

SNIA COMPUTE + MEMORY
+ STORAGE SUMMIT

Architectures, Solutions, and Community
VIRTUAL EVENT, APRIL 11-12, 2023

The Evolution of Compute from a Storage Viewpoint

Scott Shadley
SNIA Board Member



Agenda

- von Neumann
- What Has Changed?
- Amdahl
- Market Evolution
- On the Forefront of Change



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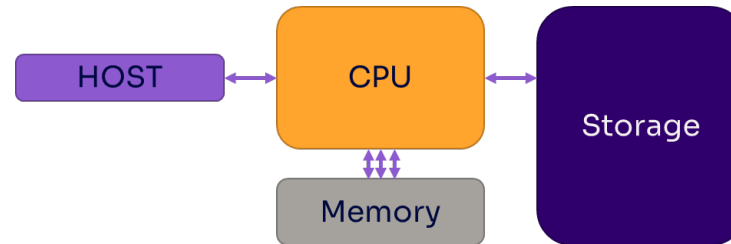


von Neumann

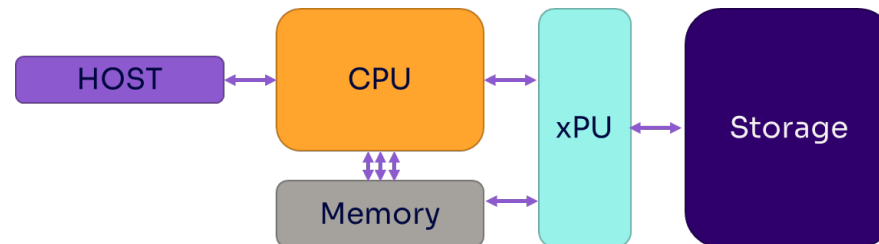
John von Neumann – The Princeton Architecture



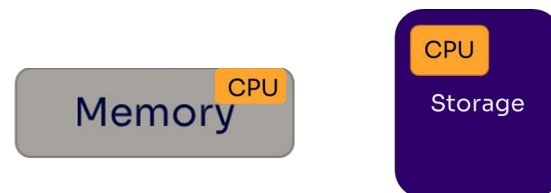
- The Ecosystem today, we have our friend J. v N. – CPU/Memory/Storage



- The world is evolving and there is a need for compute in more available locations, enter the world of “Accelerators” – SmartNIC, xPU, DPU, GPU, IPU



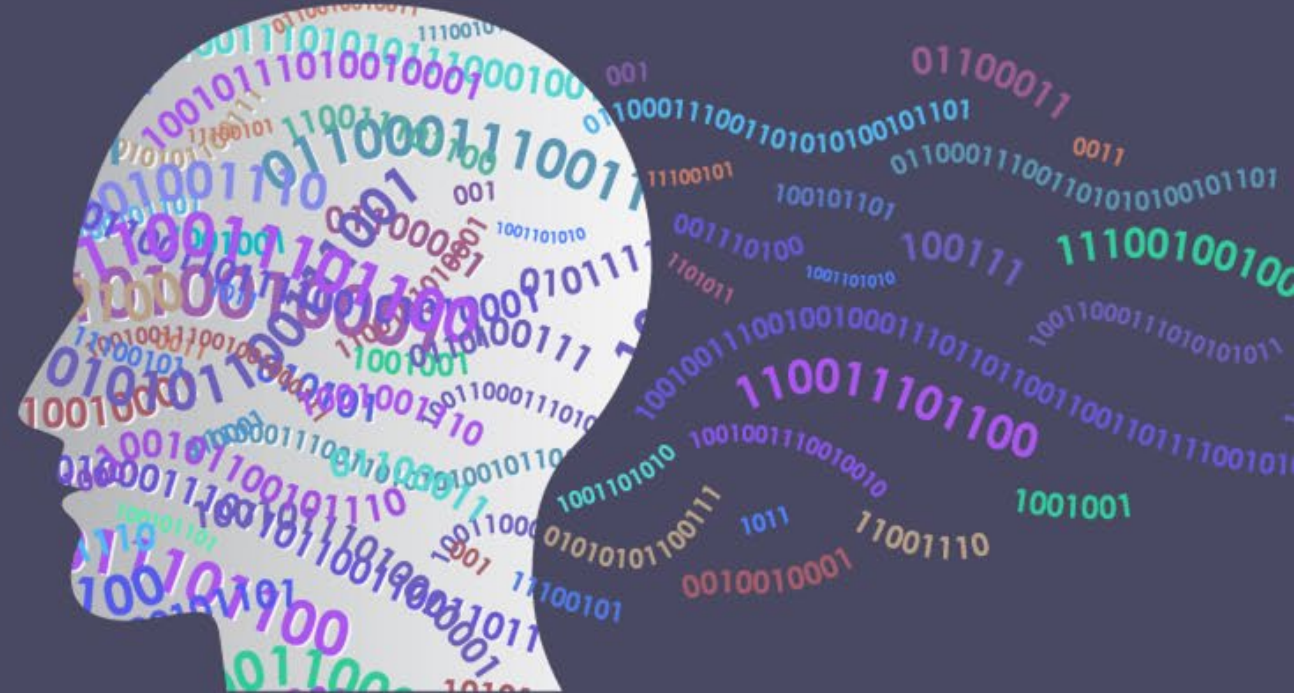
- These are great, but there is room for more! History tells Us this much...





