





# Introduction to Software-Defined

Several terms have dominated technology discussions over recent years. Cloud, big data analytics, internet of things, social, and mobile are just a few that come to mind. These technologies have varying definitions and multiple methods of implementation. Software-defined is another term that is being used today, with multiple ways to implement it. Software-defined can apply to the compute, storage, network, and security components of your infrastructure. It can also be implemented systemwide in a software-defined data center (SDDC).

While there is no single accepted industrywide way to implement SDDC, software-defined describes the abstraction of functions and workloads from the physical hardware. The goal is to reduce reliance on the underlying hardware.

The compute portion of the environment was the first to become software-defined. Over the last two decades, organizations have been virtualizing their servers, with Gartner estimating that many organizations have exceeded 75% server virtualization.<sup>1</sup> What will be the next part of the data center to adopt software-defined technology and reach 75% virtualization?

In this eBook, we will explore several areas of software-defined, including a sneak peek at hyperconverged solutions. In each chapter, we will list why the solution is needed, what the solution is, and how you can implement it.

# Software-Defined Storage (SDS)

## Rethinking Storage for Big Data Analytics

New digital sources of information, such as mobile applications, the internet of things (IoT), and social feeds, have triggered a massive explosion of the amount of data being generated by organizations of all sizes. If you are like these organizations, you are looking to extract the maximum value from that data.

Extracting insights from data requires a new approach to storage. In the past, when you needed more storage for an application, you went to your storage vendor and added more disk. Unfortunately, that leaves a lot of your data in silos, making it inaccessible to the rest of the organization. New storage concepts are needed to store, access, and analyze all your data.

## Looks Like a Job for Software-Defined Storage (SDS)

SDS demolishes silos, making data from across your business easier to access and manage. SDS uses software (either running on a server or a dedicated appliance) to virtualize all the storage behind it. The goal of SDS vendors is to provide a single pane of glass to manage your entire storage environment regardless of the hardware manufacturer.

Virtualizing your storage simplifies systems and data management and allows you to pool your storage. You do not need personnel who are trained to use each manufacturer's management tools. You can tier your data to the appropriate storage. Frequently accessed data can reside on high-performance flash storage, while data that is used less frequently can move to slower disks or be archived in the cloud. When storage space isn't hidden in silos, you can achieve much higher utilization rates.

## Getting on Board With SDS

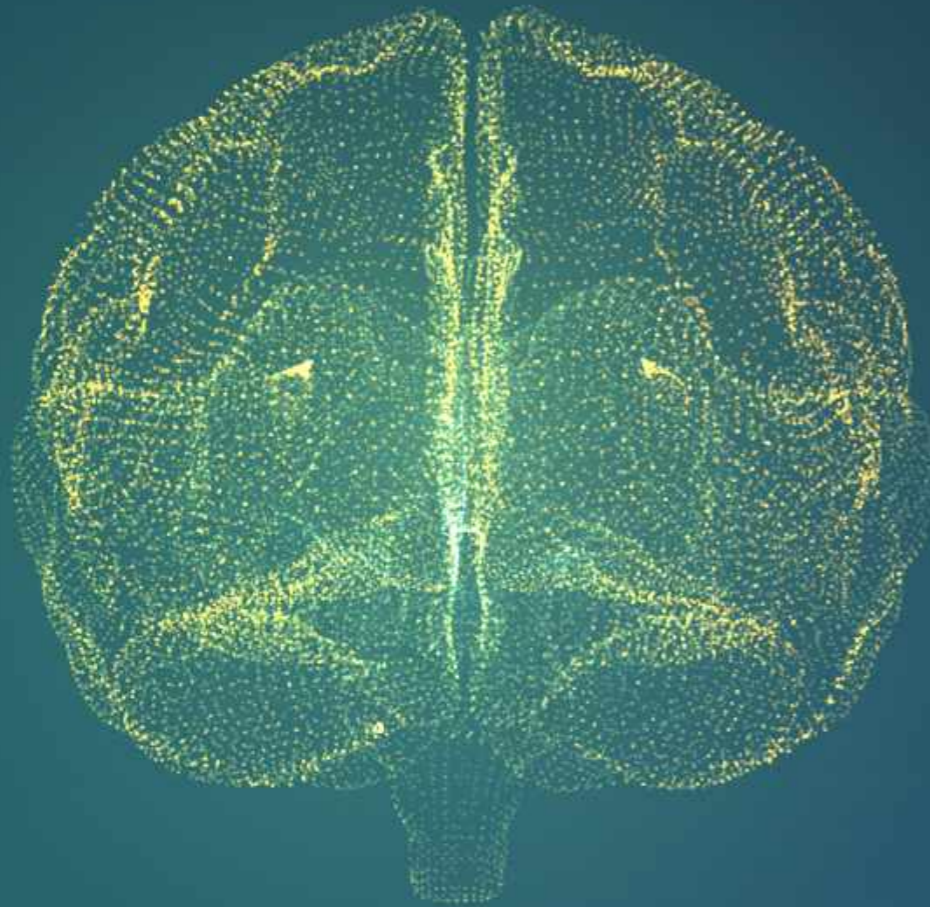
Companies that want to move to SDS have many vendor choices. Traditional hardware manufacturers such as IBM and HP have both hardware and software solutions. Software providers, including VMware, Microsoft, and Citrix, also have options. To select the right solutions, you must understand your environment, business requirements, resiliency needs, and service level demands.

