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ftp://ftp.t10.org/t10/document.02/02-282r0.pdf

Minutes of the SBP-3 Working Group meeting, July 16-17, 2002
Wyndham Hotel, Colorado Springs

Attendees:

Eric Anderson	Apple	ewa@apple.com
Robert Botchek	Granite Digital	rbotchek@granitedigital.com
John Fuller	Sony	jfuller@computer.org
Rob Haydt	Microsoft	robhay@microsoft.com
Peter Johansson	Congruent Software	Pjohansson@ACM.org

The following agenda was presented by Johansson. In the minutes that follow, the start of discussion of items listed below is denoted by the index number listed within square brackets, such as [4.1]. Note that these references do not always appear in order, and may not signify the conclusion of discussion of a previous agenda item.

1. Introductions and procedures
1.1 T10 Membership and voting
1.2 Document naming conventions
1.3 Two-week rule
1.4 Meeting fees
1.5 Approval of prior minutes
2. Call for patents
3. Informal liaison
3.1 IEEE P1394.1 [Johansson]
3.2 IEEE P1394.3 [Johansson]
4. Prior action items
4.1 Publish 02-069r2 with agreed modifications and incorporate into working draft [Johansson]
4.2 Update working draft to clarify net update effect on timers [Johansson]
4.3 Review draft in re bridge-aware login when no bridges are present [Johansson]
5. Review of changes in working draft
6. Review reflector traffic
7. Old business

7.1 AVD Commands
7.2 Persistent ownership of SBP-3 targets
8. New business
8.1 Target retry after busy acknowledgment
8.2 Prototype AV command set [Johansson]
8.3 Bare-bones isochronous [Johansson]
9. Meeting schedule
10. Review of action items
11. Adjournment

[1] Johansson called the meeting to order and updated the agenda, as reflected above.

[1.3] Johansson briefly reviewed the two-week rule, explaining that it did not prevent the discussion of documents posted less than two weeks before a meeting.

[1.5] Anderson noted that he had previously distributed draft minutes from November 6 (Monterey) and May 29 (Timberline). After review, the group approved the minutes from both meetings.

ftp://ftp.t10.org/t10/document.01/01-331r0.pdf

ftp://ftp.t10.org/t10/document.02/02-208r0.pdf

[1.1] [2] Johansson reviewed general T10 policies and procedures. In general, attendance and participation at T10 ad hoc meetings (such as this one) is open to both visitors and T10 members. When formal votes are taken, either in an ad hoc meeting or in the T10 plenary, one vote is permitted each organization, to be cast by its principal representative or designated alternative. A two-week rule is in effect: No matter may be voted on unless notice was given at least two weeks prior. Documents to be voted on must have been posted two weeks prior to the vote. The two-week rule can be waived if nobody objects. Announcements of new documents and meetings must be posted to the T10 email reflector; all other business can be conducted on the working group reflector.

The following paragraph about ANSI/T10 patent policy is copied from past T10 Plenary minutes:

A document is available from ANSI, "Procedures for the Development and Coordination of American National Standards", at no charge. This document is also on the web at http://www.ncits.org/help/ansi_sdo.html. Section 1.2.11 contains the ANSI patent policy. Amy Marasco manages patent issues for ANSI and can be contacted at amarasco@ansi.org or 212-642-4954. Gene Milligan

prepared a useful “Handy dandy Technical Committee's Patents Guide“, which is available at ftp://ftp.t10.org/t10/document.99/99-291r0.pdf.

[3.1] Johansson reported that the IEEE 1394.1 BRC was continuing to resolve ballot comments.

[3.2] Johansson noted that IEEE 1394.3 had one significant ballot comment remaining to be resolved.

[4.1] Johansson reported that he had published 02-069r2 with previously agreed modifications, and had incorporated this 1394.1 bridge awareness text into the working draft of SBP. Johansson noted that the updated SBP draft would be reviewed later in the agenda.

ftp://ftp.t10.org/t10/document.02/02-069r2.pdf

[4.2] Johansson reported that he had updated the SBP working draft to clarify the effect of a 1394.1 net update on timers, which would also be covered in the scheduled draft review.

[4.3] Johansson reported that he had not reviewed the SBP draft regarding the possibility for bridge-aware login when no bridges are present. Johansson asked Fuller to take this action item, and Fuller accepted it.

[5] Johansson led a review of changes in SBP-3 draft "2a":

ftp://ftp.t10.org/t10/drafts/sbp3/sbp3r02a.pdf

In 5.1.4.5 (Node Handle ORB) Anderson suggested clarifying "one or all" in the paragraph below figure 30. Johansson and Botchek agreed, and Johansson reworded the text.

