



August 11, 2015

2015 Enterprise Flash Storage

Who's Adopting Them and Why

Frank Berry
Senior Analyst



This preview version does not show numerical data as presented in the Flash Memory Summit session.
The cost to purchase a copy of the full presentation (which includes all numerical data) is \$ 495.
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IT Brand Pulse



Year in Review



2015 Flash Brand Leaders



2015 Flash Adoption Trends

A trusted source to 20,000 IT
pro subscribers for product
testing, research, and analysis
about data center infrastructure



IT Brand Pulse



Year in Review



2015 Flash Brand Leaders



2015 Flash Adoption Trends

6'7" 250 lb. Penguins



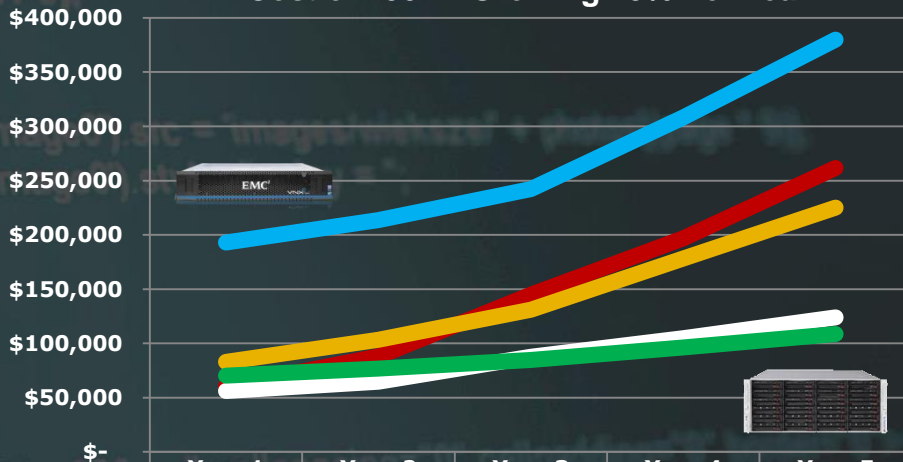


“[We] offer [TLC 3D NAND] SSDs at approximately the same price per gigabyte as high-end 15K HDDs and with up to 24 times performance improvement, up to six times the density, lower latency and lower power consumption”. – Dell, 7/21/15

Software Defined [Flash] Storage



Cost of 250TB Growing 25% Per Year



	Year 1	Year 2	Year 3	Year 4	Year 5
EMC VNXe 3200	\$192,922	\$213,468	\$242,108	\$308,338	\$380,010
NetApp E2700	\$60,206	\$87,838	\$144,718	\$196,890	\$261,622
NEC M110	\$83,017	\$103,285	\$130,975	\$178,055	\$225,203
Dot Hill Ultra56	\$55,979	\$64,493	\$87,555	\$104,713	\$123,774
SUSE Enterprise Storage	\$70,100	\$76,579	\$84,825	\$96,238	\$108,607

Flash reliability breaks out

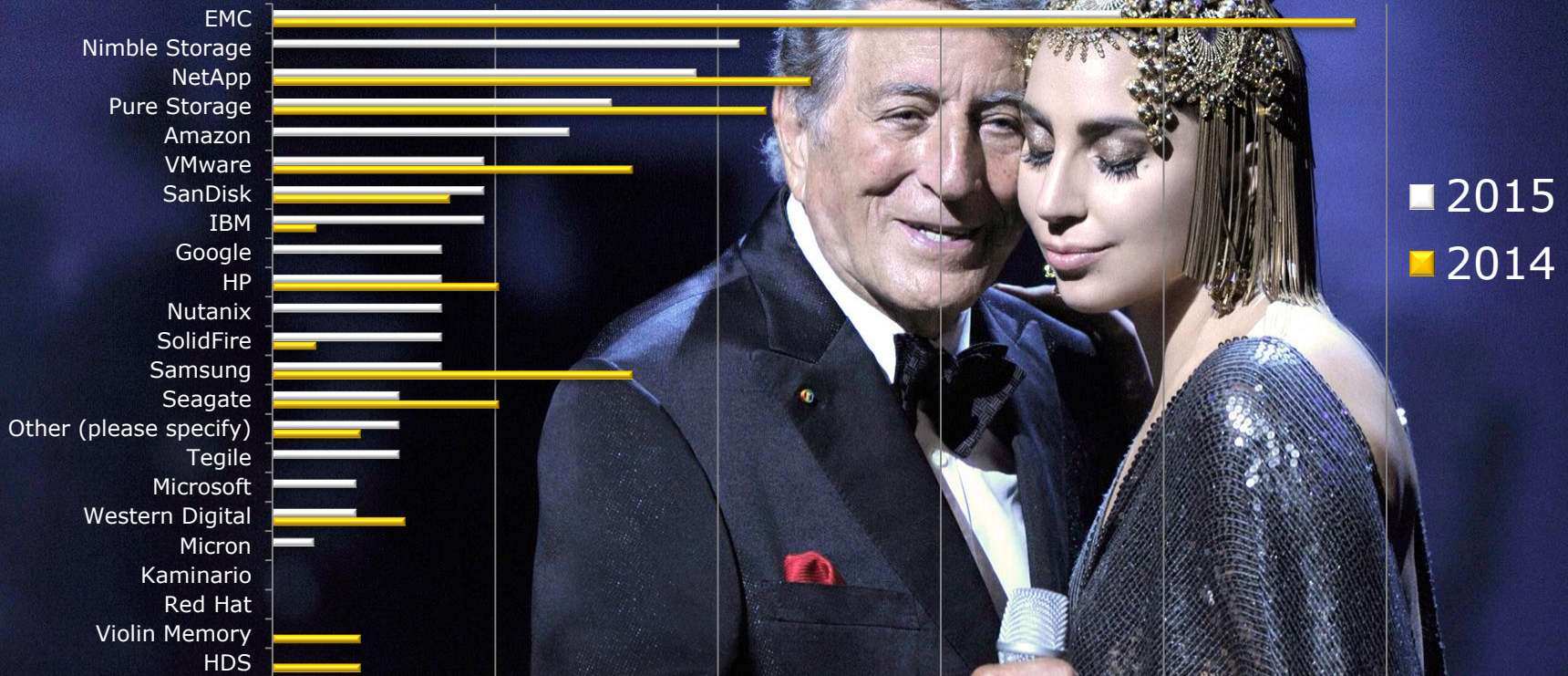




SOFTLAYER[®]
an IBM Company

**Enterprise IT OEM public clouds rolled
back out as fast as they rolled in**

I believe the hottest storage company over the last year was:





IT Brand Pulse



Year in Review



2015 Flash Brand Leaders



2015 Flash Adoption Trends

The Symbols for IT Brand Leadership



Servers

hp For Home For Work Support

HP ProLiant Awards and Honors

HP ProLiant and HP BladeSystem

HP ProLiant and HP BladeSystem wins multiple awards at the 2012 IT Brand Pulse Awards for its innovation leadership in Enterprise Servers (2nd Year), Midrange Servers, Microservers, Blade Servers (3rd Year), Embedded Blade Server Networking, Servers for VMs and HPC Servers.

Microsoft

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And Again: ProLiant Powers Great Technology Series

The award was based on a survey of IT professionals from large enterprise, medium enterprise and HPC environments. IT Brand Pulse is an industry organization that provides research, data and analysis about IT infrastructures.

It is fantastic that Microsoft and its engineers are being recognized for the hard work they are doing for the greater good of the networking industry. We demand unparalleled performance from our products and continuously strive to transform the world of software, cloud infrastructure and services by addressing the evolving technical challenges facing Software-Defined Networks (SDN).

We hope that by sharing our best practices, we will help to increase the performance and efficiency within the entire industry. In doing so, we can all achieve a higher level of satisfaction among our customers and partners.

Operating Systems

Storage

EMC XtremIO

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Uptime Institute's Green Energy IT Award

Best of Show Award- Flash Memory Summit 2013

IT Brand Pulse Innovation Award

VCE

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PRESS RELEASES

VCE CAPTURES IT BRAND PULSE AWARD FOR MOST INNOVATIVE CONVERGED INFRASTRUCTURE

RICHARDSON, TX -- December 20, 2012 -- VCE, the leader in converged cloud infrastructure systems, was awarded the 2012 IT Brand Pulse leader for converged infrastructure in an industry survey of IT professionals. VCE swept first place in five of six categories, including Market Leader, Innovation Leader, Performance Leader, Reliability Leader and Service & Support Leader.

VCE technologies help companies and organizations accelerate the adoption of cloud computing. Its **Vblock Systems** bring together leading technologies from Cisco, EMC and VMware into a single, integrated and pre-configured converged infrastructure system with seamless support.

Converged Systems

Networking

cisco Cisco Blogs

Cisco Blog Data Center and Cloud

IT Brand Pulse Award 2014: Cisco established brand leadership for the fifth

BROADCOM

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Press Release

IT Professionals Honor Broadcom with Brand Leader Award

Broadcom Selected as Leading Vendor of Ethernet LAN-on-Motherboard Solutions in Annual IT Brand Pulse Report

IRVINE, Calif., Jan. 12, 2011 (PRNewswire) - Broadcom Corporation (Nasdaq: BRCM), a global leader in semiconductors for wired and wireless communications, today announced that it has received awards in five brand leadership categories for Ethernet LAN-on-Motherboard (LOM) - The Best of the Industry, Ethernet LAN-on-Motherboard, IT

Chips

Select List of Survey Respondents

AHCCCS
AHIP
Alba Health
Alliant Techsystems
American Airlines
AOL
Aramco
Argonne National Labs
Assurant
Astoria Bank
ATPCO
AT&T
Attorneys Title Fund Services
Bank of America
Baylor College of Medicine
Bellin
Berkshire Capital Securities
Biotek
Booz Allen Hamilton
Boston Dynamics
CA Traffic Safety Institute
Capital One
Christus Health
Chubb
Criminal Justice Institute

Colliers L&A
DARPA
Delta Airlines
Department of Defense
Disney Interactive
Duke University
Duchesne University
Employment Development Dept.
Entercom
Ernst and Young
Expedia
Exxon Mobil
Fermilab
Ford Motor
Fluor
GE
General Motors
Gulfstream Aerospace
Houghton Mifflin Harcourt
Independence Blue Cross
Intuitive Surgical (ISRG)
ITG
JP Morgan Chase
Kaspersky Lab
Kingston Technology







Lockheed Martin Space Systems
Monsanto
Morgan Stanley
NASA Ames Research Center
National Institute of Health
Nationwide Insurance
Navistar
NAVMISSA
New York Life
Nielsen
NYSE
Omnicom
Owens Corning
Philips
Pitney Bowes
Planar Systems, inc.
Polycom, Inc.
Pratt & Whitney
Providence Health
Prudential
Purdue University
Reallusion
REI
Sandia National Labs
Siemens

Social Security Administration
Sony Online Entertainment
St. Luke's Hospital
State of PA (Security)
Target
TD Bank
The Children's Hospital of Philadelphia
The Forum Corporation
The University of Chicago
T-Mobile
TMX
Transamerica
UCSB
UBS
United Airlines
United Health Services
United Nations Federal Credit Union
Universal Parks and Resorts
USC Marshall School of Business
Verizon
Virginia Tech
Walmart
Wells Fargo
Yale University

2015 Flash Storage Brand Leader Survey Results

Brand Leaders



						
All Flash Converged System	HP	HP	HP	HP	HP	HP
All Flash Fibre Channel Array	EMC	Dell	HP	IBM	EMC	IBM
All Flash Hyperconverged System	Nutanix	HP	Nutanix	HP	HP	Nutanix
All Flash InfiniBand Array	NetApp	IBM	NetApp	IBM	IBM	NetApp
All Flash iSCSI Array	Dell	Dell	Dell	Dell	Dell	Dell
All Flash NAS Array	NetApp	NetApp	NetApp	NetApp	NetApp	NetApp
All Flash PCIe Adapter	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk
All Flash Unified SAN/NAS Array	NetApp	NetApp	NetApp	NetApp	EMC	NetApp
Flash Caching Software	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk
Hybrid HDD/SSD Array	EMC	HP	EMC	EMC	EMC	Nimble Storage
Memory Channel Storage	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk
SAS/SATA SSD Module	Samsung	Seagate	Samsung	Samsung	Seagate	Samsung
SSD Controller Chip	Intel	Intel	Intel	Intel	Intel	Intel



