Dell EMC VxRail™ vCenter Server Planning Guide

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 2,500 hosts (VxRail nodes) and 30,000 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 Dell EMC VxRail™ clusters. It is intended for customers and field engineers involved in selling, planning and installing VxRail, including Dell EMC Sales and support personnel.

1 vCenter Server 7.0

Starting with vSphere v7.0, external Platform Services Controller (PSC) is deprecated. The only option is vCenter Server with embedded Platform Services Controller (PSC).

- The new vCenter Server contains all PSC services, preserving the functionality and workflows, including authentication, certificate management, tags, and licensing.

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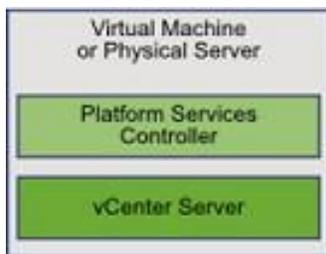
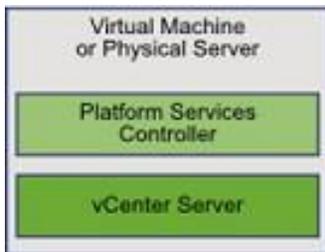The vCenter Server and the PSC are deployed on a single virtual machine or physical server.

For details, see vCenter Server Installation and Setup VMware vSphere 7.0

2 vCenter Server 6.0 - 6.7

vSphere v6.0 introduced vCenter Server with an embedded PSC and vCenter Server with an external PSC. The following components are part of 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.

2.1 vCenter Server with an embedded PSC

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

2.2 vCenter Server with an external PSC
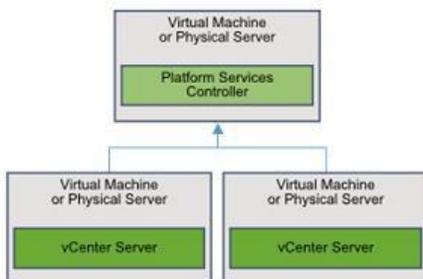
The vCenter Server and the PSC are deployed as separate virtual machines or physical servers. The PSC can be shared across several vCenter Server instances. You can install a PSC and then install several vCenter Server instances and register them with the PSC. You can then install another PSC, configure 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 vCenter Server 6.7](#) 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 4.0.x

3 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 and enables streamlined deployment and the ability to extend the use of existing IT tools and processes.

VxRail appliances are managed using VxRail HCI System software for hardware and appliance maintenance tasks as well as software life cycle management. VxRail HCI System Software incorporates Secure Remote Services (SRS) and other serviceability capabilities. 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 HCI System Software

- 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 full 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.

3.1 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" 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.

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 "external" 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.

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. Changing from a customer-supplied vCenter Server to VxRail vCenter Server requires a factory reset and all data to be wiped from the VxRail appliance and reinstalled. On the other hand, migrating a VxRail vCenter Server to a customer-supplied vCenter is possible but requires a Request for Product Qualification (RPQ). Starting with VxRail 4.0.301, your Dell EMC service team can perform this migration procedure. Moreover, starting with VxRail 4.7.x VxRail vCenter Server can be externalized using the VxRail plug-in.

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, if external, PSC cannot be modified after VxRail deployment.

3.2   VxRail vCenter Server 7.0

As part of a VxRail deployment, a vCenter Server instance with embedded PSC is configured. The vCenter Server and the PSC are hosted on a single Linux-based virtual machine. The vCenter Server with embedded PSC is deployed on the VxRail 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.

3.3   VxRail vCenter Server 6.0 – 6.7

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 cluster they are 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.

3.3.1 Use cases

A VxRail vCenter Server is an ideal choice for:

- Single VxRail clusters
- Standalone environments.

3.3.2 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 is *vsphere.local* and cannot be customized.
- 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.

3.4 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.
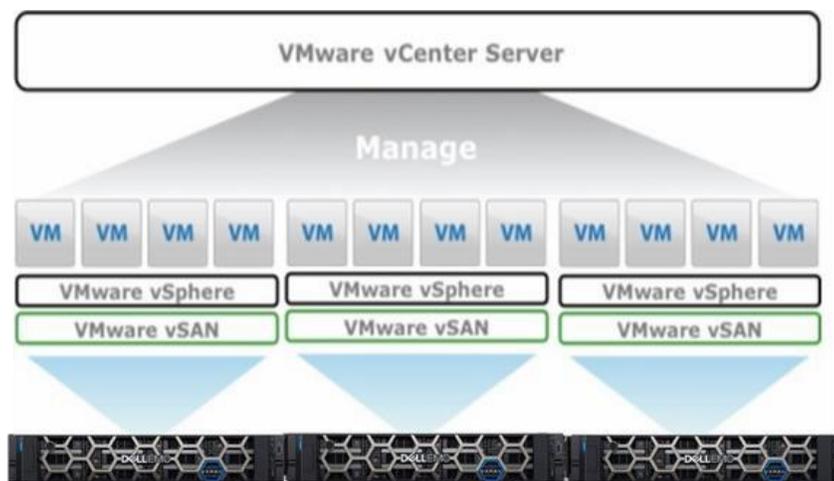
Note: The customer-supplied vCenter Server deployment can be a physical server or a virtual server running on a vCenter Server appliance.

