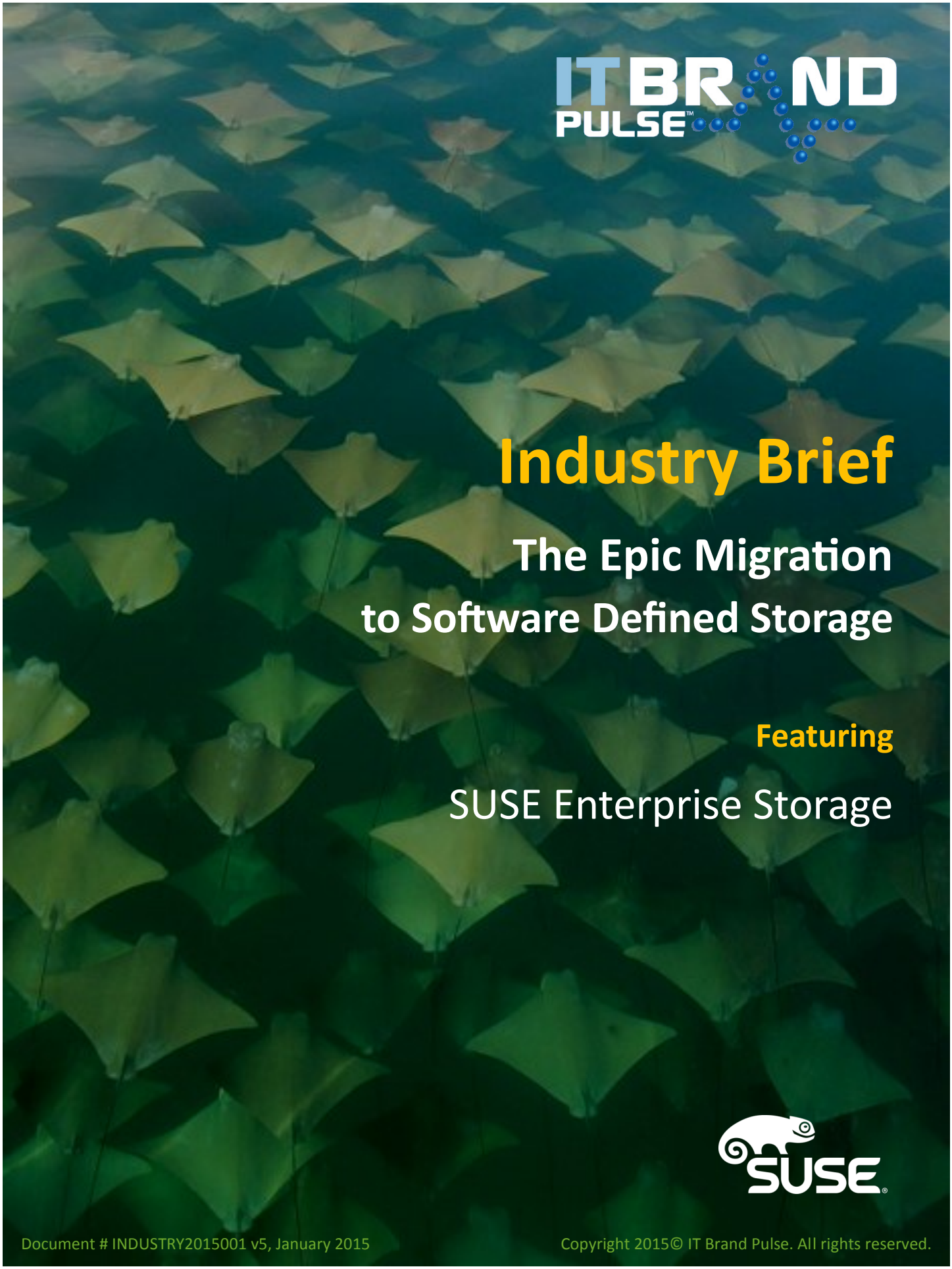


Industry Brief

The Epic Migration to Software Defined Storage

Featuring

SUSE Enterprise Storage

Document # INDUSTRY2015001 v5, January 2015

Executive Summary

A Change of Seasons for Data Center Architecture

Migratory creatures such as Stingrays have an innate response to changes which are reliable indicators of a changing season. Certain changes signal the onset of the migratory season, and more immediate factors such as water temperature, determine the precise day they will migrate.