IT Brand Pulse



Year in Review



2015 Flash Brand Leaders

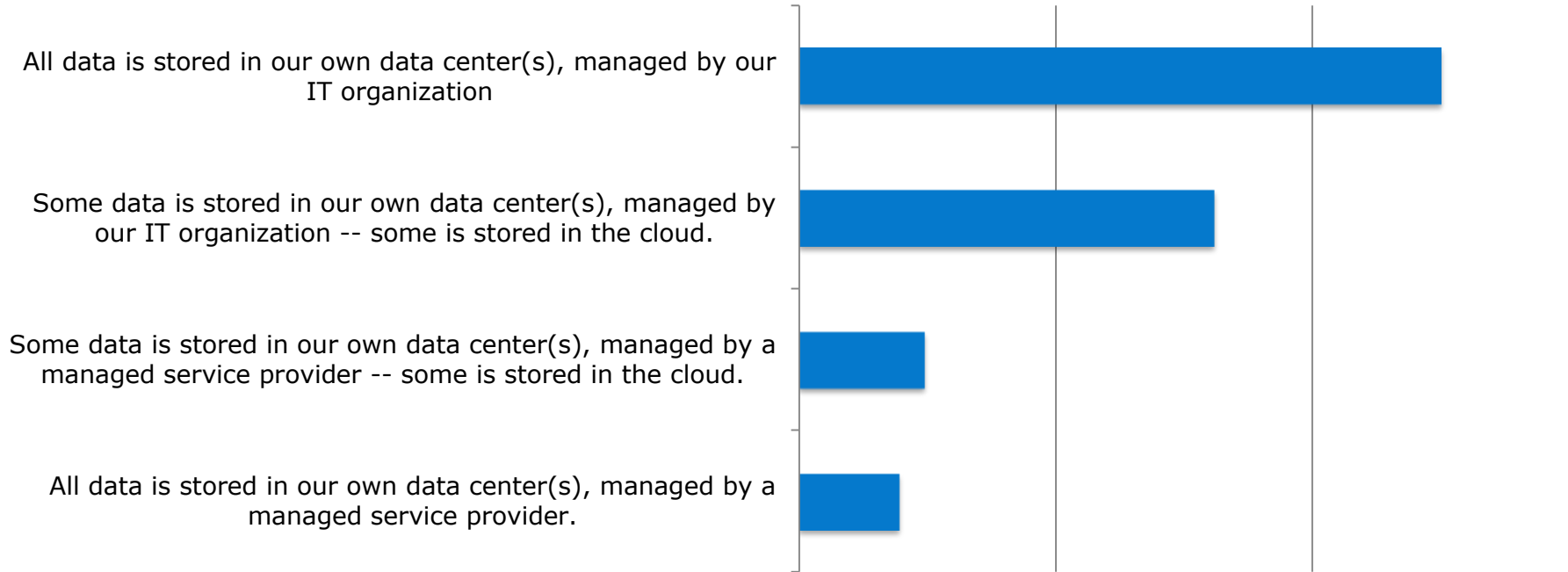


2015 Flash Adoption Trends

IT Strategy

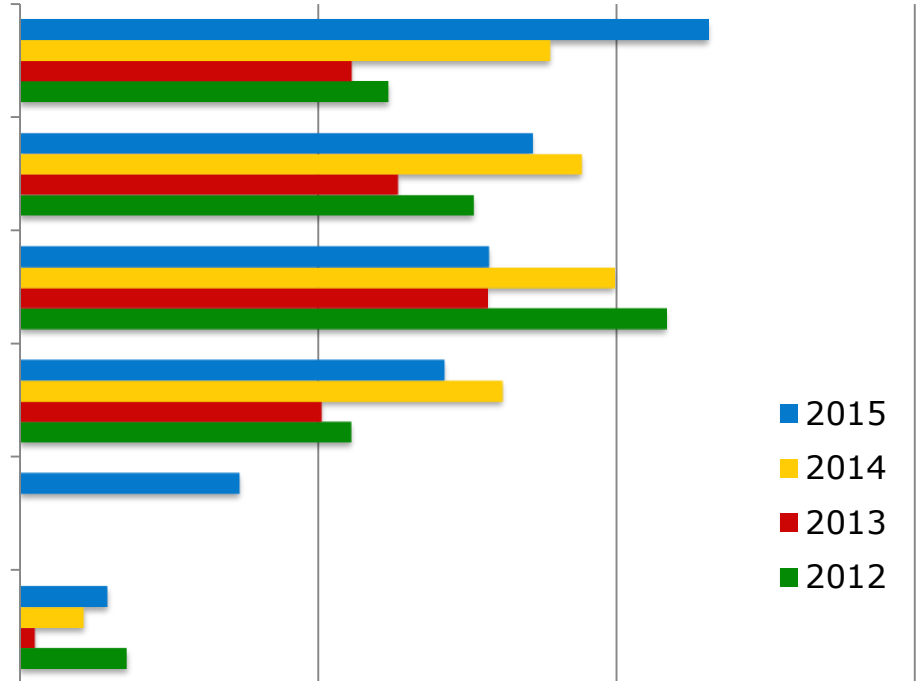


My company's storage strategy for frequently-accessed data from our core business applications is:

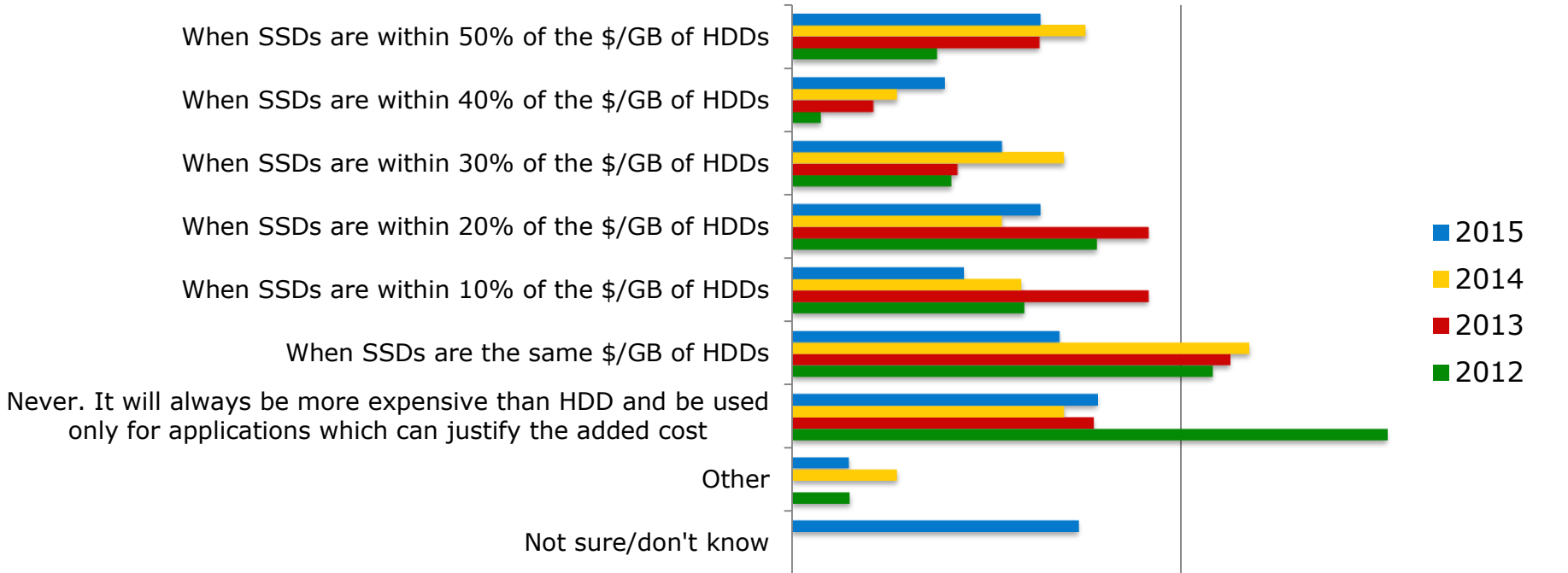


My organization uses the following SSD strategies (select all that apply):

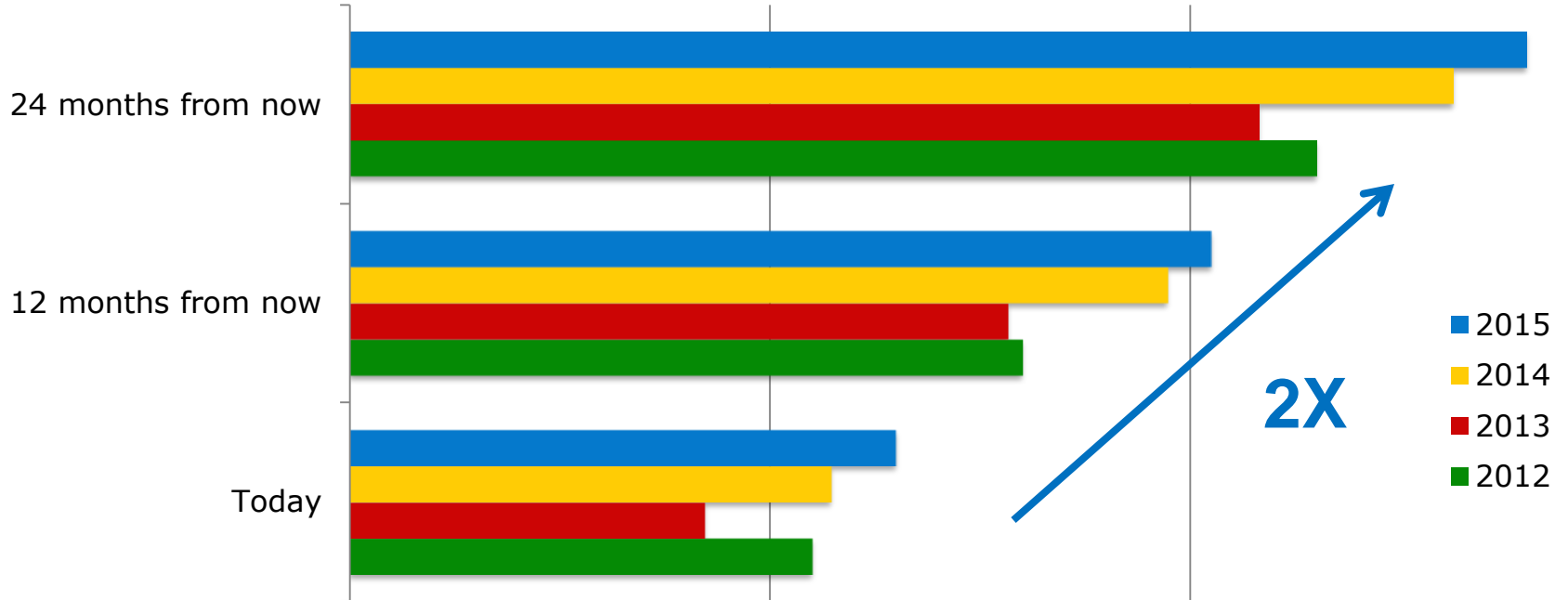
- Add SSD to disk arrays because we trust our disk array products and vendors, and we are familiar with how to deploy and manage them
- Use SAN based SSD arrays because the performance is much better than disk-based SAN arrays and it can be shared by all servers
- Use disk-based storage because SSD is too expensive
- Use server based SSD because it is closest to the processor thus offering the absolute best performance
- Server-based flash because our software defined storage software uses only server-based storage.
- Other (don't know)



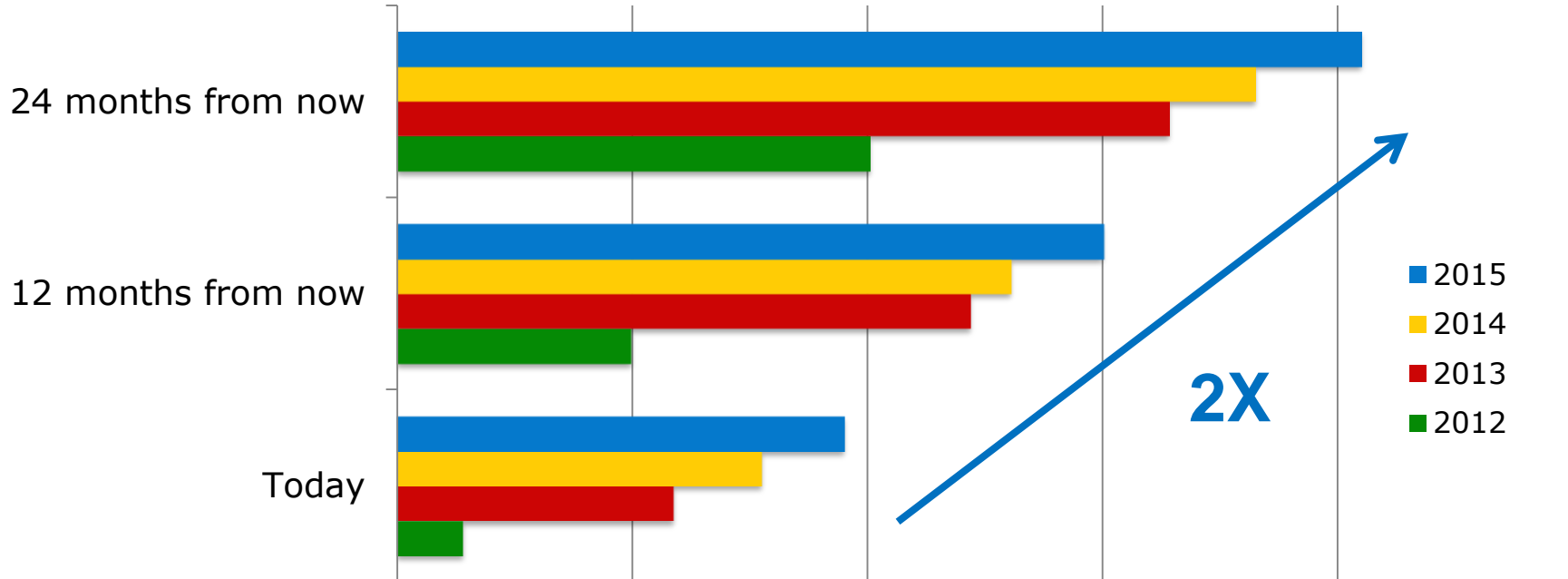
My organization plans to completely replace HDDs and deploy SSD as primary storage:



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



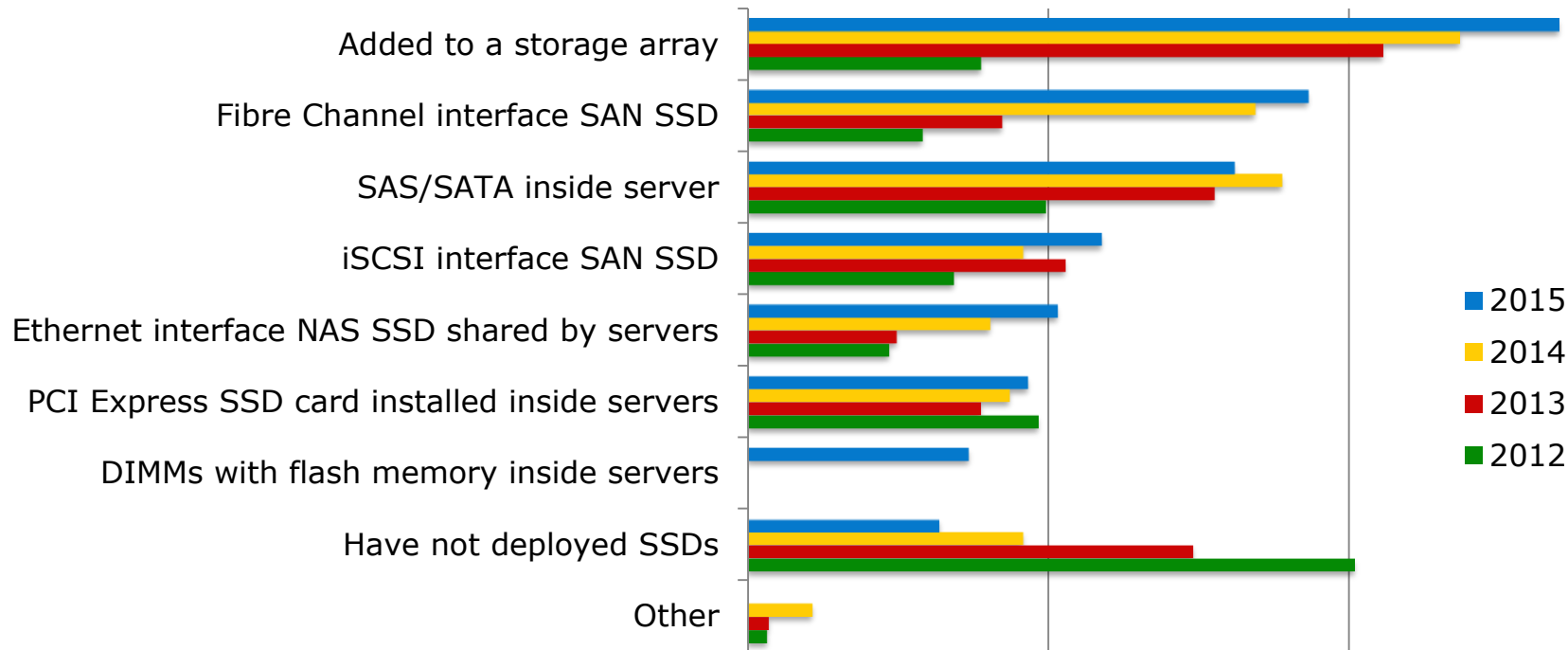
SSD will comprise approximately this percentage of my organization's combined SSD and HDD disk capacity:



