



# Managing the HCI stack: A comparison of two approaches with Dell EMC VxRail and vSAN ReadyNodes with VMware vSphere Lifecycle Manager

A Principled Technologies research report based on publicly available information

## Introduction

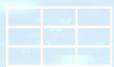
The benefits of hyperconverged infrastructure (HCI) are well documented: A 2020 IDC analysis estimated that Dell EMC™ VxRail™ could deliver a 452 percent return on investment over a five-year period, potentially lowering operational costs by 72 percent and increasing efficiency among IT infrastructure teams by 68 percent.<sup>1</sup> As recognition and adoption of HCI solutions has increased, so too have the number of solutions on offer. A recent Market Study Report forecasted that the global HCI market will grow by 28 percent over the next seven years.<sup>2</sup>

Confronted with proliferating choices, businesses seeking to consolidate their data center infrastructure might be wondering: Should they go with an approach that includes VMware vSAN ReadyNodes™, or choose a more comprehensive solution like VxRail? We reviewed publicly available data on Dell EMC VxRail, VMware vSAN ReadyNodes, and several other VMware technologies. In this paper, we use that research to investigate what advantages customers might see by choosing VxRail.

## With VxRail, organizations could...



**Gain IT efficiencies** using VxRail Lifecycle Manager automated updates, with AI-driven health scores for monitoring, and one-stop-shop support



**Reduce IT time** spent on researching compatibility and testing new updates thanks to 100+ dedicated VxRail engineers working behind the scenes to validate updates for customers<sup>3</sup>



**Support multiple different configurations** without needing to purchase new hardware due to older hardware aging or current hardware not being identical, thanks to VxRail heterogeneous hardware support



**Expand into the cloud** with full VMware Cloud Foundation™ integration, including a unique level of integration with Software Defined Data Center Manager<sup>4</sup>

- <sup>1</sup> "The Business Value of Dell EMC VxRail and VMware Cloud Foundation on VxRail," accessed October 12, 2020, <https://www.dell.com/resources/en-us/asset/analyst-reports/products/converged-infrastructure/idc-business-value-of-dell-emc-vxrail-snapshot.pdf>.
- <sup>2</sup> "Hyper-Converged Infrastructure Market Share – Detailed Analysis of Current Industry Figures with Forecasts Growth By 2027," accessed September 9, 2020, <https://www.marketwatch.com/press-release/hyper-converged-infrastructure-market-share-detailed-analysis-of-current-industry-figures-with-forecasts-growth-by-2027-2020-08-28>.
- <sup>3</sup> "How does vSphere LCM compare with VxRail LCM?," accessed September 9, 2020, <https://infohub.delltechnologies.com/p/how-does-vsphere-lcm-compare-with-vxrail-lcm/>.
- <sup>4</sup> "VMware Cloud Foundation on Dell EMC VxRail" (page 1), accessed September 23, 2020, <https://www.dell.com/resources/en-us/asset/white-papers/products/converged-infrastructure/h17854-vmware-cloud-foundation-on-dell-emc-vxrail-wp.pdf>.

Principled Technologies has produced several hands-on studies featuring VMware HCI products. In 2017, we tested the database performance of the VxRail P470F, finding that it delivered more transactions with lower latency than two different competitive solutions.<sup>5</sup> In 2020, we tested vSAN ReadyNodes to measure data analytics and transactional database performance and evaluate a new release of VMware vSphere® 7.0, which includes vSphere Lifecycle Manager.<sup>6</sup>

## About VxRail

Dell Technologies and VMware offer multiple hardware and software products and solutions that could help an organization build a hyperconverged environment. Two examples are vSphere Lifecycle Manager (vLCM), a software solution introduced with VMware vSphere 7.0 that helps in ongoing maintenance operations, and vSAN ReadyNodes, physical servers that are pre-validated to run VMware vSAN and vSphere. However, combining these and/or other components into a cohesive solution takes planning and time. VxRail presents an alternative to this more piecemeal approach: an integrated and supported product that Dell EMC states delivers a curated experience.<sup>7</sup>

