Flash Memory Summit

nvm EXPRESS®
Architected for Performance

What's New: Ratified NVMe® Technology that Enables the Future of Storage

Sponsored by NVM Express™ organization, the owner of NVMe® Family of Specifications

Speaker

Mike Allison

SAMSUNG

Agenda

Since FMS last year, NVM Express ratified 25 technical proposals and 6 ECNs.

I am providing a summary of the following technical proposals:

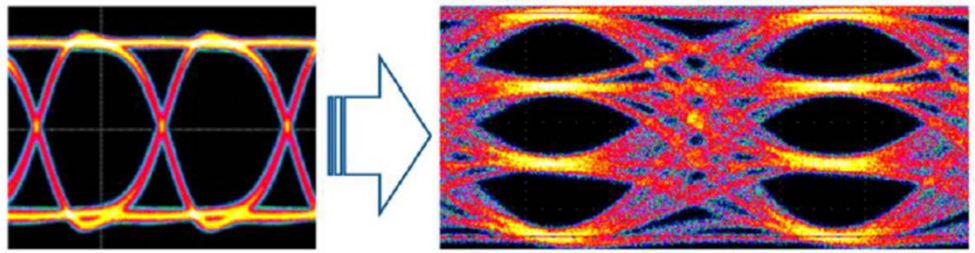
- TP 4119 Rx Phy Eye Opening Measurement
- TP 4135 NVMe® Specification Version Reporting
- TP 4146 Flexible Data Placement
- TP 6032 Out-of-band Admin Command While Shutdown Enhancement
- TP 8019 Authentication Verification Entity for DH-HMAC-CHAP

All ratified Technical Proposals and ECNs are available on the NVM Express Website

Reporting RX Phy Eye Opening Measurements

Standardizes the gathering and reporting of the Receiver Phy measurements

- Physical Interface Receiver Eye Opening Measurement log page
  - Estimated measurement time
  - Initiate a measurement in the background
  - Status of an on-going measurement
  - Results



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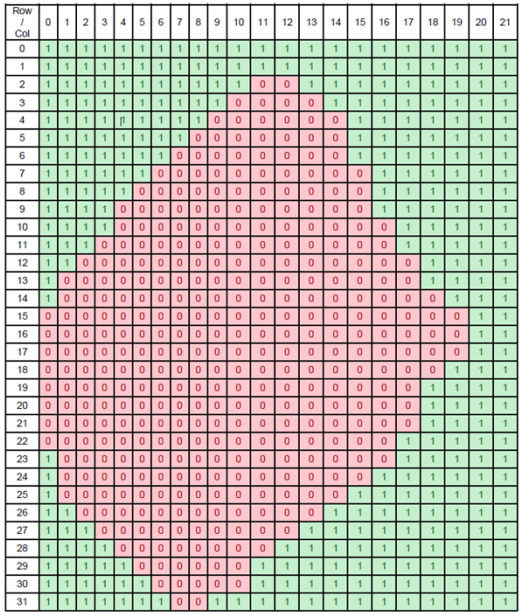
Standardizes the gathering and reporting of the Receiver Phy measurements

- Physical Interface Receiver Eye Opening Measurement log page
  - Estimated measurement time
  - Initiate a measurement in the background
  - Status of an on-going measurement
  - Results:
    - PCIe® architecture
      - Per Lane
        - Optional Vendor specific data
        - Optional Printable Eye



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Reporting the NVMe® Family of Specifications

Standardize I/O Command Set version reporting within the NVMe Family of specifications

Specification	Command Sets		
	NVM	Zoned Namespace	Key Value
NVM Express® Base Specification 2.0	✓	✓	✓
NVM Express NVM Command Set Specification 1.0	✓	✓	
NVM Express Zoned Namespace Command Set Specification 1.1		✓	
NVM Express Key Value Command Set Specification 1.0			✓

