

IEEE P1394.1 Bridge Standards Meeting

AGENDA for Dec. 10-11, 1998 Monterey, California

Chair: Dick Scheel, dicks@lsi.sel.sony.com
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Web: <http://grouper.ieee.org/groups/1394/1>

1. Administrative: (see handout)

- 1.1. Minutes of Oct. 15-16, 1998 meeting
- 1.2. Future Meeting schedule
 - 1.2.1. February 11-12, 1999: Huntington Beach, California (2 full days)
 - 1.2.2. March 25-26, 1999: Phoenix, Arizona (2 full days)
- 1.3. Status of ftp & web sites
- 1.4. Reminder about IEEE Standards Association and IPF
- 1.5. Call for patents

2. Technical topics (see handout)

- 2.1. Protocol considerations related to wireless bridging connections - Ubiquity
- 2.2. Report on IEEE802 tutorial - Smith
- 2.3. Path Dependent Addressing - Wooten
- 2.4. Why bridges should be self organizing - Wooten
- 2.5. Suspend/Resume and bridges - Wooten
- 2.6. Proposal to IETF IP/1394 regarding asynchronous streams - Johansson
- 2.7. Review of SCAT

Minutes of the December 10-11, 1998 Meeting

Administrative

- 1.1. Peter Johansson moved to approve the Oct. 15-16, 1998 meeting minutes. David Wooten seconded. The motion passed.
- 1.2. Schedule of next two P1394.1 standards meeting was announced. In future P1394.1 meetings will be scheduled on Thursdays and Fridays and they will be co-located with P1394b meetings scheduled on Mondays and Tuesdays. Usually P1212r will meet on Wednesdays.
- 1.3. Ftp site at Symbios may be moved to T10. A message will be posted on the IEEE P1394.1 reflector well in advance of this move.
- 1.4. Dick Scheel reminded attendees to add IEEE Standards Association (SA) membership fee (\$10) to their IEEE annual membership bills. In order to vote in this standardization activity one has to be a member of the IEEE SA.
- 1.5. Same as item 1.5 in Oct. 15-16, 1998 meeting minutes.

Technical Topics

December 10, 1998, Thursday: Morning Session

A. Presentation Topic: Report on IEEE Tutorial
Presenter: Michael Smith, ControlNet Inc.

(Presentation slides are available as document BR039R00 on the web site, also look at 802 website for more details.)

Goal of this presentation was to keep 802 and P1394.1 committees aware of each other's work. M. Smith presented a short summary of his Oct. 15, 1998 presentation at Maui for the benefit of those who didn't attend the Maui meeting (BR037R00). In the Nov. 1998 IEEE802 plenary meeting in Albuquerque, ControlNet made presentations on interoperability of IEEE 1394 and IEEE802 standards and they also gave a tutorial on IEEE 1394 technology (see http://grouper.ieee.org/groups/802/802_tutorials/nov98/1394.html). About a third of Albuquerque, Nov. 1998 IEEE802 plenary meeting attendees were aware of IEEE 1394 technology. Action items that came out of that meeting were:

- (a) Investigation of how 802 and 1394 can interoperate in home,
- (b) 1394/802 Liaison,
- (c) 1394/802.3 Bridging Standard (Translation/Tunneling).

Noting that there is an ongoing IETF standardization activity on IP over 1394, bridge committee questioned if there are in-home applications that use Ethernet but not IP. Although NetWare and NetBUI were mentioned, they would not enable new applications but will allow more choices for supporting different applications such as printer and file sharing. Supporting both 802 and 1394 in home will require two types of wires, which is not desirable. However, some upcoming home-networking standards such as HOMEPCNA (?) are based on IEEE802.3. P1394.1 group thought that the topic of interoperability between 802 and 1394 is outside the charter of this group. IEEE P1394.1 committee will not devote time towards possible standardization of 1394/802 bridging.

B. Presentation Topic: Protocol Considerations Related to Wireless Bridging Connections
Presenter: C. Rypinski, Ubiquity Communications

(Presentation slides available on P1394.1 web site as document BR040R00)

The presenter shared his experience and knowledge on designing wireless communication system with special considerations for wireless 1394 bridges. The presentation focused on four areas: (1) Common dogmas to be avoided, (2) hub-and-spoke vs. distributes architectures, (3) frequency reuse, and (4) access methods. See document BR040R00 for details.

Dick Scheel reminded that this committee would not work towards standardization of *wireless* 1394 bridging. It was suggested that people interested in wireless 1394 bridging should form a separate committee. However, this committee is open to consider any issues that are stumbling blocks in wireless 1394 bridging which might be resolved in P1394.1 committee. MMAC in Japan and ETSI BRAN in Europe were mentioned as two ongoing in-home wireless networking standardization efforts.

C. Presentation Topic: General Asynchronous Stream Packet Format (GASP)
Presenter: Peter Johansson, Congruent Software

Presentation slides available as Document BR041R00 at P1394.1 web site.

Background: Asynchronous stream was introduced in P1394a to avoid some of the undesirable side effects of broadcast asynchronous writes. IETF "IP over 1394" standards group employs asynchronous stream packets to broadcast ARP packets in the network. ARP packet *payload* contains the source id to which the appropriate ARP packet recipient can respond. Meanwhile, P1394.1 group introduced the concept of virtual node ids in order to protect a bridged network from frequent resets. These virtual node ids in asynchronous packets need to be remapped or modified by the 1394.1 bridges. Unfortunately, like Iso. stream packets, async stream packets do not contain source node ids in their *headers* that bridges can modify. Also, source id inside a ARP payload is outside the scope of the bridges.

