Abstract
Combining the power of VMware Cloud Foundation and Dell EMC infrastructure, Dell Technologies Cloud delivers a consistent hybrid cloud experience across private, public, and edge environments. With Dell Technologies Cloud Validated Designs, customers now have more choice to meet their most demanding workload needs using pre-tested infrastructure with deployment guidance based on Dell EMC best-of-breed storage, compute, and networking that’s been validated with VMware Cloud Foundation. This white paper shows how to configure Dell EMC storage products to work with VMware Cloud Foundation.

August 2019
<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>February 2019</td>
<td>Initial release</td>
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<tr>
<td>March 2019</td>
<td>SC Series added</td>
</tr>
<tr>
<td>April 2019</td>
<td>PowerMax NFS, VxFlex OS, and XtremIO added</td>
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<tr>
<td>July 2019</td>
<td>PowerMax and Dell EMC Unity iSCSI steps added</td>
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<tr>
<td>August 2019</td>
<td>Introducing Fibre Channel storage as primary storage for VMware Cloud Foundation workload domains (available Q4 2019)</td>
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1 Introduction

1.1 Business IT challenges
Digital Transformation is no longer a buzz word, but rather a direct reflection of the massive changes that are happening across every industry. Organizations are making substantial investments in IT to succeed in this digital landscape that requires leveraging data as an asset across all aspects of their business. There has also been substantial movement towards onboarding cloud services to accelerate innovation, expand to new locations, keep up with massive growth, and reduce costs of delivering IT.

As a result, IT departments are under significant pressure today. They are no longer treated as a cost center only responsible for keeping the lights-on, but instead IT is playing a significant role in shaping their organization’s overall digital strategy. As organizations continue to grow their application ecosystems, this represents a large shift for many IT departments with significant challenges on the way such as aging data centers and legacy infrastructure that make it difficult to support their transformation ambitions.

IT departments are now forced to re-examine what they do and how they do it—prioritizing their business objectives to deliver greater efficiency, predictability, and business agility.

1.2 The need for a hybrid cloud model
The explosion of data and devices in addition to the continued focus on controlling and reducing operating expenses has accelerated the adoption of both public and private cloud computing. Success is now the ability to make data-driven decisions and to act quickly on new ideas to deliver outstanding customer and user experiences. To support this new paradigm, IT is addressing the needs of both traditional 3-tier applications as well as new cloud-native applications, each with a different set of priorities.

For existing workloads, IT departments are looking to reduce costs and improve performance and efficiency, while for cloud-native workloads the priorities are focused around access to new cloud services such as containers or AI/ML platforms. To address the specific needs of workloads, organizations are moving towards adopting a mix of public and private clouds.

However, operating in multiple clouds comes with another set of challenges including operational silos, different management and operations tools, complex workload migrations, security concerns, and inconsistent SLAs. These problems are a byproduct of the lack of consistent infrastructure and operations across clouds, slowing cloud adoption and limiting its effectiveness.

To overcome this complexity, the ideal choice for organizations is to embrace a consistent hybrid cloud strategy for both public and private clouds, allowing for the optimal deployment of workloads. It’s no wonder half of organizations formulating hybrid cloud strategies have cited seamless compatibility with their on-premises infrastructure as the most important consideration, according to new research from analyst firm ESG. In other words, they need a hybrid cloud strategy that eliminates multi-cloud complexity, while providing flexible deployment options for high value workloads.

IDC Worldwide Quarterly Cloud IT Infrastructure Tracker, Q1 2019, June 209
Introduction

1.3 VMware Cloud Foundation

VMware is a leader in providing both the virtualization and management software that support a software-defined data center (SDDC). The VMware vision of a modern data center starts with a foundation of software-defined infrastructure that is simple to manage, monitor, and operate. The architecture for the SDDC empowers companies to run hybrid clouds, delivering scalability, automation, and agility. It’s based on well-established products from VMware, such as vSphere, vSAN, and NSX, providing compute, storage, and networking virtualization—together with the vRealize Suite which brings additional management, self-service, automation, intelligent operations, lifecycle management, and financial transparency. With VMware Cloud Foundation, IT departments now have a powerful operational hub for their hybrid cloud environments and external storage arrays, delivering a strong foundation to deploy and manage both traditional and cloud-native workloads.

