SNIA PERSISTENT MEMORY + SUMMIT 2021
COMPUTATIONAL STORAGE

FROM DATACENTER TO EDGE : VIRTUAL EVENT
APRIL 21-22, 2021

Opening Remarks and State of the Event

Scott Shadley

SNIA Board of Directors

VP of Marketing, NGD Systems

SNIA PERSISTENT MEMORY + SUMMIT 2021 COMPUTATIONAL STORAGE

Welcome to our 9th annual Summit – and a 1st in several areas!

Thanks To Our Sponsors

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Tour our exhibitor virtual booths throughout the Summit. Chat with them via our Slack channels.

Summit Agenda – Wednesday April 21

Sessions Live at Listed Times – then On-Demand

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Time (PST)	Title	PM-focused	CS-focused	Both
9:00 a.m. – 9:30 a.m.	Summit Opening Remarks and State of the Union			
9:30 a.m. - 10:00 a.m.	Future of Persistent Memory, DRAM, and SSD Form Factors Aligned with New System Architectures			
10:05 a.m. - 10:35 a.m.	The Persistent Memory Connection - How to Attach PM in Computing Systems?			
10:40 a.m. - 11:10 a.m.	NVMe Computational Storage: A New Hope for Accelerators and DPUs			
11:15 a.m. - 11:45 a.m.	Dynamic Trends in Non-Volatile Memory Technologies			
11:45 a.m. - 12:30 p.m.	What Does the Future Hold for Persistent Memory? A Panel Discussion			
12:35 p.m. - 1:05 p.m.	CXL 2.0 - Architecture and Benefits for Computational Storage			
1:10 p.m. – 1:40 p.m.	Security in Computational Storage Drives			
1:45 p.m. - 2:45 p.m.	Benefits of Computation in CSD, CSA, CSP - A Panel Discussion			
1:45 p.m. – 2:15 p.m.	The Challenges of Measuring Persistent Memory Performance			
2:20 p.m. - 2:55 p.m.	How Computational Storage Can Become a New Standard for Cloud Architectures			
2:50 p.m. – 3:00 p.m.	Recap of Day and Closing Remarks			
3:00 p.m. – 4:00 p.m.	Birds-of-a-Feather - Computational Storage			
4:00 p.m. – 5:30 p.m.	Networking Reception			

Summit Agenda – Thursday April 22

Sessions Live at Listed Times – then On-Demand

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Time	Title	PM-focused	CS-focused	Both
9:00 a.m. – 9:30 a.m.	State of the Computational Storage Market – A Supplier's View			
9:30 a.m. - 10:00 a.m.	Four Top Use Cases for Big Memory Today and Tomorrow			
10:05 a.m. - 10:35 a.m.	Practical Computational Storage: Performance, Value, and Limitations			
10:40 a.m. - 11:10 a.m.	Persistent Memory in CXL			
11:15 a.m. - 11:45 a.m.	Why Distributed AI Needs Computational Storage			
11:45 a.m. - 12:30 p.m.	Q&A With Thursday Morning's Presenters			
12:35 p.m. - 1:05 p.m.	Beyond Zoned Named Spaces – What Do Applications Want?			
1:10 p.m. – 1:40 p.m.	A New Path to Better Data Movement within System Memory, Computational Memory with SDXI			
1:45 p.m. - 2:45 p.m.	Security Impacts to a Changing Storage Ecosystem – A Panel Discussion			
1:45 p.m. – 2:45 p.m.	CXL: Expanding the Memory Ecosystem – A Panel Discussion			
2:50 p.m. – 3:00 p.m.	Recap of Day and Closing Remarks			

Enjoy and Socialize the Summit!

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Check out the PM+CS Summit Slack Channels and network with your peers

