Veeam Availability Suite on Cisco UCS C240 M5 Rack Servers: Deployment Overview

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This document introduces the process for deploying Veeam Availability Suite on the Cisco UCS C240 M5 Rack Server.
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Introduction
This document describes at a high level the installation and configuration steps for deploying Veeam Availability Suite on Cisco UCS® C240 M5 Rack Servers to build a data protection solution. This is not a detailed step-by-step guide, and not every task is documented. The focus is on the steps that are relevant to the specific use case. To finish the deployment, knowledge of the following processes is required:

- Cisco Unified Computing System™ (Cisco UCS) configuration
- Microsoft Windows installation and configuration
- Veeam Availability Suite configuration

Technology overview
This section introduces the technologies used in the solution described in this document.

Cisco Unified Computing System
Cisco UCS is a state-of-the-art data center platform that unites computing, network, storage access, and virtualization resources into a single cohesive system.

The main components of Cisco UCS are described here:

- **Computing**: The system is based on an entirely new class of computing system that incorporates rack-mount and blade servers using Intel® Xeon® processor CPUs.
- **Network**: The system is integrated onto a low-latency, lossless, 10-, 25-, 40-, or 100-Gbps unified network fabric. This network foundation consolidates LANs, SANs, and high-performance computing (HPC) 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 SAN storage and network-attached storage (NAS) over the unified fabric. By unifying the storage access layer, Cisco UCS can access storage over Ethernet (with Network File System [NFS] or Small Computer System Interface over IP [iSCSI]), Fibre Channel, and Fibre Channel over Ethernet (FCoE). This approach provides customers with choice for storage access and investment protection. In addition, server administrators can preassign storage-access policies for system connectivity to storage resources, simplifying storage connectivity and management for increased productivity.
The Cisco UCS consists of the following components:

- **Cisco UCS Manager** provides unified, embedded management of all Cisco UCS software and hardware components (Figure 1).
- **Cisco UCS 6300 Series Fabric Interconnects** offer several important features and benefits that can lower the total cost of ownership (TCO) for the platform. Some examples include:
  - Bandwidth up to 2.56 Tbps
  - Centralized unified management with Cisco UCS Manager software
  - High-performance ports capable of line-rate, low-latency, lossless 10 and 40 Gigabit Ethernet (varies by model) and FCoE, and 4-, 8-, and 16-Gbps Fibre Channel
- **Cisco UCS 5100 Series Blade Server Chassis** supports up to eight blade servers and up to two fabric extenders in a six-rack-unit (6RU) enclosure.
- **Cisco UCS B-Series Blade Servers** increase performance, efficiency, versatility, and productivity with Intel-based blade servers.
- **Cisco UCS C-Series Rack Servers** deliver unified computing in an industry-standard form factor to reduce TCO and increase agility.
- **Cisco UCS S-Series Storage Servers** deliver unified computing in an industry-standard form factor to address data-intensive workloads with reduced TCO and increased agility.
- **Cisco UCS adapters**, with wire-once architecture, offer a range of options to converge the fabric, optimize virtualization, and simplify management.

Cisco UCS is designed to deliver:

- Reduced TCO and increased business agility
- Increased IT staff productivity through just-in-time provisioning and mobility support
- A cohesive, integrated system that unifies the technology in the data center
- Industry standards supported by a partner ecosystem of industry leaders
- Unified, embedded management for easy-to-scale infrastructure
Cisco UCS C240 M5 Rack Server

The UCS C240 M5 large-form-factor (LFF) server (Figure 2) extends the capabilities of the Cisco UCS portfolio in a 2RU form factor with the addition of the Intel Xeon Scalable processor family, 24 DIMM slots for 2666-MHz DDR4 DIMMs and capacity points of up to 128 GB, up to 6 PCI Express (PCIe) 3.0 slots, and up to 12 front-facing internal LFF drives plus 2 rear hot-swappable small-form-factor (SFF) drives. The C240 M5 LFF server also includes one dedicated internal slot for a 12-Gbps SAS storage controller card.

