

Create Service Profiles

This section describes how to associate the Compute Node on S3260 Storage server to a Service Profile.

To create service profiles from the service profile template, complete the following steps:

1. On Servers tab in the navigation pane.
2. Select Service Profile Templates > root > Sub-Organizations > Veeam > Service Template. S3260_SP_Template.
3. Right-click S3260_SP_Template and select Create Service Profiles from Template.
4. Enter SP_S3260_node as the service profile prefix.
5. Enter 1 as “Name Suffix Starting Number.”
6. Enter 1 as the “Number of Instances.”
7. Click OK to create the service profile.



Create Service Profiles From Template

Naming Prefix : SP_S3260_node

Name Suffix Starting Number : 1

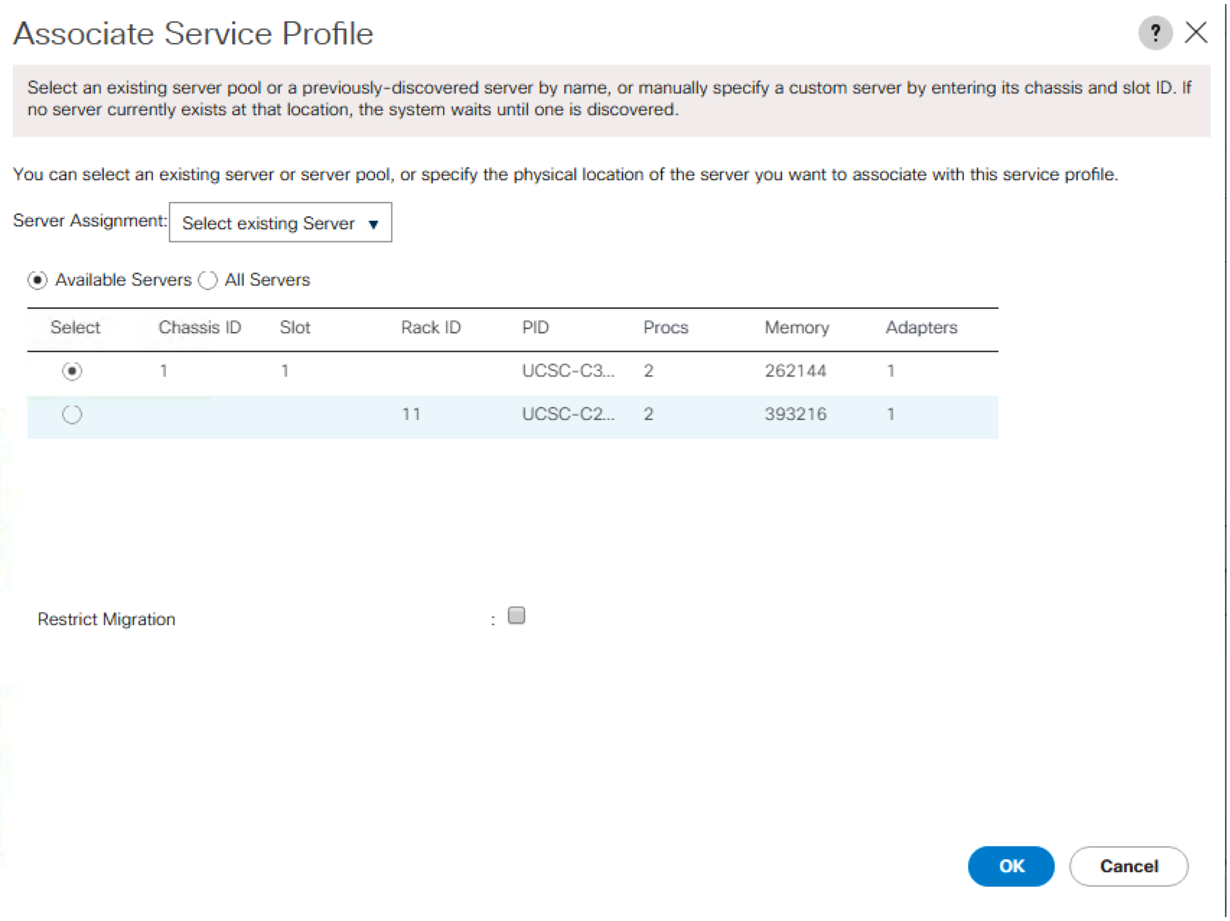
Number of Instances : 1

8. Click OK in the confirmation message.

Associate Service Profile to Server Node of S3260 Chassis

To Associate Service Profile to server node of S3260 Chassis, complete the following steps:

1. Click the Chassis tab in the navigation pane.
2. Select Service Profiles > root > Sub-Organizations > Veeam.
3. Right-click ‘SP_S3260_node1” and select Change Service Profile Association.
4. In the Assignment tab, Select Existing Chassis.
5. In the Associate Service Profile Window, select the M4 node for S3260 Chassis.
6. Click OK.



Associate Service Profile

Select an existing server pool or a previously-discovered server by name, or manually specify a custom server by entering its chassis and slot ID. If no server currently exists at that location, the system waits until one is discovered.

You can select an existing server or server pool, or specify the physical location of the server you want to associate with this service profile.

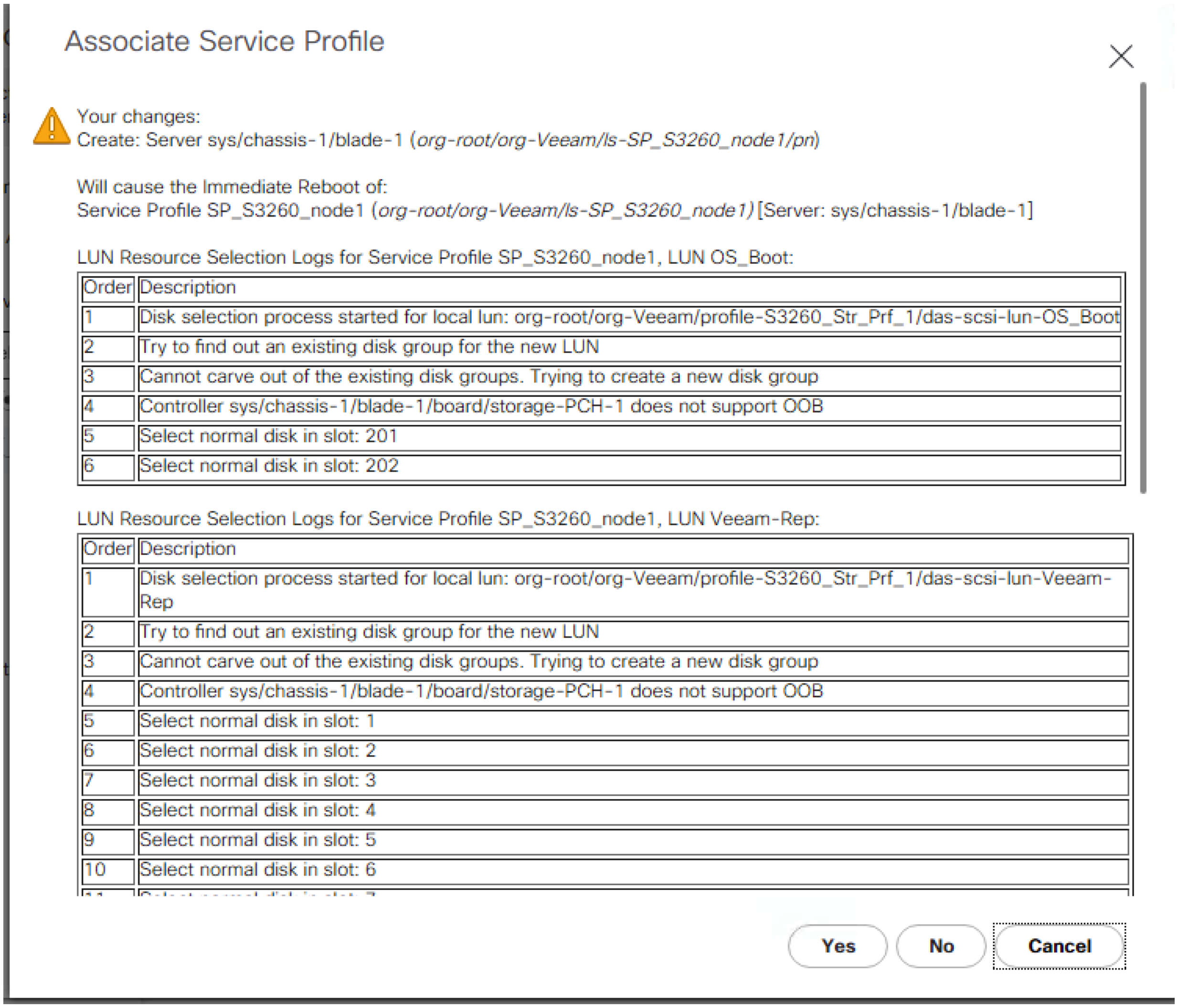
Server Assignment: Select existing Server ▾

● Available Servers ○ All Servers

Select	Chassis ID	Slot	Rack ID	PID	Procs	Memory	Adapters
●	1	1		UCSC-C3...	2	262144	1
○			11	UCSC-C2...	2	393216	1

Restrict Migration : □

7. A warning displays, click Yes.



Associate Service Profile

Your changes:
Create: Server sys/chassis-1/blade-1 (*org-root/org-Veeam/ls-SP_S3260_node1/pn*)

Will cause the Immediate Reboot of:
Service Profile SP_S3260_node1 (*org-root/org-Veeam/ls-SP_S3260_node1*) [Server: sys/chassis-1/blade-1]

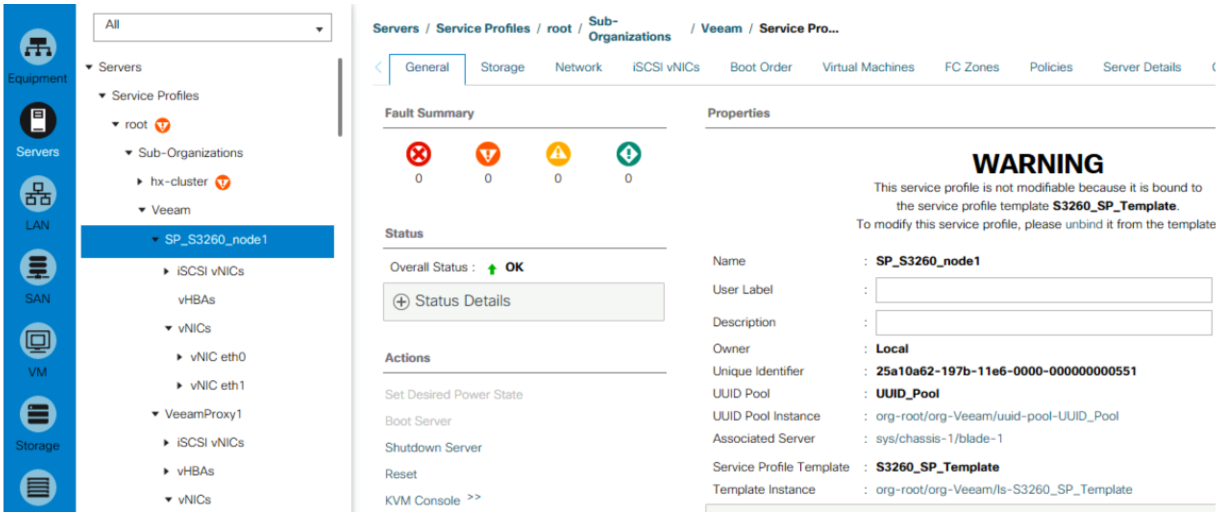
LUN Resource Selection Logs for Service Profile SP_S3260_node1, LUN OS_Boot:

Order	Description
1	Disk selection process started for local lun: org-root/org-Veeam/profile-S3260_Str_Prf_1/das-scsi-lun-OS_Boot
2	Try to find out an existing disk group for the new LUN
3	Cannot carve out of the existing disk groups. Trying to create a new disk group
4	Controller sys/chassis-1/blade-1/board/storage-PCH-1 does not support OOB
5	Select normal disk in slot: 201
6	Select normal disk in slot: 202

LUN Resource Selection Logs for Service Profile SP_S3260_node1, LUN Veeam-Rep:

Order	Description
1	Disk selection process started for local lun: org-root/org-Veeam/profile-S3260_Str_Prf_1/das-scsi-lun-Veeam-Rep
2	Try to find out an existing disk group for the new LUN
3	Cannot carve out of the existing disk groups. Trying to create a new disk group
4	Controller sys/chassis-1/blade-1/board/storage-PCH-1 does not support OOB
5	Select normal disk in slot: 1
6	Select normal disk in slot: 2
7	Select normal disk in slot: 3
8	Select normal disk in slot: 4
9	Select normal disk in slot: 5
10	Select normal disk in slot: 6
11	Select normal disk in slot: 7

8. When Service Profile Association is complete, confirm that the overall status is OK.

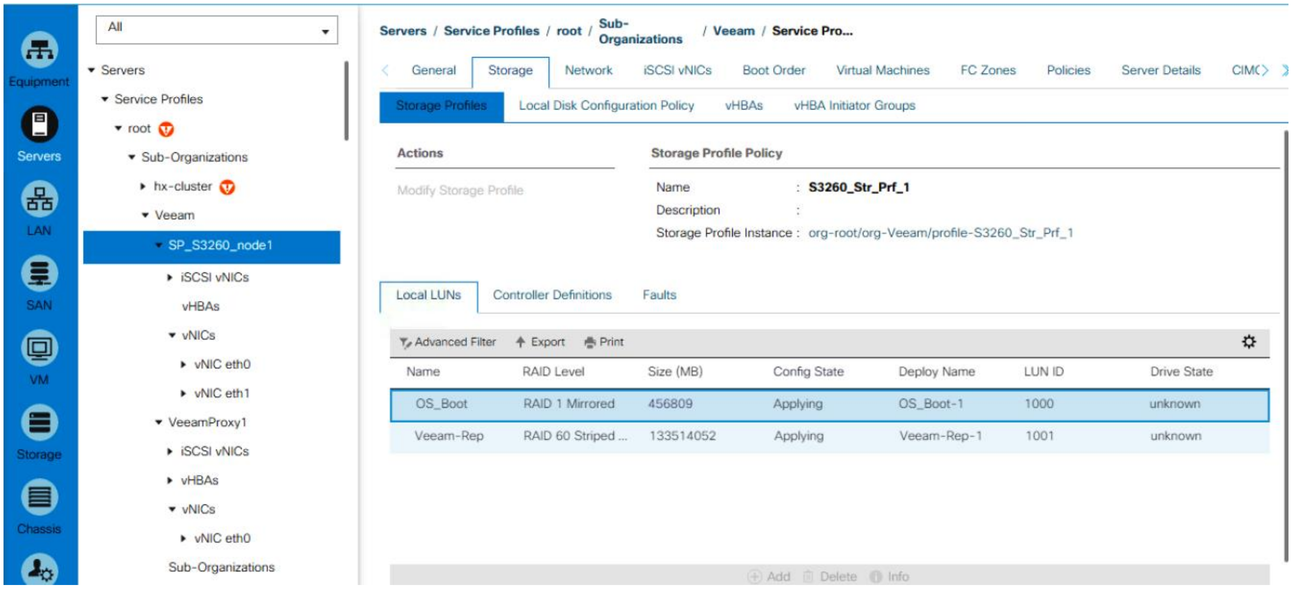


Overall Status : OK

WARNING
This service profile is not modifiable because it is bound to the service profile template **S3260_SP_Template**.
To modify this service profile, please unbind it from the template

Name : **SP_S3260_node1**
User Label :
Description :
Owner : **Local**
Unique Identifier : **25a10a62-197b-11e6-0000-000000000551**
UUID Pool : **UUID_Pool**
UUID Pool Instance : org-root/org-Veeam/uuid-pool-UUID_Pool
Associated Server : sys/chassis-1/blade-1
Service Profile Template : **S3260_SP_Template**
Template Instance : org-root/org-Veeam/ls-S3260_SP_Template

9. Verify the Boot LUN and Veeam Repository LUN under Storage tab of Service Profile.



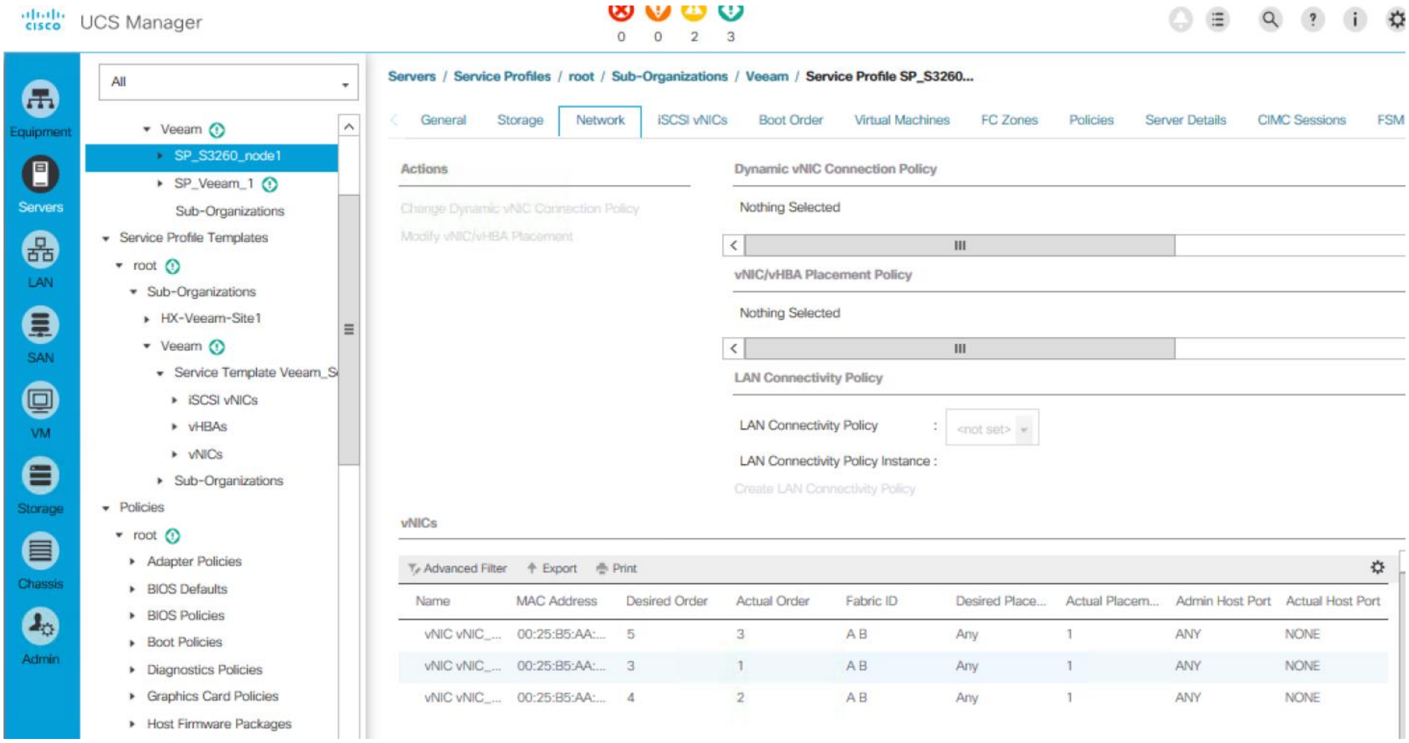
Servers / Service Profiles / root / Sub-Organizations / Veeam / Service Pro...

Storage Profile Policy

Name : S3260_Str_Prf_1
Description :
Storage Profile Instance : org-root/org-Veeam/profile-S3260_Str_Prf_1

Name	RAID Level	Size (MB)	Config State	Deploy Name	LUN ID	Drive State
OS_Boot	RAID 1 Mirrored	456809	Applying	OS_Boot-1	1000	unknown
Veeam-Rep	RAID 60 Striped ...	133514052	Applying	Veeam-Rep-1	1001	unknown

10. Verify Service Profile has 3 vNICs.



Servers / Service Profiles / root / Sub-Organizations / Veeam / Service Profile SP_S3260...

Dynamic vNIC Connection Policy

Nothing Selected

vNIC/vHBA Placement Policy

Nothing Selected

LAN Connectivity Policy

LAN Connectivity Policy : <not set>
LAN Connectivity Policy Instance :

vNICs

Name	MAC Address	Desired Order	Actual Order	Fabric ID	Desired Place...	Actual Placem...	Admin Host Port	Actual Host Port
vNIC vNIC_...	00:25:B5:AA:...	5	3	A B	Any	1	ANY	NONE
vNIC vNIC_...	00:25:B5:AA:...	3	1	A B	Any	1	ANY	NONE
vNIC vNIC_...	00:25:B5:AA:...	4	2	A B	Any	1	ANY	NONE

Veeam Availability Suite 9.5 Installation

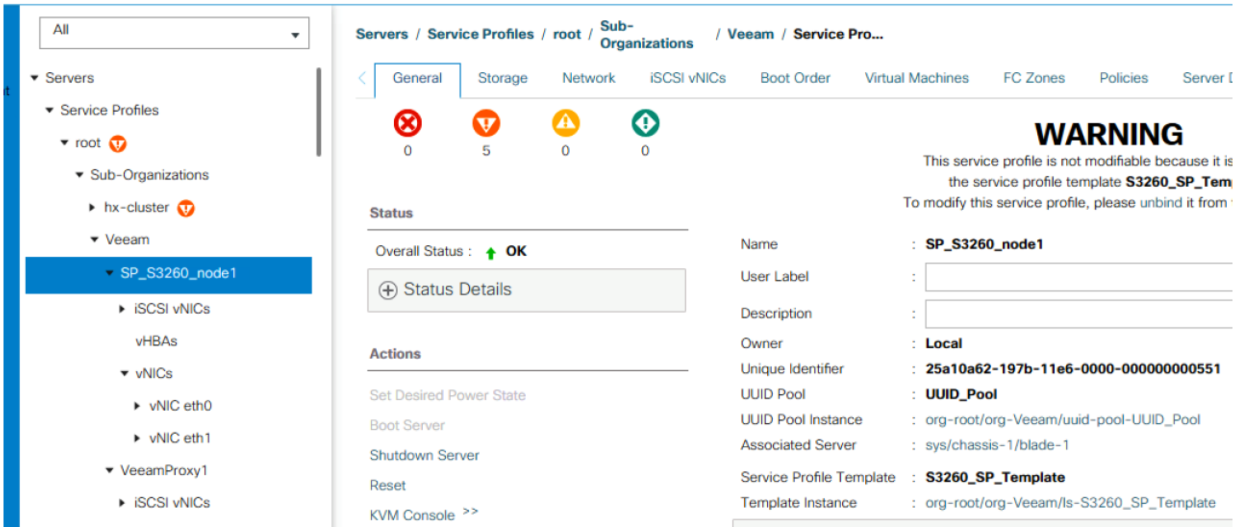
This section details the installation and configuration of Veeam Availability Suite 9.5 on Cisco UCS S3260 storage server node. The important high-level steps are as follows:

- Install and configure Windows 2016 on S3260 server node
- Install Veeam Availability Suite 9.5
- Configure Backup Infrastructure for Veeam Availability Suite

Install and Configure Windows 2016

To install and configure Windows 2016, complete the following steps:

1. In the Navigation pane, select Server tab.
2. In the Servers tab, expand Service Profiles > root > Sub-Organizations > Veeam >SP_S3260_node1.
3. Click KVM console and open the *.jnlp with java webstart.

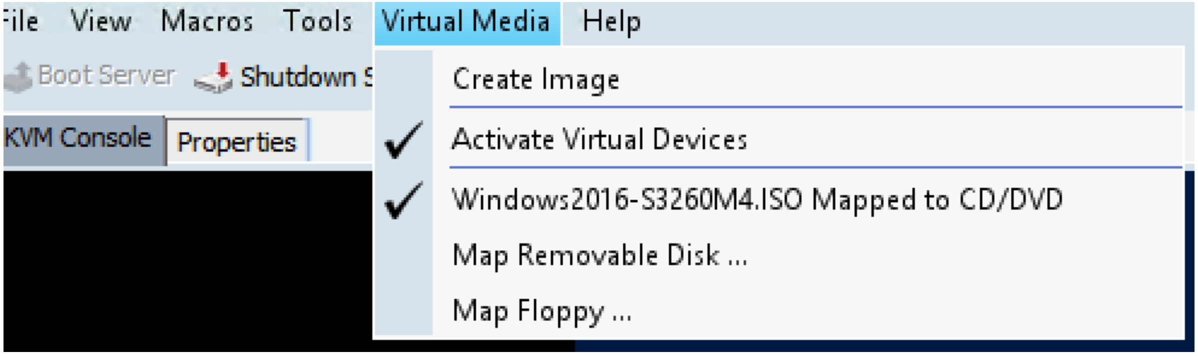


WARNING

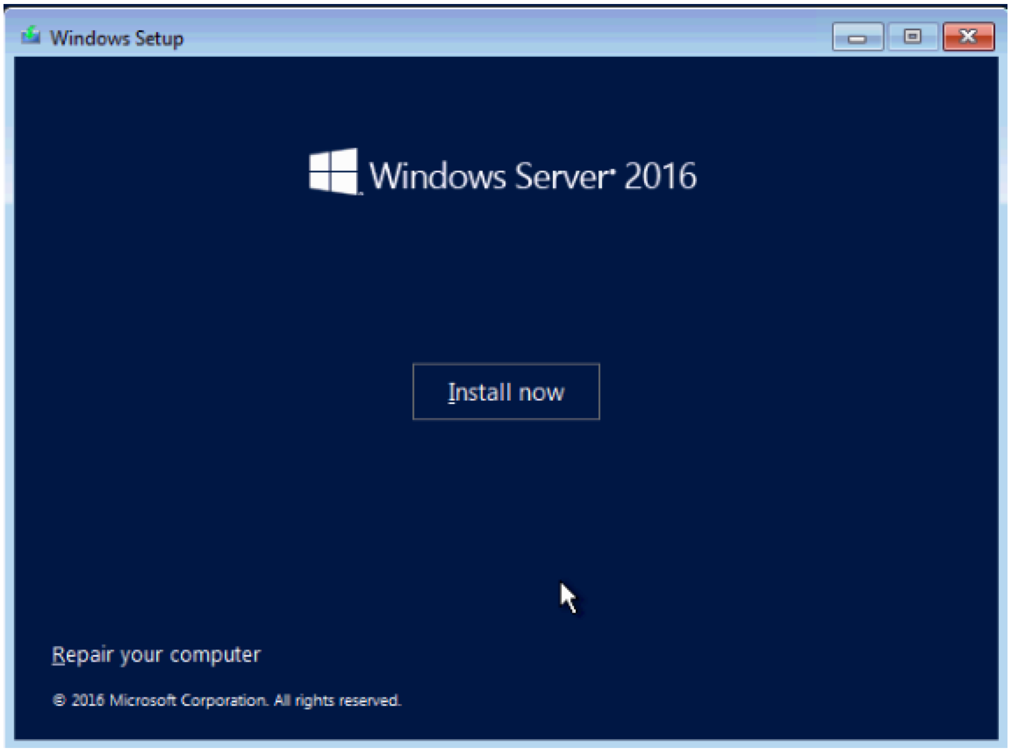
This service profile is not modifiable because it is
the service profile template **S3260_SP_Tem**
To modify this service profile, please unbind it from

Name : **SP_S3260_node1**
User Label :
Description :
Owner : **Local**
Unique Identifier : **25a10a62-197b-11e6-0000-000000000551**
UUID Pool : **UUID_Pool**
UUID Pool Instance : org-root/org-Veeam/uuid-pool-UUID_Pool
Associated Server : sys/chassis-1/blade-1
Service Profile Template : **S3260_SP_Template**
Template Instance : org-root/org-Veeam/ls-S3260_SP_Template

4. In KVM Console, go to the Virtual Media tab and select Activate Virtual Devices.
5. On the Virtual Media tab, select MAP CD/DVD and browse to Windows 2016 Installer and Map Device.



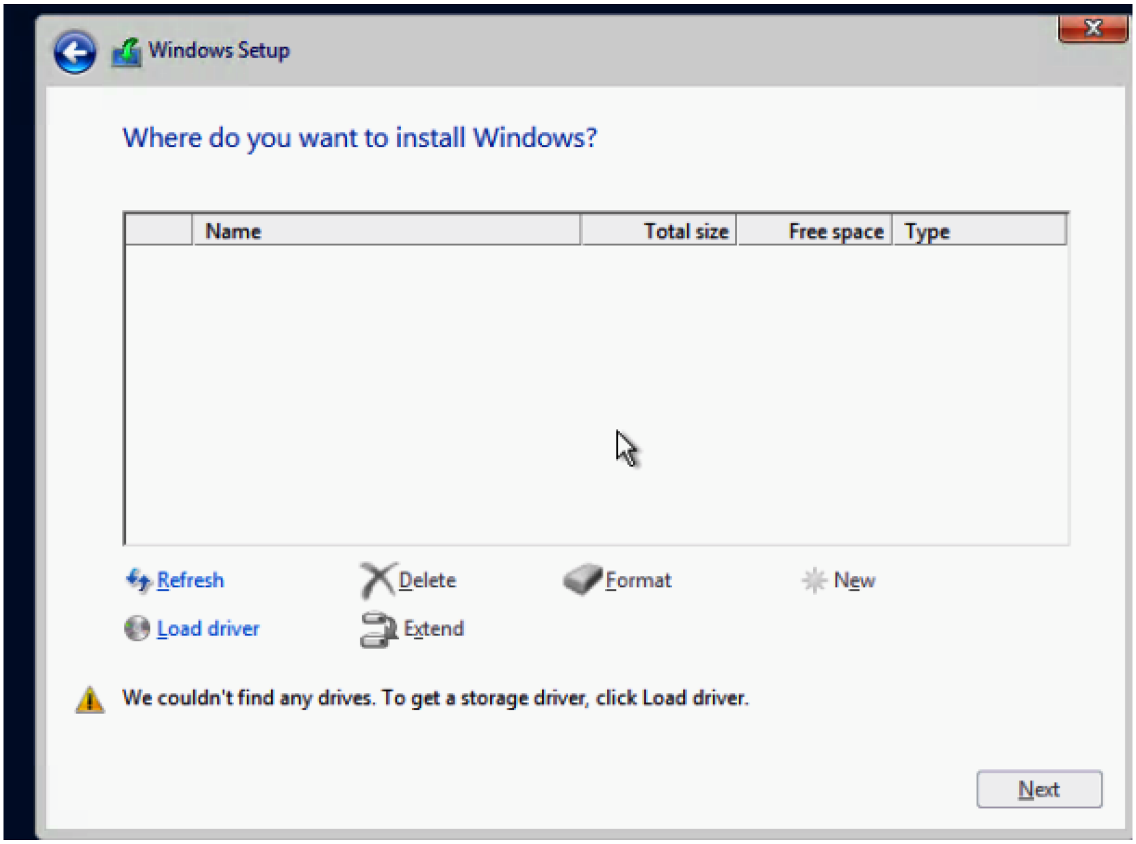
6. Reset the server and wait for the ISO image to load.
7. Install Windows 2016.



Load Driver for S3260 RAID Controller

To load the RAID Controller driver S3260, complete the following steps:

1. On the Screen ‘Where do you want to install Windows?’ click Load Driver.

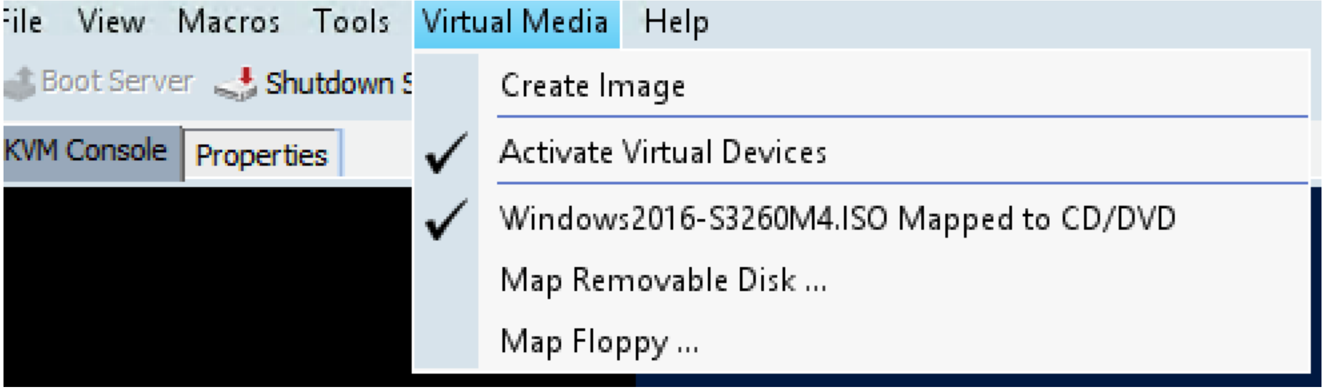


Where do you want to install Windows?

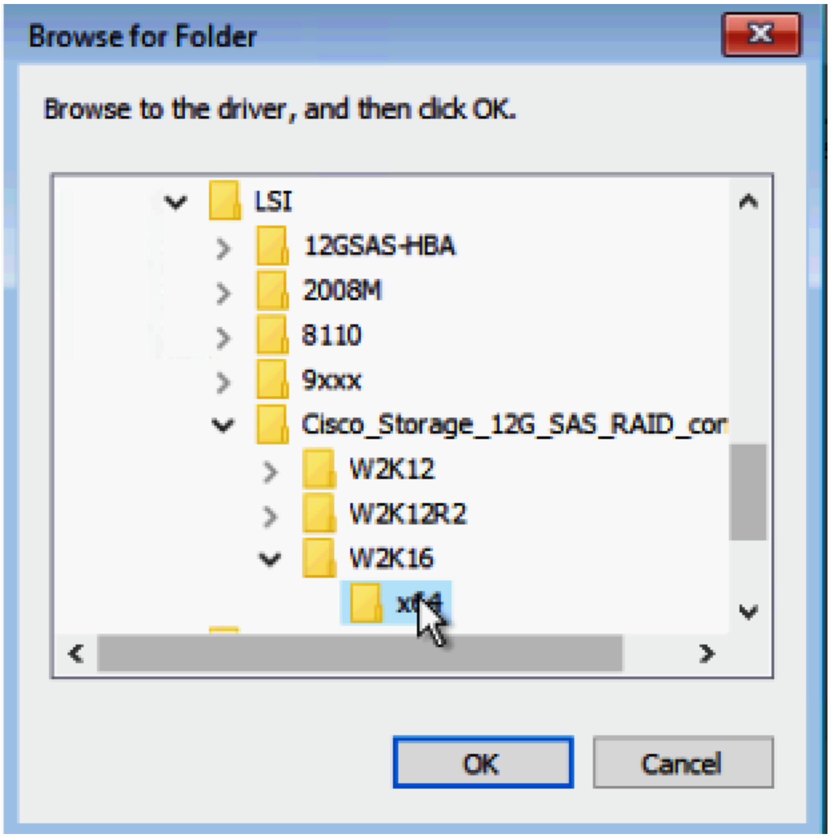
We couldn't find any drives. To get a storage driver, click Load driver.

2. In Cisco UCS Manager, click the LAN tab in the navigation pane.

3. In Virtual Media, un-map the Windows installer ISO and map the S3260 drivers ISO. The drivers for S3260 can be downloaded from www.cisco.com at location > Downloads Home Products Servers > Unified Computing > UCS C-Series Rack-Mount UCS-Managed Server Software > Unified Computing System (UCS) Drivers-3.0(1a).



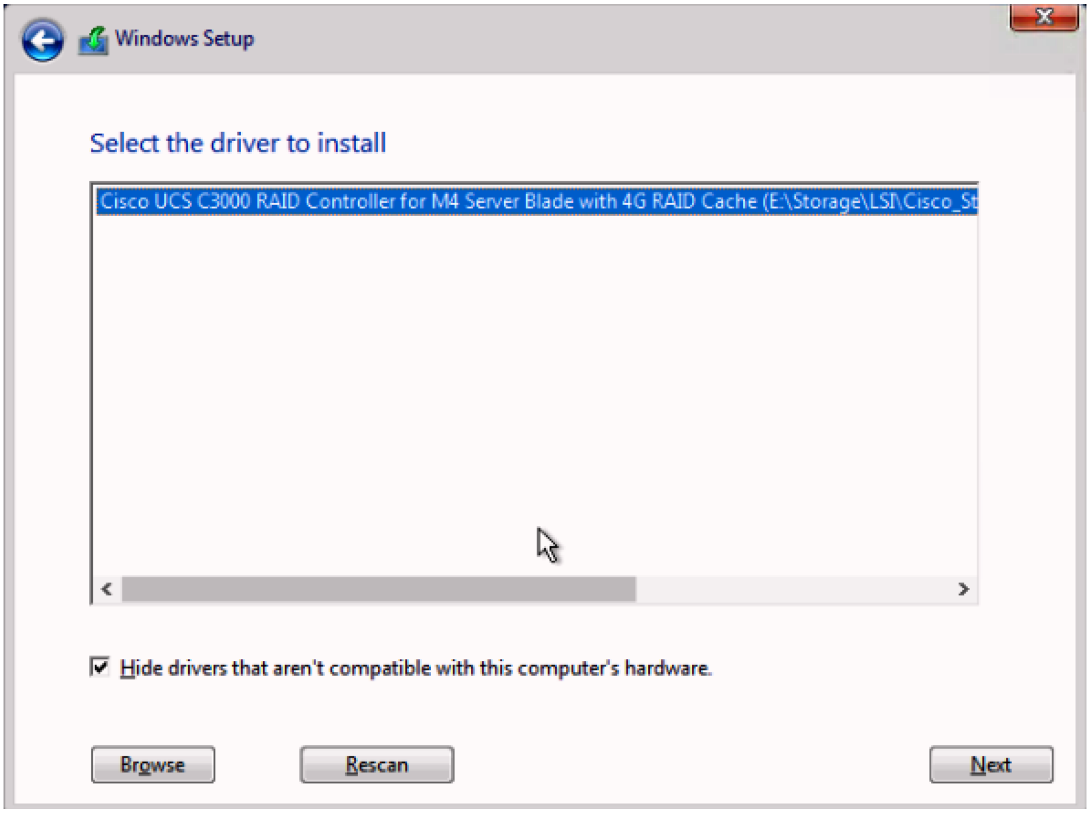
4. Click Browse and navigate to the location of the driver as shown in screenshot below:



Browse for Folder

Browse to the driver, and then click OK.

5. Click Rescan and view the correct RAID Controller driver in the "Select the driver to install" window.



Windows Setup

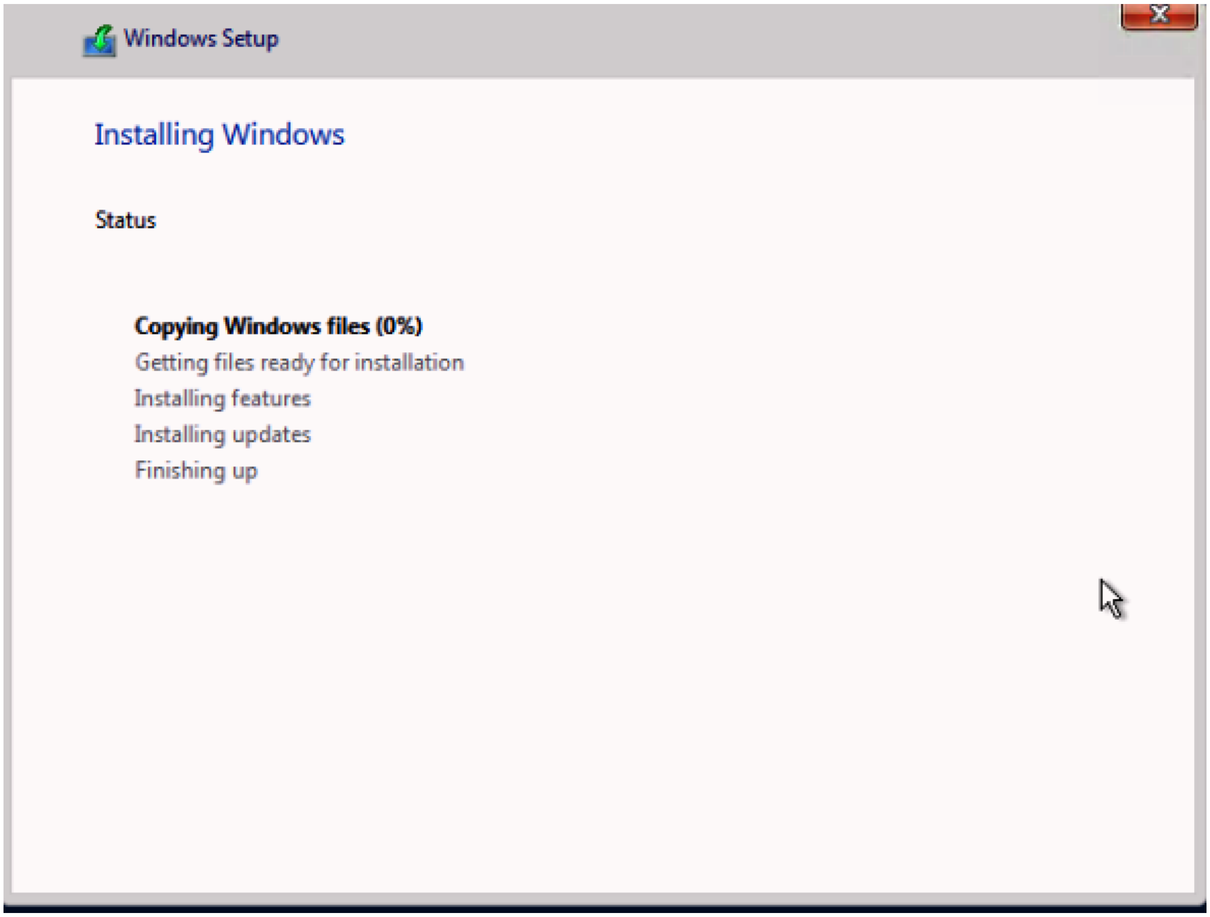
Select the driver to install

Cisco UCS C3000 RAID Controller for M4 Server Blade with 4G RAID Cache (E:\Storage\LSI\Cisco_St

☑ Hide drivers that aren't compatible with this computer's hardware.

6. Click Next to install the driver.

7. Return to ‘Where do you want to install Windows’ screen, uncheck the driver ISO image and re-map the Windows Installer Image.
8. Click Refresh.
9. Select the Drive2. This drive is RAID1 config created from the two SSD in the rear of S3260 chassis for OS installation through Storage Profile in the Cisco UCS Service Profile. Drive3 is the RAID60 configuration created from the top load SAS drives for Veeam Repository.
10. Click Next.



Windows Setup

Installing Windows

Status

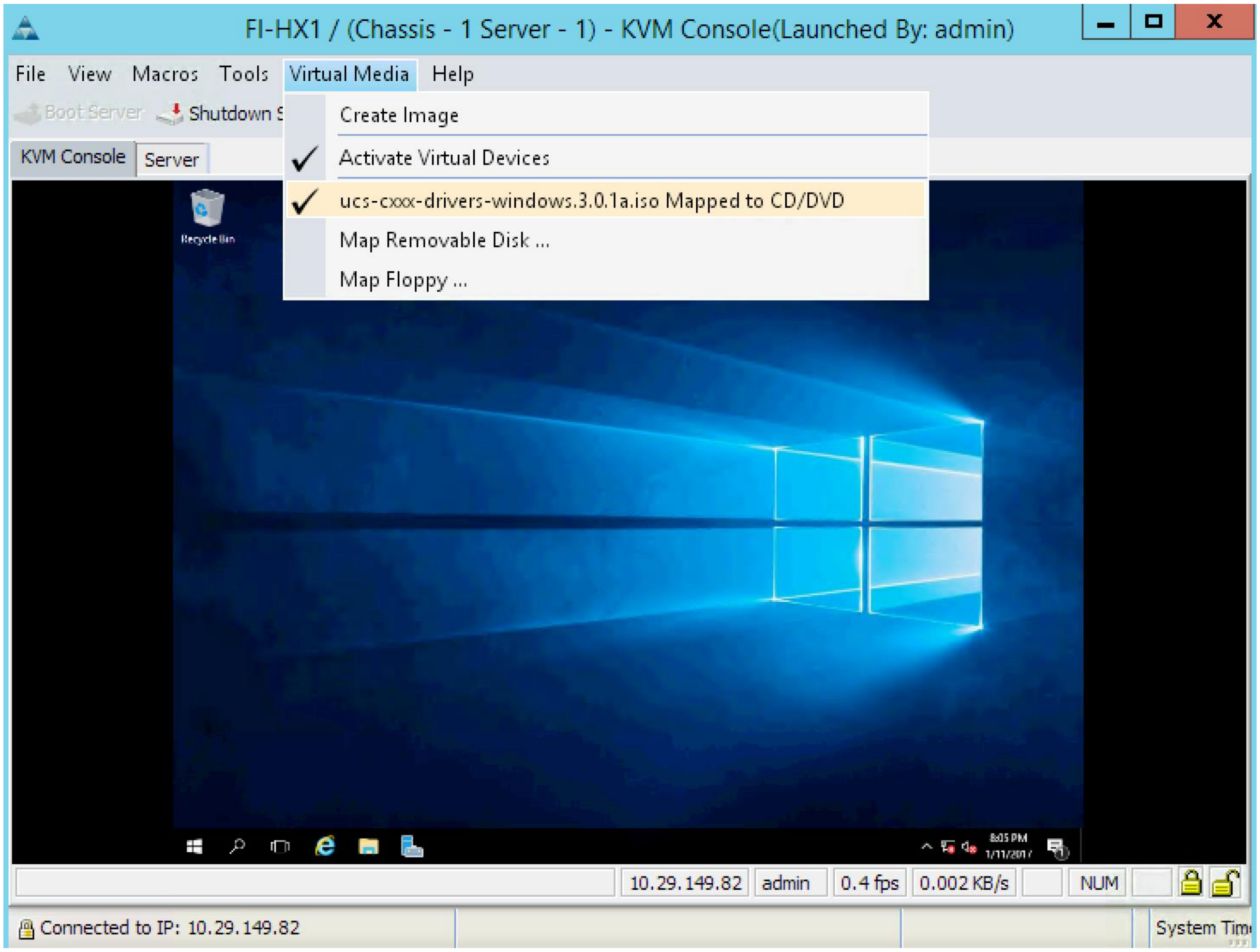
Copying Windows files (0%)
Getting files ready for installation
Installing features
Installing updates
Finishing up

11. When the installation completes, proceed to the following section, Update Cisco VIC Driver for Windows 2016.

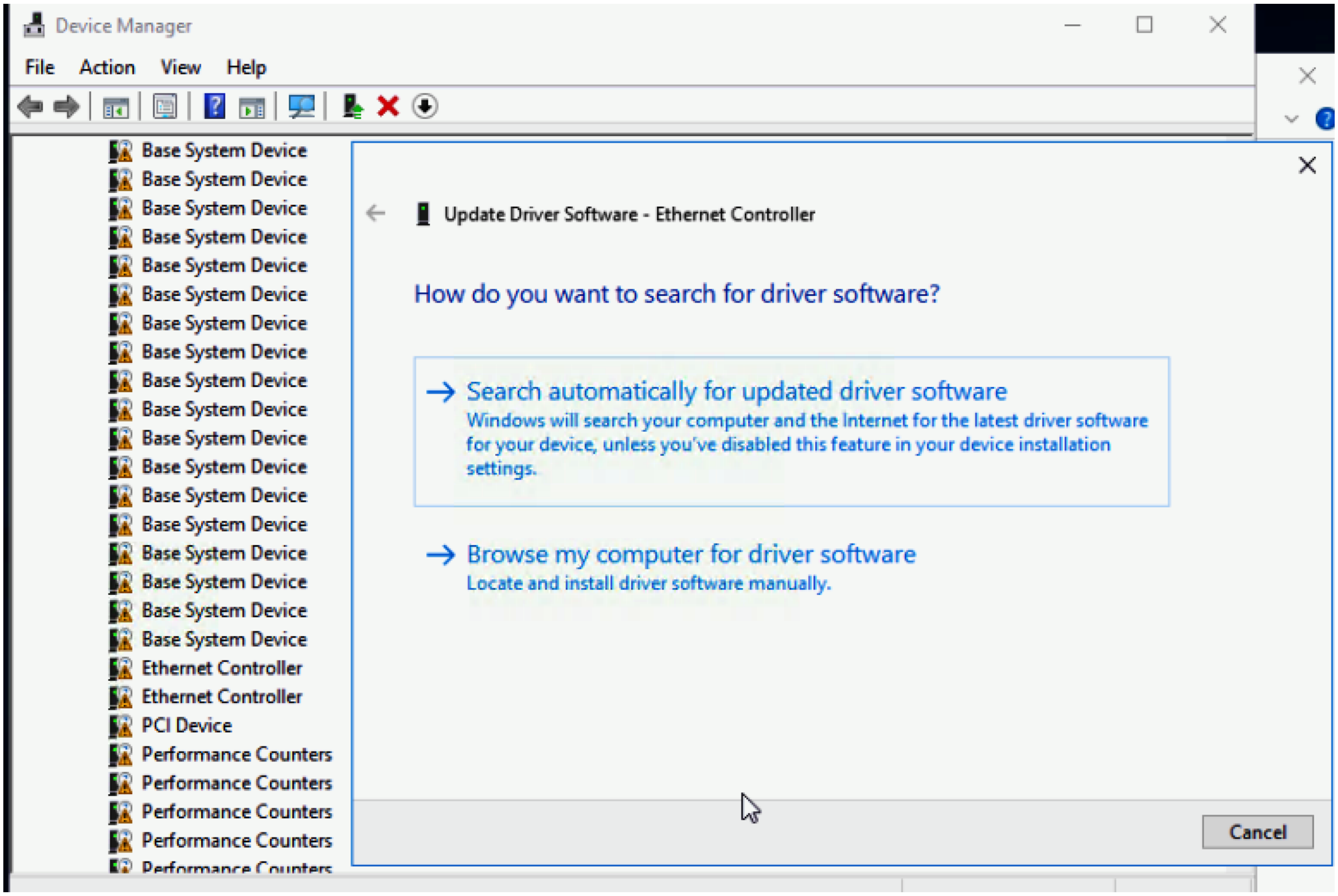
Update Cisco VIC Driver for Windows 2016

To update the Cisco VIC driver for Windows 2016, complete the following steps:

1. Open the UCS KVM Console and login to Windows 2016 installed on S3260 Storage Server.
2. Map the S3260 drivers through Map CD/DVD option under the Virtual Media tab in the KVM Console.
3. The S3260 drivers are located in the section ‘Load Drivers for S3260 RAID Controller.’