Ask a question on Twitter – use #sniapmcs

mentioning @SNIA and @SNIACMSI

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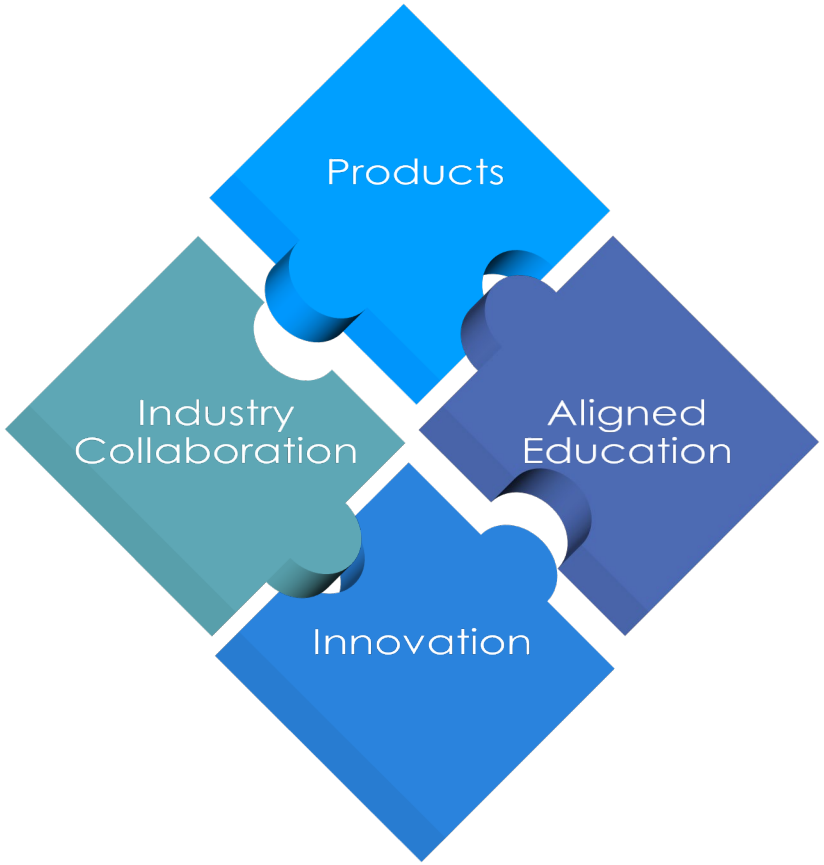
The Computational Storage Market

Scott Shadley, VP Marketing – NGD Systems
Board Member, SNIA Board of Directors

Driving from Nothing to Something

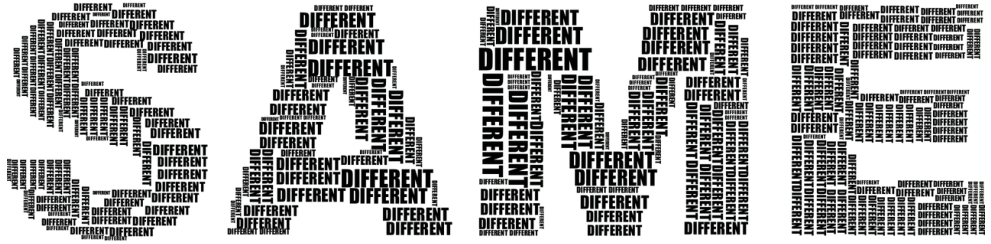
- Innovation is key to future technology development
- It cannot be done in a vacuum and requires:
  - Collaboration
  - Marketing
  - Products
- Computational Storage shares this Evolution
  - Products – Start-ups, R&D projects
  - Education – Marketing, Events, Customer Engagements
  - Collaboration – SNIA and NVMe



History – Getting the Word Out

Information Sharing is Key

- The challenge with information sharing can be the convolution of data
  - The ability to say the same thing with different words



- Computational Storage had many names – back as far as 2010
  - Scale-In
  - In-Situ Processing
  - Compute to Data
  - In-Data Processing

- A Change to the taxonomy model was needed and SNIA TWG was formed

Getting the Industry Involved

- Don’t just listen to me, Ask the Experts
  - New technology requires understanding and backing
- Gaining the attention, insights and shared knowledge is invaluable
- So many technology advancements come and go without support
  - Who remembers the Betamax?
- Working as a collaborative industry, engaging the ‘Analysts’ was a key factor in driving awareness and adoption of the technology…

Gartner

IDC
ANALYZE THE FUTURE

451 Research

TechTarget

Crossing Boundaries, Driving Innovation

- Very few times has a technology crossed the Hype Cycles
- NVMe-oF and now Computational Storage
- 2020 was the year for Gartner to drive Computational Storage

Prepare Your Storage and Data Management Strategy for the Impact of Artificial Intelligence Workloads

20 April 2020 | ...infrastructure **Computational storage** NVMe SSD **Storage**-class memory NVMe-oF Distributed file systems **Computational storage** Object **storage** Blob **storage** Tape Hybrid...datasets in shared **storage**, so that organizations can scale the compute and...

Analysts: Julia Palmer, Arun Chandrasekaran, Chirag Dekate

2020 Strategic Roadmap for Storage

01 July 2020 | ..Flash Technology Hierarchy **Computational Storage Computational storage** (CS) will bring computing power closer to **storage**, reducing performance inefficiencies...ecosystem is rapidly evolving with unproven vendor business models. **Computational Storage**...