The C240 M5 server includes a dedicated modular LAN on motherboard (mLOM) slot for installation of a Cisco virtual interface card (VIC) or third-party network interface card (NIC) without consuming a PCI slot, in addition to two Intel x550 10GBASE-T LOM ports (embedded on the motherboard). The C240 M5 server can be used in a standalone setup or as part of Cisco UCS, which unifies computing, networking, management, virtualization, and storage access into a single integrated architecture, enabling end-to-end server visibility, management, and control in both bare-metal and virtualized environments.


Figure 2. Cisco UCS C240 M5 Rack Server

(Front view)

(Rear view)

Veeam Availability Suite

Veeam is an industry leader in the data protection market. In the era of digital transformation, Veeam recognizes the new challenges that companies around the world face in enabling the always-on enterprise: a business that must operate 24 hours a day, 7 days a week, every day of the year. To address these challenges, Veeam has pioneered a new market of availability for the always-on enterprise, helping organizations meet today’s service-level objectives by enabling recovery of any IT service and related applications and data within seconds or minutes. Veeam consistently leads the way in bringing sophisticated backup and disaster recovery capabilities to enterprises and cloud providers.

Solution design and suggested configurations

The Veeam Availability Suite on Cisco UCS C240 data protection solution is designed to address the data protection needs of modern data centers. The increasing percentage of virtualized workloads, the dramatic increase in the size and amount of data, and the changes in the ways that companies do business and work with data have had an immense impact on data protection solutions. With the time requirement for backup operations reduced to minutes, and with recovery point objective (RPO) and recovery time objective (RTO) requirements in the range of minutes to one hour, technologies such as compression, deduplication, replication, and backup to disk are essential in every design.
The features and functions provided by Veeam Availability Suite, combined with the features and functions provided by the Cisco UCS C240 M5 Rack Server, create a powerful solution for fast backup and fast restore operations.

Consider the following factors when backing up a data set to disk or tape:

- Disks are well suited for short retention periods; tape is better suited for longer retention periods.
- Disks are well suited for staging; tape is good for long-term storage.
- Disks are better suited for low-volume incremental backups.
- Incremental forever backups are well suited for storage on disk.
- Restoration from disk is usually faster than restoration from tape.
- If client backup operations are too slow to keep the tape in motion, send the backups to disk.
- If the backups are small, send the backups to disk.
- Staging or lifecycle policies can later move the backup images to tape.

There is no best position in the infrastructure to install a Veeam Availability Suite server on the Cisco UCS C240 because many different options are available to lay out a data center regardless of how big it is. One option is to position the Veeam Availability Suite servers in a central place in the physical network so that they can be accessed from everywhere with the required bandwidth. With this approach, the number of required Veeam Availability Suite servers will be low, but the amount of network traffic will be high. Another option is to place the Veeam Availability Suite servers as close as possible to the data source. With this approach, the number of Veeam Availability Suite servers will be greater, but the amount of network traffic on the core network will be much less.

Integrating Cisco UCS C240 with Veeam Availability Suite into a converged infrastructure solution such as FlashStack provides benefits such as these:

- **Simplified management:** Data protection is part of the existing infrastructure management framework.
- **Ease of scalability:** Storage capacity and network bandwidth are managed within the converged infrastructure solution. Within Cisco UCS, you can scale from a 10-Gbps network to a 40-Gbps network to reduce the backup window. You do not need to order and pay for a 40-Gbps port on the core network from the network team. You can scale the Veeam Availability Suite system from small to large according to the scale of the tier-1 storage or service-level agreement (SLA) changes from the business for applications running on the converged infrastructure solution.
- **Ease of support:** All components required to run an application and to back up and restore data are part of the same converged infrastructure solution and known by the administrator team onsite, the support team at Cisco, and the implementation partner. This approach simplifies the identification and resolution of problems such as bottlenecks and failed components.
**Suggested hardware configurations**

Using the sizing rules for the Veeam server components, Cisco has defined suggested configurations for different scale options, summarized in Table 1.

