NVMe Technical Proposal

Technical Proposal Name:	ICC Plugfest #20 Fall 2023 Phase 3
Date:	July 19, 2023
Impacted Specification:	UNH-IOL_NVM_Command_Set_Confomance_v19.0_2023.01.04 UNH-IOL_NVMe_Integrators_List_Policy_v19.0_2023.01.04 UNH-IOL_NVMe_RDMA_TCP_Interoperability_v19.0_2023.01.04 UNH-IOL_NVM_ZNS_Command_Set_Confomance_v19.0_2023.01.04 UNH-IOL_NVMe-MI_Confomance_v19.0_2023.01.04 UNH-IOL_NVMe-PCIe_Interoperability_v19.0_2023.01.04 UNH-IOL_PCIe Transport_Conformance_v19.0_2023.01.04 UNH-IOL_RDMA_Transport_Confomance_v19.0_2023.01.04 UNH-IOL_TCP_Transport_Confomance_v19.0_2023.01.04
Sponsor:	Tim Sheehan

1. Benefits of the Technical Proposal

A technical proposal should have broad industry benefit. What is the value proposition of the technical proposal and how will it benefit the industry?

NVMExpress Compliance Test Plan updates for TP2016 ICC Plugfest 20 Fall 2023

2. Summary of the Technical Proposal

Provide a brief technical description of what is being proposed.

2.1. NVMe Plugfest Dates and Locations

Currently UNH-IOL is trying to determine the best time and location for NVMe Plugfest #20 the weeks of November 6th and 13th, 2023 at the UNH-IOL facility. The event can be in person or remote.

2.2. Updates to Integrators List Policy

- NVMe/MI testing will now show the interface type used to perform the MI conformance testing in IL listings and reports.

2.3.   NVMe Base Specification Refactoring

No Modifications made.

2.4.   Proposed Test Status Changes

After review by the Interop and Compliance Committee, the following tests have been changed from FYI to Mandatory. These tests have been performed at plugfests and deemed stable and correct. There are no technical changes needed to either the test documentation or test implementation for these tests.

NVMe Conformance Test Suite FYI to Mandatory Status Changes for PCIe Devices

1. Test 1.3 case 29 updated from (FYI) to (M)
2. Test 1.3 case 32 updated from (FYI) to (M)
3. Test 1.3 case 33 updated from (FYI) to (M)
4. Test 1.3 case 36 updated from (FYI) to (M)
5. Test 1.3 case 40 updated from (FYI) to (M)
6. Test 1.4 case 11 updated from (FYI) to (M)
7. Test 1.17 case 6 updated from (FYI) to (M)
8. Test 1.17 case 7 updated from (FYI) to (M)
9. Test 1.17 case 8 updated from (FYI) to (M)
10. Test 1.17 case 9 updated from (FYI) to (M)

NVMe/MI Conformance Test Suite FYI to Mandatory Status Changes

1. Test 10.3 cases 1 & 2 updated from (FYI) to (M)
2. Test 10.4 cases 1 & 2 updated from (FYI) to (M)

2.5.   Proposed new FYI Tests and updates to existing tests

New and/or Modified NVMe Conformance Tests

Below are modifications needed based a review of all Technical Proposals and specification that have been ratified as of January 2023, for the Phase 3 of this TP 2016, along with other features that should be addressed as part of NVMe conformance testing.

1. Modified Test 1.14.1 clarified procedure steps 2&3
2. Modified Tests 7.9.1&2 procedure step 3.b.ii
3. Modified Test 1.1.44 procedure step wording
4. Modified Tests 3.2.7-11 Clarified PIC Bit 2 in procedure steps
5. Modified Test 5.5.1 Possible Problem added for status code returned
6. Modified Test 3.10.6 Observation Result 1 for clarity
7. Modified Tests 1.2.2,3,& 4 Grammar

8. Modified Test 3.2.6 to clarify Procedure steps
9. Modified Test 1.6.8 add new status code in results
10. Modified Test 1.12.6 added procedure step to check sanitize status
11. Modified Test 1.22.2 to remove skip procedure step
12. Modified Test 1.1.24 to remove CSI from procedure step
13. Modified Test 1.1.2 to remove Observation Result 8 to follow NVMe Specification
14. Modified Test 2.3.12&13 to use correct variable name
15. Modified Test 2.14.7 to clarify return status code
16. Added New Tests 1.6.17, 1.7.5, 3.14.6, 1.3.77, & 1.17.10 per requirements in ECN 105
17. Added New Tests 1.2.35 & 36 per requirements in TP4142 Temperature Threshold Hysteresis
18. Added New Tests 1.2.44&45, 8.1.7, 5.5.7, 1.2.46, 1.1.45, 1.6.18, 1.6.19, 1.3.68, 1.3.79, 8.1.8&9, 1.7.6 per requirements in TP4136 Should to Shall
19. Modified Tests 1.6.8, 2.11.2, & 3.2.1 per requirements in TP4136 Should to Shall
20. Added New Tests 1.2.37-43 per requirements in TP4145 Namespace Admin Label
21. Added New Tests in Group 9, Flexible Data Placement per requirements in TP4146a Flexible Data Placement
22. Added New Tests 1.5.3&4, 1.3.80, 1.23.1-8 per requirements in TP4097a Abort Enhancements
23. Added New Test 1.16.8 per requirements in TP4114 Vendor Specific Directives

