The Value of Dell vSAN Ready Nodes

The Four Pillars

March 2022

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White Paper

Abstract

This white paper describes the unique values Dell Technologies has developed for its family of vSAN Ready Nodes to stand out in a very competitive marketplace.

Dell Technologies

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Executive summary

Overview

Dell vSAN Ready Nodes bring to the market some key competitive differentiation factors including:

- One of the broadest offerings, with more than 250 certified configurations
- All form factor options supported (Blade, rackmount, tower, and ruggedized)
- Identity Modules in 13 vSAN Ready Nodes models which streamline deployment, updates, and support operations
- Simplified life cycle management with VMware vSphere Lifecycle Manager with Dell Open Manage Integration for VMware vCenter

Audience

This white paper is for any customer who is interested in infrastructure options for their VMware based business workloads.

We value your feedback

Dell Technologies and the authors of this document welcome your feedback on this document. Contact the Dell Technologies team by email.

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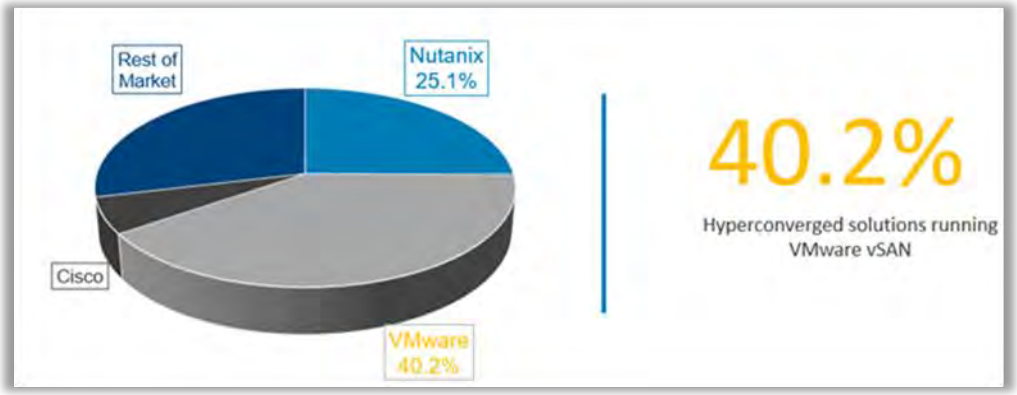
Note: For links to other related documentation, see the vSAN Ready Nodes Info Hub.

Introduction

It has been over a decade since hyperconverged infrastructure (HCI) disrupted technology. An ideal architecture for HCI would be a simple, modular architecture, in which all data center components (compute, storage, and networking) are consumed in a virtualized way to simplify allocating and managing resources. With this architecture, all physical components reside in the same box. When we combine these boxes, we can scale our data center power in all resource domains to accommodate almost any type of workload. This is due to fast processors, large and efficient storage devices, and advanced network connections.

VMware is a solution that enables the virtualization of the three infrastructure domains: compute, network, and storage. VMware has a strong portfolio of software defined compute (vSphere), storage (vSAN), and networking (NSX family) to create a top tier HCI product.

VMware is a leader in the HCI market due to its vSAN based systems, as reported by IDC[1]:



In this VMware led market, Dell PowerEdge servers stand out as a logical choice in terms of providing the modular box (server), for this hyperconvergence paradigm. Dell Technologies, as a global server market leader[1] has a long tradition of Ready Systems that provide a simple customer deployment experience.

Dell vSAN Ready Nodes are an example of efficient HCI implementation, providing a robust and mature data center platform that is pre-configured, tested, and certified to run VMware vSAN.

This HCI market is especially relevant as its current growth rate surpasses the growth rate of the server market. The server market is growing at 4.7 percent[2], while analysts reports that the HCI market is increasing by 28 percent.[3] This means that the growth rate of HCI is more than four times that of the server market:

[1] Worldwide Server Market, IDC, June 2021.