This report covers the changes signaling enterprise IT that a change in season is on the way for data center infrastructure and the factors triggering a mass migration to software defined storage (SDS). The benefits of a software defined data center (SDDC) architecture and the emergence of enterprise-class SDS solutions have captured the attention of the IT community. If SDS is not on your list of key data center strategies, it should be.

Software Defined Data Center Model: Proven by Hyperscales

It is estimated that within the next two years, hyperscale data centers will host half of compute capacity and two-thirds of raw storage capacity worldwide. Hyperscale growth by Amazon, Apple, Facebook, Google, Microsoft, and others was made possible by a software defined data architecture. Using white box servers and software infrastructure apps, SDDC reduced costs by 40% versus proprietary hardware, enabled deployment of virtualized resources in days versus months, and delivered the ability to scale-out to millions of nodes.

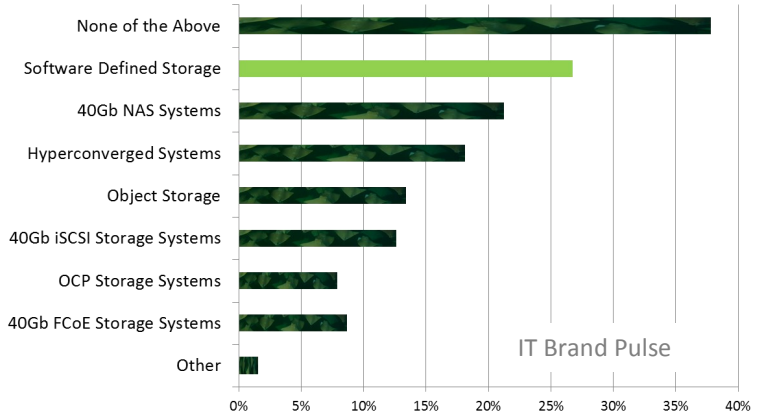
New data center architectures by leading enterprise IT organizations are rich in SDDC technologies.

Software Defined Storage: One of 3 Pillars of a Software Defined Data Center

The three pillars of a SDDC infrastructure are compute, storage and networking. Thanks to server virtualization, IT pros know that much higher efficiency and much lower costs can be achieved by deploying software defined infrastructure. And like server virtualization, SDS is one of the few technologies which can pay for itself in a very short period of time.

Our survey results indicate that SDDC and the availability of enterprise-class SDS solutions, are capturing the attention of the IT community in 2015.

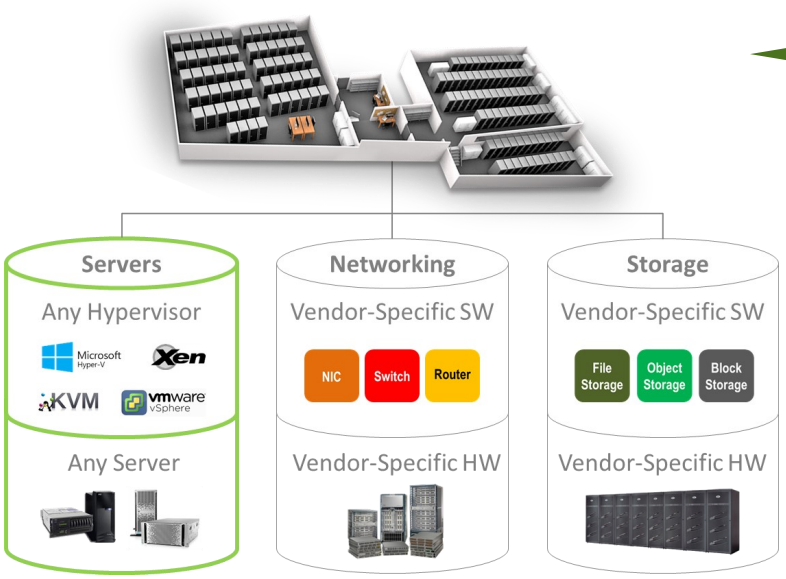
Which of the following new storage technologies do you expect to evaluate or deploy in 2015?



