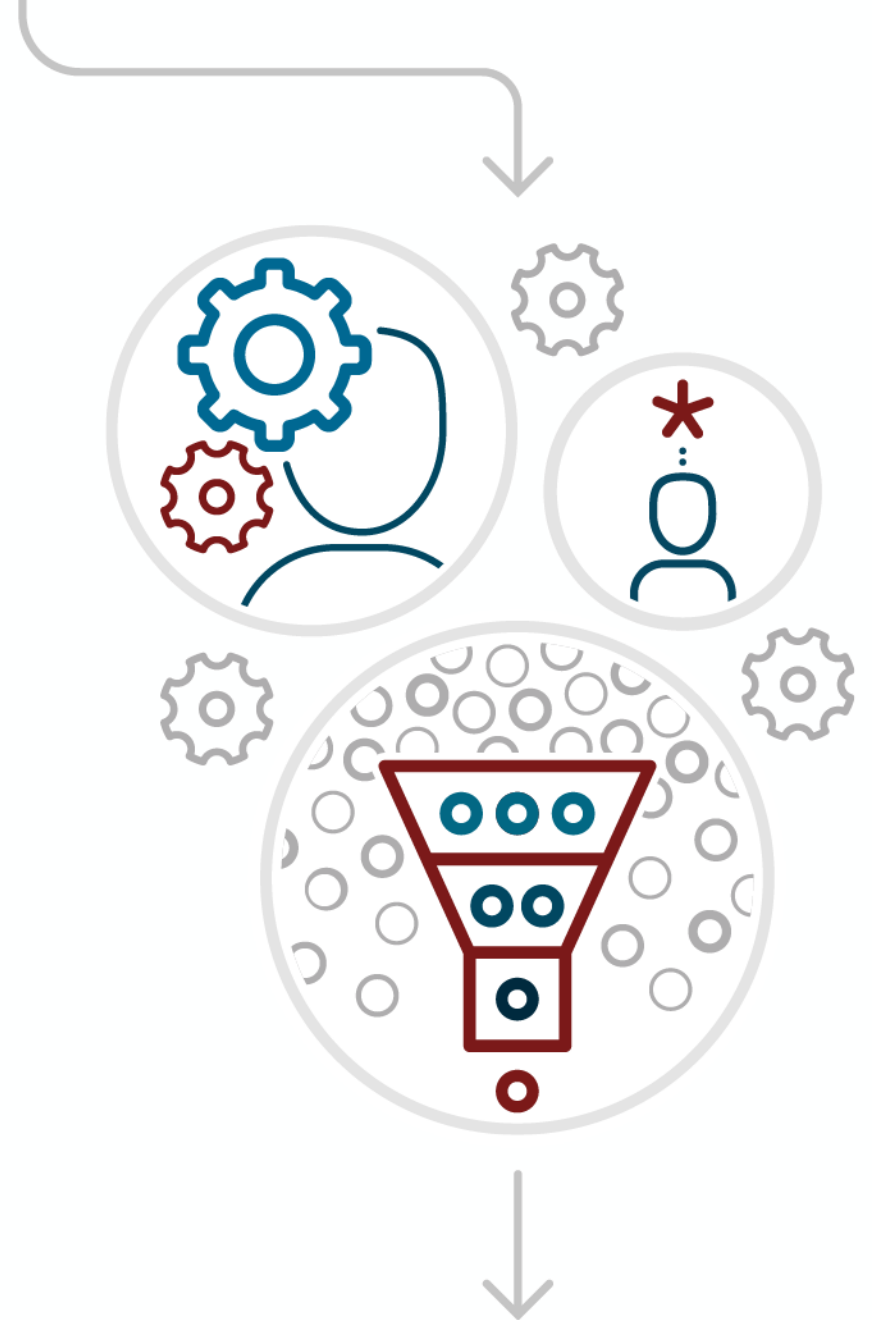


Know What the Flash Customer Wants and Needs

Dave Raffo
Editorial Director

August 7, 2018



Today's Agenda

- State of the Flash Market
- Is NVMe eating the world?
- What's next?