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# Software-Defined Networking (SDN)

# 99.9999%



*Your network is the nervous system of your technology environment and is expected to be up and running beyond 99.9999% of the time.*

## Greater Demands for Availability

Your network functions as the nervous system of your technology environment. To serve the needs of users, your network must be up and running beyond 99.9999% of the time. Traditionally, you configured your network and locked it down. That is why changes to that configuration would give your network administrator panic attacks.

Now that your servers are virtualized, your applications are no longer locked into a physical server. Workloads can move around your network and to the cloud based on compute requirements. As your applications and data move, your network needs to be able to adapt.

## A New Approach to Networking

Software-defined networking (SDN) provides a more agile approach to connecting your company's systems. SDN allows your network engineers and administrators to make changes to the network without having to reprogram individual switches through a console. Instead, they can program the network to respond to changing business needs and automatically adapt to moving workloads while also interacting with public and private clouds.

SDN empowers your administrators to program how your network handles specific traffic. VoIP, for example, can be prioritized easily, and multiple pathways can be defined to ensure the highest quality of service (QoS).

SDN goes even further than directing traffic. Functions that have been traditionally handled by a firewall, an intrusion protection system (IPS), or a load balancer can now be deployed as applications directly in the network controller. This improves functionality and responds better to the needs of today's networks.

## Finding an SDN Solution to Meet Your Needs

The SDN market is healthy, providing many options for your business to choose from. There are many open source solutions led by the Open Networking Foundation.<sup>2</sup> VMware has brought NSX to market.<sup>3</sup> Cisco has delivered Application Centric Infrastructure (ACI).<sup>4</sup> While Cisco's solution is software-based, built-in application-specific integrated circuits (ASICs) can handle special processing of the software layer. These solutions can also enable microsegmentation and help you prepare for IoT management.

# Software-Defined Security

## Facing Increasing Risk

Cyberattacks continue to increase in frequency and severity. It seems a story about a major data breach breaks every week. We all know that cybercrime is not limited to the large organizations that make the news. Every business is a potential target. A recent study by the Ponemon Institute stated that 26% of midsized organizations will suffer a significant data breach within the next 24 months.<sup>5</sup>

As technology evolves, it creates new opportunities for hackers. Applications and data now move between physical servers, the cloud, and storage subsystems. This enables excellent agility and limitless flexibility. It also renders traditional cybersecurity solutions incomplete. You can no longer lock up your applications and data behind a firewall and truly be secure.

## Enabling Agile Security

In today's risk landscape, security needs to move outside the perimeter. Software-defined security (SDSec) takes security services that were once managed by individual boxes like firewalls or IPS and moves them into the network itself. This creates a tight link between SDN and SDDP. As workloads and

applications move dynamically around your network and into the cloud, security must move with it.

Technology experts recognize the need to rethink approaches to security. Neil MacDonald, VP and distinguished analyst with Gartner, says, "Information security infrastructure is too rigid and static to support the rapidly changing needs of digital business or to provide effective protection in a rapidly changing threat environment."<sup>6</sup> He goes on to say, "Enterprises must evolve information security to support increasingly dynamic and adaptive data centers."