Software Defined Data Center (SDDC)

Server Virtualization Leading the Migration

Approximately 80% of new workloads deployed in enterprise data centers are hosted on virtual machines, otherwise known as software defined servers. Hyperscale data centers have taken that concept two steps further with software defined storage and software defined networks. Almost every enterprise IT organization is at some stage of transforming their infrastructure into private clouds with a software defined data center architecture allowing them to efficiently manage virtual resources across multiple data centers.

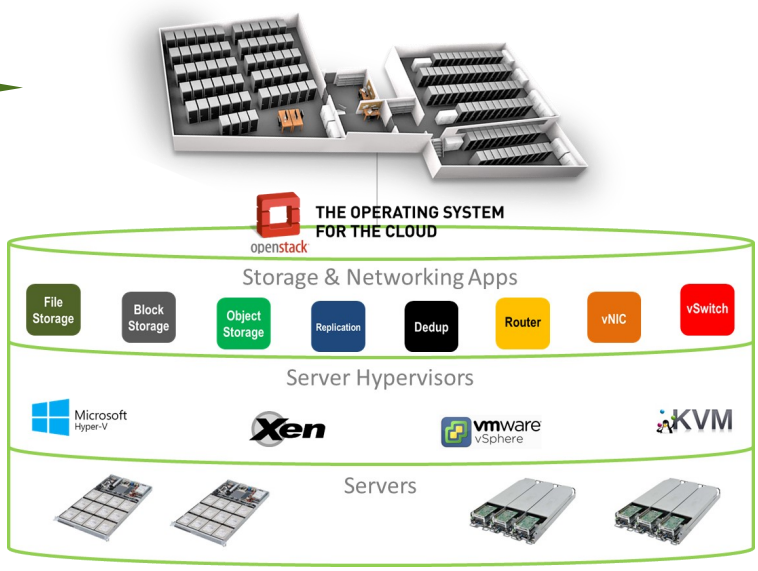


Traditional Data Center

In a typical enterprise data center, IT organizations have broken free from server vendor lock-in with hypervisors which can virtualize any server using an x86 processor. However, most networking and storage environments remain silos of vendor-specific hardware and software.