IT Purchases



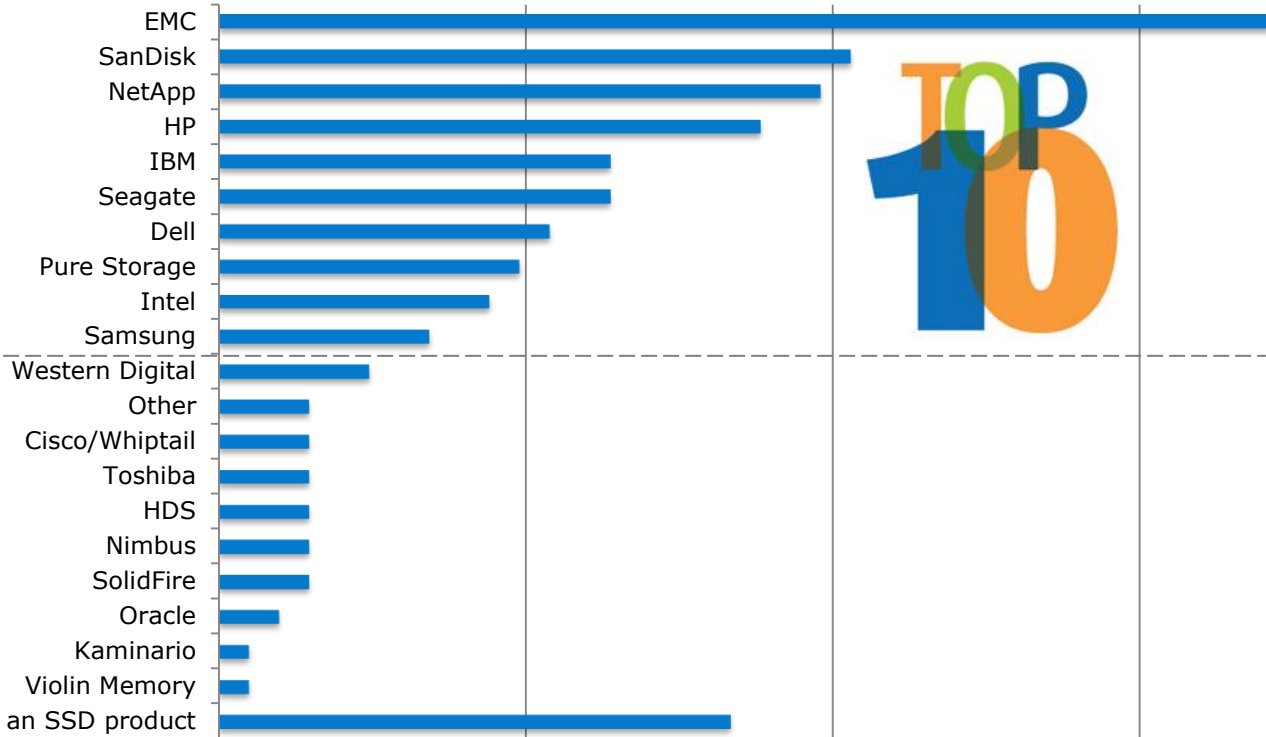
My organization has deployed the following types of SSD products (select all that apply):



I purchased the following brands of flash storage in the last year:

1 of 10 <\$5B

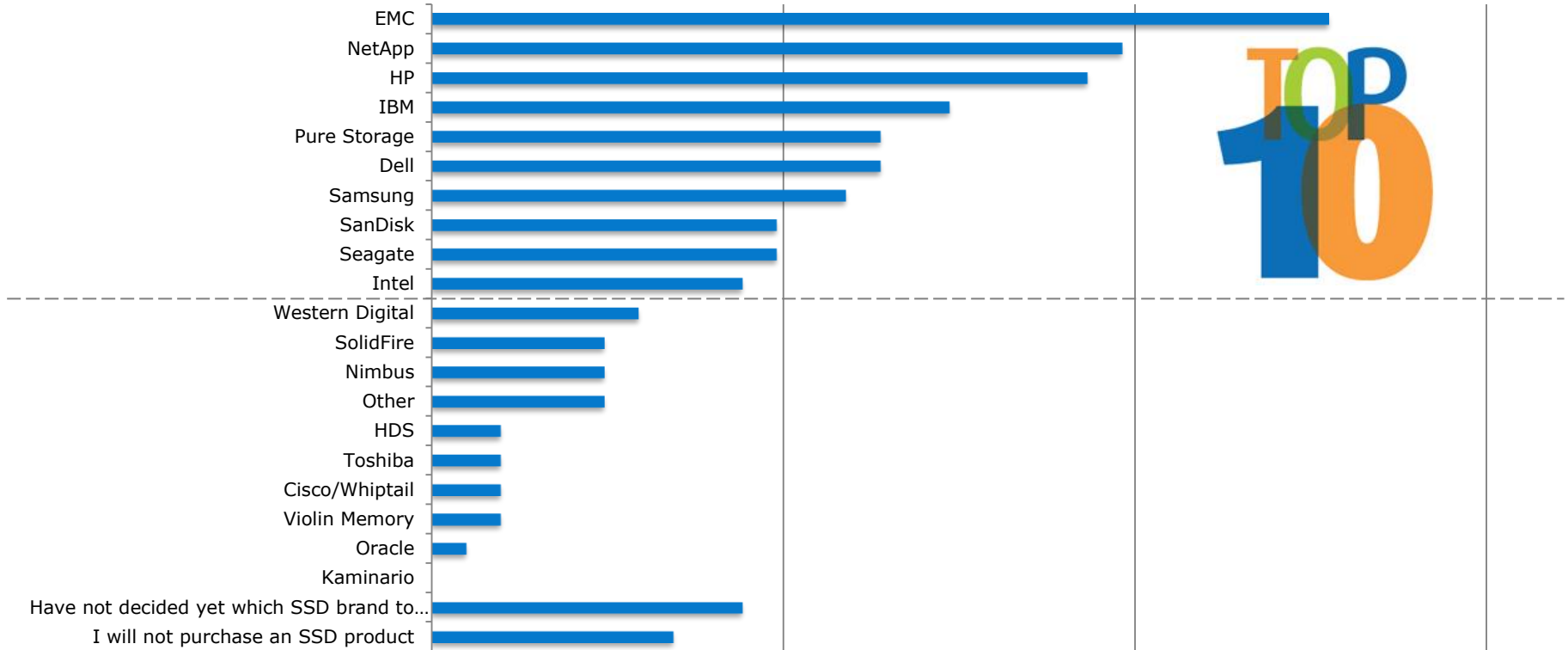
TOP
10



I purchased the following brands of enterprise flash storage in the last year (select all that apply):

	2012		2013		2014		2015	
1	Intel	_%	Dell	_%	EMC	_%	EMC	_%
2	SanDisk	_%	Western Digital	_%	Samsung	_%	SanDisk	_%
3	HP	_%	Samsung	_%	NetApp	_%	NetApp	_%
4	Toshiba	_%	Intel	_%	HP	_%	HP	_%
5	EMC	_%	HP	_%	SanDisk	_%	Seagate	_%
6	IBM	_%	SanDisk	_%	Seagate	_%	IBM	_%
7	Seagate	_%	Toshiba	_%	Western Digital	_%	Dell	_%
8	Dell	_%	Seagate	_%	Dell	_%	Pure Storage	_%
9	Western Digital	_%	NetApp	_%	Intel	_%	Intel	_%
10	Samsung	_%	EMC	_%	IBM	_%	Samsung	_%
	Did not purchase SSD product	_%	Did not purchase SSD product	_%	Did not purchase SSD product	_%	Did not purchase SSD product	_%

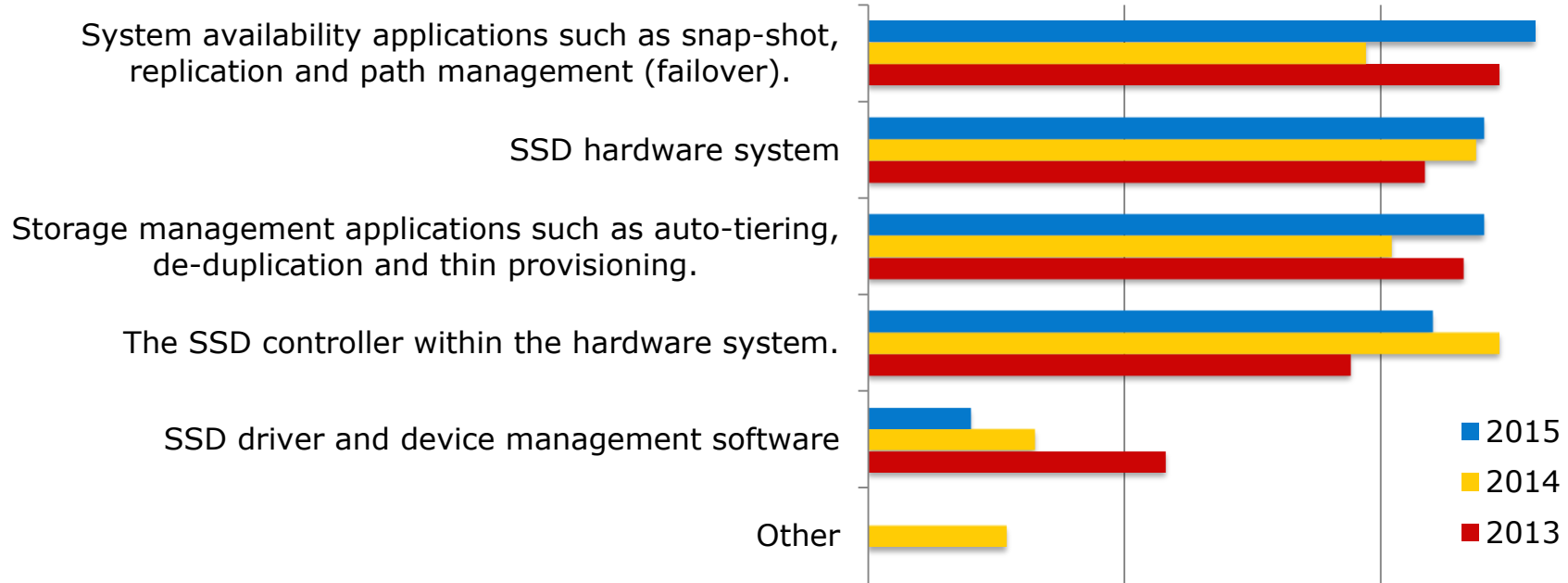
I will purchase the following brands of flash storage in the next 12 months:



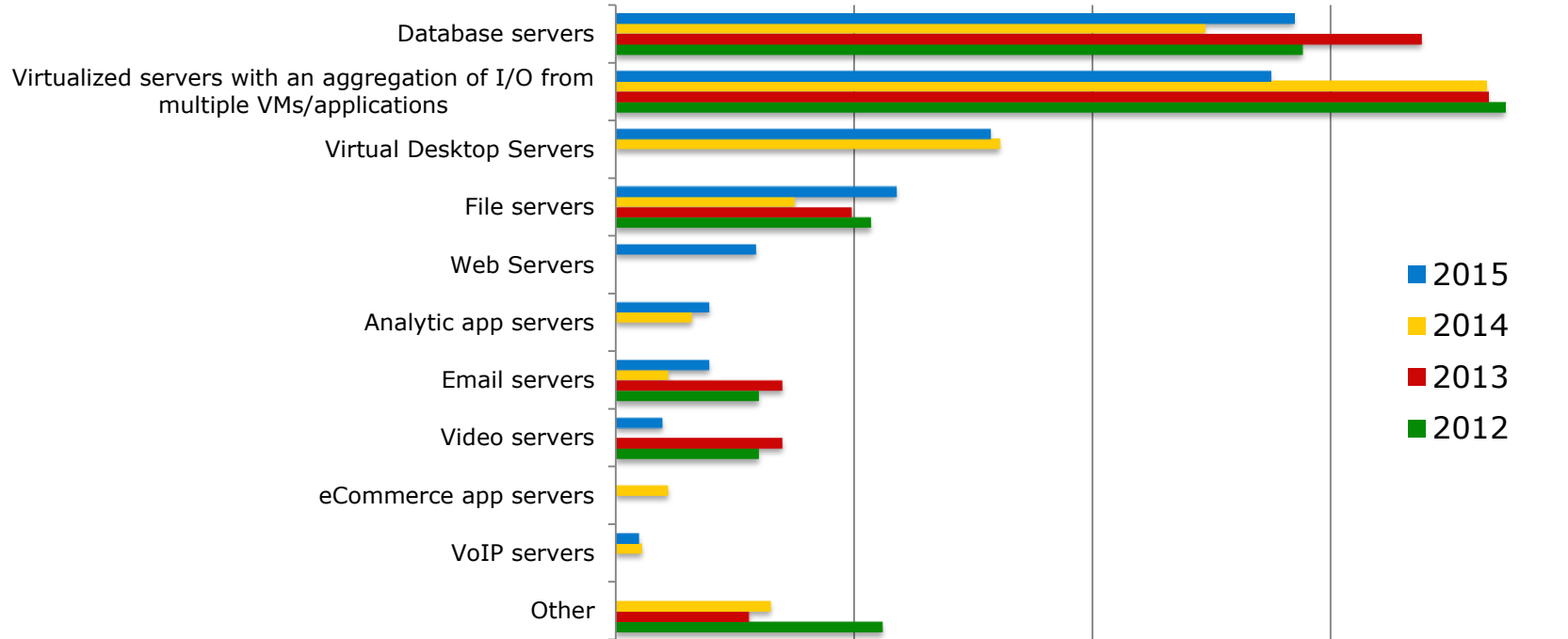
A high-angle photograph of a person walking away from the camera on a dirt path in a park. The person is wearing a dark jacket and carrying a red bag. To the right of the path is a paved walkway, a young tree, a bench, and a building in the background. The scene is brightly lit, casting shadows. A black rectangular box with white text is overlaid on the lower-left portion of the image.

