



Enterprise SSDs

Who's Adopting Them and Why?

August 5, 2014
Flash Memory Summit



This version does not show the numerical data.
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IT Brand Pulse



Year in Review



2014 Flash Brand Leaders



2014 Flash Adoption Trends

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END USER RESEARCH

Breaking down walls between customers and you

A superstore for information about the largest data centers, Co-Los, and Cloud Service Providers



The screenshot shows the homepage of the World's Top Data Centers website. At the top, there is a navigation menu with links for Spotlight, Top Ten, Greenest, Co-Lo Directory, Cloud Service Directory, Brand Leaders, Rate Co-Los & Services, Reports, Glossary, and About Us. A prominent banner features the text "THE WORLD'S BIGGEST CUSTOMERS DEPEND ON US." alongside logos for hyve solutions and DATASTAX. Below this, a featured article titled "If you sir, are a newbie." discusses Co-Los and Cloud Services, with a sub-headline "We'll help you learn about Co-Los and Cloud Services". To the right of the article is a "Subscribe to our Weekly Report" form with an email input field and a "Subscribe!" button. Below the form is a "Sponsor Ad" for the "Top Ten Cloud Services Report".



IT Brand Pulse



Year in Review



2014 Flash Brand Leaders



2014 Flash Adoption Trends

First Test Tube Burger



At last year's FMS, only one enterprise OEM had made the jump to all-flash



**During the last year the enterprise
OEM all-flash invasion begun**



**More All Flash
Companies were
Beamed Up During
the OEM Invasion**



TMS

Cache IQ

Pliant

XtremIO

STEC

NexGen

Virident

Whiptail

Fusion-io

LSI

Smart Storage



**Congratulations to the Flash
Start-ups Who Won a Chair**

Virident

Smart Storage

Whiptail

Fusion-io

NexGen

Good Luck to the Flash Startups Who Want a Chair

Tintri

SolidFire

Pure Storage

Violin Memory

Nimble Storage



Last Year's Weather Report for Enterprise IT OEMs "Not a cloud in the sky"





SOFTLAYER®
an IBM Company



This year the Enterprise IT OEM Clouds are Rolling In



Most Cloud Storage Looked Like This a Year Ago

Cloud SSD Array Volumes are Fast Becoming Pervasive

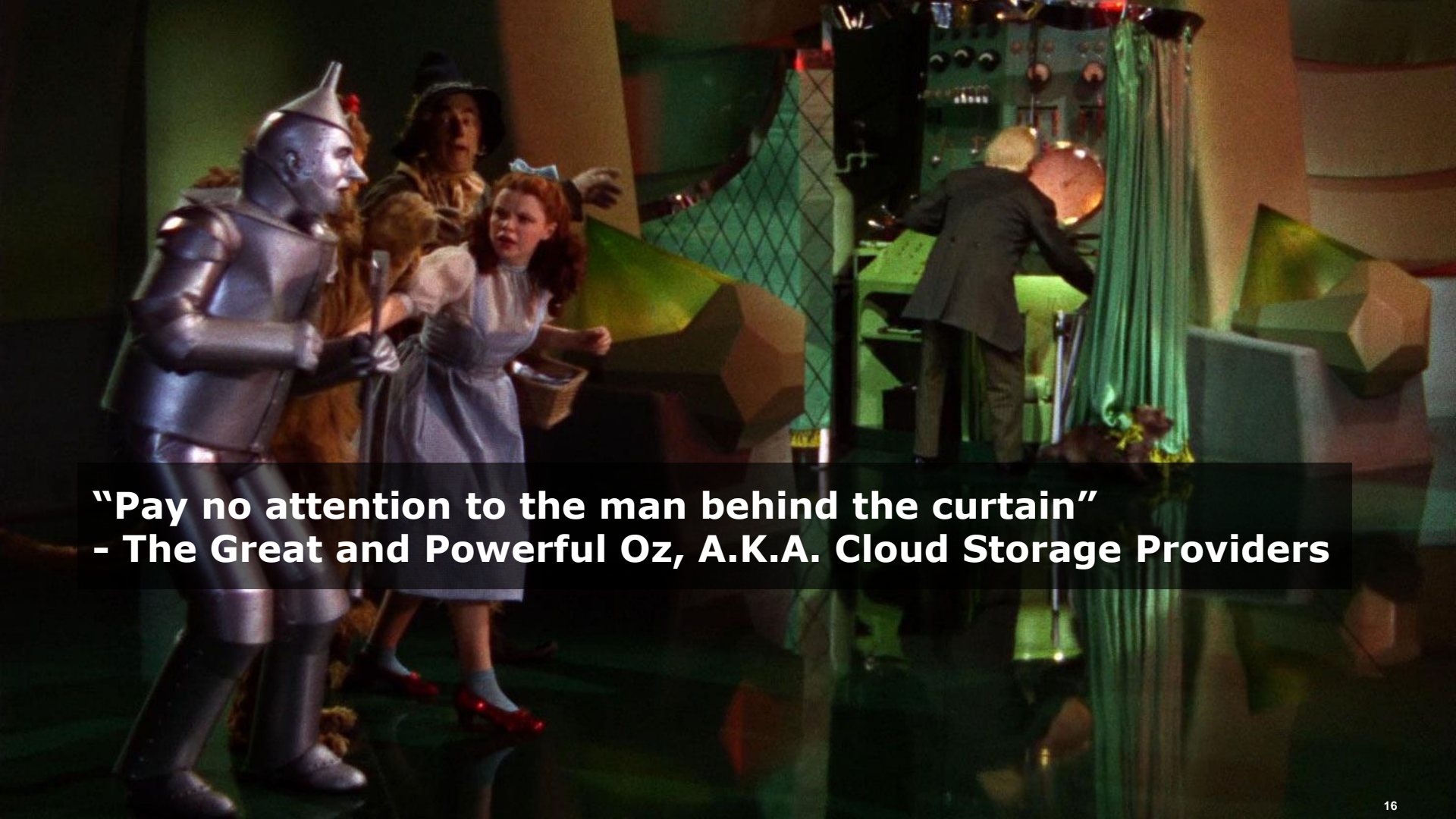


SSD Backed Volumes



Google Cloud Platform

SSD Persistent Disks



**“Pay no attention to the man behind the curtain”
- The Great and Powerful Oz, A.K.A. Cloud Storage Providers**

Google

Innovation Leader
Contributions to
Ethernet
2009-2014



Bikash Koley
Principal Engineer
Networking
Google

Cloud Service Providers are
Now Talking about What's
Behind the Curtain

IT BRAND
PULSE

<http://www.youtube.com/watch?v=RsdlyfV4onk>



0:16 / 2:07



Who do you perceive as the HOTTEST ENTERPRISE IT COMPANY in 2013?



Who do you perceive as the HOTTEST IT STORAGE COMPANY during the last year?





IT Brand Pulse



Year in Review



2014 Flash Brand Leaders



2014 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

Datacenters

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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

PRODUCTS SOLUTIONS SERVICES PARTNERS SUPPORT CAREERS

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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

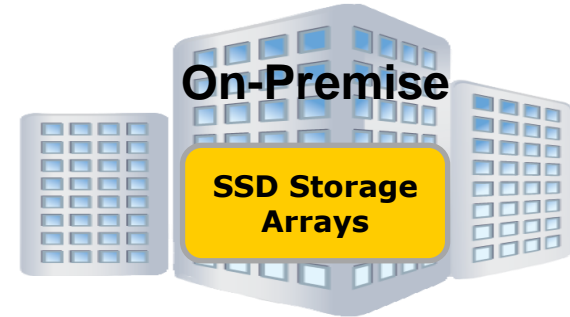
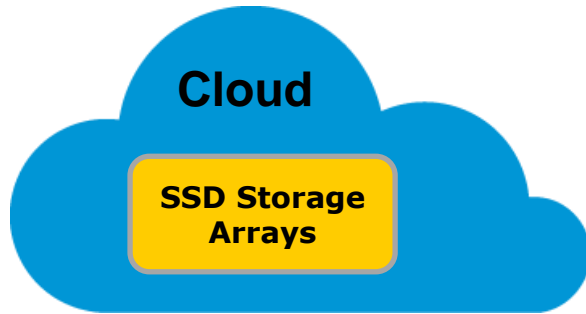
Broadcom Selected as Leading Vendor of Ethernet LAN-on-Motherboard Solutions in Annual IT Brand Pulse Report

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 award categories include the performance of IT

Chips

Looking Forward: Comparing Perceptions of On-Premise and Cloud Infrastructure

The Best of The Best



Enterprise IT Pro



*** Meant to represent an approach: not a final taxonomy*

Select Respondents to 2014 SSD Brand Leader Surveys



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
Duquesne 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

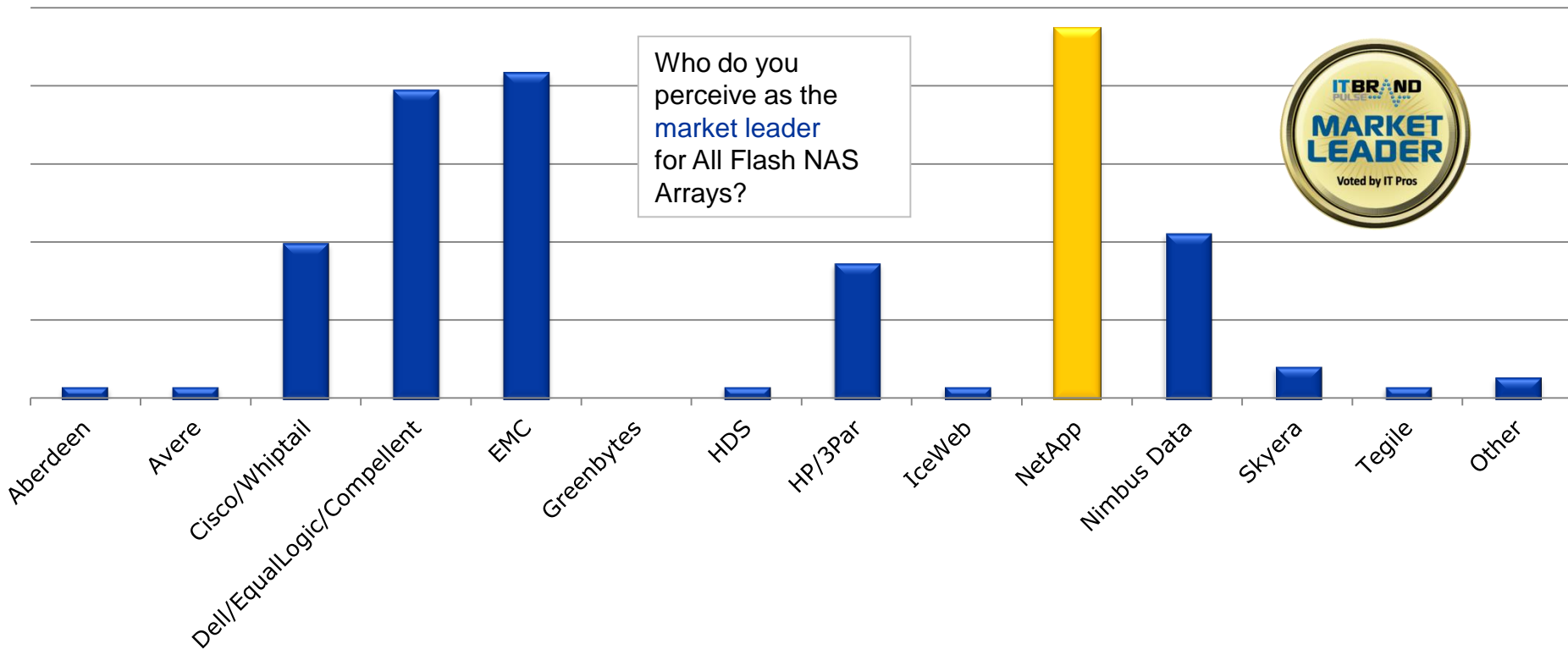
Social Security Administration
Sony Online Entertainment
St. Luke's Hospital
State of PA (Security)
Target
TD Bank
The Children's Hospital of Philadelphia
The Forum Corporation
The University of Chicago
T-Mobile
TMX
Transamerica
UCSB
UBS
United Airlines
United Health Services
United Nations Federal Credit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

2014 Brand Leader Survey Results



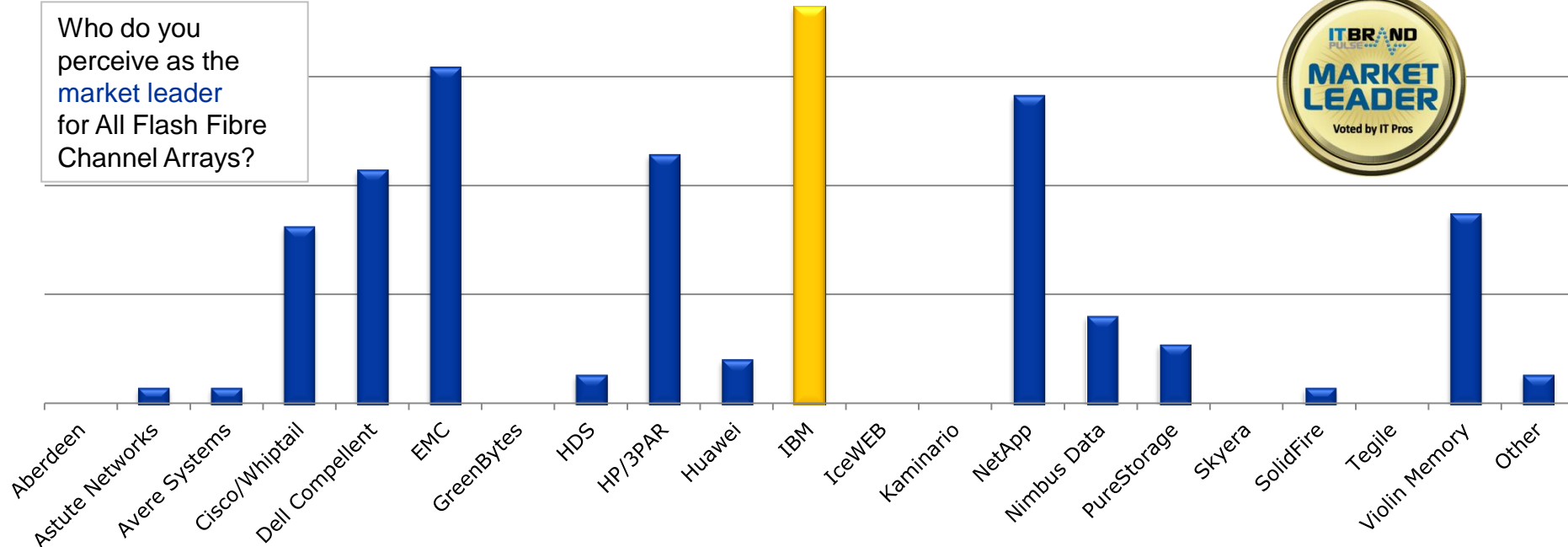
Brand Leaders	MARKET	PRICE	PERFORMANCE	RELIABILITY	SUPPORT	INNOVATION
<u>All Flash NAS SSD</u>	NetApp	Dell	NetApp	NetApp	NetApp	NetApp
<u>All Flash Fibre Channel SSD</u>	IBM	Dell	IBM	IBM	EMC	IBM
<u>All Flash Unified SSD</u>	Nimbus Data	Dell	Nimbus Data	Nimbus Data	Dell	Nimbus Data
<u>All Flash iSCSI SSD</u>	Dell	Dell	Dell	Dell	Dell	Dell
<u>All Flash InfiniBand SSD</u>	IBM	IBM	IBM	IBM	IBM	Violin Memory
<u>Hybrid HDD/ SSD Array</u>	EMC	Dell	EMC	EMC	EMC	EMC
<u>All Flash System Mgmt Software</u>	EMC	Dell	IBM	IBM	EMC	EMC
<u>Flash Cache Software</u>	SanDisk/FIO	SanDisk	SanDisk/FIO	SanDisk/FIO	IBM	SanDisk/FIO
<u>Virtual Server Cache Software</u>	VMware	VMware	VMware	VMware	VMware	VMware
<u>Memory Channel Storage</u>	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk	SanDisk
<u>PCIe SSD DAS Adapters</u>	SanDisk/FIO	Intel	SanDisk/FIO	Intel	Intel	SanDisk/FIO
<u>PCIe SSD SAN Adapters</u>	QLogic	QLogic	QLogic	QLogic	QLogic	QLogic
<u>SAS/SATA SSD Modules</u>	Samsung	Seagate	Samsung	Intel	Intel	Samsung
<u>SSD Controller Chips</u>	LSI (SandForce)	Intel	LSI (SandForce)	Intel	Intel	LSI (SandForce)

