

**Minutes**  
**T11.3 FC-NVME-2 ad hoc work group regular meeting**  
**05 Jun, 2019 – 02:00PM-06:00PM PDT**  
**La Jolla, CA, USA**

The FC-NVME ad hoc work group of the Fibre Channel Protocol (T11.3) Task Group held a regular meeting at La Jolla, CA on 05 Jun, 2019, hosted by Broadcom. Attendance was 13 people from 7 organizations and is tabulated at the end of this document.

Patty Driever (IBM) (rhathorn@us.ibm.com) took minutes. Please report any corrections by email at [fc\\_protocol@standards.incits.org](mailto:fc_protocol@standards.incits.org)

## **1 Opening Remarks**

### ***Introductions***

Chairperson Craig Carlson (Marvell) opened the regular meeting on Wednesday, 05 Jun, 2019 at 11:39 PM PDT and led a round of introductions and thanked the host (Broadcom) for organizing this week's events.

## **2 Meeting Policy**

### ***2.1 Attendance and Membership***

The chair explained that attendance is recorded electronically at <https://standards.incits.org/apps/org/workgroup/t11>, and explained the procedure. Attendance at this meeting does not count toward attendance at the plenaries of T11 and its task groups (i.e., being here will not get you out or keep you out of membership jeopardy).

The chair stated that all persons present are considered members of this meeting and may vote on questions, limited to one vote per company present. He advised that although T11 does not limit participation in the activities of its work groups to representatives of T11 member organizations, it requires nonmembers to identify themselves as such. Nonmembers that expect they may participate in the activities of T11 regularly were encouraged to become members.

### ***2.2 Patents***

The chair indicated that among the rules and policies under which this working group operates are the ANSI intellectual property policies as specified in pages 1-3 of [http://www.incits.org/pat\\_slides.pdf](http://www.incits.org/pat_slides.pdf). He displayed these pages without comment or explanation, and directed that questions about the policy should be referred to the questioner's legal counsel or the ANSI General Counsel.

## **2.3 Antitrust**

The chair indicated that among the rules and policies under which this working group operates are the INCITS Antitrust Guidelines. Any member of the meeting is responsible for objecting if he believes discussion in the meeting violates those guidelines. As examples, there should never be discussion of the following topics at any INCITS or INCITS subgroup meeting:

- Any company's prices or pricing policies;
- Specific R&D, sales and marketing plans;
- Any company's confidential product, product development or production strategies;
- Whether certain suppliers or customers will be served;
- Prices paid to input sources; or
- Complaints about individual firms or other actions that might tend to hinder a competitor in any market.

If such discussion is not immediately terminated, it is the chairperson's responsibility to terminate the meeting. The INCITS Antitrust Guidelines are available at <http://www.incits.org/inatrust.htm>

## **3.0 Approval of Agenda**

An agenda for the FC-NVME ad hoc work group regular meeting 05 Jun, 2019 was posted as T11/2019-00179-v000.

*Motion: Jason Rusch (Viavi) moved and Alan Rajapa (Dell) seconded to accept T11/2019-00179-v000 as amended as the agenda for this regular meeting.*

Approved by acclamation.

## **4.0 Past Business**

### **4.1 Review of Minutes**

*Motion: Jason Rusch (Viavi) moved and Alan Rajapa (Dell) seconded to accept the following documents as the official minutes for the regular meeting on 10 Apr, 2018, and the conference call on 22 May, 2019.*

*Approved by acclamation.*

T11-2018-00118-v000.pdf

FC-NVMe-2 Ad Hoc working group meeting Minutes for April 10, 2019

T11-2018-00154-v000.pdf

FC-NVMe-2 Ad Hoc working group conference call Minutes for May 22, 2019

## **4.2 Review of Old Action Items**

### **Action items carried forward from prior meetings:**

19-0410-01: Dave Baldwin to prepare a proposal for a Disconnect Connection to disconnect a single connection for sizing of scope for FC-NVMe-2 – **Complete.**

19-0522-01: Roger Hathorn to propose description of NVMeoFC Control IU construct for R\_CTL of solicited and unsolicited control using the FC-4 type code and opcode. – **carry to August.**

### **New action items from this meeting:**

19-0605-01: Editor to incorporate T11-2019-00158-v001 into FC-NVMe-2.