IT Preferences

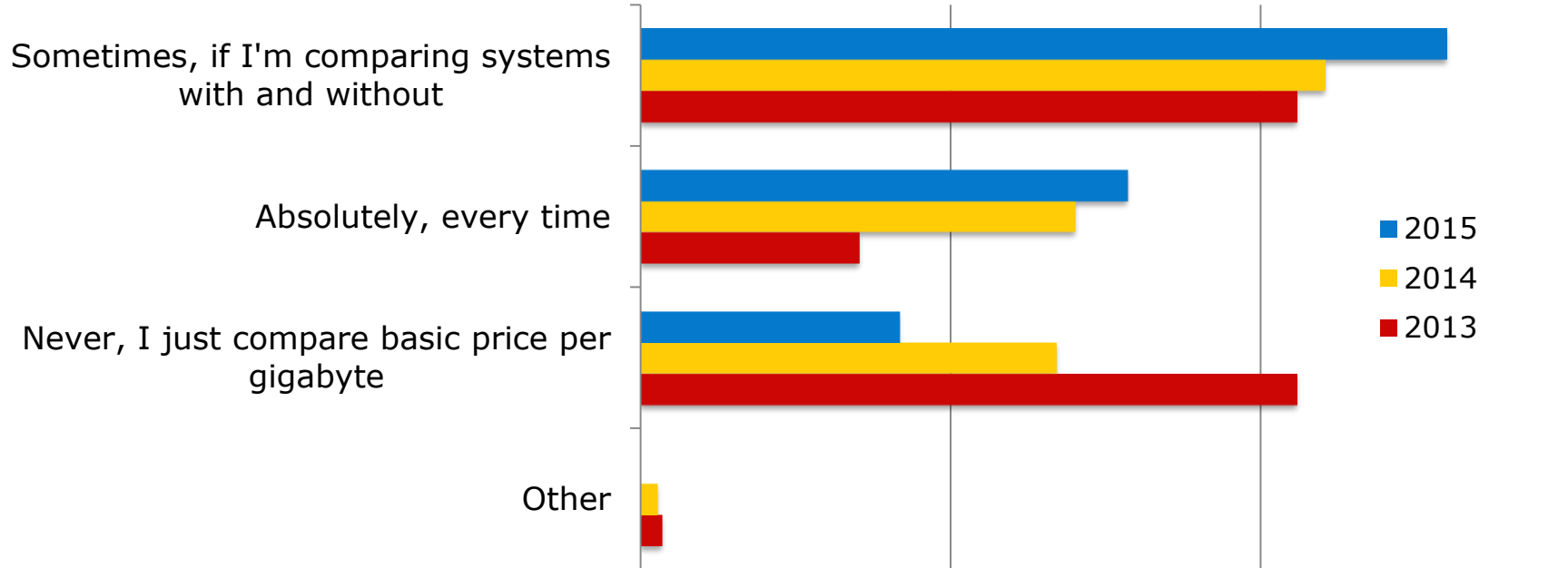
The most strategic (irreplaceable) component of a complete SSD storage solution is the:



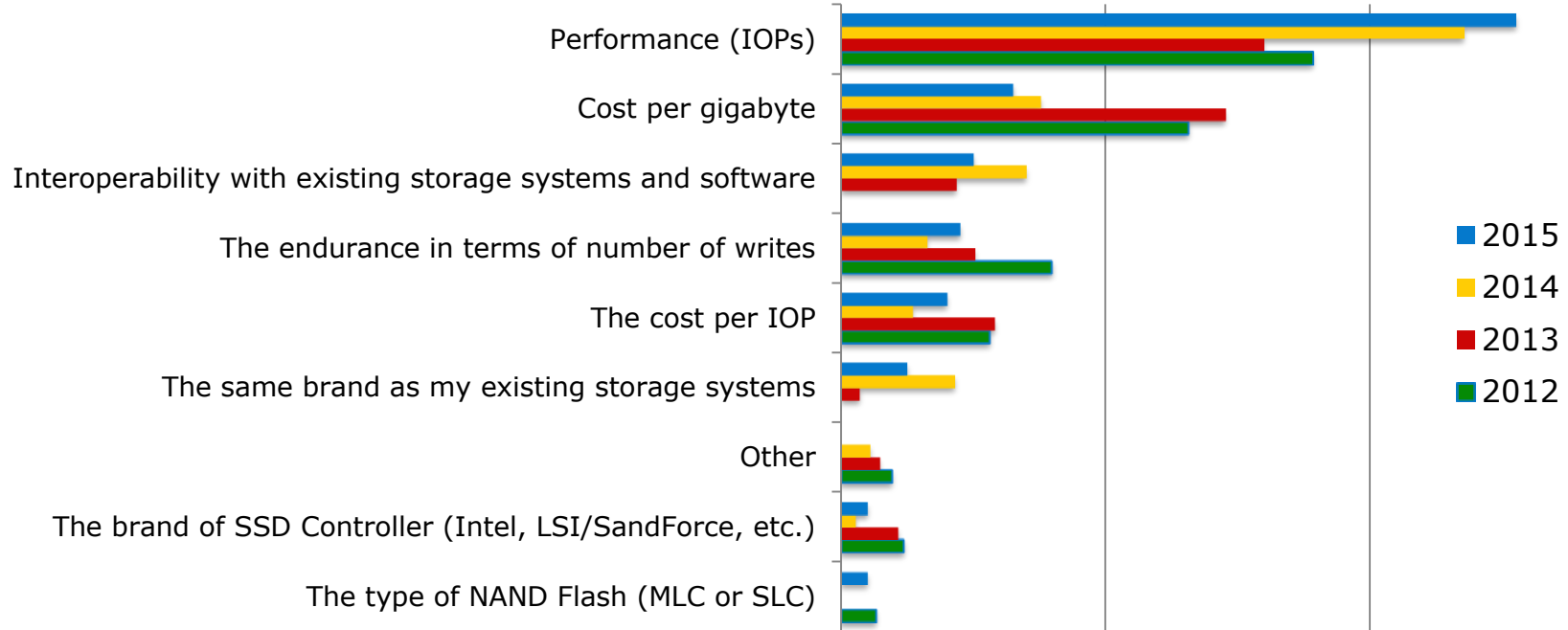
The following type of server most driving the adoption of SSD in my environment is:



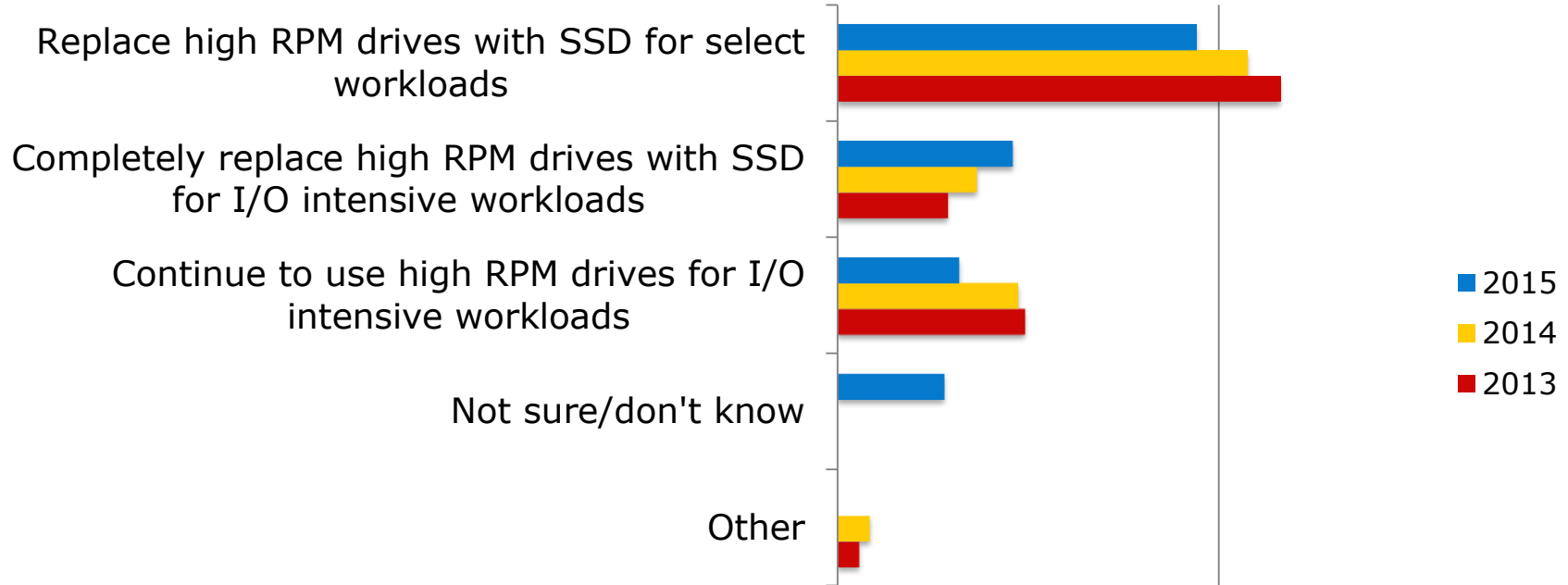
When I purchase HDD and SSD storage, I factor in compression, de-duplication and thin-provisioning to calculate my price per "usable" gigabyte:



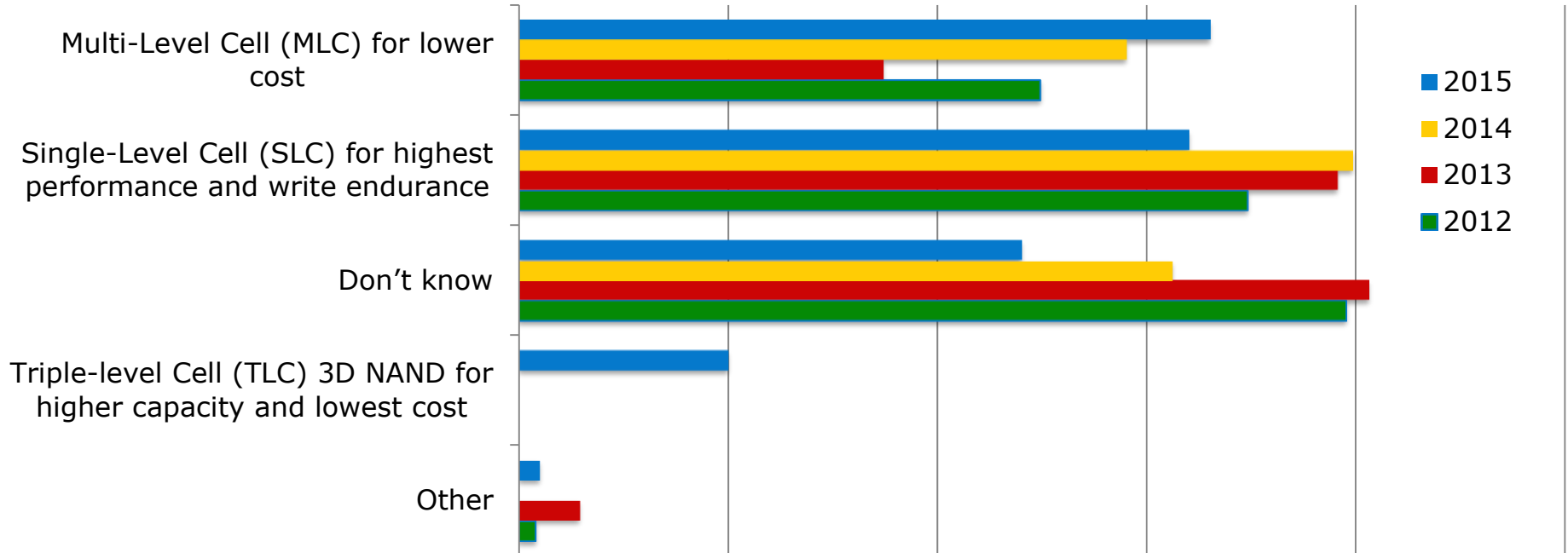
The most important feature of an SSD for my environment is:



My organization's strategy for SSDs vs. High RPM Drives:



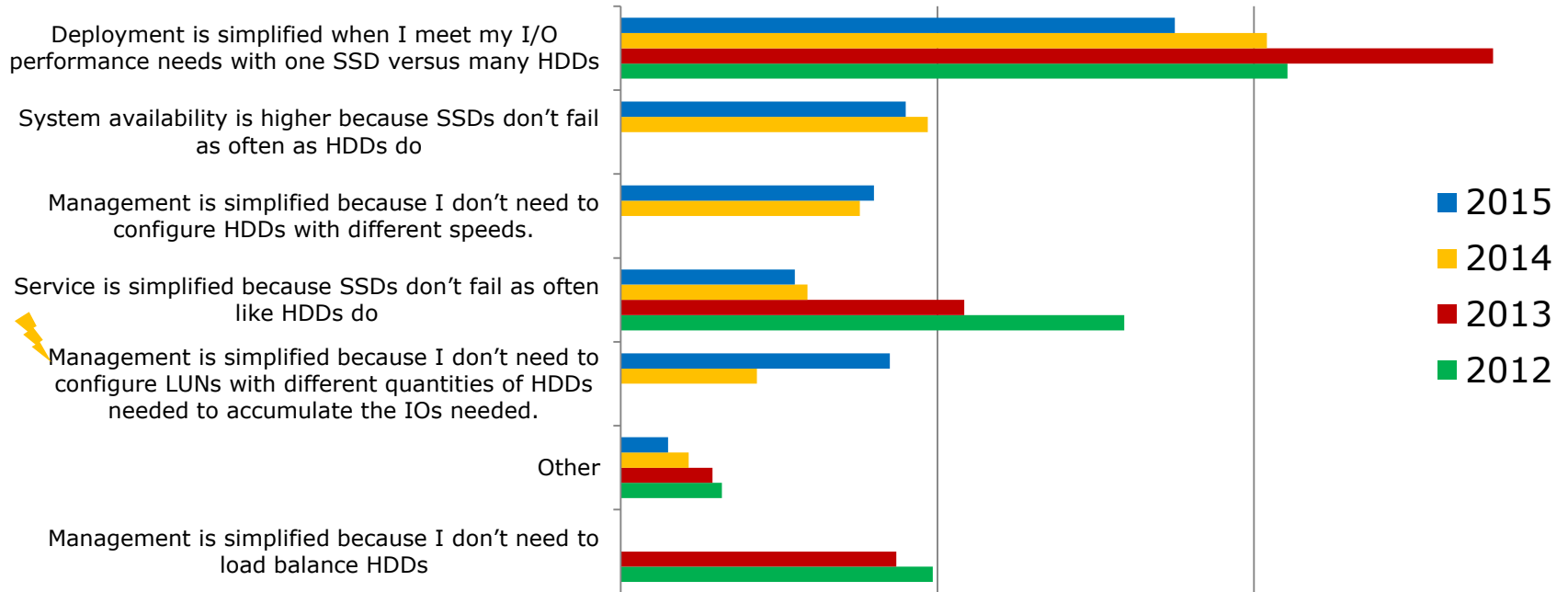
SSDs with the following type of NAND Flash are best suited for my environment:



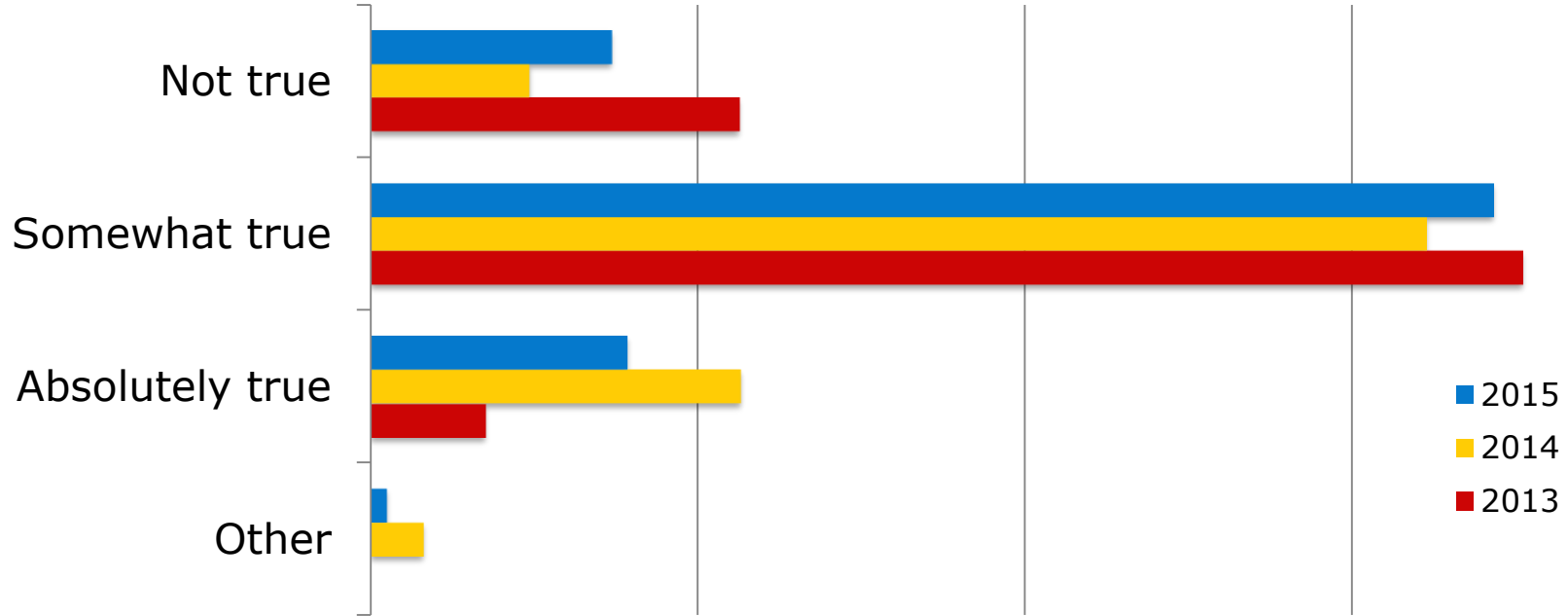
My experience with SSD so far (all that apply):



What I value most from SSDs is:



A substantially longer warranty period for SSD storage systems is a strong indicator that SSD technology is more reliable than HDD storage systems. I believe this is:



I believe the warranty periods for all-flash arrays are:

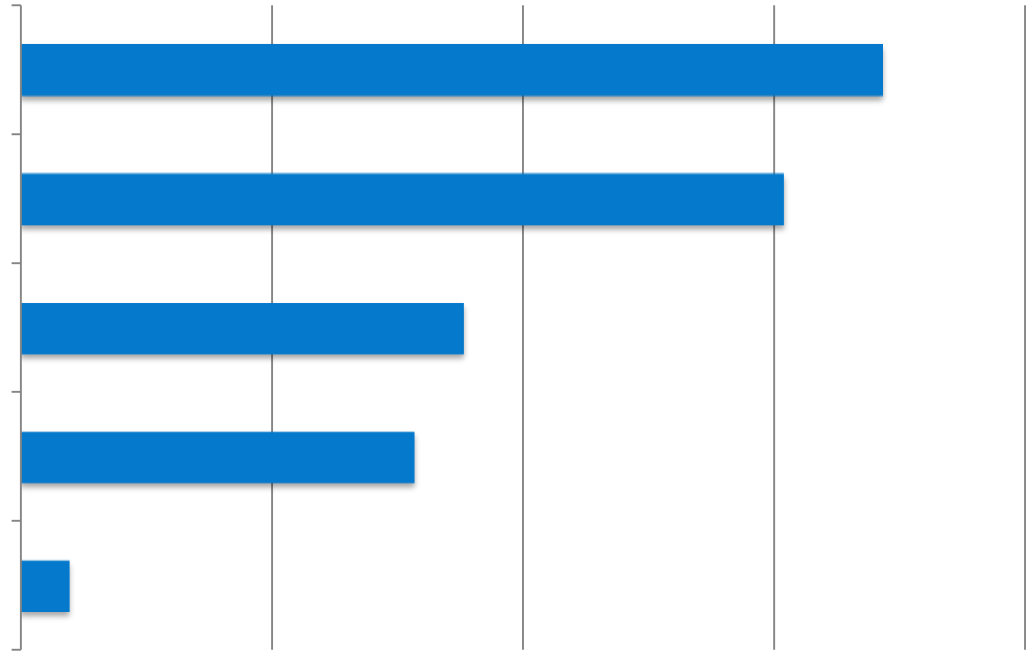
The same as the warranty period for disk arrays

Longer than the warranty period for disk arrays

Shorter than the warranty period for disk arrays

Don't know

Other





New Technology

This best describes where I'm at with adoption of these new flash storage related technologies:

	Memory Channel	3D NAND/TLC	DSSD	Hyperconverged systems	Software defined storage	NVM Express (NVMe)
I have not heard of it.	_%	_%	_%	_%	_%	_%
I am aware of it, but I have no interest.	_%	_%	_%	_%	_%	_%
I have heard of it, but I have not investigated.	_%	_%	_%	_%	_%	_%
I plan on evaluating it / products using it.	_%	_%	_%	_%	_%	_%
I am evaluating it / products using it.	_%	_%	_%	_%	_%	_%

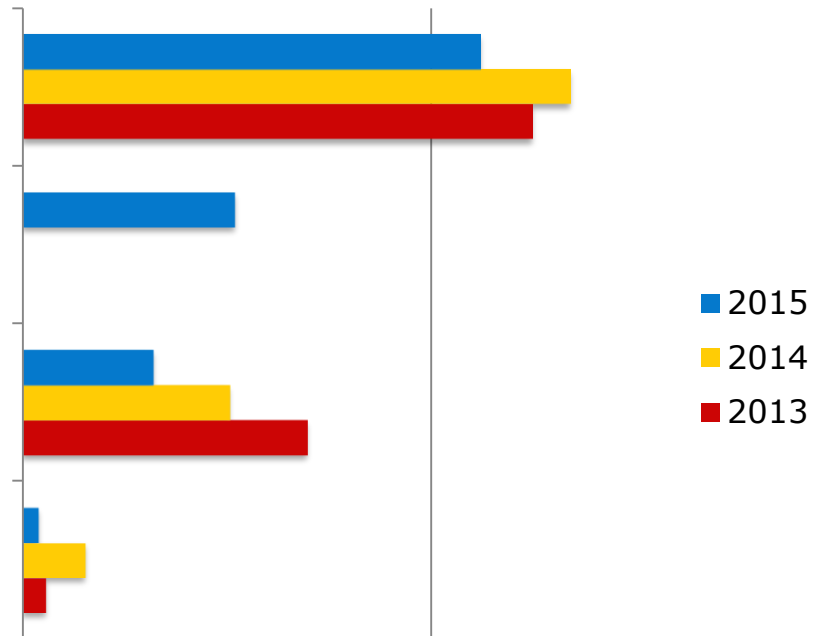
I see Software Defined Storage as a technology that:

Will emerge as a class of storage virtualization software separate from the storage hardware--and more important than the commodity storage hardware.

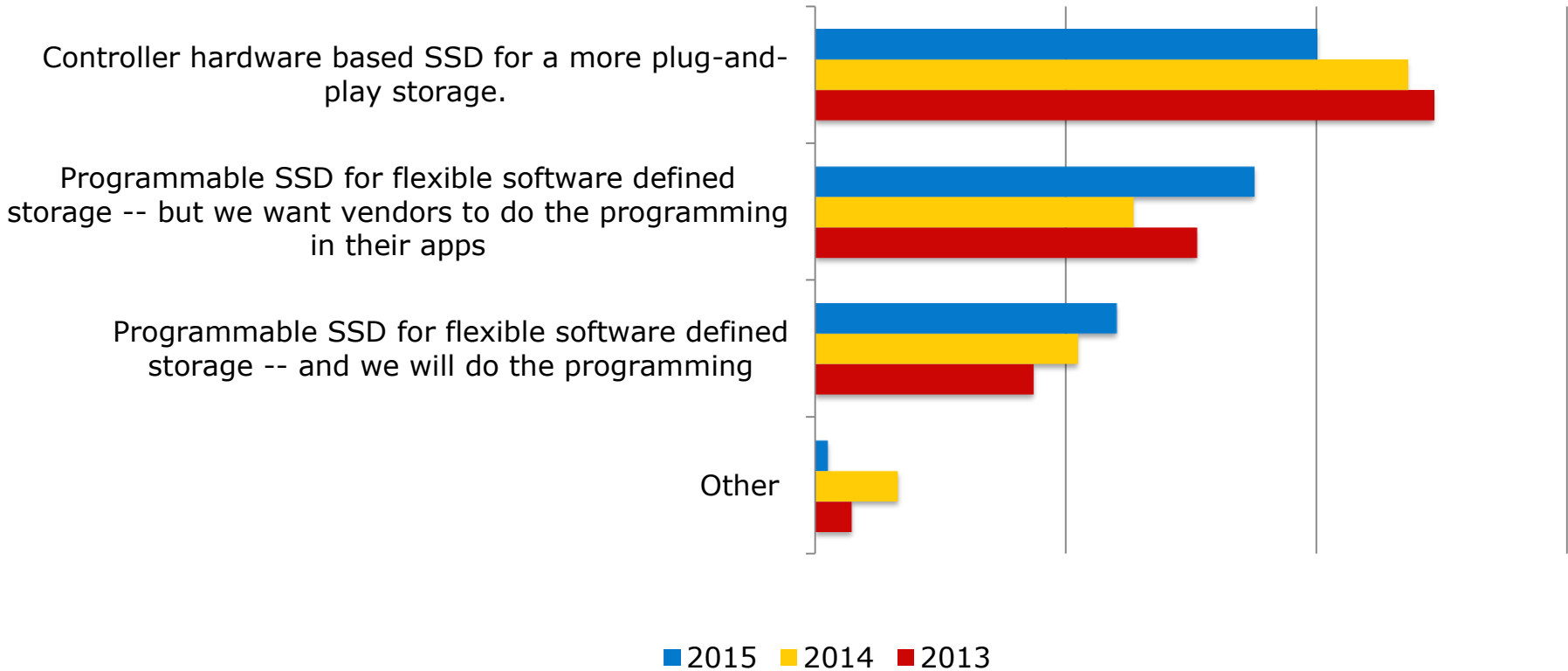
Not sure/don't know

Is an inseparable feature of an enterprise storage "solution"