2014 Market Leader All Flash NAS Arrays

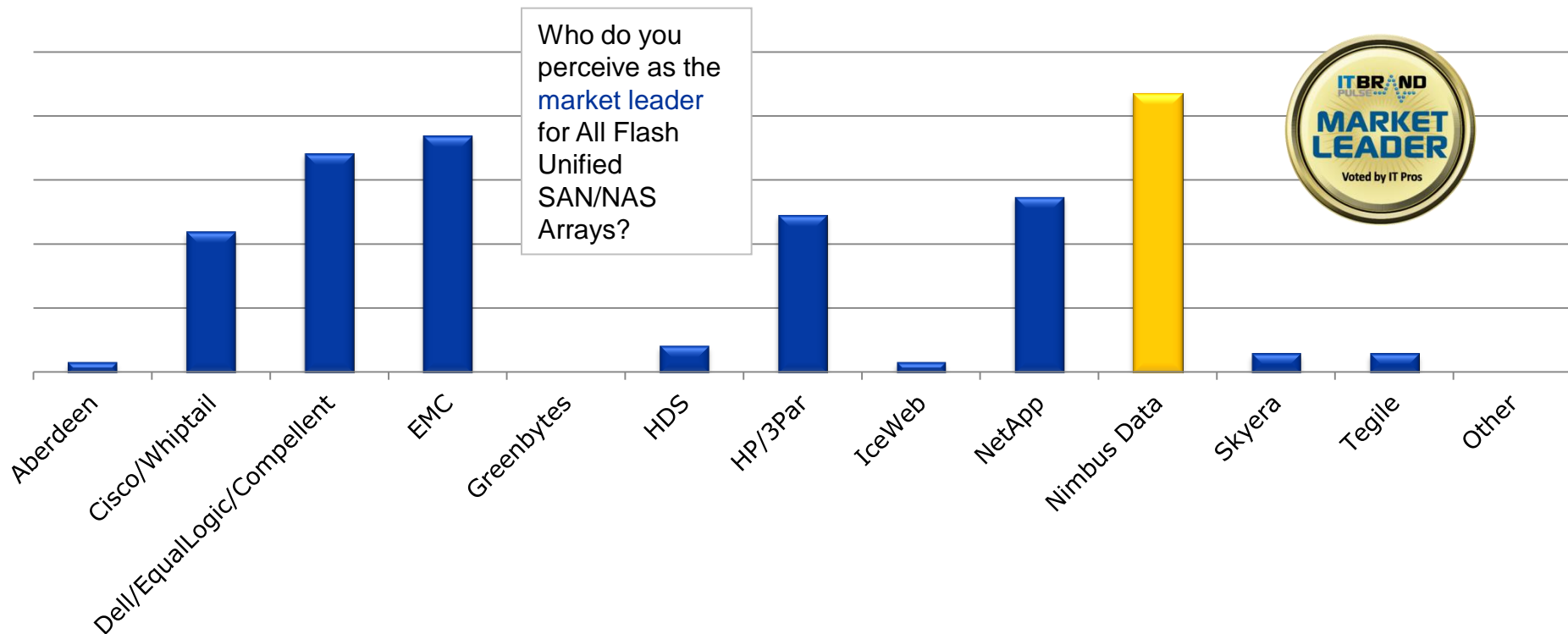


2014 Market Leader All Flash Fibre Channel Arrays

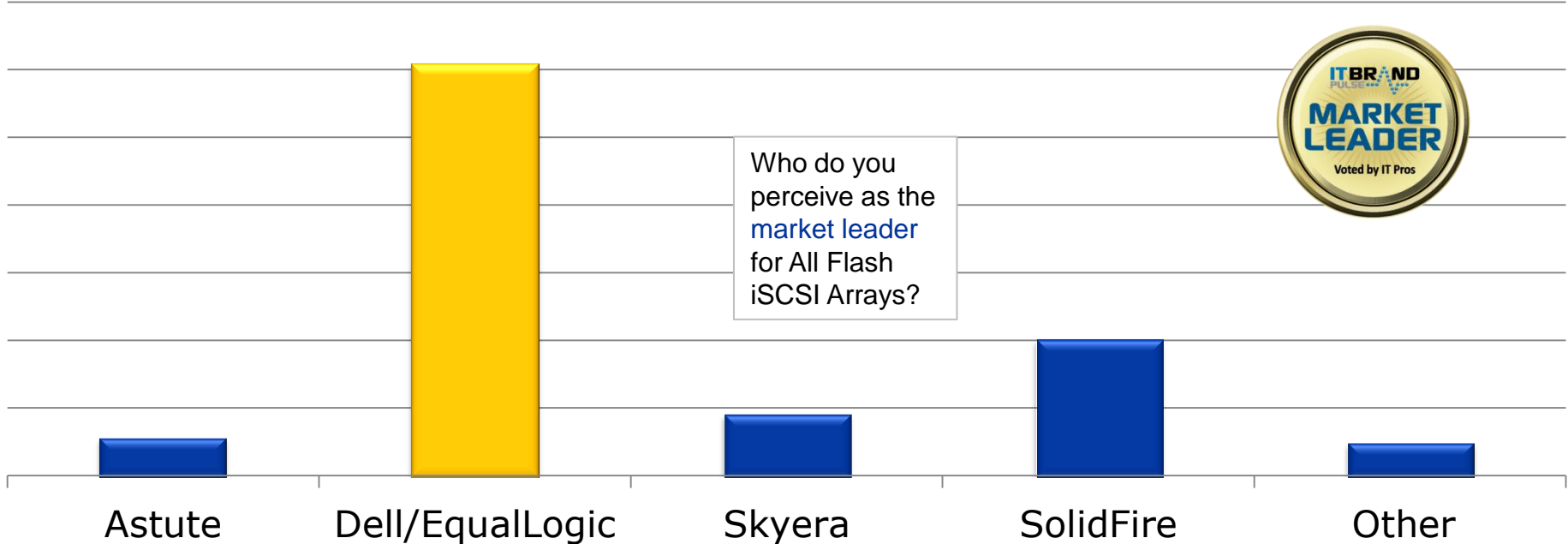
Who do you
perceive as the
market leader
for All Flash Fibre
Channel Arrays?



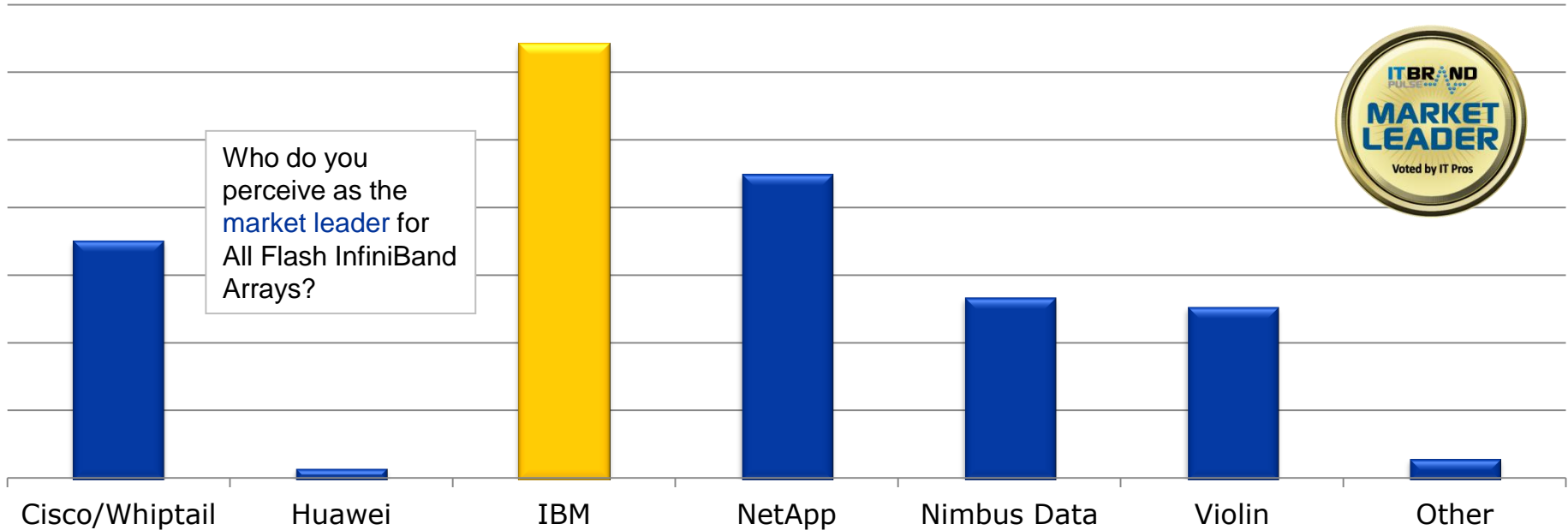
2014 Market Leader All Flash Unified SAN/NAS Arrays



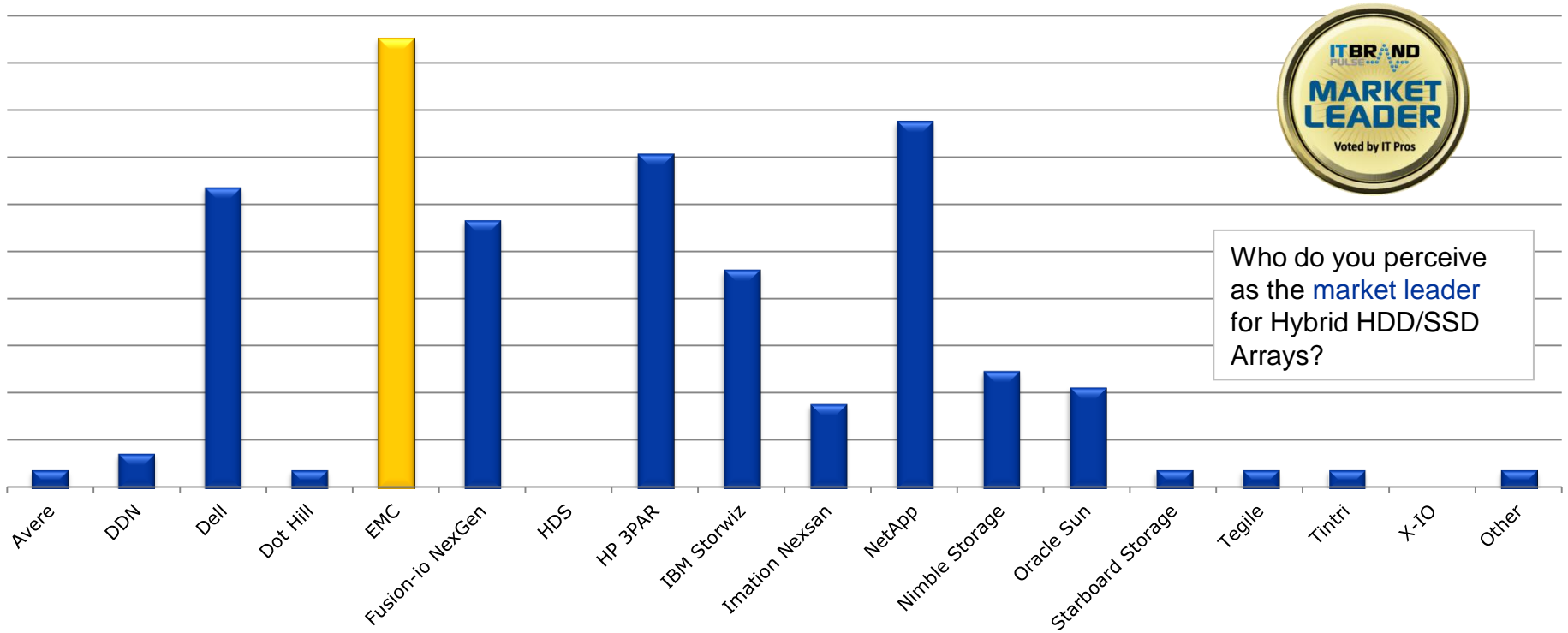
2014 Market Leader All Flash iSCSI Arrays



2014 Market Leader All Flash InfiniBand Arrays

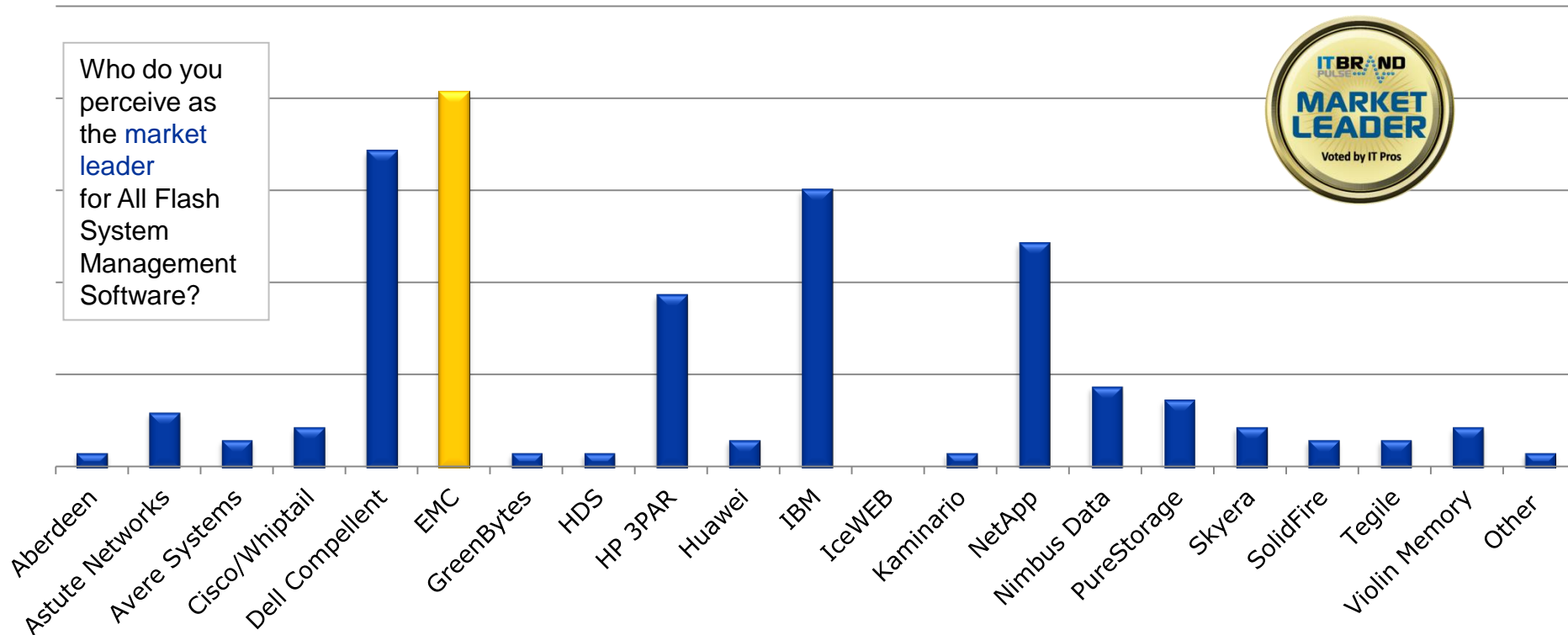


2014 Market Leader Hybrid HDD/SSD Arrays



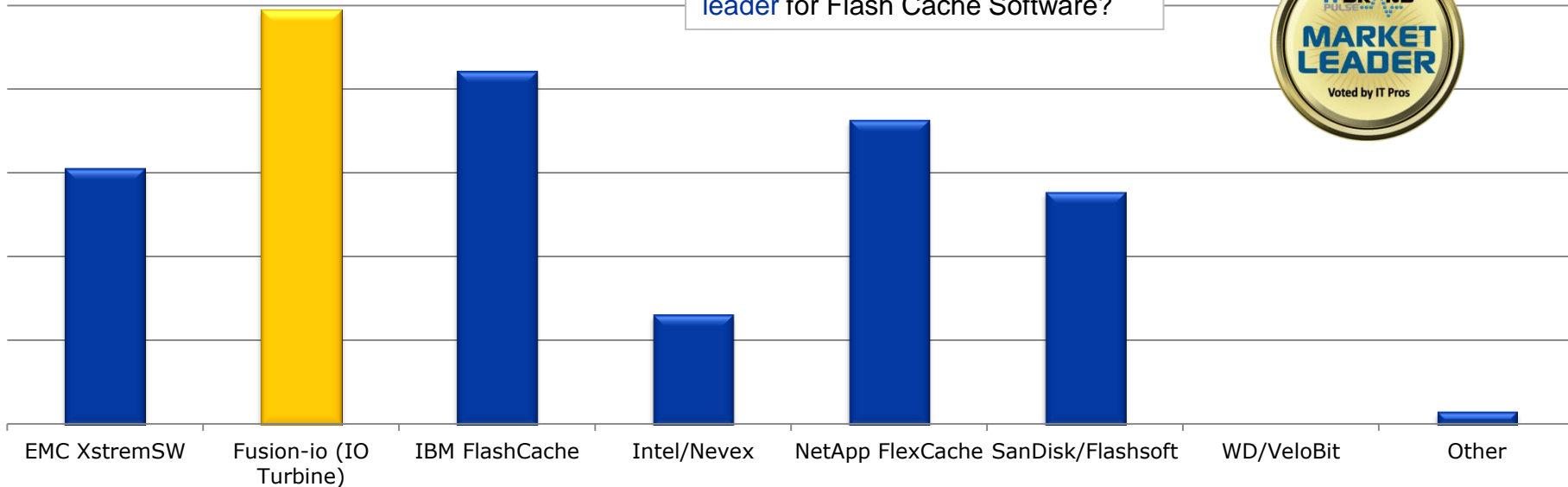
2014 Market Leader All Flash System Management SW

Who do you
perceive as
the market
leader
for All Flash
System
Management
Software?

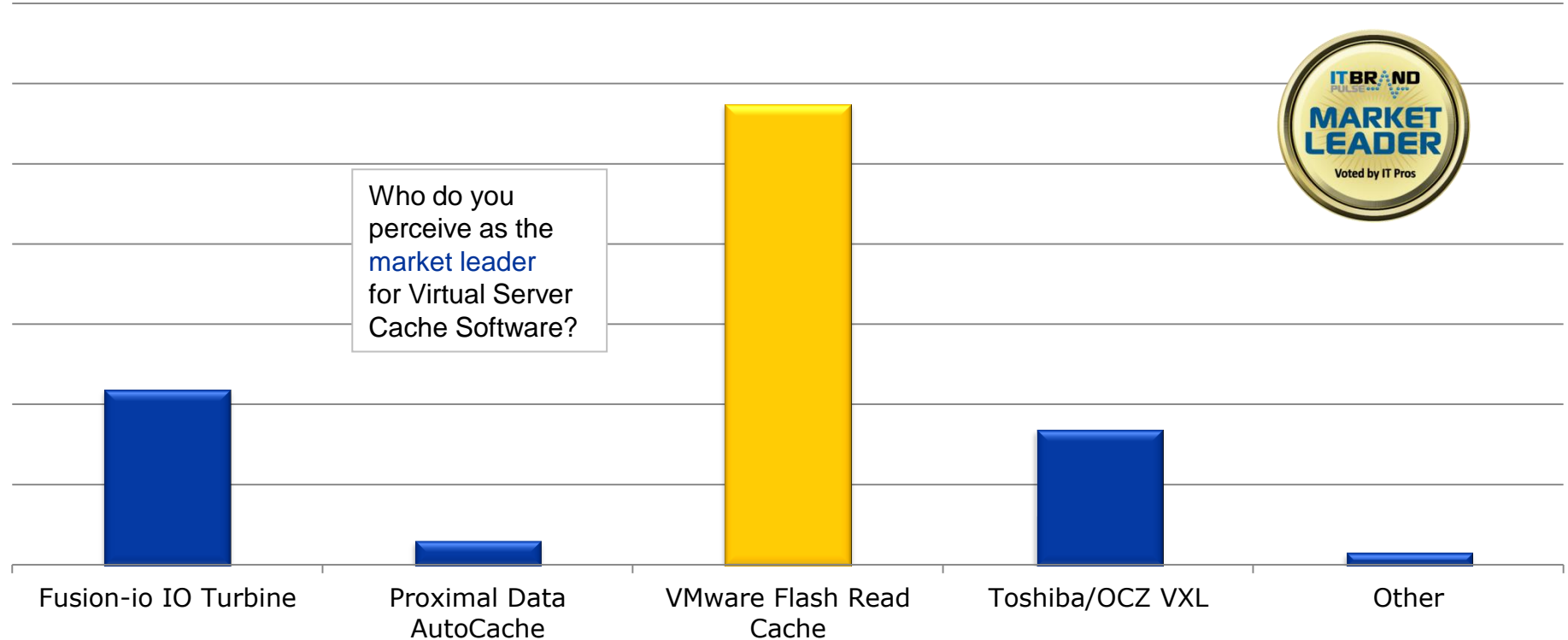


2014 Market Leader Flash Cache Software

Who do you perceive as the **market leader** for Flash Cache Software?