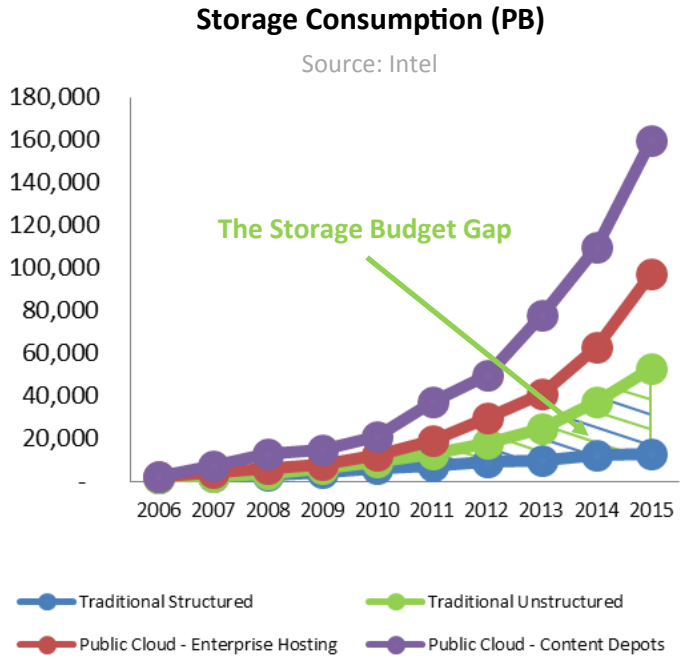
Software Defined Data Center

In software defined data centers, IT organizations have transformed their networking and storage infrastructure from vendor-specific hardware into open-source based software and hardware. This is accomplished by deploying apps on virtual machines and industry standard servers—all under the centralized control of a cloud operating system such as OpenStack.



Today, over 80% of new workloads in the enterprise are deployed on virtual machines, and the benefits of server virtualization have signaled IT organizations it's time to consider a migration to software defined networking and storage.

The Case for Software Defined Storage

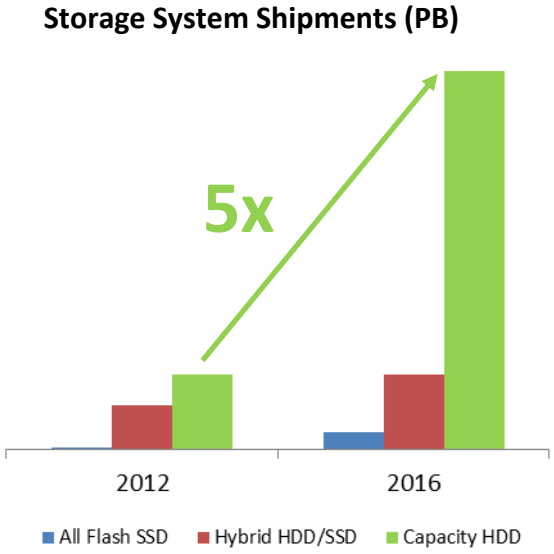


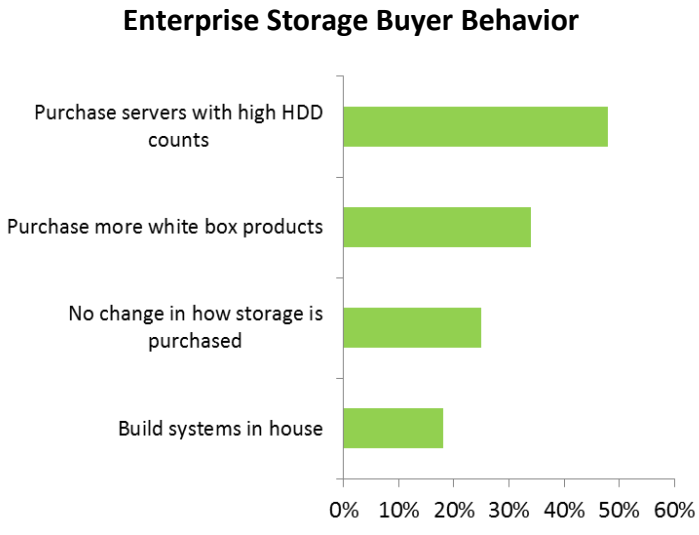
The Storage Budget Gap is Widening

For many years, IT budgets have been shaped by linear increases in storage capacity. The proliferation of messages, photos, surveillance video, and medical images —to name just a few—has resulted in the need for unstructured data storage capacity, which is growing exponentially. The difference between requirements for traditional data storage and new unstructured data storage is the storage budget gap.

Priority #1: Cost Reduce Cold Storage

Most unstructured data is put into cold storage, which is not frequently accessed. As a result, shipments of capacity optimized HDD storage systems will increase five-fold from 2012 to 2016. It's also why priority #1 for storage architects aiming to address their storage budget gap, is to reduce the cost of their cold storage.