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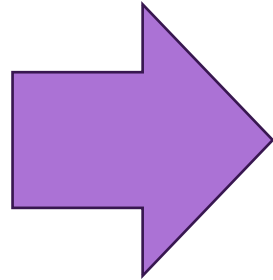


What Has Changed?

What has Changed?

Why Now?

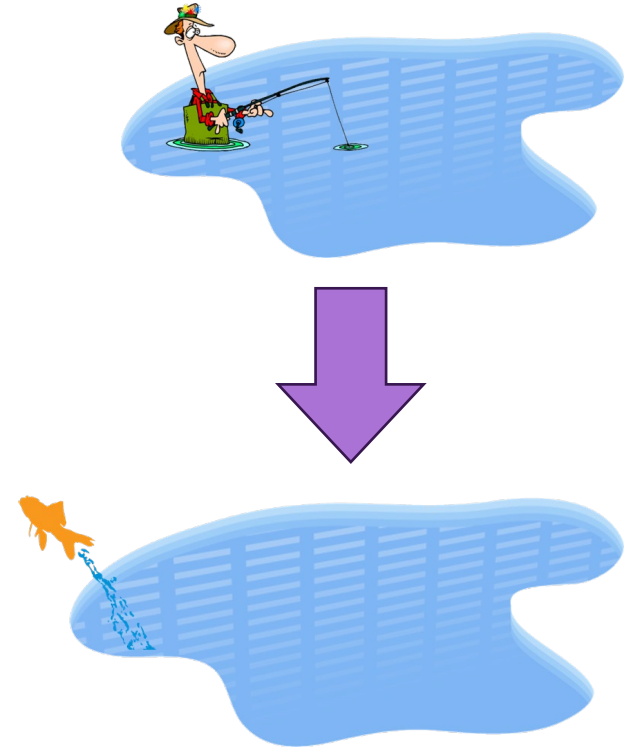
- Storage is no longer 'SLOW'
- Memory is no longer 'Gated'
- Data Gravity, Data Size, Data Locality
- Edge Data Explosion, Transport issue!
- SNIA, NVMe, CXL, OCP, Others are providing new guidance in new areas of implementation



Key Benefits?

- Faster, Fewer, Easier I/O transfers
- Reducing DRAM/Network tax with new transports, solutions, products
- Redeploy Primary CPU to High Value Work, offer up new services to help
- Improved performance due to parallelism for certain workloads
- Better scheduling of data management and device functionality

