



20 Years of Storage Innovation ...and Predictions for the Next 20 Years

Michael Oros, Executive Director, SNIA

**Flash Memory Summit 2017
Tuesday, August 8, 2:50 pm**

About the Presenter



- ❖ Michael Oros is Executive Director at Storage Networking Industry Association, where he oversees the group, industry collaboration and standards work of the organization. Michael brings 20 years of strategy, planning and development experience in IT services and high-tech industry to SNIA.
- ❖ Before joining the organization, Michael held roles at Intel including oversight of technology initiatives and collaboration on open standards, as well as the deployment of storage, backup, and disaster recovery services for the organization. He led the storage and networking components vendors through the biggest I/O transitions of the past decade, while playing a key role in the introduction, adoption and ramp of PCI Express, InfiniBand, OpenFabrics, and various storage/memory technologies in server, cloud, HPC and storage industries.
- ❖ Michael holds an MBA in strategic management, marketing and international business from USIU.

Remembering how far we've come...



Who remembers dialup?

5 years ago

NO: Pokemon Go, Apple Watch, Microsoft Surface, Amazon Echo

10 years ago

NO: iPhone, Android, Instagram, Uber, iPad, Wii, Nest, WhatsApp, Fitbit, Pinterest, Waze, Kindle, AirBNB, Macbook Air, Snapchat, Lyft, Minecraft

15 years ago

NO: Facebook, Twitter, Google Maps, WiFi, Bluray, Xbox, Spotify, YouTube, Hulu, Kayak, Sonos, Skype, iPod

20 years ago

NO: Google, DVRs, USB, Bluetooth, Netflix, Tencent, Blackberry, Alibaba, Salesforce.com, Mailchimp, Jive

Data Center Dependent

5 years ago

NO: Pokemon Go, Apple Watch, Microsoft Surface, Amazon Echo

10 years ago

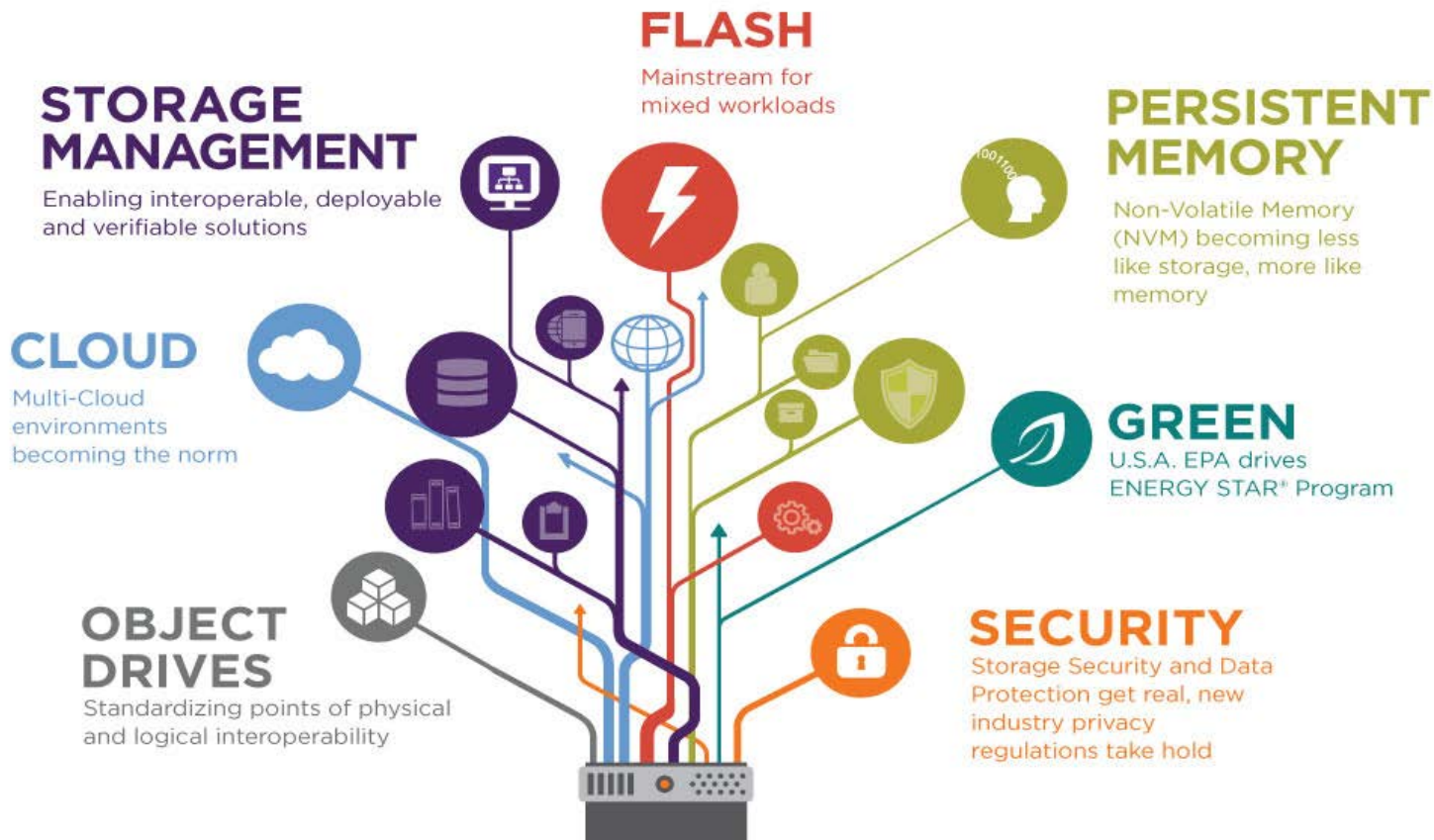
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20 years ago

