IT BRAND PULSE

Where IT perceptions are reality

Industry Brief

Five Trends Defining the Future of Enterprise Storage

Public Cloud-as-a-Service
On-Premise-as-a-Service
Software-Defined
All Flash
Artificial Intelligence

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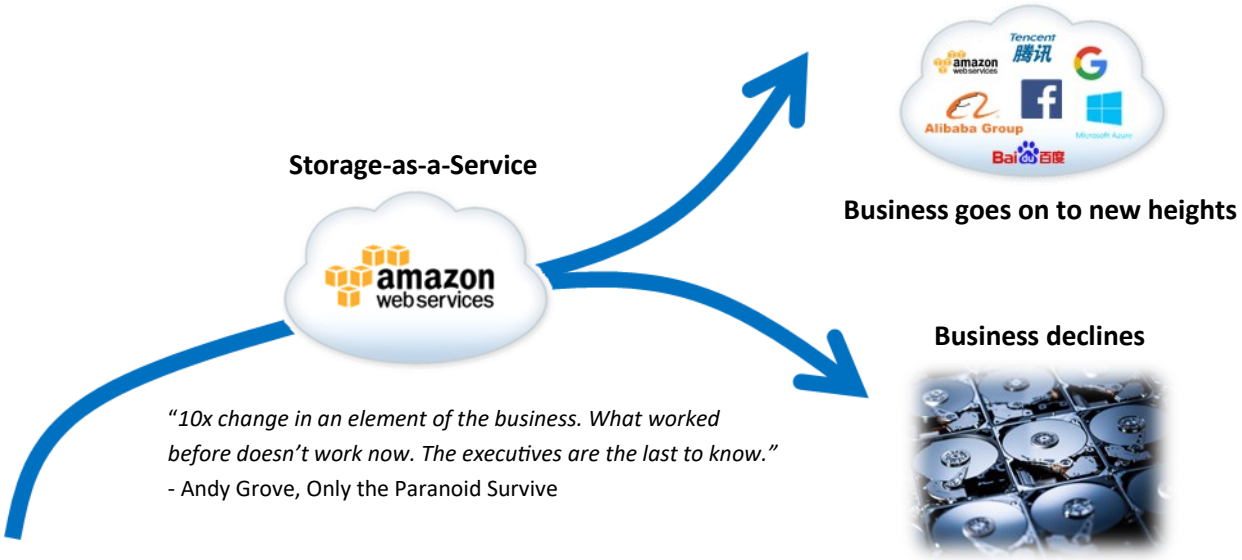
Inflection Point

2006

For the enterprise storage industry, the year 2006 was highlighted by the consolidation of SAN switching with Brocade's acquisition of McData; a big bet on iSCSI with Microsoft's acquisition of String Bean Software; and one of the first attempts at software defined storage when LSI picked-up StoreAge Networking Technologies to pool their Engenio disk arrays. At that point in time, the design center for the industry was database transaction performance and high-availability for business continuity. Large enterprise buyer behavior was marked by IT organizations deploying name brands, such as EMC and NetApp, in their data centers to ensure high availability as well as job security.

On March 13, 2006, few realized it at the time, but enterprise storage had reached an inflection point when Amazon Simple Storage Service, or Amazon S3, was launched by a company with a maniacal desire to transform whole industries. At this fork in the road, traditional enterprise storage stayed on course, while AWS branched off with a hard left in the direction of enterprise storage-as-a-service.

Enterprise Storage Industry Inflection Point



Andy Grove's model for a technology inflection point fits perfectly for enterprise storage. Companies who were quick to adopt, or built from the ground-up for storage-as-a-service are going on to new heights, while business for traditional enterprise storage is declining.