Figure 1: VMware software-defined data center architecture

1.4 Dell Technologies Cloud

The Dell Technologies Cloud is a set of cloud infrastructure solutions designed to make hybrid cloud environments simpler to deploy and manage. Combining the power of VMware Cloud Foundation and Dell EMC, the No. 1 provider of cloud infrastructure², customers now have a consistent experience across public clouds, private clouds, and edge locations. With streamlined operations and lowered total cost of ownership (TCO), IT departments can now let business priorities determine where workloads reside, ensuring they are delivering the reliable infrastructure that best meets their unique business needs.

Using Dell Technologies Cloud, customers can deploy their workloads on-premises or use cloud environments—with VMware Cloud Foundation providing the consistent operational experience across all.

² ESG Master Survey Results, Hybrid Cloud Trends, May 2019
The hybrid cloud solution is delivered through unique integration of hardware, software, services and consumption options from Dell EMC and VMware. Customers can consume in the way that aligns best with their workload requirements and business objectives:

- **Dell Technologies Cloud Platform** with Enterprise PKS and VMware Cloud Foundation on VxRail: The only fully integrated HCI system jointly engineered with VMware, delivered as a turnkey option.

- **Dell Technologies Cloud Datacenter-as-a-Service** with VMware Cloud on Dell EMC: A fully managed service for data center and edge locations.

- **Dell Technologies Partner Clouds** with support for major cloud providers and over 4200 additional cloud partners: Available via subscription/lease or usage-based.

- **Dell Technologies Cloud Validated Designs** using Dell EMC best-of-breed storage, compute, and networking: Pre-tested infrastructure with deployment guidance.

### 1.5 Dell Technologies Cloud Validated Designs

**Bring more workloads to the cloud with Dell Technologies Cloud Validated Designs**

Dell Technologies Cloud Validated Designs enable customers to bring cloud to a broader set of workloads that require independent scaling of storage and compute. This new option to consume Dell Technologies Cloud provides deployment guidance for pre-tested Dell EMC storage, compute, and networking infrastructure that’s been validated with VMware Cloud Foundation. Using Validated Designs, customers can now support new and legacy workloads that have infrastructure-intensive requirements in the most efficient way possible.

Benefits of Validated Designs:

- Rapid time-to-value with pre-tested infrastructure and deployment guidance
- Superior performance with independent scaling of storage and compute
- Leverage existing investments for hybrid cloud environments

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3 A Dell Technologies Cloud Validated Design does not equal a VMware Validated Design (VVD). A VVD is a software bill of materials (BoM) with related documentation to guide customers building their own software-defined data center (SDDC). Dell Technologies Cloud VD are focused on infrastructure, with related documentation to guide customers building out their own on-premises infrastructure.
Dell EMC Storage with VMware Cloud Foundation

Currently, Validated Designs are available for Dell EMC Unity XT and PowerMax storage arrays, and PowerEdge MX—which have been the backbone of most companies’ high-value workloads for the better part of the last three decades. While this white paper is focused on Dell EMC storage with VMware Cloud Foundation, more Validated Designs are coming soon.

![VMware Cloud Foundation](image)

Figure 2: PowerMax and Unity integrated with VMware Cloud Foundation

2.1 Customer use cases

Customers can now use Validated Designs to build their own hybrid cloud infrastructure, combining the best of software-defined and traditional 3-tier architecture. With more choices, they have deployment flexibility to meet unique external storage-intensive requirements such as the ability to scale storage capacity independent from compute capacity.

Currently, both the enterprise-class, PowerMax, and the versatile mid-range storage system, Unity XT, support Network File System (NFS) as both primary and supplemental storage. Fibre Channel (FC) is available as supplemental storage for workload domains, with support for primary storage coming in Q4 2019.