Cold SDS a Safe Way to Start

Software defined storage drives down the cost of storage by combining white box server hardware and open-source-based software. That's why over a third of IT pros surveyed said they are planning to purchase more white box servers. Implementing software cold SDS is a safe way to start. Unlike transaction-intensive storage which is mission-critical, cold storage is not frequently accessed and a far less risky environment for deploying new technology.

Software Defined Storage

Storage Transformed into Apps Running on Industry-Standard Servers

Traditional enterprise-class storage can be described simply as file, block, and object storage systems including software embedded on system controllers, along with server-based storage management software. Transform both types of software into apps running on industry-standard servers, and you have software defined storage, which lies at the heart of a SDDC. Use a cloud operating system and your apps to orchestrate storage in geographically dispersed data centers, and you've created a modern high-performance, high-availability, cloud storage environment.

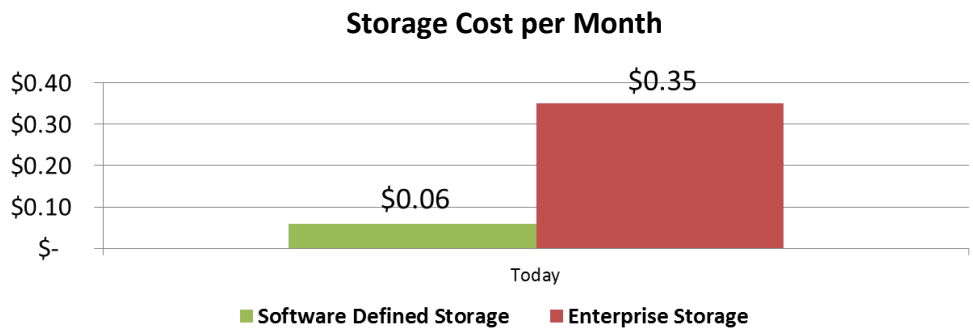
Software Defined Storage	File	Block	Object
How data is organized	By a file system residing in a single host or controller, or distributed and shared between multiple hosts.	In blocks and presented as logical unit numbers with SCSI addresses.	In containers, instead of a tree-based file system. Replaces RAID and replication with erasure coding for data redundancy.
Underlying software	vSphere, Xen or KVM		
Underlying hardware	Industry-Standard x86 server		
How you buy it	Software app-only or appliance (with server, hypervisor and storage app)		
Comparable HW product	NAS system	SAN RAID system	Object storage appliance

Deploy as an Appliance or Roll Your Own with Software-Only

For IT organizations short on resources, turn-key file, block and object storage software solutions are available in the form of appliances in which the server hardware, hypervisor and storage software are fully integrated. For cost-conscious IT organizations who prefer to roll their own storage servers in-house, software-only file, block , and object storage is also available.

Expect to Save on the Initial Purchase and Every Year After

Many IT organizations exploring SDS technology are pleasantly surprised to learn they can expect to pay less for commodity server hardware, and less each month thereafter for open-source based software licenses.



SDDC and SDS are Here to Stay

Hyperscale Depends on It

At the 2014 AWS re:Invent, Amazon VP James Hamilton said AWS deploys in one day the infrastructure needed to support Amazon's ecommerce business when it was at $7B of revenue per year. And they did it 365 times last year.

This hyperscale growth was possible because AWS orchestrates infrastructure in multiple data centers using virtualized server, networking and storage resources. At AWS, SDDC technology puts the hyper into hyperscale.

Million Server Club

Hyperscale	Servers
Amazon	>2M
Google	>1M
Microsoft	>1M

www.worldstopdatacenters.com

The population of servers in large Global 500 companies numbers in the tens of thousands. Members of the Million Server club have 50,000-100,000 servers in many different data centers.

Hyperscale Profitability Demands It

Amazon, Google and Microsoft have to address a challenge that never existed before: scale Infrastructure-as-a-Service (IaaS) efficiently to millions of servers...*and turn a profit*.