Johansson updated the body text to match the terminology change in the table in section 5.3.1 (Request status) where "Login ID not recognized" became "Login ID invalid".

Various comments were made regarding the clarity of the two paragraphs in section 6.4.6 (HEARTBEAT_MONITOR). Johansson agreed that the section should be clarified. Anderson noted that 6.4.6 required a type error to be sent to heartbeat requests that arrive during the reconnect process or outside of a login. Anderson asked if this requirement was consistent with other text regarding fetch agent write attempts during a reconnect.

Johansson identified the final paragraph of 6.4 (Command block registers) which covered this requirement in a general way. Fuller identified section 9.1.5 (Fetch agent state machine) which provided further clarity on this point. Johansson explained that during the reconnect period, any access would fall into the category described by 9.1.5 because there would be no known node ID for a login that had not yet been reconnected. Anderson agreed but suggested that 9.1.5 could benefit from text explaining Johansson's observation, and Johansson agreed to add such text.

Finding that 9.1.5, from SBP-2, specified type_error, the group agreed not to change the response from type_error to address_error. Anderson suggested that 6.4 should make reference to 9.1.5 for greater clarity, and Johansson agreed. Fuller suggested that 9.1.5 should require the use of a type_error response by bridge-aware targets, and Anderson agreed. Johansson added corresponding text at the end of the section, making the requirement dependent upon the unit having a non-zero revision entry.

Johansson suggested that it would be valuable to have an informative annex summarizing changes from SBP-2 to SBP-3, and what combinations of features would be sensible. Anderson said he might be able to provide a draft of such an annex.

Anderson observed that in 8.2.1 (Login) steps c) and d) could be exchanged for greater efficiency, though executing them in the order shown would lead to correct results with a slight inefficiency. Fuller agreed. Johansson determined that clause d) could be done before clause b) for even greater efficiency, and all present agreed with this change.

Reviewing 8.2.1, Anderson observed that 6.3 (MANAGEMENT_AGENT register) required the target to execute only a single management ORB at one time, which guarantees there will be no interruption of an update login operation, nor any query logins operation during such an update. Anderson suggested that the second paragraph after step h) could be simplified by giving reference to section 6.3.

Johansson suggested that the second sentence of the final paragraph of 8.2.1 (not the note) was unnecessary. Anderson said the sentence was incorrect, and agreed to its removal. Johansson promoted the following Note to be part of the final paragraph.

Johansson observed that an update login could be implemented by a target as a completely new login, and suggested that the login response could indicate new values for any field, such as node handle and reconnect. Anderson agreed with this possibility, stating that it could simplify the implementation of the update login

capability in targets. Johansson added text stating that the update login response values could differ from those previously returned by the login that was being updated.

In review of 8.3.3 (Node handle update after bus reset), Anderson asked if the requirement to process self-IDs in order to track node IDs was unduly burdensome on targets. Anderson observed that self ID sets can arrive in rapid succession due to a "bus reset storm". Anderson further speculated that the process was not robust, and was subject to failure (such as mis-identifying a node) in the face of bus reset storms, suspend faults, and other hot-plug related problems that are observed in practice.

Anderson suggested that targets should be required to confirm their node ID tracking by way of a GUID read, and to initiate recovery operations when this read finds an error. Botchek agreed that the existing mechanism was not robust and that a verification and recovery mechanism was desirable. Fuller suggested that a target failing the GUID check could simply be required to loop over all node IDs on the bus until the desired GUID was found. Anderson agreed with Johansson's comment that a GUID check would cause additional bus traffic, but felt that the cost was bearable and was reasonable in order to achieve a robust service. Johansson agreed to add text describing the verification and recovery strategy, and worked out preliminary text with the group based on Anderson's proposal.

In section 10.5 (Task management event matrix), in the fourth paragraph after the table, Johansson observed that fully-local bridge-aware logins should be exempted from the abort following a net update. Fuller and Anderson agreed with this change.

Botchek noted that section C.2 (Login) should be updated according to the ordering changes earlier made in section 8.2.1 (Login). Johansson made the appropriate changes. Johansson further observed that step c) regarding three failed logins should be relocated.

[7.2] Johansson mentioned that Microsoft and Apple are working on solutions for the two host, one drive problem based on existing drive products and exclusive logins. Johansson suggested the group should consider new mechanisms that could be used in a future, more flexible or powerful solution. Johansson mentioned passwords and reservations (such as in SBC-2) as mechanisms that could be applied to the problem.

