

SAP HANA on Dell EMC VxRail Hyperconverged Infrastructure

Configuration and Deployment Best Practices

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Validation Guide

Abstract

This validation guide provides best-practice storage and configuration guidelines for a Dell EMC VxRail hyperconverged appliance for SAP HANA deployment. The solution incorporates Dell EMC PowerEdge servers, VMware vSphere infrastructure, and VMware vSAN storage.

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Introduction

Executive summary

Deploying the Dell EMC VxRail Appliance, the hyperconverged infrastructure appliance from Dell EMC and VMware, is the easiest and fastest way to extend and simplify an existing VMware environment. Powered by VMware vSAN and managed through the VMware vCenter interface, the VxRail appliance gives existing VMware customers an operational experience with which they are already familiar. Seamless integration with existing VMware tools enables customers to use and extend their current IT tools and processes.

In 2018, SAP extended their HANA platform support with a certification and validation process for a hyperconverged platform and infrastructure—a software stack consisting of VMware vSphere and vSAN and a Dell EMC VxRail hardware stack. This process complements existing hardware certifications for SAP HANA appliances and enterprise storage.

SAP has certified the VxRail appliance for running SAP HANA workloads in the configuration that this validation guide describes.

Solution overview

This Dell EMC hyperconverged solution for SAP HANA based on VxRail infrastructure incorporates Dell EMC PowerEdge servers with vSphere and vSAN virtualization software. The solution encompasses design configurations and deployment options. Customers use SAP sizing tools for SAP systems on VMware virtualized infrastructure to determine the requirements of the deployment and work with Dell EMC representatives to configure and deploy the solution.

Key benefits

With the VxRail appliance, Dell EMC provides a fully engineered, hyperconverged infrastructure solution that enables businesses to innovate faster and accelerate their IT operations. Customers implementing the solution can expect the following benefits:

- **Agility**—A modern SAP landscape management experience that provides automated provisioning capabilities and a faster time-to-value for SAP applications including SAP HANA.
- **Engineering**—Compute, networking, and storage components that are integrated with the specified prerequisites, and tested dependencies that deliver a seamless solution experience.
- **Optimization**—Design and deployment guides that describe proven performance, automation, and resiliency best practices for SAP landscapes including SAP HANA.

Document purpose

This guide describes how to plan, prepare, and configure a VxRail hyperconverged infrastructure for SAP HANA deployments. The guide provides validated best practices for configuring and designing virtualized SAP HANA deployments on VxRail based on vSphere and vSAN technologies.

This guide does not replace the requirement for VxRail implementation services by Dell EMC Professional Services. Detailed VxRail installation and implementation documentation is available for Dell EMC service personnel only.

Audience

This guide is for SAP Basis administrators, system administrators, storage administrators, and presales architects who design mission-critical SAP HANA systems to deploy on VxRail hyperconverged appliances. You should have some knowledge of VxRail appliances, PowerEdge servers, and VMware virtualization technologies including vSphere and vSAN.

We value your feedback

Dell EMC and the authors of this document welcome your feedback on the solution and the solution documentation. Contact the Dell EMC Solutions team by [email](#) or provide your comments by completing our [documentation survey](#).

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Note: For links to additional documentation for this solution, see the [Dell EMC Solutions Info Hub for SAP](#).

VxRail requirements for SAP HANA

Dell EMC VxRail models

SAP has certified SAP HANA on the VxRail P-series All Flash dual-socket P570F and All-NVMe 4-socket P580N hyperconverged infrastructure. These models are the only VxRail models that can support SAP HANA workloads. Hybrid models such as the P570 and other models such as the VxRail E, G, V, or S series or previous models are not supported in an SAP HANA environment.

The following table-shows the system specifications for the VxRail P series:

Table 1. VxRail P-series system specifications

	P570F	P580N
Form factor	Single system 2U	
		
Drive configuration	24 x 12 G SAS drive slots (2.5") Up to four disk groups with up to five capacity drives each	24 x NVMe drive slots (2.5") Up to four disk groups with up to five capacity drives each. Optional Intel Optane SSD cache drives
Maximum capacity	153.6 TB SSD	76.8 TB SSD
Processors	Single-socket or dual-socket, up to 28 cores per CPU	Quad socket, up to 28 cores per CPU
Memory	Up to 3,072 GB RAM (1,536 per processor, requires an M or L processor)	Up to 6,144 GB RAM (1,536 per processor, requires an M or L processor)
Power supplies	1100W 100-240V AC, 1600W 200-240V AC, 1100W 48V DC	
Boot	BOSS with two 240 GB SATA M.2	
Additional network options	Up to three (single CPU) or four (dual CPU) 2 x 10 GbE SFP+, 2 x 10 GbE RJ45, 4 x 10 GbE RJ45, 4 x 0 GbE SFP+, 2 x 25 GbE SFP28	

Sizing considerations

With SAP HANA Tailored Datacenter Integration (TDI) Phase 5, SAP introduced customer-workload-based system sizing. It uses SAP application performance standard (SAPS) requirements for specific customer workloads to determine the type and number of processors that are required to run SAP HANA. Customers use the SAP HANA Quick Sizer tool and sizing reports. They share the results with Dell EMC to determine the optimal number of VxRail nodes, CPU types, and memory sizes for their SAP HANA environment.

It is important to understand the impact and limitations of vSphere virtual machine (VM) and vSAN. For links to relevant information from VMware and SAP, see the [References](#) section of this validation guide.

CPU and memory considerations

While VxRail is generally available with single, dual, and quad CPU sockets, SAP HANA is certified only on dual-socket and quad-socket VxRail P-Series appliances with Intel Xeon-SP (1st and 2nd generation) platinum, gold, or silver CPUs and a minimum of 12 cores per socket. Half-socket SAP HANA configurations, where two SAP HANA VMs share a single CPU socket, require a minimum of 16 cores per socket.

When configuring memory for VxRail nodes to use for SAP HANA, ensure that you comply with the SAP requirement for a symmetric homogeneous DIMM assembly and that all memory channels are used—six channels with Intel Xeon-SP CPU architecture. Mixed DIMM configurations are not supported on VxRail nodes.

The following memory configurations are available for VxRail P-series nodes for SAP HANA:

Table 2. Supported memory configurations for VxRail P-series nodes

P570F	P580N
192 GB (24 x 8 GB DIMMs ¹ or 12 x 16 GB DIMMs)	N/A
384 GB (12 x 32 GB DIMMs)	384 GB (48 x 8 GB DIMMs or 24 x 16 GB DIMMs)
768 GB (12 x 64 GB DIMMs)	768 GB (48 x 16 GB DIMMs or 24 x 32 GB DIMMs)
1,536 GB (24 x 64 GB DIMMs or 12 x 128 GB DIMMs)	1,536 GB (48 x 32 GB DIMMs or 24 x 64 GB DIMMs)
3,072 GB (24 x 128 GB DIMMs)	3,072 GB (48 x 64 GB DIMMs or 24 x 128 GB DIMMs)
N/A	6,144 GB (48 x 128 GB DIMMs)

Note: 128 GB DIMMs are only supported with Intel Xeon-SP M-type CPUs.

