NVM Express State of the Union

Sponsored by NVM Express™ organization, the owner of NVMe® Family of Specifications
NVMe® Specifications – The Language of Storage

Enterprise SSD Capacity Shipment Forecast by Interface

Source: IDC Worldwide Solid State Drive Forecast, 2023-2027 Doc # US49401623, Apr 2023
NVMe® Technology Powers the Connected Universe

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise</td>
<td>32,483</td>
<td>42,973</td>
<td>37,094</td>
<td>48,602</td>
<td>65,701</td>
<td>82,499</td>
<td>106,106</td>
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<tr>
<td>Cloud</td>
<td>73,191</td>
<td>86,307</td>
<td>53,534</td>
<td>89,678</td>
<td>128,164</td>
<td>175,730</td>
<td>237,949</td>
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<tr>
<td>Client</td>
<td>145,610</td>
<td>157,304</td>
<td>200,391</td>
<td>274,530</td>
<td>350,518</td>
<td>437,054</td>
<td>517,991</td>
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</tbody>
</table>

Source: Data and projections provided by Forward Insights Q2’23
NVM Express Organization

Board of Directors
Chair: Amber Huffman
Treasurer: Curtis Ballard
Secretary: Dave Landsman

Technical Workgroup
Chair: Peter Onufryk

Marketing Workgroup
Chair: Cameron Brett, Kerry Munson

Computational Storage
Chairs: Kim Malone, Bill Martin

Fabric & Multi-Domain Subsystem
Chair: Fred Knight, Erik Smith

Management Interface
Chairs: Austin Bolen, John Geldman

Interoperability and Compliance
Chair: Ryan Holmqvist

NVMe® over Fabrics (NVMe-oF™) Boot
Chairs: Phil Cayton, Rob Davis, Doug Farley

Errata
Chair: Mike Allison
Board of Directors
Elections occur yearly
Organizational Enhancements

- Tooling Updates
  - Zoom, Causeway, Bugzilla
- Errata Taskgroup
- Website Redesign
- Software Taskgroup
- Framework
Modernizing the NVM Express Website

- Refreshed pages
- Updated user interface
- Consolidated & reorganized specifications
  - Specifications
  - Blogs
  - Webinars

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>NVMe Express® Base Specification</td>
<td>NVMe Base</td>
</tr>
<tr>
<td>NVMe Zoned Namespaces (ZNS) Command Set Specification</td>
<td>Command Set</td>
</tr>
<tr>
<td>NVMe Command Set Specification</td>
<td>Command Set</td>
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<tr>
<td>Key Value Command Set Specification</td>
<td>Command Set</td>
</tr>
<tr>
<td>RDMA Transport Specification</td>
<td>Transport</td>
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<tr>
<td>TCP Transport Specification</td>
<td>Transport</td>
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<tr>
<td>NVMe over PCIe Transport Specification</td>
<td>Transport</td>
</tr>
<tr>
<td>NVMe Express Management Interface Specification</td>
<td>NVMe-MI™</td>
</tr>
<tr>
<td>NVMe Boot Specification</td>
<td>Boot</td>
</tr>
<tr>
<td>Changes in NVMe Express Revision 2.0</td>
<td>Command Set, NVMe Base, NVMe-MI™, Transport</td>
</tr>
<tr>
<td>NVMe over Fabrics (oF) Specification (historical reference only)</td>
<td>Historical Reference</td>
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</tbody>
</table>
Resources to Learn About NVMe® technology
NVMe® 2.0 Family of Specifications

NVMe 2.0 specifications were released on June 3, 2021
Refer to nvmexpress.org/developers
Activity Since Release of NVMe® 2.0 Family of Specifications*

New Authorized Technical Proposals: 60
Ratified Technical Proposals: 69
Ratified ECNs: 13

* Activity as of 7/28/2023
NVMe® Specifications Feature Roadmap

- **2021**
  - Q2: NVMe-oF™ Automated Discovery
  - Q2: Dispersed Namespaces
  - Q4: Flexible Data Placement (FDP)
  - Q4: Key Per I/O

- **2022**
  - Q1: Scalable Resource Management
  - Q2: Cross Namespace Copy
  - Q3: Computational Programs
  - Q4: Subsystem Local Memory

- **2023**
  - Q1: Network Boot / UEFI
  - Q2: Live Migration

- **2024**
  - Q1: NVMe 2.0 Family of Specifications Released
  - Q2: Planned New Specification
  - Q3: Computational Programs
  - Q4: Subsystem Local Memory

Legend:
- **Ratified Feature** (left edge indicates ratification quarter)
- **Planned Feature** (left edge indicates planned ratification quarter)
- **Planned New Specification** (left edge indicates planned ratification quarter)
Specification **Advancements**

- **Flexible Data Placement**
  - Reducing Write Amplification

- **Network Boot / UEFI**
  - New Network Storage Functionality

- **Computational Storage**
  - Executing Programs within a Device

- **Live Migration**  
  - *new feature!*
  - Seamlessly Move Data across vMachines
The Union is Strong and Delivering Value!
Architected for Performance