



# Deploy Containers and VMs Together on a Validated Solution from VMware, Dell EMC, and Intel



## Executive Summary

Increasing numbers of modern businesses are turning to microservices in order to accelerate development and shorten time to market. Containers can play a major role in a microservices model, but many organizations don't know how to transition from their VMware virtual-machine (VM)-based environments to ones that support both VMs and containers. A validated solution built on proven, mature technology from VMware, Dell EMC, and Intel can provide a convenient way for these organizations to deploy and manage Docker\* containers alongside their traditional, VM-based workloads. The validated solution can also enable organizations to take full advantage of the benefits of a microservices-based architecture, without requiring an infrastructure overhaul.

## Containers Can Accelerate Time to Market

In today's digital economy, modern businesses need to move at a rapid pace to keep up with changing demands. To support this need, businesses are increasingly moving to microservices-based architectures for the software within their data centers. Microservices provide a flexible, loosely coupled, service-oriented architecture that can help organizations break free from monolithic hardware and software stacks, which can slow the development of apps and services. One way companies can begin their microservices journey is by supporting the use of containers—lightweight, stand-alone, executable software packages. Containers allow developers to develop and deploy apps for portability, repeatability, and scale. In addition, admins have greater control over containerized microservices compared to traditional apps because containers can be isolated for security and scaled independently.

Many organizations are already sold on the benefits of containers, but they are unsure how to efficiently and affordably implement them without having to independently support two architectural models—an existing VM-based infrastructure and a new containerized environment—at the same time. To avoid splitting their networks and infrastructures into two isolated systems, businesses should consider a hyper-converged platform that lets them deploy, manage, and monitor both VMs and containers with simple, unified management, strong security and compliance features, and persistent storage for containers.

## Deploy a Container-Ready Validated Solution

VMware, Dell EMC, and Intel have joined forces to validate a do-it-yourself (DIY) solution that organizations can build to easily manage a dual environment that runs VMs and containers side-by-side. The solution enables IT organizations to easily manage and deploy containers without abandoning their existing VM-based infrastructures or adding complexity to their environments.

The solution offers organizations a tested and validated dual-mode VM/container stack, built on VMware Cloud Foundation™ and VMware vSphere® Integrated Containers™, that is optimized for performance and reliability. Organizations can quickly deploy a unified infrastructure that supports both traditional VM-based applications and Docker containers, with simplified monitoring and management for IT, and rapid, self-service environment provisioning for

developers. The validated solution also provides hyper-converged VMware vSAN™ storage for VMs and containers to ensure workload persistence. In addition, the solution makes use of VMware NSX® to provide network virtualization, load balancing, and microsegmentation, which ensures that applications communicate using only the specified ports/IP addresses at the container level.

## The validated, DIY container and VM solution is built on the following components from VMware, Dell EMC, and Intel:



- VMware Cloud Foundation, which includes VMware vSphere®, vSAN, VMware NSX, and VMware SDDC Manager™. Together, these components enable a complete software-defined data center (SDDC) with automated lifecycle management, covering configuration, provisioning, upgrades, and patching.
- VMware vSphere and the VMware vSphere Integrated Containers plug-in, which provide the data center virtualization, with comprehensive monitoring and deployments for VMs and containers.
- VMware NSX enables advanced network virtualization and microsegmentation for fine-grained, policy-driven security.
- VMware vSAN enables hyper-converged storage for the SDDC solution.