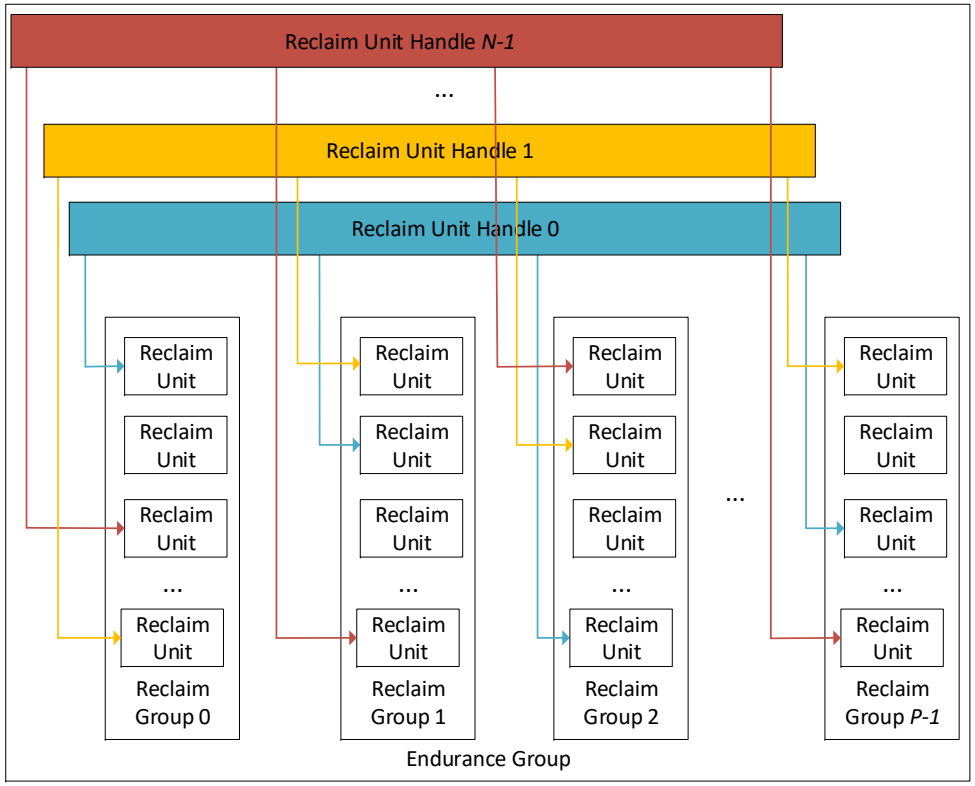
NVM Express Base Specification reported

- Identify command CNS 01h
  (Identify Controller data structure)

I/O Command Set specification reported

- Identify command CNS 06h
  (I/O Command Set specific Identify Controller data structure)

Flexible Data Placement (FDP)



Defines one or more FDP configuration that consists of:

- One or more Reclaim Units (RUs)
- One or more Reclaim Groups (RGs)
- One or more Reclaim Unit Handles (RUHs) that reference to a Reclaim Unit in each RG

Allows a write to a namespace to be placed into a specified Reclaim Group using a specific write resource

Backwards Compatible

- Host defines what SW to update to reduce Write Amplification

Come to the FDP presentation for more details including a comparison between Streams, FDP and Zoned Namespaces

Out-of-Band Admin Commands Work While Shutdown

Standardize Out-of-band Admin command access when Media is shutdown

Media is shutdown after all controllers in a Domain/NVM subsystem have completed shutdown

Controller are shutdown:

- Controller Shutdown
  - Host writes Controller Configuration property
- NVM Subsystem Shutdown
  - In-band: Host writes NVM Subsystem Shutdown property
  - Out of Band: Management Controller issue Shutdown command

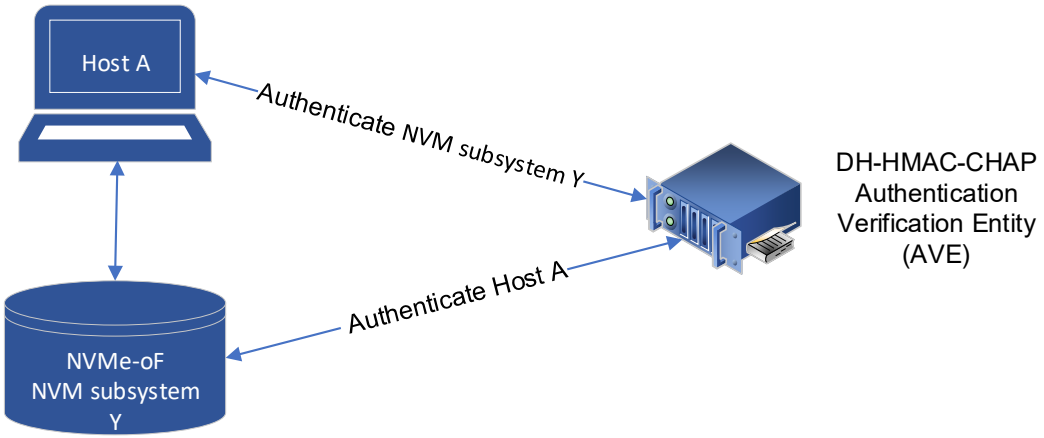
If Media is being shutdown or has shutdown and an out-of-band Admin command requires Media:

- Media is brought back online to perform the Admin command and then may be shutdown again
  - Power loss in this state may cause a unsafe shutdown
- In-band host not aware of this condition

DH-HMAC-CHAP Authentication Verification Entity (AVE)

Standardize a centralized authentication authority for NVMe-oF™ technology applications

- Makes it easier for administrators to manage who can talk to who
- Reduces the number DH-HMAC-CHAP secrets maintained
- Connection with an AVE is required to use TLS version 1.3
- An AVE is allowed to be discovered from a Discovery controller using a new AVE Discovery log page



Questions?

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