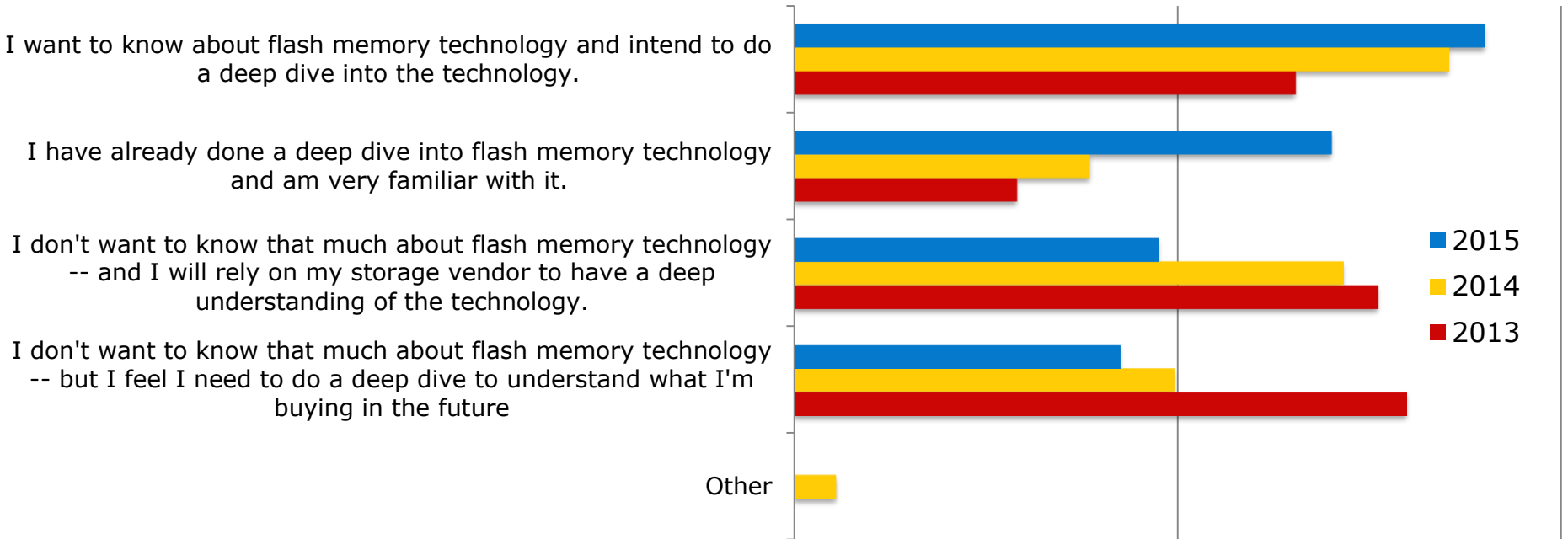
Other



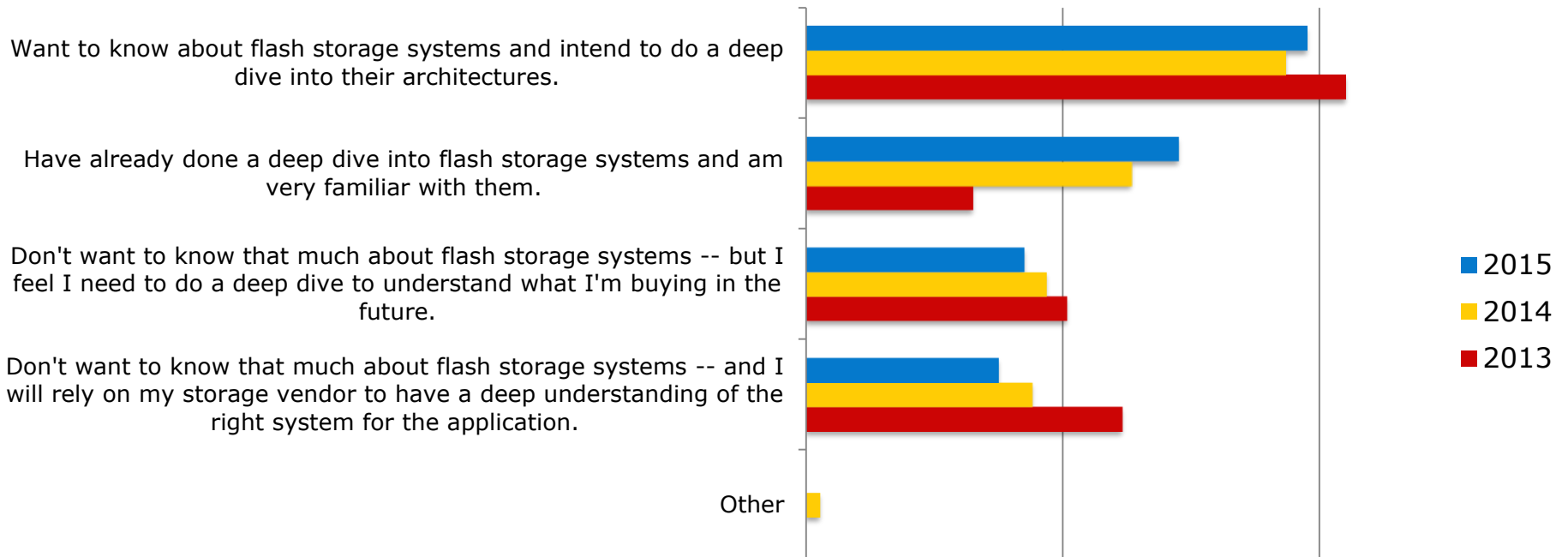
Some SSD products are "programmable" so they fit into a software defined storage environment. Other SSD products have most functions embedded in the controller hardware. What is best for my organization in the future is:



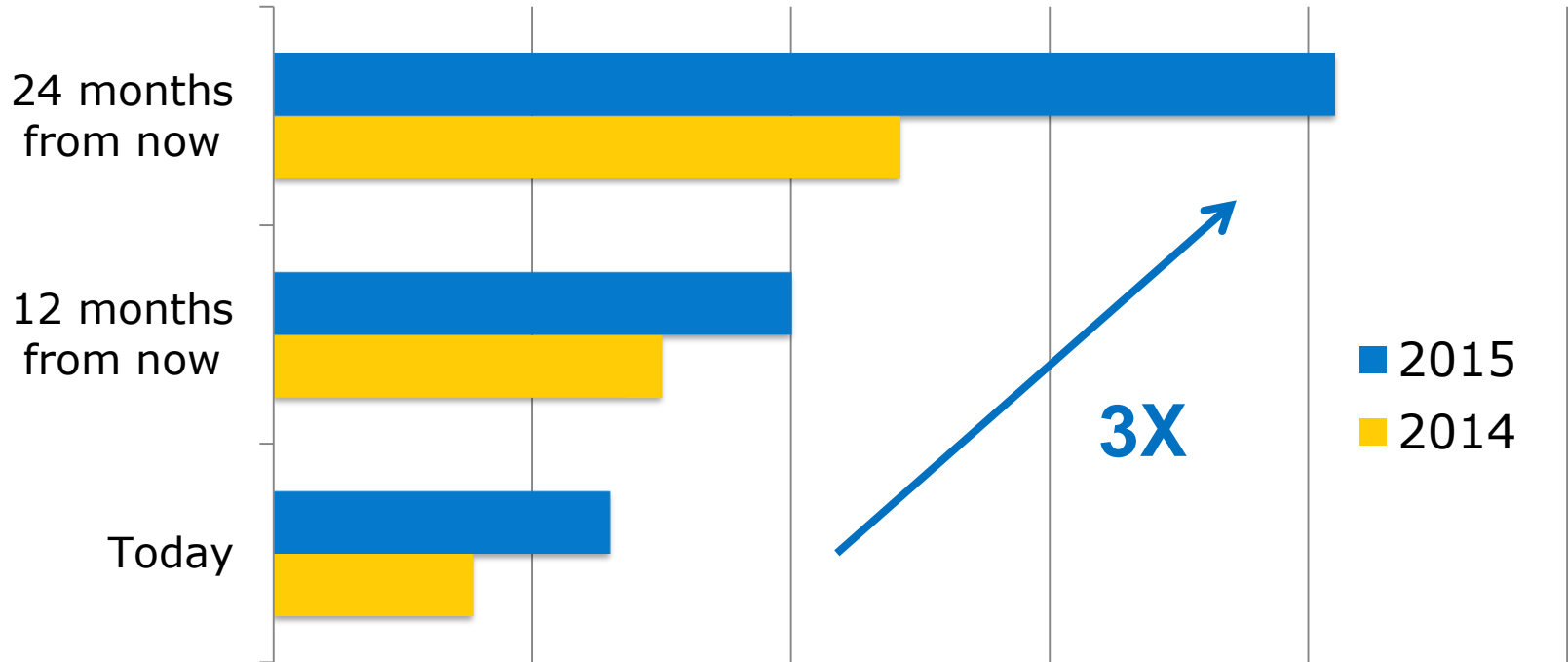
There are different types of Flash Memory (MLC, SLC, TLC, etc.) with new characteristics that define how it works in the data center (wear leveling, write endurance, etc.):



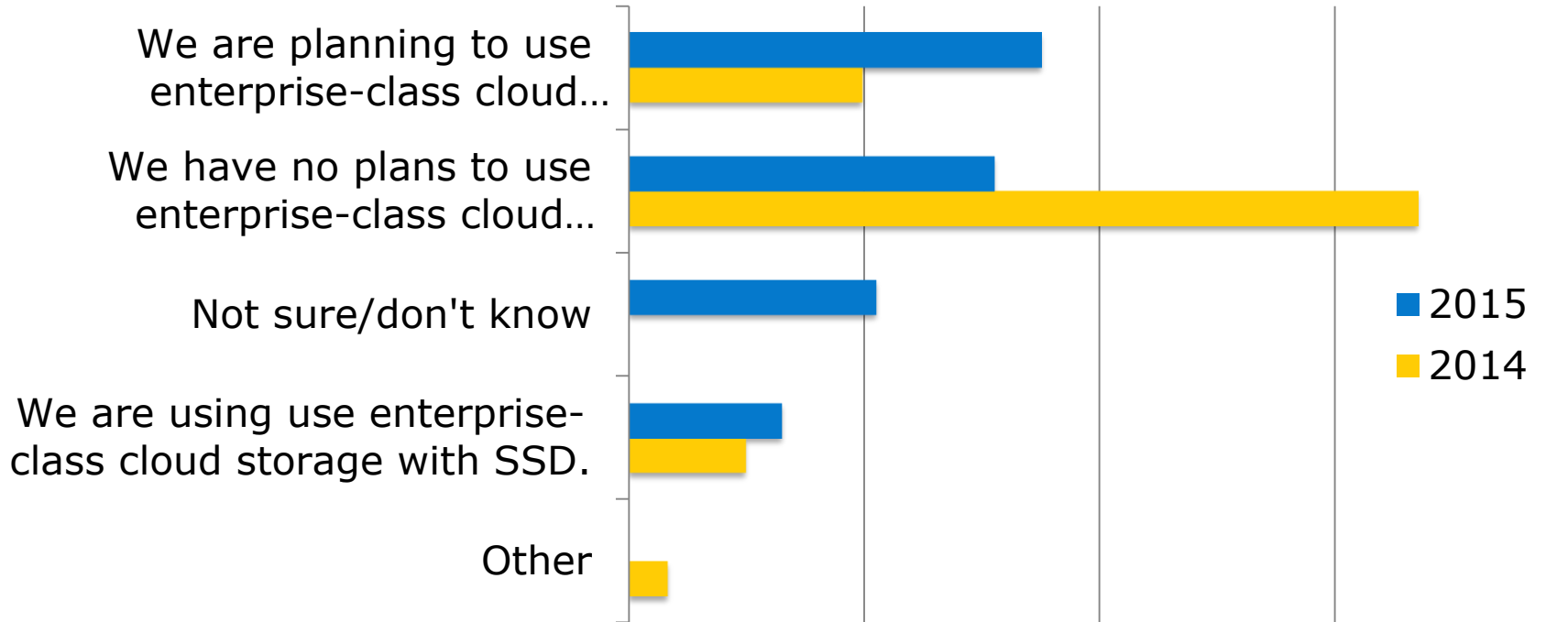
There are different types of Flash Storage systems (All Flash Arrays, Hybrid Arrays, PCIe cards, etc.) with new characteristics that define how they work in the data center (software defined vs. plug-and-play SSD, captive PCIe vs. shared PCIe SSD, permanent storage vs. cache, etc.). I:



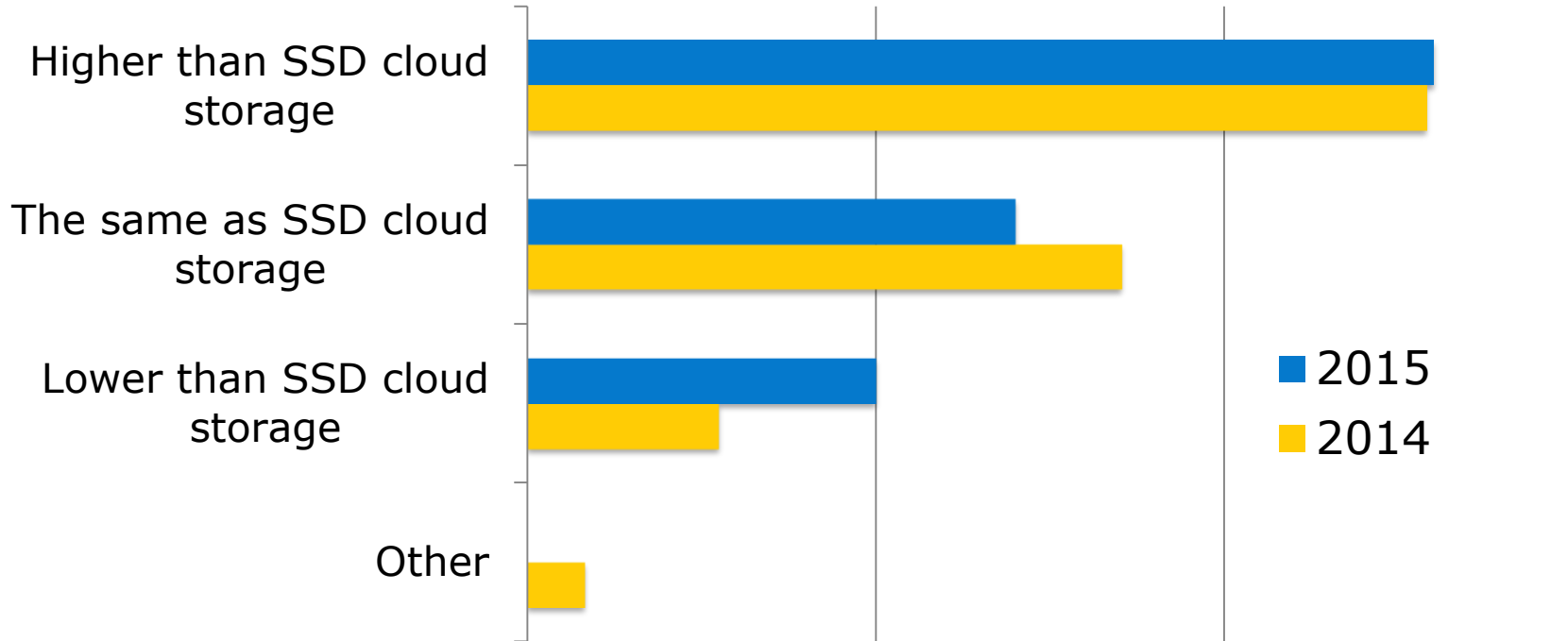
Percent of my overall storage that is in the cloud:



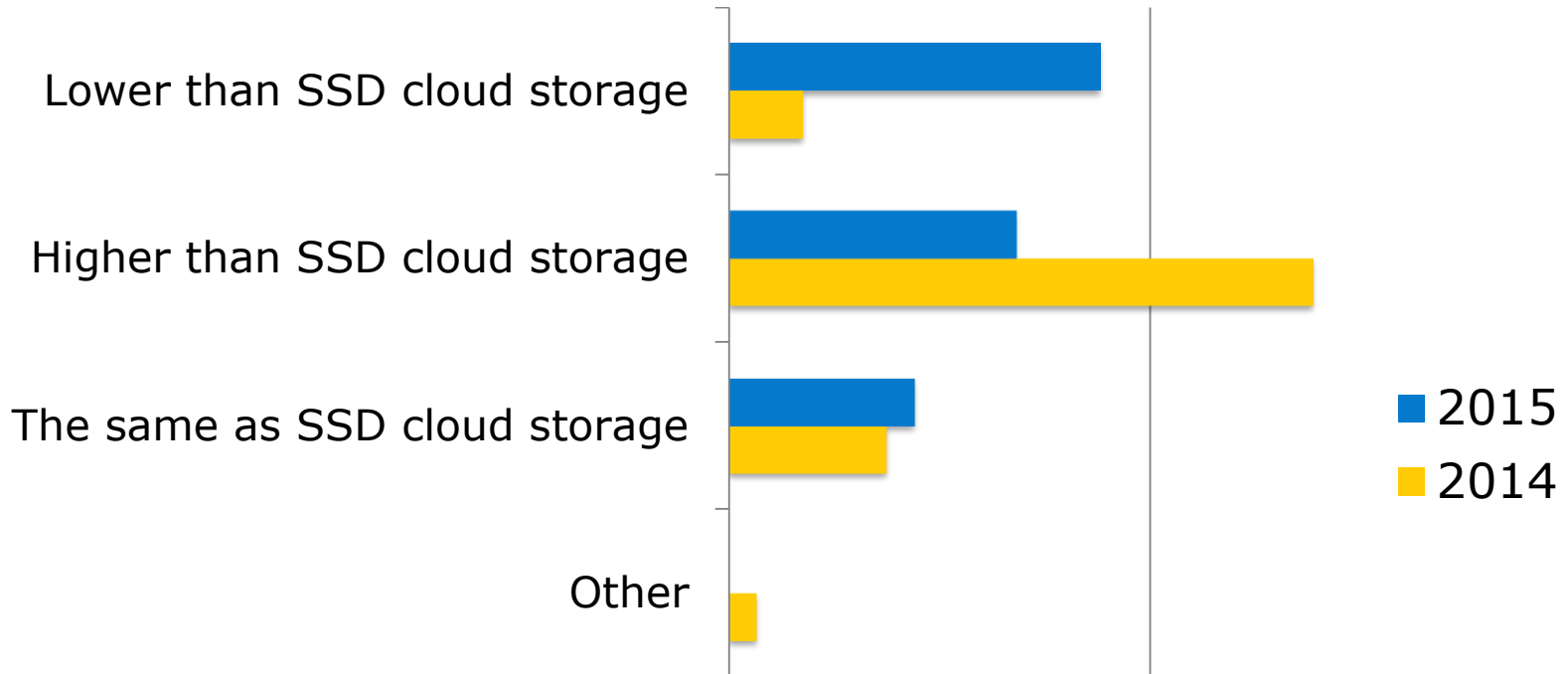
My organization's strategy for enterprise-class SSD-backed cloud storage is best described as:



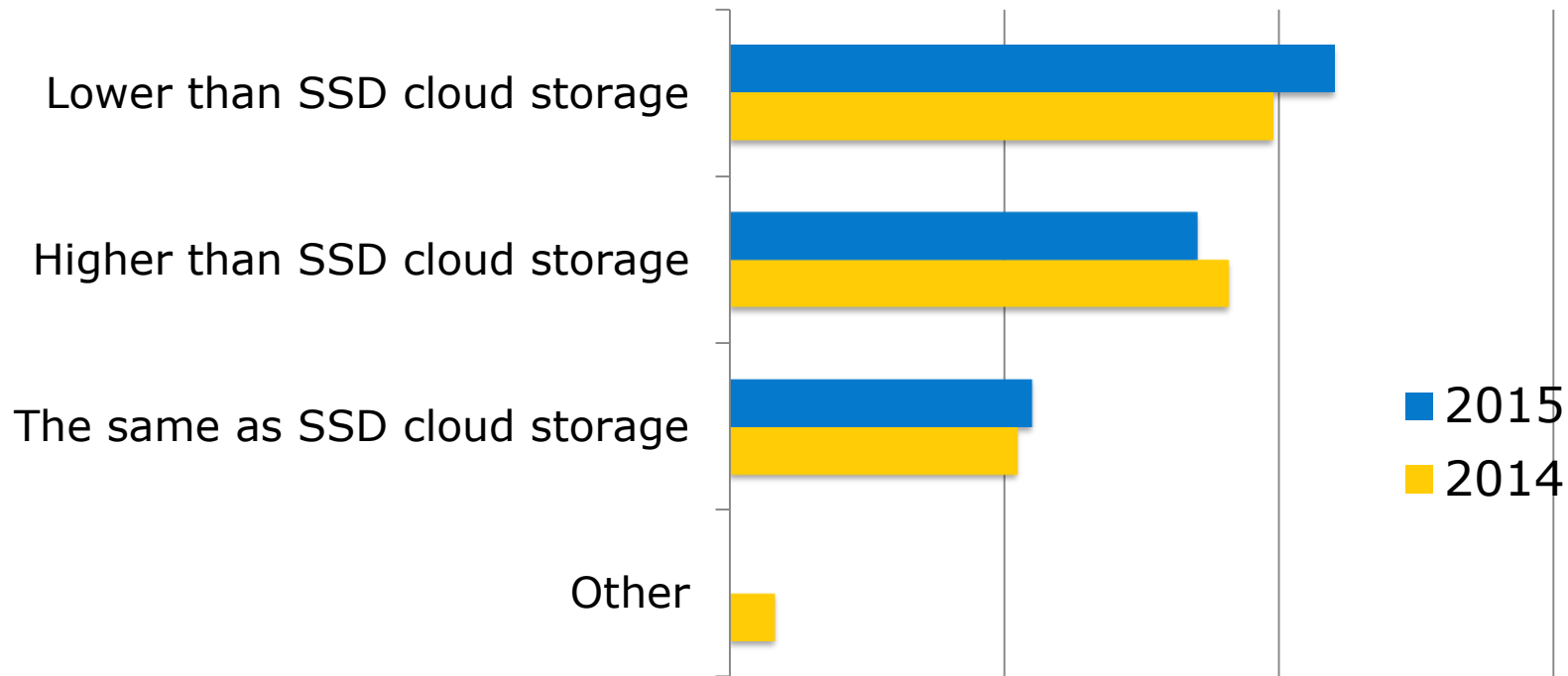
I would expect the AVAILABILITY of SSD storage in my data center to be:



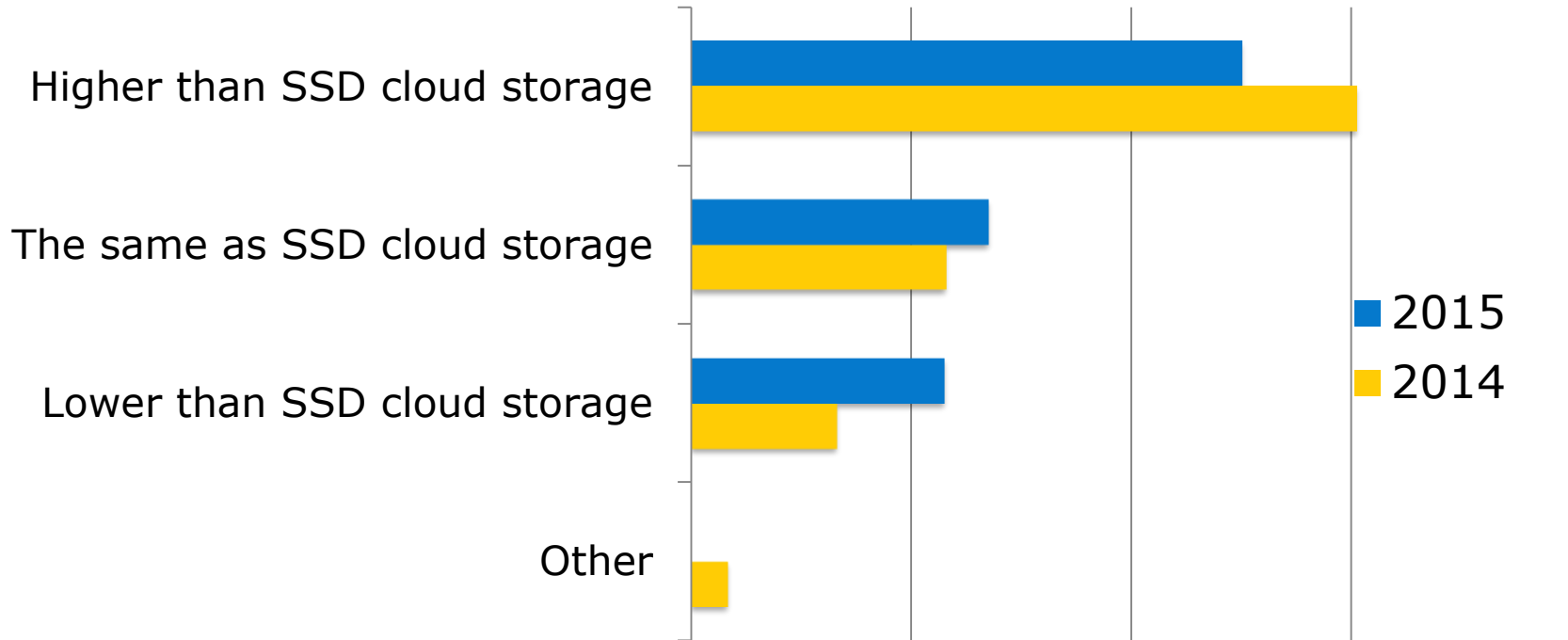
I would expect the PERFORMANCE of SSD storage in my data center to be:



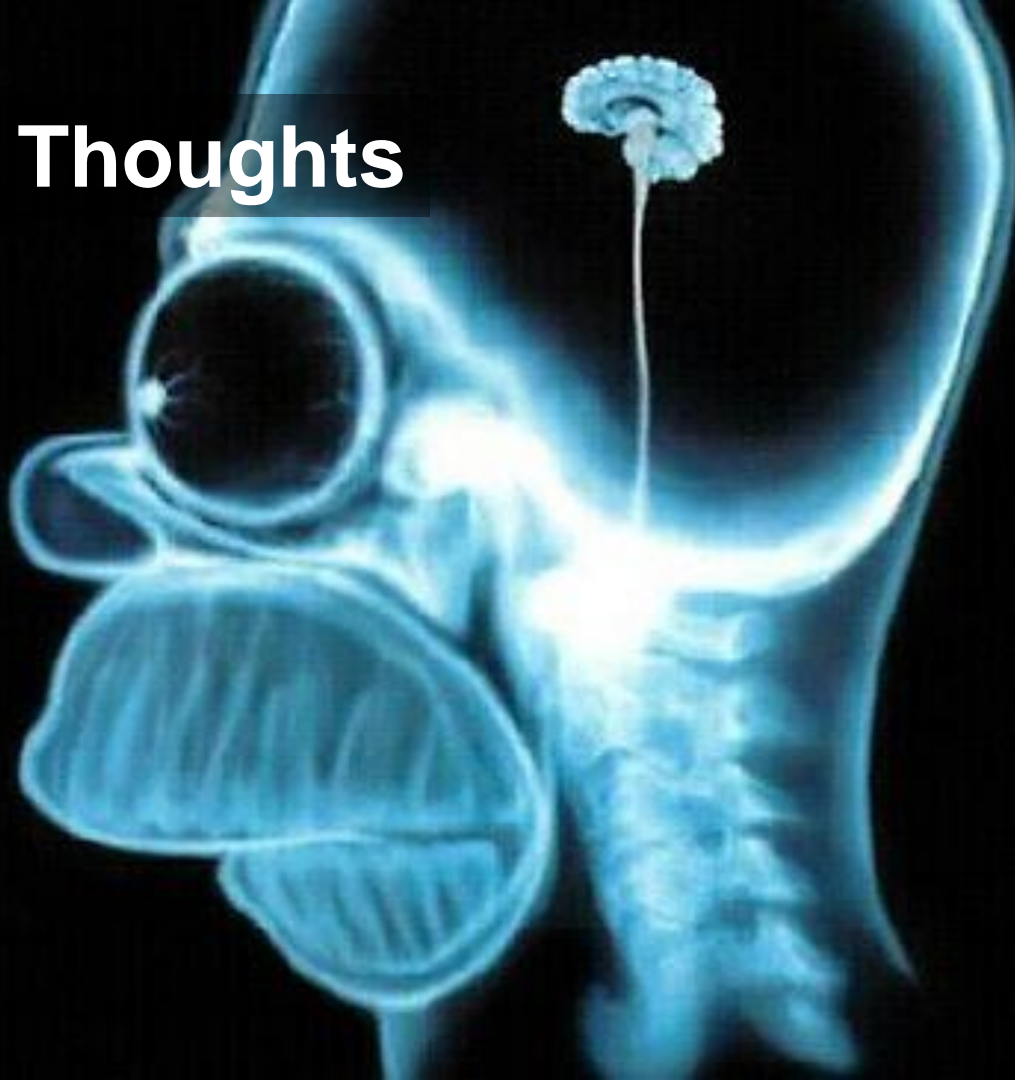
I would expect the COST of SSD storage in my data center to be:



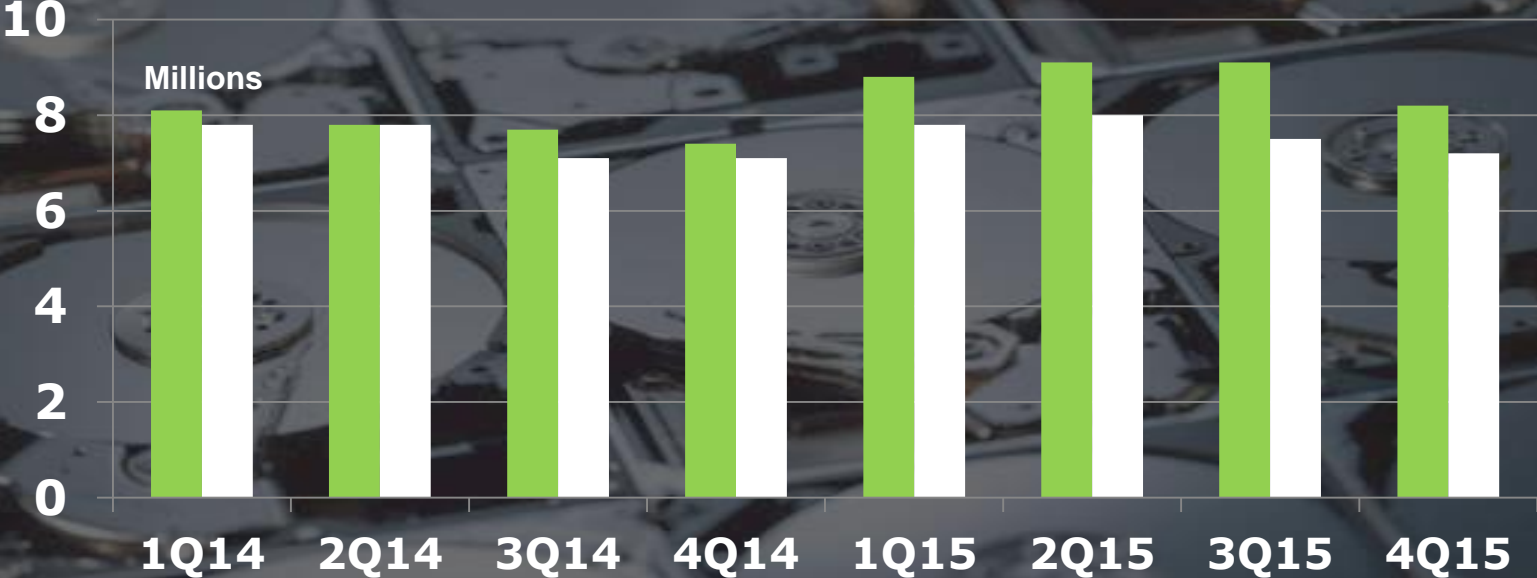
I would expect the CONTROL of SSD storage in my data center to be:



My Thoughts



Enterprise HDD Units Flat-to-Down



Time to start thinking about the next big thing

2015

Flash

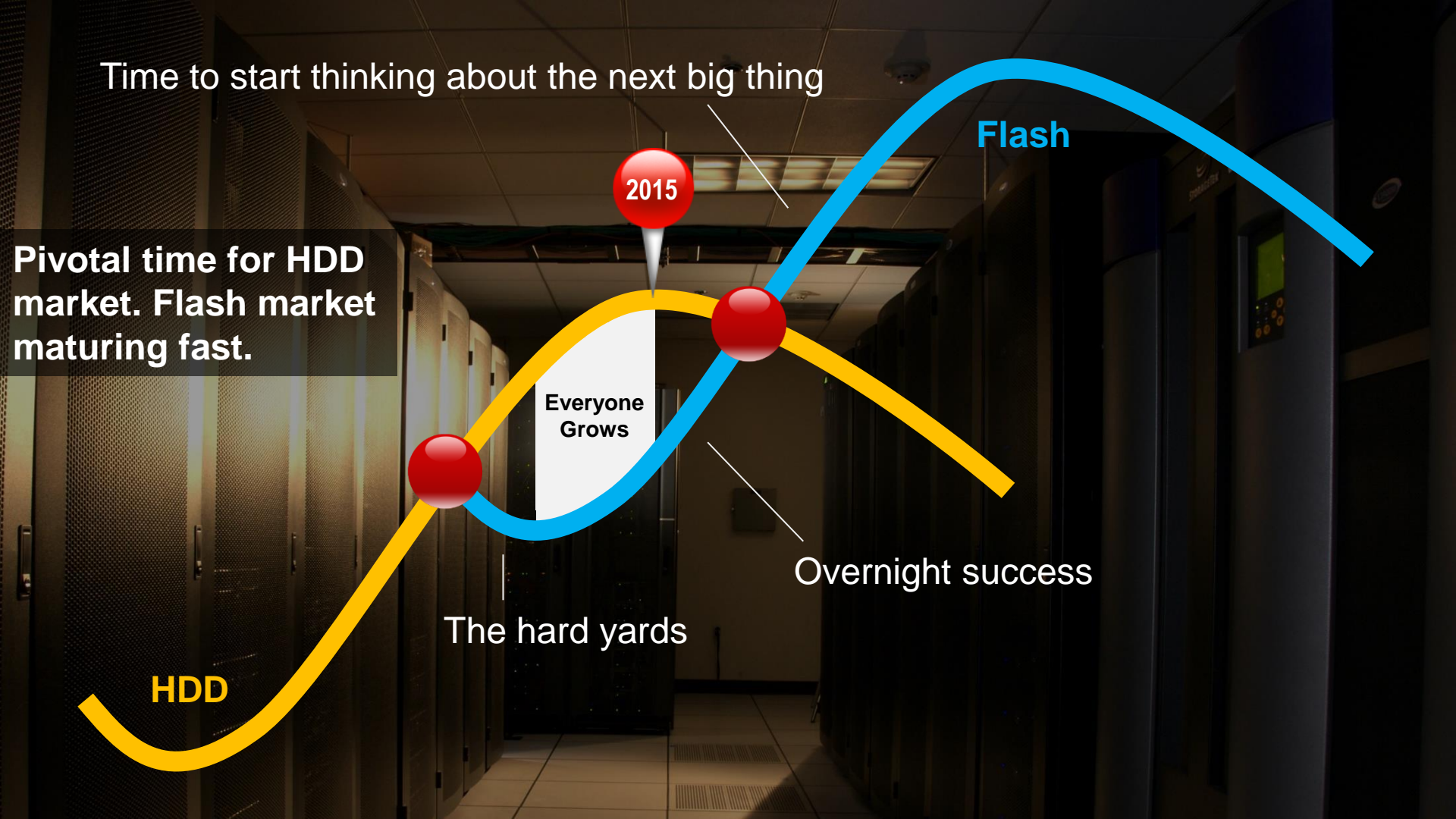
Pivotal time for HDD market. Flash market maturing fast.

Everyone Grows

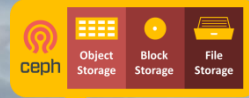
Overnight success

The hard yards

HDD



OEMs fully armed for air, sea & land flash assault



The logo for EMC², featuring the letters 'EMC' in a serif font with a superscript '2' to the right.

HITACHI
Hitachi Data Systems

Enterprise Flash Market

Growing profitably was tough

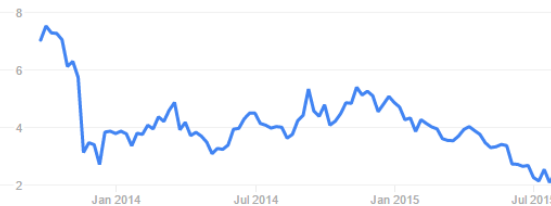


Violin Memory Inc

NYSE: VMEM - Aug 7 4:02 PM EDT

2.15 ↓ (0.00%)

1 day 5 day 1 month 3 month 1 year 5 year max



Open	2.29	Mkt cap	207.4M
High	2.33	P/E ratio	-
Low	2.12	Div yield	-

Nimble Storage Inc

NYSE: NMBL - Aug 7 4:02 PM EDT

26.06 ↓ (0.00%)

1 day 5 day 1 month 3 month 1 year 5 year max



Open	26.38	Mkt cap	2.03B
High	26.99	P/E ratio	-
Low	25.75	Div yield	-

Sustained Advantage



EMC²



HITACHI
Hitachi Data Systems

kaminario.

violin
MEMORY

NIMBUS DATA

PURE
STORAGE

SOLIDFIRE

tegile

Tintri

nimblestorage

The first stumble



EMC²



HITACHI
Hitachi Data Systems

NIMBUS DATA

violin
MEMORY



kaminario.

WHIPTAIL

nimblestorage

PURE
STORAGE

SOLIDFIRE

tegile

Tintri

No big acquisitions or IPOs



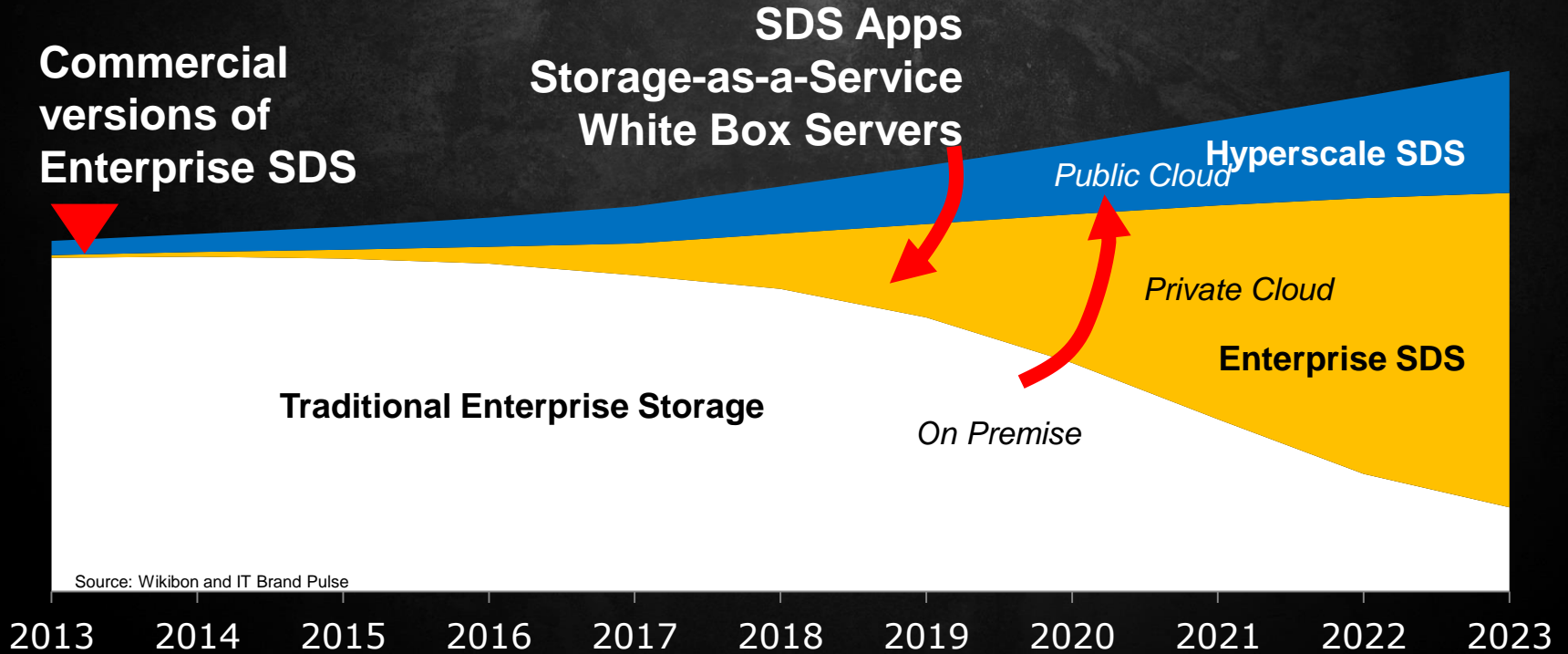
\$450M VC
\$3B Valuation

IT as a Service Market



Traditional IT Market

Software Define Storage Ascends over 10 Years



Past: Enterprise HW Defined Ecosystem

Cisco & Dwarves

Vendor NOS

Orchestration
Monitoring



Appliances

Router
Firewall
Load Balancer
Etc.



Vendor Switch

Switch OS 

Vendor or Merchant Switch
ASIC

EMC & Dwarves

Vendor Storage Software

Failover
DeDup
Compression
Etc.



Vendor Storage System

Block, File, Object 

Merchant Server Processor

HP, IBM, Dell, Lenovo

Hypervisor



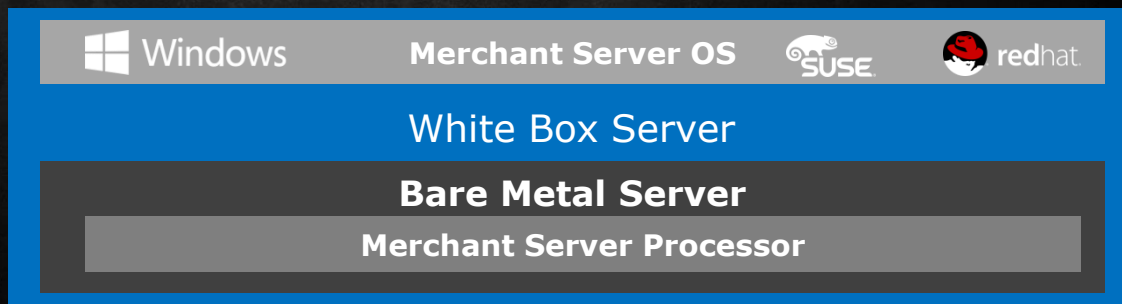
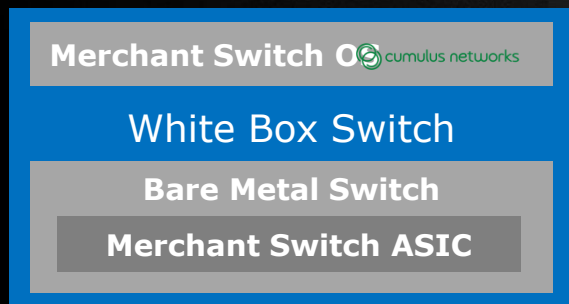
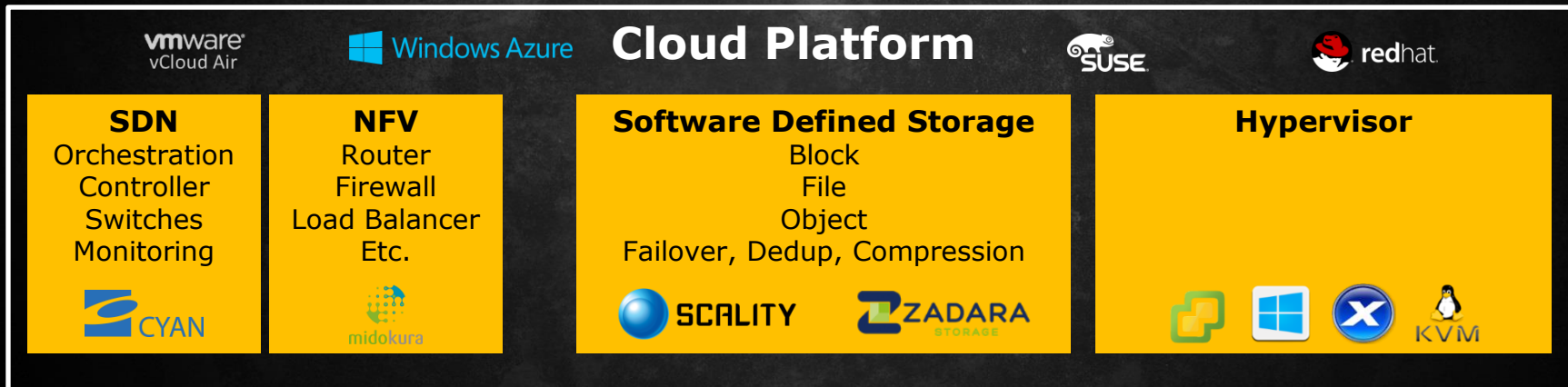
Vendor Server

Merchant Server OS

 Windows  SUSE  redhat.

Merchant Server Processor

Future: Enterprise SW Defined Ecosystem



About the Authors



Frank Berry
CEO and Senior Analyst

Frank Berry is a senior analyst with IT Brand Pulse. Prior to founding IT Brand Pulse, Frank was vice president of product marketing for QLogic, vice president of corporate marketing for QLogic, and vice president of worldwide marketing for Quantum.

frank.berry@itbrandpulse.com



Cheryl Parker
Director and Senior Analyst - End User, Channel, and OEM Research

Cheryl Parker oversees the End User Research practice for IT Brand Pulse. Cheryl and her team conduct IT Brand Leader Surveys, Technical Product, Customer Satisfaction Surveys, Focus Groups and custom research, as well as compile Product Databases. Cheryl has more than 20 years in sales/marketing/research, and is a former reporter/sportswriter for the *Los Angeles Times*.

cheryl.parker@itbrandpulse.com

The background of the slide is a perspective view of a server room aisle with rows of server racks on both sides. The floor is tiled, and the ceiling has recessed lighting. The logo is centered in the aisle.

IT BRAND PULSE™

**This preview version does not show numerical data as presented in the Flash Memory Summit session.
The cost to purchase a copy of the full presentation (which includes all numerical data) is \$ 495.
Contact cheryl.parker@itbrandpulse.com to order.**