New Standardized API & Programming Model





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Amdahl

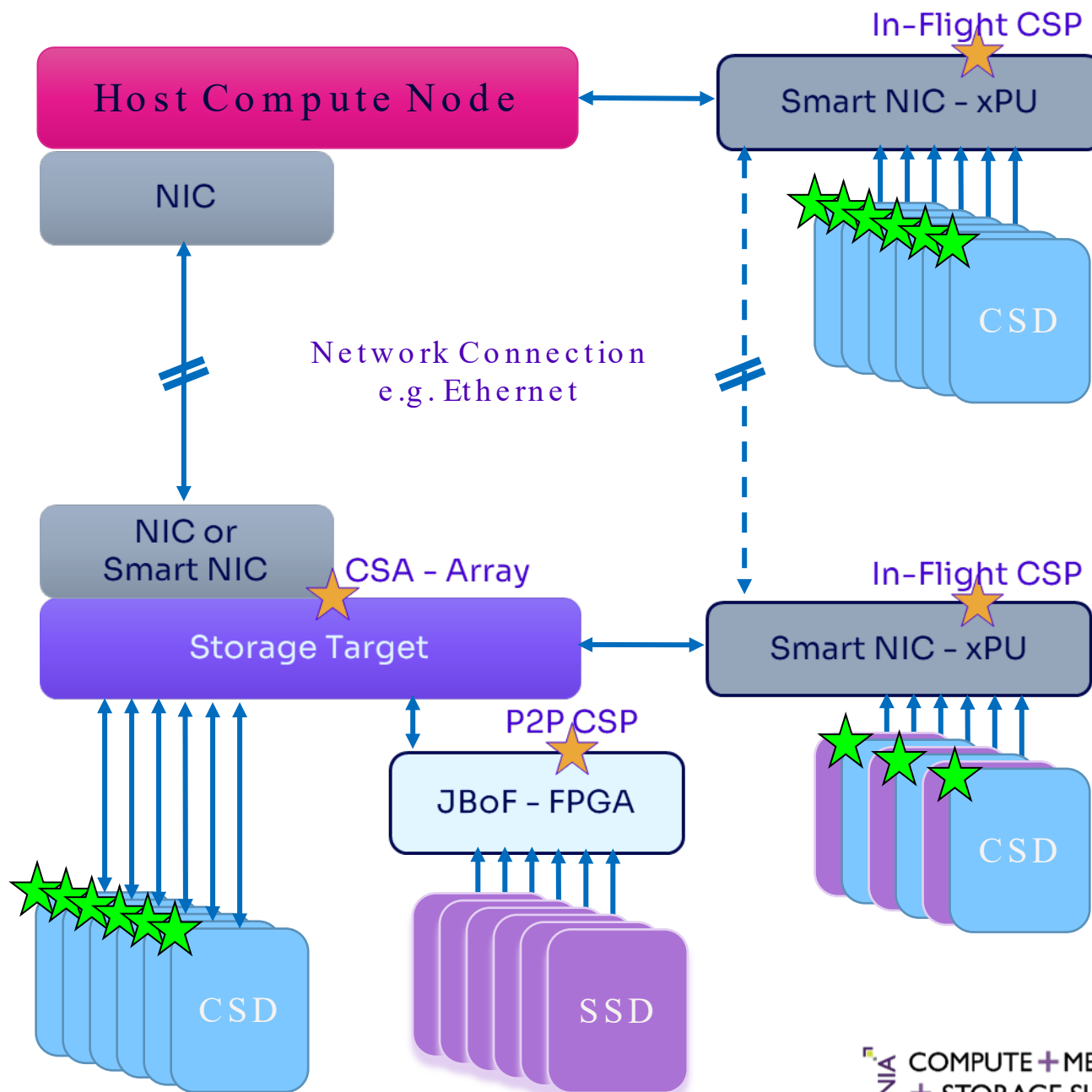
Amdahl's Law

Amdahl's Law

Measures the theoretical speedup of a program's execution latency as a function of the number of processors executing it...

The limiting factor is 'Serial' so move it!!

- In Memory? Sure...
 - New areas of “Computational Memory”
- In Storage? Why Not...
 - Computational Storage Drives, Arrays
- In the Middle? Of Course...
 - Computational Storage Processors
 - SmartNIC, xPU...





