

CS TWG Update

Another Great Year!

Presented by the Co-Chairs of the CS TWG

Jason Molgaard, Solutions Architect, ARM

Scott Shadley, VP Marketing, NGD Systems

Agenda

- Updates on the TWG Membership
- Updates on the TWG Work Efforts
- Status of the Architecture
- Status of the SW API
- What is Next?



The Continued Growth of Experience

- TWG Working group is continuing to see growth
 - 51 companies, 258 individual members
- Work within SNIA Efforts
 - CS SIG Webinars, Blogs, Events
 - SDXI New Sub-Group Collaboration
 - Security TWG Ensuring Alignment



- Collaborating with other Groups
 - NVM Express Computational Programs
 - xPU Engagements Overlap/Complimentary



The Efforts to Get Information Out is Continuing

DISCOVER / NEWS / 0321 COMPUTATIONAL STORAGE

Accelerated Box of Flash: Powerful computational storage for big data projects

Radically new approach to storage acceleration aids data manipulation for research and discovery

MARCH 21, 2022

2022 Strategic Roadmap for Storage

Published 16 March 2022 - ID G00760294 - 35 min read

By Jeff Vogel, Julia Palmer, and 3 more

Computational Storage

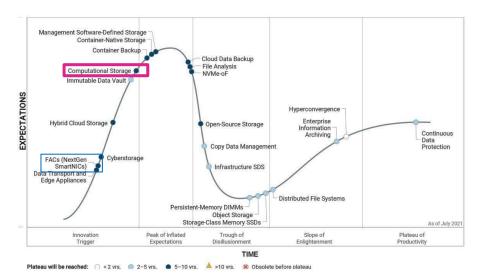
Computational storage device (CSD) combines processing and storage to reduce performance inefficiencies in the movement of data between storage and compute resources to address latency-sensitive application issues. CS offloads host processing from the main memory of the CPU to the storage device.

Why Is Computational Storage Inevitable?

by Sarah Lee | Mar 7, 2022 | Technology



Hype Cycle for Storage and Data Protection Technologies, 2021



Source: Gartner (July 2021)

747395



Current Progress of TWG Output

- Architectural Document has been Released
 - V0.8 is now in Public Review
 - V1.0 Release SOON!!

- Second release of API Document Soon
 - First level support of customer interface
- Security now being incorporated
 - In Collaboration with Security TWG



Computational Storage Architecture and Programming Model

Version 0.8 Revision 0

Abstract: This SNIA document defines recommended behavior for hardware and software that supports Computational Storage

Publication of this Working Draft for rev Storage TWG. This draft represents a "be preliminary consensus, and it may be upo should not be used as reference mater revisions should be directed to http:



information technology

Computational Storage API

Version 0.5 rev 0

ABSTRACT:

This SNIA Draft Standard defines the interface between an application and a Computational Storage device (CSx). For each CSx there will need to be a library that performs the mapping from the APIs in this specification and the CSx on the specific interface for that CSx.

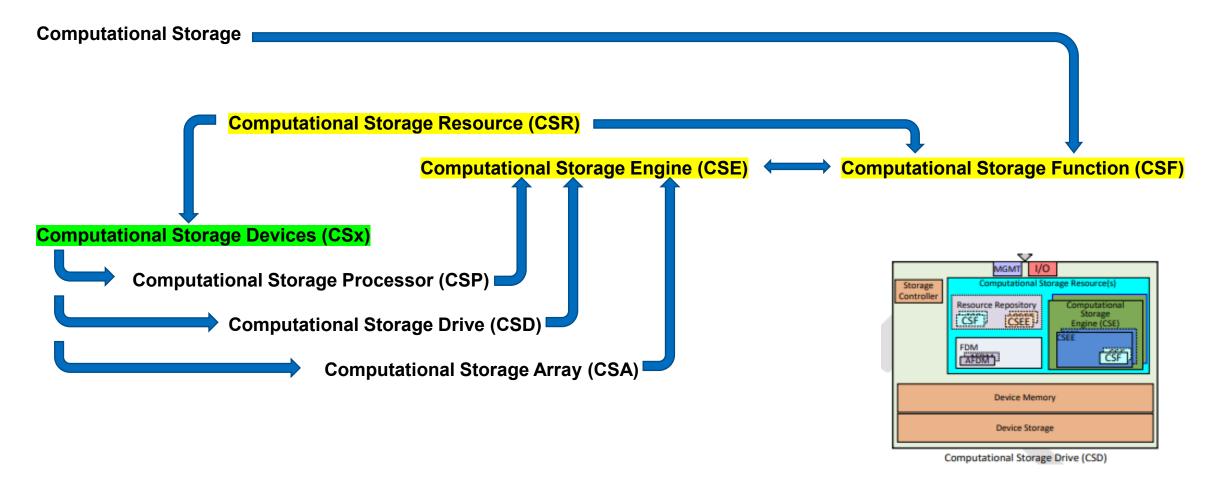
ublication of this Working Draft for review and comment has been approved by the Computational Storage TWG. This draft represents a "best effort" attempt by the Computational Storage TWG to reach preliminary consensus, and it may be updated, replaced, or made obsolete at any time. This documen should not be used as reference material or cited as other than a "work in progress." Suggestions for revisions should be directed to http://www.snia.org/feedback