The group divided up the solution space in three ways:

Initiator-based solutions: Initiators keep track of drives and possibly cooperate regarding who logs in when. Fuller observed that a "most favored" Initiator might arrive later than other Initiators, after another Initiator has taken control of a drive. Fuller suggested that a mechanism for "please let go" and "I have let go" messages would be helpful.

Drive-based solutions: Drives keep track of Initiators, and enforce who can or cannot log in. Anderson observed that this style of solution would be most robust in the presence of legacy initiators.

Hybrid solutions: Both Initiators and Drives cooperate using the features listed above.

Fuller and Johansson agreed that password protection was orthogonal to these three approaches, but could be used as a mechanism to enforce one of the above approaches. Johansson added that passwords can cover the "one preferred initiator" case, but not the "list of preferred initiators" case.

Johansson suggested that in the proposed Apple/Microsoft solution (where one Initiator logs in, then makes the drive available to all others over IP/1394), it would be helpful for a drive to indicate who its preferred initiator was (if any) in order to obtain reproducible results. Fuller noted that such cooperation could also be done in initiator software.

Fuller observed that target-only solutions were unlikely, because initiator changes to use new target features would probably be required. Fuller concluded that since initiators must be changed, one could look for an initiator-only solution that would be less work and yield more compatibility with legacy targets.

Johansson noted that Microsoft had observed that exposing Target information in 1394 Configuration ROM was convenient because it could be accessed without a login, which is both fast and unlikely to require coordination with other Initiators.

Fuller observed that for booting from a target, it would be desirable to have a strong affinity mechanism such as a password, because sharing mechanisms were unlikely to be feasible during the boot load or paging process.

[8.1] Johansson reported that the 1394 TA Architecture Working Group had contemplated deprecating the 1394 BUSY_TIMEOUT register, opening a question as to how SBP should address retries. Anderson remarked that SBP was "the" protocol that demonstrated the need for an effective retry strategy, due to the high penalty of a transport failure. Johansson observed that SBP targets primarily use request subactions, especially for payload transport.

Johansson suggested that SBP-3 could require the BUSY_TIMEOUT register to be unimplemented. Anderson noted that legacy SBP-2 initiators might fail if they detected an error when writing BUSY_TIMEOUT. Johansson remarked that BUSY_TIMEOUT was optional in 1394, but Fuller observed that SBP-2 required BUSY_TIMEOUT. Anderson suggested that SBP-3 specify a desirable busy retry strategy that would work if an initiator never wrote to BUSY_TIMEOUT, without removing the actual register, so legacy initiators would not be affected.

Johansson suggested preserving BUSY_TIMEOUT, but requiring the initial values be set to either zero or greater than or equal to 200 milliseconds for second/cycle limit (as determined by the implementer) and 15 for retry count, with all writes to be ignored (with ack_complete or resp_complete). Initiators recognizing SBP-3 via the revision level in the 1394 Configuration ROM will know that there is no need to set this register. Anderson endorsed this plan, with a provision that all target retries must be separated by at least one isochronous cycle time (whether or not a cycle master was active on the bus), in addition to any required separation due to fair arbitration and other bus access rules. Johansson suggested an exponential backoff for retries, such as consecutive doubling of the retry interval, which Anderson endorsed. Fuller noted that backoff would be OK for single-phase retry, but that dual-phase retry had specific retry timing requirements that must be honored in order for it to work correctly.

Johansson noted that exponential backoff starting with one cycle time would lead to a four second retry delay if 15 retries were allowed. Anderson and Johansson agreed that an arithmetic backoff (1 cycle, 2 cycles, 3 cycles, etc. to 15) would be more effective for single-phase retry, leading to a maximum retry delay of 15 cycles and a total retry period of about 120 cycles (15 milliseconds). Johansson suggested adding text in section 9 to explain this, with a reference from the register description section. Anderson suggested recommending support for dual-phase in all transactions, but not requiring it beyond what other specifications require. Fuller suggested that outbound dual-phase retry be mandatory for bridge-aware targets. Johansson suggested that all outbound dual-phase retry should skip one fairness interval instead of applying the arithmetic backoff strategy.

[8.3] Johansson led a review of the updated Bare bones isochronous proposal:

ftp://ftp.t10.org/t10/document.01/01-287r1.pdf

Johansson explained the proposal to add an isochronous bit to the normal command ORB. The group discussed the viability of a peer-to-peer isochronous transfer, such as a scanner delivering a page to a printer. Anderson noted that the devices would either need matched mechanical speeds, or the faster device

would need to be able to pause or otherwise slow down. Anderson said that though some devices like laser printers had no ability to vary their mechanical speed during a page, many devices did, such as scanners and ink-jet printers.