4. In Windows 2016, go to Control Panel > Device Manager.
5. Select Ethernet Controller and Select Update Driver.



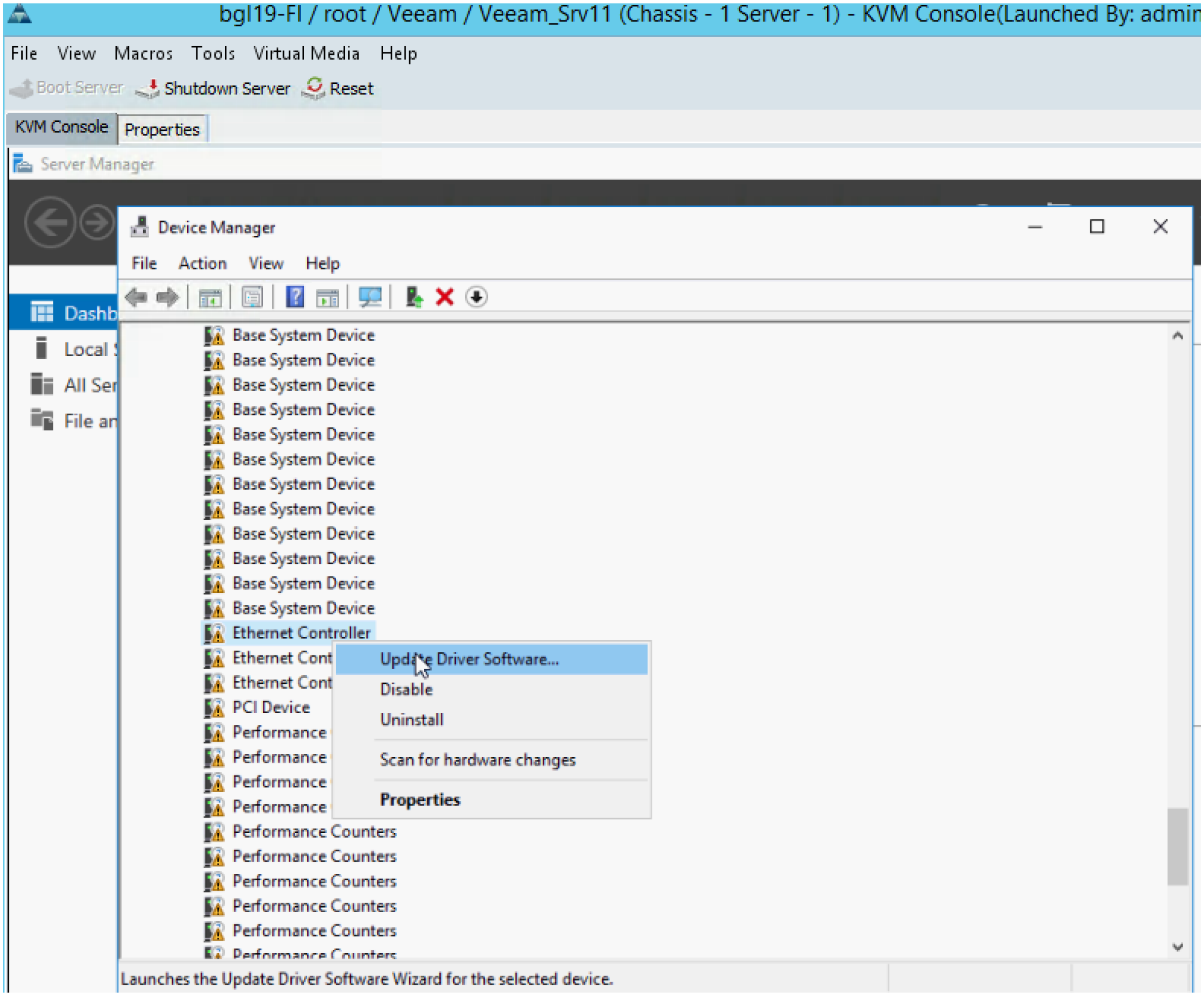
Update Driver Software - Ethernet Controller

How do you want to search for driver software?

→ Search automatically for updated driver software
Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.

→ Browse my computer for driver software
Locate and install driver software manually.

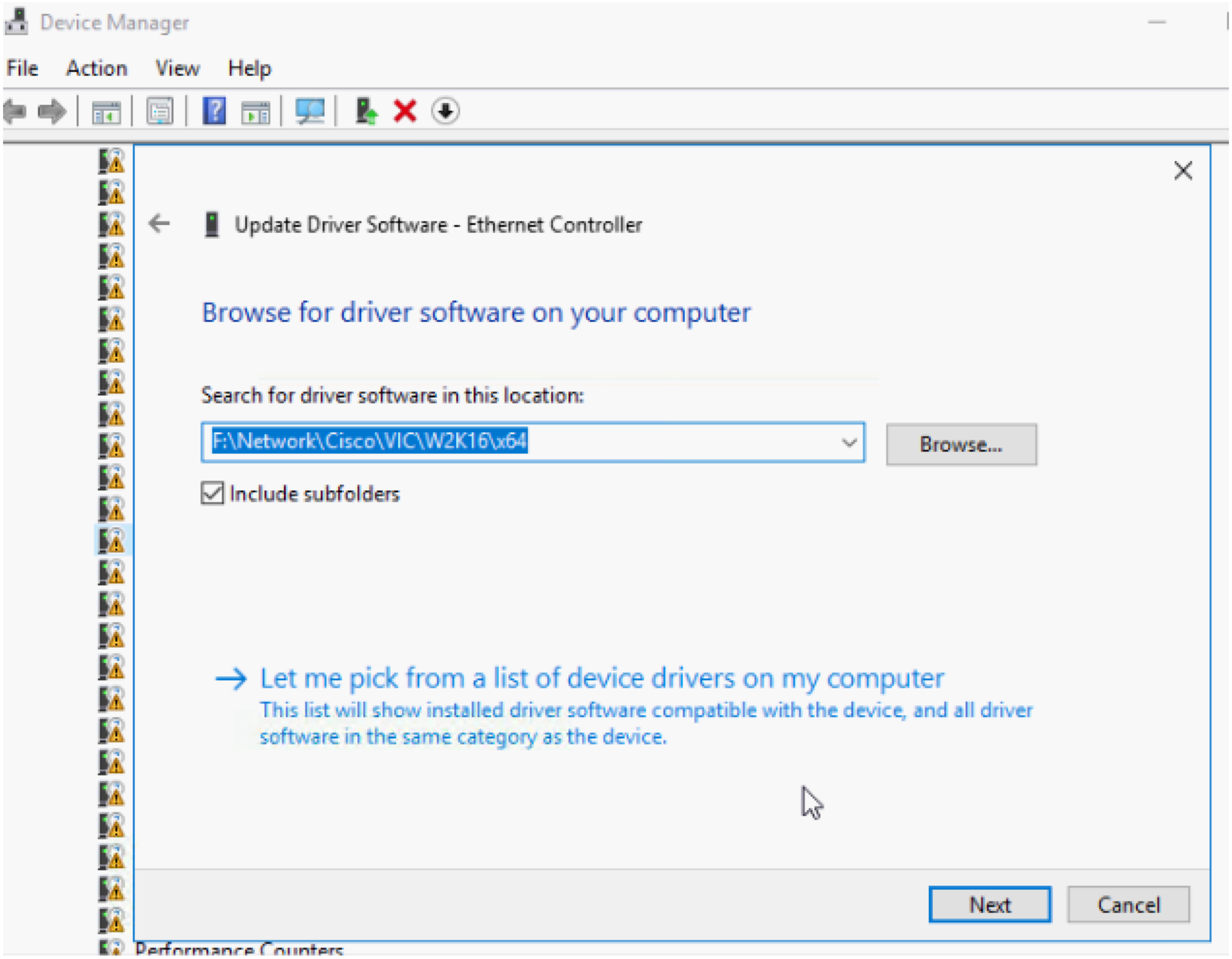
6. Select for ‘Browse for Driver in My Computer.’
7. Select DVD Driver as mapped through Virtual Media in KVM Console and browse to \Network\Cisco\VIC\W2K16\x64.



bgl19-FI / root / Veeam / Veeam_Srv11 (Chassis - 1 Server - 1) - KVM Console(Launched By: admin

Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Base System Device
Ethernet Controller
Ethernet Cont
Ethernet Cont
PCI Device
Performance
Performance
Performance
Performance
Performance Counters
Performance Counters
Performance Counters
Performance Counters
Performance Counters
Performance Counters

Launches the Update Driver Software Wizard for the selected device.



Update Driver Software - Ethernet Controller

Browse for driver software on your computer

Search for driver software in this location:

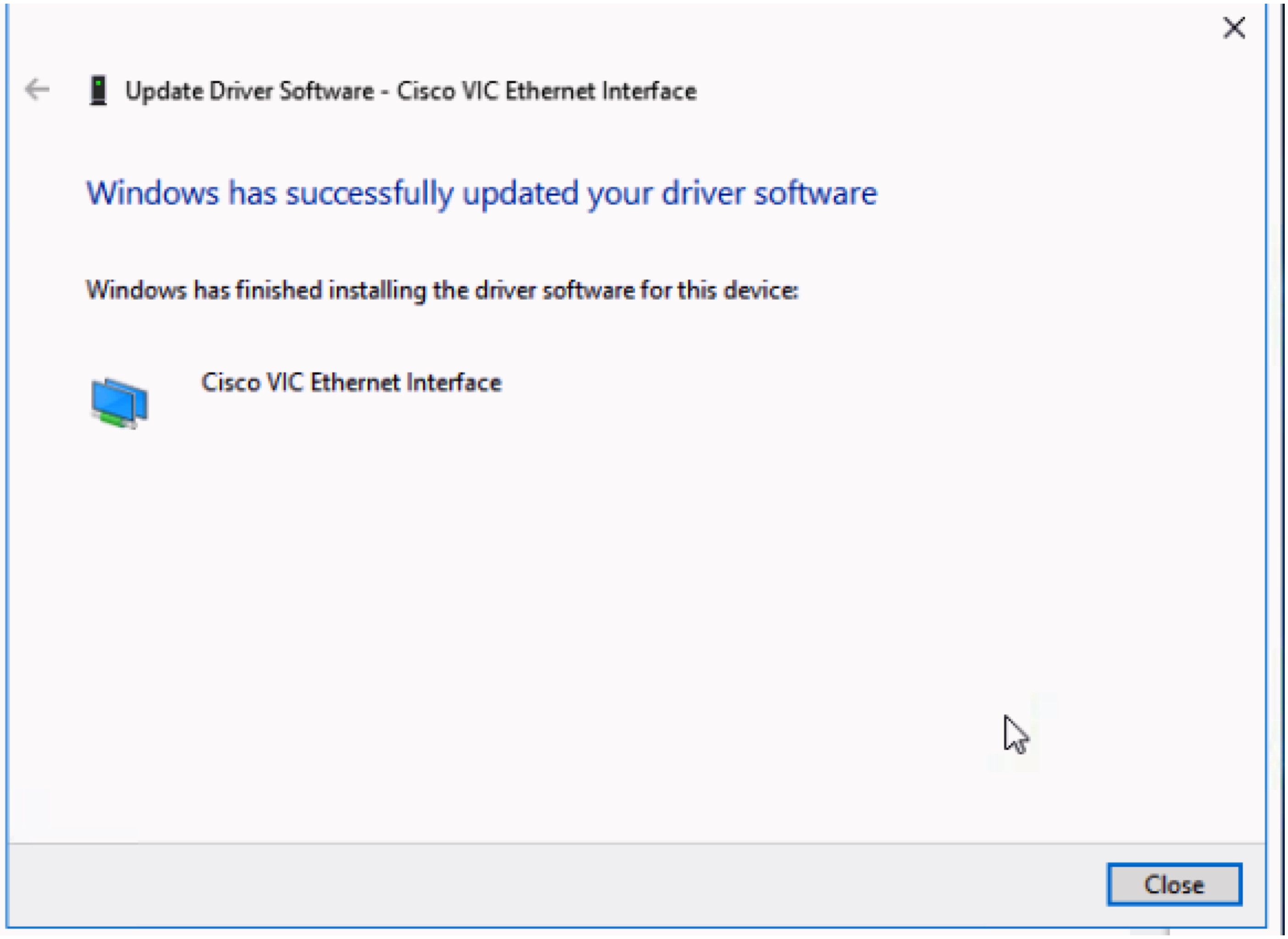
F:\Network\Cisco\VIC\W2K16\x64

☑ Include subfolders

→ Let me pick from a list of device drivers on my computer

This list will show installed driver software compatible with the device, and all driver software in the same category as the device.

8. Click Next to install the Cisco VIC Ethernet Interface driver.



Windows has successfully updated your driver software

Windows has finished installing the driver software for this device:

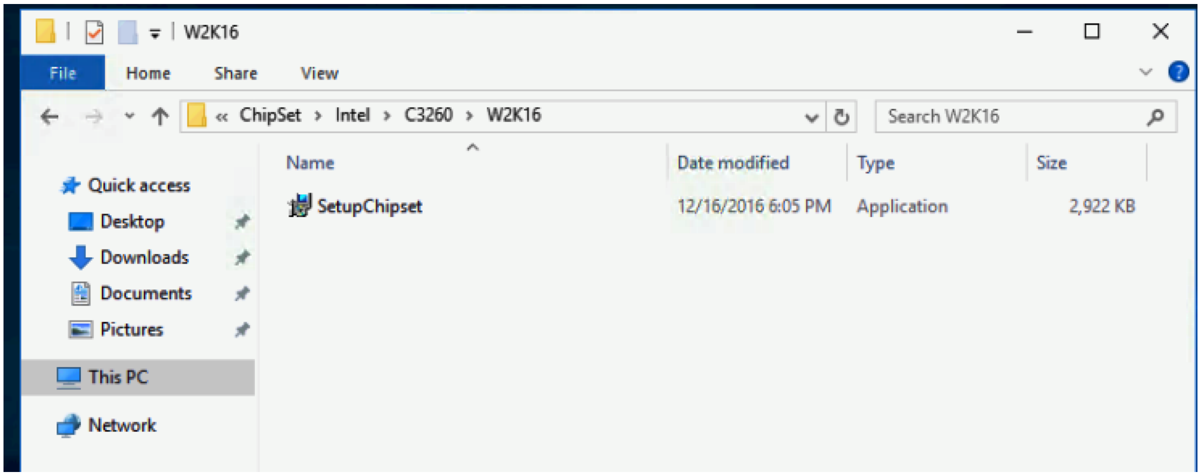
Cisco VIC Ethernet Interface

9. Follow steps 5 through 8 to install the driver for the other two VIC Ethernet interface.

Update Intel ChipSet Driver for Windows 2016

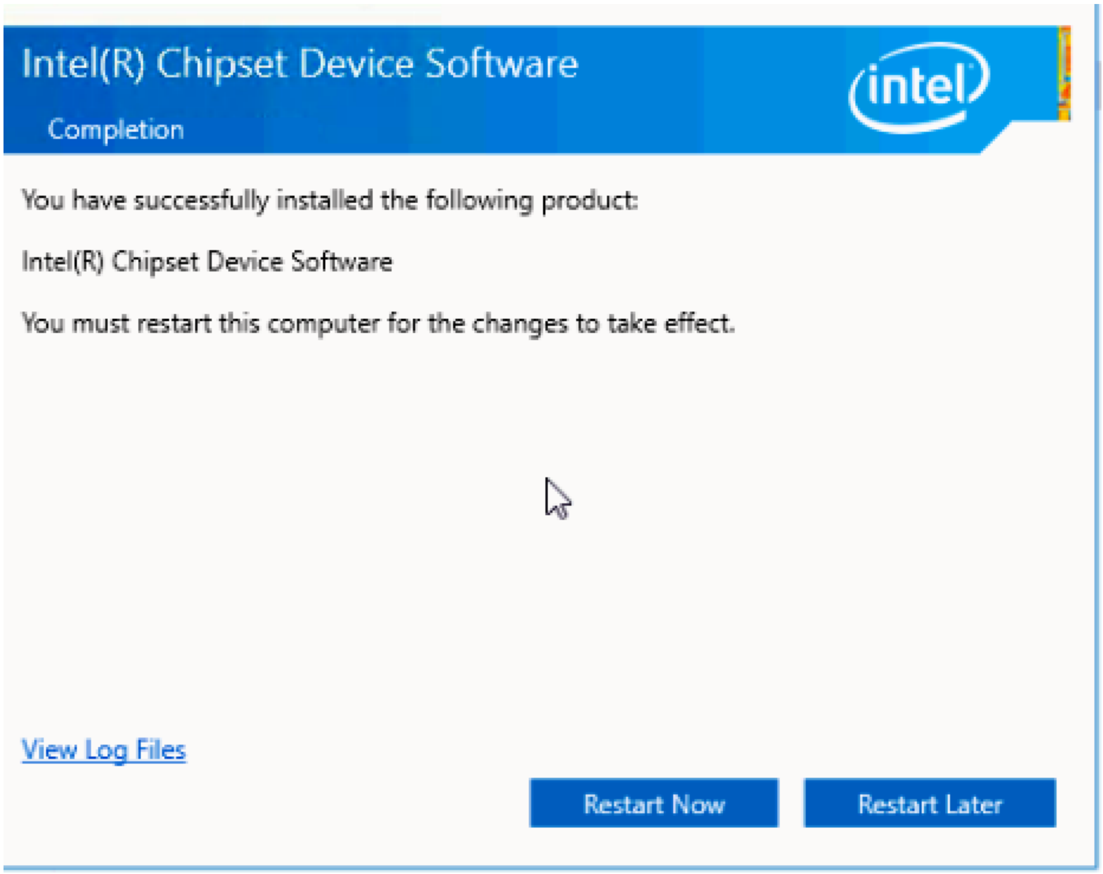
To update Intel ChipSet driver for Windows 2016, complete the following steps:

1. Update Driver for S3260 Intel Chip Set.
2. Under the S3260 Driver ISO mounted through Virtual Media of KVM Console, browse to \ChipSet\Intel\C3260\W2K16.



Name	Date modified	Type	Size
SetupChipset	12/16/2016 6:05 PM	Application	2,922 KB

3. Execute SetupChipset.exe. When it is installed, click Restart Now.

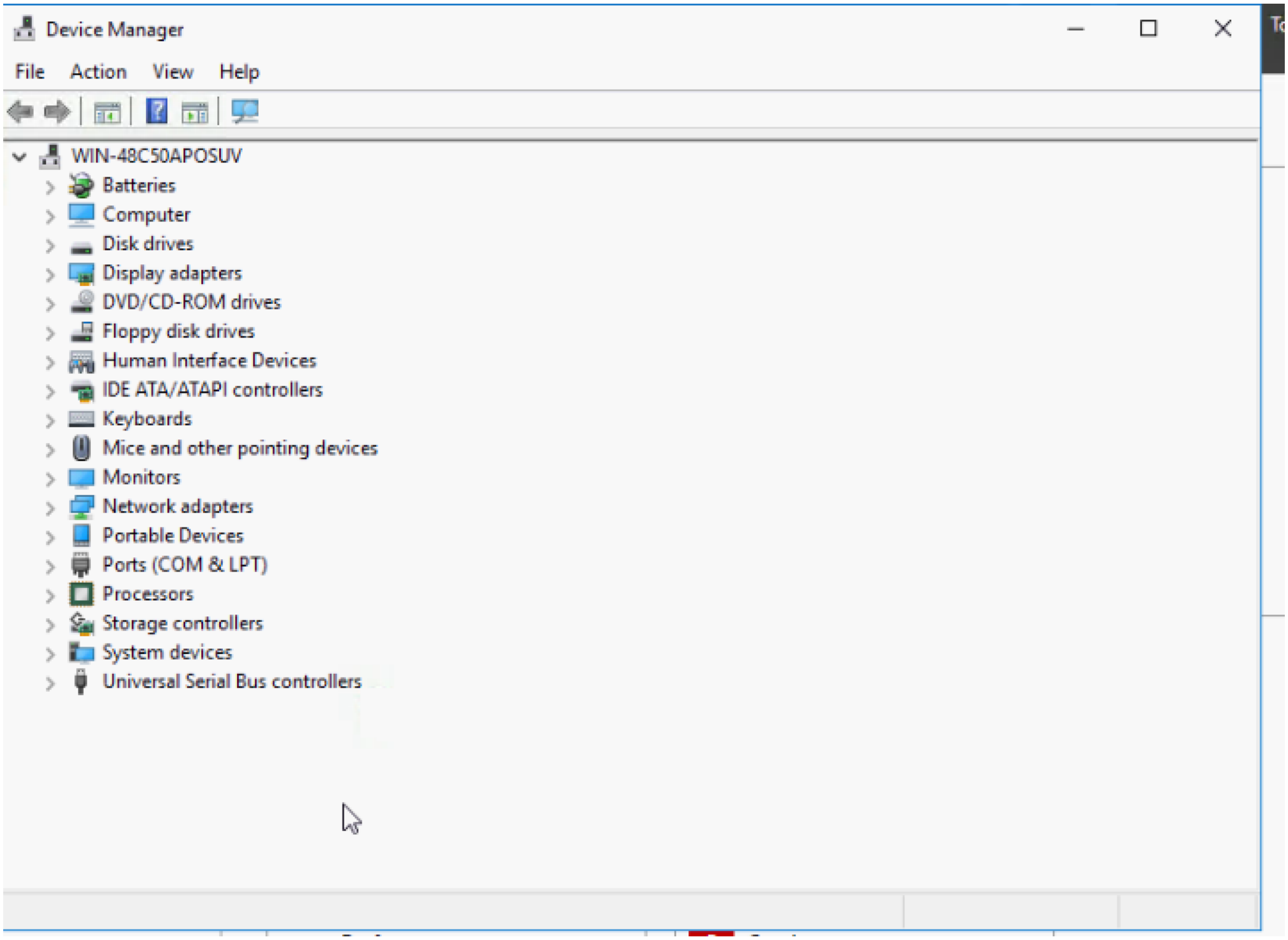


You have successfully installed the following product:

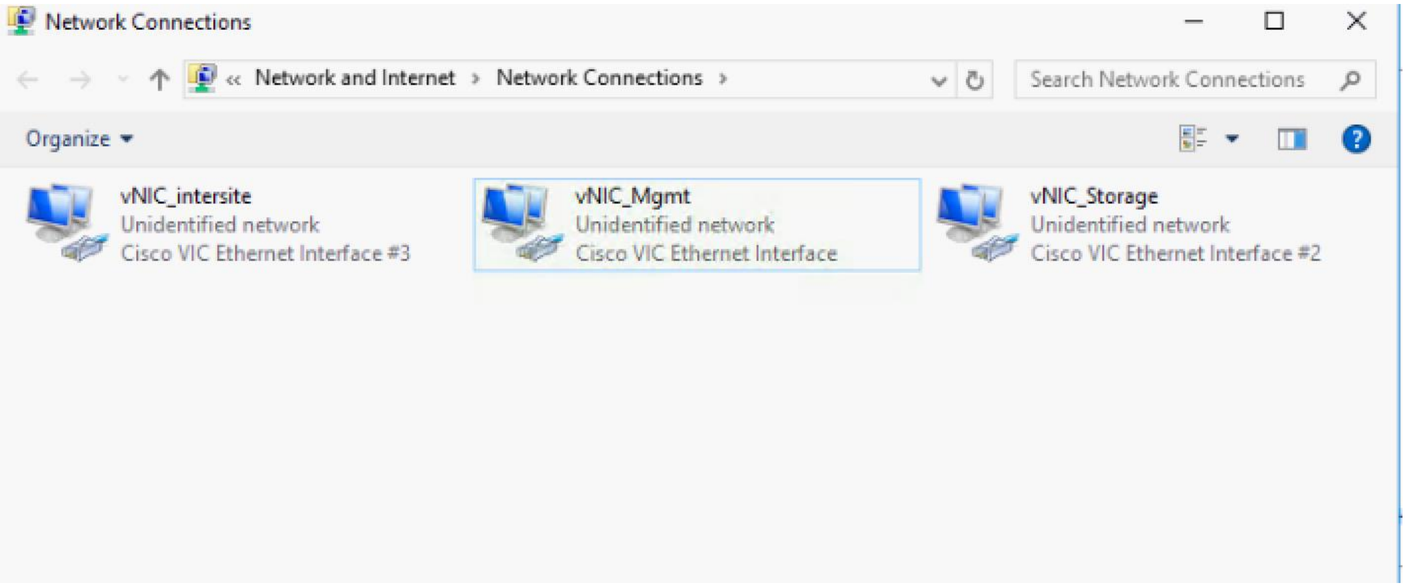
Intel(R) Chipset Device Software

You must restart this computer for the changes to take effect.

4. After Reboot, verify that all the drivers are updated and you have 3 vNIC on the Windows 2016 OS.



WIN-48C50APOSUV
- Batteries
- Computer
- Disk drives
- Display adapters
- DVD/CD-ROM drives
- Floppy disk drives
- Human Interface Devices
- IDE ATA/ATAPI controllers
- Keyboards
- Mice and other pointing devices
- Monitors
- Network adapters
- Portable Devices
- Ports (COM & LPT)
- Processors
- Storage controllers
- System devices
- Universal Serial Bus controllers


Network Connections
« Network and Internet › Network Connections ›
Search Network Connections
Organize ▾

vNIC_intersite
Unidentified network
Cisco VIC Ethernet Interface #3

vNIC_Mgmt
Unidentified network
Cisco VIC Ethernet Interface

vNIC_Storage
Unidentified network
Cisco VIC Ethernet Interface #2

Configure Network for Veeam Backup Server

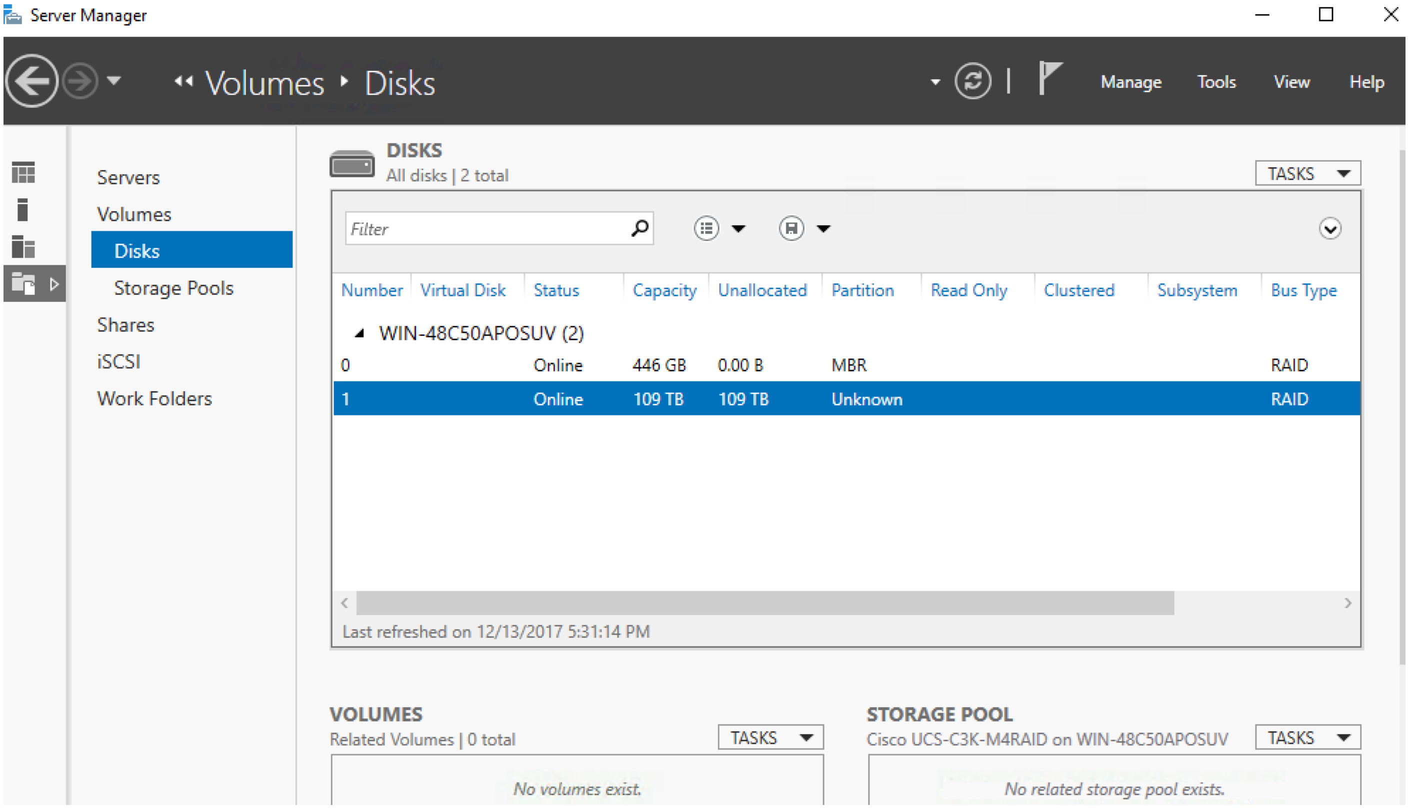
The Cisco S3260 storage server configured as the Veeam Backup Server has three networks:

1. Configure vNIC_intersite with IP Address on VLAN which can access Remote HX VCenter and Remote Proxy Server. Remote Proxy Server allows Replication of HyperFlex Remote Site. vNIC_intersite configuration is only required if HX Management network cannot be accessed outside the Primary Data Center.
2. Configure vNIC_Mgmt with IP Address on HX Management VLAN.
3. Configure vNIC_Storage with IP Address on HX Storage VLAN. This is required for Cisco HyperFlex and Veeam Storage Integration.

Create Disk Volume for Veeam Repository

To create a disk volume for Veeam repository, complete the following steps:

1. Go to Server Manager > File and Storage Services.
2. Navigate to Volumes > Disks and select the volume with Partition type as ‘Unknown.’
3. Create a New Volume.



DISKS
All disks | 2 total

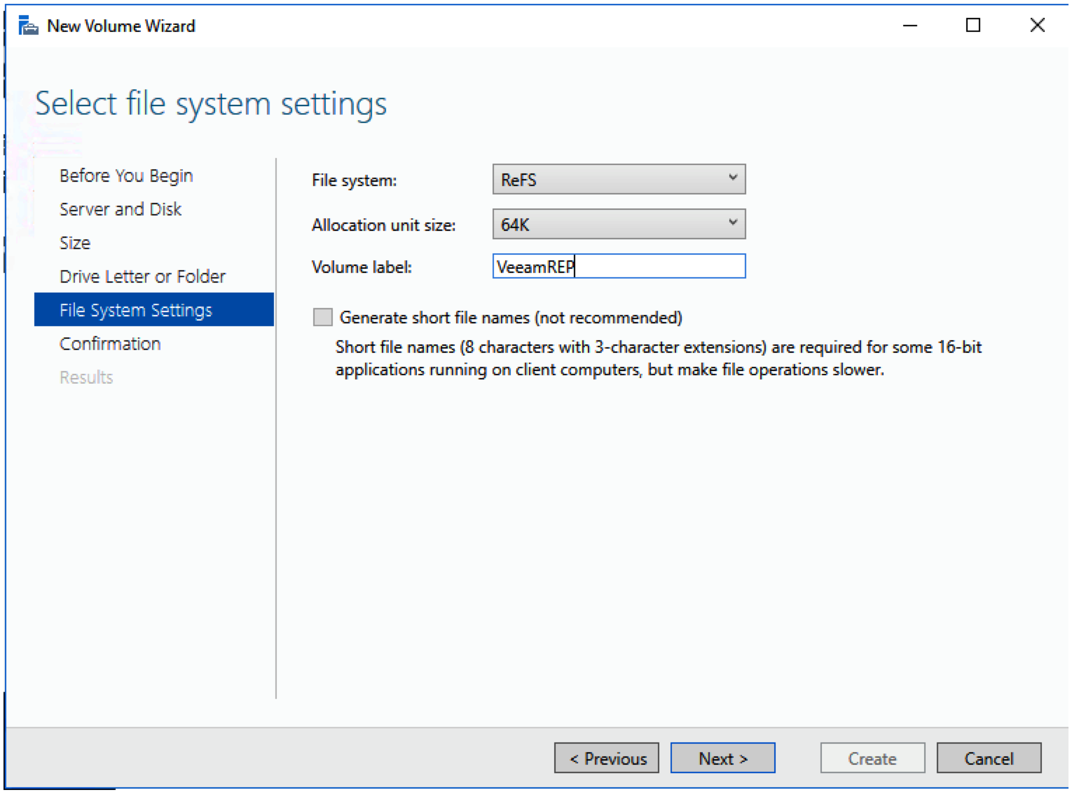
Number	Virtual Disk	Status	Capacity	Unallocated	Partition	Read Only	Clustered	Subsystem	Bus Type
WIN-48C50APOSUV (2)									
0		Online	446 GB	0.00 B	MBR				RAID
1		Online	109 TB	109 TB	Unknown				RAID

Last refreshed on 12/13/2017 5:31:14 PM

VOLUMES
Related Volumes | 0 total
No volumes exist.

STORAGE POOL
Cisco UCS-C3K-M4RAID on WIN-48C50APOSUV
No related storage pool exists.

4. Click Next until you reach the ‘Select File System settings’ window.
5. Create a Volume Label, select File system to ‘ReFS’, Allocation unit size to ‘64k’, Volume label to 'VeeamRep.'
6. Click Next.



File system: ReFS

Allocation unit size: 64K

Volume label: VeeamREP

□ Generate short file names (not recommended)

Short file names (8 characters with 3-character extensions) are required for some 16-bit applications running on client computers, but make file operations slower.

7. Confirm the File System Settings and click Create.

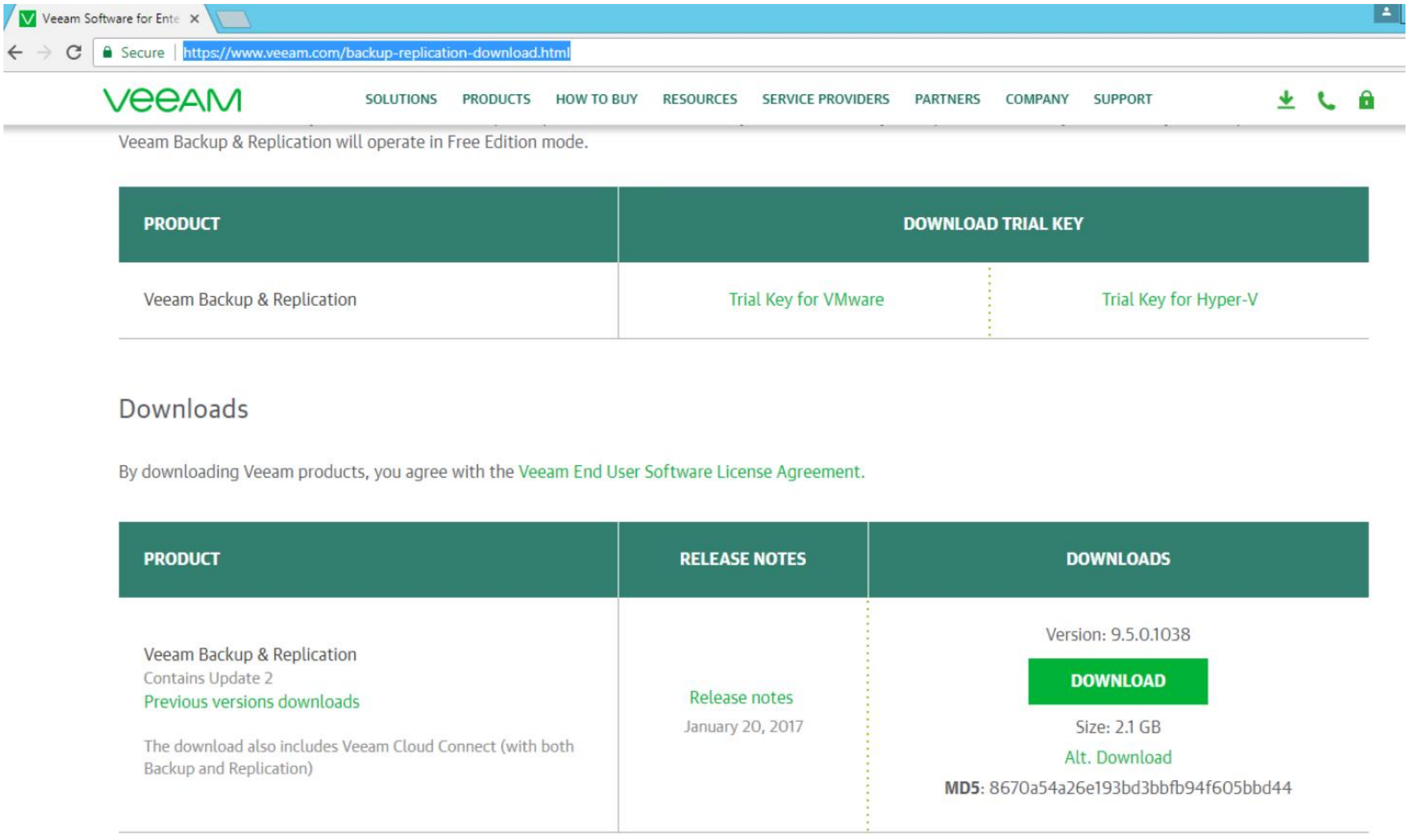
ReFS volumes provide significantly faster synthetic full backup creation and transformation performance, as well as reduce storage requirements and improve reliability. Even more importantly, this functionality improves Availability of backup storage by significantly reducing its load — which results in improved backup and restore performance and enables customers to do much more with virtual labs running off of backup storage.

Install Veeam Availability Suite 9.5

To install Veeam Availability Suite 9.5, complete the following steps:

For detailed steps to install and configure Veeam 9.5, refer to the Veeam Cisco UCS S3260 Configuration Guide.

1. Download the Veeam software from https://www.veeam.com/data-center-availability-suite-vcp-download.html. Download a free 30-day trial license key or obtain license key from Veeam.



Veeam Backup & Replication will operate in Free Edition mode.

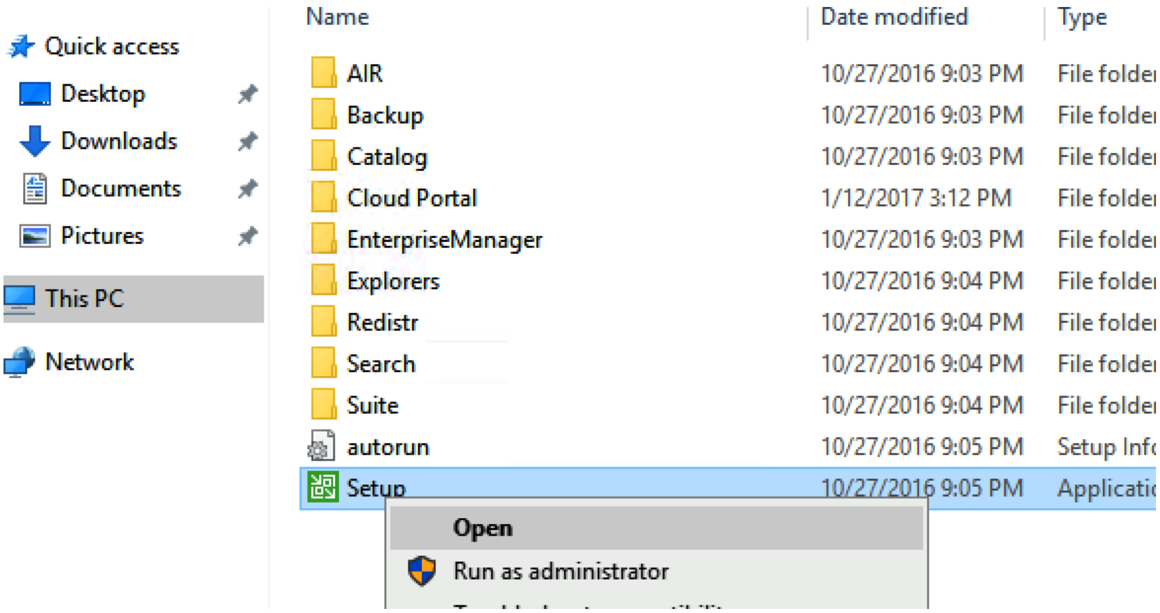
PRODUCT	DOWNLOAD TRIAL KEY	
Veeam Backup & Replication	Trial Key for VMware	Trial Key for Hyper-V

Downloads

By downloading Veeam products, you agree with the Veeam End User Software License Agreement.

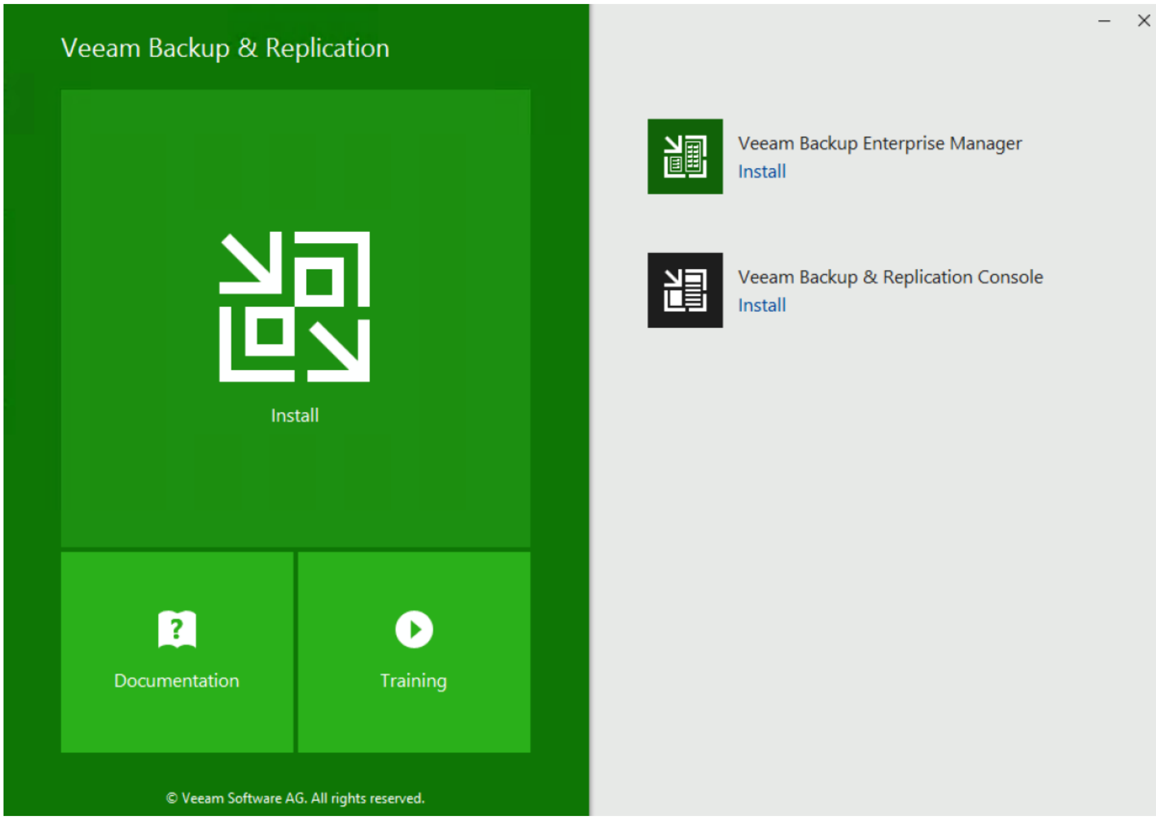
PRODUCT	RELEASE NOTES	DOWNLOADS
Veeam Backup & Replication Contains Update 2 Previous versions downloads The download also includes Veeam Cloud Connect (with both Backup and Replication)	Release notes January 20, 2017	Version: 9.5.0.1038 DOWNLOAD Size: 2.1 GB Alt. Download **MD5**: 8670a54a26e193bd3bbfb94f605bbd44

2. Execute Veeam 9.5 setup file.

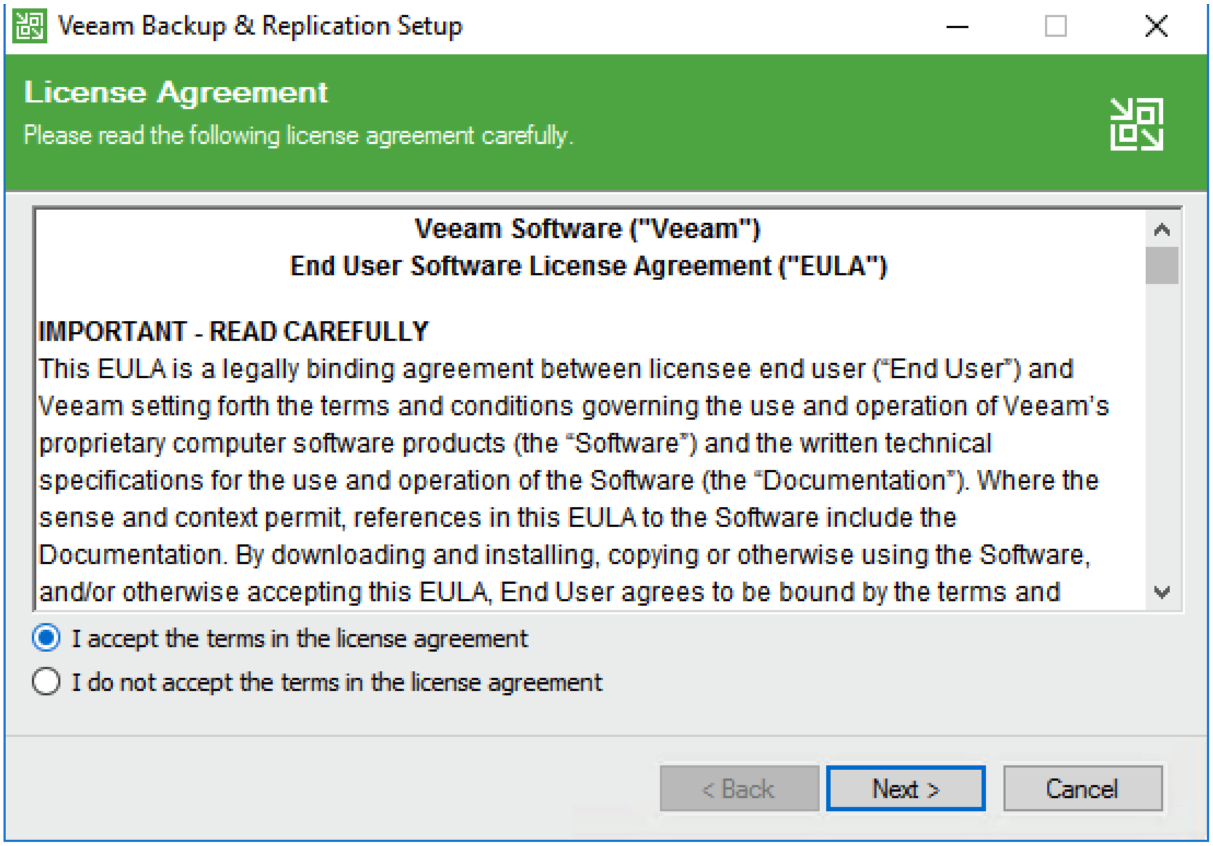


Name	Date modified	Type
AIR	10/27/2016 9:03 PM	File folde
Backup	10/27/2016 9:03 PM	File folde
Catalog	10/27/2016 9:03 PM	File folde
Cloud Portal	1/12/2017 3:12 PM	File folde
EnterpriseManager	10/27/2016 9:03 PM	File folde
Explorers	10/27/2016 9:04 PM	File folde
Redistr	10/27/2016 9:04 PM	File folde
Search	10/27/2016 9:04 PM	File folde
Suite	10/27/2016 9:04 PM	File folde
autorun	10/27/2016 9:05 PM	Setup Infc
Setup	10/27/2016 9:05 PM	Applicati

3. Click Install Link.


Veeam Backup & Replication
Install
Documentation
Training
© Veeam Software AG. All rights reserved.
Veeam Backup Enterprise Manager
Install
Veeam Backup & Replication Console
Install

4. Accept the License Agreement.



License Agreement

Please read the following license agreement carefully.