### **Completed action items from prior meetings:**

19-0204-01: Editor to post revision 1.04 of FC-NVMe-2 with accepted Annex E content - Complete

19-0204-02: Chair to request T11.3 conduct an RFC ballot on FC-NVMe rev 1.04. - Complete

18-1205-01: Dave Baldwin to ensure text is in FC-FS-6 that specifies the setting of SI bit in a FLUSH response. – Complete -all good.

18-1205-02: Editor to incorporate T11-2018-00262-v1 on CMD IU extensions for PI – Complete (Rev 1.03)

18-1205-03: David Peterson to post and incorporate T11-2018-00155-v005 for SLER Diagrams – Complete (Rev 1.03)

18-1205-04: Dave Baldwin to post T11-2018-00328-v001 on lost read data enhancement - Complete

18-1205-05: Editor to incorporate T11-2018-00328-v001 – Complete (Rev 1.03)

18-1205-06: Editor to post revision 1.03 with all approved proposals incorporated – Complete

18-1003-01: Dave Baldwin to post T11-2018-00221-v2 on accommodation of NVMe TP8005 – Complete

18-1003-02: Editor to incorporate T11-2018-00221-v2 - Complete

18-1003-03: Dave Baldwin to post T11-2018-00261-v1 on SLER Lost CMD IU text – Complete

18-1003-04: Editor to incorporate T11-2018-00261-v1 – Complete

18-1003-05: Dave Baldwin to post T11-2018-00262-v1 on PI for further review – Complete

18-0606-05: Editor to incorporate T11-2018-00129-v002 in the next draft (incorporated but not yet posted). Complete. See Rev 1.01 of draft

18-0715-01: David Peterson to post revision T11-2018-0103-v003 (Misc. SLER text) - complete

18-0715-02: Editor to incorporate T11-2018-0103-v003 (Misc. SLER text) - Complete.  
See Rev 1.01 of draft

18-0715-01: David Baldwin to post revision T11-2018-00047-v007 (SLER text)-  
Complete

18-0715-02: Editor to incorporate T11-2018-00047-v007 (SLER text) - Complete. See  
Rev 1.01 of draft

18-0606-01: Dave Baldwin to post revision T11-2018-00047-v003 SLER text with  
modifications - Complete (See v004)

18-0606-02: David Peterson to update T11-2018-00155-v000 Sequence error diagrams  
based on current updates to the proposals. – complete (see v001)

18-0606-03: Chair to bring T11-2018-00091-v000 FC-NMVe/AM1 to T11 to request  
letter ballot. – complete.

18-0606-04: David Peterson to post T11-2018-00129-v002, keep alive text. - complete

18-0207-05: Craig Carlson to propose text for FC-NVMe-2 requirements for Keep Alive  
– completed by David Peterson (see T11-2018-00129-v000).

18-0207-01: AI: James to post T11/2017-00419-v0004 (Association Termination) -  
Complete

18-0207-02: AI: Editor to incorporate T11/2017-00419-v0004 and post a new revision of  
the FC-NVMe-2 draft. – Complete (See rev 1.00)

18-0207-03: David Peterson to post T11-2018-00040-v001 – completed during the  
meeting.

18-0207-04: Editor to incorporate T11-2018-00040-v001 into the next revision of FC-  
NVMe-2. – Complete (See Rev 1.00)

18-0116-01: James Smart to update text proposal for disconnection interlock rules and  
post as T11/2017-00419-v001. See v002. – Complete

17-1205-02: James Smart to prepare a text proposal for covering the results of the  
discussion around disconnection interlock rules – Complete. See T11/2017-00419-v000.

17-1205-01: Chair to schedule interim conference call to review a text proposal (not yet  
available) around disconnection interlock. – Complete

18-0131-01: James Smart to update text proposal for disconnection interlock rules and  
post as T11/2017-00419-v003. – complete.

For action items prior to 12/05/2017, see prior minutes of the 12/06/2017 regular  
meeting.

## 5. Old business

### ***5.1 RFC Ballot Comment Resolution, T11-2019-00077-v003 (Peterson, Broadcom)***

An RFC ballot concluded with 207 comments, 111 Technical to be resolved. This meeting was dedicated to resolving technical comments. Results and progress are recorded in the RFC Comment database.