Analysts: Jeff Vogel, Julia Palmer, Santhosh Rao, Joseph Unsworth, Michael Hoeck, Jerry Rozeman

Hype Cycle for Storage and Data Protection Technologies, 2020

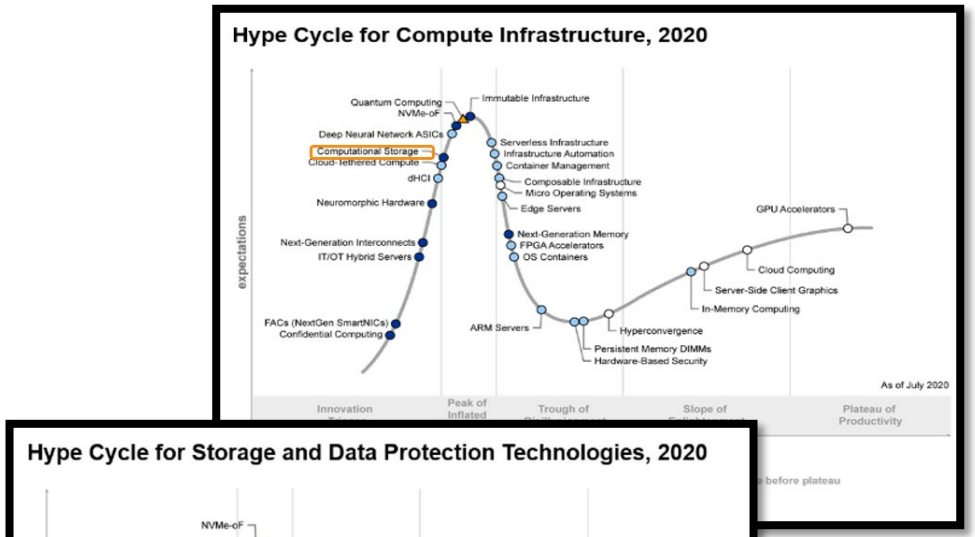
06 July 2020 | ..Julia Palmer Definition: **Computational storage** (CS) combines processing and **storage** media to allow applications to run on the **storage** media, offloading host...SSD. Position and Adoption Speed Justification: **Computational storage** brings computing power to...

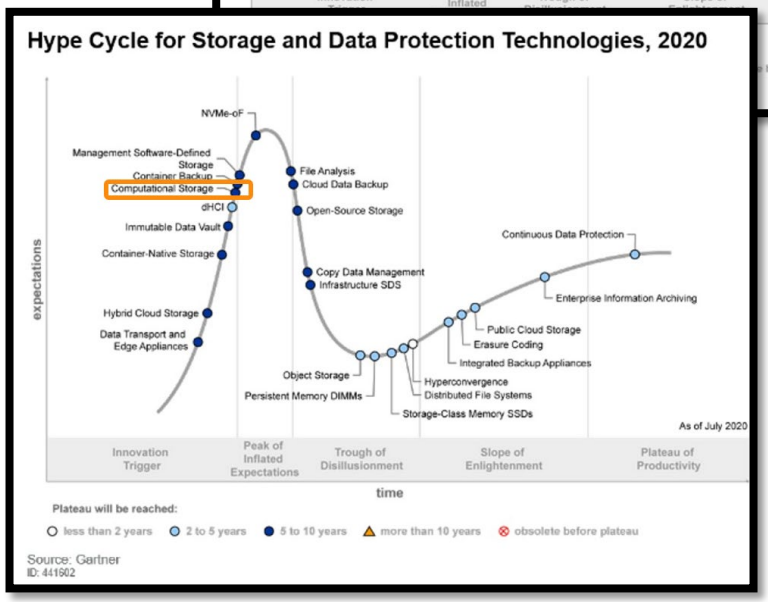
Analysts: Julia Palmer

Hype Cycle for Compute Infrastructure, 2020

08 July 2020 | ...Julia Palmer Definition: **Computational storage** (CS) combines processing and **storage** media to allow applications to run on the **storage** media, offloading host...widespread in **storage** arrays and offer significant performance increases for some workloads. In the longer...