## Get Smart With Security

Companies must become more proactive to stay ahead of hackers. Security needs to follow the user, not the device. It also must be intelligent enough to adapt to evolving threats. Focusing on the user requires a software approach that manages identity and access management. IBM, for example, takes a cognitive approach to SDDP. It uses artificial-intelligence from its Watson project to identify vulnerabilities and suspicious behavior and then remediates the risks automatically.<sup>7</sup>

# 26%

*26% of midsized organizations will suffer a significant data breach within the next 24 months.*

# Software-Defined Data Center (SDDC)

Transitioning to  
a virtualized  
environment improves:



**Flexibility**



**Agility**

## Managing Increasingly Complex Data Centers

Transitioning to a virtualized environment improves flexibility and agility. To take full advantage of that flexibility, you will need intelligent systems that can manage your entire environment. Your infrastructure becomes fluid, which creates tens of thousands of possible system configurations and variations.

As you transition to a virtualized environment, countless changes will take place in your environment. These changes occur faster than a human can respond to them. It takes intelligent systems to keep your software-defined infrastructure running.

## Software-Defined Data Center for Virtualization and the Cloud

The software-defined data center (SDDC) is the holy grail of virtualization and automation. Your servers, network, storage, and security are virtualized. A business logic

layer is added to manage applications, system policies, and resource utilization.

SDDC can take your hybrid cloud environment to new heights without breaking the bank. With SDDC, you can evaluate the price of resources on-premises, in a private cloud, or in a public cloud to utilize the most cost-effective solution. Your SDDC orchestration software can then enable you to bill-back IT to business units, partners, or clients. SDDC allows you to truly deliver IT-as-a-service (ITaaS).

## Starting the SDDC Journey

SDDC brings together all the technologies that we have talked about, including software-defined storage, network, and security. There is no instant approach to SDDC. It is a journey that needs to be considered with all new technology investments. There are also multiple partners. As with server virtualization, VMware is a leader in SDDC.<sup>8</sup>

# Hyperconverged Infrastructure

## The Need to Scale

Organizations from every industry turn to technology to differentiate themselves from competitors. If you are like many IT departments, you are feeling pressure from the business to rapidly deploy applications. And now many of these new applications are mission-critical.

To meet the demands of today's advanced applications, you need an infrastructure that combines flexibility with stability and predictability. Your architecture must be designed to run high-performance applications in a Linux or Windows environment. As the application grows, the underlying infrastructure needs to be able to rapidly scale to meet demand.

## The Whole Package

Hyperconverged Infrastructure (HCI) provides a software-centric architecture that tightly integrates compute, network, storage, and virtualization through a single vendor. All the components are designed to work together, eliminating incompatibility issues

and the need for complex configurations. This means that HCI systems can deploy rapidly and scale quickly.


HCI makes data management and upgrades easy. Most solutions include built-in functionality such as data deduplication and compression. When you upgrade one node, the change will propagate across all the nodes in the system.

## Eliminating Overprovisioning

HCI may not be right for every application or workload, but it provides a scalable environment appropriate for many use cases. For instance, virtualized workloads make an ideal fit for HCI.

Getting started with HCI is simple. You purchase a couple of nodes for what you need today, not how many you anticipate needing five years from now. As the needs grow, you add more nodes. These nodes auto-scale and auto-balance the workload. Most systems can scale from three to five nodes up to thousands. And as you add nodes, the performance increases instead of declining.

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# Where to Go From Here?

Technology experts predict that SDDC is the future of IT architecture. Gartner believes that SDDC is critical to the long-term evolution of an agile digital business. “Infrastructure and operations (I&O) leaders need to understand the business case, best use cases, and risks of an SDDC,” said Dave Russell, vice president and distinguished analyst at Gartner. “Due to its current immaturity, the SDDC is most appropriate for visionary organizations with advanced expertise in I&O engineering and architecture.”<sup>9</sup>

While every company would like to be at the forefront of change, moving to SDDC will take most organizations years. Typically, it does not make sense to ‘rip and replace’ your entire environment. Unless you are in a unique situation where you are building a new data center from the ground up, your transition to software-defined will happen in stages.

The timeline and nature of these stages are dictated by your specific business needs. If you need to add storage, you should evaluate an SDS solution to cut costs, improve utilization, and simplify management. If you currently have a security initiative, you should investigate SDSec options.

The process of transitioning to SDDC begins with a road map. Building a road map starts with a thorough evaluation of your current infrastructure and where the business is heading. There are no make-or-break rules when it comes to software-defined. Establishing a game plan based on where you are today with a well-defined strategy of tomorrow is the key to achieving improved agility and flexibility.



**Don't go at it alone. Contact the software-defined and virtualization experts at ProActive Solutions today to schedule a no-cost Data Center Transformation Workshop.**



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