VxRail is, according to Dell Technologies and VMware, “the only fully integrated, pre-configured, and pre-tested VMware hyperconverged system optimized for VMware vSAN or VMware Cloud Foundation.”<sup>8</sup> This jointly engineered, hyperconverged infrastructure solution from Dell Technologies and VMware offers companies a top-to-bottom, software-defined solution for their workloads. It aims to deliver full integration and automation through the entire pre-validated VxRail hardware stack, VMware HCI software, and the VxRail HCI System Software suite, which consists of multiple software elements that extend VMware capabilities. In a video called “Introducing VxRail HCI System Software,” Dell Technologies states that this level of automation helps IT administrators save time and effort in areas including researching and applying updates, multi-site management, and troubleshooting and working with support services.<sup>9</sup> VxRail customers receive not just the hardware stack, but also integrations for Kubernetes, VMware Network & Security Virtualization (NSX), VxRail-specific application program interfaces (APIs), and more. Additionally, the VxRail HCI System Software SaaS multi-cluster management (formerly known as VxRail Analytical Consulting Engine, or ACE) applies machine learning technologies to collect data on the VxRail stack, using that data to improve a company’s HCI stack.<sup>10</sup>

Organizations can use the VxRail toolsets to help reduce the time and effort of executing Day 2 tasks such as lifecycle management and updates, troubleshooting, and support tasks. Ultimately, these efficiencies mean that IT departments can dedicate more resources to tasks that contribute to business growth.

**100+ dedicated VxRail team members**

**Over \$60 million of lab investments**

**25,000+ runtime hours to test each major release<sup>11</sup>**

5 “Empower your databases with strong, efficient, scalable performance” (<http://facts.pt/KzRxeb>) and “Handle more orders with faster response times, today and tomorrow” (<http://facts.pt/tkCS84>), accessed September 23, 2020.

6 “New VMware vSphere 7.0 features reduced the time and complexity of routine update and hardware compliance tasks,” accessed September 9, 2020, <https://www.principledtechnologies.com/Dell/vSphere-7.0-update-compatibility-check-0820-v3.pdf>.

7 “Dell EMC VxRail Hyperconverged Infrastructure,” accessed September 9, 2020, <https://www.delltechnologies.com/en-us/converged-infrastructure/vxrail/index.htm>.

8 “Dell EMC VxRail Hyperconverged Infrastructure.”

9 “Introducing VxRail HCI System Software,” accessed September 9, 2020, <https://youtu.be/0Q4U5igE0P8?t=261>.

10 “Analytical Consulting Engine (ACE),” accessed September 9, 2020, <https://infohub.delltechnologies.com/p/analytical-consulting-engine-ace/>.

11 “How does vSphere LCM compare with VxRail LCM?,” accessed September 9, 2020, <https://infohub.delltechnologies.com/p/how-does-vsphere-lcm-compare-with-vxrail-lcm/>.

## How VxRail differs from other HCI solutions

Since vSAN ReadyNodes are components of HCI solutions that leverage x86 hardware and VMware software—such as vSAN, vCenter®, ESXi™, vLCM and more—some might assume that they are simply another flavor of VxRail. However, these software solutions are just part of what VxRail includes. vSAN ReadyNodes are pre-validated server nodes ready to run vSAN, but they lack unifying management software that manages Day 2 tasks. vLCM manages updates of VMware software, but stands distinctly apart from a comprehensive solution. It is also only one option for updating vSphere and vSAN environments. For example, if you manage your vSAN cluster with baselines, firmware updates are not available through vLCM.<sup>12</sup> This means customers will still need to put time and thought into configuring their environment to take full advantage of vLCM. In addition, with these other solutions, customers need to ensure that they have all the proper plug-ins for their various hardware components.<sup>13</sup> While these pieces can deliver significant benefits to customers, they alone do not constitute a fully integrated HCI solution.

The driving differentiator between VxRail and components such as vSAN ReadyNodes or vLCM is Dell EMC VxRail HCI System Software, a suite of software capabilities unique to VxRail. Encompassing VxRail Manager, ecosystem connectors, automated lifecycle management, VxRail SaaS multi-cluster management, and more, VxRail HCI System Software provides the connective tissue between Dell Technologies hardware and VMware software that helps IT administrators to automate tasks within the HCI environment and manage the VxRail stack. One way to think of the difference is to imagine products such as vSAN ReadyNodes or vLCM as a quality hotel with some amenities. If you want to enjoy the local food, sites, and entertainment, you'll need put in effort to research the area, determine how to get tickets for events, and so on. VxRail, on the other hand, is an all-inclusive resort that alleviates some of the guesswork and effort. You get the same amenities as the first hotel, but you also get multiple restaurants, entertainment, drinks, tennis lessons, and more—all without leaving the resort grounds.