Working Draft

June 9, 2021



A Brief Rundown of the Architecture





Security Recommendations/Considerations

EXAMPLE Considerations

- Mutual authentication of all entities that are interacting (in-band; out-of-band)
- Data-in-flight Security (integrity and confidentiality)
- Authorization and access controls (least privilege)
- API Security (CSF specific) privileged APIs.
- Trusted code (firmware/OS) updates
- Data-at-rest security implemented in the CSP
- Key management implemented in the CSP

- Root of Trust (RoT) (e.g., TPM); securing and storing keys
- CSF sanitization (app/function, FPGA, metadata, configuration)
- Data-at-rest security implemented in the CSD (FDE, KPIO, etc.,)
- Key management implemented in the CSD (for datain-flight and data-at-rest security, key lifecycle)
- User Data/media sanitization



The API - What Has Been Going On?

- Proposes an Application Programming Interface to Computational Storage devices
- 2) Allows a user application on a host to have a consistent interface to any vendor's CS device
- 3) Vendor defines a library for their device that implements the API
 - a. Mapping to wire protocol for the device is done by this library
 - b. Functions that are not available on a specific CS device may be implemented in software

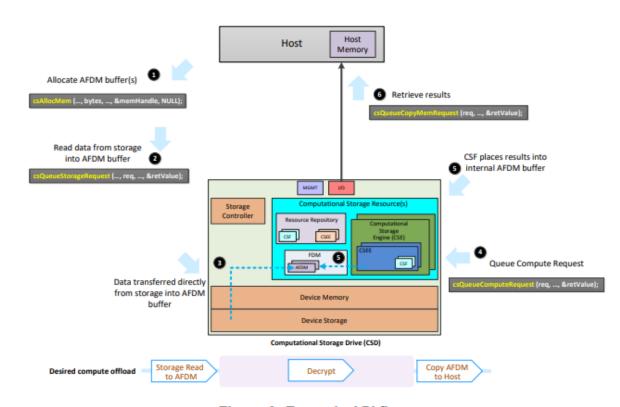


Figure 3: Example API flows









Moving Beyond Architecture

- Security and Computational Storage
 - Moving beyond single host usage
- Illustrative Examples Growth
 - More and more ways to deploy
- CS and SDXI Collaboration
 - Ensuring proper cross-platform support
- xPU The coordination of Compute
 - CSP or xPU and how they align







(1) LOGIN SEARCH

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Cloud Storage Technologies Computational Storage Computational Storage Use Cases Compute, Memory, and Storage Initiative Computational Storage Technical Work Group

Computational Storage

Today, Computational Storage is transforming enterprises worldwide. The SNIA Computational Storage Technical Work Group (TWG) is actively working on establishing hardware and software architectures to allow for compute to be more tightly coupled with storage at the system and drive level. In addition, the SNIA Compute, Memory, and Storage Initiative (CMSI) is focused on fostering the acceptance and growth of computational storage in the marketplace with the activities of the Computational Storage Special Interest Group. To achieve those goals, the CMSI provides education, performs market outreach, and influences and promotes standards.

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.

Session at this Event on NVMe Work Kim Malone, Stephen Bates – Co-Chairs







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