	2021 Spending	2021 Growth (%)	2022 Spending	2022 Growth (%)	2023 Spending	2023 Growth (%)
Data Center Systems	216,337	11.4	226,475	4.7	237,021	4.7

Figure 1. Gartner Worldwide IT Spending Forecast

WW Quarterly Converged Systems Tracker 2021 Q3

HCI Software Vendor	2021 Q3 Revenue (in $ Millions)	Market Share	Year Ago Revenue	Year over Year Revenue Change
VMware	$982.32	41.5%	$834.58	17.7%
Nutanix	$581.16	24.6%	$512.57	13.4%
Huawei	$111.24	4.7%	$91.51	21.6%
Cisco	$104.13	4.4%	$121.06	-14.0%
HPE	$82.54	3.5%	$89.45	-7.7%
Others	$504.09	21.3%	$420.16	20.0%
Total	$2,365.48	100.0%	$2,069.34	14.3%

Source: IDC Q3 2021 Worldwide Converged Tracker dated December 13, 2021. Market share based on revenue and the company providing HCI systems software.

Figure 2. IDC Q3 2021 Worldwide Converged Tracker, December 2021

Dell Technologies holds a leading place in this landscape, with a wide portfolio of HCI offerings, led by Dell VxRail with vSAN Ready Nodes. Dell Technologies and VMware have collaborated for more than 20 years, specifically in the server space, where both teams have worked to simplify their customers' technology experience.[24]

[2] For more information, see Phenomenal Power: Automating Dell EMC vSAN Ready Nodes.



Figure 3. IDC Calendar Year 2021-Q3 Global HCI Unit Market vendor

Dell vSAN Ready Nodes simplify and accelerate infrastructure modernization by providing IT flexibility, simplified operations, and breadth of choice.

Dell vSAN Ready Nodes value pillars

Dell leadership in the HCI space is based on four pillars:

- Broad offering – choice
- Form factors
- Identity Modules
- OMIVV with vLCM

The following sections describe these pillars in detail.

Broad offering – choice

Dell offers one of the broadest vSAN Ready Nodes offerings, with more than 250 certified configurations, including tower, rack, blade, and modular form factors with single, 2-and 4-socket models.

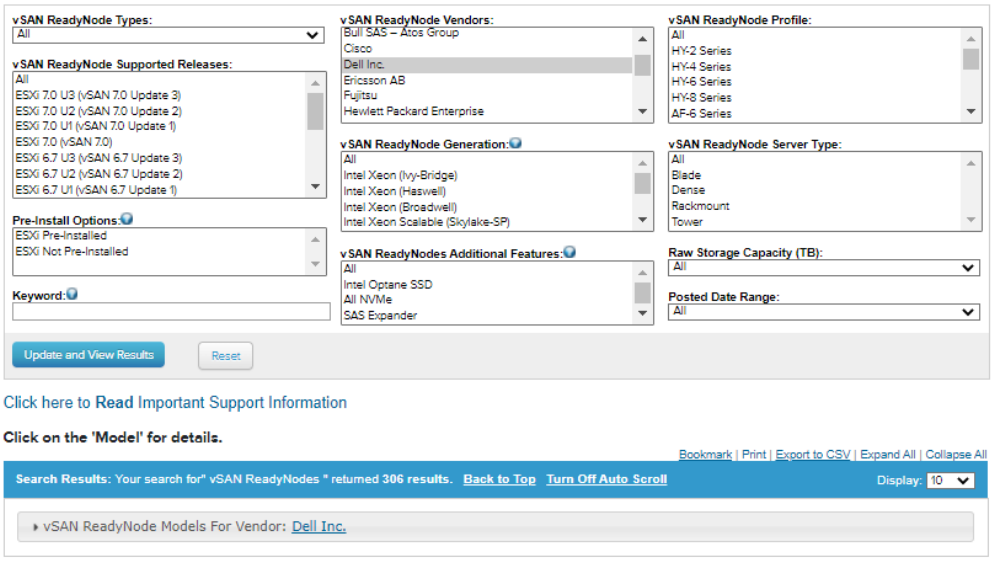


Figure 4. VMware Compatibility Guide for vSAN, vendor: Dell (February 2022)

These offerings provide a wide range of choice for customers when selecting their infrastructure platform to support a vSAN deployment.