| Table 1. Suggested Cisco UCS configurations for Veeam Availability Suite server |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Raw capacity                    | 8 TB            | 48 TB           | 72 TB           | 84 TB           | 168 TB          | 336 TB          | 672 TB          | 2016 TB         |
| Servers                         | 1 Cisco UCS C240 M5 (LFF) | 1 Cisco UCS C240 M5 (LFF) | 1 Cisco UCS C240 M5 (LFF) | 1 Cisco UCS S3260 | 1 Cisco UCS S3260 | 1 Cisco UCS S3260 | 1 Cisco UCS S3260 | 3 Cisco UCS S3260 |
| OS drives                        | 2 x 400-GB SAS SSDs | 2 x 400-GB SAS SSDs | 2 x 400-GB SAS SSDs | 2 x 480-GB SATA SSDs | 2 x 480-GB SATA SSDs | 2 x 480-GB SATA SSDs | 2 x 480-GB SATA SSDs per node |
| Storage                          | Replication-only appliance | 12 x 4-TB SAS 7200-rpm drives | 12 x 4-TB SAS 7200-rpm drives | 14 x 6-TB SAS 7200-rpm drives | 14 x 12-TB SAS 7200-rpm drives | 28 x 12-TB SAS 7200-rpm drives | 56 x 12-TB SAS 7200-rpm drives | 168 x 12-TB SAS 7200-rpm drives |
|                                 | 48 TB of raw capacity | 72 TB of raw capacity | 84 TB of raw capacity | 168 TB of raw capacity | 336 TB of raw capacity | 672 TB of raw capacity | 1008 TB of raw capacity |

**Note:** Storage efficiencies through Veeam compression and deduplication technologies can reduce space utilization by 50 percent or more. Backup repositories on Microsoft Resilient File System (ReFS) 3.0 volumes also benefit from integration with the Block Clone API, reducing creation time for synthetic full backups and dramatically reducing space consumption for the synthetic full backup. Overall space savings will vary depending on the environment.

The suggested configurations based on the Cisco UCS C240 are as-is designs, with no option to scale within the rack server. The configurations are for small deployments and remote-office and branch-office (ROBO) deployments, or for deployment to staging units for backup to disk and then to tape or backup to disk and then to the cloud.

The suggested configurations are based on the Cisco UCS S3260 Storage Server with 6- and 12-TB drives. The configurations provide the option to choose 14, 28, 42, or 56 drives at the time of ordering and to scale to 56 drives later. The configuration with 6-TB drives provides better throughput per terabyte, and the configuration with 12-TB drives provides lower cost per terabyte.
Cisco UCS configuration
This document discusses the use of a standalone Cisco UCS C240 M5 LFF rack server and of a Cisco UCS C240 M5 LFF rack server managed by Cisco UCS to install Veeam Availability Suite. The document thus describes how to deploy the solution both within a Cisco UCS domain and connected to data center switches.

Use the Cisco UCS C240 installation guide
(https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/c/hw/C240M5/install/C240M5/C240M5_chapter_00.html) to complete the initial configuration (IP addresses, passwords, software versions, etc.). This document assumes that the C240 M5 is accessible through the Cisco Integrated Management Controller (IMC) or Cisco UCS Manager over the network.

Note: The design and configuration principles presented here can be used for unmanaged installations. You can use the Cisco IMC for the storage and network configuration as well as for operating system installation.

Standalone configuration with Cisco Integrated Management Controller
Use the process described here to configure a standalone solution.

1. Log on to the Cisco IMC as the admin user.

2. Check the condition of the system and the components required for the deployment on the Chassis > Summary page.
3. Choose Networking to see the mLOM adaptor card configuration.

The General tab presents an overview of the Cisco UCS VIC 1387 configuration.

4. View the vNICs tab. This tab summarizes the existing host Ethernet interfaces, including the maximum transmission unit (MTU) size, the uplink port used, and VLAN information.

a. As a best practice, create at least two virtual NICs (vNICs) per VLAN ID connected to a redundant pair of uplink switches.

b. If possible, use an MTU value of 9000 for the backup network and on all participating devices in the network (clients, switches, and servers).
5. Choose Chassis > Inventory.

The CPU tab summarizes the details of the CPU on the C240 M5.

The Memory tab of the Inventory pane presents memory details.

The Storage tab of the Inventory pane shows the storage controller information.
6. Choose Storage.

The storage configuration is the most important part of the Cisco UCS C240 M5 LFF configuration.

The Storage pane shows the RAID controller information, physical drive and virtual drive information, and RAID settings.

7. Choose Physical Drive Info.

The RAID controller will see only the physical drives on the C240 M5. The present server is configured with 12 x 4-TB capacity drives and rear-mounted 2 x 400-GB SAS solid-state disk (SSD) drives. The SSD drives with RAID 1 will be used for OS and Veeam installation.
8. Verify that all drives are in the Unconfigured Good state. If drives are in JBOD mode, select each drive and set the state to Unconfigured Good.