Analysts: Tony Harvey, Daniel Bowers, Chirag Dekate





Continued Engagement – Beyond Press

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- Gaining traction means gaining recognition as well

Gartner Cool Vendor 2018

- Humble beginnings have garnered greater visibility, and traction

Work smarter, work faster: Move the processing, not the data

MARCH 4 2019

By Tim Stammers

In the cloud world, the problem of data gravity is well known. But it also includes the performance-sapping micro-gravity suffered by IO data movements between storage and server processors. Pioneers of computational storage are sidestepping that problem by moving the processing to the data.

IDC Innovators: Computational Storage, 2019

Jeff Janukowicz

IDC INNOVATORS IN COMPUTATIONAL STORAGE

- More engagement, more points of view, more products come to market

Don’t Just Take “Our Word” For It

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GET STARTED

Computational storage terminology explained

Computational and edge storage are changing the way we manage data at the network edge. Understanding the terminology around this technology can help clarify how it works.

By Stacey Peterson, Senior Managing Editor — Published: 25 Mar 2020

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RESEARCH AND INSIGHTS

Computational Storage in the Data Decade

Learn how computational data storage allows us to process and compute data more efficiently.

INDUSTRY PERSPECTIVES

Persistent Memory vs. Computational Storage

There’s an alternative to persistent memory that provides a different approach to compute and storage locality: computational storage.

Jun 14, 2019

What is computational storage? Everything you need to know

By Neil Werdmuller October 22, 2020

Computational storage is rapidly evolving and creating value across the IoT, ML, edge computing and more

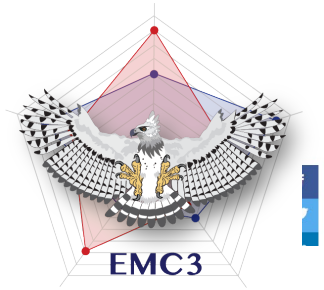
BLOCKS & FILES.

HOME | BLOCK | FILE | OBJECT | DISK | TAPE | FLASH | NVME

AI/ML | Block | Flash | NVME

What’s up with computational storage

By Daniel Robinson - June 14, 2019



Computational storage: What is it and what are its key use cases?

Computational storage brings the CPU to the storage and so boosts system performance by tackling processing tasks, such as near the edge or in AI/machine learning workloads

This article can also be found in the Premium Editorial Download: Computer Weekly: Is digital transformation in the public sector making progress?

By Stephen Pritchard — Published: 20 Mar 2020

2020/2021 Flash Brand Leaders Voted by IT Pros

MARKET LEADER | PRICE LEADER | PERFORMANCE LEADER | RELIABILITY LEADER | INNOVATION LEADER | SERVICE AND SUPPORT LEADER

SSD	Samsung	Samsung	Samsung	Intel	Intel	Intel
NVDIMM	Intel	Intel	Intel	Intel	Intel	Intel
Computational Storage	NGD	NGD	NGD	NGD	NGD	NGD
All-Flash SAN Array	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies	Pure Storage	Dell Technologies
All-Flash NAS Array	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies
Hybrid HDD/SSD Array	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies
On-Prem All-Flash Storage-as-a-Service	HPE	HPE	HPE	HPE	Pure Storage	HPE
Big Memory Software	MemVerge	MemVerge	MemVerge	MemVerge	MemVerge	MemVerge
All-Flash Scale-Out File & Object Storage Systems	Dell Technologies	Dell Technologies	Dell Technologies	Dell Technologies	Pure Storage	Dell Technologies