Currently, Dell is the only vendor that provides a four socket platform for vSAN Ready Nodes. This server type is optimal for memory or compute intensive workloads, such as in-memory databases, high performance, relational (MySQL) and NoSQL (MongoDB, Cassandra), or real-time processing applications (financial services, Hadoop/Spark clusters).

Form factors

When thinking of a VMware vSAN-based integrated solution, the virtualization layer is a key technology piece. That virtualization layer abstracts the classical hardware domains—compute, storage, and network—to present users with a consolidated view of their data center hardware resources through the vSphere abstractions.

In addition to the virtualization layer, the underlying hardware continues to plays a main role. It is responsible for the specific characteristics of its processors, memory, I/O devices, and storage, and for the available form factors in which that set of hardware resources can be installed and deployed.

The rack mount, tower, modular, and ruggedized servers that are used to deploy a vSAN Ready Node environment offers customers robust choices to adapt infrastructure to their specific business needs.



Figure 5. Dell vSAN Ready Nodes portfolio

VMware with vSAN can host almost any existing workload. This ability gets a boost when the underlying platform is also capable of showing different forms, sizes, and infrastructure offerings, such as those in the Dell PowerEdge portfolio.

Some of the most common data center choices are the types of servers that can be installed within a rack: rackmount and blade servers. These server types achieve optimal space and power utilization when customers want compute density, which is a key design criteria for many facilities.

The range of rack mount and composable infrastructure available in the Dell vSAN Ready Node family is extensive, as 14 different server types qualified. This wide range of options allows customers to find the perfect resource fit for their specific workload demands. It is likely that the exact compute, storage, and network specifications that customers want are available among the 14 server platforms.

This range of options also enables price flexibility, as customers can choose the most affordable options to suit their needs.

Even platform homogeneity represents an operational savings opportunity. Many companies have gone through infrastructure standardization campaigns to explore the benefits of sizing, designing, operating, servicing, and life cycle managing the most homogeneous server platform possible. The broader the server offering, the greater the chance that the bare metal deployments require alignment with the VMware-based infrastructure.

The rack mount format offers servers ranging from 1 to 2U, and from one to four sockets. Rack servers can include up to 112 Intel Xeon Scalable processors, 6 TB of RAM, and 24 direct-attach NVMe drives, and in the PowerEdge R840 in just 2Us.



Figure 6. Rackmount Dell vSAN Ready Node R840

The following graphic shows the full rackmount and composable portfolio.

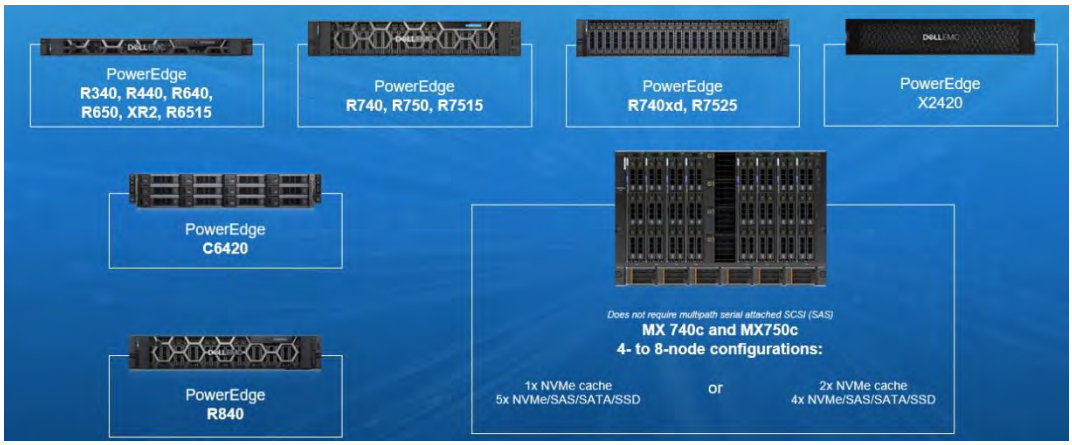


Figure 7. Dell vSAN Ready Nodes full portfolio (Branded ones)

As 5G and edge have become mainstream, they have enabled new business opportunities such as next-generation applications and services.