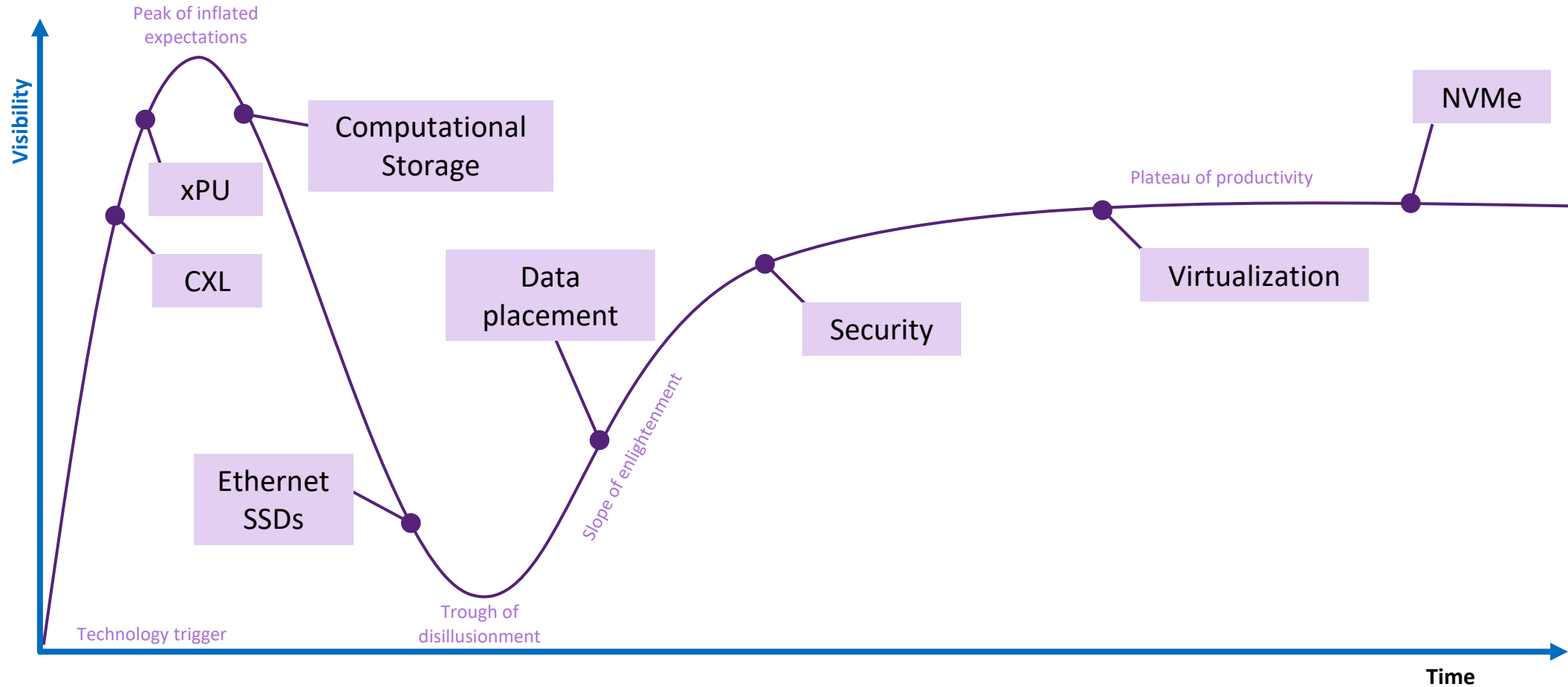
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Market Evolution

A 'Spin' on the Hype Cycle – Not 'official' 😊



* Technology hype cycle is a product of the Gartner Research <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>