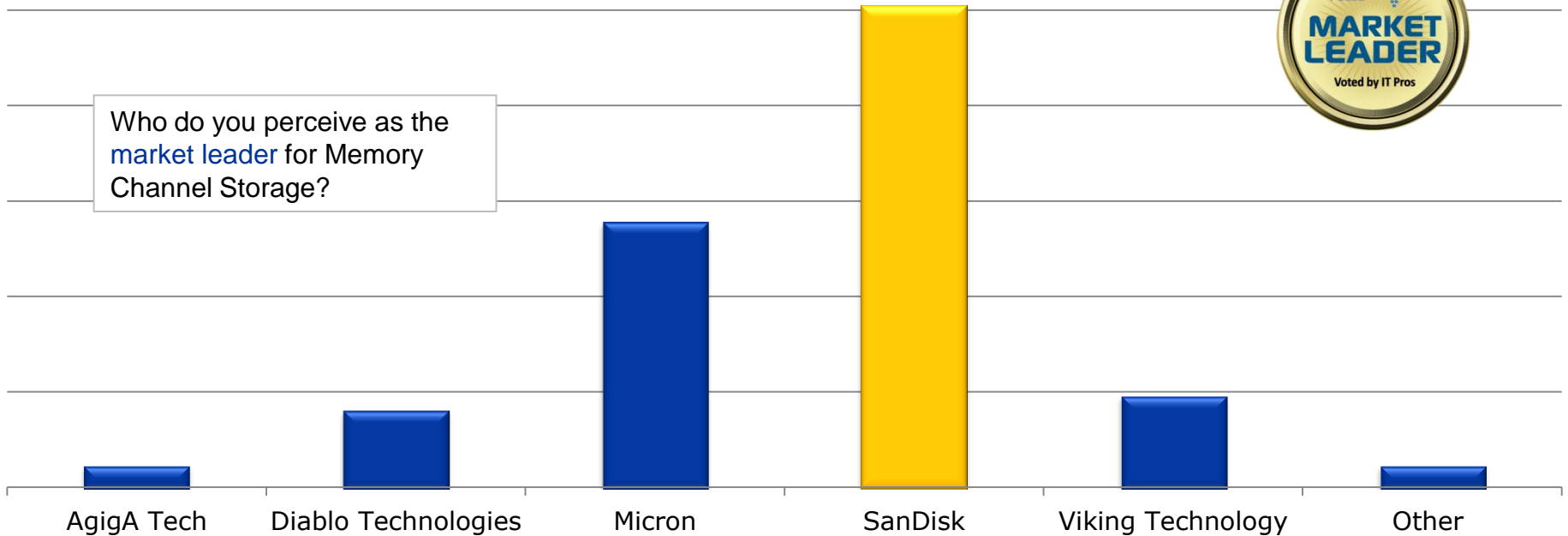
2014 Market Leader Virtual Server Cache Software



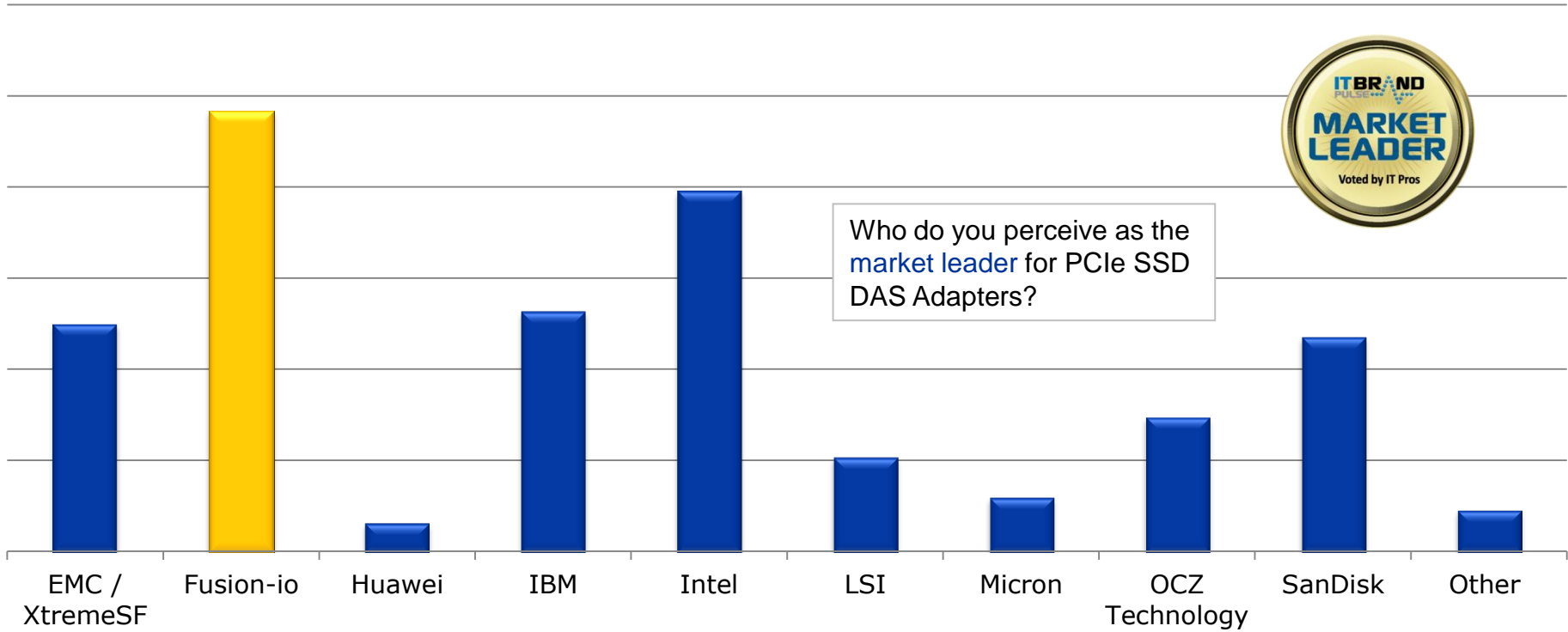
2014 Market Leader Memory Channel Storage



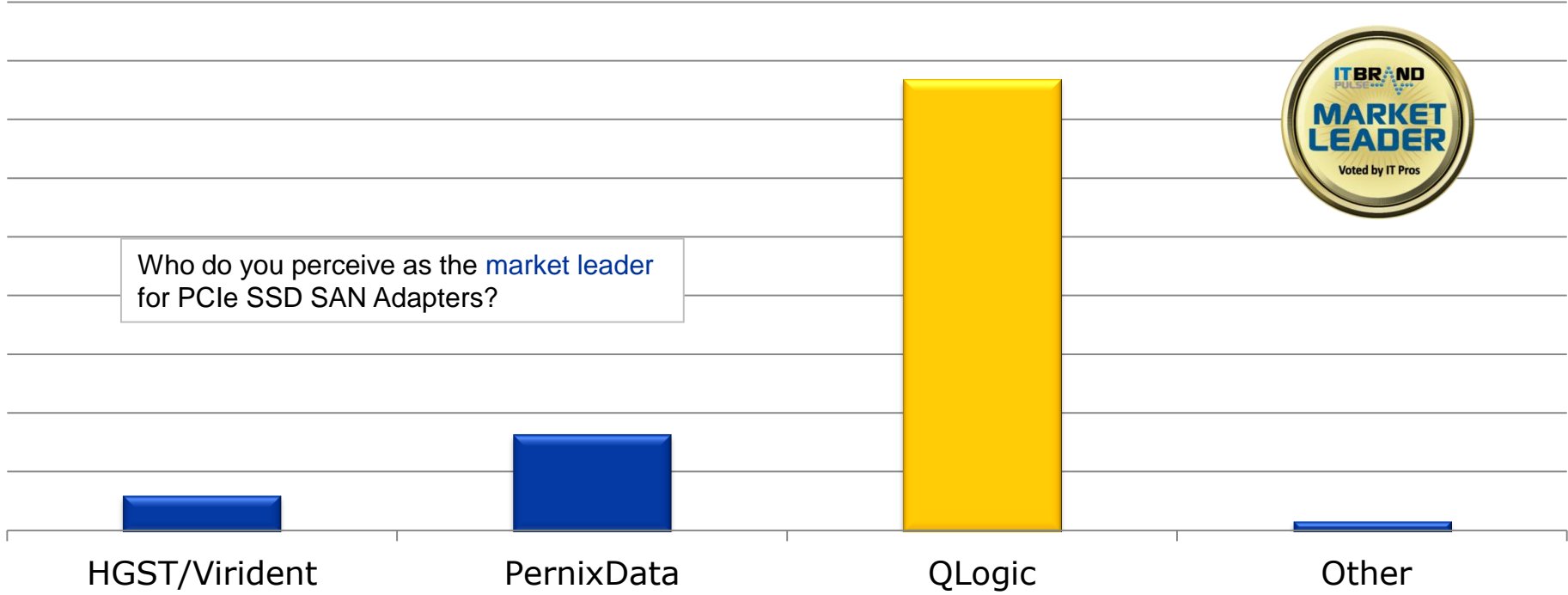
Who do you perceive as the
market leader for Memory
Channel Storage?



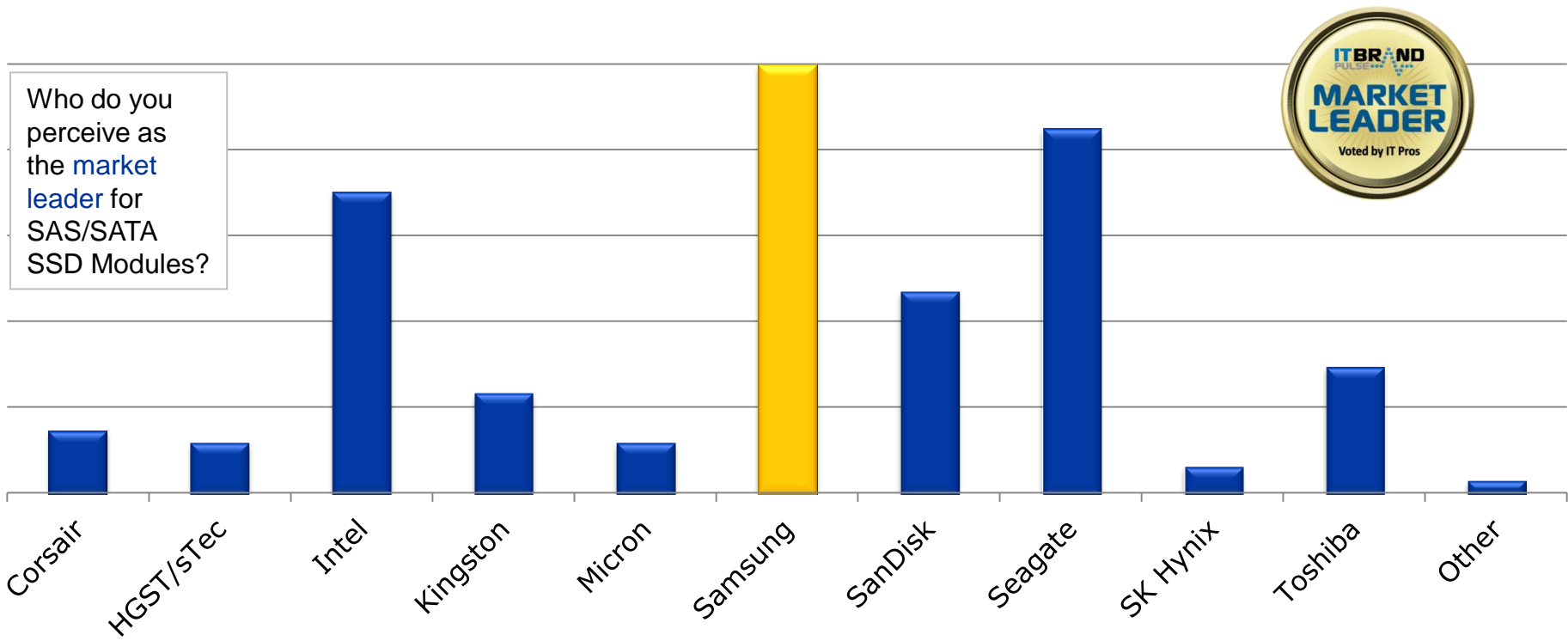
2014 Market Leader PCIe SSD DAS Adapters



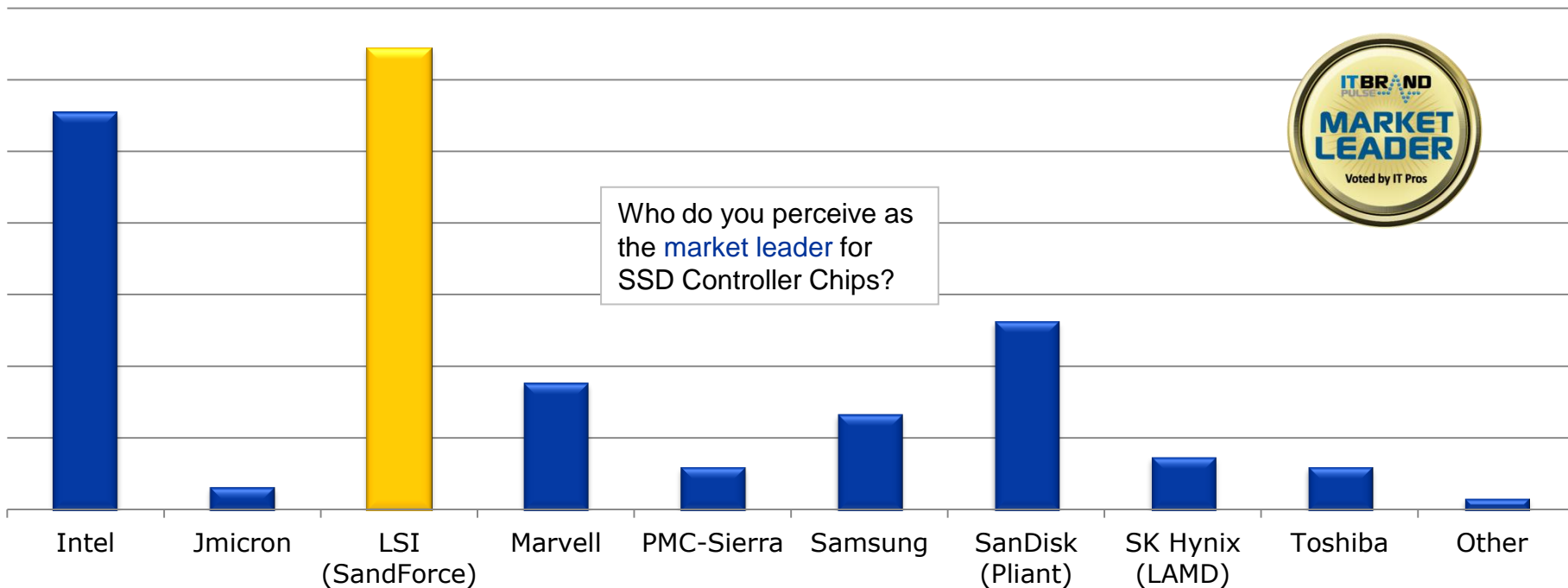
2014 Market Leader PCIe SSD SAN Adapters



2014 Market Leader SAS/SATA SSD Modules



2014 Market Leader SSD Controller Chips





IT Brand Pulse



Year in Review



2014 SSD Brand Leaders



2014 SSD Adoption Trends

Flash Acceptance by the 40%

**This year thousands of men
will die from stubbornness.**

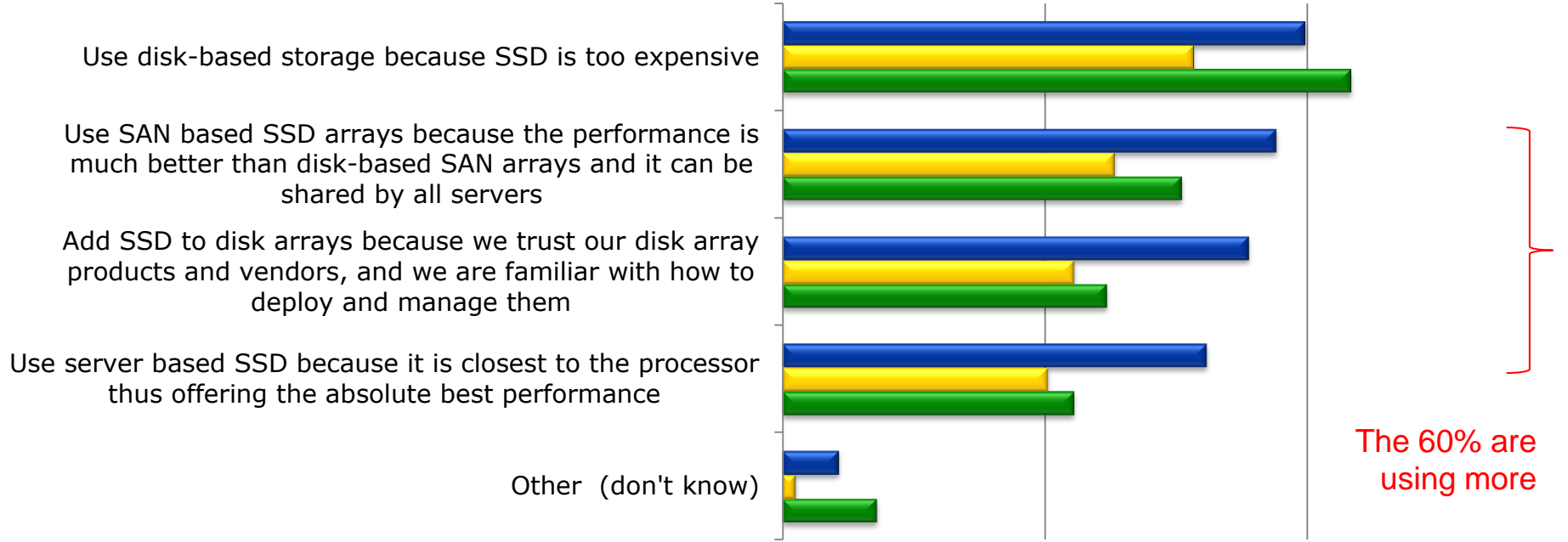
NO WE WON'T

Learn the preventive medical tests you need. ahrq.gov



LAMAR 15204

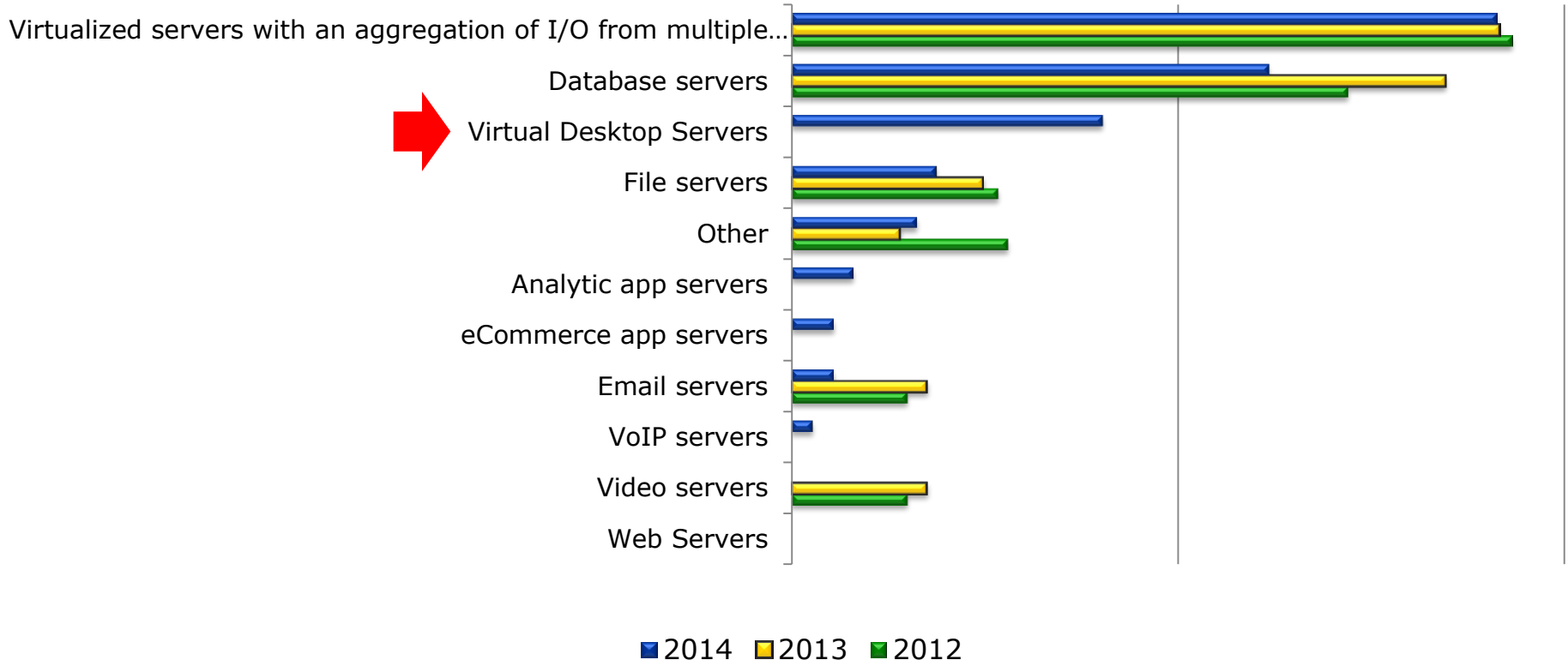
My organization uses the following SSD strategies (select all that apply):