9. Create virtual disk group 0. On the Controller Info page, click Create Virtual Drive from Unused Physical Drives.

10. For the operating system and Veeam Server, you must create a RAID 1 configuration on the two SSDs on the back of the chassis.
   a. Select 1 as the RAID level.
   b. Select physical drives 13 and 14 and add them to the drive group (click >>).
   c. Set the following parameters:
      - Name: RAID1_Boot
- Disk Cache Policy: Unchanged
- Access Policy: Read Write
- Write Policy: Write Back Good BBU
- Read Policy: Always Read Ahead
- Cache Policy: Cached IO
- Strip Size: Select the value shown for the largest available space.

11. Configure drive 12 as a global hot spare.

12. Create RAID 6 as the Veeam repository.
   a. On the Controller Info tab, click Create Virtual Drive from Unused Physical Drives.
b. For the RAID level, select RAID 6.

c. Select drives 1 to 11 and click the >> tab to add drives under Drive Groups.

d. Set the following parameters:

- **Name:** Veeam_Rep.
- **Disk Cache Policy:** Unchanged
- **Access Policy:** Read Write
- **Write Policy:** Write Back Good BBU
- **Read Policy:** Always Read Ahead
- **Cache Policy:** Cached IO
13. Click the Virtual Drive Info tab and select the boot virtual drive.

14. Click Set as Boot Drive.
15. Confirm that you want to make the boot virtual drive the boot drive. Confirm the use of two virtual drives: for the OS boot and Veeam installation and for the Veeam repository.

16. Choose Compute > BIOS > Configure the Boot Order.
Cisco UCS managed configuration with Cisco UCS Manager

Use the process described here to configure a solution managed by Cisco UCS.

View the system

Start the configuration by reviewing the setup.

1. Log in to Cisco UCS Manager as the admin user or as another user with administrative rights.

2. On the Equipment tab, identify the Cisco UCS C240 M5 Rack Server and check the condition of the system and the components required for the deployment.
3. On the Inventory tab, verify the CPU and configured memory.

<table>
<thead>
<tr>
<th>Processor 1</th>
<th>Processor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Name</strong>: Intel® Xeon® Bronze 3104</td>
<td><strong>Product Name</strong>: Intel® Xeon® Bronze 3104</td>
</tr>
<tr>
<td><strong>PID</strong>: UCS-CPU-3104</td>
<td><strong>PID</strong>: UCS-CPU-3104</td>
</tr>
<tr>
<td><strong>Vendor</strong>: Intel® Corporation</td>
<td><strong>Vendor</strong>: Intel® Corporation</td>
</tr>
<tr>
<td><strong>Revision</strong>: 0</td>
<td><strong>Revision</strong>: 0</td>
</tr>
</tbody>
</table>

**Part Details**

- **Processor Architecture**: Xeon
- **CPU Stepping**: 4
- **Socket Name**: CPU1
- **Number of Cores**: 8

**States**

- **Overall Status**: Operable
- **Operability**: Operable
- **Thermal**: OK

**Part Details**

- **Processor Architecture**: Xeon
- **CPU Stepping**: 4
- **Socket Name**: CPU2
- **Number of Cores**: 8

**Speed (GHz)**: 1.3
**Number of Threads**: 6
**Number of Cores Enabled**: 6
4. On the Inventory tab, verify that the adaptor is the mLOM for a 40-Gbps network.

5. On the Inventory > Storage > Controller tab, confirm the presence of the Cisco 12-Gbps modular RAID controller with a 2-GB cache.
6. In a standalone configuration, the Cisco UCS VIC 1387 includes predefined vNICs and virtual host bus adapters (vHBAs). In a configuration managed by Cisco UCS, however, nothing is defined. This definition is part of the service profile configuration. If PCIe cards for networking or Fibre Channel are installed, the information is listed on the NICs and HBAs tabs. View the tabs.

Identify physical disks for the OS installation

To complete the storage configuration discussed later in this document, you need to identify the physical disks available for the operating system installation. The Cisco UCS C240 M5 LFF rack server comes with four disk slots at the rear, with disk numbers 13 through 14. In addition, using the service profile, you configure RAID 1 for the rear SSD, which are provisioned for the OS and Veeam installation. In the example here, the available disks are 13 and 14.

