

# SigmaUptime

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## Tomorrow's Data Center Will Be SOFTWARE-DEFINED

UPTIME

The software-defined data center represents the ultimate transition to an 'IT-as-a-Service' model.

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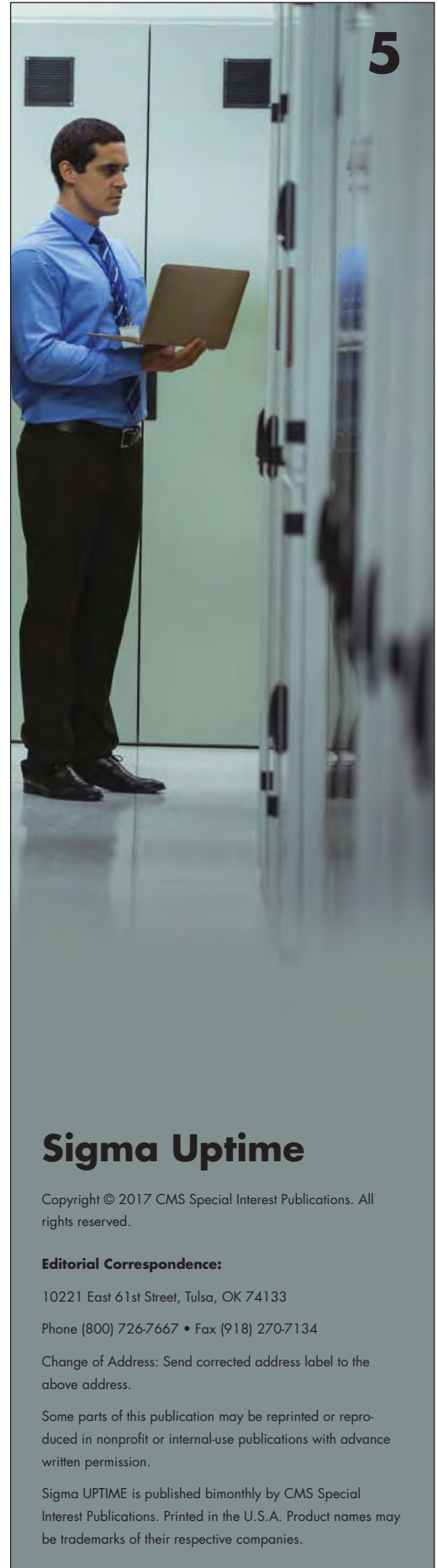
The software-defined data center (SDDC) extends the virtualization principles of abstraction, pooling and automation across all data center resources and services. VMware's SDDC architecture enables companies to evolve beyond outdated, hardware-centric architectures to a platform that is automated and much easier to manage.

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## **Sigma Uptime**

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A man in a blue shirt and dark trousers stands in a server room aisle, holding a folder. The aisle is lined with server racks on both sides, and the lighting is dim, creating a professional and technical atmosphere.

# **TOMORROW'S DATA CENTER WILL BE SOFTWARE-DEFINED**



*The software-defined data center represents the ultimate transition to an 'IT-as-a-Service' model.*

**T**he accelerated pace of business is shifting emphasis from traditional hardware-centric architectures to a “software-defined” model. By delivering IT services through software, organizations can reduce costs while increasing efficiency and flexibility. IT teams can roll out new services faster, with minimal risk, and with less operational overhead. It’s hardly surprising, then, that the global software-defined anything (SDx) market is expected to see a compound annual growth rate of more than 32 percent by 2020, according to research firm TechNavio

The software-defined data center (SDDC) is the ultimate manifestation of the SDx model. Considered the logical evolution of virtualization and the cloud, the SDDC virtualizes the entire data center infrastructure, enabling resources to be provisioned and configured automatically and managed using centralized, policy-based systems.

“The SDDC extends the virtualization principles of abstraction, pooling and automation across all data center resources and services. The resulting efficiencies enable IT organizations to cut CAPEX costs by as much as 49 percent while reducing deployment and provisioning time from days to hours,” said Dan Shauver, Director, Solutions Architecture, Sigma Solutions.

“But cost savings and efficiency are only part of the story. The SDDC forms the foundation of an IT-as-a-Service model, which enables users to provision and deploy applications and services on demand through a self-service platform. Instead of building and maintaining infrastructure, administrators set policies and monitor the environment, changing the role of IT from technology caretaker to strategic partner and provider of business services.”

The term “software-defined data center” was coined in 2012 by VMware CTO Steve Herrod, and VMware has taken a leadership role in the development of SDDC technologies. The company offers a comprehensive portfolio of industry-leading solutions that enable organizations to build more agile data centers and private clouds.