The 60% are using more

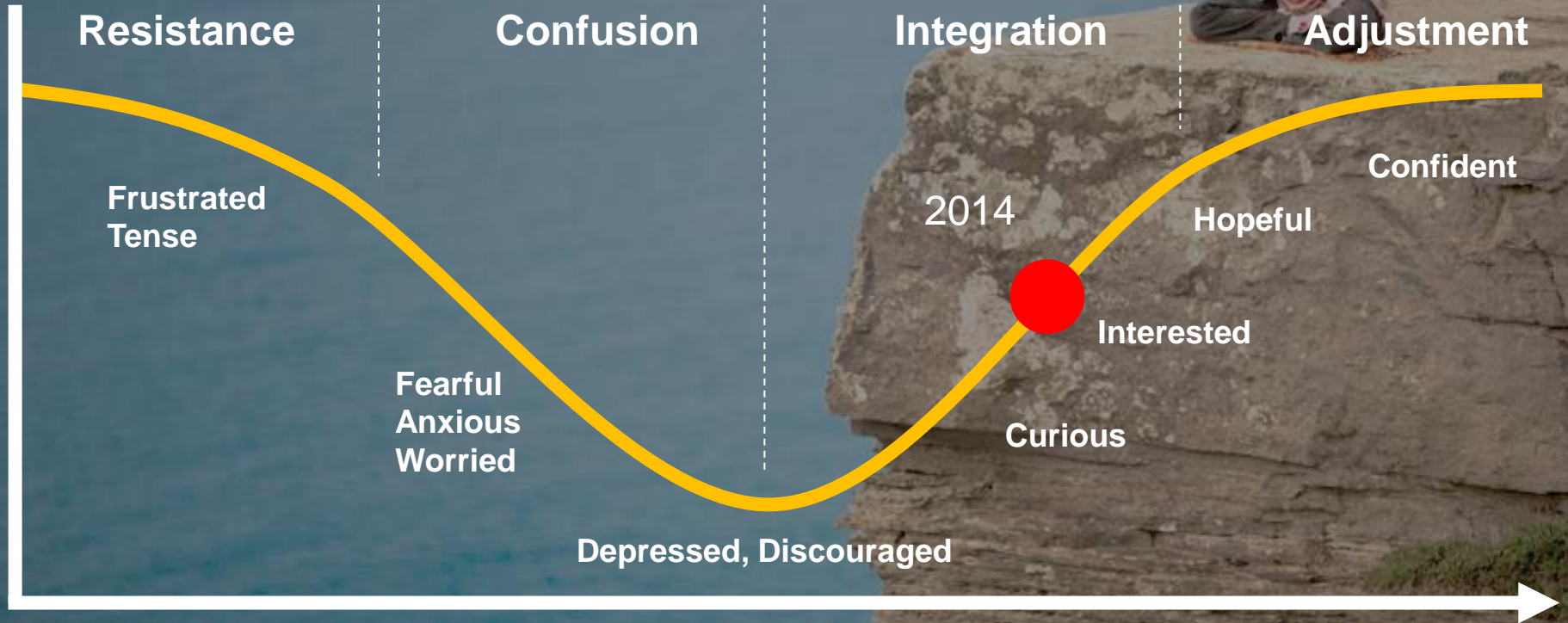
■ 2014 ■ 2013 ■ 2012

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

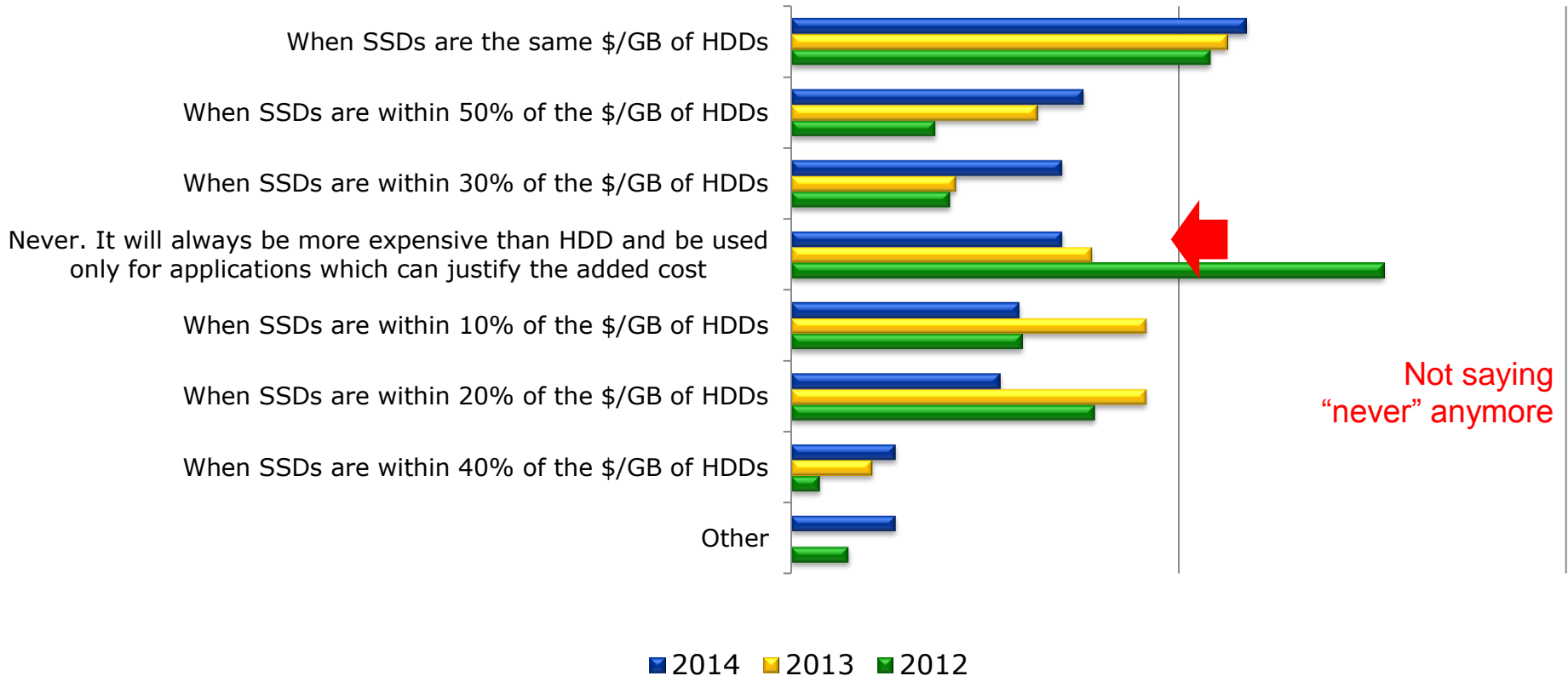


Flash Acceptance by the 60%

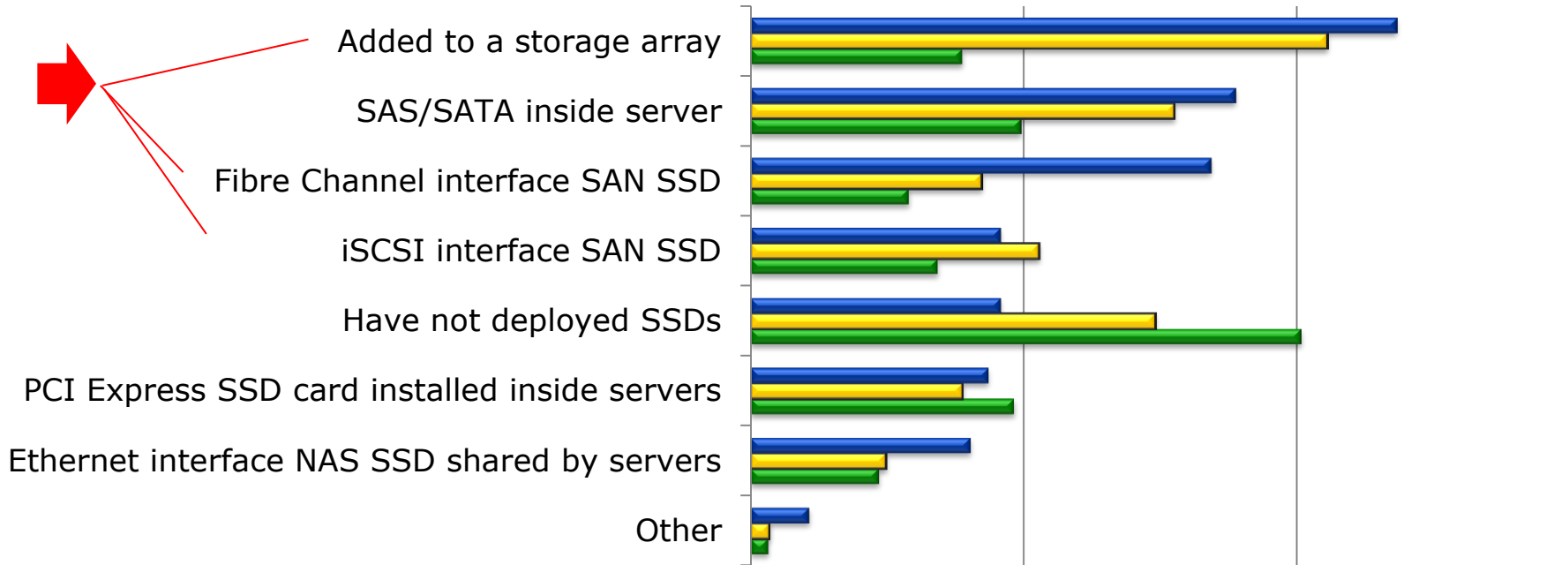
Shock/Surprise



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



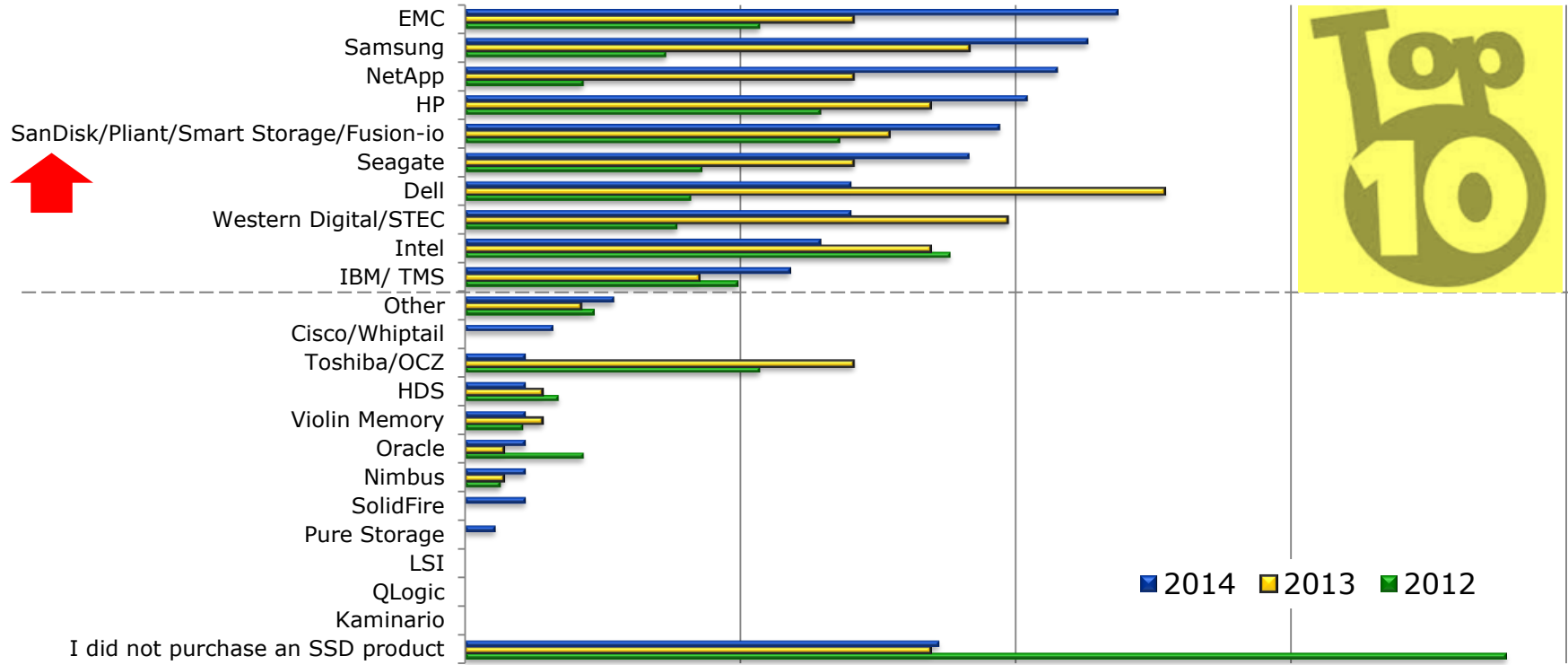
My organization has deployed the following types of SSD products (select all that apply):



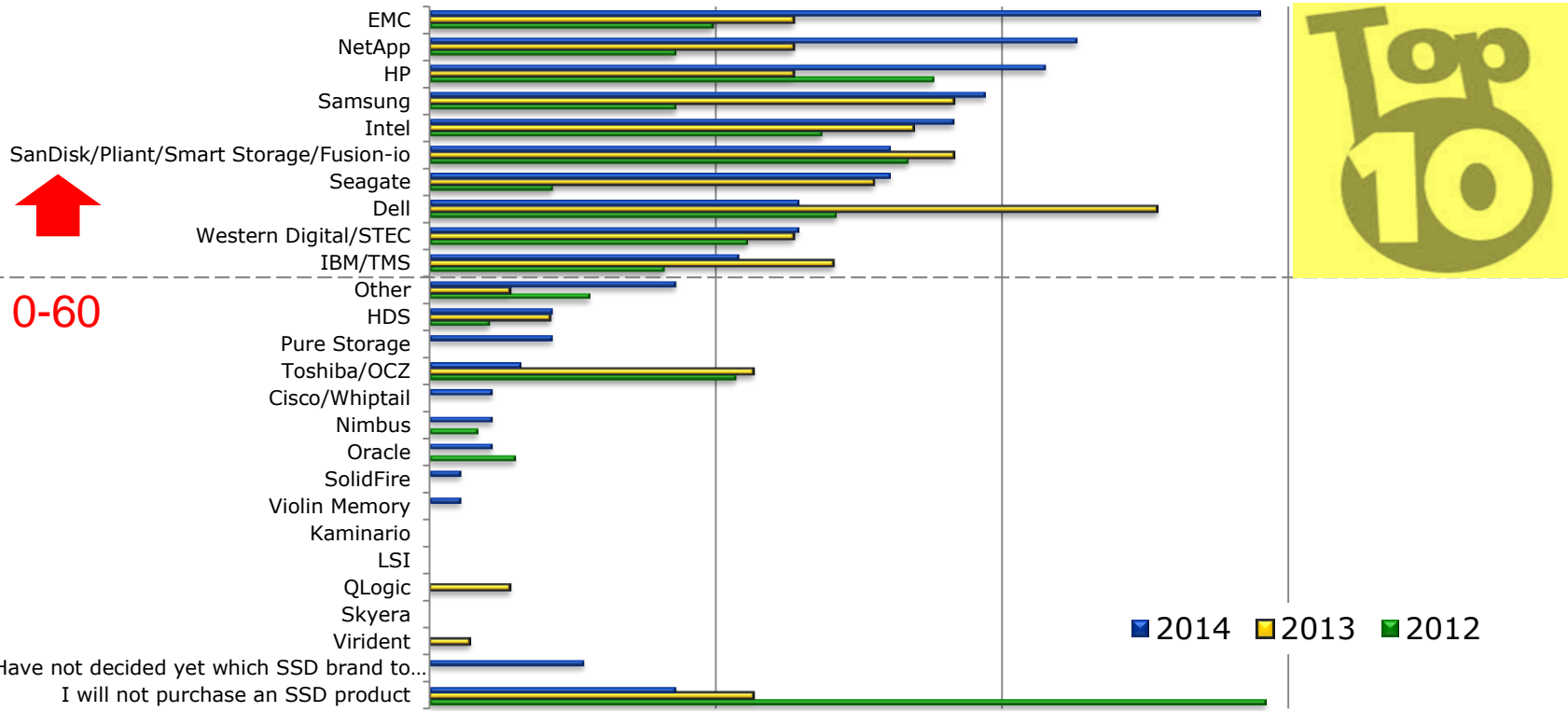
High Trust.
Shared Storage Architecture.