There is an increasing need for businesses to have IT resources as close as possible to the data creation place. But the edge has some constraints in space, power, and cooling coupled with limited bandwidth and limited IT staff. There are options to mitigate the challenges in this space in the Dell vSAN Ready Node portfolio:

- **Dell XR2 vSAN Ready Node**: Built for rugged environments, this option can operate in temperatures up to 45ºC and avoid thermal damage up to 55ºC with high shock, vibration, dust, humidity, and electromagnetic interference (EMI). With a minimal footprint of 1U and short depth, this option is ideal for space-constrained installations.



Figure 8. Dell XR2 vSAN Ready Node

- **Dell T340 vSAN Ready Nodes**: With the T340vSAN Ready Node, these reliable platforms in a tower form factor represent allow customers to build a scalable IT platform by starting small, with an affordable investment.

  To address the demands and typical constraints of edge locations, the T340 provides a cyber-resilient architecture that includes reduced server size, thermal efficiency technologies, and advanced security features.



Figure 9. Dell vSAN Ready Node T340

PowerEdge MX7000 vSAN Ready Nodes: These nodes host elastic compute and storage resources that are connected by a Smart I/O fabric in a flexible 7U modular enclosure, which can hold two and four sockets in its compute sleds**.**

The Dell MX750c vSAN Ready Node is one of the latest additions to the MX ecosystem, supporting up to two 3rd Generation Intel Xeon Scalable Processors (Ice Lake), 32x DIMMs, and PCIe Gen4, which enables faster NVMe drives and NICs.

The MX750c adds a flexible building block to the Dell vSAN Ready Node family that helps reduce deployment risks with certified configurations and improves storage efficiencies, which can help build vSAN clusters.

Dell MX750c vSAN Ready Nodes offer the platform flexibility that allows customers to add resources as business demands grow.



Figure 10. Dell vSAN Ready Nodes MX750c

Identity Modules

Dell vSAN Ready Nodes stand out in a competitive landscape due to their wide portfolio of platforms (both in terms of form factors and technical specifications), the integration between OMIVV and vLCM, and Identity Modules

Customers will initially encounter the motherboard-based feature as they connect to the underlying PowerEdge iDRAC interface.