Because of this strict SAP requirement for a symmetric homogeneous DIMM assembly, memory sizes such as 1,024 GB or 2,048 GB are not possible with the Intel Xeon-SP CPU architecture.

Nonuniform memory access (NUMA) node sharing, the sharing of CPU sockets between SAP HANA VMs, is supported on dual-socket and quad-socket VxRail appliances. Only two production SAP HANA VMs per socket (half-socket) are allowed. The maximum number of production SAP HANA VMs on dual-socket and quad-socket servers is four.

¹ DIMM = Dual Inline Memory Model—the memory chips in the server

With the NUMA architecture, each processor has its local memory and can also access the nonlocal memory of the other processors over an advanced memory controller. Even though this is a high-performance connection, access to local memory is always faster than access to the nonlocal memory of the other processors. Take this difference into consideration when designing and configuring SAP HANA VMs under vSphere on VxRail appliances.

Number of VxRail nodes

A VxRail cluster can have a minimum of three nodes and as many as 64 nodes. When running SAP HANA in production on a VxRail cluster, it is strongly recommended that you use a minimum of four nodes to avoid an availability and performance impact when nodes become unavailable, for example, during software upgrades (maintenance mode).

When sizing a VxRail cluster for SAP HANA, consider having enough free resources (standby nodes) available for smooth upgrades or for situations where VMware high availability (HA) needs to migrate VMs to available nodes if a VxRail node fails.

The following table shows the sizing recommendations for a VxRail cluster for SAP HANA:

Table 3. Recommended VxRail standby nodes

Number of VxRail nodes required for SAP HANA	Recommended number of additional standby nodes
4-7	1
8-14	2
15-21	3
22-28	4
29-35	5
36-42	6
43-49	7
50-56	8

SAP HANA VMs per node and per total

The SAP certification for SAP HANA on VxRail P-Series hyperconverged infrastructure limits the deployment to four production SAP HANA VMs per physical VxRail node and two VMs per socket (half-socket).

Note: This limitation does not apply to nonproduction SAP HANA VMs.

While it is possible to deploy four production SAP HANA VMs on a physical host, Dell EMC recommends that you have enough free resources to allow vSphere HA to perform an automatic restart of the SAP HANA VMs on another host if one host fails as a result of a hardware problem. See Table 3 for the VxRail standby node sizing recommendations.

Disks

The VxRail P-Series nodes support up to 24 disks per node. Only all-flash configurations are supported for SAP HANA for the dual-socket P570F, and only NVMe configurations

are supported for the quad-socket P580N², with a minimum of two vSAN disk groups per node and a minimum of three capacity disks per disk group.

Based on capacity requirements, you can configure up to four disk groups with a maximum of five capacity disks per disk group. Every VxRail node must have the same disk group configuration. For performance reasons, it is a best practice that the number of disk groups in the vSAN cluster matches the number of production SAP HANA VMs running in the cluster.

The RAID-1 failure tolerance method is assigned in the storage policy to the SAP HANA persistence (the data and log of each SAP HANA VM), as explained in [Assign VM storage policies for SAP HANA data and log](#). This method provides twice the capacity of the data and log devices as SSD/NVMe capacity.

Although RAID-1 is the default storage policy for all VMs on vSAN and is specifically required for the persistence of production SAP HANA devices, you can create a new capacity-optimized storage policy with RAID-5/6 and assign it to other nonpersistent devices. RAID-5/6 consumes 1.33 times the usable device capacity on disk.

Network

To support the SAP HANA bandwidth requirements, Dell EMC recommends configuring the VxRail nodes with two 25 GbE SFP28 network daughter cards (NDCs) and an additional two 25 GbE SFP28 connectivity cards for SAP HANA application network traffic—the SAP HANA internode. While 10 GbE network configurations are also supported, these configurations provide limited network and storage performance, which might result in longer SAP HANA database restart times and a smaller number of SAP HANA VMs that can be supported in the cluster.

With more than two SAP HANA VMs on any VxRail node, a 25 GbE network for vSAN is required to meet the SAP storage performance requirements.

Besides the system networks that are required for vSphere and vSAN software, configure the following networks for SAP HANA including system replication if the corresponding function (SAP HANA system replication) is used:

- Application server
- Clients
- System replication
- Internode
- Backup

Create a new vSphere distributed switch (VDS) for the networks that are required for SAP HANA and assign the additional 2 x 25 GbE (or 2 x 10 GbE) network cards as uplinks to this new distributed switch. To meet the performance requirements of the SAP HANA internode network communication, set an MTU size of 9,000 on the distributed switch and in the operating system network settings of the SAP HANA VM for the internode network. Follow VMware and SAP HANA requirements and best practices when configuring networks on the VxRail distributed switch.

² The P580N also supports Intel Optane cache disks

For detailed information about planning logical and physical VxRail networks, see the [Dell EMC VxRail Network Planning Guide](#).

Configuration recommendations for SAP HANA virtual machines

SAP HANA deployment options

In accordance with SAP requirements, only scale-up (single-node) SAP HANA deployments are allowed on VxRail infrastructure. SAP HANA scale-out deployments are not supported on virtualized environments with vSAN software-defined storage.

Linux kernel settings

To achieve optimal storage performance, set the following Linux kernel settings in the SAP HANA VM:

- `transparent_hugepage=never`
- `numa_balancing=disabled`
- `elevator=noop`
- `vmw_pvscsi.cmd_per_lun=254`
- `vmw_pvscsi.ring_pages=32`

In a SUSE Linux VM, you can set these parameters using `yast2` and the System Bootloader settings for the kernel parameters. For more information, see VMware Knowledge Base article KB2053145: [Large-scale workloads with intensive I/O patterns might require queue depths significantly greater than Paravirtual SCSI default values](#).

Also, change the default maximum I/O size of the Linux kernel from 1,280 KB to 512 KB using `udev`. Create a `71-block-max-sectors.rules` file under `/etc/udev/rules.d` by using the following command:

```
ACTION=="add|change", SUBSYSTEM=="block", RUN+="/bin/sh -c  
'/bin/echo 512 > /sys%p/queue/max_sectors_kb'"
```

A reboot is required to activate this setting.

CPU and memory

Use SAP and VMware sizing guidelines to size CPU and memory for the SAP HANA VMs. SAP does not allow overcommitment of CPU and memory resources. An SAP HANA VM can use either 0.5 (half-socket), one, two, three, or four sockets. Odd multiples of half-socket VMs, for example, 1.5 socket VMs or 2.5 socket VMs, are not allowed.

