



**SOFTWARE-
DEFINED STORAGE
AND CONVERGENCE:
IMPACTING YOUR DATA CENTER,
NETWORK AND BUSINESS**

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Abstract:

New virtual services are sweeping the modern data center and are exciting data center administrators. Just imagine – having the ability to abstract vast amounts of resources and manage heterogeneous environments all from one logical controller. New infrastructure components no longer care what type of hardware you're using – it cares about how you are presenting resources. Software-defined technologies have come quite a long way. These logical systems are capable of introducing amazing optimizations for the data center platform as well as your business model.

Today, software-defined storage (SDS) is a very real concept and technology. There are a number of solutions now allowing you to completely abstract storage resource and point them to a virtual layer. You can deploy powerful SDS solutions, which pool resources and allow you to create a persistent storage tier at the hypervisor layer. Coupled with SDS architecture, hyperconverged infrastructure (HCI) aims to leverage the power of software-defined technologies to help redefine the data center.

In this whitepaper, we explore the evolution of software-defined systems – while focusing on the power of software-defined storage. Furthermore, we'll explore how to prepare your infrastructure for SDS, how HCI impacts software-defined technologies, systems that are already designed for software-defined architecture, and how this can positively impact your business!

Introduction:

Software-defined technology is much more than just an IT buzz term. It's a new way to control resources on a truly distributed plane. The ability to abstract powerful physical components into logical services and features can help a cloud platform scale and become more robust. It also allows the data center to control key resources more efficiently. One of those resources that was beginning to sprawl physically quite a bit was storage. Storage admins would have to buy bigger controllers, more disks and additional shelves just to keep up with modern data and cloud demands. *Something had to give.*

As new applications require cloud delivery or deployment, the demand for storing data in the cloud is increasing. This requires a new approach to managing data with a layer of software on top of existing storage hardware to drive innovation. Industry analyst firm [Gartner predicts](#) that by 2019, 70 percent of existing storage array products will also be available as "software only" versions. And, by 2020, between 70 percent and 80 percent of unstructured data will be held on lower-cost storage managed by software-defined storage environments.

This is where next-gen software-defined storage technologies start to help – a lot. We're not talking about eliminating physical storage – just making it smarter! The cloud storage platform needs to be extremely agile. With that in mind, the storage infrastructure supporting a truly distributed environment needs to be agile as well. So, what is the software-defined storage revolution doing to the cloud storage model? What are the use-cases that support SDS and what does it help optimize? Most of all, how do you prepare your network, data center and business for the power of SDS?

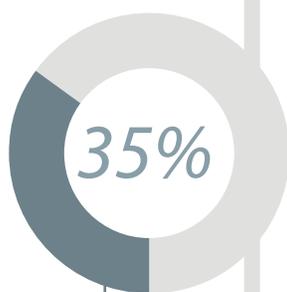
Part 1: Software-Defined Solutions Lead to Powerful Convergence Technologies

Our ability to abstract the hardware layer has created even more capability within the modern data center. This is truly evident in the evolution of hyperconverged infrastructure (HCI). When you combine technologies like software-defined storage, HCI becomes a powerful platform delivering real business and IT capabilities. With built-in automation, high-density architecture, and high-performance chassis, converged systems help architect a very robust cloud and storage environment. The idea is to create unparalleled density and allow for resources to be delivered as effectively as possible. Furthermore, industry trends show that the pace of converged systems adoption will only continue to grow. According to a recent [Gartner report](#), hyper-converged integrated systems will represent over 35% of total integrated system market revenue by 2019.

Let me give you an example – in a recent Dell EMC Survey looking at the most modern Data Center Trends, we see exactly why so many organizations are deploying hyperconverged and converged infrastructure systems. The number #1 response for HCI, for example, was to help reduce overall data center space, with 55% of respondents indicating this is their main concern. From there, another 30% are hoping for both better density for virtualization as well as reduced deployment risk.