Veeam Software ("Veeam")
End User Software License Agreement ("EULA")

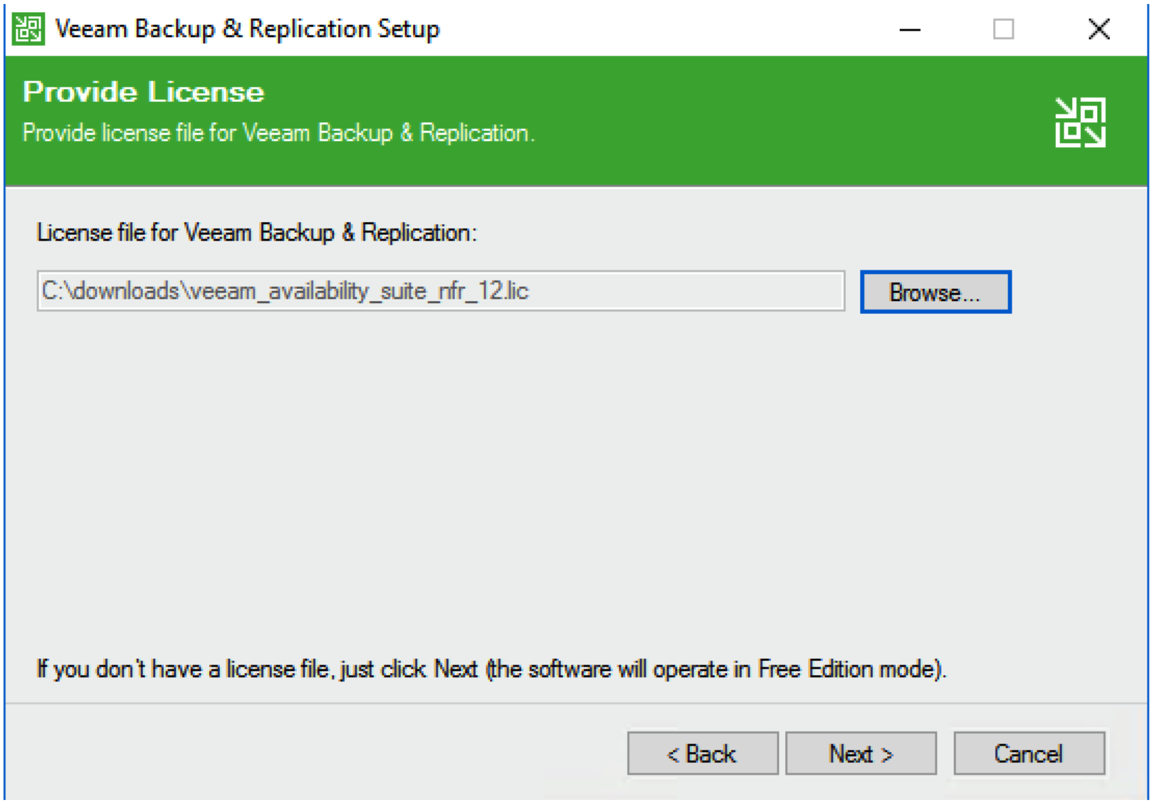
IMPORTANT - READ CAREFULLY

This EULA is a legally binding agreement between licensee end user ("End User") and Veeam setting forth the terms and conditions governing the use and operation of Veeam's proprietary computer software products (the "Software") and the written technical specifications for the use and operation of the Software (the "Documentation"). Where the sense and context permit, references in this EULA to the Software include the Documentation. By downloading and installing, copying or otherwise using the Software, and/or otherwise accepting this EULA, End User agrees to be bound by the terms and

● I accept the terms in the license agreement

○ I do not accept the terms in the license agreement

5. Browse to the license file and click Next.



Veeam Backup & Replication Setup

Provide License

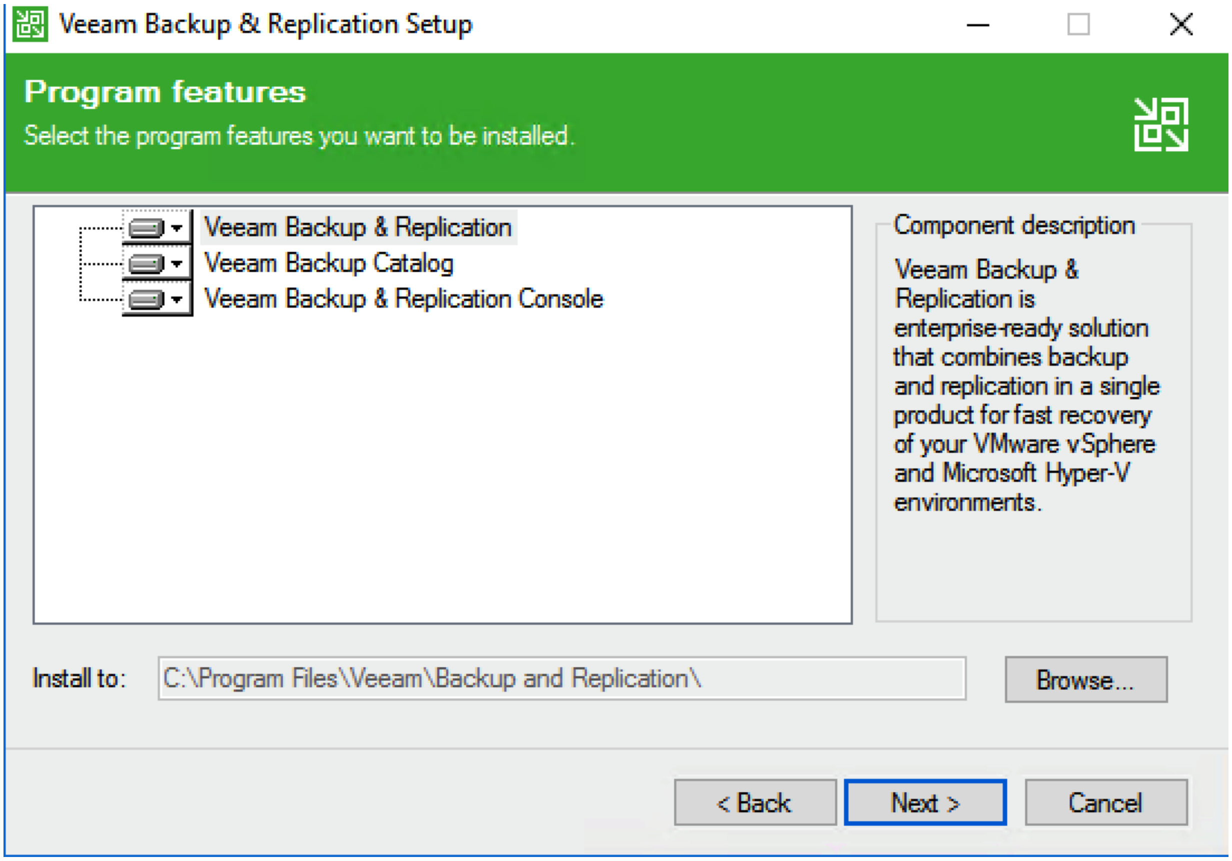
Provide license file for Veeam Backup & Replication.

License file for Veeam Backup & Replication:

C:\downloads\veeam_availability_suite_nfr_12.lic

If you don't have a license file, just click Next (the software will operate in Free Edition mode).

6. Click Next on Program features.



Veeam Backup & Replication Setup

Program features

Select the program features you want to be installed.

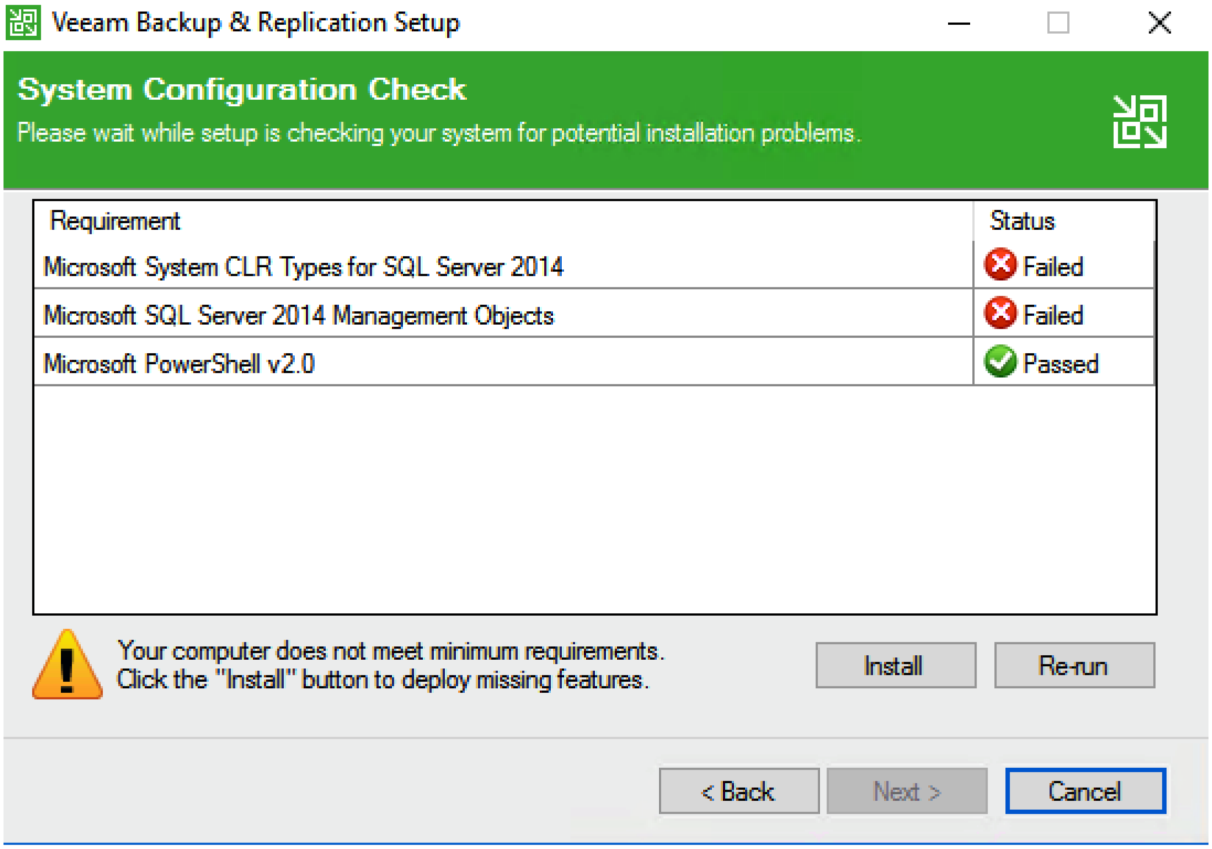
Veeam Backup & Replication
Veeam Backup Catalog
Veeam Backup & Replication Console

Component description

Veeam Backup & Replication is enterprise-ready solution that combines backup and replication in a single product for fast recovery of your VMware vSphere and Microsoft Hyper-V environments.

Install to: C:\Program Files\Veeam\Backup and Replication\

7. During System Check, Veeam verifies the SQL Server Installation and prerequisite software components. Click Install.



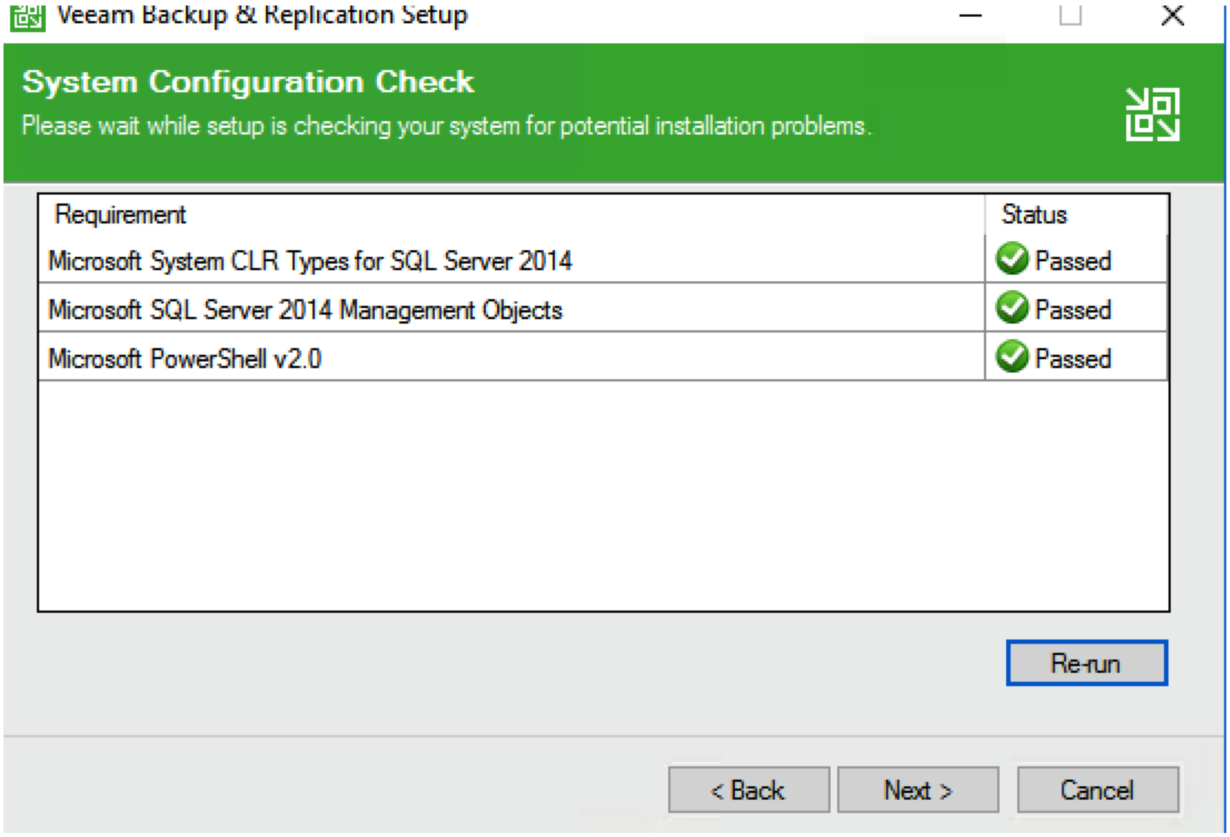
System Configuration Check

Please wait while setup is checking your system for potential installation problems.

Requirement	Status
Microsoft System CLR Types for SQL Server 2014	✗ Failed
Microsoft SQL Server 2014 Management Objects	✗ Failed
Microsoft PowerShell v2.0	✓ Passed

Your computer does not meet minimum requirements.
Click the "Install" button to deploy missing features.

8. This will install all the required dependencies. When the system Check passes, click Next.

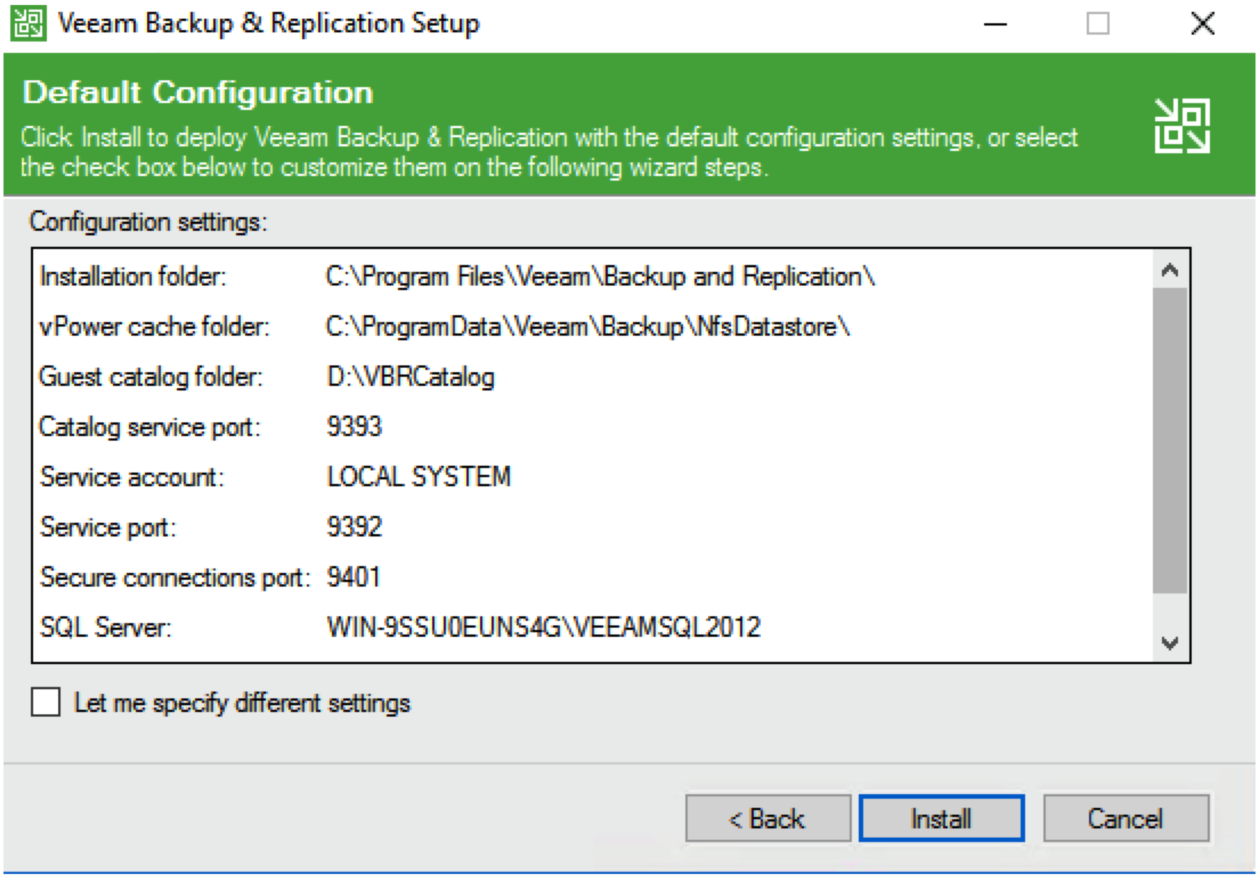


System Configuration Check

Please wait while setup is checking your system for potential installation problems.

Requirement	Status
Microsoft System CLR Types for SQL Server 2014	✓ Passed
Microsoft SQL Server 2014 Management Objects	✓ Passed
Microsoft PowerShell v2.0	✓ Passed

9. Accept the default Installer locations and click Install.



Veeam Backup & Replication Setup

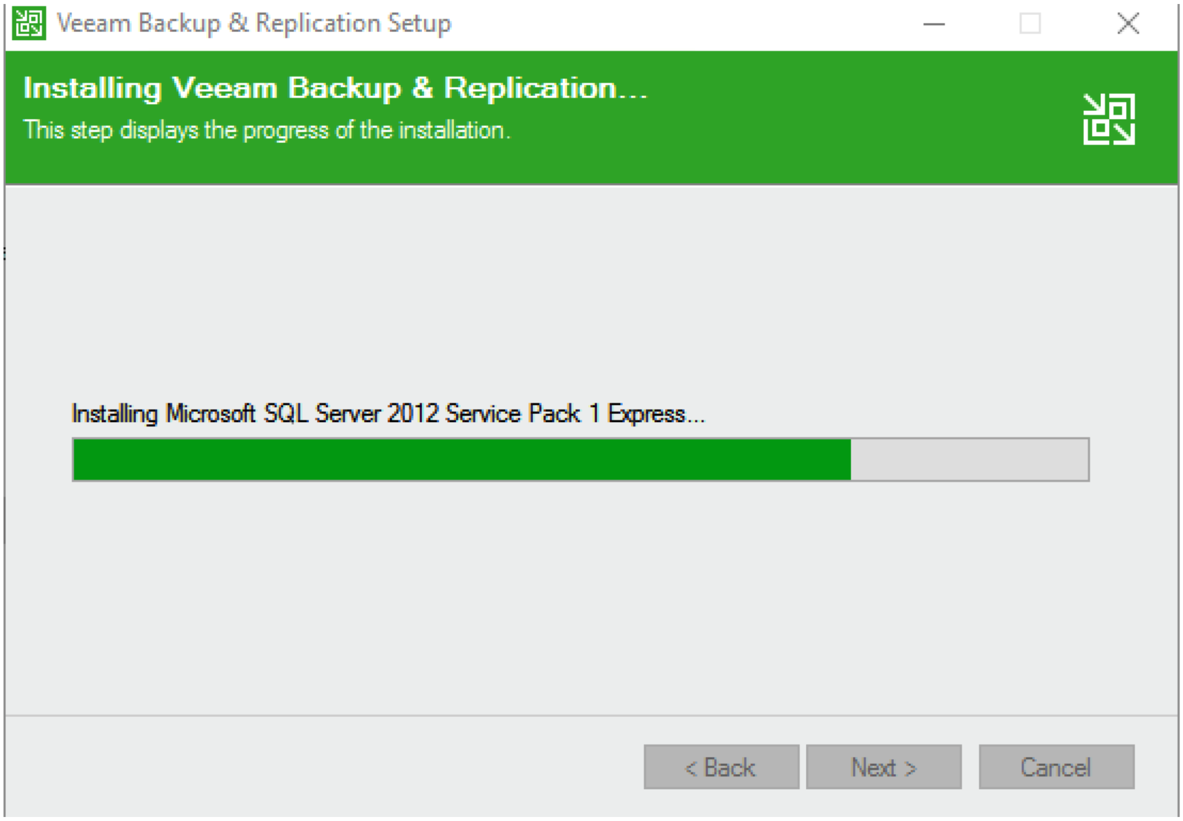
Default Configuration

Click Install to deploy Veeam Backup & Replication with the default configuration settings, or select the check box below to customize them on the following wizard steps.

Configuration settings:

Installation folder:	C:\Program Files\Veeam\Backup and Replication\
vPower cache folder:	C:\ProgramData\Veeam\Backup\NfsDatastore\
Guest catalog folder:	D:\VBRCatalog
Catalog service port:	9393
Service account:	LOCAL SYSTEM
Service port:	9392
Secure connections port:	9401
SQL Server:	WIN-9SSU0EUNS4G\VEEAMSQL2012

☐ Let me specify different settings



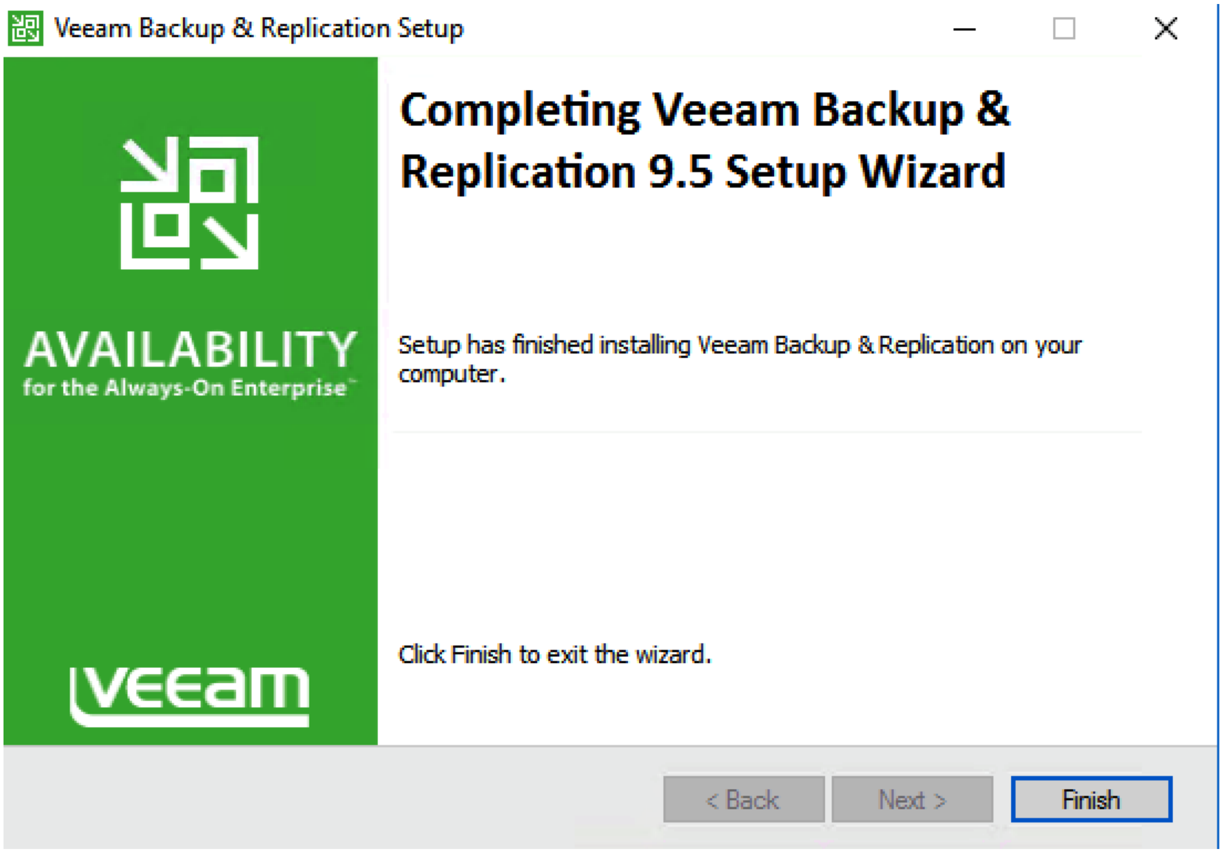
Veeam Backup & Replication Setup

Installing Veeam Backup & Replication...

This step displays the progress of the installation.

Installing Microsoft SQL Server 2012 Service Pack 1 Express...

10. Click Finish when the installation completes.



Veeam Backup & Replication Setup
AVAILABILITY
for the Always-On Enterprise
VEEAM

Completing Veeam Backup & Replication 9.5 Setup Wizard

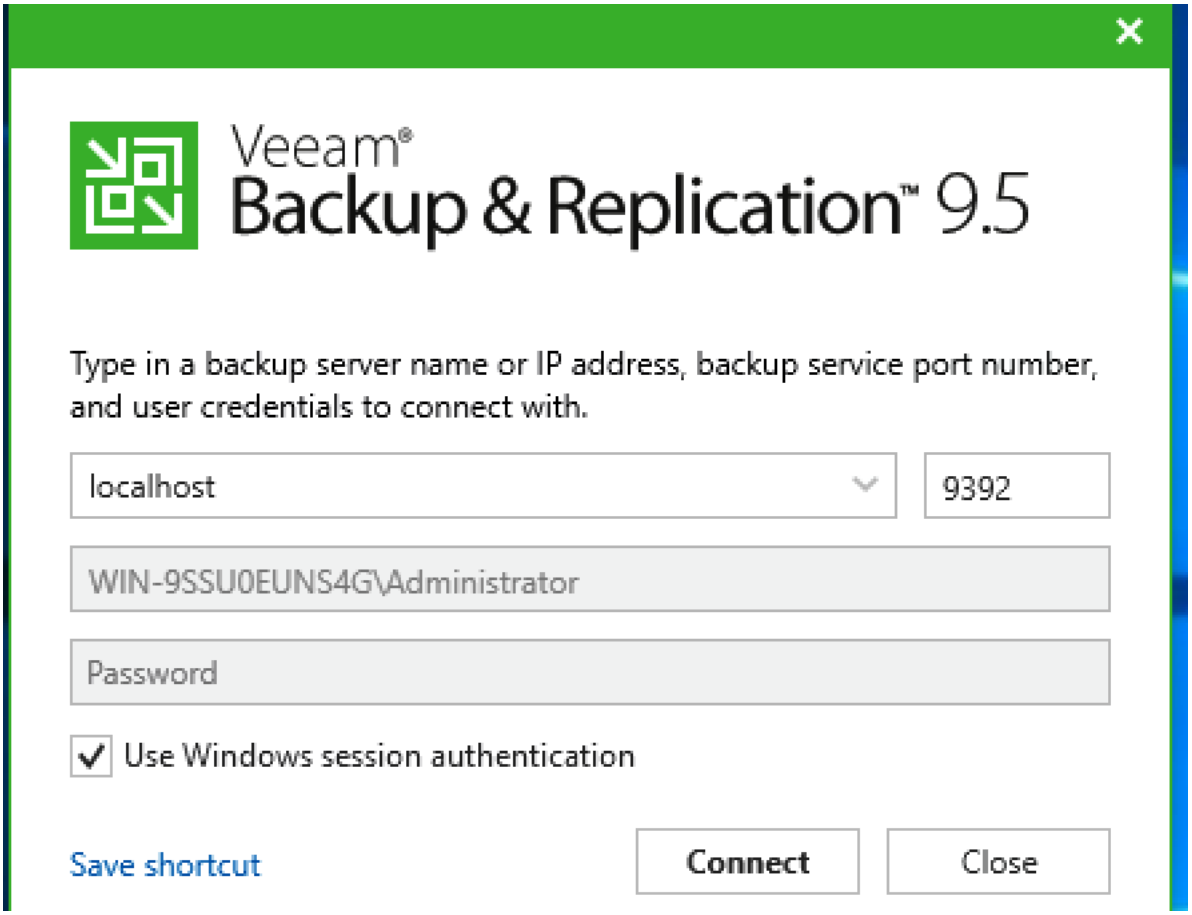
Setup has finished installing Veeam Backup & Replication on your computer.

Click Finish to exit the wizard.

Configure Veeam Availability Suite 9.5

To configure Veeam Availability Suite 9.5, complete the following steps:

1. From the desktop, Open the Veeam Backup & Replication Console.
2. Click Connect on local host.



Type in a backup server name or IP address, backup service port number, and user credentials to connect with.

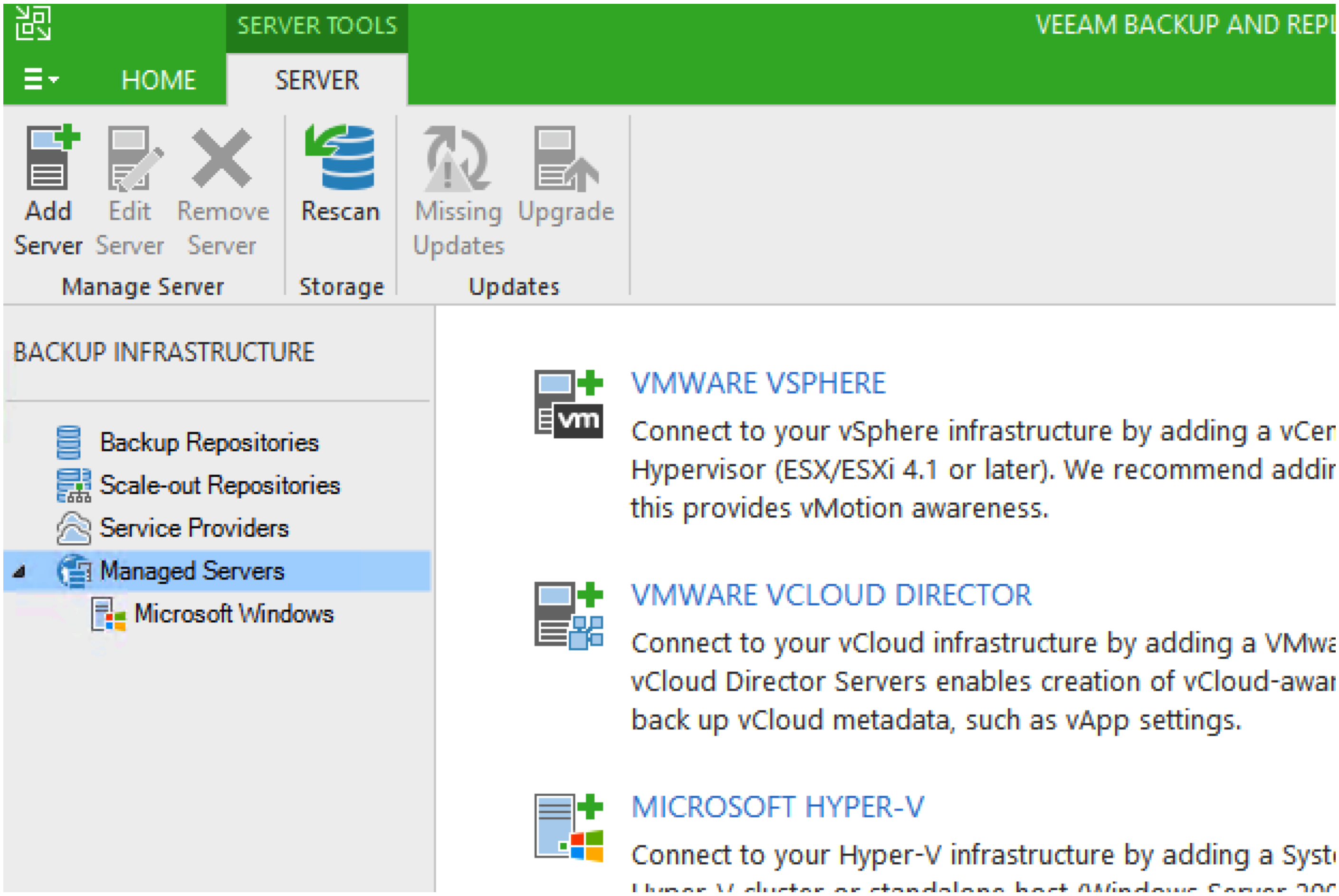
localhost | 9392

WIN-9SSU0EUNS4G\Administrator

Password

☑ Use Windows session authentication

3. By default, Veeam uses the D: drive as the Veeam Repository. This is the repository created through Disk Volume.
4. Right-click Managed Server and click 'Add Server.'
5. Select VMWare VSphere and add the vCenter URL of HyperFlex Cluster, click Next.



VMWARE VSPHERE

Connect to your vSphere infrastructure by adding a vCer
Hypervisor (ESX/ESXi 4.1 or later). We recommend addir
this provides vMotion awareness.

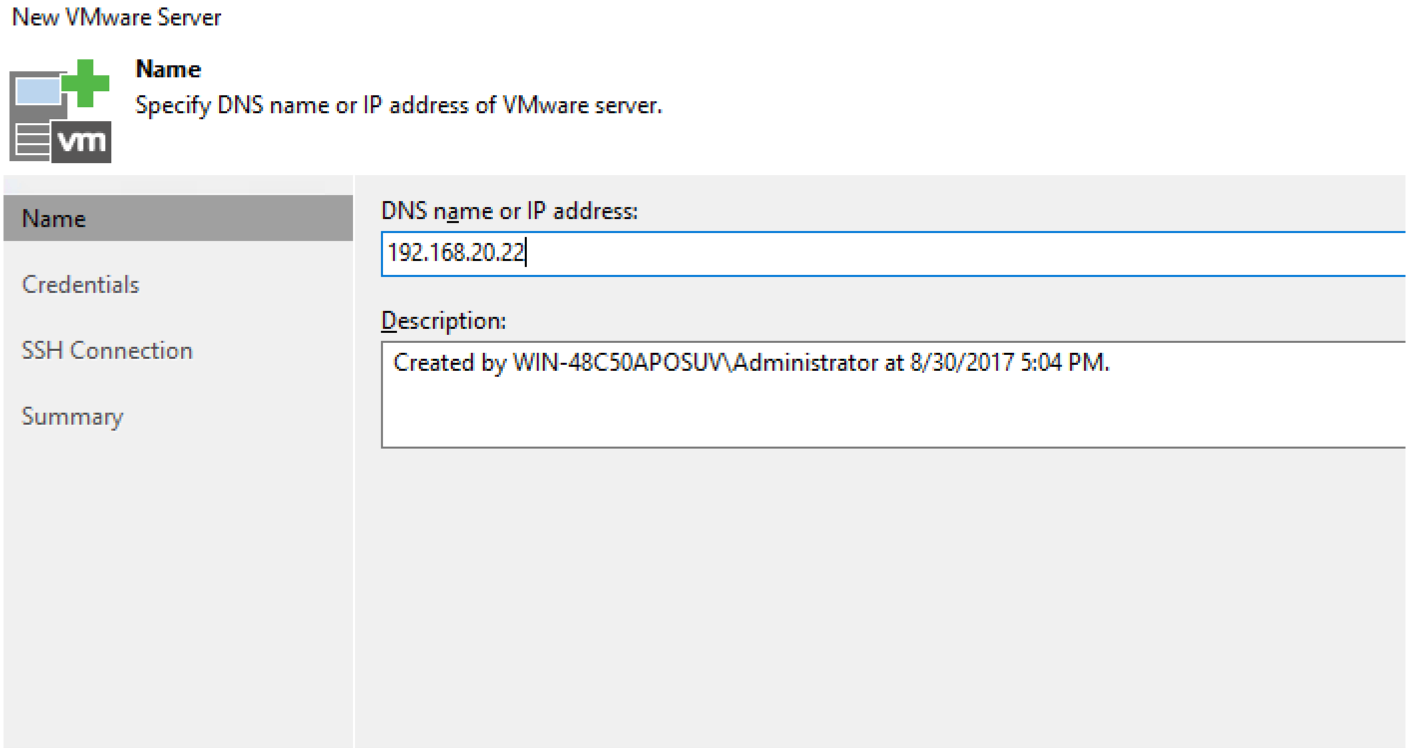
VMWARE VCLOUD DIRECTOR

Connect to your vCloud infrastructure by adding a VMwa
vCloud Director Servers enables creation of vCloud-awar
back up vCloud metadata, such as vApp settings.

MICROSOFT HYPER-V

Connect to your Hyper-V infrastructure by adding a Syst

6. Enter the vCenter credentials and click Next.



Name

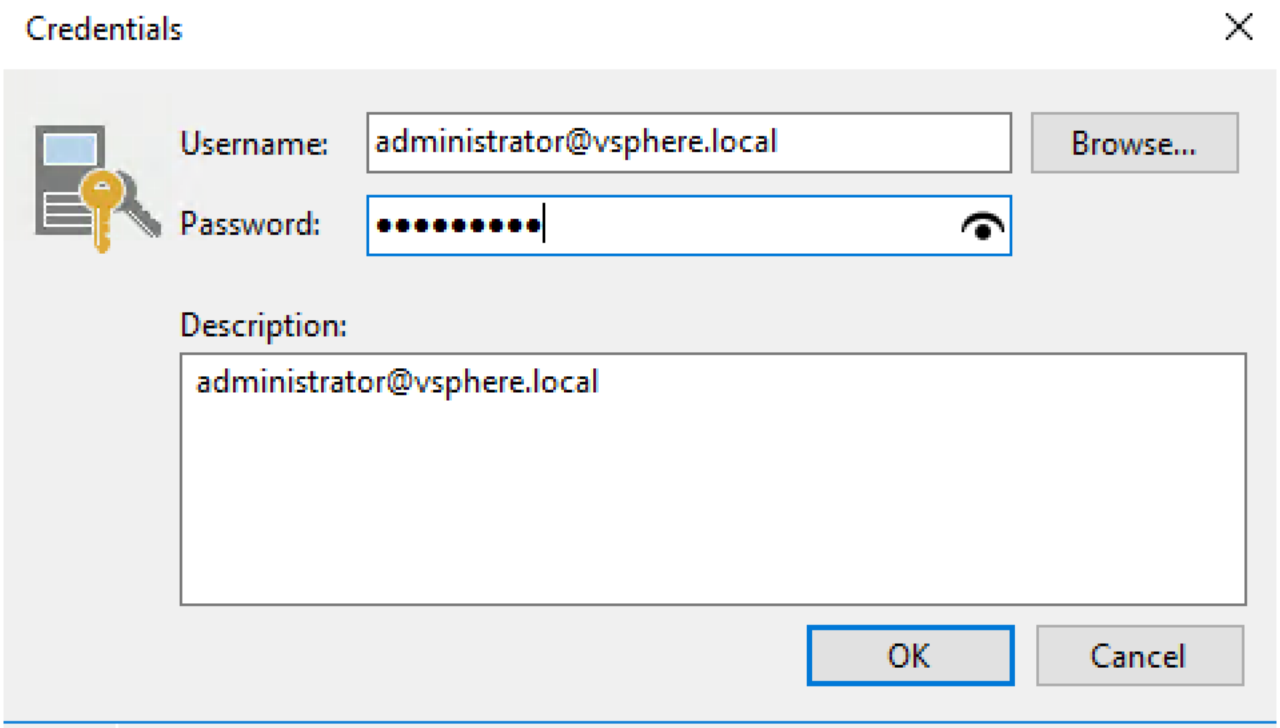
Specify DNS name or IP address of VMware server.

DNS name or IP address:

192.168.20.22

Description:

Created by WIN-48C50APOSUV\Administrator at 8/30/2017 5:04 PM.