<table>
<thead>
<tr>
<th>Storage Type</th>
<th>Management Domain</th>
<th>Workload Domains: Primary Storage</th>
<th>Workload Domains: Supplemental Storage</th>
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<tbody>
<tr>
<td>vSAN</td>
<td>✓</td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td>Network File System (NFS)</td>
<td>x</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Fibre Channel (FC)</td>
<td>x</td>
<td>Q4 2019</td>
<td>✓</td>
</tr>
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</table>

Figure 3: Available today - NFS as both primary and supplemental storage and FC as supplemental storage for workload domains
Storage-intensive applications

Dell EMC PowerMax and Unity XT storage arrays are ideal for applications with demanding throughput and capacity needs. They are powerful additions to VMware Cloud Foundation environments, delivering the flexibility to scale storage independent of compute for greater performance and application flexibility. In addition, customers can also build new levels of storage resiliency with synchronous replication for disaster recovery from on-premise data centers to multiple sites, for example.

Investment protection

For customers with existing Dell EMC storage infrastructure, they can now easily attach existing data capacity to their hybrid cloud environments. This enables them to take advantage of the advanced data services, performance, and capacity that PowerMax and Unity XT delivers.

Deployment automation

The new vRealize Orchestrator (vRO) plugin for PowerMax allows administrators to take advantage of VMware’s deployment tools of choice to rapidly stand up new environments with attached external storage. Customers can now execute storage operations such as provisioning storage or scheduling snapshots directly from vRO. In addition, they can also further automate storage management activities by establishing workflows through a self-service portal using vRealize Automation (vRA). This allows administrators to simplify the user experience and deliver a pre-defined catalog of items that users can deploy without prior knowledge of specific storage platforms. Examples of self-service items include:

- High performance storage: Pre-defined storage for workloads that require extremely low latency such as credit card authorizations for retail transactions. Users select pre-configured high performance NVMe storage capacity that offer high read/write performance designed to support OLTP (On Line Transaction Processing) transactional workloads.
- Data warehouse storage: Pre-defined storage for workloads that require large sequential read performance such as business analytics. Users select pre-configured high capacity storage (such as NL-SAS or SATA drives) that offer great sequential read performance supporting large database queries.
Figure 4: Example deployment using NFS as primary and supplemental storage, and FC as supplemental storage. FC support for primary storage will be available Q4 2019.

2.2 Introducing Fibre Channel storage as primary storage for VMware Cloud Foundation workload domains (available Q4 2019)

Continuing a history of collaboration with VMware, Dell EMC is the first to qualify external FC Storage solutions as primary storage for VMware Cloud Foundation workload domains. The ability to use external FC storage as supplemental storage was made available by VMware in Feb 2019 with VMware Cloud Foundation 3.5.1. The use of FC storage as primary storage in workload domains is in “tech preview”—currently planned for General Availability with VMware Cloud Foundation 3.8.1 by Q4 2019.

VMware Cloud Foundation 3.8.1 will support both FC and NFS storage classes as primary and supplemental storage for workload domains using PowerMax and Unity XT.

Figure 3: Dell EMC roadmap for VMware Cloud Foundation integration of external storage solutions as primary storage
This white paper is focused on Dell Technologies Cloud Validated Designs for Unity XT and PowerMax storage arrays using NFS as primary or supplemental storage, and FC as supplemental storage for workload domains. This guide will be updated as FC becomes available as primary storage.

Before completing the main steps in this guide, complete the following prerequisites:

**VMware Cloud Foundation**
- The management domain is deployed by the VMware Cloud Builder virtual machine.
- Additional hosts are commissioned and are ready to be added to a new workload domain.

