



Removing Complexity from the Infrastructure — SimpliVity Simplifies the Data Center

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Management Summary

Have you ever thought about owning the “perfect” car? How about an automobile that has the best engine that money can buy; one that goes from 0-to-60 in nothing flat and also has great gas economy, say 50MPG. This car also has to have the best transmission, the best steering, the best suspension, and style. Now, no manufacturer makes such a beast, so you would have to find all of the pieces and put it together yourself. Hopefully the transmission would work properly with that engine, and with the suspension, and the steering. Oh yes, let’s not forget the brakes. The integration of all of these components would be a massive chore, not to mention the maintenance and service. That would not be a problem, however, as you would be the only mechanic in the world that would know how to fix it. And then add up the cost – well we did say the best of everything, so you know that the cost would be high. That is why we rely upon experienced car manufacturers to fabricate and assemble the best car for us. When we go car shopping, we have a list of priorities: gas economy, seating capacity, storage space, and, of course, safety, to protect the precious cargo inside – and cost!

This scenario is nothing new to the IT staff in every data center around the world. The data center has spent decades looking for the best server, the best storage, and the best networking to assemble the “perfect” IT system that can satisfy the requirements of the business units that depend on it for achieving enterprise success. Fortunately, as each year goes by, new technologies appear to simplify your life. Unfortunately, many of them do not simplify the data center processes; they simply make them even more complex. The proliferation of servers has created server sprawl throughout the enterprise. This, in turn, has led us to consolidation and virtualization, minimizing the number of physical servers in the data center but creating a new sprawl of virtual servers, or virtual machines (VMs), contributing to even more complexity for the IT staff to manage. Add to that the new appliances created to compress, dedupe, and encrypt the explosion of data bursting the seams of every storage silo (and every budget), and you have even more complexities to be resolved. What the data center really needs is a single platform that can provide all of these services for the data center while minimizing the deployment, administration, and servicing of the IT infrastructure.

There have been a plethora of start-ups dedicated to just that purpose: storing, managing, protecting, and sharing data across the network. One new company has reared its head above the crowd: SimpliVity. SimpliVity was founded to enable VM administrators to provision, manage, and grow the storage for the VMs, easily and simply. To learn more about SimpliVity and their *OmniCube* Integrated Storage and Compute Systems, please read on.

Transforming the Data Center

No one will dispute that the principal function of an IT infrastructure is to run the mission- and business-critical applications on which the enterprise depends. Unfortunately, there is a complexity

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existing throughout every data center caused by the *sprawl* running rampant through that enterprise. Over the past decade, a myriad of open systems servers has infiltrated into the data center to run some dedicated application. The beauty in open systems servers, i.e., based on the x86 architecture, is that they are inexpensive to acquire and they *can be* dedicated to one specific task. Well, when you have every department in the enterprise clamoring for compute power to address a single task, the result is the *sprawl* of physical servers, not only within the data center, but throughout the enterprise and into the cloud. As a result, the IT department ends up with an administrative nightmare: tens, hundreds, and in some larger enterprises, thousands of modest (usually dual-socket) servers that they have to manage, administer, and maintain. In addition, many-to-most of these servers still may be operating at about 15% to 20% efficiency, wasting valuable computing resources, not to mention the energy required to run them and cool the environment. The total cost of ownership (TCO) to run this now-ancient approach had gotten out-of-hand.

As a result, the data center consolidated all of these islands of computing onto fewer and more powerful servers with more cores, more sockets, and more memory, which would not have been possible without server virtualization. While today's beefed up servers are many fewer in number, remember that they tend to cost more, both for the increased capacities, memory and networking and for the virtualization and management software to allow the sharing.

With the introduction of hypervisors, such as *VMware*, *Hyper-V*, and *RHEV*, the IT staff was enabled to improve the utilization of their enterprise servers, in many cases to as much as 75% to 80%. Anyone, however, who thought that virtualization was a panacea for all of their data center pains, sadly was mistaken. As a result of the virtualization of all of the mission- and business-critical application, a great number of VMs were spawned to create a new complexity for the IT staff and tremendous strains were applied to the enterprise networking and data storage.

