

BLOCKCHAIN TWG

2020 Review and 2021 Plans

Presented by Olga Buchonina and Parmeshwr Prasad

Blockchain TWG 2020 Accomplishments

- Blockchain TWG Charter link/summary: <https://www.snia.org/blockchain>
- Group was officially approved to be functional in June 2020
 - Focus of 2020
 - Blockchain Technology review
 - Understand the landscape of Blockchain technology and how Data Storage applications can play role
 - Outline High Level Architecture for SNIA TWG Blockchain group

Blockchain TWG Work Items

- Blockchain TWG Architecture finalize for building interoperability specification
- Release 0.5 specification for interoperability
- Create a compliance suite test specification for interoperability testing
- Establish collaboration with other Blockchain initiatives : ISO, Linux Foundation, IEEE Blockchain, Soda Foundation and more

Blockchain TWG Membership as of 01/20/2021

DELL EMC

XILINX®

WD Western Digital®

ORACLE®

NETINT

arm

MARVELL®

SK hynix

NGD systems

BANKEX
READY-TO-ASSET PROTOCOL

EBUY 易佰网络

IBM

ACTION SPOT
STARTUP STUDIO

Micron®

MEDIUM

SHENZHEN ZHONGHONG YITONG TECHNOLOGY CO., LTD
ZHYT

Blockchain TWG Participation

- What is the expected industry impact of this work
 - Blockchain industry has data storage initiatives, fast growing segment- SNIA will provide solution for interoperability (think Chainlink or Polkadot)
- What is the industry segment relevance.
 - Software vendors, application developers, open source community developers, system vendors, ICP providers, banking and finance sector (in the long run)
- Why you should join and participate in this TWG
 - Architecture will provide back end and front-end interfaces for next generation in financial sector, industrial sector and to some extent cybersecurity
- Who to contact for additional information
 - blockchaintwgchair@snia.org

Cloud Storage TWG

2020 Review and 2021 Plans

Presented by David Slik and Mark Carlson

Cloud Storage TWG 2020 Accomplishments

- The Cloud Storage TWG is created for the purpose of developing SNIA Architecture related to system implementations of Cloud Storage technology:
 - Identifies, develops, and coordinates systems standards for Cloud Storage
 - Produces specifications and drives consistency of interface standards and messages
 - Documents system-level requirements and shares these with other standards organizations
- Recent Work
 - Finalized transition to open-source documentation toolchain (GitHub/Sphinx/LaTeX)
 - CDMI 2.0 Released on GitHub / TC approved / ready for ISO submission
 - CDMI Extensions updated for CDMI 2.0
 - Continuing BrightTalk sessions/educational outreach

Cloud Storage TWG Work Items

- Submit CDMI 2.0 to JTC-1 via PAS process
- Review and document vendor-submitted CDMI extensions
 - Work on new CDMI extensions
 - #214 - CBOR Representation CDMI Extension
 - #248 - Container Value CDMI Extension
 - #257 - Object Exports CDMI Extension
 - #265 - Container Deep Enumeration Extension
 - #283 - S3 Export CDMI Extension
- OpenAPI specification for CDMI
 - CDMI JSON Schemas

Cloud Storage TWG Membership as of January 2021

- TWG Membership monitoring TWG: 27 companies
- TWG Membership actively participating in TWG: 10 companies



Cloud Storage TWG Participation

- What is the expected industry impact of this work
 - Enabling interoperable cloud storage
 - Enabling standardized cloud storage/multi-cloud data interchange
 - Enabling standardized cloud storage/multi-cloud data management
- What is the industry segment relevance.
 - Cloud storage systems (public, hybrid, private)
- Why you should join and participate in this TWG
 - Contribute functionality to existing specifications
 - Provides a forum for additional cloud storage standardization efforts
 - Non-SNIA contributions are welcome through our GitHub site/Contributors License Agreement
- Who to contact for additional information
 - Co-Chairs David Slik and Mark Carlson: cloudtwgchair@snia.org