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## The Hyper-Convergence Connection

Server virtualization has helped organizations reduce costs significantly through improved asset utilization and greater IT productivity. As the technology has matured, however, those benefits have plateaued. While virtual machines (VMs) can be spun up in minutes, the data center resources needed to support them typically aren't virtualized, requiring manual, error-prone provisioning.

The SDDC eliminates these bottlenecks by breaking down the barriers between the traditionally siloed domains of compute, networking and storage. Resources are pooled and managed using intelligent, policy-driven automation that minimizes human involvement. The SDDC also enables greater visibility, making it possible for IT to monitor the entire architecture more holistically.

“If you think it sounds a bit like hyper-converged infrastructure — you'd be right,” Shauver said. “Like the SDDC, hyper-convergence integrates compute, software and networking resources with a high level of programmability and automation. In fact, hyper-converged infrastructure solutions such as Dell EMC's VxRail appliance and VMware's vSAN Ready Node software often serve as the basis for SDDC environments.”

But while there is significant overlap between hyper-convergence and SDDC, a true SDDC environment also includes an orchestration layer that accelerates the delivery of applications and services by automatically provisioning network resources as needed. This is done

according to policies, service levels and best practices that have been developed for the entire environment, not individual systems, thereby improving resource utilization, efficiency and scalability.

“The SDDC builds upon the efficiencies of hyper-convergence to create a truly cloud-like environment,” said Shauver. “It reduces complexity and provides unprecedented levels of agility at scale, enabling more sustainable IT operations that are better aligned with the business.”

## Changing the Game

For all its promise, the SDDC comes with significant challenges. Many of the obstacles are cultural — organizations must break down the operational silos between various components of the infrastructure and invest in the skill sets needed to virtualize the entire environment. IT must also define the policies that will drive workload orchestration.

“VMware's software-defined technology provides the fastest onramp to the SDDC,” said Shauver. “By leveraging familiar VMware tools that support existing processes, organizations gain the confidence to transition to a software-defined model and seamlessly extend the data center to the cloud.”

vRealize Suite is a core component of the VMware SDDC. It combines automation, operations and business management tools in an integrated platform that speeds IT delivery while enabling cost-efficiency and control. IT teams can proactively address health, performance and capacity management across heterogeneous environments, and provide self-service access to resources by IT and business users. Intelligent workload placement saves time and enhances application and infrastructure performance.

VMware vRealize works in concert with VMware vSphere with Operations Management, VMware Virtual SAN and VMware NSX. In addition, VMware SDDC Manager provides full-lifecycle management of the entire software stack, reducing the time required to install, configure, manage and update the infrastructure. SDDC Manager is also part of VMware's new Cloud Foundation solution, which provides a consistent platform that maximizes the performance, resiliency, security and manageability benefits of vSphere, Virtual SAN and NSX.

“VMware lets you move at your own pace toward the SDDC, starting with vSphere then virtualizing networking and storage and adding various management components,” Shauver said. “The VMware SDDC can be deployed on-premises as a private cloud or offsite as an Infrastructure-as-a-Service solution. Whatever option you choose, you maintain control of the entire environment through a single management interface.”





## Capitalize on the Software-Defined Data Center

VMware's software-defined approach extends our industry-leading vSphere virtualization beyond compute to network and storage, making data center services as easy and inexpensive to configure and manage as virtual machines. Applications and services can be provisioned and run on both on-premises private clouds and secure infrastructure-as-a-service (IaaS) platforms, with seamless workload mobility across the hybrid environment. You can utilize virtually any hardware, minimizing the need for specialized infrastructure. Contact Sigma to learn more about how VMware's validated designs can help streamline deployments of the software-defined data center.





## How VMware NSX Enables the Software-Defined Data Center

**A**s the ultimate manifestation of the software-defined concept, the software-defined data center (SDDC) fully separates control of the environment from hardware, enabling centralized management and high levels of automation. IT resources are provisioned, configured and allocated based upon predefined policies. Performance and capacity can be scaled on demand to meet the requirements of specific applications and workloads.

Because the network is the backbone of the data center, software-defined networking (SDN) is considered the linchpin of the SDDC. However, SDN is implemented on network switches rather than commodity servers and programmed through a con-

troller. This hardware-oriented architecture can limit agility and lead to vendor lock-in.

“That’s counter to the idea behind the software-defined approach,” said Dan Shauver, Director, Solutions Architecture, Sigma Solutions. “Organizations should not have to make significant investments in hardware to implement SDN.”