Trends Defining the Future

The advent of storage-as-a-service put the "hyper" into scale for enterprise storage. Hyperscale growth to millions of servers, by service providers like AWS, demanded storage incorporating an agile software-defined architecture, commodity white-box hardware, and extreme automation to achieve efficiency which allows a single admin to support tens of thousands of servers. Five trends have emerged since 2006, defining a new design center and the future of enterprise storage: public cloud storage-as-a-service, on-premise storage-as-a-service, software-defined data storage, all-flash storage, and artificial intelligence.

Five Trends Defining the Future

1. Public Cloud Storage-as-a-Service

IT Brand Pulse estimates that public cloud storage-as-a-service is growing at approximately 25% per year, and by 2020 will capture 25% of a massive $50 billion in enterprise storage spending. In 2016—like every year since 2006—AWS introduced dozens of new products, and IT professionals voted for AWS in every category of leadership related to enterprise compute and storage services. However, IT pros continue to show a preference for traditional IT when compared to cloud services. Future surveys will account for a new class of service provider such as Zadara Storage, who can provide enterprise storage-as-a-service in the public cloud, on-premise, or in a hybrid configuration.

Cloud vs. On-Premises Brand Leader Surveys

2016 Cloud & On-Premise *Voted by IT Pros*	Market Leader	Price Leader	Performance Leader	Reliability Leader	Service and Support Leader	Innovation Leader
Cloud Backup & Archive as a Service	AWS	AWS	AWS	AWS	AWS	AWS
Cloud Dedicated Enterprise Servers	AWS	AWS	AWS	AWS	AWS	AWS
Cloud Enterprise Class Storage	AWS	AWS	AWS	AWS	AWS	AWS
Cloud SSD Storage	AWS	AWS	AWS	AWS	AWS	AWS
On-Premise vs. Cloud Backup & Archive	EMC & Veeam (tie)	AWS	EMC	EMC	AWS	AWS
On-Premise vs. Cloud Dedicated Enterprise Servers	HPE	AWS	HPE	HPE	AWS	HPE
On-Premise vs. Cloud Enterprise Class Storage	EMC	AWS	EMC	EMC	AWS	AWS
On-Premise vs. Cloud SSD Storage	EMC	Pure Storage	EMC	EMC	EMC	EMC

Above the blue line are the results of a survey comparing cloud service provider vs. cloud service provider. Below the blue line are the results when IT professionals were asked to select leaders from a list of cloud service providers and traditional enterprise IT companies.

2. On-Premise-as-a-Service (OPaaS)

OPaaS is a new class of IT set to take-off and grab another 25% of enterprise storage spending by 2020. There are two reasons why the on-premise-as-a-service model will ascend: a) it represents the best of two worlds. Infrastructure stays on premises, and IT pays only for what they use, and b) enterprise IT leaders such as Dell EMC, HPE and Microsoft have validated the market with on-premise-as-a-service compute and storage offerings.