In most industries, IT spending amounts to less than 5% of overall corporate spending as a percent of revenue. The primary purpose of enterprise IT is to assist the performance of the core business, and cost savings are a fraction of the 5% of spending. Compare that to Amazon which spent an estimated $1B on IT infrastructure in Q1, 2014 — approximately equal to AWS revenue. At AWS, IT infrastructure "is" the business, and a 5% cost savings has a much bigger impact. Amazon operating income in Q1 was $146M, and It is estimated AWS achieved a 40% savings in IaaS spending due to the use of open-source technology. That translates to $400M, or the difference between profit and loss not only for AWS, but for all of Amazon.

Another example is Facebook. Facebook revenue was $10.8B, and net income was $1.07B in their first three years, 2010-2012. During that period they reported savings of $1.2B by doing their own designs — the difference between profit and loss.

Hyperscale Technology for the Masses

Hyperscales operate with a unified cloud platform such as OpenStack. It's a free and open-source platform consisting of interrelated components controlling pools of processing, storage, and networking resources across multiple data centers. Data center operators manage the resources through a web-based dashboard, command-line tools, and a RESTful API.

The cloud platform open-source which made hyperscale possible is now available to enterprise IT in the form of commercial software which is fully tested and supported. If server virtualization signaled the onset of a new season for software defined data centers, then the commercial availability of cloud platforms represents the change which will trigger enterprise IT organizations to take off towards software defined storage and networking.

Looking forward, SDDC is here to stay. Hyperscales will continue to drive SDDC innovation, and commercial versions of the software will facilitate the smooth adoption of SDDC in the enterprise.

Sourcing Cloud Platforms & SDS

Best Served by Linux Vendors

It's simple. Linux is at the core of almost every cloud platform, so who can enterprise IT organizations trust more than a Linux O.S. vendor for cloud platform software and support?

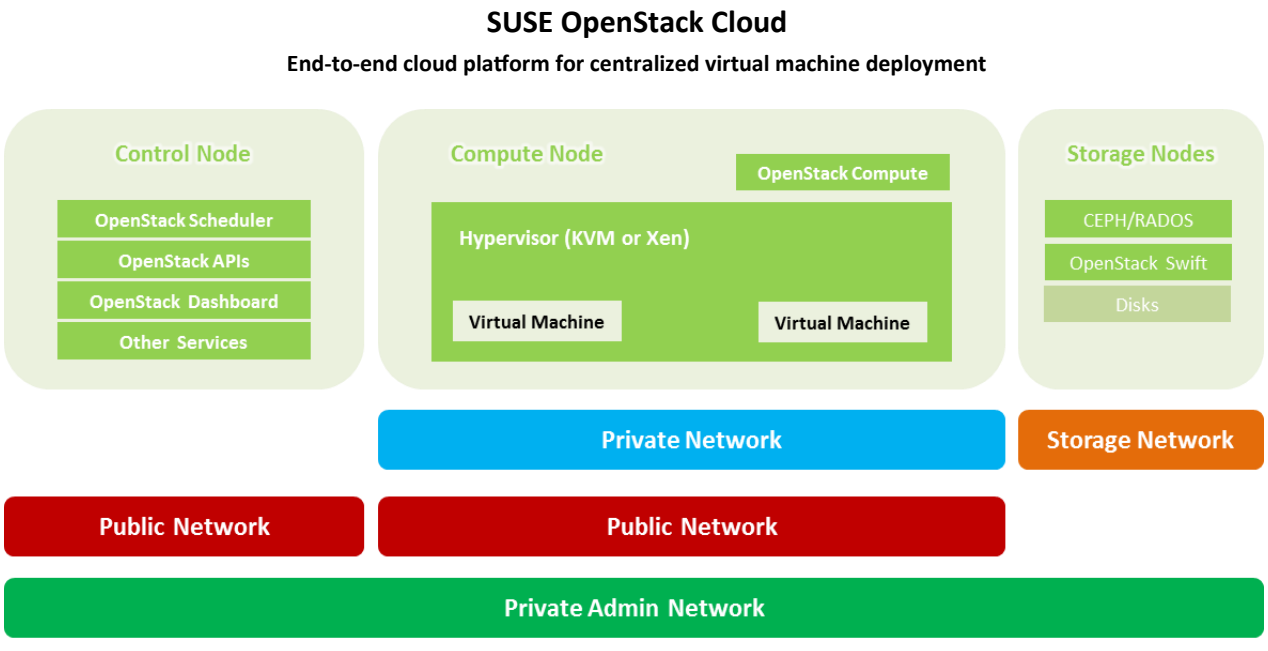
According to Chris DiBona, Director of Open Source at Google, "Linux is the natural technology for enabling cloud computing: it's modular, it's performant, it's power efficient, it scales, it's open source, and it's ubiquitous. And, as the platform upon which the largest cloud infrastructures in the world have been built, Linux —unlike other available operating systems —has little left to prove as a component of cloud infrastructures, be they public or private. "Every time you use Google, you're using a machine running the Linux kernel."