Computational Storage TWG

2020 Review and 2021 Plans

Scott Shadley, Jason Molgaard – Co-Chairs

computationaltwgchair@snia.org

Computational Storage TWG 2020 Accomplishments

- TWG Charter - [Computational Storage TWG Charter V1c-Approved.pdf](#)
- Definition updates – [Link to Dictionary Terms](#)
- Architectural updates – [Current Public Release](#)
- Drove Formation of **CS SIG** in CMSI - <https://www.snia.org/forums/cmsi>
- NVMe work to discuss TPAR efforts around “Computational Programs”
- User Space Subgroup – API Draft Document started
- Security Subgroup – kickoff and start of engagement
- [SDC participation](#) growth from member companies

Computational Storage TWG Work Items for 2021

- Architectural Document to Rev 1.0 and released
- User Space API document initial draft and public release for comment
- Security Subgroup work on efforts in White Paper/Tech comment
- Work around the potential PM/CS Summit (Q2)

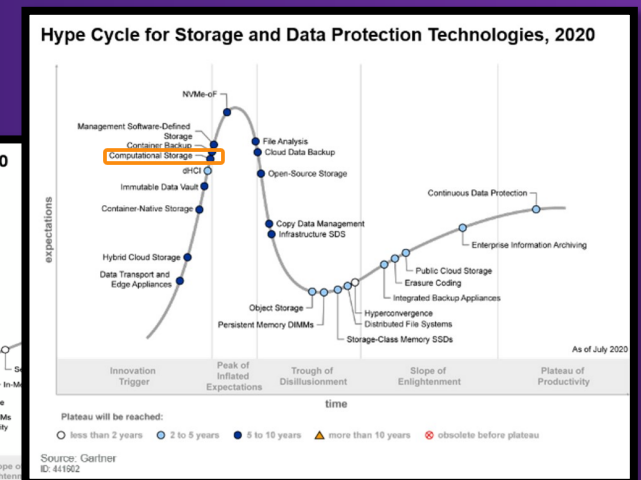
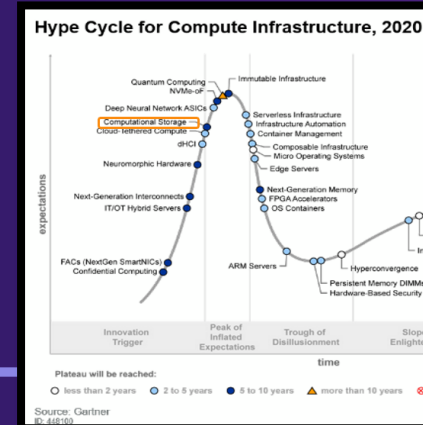
- SNIA Group collaboration
 - Engaged and monitoring SDXI efforts
- External Interactions
 - NVM Express interaction around TP work
 - ISO and NIST around Storage Security

46 Participating Companies - 227 Member Representatives



Computational Storage TWG Direction and Value

- What is the expected industry impact of this work
 - Deliver a path for unified deployment of Computational Storage Devices through Architectural and Programming models for members, vendors and customers
- What is the industry segment relevance.
 - With a growing marketplace of products, a standardized way of interacting with these devices is paramount for market adoption and growth
- Why you should join and participate in this TWG
 - This growing technology innovation is expected to explode in the next 3-5 years and become a standard use case for storage infrastructure – Industry Analysts
- Chairs SNIA contact - computationaltwgchair@snia.org
- Chair Direct Contact
 - Scott Shadley – Scott.Shadley@NGDSys.com
 - Jason Molgaard - Jason.Molgaard@arm.com





GREEN STORAGE TWG

2020 Review and 2021 Plans

Presented by:

Don Goddard Donald.Goddard@netapp.com

Herb Tanzer herbtanz@gmail.com

Green Storage TWG 2020 Accomplishments

[Green Storage TWG Charter link](#)

Recent completed work - summary

- Emerald Specification V3.0.3 became ISO 24091:2019
- January 2020 ENERGY STAR DCS Stakeholder Meeting
- Emerald V4.0 Specification including expanded Taxonomy completed in support of ENERGY STAR DCS V2.0
- Emerald V4.0 complete tester kit ready for download (scripts, how to documents, spec, links to tools)
- Ongoing data analysis of EPA Test Data Reports for Block IO and File IO (patterns and threshold setting)
- Idle data evaluation and analysis with SNIA-Japan
- Collaboration with TGG to refresh whitepaper #77, Storage Energy Efficiency and Architecture Trends
- Supported 2019 EPA DCS Unit Shipment Report Submissions; 2020 in progress
- Green terms into SNIA Dictionary is ongoing
- Swordfish DCIM feature requests to support energy measurement instrumentation
- Ongoing collaboration with SNIA-J for regional regulatory programs
- Collaboration with TGG on EU Lot9 Regulatory updates