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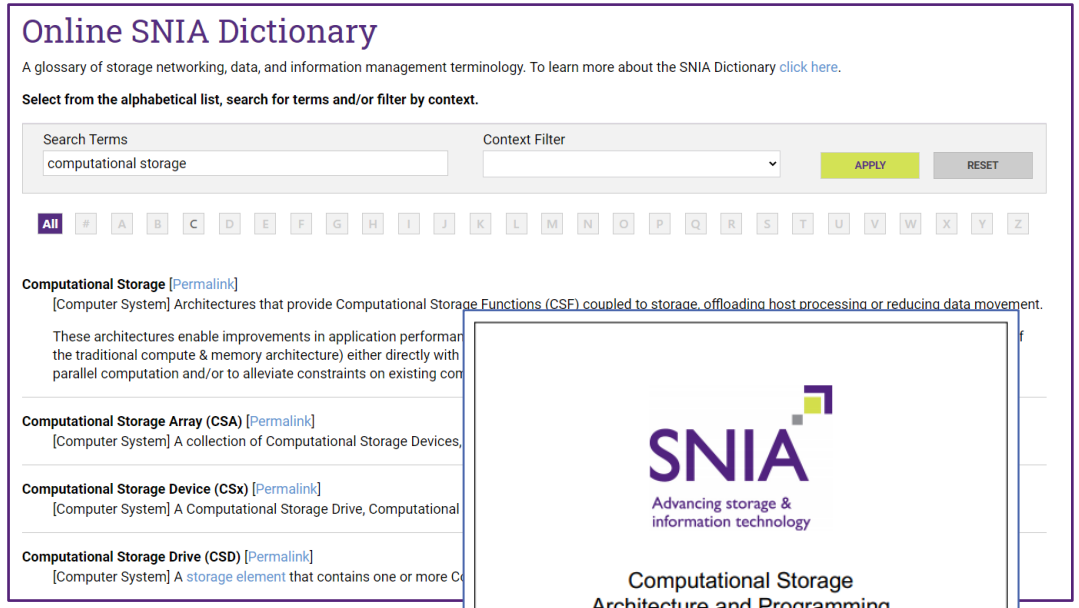
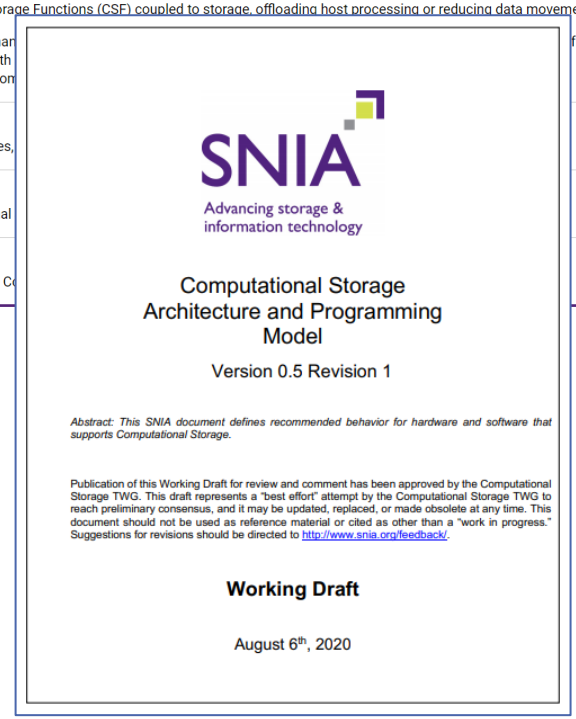
What is Going on in SNIA - NVMe?

- Definition work – Getting on the same page
- Architectural work – Providing direction
- Interface work – NVMe and more
- API work – How to program/deploy
- Security – Whole new threat modelling





nvm EXPRESS®
NVM Express Working Groups

NVMe Computational Storage Task Group
The charter of Computational Storage Task Group is to develop features associated with the concept of Computational Storage on NVM Express devices.

Productization

What is available, what is possible

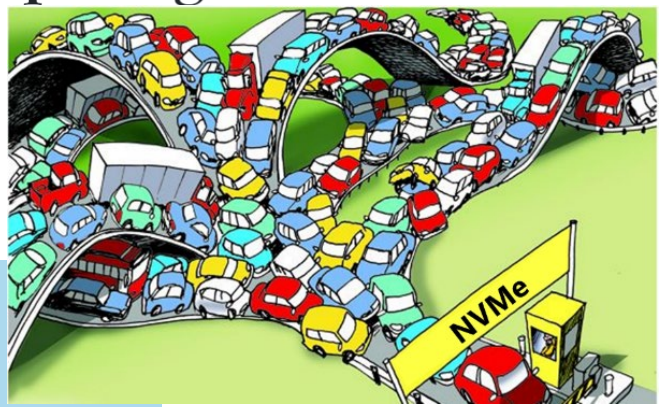
So Why is it Needed?

