Abstract
This planning document provides guidance for various vCenter Server deployment options that are supported on VxRail appliances.

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Executive summary

vCenter Server is the centralized platform for managing a VMware environment. It is the primary point of management for both server virtualization and vSAN. It is also the enabling technology for advanced capabilities such as vMotion, Distributed Resource Scheduler (DRS), and HA. vCenter scales to enterprise levels where a single vCenter can support up to 1,000 hosts (VxRail nodes) and 10,000 virtual machines. vCenter supports a logical hierarchy of data centers, clusters, and hosts, which allow resources to be segregated by use cases or lines of business and allow resources to be moved as needed dynamically. These resource changes are all done from a single interface.

Intended Use and Audience

This guide discusses various VMware vCenter Server™ deployment scenarios that are supported to manage your VxRail clusters. It is intended for customers, Dell EMC Sales teams, and field engineers involved in selling, planning and installing VxRail, including Dell EMC Sales and support personnel.
1 vCenter Server

vSphere v6.0 introduced vCenter Server with embedded Platform Services Controller (PSC) and vCenter Server with an external PSC. The following components are included in the vCenter Server installations:

- The PSC group of infrastructure services contains vCenter Single Sign-On, License service, Lookup service, and VMware Certificate Authority.
- The vCenter Server group of services contains vCenter Server, vSphere Web Client, Inventory Service, vSphere Auto Deploy, vSphere ESXi Dump Collector, VMware vSphere Syslog Collector on Windows and VMware Sphere Syslog Service for the vCenter Server appliance.

1.1 vCenter Server with an Embedded PSC

The vCenter Server and the PSC are deployed on a single virtual machine or physical server.

1.2 vCenter Server with an External PSC

The vCenter Server and the PSC are deployed as separate virtual machines or physical servers. The PSC can be shared across several vCenter Server instances. You can install a PSC and then install several vCenter Server instances and register them with the PSC. You can then install another PSC, configure it to replicate data with the first PSC, and then install vCenter Server instances and register them with the second PSC.

For details, see the following:
- vCenter Server Installation and Setup for VxRail 4.7.0+
- vSphere Installation and Setup Guide VMware vSphere 6.5 for VxRail 4.5.0+
- vSphere Installation and Setup Guide Update 2 VMware vSphere 6.0 for VxRail 3.5 and VxRail 4.0.x
2 VxRail Appliances

VxRail is jointly developed by Dell EMC and VMware and is the only fully integrated, preconfigured, and tested HCI appliance that is powered by VMware Virtual SAN (vSAN). VxRail is managed through the vCenter Server interface. It provides a familiar vSphere experience that enables streamlined deployment and the ability to extend the use of existing IT tools and processes.

VxRail appliances are managed using VxRail Manager software for hardware and appliance maintenance tasks as well as software life cycle management. VxRail Manager incorporates Secure Remote Services (SRS) and other serviceability capabilities. Additionally, VxRail appliances are discoverable and visible in Dell EMC Vision™ Intelligent Operations.

**Note:** For day-to-day VM management, you manage the VMware stack on the VxRail appliance directly through vCenter server.

The VxRail software bundle is preloaded and licensed onto hardware and consists of the following components (specific software versions not shown):

- VxRail Manager
- VMware vCenter Server
- VMware vRealize Log Insight™
- VMware vSAN™
- Dell Secure Remote Services (SRS)/VE

Also preloaded is VMware vSphere®; however, licenses are required and can be purchased through Dell EMC, VMware, or your preferred VMware reseller partner.

The VxRail clusters also include licenses for software that can be downloaded, installed, and configured:

- Dell EMC RecoverPoint for Virtual Machines (RP4VM) - 15 licenses per G-series appliance chassis or 5 full licenses per all other single node VxRail series appliances

VxRail is fully compatible with other software in the VMware ecosystem, including VMware NSX. See the VMware Product Interoperability Matrices for specific versions of NSX supported on specific versions of vSphere.

### 2.1 VxRail vCenter Server Options

The initial releases of VxRail deployed a vCenter Server appliance on the VxRail appliance. The license for this vCenter Server appliance was included with VxRail. This vCenter Server deployment has been referred to as "internal" vCenter Server or "embedded" vCenter Server. For consistency, the term that is used throughout this guide is VxRail vCenter Server. VxRail orchestrates the deployment and life cycle management of the VxRail vCenter Server. This VxRail vCenter Server can only manage the VxRail cluster on which it is deployed.

Beginning with release 3.5, a VxRail appliance can optionally join a compatible vCenter Server environment, hosted outside of the VxRail cluster. This feature allows for a central vCenter Server instance to manage multiple VxRail clusters. Each VxRail environment appears within vCenter Server as a cluster of hosts configured with a vSAN datastore. This environment has been referred to as "external" vCenter Server or "existing" vCenter Server. For consistency, the term that is used throughout this guide is customer-supplied vCenter Server. This instance of vCenter Server must exist before you deploy the VxRail appliance and requires a separate customer provided license. You are responsible for deployment, configuration, and life cycle management of the customer-supplied vCenter Server.