Enterprise Storage OPaaS Brand Leader Surveys

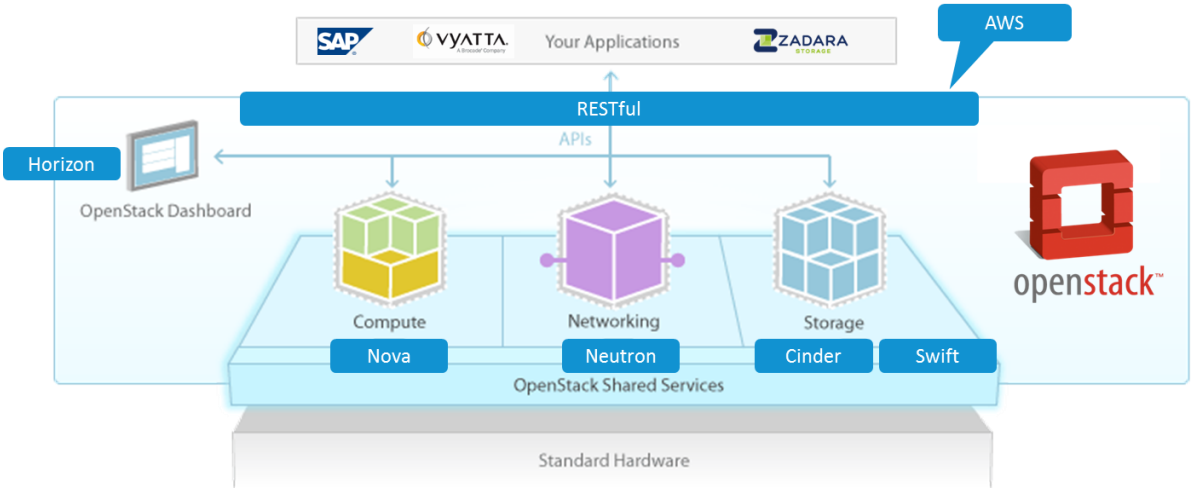
2016 Cloud & On-Premise *Voted by IT Pros*	Market Leader	Price Leader	Performance Leader	Reliability Leader	Service and Support Leader	Innovation Leader
On-Premises Enterprise Storage as a Service	Zadara	Zadara	Zadara	Zadara	Nimble	Zadara

Zadara Storage pioneered the new class of enterprise storage-as-a-service, and IT pros voted for Zadara in 5 of 6 every categories of brand leadership in 2016.

3. Software Defined Storage

The foundation of modern data center infrastructure is software defined servers (aka virtualized servers), software-defined networking, and software-defined storage. The benefit of software defined data center architecture is a quantum improvement in agility, efficiency and cost. New generations of features can be defined, developed and deployed in months instead of years; far fewer admins are required when software can automate admin functions; and the use of industry standard servers reduces cost on average about 40%.

Software Defined Data Centers

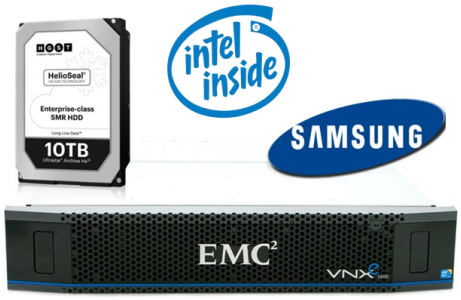


Unlike data centers of the past which included silos of proprietary server, networking and storage infrastructure, software defined data centers are instrumented with open APIs from top to bottom. The results are improved agility, efficiency and cost.

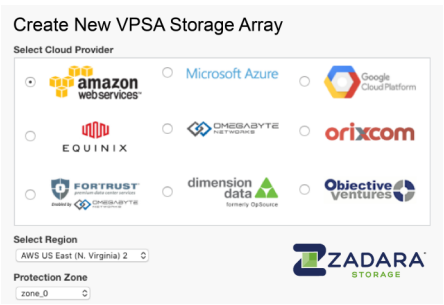
Software-defined architectures have changed the face of enterprise storage—from the brand of the hardware to the user interface for deploying storage as-as-service, either in the public cloud, or on-premise.