VMware and Dell Technologies dedicate time and resources to ensuring a validated and continuous set of hardware, software, and firmware on VxRail. According to Dell Technologies, this involves “100+ dedicated VxRail team members, over \$60 million of lab investments, and over 25,000 runtime hours to test each major release.”<sup>14</sup> This investment is in addition to the efforts of both companies to integrate hardware and software in other areas,<sup>15</sup> including validating PowerEdge servers for VMware’s hardware compatibility list.<sup>16</sup>

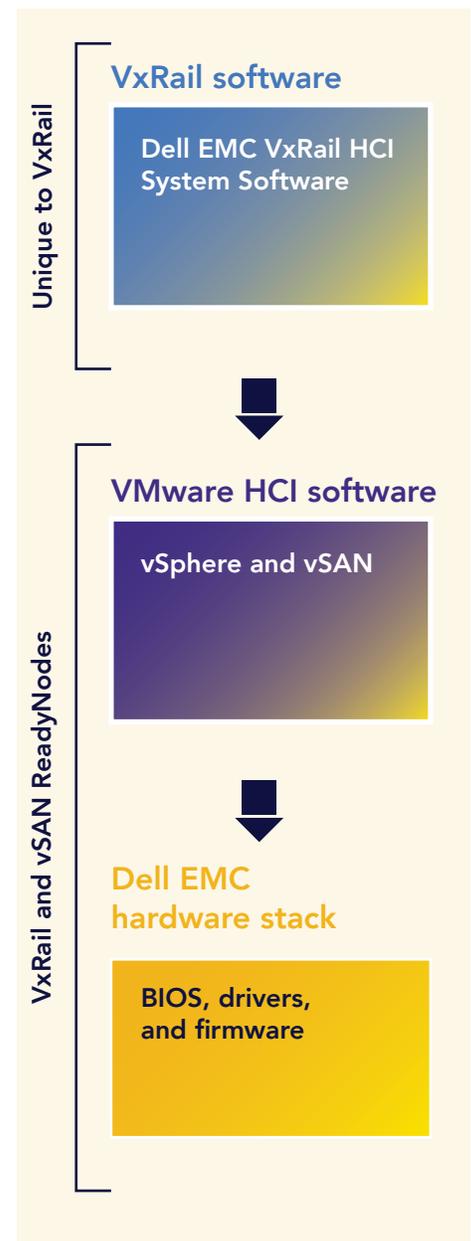


Figure 1: VxRail stack diagram.  
Source: Principled Technologies.

12 “Firmware Updates,” accessed September 23, 2020, <https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere-lifecycle-manager.doc/GUID-34AF5B19-FC80-4915-8358-D5FCC8A8E69E.html>.

13 “vSphere 7 – Lifecycle Management,” accessed September 9, 2020, <https://blogs.vmware.com/vsphere/2020/04/vsphere-7-patching-lifecycle-management.html>.

14 “How does vSphere LCM compare with VxRail LCM?,” accessed September 9, 2020, <https://infohub.delltechnologies.com/p/how-does-vsphere-lcm-compare-with-vxrail-lcm/>.

15 “Dell EMC PowerEdge and VMware,” accessed September 23, 2020, <https://www.delltechnologies.com/en-us/solutions/vmware/servers-for-vmware.htm>.

16 “VMware Compatibility Guide,” accessed September 23, 2020, [https://www.vmware.com/resources/compatibility/search.php?deviceCategory=server&details=1&partner=23&releases=448&page=11&display\\_interval=10&sortColumn=Partner&sortOrder=Asc](https://www.vmware.com/resources/compatibility/search.php?deviceCategory=server&details=1&partner=23&releases=448&page=11&display_interval=10&sortColumn=Partner&sortOrder=Asc).

