Computational Storage:
How do NVMe and SNIA CS Work Together

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Agenda

- Overview of SNIA CS Model
- Overview of NVMe CP Model
- NVMe-SNIA mapping
- Summary
SNIA Computational Storage Architecture

Computational Storage Processor

- Host 1
- Host n
- Fabric (PCIe, Ethernet, etc)
- Resource Repository
- Computational Storage Resource(s)
- Computational Storage Engine (CSE)
- Computational Storage Drive (CSD)
- Device Memory

Computational Storage Drive

- Host 1
- Host n
- Fabric (PCIe, Ethernet, etc)
- Storage Controller
- Resource Repository
- Computational Storage Resource(s)
- Computational Storage Engine (CSE)
- Device Memory

Computational Storage Array

- Host 1
- Host n
- Fabric (PCIe, Ethernet, etc)
- Storage Controller
- Resource Repository
- Computational Storage Resource(s)
- Computational Storage Engine (CSE)
- Storage Device or CSD
- Device Memory

Transparent Storage Access
Proxyed Storage Access
Array Control
SNIA Architectural Elements for CS Drive
NVMe Computational Storage Architectural Components

- Compute Namespaces contain:
  - Compute Engines
  - Programs

- Programs operate on data in Subsystem Local Memory
  - Includes program input, output

- NVM Namespaces
  - Persistent storage of data
  - NVM
  - ZNS
  - KV

This presentation discusses NVMe work in progress, which is subject to change without notice.
## Correlation of SNIA/NVMe terms

### SNIA Terms
- Computational Storage Engine
- Computational Storage Engine Environment
- Resource Repository
  - Downloaded CSF
  - Pre-loaded CSF
- Function Data Memory (FDM)
- Allocated FDM (AFDM)
- Device Storage

### NVMe Terms
- Compute Engine/Compute Namespace
- Virtual (Not Defined)
- Programs
  - Downloaded programs
  - Device-defined programs
- Subsystem Local Memory (SLM)
- Memory Range Set
- NVM Namespaces
Mapping to NVMe for Computational Storage

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Summary
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SNIA

- A general architectural model for computational Storage
- Flexibility for a variety of protocols

NVMe

- A specific I/O Command Set for computational Programs
- Specific for the NVMe protocol

• Related Computational Storage sessions at the Summit include:
  • The Latest Efforts in the SNIA Computational Storage Technical Work Group
  • NVMe Computational Storage - An Update on the Standard
  • Programming with Computational Storage

• Join SNIA and NVMe in the standardization effort
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