SUSE OpenStack Cloud

One of the best examples of a hardened cloud platform from a trusted Linux vendor is SUSE OpenStack Cloud. Enterprise-ready SUSE OpenStack Cloud is based on OpenStack Juno, includes full support for the distributed storage system Ceph, Infrastructure-as-a-Service capabilities for provisioning and managing databases, load-balancing, firewall, and enhanced VMware support. With SUSE OpenStack Cloud, you can become your company's cloud service provider, deploying and manage enterprise-ready OpenStack powered cloud infrastructure and services.

SUSE Enterprise Storage

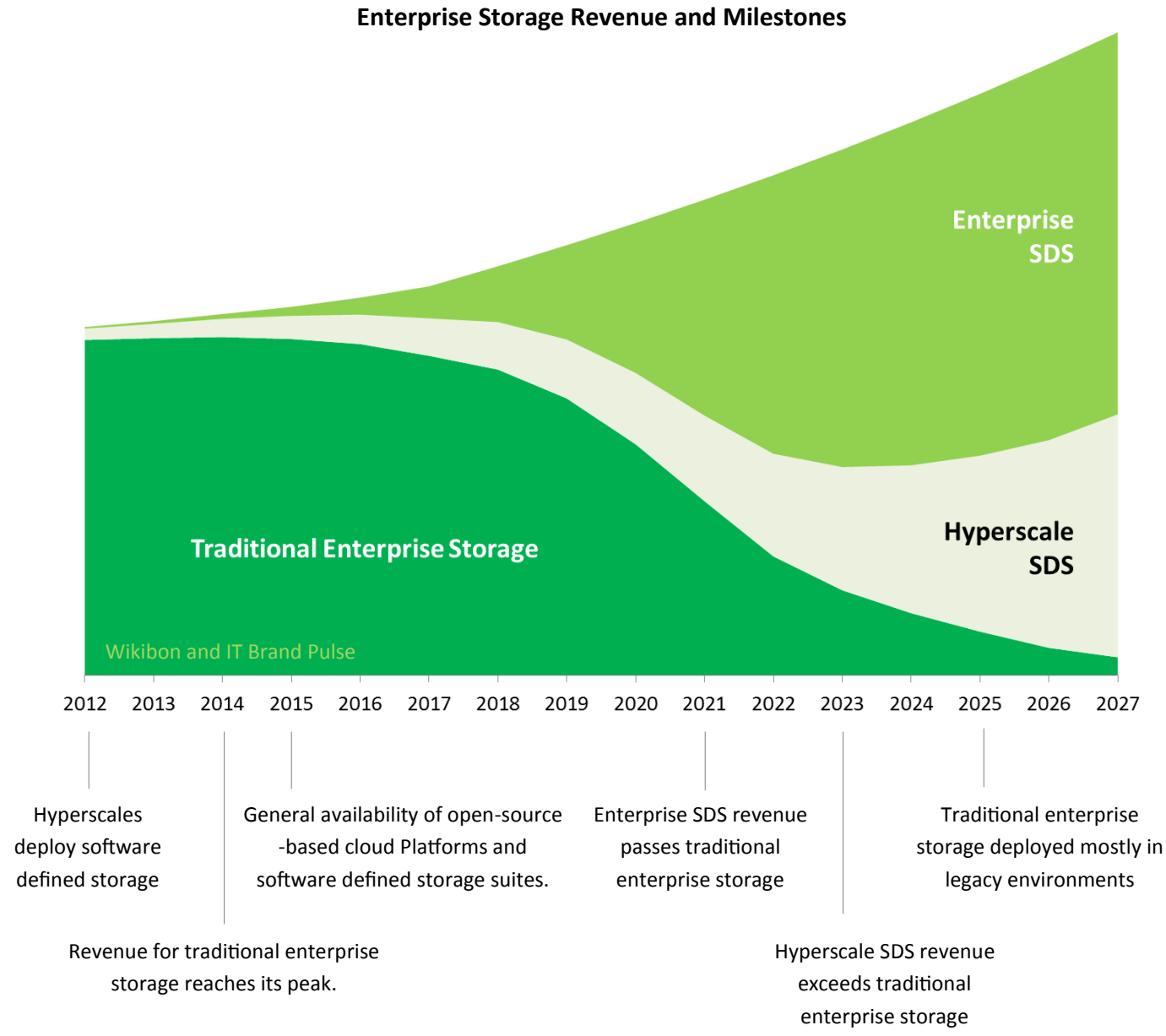
Available as an add-on to SUSE OpenStack Cloud or as a stand-alone storage solution, SUSE Enterprise Storage is a highly scalable and resilient software based storage solution that enables organizations to build cost-efficient and highly scalable storage using commodity off-the-shelf servers and disk drives. It is self-managing and delivers storage functionality comparable to mid and high-end storage products, but at a fraction of the cost.