New and/or Modified ZNS Command Set Conformance Tests

1. Modified Test 2.18 to include version check before performing test
2. Modified Tests 2.2.10, 3.1.13, 3.2.8, 3.7.13, 3.8.12, & 3.9.16 per requirements in ECN 105
3. Added New tests 2.6.18 & 9, 2.1.12 per requirements in ECN 105
4. New Tests 5.1.1-4 added per requirements in TP 4115 ZNS Namespace Management Enhancements

New and/or Modified Transport Conformance Tests

For TCP Transport Conformance Test Plan
1. Modified test case 1.2.5 for procedure step clarification
2. Modified Test 4.4.1 to removed version check
3. New Test 1.3.6 per requirements in TP4136 Should to Shall

For PCIe Transport Conformance Test Plan
1. Modified test case 2.6.1 and 2.7.1 procedures and results steps for Power State Transition

For RDMA Transport Conformance Test Plan
1. Modified test case 1.2.5 to provide clarity to procedure steps
2. New test 1.3.6 per requirements in TP4036 Should to Shall

New and/or Modified NVMe-MI Conformance Tests

1. Modified Test 7.6 to verify Msg tag in Relayed Response Message
2. Modified Test 7.4 & 7.5 to include version check for 1.4 or less support
3. New Tests 7.8 & 7.9 For Replay response message
4. Modified Tests 11.4-8 and 12.1&2 to FYI, we incorrectly labeled M
5. Modified Test 11.3&4 per requirements in TP6017 VPD Data structure enhancements and TP6019a Device Form Factor Table
6. New Test 7.10 per requirements in TP4136 Should to Shall
7. New Tests 7.8 & 9, 9.3.16 per requirements in TP6022 MI Maintenance
8. Modified Tests 4.8, 8.13.1-3, 11.7, 9.5.1, & 9.4.1&2 per requirements in TP6028 MI Command Optional Support
9. Modified Test 9.6.1 per requirements in TP6031 Progress Detect During Paused Process State
10. New Test 9.2.4 Get Log Page DOFST & DLEN

New and/or Modified NVMe PCIe Interop Tests

- No changes recommended

New and/or Modified RDMA TCP Interop Tests

- No changes recommended

2.6.   Updates expected to be Addressed in future ICC TPARs

The following list shows TPs and ECNs that ICC plans to address in the future.

- ECN111, 112, 113, 114, 115, & 117
- TP4064, 4084, 4086, 4088
- TP4068, 4088, 4090, 4093, 4099, 4102, 4103, 4104
- TP4119a, 4121, 4124, 4126,4130, 4131, 4141a, 4148
- TP4155, 4156, 4162, 4165, 4167, 4171,
- TP 6021, 6027a, 6032, 6033, 6035
- TP 8006, 8009, 8010a, 8011, 8013, 8014, 8016, 8017, 8020, 8026

2.7.   Updates not currently addressed in ICC Testing

The following list shows ratified TPs and ECNs that ICC does not include in testing.

- TP 4060 for Multiple Controller Firmware Update require significant expansions of existing testing infrastructure.

- TP 4082 for Multiple Controller Shutdown Enhancements require significant expansions of existing testing infrastructure.
- TP 6009 has been superseded by TP 6016b.
- NVMe v1.4 Path and Transport Error Enhancements (see TP 4028a), require forcing error conditions that may not be reliably produced with existing test tools.
- NVMe v1.4 Enhanced Command Retry (see TP 4033) There is not a reliable means for interrupting a command at the controller to create the scenario necessary for testing the controller. There are a variety of ways that this functionality could be test on the host side, but currently the test program primarily checks the device side.

3. Impact of the Technical Proposal on Specification Compliance

List any impact that the technical proposal will have on backward compatibility. Will a device that is compliant to the current revision of the specification(s) continue to be compliant if the technical proposal is approved? Will software, drivers, or operating systems implemented to the current revision of the specification(s) operate with devices that implement the technical proposal?

The technical proposal will be used to ensure continued specification compliance for all products going through the test program. New test items introduced will be considered FYI initially until the Interop an Compliance Committee reviews and determines that the new test cases can be made mandatory.

4. Impact of the Technical Proposal on the NVMe Ecosystem

What impact will adoption of the technical proposal have on the NVMe ecosystem? Will software, drivers, or operating systems need to change to take advantage of the technical proposal? Will the technical proposal impact any documentation, educational material, test equipment, or compliance tests? Will implementation of the technical proposal have any impact on compliance to specifications commonly associated with NVMe (e.g., PCI Express, MCTP, I2C, or SMBus)

Compliance tests are expected to need updates.

5. Proposed Ecosystem Enablement by the Sponsor(s)

What steps, if any, are the sponsor companies planning on taking to enable the industry to take advantage of the technical proposal? An example is contributing a driver patch that enables the open source Linux or Windows OFA driver to take advantage of the benefits of the technical proposal.

The sponsors are willing to do the enabling required for NVMe users to take advantage of the improved test functionality.