**Dell EMC storage**
- Storage networking is configured to allow connectivity between the Dell EMC arrays and the VMware Cloud Foundation workload hosts.
  - For NFS and iSCSI configurations, it is recommended to dedicate a workload domain VLAN for an IP-based storage network pool.
  - For Fibre Channel configuration, the workload host initiator ports must be zoned with the target ports for the array within the FC switch networks. Since FC volumes can only be used as supplemental storage for the workload domain, NFS or VSAN storage must be used for the workload domain creation.
4  **Workload domain configuration with NFS**

When provisioning a workload domain, the primary storage assignment for that workload domain must use either NFS or VSAN storage for the initial cluster creation. Supplemental storage such as VMFS on Fibre Channel or iSCSI can be added later. This section details how to configure NFS storage to be used for workload domain creation.

4.1  **VMware Cloud Foundation network pool configuration**

Before creating the NFS share, a dedicated storage IP networking pool must be created for NFS traffic.

1. From the SDDC Manager dashboard, in the left-hand pane, expand Administration, and select Network Settings.

2. In the upper right-hand side of the screen, click Create Network Pool.
3. Create the network pool.
   
a. Specify a Network Pool Name.
   
b. For Network Type, select NFS.
   
c. Enter the IP storage network information.
   
d. When finished adding IP address ranges, click Save.

4. Make note of the Included IP Address Ranges for later use when assigning host access permissions on the NFS share.
Workload domain configuration with NFS

4.2 Dell EMC storage configuration

This section details the steps for each of the various arrays to prepare the NFS mount points for VMware Cloud Foundation.

4.2.1 Dell EMC Unity NFS share configuration

To create the NFS share on the Dell EMC Unity array, follow these steps:

1. To create the NAS server, from within the Dell EMC Unity Unisphere™ interface, under Storage, click File, click the NAS Servers section, and click the plus (+) to add a NAS server.

![Dell EMC Unity Unisphere interface screenshot showing NAS Servers section](image)

2. Follow through the wizard and specify the settings unique to your environment. Any configuration pages that require special attention will be called out in the following steps.

3. On the Interface page, specify an IP address within the VLAN of the NFS network pool created earlier from the SDDC Manager, and click Next.

![Configure NAS Server Address](image)

4. On the Sharing Protocols page, select Linux/Unix shares (NFS), and click Next.

5. On the Summary page, click Finish to create the NAS server.
Next, create the file system for the NFS share.

1. Select the **File Systems** section and click the **plus (+)** to add a new file system.

   ![Unisphere File Systems](image)

   1. On the **Protocol** page, select **Linux/Unix Shares (NFS)**, select the **NAS Server** created previously, and click **Next**.

   ![Create a File System](image)

   2. Specify the options for the **Name** and click **Next**.

   3. On the **Shares** page, check the **NFS Share (Linux/Unix)** box, specify a share name, and click **Next**.
Make note of the **NFS Share Path** for use later in configuring the NFS share from within the SDDC Manager.

5. On the **Access** page, set the **Default Access** to **Read/Write, allow Root**, and click the **plus sign (+)** to customize the host access. In the section **Customize access for the following** hosts, add the **Included IP Address Ranges** assigned to the NFS network pool created in section 4.1. Click **Next**.

6. Specify the options for the **Snapshot** and **Replication** pages. At the **Summary** page, click **Finish**.
Next, create the NFS share.

**Note:** If the NFS share was previously created in section 4.2.1, skip this section and perform the steps in section 4.2.2.

If the NFS share has not yet been created, perform the following steps.

1. Select the **NFS Shares** section and click the **plus (+)** to add a new NFS share.

2. On the **File System** page, select the file system created in the previous step and click **Next**.

3. On the **Name & Path** page, specify the **Share Name**. Keep note of the **Export Paths** address for later use when configuring the NFS share from within the SDDC Manager.
4. On the **Access** page, set the **Default Access** to **Read/Write, allow Root** and click the **plus (⁺)** to customize the host access. In the **Customize access for the following** hosts section, add the **Included IP Address Ranges** assigned to the NFS network pool created in section 4.1.

![Create an NFS Share (NFS Export)](image)

### 4.2.2 PowerMax NFS share creation

To create the NFS share on the PowerMax array, follow these steps:

1. In the Unisphere interface, click **System > File**.

![Unisphere for PowerMax](image)
2. In the Actions pane, click **Provision Storage for File**.