The Changing Face of Enterprise Storage

CapEx



OpEx

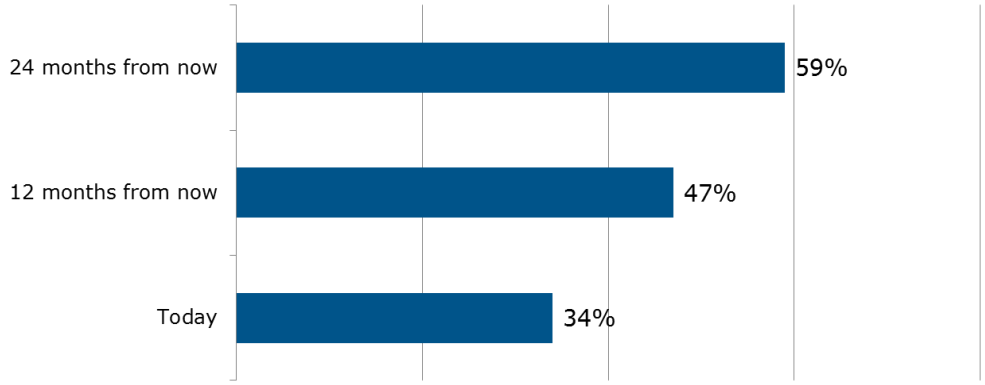


IT organizations using public cloud or on-premise storage-as-a-service are familiar with the software interface, and most likely don't know anything (or don't care) about the storage hardware deployed by their service provider.

4. All Flash Storage

"I like hard disk drive crashes, tuning a mix of HDDs with different speeds, and managing LUNs with hundreds of drives to achieve the IOPs needed"...said no one ever. All-flash storage has revolutionized enterprise storage by eliminating drive crashes and delivering 100x the performance in a lot less space than HDDs. Almost 50% of data center servers now have access to some type of SSD storage and the trend will continue as the price of flash memory continues to fall.

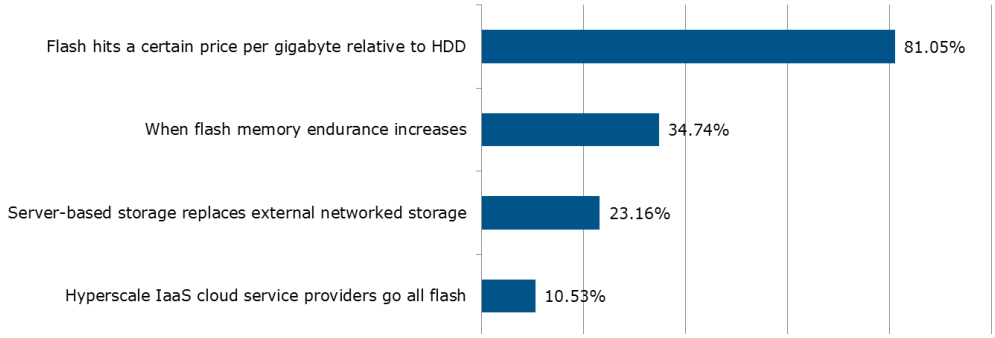
Percent of servers in my environment accessing some type of SSD storage



IT pros surveyed by IT Brand Pulse said that within the next 2 years, almost 60% of their servers will have access to SSD storage.

The question has shifted from "will you deploy flash storage?" to "when will your data center go all-flash?" The results of IT Brand Pulse surveys indicate it's mostly a pricing issue. IT organizations are trained to carefully select the storage media which is cost-optimized for the application. IT organizations are deploying all-flash today for transaction-intensive applications where all-flash storage is close to the same price as storage built with 15K or 10K RPM HDDs. For example, in a bold move, Zadara Storage announced they're pricing their SSD storage services the same or less expensive than HDD-based services.

All Flash Data Centers will happen when:



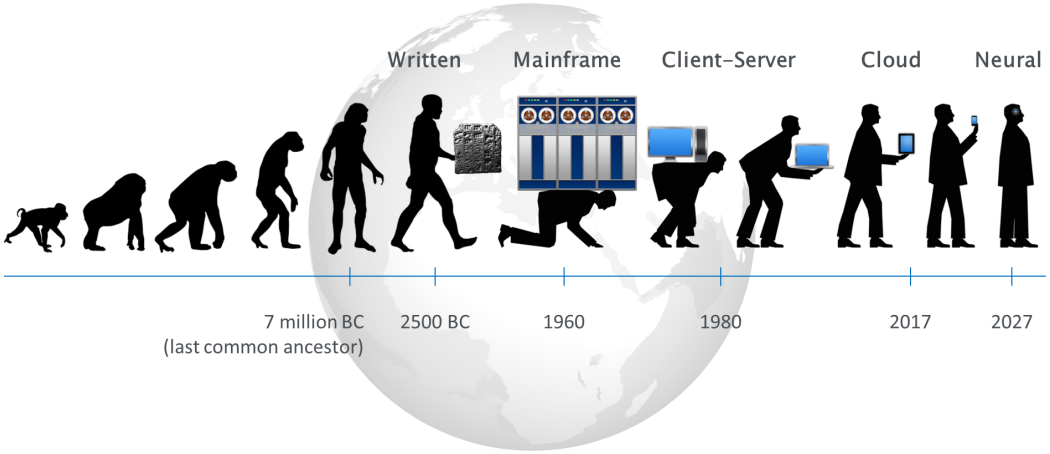
All flash storage will completely replace HDD storage if, and when, the price per gigabyte of flash is equal to the price of HDDs.