Johansson suggested the use of a "go" token associated with an isochronous ORB, sent isochronously on the reserved isochronous channel, prior to the start of isochronous data flow. Anderson noted that contemporary OHCI did not provide hardware support to trigger isochronous transmission based on the receipt of an isochronous packet, but added that system software could perform this duty with precise latency, though perhaps not bounded as tightly as a single 1394 isochronous cycle.

Anderson described the synchronization requirement between two peers such as a scanner and a printer. Anderson said that after the receipt of a command to start the mechanism, there would be a variable but bounded delay until the mechanism was ready to produce or consume data. Anderson proposed that if each device provided internal buffering sufficient to cover the maximum variation of this delay due to its own mechanism, two devices with dissimilar delays could still be synchronized to transport data successfully. Anderson noted that while it was fairly intuitive for a printer to buffer incoming data when its mechanism was not quite ready, a scanner would be similarly obligated to hold its outbound data until the end of its variable window, so that the arrival of data on the bus would be precisely timed.

Johansson suggested collapsing isochronous control into a single command ORB with an isochronous bit, and using 61883 plug control registers and other existing services to manage the establishment of isochronous transfer. Johansson said this would allow the use of a single task set for devices that have simple, single-stream requirements.

Johansson suggested that CREATE STREAM should be renamed CREATE TASK SET. The group agreed that it was not necessary to specify talker or listener (data direction) at the task set creation time, and that bi-directional transfer could be allowed. Johansson suggested that the contents of 01-287r1 were ready to be incorporated into the SBP draft.

Anderson moved to incorporate 01-287r1 into SBP.
Fuller seconded.
Motion passed with none opposed.

[7.1] [8.2] Johansson led a review of the Prototype AVD Commands:

ftp://ftp.t10.org/t10/document.02/02-281r0.pdf

Johansson noted that all of the proposed commands could be multiplexed through a single opcode. How to deal with trick-play commands such as play-fast-forward was unclear, as was how to deal with super-realtime transport. Anderson suggested that data transported in a super-realtime way should be recorded no differently from data sent in real time, because there should be no limitations on the subsequent playback speeds. This would require knowledge in the SBP device, because SBP records cycle marks.

Johansson and Anderson agreed that the SBP model of cycle awareness and cycle mark recording was greatly at odds with the concept of variable super-realtime transport, and its resolution should be deferred to future study.

Johansson expressed a desire for further comment from Apple and Microsoft regarding the AVD proposal.

Action: Anderson to review 02-281r0 with Apple and provide comment.

Action: Johansson to request similar consideration from Microsoft.

[9] The next scheduled meeting is tentatively November 5-6, during the T10 meeting in Huntington Beach, CA, tentatively followed by a meeting on January 20-21, following the January 2003 1394 TA meeting.

[10] Johansson briefly reviewed the newly assigned action items.

[6] Johansson led a brief review of email traffic since May 29 and found no issues needing to be addressed by the group.

[11] Meeting adjourned.

General information and document index

The SBP-3 email reflector SBP3@isg.apple.com can be accessed as follows:

Subscribing:
email requests@isg.apple.com w/subject "subscribe sbp3"

Help?:
email requests@isg.apple.com w/subject "help"

An automated system had been created for the allocation of T10 document numbers, and the subsequent submission of documents for posting:

http://www.t10.org/members/ad.htm

The following documents have been posted pertaining to SBP-3:

00-328 Eric Anderson
Fast Start proposal (PowerPoint slides)
ftp://ftp.t10.org/t10/document.00/00-328r0.pdf

00-371 Peter Johansson
Minutes of SBP-3 Study Group September 19, 2000
ftp://ftp.t10.org/t10/document.00/00-371r0.pdf

00-388 Peter Johansson
SBP-3 Project Proposal
ftp://ftp.t10.org/t10/document.00/00-388r0.pdf

01-057 Eric Anderson
Fast Start Proposal
ftp://ftp.t10.org/t10/document.01/01-057r0.pdf

01-060 Eric Anderson
Minutes of SBP-3 Working Group January 24-25, 2001
ftp://ftp.t10.org/t10/document.01/01-060r0.pdf

01-067 Lance Flake
RBC Access For AV/C Data Interchange
ftp://ftp.t10.org/t10/document.01/01-067r0.pdf
ftp://ftp.t10.org/t10/document.01/01-067r1.pdf

01-069 Steve Powers
Surprise Removal of 1394 Storage Devices
ftp://ftp.t10.org/t10/document.01/01-069r0.pdf

01-070 Peter Johansson
Bridge-aware targets and node handles
ftp://ftp.t10.org/t10/document.01/01-070r0.pdf

01-101 Eric Anderson
Minutes of SBP-3 Working Group March 6-7, 2001
ftp://ftp.t10.org/t10/document.01/01-101r0.pdf

01-102 Scott Smyers
Proposal for modifications to SBP3 and RBC
ftp://ftp.t10.org/t10/document.01/01-102r0.pdf

01-103 Firooz Farhoomand
Using SBP-3 for DVD playback
ftp://ftp.t10.org/t10/document.01/01-103r0.pdf

01-137 Peter Johansson
Stream command block ORB
ftp://ftp.t10.org/t10/document.01/01-137r0.pdf

01-138 Peter Johansson
Bi-directional ORBs (PowerPoint slides)
ftp://ftp.t10.org/t10/document.01/01-138r0.pdf

01-139 Eric Anderson
Minutes of SBP-3 Working Group April 26-27, 2001
ftp://ftp.t10.org/t10/document.01/01-139r0.pdf

01-179 Andy Green
Proposal to modify isochronous recording format
ftp://ftp.t10.org/t10/document.01/01-179r0.pdf

01-180 Peter Johansson
RBC-2 commands for extent management
ftp://ftp.t10.org/t10/document.01/01-180r1.pdf

01-187 Eric Anderson
Minutes of SBP-3 Working Group June 5-6, 2001
ftp://ftp.t10.org/t10/document.01/01-187r0.pdf

01-200 Peter Johansson
Distributed Buffers
ftp://ftp.t10.org/t10/document.01/01-200r0.pdf

01-222 Peter Johansson
Simplified Isochronous
ftp://ftp.t10.org/t10/document.01/01-222r0.pdf

01-223 Eric Anderson

Minutes of SBP-3 Working Group July 17-18, 2001
ftp://ftp.t10.org/t10/document.01/01-223r0.pdf

01-248 Peter Johansson
MP-friendly Fast-Start
ftp://ftp.t10.org/t10/document.01/01-248r1.pdf

01-265 Eric Anderson
Minutes of SBP-3 Working Group August 22-23, 2001
ftp://ftp.t10.org/t10/document.01/01-265r0.pdf

01-287 Peter Johansson
Bare-bones Isochronous
ftp://ftp.t10.org/t10/document.01/01-287r1.pdf

01-304 John Fuller
SBP3 Changes
ftp://ftp.t10.org/t10/document.01/01-304r0.pdf

01-318 Rob Elliott
Elimination of SCSI-2 from SAM-2 SPC-3
ftp://ftp.t10.org/t10/document.01/01-318r0.pdf

01-330 Peter Johansson
Minutes of SBP-3 Working Group October 3-4, 2001
ftp://ftp.t10.org/t10/document.01/01-330r0.pdf

01-331 Eric Anderson
Minutes of SBP-3 Working Group November 6-7, 2001
ftp://ftp.t10.org/t10/document.01/01-331r0.pdf

01-332 Scott Smyers
Isochronous SBP-3
ftp://ftp.t10.org/t10/document.01/01-332r0.pdf

02-069 Peter Johansson
Bridge-aware SBP-3 target operations
ftp://ftp.t10.org/t10/document.02/02-069r2.pdf

02-075 Peter Johansson
EUI-48 software interface ID VPD page
ftp://ftp.t10.org/t10/document.02/02-075r1.pdf

02-206 Eric Anderson

Minutes of SBP-3 Working Group January 21-22, 2002
ftp://ftp.t10.org/t10/document.02/02-206r0.pdf

02-207 Eric Anderson
Minutes of SBP-3 Working Group March 12-13, 2002
ftp://ftp.t10.org/t10/document.02/02-207r0.pdf

02-208 Eric Anderson
Minutes of SBP-3 Working Group May 29-30, 2002
ftp://ftp.t10.org/t10/document.02/02-208r0.pdf

02-281 Peter Johansson
Prototype AVD Commands
ftp://ftp.t10.org/t10/document.02/02-281r1.pdf

02-282 Eric Anderson
Minutes of SBP-3 Working Group July 16-17, 2002
ftp://ftp.t10.org/t10/document.02/02-282r0.pdf

Latest draft SBP-3 document:

ftp://ftp.t10.org/t10/drafts/sbp3/sbp3r02a.pdf

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