VMware NSX is different, Shauver says. It provides greater flexibility and agility than other SDN solutions because it doesn’t require organizations to change the underlying physical network. Organizations can deploy NSX quickly on top of existing hardware and use their existing monitoring tools. With NSX, virtual machines (VMs) and all associated network workloads can be moved seamlessly between data

centers and cloud platforms without disrupting running applications. NSX also automates network security, enforcing policies at the VM level and enabling micro-segmentation to stop threats from spreading.

“VMware NSX shifts control of networking and security functions from hardware to the hypervisor, removing the operational bottlenecks associated with traditional network infrastructure,” Shauver said. “Network provisioning is accelerated from weeks to seconds. Operational efficiency is improved because network devices are configured from a single management console. IT personnel spend significantly less time on repetitive management and maintenance tasks.”

### Software Is Key

These advantages speak to the differences between network virtualization and SDN. Although the two technologies have overlapping components and goals, the concepts behind them are not interchangeable. While network virtualization makes a clean break be-





tween the control of network resources and the underlying hardware, SDN implements programmable hardware to enable provisioning and management.

“VMware NSX applies virtualization principles to physical network infrastructure, creating a shared pool of network resources that can be allocated and used as needed. Hardware is little more than a packet-forwarding mechanism. Network and security policies remain attached to VMs as they move across the virtualized environment,” Shauver said.

“The product is available in two versions — NSX for vSphere and the new NSX-T for non-vSphere environments. Customers adopt NSX for vSphere to gain the benefits of automation, security and application continuity. NSX-T offers an agile, software-defined infrastructure to build out cloud-native application frameworks and architectures that have heterogeneous endpoints and technology stacks.”

VMware recently released NSX for vSphere 6.3, with support for VMware

vSphere 6.5 and enhancements that deliver new levels of operational simplicity, security and scale. New Application Rule Manager and Endpoint Monitoring features provide visibility from OS-level activity to network flows, enabling automated policy and rule updates and making micro-segmentation easier to implement.

In addition, NSX now allows customers to extend a unified virtual network infrastructure with consistent performance security controls to remote endpoints from a central location, enabling enterprises to connect an SDDC to branch locations. Application continuity enhancements deliver consistent and dynamic security policies for customers scaling SDDC environments across multiple data centers and multiple VMware vCenter deployments.

### **Built for the Cloud**

NSX-T extends the capabilities of NSX to OpenStack environments and multiple distributions of the KVM hypervisor, including Red Hat Enterprise

Linux, Ubuntu and Canonical. The product is designed to support customers who have launched open source initiatives or are moving beyond virtualization to cloud-based frameworks. It replaces the NSX Multi-Hypervisor product, which VMware retired in 2014.

“NSX-T is designed for use by development, operations and management teams as well as IT,” said Shauver. “Developers can use OpenStack APIs and various configuration management tools to allocate networking and security resources for application workloads.”

VMware introduced NSX-T 1.1 at the same time it announced NSX for vSphere 6.3. The release provides support for VMware Photon Platform, an enterprise cloud-native infrastructure optimized for containers and modern applications that is purpose-built for use in API-driven, multitenant and high-scale environments. NSX-T 1.1 also supports OpenStack Newton and Mitaka, and includes a new beta program for customers interested in container networking and security for application frameworks that support the Container Network Interface project.

NSX is a cornerstone of VMware’s Cross-Cloud Architecture, and a key component of VMware Cloud Foundation, Cross-Cloud Services and VMware Cloud on AWS. According to VMware’s most recent financial statement, NSX is on pace to reach \$1 billion in sales in the current fiscal year, with more than 2,400 customers using the technology.

“VMware NSX is fundamental to VMware’s strategy to drive network transformation in the industry, delivering networking and security focused on the application independent of the underlying infrastructure,” Shauver said. “It also lies at the core of the SDDC, enabling organizations to maximize agility, flexibility, efficiency and security by reproducing the entire networking environment in software.”

# Enabling the Multi-Cloud Model

*VMware's Cross-Cloud Architecture makes it easy to manage and run multiple cloud platforms in a software-defined data center.*

**N**ot that long ago, organizations were wondering if they should move to the cloud. Today, virtually every organization is using some form of cloud, with the vast majority adopting a multi-cloud strategy.

As the name implies, a multi-cloud model involves the use of more than one cloud service. It's not the same as a hybrid cloud, in which public and private clouds are integrated into a common management framework. Multi-cloud simply means that organizations are implementing multiple cloud platforms and providers to support various infrastructure and application needs.