With more and more business applications on a consolidated, virtualized server trying to access more and more data through the same communications paths, you can predict the results. This problem might not have become so serious if storage had been under good control. Unfortunately, it was not. There is one fact that is indisputable: the growth of storage is on an inexorable rampage through your IT infrastructure and its

budget, determined to consume every dollar it can. It does not matter if you are an enterprise data center, mid-sized data center, or SME, your data store is growing at a pace never seen before. With data center storage requirements doubling about every 18 months, the IT staff had to find a means to get a handle on it. This led to the deployment of storage switches throughout the data center to facilitate the connection between the servers and scalable storage. The growth of storage has also led to the *tiering* of storage and the deployment of solid-state disks (SSDs) to facilitate the high-performance access of mission-critical applications to their data. To make matters worse, the tiering of data has led to the outsourcing of some of that data to *The Cloud*, requiring the deployment of cloud gateways to further complicate the lives of the IT staff.

The sad tale continues. Next came the transformation of the data center, by reducing the sheer volume of data through appliances to *compress* the data on the one hand, and run *data deduplication* on the other. Managing all of these separate appliances was bad enough, but now the enterprise security officer was becoming concerned about the exposure of this data to the outside world, through the cloud and the Internet, as well as the exposure to disgruntled employees who had legitimate access privileges. This has led to the deployment of even more appliances to encrypt the data at rest in primary storage, as well as in transit. Add to all of this the requirements to have a secure disaster recovery solution (with secondary storage requirements) and it becomes time to throw up your hands in dismay.

Where does that leave us?

It puts us right back where we started, except now we are faced with *even more sprawl* than when we started this transformation process. Now, however, the *sprawl* involves mission- and business-critical servers, both physical and virtual, multiple storage arrays, with many storage tiers from SSDs to fat disks, special-purpose appliances, switches, and gateways. **Now is the time to change the paradigm of your data center and look at a converged, truly integrated platform that can store, manage, protect, and share data across a global network of systems, and reduce the TCO of your IT infrastructure.**

The issues of complexity in the data center affect all enterprises regardless of size, but less so for the smallest business with fewer IT resources to manage. Larger enterprises typically have the resources required to deploy an integrated IT

environment. The mid-sized data center, however, may not have that luxury. The mid-sized data center often is forced to run without some essential functionality, such as adequate disaster recovery protection, because of the high cost and the sheer complexities of trying to keep up. **The mid-sized data center needs a solution, right now, one which is integrated with all, or at least most, of the hardware and software functionality found in an enterprise-level infrastructure.**

In terms of hardware, the mid-sized data center is looking for a multi-tiered solution that includes most, if not all, of the following.

- **An integrated server, storage, and networking architecture;**
- **High performance SSDs** for their highest performing database applications, capable of delivering very high IOPS where they are needed;
- **High-capacity SATA** drives to fulfill the rapidly growing needs of business-critical applications, such as email and other web-facing requirements; and
- **Virtualization capabilities** to improve the utilization rates of all devices, in much the same way that the data center has consolidated and virtualized their server infrastructure to improve the TCO of the IT environment.

The technology roadmap for software for the mid-sized data center includes the same functionality provided to larger data centers, but with less complexity, of course.

- **Advanced scalability;**
- **Efficient data mobility;**
- **Global compression and data deduplication;**
- **Unified global management;** and
- **Seamless cloud integration.**

This seems like a tall order for SME data centers.

No doubt, the SME data center staff is striving to lower the TCO of the infrastructure by reducing the volume of resources required, improving the time to market, and improving the overall efficiency of that infrastructure. But they need help, in terms of simplifying the whole undertaking. The IT staff needs to be able to remove as much of the complexity from the entire IT environment as possible. Instead of “Do It Yourself”, the mid-sized data center needs to find a pre-integrated solution. **There is one company, a startup, that has recently appeared on the data center radar that addresses this exact requirement. That company is *SimpliVity*.**

Who is SimpliVity?

SimpliVity is an early stage company, founded in 2009, that has just recently emerged from the shadows to cast their vision into the mid-sized data center where VMware’s *vCenter* plays a major role. Their goal is to converge all of the aspects of an IT infrastructure into a single, manageable 2U framework, removing as much of the complexity and sprawl as they can, literally changing the paradigm for existing data centers. Consisting of a team of developers from a cross-section of different technologies, **SimpliVity has effectively developed a new IT infrastructure stack focused around the virtualization administrator.**

Rather than going the route of the major players in this market, who use their existing components and try to snap them together like *Legos*, SimpliVity has gone another way. They believe that the existing data structure limits data fluidity and scalability and ultimately gets in the way of server virtualization and access to the cloud.

