

BENEFITS OF THE SOFTWARE DEFINED DATA CENTER

THE GREAT LIBERATION IS COMING

The IT data center finds itself at a decisive nexus in its lifecycle and if you want an illustration of what this important junction is all about, just check out the Google self-driving car. As Americans, we love our cars. Every year, the new models released by the automobile companies capture our attention. They also consume a lot of our time and resources because they don't drive themselves. In this high productivity driven world of extreme multitasking, our lives pretty much come to a halt once we get behind the wheel. Those who contend with long commutes on a daily basis must deal with an inherent disadvantage compared to those who enjoy the luxury of spending little time behind the wheel. In the coming years however, commuting will no longer be a foisted hindrance for many as the driverless car simply drives itself. It has no brakes or floor pedals of any sort because it is completely driven by software, not human middleware. A software orchestrator drives all of the decision making, providing automated judgments based on the immediate conditions at hand. This software defined automobile is never distracted, never fatigued and always focused on the tasks at hand. Imagine how this new technology will liberate us as humans? The time we spend commuting can now be allocated to far more value added undertakings, whether it be our personal or professional lives. Once implemented, this technology will bring with it a whole new paradigm.

The IT data center is about to undergo a similar transformation, except we don't have to wait for its fruition as is the case of the driverless automobile that is years away from implementation on any sort of scale. Like the driverless car, the Software Defined Data Center (SDDC) is completely software driven. Just as the Google car is no longer dependent on floor pedals, the SDDC is no longer dependent on the command line interface. Just as we won't have to learn how to drive in the future, the SDDC will negate the need for expensive training to learn highly specialized



vendor hardware because all hardware will be commoditized. And like the driverless car, it will liberate the IT department so that it can focus on projects of innovation that add value to the organization and its bottom line. Just as the task of driving will seem archaic to future generations, the idea of spending hours each day upgrading firmware and troubleshooting hardware will seem antiquated as well in a matter of years.

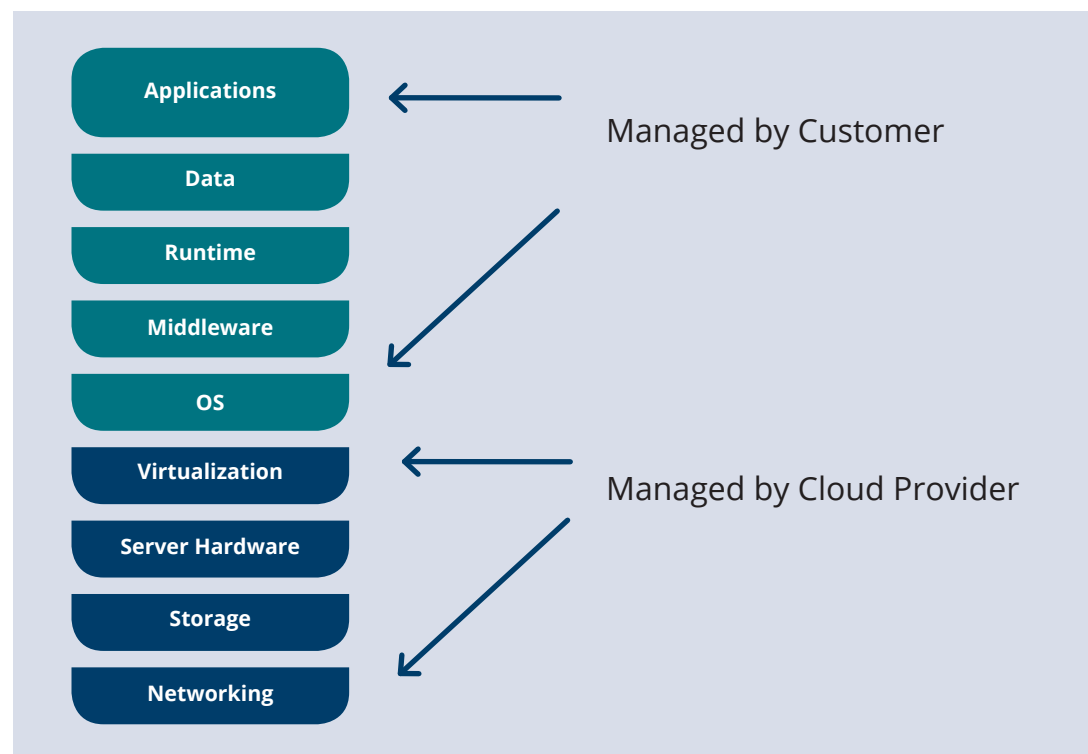
At a recent TechNet event in Atlanta, Georgia, Manuel Garriga, an Azure Tech Solutions pro, put it best:

“IT should provide differentiating services to the organization. Racking equipment is not that. If you do tasks in which no one cares about unless you screw up, you probably shouldn’t be doing that task because it neither differentiates nor contributes anything to the company.”