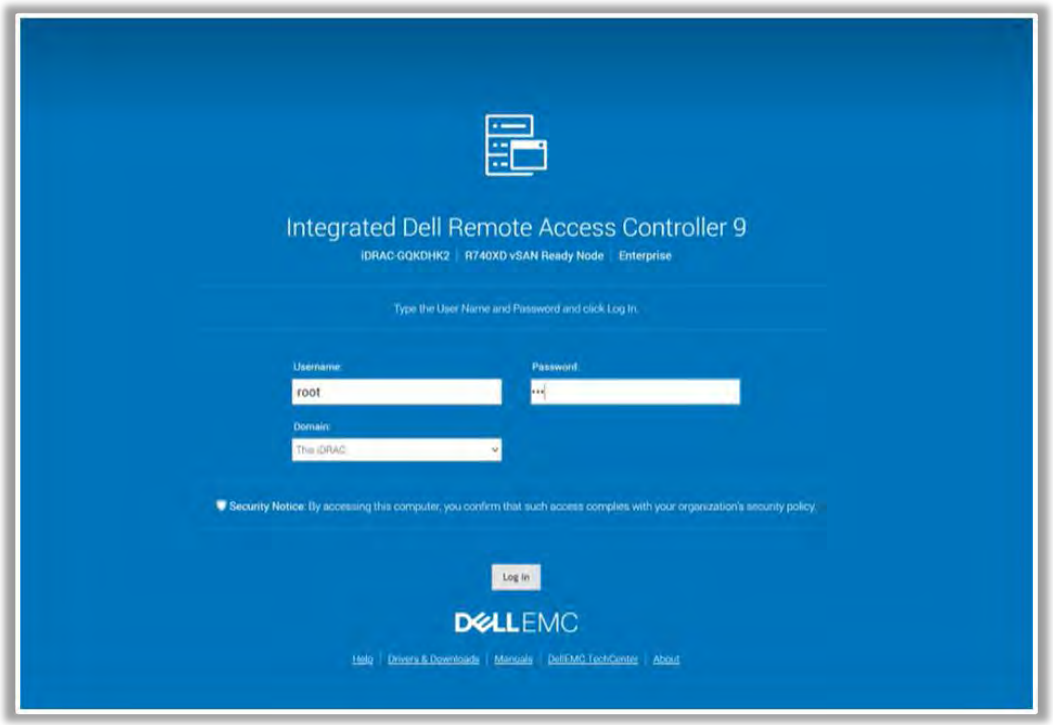


Figure 11. iDRAC Console, view from a Dell vSAN Ready Node

The Identity Module allows customers to certify that this is a vSAN Ready Node based on a Dell R740XD PowerEdge server.

The vCenter also shows the Ready Node.

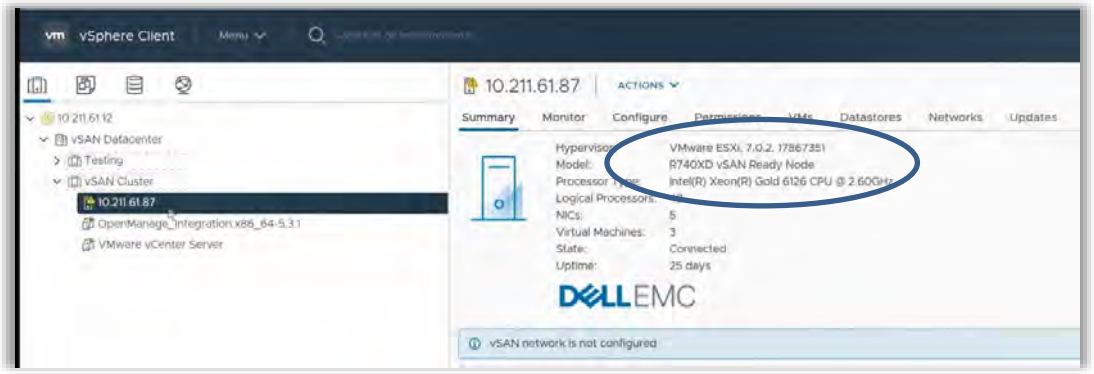


Figure 12. vCenter view for a Dell vSAN Ready Node

PowerEdge servers, such as a PowerEdge MX740C, will only display the description of the server model, not the Ready Node information.



Figure 13. vCenter view for a PowerEdge server

The particular text string that is provided by the Identity Module for vSAN Ready Nodes enables any programmatic interface to locate and direct an operation to that specific set of infrastructure assets. A select type, primitive from an automation platform, may be able to pinpoint a Dell vSAN Ready Node from other servers because it has an Identity Module.

For example, if there is a 100-node server farm, in which 16 are Dell R740XD vSAN Ready Nodes and the remaining servers are other server types that do not have Identity Modules, we can easily direct any operation coming from an automation framework such as vRealize Orchestrator, Ansible, or Puppet to our Ready Nodes, and it responds positively to any query that is looking for a text string that characterizes the 16 vSAN Ready Nodes out of the 100 servers present.

The Identity Module, as a unique chassis identification method, allows any programmatic operation to distinguish the ready node farm from the rest of the servers in the data center—a simple feature that enables such powerful automation.