An SAP HANA VM requires a minimum of eight physical cores and supports up to 256 vCPUs—logical cores with hyper-threading enabled.

You can use the VM configuration parameter `numa.nodeAffinity` to assign an SAP HANA VM to a specific CPU socket. If, for example, a VM using two sockets and 20 cores per socket must run on CPU 0 and 1, set the parameters shown in the following figure for the VM:

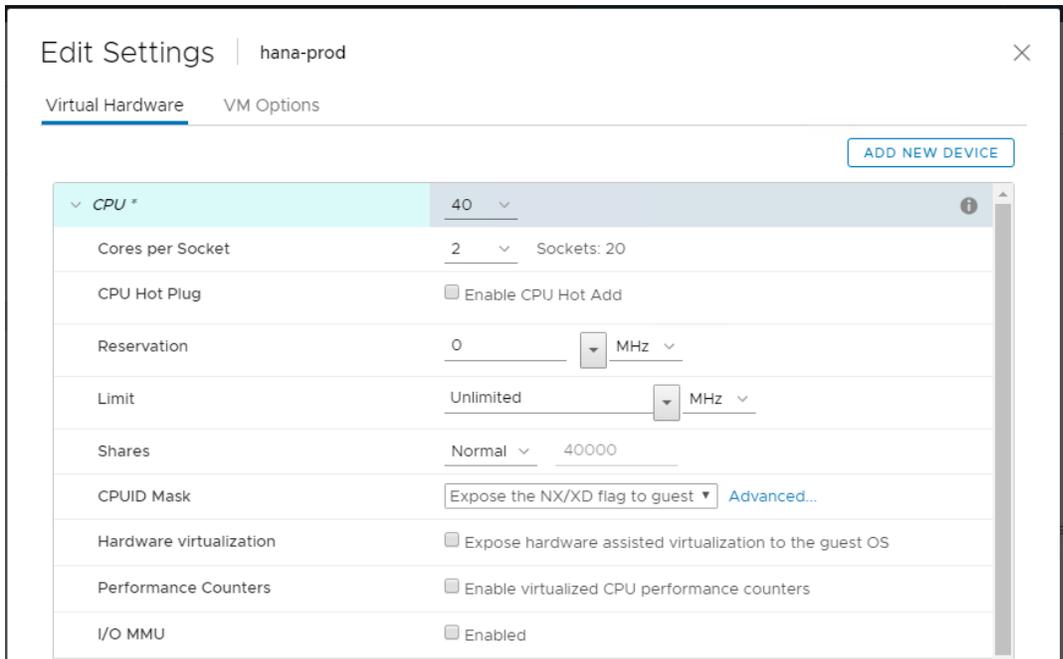


Figure 1. VM CPU settings

To set the `numa.nodeAffinity` parameter for the VM, select **Edit settings > VM Options > Advanced > Edit Configuration > Add Configuration Params**. The following window is displayed:

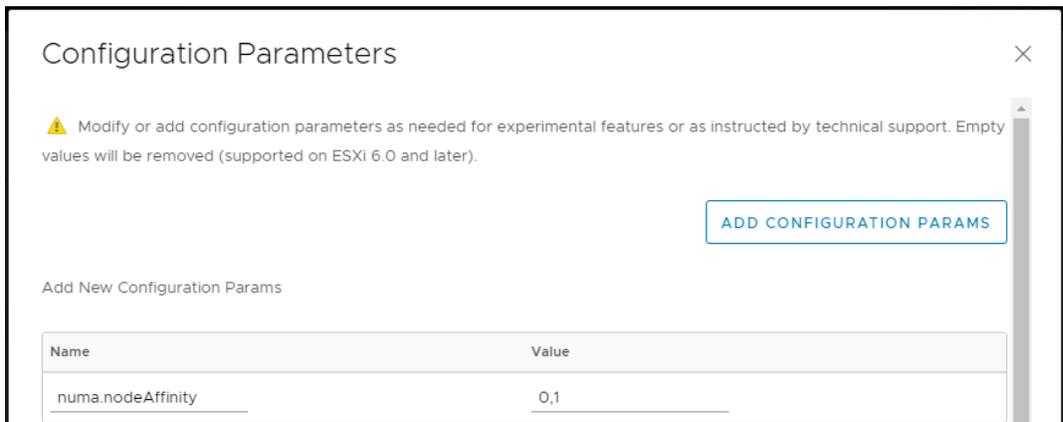


Figure 2. VM configuration parameter `numa.nodeAffinity`

SAP HANA persistence

Special requirements apply to configuring the persistence (data and log) of an SAP HANA VM.

Dell EMC recommends using Linux Logical Volume Manager (LVM) devices for the SAP HANA persistence. LVM enables a striping of the logical volumes across multiple vSAN devices, which provides better performance and flexible administration. LVM also enables resizing of logical volumes if capacity adjustments are required.

The following sections provide step-by-step instructions for configuring the SAP HANA persistence on Linux LVM devices.

Configure the SCSI Controller

A VMware best practice is to use a dedicated SCSI controller for the SAP HANA data and log devices. Configure the SCSI controller as **VMware Paravirtual**. The following example uses **SCSI Controller 0** for the system device, **SCSI Controller 1** for the LVM data devices, and **SCSI Controller 2** for the LVM log devices:

