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How the  
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# Building the Future of the Desktop on the Software-Defined Data Center

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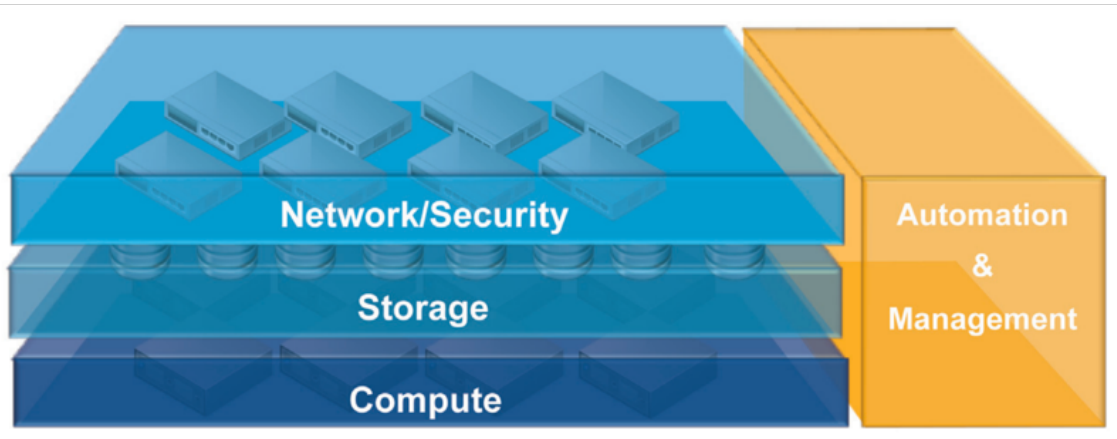
When considering the software-defined data center (SDDC), think of the dynamics of a free and open market. For example, financial markets work on supply and demand. Changes happen rapidly and are dynamic, if not unpredictable. Fortunes are won or lost on the basis of being able to react to opportunity faster than one's competition. IT is increasingly facing similar challenges to embrace the notion of service elasticity to better respond to changing business demand without overprovisioning capacity and wasting CAPEX while incurring minimal OPEX to manage it all. This notion is a core tenet of the SDDC, which is by nature efficient, agile, and dynamic and that's exactly the kind of underpinning needed for any successful desktop transformation initiative.

## What Is the SDDC?

Past (and many current) IT platforms were, or are, closed silos of resource inefficiency. Enterprises demanded greater efficiency, flexibility, agility, and value from their IT investments, which led to the transformation of the data center to a software-defined alternative.

As discussed in the first article, the SDDC offers many benefits over the hardware-defined data center (HDDC), its aging predecessor. The SDDC eliminates management complexity and allows enterprises to transform to a model where they can abstract IT functions such as deployment, provisioning, configuration, and hardware operations and instead use the power, versatility, and scale of software and virtualization. Enterprises embrace SDDC in an effort to make IT more agile, scalable, and cost efficient while eliminating the traditional constraints that have tethered enterprises in the form of hardware lock-in.

Of course, the SDDC still requires hardware, but that hardware can be just about any x86 industry-standard server, filled with the CPU, memory, and storage capacity (many times it's flash storage) specified in alignment with the expected workload characteristics, in this case, desktop virtual machine profiles (see Figure 2.1).



**Figure 2.1: SDDC**

## **SDDC Focuses on Business Outcomes**

Traditional IT usually gets caught up in purchasing, maintaining, and managing technology for the sake of technology. We in IT love technology but what we all too often do is lose track of the needs of the business and the business outcomes that we are there to provide. The SDDC is application-focused and all about business outcomes. What is a business outcome?

An example of a business outcome is to deliver revenue growth through better agility and responsiveness to market conditions or demands. Consider a retailer that needs to improve customer order management and service functions in response to seasonal demand spikes. Their need for virtual desktop capacity scaling in response to increased traffic between November 1st and December 25th, or in proximity to a major marketing campaign, is a proof point of where the SDDC can provide cloud-like service elasticity. The organization can rapidly reallocate resources, and provision virtual desktops in minutes, for customer service managers. When demand subsides, the SDDC can reallocate those resources to other workloads.