## Dell EMC HCI System Software suite contains the following components:<sup>17,18</sup>



**VxRail Manager:** vCenter plug-in management interface where administrators can perform most VxRail tasks such as monitoring, shutdowns, and more.



**Ecosystem connectors:** These integrate with hardware and software components, providing the VxRail HCI System Software with the necessary information to recognize and update components across the board and enable automation.



**Lifecycle management:** VxRail LCM is designed to keep the clusters in what Dell refers to as a Continuously Validated State so that the clusters are up to date with the validated versions across all levels of the stack. These updates are automated and, after the update is acquired, launched with a single click.



**Electronic compatibility matrix:** The matrix of compatible hardware, software, and firmware versions that the VxRail cluster uses to ensure that it is in a valid, supported state. The matrix tracks compatibility between multiple possible validated states, enabling customers to skip interim patches and releases.<sup>19</sup>



**REST APIs:** VxRail clusters have publicly available API options to allow clusters to expand into the cloud and provide large-scale management and Infrastructure as Code via scripting and more.



**SaaS-based multi-cluster management:** This cloud-based tool uses data gathered from the VxRail clusters to provide analysis of host or hardware status, server health insights, upgrade planning, staging, and optional automated execution of upgrades.



**Secure Remote Services:** In addition to serving as a single source for all support from hardware to software, Dell EMC Secure Remote Services provides VxRail customers with two-way remote connections that give Dell engineers direct access to troubleshoot and repair the cluster.

17 "Dell EMC VxRail HCI system software," accessed September 9, 2020, <https://infohub.delltechnologies.com//dell-emc-vxrail-appliances-comprehensive-security-by-design/dell-emc-vxrail-hci-system-software-2>.

18 "Dell EMC VxRail™ System TechBook" (page 14), accessed September 9, 2020, <https://www.dell.com/fr-mg/collaterals/unauth/technical-guides-support-information/products/converged-infrastructure/h15104-vxrail-appliance-techbook.pdf>.

19 Dell EMC, accessed September 9, 2020, [https://support.emc.com/docu97739\\_VxRail-7.0.x-Support-Matrix.pdf](https://support.emc.com/docu97739_VxRail-7.0.x-Support-Matrix.pdf) (Note: This source requires the user create a login to access the information).

## Lifecycle management

VxRail HCI System Software includes components that help keep VxRail clusters in validated states, such as the VxRail LCM and the Electronic Compatibility Matrix. VxRail customers can choose from available VxRail versions for their desired configuration. VxRail then uses the Electronic Compatibility Matrix to ensure that all VxRail components in the configuration are in compliance with each other and up to date.<sup>20,21</sup>

vLCM, on the other hand, uses an image-based approach to maintain a desired state on each host. This cluster image sets the desired ESXi version, as well as host firmware and driver versions. After the administrator applies the images to the hosts, the hosts maintain this state.<sup>22</sup> The VxRail method has some advantages over the vLCM image approach:

- ✓ VxRail allows customers to choose from a set matrix of tested, verified states. With an environment based on vLCM, IT staff must research, test, and choose their own desired state.
- ✓ The VxRail LCM validated state can span generations and other mixed-node use cases in a single cluster, while each vLCM image prefers configurations that are mostly homogenous.<sup>23</sup>

- ✓ While VxRail update packages maintain the continuity of the VxRail validated state, vLCM images require vendor-supplied packages for hardware compliance checks and firmware and drivers,<sup>24</sup> or a vendor Hardware Support Manager (HSM) that works as a vCenter plug-in.<sup>25</sup> If the vendor add-on doesn't include specific drivers or firmware that the cluster needs to maintain the desired state, the administrator must manually add those to the image.<sup>26</sup>

- ✓ VxRail continuously maintains the desired state, which includes updating the cluster as new versions release. With vLCM, IT staff must create a separate image for each vSAN cluster of differing configurations and consistently edit images for new target states, such as new VMware software version releases.<sup>27</sup>

While VxRail customers simply need to configure access to the VxRail repository, vSAN ReadyNodes customers must complete several steps to set up their initial baseline configuration. To see a detailed explanation of what these vSAN Ready Node customers must do, see the Dell blog post "Exploring the customer experience with lifecycle management for vSAN ReadyNodes and VxRail clusters."<sup>28</sup>