The server is equipped with 12 drives on the front, which are provisioned for the Veeam repository.
1. Under Inventory > Storage > Storage Controller SAS1, verify the use of 12 x 4-TB drives and 2 x 400-GB SSDs (for boot).

2. If the disks are in JBOD mode, select all the disks and mark them as “Set JBOD to Unconfigured Good.”

Define disk groups and logical unit numbers

The next step is to define the disk groups and logical unit numbers (LUNs) in the storage area of Cisco UCS Manager. This is the most important part of the Cisco UCS C240 configuration for the Veeam Availability Suite solution.

2. The first disk group policy is for the two disks in the back of the chassis. Create the policy.
   a. Enter an obvious name and a description.
   b. For the RAID level, select RAID 1 Mirrored.
   c. Select Disk Group Configuration (Manual) and click Add.
   d. Enter slot number 13, available to the server (see the equipment information), and click OK.
   e. Repeat the same process for slot 14 and click OK.
f. Set the following parameters:
   - Access Policy: Read Write
   - Read Policy: Read Ahead
   - Write Cache Policy: Write Back Good BBU
   - IO Policy: Cached
   - Drive Cache: Platform Default (Any other option will cause a failure because the drive cache on SSDs cannot be changed.)

g. Click OK.
3. For the purposes of this document, configure one disk group for all front-facing drives and use RAID 6 with dual parity as the RAID level for 11 disk drives. Disk 12 will be used as a hot spare.
   a. Click Add for the configuration with 12 disk drives.
   b. Enter an obvious name and a description.
   c. For RAID Level, select RAID 6 Striped Dual Parity.
   d. Select Disk Group Configuration (Automatic).
   e. Set the following parameters:
      - Number of drives: 11
      - Enter 1 as the Number of Dedicated Hot Spares: 1
      - Drive Type: HDD
   f. Scroll down.
g. Set the following parameters:
   - Stripe Size: 64 KB
   - Access Policy: Read Write
   - Read Policy: Read Ahead
   - Write Cache Policy: Write Back Good BBU
   - IO Policy: Cached
   - Drive Cache: Platform Default

h. Click OK.
The LUNs are created for the disk groups. Table 2 and Table 3 summarize the required LUNs and their sizes.

**Table 2.** Disk group C240-Boot with disks 13 and 14 (SSDs in the back of the server)

<table>
<thead>
<tr>
<th>Disk group</th>
<th>Size</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C240-Boot</td>
<td>Fill to maximum</td>
<td>Boot</td>
</tr>
</tbody>
</table>
Table 3.  Disk group C240-RAID6-1 with top-loaded disks 1 through 14

<table>
<thead>
<tr>
<th>Disk group</th>
<th>Size</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C240-RAID6-1</td>
<td>Fill to maximum</td>
<td>Veeam_Rep</td>
</tr>
</tbody>
</table>

4. Go to Storage > Storage Profiles > root > Sub-Organizations > Veeam and click Create Storage Profile.

5. Click Add to create LUNs.
6. Select Create Local LUN.
7. For the name, enter RAID1_Os.
8. Select Expand to Available. This setting allows the maximum possible size of LUN created through the selected disk group configuration.
9. Select RAID1–OS as the disk group policy. This configuration was created through a pair of back-side SSDs (slots 13 and 14) on the C240 M5 LFF.
10. Click Add again to create the LUN for the Veeam repository mapped to the front-facing HDD.
11. Select Create Local LUN.
12. For the name, enter **Veeam_Rep**.
13. Select Expand to Available. This setting allows the maximum possible size of LUN created through the selected disk group configuration.
14. Select C240-RAID6-1 as the disk group policy. This disk group policy was created for the front-facing HDD on the C240 M5 LFF.
Create Local LUN

- Create Local LUN
- Prepare Claim Local LUN

- Name: Vesam_Rep
- Size (GB): 1
- Fractional Size (MB): 0
- Auto Deploy: Auto Deploy
- Expand To Available: Check
- Select Disk Group Configuration: C240-RAID6-1

OK  Cancel

15. Click OK.
16. Click OK to finalize the storage profile.

Create a service profile
The final configuration step in Cisco UCS Manager is creating a service profile.