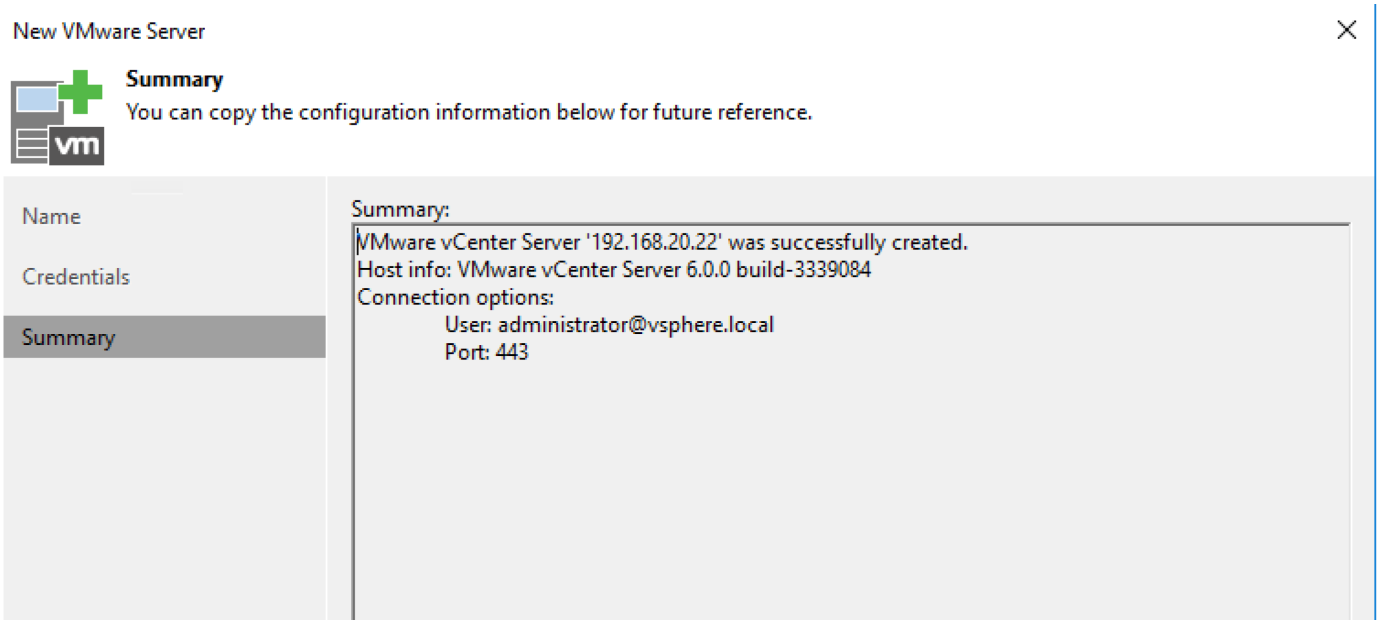


Username: administrator@vsphere.local

Password: ●●●●●●●●●●

Description:
administrator@vsphere.local

7. When Veeam Console collects all the deployment details from vCenter, click Finish.

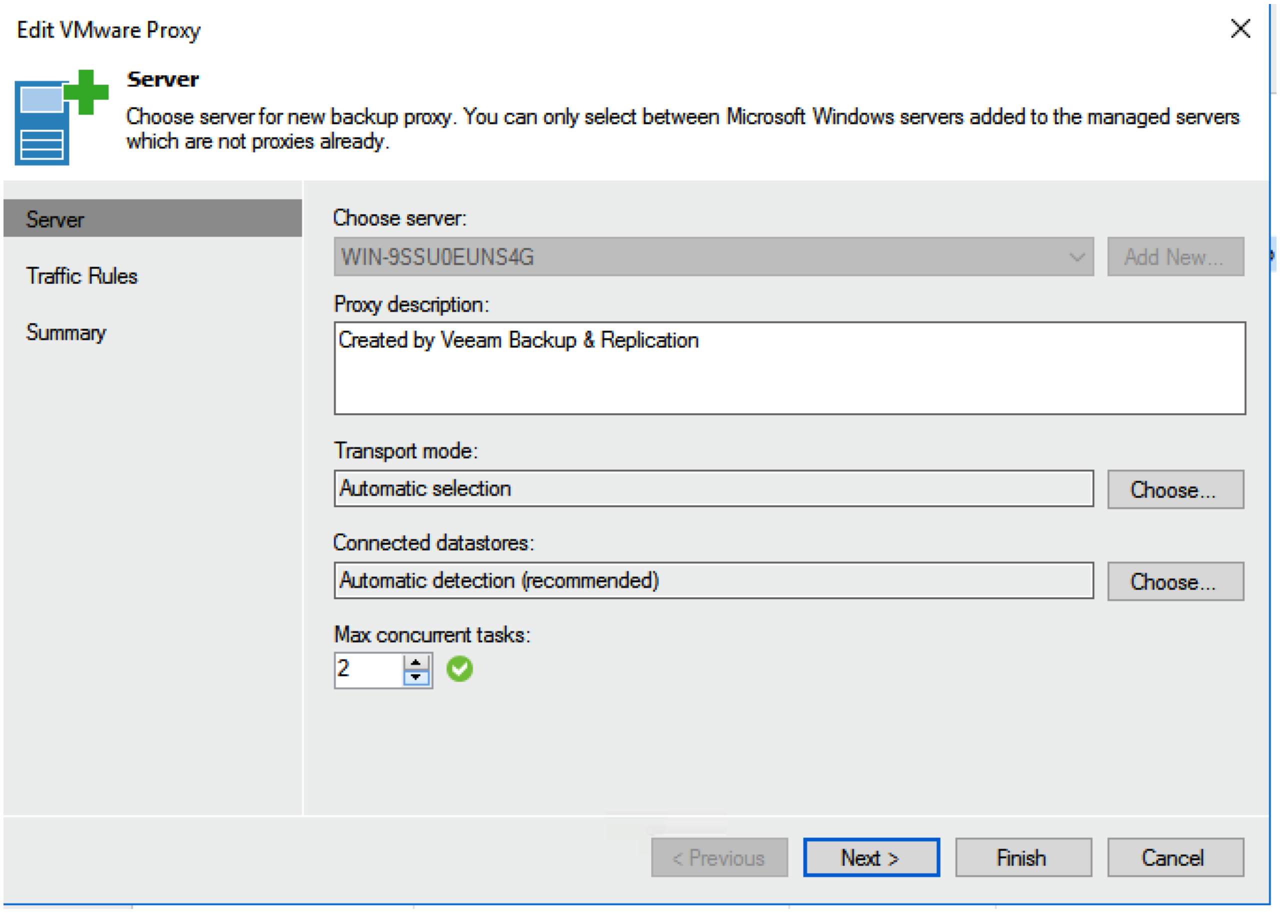


Summary
You can copy the configuration information below for future reference.

Summary:

```
VMware vCenter Server '192.168.20.22' was successfully created.
Host info: VMware vCenter Server 6.0.0 build-3339084
Connection options:
        User: administrator@vsphere.local
        Port: 443
```

8. Click Backup Proxies in the right navigation windows, choose VMware Backup Proxy and edit Properties.



Edit VMware Proxy

Server

Choose server for new backup proxy. You can only select between Microsoft Windows servers added to the managed servers which are not proxies already.

Choose server: WIN-9SSU0EUNS4G

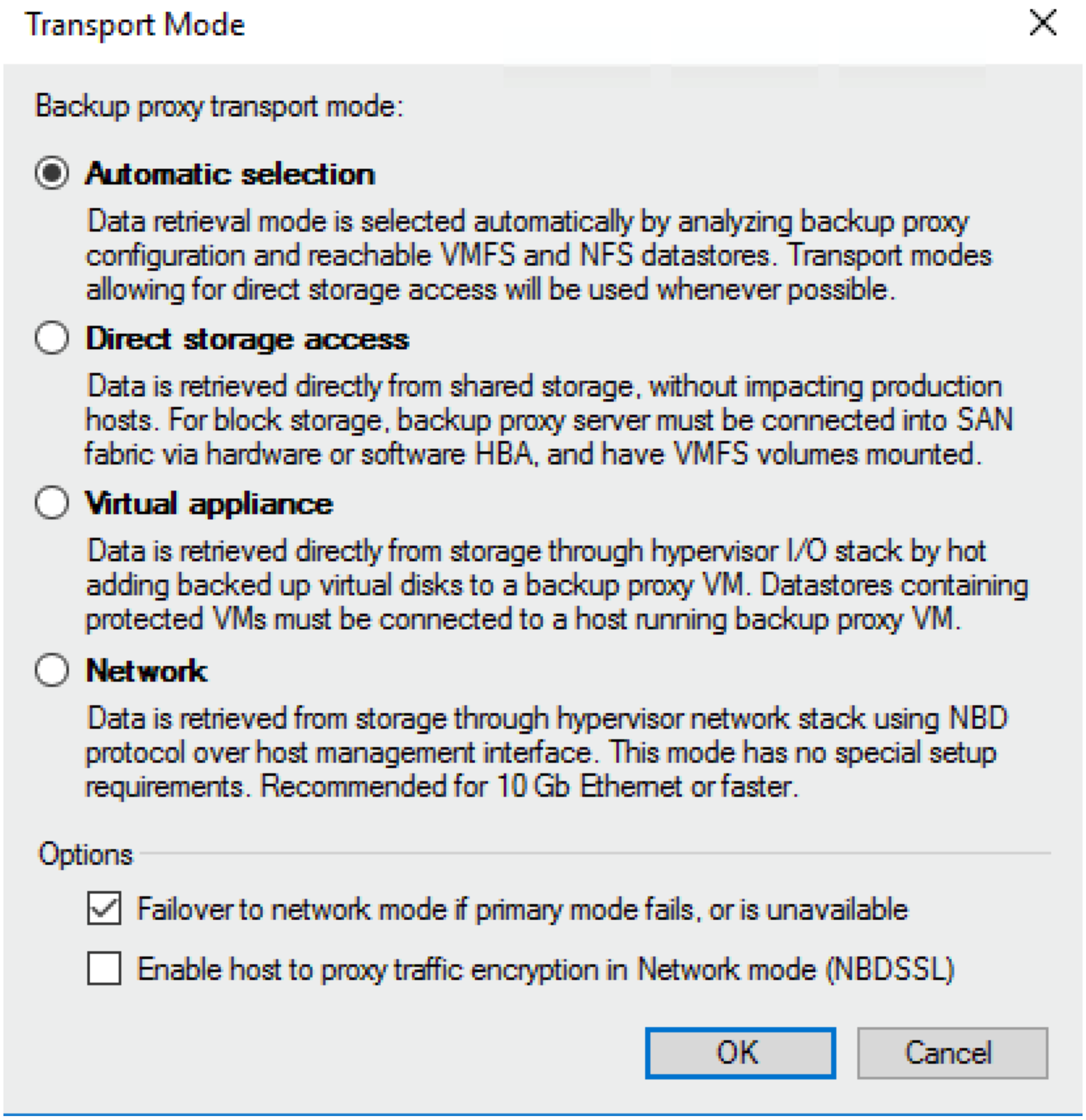
Proxy description: Created by Veeam Backup & Replication

Transport mode: Automatic selection

Connected datastores: Automatic detection (recommended)

Max concurrent tasks: 2 ✓

9. Edit Max Concurrent Task to be equal to Number of physical cores in S3260 minus 2. In the present deployment, there is a dual 18-core Intel processor and therefore you can increase the Max Concurrent Task to 34.
10. Under Transport Mode, click Choose and make sure that “failover to network mode, if primary mode fails, or is unavailable” is checked. This option is checked by default.



Transport Mode

Backup proxy transport mode:

● **Automatic selection**

Data retrieval mode is selected automatically by analyzing backup proxy configuration and reachable VMFS and NFS datastores. Transport modes allowing for direct storage access will be used whenever possible.

○ **Direct storage access**

Data is retrieved directly from shared storage, without impacting production hosts. For block storage, backup proxy server must be connected into SAN fabric via hardware or software HBA, and have VMFS volumes mounted.

○ **Virtual appliance**

Data is retrieved directly from storage through hypervisor I/O stack by hot adding backed up virtual disks to a backup proxy VM. Datastores containing protected VMs must be connected to a host running backup proxy VM.

○ **Network**

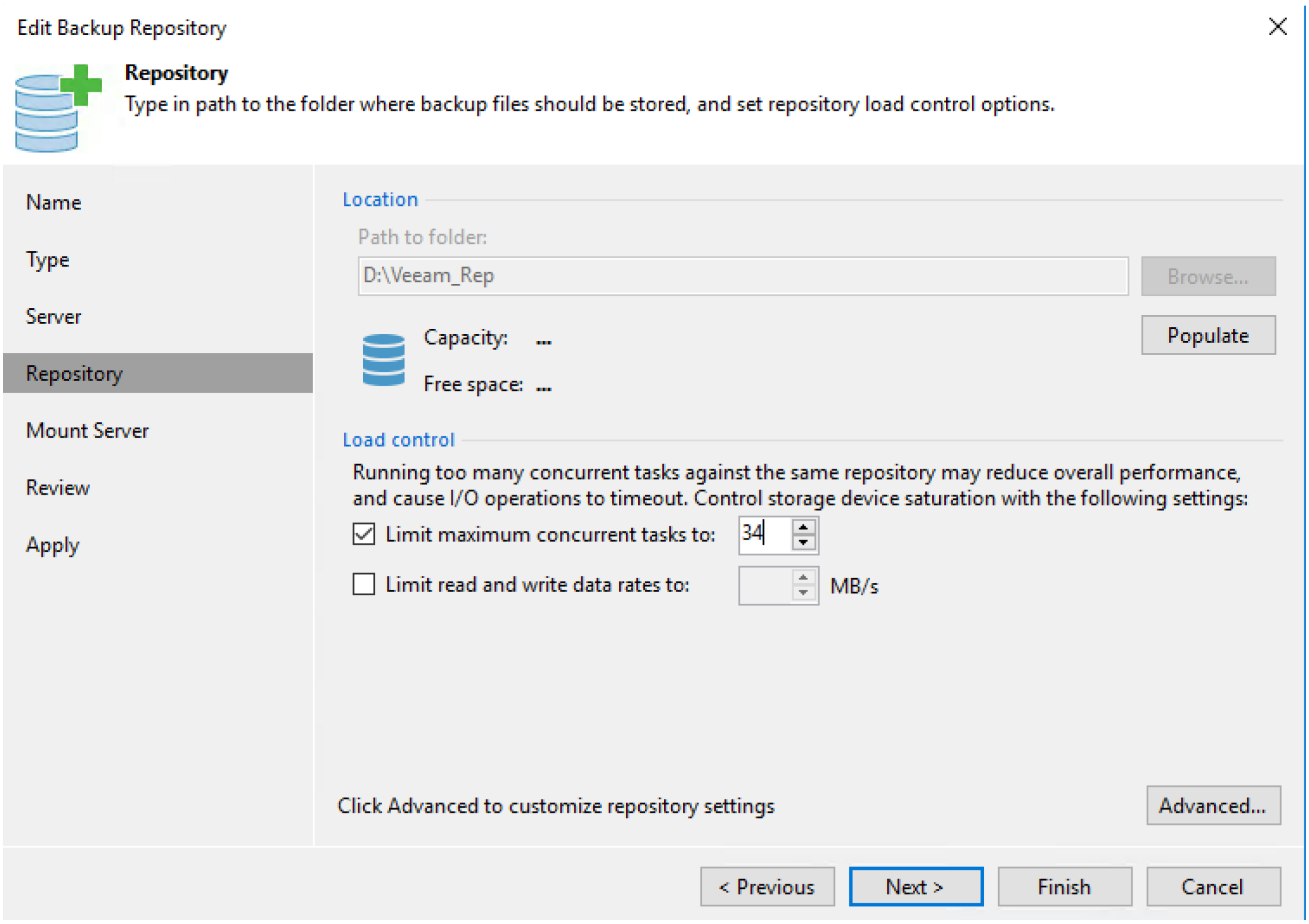
Data is retrieved from storage through hypervisor network stack using NBD protocol over host management interface. This mode has no special setup requirements. Recommended for 10 Gb Ethemet or faster.

Options

☑ Failover to network mode if primary mode fails, or is unavailable

☐ Enable host to proxy traffic encryption in Network mode (NBDSSL)

11. Click Finish.
12. Click Backup Repository in the right navigation window, select the Default Backup Repository and edit Properties.
13. Click Next until you reach the Repository Windows.
14. Increase the ‘Limit Max Concurrent Task’ to be 34 (Number of physical cores in S3260 minus 2).


Edit Backup Repository

Repository

Type in path to the folder where backup files should be stored, and set repository load control options.

Location

Path to folder: D:\Veeam_Rep

Capacity: ...

Free space: ...

Load control

Running too many concurrent tasks against the same repository may reduce overall performance, and cause I/O operations to timeout. Control storage device saturation with the following settings:

☑ Limit maximum concurrent tasks to: 34

□ Limit read and write data rates to: MB/s

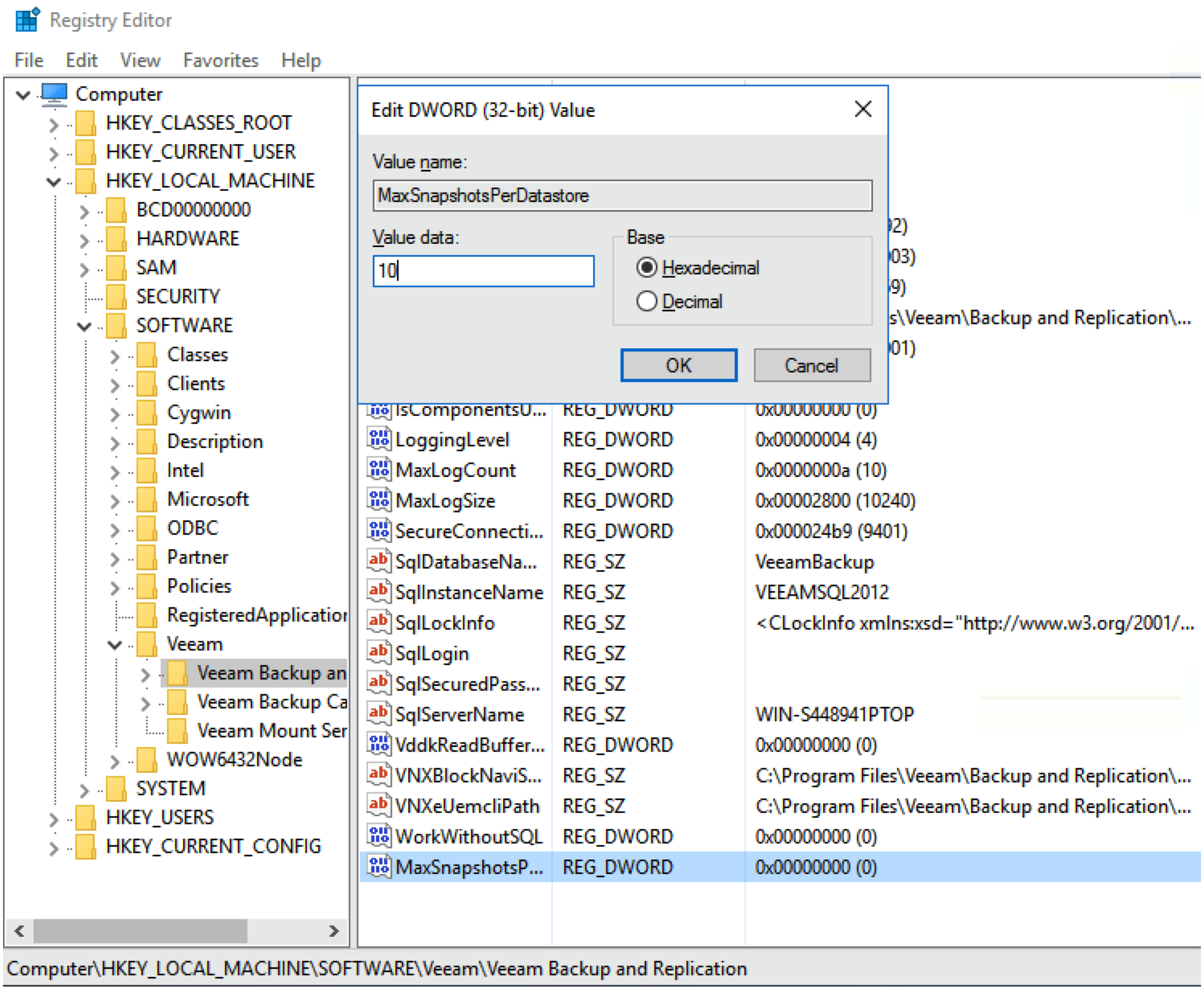
Click Advanced to customize repository settings

15. Click Finish.

16. Add the MaxSnapshotsPerDatastore parameter in Registry.

The default Number of Snapshots per datastore is 4, you may alter concurrent snapshots executed by Veeam on HX datastore and should consider the intensity of the IO workload on the HX Cluster during backup jobs. For instance, if the HX Cluster is not under heavy IO intensive transactions during Veeam backup jobs, then the Max Snapshots per Data store can be increased.

17. Using the Registry key Editor, go to HKEY_LOCAL_MACHINE\SOFTWARE\Veeam\Veeam Backup and Replication\; add a RegDWord with the name ‘MaxSnapshotsPerDatastore’ value greater than 4.



Edit DWORD (32-bit) Value

Value name: MaxSnapshotsPerDatastore

Value data: 10

Base: ● Hexadecimal ○ Decimal

IsComponentsU...	REG_DWORD	0x00000000 (0)
LoggingLevel	REG_DWORD	0x00000004 (4)
MaxLogCount	REG_DWORD	0x0000000a (10)
MaxLogSize	REG_DWORD	0x00002800 (10240)
SecureConnecti...	REG_DWORD	0x000024b9 (9401)
SqlDatabaseNa...	REG_SZ	VeeamBackup
SqlInstanceName	REG_SZ	VEEAMSQL2012
SqlLockInfo	REG_SZ	<CLockInfo xmlns:xsd="http://www.w3.org/2001/...
SqlLogin	REG_SZ	
SqlSecuredPass...	REG_SZ	
SqlServerName	REG_SZ	WIN-S448941PTOP
VddkReadBuffer...	REG_DWORD	0x00000000 (0)
VNXBlockNaviS...	REG_SZ	C:\Program Files\Veeam\Backup and Replication\...
VNXeUemcliPath	REG_SZ	C:\Program Files\Veeam\Backup and Replication\...
WorkWithoutSQL	REG_DWORD	0x00000000 (0)
MaxSnapshotsP...	REG_DWORD	0x00000000 (0)

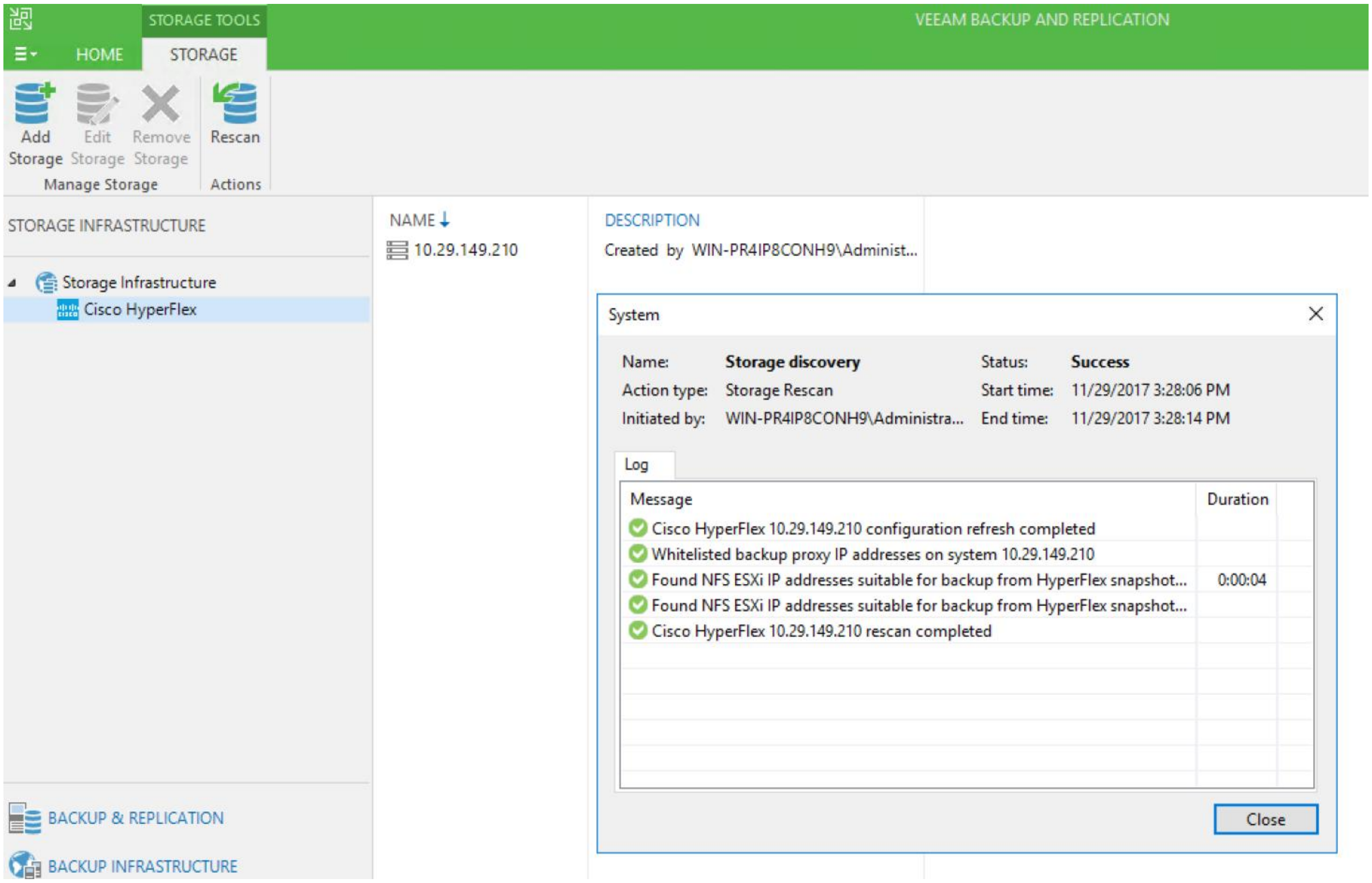
Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Veeam\Veeam Backup and Replication

18. Restart the Windows 2016 Server for Registry Settings to be applied.

Configure HX Storage Infrastructure with Veeam

To Configure Cisco HyperFlex Storage with Veeam, complete the following steps:

1. Refer to the Cisco HyperFlex Storage Integration Guide to successfully configure the storage infrastructure integration of HyperFlex with Veeam.
2. Go to Veeam Backup and Replication Console on S3260 storage server.
3. Click Storage Infrastructure > Cisco HyperFlex and Rescan Storage.
4. Ensure NFS IP are properly scanned by Veeam Server, as detailed in the screenshot below.



NAME	DESCRIPTION
10.29.149.210	Created by WIN-PR4IP8CONH9\Administ...

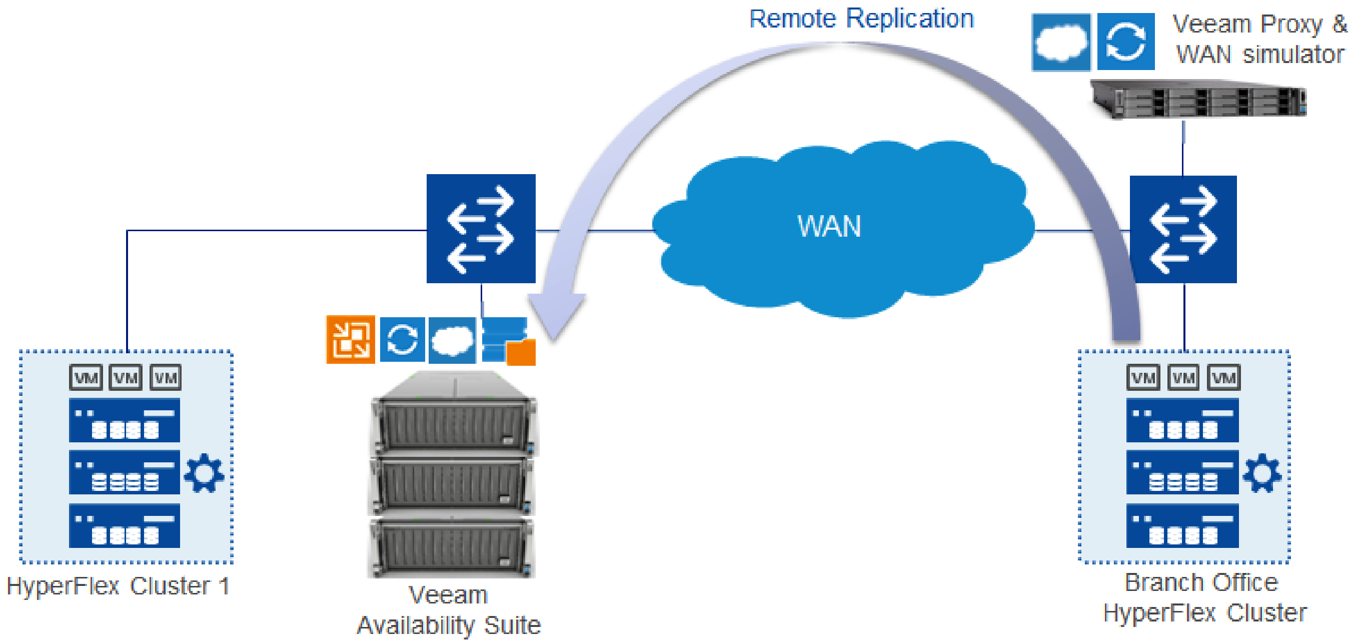
Name: **Storage discovery**
Action type: Storage Rescan
Initiated by: WIN-PR4IP8CONH9\Administra...
Status: **Success**
Start time: 11/29/2017 3:28:06 PM
End time: 11/29/2017 3:28:14 PM

Message	Duration
✓ Cisco HyperFlex 10.29.149.210 configuration refresh completed	
✓ Whitelisted backup proxy IP addresses on system 10.29.149.210	
✓ Found NFS ESXi IP addresses suitable for backup from HyperFlex snapshot...	0:00:04
✓ Found NFS ESXi IP addresses suitable for backup from HyperFlex snapshot...	
✓ Cisco HyperFlex 10.29.149.210 rescan completed	

Cisco HyperFlex Remote Site Protection

Veeam allows the protection of Cisco HyperFlex Remote Site by replication of Application VM to the Primary Site. The high-level workflow is detailed in figure below:

Figure 32 **Remote Office Deployment Components**



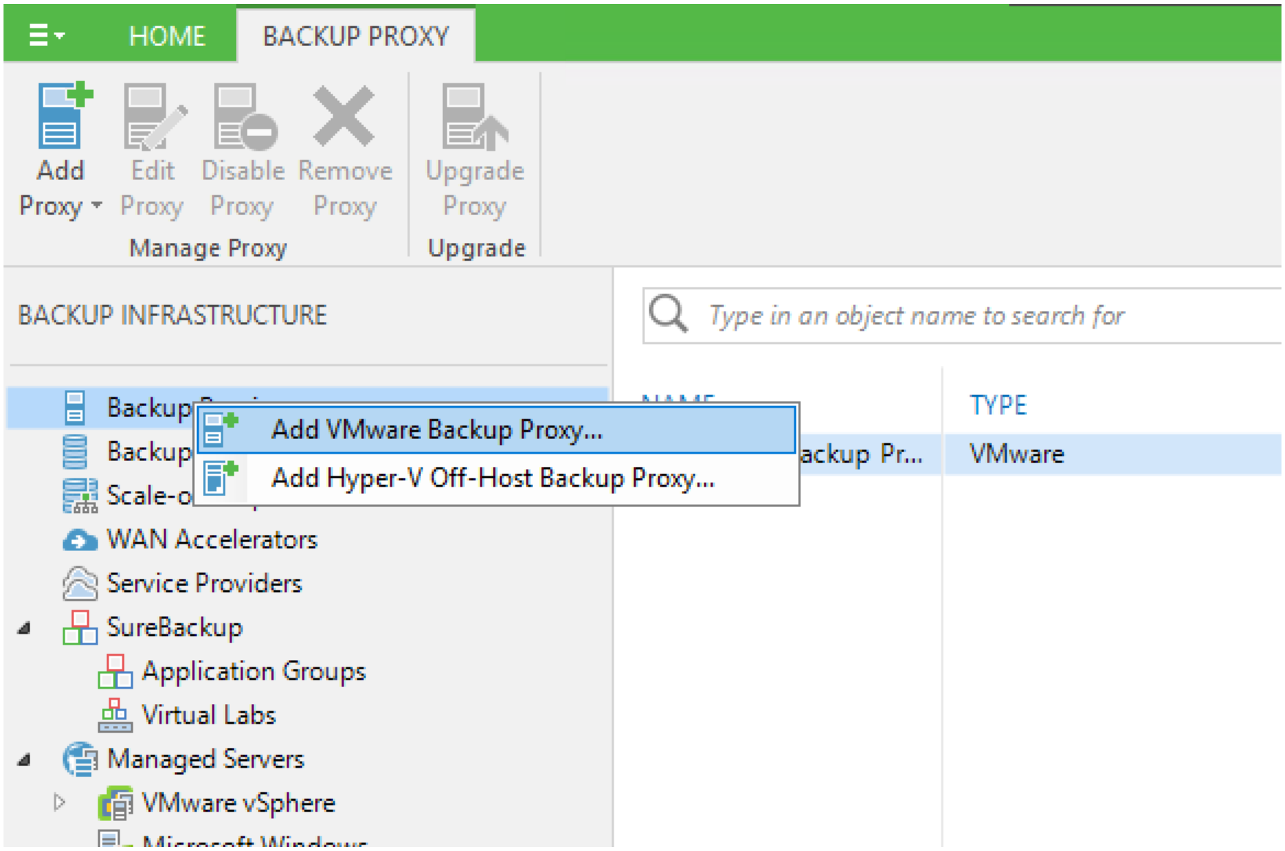
In the present design, the Veeam Proxy Server is installed in a Cisco UCS C240 M4 Server located in HX Cluster on Remote Office. Windows 2016 is installed on Cisco UCS C240 M4 LFF server. The choice of either a virtual machine or physical server for Veeam Proxy is dependent on several factors such as:

- Number of Replication jobs executed on ROBO deployment.
- Deployment of Veeam WAN Accelerator on the Remote Site. Customers can deploy Veeam WAN Accelerator, which allows faster replication and backup of application VMs. It is required to deploy Veeam WAN Accelerator on a Cisco UCS C240 M4 LFF with SSDs for WAN Accelerator Cache.

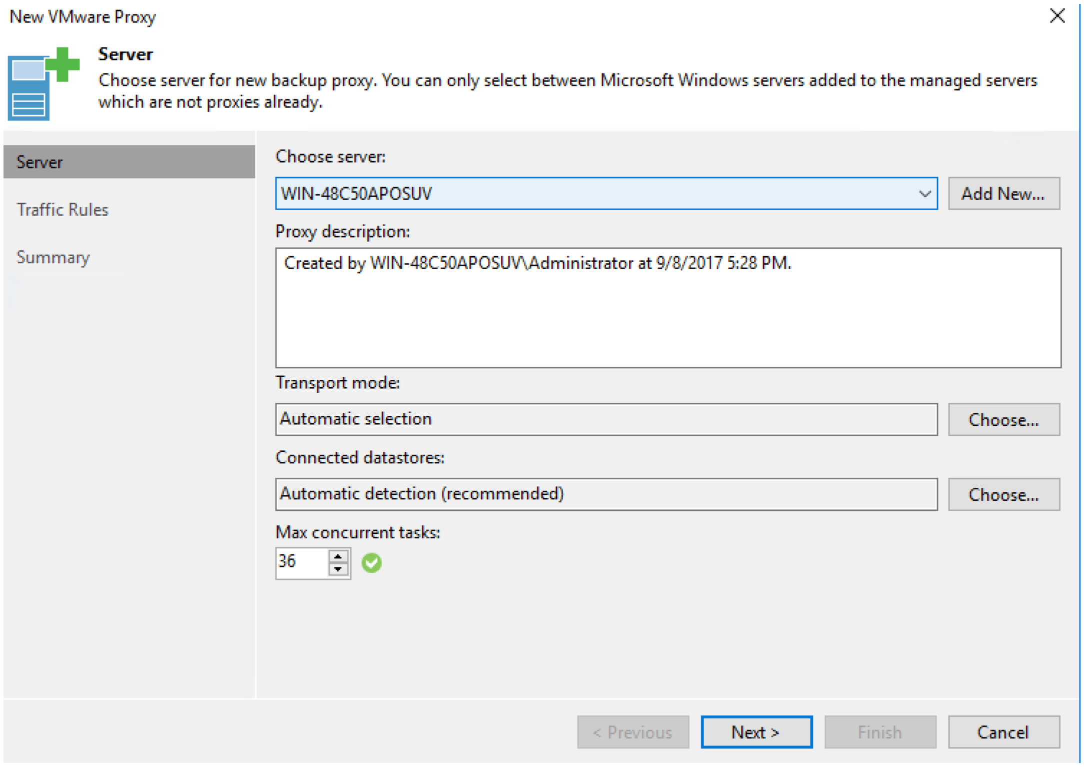
Configure Remote Veeam Proxy to Replicate VM on Cisco HyperFlex Primary Site

To Add Remote Proxy to Veeam Server, complete the following steps:

1. On the left pane of Veeam Console, go to Backup Infrastructure
2. Right-click Backup Proxy and Select Add VMWare Backup Proxy.



3. Select defaults (Automatic Selection) for transport mode and Connected datastore.


New VMware Proxy

Server

Choose server for new backup proxy. You can only select between Microsoft Windows servers added to the managed servers which are not proxies already.

Choose server: WIN-48C50APOSUV

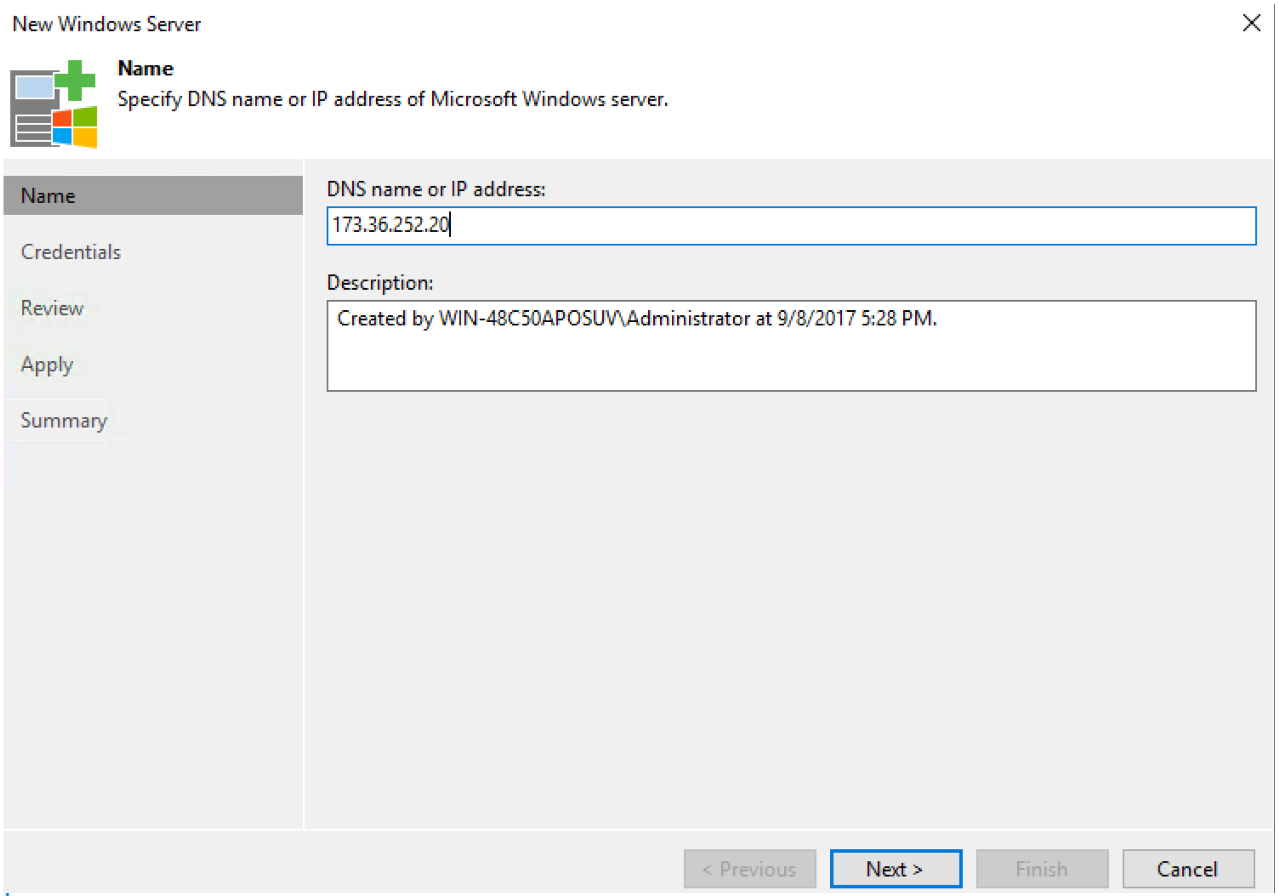
Proxy description: Created by WIN-48C50APOSUV\Administrator at 9/8/2017 5:28 PM.

Transport mode: Automatic selection

Connected datastores: Automatic detection (recommended)

Max concurrent tasks: 36

4. Add Remote Proxy details (Server IP Address & Credentials).



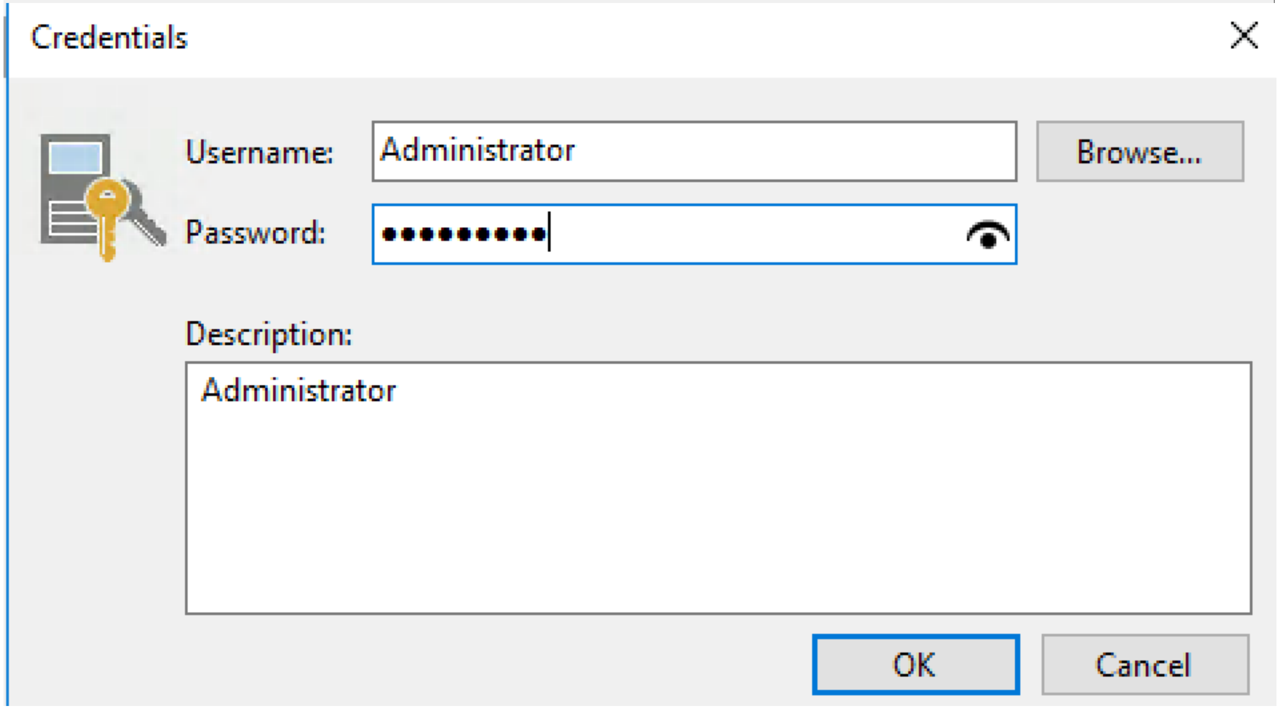
New Windows Server

Name

Specify DNS name or IP address of Microsoft Windows server.

DNS name or IP address: 173.36.252.20

Description: Created by WIN-48C50APOSUV\Administrator at 9/8/2017 5:28 PM.



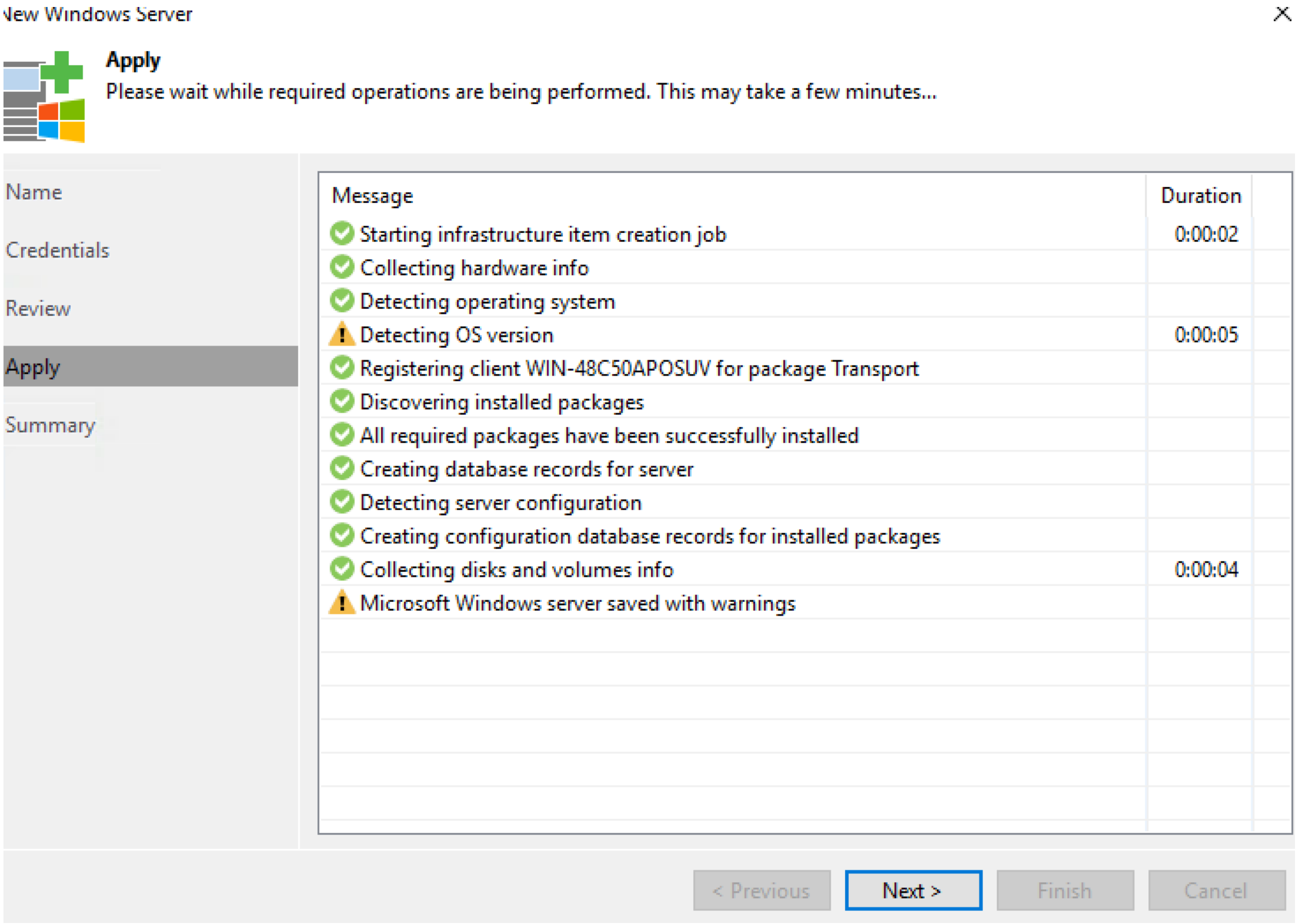
Credentials

Username: Administrator

Password: ●●●●●●●●●●

Description: Administrator

5. Click OK and then click Next; Veeam Console will connect to remote Proxy and configure the server.

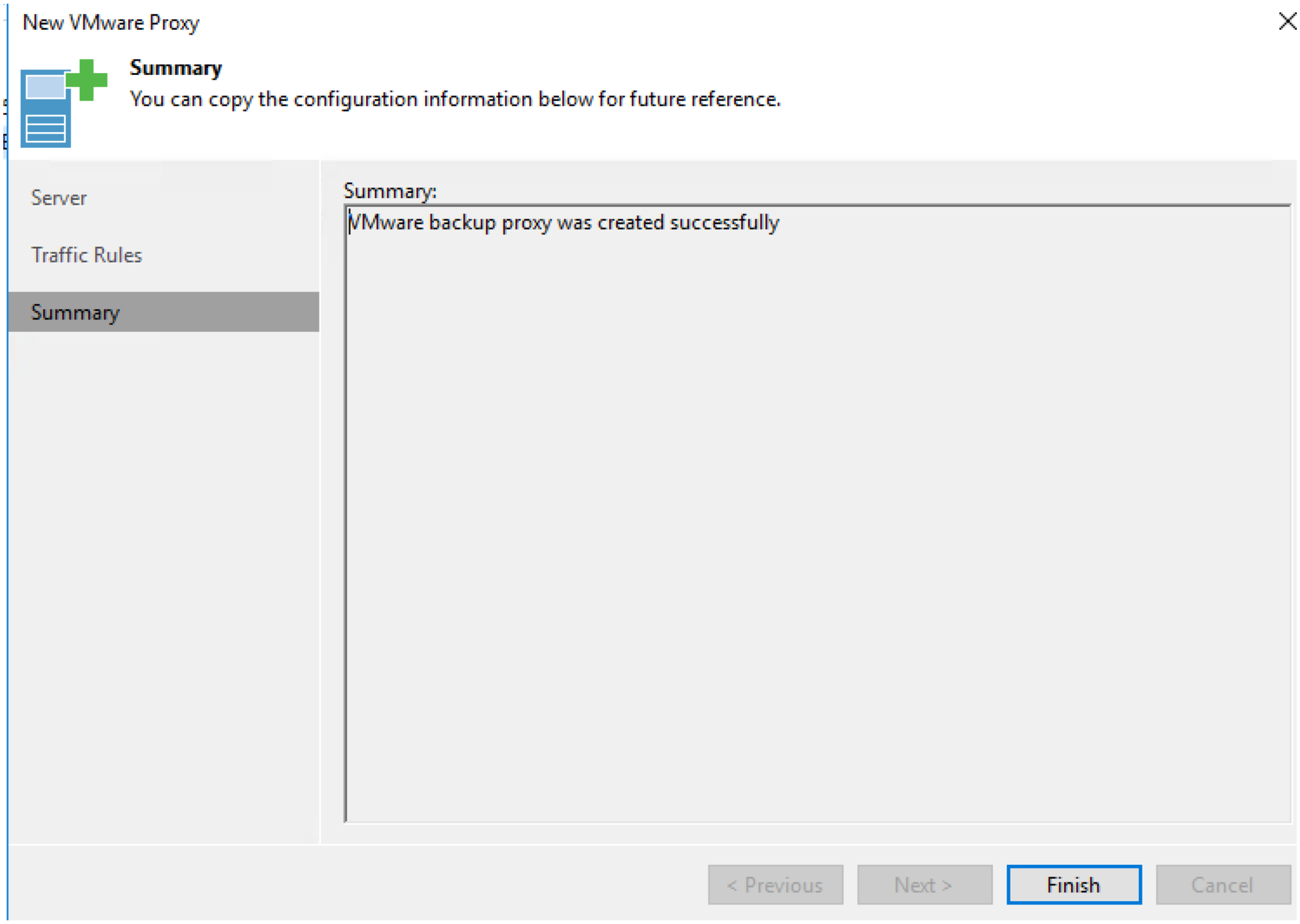


Apply

Please wait while required operations are being performed. This may take a few minutes...