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- 20 "Dell EMC VxRail™ System TechBook" (pages 14-15), accessed September 9, 2020, <https://www.dell.com/fr-mg/collaterals/unauth/technical-guides-support-information/products/converged-infrastructure/h15104-vxrail-appliance-techbook.pdf>.
- 21 "Dell EMC VxRail HCI system software," accessed September 9, 2020, <https://infohub.delltechnologies.com/l/dell-emc-vxrail-appliances-comprehensive-security-by-design/dell-emc-vxrail-hci-system-software-2>.
- 22 "vSphere 7 – Lifecycle Management," accessed September 9, 2020, <https://blogs.vmware.com/vsphere/2020/04/vsphere-7-patching-lifecycle-management.html>.
- 23 "vSphere Lifecycle Manager Requirements and Specifics," accessed September 9, 2020, <https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere-lifecycle-manager.doc/GUID-0295A915-3963-47AD-AA79-C275226B866F.html>.
- 24 "How does vSphere LCM compare with VxRail LCM?," accessed September 9, 2020, <https://infohub.delltechnologies.com/p/how-does-vsphere-lcm-compare-with-vxrail-lcm/>.
- 25 "vSphere 7 – Lifecycle Management," accessed September 9, 2020, <https://blogs.vmware.com/vsphere/2020/04/vsphere-7-patching-lifecycle-management.html>.
- 26 "vSphere 7 – Lifecycle Management."
- 27 "Using Images," accessed September 9, 2020, <https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere-lifecycle-manager.doc/GUID-9A112231-AD7C-4EF5-AB6A-A8DAA704D307.html>.
- 28 "Exploring the customer experience with lifecycle management for vSAN ReadyNodes and VxRail clusters," accessed September 25, 2020, <https://infohub.delltechnologies.com/p/exploring-the-customer-experience-with-lifecycle-management-for-vsan-ready-nodes-and-vxrail-clusters/>.

To keep VxRail clusters in constantly validated states, the VxRail team creates full-stack update packages that administrators can apply through an automated process. Within 30 days of a VMware vSphere release,<sup>29</sup> Dell Technologies provides a VxRail update package that follows a four-step process to keep the cluster compliant:

1. VxRail downloads the update bundle, including any hardware and software updates required.
2. The cluster runs pre-checks and stages the update.
  - a. Additionally, pre-checks are available on-demand for use outside of the update process to let the administrator know if the cluster is ready for an update.<sup>30</sup>
3. VxRail applies the updates in a non-disruptive manner that uses Distributed Resource Scheduler (DRS) to vMotion® VMs and take each down one at a time, while pre-staging the next node.
4. VxRail validates the updates to ensure everything updated properly.<sup>31</sup>

This automated, validated update approach can save IT staff time and effort in several ways. As we noted earlier, VxRail teams spend more than 25,000 runtime hours testing each major release.<sup>32</sup> The testing and validation effort by the VxRail teams reduces the burden of researching, testing, and validating that VxRail customers would otherwise need to perform, saving them time.

IT staff are often reluctant to apply an untested update to a server, workload, or software, fearing it could cause unforeseen complications that could bring down an environment. Due to this risk, IT staff must carefully research and test an update before they can apply it to their system. This effort can be time-consuming and (if companies want to test an update on a non-production environment) resource-intensive—especially when admins have to deal with every new update from hardware and software vendors. For ESXi alone, IT staff can expect several updates a year: According to the VMware ESXi build release list, ESXi 6.7 saw nine new version releases in 2019.<sup>33</sup> To see more detailed steps vLCM customers need to perform to plan for and execute a cluster update, see the Dell blog post “Exploring the customer experience with lifecycle management for vSAN ReadyNodes and VxRail clusters.”<sup>34</sup>

By having VxRail teams do the testing and validating beforehand, IT staff can save that time and dedicate it to other tasks. Customers could potentially save money as well, given that vLCM requires identical server hardware and that OEMs eventually discontinue servers.<sup>35</sup> Users often cannot exactly match internal hardware across server generations. Instead of being able to mix new models into their older cluster, they would have to create new clusters if they wanted to upgrade their servers. In addition, staff can see time savings in the actual application of updates. According to an August 2020 Principled Technologies report, manual updates can take quite a lot of time. To give just one example: on a single node, it took 9 minutes and 31 seconds to manually update the hypervisor, and 23 minutes to check hardware compatibility.<sup>36</sup> Automation of that task, which VxRail provides, can reduce that burden. IT staff can also save time by not having to run updates on a development environment to ensure validity and compatibility. And, thanks to VxRail support for heterogeneous clusters, the time administrators save is multiplied by the number of unique clusters in a data center.