Green Storage TWG ROADMAP Approximate and subject to change							CY 2021				CY2022
			Oct	Nov	Dec	Q1	Q2	Q3	Q4		
#	Events	Owner									
1	SNIA-GTWG F2F Invite EPA to concall					▽	Santa Clara Jan '21 virtual				
2	EPA-SNIA Industry Meetings					▽	EPA-SNIA update				
3	EPA DCStorage ENERGY STAR					▽	Becomes effective, replacing 1.1				
4	ENERGY STAR Data Analysis				New/update white paper w/ TGG	▽		▽	V2.0 data analysis		
5	ISO version of Emerald	▽						Publish ISO standard based on Emerald 4.0 (updated vs. new, tbd)	▽		
6	Emerald Measurement Spec v4.0+						Spec V4.0+ (?-tbd)				
7	Validate existing SW tools (VdBench, COMGEN)				▽						
8	Futures Power / temp reporting Memory attached persistent storage New workloads Validate new tool/versions Investigate SPEC Storage Sol'n 2020		▽		SPEC Storage Solution 2020		Incl. in Swordfish 1.0 Consider for V4.0+				
Test methodologies for capacity optimization, data protection, etc. (impact on performance, energy consumption) Energy measurement for large / new distributed systems; consider component level measurement, consider small scale measurement as system indicator Collaborate w/ other Servers, Switch Cloud data centers Object storage											
9	Partner Collaboration/Tracking	E*, TGG (incl 80PLUS, ECOS, Digital EU), Clearesults (labels 80PLUS), ----->									

- SNIA/EPA update, 27-Jan
- ENERGY STAR V2.0 effective, 15-Mar
- Update Data Center Storage Energy Efficiency White Paper, Q2
- V2.0 Data analysis, Q4
- Collaborate with TGG on EU Lot9 standards & regulation update, starts Q2

Green Storage TWG Membership as of 14-Jan-21

- Action Spot
- Dell, Inc.
- Fujitsu America
- HPE
- Hitachi
- IBM
- Kioxia Corp.
- NEC Corp.
- NetApp Inc.
- Oracle Corp.
- Quantum Corp. USA
- Samsung Electronics
- Seagate Technology
- Toshiba America

Green Storage TWG Participation

- What is the expected industry impact of this work
 - One architecturally unbiased test methodology to serve regulatory bodies worldwide
 - Proactively provide a single test methodology worldwide
 - Industry knowledge of storage system power consumption and best practices/configurations to optimize power usage w/o compromising system functionality
- What is the industry segment relevance
 - Storage System Manufacturers; Storage Device Manufacturers; DCIM SW Vendors
- Why you should join and participate in Green Storage TWG
 - Participate in developing Standards used worldwide for datacenter data storage power efficiency
 - Influence regulations worldwide related to datacenter data storage power efficiency
 - Refresh and renew focus on best practices (whitepapers, planning tools)
 - Maintain / create competitive advantage in product sustainability
 - Avoid being surprised when a new regulation goes live and affects your product portfolio/revenues
- Who to contact for additional information
 - GTWG Co-chairs: greentwgchair@snia.org (Don Goddard and Herb Tanzer)



IOTTA TWG

2020 Review and 2021 Plans

Presented by Geoff Kuenning (IOTTA TWG Co-Chair)



IOTTA TWG 2020 Accomplishments

- Input/Output Traces, Tools, and Analysis (IOTTA) Technical Work Group
- Primary focus:
 - Create/maintain worldwide repository for storage-related I/O trace files, associated tools, and other related information
 - Trace types: Block I/O, System Call, Key-Value Stores, Static Snapshots, and others
 - Repository website: iota.snia.org
 - Additional information: iota.snia.org/faqs/aboutIOTTATWG/
- Recent additions to the SNIA IOTTA Repository:
 - IBM Object Store traces
 - Twitter Memcached traces
 - YCSB RocksDB SSD traces