![Provision Storage for File](image)

3. When the wizard opens to the **Storage Group** section, specify the **Storage Group Name**, select the **Storage Resource Pool** and the **Service Level**, set **Volumes** to 1, set the desired **Volume Capacity**, and click **Next**.

![Provision Storage For File](image)
4. On the **Summary** screen, review the settings. Click the **drop-down arrow** next to **Add to Job List** and select **Run Now**.

5. Launch Unisphere for VNX.
6. When the administrative console opens, click **Storage, Storage Pool**. When the pane opens, click **Rescan Storage Systems**. When the dialog opens, click **OK**.

7. To create the interface, click **Settings > Network** and click **Interfaces**.

8. At the bottom of the pane, click **Create**. Specify the Interface settings and click **OK**. Note this IP address for use in section 4.3.
9. To create the file system, click **Storage > Storage Configuration > File Systems** and click **Create**.

10. Specify the desired options for the file system and click **OK**.
11. To create the NFS export, right-click the file system, select **NFS Exports**, and select **Create NFS Export**.

![EMC Unisphere interface showing file system and NFS Exports]

12. When the **Create NFS Export** configuration screen appears, enter the export and host information and click **OK**.

![Create NFS Export configuration screen with data mover, file system, and access options]
13. Click **Storage > Shared Folders** and click **NFS** to reveal the share information needed for section 4.3.

![EMC Unisphere](image)

In this example, the NFS share is: **10.10.132.101:VCF_FS1**

### 4.3 VMware Cloud Foundation workload domain deployment

This section describes how to deploy the NFS workload domain using the NFS share settings noted previously.

1. From the SDDC Manager dashboard, click the **+Workload Domain** button and click **VI – Virtual Infrastructure**.

![Workload Domain](image)

2. For **Storage Selection**, select **NFS** and click **Next**.

![Storage Selection](image)
3. When the **VI Configuration** wizard begins, enter the environment-specific details into the **Name**, **Compute**, **Networking**, and **Host Selection** pages.

4. When the **NFS Storage** page is reached, enter the NFS share **Export Paths** info previously noted in section 0.

5. Continue with the wizard to specify **Licenses** and the **Object Names**. On the **Review** page, click **Finish** to begin the workload domain deployment.

6. When the workload domain has finished deployment, the NFS share information will appear in the SDDC Manager interface.
5 Workload domain configuration with Fibre Channel or iSCSI

When presenting external storage to VMware Cloud Foundation vSphere hosts, it is important to remember that VMFS datasstores on Fibre Channel (FC) or iSCSI are considered supplemental storage for a workload domain. In other words, on creation, VSAN or NFS storage is required for initial deployment, and then the VMFS datasstores on FC/iSCSI can be presented to the workload hosts.

In addition, while VSAN and NFS storage can be managed from within the SDDC Manager interface, all FC/iSCSI datasstores must be managed independently from the workload domain VMware vCenter® instance.

**Note:** FC/iSCSI datasstores should only be presented to workload domains. Presenting FC/iSCSI datasstores to the management domain is not supported.

**Caution:** When upgrading VMware ESXi™ hosts within the VMware Cloud Foundation workload cluster, hosts requiring custom Fibre Channel VIbs may be overwritten, potentially causing an outage. Consult the VMware KB article [How to upgrade ESXi hosts in VMware Cloud Foundation 3.5 with a vendor-specific ISO image (65047)](https://kb.vmware.com/selfservice观点查询?displayLanguage=en&article=65047) for more information.

5.1 Dell EMC storage configuration

For each Dell EMC storage product, the steps to provision storage to VMware Cloud Foundation vary from model to model. This section details the steps for each.

5.1.1 Dell EMC Unity

When presenting storage from a Dell EMC Unity array, the array can present an NFS share for the workload domain storage as well as FC/iSCSI datasstores for supplemental virtual machine storage.