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1 Log Insight is a configuration option only if VxRail vCenter Server is used.
The virtual infrastructure of a VxRail cluster is managed by a single vCenter Server instance, either VxRail vCenter Server or customer-supplied vCenter Server. When a VxRail appliance is deployed, the vCenter deployment type is selected and is difficult to change. Making a change, for VxRail 3.5 and 4.0.1, requires a factory reset and all data to be wiped from the VxRail appliance and reinstalled. Migrating a VxRail 4.0.2 vCenter Server to a customer-supplied vCenter requires a Request for Product Qualification (RPQ). Starting with VxRail 4.0.301 your Dell EMC service team can perform this procedure.

Notes:

- The customer-supplied vCenter Server provides more configuration options and is recommended.
- The virtual machine name and IP address of the customer-supplied vCenter Server and PSC cannot be modified after VxRail deployment.

2.2 VxRail vCenter Server

As part of a VxRail deployment, a vCenter Server instance with an external PSC is configured. The vCenter Server and the PSC are separate Linux-based virtual machines. Both the VxRail vCenter Server and PSC are deployed on the VxRail appliance cluster it is managing and cannot be moved off the cluster after deployment.

The VxRail vCenter license is for the VxRail vCenter Server and is not transferable to be used for a customer-supplied vCenter Server. As such, it can be considered a limited or restricted use vCenter Server license.

2.2.1 Use Cases

A VxRail vCenter Server is an ideal choice for:

- Small configurations
- Standalone environments

2.2.2 Limitations

- The VxRail vCenter Server only manages its own VxRail cluster.
  - It cannot manage other VxRail clusters or any other ESXi hosts.
  - It cannot be used as a customer-supplied vCenter Server.
- Enhanced link mode is not supported.
- Single Sign-On domain cannot be customized and will be vsphere.local.

VxRail vCenter Server does NOT support encryption in VxRail versions earlier than 4.5.200.

With stretched clusters, if an Inter-Switch Link (ISL) failure occurs, all virtual machines that are not on the same site as the vCenter are powered off. Thus, special attention is needed when planning to deploy an internal vCenter.
2.3 Customer-Supplied vCenter Server

The following figure shows an example where multiple VxRail clusters are part of a customer-supplied vCenter environment. Each cluster appears as a separate cluster within vCenter. In addition to centralized management, being part of the same vCenter environment allows VMs to be easily migrated into and between vSAN environments for optimal workload balance and simplifies VxRail appliance upgrades and expansion.

**Note:** The customer-supplied vCenter Server deployment can be a physical server or a virtual server running on a vCenter Server appliance.

### 2.3.1 Use Cases

A customer-supplied vCenter Server solution is required when:

- Enhanced link mode is desired.
- VxRail is being added to an existing VMware platform, and a single management instance is desired.
- Multiple VxRail clusters are deployed, and a single management interface is desired.
- vCenter Server cannot be deployed on the 2-Node cluster.

Before VxRail 4.5.200, customer-supplied vCenter Server solution is required when:

- Stretched clusters are part of the solution.
- vSAN encryption is desired. When enabling Data at Rest Encryption (DARE) in a vSAN cluster, the Key Management Server (KMS) must be external to the vSAN cluster.

### 2.3.2 Limitations

- VxRail Manager does not upgrade the customer-supplied vCenter Server. Before an upgrade of VxRail appliance software, see the release notes to verify the required vCenter Server release number. It might be necessary to upgrade the customer-supplied vCenter Server before the VxRail upgrade.
• Special approval is required if the customer-supplied vCenter Server is hosted on a VxRail cluster running versions earlier than 4.7.
  • The VxRail cluster Shutdown function requires you to power off all VMs manually. We highly recommend the vCenter be backed up to a remote site if there is a vSAN failure.

Notes

• You are responsible for the customer-supplied vCenter Server license.
• Log Insight is not activated when using a customer-supplied vCenter Server.
• Only one public IP address for the vCenter HA network is supported.
## 3 VMware vSphere Recommended Topologies for vCenter Server

VMware provides a list of recommended topologies for VMware vCenter Server deployments. The vCenter Server topologies are described in VMware KB article [2147672](https://kb.vmware.com/kb/2147672) for vSphere 6.5 and VMware KB article [2108548](https://kb.vmware.com/kb/2108548) for vSphere 6.0. The following table indicates whether a VxRail vCenter Server or a customer-supplied vCenter Server could support a particular topology.