■ 2014 ■ 2013 ■ 2012

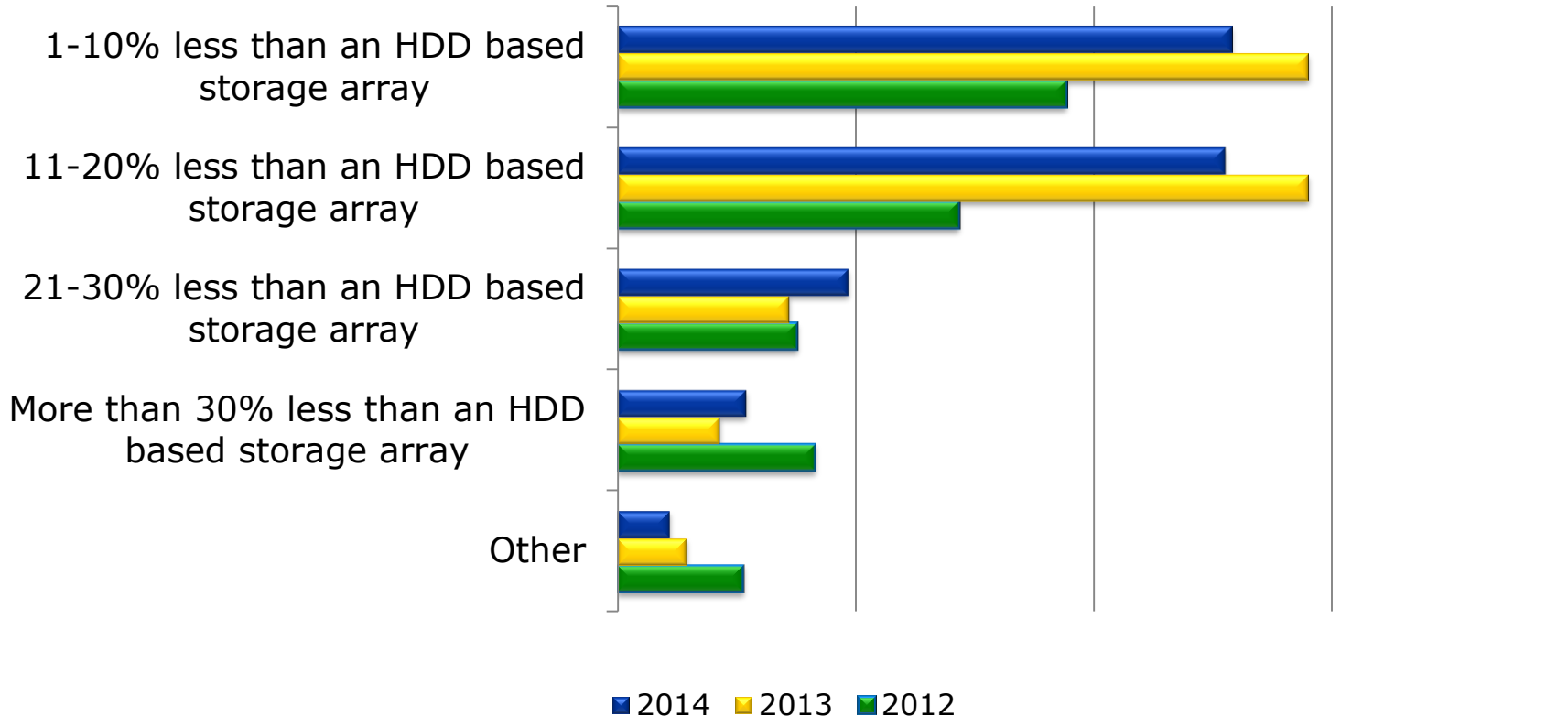
I purchased the following brands of SSD in the last year:



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



By eliminating HDD crashes, I expect the operating costs of SSD based storage arrays to be:

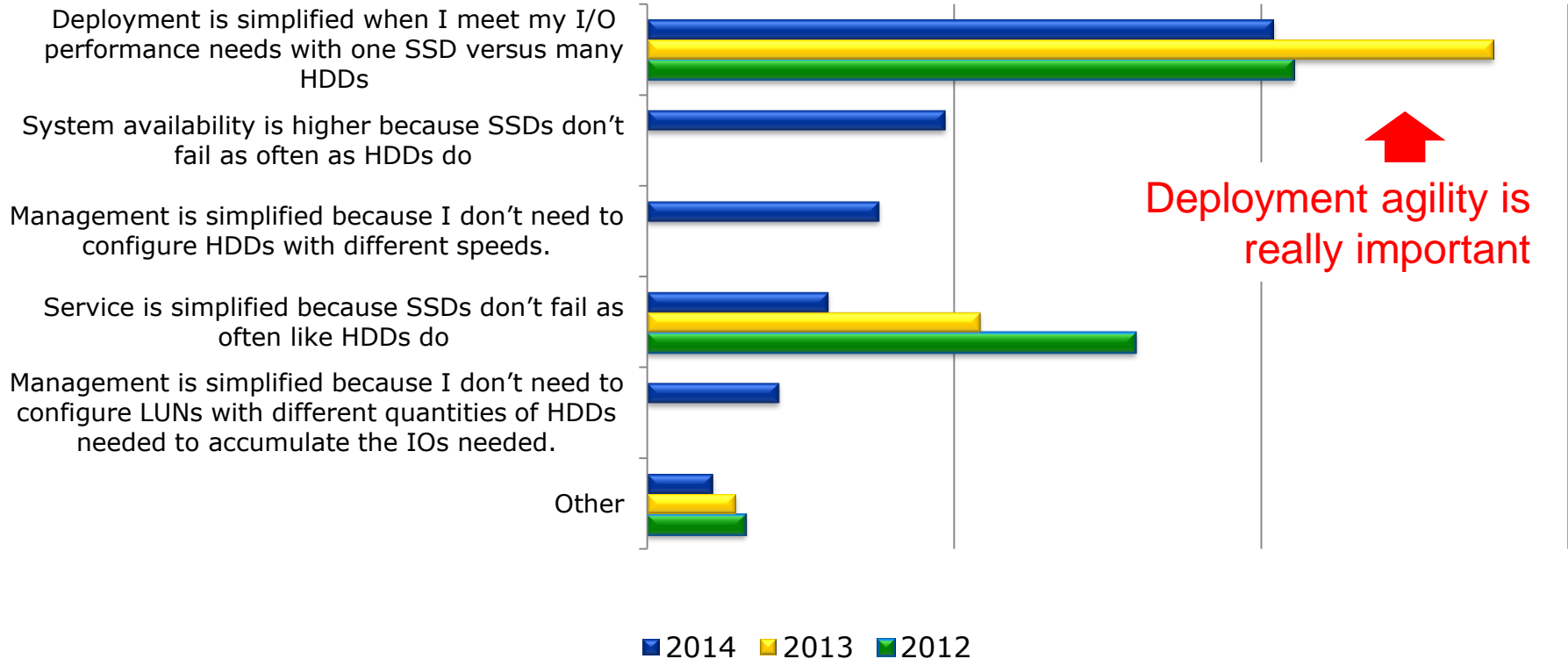


My experience with SSD so far (all that apply):

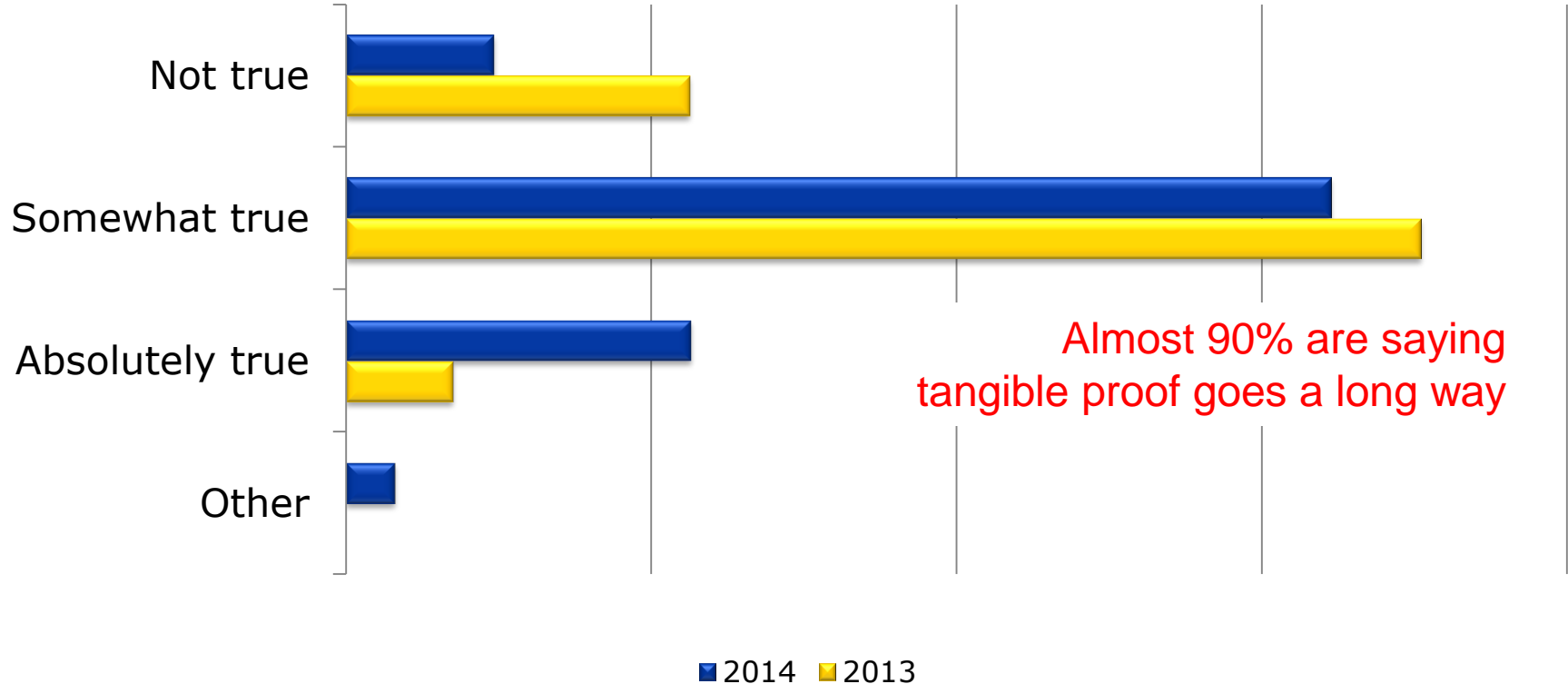


■ 2014 ■ 2013

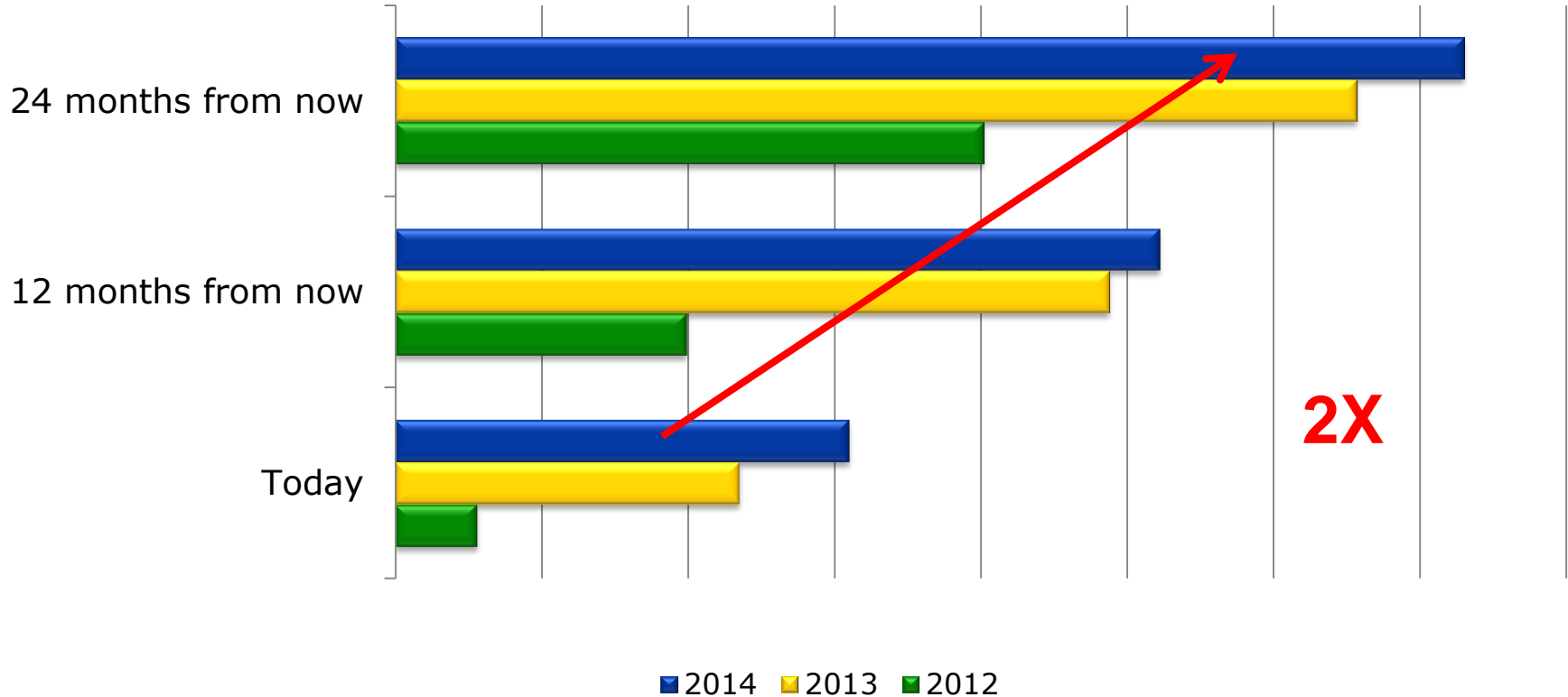
What I value most from SSDs is:



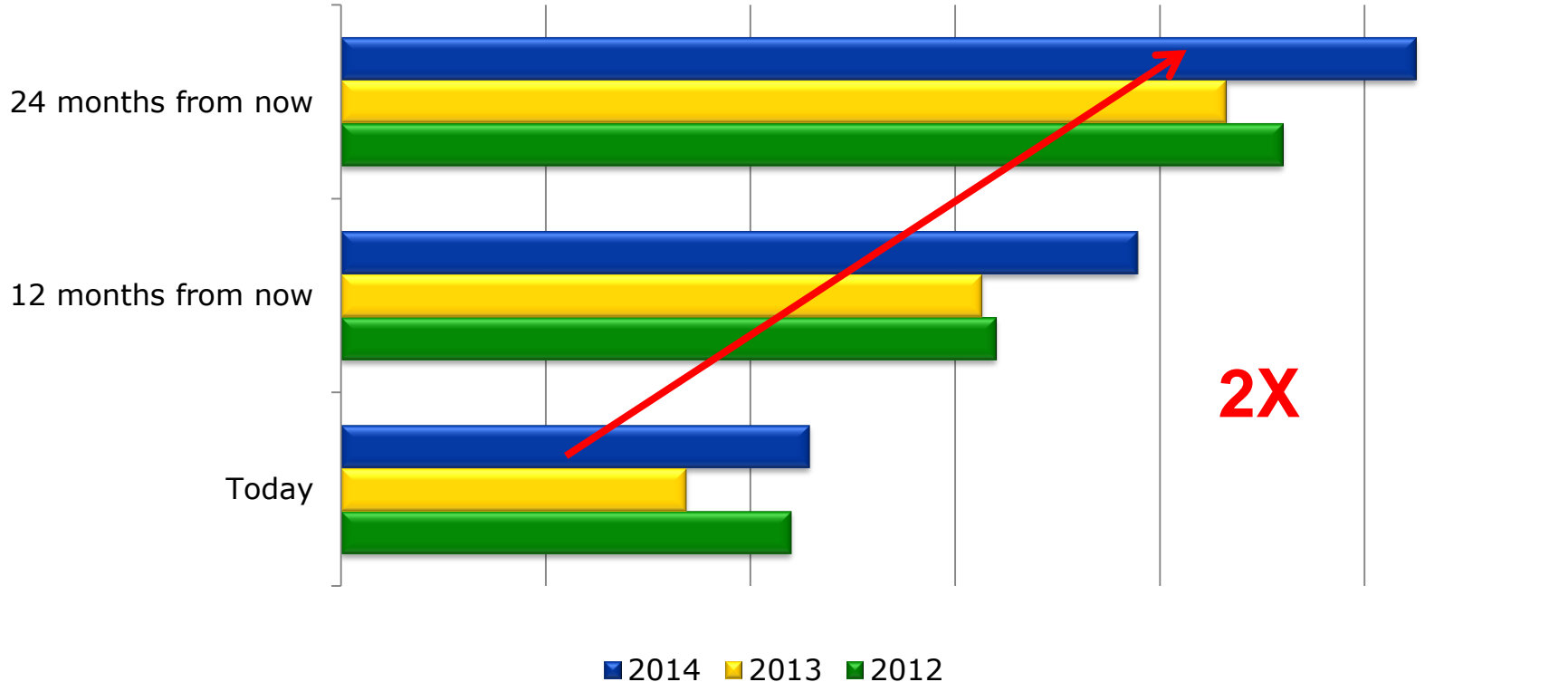
A substantially longer warranty period for SSD storage systems is a strong indicator that SSD technology is more reliable than HDD storage systems. I believe this is:



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



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



IT Pros Flash IQ is Increasing



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.):

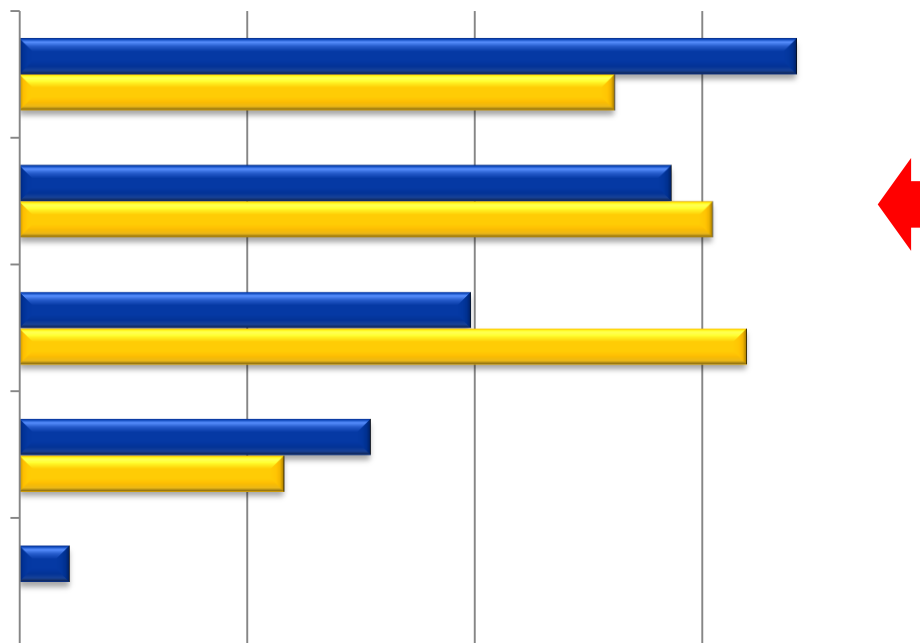
I want to know about flash memory technology and intend to do a deep dive into the technology.