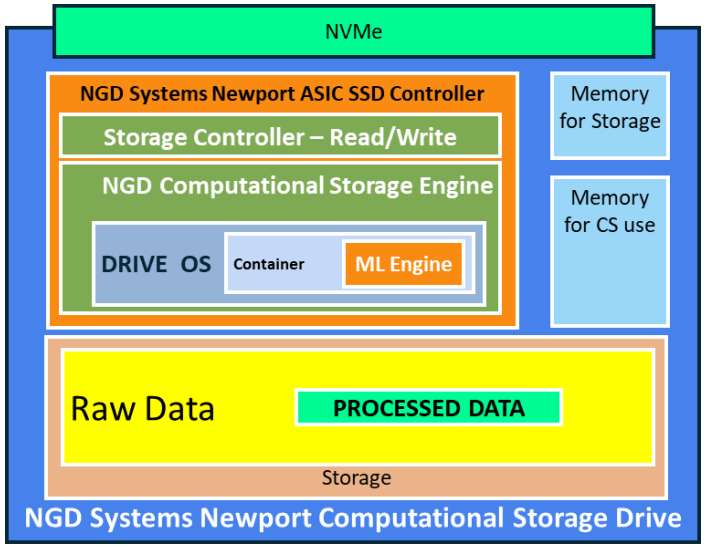
- IDC predicts we will churn out 175 zettabytes of data in 2025
- NVMe and PCIe Gen 3/4/5 are still just a Transport
- Moving Data has weight, Challenges
- A new way is Needed

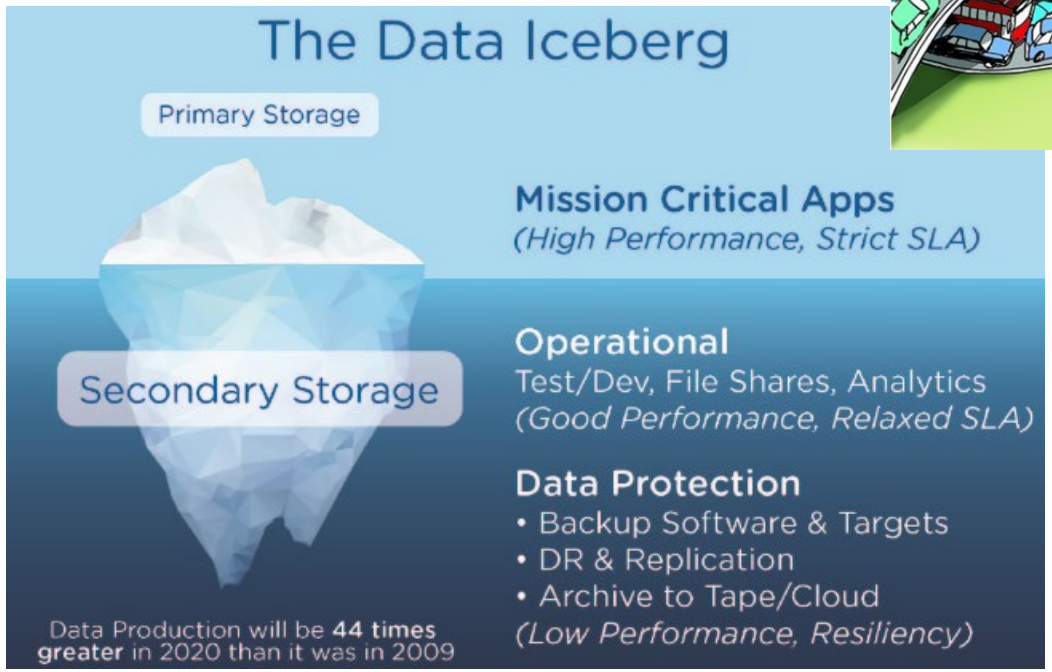
The Great Compute Migration: From Cloud Computing to Edge Supercomputing