So – why is all of this adoption actually happening? It's important to note that these aren't just new types of software and hardware solutions. Rather, these are business technologies helping shape the data center and organizational goals. When you leverage technologies like SDS and HCI, you create powerful competitive advantages. Consider these three big points:

- **Enabling Greater Amounts of Density.** A great way to create better ROI and reduce space is to efficiently place more users on less gear. HCI gives users this option by combining key resources into one management plane. With converged infrastructure, you create a mechanism that can host apps, desktops, and a variety of other related use-cases. This means you can support more users while still reducing your overall data center footprint. In working with CI, you're not just placing more users onto an infrastructure. With VDI and virtualization, you're removing legacy end-points and providing even better user experiences than before. Today's CI architectures combine best-of-breed systems to handle more users, while still optimizing user experiences.
- **Reducing Deployment Risk and Size.** HCI and SDS are deployed in pre-validated blocks of architecture, which are referenced and tested to work with a variety of deployment scenarios. This means that organizations are working with technologies that have been tested and verified to work in their specific use-case. This helps reduce deployment complexity, significantly lowers the risk of making a mistake, and ensuring that the piece of architecture you have not only deploys properly – but can also scale. Risk is the factor that often slows down critical deployments or puts the brakes on great IT projects. With HCI, you mitigate that risk with validated designs for your *specific* IT and business needs. This means the environment is sized, configured, and oftentimes validated before it even goes in your ecosystem.
- **Creating Smarter Storage.** Work smarter, not harder – right? That's the message to storage vendors out there. Instead of provisioning additional physical resources, how can we make what we have work better? Software-defined storage is designed to intelligently pass data traffic to appropriate pools, shares and aggregates. Consider this, through a smarter storage platform you have the ability to control all storage components from a virtual SDS controller. This gives you the ability to create a directly extensible storage infrastructure. With a virtual storage controller layer – utilizing SDS – you're able to aggregate your storage environment and then distribute it from data center to cloud. Ultimately, SDS platforms won't care which



hyper-converged integrated systems will represent over 35% of total integrated system market revenue by 2019.

Source: Gartner

Remember, the idea isn't only to create a "converged" architecture; you're also trying to create an environment that's easier to manage and is built around intelligence.



hypervisor you're using or which physical controllers you have. They'll only want to be presented the appropriate resources. From there, the VMs will be able to communicate with one another while still living on heterogeneous platforms.

- **Software-Defined Storage and HCI Help Redefine Data Center Management.** The best way to really understand HCI and SDS is to see the bigger picture. Today, you might have several storage and compute silos. The direct combination of software-defined technologies and converged architecture aims to remove those silos both within the data center and within your cloud. HCI allows you to deploy a number of new kinds of storage and compute models. If you have an older array of disks, you can point them to the hyper-convergence controller to give new life to these storage repositories. In fact, you can point enterprise features to older disk and storage arrays that still have useful life in them. Another big point is the amount of control you now have around the physical media within your environment. Traditional disks, hybrid arrays, and all-flash arrays can all be controlled and optimized through a hyperconverged architecture. At this point, you can create intelligent policies that can dynamically allocate workloads to appropriate disks. This can be assigned to applications, databases, backup operations, cloud extensions and more. Remember, the idea isn't only to create a "converged" architecture; you're also trying to create an environment that's easier to manage and is built around intelligence.

With all of this in mind, it's pretty clear that software-defined solutions, when coupled with powerful converged platforms, can create a next-generation data center ecosystem. But how do you know if you're actually ready for this type of model? What can you, your data center, and your business do to better prepare for an HCI ecosystem powerful by SDS?

Preparing for this type of architecture doesn't have to be a painstaking process. In fact, there are some great best practices to follow when you begin to analyze the design of your data center, and begin to understand where SDS and HCI really fit in.



Part 2: Preparing Your Data Center, Network, and Business for SDS

Remember, deployment is only step 1 of the process. Getting real-world business value from the technology can sometimes be a bit more challenging. This is why when deploying software-defined systems and converged infrastructure, planning and preparedness is critical. When putting a HCI and SDS technology into your data center, there are a few considerations to factor in and best practices to follow.



Measure twice; cut once. When working with converged infrastructure, always make sure to size your environment properly.

- **Capacity planning and sizing is critical.** Measure twice; cut once. When working with converged infrastructure, always make sure to size your environment properly. What are you deploying? Are these heavy applications or light weight web portals? Are you supporting virtualization with high levels of user density or are you running databases supporting business functions? Each scenario will dictate specific requirements.
- **Create good monitoring/management practices.** There are a lot of great ways to monitor and control your hyperconverged infrastructure ecosystem. Outside of native tools, you can also integrate with hypervisor technologies to increase visibility into the workloads living on the HCI system. Keeping your CI architecture healthy means creating proactive monitoring and alerting. Make sure to catch problems before they become major issues.
- **Plan for the future from day 1.** Deployed as building blocks – HCI is fairly easy to expand as business requirements evolve. Still, this needs to be planned around and budgeted. If you deploy a system that is quickly outgrown by the business, you're going to have a negative impact on the organization; especially when upgrades aren't planned for. Make sure you plan for growth and are deploying a HCI architecture that *can* support your business.