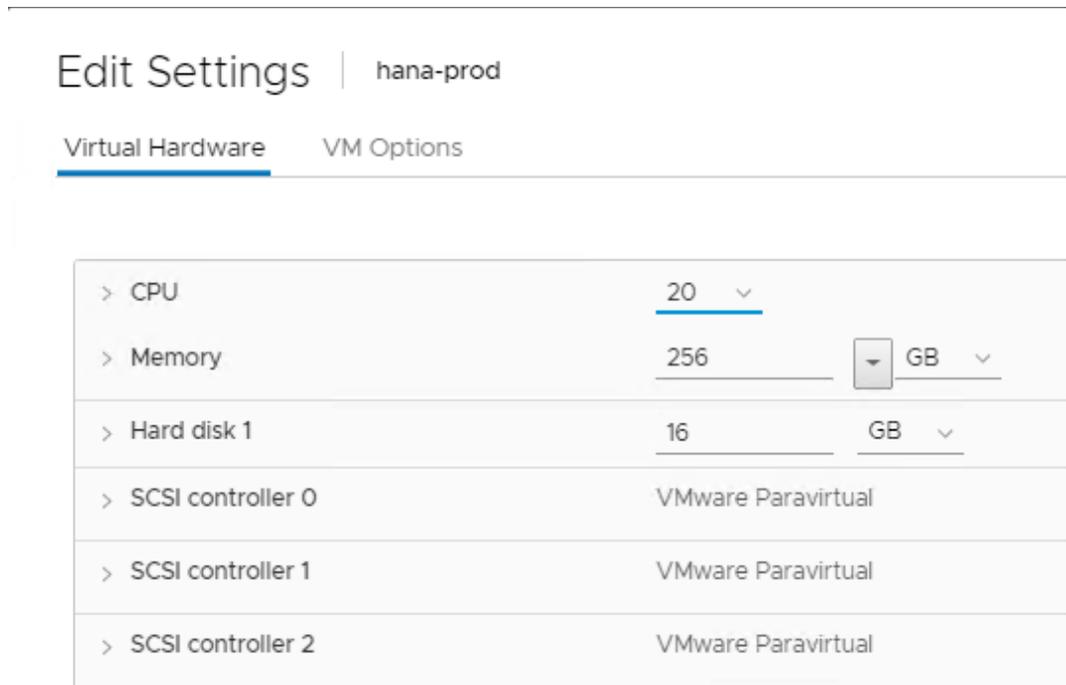


Figure 3. VM SCSI controller for the SAP HANA persistence

Configure the device capacity for data and log

Use the SAP Quick Sizer tool to determine the required capacity for the SAP HANA data and log devices. If the sizing details are not available, Dell EMC recommends configuring the sizes of the data and log devices based on the memory size of the SAP HANA VM. For data, configure 2x RAM. For log, configure 0.5-1x RAM (512 GB maximum for log).

Add the capacity of the data and the log device to get the total capacity required for the SAP HANA persistence of the VM.

Assign VM storage policies for SAP HANA data and log

You must define a storage policy for the SAP HANA LVM physical devices that are deployed on the vSAN data store. While the default vSAN storage policy is adequate for the system device, the SAP HANA persistence devices must have a dedicated storage policy to meet the SAP performance requirements. The following figure shows the rules that we defined in the storage policy for the SAP HANA persistence:

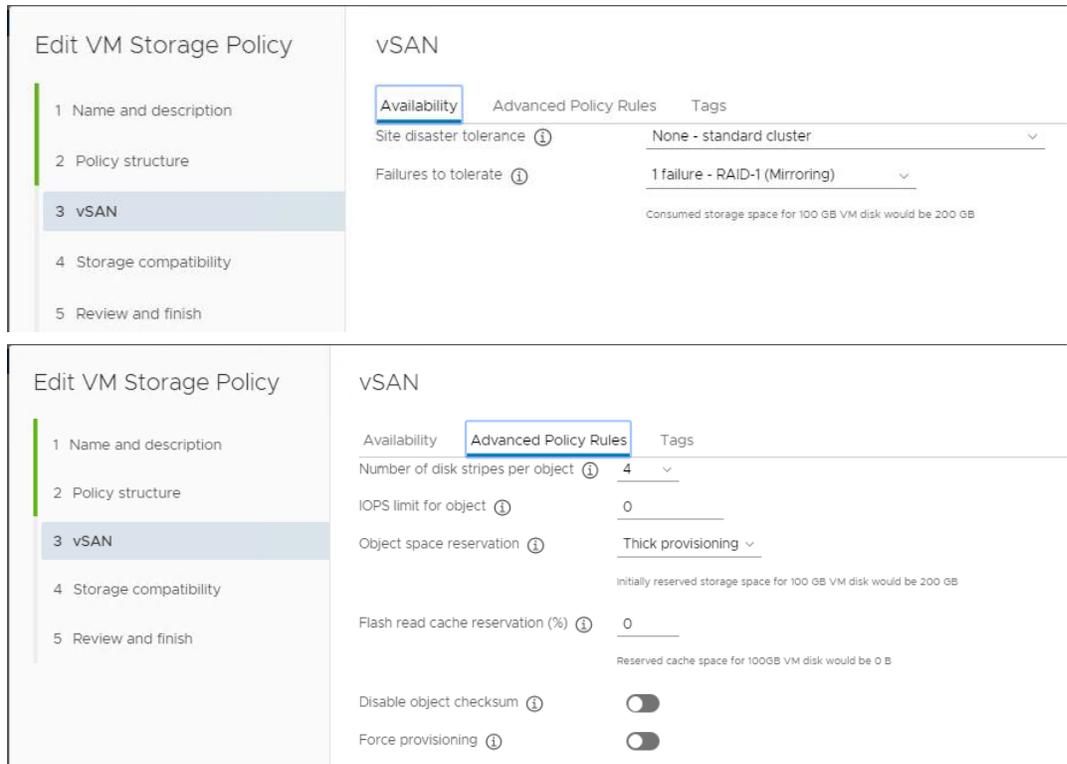


Figure 4. VM storage policy for the SAP HANA persistence

vSAN storage policy requirements for the SAP HANA persistence

The vSAN storage policy requirements are:

- **Failure tolerance method = RAID-1** (mirroring)
This option provides best performance on vSAN compared to RAID-5/6, which is mainly optimized for space utilization.
- **Failures to tolerate = 1**
This setting defines the number of disk, host, or fault-domain failures that a storage object can tolerate
- **Number of disk stripes per object = 4**
This setting defines the number of disks across which each replica of a storage object is striped.

Note: With RAID-1, each storage object has two replicas.

The optimal number depends on the number of available disk groups and capacity disks. The minimum (default) is 1 and the maximum is 12.

- **Object space reservation = Thick Provisioning**
Defines that the devices will be thick-provisioned.
- **Flash read cache reservation (%) = 0**
This option applies only to hybrid vSAN deployments: NVMe or SSD for cache and HDDs for capacity.

- **Disable object checksum = Off**
During read/write operations, vSAN checks the validity of the data based on the checksum. If the data is not valid, vSAN takes the necessary steps to correct the data by retrieving a new copy from another replica or to report the issue to the user for action (nonrecoverable errors).
- **Force provisioning = off**
If this option is ON, the object is provisioned even if the policy specified in the storage policy is not satisfiable with the resources that are currently available in the cluster.

Assigning vSAN devices for the SAP HANA persistence to the VM and using them in LVM

Linux LVM distributes the logical volumes that the application uses across multiple physical devices—in our case, vSAN devices. We recommend distributing the persistence for the data device across eight physical devices and distributing the persistence for the log device across four physical devices.

In the following example, we need 500 GB capacity for the SAP HANA data device and 200 GB for the SAP HANA log device, yielding a total of 700 GB for the SAP HANA persistence. We therefore create eight 62 GB vSAN devices for data and four 52 GB devices for log.