I don't want to know that much about flash memory technology -- and I will rely on my storage vendor to have a deep understanding of the technology.

I don't want to know that much about flash memory technology -- but I feel I need to do a deep dive to understand what I'm buying in the future

I have already done a deep dive into flash memory technology and am very familiar with it.

Other



Now essential knowledge.
Only a little more than 25% will not deep dive into the technology.

■ 2014 ■ 2013

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:

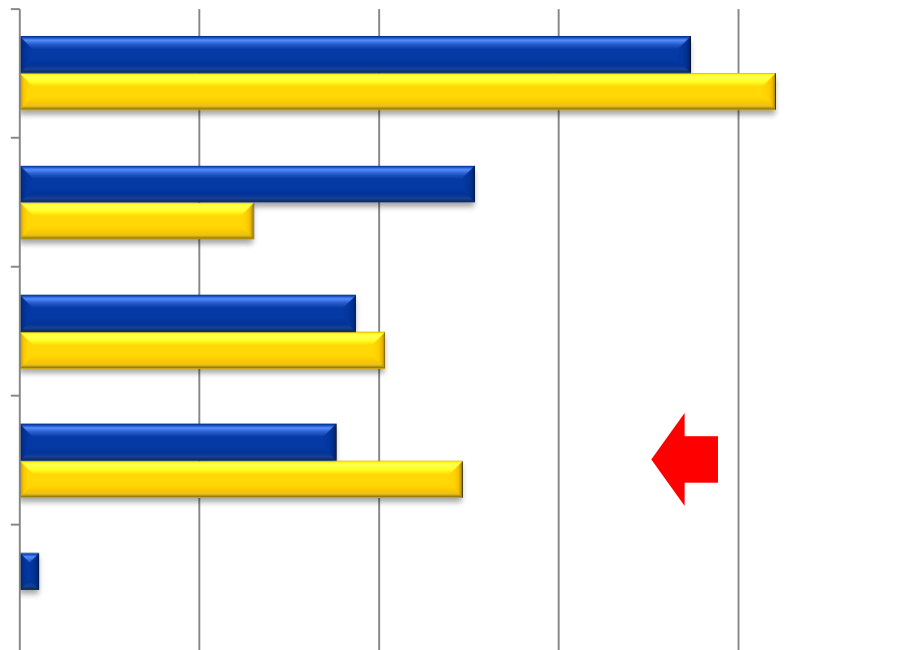
Want to know about flash storage systems and intend to do a deep dive into their architectures.

Have already done a deep dive into flash storage systems and am very familiar with them.

Don't want to know that much about flash storage systems -- but I feel I need to do a deep dive to understand what I'm buying in the future.

Don't want to know that much about flash storage systems -- and I will rely on my storage vendor to have a deep understanding of the right system for the application.

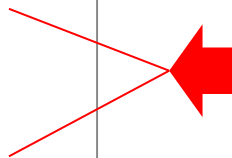
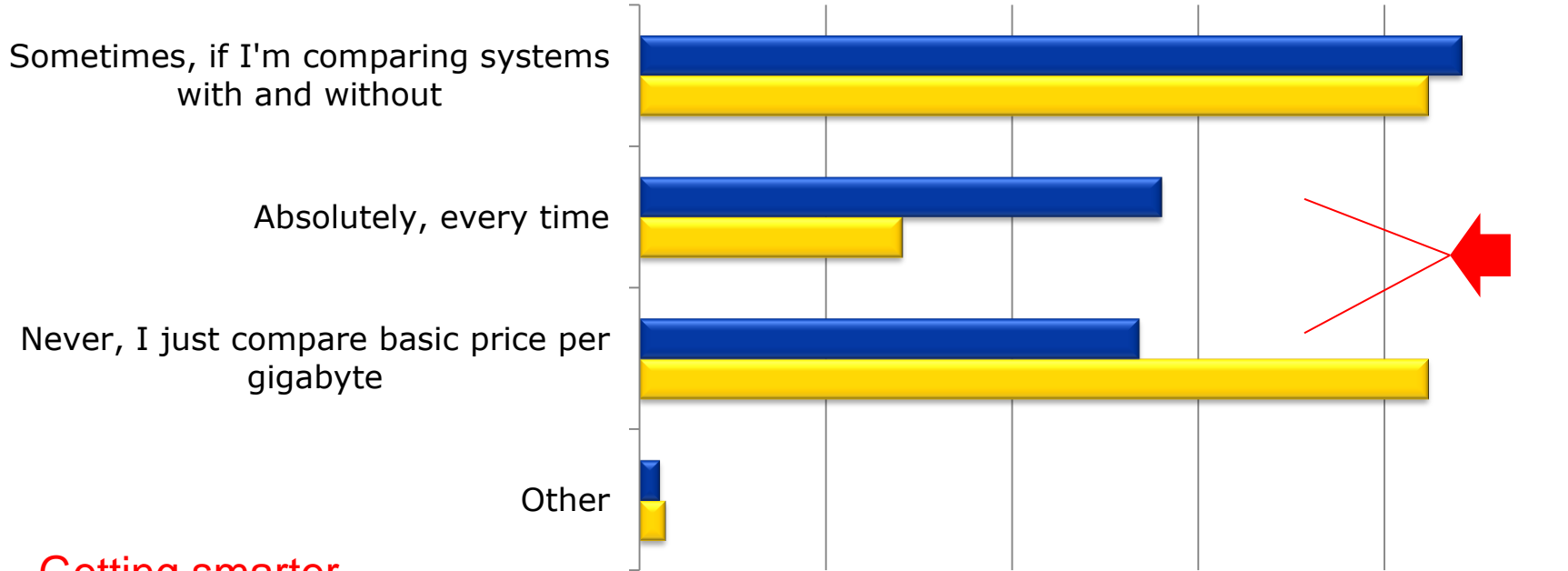
Other



Now essential knowledge.
Less than 20% will not deep dive into the systems.

■ 2014 ■ 2013

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



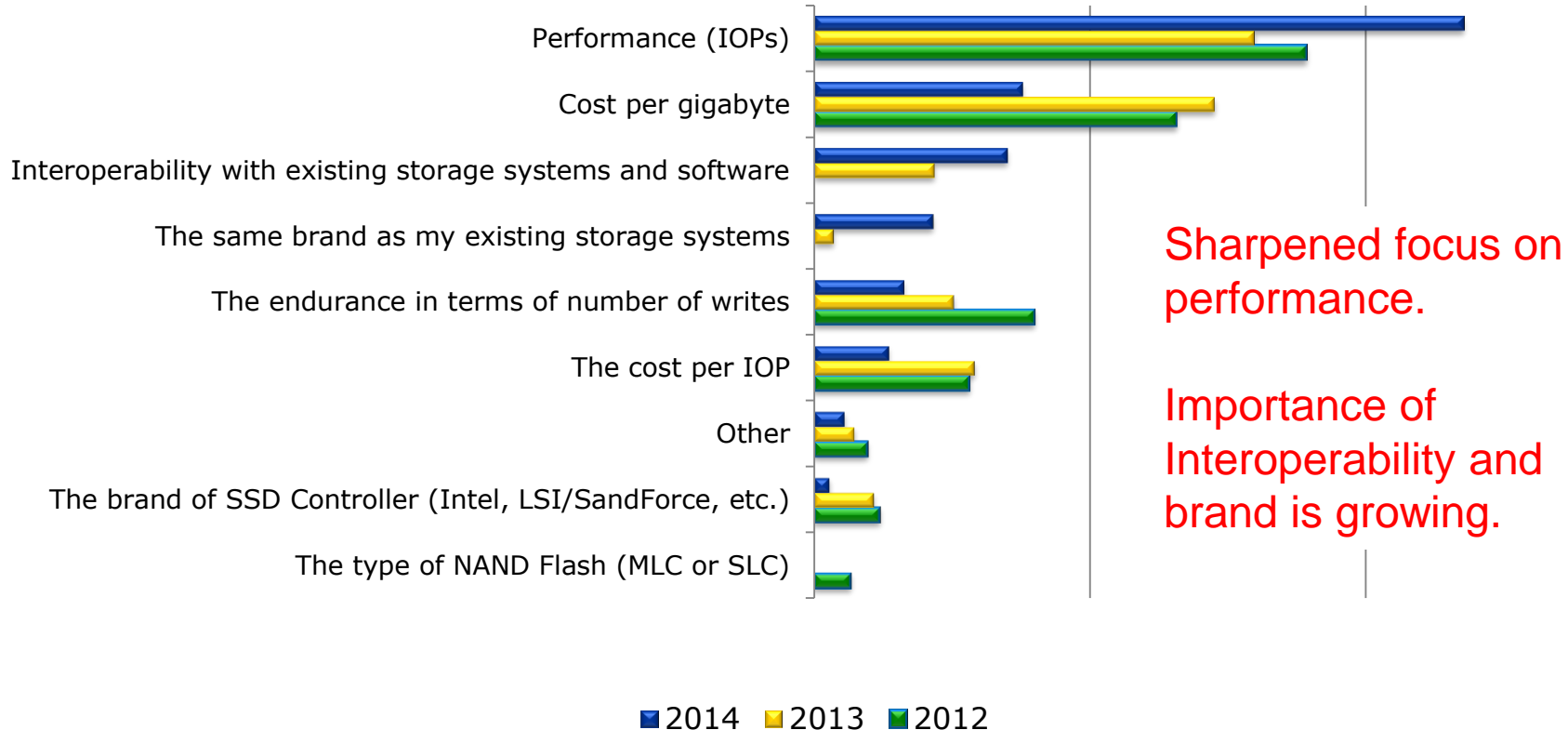
Getting smarter.
Changing habits.

■ 2014 ■ 2013

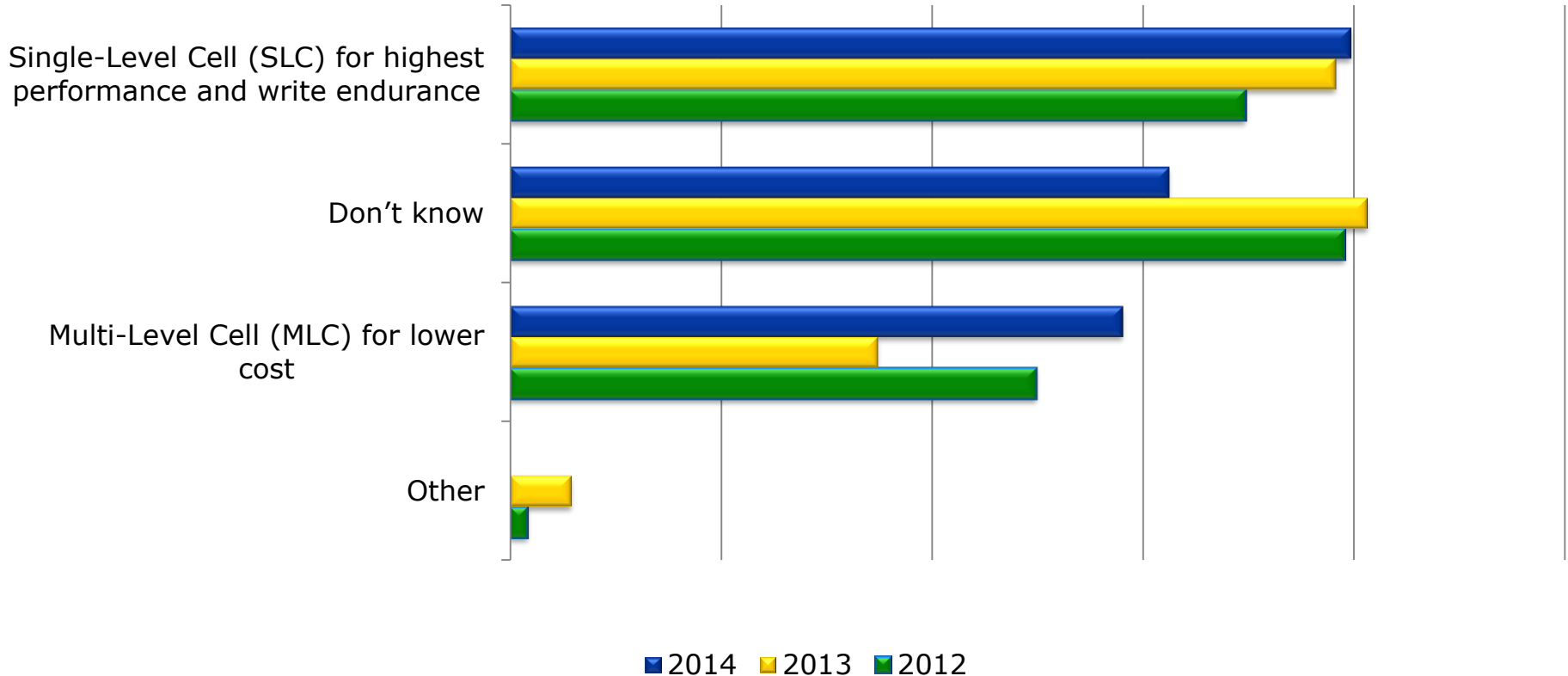
Sharper Focus on Performance



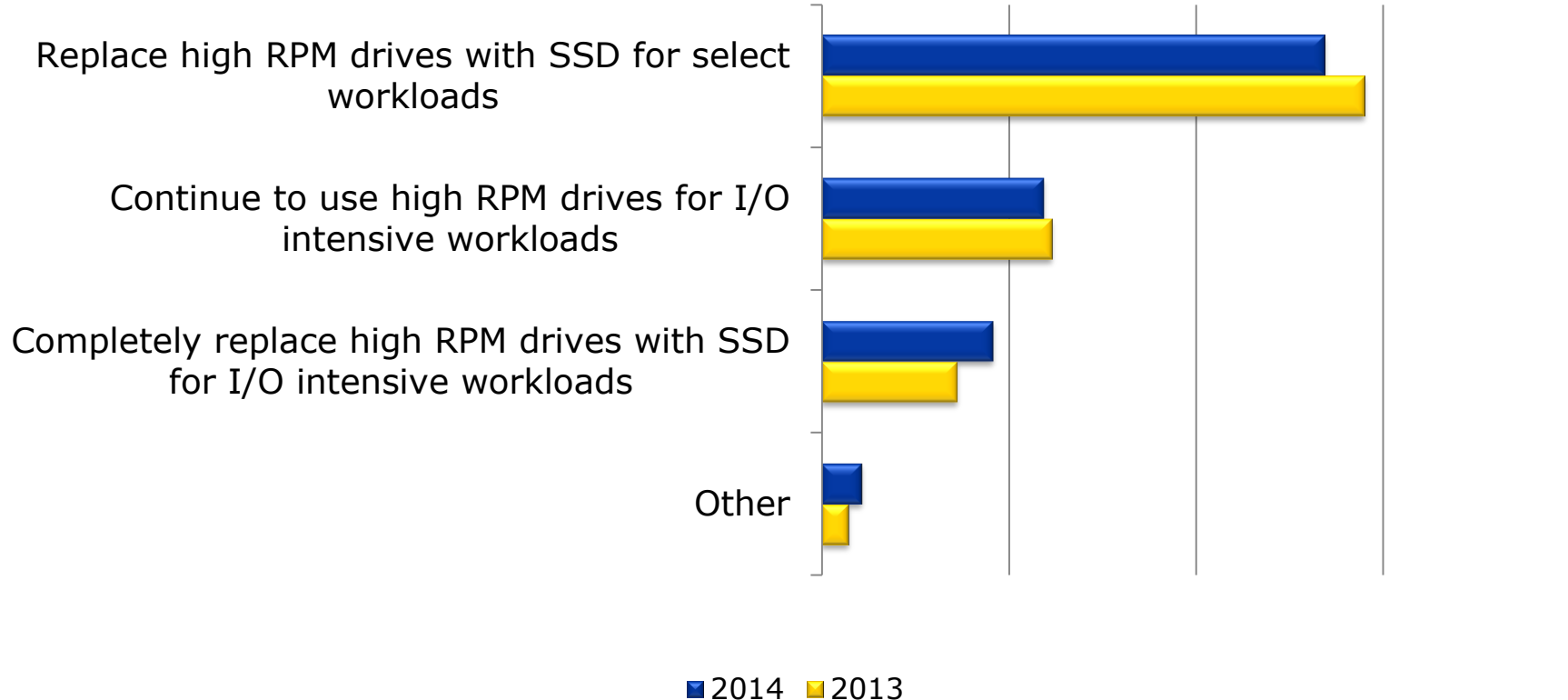
The most important feature of an SSD for my environment is:



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



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



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



The SSD controller within the hardware system.

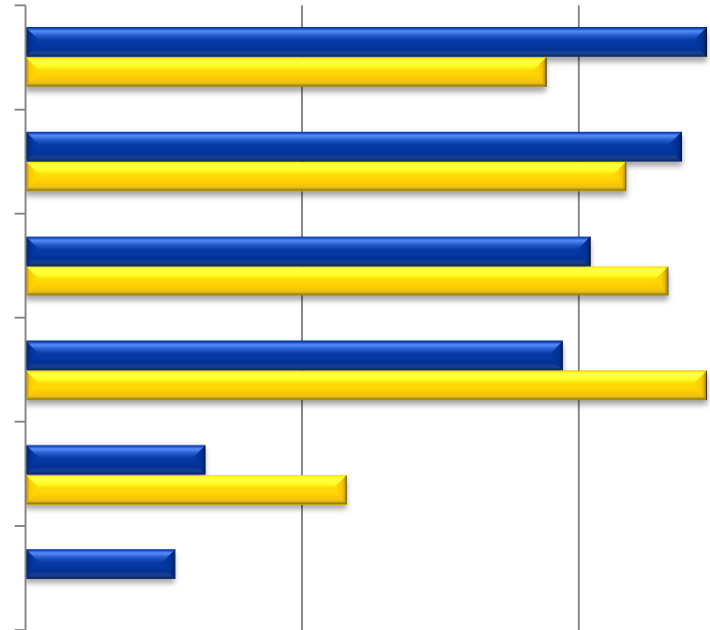
SSD hardware system

Storage management applications such as auto-tiering, de-duplication and thin provisioning.

System availability applications such as snap-shot, replication and path management (failover).