There are sound business reasons for a multi-cloud strategy. The use of multiple clouds enables organizations to select the cloud service that best meets the requirements of a particular application or workload. In addition, the multi-cloud model can reduce the risk of downtime through redundancy. Organizations can also leverage cloud services in multiple geographies to reduce latency, and meet increasingly stringent data sovereignty requirements of government and industry regulations.

Despite its advantages, a multi-cloud strategy creates management and operational challenges. Although the cloud masks some IT complexity, it does not eliminate the operational burden. Organizations must dedicate time and resources toward learning and managing the cloud platforms they use. Furthermore, a multi-cloud strategy demands a cross-functional team capable of monitoring, optimizing and



securing multiple platforms and tiers across hundreds of applications.

“VMware is addressing these challenges with its Cross-Cloud Architecture, delivered through VMware Cloud Foundation and the vRealize cloud management platform,” said Dan Shauver, Director, Solutions Architecture, Sigma Solutions. “VMware’s Cross-Cloud Architecture enables consistent deployment models, security policies, visibility and governance, regardless of the underlying cloud framework or hardware platform.”

## **Solid Foundation**

VMware Cloud Foundation natively integrates VMware solutions to support cloud flexibility and choice. It combines VMware’s highly scalable hyper-converged software, vSphere and Virtual SAN, with its industry-leading network virtualization platform, NSX, to create enterprise-ready cloud infrastructure. Regardless of whether ap-

plications are run in virtual machines or containers, VMware Cloud Foundation provides a consistent platform that delivers the unique performance, resiliency, security and manageability benefits of VMware technology.

VMware SDDC Manager, a core component of VMware Cloud Foundation, enables organizations to automate the deployment and management of VMware cloud software. SDDC Manager can be used to build and maintain the entire VMware cloud software stack, freeing administrators from the complex and tedious task of installing, configuring, managing and updating cloud infrastructure.

“SDDC Manager makes it possible to build a complete cloud in a matter of hours,” Shauver said. “As a result, customers can dramatically reduce the time required to deploy cloud infra-

structure, and save up to 40 percent on total cost of ownership.”

Organizations have multiple options for deploying Cloud Foundation. For private clouds, customers can procure integrated VxRack Systems from EMC, or combine Cloud Foundation software with qualified VMware Virtual SAN Ready Nodes from Dell, Hewlett Packard Enterprise and QCT.

VMware Cloud Foundation is also available in an “as-a-service” option that delivers the full power of the software-defined data center in a hybrid cloud environment. IBM was the first VMware vCloud Air Network partner to deliver offerings based on VMware Cloud Foundation. VMware Cloud on AWS is currently in technology preview with general availability expected sometime in 2017.

## Freedom and Control

VMware vRealize Suite is a comprehensive platform for managing multi-cloud environments and heterogeneous hybrid clouds. It accelerates IT service delivery, automates many management tasks, and proactively addresses the performance, capacity and overall health of IT services. It also enables IT to better understand the consumption of IT resources and the costs of various infrastructure options.

“In a recent survey, organizations using the cloud said that optimizing costs was their top initiative. However, relatively few companies were taking steps to reduce cloud expenditures, such as shutting down unused workloads or selecting lower-cost services,” said Shauer. “vRealize ensures that end-users get the right applications and resources at the appropriate service level to meet their objectives. It reduces costs through the automation of manual tasks and the reclamation of inactive resources.”

VMware NSX helps organizations overcome the difficulty of integrating cloud services with the existing IT environment and ensuring secure, reliable and scalable access to a multi-cloud

environment. By applying network virtualization to both public and private clouds, organizations can extend secure connectivity across on-premises and off-premises infrastructure while preserving existing network rules.

“Customers are increasingly relying on multiple public and private clouds to run their applications, but are daunted by the challenge of managing and securing applications across diverse cloud platforms,” said Raghu

Raghuram, executive vice president and general manager, Software-Defined Data Center Division, VMware. “When customers combine a best-in-class private cloud with leading public clouds, all enabled by VMware, they have the strongest, most flexible hybrid cloud strategy. VMware is delivering cloud freedom and control by providing a common operating environment for all clouds with our unique Cross-Cloud Architecture.”



**Enable Digital Business Transformation with VMware Cross-Cloud Architecture™**

Organizations are increasingly relying on multiple public and private clouds to run their applications, but managing and securing those apps across diverse cloud platforms creates challenges. The VMware Cross-Cloud Architecture™ provides an easy way to run, manage, connect, and secure apps across clouds and devices in a common operating environment. This means you have the freedom to innovate across clouds.

Contact Sigma to learn how VMware Cross-Cloud Architecture can help you unify your cloud resources.

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