Every volume uses the VM storage policy “HANA PERSISTENCE” and is assigned to the dedicated SCSI controller, as shown in the following figure:

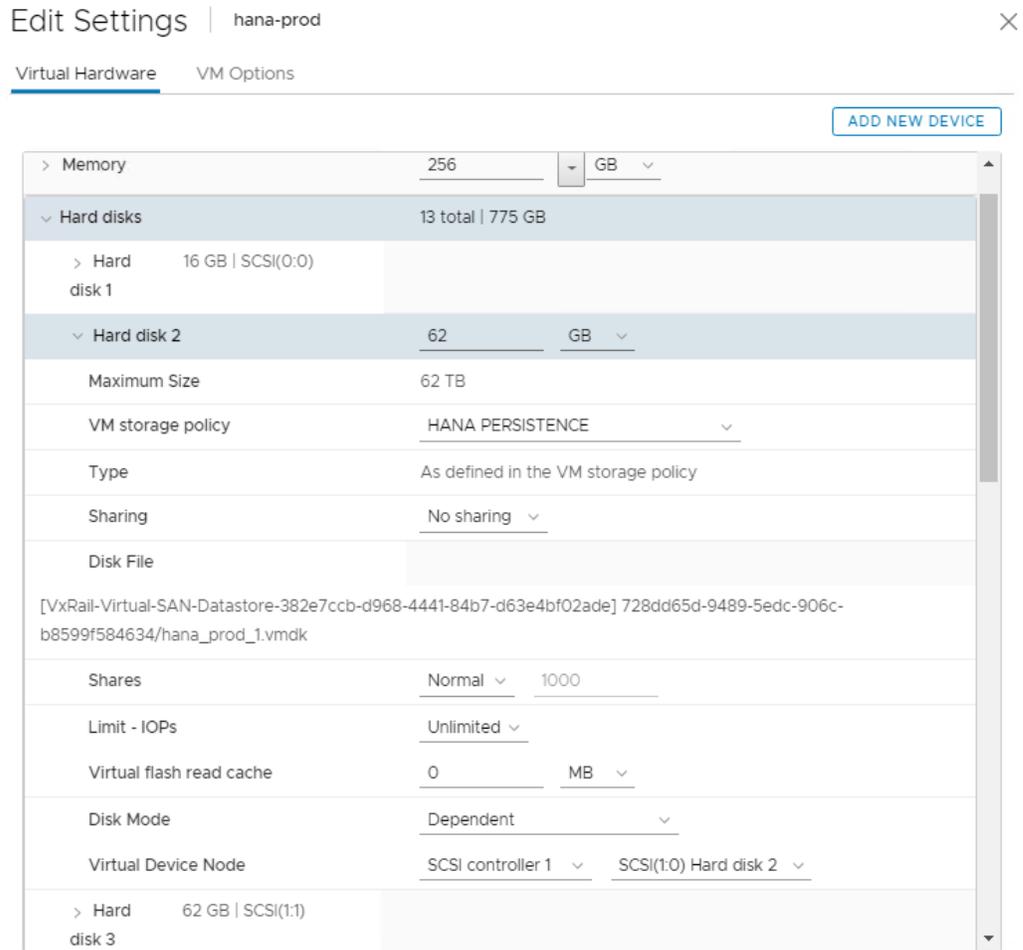


Figure 5. Assigning a VM storage policy to the devices

Adding devices to Linux LVM and creating the SAP HANA persistence

After the devices have been added to the VM, perform the following steps in Linux to partition the devices and add them to LVM:

1. Rescan the SCSI devices by running the following Linux command:
`rescan-scsi-bus.sh`
2. Verify that the devices are visible by running the `fdisk -l` command.
3. Create a Linux LVM partition on each device. The best way to do this is to create a text file (for example, *fdin.txt*) with the following content:

```
n
p
1
↓
↓
t
8e
w
```

4. Create a partition on a device by running a command such as:

```
cat fdin.txt | fdisk /dev/sdb
```

This command creates new LVM partitions on the devices, for example, /dev/sdb1. These partitions can be used as physical devices in LVM.

Repeat this command for every device that you create for the SAP HANA persistence.

5. Add the devices as physical devices to LVM:

```
pvcreate /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1 /dev/sdf1  
/dev/sdg1 /dev/sdh1 /dev/sdi1 /dev/sdj1 /dev/sdk1 /dev/sdl1  
/dev/sdm1
```

6. Create an LVM volume group for data with the name hana-data:

```
vgcreate hana-data /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1  
/dev/sdf1 /dev/sdg1 /dev/sdh1 /dev/sdi1
```

7. Create a second LVM volume group for log with the name hana-log:

```
vgcreate hana-log /dev/sdj1 /dev/sdk1 /dev/sdl1 /dev/sdm1
```

8. Create logical volumes for the SAP HANA data and log file systems on the new volume groups using lvcreate. For example:

```
lvcreate --name data --size 500G --stripes 8 --stripesize 64  
hana-data
```

and

```
lvcreate --name log --size 200G --stripes 4 --stripesize 64  
hana-log
```

Use the number of physical devices that you created earlier as the --stripes parameter

9. Format the devices by running:

```
mkfs.xfs /dev/mapper/hana--data-data and mkfs.xfs  
/dev/mapper/han--log-log
```

10. List the formatted devices under the required mount points for SAP HANA by running (for example):

```
mount /dev/mapper/hana-data /hana/data and mount  
/dev/mapper/hana-log /hana/log
```

To persist the mounts over reboots, add the corresponding entries to /etc/fstab.

SAP HANA shared file system

SAP HANA installations require a file system to store the SAP HANA binaries, trace, and configuration files. This file system is mounted under the /hana/shared mount point.

In SAP HANA scale-up (single-node) deployments, this mount point can reside on the local system device. SAP HANA requires approximately the same RAM memory capacity as is used for the /hana/shared file system.

Note: SAP HANA scale-out deployments are not supported on hyperconverged infrastructures using vSAN storage.

High availability **Automatic restart of SAP HANA VMs**

If one of the hosts in the cluster fails, the vSphere HA feature restarts a VM on another host that has enough free resources. Dell EMC strongly recommends that you enable this feature in a vSphere cluster with SAP HANA. The SAP HANA service autostart feature must be enabled in the SAP HANA software. You can enable the autostart feature at the time of the SAP HANA installation or by setting the autostart option to **1** in the `/hana/shared/<SID>/profile/<SID>_HDB<InstNo>_<hostname>` file. The minimum vSphere HA settings must be in place, as shown in the following figure:

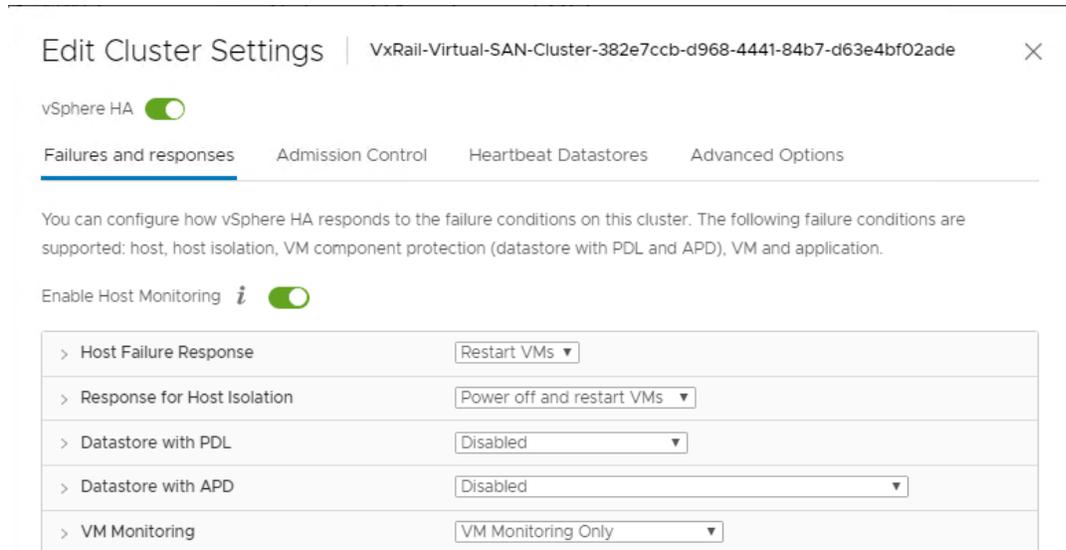


Figure 6. vSAN cluster HA settings

HA for SAP HANA VMs

The SAP HANA service autorestart watchdog function, which automatically detects a failure and restarts the corresponding SAP HANA process (nameserver, index server, and so on), monitors the SAP HANA application and the associated services within a VM. The VMware HA monitoring feature “Guest not heartbeating” restarts the guest operating system of the VM as well as SAP HANA on the same host. The monitoring feature also handles operating system crashes as long as the SAP HANA autostart options are enabled.

Enable the heartbeat monitoring feature when vSphere HA is enabled. Dell EMC recommends setting **Heartbeat monitoring sensitivity** to **High**, as shown in the following figure:

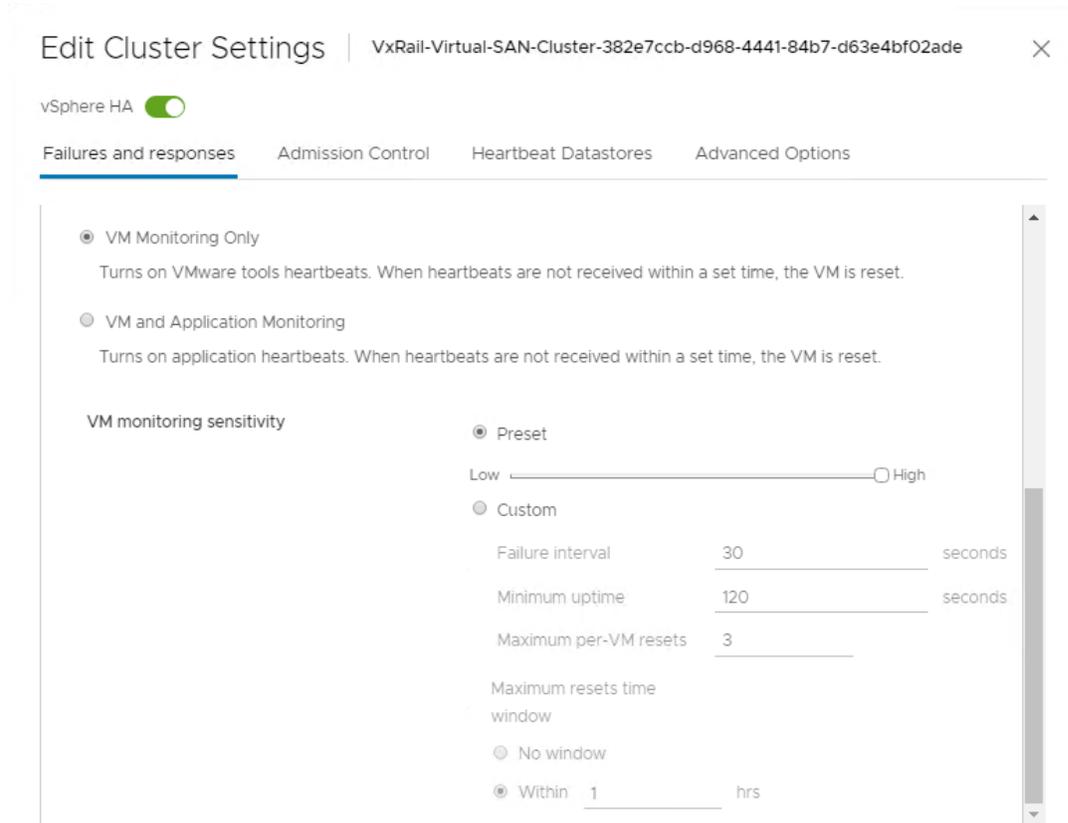


Figure 7. vSphere settings for VM monitoring

VMware Tools must be installed and running in the VM. You can install VMware Tools as part of the operating system `open-vm-tools` or by using the vSphere web client and selecting **Guest OS > Install VMware Tools** in the VM context menu.

Optimizing file I/Os after the SAP HANA installation

You can configure the SAP HANA file I/O layer with certain parameters to optimize file I/Os for a specific storage solution and file system. The Linux XFS file system is used on all storage volumes for the SAP HANA persistence.

Setting file I/O layer parameters in SAP HANA 1.0

For SAP HANA 1.0 installations, run the SAP HANA `hdbparam` command as `<sid>adm` in the Linux shell:

```
$ su - <sid>adm
$ hdbparam -p          # lists current parameter setting
$ hdbparam --paramset fileio.max_parallel_io_requests[Data]=128
$ hdbparam --paramset fileio.max_parallel_io_requests[Log]=256
```

Setting file I/O layer parameter in SAP HANA 2.0

For SAP HANA 2.0 installations, use either `hdbsql` or the SQL function in SAP HANA Studio or Cockpit and run the following SQL commands:

```
ALTER SYSTEM ALTER CONFIGURATION ('global.ini', 'SYSTEM') SET
('fileio', 'max_parallel_io_requests[Data]') = '128' WITH
RECONFIGURE;
```

```
ALTER SYSTEM ALTER CONFIGURATION ('global.ini', 'SYSTEM') SET
('fileio', 'max_parallel_io_requests[Log]') = '256' WITH
RECONFIGURE;
```

For more information, see SAP Note 2399079: [Elimination of hdbparam in HANA 2](#) (access requires an SAP username and password).

Support requirements and considerations

Contacting SAP Support

Identify an SAP HANA certified HCI solution

As part of the SAP HANA HCI certification requirements, SAP requires a method to detect if an SAP HANA VM is running in a hyperconverged environment on a vSAN data store. SAP HANA Studio and SAP HANA Cockpit cannot report the hardware vendor and hardware type when running under VMware, so it is important to report to SAP that SAP HANA is running on a VxRail P570F or P580N hyperconverged infrastructure.