3.4.1 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.

In versions earlier than 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.
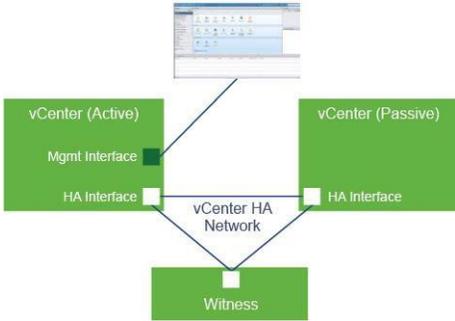
3.4.2 Limitations

- VxRail Manager does not upgrade the customer-supplied vCenter Server. Before an upgrade of VxRail appliance software, see the release notes to verify the minimum required vCenter Server release number. It might be necessary to upgrade the customer-supplied vCenter Server before the VxRail upgrade.

- RPQ is required if the customer-supplied vCenter Server is hosted on a VxRail cluster running versions earlier than 4.7.

    o The VxRail cluster Shutdown function requires that you power off all VMs manually.

    o We highly recommend the vCenter be backed up to a remote site in case a vSAN failure occurs.

Notes

- You are responsible for the customer-supplied vCenter Server license.

- Log Insight is not activated when using a customer-supplied vCenter Server.

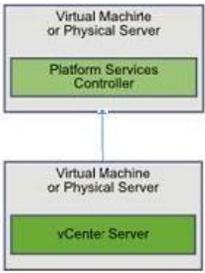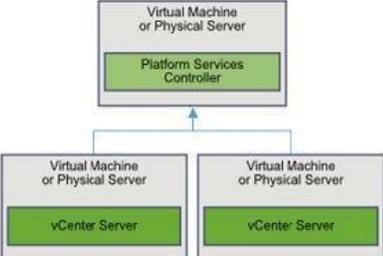- Only one public IP address for the vCenter HA network is supported.

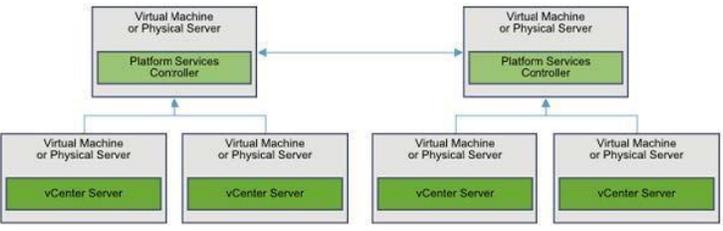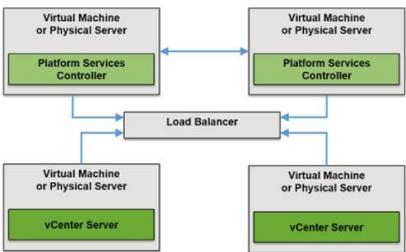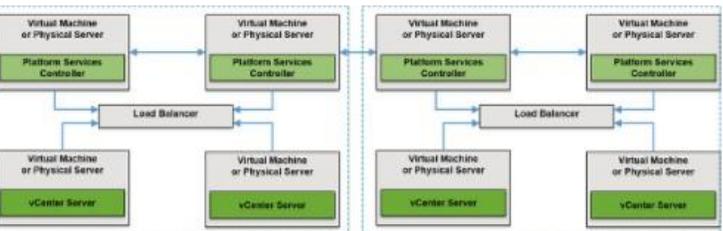# 4 VMware vSphere recommended topologies for vCenter Server 7.0

The following table indicates whether a VxRail vCenter Server or a customer-supplied vCenter Server could support a particular topology.

Recommended Topology	VxRail vCenter Server 7.0	Customer-Supplied vCenter Server *requires a vCenter Server license
1 Single sign-on domain 1 Single sign-on site 1 vCenter Server with embedded PSC **Limitations:** • Does not support enhanced linked mode • Does not support PSC replication	Yes	Yes
1 Single sign-on domain 1 Single sign-on site vCenter Server with PSC on same vCenter Server appliance 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	No	**Note:** Only one public IP address for the vCenter HA network is supported.