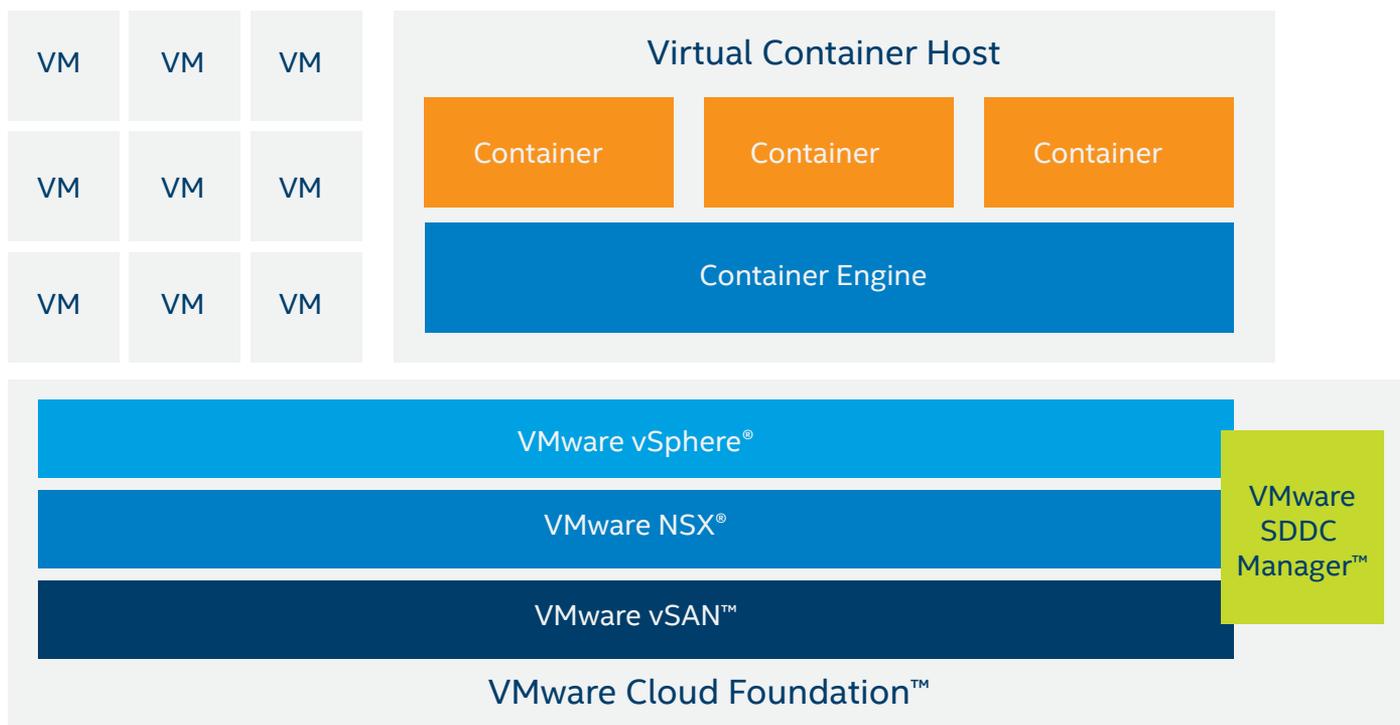


- Dell EMC™ PowerEdge™ R630 servers, powered by Intel® Xeon® processors, provide performance, reliability, and security as a certified VMware® platform.



- Two Intel Xeon processors E5-2660 v4 in each Dell EMC PowerEdge server, which provide hardware-enhanced protections to help ensure the integrity of hypervisors and workloads running on the servers.
- Intel® Virtualization Technology (Intel® VT) accelerates performance for virtual workloads.
- Intel® Solid-State Drives (SSDs) deliver data integrity, performance consistency, and drive reliability for read-intensive (with the Intel SSD DC S3520 Series) and write-intensive (with the Intel SSD DC S3710 Series) workloads in the VMware vSAN data tier and cache tier, respectively. Both of these Serial ATA (SATA) Intel SSD series offer an attractive performance/price ratio for businesses. Organizations that have critical performance needs can deploy Intel SSDs with NVM Express\* (NVMe\*) to experience exceptional speeds and low latencies.
- The 10 Gigabit Ethernet (GbE) Intel® Ethernet Converged Network Adapter X520 is designed to provide reliable, high performance for VM workloads in the data center.

## VMware vSphere® Integrated Containers™



**Figure 1.** The validated solution, based on VMware Cloud Foundation and VMware vSphere Integrated Containers, provides enhanced security and isolation for VMs, along with agility, portability, and speed for containers, enabling rapid app development

### Deliver and Manage Containers through VMs

The VMware, Dell EMC, and Intel validated solution enables VMs and containers to run within a single, unified framework, based on VMware Cloud Foundation. VMware Cloud Foundation combines VMware vSphere, VMware vSAN, and VMware NSX into a natively integrated stack to deliver enterprise-ready cloud infrastructure for the data center. With SDDC Manager, a part of VMware Cloud Foundation, VMware enables simplified deployment and operation of a private cloud. VMware vSphere Integrated Containers—installed on top of VMware vSphere—provisions container images and makes use of a container engine to deploy and run containers as VMs within VMware Cloud Foundation.