IOTTA TWG Work Items for 2021

- Continued support of the repository
 - Posting of new traces
 - Solicitation of additional traces
- Announce the “SNIA IOTTA GitHub Project”
 - SNIA IOTTA Open-Source software tools
 - SNIA Open Source Liaison (multi-vendor collaborative group)
 - Open to both SNIA and non-SNIA members
- SNIA Compute, Memory, and Storage Initiative (CMSI) collaboration
 - Stay abreast of CMSI related activities (e.g., Performance Test Specifications)

IOTTA TWG Membership as of January 2021

- TWG roster includes 39 members
- Company affiliations include:
 - Cisco, Dell, Hitachi, HPE, Huawei, Inspur, Kioxia, Lenovo, Marvell, Micron, Samsung, Seagate, SK Hynix, Western Digital
- Education Institutions:
 - Harvey Mudd College (HMC)
 - Stony Brook University
- Additional support from Ulsan National Institute of Science and Technology (UNIST) and NetApp

IOTTA TWG Participation

- Industry Impact of the IOTTA Repository:
 - Provides a *common facility* through which a *broad community* can avail themselves of a variety of storage-related I/O traces (especially *contemporary* I/O traces)
 - “One-Stop Shop” with currently over 550 [citations](#) in research publications
- All repository content available for free download and unrestricted use:
 - Storage research and development communities in both academia and industry
 - General public
- Why you should join and participate in the IOTTA TWG
 - Help improve the IOTTA Repository, including vote on future directions
 - Monitor upcoming changes to the repository (e.g., the addition of new traces)
- Contact chairs for additional information:
 - Co-Chairs: Geoff Kuenning (HMC), Tom West (hyperI/O LLC)
 - Contact at: iottatwgchair@snia.org



LTFS TWG

2020 Review and 2021 Plans

Chris Martin, HPE (TWG co-chair)



LTFS TWG 2020 Accomplishments

- Linear Tape File System (LTFS) is a common data recording format on modern magnetic tape, for long-term and low-cost data archival
 - LTFS TWG standardizes the presentation of files and directories on tape in a self-describing format, which provides universal interchangeability of tape cartridges between compatible software and hardware. See more at <https://www.snia.org/ltfs>
- Recent Accomplishments
 - LTFS Format Specification Version 2.5.1
https://www.snia.org/tech_activities/standards/curr_standards/ltfs
 - ISO/IEC 20919 updated standard (in progress)

LTFS TWG Work Items

- LTFS Compliance Test Specification
 - How to validate that an implementation complies with the latest (2.5.1) LTFS format specification
- LTFS Tape Image Format Specification
 - In support of the above, how to exchange LTFS “volumes” without physically shipping tape cartridges

LTFS TWG Membership as of January 2021

- Chair

- Hewlett Packard Enterprise
- IBM

- Members

- Dell Inc.
- Huawei Technologies Co. Ltd.
- Inspur
- Kioxia Corporation
- NetApp
- Quantum Corporation USA
- SK Hynix
- VMware, Inc
- Western Digital

LTFS TWG Participation

- What is the expected industry impact of this work
 - Magnetic tape is the most economical storage device suitable for cold data archival. Decoupling the recording format on tape from the storage management software by using the LTFS format prevents the vendor lock-in of important data, and provides the flexibility to restore the data from tape to a different software stack, in a different location, and on a different platform.
- What is the industry segment relevance
 - System vendors and architects of file storage infrastructure combining flash, disk, cloud, and tape storage
- Why you should join and participate in this TWG
 - Contribute to the development of specifications for interoperability testing and an electronically transferrable LTFS image format
- Who to contact for additional information
 - TWG co-chairs ltfstwgchair@snia.org
 - Chris Martin, HPE chris.martin@hpe.com
 - Takeshi Ishimoto, IBM ishimoto@jp.ibm.com



Object Drive TWG

2021 Update

Presented by Bill Martin, Mark Carlson



Object Drive TWG 2020 Accomplishments

- Native NVMe-oF™ Drive Specification v1.0.1 June 2, 2020
- Key Value Storage API v1.1 September 28, 2020

Object Drive TWG Work Items

- Native NVMe-oF™ Drive Specification
- Coordinating with the SSM TWG work on Swordfish for NVMe