5 VMware vSphere recommended topologies for vCenter Server 6.0 – 6.7

VMware provides a list of recommended topologies for VMware vCenter Server deployments. The vCenter Server topologies are described in VMware KB article 2147672 for vSphere 6.5 and VMware KB article 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.

| Recommended Topology	VxRail vCenter Server	Customer-Supplied vCenter Server
		*requires a vCenter Server license
1 Single sign-on site 1 vCenter Server with embedded PSC 1 Single sign-on domain **Limitations:** • Does not support enhanced linked mode • Does not support PSC replication	No	Yes You must have a customer-supplied vCenter Server with an embedded PSC deployed to achieve this topology.
1 Single sign-on domain 1 Single sign-on site 1 vCenter Server with PSC on a different machine	Yes **Note:** There is only one vCenter Server.	Yes
1 Single sign-on domain 1 Single sign-on site More than 1 vCenter Servers with PSC on a different machine	No	Yes

	No	Yes
1 Single sign-on domain 2 or more single sign-on sites 2 or more vCenter Server with external PSCs	No	Yes
1 Single sign-on domain 1 Single sign-on site 2 or more external PSCs 1 or more vCenter Server with external PSCs using 1 third-party load balancer	No	Yes
1 Single sign-on domain 2 Single sign-on sites 1 or more external PSCs per single sign-on site 1 or more vCenter Server with external PSCs 2 third-party load balancers (1 per site)	No	Yes
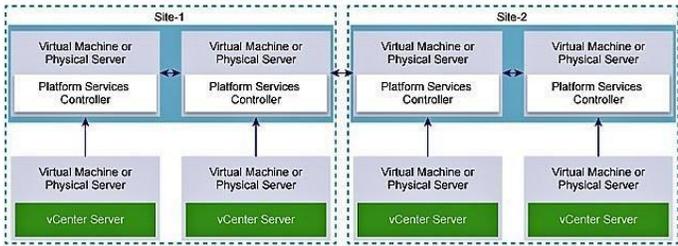
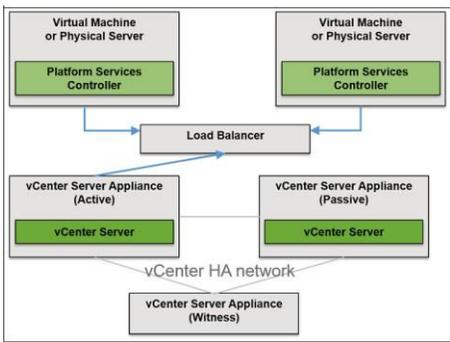|	No	Yes
1 Single sign-on domain 2 Single sign-on sites 2 or more external PSCs per single sign-on site 1 or more vCenter Server with external PSCs	No	Yes
1 Single sign-on domain 1 Single sign-on site vCenter Server with PSC on same vCenter Server appliance 3 vCenter Server appliances are used (1 Active, 1 Passive, and 1 Witness connected to the vCenter HA network). **Limitations:** • Does not support Enhanced Linked mode • Does not support PSC replication	No	**Note:** Only one public IP address for the vCenter HA network is supported.
1 Single sign-on domain 1 Single sign-on site 2 or more external PSCs vCenter Server connected to PSC using 1 third-party load balancer vCenter Server appliances are used (1 Active, 1 Passive, and 1 Witness connected to the vCenter HA network).	No	**Note:** Only one public IP address for the vCenter HA network is supported.
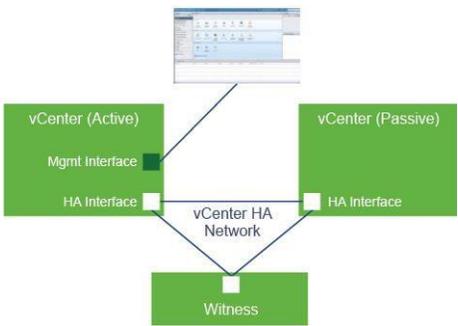
6 VxRail vCenter Server deployment details

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.

6.1 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.

6.1.1 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

Note: PSC Hostname and IP Address are not needed when using VxRail 7.0 with vCenter Server 7.0.

6.2 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 an external 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[1]
- A vCenter Server appliance virtual machine or vCenter Server for Windows[2]
- Using Enhanced Linked Mode

6.2.1 Requirements

- In versions earlier than VxRail 4.5.200, the customer-supplied vCenter cannot 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.

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[1] External PSC is deprecated starting with version 7.0

[2] vCenter Server for Windows has been deprecated starting with vSphere 7.0

- 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.

  o VxRail 4.0.x and vSphere 6.0 VxRail Appliance Software 4.0.x Release Notes

  o VxRail 4.5.x and vSphere 6.5 VxRail Appliance Software 4.5.x Release Notes

  o VxRail 4.7.x and vSphere 6.7 VxRail Appliance Software 4.7.x Release Notes

  o VxRail 7.x and vSphere 7.0 VxRail Appliance Software 7.x Release Notes

- You must provide the vCenter Server license.

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

- 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:

  o Created with no permissions

  o Created with no roles assigned to it

Note: If a previous VxRail cluster has been deployed on the customer-supplied vCenter Server, the same VxRail Management User can be reused for additional VxRail clusters managed by the same vCenter Server.

- 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:
  o Create two new roles, VxRail Initial Global and VxRail Datacenter Global.

  o 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.

7 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.

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

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