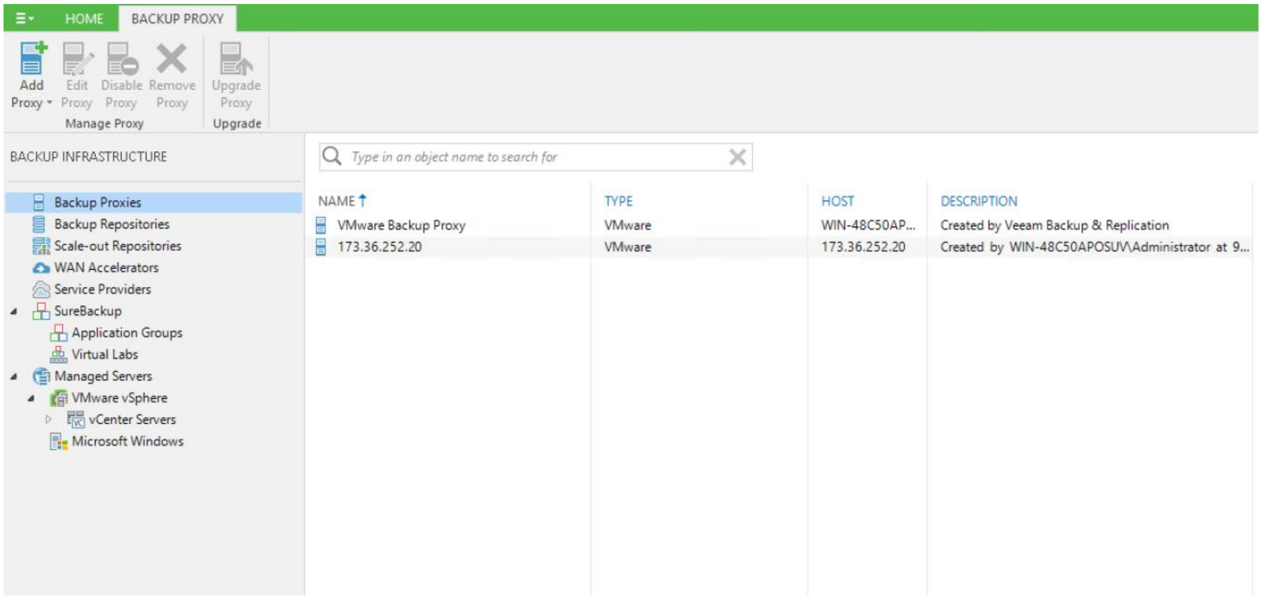
Message	Duration
✓ Starting infrastructure item creation job	0:00:02
✓ Collecting hardware info	
✓ Detecting operating system	
⚠ Detecting OS version	0:00:05
✓ Registering client WIN-48C50APOSUV for package Transport	
✓ Discovering installed packages	
✓ All required packages have been successfully installed	
✓ Creating database records for server	
✓ Detecting server configuration	
✓ Creating configuration database records for installed packages	
✓ Collecting disks and volumes info	0:00:04
⚠ Microsoft Windows server saved with warnings	

6. Select default for the subsequent screens and verify that the Proxy is successfully added.



VMware backup proxy was created successfully

7. Verify the Veeam Console is configured with two proxies:
   - Local Veeam proxy deployed on same S3260 storage server
   - Remote Veeam proxy deployed on C240 M4 LFF Rack Server



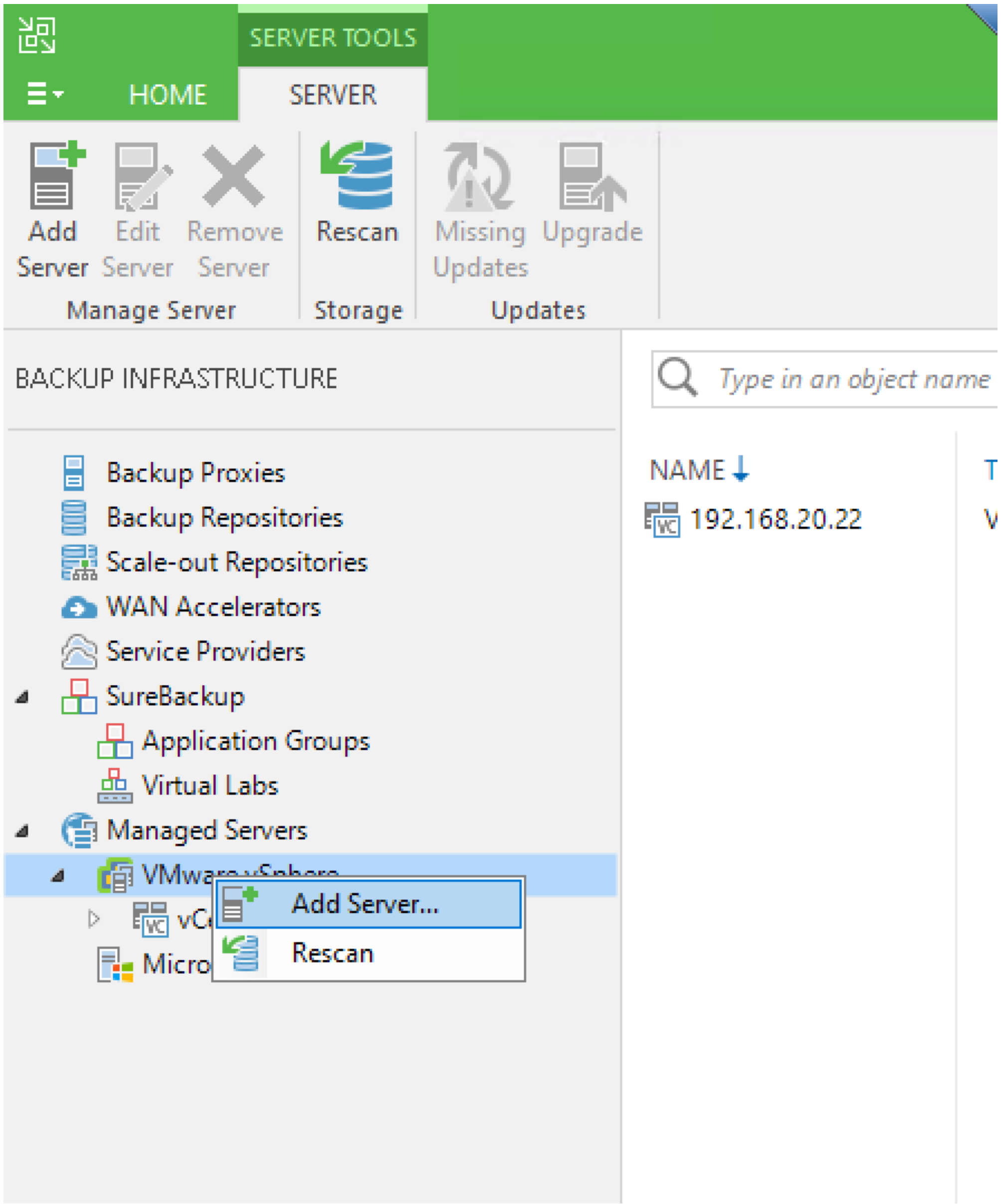
NAME	TYPE	HOST	DESCRIPTION
VMware Backup Proxy	VMware	WIN-48C50AP...	Created by Veeam Backup & Replication
173.36.252.20	VMware	173.36.252.20	Created by WIN-48C50APOSUV\Administrator at 9...

Add Remote VCenter to the Veeam Console

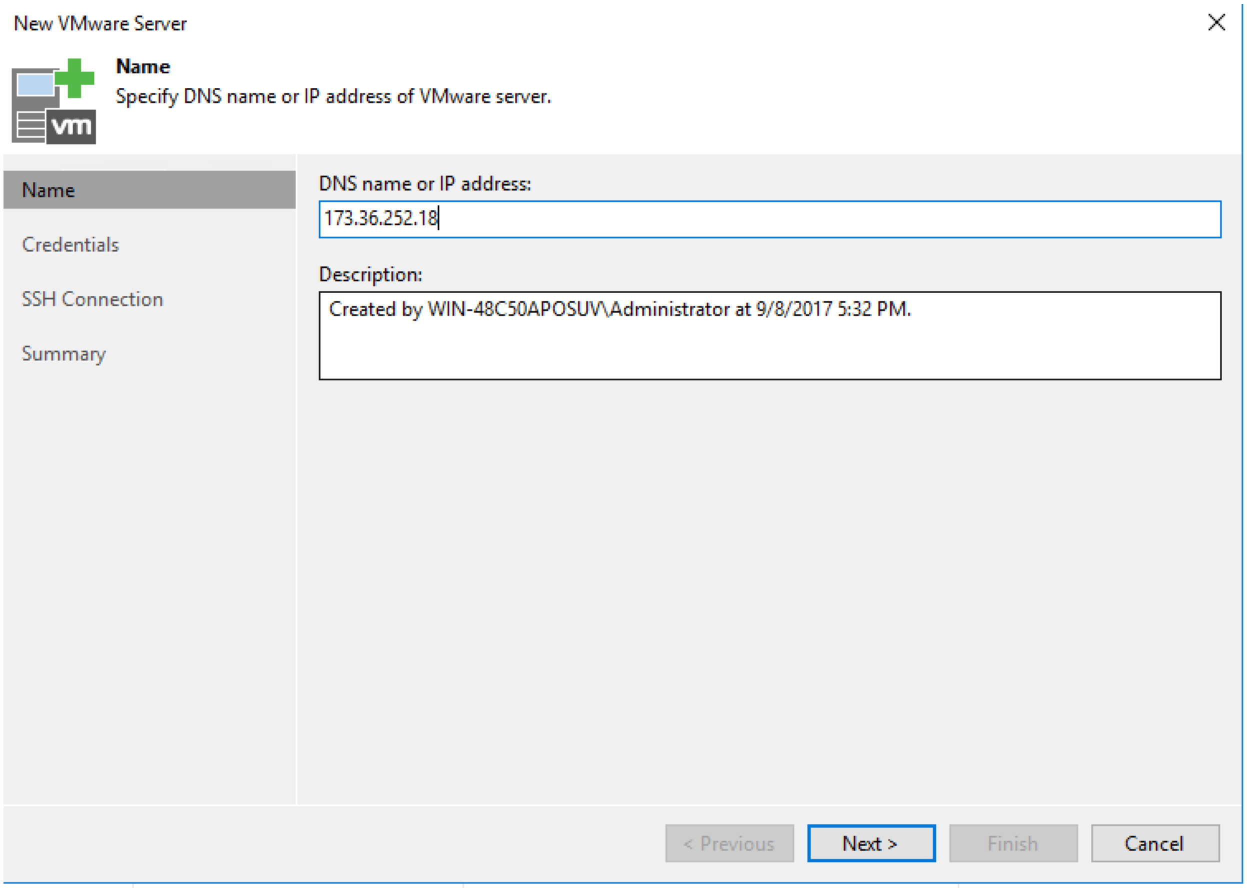
When the Remote Proxy is successfully added, you need to add the Remote VCenter managing the Remote HX Cluster.

To add the Remote VCenter, complete the following steps:

1. In the left pane of Veeam Console, Under Backup Infrastructure, right-click Managed Server and Select Add Server.



2. Add Remote VCenter Details.



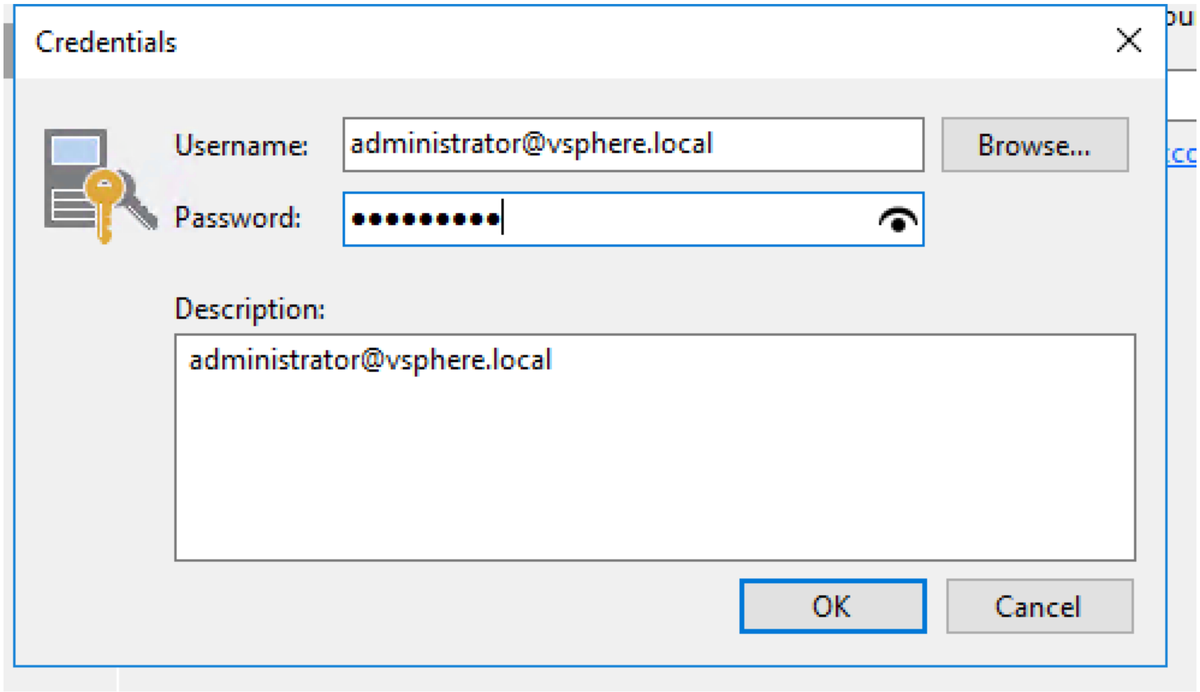
New VMware Server

Name

Specify DNS name or IP address of VMware server.

DNS name or IP address: 173.36.252.18

Description: Created by WIN-48C50APOSUV\Administrator at 9/8/2017 5:32 PM.



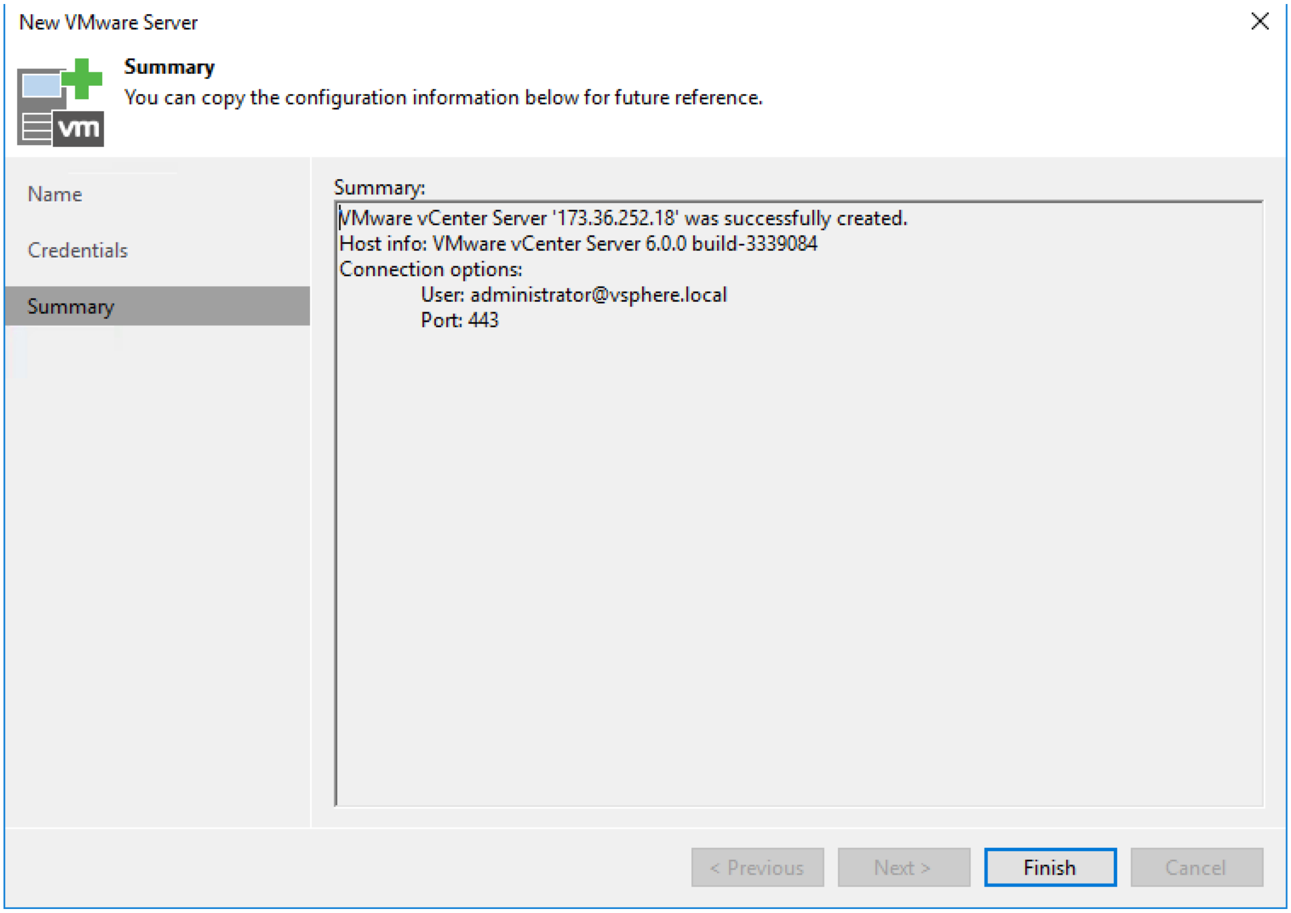
Credentials

Username: administrator@vsphere.local

Password: ●●●●●●●●●

Description: administrator@vsphere.local

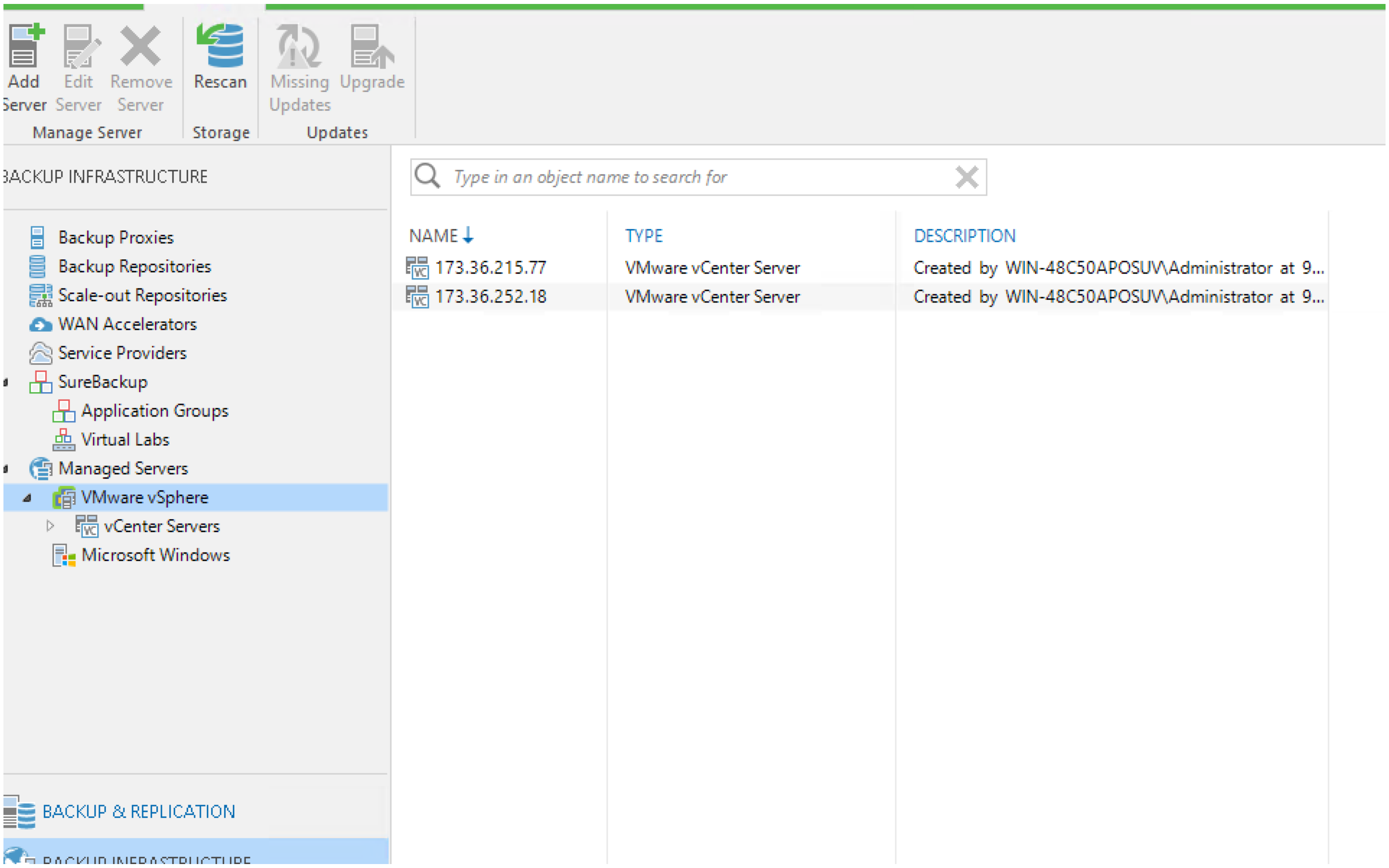
3. Verify VCenter is successfully added.



Summary:

```
VMware vCenter Server '173.36.252.18' was successfully created.
Host info: VMware vCenter Server 6.0.0 build-3339084
Connection options:
        User: administrator@vsphere.local
        Port: 443
```

4. Verify there are two VCenter configured on Veeam Console:
    a. Local VCenter configured for Local HyperFlex Cluster
    b. Remote VCenter with Remote HyperFlex Cluster



NAME	TYPE	DESCRIPTION
173.36.215.77	VMware vCenter Server	Created by WIN-48C50APOSUV\Administrator at 9...
173.36.252.18	VMware vCenter Server	Created by WIN-48C50APOSUV\Administrator at 9...

This completes the deployment of Veeam Availability Suite 9.5 on Cisco UCS S3260 Storage server with Primary HyperFlex Cluster and Remote Office HyperFlex Cluster.

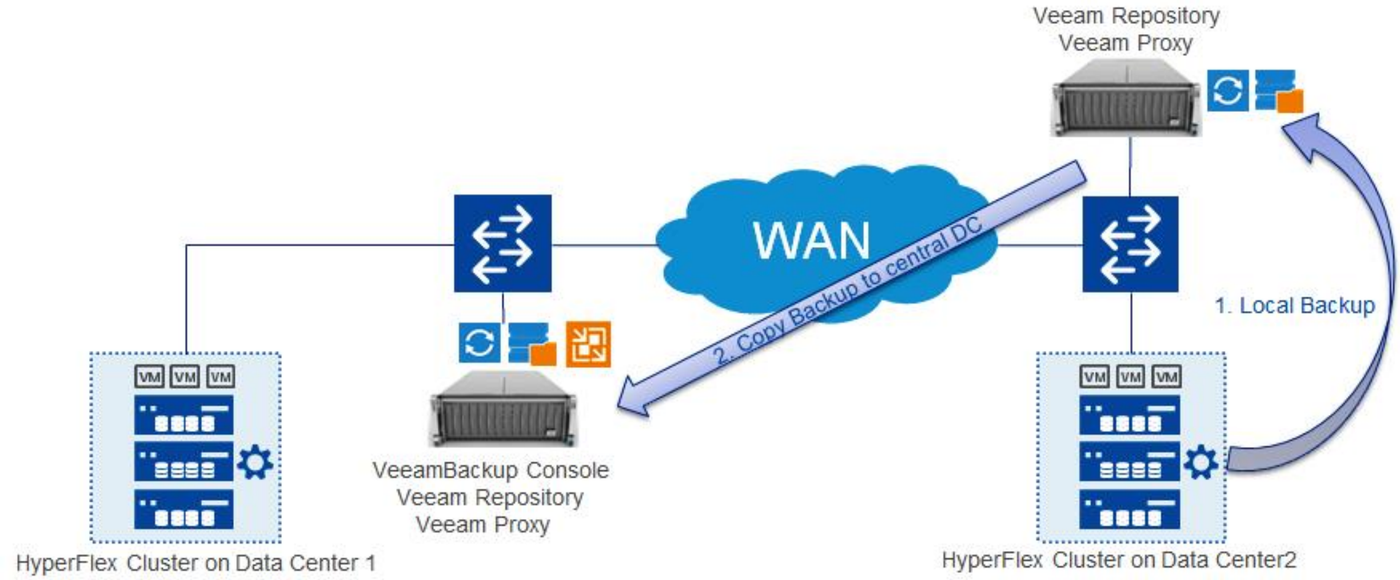
Cisco HyperFlex Multisite Protection

As detailed in section Multisite Backup and Replication for Cisco HyperFlex, Multisite Backup and Replication is configured with Cisco UCS S3260 Server on each of the data center. Both the proxy and Repository are configured on same the S3260 server.

Backup copy jobs can be executed across S3260 storage server. This allows high availability of backups during backup server failures in the Data Center.

Figure 33 illustrates the HyperFlex Multisite Backup components.

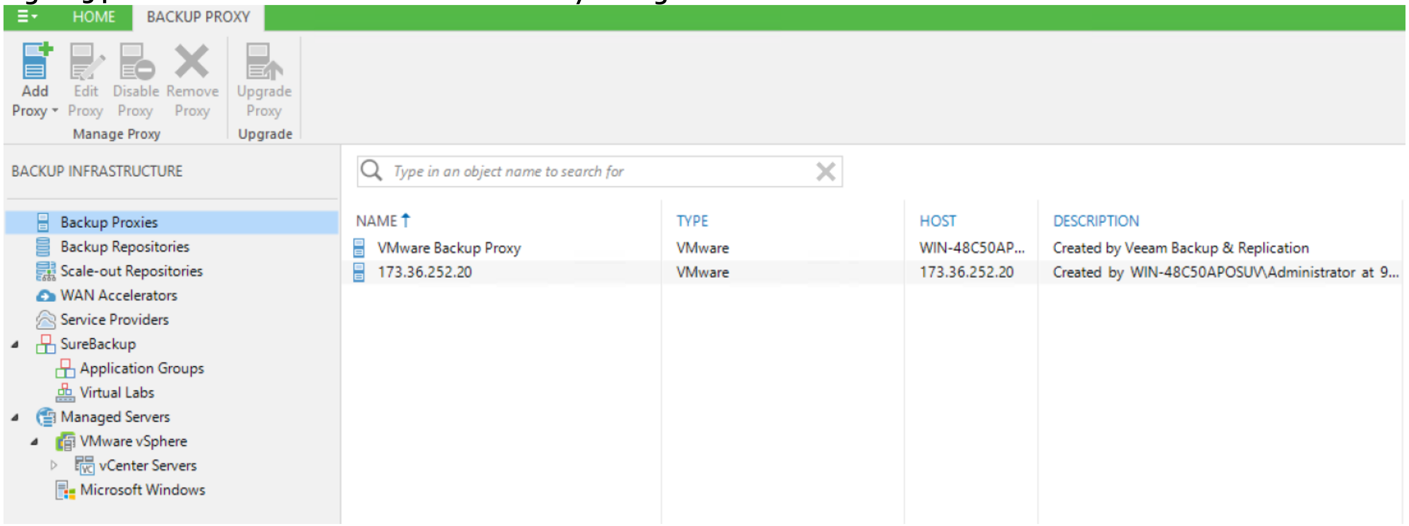
Figure 33 Multisite Backup Components



As detailed in Figure 34:

- Veeam Repository and Veeam Proxy are locally configured on the Cisco UCS SS3260 storage server existing on each of the data center. In cases wherein, the Remote Data Center requires lower storage capacity, Cisco UCS C240 M4 LFF server can be configured.
- Veeam Backup console is deployed on the S3260 storage server existing on the primary Data Center. Veeam Console can be also be configured as a VM on existing Primary Data Center ESXi environment.
- Veeam Console manages all the Veeam repositories and proxies existing across data centers.

Figure 34 Details of the Local and Remote Proxy Configured on Veeam Console

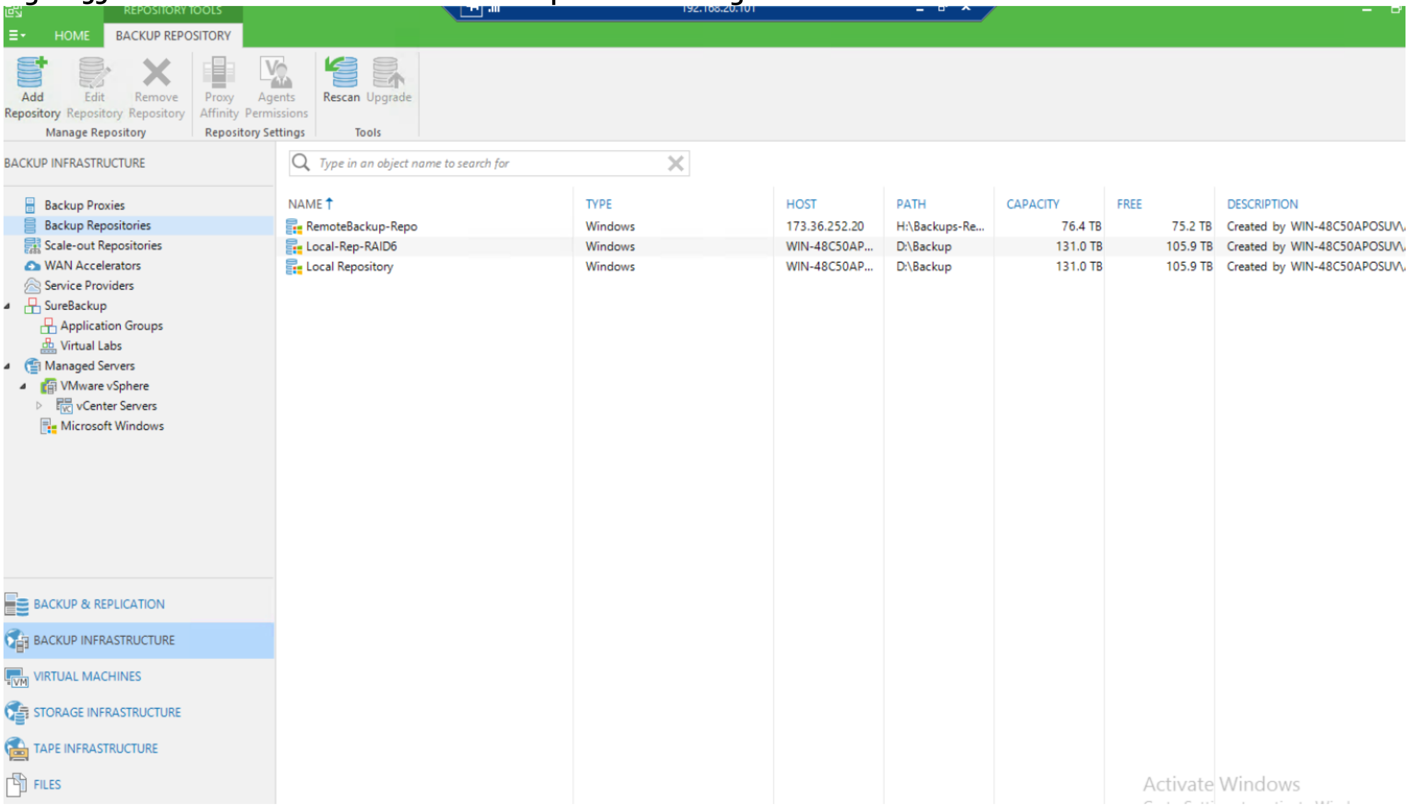


BACKUP INFRASTRUCTURE

- Backup Proxies
- Backup Repositories
- Scale-out Repositories
- WAN Accelerators
- Service Providers
- SureBackup
  - Application Groups
  - Virtual Labs
- Managed Servers
  - VMware vSphere
    - vCenter Servers
  - Microsoft Windows

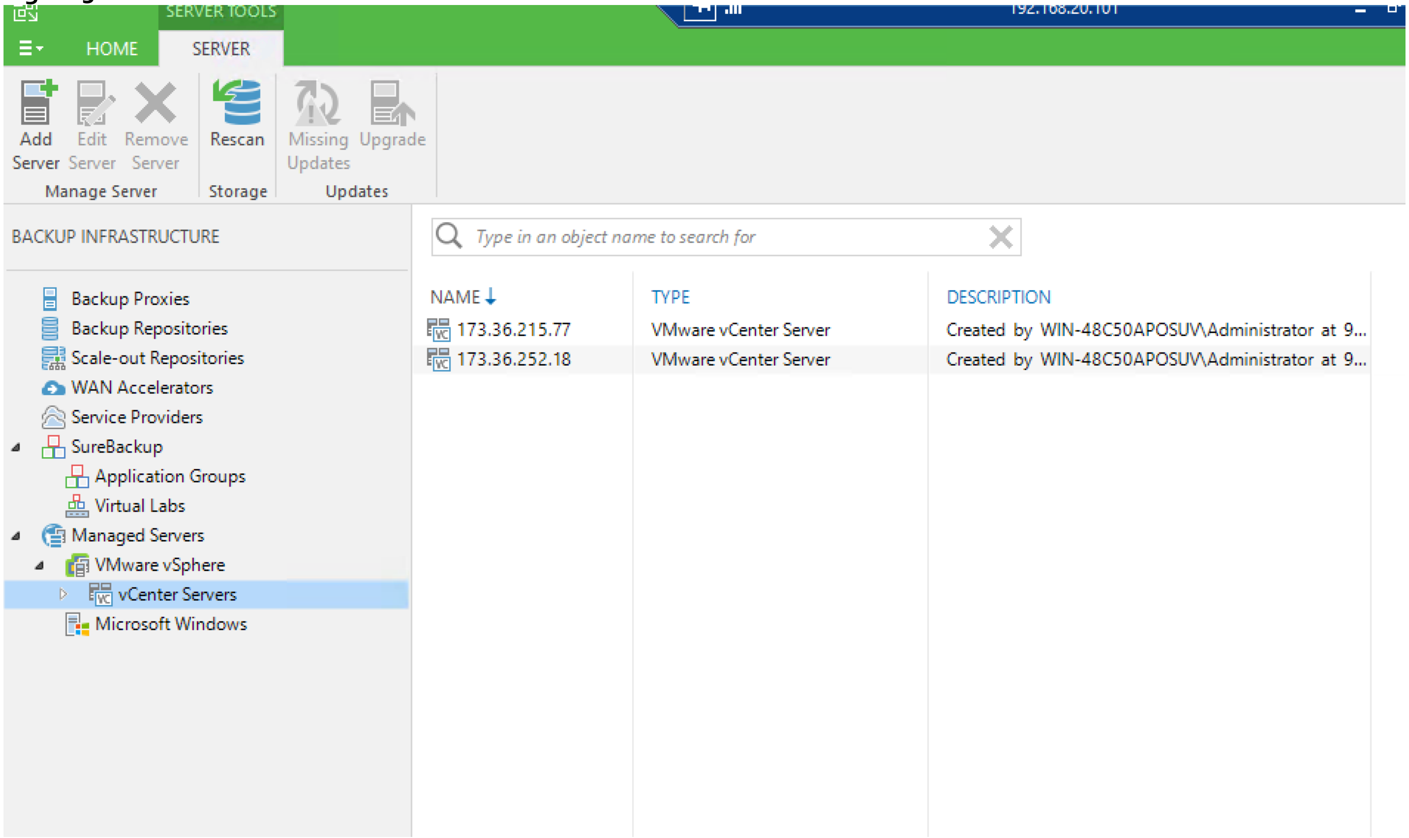
NAME ↑	TYPE	HOST	DESCRIPTION
VMware Backup Proxy	VMware	WIN-48C50AP...	Created by Veeam Backup & Replication
173.36.252.20	VMware	173.36.252.20	Created by WIN-48C50APOSUV\Administrator at 9...

Figure 35 Details of the Local and Remote Repositories Configured on Veeam



NAME ↑	TYPE	HOST	PATH	CAPACITY	FREE	DESCRIPTION
RemoteBackup-Repo	Windows	173.36.252.20	H:\Backups-Re...	76.4 TB	75.2 TB	Created by WIN-48C50APOSUV\
Local-Rep-RAID6	Windows	WIN-48C50AP...	D:\Backup	131.0 TB	105.9 TB	Created by WIN-48C50APOSUV\
Local Repository	Windows	WIN-48C50AP...	D:\Backup	131.0 TB	105.9 TB	Created by WIN-48C50APOSUV\

Figure 36 Details of the Remote and Local VCenters Added to Veeam Console



NAME ↓	TYPE	DESCRIPTION
173.36.215.77	VMware vCenter Server	Created by WIN-48C50APOSUV\Administrator at 9...
173.36.252.18	VMware vCenter Server	Created by WIN-48C50APOSUV\Administrator at 9...

Validation

This section describes the test executed to validate the Veeam Backup and Recovery Solution on the Cisco HyperFlex platform. This solution and its scenarios are validated with high-level backup, Replication, Failover and Failback task between HyperFlex Cluster and Cisco UCS S3260 Storage Server.

Some of the important test executed are as follows:

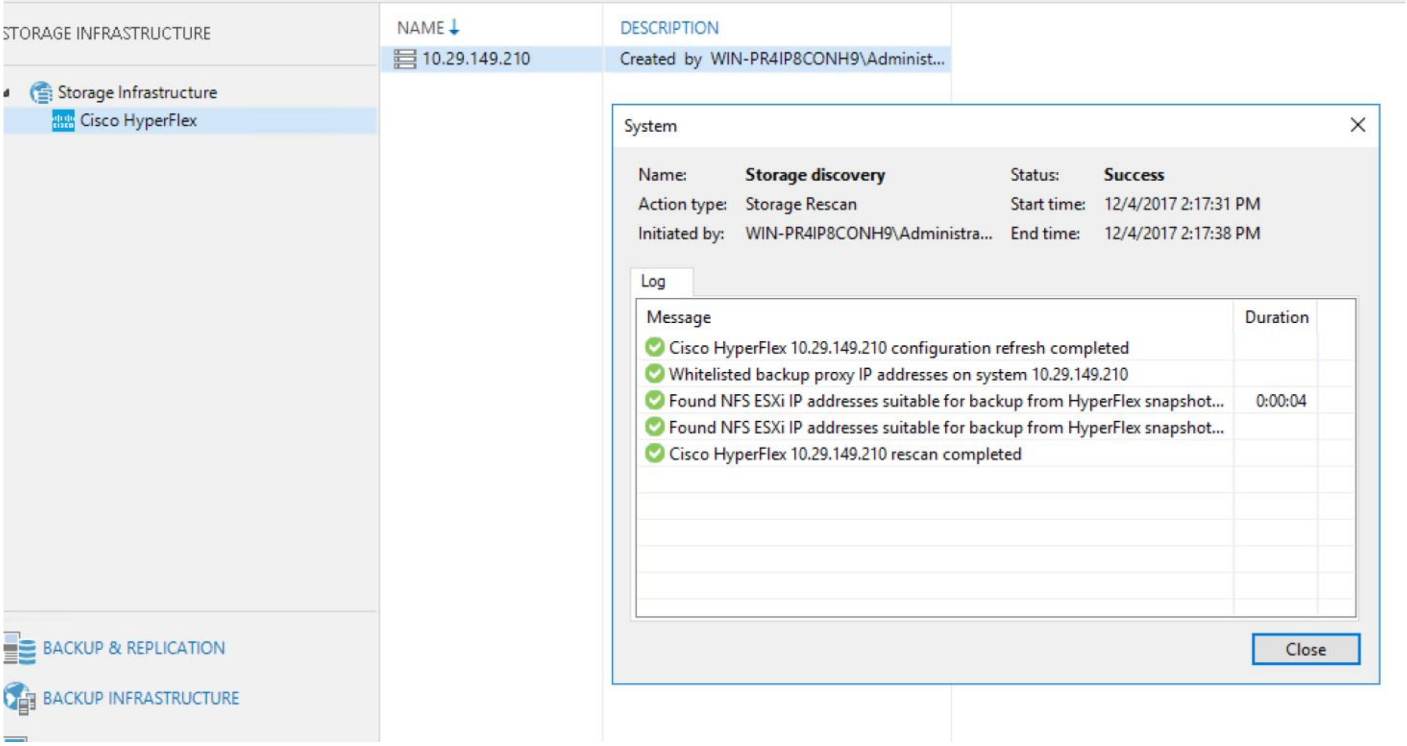
- Backup VM on HX Cluster with HyperFlex and Veeam Storage Integration
- Remote Office / Branch Office VM Replication
- Backup Copy jobs across Data Centers
- Restoration of VM from Backup Copy job to HyperFlex Cluster on DR Site

Backup VM on HX Cluster with HyperFlex and Veeam Storage Integration

The validation detailed below displays a successful backup of several VM on HX cluster to Cisco UCS S3260 target repository utilizing HyperFlex and Veeam Storage Integration.

To backup the VM on HX Cluster, complete the following steps:

1. Verify HX Cluster is configured through Veeam Storage Integration. As detailed in previous sections, refer to Cisco HyperFlex Storage Integration Guide, to successfully configure Strorage Infrastucture Integration of HyperFlex with Veeam.

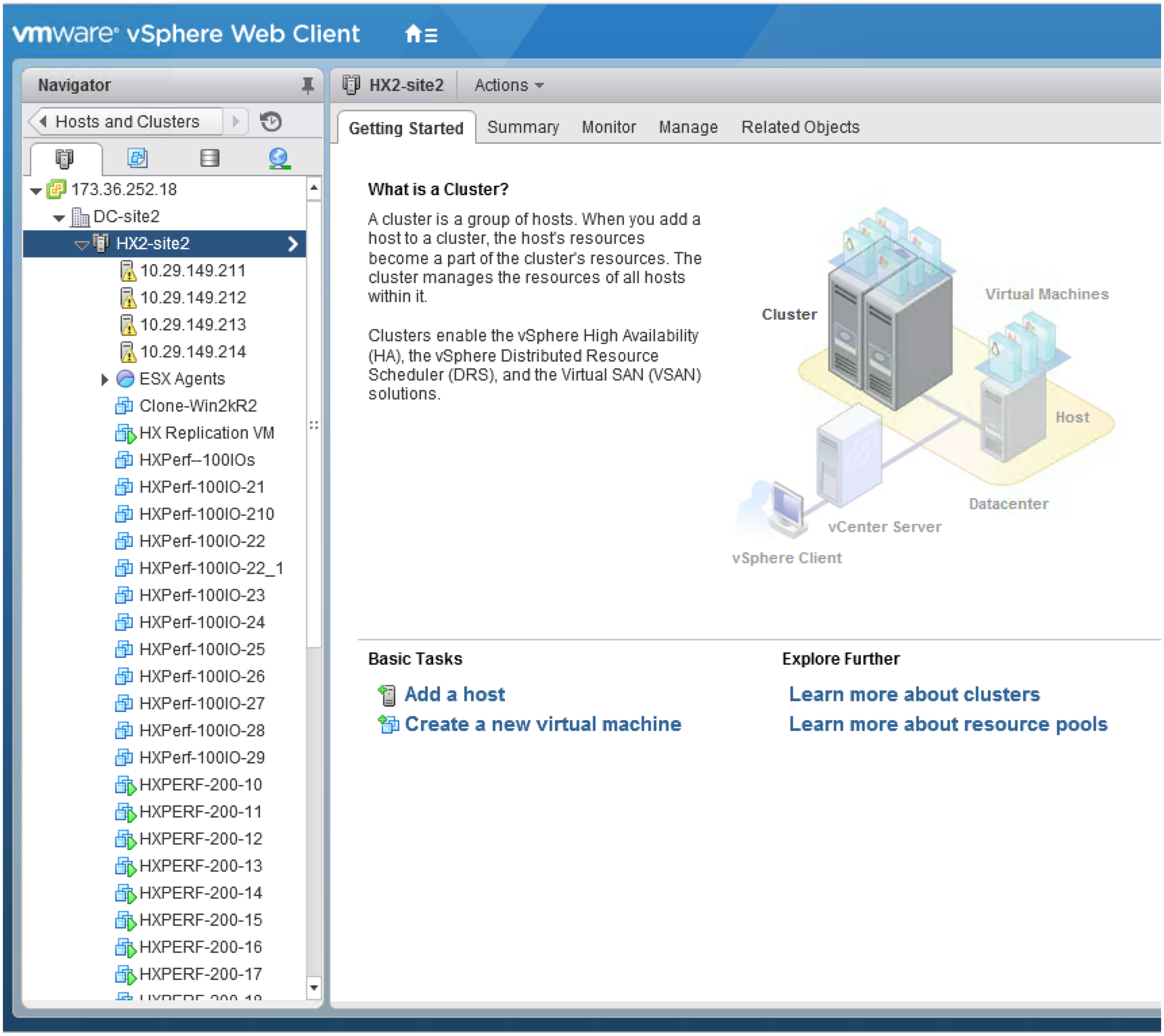


NAME	DESCRIPTION
10.29.149.210	Created by WIN-PR4IP8CONH9\Administ...