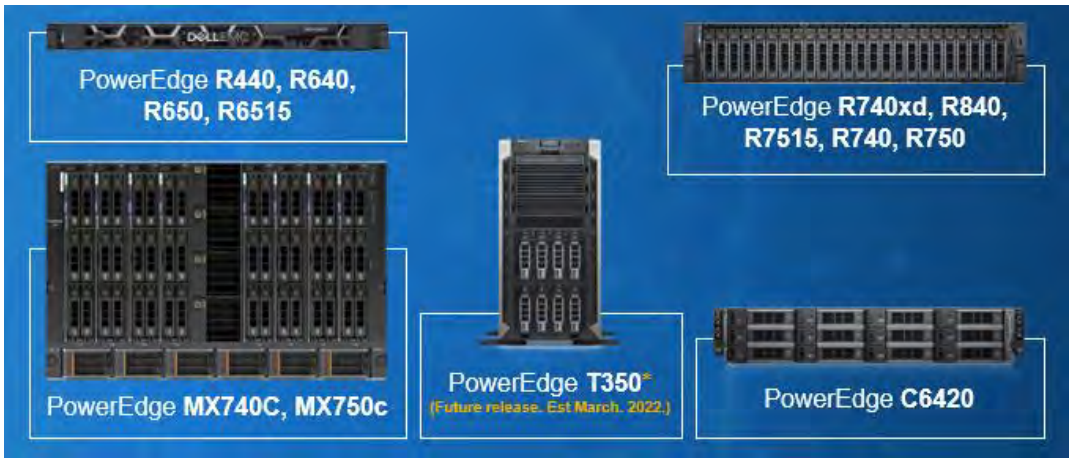


Figure 14. List of Dell vSAN Ready Nodes supporting Identity Modules

An example of the Identity Module technology is provided below. We have created a simple code block that identifies all the Dell vSAN Ready Nodes in our environment and provides some information about them, such as the BIOS version of each host and vSphere version.

This example is performed using VMware's PowerCLI, which is a plug-in for Microsoft PowerShell. This could also have been performed using other tools for vSphere, such as Python (with pyVmomi), Ansible, and other automation frameworks.

The following code can be used as a base to create powerful scripts. This unlocks many automation capabilities for organizations. It also moves them further along in their autonomous operations journey.

```
Get-VMhost -State "connected" | ForEach-Object {

     if ($_.ExtensionData.hardware.systemInfo.model.contains("vSAN Ready Node"))
{

         echo "================================================"

         echo "System Details"

         echo "Model: " $_.ExtensionData.hardware.systemInfo.model

         echo "Service Tag: " $_.ExtensionData.hardware.systemInfo.serialNumber

         echo "BIOS version: " $_.ExtensionData.hardware.biosInfo.biosVersion

         echo "ESXi build: " $_.ExtensionData.config.product.build

     }
```

Figure 15. Code to find Dell vSAN Ready Nodes in our environment

1. This code snippet assumes connection to a vSphere environment with the *Connect-VIServer* command.
2. The code creates a view of all the hosts in the environment using the *Get-VMhost* command.
3. These results are passed to the *ForEach-Object* loop using the pipe symbol (**|**).
4. Loop through this view of hosts using a *ForEach-Object* command and look at the *hardware.systemInfo*.model property of each host.
   - The object of focus, one of the discovered hosts, is represented by the $_ variable, and to access the properties of the host object, we use the *ExtensionData* property.
5. Check each host with a conditional method, *contains(),* added on to the end of the property we want to check.
6. Use the *.contains* method to check if the *hardware.systemInfo.model* contains "vSAN Ready Node". This string is a property that is unique to Dell vSAN Ready Nodes and the Identity Module. This property is set at the factory when the Identity Module is installed.
7. If the system is a Dell vSAN Ready Node with an Identity Module, display information from the *hardware.systemInfo* and the *hardware.biosInfo*, specifically the system's BIOS version. Collect the vSphere build of the host using the *config.product* property of the host.