Five Trends Defining the Future

5. Artificial Intelligence

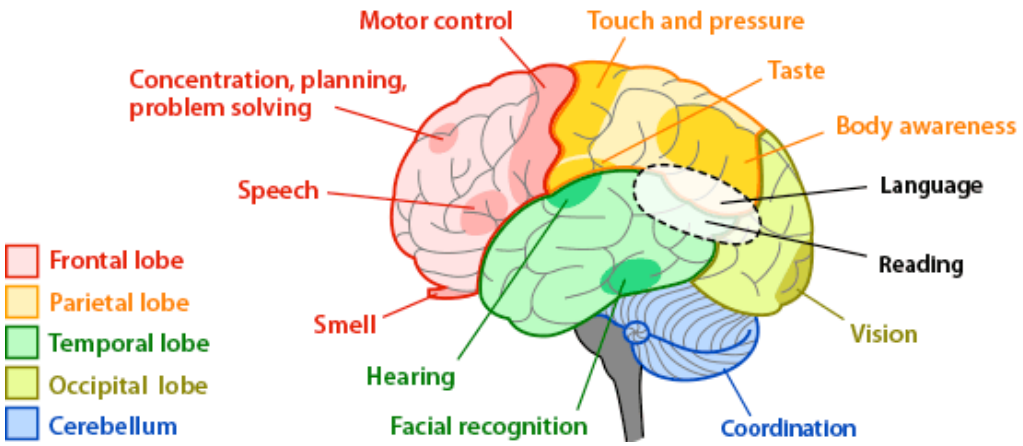
The IT industry—and to a large degree the human race—is undergoing the most breathtaking technology transformation since the invention of the transistor. Artificial intelligence will someday soon deliver computing environments which will possess the human-like cognitive abilities of sight, smell, touch, hearing and taste and, more profoundly, will have the ability to learn.

The Evolution of IT



The computing model underneath artificial intelligence is called neural networking. A neural network is a computer system modeled on the human brain and nervous system. A neural network simulates the behavior of biological neural networks (as in pattern recognition, language processing, and problem solving) with the goal of self-directed information processing.

Future IT is Built on Neural Networks Designed to Learn



Rather than hand-code software routines with a specific set of instructions, neural networks use layers of processing, massive amounts of data and algorithms to parse data, learn from it, and then make a determination or prediction about something in the world.