29 “VxRail—Simpler. More Powerful. More Protected,” accessed September 9, 2020,

<https://blog.dell EMC.com/en-us/dell-emc-advances-hci-portfolio-vmware-environments/>.

30 “Dell EMC VxRail™ System TechBook” (page 24), accessed September 9, 2020, <https://www.dell EMC.com/fr-mg/collaterals/unauth/technical-guides-support-information/products/converged-infrastructure/h15104-vxrail-appliance-techbook.pdf>.

31 “Dell EMC VxRail™ System TechBook” (page 17).

32 “How does vSphere LCM compare with VxRail LCM?,” accessed September 9, 2020,

<https://infohub.delltechnologies.com/p/how-does-vsphere-lcm-compare-with-vxrail-lcm/>.

33 “Build numbers and versions of VMware ESXi/ESX (2143832),” accessed September 23, 2020,

<https://kb.vmware.com/s/article/2143832>.

34 “Exploring the customer experience with lifecycle management for vSAN ReadyNodes and VxRail clusters,”

accessed September 25, 2020, <https://infohub.delltechnologies.com/p/exploring-the-customer-experience-with-lifecycle-management-for-vsan-ready-nodes-and-vxrail-clusters/>.

35 “vSphere Lifecycle Manager Requirements and Specifics,” accessed September 23, 2020, <https://docs.vmware.com/en/VMware-vSphere/7.0/com.vmware.vsphere-lifecycle-manager.doc/GUID-0295A915-3963-47AD-AA79-C275226B866F.html>.

36 “New VMware vSphere 7.0 features reduced the time and complexity of routine update and hardware compliance tasks,” accessed September 9, 2020,

<https://www.principledtechnologies.com/Dell/vSphere-7.0-update-compatibility-check-0820-v3.pdf>.

## Global management

Dell EMC VxRail HCI System Software offers a global SaaS multi-cluster management tool that provides two main functions for VxRail customers:

- The ability to manage clusters at scale across sites and geographies
- Insights into health and resource issues<sup>37</sup>

Building on VxRail LCM infrastructure management tools, SaaS multi-cluster management can help IT staff manage multiple VxRail clusters, offering a unified view of clusters spread across a company.<sup>38</sup> Administrators can view their clusters at a high level, by geographical location, or by drilling down into individual nodes. VxRail multi-cluster management then works with VxRail LCM to apply update bundles to the clusters both local and remote. A data collection service running on all VxRail clusters feeds this data into the VxRail multi-cluster management, which uses the data to assign health scores to each cluster. Administrators can use these health scores to identify issues around performance and availability.<sup>39</sup> Per the Dell EMC VxRail System TechBook, the VxRail multi-site manager can identify patterns and predict issues or warn of a need to expand a cluster as resources reach full capacity.<sup>40</sup>

With these abilities, VxRail SaaS-based multi-cluster management offers several benefits to VxRail customers:

- If a workload's performance starts to lag due to a cluster health issue, administrators can check the health scores to help determine where the problem lies.
- Using the predictive nature of VxRail multi-site manager to show that a cluster is approaching maximum capacity, companies can avoid workload performance issues by adding or adjusting resources accordingly.<sup>41</sup>
- IT staff can use the metrics charting that VxRail multi-site manager provides to track the status of hardware resources.<sup>42</sup>

Upgrades are simplified with upgrade pre-checks, component identification, pre-staging, and an optional, more active upgrade execution with purchase of the add-on license.<sup>43</sup> VxRail expands on the extensive Dell Technologies and VMware RESTful API frameworks around vSAN, vCenter, Dell EMC iDRAC, and more by providing software interfaces for Dell EMC PowerEdge™ servers, VMware vSAN, VxRail Manager, and other components in the HCI stack.<sup>44</sup> This extends the ways that IT organizations can manage and interact with VxRail, including giving another option for management at scale. With the VxRail API framework, customers can manage multiple clusters with homemade scripts in addition to using the VxRail SaaS multi-cluster manager.<sup>45</sup>

37 "Dell EMC VxRail™ System TechBook" (page 21), accessed September 9, 2020, <https://www.dell EMC.com/fr-mg/collaterals/unauth/technical-guides-support-information/products/converged-infrastructure/h15104-vxrail-appliance-techbook.pdf>.

