

**Minutes**  
**T11.3 FC-NVME ad hoc work group regular meeting**  
**4 April, 2018 – 2:30PM-6:00PM CST**  
**Deerfield Beach, FL, USA**

The FC-NVME ad hoc work group of the Fibre Channel Protocol (T11.3) Task Group held a regular meeting at Deerfield Beach on 4 April, 2018, hosted by Molex. Attendance was 12 people from 8 organizations and is tabulated at the end of this document.

Roger Hathorn (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 (QLogic) opened the regular meeting on Wednesday, 4 April, 2018 at 2:00 PM CDT and led a round of introductions and thanked the host (Molex) 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 4 April, 2018 was posted as T11/2018-00122-v0000.

***Patty Driever (IBM) moved and David Peterson (Broadcom) seconded to accept T11/2017-00122-v0000 as amended as the agenda for this regular meeting. Approved by acclamation.***

## **4.0 Past Business**

### **4.1 Review of Minutes**

***Patty Driever (IBM) moved and David Peterson (Broadcom) seconded to accept the following document as the official minutes for the regular meeting on 07 February, 2018. Approved by acclamation.***

[T11-2018-00066-v000.pdf](#)

FC-NVMe-2 Ad Hoc working group meeting Minutes for February 7, 2018

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

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

- 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)
- 18-0207-05: Craig Carlson to propose text for FC-NVMe-2 requirements for Keep Alive

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

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

- 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 NVMe-2 Sequence Level Error Recovery (Baldwin, Broadcom) (T11-2018-00047-v001)**

David Baldwin (Broadcom) presented this detailed proposal for sequence level error detection and recovery modeled after the FCP sequence retransmission protocol, but using new proposed Basic Link Services (FLUSH and RED for FC-FS-6). David Peterson (Broadcom) presented working drafts of sequence level diagrams to illustrate recovery scenarios.

These generated productive discussion on the proposed protocols and will continue next meeting.

- For lost response (and data/response on reads), there is a requirement to either use CONF, or to wait IR\_TOV (seconds) after sending response that closes the exchange

before retiring exchange. Roger Hathorn (IBM) raised a concern about having to preserve access to all the other resources associated with the exchange such as task blocks, cache track locks, etc., in a shared storage environment. This may drive the need to use CONF. When using CONF, a target is required to use REC to detect a lost response or CONF IU. Use of REC with exchange based routing still has timing issues with the REC being on an different exchange than the response. This may warrant a reverse-FLUSH type service to solve.

Feedback will be incorporated into the proposal and discussion will continue in the next meeting.

No motions were made.

## **6. Scheduled business**

None:

### **7. *Unscheduled business***

#### **7.1 *FC-NVMe AM1 Project Proposal T11-2018-00072-v000 (Peterson – Broadcom)***

An amendment is being proposed to address possible incompatibilities that may exist between early implementations and some last minute changes to the association recovery requirements in FC-NVMe. This is the project proposal for that amendment.

***Motion: David Peterson (Broadcom) moved and Fred Knight (NetApp) seconded to forward the project proposal to T11.3 for further processing. Passed by acclamation.***

#### **7.2 *FC-NVMe/AM1 Proposed text – T11-2018-00103-v000 (Peterson, Broadcom)***

David presented the proposed text for the amendment which contains the same text incorporated into the FC-NMVe-2 draft from proposal T11/2017-00419-v0004 on Association Termination.

No motions were made. The intent is to move forward when we have an approved project.

#### **7.3 *SLER Text T11-2018-00103-v000 (Peterson, Broadcom)***

David presented this proposal adding supporting text associated with sequence level error recovery to go along with the T11-2018-00047-v001 proposal from Broadcom.

- Subclause 4.12 Sequence Level Error Recovery
- Subclause 4.13 Retry Identification (changed to SLER Qualifier)

- PRLI support for SLER.
- 6.5 REC text added back in.
- TOV additions and text (needs some work)

No motions were made.

### **7.3 NVMe Keep Alive text T11-2018-00129-v000**

This was more of the same discussion on what to do about keep alive. The action item stands that FC-NVMe-2 needs to specify

- Keep alive is not required by for the FC transport
- If used the minimum and maximum timeout values are:
- KATO (Command Dword 11 of the get features command) is set to 0. – keep alive timer disabled.

Craig Carlson still holds the action item to propose text.

## **8 Project Schedule**

A project schedule was discussed and results follow.

<b>Milestone</b>	<b>Expected Date</b>
Last technical input	August, 2018
T11 Letter Ballot	December, 2018
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, June 4-8, 2018. There will be no interim conference calls.

## **11 Attendance Check and Adjournment**

<b>Company</b> 	<b>Name</b>	<b>Role</b>
Broadcom Limited	David Baldwin	Member
Broadcom Limited	David Peterson	Member
Broadcom Limited	Steven Wilson	Member
Cisco Systems Inc	Mike Blair	Member
Cisco Systems Inc	J Metz	Member
Dell Inc	David Black	Member
Fujitsu America Inc	Mark Malcolm	Member

Hewlett Packard Enterprise	Krishna Babu Puttagunta	Member
IBM Corporation	Patty Driever	Secretary
IBM Corporation	Roger Hathorn	Member
NetApp Inc	Frederick Knight	Member
QLogic Corporation	Craig Carlson	Group Chair

***Dave Peterson (Broadcom) moved and Patty Driever (IBM) seconded to adjourn.  
Approved by acclamation.***

The regular meeting was adjourned at 5:30 PM CST on 4 April, 2018.