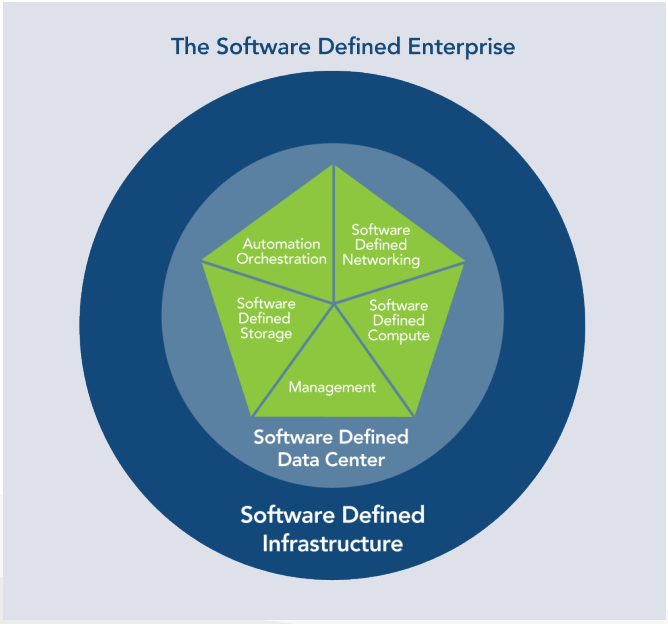
WHAT MAKES UP THE SOFTWARE DEFINED ENTERPRISE?

In our white paper, *Managing the Software Defined Enterprise*, we outlined the benefits of fully acclimating the enterprise from the traditional hardware centric model to the more fluid and automated one of software defined. We refer to these benefits as the 5 A's which are Accuracy, Adaptability, Agility, Alignment and Assurance. Most organizations have experienced these on some type of scale working within virtualized computer environments, but few if any have experienced these benefits across all facets and endpoints of the enterprise.

In order to achieve the benefits of the 5 A's, an organization must embrace and implement the five components that make up the Software Enterprise Network. These are Software Defined Compute, Software Defined Networking, Software Defined Storage.



Think of your enterprise like a desktop computer from twelve years ago (or more). The large beige case hosted the core components that you thought would deliver all the computing power you would ever need for years to come. It didn't take long to outgrow it though and the cumbersome process of upgrading soon became a cycle of frustrating limitations. Initially you upgraded the CPU which greatly enhanced your

processing power, but these processes were held up by the limited amount of memory so you doubled your RAM next. Everything was so fast – unless you had to integrate with your hard drive that just didn't have the I/O rate to keep up. Next you found yourself upgrading your NIC in order to fully utilize your new level of speed for your Internet applications and usage. Soon you reached a level of performance nirvana until you outgrew your resources once again, only to find out that your motherboard wouldn't accommodate any further upgrades. You then bought a new computer which coincided with a more powerful OS and started the exasperating progression once again. Exhausting? Yes. Such is the experience of dealing with rigidness of hardware.

1. Software Defined Computing

The hypervisor was the tool that sparked the revolution. It was the promised cost savings of this new technology that coerced us to take that first step into this new paradigm. It didn't take long for the light bulb to go off recognizing the true potential of virtualization. We learned about going green and reducing the size of our footprint. We achieved higher levels of uptime and redundancy and avoided vendor lock-in. We were able to isolate applications and extend the life of older applications. Virtualization then led us to the cloud, where we discovered we could host some or all of our virtual machines. We also discovered something else, that just like upgrading one component of the desktop computer, our virtual agile solution was held back by the limitations of the rest of our network, storage in particular. The confines of an inelastic data center was limiting.

2. Software Defined Storage

Initially we simply utilized the internal storage of our virtual hosts, but then discovered that it didn't allow us to take advantage of automated advanced control features such as VMotion found in VMware. We then turned to the external array. It was robust and designed for supreme levels of redundancy. It was also very expensive and required specialized training. As easy as it was to provision virtual machines, we soon found ourselves requiring more and more storage volumes. It became obvious that our virtual topology was constrained by the hardware barrier of the array.

And there lies one of the problems. The high cost of the traditional storage array prohibits the low cost virtual plane. What we need is a storage model which utilizes inexpensive storage that is redundant, not due to its intricate hardware but because of its adaptability and automation that can only be achieved through software. This is what Software Defined Storage is all about. It utilizes x86 storage to make virtualized volumes that span across multiple storage hosts throughout the enterprise. Unlike the array, it's not the stoutness of the hardware that protects the data, but the fluid adaptability of its design.

3. Software Defined Networking

The purpose of computer virtualization is to provide an environment to host applications. The purpose of storage is to store the data that these applications then create. This synergy of applications and data add great value to an organization, unless you have no way to deliver it to your users. The traditional network that provides the fabric for users to traverse in and out of applications is made up of various switches, routers and firewalls. All of these require a separate interface session to configure or at best, a vendor provided application that can configure its own particular set of devices. This mesh demands a large degree of human middleware to manage it all. Manual provisioning of devices is no match for automated virtualization.

Which is why we have Software Defined Networking, a whole new way of thinking in which we separate the control plane from the data plane of devices. In an SDN environment, we don't configure hardware, we configure the software that will then serve as the orchestrator of our mesh. Using SDN, the enterprise is no longer a lattice of disconnected devices but an array of highly synchronized ones all working in coordination with one another in automated style.

4. Automation Orchestration

Automation within the network means having the ability of your network to react to real time conditions within the network itself. It's about automatically provisioning more bandwidth and resources in reaction to traffic demands. It's about switching between synchronous and asynchronous replication for your databases depending on demand fluctuations. It's about having a newly provisioned device boot up with its assigned policies and configurations ready for production. It's about readiness and agility.

5. Management

When you have this software defined everything enterprise working in conjunction with the orchestrator, amazing things can take place from a management perspective. Like Software Defined Storage that offers simplicity over the external array, management is greatly simplified in the Software Defined Network. The knowledge base of the IT staff is no longer a limiting factor as management is done through a single pane of glass that provides an intuitive GUI-based interface that doesn't require a great deal of specialized training. It's also about a policy driven network that enforces compliance, security, QoS, VLAN configuration, etc. Management is no longer about controlling "a device" but managing innovation optimization throughout the network.

In summary, the software defined enterprise is about ridding enterprises and IT staff of the rigidness of hardware. Hardware is stationary and because business agility is a top priority for companies today, we as IT managers must loosen the shackles of the traditional network that has served us in the past, but now inhibit us today. Through our initial acceptance of computer virtualization, we saw the light. Now it is time to shine it on the entire enterprise infrastructure.

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