## **Application-Centricity**

IT needs to focus on business outcome and, in many ways, the best way to do so in the data center is to focus on applications and the business roles that use them. The SDDC enables a focus on applications because of the SDDC's policy-based management. With the SDDC, role- and application-based policies can be created; those policies can then be assigned and the underlying storage and network will immediately adapt to accommodate them.

Then, for example, if an application suddenly needs a higher quality of storage, more storage I/O, or greater storage redundancy protection, the underlying infrastructure will immediately adapt to those configurations. The SDDC management tools and automation systems are also application-focused, allowing you to manage applications in the same manner.

## **SDDC: One Destination, Three Ways to Get There**

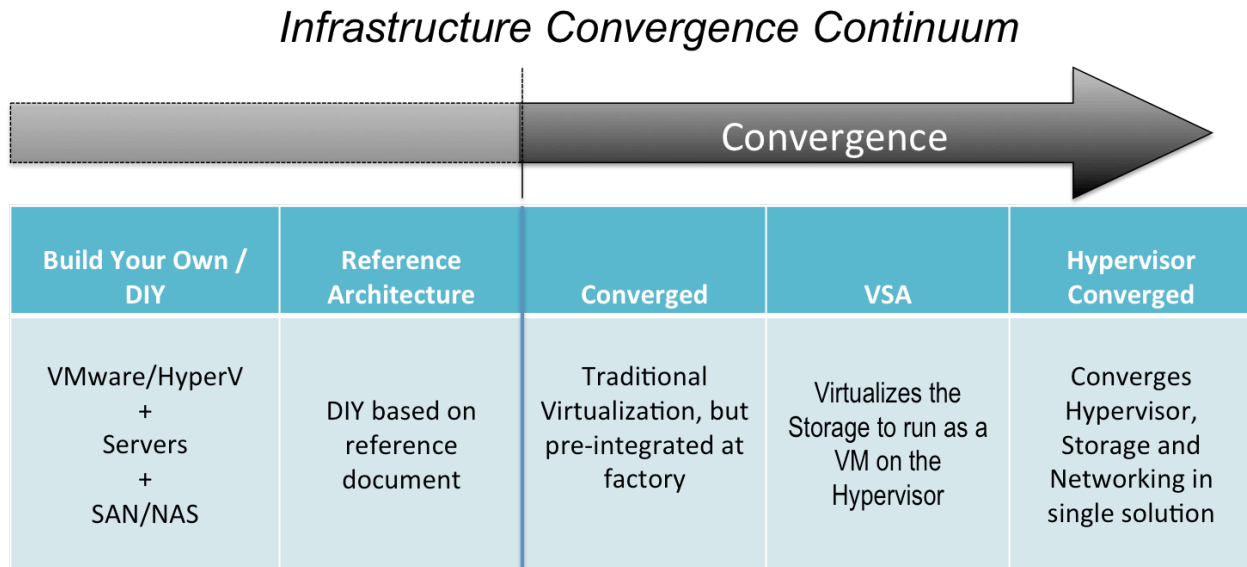
Unlike monolithic data center systems of the past, the SDDC design offers great flexibility in how it can be implemented. The SDDC doesn't have to be purchased from a single vendor with prescribed hardware and software. The SDDC can be fulfilled in one of three ways: do it yourself (DIY), converged, and hyperconverged infrastructure (HCI).

### **Open Systems or DIY**

You can create your own SDDC with your own hardware, virtualization software, management software, and automation software all layered on top. With the vast majority of enterprises out there having already virtualized their servers, most enterprises are already roughly halfway complete with building an SDDC without even realizing it. For those companies that already have the server hardware and virtualization infrastructure in place, they need only to add SDDC management and automation layers on top. Optionally, these enterprises could use hyperconverged storage and compute, and they could use network virtualization to converge the compute and network (which the next article talks about in more detail). The challenge here is that an organization must have the design and operations disciplines in place to be able to deploy the right architecture. Although many organizations aspire to SDDC, the implied complexity often drives CapEx and OpEx higher than expected, at the outset.