The “Official” Storage Hype Cycle

1. Computational Storage

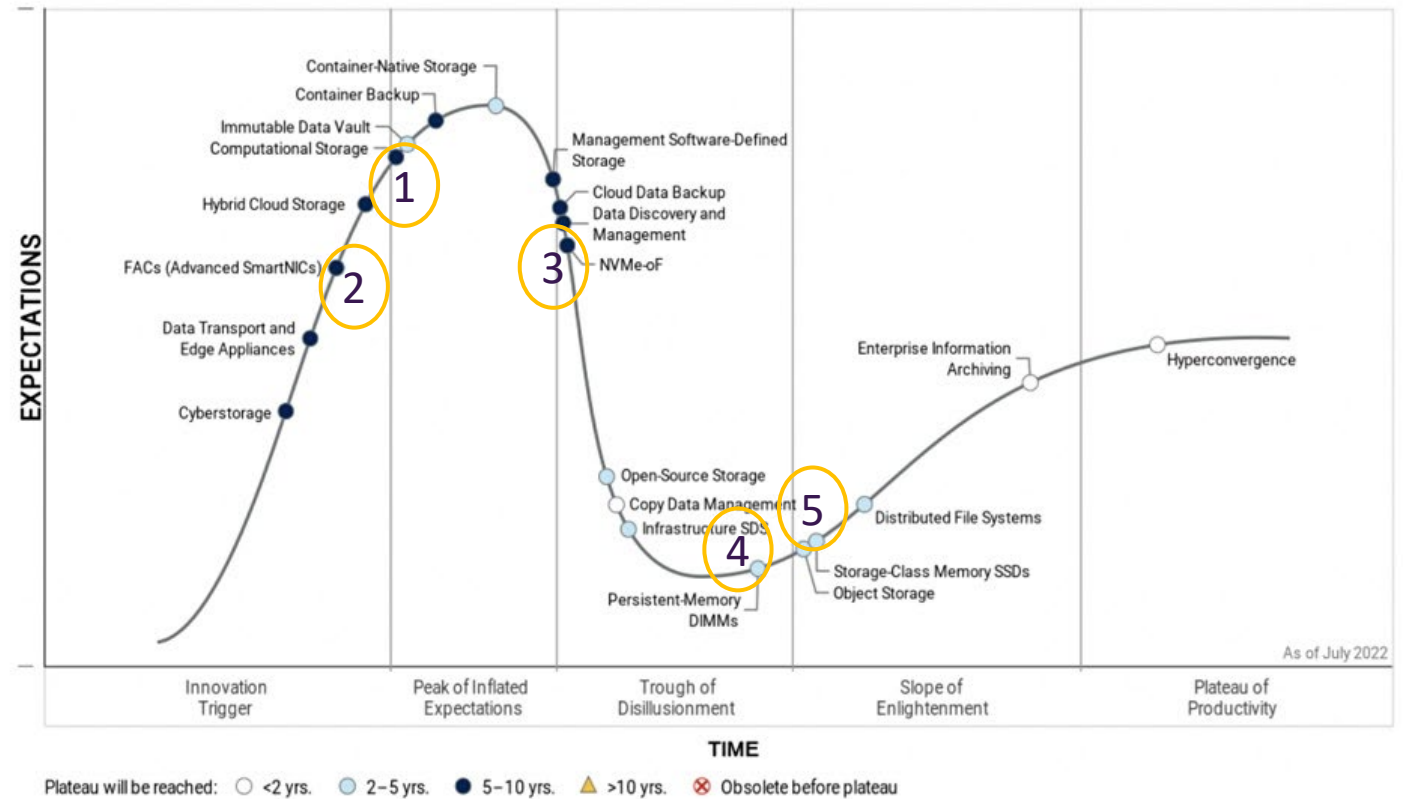
1. FACs

1. NVMe-of

1. PM DIMMs

1. Storage-Class Memory SSDs

Hype Cycle for Storage and Data Protection Technologies, 2022



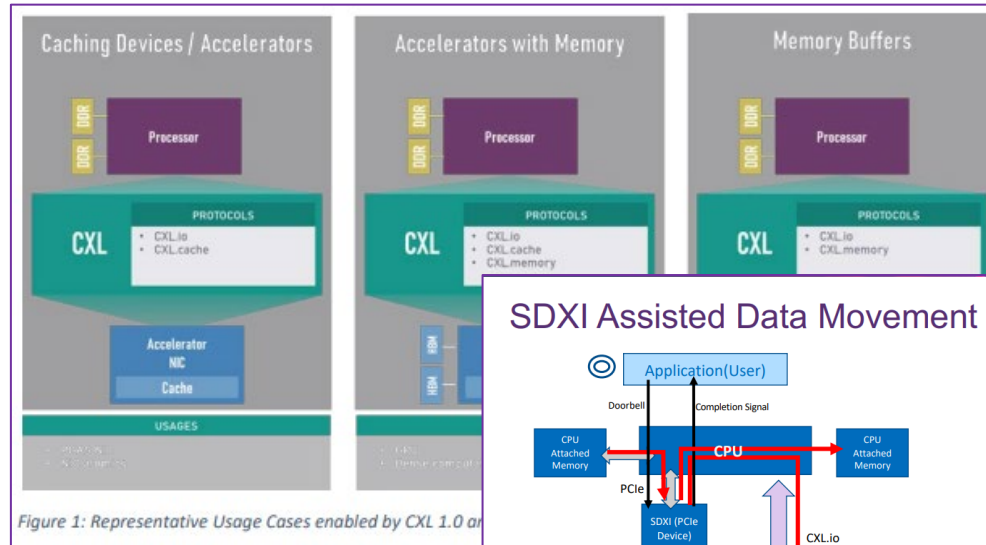
As of July 2022

Gartner