Five Trends Defining the Future

5. Artificial Intelligence (continued)

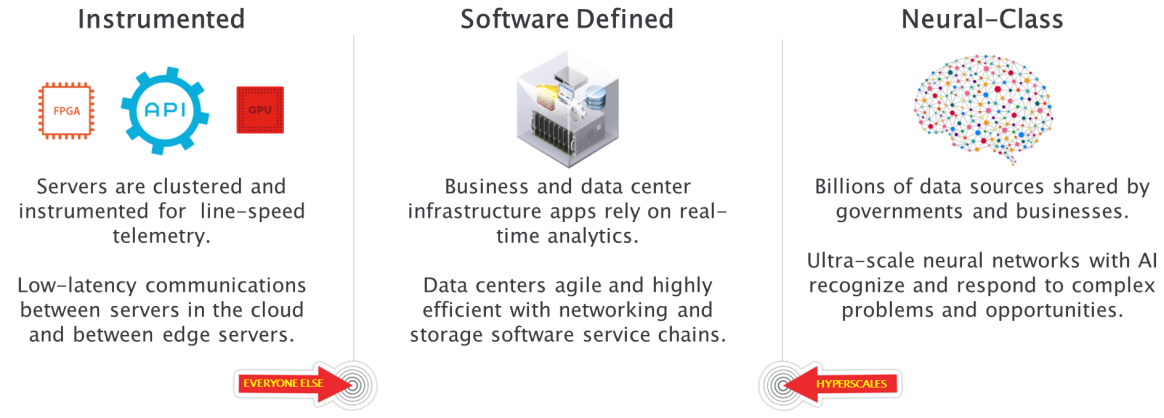
The result of artificial intelligence running on neural networks will be self-driving enterprise storage and eventually storage infrastructure which can learn to solve complex problems in its own. Below is the IT Brand Pulse classification system for self-driving storage based on the NHTSA model for automated driving systems. Within 5 years, hyperscale data centers will reach level 4 and full self-driving automation for enterprise storage.

IT Brand Pulse – Self Driving Storage System Classifications

	L0	L1	L2	L3	L4
	No Automation	Function-Specific Automation	Combined Function Automation	Limited Self-Driving Automation	Full Self-Driving Automation
Description	Admin in complete and sole control of primary storage controls (media, volume management, backup, replication, dedup, compression) at all times.	Automation of one or more primary storage control functions, but no combination of systems working in unison.	Automation of at least two primary storage control systems working in unison.	Admin able to cede full control of all performance and HA critical functions under certain conditions. Admin is expected to be available for occasional control, but with sufficiently comfortable transition time.	Self-driving storage can perform all performance and HA-critical driving and monitoring functions 24x7, 365 days a year.
Example		Virtualization (RAID) Automated backup Storage monitoring	HSM Storage migration QoS DELL EMC Hewlett Packard Enterprise	Service Chains Google amazon web services ZADARA STORAGE	Artificial Intelligence
Time Frame	Since enterprise-class storage invented - 1960s	1990s - Today	2000s - Today	2010s - Today	2020s

The industry road map to artificial intelligence and neural networks is a continuum which starts with the instrumentation of the data center, moves on to software defined infrastructure, and eventually includes huge neural networks needed to digest data from billions of sources of data flowing from the Internet of Things. Hyperscale cloud service providers are already entering the age of neural-class networks, while corporate IT is moving slowly into software defined data center architectures.

Enterprise Storage Technology Road Map



One Company is Already There

Zadara Storage

There are five trends which define what the future of enterprise storage looks like...and one company is already there.

- Zadara Storage pioneered on-premise storage-as-a-service (OPaaS), and is one of a small handful of enterprise storage-as-a-service providers with offerings available in the public cloud, on-premise and hybrid configurations.
- The company is leading the way to all-flash storage in a partnership with Intel. With Zadara, IT organizations can deploy SSD storage services for the same price as high-performance HDD storage.
- Zadara Storage is aggressively priced because the company has developed a software defined storage platform which is agile, efficient and low-cost.
- IT Brand Pulse expects Zadara Storage to be a leader in the development of enterprise storage with artificial intelligence, starting with predictive analysis.

The Bottom Line

It's time to think about enterprise storage differently. CapEx for enterprise storage is virtually obsolete now that IT organizations can deploy storage-as-a-service (OpEx) anywhere—cloud, on-premise, and hybrid—but pay for only the storage they consume. High performance HDD storage is a thing of the past as all-flash storage is available for the same price. And proprietary storage is a trap IT organizations can now avoid by deploying enterprise storage-as-a-service.

ZADARA
STORAGE

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.