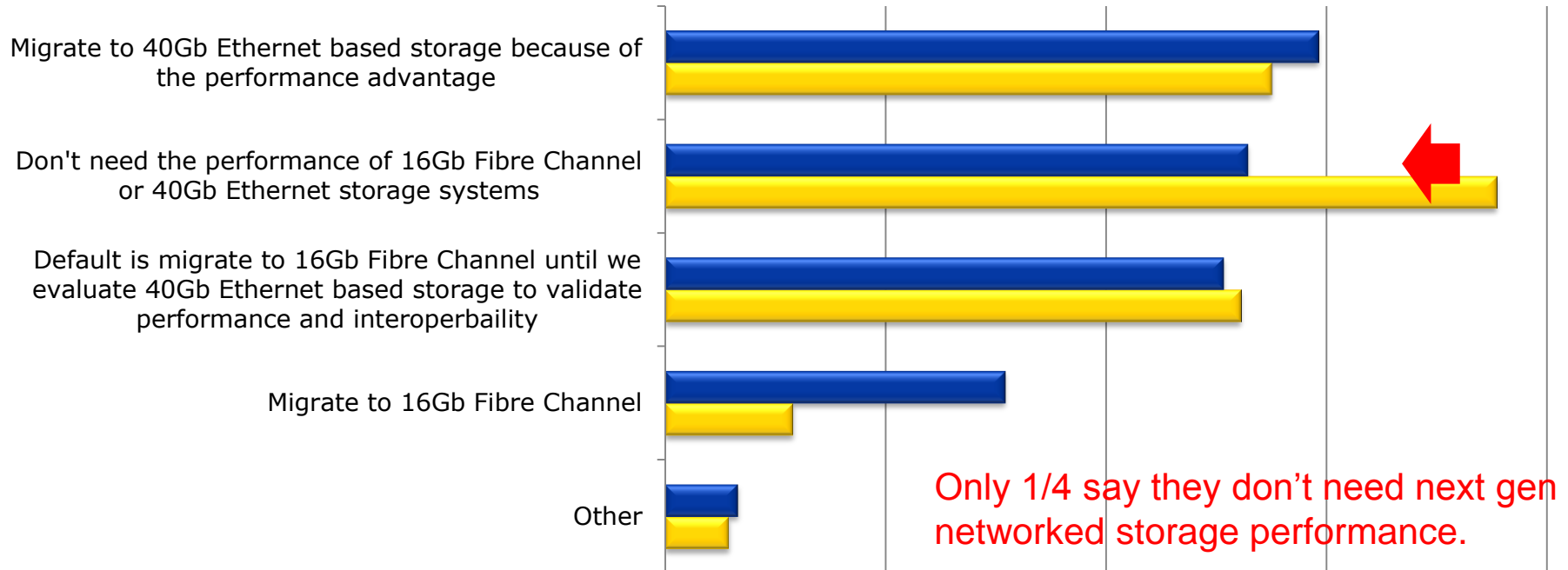
SSD driver and device management software

Other



■ 2014 ■ 2013

Storage system network interfaces are making speed jumps in the next year to 16Gb Fibre Channel and 40Gb Ethernet (NAS, iSCSI and FCoE). I would describe my organization's strategy for next generation storage to be:



■ 2014 ■ 2013

Looking Forward

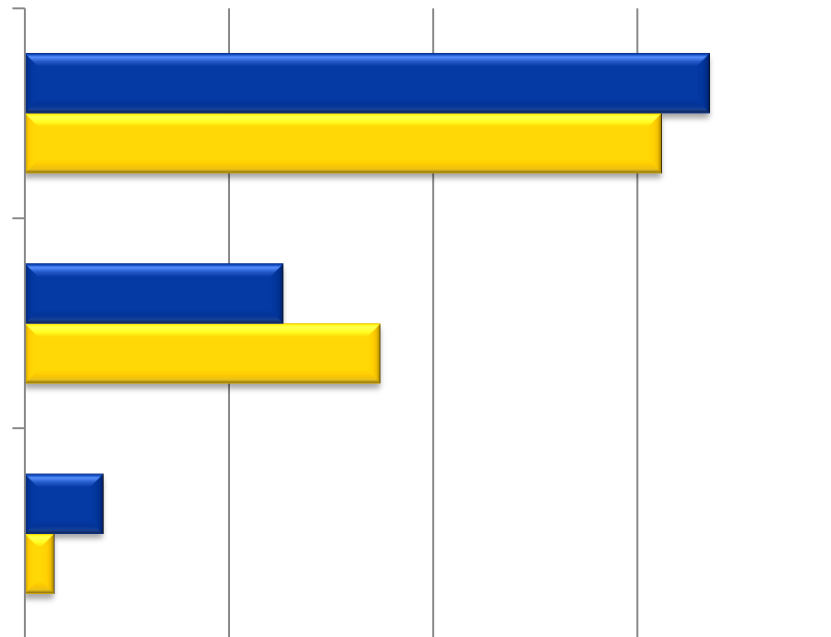


I see Software Defined Storage as a technology that:

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

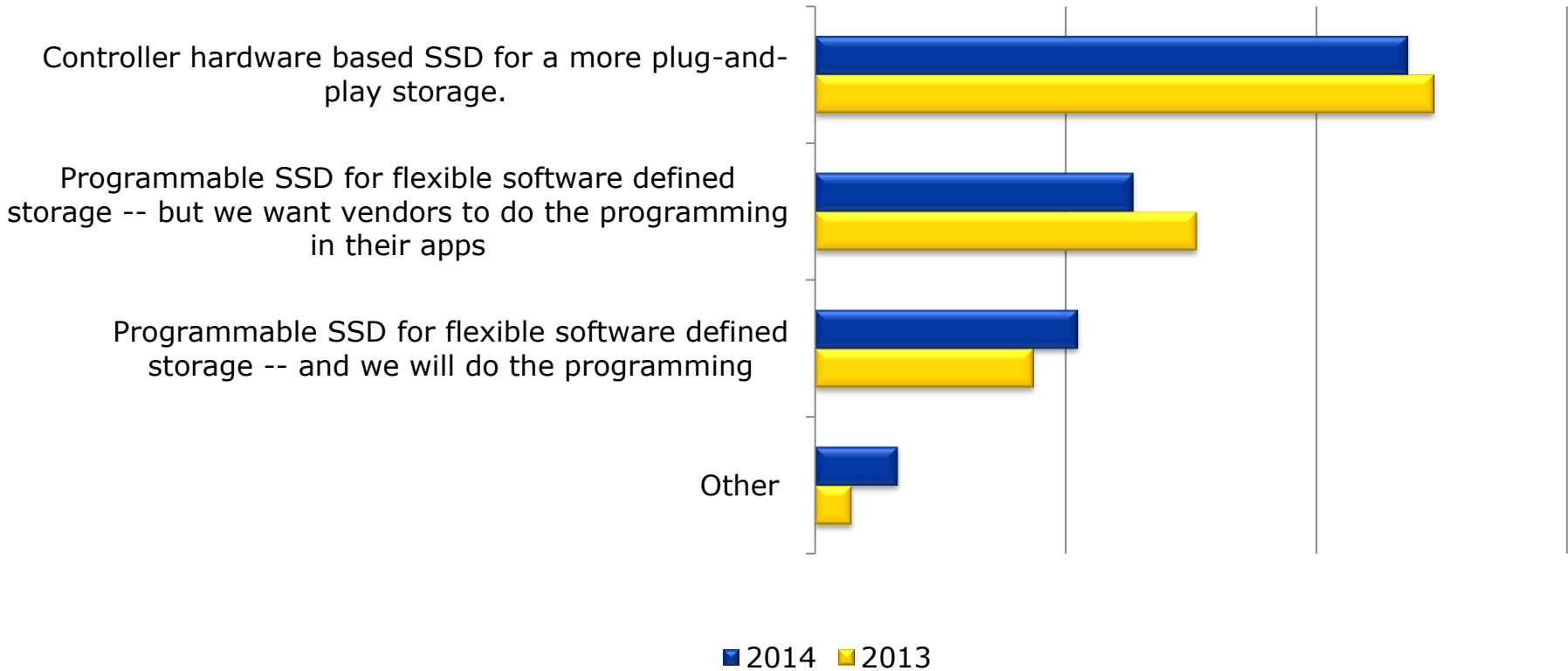
Is an inseparable feature of an enterprise storage "solution"

Other



■ 2014 ■ 2013

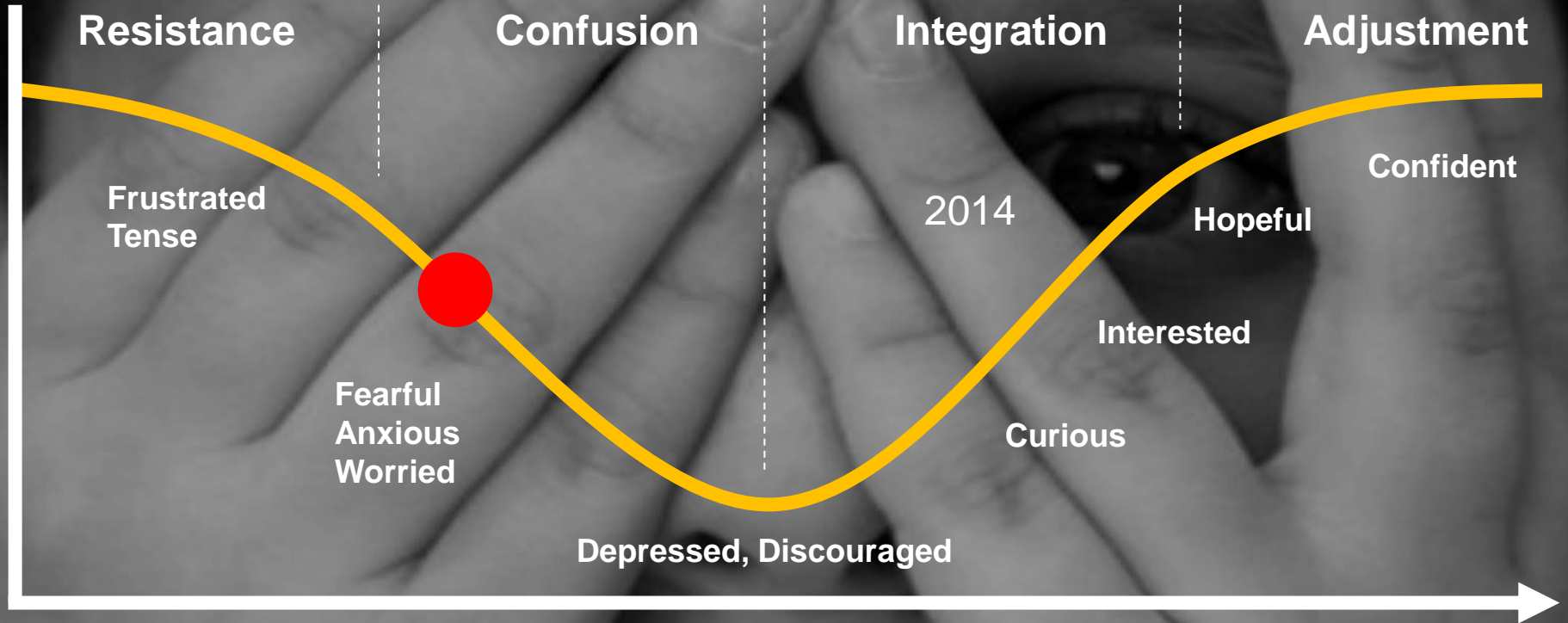
Some SSD products are "programmable" so they fit into a software defined storage environment. Other SSD products have most functions embedded in the controller hardware. What is best for my organization in the future is:



■ 2014 ■ 2013

Cloud Acceptance by the 70%

Shock/Surprise



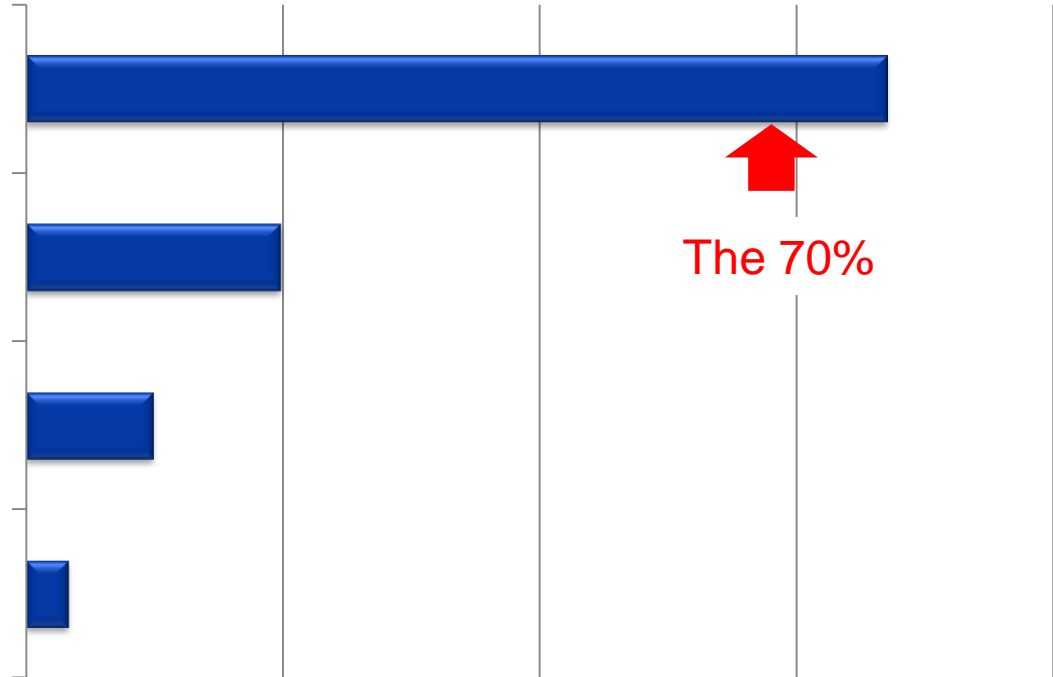
My organization's strategy for enterprise-class SSD-backed cloud storage is best described as:

We have no plans to use enterprise-class cloud storage with SSD.

We are planning to use enterprise-class cloud storage with SSD.

We are using use enterprise-class cloud storage with SSD.

Other



The following best describes my knowledge of SSD cloud storage:

I heard there is SSD cloud storage, but I have not investigated the offering.

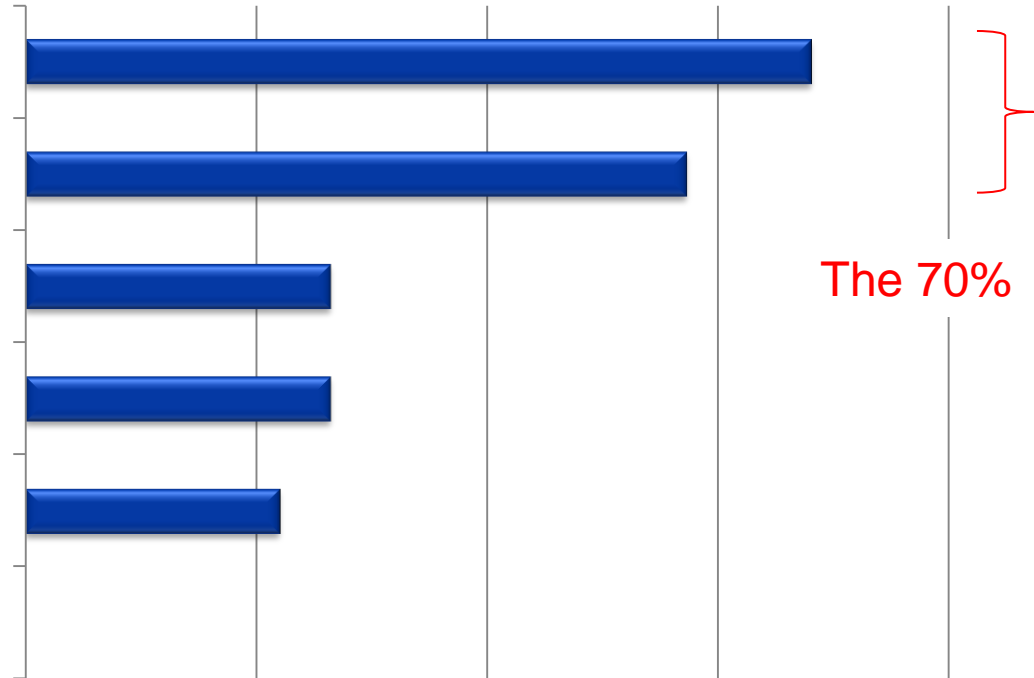
I am aware there is SSD cloud storage, but I have no interest.

I plan on evaluating SSD cloud storage.

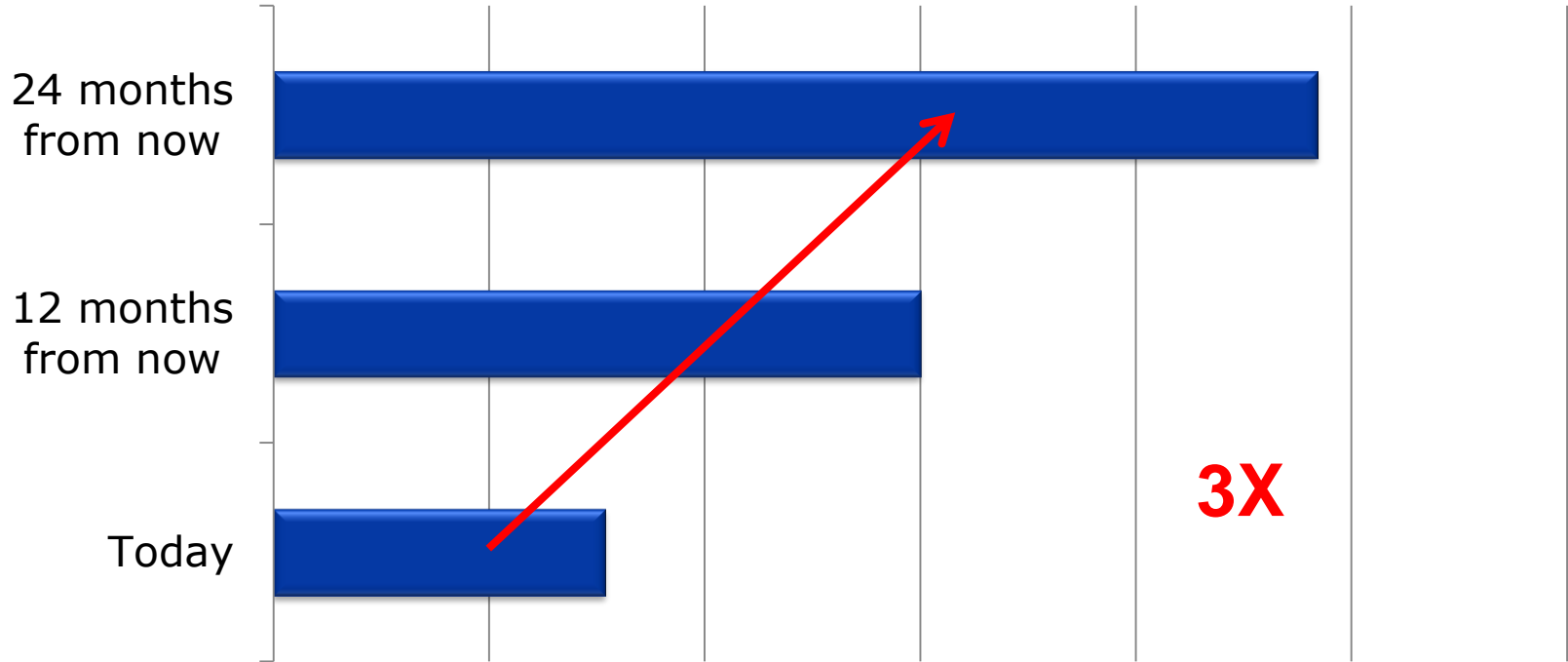
I was not aware there is SSD cloud storage available.