Name: **Storage discovery**
Status: **Success**
Action type: Storage Rescan
Start time: 12/4/2017 2:17:31 PM
Initiated by: WIN-PR4IP8CONH9\Administra...
End time: 12/4/2017 2:17:38 PM

Message	Duration
✓ Cisco HyperFlex 10.29.149.210 configuration refresh completed	
✓ Whitelisted backup proxy IP addresses on system 10.29.149.210	
✓ Found NFS ESXi IP addresses suitable for backup from HyperFlex snapshot...	0:00:04
✓ Found NFS ESXi IP addresses suitable for backup from HyperFlex snapshot...	
✓ Cisco HyperFlex 10.29.149.210 rescan completed	

2. Identify the VMs on HyperFlex Cluster for Backup through Veeam.



- 173.36.252.18
  - DC-site2
    - HX2-site2
      - 10.29.149.211
      - 10.29.149.212
      - 10.29.149.213
      - 10.29.149.214
      - ESX Agents
      - Clone-Win2kR2
      - HX Replication VM
      - HXPerf--100IOs
      - HXPerf-100IO-21
      - HXPerf-100IO-210
      - HXPerf-100IO-22
      - HXPerf-100IO-22_1
      - HXPerf-100IO-23
      - HXPerf-100IO-24
      - HXPerf-100IO-25
      - HXPerf-100IO-26
      - HXPerf-100IO-27
      - HXPerf-100IO-28
      - HXPerf-100IO-29
      - HXPERF-200-10
      - HXPERF-200-11
      - HXPERF-200-12
      - HXPERF-200-13
      - HXPERF-200-14
      - HXPERF-200-15
      - HXPERF-200-16
      - HXPERF-200-17

What is a Cluster?

A cluster is a group of hosts. When you add a host to a cluster, the host's resources become a part of the cluster's resources. The cluster manages the resources of all hosts within it.

Clusters enable the vSphere High Availability (HA), the vSphere Distributed Resource Scheduler (DRS), and the Virtual SAN (VSAN) solutions.

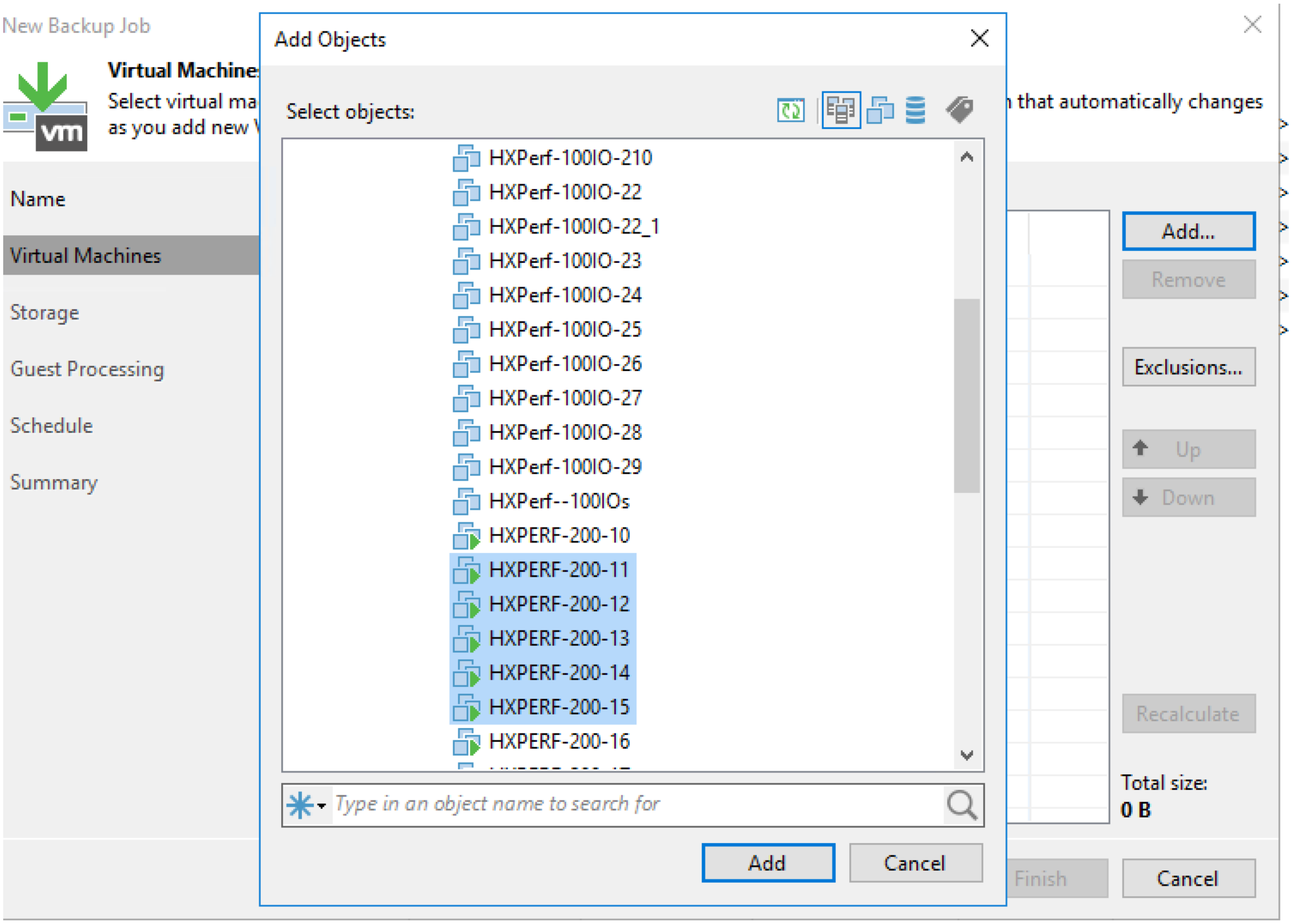
Basic Tasks

- Add a host
- Create a new virtual machine

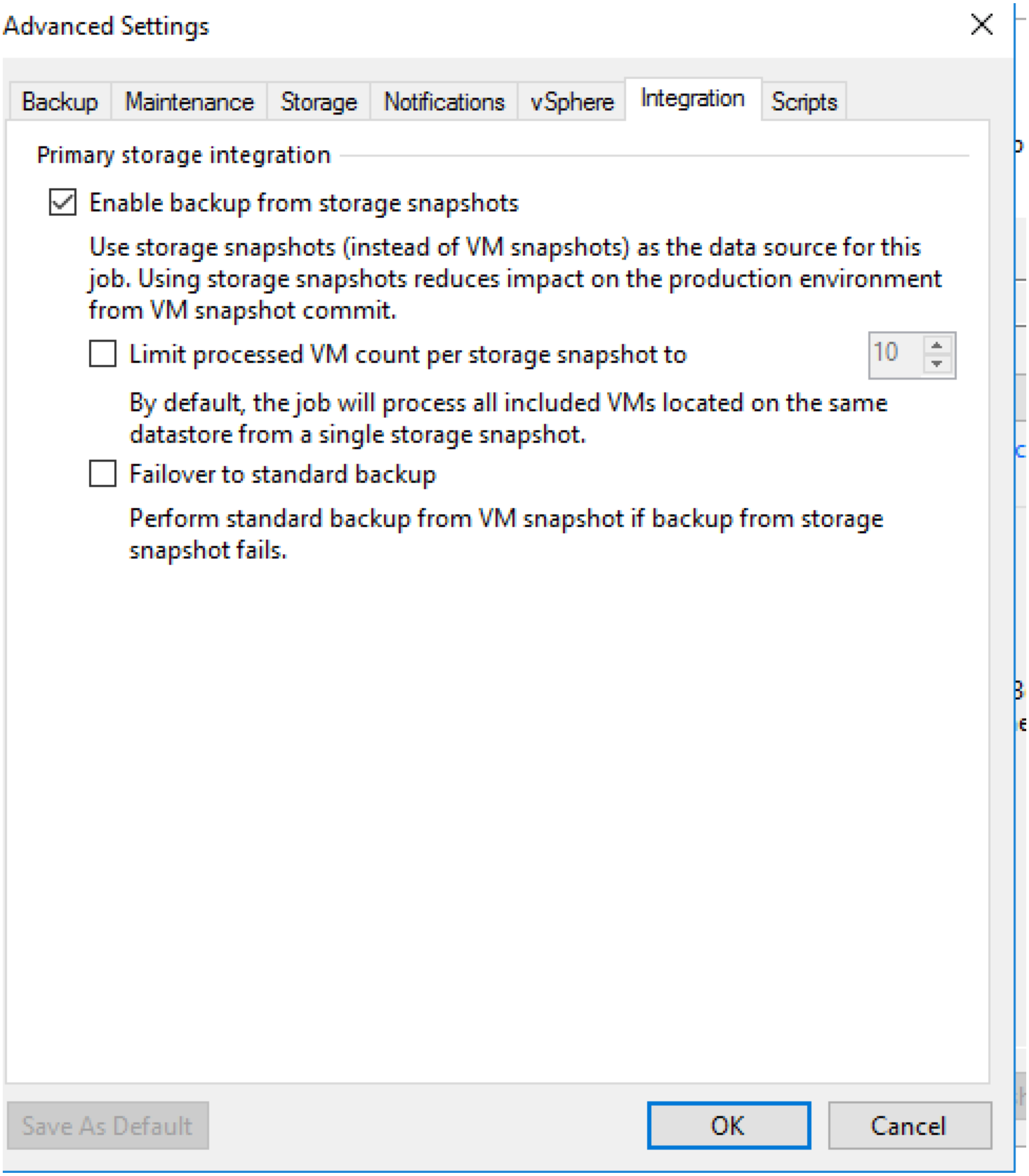
Explore Further

- Learn more about clusters
- Learn more about resource pools

3. Go to Veeam Backup and Replication Console and Create Backup job.



4. Make sure that Enable Backup from Storage Snapshot is checked.



Advanced Settings

Primary storage integration

☑ Enable backup from storage snapshots

Use storage snapshots (instead of VM snapshots) as the data source for this job. Using storage snapshots reduces impact on the production environment from VM snapshot commit.

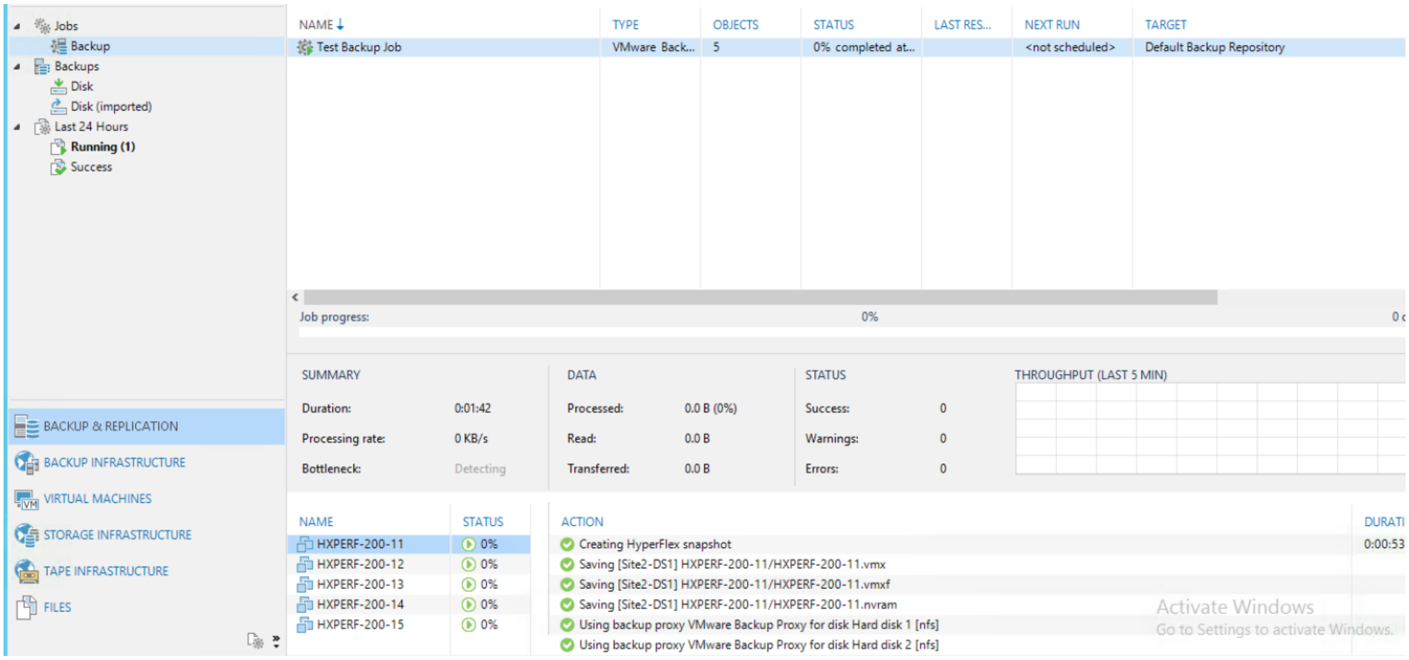
□ Limit processed VM count per storage snapshot to 10

By default, the job will process all included VMs located on the same datastore from a single storage snapshot.

□ Failover to standard backup

Perform standard backup from VM snapshot if backup from storage snapshot fails.

5. During Backup make sure Veeam executes HyperFlex Snapshot.



NAME	TYPE	OBJECTS	STATUS	LAST RES...	NEXT RUN	TARGET
Test Backup Job	VMware Back...	5	0% completed at...		<not scheduled>	Default Backup Repository

Job progress: 0% 0 c

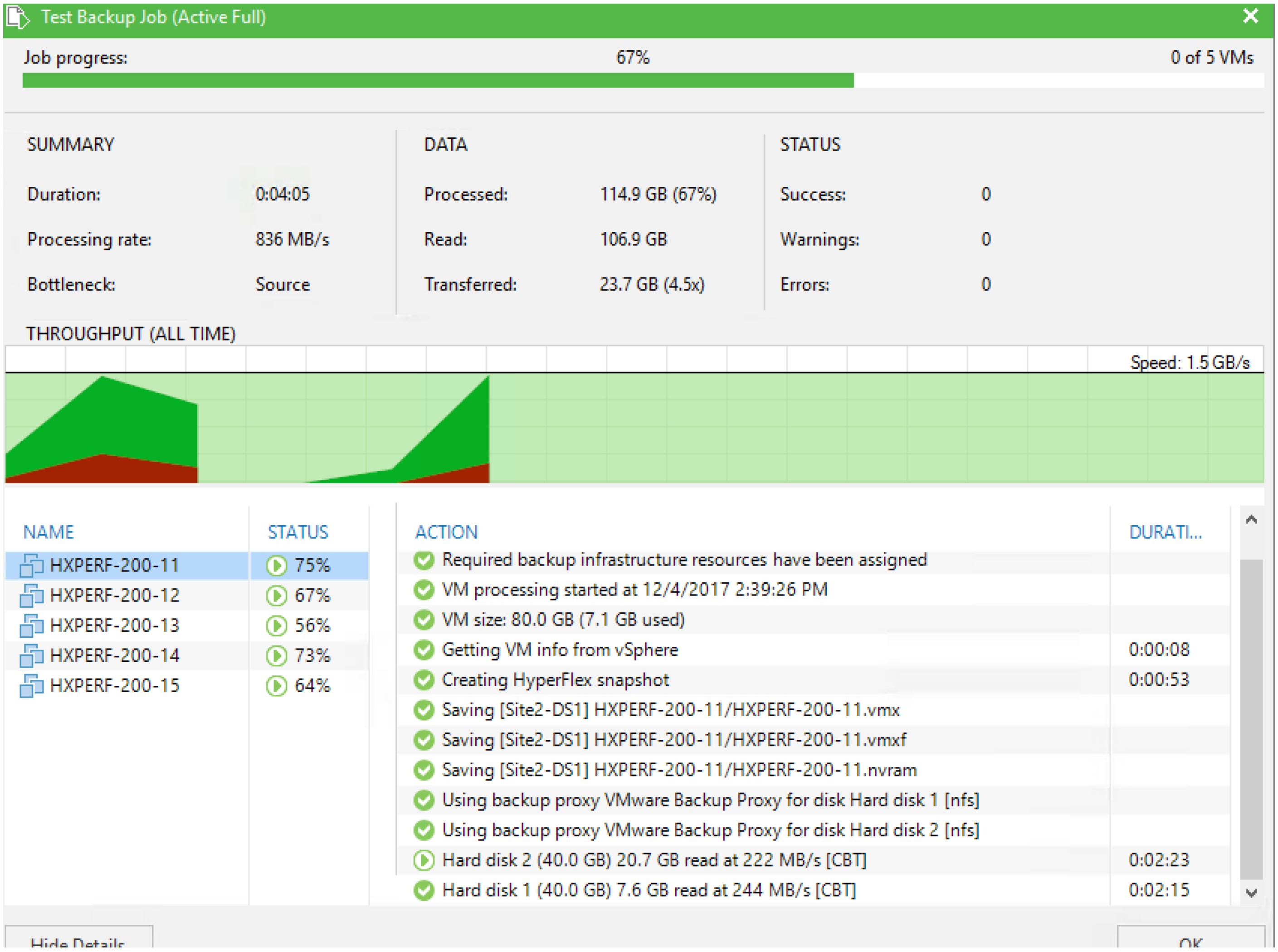
SUMMARY		DATA		STATUS	
Duration:	0:01:42	Processed:	0.0 B (0%)	Success:	0
Processing rate:	0 KB/s	Read:	0.0 B	Warnings:	0
Bottleneck:	Detecting	Transferred:	0.0 B	Errors:	0

THROUGHPUT (LAST 5 MIN)

NAME	STATUS
HXPERF-200-11	0%
HXPERF-200-12	0%
HXPERF-200-13	0%
HXPERF-200-14	0%
HXPERF-200-15	0%

ACTION	DURATI
✓ Creating HyperFlex snapshot	0:00:53
✓ Saving [Site2-DS1] HXPERF-200-11/HXPERF-200-11.vmx	
✓ Saving [Site2-DS1] HXPERF-200-11/HXPERF-200-11.vmxf	
✓ Saving [Site2-DS1] HXPERF-200-11/HXPERF-200-11.nvram	
✓ Using backup proxy VMware Backup Proxy for disk Hard disk 1 [nfs]	
✓ Using backup proxy VMware Backup Proxy for disk Hard disk 2 [nfs]	

6. During Execute Backup job and monitor progress.



Test Backup Job (Active Full)

Job progress: 67% 0 of 5 VMs

SUMMARY		DATA		STATUS	
Duration:	0:04:05	Processed:	114.9 GB (67%)	Success:	0
Processing rate:	836 MB/s	Read:	106.9 GB	Warnings:	0
Bottleneck:	Source	Transferred:	23.7 GB (4.5x)	Errors:	0

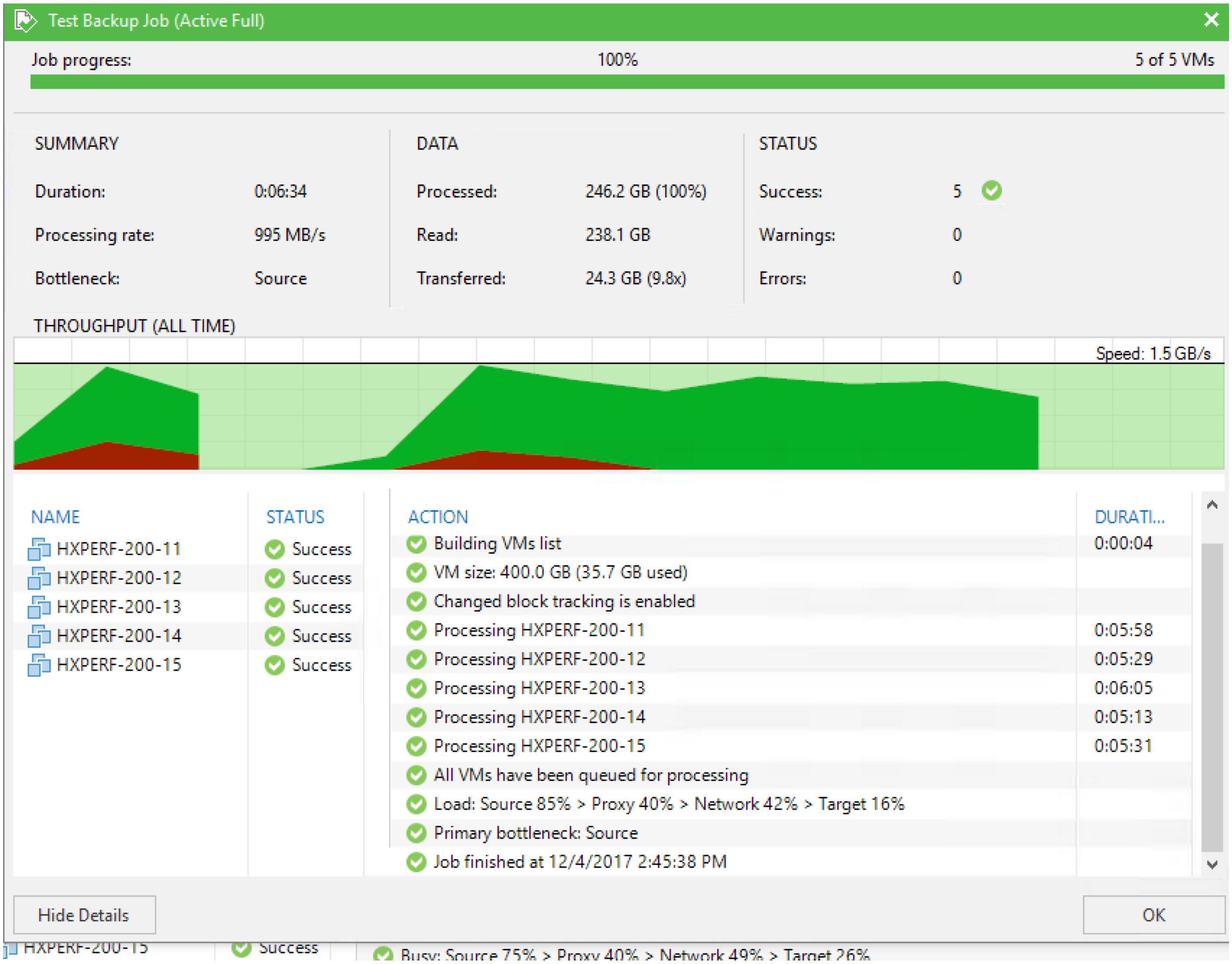
THROUGHPUT (ALL TIME)

Speed: 1.5 GB/s

NAME	STATUS
HXPERF-200-11	75%
HXPERF-200-12	67%
HXPERF-200-13	56%
HXPERF-200-14	73%
HXPERF-200-15	64%

ACTION	DURATI...
✓ Required backup infrastructure resources have been assigned	
✓ VM processing started at 12/4/2017 2:39:26 PM	
✓ VM size: 80.0 GB (7.1 GB used)	
✓ Getting VM info from vSphere	0:00:08
✓ Creating HyperFlex snapshot	0:00:53
✓ Saving [Site2-DS1] HXPERF-200-11/HXPERF-200-11.vmx	
✓ Saving [Site2-DS1] HXPERF-200-11/HXPERF-200-11.vmxf	
✓ Saving [Site2-DS1] HXPERF-200-11/HXPERF-200-11.nvram	
✓ Using backup proxy VMware Backup Proxy for disk Hard disk 1 [nfs]	
✓ Using backup proxy VMware Backup Proxy for disk Hard disk 2 [nfs]	
▷ Hard disk 2 (40.0 GB) 20.7 GB read at 222 MB/s [CBT]	0:02:23
✓ Hard disk 1 (40.0 GB) 7.6 GB read at 244 MB/s [CBT]	0:02:15

7. Validate the successful completion of Backup job.



Test Backup Job (Active Full)

Job progress: 100% 5 of 5 VMs

SUMMARY		DATA		STATUS	
Duration:	0:06:34	Processed:	246.2 GB (100%)	Success:	5 ✓
Processing rate:	995 MB/s	Read:	238.1 GB	Warnings:	0
Bottleneck:	Source	Transferred:	24.3 GB (9.8x)	Errors:	0

THROUGHPUT (ALL TIME)

NAME	STATUS
HXPERF-200-11	✓ Success
HXPERF-200-12	✓ Success
HXPERF-200-13	✓ Success
HXPERF-200-14	✓ Success
HXPERF-200-15	✓ Success

ACTION	DURATI...
✓ Building VMs list	0:00:04
✓ VM size: 400.0 GB (35.7 GB used)	
✓ Changed block tracking is enabled	
✓ Processing HXPERF-200-11	0:05:58
✓ Processing HXPERF-200-12	0:05:29
✓ Processing HXPERF-200-13	0:06:05
✓ Processing HXPERF-200-14	0:05:13
✓ Processing HXPERF-200-15	0:05:31
✓ All VMs have been queued for processing	
✓ Load: Source 85% > Proxy 40% > Network 42% > Target 16%	
✓ Primary bottleneck: Source	
✓ Job finished at 12/4/2017 2:45:38 PM	

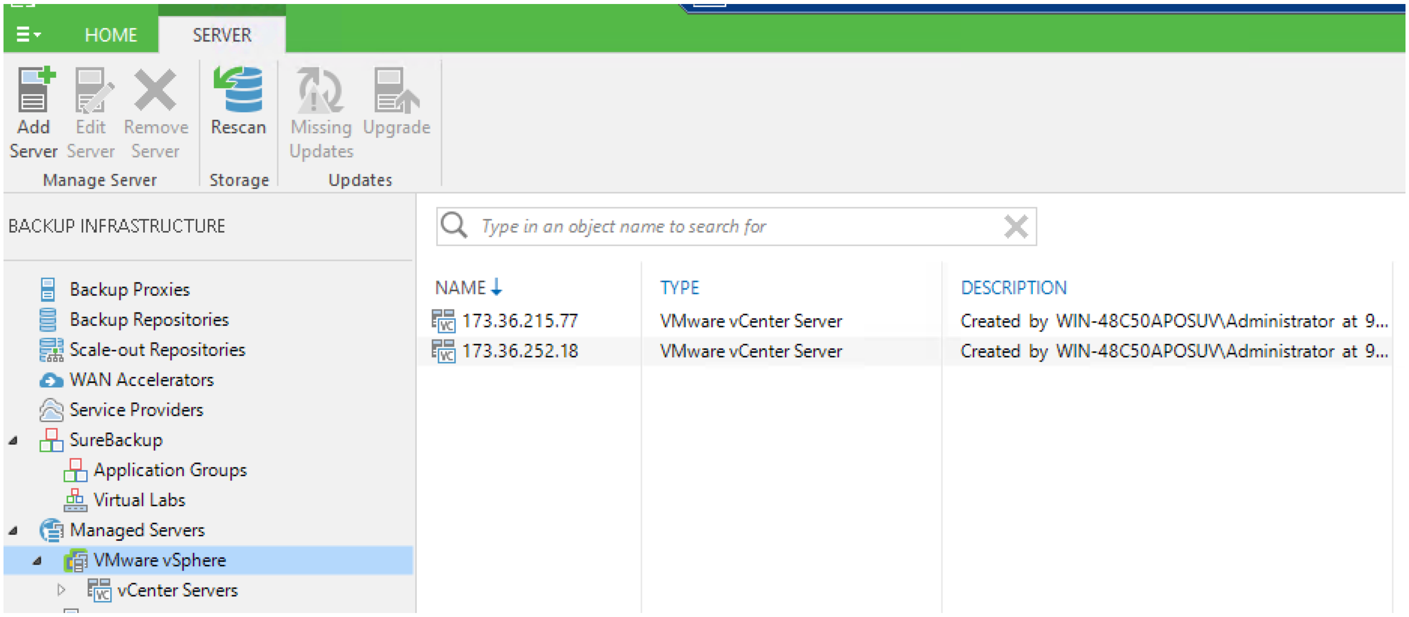
HXPERF-200-15 ✓ Success ✓ Busy: Source 75% > Proxy 40% > Network 49% > Target 26%

Remote Office / Branch Office VM Replication

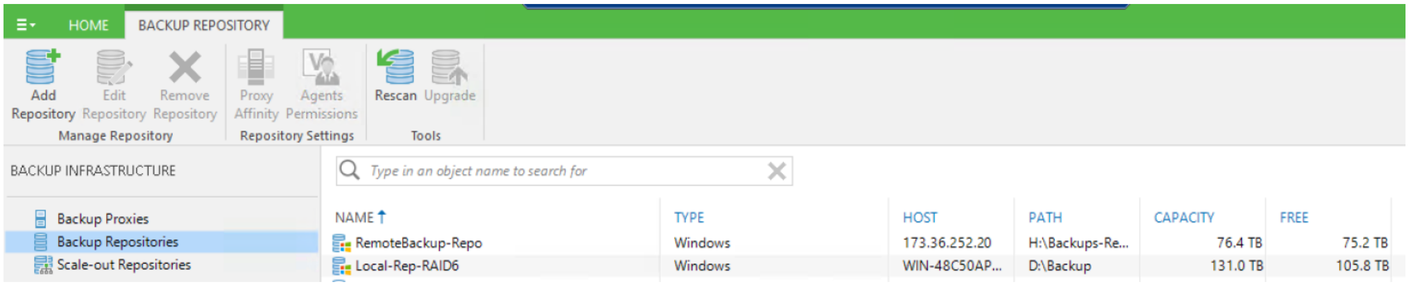
The validation detailed below displays a successful backup of several VM on HX cluster to Cisco UCS S3260 target repository utilizing HyperFlex and Veeam Storage Integration.

To replicate the VM for the Remote/Branch office, complete the following steps:

1. Identify the VM to be replicate on Remote Site. Make sure the Remote VCenter and Remote Veeam Proxy is configured through Veeam Backup Server.

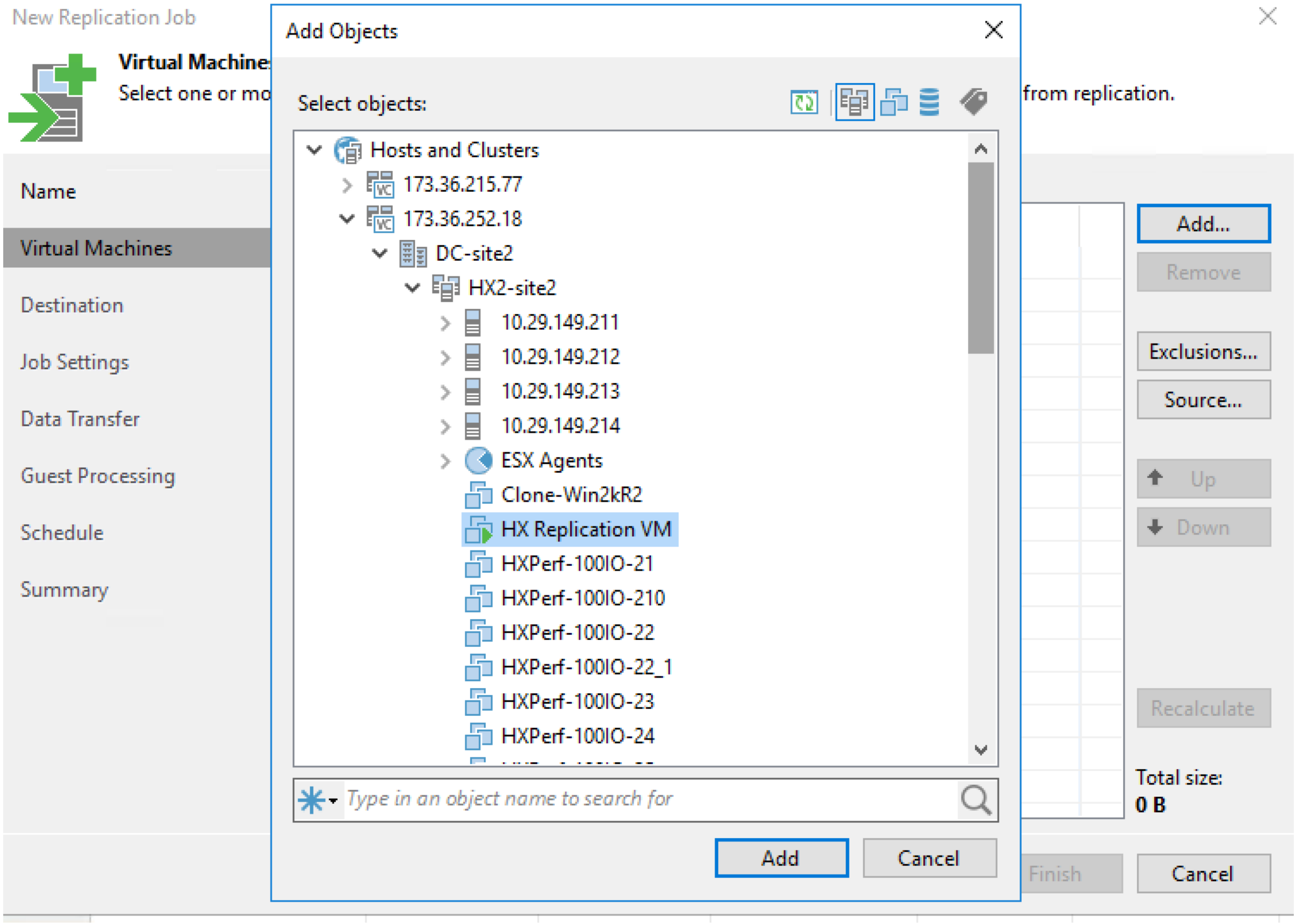


NAME	TYPE	DESCRIPTION
173.36.215.77	VMware vCenter Server	Created by WIN-48C50APOSUV\Administrator at 9...
173.36.252.18	VMware vCenter Server	Created by WIN-48C50APOSUV\Administrator at 9...

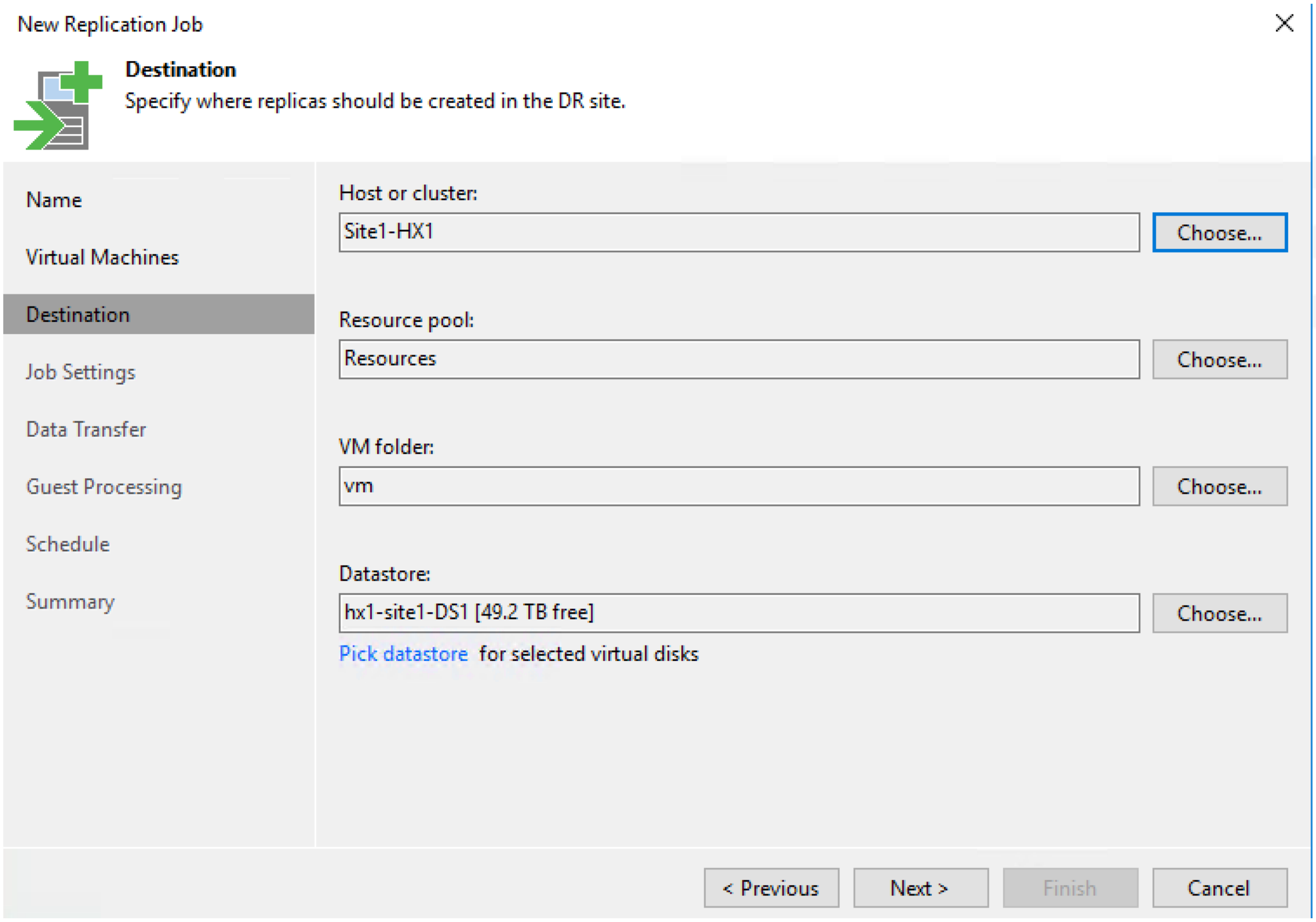


NAME	TYPE	HOST	PATH	CAPACITY	FREE
RemoteBackup-Repo	Windows	173.36.252.20	H:\Backups-Re...	76.4 TB	75.2 TB
Local-Rep-RAID6	Windows	WIN-48C50AP...	D:\Backup	131.0 TB	105.8 TB

2. Create a Replication Job and Add VM for Replication.



3. Configure Destination. This would is the HX Cluster on the Primary Site.



New Replication Job

Destination

Specify where replicas should be created in the DR site.

Host or cluster: Site1-HX1

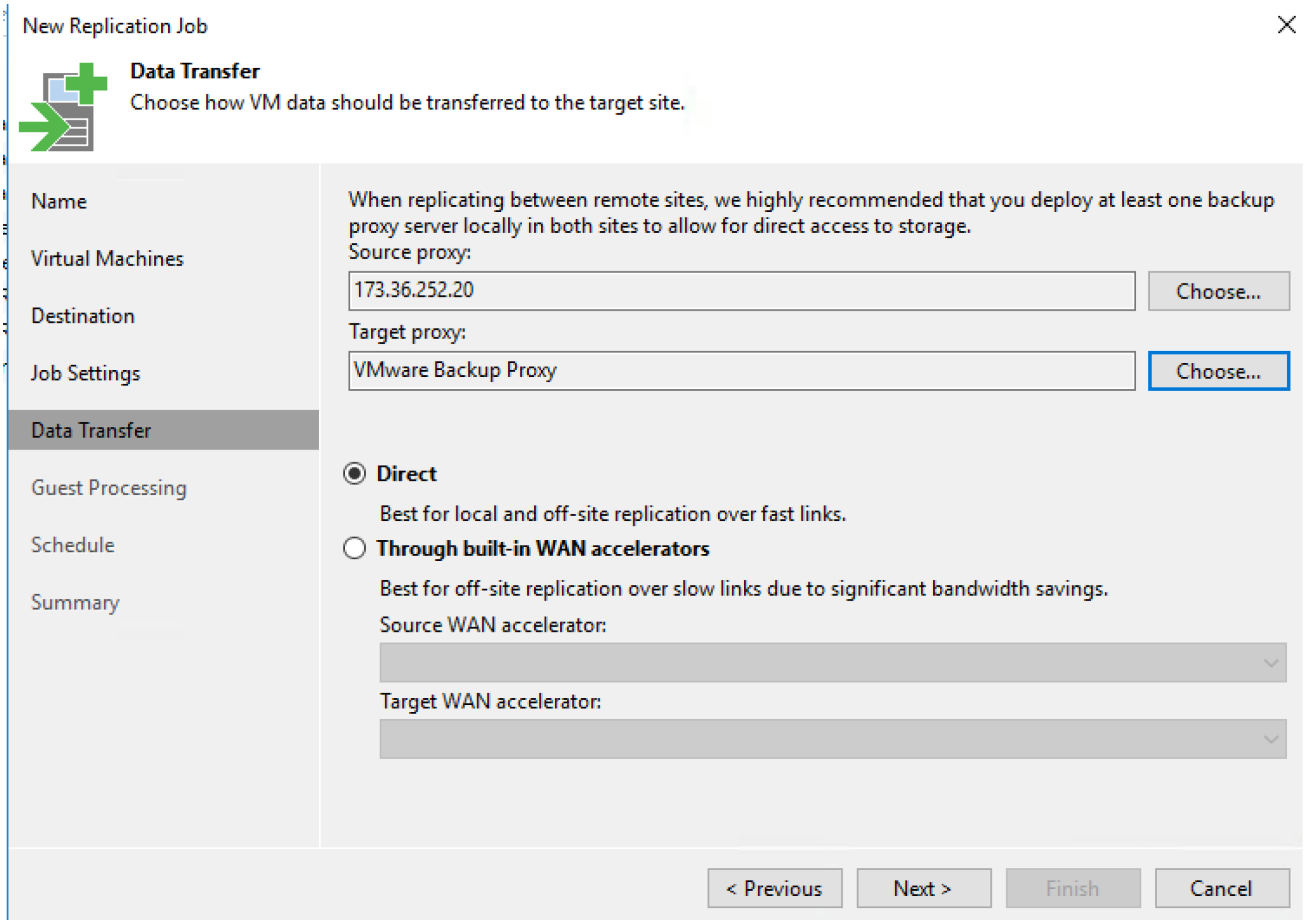
Resource pool: Resources

VM folder: vm

Datastore: hx1-site1-DS1 [49.2 TB free]

Pick datastore for selected virtual disks

4. Configure Source and Target Proxy.



Data Transfer

Choose how VM data should be transferred to the target site.

When replicating between remote sites, we highly recommended that you deploy at least one backup proxy server locally in both sites to allow for direct access to storage.

Source proxy: 173.36.252.20

Target proxy: VMware Backup Proxy

● **Direct**

Best for local and off-site replication over fast links.

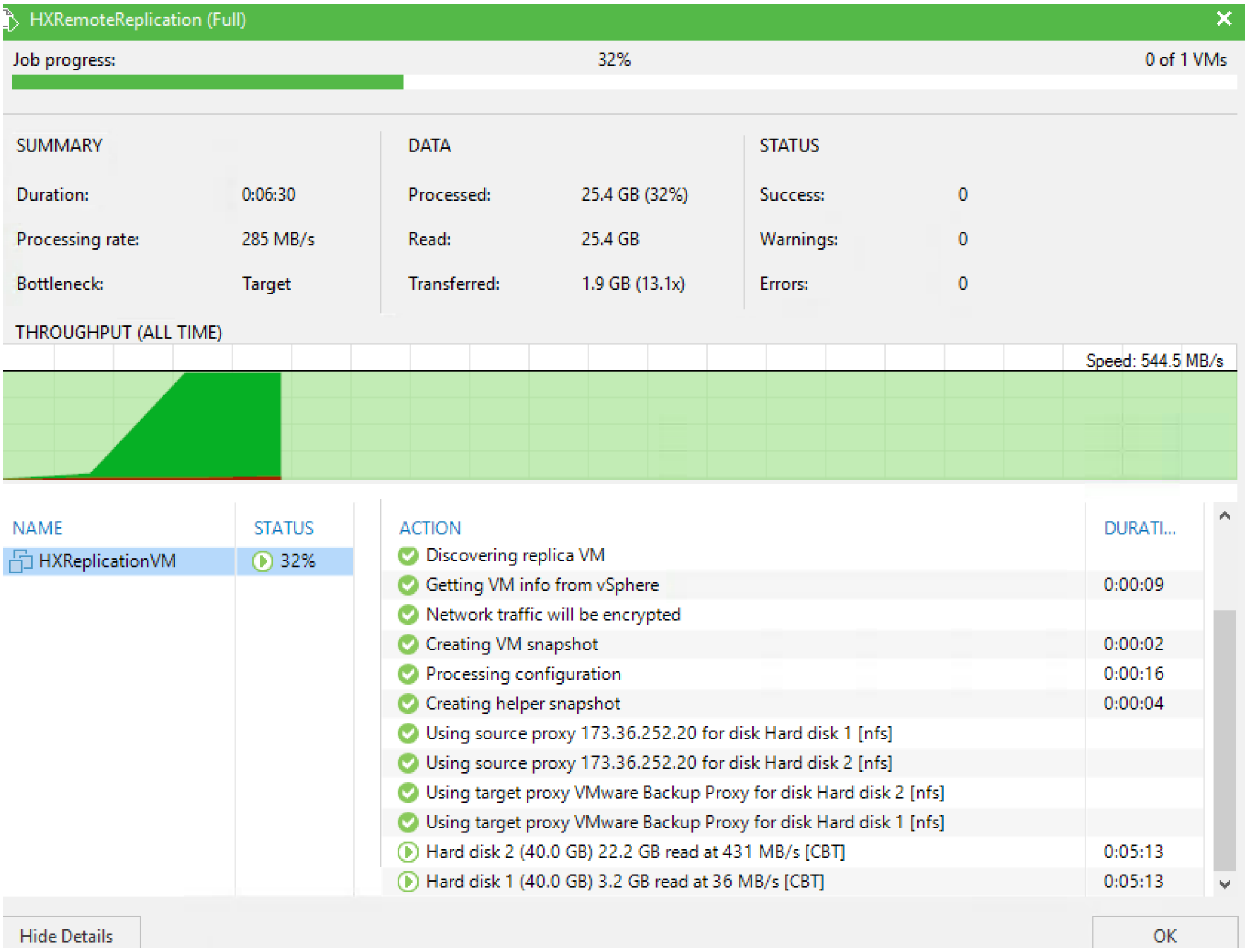
○ **Through built-in WAN accelerators**

Best for off-site replication over slow links due to significant bandwidth savings.