One method of identifying a certified HCI environment is to identify the ESXi host model name (physical BIOS name). To identify the certified VxRail model, look up the model name of the ESXi host in the **Summary** tab of the vSphere client. Both the VxRail P570F and VxRail P580N models are certified as valid.

Enable the VxRail model name to the SAP HANA VM

Ensure that you report the host model name from within each of the SAP HANA VMs by setting the `SMBIOS.reflectHost=TRUE` option for all SAP HANA VMs:

1. Select **VM Hardware > Editing Settings > VM Options > Advanced > Edit Configuration**.
2. In the following fields, enter:
Name: `SMBIOS.reflectHost`
Value: `TRUE`
3. Click **Add**.

Deploy a VMware script to detect vSphere and vSAN information

In addition, VMware developed and supports a script that must be deployed on every Dell EMC VxRail Node. You can download the VMware script from the [VMware website](#).

The script checks if a VM has a device on the vSAN data store. If the device is found, the script adds the following parameters to the VM's configuration file:

```
"guestinfo.vsan.enabled": True/False,
"guestinfo.SDS.solution": ESXi_version, which is also the vSAN
release version
"guestinfo.vm_on_vsan": True/False
```

Both the HCI model name and VMware information is used by the SAP CIM provider and support tools such as `sapsysinfo.sh`.

Note: The script `sapsysinfo.sh` provides a method for collecting Linux system information and sending it to SAP Support. This script is attached to [SAP Note 618104: “sapsysinfo” – Compiling system information on Linux](#). When reporting an issue to SAP Support, attach the file that `sapsysinfo.sh` generated.

Perform a health check with VxRail Manager

Before reporting a problem to SAP, check the physical health of the VxRail hardware. The health function in VxRail Manager, which is fully integrated into the vSphere client application, provides details of any issues, as shown in the following figure:

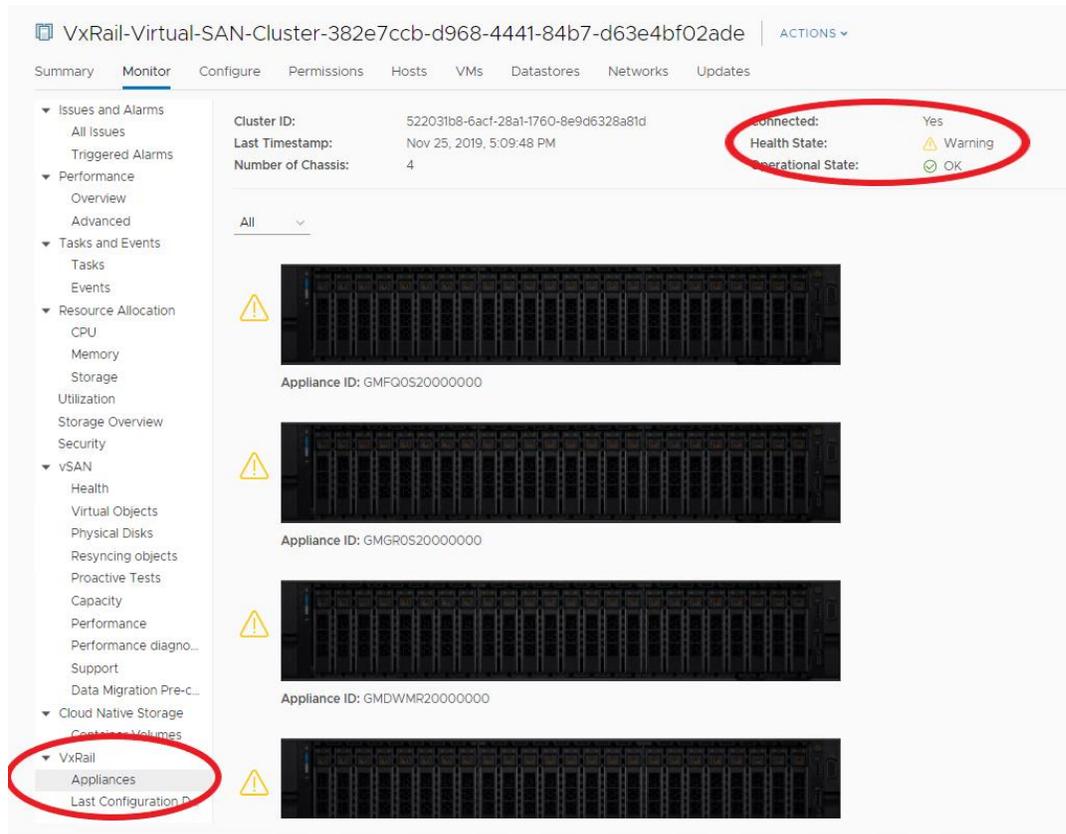


Figure 8. VxRail Manager health check report

Perform a health check with iDRAC

In addition, verify the health of the system by using the Integrated Dell Remote Access Controller (iDRAC) dashboard.

The following figure shows an example of an iDRAC health check report:

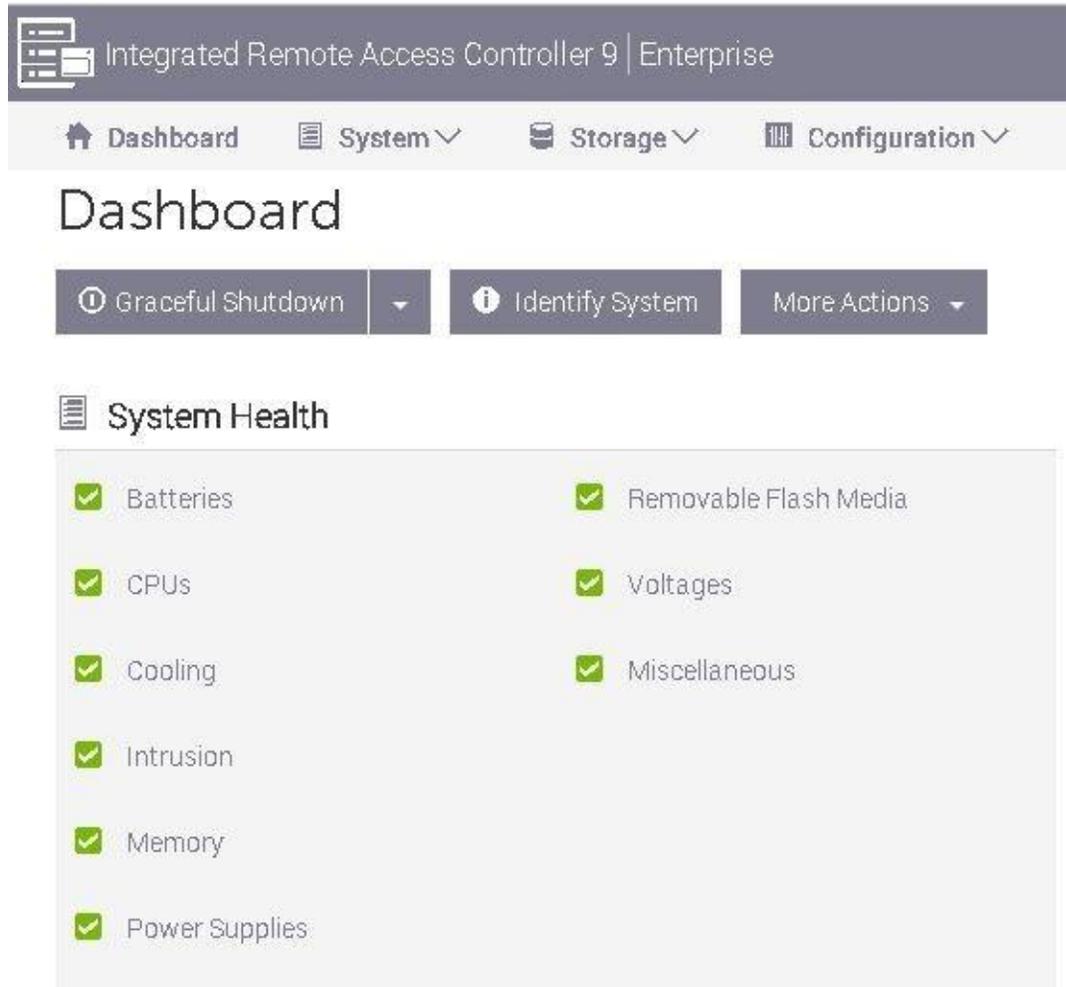


Figure 9. iDRAC health check report

Correct all hardware-related issues before reporting an SAP HANA problem to SAP Support.

Contacting Dell EMC Support

[Dell EMC Online Support](#) provides a single point of support for all VxRail hardware issues as well as vSphere Hypervisor and vSAN issues.

To collect VxRail log information and create a support bundle for Dell EMC support, log in to vSphere client, click the cluster entry, and select **Configure > VxRail > Troubleshooting > Create**.

The **Create Log Bundle** window is displayed, as shown in the following figure:

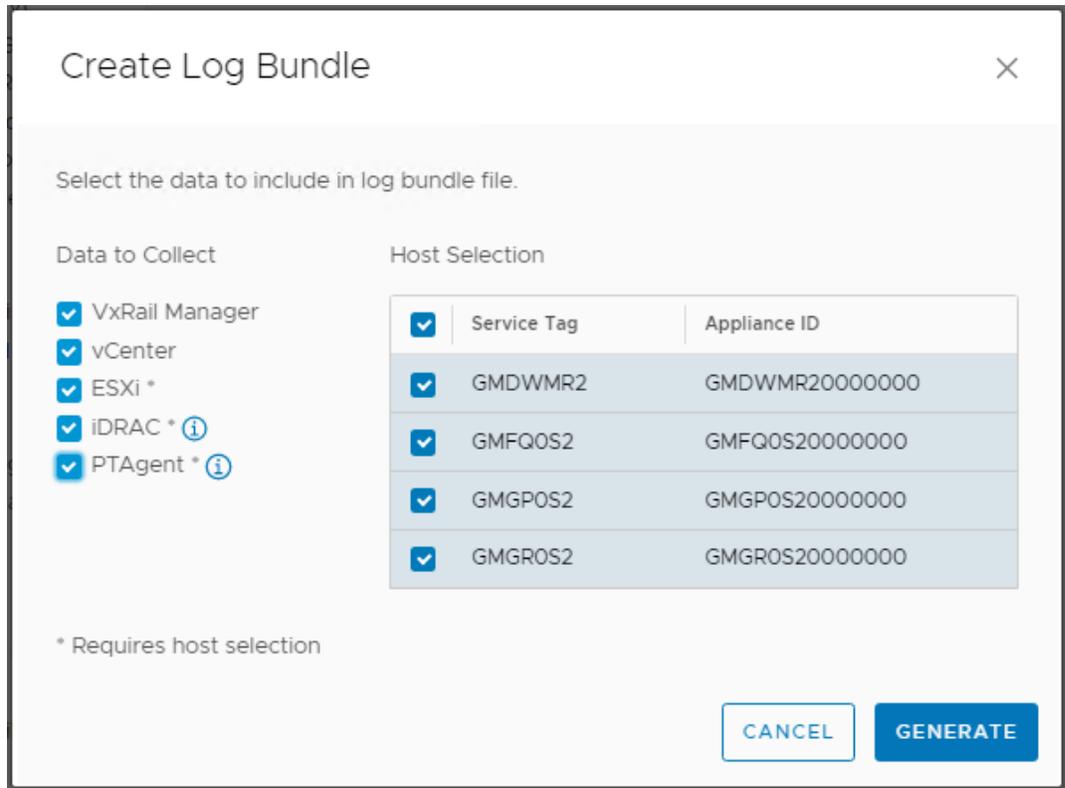


Figure 10. Generating a VxRail log bundle

References

Dell EMC documentation

The following documentation on [Dell EMC.com](#) and [Dell EMC Online Support](#) provides additional, relevant information. Access to documents on Online Support depends on your login credentials. If you do not have access to a document, contact your Dell EMC representative.

- [Dell EMC VxRail Appliance Version 4.7 Administration Guide](#)
- [Dell EMC VxRail System Techbook](#)
- [Dell EMC VxRail Hyperconverged Infrastructure](#)
- [Dell EMC VxRail Network Planning Guide](#)
- [Dell EMC SmartFabric OS10 Switch Configuration Guide for VxRail 4.7](#)

Note: Deploying the VxRail appliance requires Dell EMC implementation services. Detailed installation documentation is only available to Dell EMC service personnel.

VMware documentation

The following documentation provides additional relevant information:

- [Architecture Guidelines and Best Practices for Deployments of SAP HANA on VMware vSphere](#)
- [Virtualize Business Critical Applications](#)
- [SAP and VMware Virtualization-Overview](#)
- [SAP Solutions on VMware Best Practices Guide](#)

SAP documentation

For proper sizing of an SAP HANA environment, look for the latest version of the SAP HANA Quick Sizer tool on the [Quick Sizer](#) website.

The following SAP resources provide additional relevant information:

- [SAP HANA on VMware vSphere](#)
- [SAP Help Portal](#)
- [SAP Support Portal](#)
 - SAP Note 618104: “sapsysinfo” – Compiling system information on Linux
 - SAP Note 2779240: Workload-based sizing for virtualized environments