Detailed steps for provisioning datasstores to vSphere hosts are not covered within this document. For more information, refer to the document [Dell EMC Unity Storage with VMware vSphere](https://www.dell.com/support). The high-level steps to provision FC/iSCSI storage to the workload cluster are as follows:

1. If using FC:
   a. Create Fibre Channel zones for the workload domain ESXi hosts.

2. Perform the following in SDDC Manager:
   a. Commission the workload domain hosts.
   b. Create a new workload domain from the commissioned hosts.
   
   - The workload domain storage selection must use either vSAN or an NFS share.
   - If using a Dell EMC Unity NFS share for the storage selection, refer to steps in section 4.

3. If using iSCSI:
   a. Add an iSCSI Distributed Port Group and assign it the iSCSI VLAN.
   b. Add a VMkernel adapter to each workload domain host with an IP in the storage network.
   c. Add a software iSCSI adapter to each workload domain host.
   d. Add the iSCSI targets for the array to the iSCSI adapter and then rescan.
4. Perform the following in the Dell EMC Unity Unisphere interface:
   a. Create the hosts for the workload domain ESXi® hosts.
   b. Create a block LUN specifying the name, capacity, and other options desired for the datastore. Configure the host access to specify the workload domain vSphere hosts.
   c. (Optionally) Use the Create Datastore Wizard from the VMware storage section to automatically provision a datastore to the vSphere hosts, which bypasses the following manual datastore-creation steps.

5. Create the new datastore using the steps outlined in section 5.2.

5.1.2 PowerMax
When presenting storage from PowerMax arrays to a workload domain, the process is completed in the same manner as presenting storage to conventional vSphere clusters. In other words, since FC/iSCSI datastores are managed outside of VMware Cloud Foundation, normal administrative tools can be used.

Detailed steps for provisioning datastores to vSphere hosts are not covered within this document. For more information, refer to the document Using Dell EMC VMAX and PowerMax in VMware vSphere Environments.

The high-level steps to provision FC/iSCSI storage to the workload cluster are as follows:

1. If using FC:
   a. Create Fibre Channel zones for the workload domain VMware ESXi hosts.

2. Perform the following in SDDC Manager:
   a. Commission the workload domain hosts.
   b. Create a new workload domain from the commissioned hosts. The workload domain storage selection must use either vSAN or an NFS share.

3. If using iSCSI:
   a. Add an iSCSI distributed port group and assign it the iSCSI VLAN.
   b. Add a VMkernel adapter to each workload domain host with an IP in the storage network.
   c. Add a software iSCSI adapter to each workload domain host.
   d. Add the iSCSI targets for the array to the iSCSI adapter and then rescan.

4. Perform the following in the Unisphere for PowerMax interface:
   a. Create the port group for the PowerMax target ports zoned to the ESXi hosts.
   b. Create the hosts and hosts group for initiators belonging to the workload domain ESXi hosts.
   c. Create a storage group specifying the name and volume capacity desired for the datastore.
   d. Create the masking view to present the new volume to the workload domain vSphere cluster.

5. Create the new datastore using the steps outlined in section 5.2.

5.1.3 SC Series
When presenting storage from Dell EMC SC Series arrays to a workload domain, the process is completed in the same manner as presenting storage to conventional vSphere clusters. In other words, since FC datastores are managed outside of VMware Cloud Foundation, normal SC Series administrative tools can be used.
Detailed steps for provisioning datastores to vSphere hosts are not covered within this document. For more information, refer to the current *Dell Storage Manager Administrator’s Guide* on Dell.com/support.

The high-level steps to provision FC storage to the workload cluster are as follows:

1. Create Fibre Channel zones for the workload domain ESXi hosts.
2. Perform the following in SDDC Manager:
   a. Commission the workload domain hosts.
   b. Create a new workload domain from the commissioned hosts. The workload domain storage selection must use either vSAN or an NFS share.
3. Perform the following in the Dell Storage Manager or Unisphere for SC Series interface:
   a. Create a server cluster and add the workload domain ESXi hosts.
   b. Create a new volume specifying the name, capacity, and other options desired for the datastore.
      i. For the *Server* (Dell Storage Manager Client) or *Server Mapping* (Unisphere for SC Series web interface), select the server cluster created in step a.
4. Create the new datastore using the steps outlined in section 3.2.