Source WAN accelerator:

Target WAN accelerator:

5. Execute the Replication Job and monitor progress.



HXRemoteReplication (Full)

Job progress: 32% 0 of 1 VMs

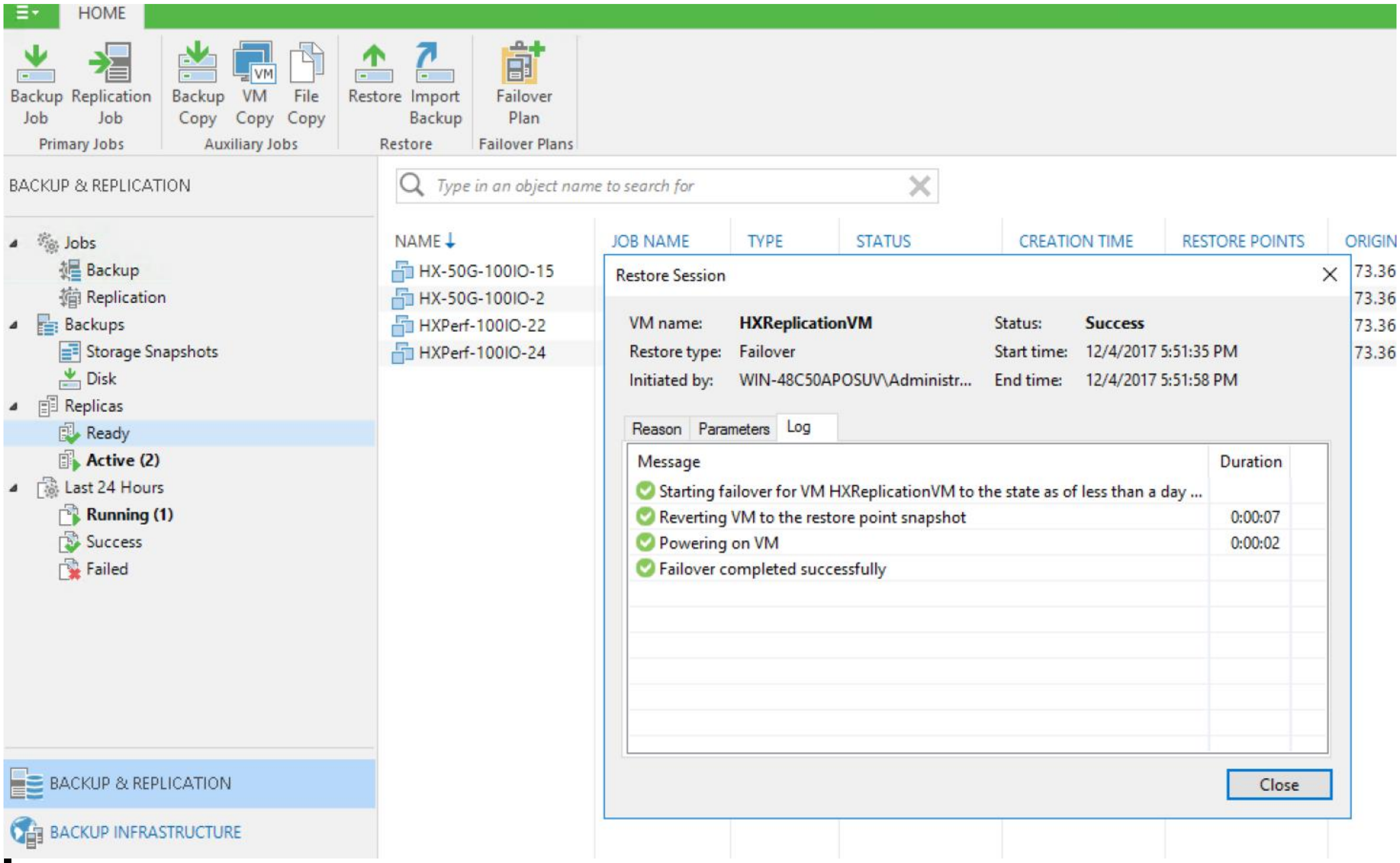
SUMMARY		DATA		STATUS	
Duration:	0:06:30	Processed:	25.4 GB (32%)	Success:	0
Processing rate:	285 MB/s	Read:	25.4 GB	Warnings:	0
Bottleneck:	Target	Transferred:	1.9 GB (13.1x)	Errors:	0

THROUGHPUT (ALL TIME)

Speed: 544.5 MB/s

NAME	STATUS	ACTION	DURATI...
HXReplicationVM	32%	✓ Discovering replica VM	
		✓ Getting VM info from vSphere	0:00:09
		✓ Network traffic will be encrypted	
		✓ Creating VM snapshot	0:00:02
		✓ Processing configuration	0:00:16
		✓ Creating helper snapshot	0:00:04
		✓ Using source proxy 173.36.252.20 for disk Hard disk 1 [nfs]	
		✓ Using source proxy 173.36.252.20 for disk Hard disk 2 [nfs]	
		✓ Using target proxy VMware Backup Proxy for disk Hard disk 2 [nfs]	
		✓ Using target proxy VMware Backup Proxy for disk Hard disk 1 [nfs]	
		Hard disk 2 (40.0 GB) 22.2 GB read at 431 MB/s [CBT]	0:05:13
		Hard disk 1 (40.0 GB) 3.2 GB read at 36 MB/s [CBT]	0:05:13

6. When the job completes, you can execute a Failover and verify that the VM has failed over to the Primary HX Cluster.

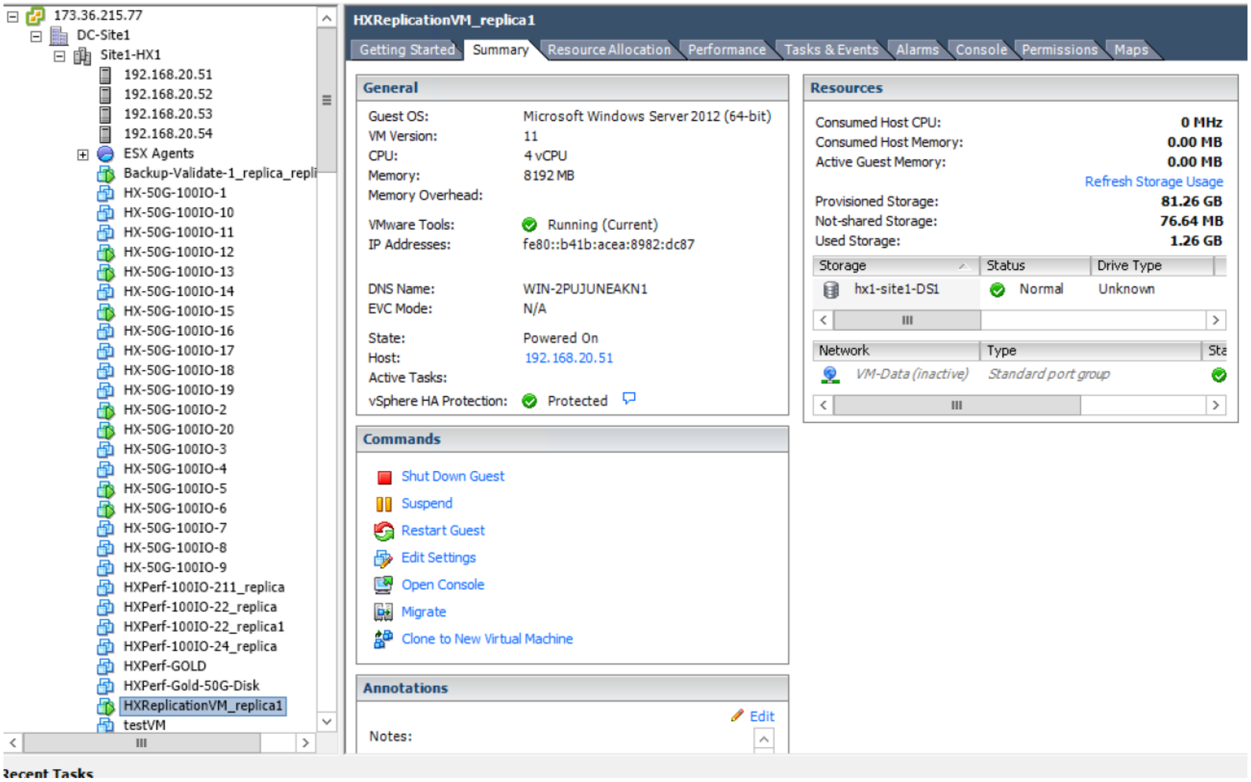


Restore Session

VM name:	HXReplicationVM	Status:	Success
Restore type:	Failover	Start time:	12/4/2017 5:51:35 PM
Initiated by:	WIN-48C50APOSUV\Administr...	End time:	12/4/2017 5:51:58 PM

Reason | Parameters | Log

Message	Duration
✓ Starting failover for VM HXReplicationVM to the state as of less than a day ...	
✓ Reverting VM to the restore point snapshot	0:00:07
✓ Powering on VM	0:00:02
✓ Failover completed successfully	



HXReplicationVM_replica1

General

Guest OS:	Microsoft Windows Server 2012 (64-bit)
VM Version:	11
CPU:	4 vCPU
Memory:	8192 MB
Memory Overhead:	
VMware Tools:	✓ Running (Current)
IP Addresses:	fe80::b41b:acea:8982:dc87
DNS Name:	WIN-2PUJUNEAKN1
EVC Mode:	N/A
State:	Powered On
Host:	192.168.20.51
Active Tasks:	
vSphere HA Protection:	✓ Protected

Resources

Consumed Host CPU:	0 MHz
Consumed Host Memory:	0.00 MB
Active Guest Memory:	0.00 MB
	Refresh Storage Usage
Provisioned Storage:	81.26 GB
Not-shared Storage:	76.64 MB
Used Storage:	1.26 GB

Storage	Status	Drive Type
hx1-site1-DS1	✓ Normal	Unknown

Network	Type	Sta
VM-Data (inactive)	Standard port group	✓

Commands

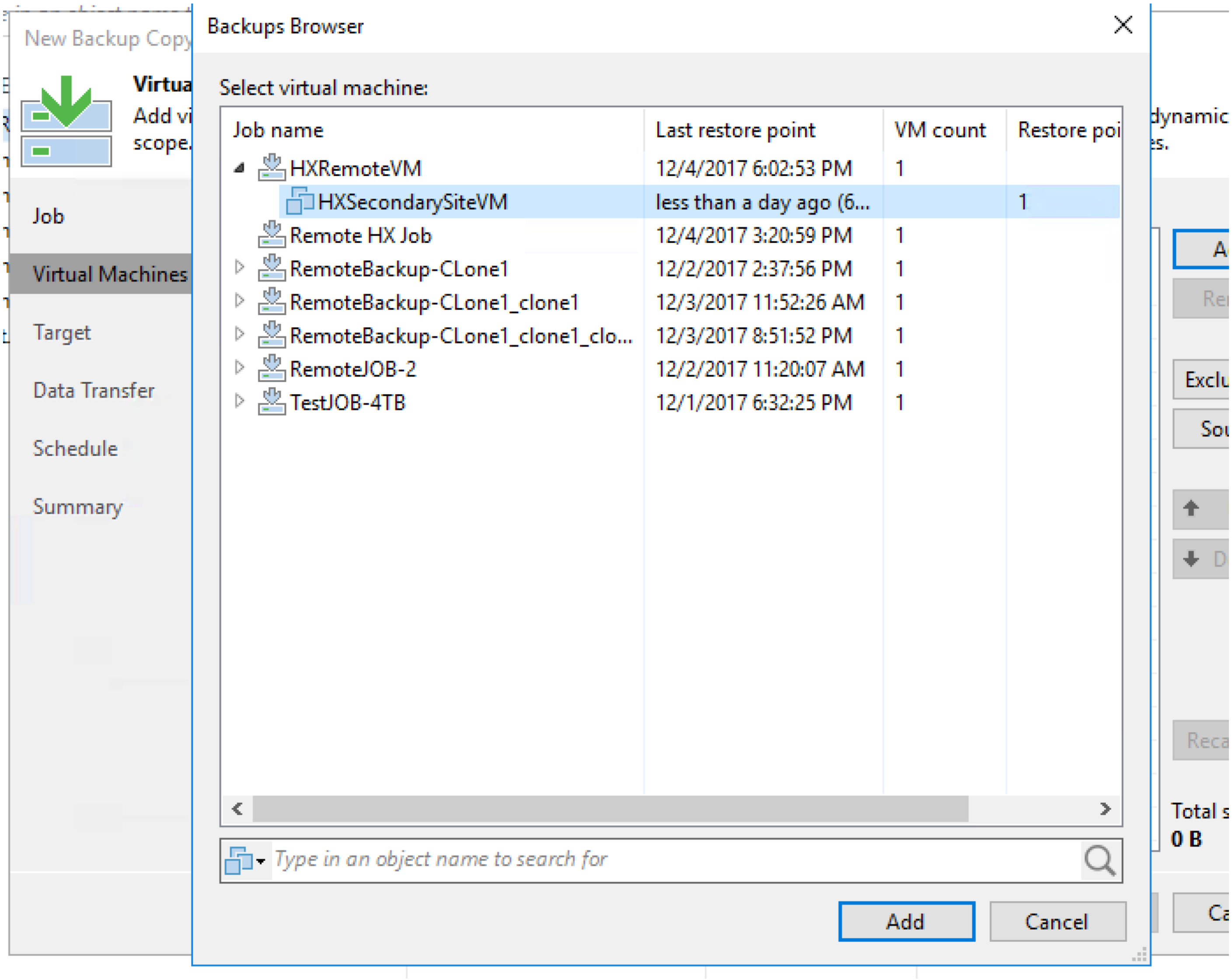
Annotations

Notes:

Backup Copy Jobs Across Data Centers

The validation detailed below describes a successful Backup Copy jobs across HX Multi Data Center. To Backup Copy, complete the following steps:

1. Identify the Backup on Remote Site which is copied to Primary site.
2. Create a Backup Copy job.

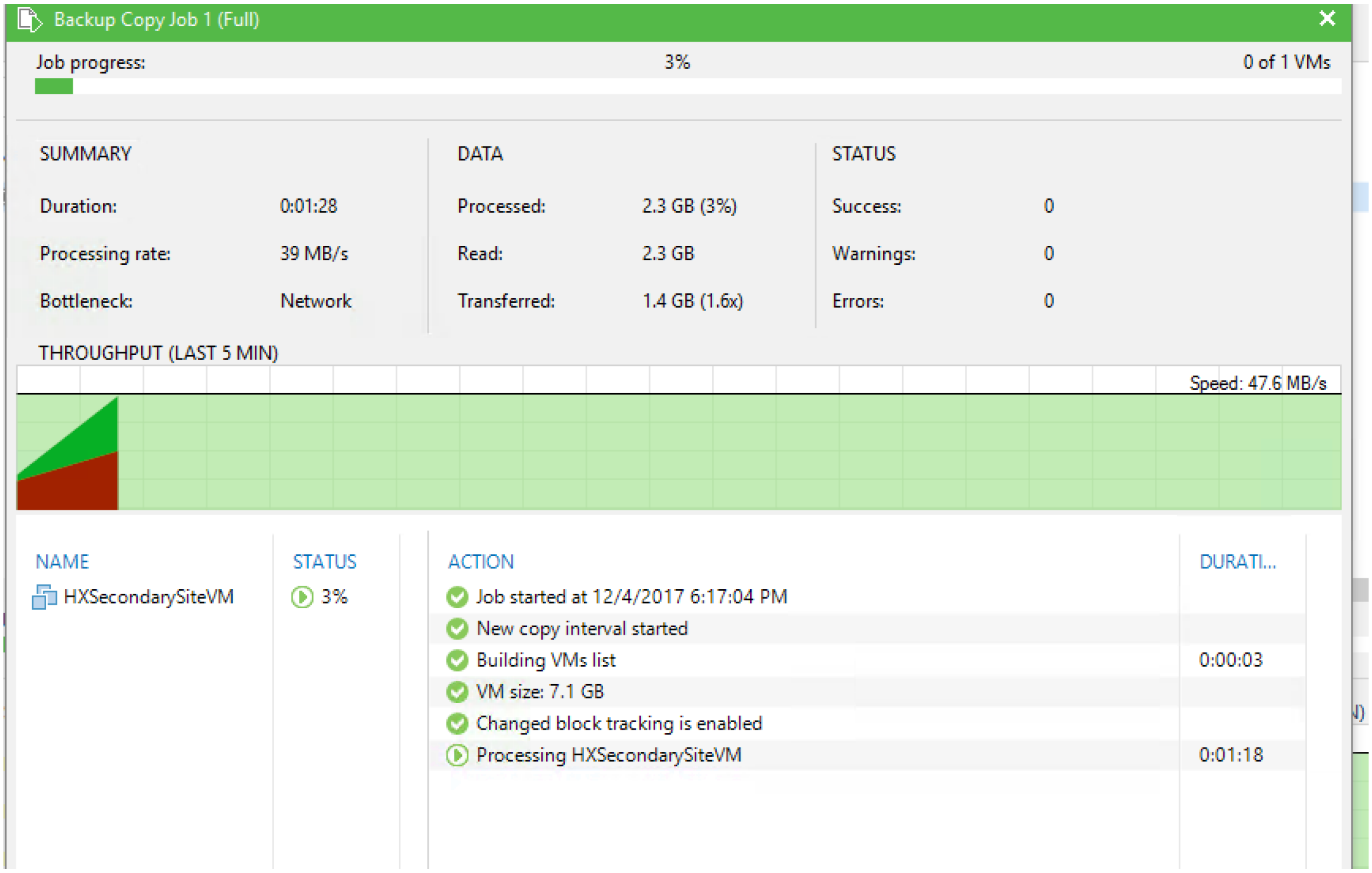


Select virtual machine:

Job name	Last restore point	VM count	Restore poi
HXRemoteVM	12/4/2017 6:02:53 PM	1	
HXSecondarySiteVM	less than a day ago (6...		1
Remote HX Job	12/4/2017 3:20:59 PM	1	
RemoteBackup-CLone1	12/2/2017 2:37:56 PM	1	
RemoteBackup-CLone1_clone1	12/3/2017 11:52:26 AM	1	
RemoteBackup-CLone1_clone1_clo...	12/3/2017 8:51:52 PM	1	
RemoteJOB-2	12/2/2017 11:20:07 AM	1	
TestJOB-4TB	12/1/2017 6:32:25 PM	1	

Type in an object name to search for

3. Execute the backup copy.



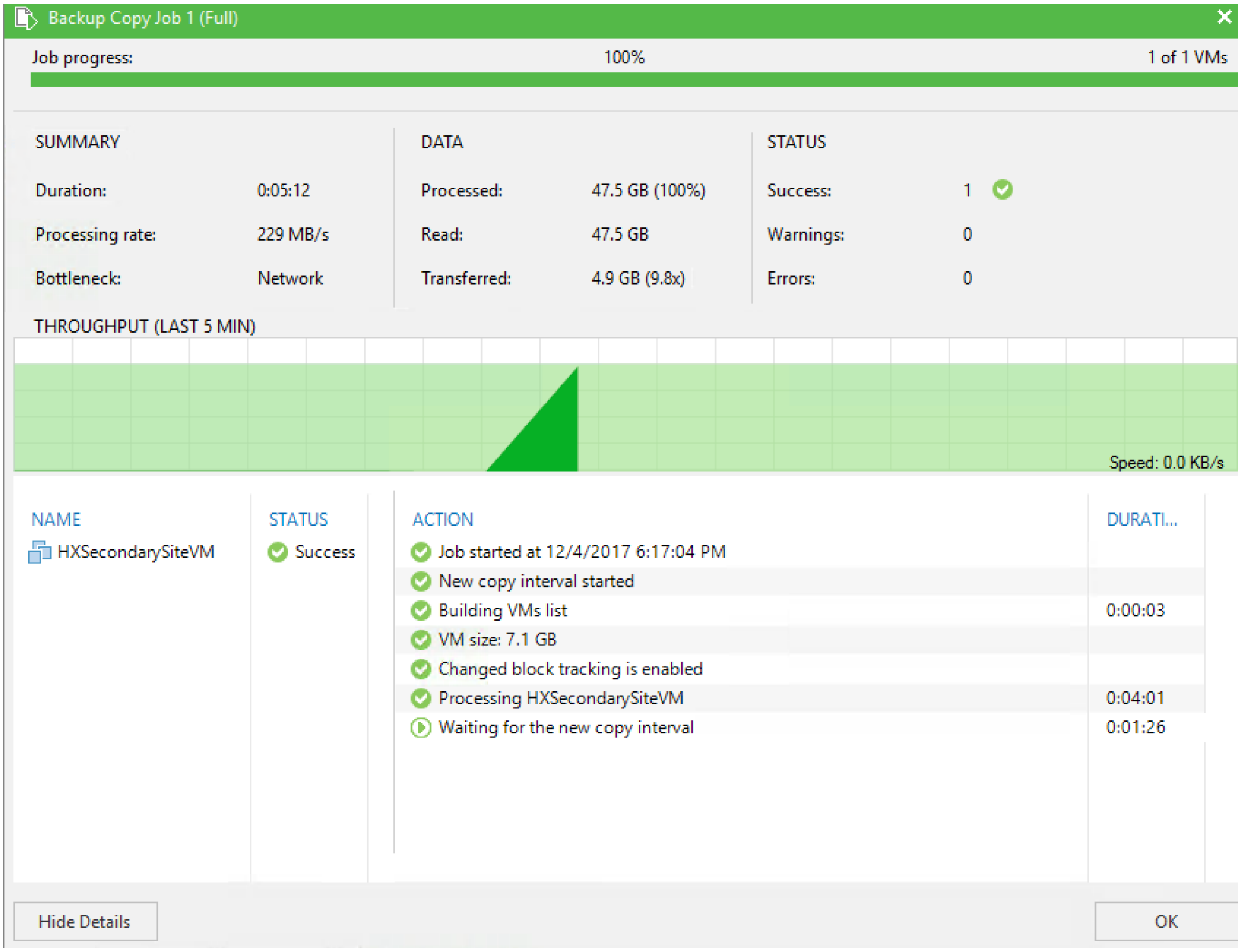
Backup Copy Job 1 (Full)

Job progress: 3% 0 of 1 VMs

SUMMARY		DATA		STATUS	
Duration:	0:01:28	Processed:	2.3 GB (3%)	Success:	0
Processing rate:	39 MB/s	Read:	2.3 GB	Warnings:	0
Bottleneck:	Network	Transferred:	1.4 GB (1.6x)	Errors:	0

NAME	STATUS	ACTION	DURATI...
HXSecondarySiteVM	3%	✓ Job started at 12/4/2017 6:17:04 PM	
		✓ New copy interval started	
		✓ Building VMs list	0:00:03
		✓ VM size: 7.1 GB	
		✓ Changed block tracking is enabled	
		Processing HXSecondarySiteVM	0:01:18

4. When completed, you will have a copy of Backup to the secondary S3260 Storage server. This provides protection for Backups executed on the S3260 storage sever during Secondary or Primary Site Failure.



Backup Copy Job 1 (Full)

Job progress: 100% 1 of 1 VMs

SUMMARY		DATA		STATUS	
Duration:	0:05:12	Processed:	47.5 GB (100%)	Success:	1 ✓
Processing rate:	229 MB/s	Read:	47.5 GB	Warnings:	0
Bottleneck:	Network	Transferred:	4.9 GB (9.8x)	Errors:	0

THROUGHPUT (LAST 5 MIN)

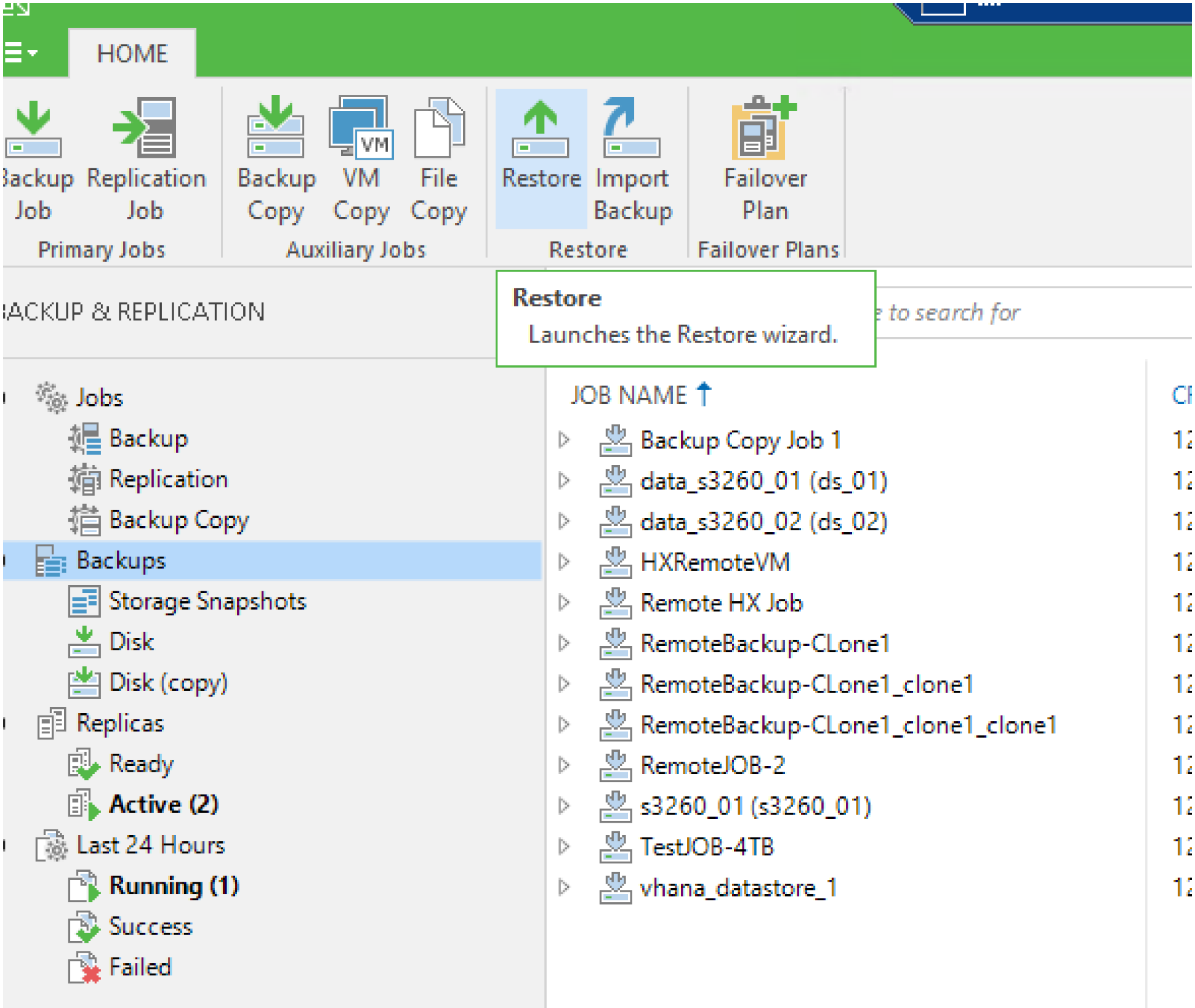
Speed: 0.0 KB/s

NAME	STATUS	ACTION	DURATI...
HXSecondarySiteVM	✓ Success	✓ Job started at 12/4/2017 6:17:04 PM	
		✓ New copy interval started	
		✓ Building VMs list	0:00:03
		✓ VM size: 7.1 GB	
		✓ Changed block tracking is enabled	
		✓ Processing HXSecondarySiteVM	0:04:01
		▷ Waiting for the new copy interval	0:01:26

Restore Backup Copy Job VM to DR Site

The validation detailed below describes the restoration of VM from Backup Copy job to HX Cluster on DR Site. You will restore the HXSecondarySiteVM from the backup copy job executed in the previous section. To restore the backup copy job VM, complete the following steps:

1. Launch Restoration from the Restore tab from the Main menu.

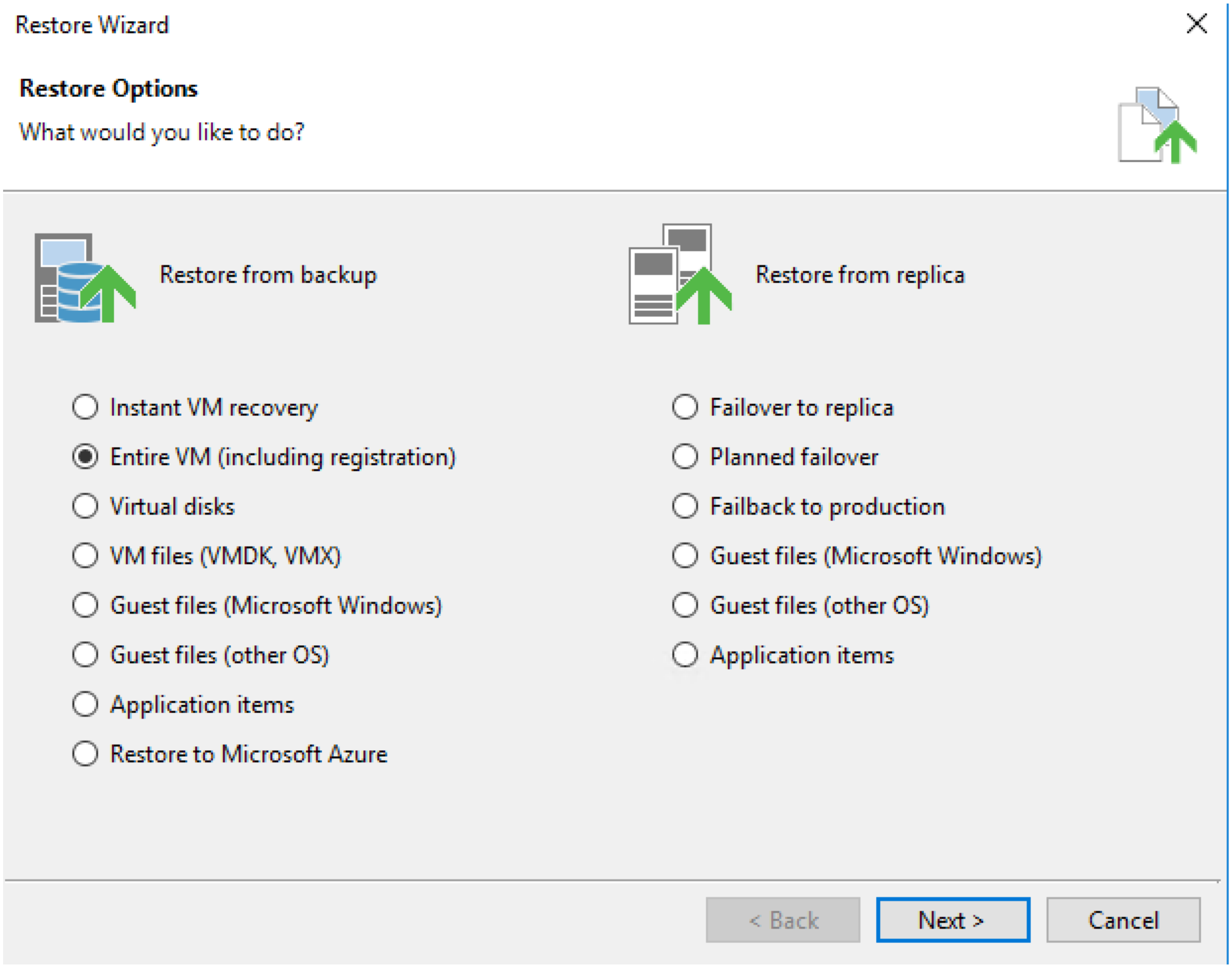


Restore

Launches the Restore wizard.

JOB NAME	CR
Backup Copy Job 1	12
data_s3260_01 (ds_01)	12
data_s3260_02 (ds_02)	12
HXRemoteVM	12
Remote HX Job	12
RemoteBackup-CLone1	12
RemoteBackup-CLone1_clone1	12
RemoteBackup-CLone1_clone1_clone1	12
RemoteJOB-2	12
s3260_01 (s3260_01)	12
TestJOB-4TB	12
vhana_datastore_1	12

2. Select Entire VM option.



Restore Wizard

Restore Options

What would you like to do?

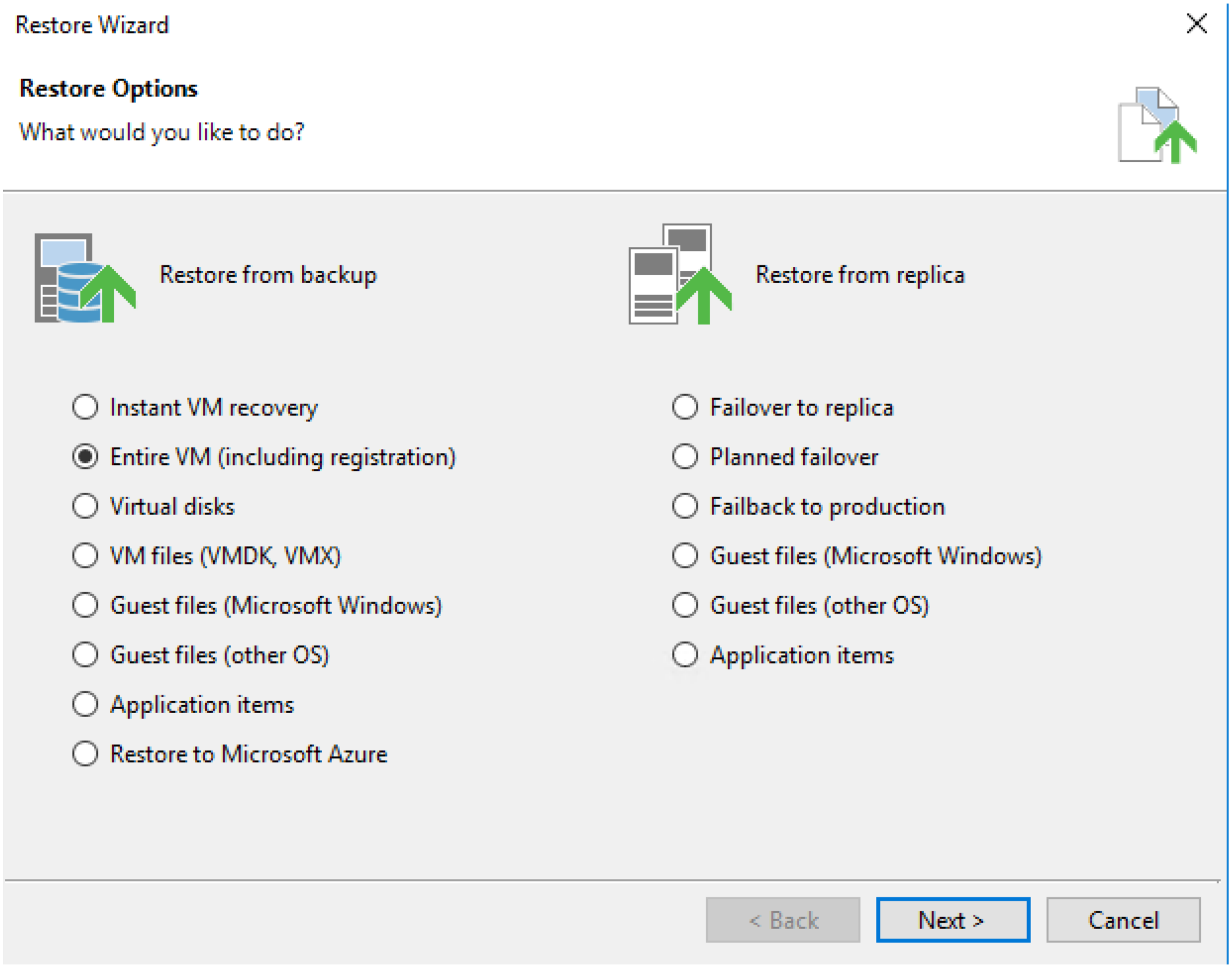
Restore from backup

○ Instant VM recovery
● Entire VM (including registration)
○ Virtual disks
○ VM files (VMDK, VMX)
○ Guest files (Microsoft Windows)
○ Guest files (other OS)
○ Application items
○ Restore to Microsoft Azure

Restore from replica

○ Failover to replica
○ Planned failover
○ Failback to production
○ Guest files (Microsoft Windows)
○ Guest files (other OS)
○ Application items

3. Add the VM from the Backup Copy job executed in the previous section.



Restore Wizard

Restore Options

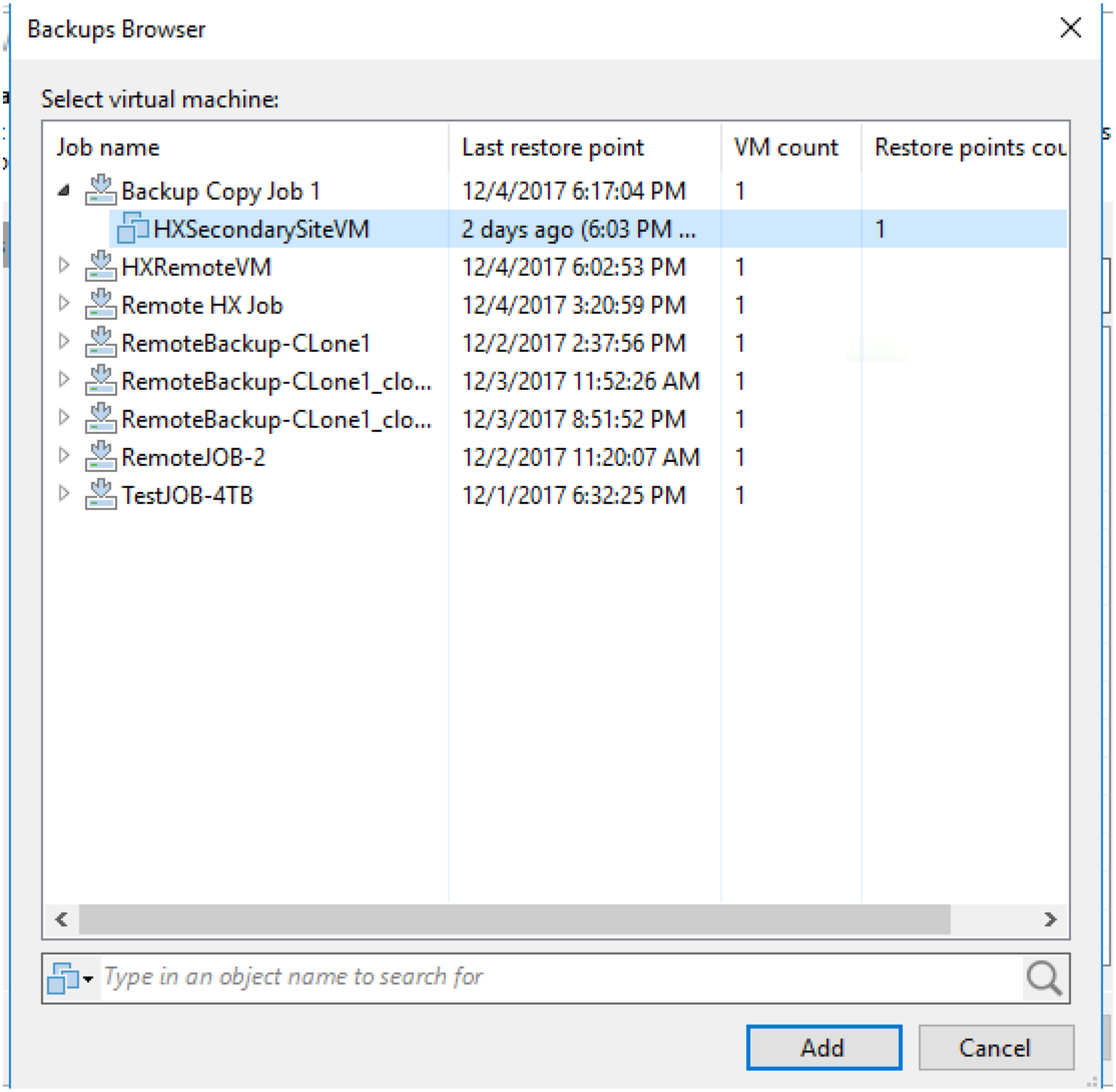
What would you like to do?

Restore from backup

- ○ Instant VM recovery
- ● Entire VM (including registration)
- ○ Virtual disks
- ○ VM files (VMDK, VMX)
- ○ Guest files (Microsoft Windows)
- ○ Guest files (other OS)
- ○ Application items
- ○ Restore to Microsoft Azure

Restore from replica

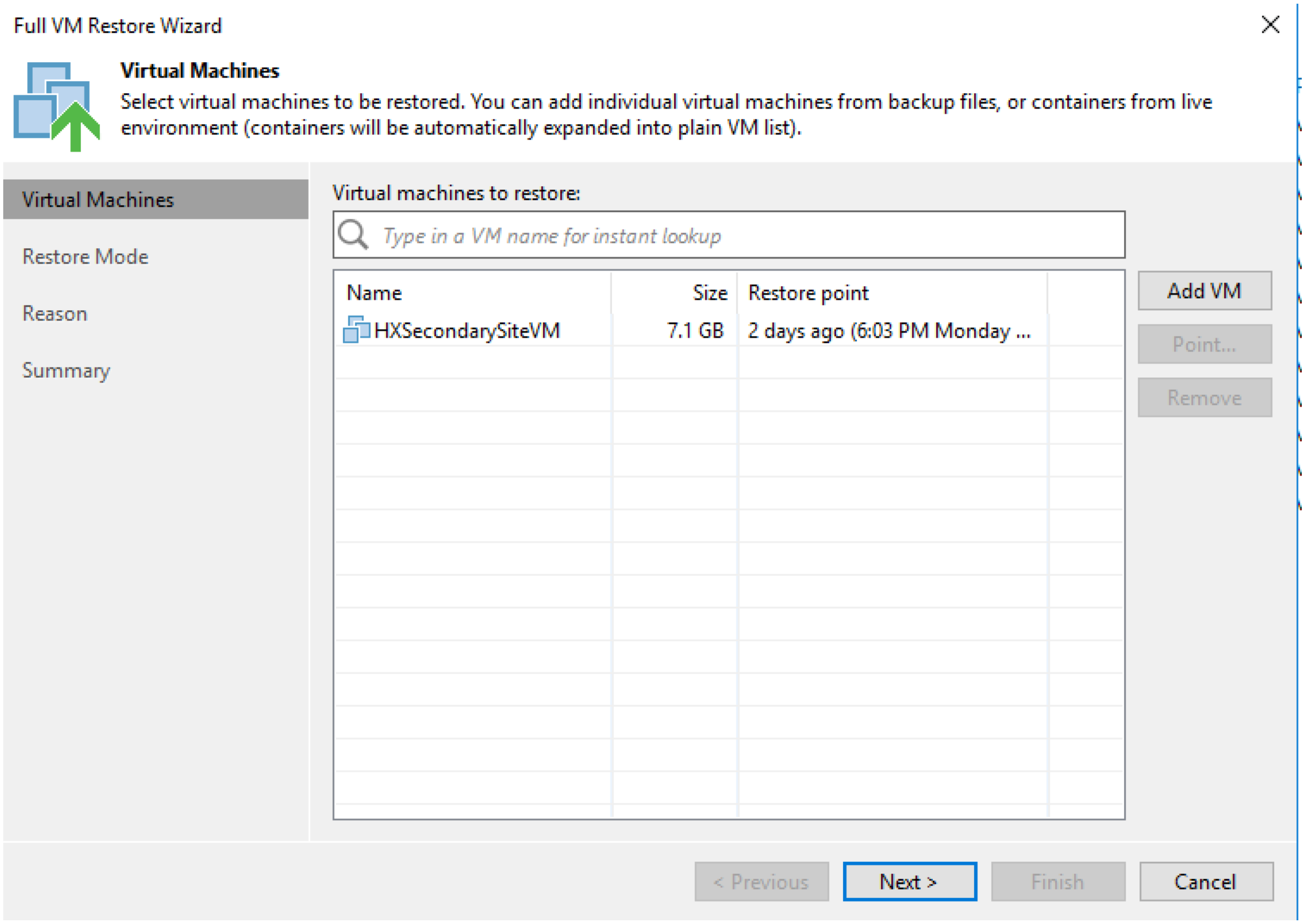
- ○ Failover to replica
- ○ Planned failover
- ○ Failback to production
- ○ Guest files (Microsoft Windows)
- ○ Guest files (other OS)
- ○ Application items



Backups Browser

Select virtual machine:

Job name	Last restore point	VM count	Restore points cou
Backup Copy Job 1	12/4/2017 6:17:04 PM	1	
HXSecondarySiteVM	2 days ago (6:03 PM ...		1
HXRemoteVM	12/4/2017 6:02:53 PM	1	
Remote HX Job	12/4/2017 3:20:59 PM	1	
RemoteBackup-CLone1	12/2/2017 2:37:56 PM	1	
RemoteBackup-CLone1_clo...	12/3/2017 11:52:26 AM	1	
RemoteBackup-CLone1_clo...	12/3/2017 8:51:52 PM	1	
RemoteJOB-2	12/2/2017 11:20:07 AM	1	
TestJOB-4TB	12/1/2017 6:32:25 PM	1	



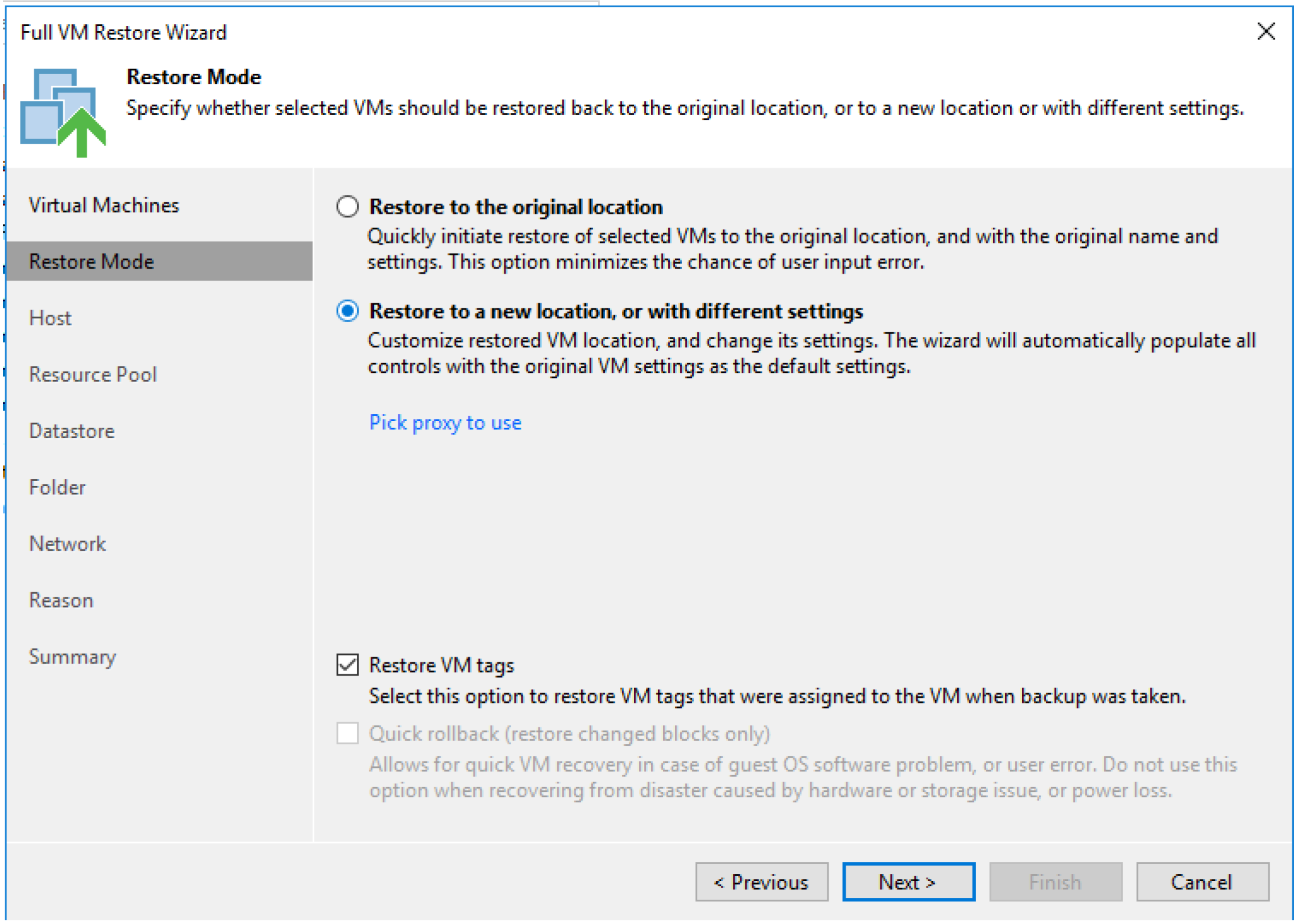
Full VM Restore Wizard

Virtual Machines

Select virtual machines to be restored. You can add individual virtual machines from backup files, or containers from live environment (containers will be automatically expanded into plain VM list).

Name	Size	Restore point
HXSecondarySiteVM	7.1 GB	2 days ago (6:03 PM Monday ...

4. Select Restore to new Location; the location is HX Cluster on the site where you created the Backup Copy Job.



Full VM Restore Wizard

Restore Mode

Specify whether selected VMs should be restored back to the original location, or to a new location or with different settings.