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SNIA-at-a-Glance



160
unique member
companies



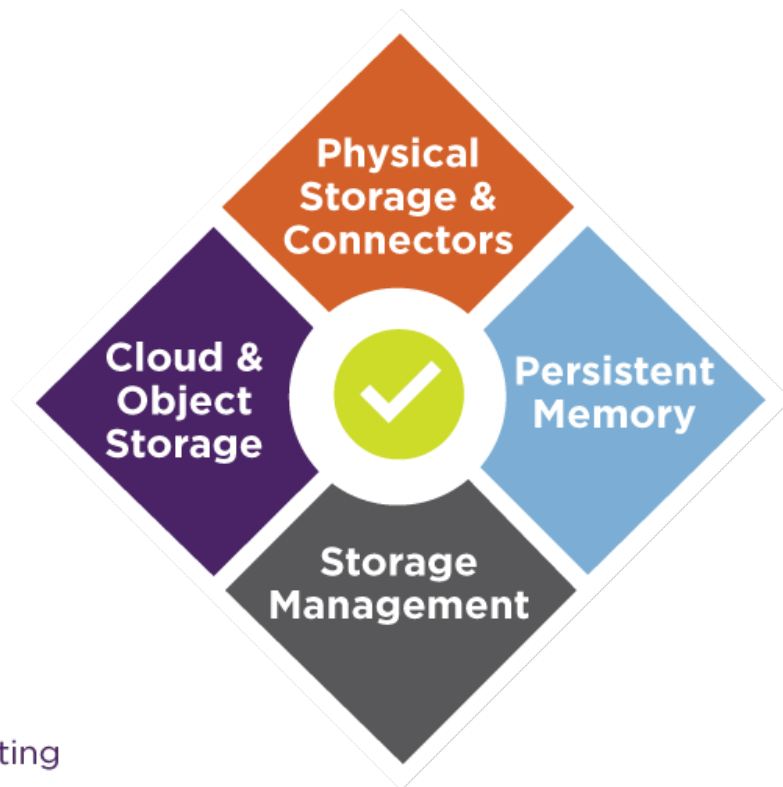
2,500
active contributing
members



50,000
IT end users & storage
pros worldwide

20 YEARS of Standards Development

- ✓ ISO & ANSI Standards
- ✓ Storage Standards
- ✓ Best Practices & Security
- ✓ Interoperability & Conformance Testing



Standards Development – Past 20 Years



IP-Based Drive Management Specification 1.0
Self-contained Information Retention Format (SIRF) Specification 1.0
Storage Management Initiative Specification (SMI-S) 1.7
SNIA Emerald™ Power Efficiency Measurement Specification 2.1
Storage Management Initiative Specification (SMI-S) 1.6.1
NVM Programming Model 1.0
SSS PTS Enterprise 1.1
SNIA Emerald™ Power Efficiency Measurement Specification 2.0
SSS PTS Client 1.0
SSS PTS Enterprise 1.0
XAM SDK 1.0.1
Common RAID Disk Data Format (DDF) 2.0
Storage Management Initiative Specification (SMI-S) 1.3
Storage Management Initiative Specification (SMI-S) 1.1
Storage Management Initiative Specification (SMI-S) 1.0