### Quickly Deploy a Fully Operational Stack

VMware Cloud Foundation automates the installation of the entire VMware software stack. Once the rack is installed and powered on and the networking is in place, SDDC Manager initializes the rack. Because it automates tasks that previously had to be performed manually, SDDC Manager can reduce the time spent by DevOps engineers to create a fully operational stack from days to as little as two hours.<sup>1</sup> This translates into reduced operational complexity, operational consistency and accuracy, and rapid time to market for the business.

### Simplified Resource Provisioning

VMware Cloud Foundation uses policy-based resource containers, called workload domains, for creating logical pools across compute, storage, and networking. When deploying workload domains, an administrator specifies capacity, performance, availability, and security parameters. SDDC Manager automatically allocates resources from the underlying pool, based on the specified workload domain requirements. As a result, workload domains can greatly reduce time and effort for admins. Workload domains can also be expanded to add capacity as the underlying infrastructure grows.

Admins can configure and run separate workload domains, side-by-side, for VMware vSphere Integrated Containers and for VMs or other infrastructure deployments.

### Automated Lifecycle Management

SDDC Manager automates upgrade and patch management for the SDDC software stack, which frees up DevOps resources to focus on business-critical initiatives. Lifecycle management in SDDC Manager can be applied to the entire infrastructure or to specific workload domains.

### Familiar Developer Experience

Because the solution supports VM-based and containerized environments, developers can easily and rapidly create both traditional and containerized apps. vSphere Integrated Containers is a Docker container engine, so developers with Docker experience will be able to immediately containerize their apps and run them using the vSphere Integrated Containers environment. A Docker remote API-compatible engine is integrated into vSphere for instantiating container images that run as VMs.

The validated solution also includes an integrated containers registry and management portal, which allows IT admins to provide production-ready containers to developers without having to build out a separate, specialized container infrastructure stack.

Developers can also self-provision storage for containers by using a Docker API, without having to coordinate with an IT admin. At the same time, IT operations staff can have full visibility to monitor and secure containers by using the same vSphere management tools they use to manage VMs.

The solution also makes use of the vSphere Integrated Containers engine to store container data volumes as persistent, shared storage backed by VMware vSAN and powered by fast, reliable Intel SSDs. And with vSphere shared storage, containers can be moved seamlessly between vSphere hosts within a cluster, without having to move the data.