### **Converged Infrastructure**

Converged infrastructure offers a modular approach to procuring and deploying infrastructure, offering simplification to organizations that want a faster path to the SDDC, or those who don't have the in-house design or operations skills. These solutions typically come from a single vendor, and are supported with a single phone call to that vendor. Good examples include NetApp FlexPod or VCE Vblock. In this model, a large rack containing servers, storage, network, hypervisor, and SDDC management/automation software is delivered to the customer data center with the hardware design completed and pre-sized (see Figure 2.2). The virtualization layer, centralized management, SDDC management, and SDDC automation software is also already preconfigured. Typically, converged infrastructure solutions come in large to very large step sizes and have traditionally been only for large enterprises or service providers.



**Figure 2.2: The Infrastructure Convergence Continuum (Source: <http://blog.scalecomputing.com/wp-content/uploads/2014/04/Untitled.png>)**

### Hyperconverged Infrastructure

Similar in many concepts to converged infrastructure, HCI typically offers single vendor support and is sold, in many cases, via a single SKU per node (which contains compute and storage). The difference is that with hyperconvergence the server host’s storage (disk and flash) is virtualized and pooled across the cluster of hosts, abstracted as one large datastore for all workloads running on HCI nodes. The result is elimination of the traditional monolithic storage array (see Figure 2.3).

Also part of hyperconvergence is policy-based management of the storage layer, which allows administrators to manage their storage on a per-virtual machine basis (or even per application if there is one application per virtual machine) and dynamically change the storage attributes on the fly. Hyperconverged storage is managed as a single large pool of storage in contrast to the traditional “per-LUN” management paradigm.

Hyperconverged can also include network virtualization or software-defined networking (SDN) capability integrated into the platform’s hypervisor.



**Figure 2.3: HCI Example: VMware EVO:RAIL/EVO SDDC**

In addition to the collapse of the storage layer into compute, hyperconverged systems can provide advanced storage data services. In many cases, hyperconverged solutions leverage disk/flash hybrids or all-flash configurations to deliver the price to performance ratio an environment requires.

## How the SDDC Is Changing the Data Center

So how exactly has the SDDC been transforming data centers around the world? The SDDC has:

- Increased data center management efficiency, allowing enterprises to better focus on technology that will make a real difference to a company's bottom line and competitiveness
- Made data centers more agile, allowing companies to roll out new services and new applications faster than ever before and, typically, faster than their competition, resulting in a competitive advantage



- Made data centers more automated, allowing companies to provide self-service to power users and application owners and allowing administrators to spend more time doing smarter tasks instead of “busy work”
- Given enterprises a foundation for their jump to the hybrid cloud
- Lowered IT costs, resulting in either decreased IT budgets or a redirection of IT budget to services that truly have a positive impact on the bottom line

## SDDC and the Cloud

Companies that think that they are interested in “moving to the cloud” should take a step back and first ask themselves, why? Typically, the answer is so that they can:

- Lower IT costs
- Be more agile
- Be more efficient
- Deliver to the business the applications they need without spending so much of their time and budget worrying about the infrastructure

For those companies, the SDDC is possibly a more tenable starting point. For those who are not ready to place both feet in the cloud just yet, the SDDC provides many of the same attributes of the public cloud without giving up all the control to an outside company. The move to the public cloud has associated concerns around cost (what will it cost?), security (where is my data and is it secure?), and control/SLA (who do I call when things don’t work?).

In addition, once you adopt the SDDC vision, there is no reason the public cloud still can’t be a part of it for certain applications, as a kind of hybridized approach. For example, say that your development manager needs to deploy a new test environment based on production. Using the SDDC, the existing environment could be cloned to a public cloud and be up in running in minutes or hours while still being under the management, monitoring, and automation umbrella of the SDDC.

## Summary

It’s said that, in traditional IT departments, 80% of the budget is spent “just keeping the infrastructure running” and 20% (sometimes less) is spent on innovation. The SDDC vision gets more and more innovative every day, but today’s incarnation is mature, being used by many companies already, and is where smart companies should be investing time and energy so that they can soon move to the SDDC and reverse the traditional budget paradigm. Doing so will allow them to allocate 80% of the budget to innovation and 20% to data center maintenance. The next article will explore three focal points of SDDC investment that can improve any desktop virtualization deployment.