Panelists

- Dave Raffo, Editorial Director, TechTarget
- Marc Staimer, President, DragonSlayer Consulting
- Eric Herzog, Chief Marketing Officer, IBM
- Josh Epstein, Chief Marketing Officer, Kaminario
- Brian Schwarz, VP Product Management, Pure Storage

Dave Raffo

Editorial Director at TechTarget

- Dave joined **TechTarget** in 2007 after spending three-and-a-half years covering storage for Byte and Switch.
- TechTarget is a media and research company covering all IT disciplines.
- As editorial director of the Storage Group, Dave leads TechTarget's coverage of storage, data protection and hyper-convergence.
- Dave oversees SearchStorage.com, SearchConvergedInfrastructure.com, SearchDataBackup.com, SearchDisasterRecovery.com and Storage Magazine



SearchStorage

Marc Staimer

President, Dragon Slayer Consulting

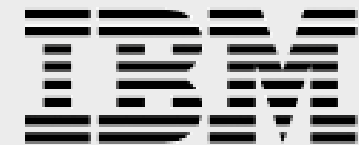
- Marc Staimer is the President at Dragon Slayer Consulting in Beaverton, Oregon
- The consulting practice has focused on the areas of strategic planning, product development and market development.
- With more than 30 years of marketing, sales and business experience in infrastructure, storage, server, software and virtualization, Marc is considered one of the industry's leading experts.



Eric Herzog

Chief Marketing Officer

- Eric's responsibilities include worldwide product marketing and management for IBM's award-winning family of storage solutions, software defined storage, integrated infrastructure, and software defined computing, as well as responsibility for global storage channels.
- Herzog has over 32 years of product management, marketing, business development, alliances, sales, and channels experience in the storage software, storage systems, and storage solutions markets, managing all aspects of marketing, product management, sales, alliances, channels, and business development in both Fortune 500 and start-up storage companies.
- Herzog holds a B.A. degree in history from the University of California, Davis, where he graduated cum laude, studied towards a M.A. degree in Chinese history, and was a member of the Phi Alpha Theta honor society.



Josh Epstein

Chief Marketing Officer

- Josh has 20 years experience in technology marketing and strategy roles. At Kaminario, Josh is responsible for developing the company's brand, driving global marketing programs, and telling the Kaminario story.

Prior to Kaminario, Josh held a range of marketing, strategy and business development roles at startups including Reddo Mobility, Gizmox, and Advanced Electron Beams as well as global technology companies including EMC, CA Technologies, Acme Packet, and Oracle.

- He holds a B.S. in Operations Research from Cornell and an MBA from MIT Sloan..



kaminario.

Brian Schwarz

VP Product Management

- Brian is VP of Product Marketing at Pure, focusing on the FlashBlade platform.
- His expertise is in building simple solutions for complex technical challenges that come at the leading edge of technology.
- Before joining Pure in 2014, Brian spent 6 years at Cisco building the Unified Computing System platform.
- MBA, U of Wash, BS in computer engineering, Rensselaer Polytech Institute (RPI)



The TechTarget Research Audience

- **Technology buyers** from our global audience of **15 million+** actively researching solutions on our network of **140+** websites.
- Comprised of **decision makers at organizations with all ranges of revenue**
- On average most of our technology researchers have been **TechTarget members for 5+ years**
- **Participation is based on a reciprocal relationship** with respondents, who share confidential information about their recent purchases, technology roadmaps, vendor relationships and forward-looking spending plans. In return they receive valuable research information and insights on an ongoing basis for benchmarking and vendor selection.



Methodology and Survey Demographics

Storage Market Landscape Study

- With more than 800,000 registered users on TechTarget's storage sites in North America - **475 survey responses**
- **Pre-and post-purchase surveys**
- **When?** 1H 2018
- **How?** Phone and web surveys, using a quantitative survey instrument



Key Findings: **All-Flash Arrays**

40%

of the current audience **has all-flash in place**

64%

have **plans to implement within the next 24 months**



What buyers are telling us about their next flash arrays purchase

Top Purchase Drivers

All-flash Arrays	Hybrid Arrays
37% Improve existing application or database performance	39% Improve performance for existing applications
20% Assure performance for a new application	31% Reduce total cost of ownership
20% Reduce total cost of ownership	26% Ongoing capacity growth
19% Eliminate storage performance issues	25% Simplify performance management of storage
19% Ongoing capacity growth	24% End of life replacement for existing hardware

Buyers are turning to **flash arrays to refresh aging storage** implementations supporting existing workloads with faster-performing, more cost-effective and easier-to-manage hardware that can support rapidly growing data pools.