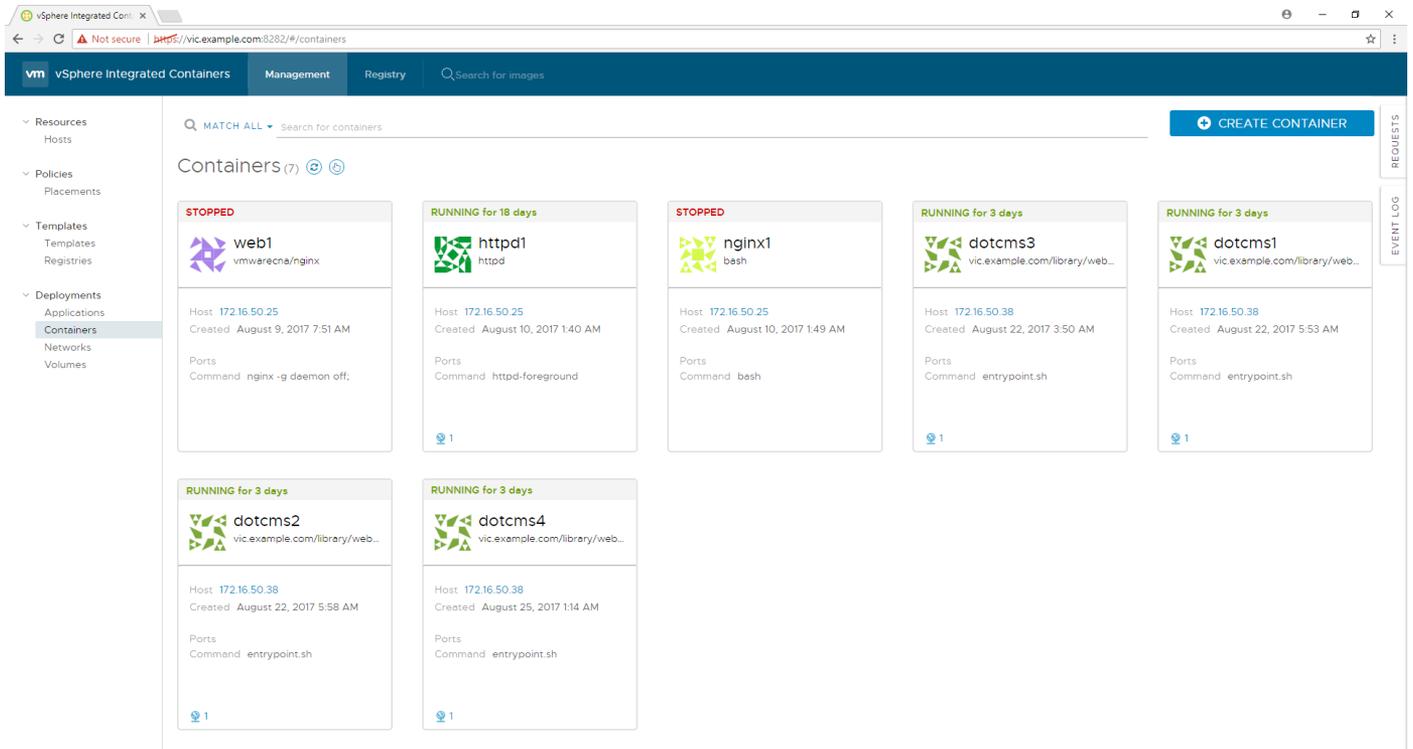


Figure 2. The VMware vSphere Integrated Containers management portal lets admins view and manage containers as easily as VMs

## Configure a Dual VM/Container Ecosystem in Your Data Center

The VMware, Dell EMC, and Intel validated DIY solution provides businesses with a convenient method for deploying an infrastructure that supports both containers and traditional VMs, side-by-side. The solution provides simplified management, with scalability and security. The dual environment helps organizations move toward a more agile microservices architecture because it allows developers to quickly build containerized apps, without the continuous overhead required to create and support traditional apps. At the same time, admins can continue to deploy and support traditional apps and workloads in VMs, as needed. The validated, DIY solution offers the best of both worlds, using one platform and one set of tools.

### Try It Yourself

Engage your Dell EMC account team and the Dell EMC Customer Solutions Centers to test this solution for yourself: <http://dell.com/solutioncenters>.

### Build or Buy?

The VMware, Dell EMC, and Intel validated solution represents one option in a build-to-buy continuum. The solution can be implemented as a tested and verified DIY solution built on a qualified VMware vSAN ReadyNode™ with qualified network infrastructure.

Some businesses might prefer to purchase a solution as a service from a qualified public cloud service provider. Others might prefer a turnkey approach, using Dell EMC™ VxRail™ and Dell EMC™ VxRack™ converged-infrastructure appliances that offer integrated, preconfigured, and pre-tested solutions in a single package.

### Learn More

- Check the **Intel® Builders** web site for the full reference architecture, available September 2017.
- Visit the **VMware** web site for more information on **VMware Cloud Foundation** and **vSphere Integrated Containers** and to learn more about joint **Dell and VMware optimized solutions**.
- Visit the **Dell EMC** web site for more information on **Dell EMC VxRack hyper-converged appliances**.
- Learn more about the **Intel Xeon processor family**, the **Intel SSD Data Center Family**, and the **Intel Ethernet Converged Network Adapter X520** on [intel.com](http://intel.com).

#### Solution Provided By:



<sup>1</sup> VMware. "VMware Cloud Foundation Overview and Bring-Up Guide." 2017. <https://docs.vmware.com/en/VMware-Cloud-Foundation/2.1.3/vcf-21-ovdeploy-guide.pdf>.

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