In order to get the job done, SimpliVity has created an innovative, new technology called *OmniStack*, designed for today’s virtualized and cloud-enabled environment. (See Exhibit 1, on the next page.) With this new technology as the basis, SimpliVity has introduced us to *OmniCube*, combining server, storage, and networking services into a single, rack-optimized drawer which takes the sprawl, and the complexity, out of your data center. In fact, it is far from a cube. It is a 2U chassis, with all of the functionality that previously required an entire rack of hardware, and delivers the new data structure and overall system architecture that today’s data center demands.

The OmniCube Assimilated Storage and Compute System

What does OmniCube do?

It provides baseline storage services in addition to the functionality that now is delivered via multiple appliances, but without the complexity prevalent in the data center today. *OmniCube* provides the data center with the new infrastructure stack that it has been seeking:

- With modern data virtualization that has been designed for virtualized environments,
- With advanced scalability,
- With enhanced data protection,
- With all nodes controlled from a single management pane to eliminate all management pain, and

Exhibit 1 — Core Elements of OmniStack

- **Realtime Deduplication and Compression** – This is the engine which dedupes and compresses all data, at inception, at a very fine grained level, optimized to be mobile.
- **Accelerator** – A specialized PCIe module that offloads compute-intensive tasks such as compression and deduplication to eliminate performance impact.
- **Server/Storage/Network Architecture** – An assimilated system consisting of an industry-standard x86 platform, combining server, storage, and internal networking, to create a high-performance, high-functionality, VM-optimized building block.
- **Global Federation** – Each OmniCube is designed to be one of many in a network, creating a scalable pool of shared resources. It enables local HA and data protection within the data center.
- **Software** – Every OmniCube includes an instance of OmniCube software running in a VM.

Source: SimpliVity

- With *vCenter* used to manage the whole stack.

OmniCube has been designed with VMs as the focal point of the architecture, with VM management automated in the background to handle all analysis, reporting, and actions through the *vSphere* client. It applies data deduplication and compression in-line, throughout the life cycle of the data, across all tiers, and all configurations – single node, multiple nodes, multiple data centers, and the cloud. This eliminates the need for separate appliances for data deduplication, compression, WAN optimization, Cloud Gateway, and more.

OmniCubes are deployed in a network of two or more, creating an *OmniCube Global Federation*, to enable efficient data movement, the sharing of resources, and scalability. OmniCubes can be added to the federation locally, remotely, or in the cloud. All policies, operations, and information are managed on a per VM basis. Everything else in the infrastructure is transparent. An OmniCube integrates into existing IT environments simply and easily. Existing infrastructure can be connected to the access its data storage.

A single OmniCube is the building block to provide the core server and storage resources. It

has a 2U chassis configured with two Intel Xeon E5-2650 processors (12 cores), up to 768GB of memory, supporting four 200GB SSD drives and eight 3TB HDDs, for an effective capacity of from 20 to 40TBs, depending upon the rate of compression and data deduplication for your data. (Your mileage may vary.) Each OmniCube also supports two 10GbE and two 1GbE network connections to facilitate rapid communications between nodes.

A pair of these OmniCubes can replace an entire rack of existing infrastructure, including servers, storage, compression appliances, gateways, and more, reducing the requirement for floor space and energy, helping to lower the TCO of your IT infrastructure. This federated pair provides the application set with an elastic, scalable pool of shared resources. They also provide the data center with the reliability, availability, and serviceability (RAS) that critical applications and data require, along with the high performance that is needed to meet business needs.

Conclusion

Decades of innovation in the data center have proven that as technology evolves, so must the infrastructure, if we expect to realize the full benefit of the transformation. Innovations, such as infrastructure virtualization and cloud computing, are prevented from fulfilling their promise because of an overly complex legacy IT infrastructure stack. **The availability of OmniCube, a new, radically simplified and assimilated IT infrastructure building block, with a new IT stack, addresses that problem with an innovative infrastructure that removes the complexity that holds back virtualization and access to the Cloud, and allows them to fulfill their promise of simplification, IT commoditization, and globalization.**

OmniCube delivers high performance and functionality at a low price. List price for an OmniCube system begins at \$55,000, making it suitable for the SME budget, particularly given the scope of functionality that it delivers. If your data center is saddled by a legacy approach to IT, SimpliVity's OmniCube is one solution that you need to investigate to transform your IT architecture.



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