SDS Industry Road Map

The Epic Migration Has Started

With hyperscale companies leading the way, the enterprise industry migration to software defined storage is underway. Revenue for traditional enterprise storage peaked in 2014 and will gradually decline from this point forward as it is displaced by spending on enterprise SDS and hyperscale SDS. In 2015, a catalyst for acceleration of enterprise adoption of SDS is the general availability of open-source-based SDS suites from Linux vendors like SUSE. Six years from now revenue for enterprise SDS will surpass revenue for traditional enterprise storage and become the dominant class of storage through our visible horizon of 2027.



Summary

The Bottom Line

Virtualized (software defined) storage has been around longer than much-hyped server virtualization. However, the market for virtualized storage has been fragmented with dozens of closed, vendor-specific, hardware implementations dominating the market.

The bottom line is general availability of open-source-based SDS apps from Linux vendors like SUSE marks the beginning of a new era of much more agile, scalable, and cost-effective storage. SDS will displace traditional enterprise storage as the dominant storage architecture and therefore creates a strategic imperative for storage IT pros.

Recommendations

- Learn about SDS technologies, products, fails and successes.
- Determine the return-on-investment for deployment of SDS in your environment.
- Create an SDS migration strategy for your company.
- Start small and fail fast. Deploy SDS in an DevOps lab or in a non-critical production environment such as cold storage.

Resources

Linux: The Operating System of the Cloud

SUSE Cloud

SUSE Software Based Storage

Wikibon: The Rise of Server SAN

The Author

Frank Berry is founder and senior analyst for IT Brand Pulse, a trusted source of testing, research and analysis about cloud IT infrastructure, including operating platforms, servers, storage and networking. As former vice president of product marketing and corporate marketing for QLogic, and vice president of worldwide marketing for the automated tape library (ATL) division of Quantum, Mr. Berry has over 30 years experience in the development and marketing of IT infrastructure. If you have any questions or comments about this report, contact frank.berry@itbrandpulse.com.