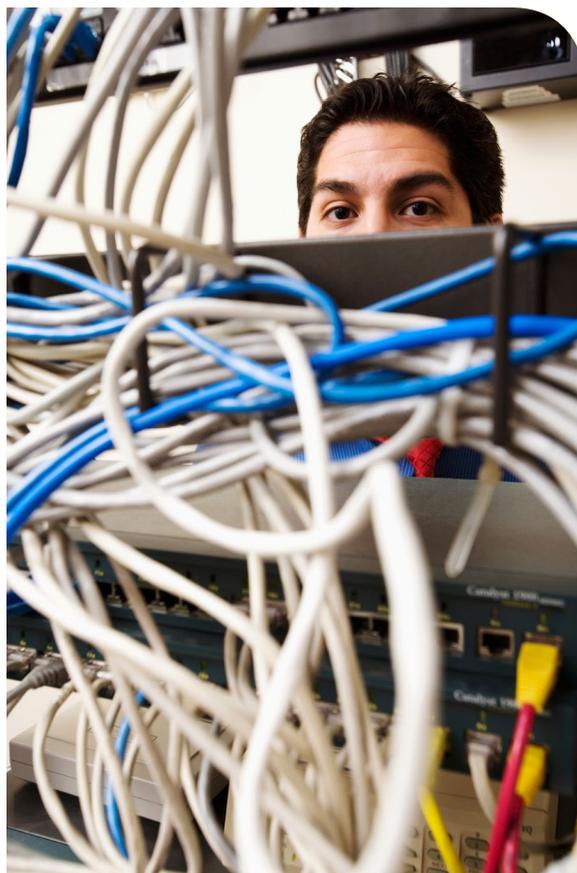


Preparing your Data Center

New types of hyperconverged systems coupled with software-defined storage controls are helping define the next-generation data center. Organizations looking to create cloud-scale ecosystems must look to convergence to help them evolve. These kinds of systems help manage resources, reduce IT costs, and help create real competitive advantages for the business.

To that extent, here are some things to keep in mind when preparing your data center for these types of technologies.

- **Analyze your entire data center – hardware and software.** A critical planning point to prepare yourself for HCI and SDS is to analyze what you have already. When you deploy software-defined technologies coupled with hyperconverged solutions, you enable greater levels of consolidation, support for virtual technologies, and help deliver apps and data much faster. So, if you need to consolidate applications or core workloads, now is the time to identify this. Furthermore, a deep understanding of your data center will allow you to deploy efficiencies at all levels.
- **Look for legacy components you can remove.** If you have older networking, compute, or storage gear, now is the time to ask if these technologies are actually still bringing value to your business. Remember, legacy gear can slow down processes, not be compatible with newer technologies, and can be much costlier to maintain. A big challenge for many organizations is the removal of legacy gear. When you design around SDS and HCI, you have the ability to consolidate workloads, reduce your overall data center footprint, and support evolving business initiatives. However, if you deploy SDS and HCI, but still have legacy networking – for example – you'll potentially run into some serious bottlenecks when it comes to performance. Remember, throughput is critical for HCI as it'll be processing apps, data, and user requests. Ensure that your data center architecture can support new initiatives with these types of systems.
- **Prepare your business case.** Business and data center technologies go hand-in-hand. To that extent, garnering corporate sponsorship not only helps align with IT, it also helps build great business use-cases. Remember, with HCI and SDS, you help your business create faster go-to-market strategies, provision users and apps very quickly, and you help support an ever-evolving business model. When you prepare your business for a new type of infrastructure, make sure business leaders understand the real-world value of this technology. Ensure that they don't just see it as another piece of hardware. Rather, this is a direct part of the entire business engine.



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Part 3: Putting It All Together – Leveraging Real-World SDS and HCI-Ready Technologies

SDS has become a very interesting approach to controlling the storage layer. Much like servers and desktops, storage has experienced a physical infrastructure boom. As a result, new ways to manage storage ecosystems were required. With that came the concept of software-defined storage. This is a virtual layer that sits in front of all storage components to control and distribute incoming requests to the appropriate storage pool. Virtual storage controllers (also known as software-defined storage controllers), for example, create that virtual layer where any storage controller can be inserted into the pool. With that, you can point DAS, Flash, SSD, spinning disk, and even RAM as a storage pool repository to the SDS controller. From there, the software-defined storage system will intelligently push appropriate traffic to the appropriate pool.