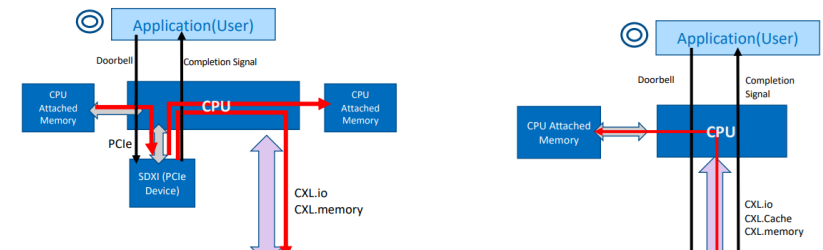
Source: Gartner (July 2022)

NOT on the Official Hype Cycle – CXL and SDXI

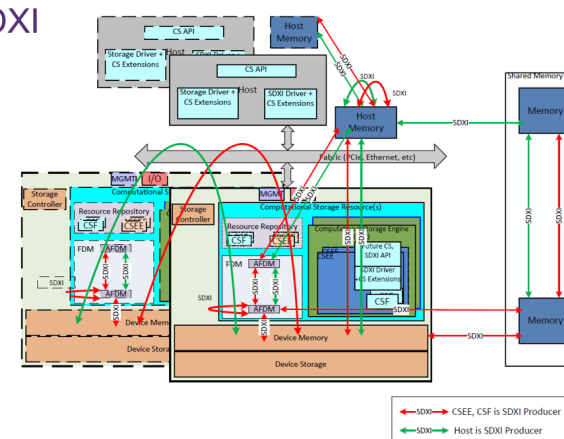
- Mutually Exclusive?
 - Why should they be?
- Need to think ‘outside the box’
- Close collaboration is THE key success criteria