38 "Dell EMC VxRail™ System TechBook" (page 22).

39 "Dell EMC VxRail™ System TechBook" (page 22).

40 "Dell EMC VxRail™ System TechBook" (pages 20-22).

41 "Dell EMC VxRail™ System TechBook" (page 23).

42 "Dell EMC VxRail™ System TechBook" (page 22).

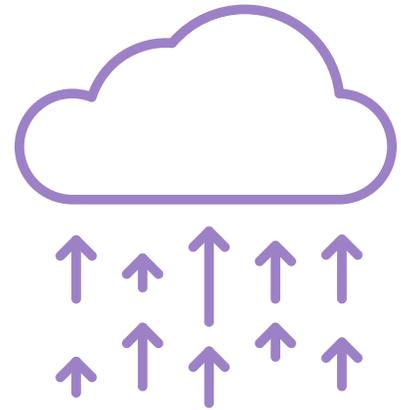
43 "Building on VxRail HCI System Software: the advantages of multi-cluster active management capabilities," accessed October 7, 2020, <https://infohub.delltechnologies.com/p/building-on-vxrail-hci-system-software-the-advantages-of-multi-cluster-active-management-capabilities/>.

44 "VxRail API – Overview," accessed September 9, 2020, <https://www.youtube.com/watch?v=-1Nk15WJ6IY>.

45 "Dell EMC VxRail™ System TechBook" (pages 18-19), accessed September 9, 2020, <https://www.dell EMC.com/fr-mg/collaterals/unauth/technical-guides-support-information/products/converged-infrastructure/h15104-vxrail-appliance-techbook.pdf>.

## Cloud integration

For hybrid cloud environments, VMware created VMware Cloud Foundation. Cloud Foundation customers can leverage on-premises and public cloud environments for virtual resource provisioning, in addition to using VMware Cloud Foundation with Tanzu integration for modern applications. Customers have several options for deploying VMware Cloud Foundation, including vSAN ReadyNodes,<sup>46</sup> but can also deploy VMware Cloud Foundation on VxRail. According to Dell Technologies, “VMware Cloud Foundation on VxRail delivers an experience you won’t find on any other infrastructure running VMware Cloud Foundation.”<sup>47</sup> While the VMware Cloud Foundation features remain the same for VxRail customers compared to other Cloud Foundation consumers, VxRail offers several advantages for VMware Cloud Foundation users, including the unique integration between VxRail Manager and VMware Software Defined Data Center (SDDC) Manager.<sup>48</sup> With VMware Cloud Foundation on VxRail, the HCI infrastructure and cloud software function as a single entity. As we discuss in the previous section on lifecycle management, keeping components up to date can be a time-consuming task. With VMware Cloud Foundation on VxRail, VxRail LCM is integrated into the SDDC Manager and VMware Cloud Foundation automated updating process.<sup>49</sup>



Dell Technologies also supports Tanzu Architecture for VxRail (formerly Pivotal Ready Architecture), a validated design for leveraging Tanzu Kubernetes Grid (TKG) in VxRail environments.<sup>50</sup> This offer for cloud-native application development with Kubernetes containers integrates with VxRail management software to add another tool for cloud environments. With the newly released vSphere 7 Update 1 (vSphere 7U1), VMware has added Tanzu support to vSphere customers, including vSAN ReadyNodes users, without requiring a full VMware Cloud Foundation deployment.<sup>51</sup> While this addition can meet the basic needs of companies looking for a Kubernetes environment, organizations using Tanzu with vSphere on VxRail clusters can utilize VMware Virtual Switching for small-scale implementations.<sup>52</sup> According to a VMware video introducing vSphere for Tanzu, this solution is “the fastest way to get started with Kubernetes” (which is a great opportunity for vSAN ReadyNodes customers), but VMware Cloud Foundation is “the best way to run Kubernetes at scale.”<sup>53</sup>