1. Go to Servers > root > Sub-Organizations > Veeam and click Create Service Profile (expert).
2. Enter an obvious name.
3. For UUID Assignment, select a universal user ID (UUID) pool with free IDs.
4. Click Next.
5. In the Storage Provisioning section, click the Storage Profile Policy tab.

6. Select the storage profile that you want (in the example here, Veeam_Str_Prf is used).

7. Click Next.
8. In the Networking section, click the Expert button.

9. Click Add.

10. Enter `eth0` as the name.
11. Select a MAC address pool with free addresses.
12. Select Fabric A as the fabric ID and select the Enable Failover checkbox.
13. Select your backup network (the example here uses hx-inband-mgmt) and click the Native VLAN button.

14. Enter **1500** or **9000** for the MTU value. MTU 9000 works only if all network components and the server are configured with MTU 9000. Check with your network administrator and server administrator to determine which value to use.
15. For Adapter Policy, select Windows.
16. Set QoS Policy and Network Control Policy as defined by your local network administrator.
17. Click OK.
18. Click the SAN Connectivity section, select No vHBAs, and then click Next.
19. In the Zoning area, click Next.

20. In the vMedia Policy section, click Next.
21. In the Server Boot Order section, select default. This setting allows a local boot.

22. In the Maintenance section, for Maintenance Policy, select default. Then click Next.

23. In the Server Assignment section, select Assign Later and then click Next.
24. In the Operational Policies section, select the policies required for your installation. Veeam does not require you to select any particular options.

25. Click Finish.
Assign the service profile to the server

Now assign the service profile to the available C240 M5 server. Thereafter, you can assign the chassis server node to the previously created service profile.

1. Right-click the previously created service profile and choose Change Service Profile Association.

2. Select the available C240 M5 LFF server.
3. Monitor the service profile association on the FSM tab. Figure below elaborates on the association of Service Profile to Cisco UCS C240 M5 Rack Server

<table>
<thead>
<tr>
<th>Select</th>
<th>Chassis ID</th>
<th>Slot</th>
<th>Rack ID</th>
<th>Proc</th>
<th>Memory</th>
<th>Adapters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>UCSC-C240-M5L</td>
<td>2</td>
<td>131072</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2</td>
<td>HX220C-M5SX</td>
<td>2</td>
<td>393210</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2</td>
<td>HX220C-M5SX</td>
<td>2</td>
<td>393210</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>2</td>
<td>HX220C-M5SX</td>
<td>2</td>
<td>393210</td>
<td>1</td>
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<td></td>
<td>7</td>
<td>2</td>
<td>HX220C-M5SX</td>
<td>2</td>
<td>393210</td>
<td>1</td>
</tr>
</tbody>
</table>
4. Verify the association status and the LUNs created.

OS Installation & Configuration

Install Microsoft Windows on the Cisco UCS server

After you have verified the service profile, you can proceed to the installation of Microsoft Windows 2016 on the C240 M5 server. Windows 2016 installation requires a valid C240 M5 RAID controller driver, which allows installation of the OS on the boot LUN. Follow the steps here to successfully install the RAID controller driver.

1. To load the RAID controller driver for the C240 M5, on the setup screen that asks “Where do you want to install Windows?” click “Load driver.”
2. In Cisco UCS Manager, click the LAN tab in the navigation pane.

4. Click Browse and navigate to the location of the driver:
5. Click Rescan and view the correct RAID controller driver in the "Select the driver to install" window.
6. Click Next to install the driver.

7. Return to ‘Where do you want to install Windows’ screen, uncheck the driver ISO image, and remap the Windows Installer Image.

8. Click Refresh.
9. Select Drive5. This drive is the RAID 1 configuration created from the two SSDs in the rear of the C240 M5 LFF for OS installation through the storage profile in the Cisco UCS service profile. Drive6 is the RAID 6 configuration created from the front-facing drives.

10. Click Next.
Update the Cisco UCS VIC driver

When the installation is complete, proceed to the next section: 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 log in to Windows 2016 installed on C240 M5 server.
2. Map the C240 M5 drivers through the Map CD/DVD option on the Virtual Media tab in the KVM console.
3. In Windows 2016, go to Control Panel > Device Manager.
4. Select Ethernet Controller and then select Update Driver Software.
5. Select “Browse for driver software on your computer.”