Dave Baldwin (Broadcom) moved, seconded by David Brown (Dell), to incorporate T11-2019-00158-v000 as modified (v001) as a late letter ballot comment Broadcom-L01.

## 6. Scheduled business

### ***6.1 Disconnect Connection, T11-2019-00158v000 (Baldwin, Broadcom)***

Dave Baldwin prepared a proposal for disconnect connection (based on NVMe addition TP8001) for group to evaluate scope of incorporating before completion of FC-NVMe-2. NVMe oF spec is adding Disconnect Connection functionality, as TP 8001. They're calling it a 'Graceful Disconnect', and will have the ability to delete an I/O queue pair (i.e. Submission and Completion queue), but will not apply to an Admin Queue. In general we need to change Disconnect Command to 'Disconnect Association' (with one or two exceptions noted by David), and the abbreviation/acronym DISC will be replaced with DISA.

We must also add a new Disconnect Connection (DISC) NVMeoFC link service. The section (4.3.1) that describes cases which require an association to be terminated will need to remove the idea that terminating a connection is one reason. Same section requires changes to the unordered list of what an NVMe\_Port shall do when terminating an association.

Additional changes to 4.3.3 for NVMe\_Port Exchange recovery, primarily clarifying the Disconnect is really a Disconnect Association now. Similar for 4.3.4 and 4.3.5.

More significant changes are required to 4.4 to describe the new behavior regarding the termination of a single Connection within an Association. Too numerous to describe here.

Small changes to 11.2 (Error Detection) and 11.3.1 (ABTS-LS Overview) and 11.4.1 (ABTS-LS Error Recovery) are also required to indicate that a connection is terminated rather than an association when terminating an exchange. We also need to add a section on a new clearing effect for Disconnect Connection.

## **6.2 Requiring NVMe CONF, T11-2019-00162v000 (Baldwin, Broadcom)**

Dave Baldwin prepared a proposal for requiring the use of NVMe CONF for group to evaluate scope of incorporating before completion of FC-NVMe-2.

Long-lived commands exist (e.g. Asynch Event Request) that could be open for long periods of time, requiring frequent FLUSH commands that are somewhat undesirable and unnecessary. Also, without requiring CONF the Targets must run a 23 second timer (IR\_TOV) on each exchange such they can't release state info and reuse the exchange until the timer expires.

Proposal is to require the use of CONF if SLER is being used. So indicating support of SLER must be accompanied by support of confirmed completion in order to successfully negotiate SLER.

This would remove item d) in 11.7.1 (Overview (SLER)) to remove IR\_TOV expiring after transmitting NVMe\_RSP or NVMe\_ERSP IU.

Dave also proposed related text changes for NVMe\_CONF IU recovery (11.7.5.10).

Concern was raised over the performance impact of requiring CONF on every operation. It was agreed to table this proposal until next meeting to allow everyone time to think about the implications and take a more informed position at the next face-to-face.

## **7. Unscheduled business**

## **8 Project Schedule**

A project schedule was discussed and results follow.

<b>Milestone</b>	<b>Expected Date</b>
Last technical input	August, 2018
T11 RFC	February, 2019
Forward to INCITS	June, 2019

## **9 Review of Action Items**

See 4.2, Review of Old Action Items.

## **10 Meeting Schedule**

The chair will request 4 hours at the T11 plenary week for FC-NVMe-2 in Santa Fe, NM, August, 2019.

## **11 Attendance Check and Adjournment**

<b>Company</b> 	<b>Name</b>	<b>Role</b>
Broadcom Inc	David Baldwin	Member
Broadcom Inc	Howard Johnson	Member
Broadcom Inc	David Peterson	Member
Broadcom Inc	James Smart	Member
Broadcom Inc	Steven Wilson	Member
Cisco Systems Inc	Mike Blair	Member
Cisco Systems Inc	J Metz	Member
Dell Inc	David Brown	Member
Dell Inc	Alan Rajapa	Member
Hewlett Packard Enterprise	Rupin Mohan	Member
IBM Corporation	Patty Driever	Member
Marvell Semiconductor Inc	Craig Carlson	Group Chair
Viavi Solutions Inc	Jason Rusch	Member

***Alan Rajapa (Dell) moved and Patty Driever (IBM) seconded to adjourn. Approved by acclamation.***

The regular meeting was adjourned at 5:50 PM PDT on 05 Jun, 2019.