In essence, the best days of IT lie ahead.

THE HARDWARE DRIVEN DATA CENTER IS UNSUSTAINABLE

The discussion of the emerging Software Defined Data Center is nothing new. VMware chief executive Pat Gelsinger in his keynote speech at VMworld Europe in 2012 described today’s approach to the data center as a “museum of IT” and emphasized the necessity of making all aspects of infrastructure flexible¹. Sanjay Mirchandani, Senior Vice President and General Manager at VMware, reinforces this idea when he says, “The hardware—servers and PCs—no longer determine the IT operations of companies. It is the software that is navigating the IT ecosystem today.”





Up until recently, the data center has been driven by specialized hardware. These proprietary devices were created for specific purposes, designed to deliver prescribed solutions. These devices are indeed robust and intelligent, delivering increased performance, lower latency and greater redundancy. When compared to commodity hardware, the associated metrics clearly show the resiliency and performance superiority of these dedicated devices. But these higher metrics come at a cost:

- Increased manufacturing costs which are incorporated into the price structure
- The inability to recycle hardware for dissimilar projects
- The cost of overprovisioning by purchasing for tomorrow rather than today
- Training costs and dependencies on highly specialized personnel
- The incompatibility between systems
- The opportunity cost and risk of vendor lock-in
- Time consuming maintenance and support
- Costly upgrades and migrations
- Cooling and power costs

Yes, the data center infrastructure must be driven by intelligence and it must provide redundancy and high availability. But there are alternatives to achieving these objectives utilizing high end proprietary hardware that is expensive to purchase and support. In an era in which IT departments are pressed to do more with less due to ever diminishing price margins stemming from global competition, the hardware driven data center is not sustainable.

BRINGING THE BENEFITS OF THE CLOUD DOWN TO EARTH

There are companies everywhere that have found liberation in the cloud. They are abandoning any future hardware commitments by migrating elements of their data center to the cloud. The National Institute of Standards and Technology (NIST) defines the cloud as:

“A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

In the cloud, IT personnel are no longer found in front of servers to rack them, take them off line or troubleshoot. In the cloud, servers are provisioned and decommissioned at the click of a mouse and resources are automatically failed over in the case of an anticipated failure at some level of the network model.

The most prevalent public cloud prototype is known as Infrastructure as a Service (IaaS). Here, the cloud provider accepts the burden and responsibility of supporting the infrastructure so that the



client organization can simply focus on deploying and managing software, be it network applications or operating systems. The IaaS separation of responsibilities is broken down into the following categorization such that the blue areas denote the services provided by the cloud provider.

The virtual environment of the IaaS ecosystem provides an on demand self-service structure that makes it easy for the client to deliver compute, storage and network resources quickly and easily. This instant resource provisioning and release allows customers to scale in and scale out on demand, providing rapid elasticity so that network resources always meet but never exceed demand. This ensures that organizations can respond to extreme usage peaks in real time without the victimizing financial burden of over provisioning hardware which has plagued IT budgets for far too long.

The benefits of cloud computing are many, but countless organizations are unable to utilize cloud computing for various reasons such as:

- Industry or government standards and requirements may prohibit the use of the cloud
- Cloud computing is based around a variable cost model which makes it impossible to budget for some organizations such as school systems and government institutions
- Organizations that deal with highly sensitive data cannot justify risking such high valued data assets to be stored off premise
- The vast majority of enterprise applications are still traditional applications that are not optimized for the cloud
- The public cloud might be competing with the clients it services such as was the recent case of Dropbox and its migration away from AWS to its own internal solution
- As the number and size of workloads increase, the pricing of the public cloud may exceed the cost of hosting resources on premise.

Those organizations who are unable to take advantage of public IaaS offerings face greater challenges than unrealized cloud computing benefits. They must compete with organizations who actually can fully vest themselves in the cloud and reap the advantages. Fortunately, vendors such as VMware, Cisco, HP and others are making it possible for organizations to host their own private cloud on premise through SDDC, offering the same degree of responsiveness, elasticity and fluidness of IaaS. You don't have to go off premise to obtain the benefits of flexibility and automation. The tools are available today to create your own software driven network. Just as computer virtualization became the building block and stepping stone to cloud computing, cloud computing is now delivering the blueprint for the software defined data center.



THE BEST OF BOTH WORLDS

SDDC offers organizations the best features of the cloud and the traditional on premise network.