I am evaluating SSD cloud storage.

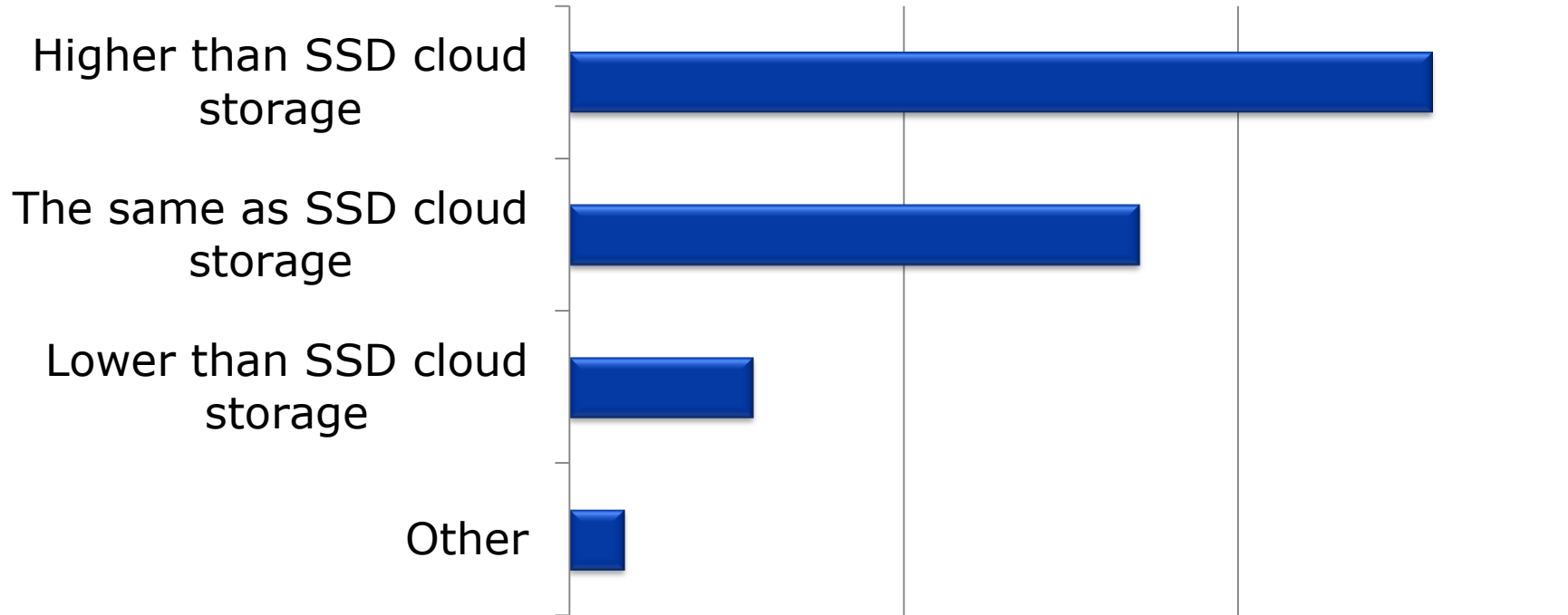
Other



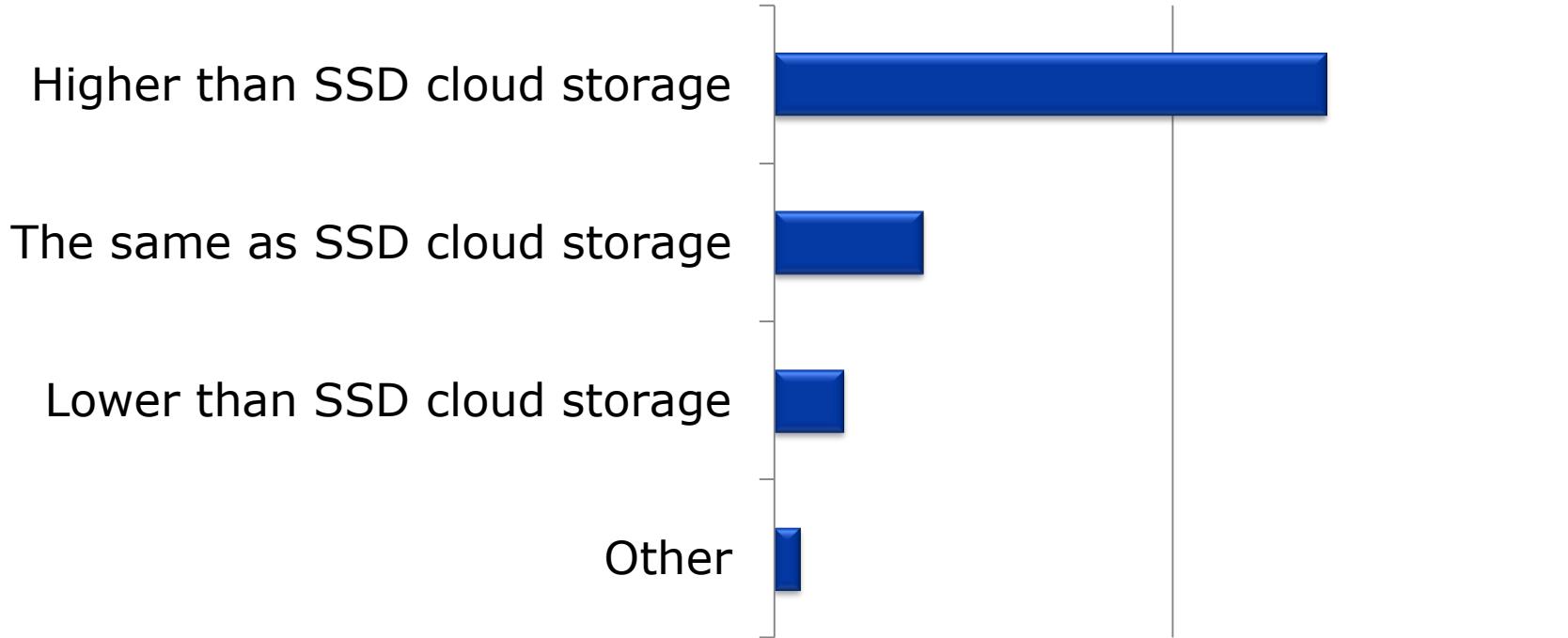
Percent of my overall storage that is in the cloud:



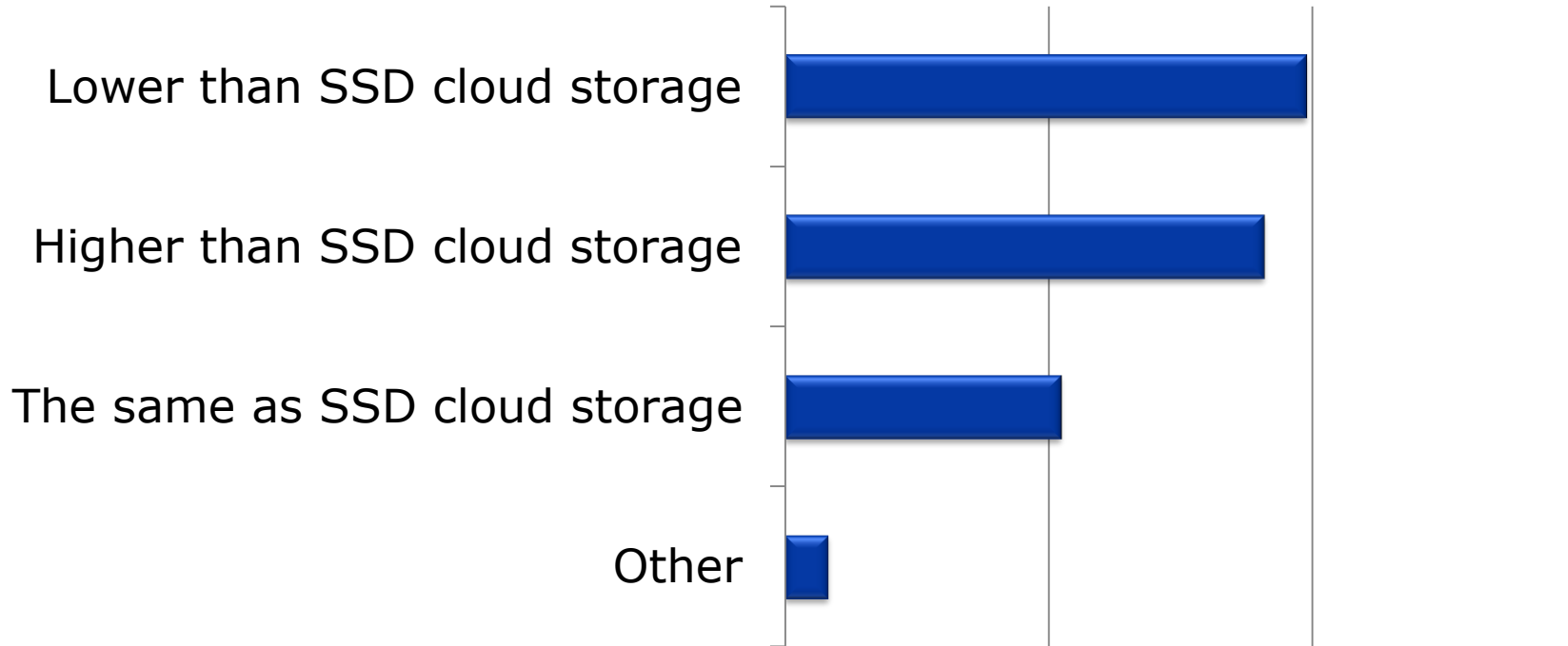
I would expect the AVAILABILITY of SSD storage in my data center to be:



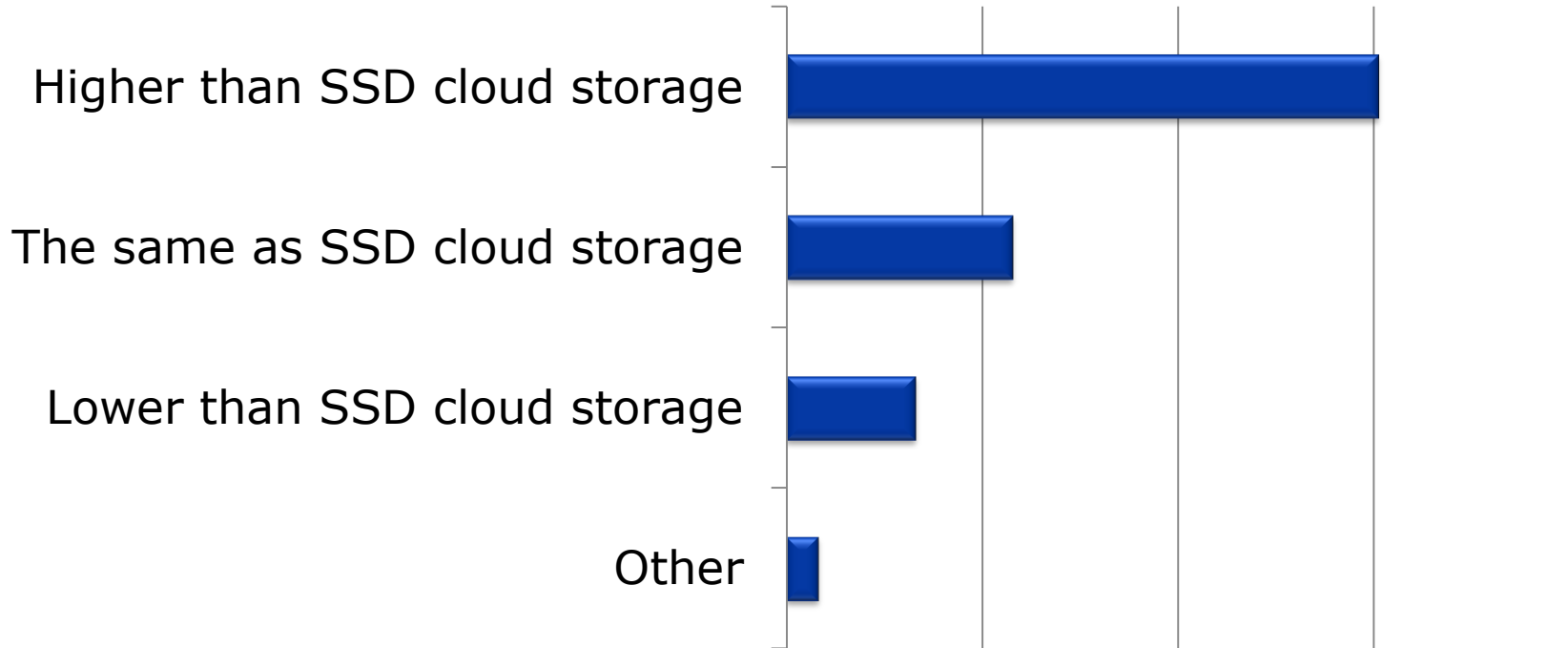
I would expect the PERFORMANCE of SSD storage in my data center to be:



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:



The following best describes my knowledge of Memory Channel storage:

I have heard of Memory Channel storage, but I have not investigated the offering.

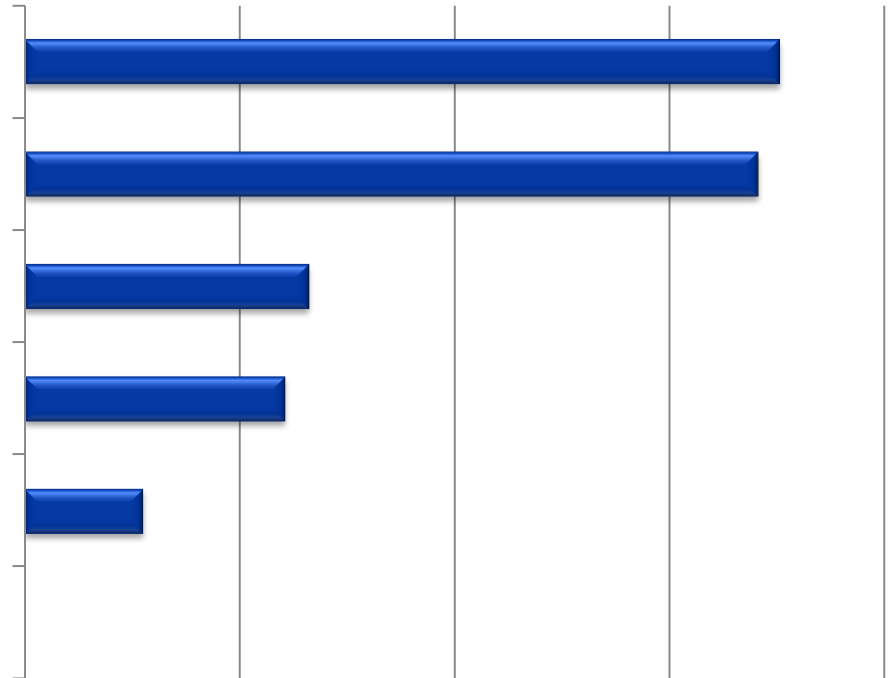
I have not heard of Memory Channel storage.

I am aware there is Memory Channel storage, but I have no interest.

I plan on evaluating Memory Channel storage.

I am evaluating Memory Channel storage.

Other





IT and Flash system vendors are between equally sized tectonic plates

Traditional Data Center

Cloud Data Center

A photograph of a forest floor with large, gnarled tree roots and green foliage. The image is semi-transparent, serving as a background for text.

NetApp

EMC

HP

HDS

**Needs of Traditional
IT Architectures will
be Met by Traditional
IT Vendors**

Hyperscales are Dictating a New Model

Proprietary System
Storage Apps
Software
Hardware

Proprietary OSs

Flash

HDDs

Enterprise App Store

Open OS

Open Storage System

Flash

HDDs

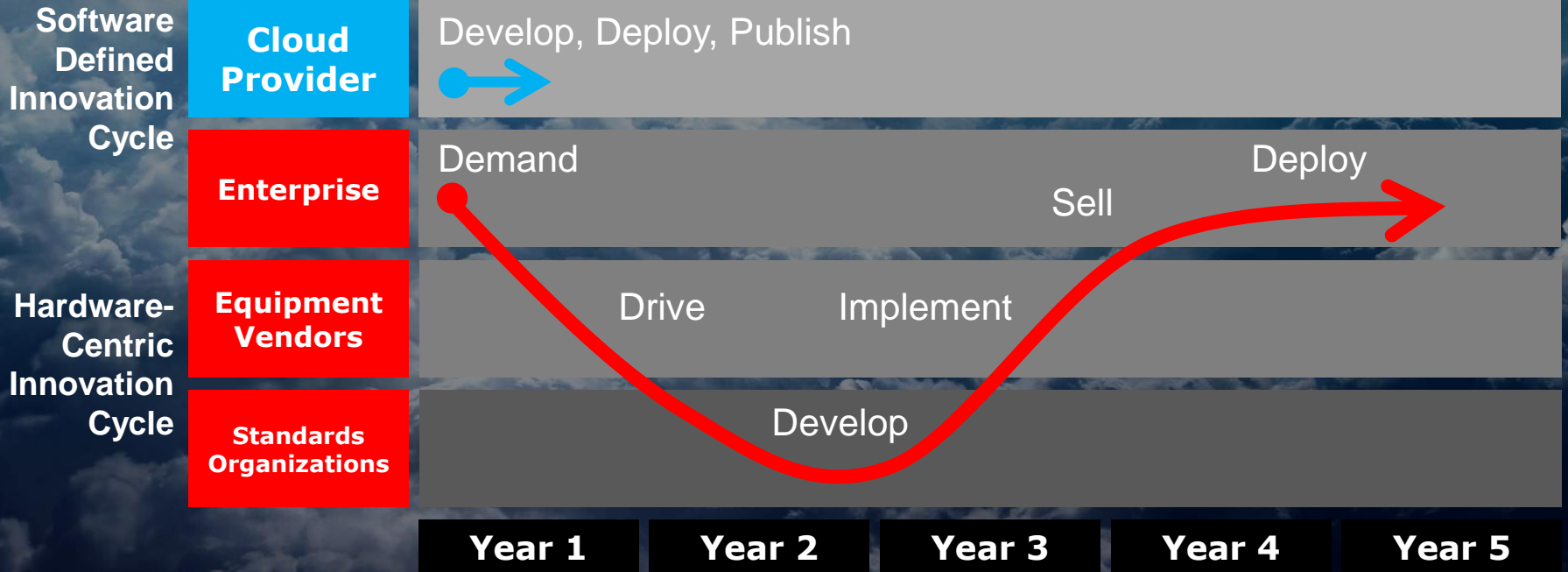


**The Open
Software Defined
Data Center is a
Greenfield**

The Enterprise App Store is Coming



Innovation Will Explode



Thank You



This version does not show the numerical data.

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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.

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The logo features the text "ITBRND" in a bold, white, sans-serif font. The letter "D" is partially obscured by a cluster of blue dots of varying sizes. Below "ITBRND" is the word "PULSE" in a smaller, white, sans-serif font, followed by a trademark symbol (™).