The great part here is that you don't have to start from scratch. There already are *Ready Nodes*, which are designed to support business applications. For example:

- **vSAN ReadyNodes.** The vSAN ReadyNode provides the most flexible hardware options to build hyperconverged infrastructure based on VMware HCI software. Selecting a vSAN ReadyNode is simple. Choose the vSAN version you want to deploy, pick a ReadyNode profile based on your specific needs and then pick one of the available models. After that, maximize choice while reducing project risk and increase storage efficiency of your software defined storage. These validated configurations combine wide-ranging Dell EMC hardware with VMware vSAN software into a ready-to-order package. Furthermore, they help speed your time-to-value and allow you to create the perfect configuration for your workloads. As needs grow, you can use vSAN ReadyNodes to scale with the Ready Bundle for Virtualization, a VMware Validated Design for SDDC.
- **SAP HANA Ready Nodes.** These Ready Nodes make for an easy-to-scale solution that can provide advanced predictive analytics. Furthermore, you'll be able to leverage multiple configurations tuned to use case/need, real time response from in-memory database, and single system analytics, performance management and operations. When it's time to scale out, you can leverage what you have in the the Ready Bundle for SAP HANA Scale-out.
- **Microsoft Storage Spaces Direct Ready Nodes.** Dell EMC Microsoft Storage Spaces Direct Ready Nodes are pre-configured with certified components and validated building blocks that simplify ordering and reduce deployment risks while providing a superb customer support experience. Dell EMC Microsoft Storage Spaces Direct Ready Nodes are built on Dell EMC PowerEdge R730xd/R740xd Servers, which provide the storage density and compute power to maximize the benefits of Storage Spaces Direct and the advanced feature sets in Windows Server 2016. And, you'll get a single point of contact for sales and technical support for the entire solution.
- **ScaleIO Ready Nodes.** Dell EMC ScaleIO Ready Nodes combine robust Dell EMC PowerEdge servers powered by *Intel Xeon processors* and the software-defined block storage capabilities of ScaleIO to deliver endless server SAN possibilities. Here's why this is important: Not only are you working with next-generation software-defined systems, you're also working with all-new Intel Xeon Scalable processors. These new Intel chips are workload-optimized to support hybrid cloud infrastructure and the most high-demand applications. Plus, you can drive actionable insight, count on hardware-based security, and deploy dynamic service delivery that's built into the Dell EMC ScaleIO Ready Nodes. From there, offering All-Flash and Hybrid configurations, the ScaleIO Ready Node is pre-validated, tested and configured to provide the best performance possible – with single-vendor support. With this architecture, you can meet your business

*Dell EMC
Microsoft
Storage
Spaces Direct
Ready Nodes
are pre-
configured
with certified
components
and validated
building
blocks that
simplify
ordering
and reduce
deployment
risks while
providing
a superb
customer
support
experience.*

When you begin to put network, storage and compute all together on a virtual plane, you begin to truly see just how far you'll be able to take your own data center platform

objectives while simplifying the process of procuring and deploying a server SAN—all from the leader in SDS! When you're ready, you can scale into Dell EMC VxRack FLEX.

Just like any other physical component in your infrastructure, the virtual layer can really help optimize utilization and resource consumption. Server virtualization helped with server sprawl, application virtualization helped with new types of virtual application delivery methodologies, and now virtual storage technologies are helping control your heterogeneous storage infrastructure. The future cloud and data center model clearly indicate growth in the amount of data that will pass through your infrastructure. With that in mind, take a look at how software-defined technologies can help you optimize your existing resources to better deliver next-generation services.

Conclusion:

Here's the reality – there's no one recipe to become a software-defined data center. Bits and pieces of virtual services and code can be deployed in unison or separately to achieve optimal data center performance. Many organizations are taking the equivalent of a leisurely stroll during their path to a more logically controlled data center. The beauty here is that these technologies allow traditional data center technologies to live in parallel with next-generation SDDC platforms. In some cases, it's smart to start with storage or just networking. Identify specific points of need within your organization and begin to apply SDDC technologies. You'll quickly notice that management becomes simplified and you suddenly regain control over quite a few resources. Furthermore, with software-defined technologies and hyperconverged infrastructure, you're able to interconnect with various cloud models a lot easier.

Data center technologies will continue to evolve as hardware and software platforms become more interconnected. The logical aspect of the data center allows modern organizations to truly span their environments and connect with a variety of cloud resources. It's no wonder that the hybrid cloud model is becoming so prevalent. New services allow for the powerful expansion of private data centers directly into the cloud model. All of this is done at the virtual control layer. When you begin to put network, **storage** and compute all together on a virtual plane, you begin to truly see just how far you'll be able to take your own data center platform. ●