Digital transformation & AI create new routes to market

Likelihood to invest	All-flash Arrays	Hybrid Flash Arrays
Artificial intelligence	+58%	+65%
Big data/business analytics	+38%	+21%
Compliance or legal discovery	+63%	+42%
Customer relationship management (CRM)	+5%	+45%
DevOps	+64%	+74%
Mobility	+45%	+58%
Network technology upgrade	+21%	+39%
Planning for GDPR	+39%	+32%
Social media/collaboration	+23%	+88%

Next big thing in flash: NVMe?

- **It's still New!**
- **Storage vendors continue to work on support for end-to-end NVMe** from host servers to storage targets
- **Use Cases will increase** for hyperscale, analytics, (HPC) high-performance computing workloads, database management systems, and consolidation purposes
- Early Adopters will be looking for **lower latency and higher throughput**
- **10% claim to have at least one instance running today and 27% have plans for evaluate over the next 24 months**
- **NVMe vendor consortium** is working on a TCP transport option for Ethernet



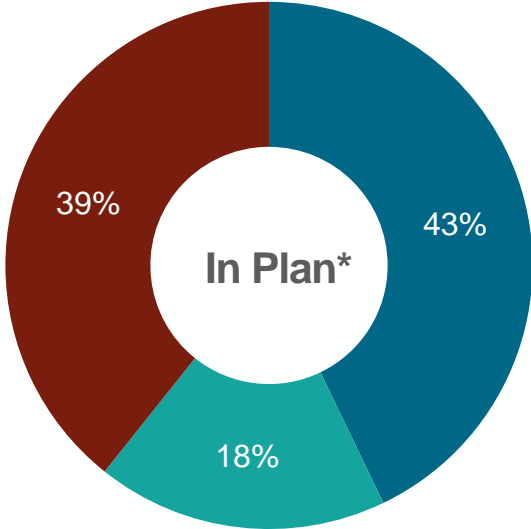
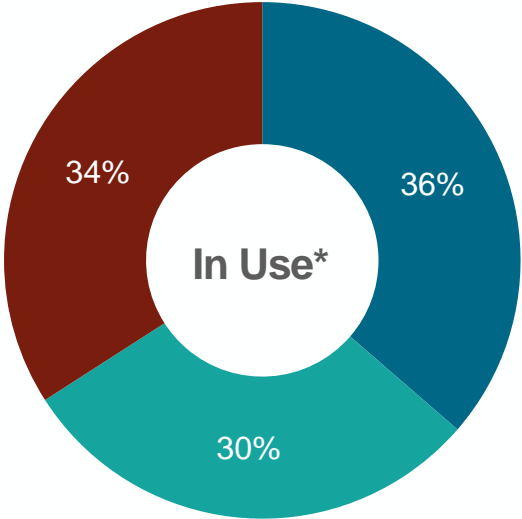
Key Findings: NVMe Flash

- **It's still quite early in NVMe flash landscape**, meaning that very little of the Total Addressable Market for this technology is actually purchasing it.
- **More than half** (53%) of large organizations **have no plans** to touch the technology in the next two years.
- About **1 in 10** claims to have at least one instance running today.
- **27%** of this group has plans for formal evaluations of the technology over the next 24 months.



The advent of NVMe will expand the addressable flash and broader storage markets

NVMe-based storage systems implementation



■ As part of storage arrays ■ Direct attached to server ■ Both

1 in 10

claim to have at least one instance of NVMe running today

27%

have plans for formal evaluations of NVMe over the next 24 months

NVMe Market Predictions

- **Revenue for storage products supporting NVMe-oF revenue will start to grow in 2018**, with user deployments to follow in 2019 and beyond
- **Early Revenue driven by hyperscale users, enterprise NVMe SSDs** (will surpass SATA SSDs in sales as the two drive types reach price parity)
- **U.2 SSDs** (arrays, appliances & servers) **and M.2 SSDs** (boot drives) **will become more prevalent**, driving a decline in PCIe add-in cards
- **Competition should start to drive down the price premium for storage arrays** equipped with dual-port enterprise NVMe SSDs



Vendor Landscape is expanding and the war begins

Enterprise NVMe SSDs*



**Note: Some storage array vendors make their own NVMe SSDs*

Established Vendors



Startup Vendors*



**Note: Elastifile and Excelerio write software designed to exploit NVMe SSDs.*

Adapters/Switches





What's next?

Optane, 3D Xpoint, storage class memory, phase change memory, ReRAM, MMRAM, STT-RAM – what excites you about the future?



Thank you.

Dave Raffo

Editorial Director, TechTarget Storage

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