SDXI Assisted Data Movement in a CXL Architecture



CS + SDXI



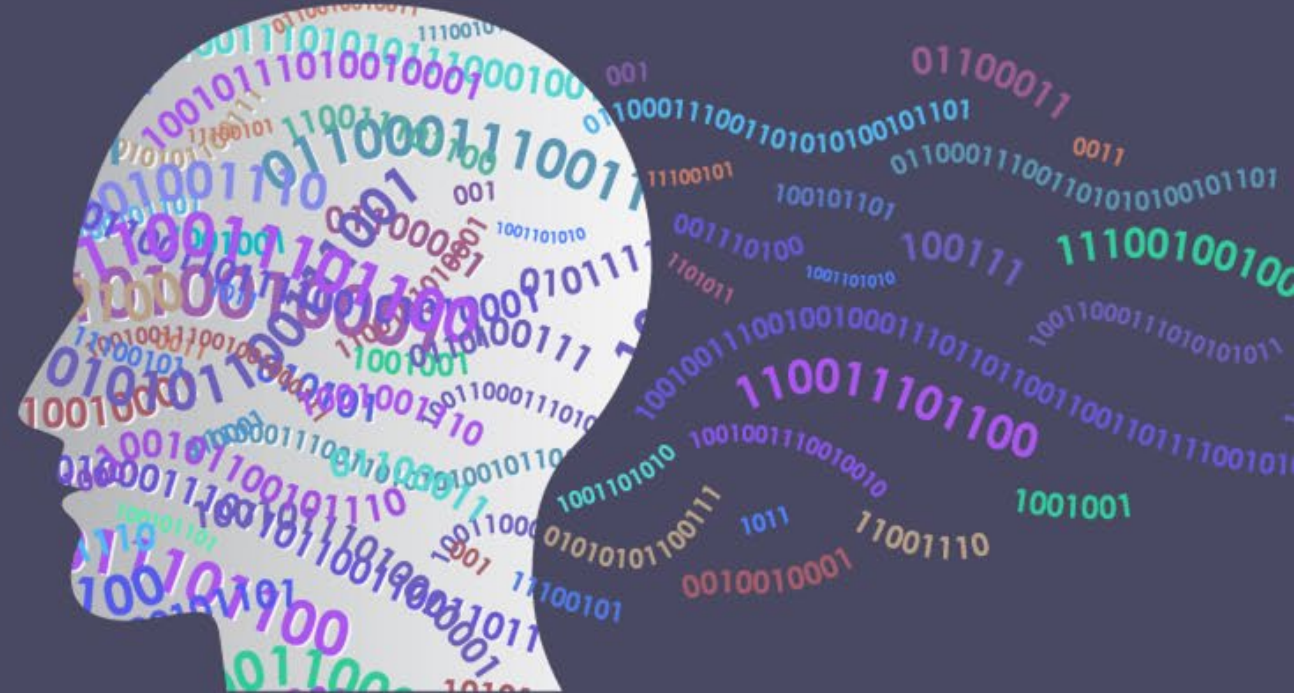
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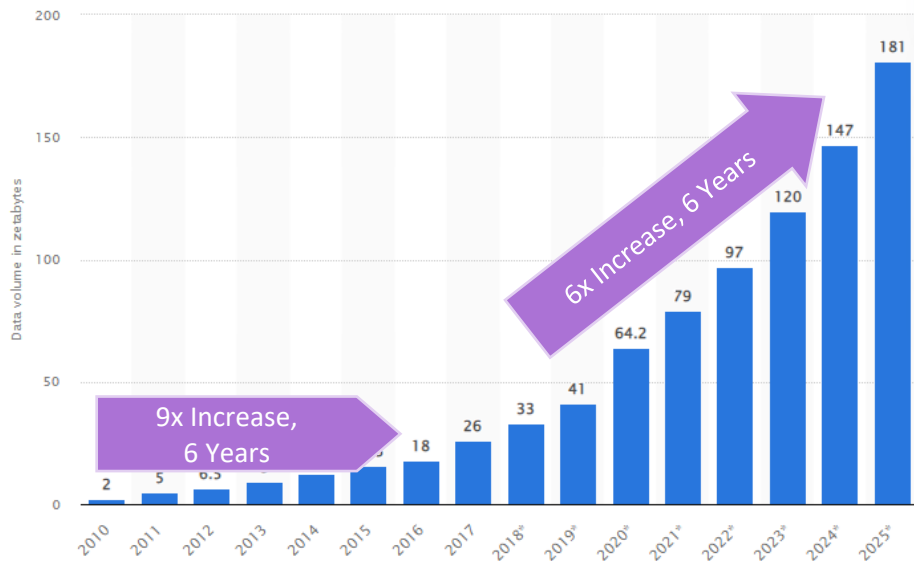
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On the Forefront of Change

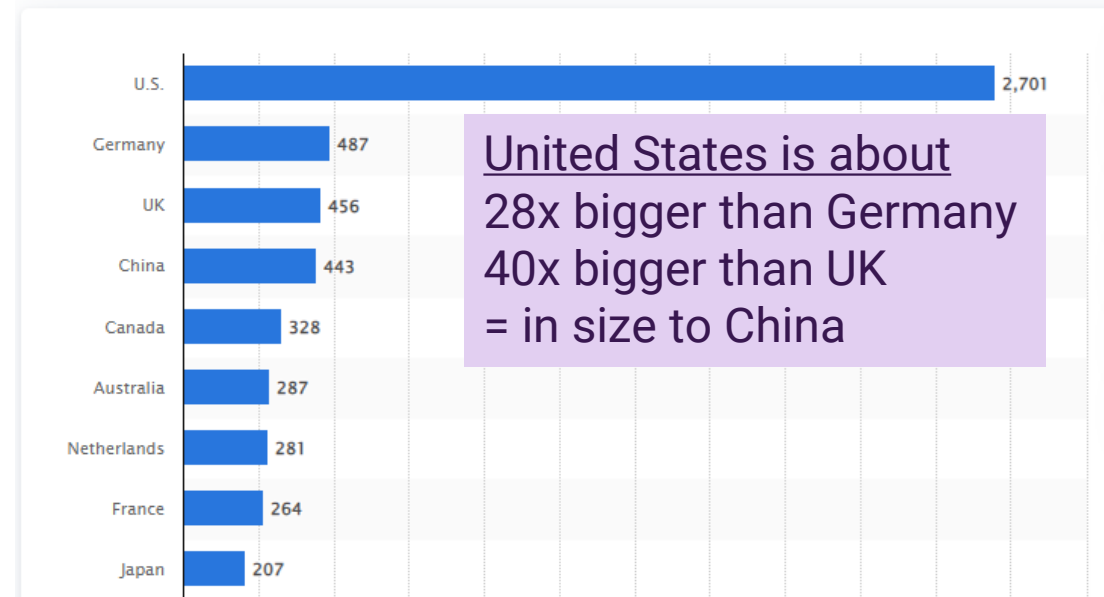
The Forefront of Change

Volume of data/information created, captured, copied, and consumed worldwide from 2010 to 2020, with forecasts from 2021 to 2025