By Veerbhan Kheterpal
QUADRIC

April 09, 2021

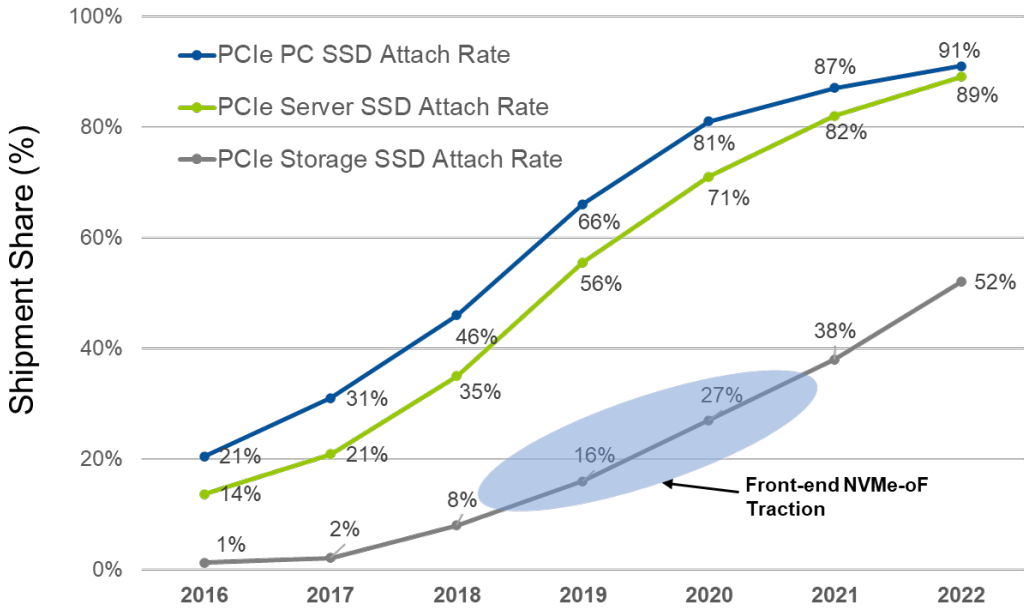






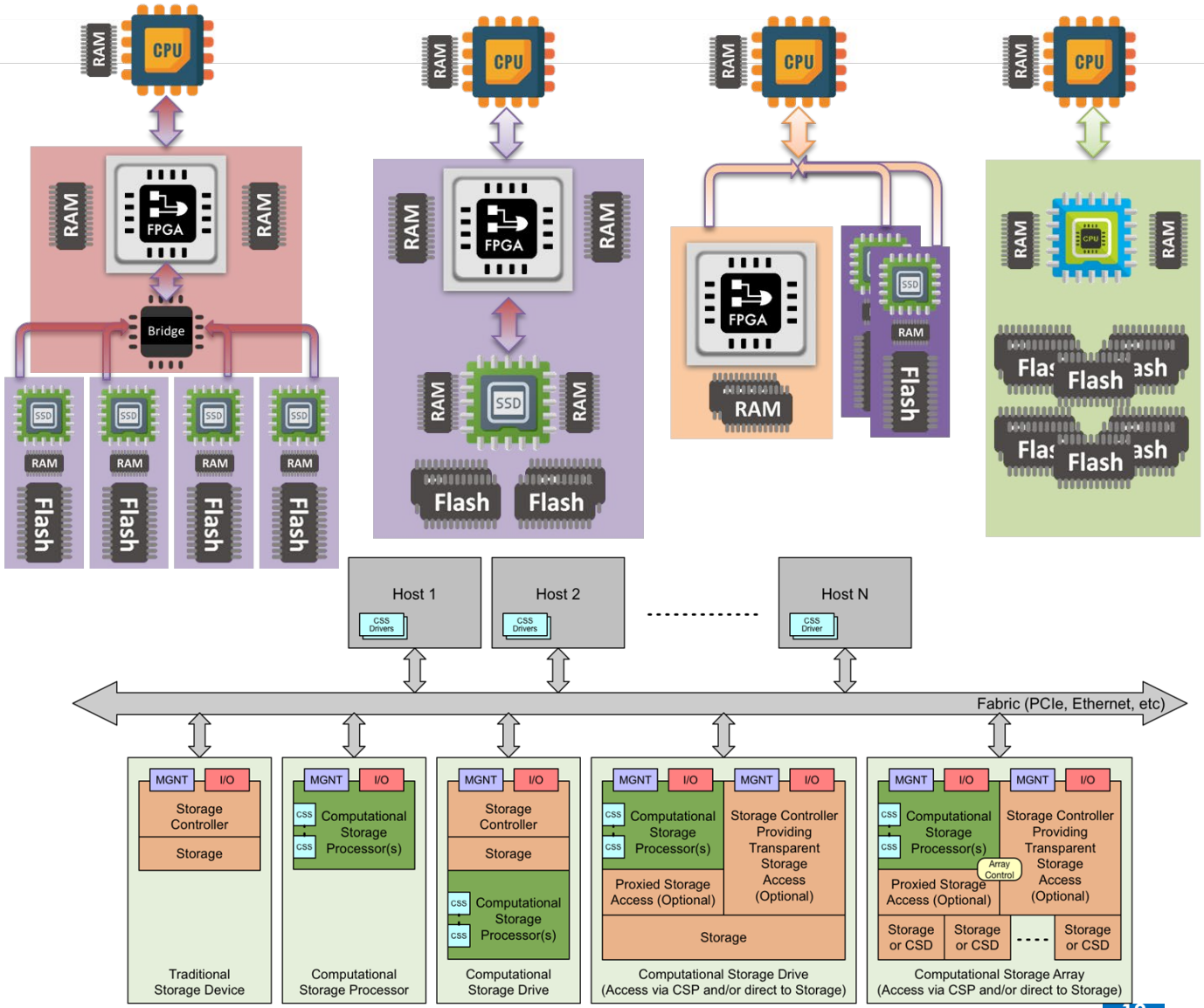
Making a Product is 'Easy', Adoption???