This code offers an insight into what is possible when building scripts with PowerCLI or similar tools for Dell vSAN Ready Nodes.

The Identity Module also enables Dell teams to rapidly triage and diagnose any system anomaly. This feature helps the more than 1.800 VMware certified Dell support engineers solve most of the cases in-house, avoiding route level 3 tickets to VMware.

For more information about how Identity Modules enable advance automation, see this blog.

OMIVV with vLCM

The Dell EMC OpenManage Integration for VMware vCenter (OMIVV) is designed to streamline the management processes in your data center environment by allowing you to use VMware vCenter Server to manage your physical and virtual full server infrastructure.

The following list includes a few examples of how the OMIVV will expand and enrich your data center management experience with Dell vSAN Ready Nodes:

- Monitors system level information (hardware inventory)
- Bubbles up system alerts for action in vCenter
- Rolls out firmware updates for an ESXi or vSAN cluster that can leverage DRS
- Bare metal deployment

OMIVV brings all relevant information from different sources together to reduce pre-upgrade planning time and extends Dell systems' management capabilities from iDRAC directly to vCenter.

Combining OMIVV with vSphere Lifecycle Manager (vLCM) provides a unified software and firmware life cycle management solution to configure and upgrade ESXi clusters.

In this unified scenario, a VMware administrator can see both the physical and virtual host information from a single pane of glass. OMIVV acts as a firmware provider within vLCM to combine ESXi iso image, driver, and firmware baselines in one process flow.