<table>
<thead>
<tr>
<th>Recommended Topology</th>
<th>VxRail vCenter Server</th>
<th>Customer-Supplied vCenter Server</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /> 1 Single sign-on domain 1 Single sign-on site 1 vCenter Server with embedded PSC</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Limitations:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Does not support enhanced linked mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Does not support PSC replication</td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image2" alt="Diagram" /> 1 Single sign-on domain 1 Single sign-on site 1 vCenter Server with PSC on a different machine</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Note:</strong> There is only one vCenter Server.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image3" alt="Diagram" /> 1 Single sign-on domain 1 Single sign-on site More than 1 vCenter Servers with PSC on a different machine</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><img src="image4" alt="Diagram" /> 1 Single sign-on domain 1 Single sign-on site More than 1 vCenter Servers with PSC on a different machine</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Single sign-on domain</td>
<td>Single sign-on site</td>
<td>External PSCs</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>1 or more single sign-on sites</td>
<td>1 or more external PSCs</td>
<td>1 or more vCenter Server with external PSCs using 1 third-party load balancer</td>
</tr>
<tr>
<td>2 or more vCenter Server with external PSCs</td>
<td></td>
<td>1 third-party load balancer</td>
</tr>
</tbody>
</table>
### Single-sign-on domain

1. Single-sign-on domain
2. Single-sign-on sites
3. 2 or more external PSCs per single-sign-on site
4. 1 or more vCenter Server with external PSCs

**Limitations:**
- Does not support Enhanced Linked mode
- Does not support PSC replication

**Note:** Only one public IP address for the vCenter HA network is supported.

### Single-sign-on site

1. Single-sign-on domain
2. Single-sign-on site
3. vCenter Server with PSC on same vCenter Server appliance
4. 3 vCenter Server appliances are used (1 Active, 1 Passive, and 1 Witness connected to the vCenter HA network).

**Limitations:**
- Does not support Enhanced Linked mode
- Does not support PSC replication

**Note:** Only one public IP address for the vCenter HA network is supported.
4 VxRail vCenter Server Deployment Details

Following are the high-level details of each deployment option. It is important to understand the pre-requisites before deployment. This document covers the requirements that are related to vCenter Server only. See the Dell EMC VxRail Network Guide for complete VxRail implementation requirements.

4.1 VxRail vCenter Server

**Note:** The vCenter license that is included with the VxRail appliance is for use of the VxRail vCenter Server only. It is not transferable for use as a customer-supplied vCenter Server.

4.1.1 Requirements

This scenario requires:

- A reserved vCenter Server hostname
- A reserved IP address for the VxRail vCenter Server
- A reserved PSC hostname
- A reserved IP address for the new VxRail vCenter Server Platform Service Controller
- DNS names to be configured correctly

4.2 Customer-Supplied vCenter Server

When deploying a VxRail appliance into an existing VMware virtualization infrastructure, use the customer-supplied vCenter Server that is managing the current environment to also manage the VxRail appliance. This allows a remote central vCenter Server to manage multiple VxRail clusters in a single management instance.

The customer-supplied vCenter Server can be:

- Standalone with an embedded PSC or external PSC
- A vCenter Server appliance virtual machine or vCenter Server for Windows
- Using Enhanced Linked Mode

4.2.1 Requirements

- In versions earlier than VxRail 4.5.200, the customer-supplied vCenter can **NOT** be hosted on the VxRail cluster it is managing.
- Starting with VxRail 4.5.200, the customer-supplied vCenter Server can be hosted on the VxRail cluster it is managing, except for 2-node clusters. You must shut down the vCenter Server in order to use the shutdown cluster feature.
- Check the VxRail Release Notes to determine the proper version numbers. The ESXi version hosting the vCSA should be running version 6.0 or later.

Starting after vCenter Server 6.5, VMware plans to deprecate vCenter Server for Windows with the next numbered release (not update release) of vSphere.
You must provide the vCenter Server license.

If you want VxRail to join a customer-supplied vCenter Server, you will need to:

- Know the customer-supplied vCenter Server FQDN.
- Know whether your customer-supplied vCenter Server has an embedded or nonembedded PSC. If the PSC is nonembedded, you will need the PSC FQDN.
- Know the *Existing* Single Sign-On domain (SSO) (for example, `vsphere.local`).
- Create a VxRail management user and password for this VxRail cluster on the customer-supplied vCenter Server. This user must be:
  - Created with no permissions
  - Created with no roles assigned to it

**Note:** If a previous VxRail cluster has been deployed on the customer-supplied vCenter Server, the VxRail Management User can be reused if you so choose.

- Create or select a data center on the customer-supplied vCenter Server for the VxRail cluster to join.
- Specify the name of the cluster that is created by VxRail in the selected data center when the cluster is built. This is also the name of the distributed switch. This name must be unique and not used anywhere in the data center on the customer-supplied vCenter Server.
- Verify that the DNS server can resolve all VxRail ESXi hostnames before deployment.
- (Optional) Create a VxRail non-admin user and password for VxRail on the customer-supplied vCenter Server. The following will be performed by your Dell EMC Representative:
  - Create two new roles, VxRail Initial Global and VxRail Datacenter Global.
  - Assign each of these roles to the new VxRail admin user.

**Note:** Starting with VxRail 4.5.200, you can deploy a customer-supplied vCenter Server on an existing VxRail cluster, even the one it is managing. You must still provide a vCenter Server license.
5 Conclusion

During the planning stage of a VxRail cluster configuration, careful planning should take place to determine the best vCenter Server deployment topology for your environment. VxRail gives you the option of using a customer-supplied vCenter Server so that more topologies can be supported. The VxRail vCenter Server has limited use case application. Since the decision for the topology is not changeable after deployment for any use case, careful planning is essential.

For further details about the best vCenter deployment options, contact your Dell EMC sales team or your VMware representative.