5.1.4 **VxFlex OS**

When presenting storage from VxFlex OS nodes to a workload domain, the process is completed in the same manner as presenting storage to conventional vSphere clusters. In other words, since the datastores are managed outside of VMware Cloud Foundation, normal VxFlex OS administrative tools can be used.

Detailed steps for provisioning datastores to vSphere hosts are not covered within this document. For more information, refer to the current *Dell EMC VxFlex OS deployment guide* on Dell.com/support.

The high-level steps to provision storage to the workload cluster are as follows:

1. Perform the following in SDDC Manager:
   a. Commission the workload domain hosts.
   b. Create a new workload domain from the commissioned hosts. The workload domain storage selection must use either vSAN or an NFS share.

   If the network pool for the workload domain has NFS defined, it will automatically create VMkernel interfaces on each ESXi host which can be used by the Storage Data Client (SDC) to connect the VxFlex OS nodes. If not, a vSphere administrator will have to manually create the necessary VMKernel Interfaces on the vSphere Distributed Switch (vDS) through the vCenter vSphere web client for the workload domain cluster.

2. Install the SDC on each workload domain ESXi host and connect it to VxFlex OS system.
3. Perform the following in the VxFlex OS GUI or CLI:
   a. Create a new volume specifying the name, size, and other options desired for the datastore.
   b. Map the new volume to the workload domain hosts.
4. Create the new datastore using the steps outlined in section 5.2.
5.1.5 **XtremIO**

When presenting storage from XtremIO storage controllers to a workload domain, the process is completed in the same manner as presenting storage to conventional vSphere clusters. In other words, since the datastores are managed outside of VMware Cloud Foundation, normal XtremIO administrative tools can be used.

Detailed steps for provisioning datastores to vSphere hosts are not covered within this document. For more information, refer to the latest *XtremIO Storage Array User Guide* on [Dell.com/support](http://Dell.com/support).

The high-level steps to provision storage to the workload cluster are as follows:

1. Perform the following in SDDC Manager:
   a. Commission the workload domain hosts.
   b. Create a new workload domain from the commissioned hosts. The workload domain storage selection must use either vSAN or an NFS share.

2. Perform the following in the XtremIO Storage Management interface:
   a. Create the initiator group for initiators belonging to the workload domain ESXi hosts.
   b. Create a new volume specifying the name, size, and other desired options for the datastore.
   c. Map the volume to the initiator group for the workload domain ESXi hosts.

3. Create the new datastore using the steps outlined in section 5.2.

5.2 **Datastore creation**

Once the storage device is presented to the ESXi cluster, switch to the workload domain’s VMware vCenter client to finish provisioning the datastore.

1. To rescan for new storage, right-click the workload vSphere Cluster, click **Storage**, and click **Rescan Storage**.

2. Right-click the vSphere Cluster, click **Storage**, and click **New Datastore**.
3. Complete the New Datastore wizard to create the new datastore for the workload cluster.
A Technical support and resources

*Dell.com/support* is focused on meeting customer needs with proven services and support.

*Storage technical documents and videos* provide expertise that helps to ensure customer success on Dell EMC storage platforms.

A.1 Related resources

- VMware Cloud Foundation resources
  - *VMware Cloud Foundation documentation*

- Dell EMC Unity resources
  - *Dell EMC Unity Storage with VMware vSphere*
  - *Dell EMC Unity: Virtualization Integration*

- PowerMax resources
  - *PowerMax Product Guide*
  - *Using Dell EMC VMAX and PowerMax in VMware vSphere Environments*

- VxFlex OS resources
  - *VxFlex OS Product Documentation*

- XtremIO resources
  - *Dell EMC XtremIO Storage Array Host Configuration Guide*