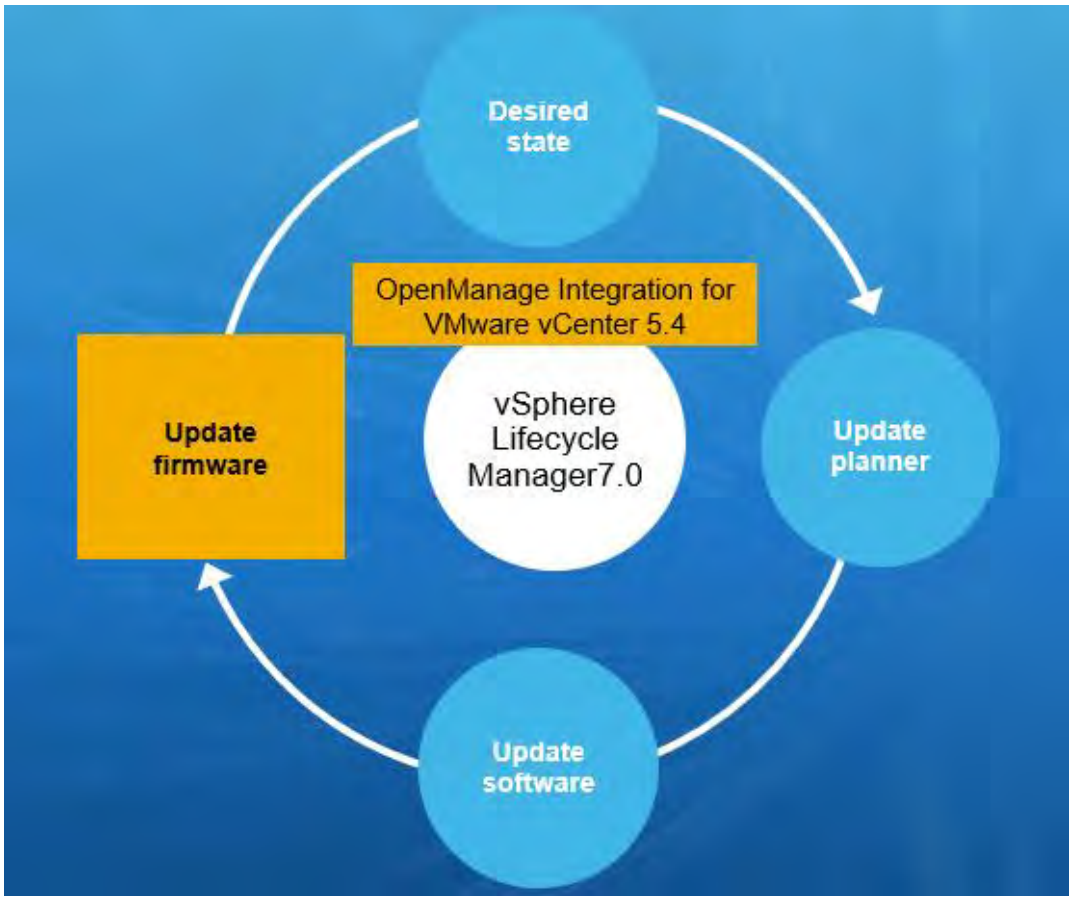


Figure 16. vSAN Lifecycle Management with vLCM + OMIVV

In this simplified management experience, OMIVV provides PowerEdge hardware inventory information directly in host view, cluster view, and in the OMIVV dashboard within vCenter.

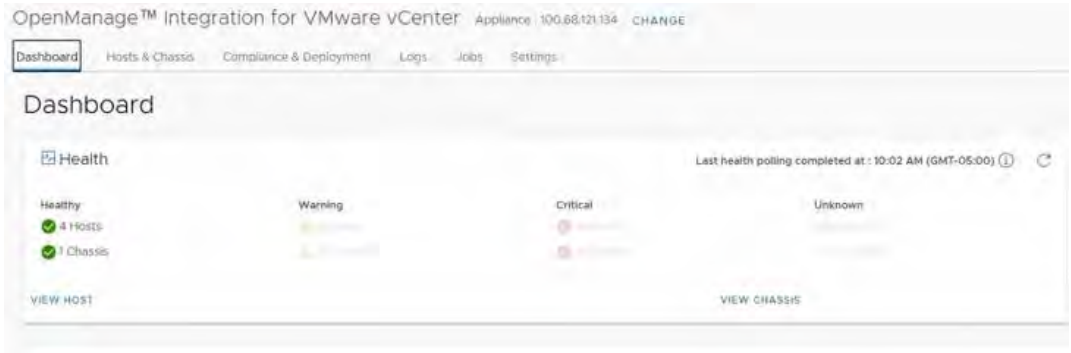


Figure 17. OMIVV vCenter dashboard

IT administrators often use different tools to life cycle manage infrastructure. vLCM with OMIVV reduces operational complexity by providing a single tool for life cycle management activities. This also reduces the amount of time that is dedicated to monitoring the environment for compliance, with a more robust, desired-state model.

vLCM eliminates the need for server vendor update tools by consolidating the number of tools that are required for software and hardware updates to one.

vLCM also automatically validates that the HBA firmware is on the hardware compatibility list, giving administrators confidence that their updates will be successful.

vLCM introduces a new implementation model, called the desired-state model. This model reduces time spent monitoring and troubleshooting. Administrators create an image for their HCI cluster and vLCM implements the image.

In addition, vLCM continuously monitors that all nodes in the cluster comply with the image. If vLCM detects any drift from the wanted image, it will automatically remediate the drift back to the wanted image.

Conclusion

Dell vSAN Ready Nodes are competitive choices to hold VMware based workloads for the following reasons:

- Flexible configurations to support any customer requirement
- Identity Modules in 13 (branded) models that uniquely identify a server as a vSAN Ready Node, simplifying deployment, updates, inventory management, and support, also providing the foundation for advanced automation
- Streamlined updates through the integration of OMIVV and VMware vLCM

References

The following documentation provides other information related to this document. Access to these documents depends on your login credentials. If you do not have access to a document, contact your Dell Technologies representative.

1. Worldwide Quarterly Converged Systems Tracker (IDC)
2. Worldwide IT Spending Forecast
3. HCI market growth forecast
4. Dell vSAN Ready Nodes
5. IDC Converged Systems Tracker Forecast, Q4020, March 2021
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