6. Select the DVD driver mapped through virtual media in the KVM console and browse to \Network\Cisco\VIC\W2K16\x64.

7. Click Next to install the Cisco VIC Ethernet Interface driver.
Update the chipset driver

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

1. Select Update Driver for Intel Chipset.
2. Under the C240 driver ISO file mounted through the virtual media in the KVM console, browse to \ChipSet\Intel\CxxxM5\W2K16.
3. Click the chipset driver executable location and run SetupChipset.exe. When the file has been installed, restart the system.
Finish the configuration

Complete the configuration.

1. Assign an IP address, disable the firewall, and enable Microsoft Windows Remote Desktop for management of the server.
2. Create NICs.
   - If the C240 M5 is used as a standalone server, that is, if it is managed through the Cisco IMC, create a NIC team across the two NIC interfaces connected to a pair of redundant uplink switches. This approach provides high availability during failure of any one of the uplink switches.
   - If the C240 M5 server is managed by Cisco UCS Manager, you should create a single NIC, as discussed in the steps for creating a service profile.

Create the ReFS disk volume for the Veeam repository

ReFS volumes provide significantly faster synthetic full backup creation and transformation performance. They also reduce storage requirements and improve reliability. Even more important, they improve the availability of backup storage by significantly reducing its load, resulting in improved backup and restore performance and enabling customers to do much more with virtual labs.

To create a disk volume for the 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 the name as Cisco UCSC-RAID16-2GB.
3. Create a new volume.
4. Click Next until you reach the “Select File System settings” window.
   a. Create a volume label.
   b. Set the file system to ReFS.
   c. Set an allocation unit size of 64 KB.
   d. For the volume label, specify VeeamRep.

5. Click Next.
6. Confirm the file system settings and click Create.
Veeam Availability Suite installation

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 a license key from Veeam.

1. Start the Veeam installation with Setup.exe.

2. Click Install under Veeam Backup & Replication 9.5 Update 3.
3. Enter the location of a valid Veeam license file.

4. During the system check, Veeam verifies the SQL Server Installation and prerequisite software components. Click Install.

5. Accept the default Installer locations and click Install.
The core installation is complete.

**Veeam Availability Suite configuration**

Now configure Veeam Availability Suite.

1. Open the Veeam Backup & Replication console.
2. By default, Veeam uses the drive with the most capacity as the Veeam repository. This is the VeeamRep repository created through the disk volume.

3. Right-click Managed Server and choose Add Server.

4. Select VMware VSphere and add the VMware vCenter URL. Then click Next.
5. Enter the vCenter credentials and click Next.

6. When the Veeam console has collected all the deployment details from vCenter, click Finish.
7. Click Backup Proxies in the right navigation window and choose VMware Backup Proxy. Edit the properties.

8. Edit Max Concurrent Tasks so that the value is equal to the number of physical cores minus 2. The present deployment uses a dual 12-core Intel processor, and therefore you can increase the maximum concurrent task value to 22.

9. 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.
10. Click Finish.

11. Click Backup Repository in the right navigation window, select the default backup repository, and edit Properties.

12. Click Next until you reach the Repository window.

13. Increase the Limit Max Concurrent Task value to 22 (the number of physical cores minus 2).

14. Click Finish.

15. Add the `MaxSnapshotsPerDatastore` parameter in the registry.

16. The default number of snapshots per data store is 4. You can change the number of concurrent snapshots processed by Veeam in the VMware data store. In doing so, you should consider the intensity of the I/O workload on the vSphere cluster.
during backup jobs. For instance, if the vSphere cluster is not performing heavy I/O-intensive transactions during Veeam backup jobs, then the MaxSnapshotsPerDatastore value can be increased.

17. Using the registry key editor, go to HKEY_LOCAL_MACHINE\SOFTWARE\Veeam\Veeam Backup and Replication and add a REG_DWORD with the name MaxSnapshotsPerDatastore. Specify a value greater than 4.

18. Restart the Windows 2016 Server to apply the registry settings.

Deployment of Veeam Availability Suite 9.5 on the Cisco UCS C240 M5 LFF rack server is now complete.

For more information

For additional information, see the following:
