

**Minutes**  
**T11.3 FC-NVME ad hoc work group regular meeting**  
**6 June, 2018 – 1:30PM-6:00PM MST**  
**Santa Fe, NM, USA**

The FC-NVME ad hoc work group of the Fibre Channel Protocol (T11.3) Task Group held a regular meeting at Santa Fe, NM on 6 June, 2018, hosted by Cavium. Attendance was 13 people from 6 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, 6 June, 2018 at 1:30 PM MST 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 6 June, 2018 was posted as T11/2018-00172-v0000.

*Motion: Howard Johnson (Broadcom) moved and Patty Driever (IBM) seconded to accept T11/2017-00172-v0000 as amended as the agenda for this regular meeting. Approved by acclamation.*

## **4.0 Past Business**

### **4.1 Review of Minutes**

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

T11-2018-00140-v000.pdf

FC-NVMe-2 Ad Hoc working group meeting Minutes for April 4, 2018

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

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

None

**New action items from this meeting:**

- 18-0606-01: Dave Baldwin to post revision T11-2018-00047-v003 with today's modifications.
- 18-0606-02: David Peterson to update T11-2018-00155-v000 Sequence error diagrams based on current updates to the proposals.
- 18-0606-03: Chair to bring T11-2018-00091-v000 FC-NMVe/AM1 to T11 to request letter ballot.
- 18-0606-04: David Peterson to post T11-2018-00129-v002, keep alive text.
- 18-0606-05: Editor to incorporate T11-2018-00129-v002 in the next draft.

**Completed action items from prior meetings:**

- 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 NVMe-2 Sequence Level Error Recovery (Baldwin, Broadcom) (T11-2018-00047-v002)**

David Baldwin (Broadcom) presented this updated 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).

Highlights;

Added new IU types for SR and SR Response using Device Data R\_CTL 0x09 (extended unsolicited control) and 0x0A (extended solicited control) proposed in FC-FS-6 today.

Roger Hathorn, IBM requested adding the FC\_Type code and a control IU opcode defined by this standard, so that FCP and FC-NVMe can share these R\_CTL values and operate independently. This was updated in the proposal.

We walked through all of the detailed recovery scenarios written in the text. Many updates were made, but none of them very major.

Updates to come include updates to allow a target to send a FLUSH command for its REC processing for lost CONF (only, with restricted use). An update is also needed to allow SR IU to be sent without a FLUSH after a RED error is reported by the target.

A decision was made to not specify CONF with REC usage outside the context of SLER, where CONF is used with FLUSH for loss detection. Once updates are made for allowing FLUSH from the target, this section can be removed.

No motions were made.

## **5.2 NVMe-2 Sequence 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-v002 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 – but to be removed again.
- TOV additions and text

A description of REC /REC TOV is no longer needed based on proposal that the target may use FLUSH BLS instead of REC for detection of a missing CONF. It will be left in for now as we explore if it is useful for other things.

## **6. Scheduled business**

None

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

### **7.1 FC-NVMe/AM1 Draft T11-2018-00091-v000 (Peterson – Broadcom)**

This is an amendment to FC-NVMe to address possible incompatibilities that may exist between early implementations and some last minute changes to the association recovery requirements in FC-NVMe. No comments were received on the text since posted.

*Motion: David Peterson (Broadcom) moved and Craig Carlson (QLogic) seconded to forward T11-2018-00091-v000 to T11.3 for further processing.*

Passed by acclamation.

## **7.2 NVMe Keep Alive text T11-2018-00129-v001**

David Peterson presented an updated proposal of text to be added for stating keep alive timeout requirements in FC-NVMe-2.

*Motion: David Peterson (Broadcom) moved and Roger Hathorn (IBM) seconded to incorporate slide 7 from T11-2018-00129-v001, as modified, in the next draft revision of FC-NVMe-2.*

## **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 Louisville, KY, August 15, 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	Howard Johnson	Member
Broadcom Limited	Mark Jones	Member
Broadcom Limited	David Peterson	Member
Broadcom Limited	Steven Wilson	Member
Cisco Systems Inc	Harsha Bharadwaj	Member
Cisco Systems Inc	Mike Blair	Member

Dell Inc	David Black	Member
Dell Inc	Alan Rajapa	Member
IBM Corporation	Patty Driever	Member
IBM Corporation	Roger Hathorn	Member
QLogic Corporation	Craig Carlson	Group Chair
Viavi Solutions Inc	Jason Rusch	Member

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

The regular meeting was adjourned at 4:00 PM MST on 6 June, 2018.