Therefore, customers wishing to build a cloud-native, Kubernetes-based environment at scale, whether hybrid or private, on a fully integrated, managed environment engineered by Dell Technologies and VMware, should consider investing in a VMware Cloud Foundation on VxRail hyperconverged infrastructure solution. With integration between VxRail and VMware Cloud Foundation management tools, organizations may see manageability benefits on a VxRail system. And by expanding the upgrade and patching capabilities discussed in the Lifecycle management section above, IT staff could save time and dedicate more attention to strategic tasks that foster organizational growth.<sup>54</sup>

46 “VMware Cloud Foundation,” accessed September 23, 2020, <https://www.vmware.com/products/cloud-foundation.html>.

47 “VMware Cloud Foundation on Dell EMC VxRail,” accessed September 23, 2020, <https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/products/cloud-foundation/vmw-cloud-foundation-on-vxrail-solution-overview.pdf>.

48 “VMware Cloud Foundation on Dell EMC VxRail.”

49 “VMware Cloud Foundation on Dell EMC VxRail” (page 2).

50 “VMware Tanzu Architecture for Dell EMC VxRail,” accessed September 9, 2020, <https://www.delltechnologies.com/en-us/solutions/cloud/tanzu-architecture-for-vxrail.htm#scroll=off>.

51 “Announcing VMware vSphere with Tanzu: The Fastest Way to Get Started with Kubernetes,” accessed September 23, 2020, <https://blogs.vmware.com/vsphere/2020/09/announcing-vsphere-with-tanzu.html>.

52 “VMware Tanzu on Dell EMC VxRail,” accessed October 13, 2020, <https://www.delltechnologies.com/en-us/converged-infrastructure/vxrail/index.htm#accordion0&overlay=//www.dellemc.com/en-us/collaterals/unauth/infographic/products/converged-infrastructure/tanzu-for-vxrail-infographic.pdf>.

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## Support

One final piece of the VxRail HCI System Software is its integrated remote support services on VxRail environments. While all Dell Technologies customers benefit from the tier of services they have chosen, as well as the status of Dell Technologies as a VMware-certified support partner, VxRail offers direct integrations with technical support. VxRail customers not only benefit from having a single place for all support needs for both hardware and software, but also enjoy integration with Dell EMC Secure Remote Services for call-home support.<sup>55</sup> Additionally, the VxRail Manager plugin enables IT staff to open service requests to Dell Technologies directly from the vCenter portal.<sup>56</sup>

Thanks to the Validated States and Compatibility Matrix, support teams should know the specifications across hardware, software, and firmware levels, information that can prove useful to help troubleshoot issues. These support features may help organizations save time and effort when it comes to keeping track of multiple support service contracts, phone numbers, service tickets, incident history, and upgrade history.

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## Conclusion

With over 25,000 runtime hours dedicated to testing each major release,<sup>57</sup> the engineers behind VxRail seek to help organizations save time and effort on updates, management, and support for their Dell Technologies and VMware hyperconverged infrastructure. Compared to more piecemeal HCI solutions such as VMware vSAN ReadyNodes and vSphere Lifecycle Manager, VxRail offers several benefits:

- **Continuous validation and full-stack updates** via Dell EMC VxRail HCI System Software and the VxRail Compatibility Matrix, helping to ensure continued compliance and saving IT administrators time, particularly when running updates and maintaining software.
- **Support for heterogeneous clusters** that allow for scaling opportunities with newer server models or mixed hardware configurations.
- **Global management capabilities via VxRail SaaS multi-cluster management**, which provides health scores for at-a-glance problem diagnosis; predictions of cluster capacity to avoid workload performance issues; and capabilities to help administrators identify patterns and proactively address potential issues, automated upgrade staging, and execution.
- **A wide array of cloud integrations and support features**, potentially saving IT administrators time and effort on VMware Cloud Foundation and Tanzu Kubernetes deployment and management.

With VxRail, organizations can benefit from an integrated and validated solution by Dell Technologies and VMware.

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This project was commissioned by Dell Technologies.



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