NVM Programming Model v1.2
Swordfish Scalable Storage Management API Specification 1.0
LTFS Bulk Transfer 1.0
Linear Tape File System (LTFS) Format Specification 2.3
SSS PTS Enterprise 1.1.1
TLS Specification for Storage Systems 1.0
Linear Tape File System (LTFS) Format Specification 2.2
SNIA Emerald™ Power Efficiency Measurement Specification 1.0
Storage Management Initiative Specification (SMI-S) 1.5
Multipath Management API 1.1
Storage Management Initiative Specification (SMI-S)
XAM Specification 1.0
iSCSI Management API 1.1

SFF TA TWG
SSS PTS Client 1.2
NVM Programming Model 1.1
Cloud Data Management Interface (CDMI) 1.1
Storage Management Initiative Specification (SMI-S) 1.6
SSS PTS Client 1.1
Cloud Data Management Interface (CDMI) 1.0
Storage Management Initiative Specification (SMI-S) 1.4
NDMPv4 Release 1.0
iSCSI Management API 2.0
Storage Management Initiative Specification (SMI-S) 1.2
Common RAID Disk Data Format (DDF) 1.2
Multipath Management API 1.0

SNIA Technical Work Groups Drive Important Storage Specifications



- ✓ Non-Volatile Memory Programming Model (NVM)
- ✓ Object Drive IP-Based Management Specification
- ✓ SNIA Emerald™ Power Efficiency Measurement Specification
- ✓ Storage Management Specification (SMI-S)
- ✓ Transport Layer Security (TLS) Specification for Storage Systems
- ✓ Solid State Storage Performance Test Specification (PTS)
- ✓ Linear Tape File System (LTFS) Format Specification
- ✓ LTFS Bulk Transfer Technical Position
- ✓ Self-contained Information Retention Format (SIRF)
- ✓ Device level connectors, interfaces, and form factors (SFF)

5G

A.I.

IoT

VR/AR

Smart City

Moore's Law

Autonomous

INFORMATION

Machines

Object

Social

Recognition

Media

What's Next?



- **Data:** Efficient management, movement and security of information
 - ◆ Industry: ^growth, higher scrutiny and liability for collected private data
- **Physical Storage:** Persistent Memory over Fabrics, Hyperscaler Storage
 - ◆ Industry: high density/lower cost media, persistent media, new interfaces
- **Storage Management:** Device/System management, SNIA Swordfish™
 - ◆ Industry: automation, self-management and healing
- **Object Storage:** IP Drive Management Specification, Object Storage API
 - ◆ Industry: classification/categorization of data will become overwhelming
- **Cloud Storage:** Data into and out of Cloud Storage
 - ◆ Industry: physical transport of data

Join the community!

snia.org/join

Startup Membership Category Launched



CELEBRATING 20 YEARS OF
STANDARDS DEVELOPMENT

STORAGE NETWORKING INDUSTRY ASSOCIATION

STORAGE DEVELOPER CONFERENCE

SEPTEMBER 11-14, 2017

SANTA CLARA, CA, HYATT REGENCY HOTEL

WWW.STORAGEDEVELOPER.ORG

➤ Tuesday August 8

- ◆ **9:45 am** – *Session 102-A SSSI Data Recovery/Erase Special Interest Group session, GAMR2*
- ◆ **4:00 – 7:00 pm** – SNIA in Booth #820 and the FMS Technology Pavilion, Exhibit Hall
- ◆ **7:00 pm** -*FMS Chat with the Experts* – SNIA leadership at tables on persistent memory, NVDIMM, and Data Recovery/Erase – Ballrooms A-E

➤ Wednesday August 9

- ◆ **8:30 – 10:50 am & 3:20 – 5:45 pm** – *Forum R-21 and R-22, Persistent Memory – Convergence of Storage and Memory, sponsored by SNIA, JEDEC, and the OFA* - Ballroom G
- ◆ **12:00 – 7:00 pm** – SNIA in Booth #820 and the FMS Technology Pavilion, Exhibit Hall

➤ Thursday, August 10

- ◆ **8:30 – 10:50 am** – *Forum R-31, NVDIMM, sponsored by SNIA*, Ballroom C
- ◆ **10:00 – 2:30 pm** – SNIA in Booth #820 and the FMS Technology Pavilion, Exhibit Hall