- SATA – SAS – PCIe – NVMe - ...
- Fusion-IO was a success, drove innovation from PCIe to NVMe
- It takes time, It takes collaboration, It takes 'ease of Deployment'

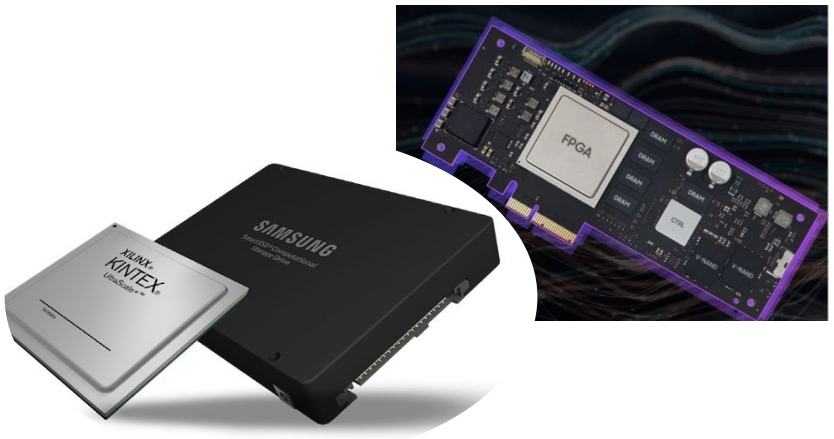


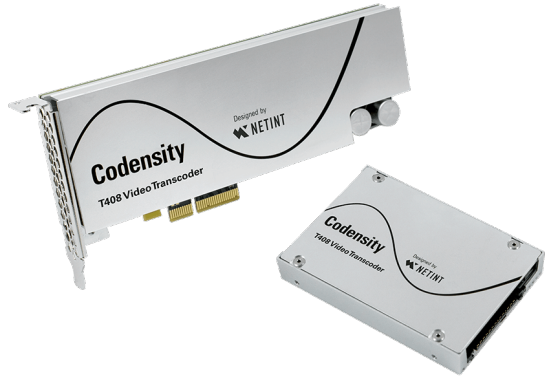
What is Available Today – Graphically

- Different Ways to Look at a Product
- Implementation is Vendor Related
- Connectivity, Use – Standards
  - NVMe, SNIA, etc…
- Making it ‘Easy to Use’ is Key!!
  - API, Seamless Programming, Plug ‘n Play



Existing Solutions – Vendors Specific





Keys To Success

Driving Adoption while Driving Standards

What is the Next Step

- Making sure it is Easy to Use
  - Plug ‘n Play
  - Seamless Programming
  - Common Interface
- Making sure adoption is not cost prohibitive
  - Pricing drives adoption as much as ease of use
  - SSDs are Commodity Pricing today, need to ‘be aligned’
- Strong Roadmaps
  - For Both Vendors, Standards and Customers
  - If you Build it, they WILL NOT COME, unless you can make it the way they want it ☺

Customer Success is Key

- First Innovations don't always win

- First Customer Introduction is key!
  - Fast Followers are Great!

- Flexibility of Designs is Mandatory
  - Vendor unique is great, Vendor collaboration is best

What Is Next?

Learn, Participate, Evangelize, Deploy

JOIN the Efforts!! SNIA and NVMe!!

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NVMe Computational Storage Task Group

The charter of Computational Storage Task Group is to develop features associated with the concept of Computational Storage on NVM Express devices. The scope of work encompasses how these features are discovered, configured and used inside an NVM Express framework. Examples of these features include general compute, compression, encryption, data filtering, image manipulation and database acceleration.

The target audience consists of the vendors and customers of NVMe Storage Devices that support computational features.

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Join SNIA at SDC Events in 2021

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Storage Developer Conference
September 28 - 29, 2021

Storage Developer Conference India
Virtual Conference, August 5, 2021

Storage Developer Conference EMEA
Virtual Conference, June 8, 2021

To attend, or to speak or sponsor, visit:

https://www.snia.org/news-events/storage-developer-conference

Thank you

Scott Shadley, VP Marketing – NGD Systems, Computational Storage TWG Co-Chair and Board Member – SNIA
Twitter: @SMShadley, @NGDSystems

Please visit www.snia.org/pm-summit for presentations