○ **Restore to the original location**
Quickly initiate restore of selected VMs to the original location, and with the original name and settings. This option minimizes the chance of user input error.

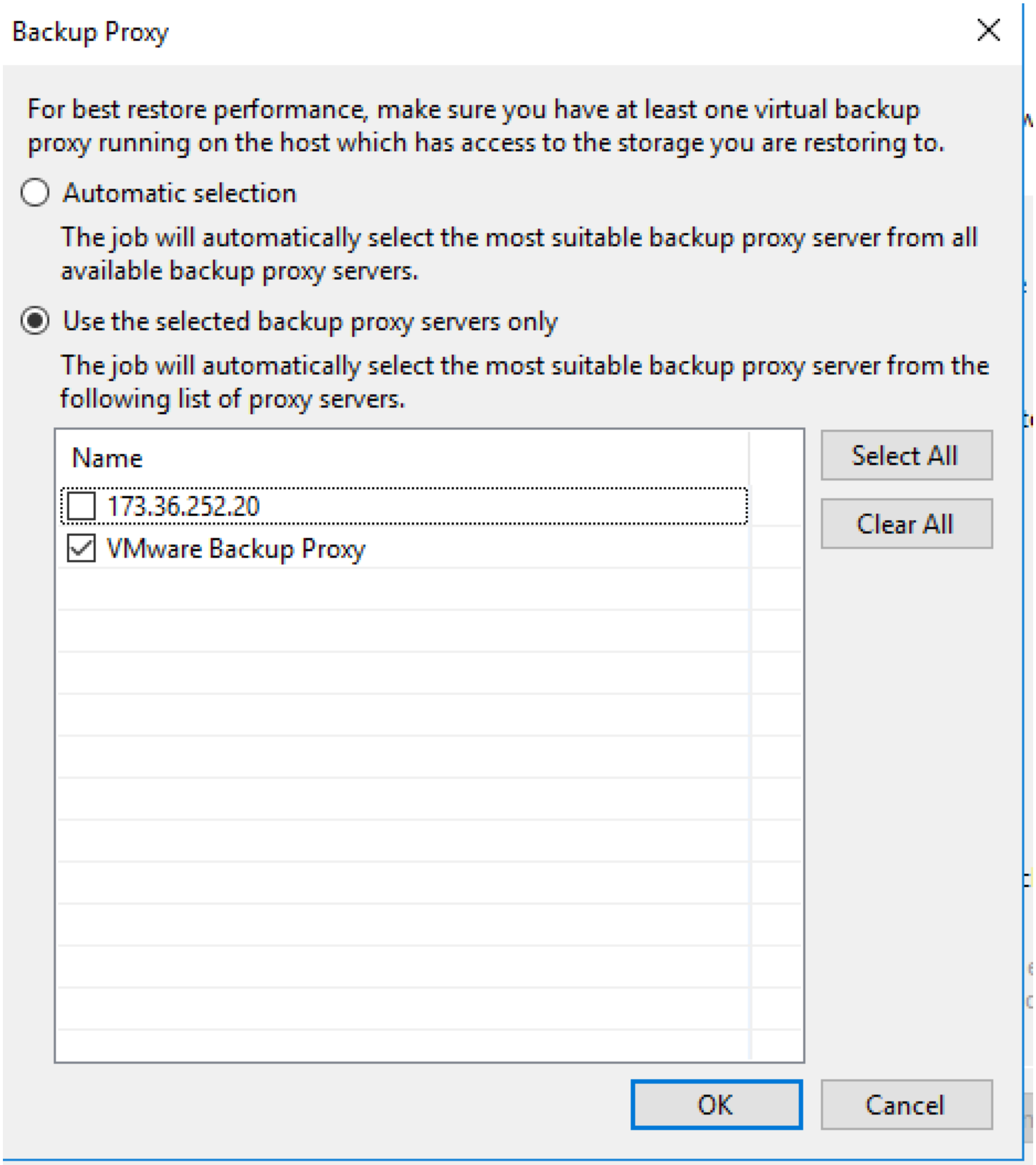
● **Restore to a new location, or with different settings**
Customize restored VM location, and change its settings. The wizard will automatically populate all controls with the original VM settings as the default settings.

Pick proxy to use

☑ Restore VM tags
Select this option to restore VM tags that were assigned to the VM when backup was taken.

□ Quick rollback (restore changed blocks only)
Allows for quick VM recovery in case of guest OS software problem, or user error. Do not use this option when recovering from disaster caused by hardware or storage issue, or power loss.

5. Select Proxy existing on the DR Site.



Backup Proxy

For best restore performance, make sure you have at least one virtual backup proxy running on the host which has access to the storage you are restoring to.

○ Automatic selection

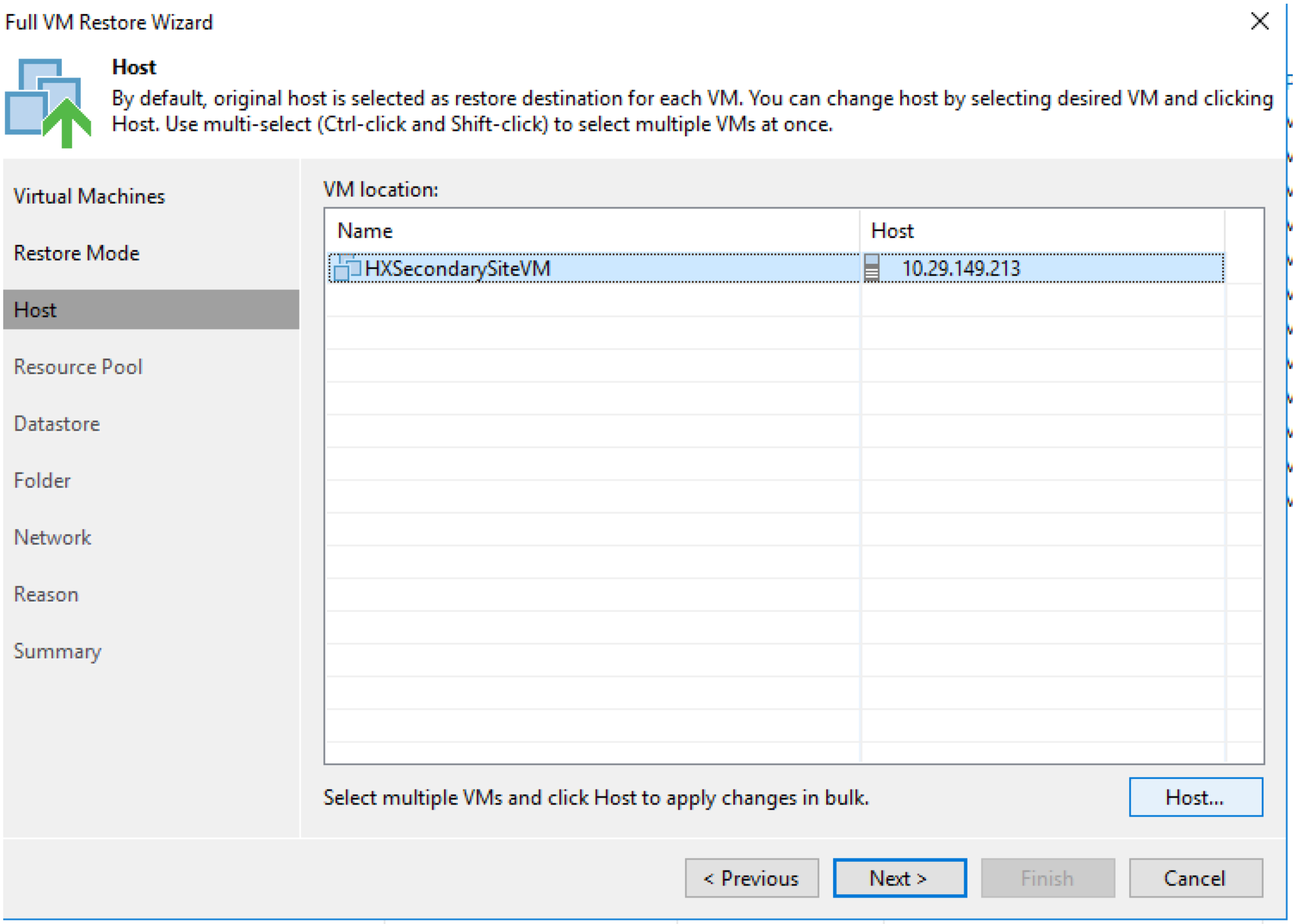
The job will automatically select the most suitable backup proxy server from all available backup proxy servers.

● Use the selected backup proxy servers only

The job will automatically select the most suitable backup proxy server from the following list of proxy servers.

Name
□ 173.36.252.20
☑ VMware Backup Proxy

6. Add Host; this the HX Cluster where you want to restore the VM from Backup Copy job.



Full VM Restore Wizard

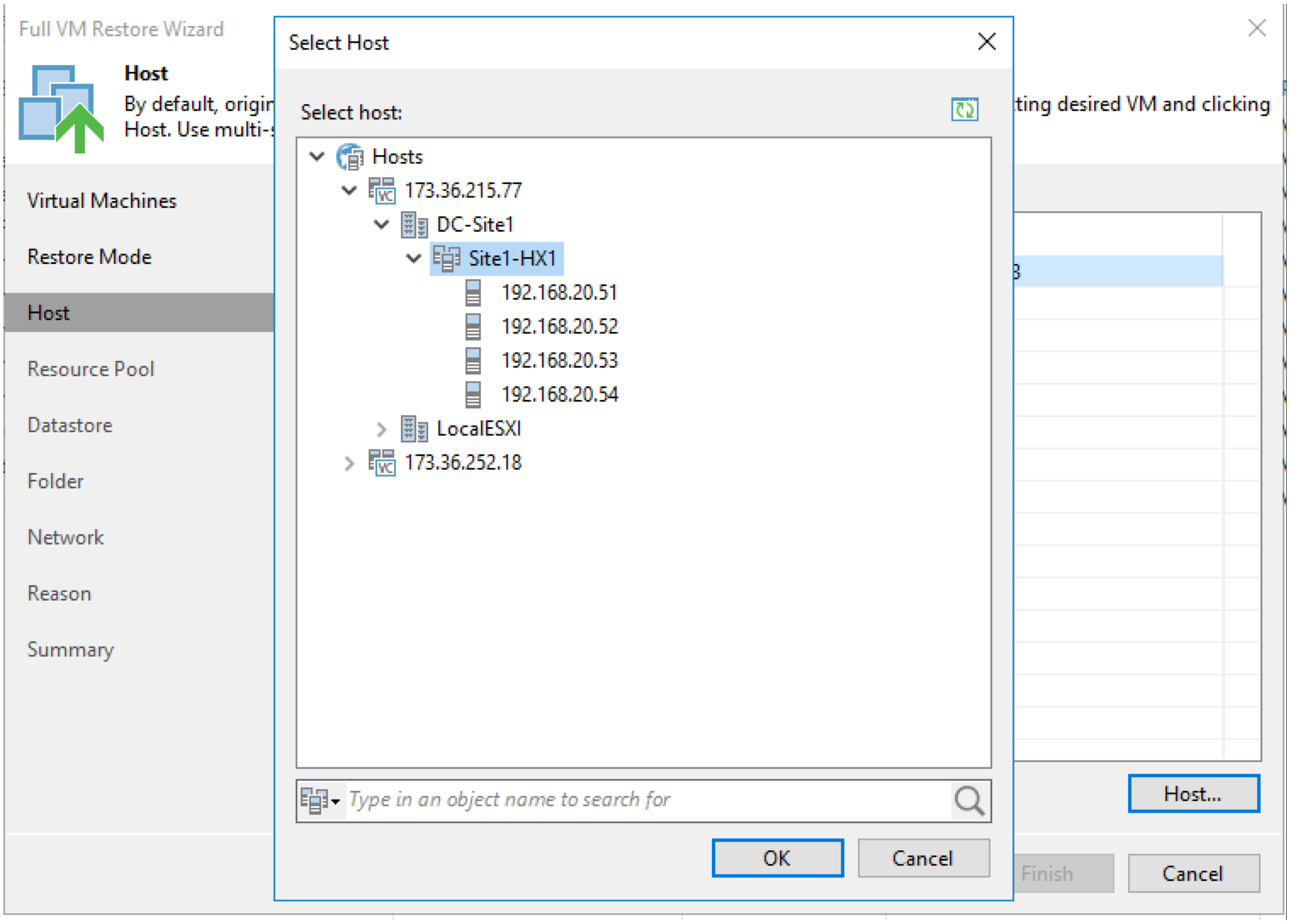
Host

By default, original host is selected as restore destination for each VM. You can change host by selecting desired VM and clicking Host. Use multi-select (Ctrl-click and Shift-click) to select multiple VMs at once.

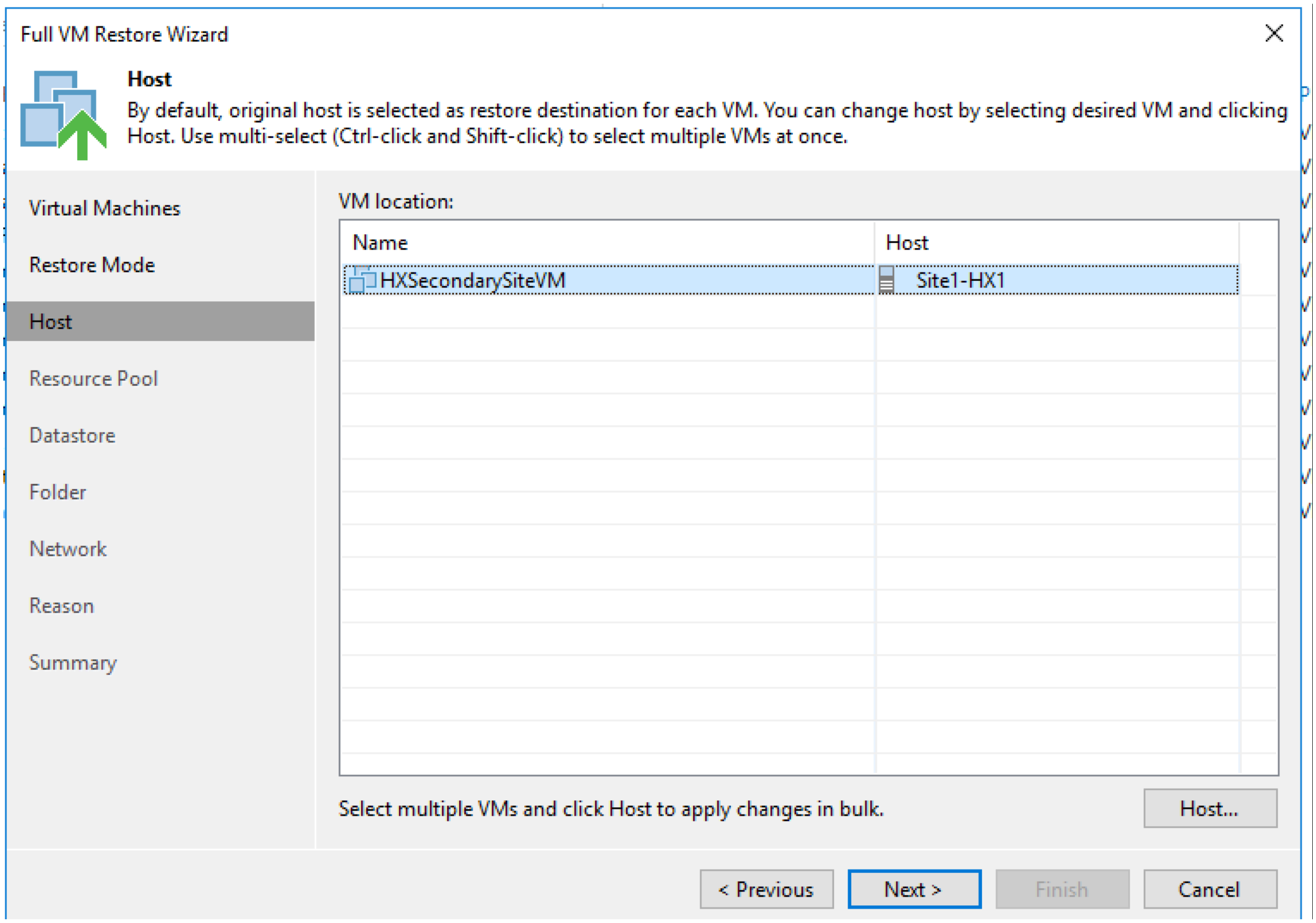
VM location:

Name	Host
HXSecondarySiteVM	10.29.149.213

Select multiple VMs and click Host to apply changes in bulk.



Full VM Restore Wizard
Host
By default, origin
Host. Use multi-s
ting desired VM and clicking
Virtual Machines
Restore Mode
Host
Resource Pool
Datastore
Folder
Network
Reason
Summary
Select Host
Select host:
Hosts
173.36.215.77
DC-Site1
Site1-HX1
192.168.20.51
192.168.20.52
192.168.20.53
192.168.20.54
LocalESXI
173.36.252.18
Type in an object name to search for
OK
Cancel
Host...
Finish
Cancel



Full VM Restore Wizard

Host

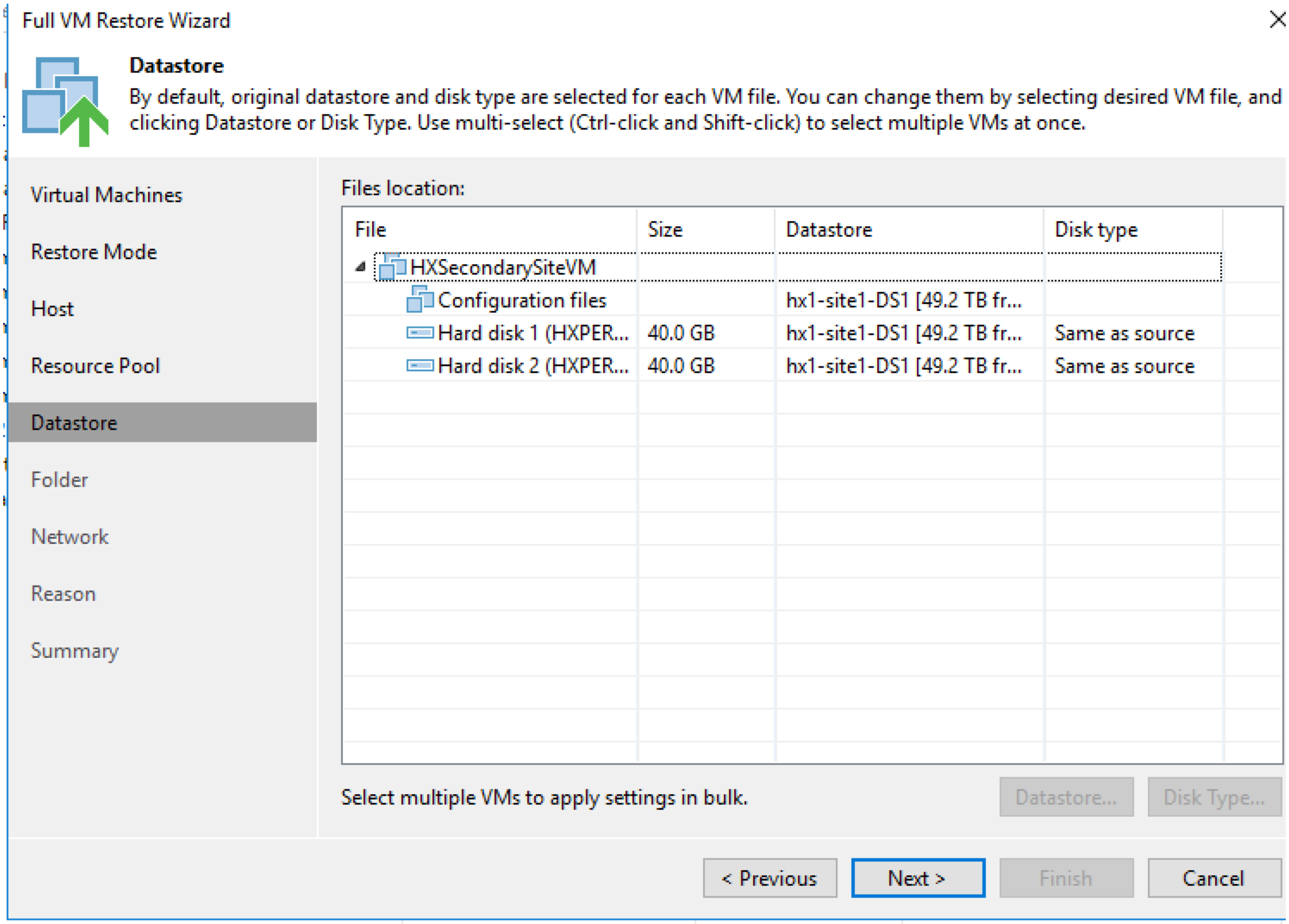
By default, original host is selected as restore destination for each VM. You can change host by selecting desired VM and clicking Host. Use multi-select (Ctrl-click and Shift-click) to select multiple VMs at once.

VM location:

Name	Host
HXSecondarySiteVM	Site1-HX1

Select multiple VMs and click Host to apply changes in bulk.

7. Select the default Datastore on HX Cluster.



Full VM Restore Wizard

Datastore

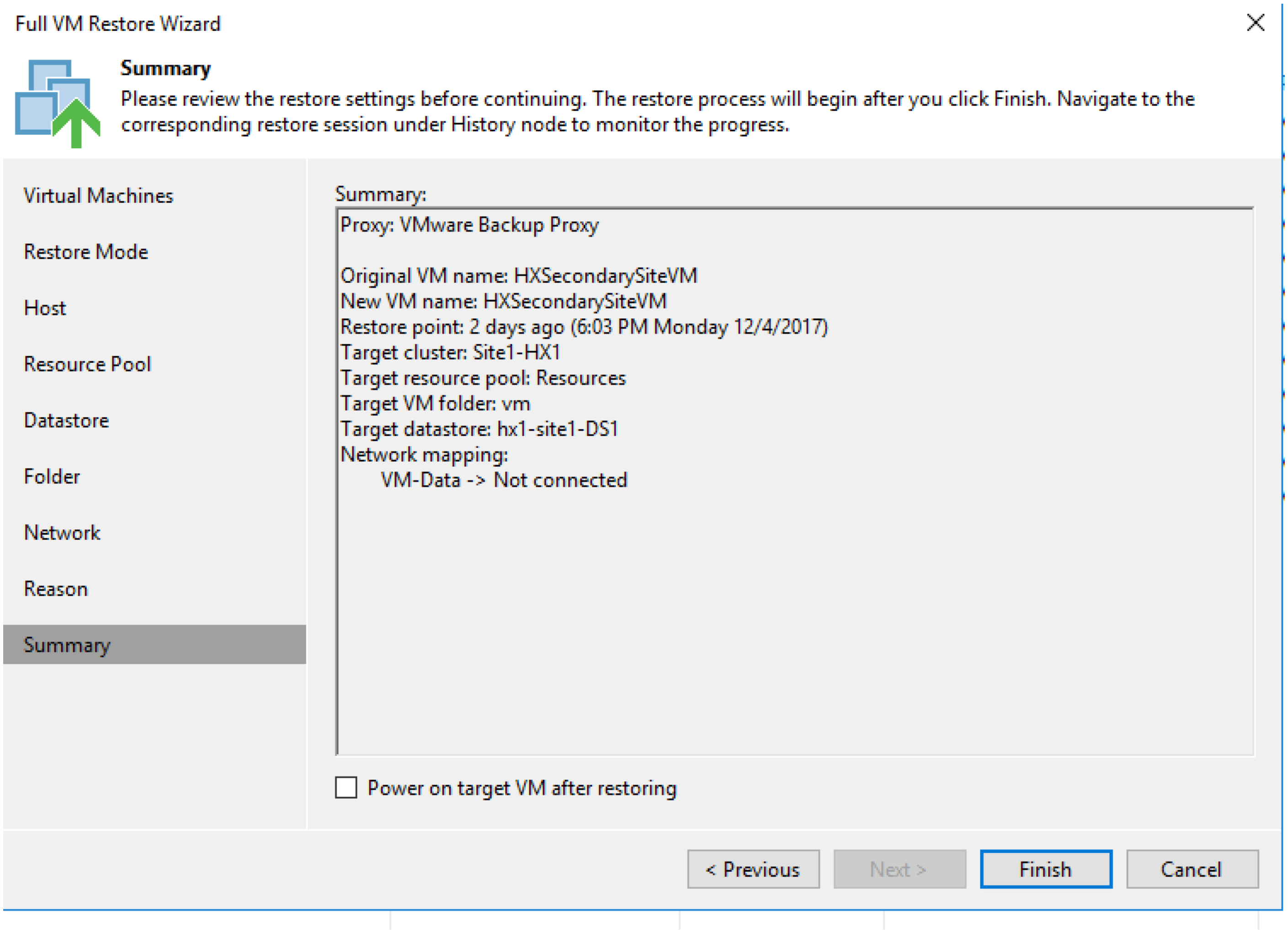
By default, original datastore and disk type are selected for each VM file. You can change them by selecting desired VM file, and clicking Datastore or Disk Type. Use multi-select (Ctrl-click and Shift-click) to select multiple VMs at once.

Files location:

File	Size	Datastore	Disk type
HXSecondarySiteVM			
Configuration files		hx1-site1-DS1 [49.2 TB fr...	
Hard disk 1 (HXPER...	40.0 GB	hx1-site1-DS1 [49.2 TB fr...	Same as source
Hard disk 2 (HXPER...	40.0 GB	hx1-site1-DS1 [49.2 TB fr...	Same as source

Select multiple VMs to apply settings in bulk.

8. Select default for the other screens.
9. Confirm the Restoration Summary.



Please review the restore settings before continuing. The restore process will begin after you click Finish. Navigate to the corresponding restore session under History node to monitor the progress.

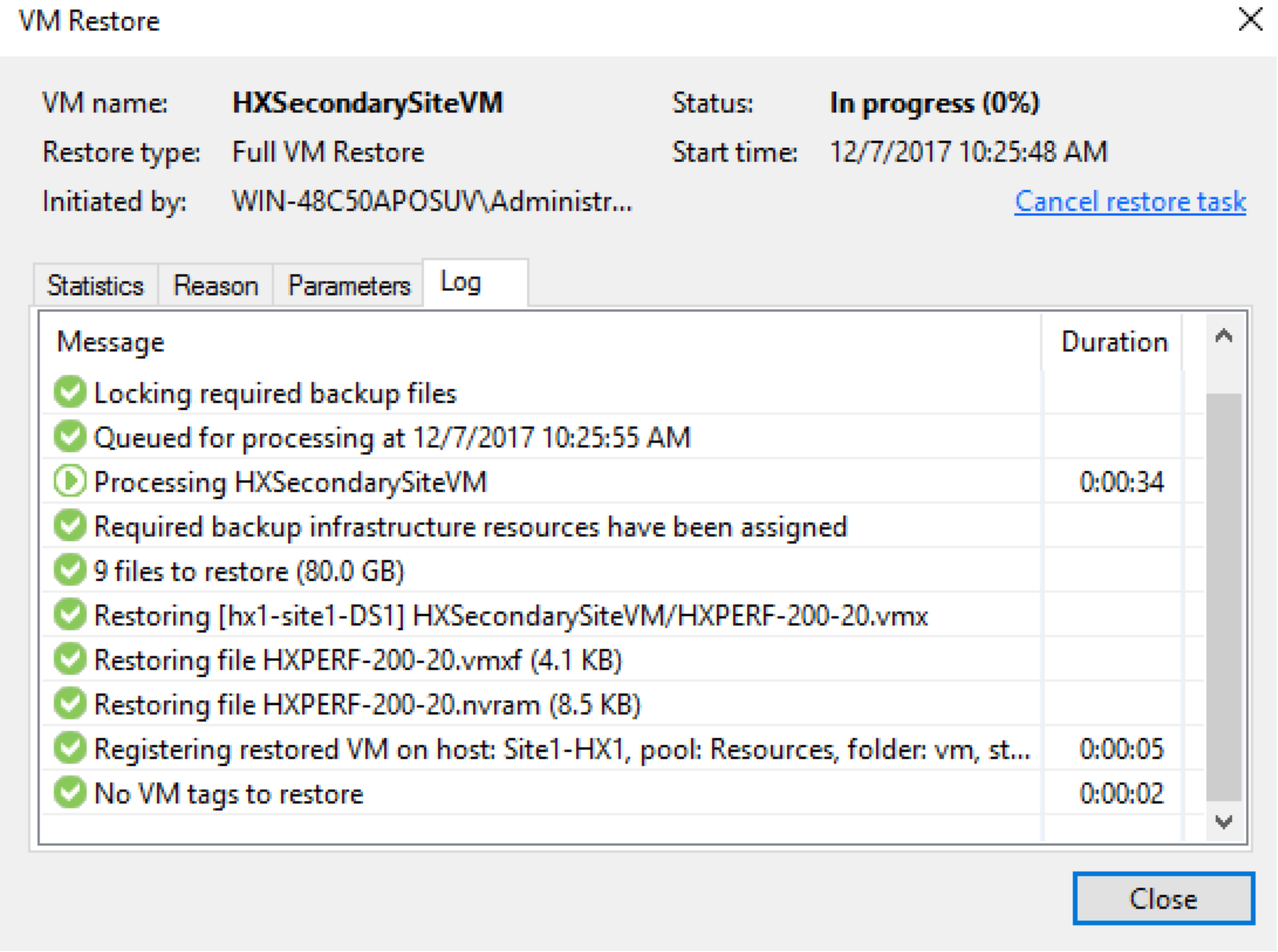
Summary:

```
Proxy: VMware Backup Proxy

Original VM name: HXSecondarySiteVM
New VM name: HXSecondarySiteVM
Restore point: 2 days ago (6:03 PM Monday 12/4/2017)
Target cluster: Site1-HX1
Target resource pool: Resources
Target VM folder: vm
Target datastore: hx1-site1-DS1
Network mapping:
    VM-Data -> Not connected
```

□ Power on target VM after restoring

10. Execute the job.



VM Restore

VM name: **HXSecondarySiteVM**

Status: **In progress (0%)**

Restore type: Full VM Restore

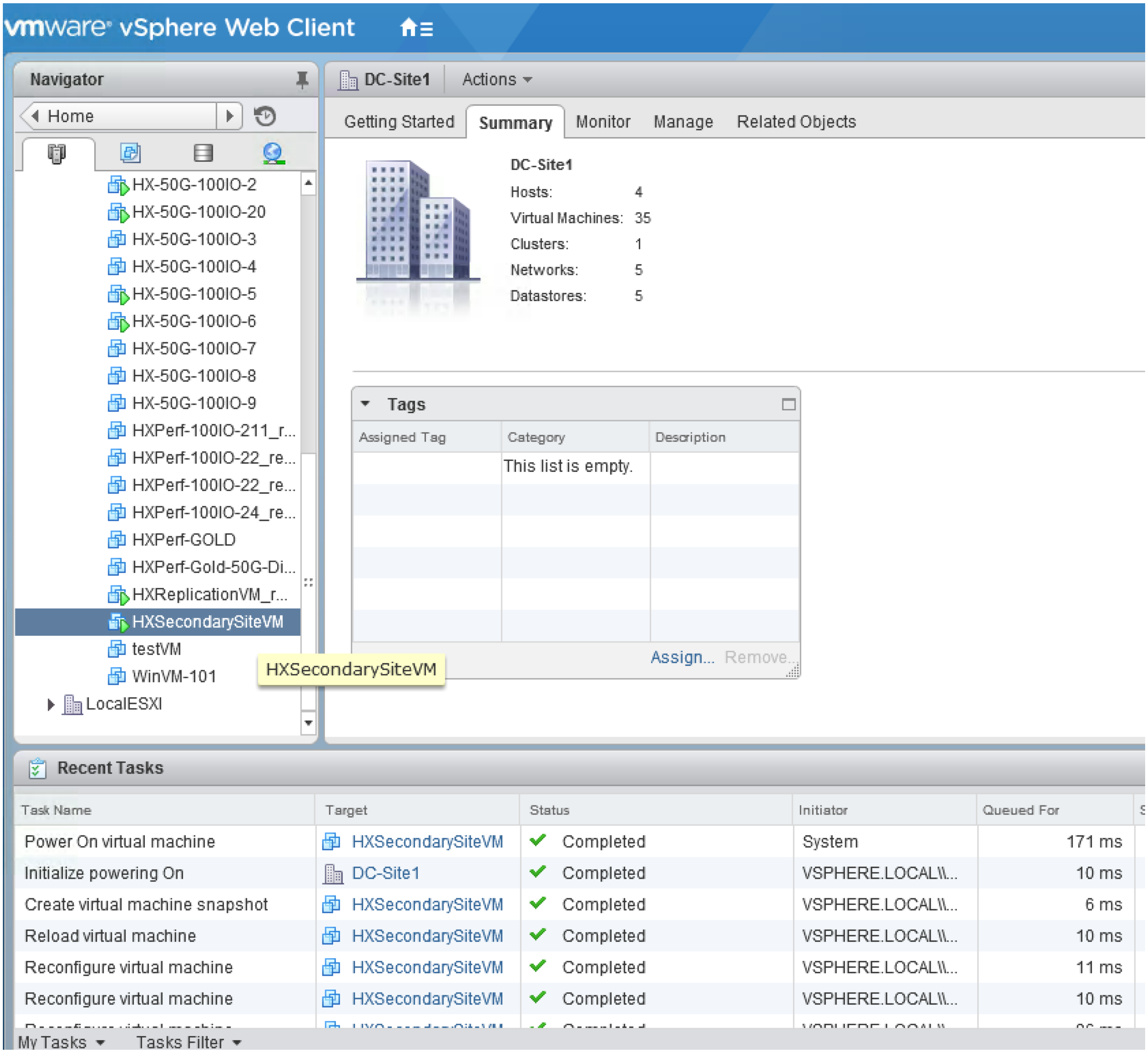
Start time: 12/7/2017 10:25:48 AM

Initiated by: WIN-48C50APOSUV\Administr...

Cancel restore task

Message	Duration
✓ Locking required backup files	
✓ Queued for processing at 12/7/2017 10:25:55 AM	
▷ Processing HXSecondarySiteVM	0:00:34
✓ Required backup infrastructure resources have been assigned	
✓ 9 files to restore (80.0 GB)	
✓ Restoring [hx1-site1-DS1] HXSecondarySiteVM/HXPERF-200-20.vmx	
✓ Restoring file HXPERF-200-20.vmxf (4.1 KB)	
✓ Restoring file HXPERF-200-20.nvram (8.5 KB)	
✓ Registering restored VM on host: Site1-HX1, pool: Resources, folder: vm, st...	0:00:05
✓ No VM tags to restore	0:00:02

11. Post Restoration; power on the VM and confirm that it is restored on the DR Site.



DC-Site1

Hosts:	4
Virtual Machines:	35
Clusters:	1
Networks:	5
Datastores:	5

Tags

Assigned Tag	Category	Description
	This list is empty.	

Recent Tasks

Task Name	Target	Status	Initiator	Queued For
Power On virtual machine	HXSecondarySiteVM	✓ Completed	System	171 ms
Initialize powering On	DC-Site1	✓ Completed	VSPHERE.LOCAL\\...	10 ms
Create virtual machine snapshot	HXSecondarySiteVM	✓ Completed	VSPHERE.LOCAL\\...	6 ms
Reload virtual machine	HXSecondarySiteVM	✓ Completed	VSPHERE.LOCAL\\...	10 ms
Reconfigure virtual machine	HXSecondarySiteVM	✓ Completed	VSPHERE.LOCAL\\...	11 ms
Reconfigure virtual machine	HXSecondarySiteVM	✓ Completed	VSPHERE.LOCAL\\...	10 ms
Reconfigure virtual machine	HXSecondarySiteVM	✓ Completed	VSPHERE.LOCAL\\...	[illegible]

Validated Hardware and Software

Table 6 lists all the software and hardware components deployed to validate the design for Cisco HyperFlex with Veeam Backup and Replication.

Table 6 Software and Hardware Components Deployed in this CVD

	Components	Software Version	Comments

	Components	Software Version	Comments
Compute & Storage	Cisco UCS S3260 Storage Server	3.1(3c)	Directly managed through Fabric Interconnect. Veeam AS is installed on the same. Provides Storage Veeam Repository
	Cisco UCS C240 M4 LFF Rack Server		Veeam Proxy server on Remote Office. Directly managed through Fabric Interconnect
	Cisco HX220c M4		Hyper Converged node for HX Cluster
	Cisco HX240c M4		Hyper Converged Node for HX Cluster
Management	Cisco UCS Manager	3.1(3c)	UCS Management for all servers directly attached to Fabric Interconnects
Backup and Replication	Veeam Availability Suite	9.5 Update 2	Pre-configured with Veeam Backup Server, Veeam Proxy , Veeam Repository
	Operating System	Windows 2016 DataCenter Edition	
Hyper Converged Software	Cisco HX Data Platform	HX Data Platform Release 2.5 (1b)	
Virtualization	VMWare VSphere	6.0 U3	
	VMWare vCenter	6.0 U3	
Network	Cisco Nexus 9372PX (N9k-9372PX)	6.1(2)I3(4b)	Cisco Platform Switch for ToR, MoR, EoR deployments; Provides connectivity to users and other networks and deployed in NX-OS Standalone mode
	Cisco UCS 6248UP FI	3.1(3c)	Fabric Interconnect with embedded UCS Manager

Bill of Materials

The BOM below lists the major components validated, but it is not intended to be a comprehensive list.

Line Number	Part Number	Description	Qty
1.0	**HX-SP-220M4SBP1-1A**	UCS SP HX220c HyperFlex System w/2xE52690v4,16x32Gmem,1yrSW	1
1.0.1	CON-PSJ1-220SBP1A	UCS SUPP PSS 8X5XNBD, UCS SP HX220c HyperFlex System w2xE526	1
1.1	UCS-CPU-E52690E	2.60 GHz E5-2690 v4/135W 14C/35MB Cache/DDR4 2400MHz	2
1.2	UCS-MR-1X322RV-A	32GB DDR4-2400-MHz RDIMM/PC4-19200/dual rank/x4/1.2v	16
1.3	UCS-HD12TB10K12G	1.2 TB 12G SAS 10K RPM SFF HDD	6
1.4	UCS-SD480G12S3-EP	480GB 2.5 inch Ent. Performance 6GSATA SSD(3X endurance)	1
1.5	UCS-SD120GBKS4-EV	120 GB 2.5 inch Enterprise Value 6G SATA SSD	1
1.6	UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	1
1.7	UCSC-RAILB-M4	Ball Bearing Rail Kit for C220 M4 and C240 M4 rack servers	1
1.8	UCS-SD-64G-S	64GB SD Card for UCS Servers	2
1.9	UCSC-PSU1-770W	770W AC Hot-Plug Power Supply for 1U C-Series Rack Server	2
1.1	CAB-N5K6A-NA	Power Cord, 200/240V 6A North America	2
1.11	HXDP-001-1YR	Cisco HyperFlex HX Data Platform SW 1 year Subscription	1
1.11.0.1	HXDP001-1YR	Cisco HyperFlex HX Data Platform SW Subscription 1 Year	1
1.12	UCS-M4-V4-LBL	Cisco M4 - v4 CPU asset tab ID label (Auto-Expand)	1
1.13	UCSC-HS-C220M4	Heat sink for UCS C220 M4 rack servers	2
1.14	HX220C-BZL-M4	HX220C M4 Security Bezel	1
1.15	SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter	2
1.16	UCSC-SAS12GHBA	Cisco 12Gbps Modular (non-RAID) SAS HBA	1
1.17	HX-VSP-FND-D	Factory Installed - vSphere SW (End user to provide License)	1
1.18	HX-VSP-FND-DL	Factory Installed - VMware vSphere6 Fnd SW Download	1
2.0	**UCS-FI-6248E16-ALL**	UCS 6248UP and 16P Expansion Module with 48 Port Licenses	1
2.0.1	CON-PSJ7-F6248ALL	UCS PSS 24X7X4 OS UCS 6248UP and 16P E	1
2.1	UCS-ACC-6248UP	UCS 6248UP Chassis Accessory Kit	1
2.2	UCS-FAN-6248UP	UCS 6248UP Fan Module	2
2.3	UCS-FI-DL2	UCS 6248 Layer 2 Daughter Card	1
2.4	UCS-LIC-10GE	UCS 6200 Series ONLY Fabric Int 1PORT 1/10GE/FC-port license	28
2.5	UCS-FI-E16UP	UCS 6200 16-port Expansion module/16 UP/ 8p LIC	1
2.5.0.1	CON-PSJ7-FIE16UP	UCS PSS 24X7X4 OS 16prt 10Gb UnifiedPrt/Expnsn mod UCS6200	1
2.6	UCS-PSU-6248UP-AC	UCS 6248UP Power Supply/100-240VAC	2
2.7	CAB-N5K6A-NA	Power Cord, 200/240V 6A North America	2
3.0	**HX-SP-240M4SBP1-5A**	UCS SP HX240c HyperFlex System w/2xE52690v4,16x32Gmem,5yrSW	1
3.0.1	CON-PSJ1-240SBP5A	UCS SUPP PSS 8X5XNBD, UCS SP HX240c HyperFlex System w2xE526	1

Line Number	Part Number	Description	Qty
3.1	UCS-CPU-E52690E	2.60 GHz E5-2690 v4/135W 14C/35MB Cache/DDR4 2400MHz	2
3.2	UCS-MR-1X322RV-A	32GB DDR4-2400-MHz RDIMM/PC4-19200/dual rank/x4/1.2v	16
3.3	UCS-HD12TB10K12G	1.2 TB 12G SAS 10K RPM SFF HDD	15
3.4	UCS-SD16TB12S3-EP	1.6TB 2.5 inch Ent. Performance 6GSATA SSD(3X endurance)	1
3.5	UCSC-RAILB-M4	Ball Bearing Rail Kit for C220 M4 and C240 M4 rack servers	1
3.6	UCSC-MLOM-CSC-02	Cisco UCS VIC1227 VIC MLOM - Dual Port 10Gb SFP+	1
3.7	UCSC-PSU2V2-1400W	1400W V2 AC Power Supply (200 - 240V) 2U & 4U C Series	2
3.8	UCS-SD-64G-S	64GB SD Card for UCS Servers	2
3.9	CAB-N5K6A-NA	Power Cord, 200/240V 6A North America	2
3.1	UCSC-PCI-1C-240M4	Right PCI Riser Bd (Riser 1) 2onbd SATA bootdrvs+ 2PCI slts	1
3.11	UCS-SD120GBKS4-EB	120 GB 2.5 inch Enterprise Value 6G SATA SSD (boot)	1
3.12	HXDP-001-5YR	Cisco HyperFlex HX Data Platform SW 4 Yr Subscription Add On	1
3.12.0.1	HXDP001-5YR	Cisco HyperFlex HX Data Platform SW Subscription 5 Year	1
3.13	HX240C-BZL-M4SX	HX240C M4 Security Bezel	1
3.14	UCS-M4-V4-LBL	Cisco M4 - v4 CPU asset tab ID label (Auto-Expand)	1
3.15	UCSC-HS-C240M4	Heat sink for UCS C240 M4 rack servers	2
3.16	SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter	2
3.17	N20-BBLKD	UCS 2.5 inch HDD blanking panel	8
3.18	UCSC-SAS12GHBA	Cisco 12Gbps Modular (non-RAID) SAS HBA	1
3.19	HX-VSP-FND-D	Factory Installed - vSphere SW (End user to provide License)	1
3.2	HX-VSP-FND-DL	Factory Installed - VMware vSphere6 Fnd SW Download	1
4.0	**N9K-C9372PX**	Nexus 9300 with 48p 10G SFP+ and 6p 40G QSFP+	1
4.0.1	CON-PSRT-9372PX	PRTNR SS 8X5XNBD Nexus 9300 with 48p 10G SFP+ and 6p 40G	1
4.1	NXOS-703I2.3	Nexus 9500, 9300, 3000 Base NX-OS Software Rel 7.0(3)I2(3)	1
4.2	N3K-C3064-ACC-KIT	Nexus 3K/9K Fixed Accessory Kit	1
4.3	NXA-FAN-30CFM-F	Nexus 2K/3K/9K Single Fan, port side exhaust airflow	4
4.4	N9K-PAC-650W-B	Nexus 9300 650W AC PS, Port-side Exhaust	2
4.5	CAB-N5K6A-NA	Power Cord, 200/240V 6A North America	2
5.0	**UCSS-S3260**	Cisco UCS S3260 Storage Server Base Chassis	1
5.1	CON-OSP-UCSS3260	SNTC 24X7X4OS, Cisco UCS S3260 Storage Server Base Chassis	1
5.2	N20-BBLKD-7MM	UCS 7MM SSD Blank Filler	2
5.3	N20-BKVM	KVM local IO cable for UCS servers console port	1
5.4	UCS-C3K-28HD10	UCS C3X60 2 row of 10TB NL-SAS drives (28 Total) 280TB	1
5.5	UCS-C3K-M4RAID	Cisco UCS C3000 RAID Controller M4 Server w 4G RAID Cache	1
5.6	UCS-C3X60-G2SD48	UCSC C3X60 480GB Boot SSD (Gen 2)	2
5.7	UCS-CPU-E52695E	2.10 GHz E5-2695 v4/120W 18C/45MB Cache/DDR4 2400MHz	2
5.8	UCS-MR-1X161RV-A	16GB DDR4-2400-MHz RDIMM/PC4-19200/single rank/x4/1.2v	8
5.9	UCSC-C3260-SIOC	Cisco UCS C3260 System IO Controller with VIC 1300 incl.	1

Line Number	Part Number	Description	Qty
5.10	UCSC-C3K-M4SRB	UCS C3000 M4 Server Node for Intel E5-2600 v4	1
5.11	UCSC-C3X60-10TB	UCSC C3X60 10TB 4Kn for Top-Load	28
5.12	UCSC-C3X60-BLKP	Cisco UCS C3X60 Server Node blanking plate	1
5.12	UCSC-C3X60-RAIL	UCS C3X60 Rack Rails Kit	1
5.13	UCSC-C3X60-SBLKP	UCS C3x60 SIOC blanking plate	1
5.14	UCSC-HS-C3X60	Cisco UCS C3X60 Server Node CPU Heatsink	2
5.15	UCSC-PSU1-1050W	UCS C3X60 1050W Power Supply Unit	4
5.16	UCSS-S3260-BBEZEL	Cisco UCS S3260 Bezel	1
5.17	CAB-N5K6A-NA	Power Cord, 200/240V 6A North America	4

References

Design Guide for Cisco HyperFlex with Veeam Availability Suite

Cisco HyperFlex with Veeam Availability Suite

Cisco HyperFlex Data Platform Backup Integration Guide

Cisco HyperFlex HX220c M4 Node Installation Guide

Cisco HyperFlex HX240c M4 Node Installation Guide

Design and Deployment Guide for Cisco HyperFlex Systems

HyperFlex Hardware and Software Interoperability Matrix

Veeam Availability Suite v9 Installation and Deployment Guide

About the Authors

Anil Dhiman, Technical Marketing Engineer, Cisco Unified Computing Systems, Cisco Systems, Inc.

Anil Dhiman has over 16 years of experience specializing in Data Center solutions on Cisco UCS servers, and Performance Engineering of large-scale enterprise applications. Over the past 6 years, Anil has authored several Cisco Validated Designs for Enterprise Solutions on Cisco Data Center Technologies. Currently, Anil's focus is on Cisco's portfolio of Hyperconverged Infrastructure and Backup Solutions.

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