Object Drive TWG Membership

- Calypso Systems, Inc.
- Dell Inc.
- Fujitsu America Inc.
- Hewlett Packard Enterprise
- Huawei Technologies Co. Ltd
- IBM
- Innogrit
- Intel Corporation
- Kioxia Corporation
- Marvell
- Kioxia Corporation
- NetApp
- NETINT Technologies Inc.
- NGD Systems, Inc.
- NVIDIA
- Oracle Corporation
- Samsung Electronics Co., LTD
- Toshiba America Electronic Components, Inc.
- VMware, Inc
- Western Digital

Object Drive TWG Participation

- What is the expected industry impact of this work
 - The Object Drive TWG has defined the API for Key Value implementations that has allowed open source libraries for NVMe® Key Value drives
 - The Object Drive TWG has defined the connector pinout and management interface for drives implementing NVMe-oF to allow interoperable implementations
- What is the industry segment relevance.
 - The standards that are being driven by the Object Drive TWG are important to any developers of NVMe
- Why you should join and participate in this TWG
 - Please consider joining this TWG to continue defining infrastructure for connecting NVMe-oF drives and any possible KV API updates
- Who to contact for additional information
 - Co-Chairs Mark Carlson and William Martin: objecttwgchair@snia.org



Scalable Storage Management (SSM) TWG

2020 Review and 2021 Plans

Richelle Ahlvers, Intel, SSM TWG Chair



SSM TWG 2020 Accomplishments

- Charter: <https://members.snia.org/wg/ssmtwg/document/21899>
 - Summary: Extend DMTF's Redfish spec
- Version 1.2.x – Added support for NVMe devices (in concert with DMTF Redfish functionality) – Added in 2020
 - Available on snia.org/swordfish:
 - Specification, schema and registries, profiles, User's Guide, Error Handling Guide (new), NVMe Model Overview and Mapping Guide (new)
 - Mockups on swordfishmockups.com
- Open source software additions:
 - Swordfish Powershell Toolkit
- For reference - previous versions:
 - Version 1.1.x: Support for full block storage implementations - 2019
 - Version 1.0.x: Support for service-based implementations

SSM TWG Work Items: 2021

- NVMe Profiles

- Detailed definitions for required implementation functionality
 - Used by Swordfish CTP program
- NVMe Drives – PCIe and IP-attach, JBOF, NVMe Array
(IP-attach drive work done in collaboration with Object Drive TWG)

- Collaboration with NVM Express and DMTF for new functionality

- Additional NVMe / NVMe-oF capabilities, supporting new NVMe features as they are added

- Collaboration with OFA (and DMTF) to expand support added for NVMe-oF to additional types of fabrics

- Collaboration on PM to add management support for remote persistent memory (in conjunction with OFA)

- Enhancements to support implementation feedback

SSM TWG Membership (Jan'21)

arm

 **PURE**STORAGE

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HUAWEI

intel®


Hewlett Packard
Enterprise

 BROADCOM®

KIOXIA

 SEAGATE


cisco

Lenovo

SAMSUNG

 XILINX®


DELL

 Microsoft

FUJITSU

NEC

 SK hynix

 KALRAY

Western
Digital®


NGD
systems

TOSHIBA

HITACHI

 Microsemi
a MICROCHIP company

inspur

 StarWind

 NetApp®

IBM

SSM TWG Participation

- Industry impact:
 - Develop, maintain, and enhance Swordfish Storage Management Specification and supporting ecosystem – for standards-based storage management of: (Redfish) server-attach storage, external (standalone) storage, storage management of NVMe / NVMe-oF systems, cloud / hyperscalar, hyperconverged, enterprise datacenters
- Who Participates:
 - Storage vendors, storage client application developers (storage management, server management, etc)
- Join the SSM TWG to:
 - Contribute new or modify existing content to improve interoperability, add support for new functionality, and accelerate your company's implementation
 - Monitor new content and discussions as your company decides when to start implementation
- For additional information, contact:
 - Richelle Ahlvers, Chair: ssmtwgchair@snia.org



Security TWG

2020 Review and 2021 Plans

Presented by Eric Hibbard (securitytwgchair@snia.org)