- The service centric auto provisioning elasticity of the cloud
- Elimination of proprietary hardware dependency that the cloud provides
- The security and consolation of hosting your data resources on premise
- The ability to operate and manage legacy applications
- The ability to perform accurate budget forecasting rather than unpredictable variable cloud costs

It is software that separates one vendor from another. It is the ease of the delivery process and the accelerating "time to value" of new software innovations that is making software such a transforming and disruptive force in the world today. Look at the recent disruptors such as Uber and Pandora. The common element of these sudden disruptors is the unintimidating foot soldier called the app. The proliferation of the app clearly shows that hardware can never match the speed and elasticity of software. It is a software driven world today.

When we software define an element of the data center we are introducing an abstraction layer into the infrastructure. In the case of computer virtualization, this abstraction layer was the hypervisor which served as the buffer and orchestrator. The hypervisor reproduced the various resource attributes of the physical server itself such as CPU, memory and drive space within the application layer. This allowed for the software orchestrator to manipulate these resources in automated fashion. Automation that was driven by software intelligence. This abstraction principle paved the way for Software Defined Networking (SDN), which introduces multiple abstraction layers that in turn separate the control plane from the data plane devices below. This is the same governing principle behind SDDC. SDDC is about simply abstracting as many physical pieces as possible into software.

The software defined approach took hold with computer virtualization, only to expose the weaknesses of the networking, storage and security infrastructures of the data center. IT Managers are now starting to realize the true potential of software defining the entire data center. SDDC isn't any one thing specifically, but rather a way of describing a data center where as many pieces as possible are abstracted into software. SDDC is characterized by automation, orchestration, and the abstraction of resources into software code. By nature, software is more reliable than humans, which means that compared to the legacy data center, the SDDC is more agile and responsive in all measures.

Forrester defines SDDC as, "An abstracted and pooled set of shared resources. But the secret sauce is in the automation that slices up and allocates those shared resources on-demand, without manual tinkering." Whatever this secret sauce is, enterprises are quickly recognizing the value of it. According to one recent report, the SDDC market will grow at a compound annual rate of 28.8% between 2015 and 2020, growing from \$21.78 billion to \$77.18 billion by 2020².



COMMODITIZATION ALLOWS FOR STANDARDIZATION

The instant that an IT department virtualizes their server infrastructure, server hardware becomes a lot less important. The hardware in fact becomes trivial and commoditized as all of the intelligence is now derived within the hypervisor. An example is vSphere High Availability which provides failover protection against hardware and operating system outages by automatically migrating virtual machines amongst clustered hosts. In addition, the Distribute Resource Scheduler will move existing VMs to less utilized servers, preventing potential resource bottlenecks. In essence, you don't need servers composed of superior hardware. You need commodity hardware that is commandeered by superior software.

The same can be said of Software Defined Storage (SDS). Rather than relying on highly specialized proprietary external disk arrays that are built around seemingly limitless redundancy, SDS runs intelligent software over commoditized x86 software defined storage containers. These containers are referred to as virtual storage appliances but really aren't appliances at all. Like SDN, volume provisioning and redundancy features are abstracted from the hardware, residing instead on a virtual server that is controlled through the same pane of glass as all the other virtual servers in the data center. Storage per byte becomes much cheaper, encouraging organizations to make better use out of unstructured data and disconnected data. Organizations shouldn't have to ration data storage because their SAN is running out of available storage space.

Commoditization allows for standardization which leads to total interoperability amongst devices. Standardized hardware also allows a software developer to use pre-existing drivers which helps in speeding development cycles and lowering costs. It gives organizations the ability to recycle older hardware and allocate it towards resources of a less critical nature, but still important. It also gives IT operations the ability to manage different aspects of the network in a granular fashion, rather than the one-size fits all solutions that traditional data centers encourage by their design.

A WHOLE NEW WORLD

The idea of running everything on software may move business agility to a whole new level. Imagine a data center in which VLANs, network policies and security provisions are commissioned in step with server or virtual desktop provisioning. Similarly, the load balancer and associated firewall rules could be eliminated in conjunction with the decommissioning of a server. With all aspects of the data center abstracted and working in unified cohesion, organizations can control costs, reduce costs of ownership, reduce IT complexity, increase availability and greatly enhance the agility of operations. This is the next phase in data center evolution and the time to embrace the liberation that SDDC brings is now.



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Because we go further.**

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Our engineers have the knowledge and experience to help identify and implement the right solutions for your software defined data center. If your company has identified an initiative to transition to SDDC, let's talk.

 info@wei.com

 800.296.7837

 www.wei.com

 43 Northwestern Drive
Salem, NH 03079

Sources

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