Source: [Total data volume worldwide 2010-2025](#) | Statista

Number of data centers worldwide in 2022, by country



Source: [Data centers worldwide by country 2022](#) | Statista

How to Drive Technology Forward



- Pick an Organization, Join the Work, Drive the Market
- Areas of Work that drive change in Compute Environment:
 - SNIA – Computational Storage, SDXI, Security, Zone Storage, Object Storage, DNA Data Storage, DPU, NVMPM...
 - Transports – NVM Express, STA, PCI-SIG, CXL, UCle...
 - Global Work Groups – OCP, SODA...

I think you get the picture...

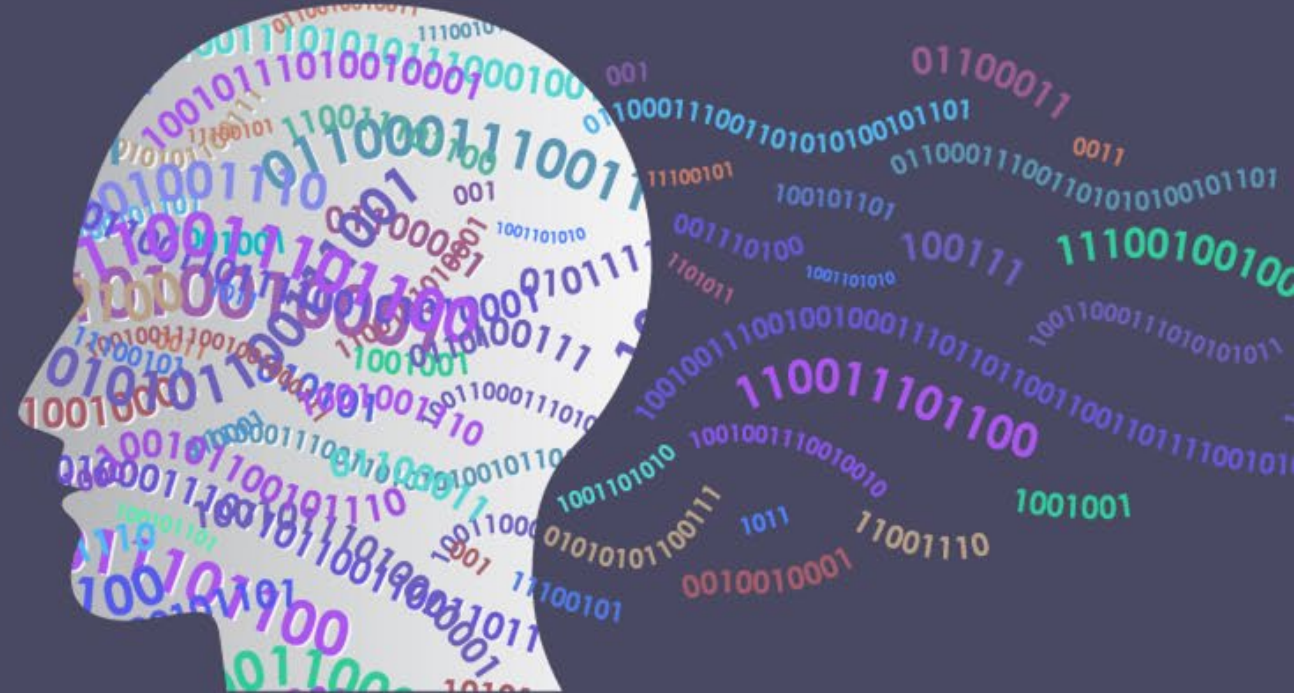
Interested? Join Me Here at SNIA!

- Join SNIA: https://www.snia.org/member_com/join-SNIA
- Question for Scott or the BoD?
 - Send them to the Communications Steering Committee Chair(s)
 - commsteer-chair@snia.org ☐ That's me 😊



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