Security TWG 2020 Accomplishments

- Program of Work
 - General Storage Security
 - SNIA Architectures & Specifications
 - Securing Storage Ecosystems
 - Information Retention, Preservation & Discovery
 - Inventory: <https://www.snia.org/securitytwg>
- SNIA TLS Specification for Storage Systems, Version 2.0
- Substantial contributions for:
 - ISO/IEC 27040 (2nd Ed.), Storage security
 - ISO/IEC 27050-4, Electronic discovery – Technical readiness
 - NIST SP 800-209, Security Guidelines for Storage Infrastructure
 - IEEE draft Std 2883, Standard for Sanitizing Storage
- Update of the “data security” and “legal” terms in the SNIA Dictionary

Security TWG Work Items

- Major Work Items this TWG will work on in 2021
 - Update of ISO/IEC 20648 (TLS Spec)
 - Contributions for ISO/IEC 27040 (Storage security) and IEEE Std 2883 (Sanitization for Storage)
 - Review and Update of Security Whitepapers
 - Storage Concepts
 - Relevant NIST draft publications
- SNIA Group collaboration: All (security & privacy are cross-cutting)
- External group collaboration: INCITS (CS1/T11/T10), IEEE CPSC, TCG

Security TWG Membership as of 2021-01-06

- ActionSpot
- Dell Inc.
- Hewlett Packard Enterprise*
- Hitachi
- IBM*
- Intel Corporation*
- Kioxia Corporation*
- Marvell
- Micron Technology Inc.
- Microsemi a Microchip Company
- NetApp*
- Pure Storage
- Rockport Networks*
- ScaleFlux
- Seagate Technology*
- Silicon Motion Inc.
- SK Hynix
- VMware*
- Western Digital
- Individual Members*

Security TWG Participation

- What is the expected industry impact of this work
 - Education, Best Practices, Formal Standards
- What is the industry segment relevance.
 - Consumers/users of Storage Technology; Vendors/Developers/Implementors
- Why you should join and participate in this TWG
 - Monitor, Contribute, Coordinate, Educate
 - Weekly Calls – **Tuesdays 13:00 – 14:00 Pacific**
 - Active participants average 1-2 hours per week
- Who to contact for additional information
 - Chair, Security TWG (securitytwgchair@snia.org)



SFF TA TWG

2020 Review and 2021 Plans

Presented by Alex Haser & Michael Koffman



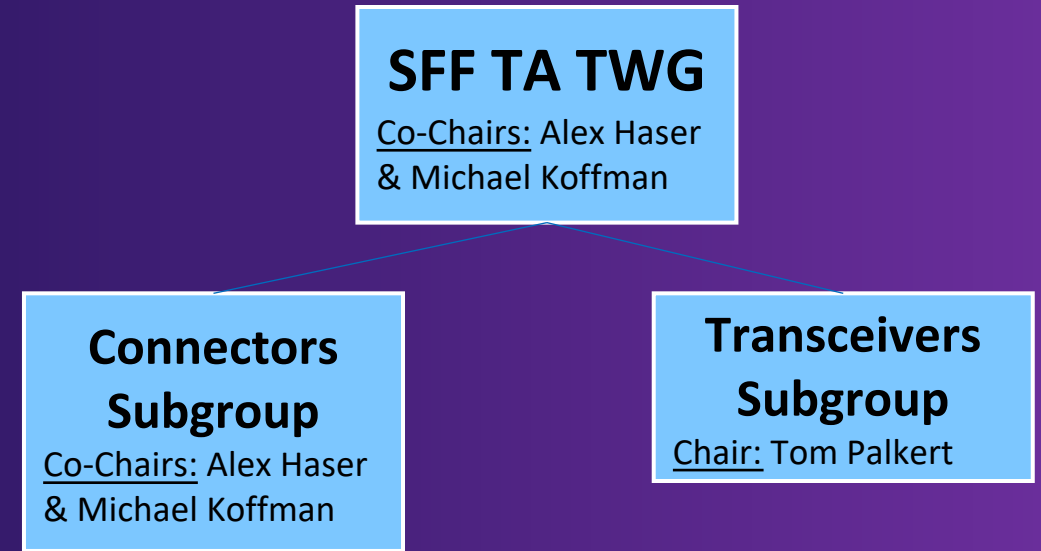
SFF TA TWG: Overview

- Who are we?

- 70+ member companies
- Managers of 150+ active specifications

- What do we do?

- Develop technical specifications for storage media, storage networks, and pluggable solutions
- Specifications encompass cables, connectors, form factor sizes and housing dimensions, management interfaces, transceiver interfaces, electrical interfaces
- Enables technology vendors to produce compatible, multi-sourced products and solutions



SFF TA TWG Work Items:

- Past accomplishments:

- Refer to the SFF TA TWG specifications site www.snia.org/sff/specifications

- Future work:

- Further refinement of SFF TA TWG Process Guide (GOV-TA-0001) and other administrative documents
 - Continued updates of specifications & other documentation (as needed)
 - Potential collaboration with PCI-SIG on next generation connector pinout

SFF TA TWG Membership (as of January 2021):



SFF TA TWG Participation:

- Why you should join and participate in this TWG
 - Access to all presentations & draft specifications
 - Voice in document content/ creation & comment resolution
- Additional resources:
 - Public site: www.snia.org/sff
 - Specifications: www.snia.org/sff/specifications
 - Member site: <https://members.snia.org/site/login>
 - How to join: www.snia.org/sff/join
 - Questions about membership? Send an email to membership@snia.org
 - Additional questions? Send an email to [sff ta twgchair@snia.org](mailto:sff_ta_twgchair@snia.org)



Smart Data Accelerator Interface (SDXI) TWG

2020 Review and 2021 Plans

Presented by Shyam Iyer, sdxitwgchair@snia.org

SDXI TWG 2020 Accomplishments

- Smart Data Accelerator Interface (SDXI) is a proposed standard for a memory to memory Data Mover interface.
- Charter and Program of Work
 - <https://members.snia.org/document/dl/31306>
- Recent completed work - summary
 - TWG approved by SNIA Technical Council and Board in July 2020
 - TWG had its first meeting on July 30, 2020
 - AMD, Dell, VMware provided contributed v0.7 draft specification as a starting point for this TWG(September)
 - Post Contribution, TWG members have met weekly to review the draft specification.
 - TWG is currently working on feedbacks received through call for RFC.
 - 18 Member companies, 42 Individual members (includes independent members)
 - SDC Keynote presentation
 - <https://youtu.be/iv2GUfnxG-A>
 - In Memory Compute keynote presentation
 - <https://youtu.be/jNZkZPNXdzY>
 - Proposal passed by TWG to be adopted by CMSI Initiative

SDXI TWG Work Items

- Items this TWG will work on in 2021
 - Finish RFC review process in Q1 CY2021
 - Initiate Public review of a pre 1.0 draft specification
 - Release a v1.0 SNIA architecture document (Refer Charter)
 - Plan and begin work on Post v1.0 features (Refer Charter)
 - Evangelize published work via podcasts, webcasts, conference presentations, blogs etc.
 - Work on building an OS-independent reference SW ecosystem
 - Work on designing Compliance Testing tools
- SNIA Group collaboration
 - Leverage expertise in other SNIA groups around persistent memory.
 - Coordinate synergies with Computational Storage Work Group
- External group collaboration / Alliance work items
 - CXL
 - Gen-Z

SDXI TWG Membership as of 1-26-2021

- Advanced Micro Devices(AMD)
- Dell Inc.
- Fujitsu America Inc.
- Hewlett Packard Enterprise
- Huawei Technologies Co. Ltd
- IBM(includes Redhat, Inc)
- MemVerge
- Micron
- Microsemi a Microchip Company
- Microsoft Corporation
- NetApp
- NGD Systems, Inc
- Samsung Electronics Co., LTD
- Scaleflux
- SK Hynix
- VMware
- Western Digital
- Xilinx, Inc
- And some more in the pipeline..

SDXI TWG Participation

- What is the expected industry impact of this work
 - Software memcpy is the current data movement standard due to stable CPU ISA.
 - Takes away from application performance and incurs software overhead to provide context isolation.
 - Offload DMA engines and their interface are vendor-specific and not standardized for use by user-level software.
 - The SDXI TWG -
 - Develops and standardizes an extensible, forward-compatible memory to memory data mover interface that is independent of actual data mover implementations and underlying I/O interconnect technology.
- What is the industry segment relevance.
 - System vendors(OEMS, cloud), OS vendors(Including Hypervisor software), ISV software vendors, HW acceleration vendors
- Why you should join and participate in this TWG
 - Monitor, contribute and vote
- Who to contact for additional information
 - sdxitwgchair@snia.org



SMI TWG

2020 Review and 2021 Plans

Presented by Don Deel, SMI TWG Chair



SMI TWG 2020 Accomplishments

- Charter: <https://members.snia.org/wg/smitwg/document/21891>
 - Summary: Maintain and evolve SMI-S, which defines an interface for the interoperable management a heterogeneous Storage Area Network
- SMI-S v1.8.0 rev 5
 - Final version to be developed by SNIA
 - Technical Position published March 23, 2020
 - Sent to ISO/IEC as a PAS submission in May, 2020

SMI TWG Work In 2021

- Track and support SMI-S 1.8.0 rev 5 as it progresses in ISO to become the next international version of the SMI-S standard
- Help the Storage Management Initiative promote SMI-S 1.8.0 rev 5

SMI TWG Membership as of January, 2021

- Dell Inc.
- Futurewei Technologies, Inc.
- Hewlett Packard Enterprise
- IBM
- Kioxia Corporation
- Lenovo
- Marvell
- Microsemi
- Microsoft
- NEC Corporation
- NGD Systems, Inc.
- Pure Storage
- Seagate Technology
- SK Hynix
- SolarWinds

SMI TWG Participation

- Industry impact of the work
 - Interoperable management of heterogeneous SAN equipment
- Participants
 - Storage system vendors, storage management application vendors, storage client application developers, others
- Who to contact for additional information
 - Don Deel, SMI TWG Chair: smitwg-chair@snia.org



Solid State Storage (S3) TWG

2020 Review and 2021 Plans

Presented by Eden Kim, ssstwgchair@snia.org

S3 TWG 2020 Accomplishments

- TWG Charter Summary

- Develop Performance Test Specifications for Solid State Storage (SSS)
- Expanded to include Real-World Workloads & Persistent Memory Storage

- Recent completed and ongoing work:

- Real World Storage Workload PTS for Datacenter Storage v1.0.7
- Update SSS PTS to v2.0.2 for SSS Device performance test
- White Paper: Introduction to Persistent Memory (PM) PTS v1.0
- Under Development: PM PTS v1.0

S3 TWG 2021 Work Items

■ Work Items 2021:

- PM PTS v1.0 Specification - PTS for Persistent Memory Modules & NVDIMM-N/P
- Reference Test Platforms (RTP) Listings - for NVMe SSD, PM Modules, NVDIMM-N/P
- Real World Workload Listings - Reference Workloads on CSMI S3 TWG page

■ SNIA Group collaboration:

- IOTTA TWG - Real-World Workload IO Capture vs IO Trace test methodologies
- CSMI - RTP & Reference Real-World Workload listing
- Network Storage Forum (NSF) - Fabric Host Factor test with different workloads & target storage
- Green Storage TWG - Architectural Storage Taxonomy (IO Access Modes for block, byte and DAX) and improved testing methods for SSS system & device testing

S3 TWG Membership as of 1/1/2021

- Active (at least 9 mtgs per year)
 - Actively Working - 8
 - Calypso, HPE, hyperI/O, Intel, SK Hynix, thedecisionplace, C. Paridon
- Membership Roll - 71 Individuals and Company employees
 - Companies - 27
 - Calypso, Dell, HPE, Huawei, InnoGrit, Intel, JetIO, Kioxia, Lenovo, Marvell, Micron, Microsemi, NEC, NetApp, NETINT, NGD, Samsung, Scaleflux, Seagate, Silicon Motion, SK Hynix, SNIA, Supermicro, WD, Xilinx, Yangtze Memory
 - Individuals - 7
 - Wayne Adams, Tom Coughlin, Jim Handy, Chuck Paridon, David Thiel, Geoff Kuenning, Jim Fister

S3 TWG Participation

- What is the expected industry impact of this work
 - Development of Technical Position Specifications, RTPs & White Papers
- What is the industry segment relevance.
 - SSD OEM/ODM, Controller/Firmware design
 - Datacenter Storage Vendors, Cloud Application & Storage Optimization
- Why you should join and participate in this TWG
 - Monitor, Contribute, Vote
- Who to contact for additional information
 - Eden Kim, Calypso – ssstwgchair@snia.org