This proposal presents a modification of the asynchronous stream packet header to make it compatible with the virtual node id concept. It extends the header by two quadlets to include source node identifying fields – 16-bit "Source Node ID" and 24-bit "Specifier ID." Note that "Specifier IDs" are organizationally unique identifiers issues by IEEE RAC. Interpretation of the remaining 24 bits in the header extension will be dependent on "Specifier ID." Having a 16-bit (virtual) Node ID at a fixed location in the asynchronous stream packet headers will allow bridges to remap them as necessary. This will allow asynchronous streams to better substitute broadcast asynchronous writes while avoiding later's drawbacks. In this presentation Peter also gave a brief overview of asynchronous streams and virtual node ids.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Data_Length																Tag		Channel				0x0A		sy							
Header_CRC																															
Source_ID																Specifier_ID_Hi															
Specifier_ID_Lo								Specifier_ID_Dependent																							
Data																															
Data_CRC																															

Discussion after the presentation: IETF "IP over 1394" draft is close to being an intermediate draft. IETF group is uncomfortable to adopt something that is not guaranteed to work reliably. This presentation should demonstrate that the proposed async stream packet format would work. Although it violates 1394 rule of "one talker per stream channel," IEEE P1394.1 group would specify that this is allowed for asynchronous streams. Bridges may be faced with two formats of async stream packets – old and the new. Any stream packet that needs to be forwarded by the bridges should have the *new* async stream packet format. Async stream packets that are confined to a local bus can use either the new or the old format.

Then the group discussed whether this modification in asynchronous stream packet header should be part of P1394.1 or P1394a standard. This group would prefer that 1394a specifications include this proposal. If it is not included in 1394a then it should be included in 1394.1. It was also noted that all bridge portals have to be NPM capable to support IP traffic across a bus that do not have any IP-capable node.

Peter Johansson made the following motion, which was passed without any opposition:

"This IEEE P1394.1 Working Group endorses the concept of a GASP format as described in BR041R00 but recommend that this standardization activity be shifted to P1394a."

P1394.1 chair will send a letter to P1394a chair to communicate that P1394.1 supports the new asynchronous stream packet format and that the relevant standardization activities should be part of P1394a.

Discussion followed on Tag values and to make the meaning of the some of the header fields dependent on the tag value. In order to reuse scarce Tag values, suggestions were made to interpret the tag values in conjunction with arbitration period (async. or iso.) and/or channel number. However, it is difficult to ascertain in which arbitration period a packet was transmitted. Need to guarantee of a channel that is always present throughout the network was considered.

December 9, 1998, Thursday: Afternoon Session

D. Presentation Topic: Bus Number Maintenance
Presenter: David Wooten, Compaq

Presentation slides available as Document BR041R00 at P1394.1 web site.

The presentation provided some of the details on:

- (a) Management of joining two buses
- (b) Management of break-up of two buses
- (c) Handling redundant paths in the network

Two approaches were presented for merging two buses into one. In one approach the node numbers of one bus is preserved while those of the other bus (victim bus) are modified to eliminate any duplicate addresses. The other approach simply resets the victim bus.

Second part of the presentation considered the case when a bus connection between portals is severed. In this case bridge portals will be segmented into two groups with one group containing the alpha portal. The presentation considers approaches for selecting alpha and/or prime portal, handling cross-bus traffic. A simplified approach to handling net break-ups was also presented. In this approach all cross bus traffic is stopped, then a prime/alpha portal is chosen for each net segment and finally the net segments are reset to trigger initialization procedures in each net.

Third part of the presentation dealt with identification and deletion of intra- and inter-subnet redundant connections.

The presenter concluded that:

- (a) Management of bus numbers can be performed by bridge portals
- (b) It is very important that bridge aware nodes be notified of any changes in bus numbers
- (c) The simplest, and may also be the fastest in many cases, way to handle topology changes is via *Net Reset*.

An alternate approach, based on "Path Dependent Addressing," was presented next.

E. Presentation Topic: Path Dependent Addressing for 1394 Bridges
Presenter: David Wooten

Presentation slides available as Document BR042R00 at P1394.1 web site.

This presentation considered virtual *bus* numbers as a way of keeping node addresses stable. Goal of this approach is to keep a node address unchanged as long as a path to that node exists, even if buses are added or removed. Procedures for updating address mappings when multiple buses are joined were presented. In this approach each bus has unique virtual bus number for all the other buses. Different buses may have different virtual bus numbers for the same physical bus. Each bus maintains a mapping of inbound and outbound virtual bus numbers. Every time a packet crosses a bus the destination & source ids in the packet header are changed based on these mappings. Later part of the presentation considered path dependent address assignment.

Note that in this approach node addresses can not be sent to a third party in a packet since address of a node varies depending on the path used to reach it. Also, more mapping memory is required to fully implement this approach.

The proposed approach needs further work to make it reliable and complete. However, the presenter concluded that *"the advantages of virtual bus numbers (over unified bus numbers) are not worth the effort."* For further details see document BR042R00.

F. Presentation Topic: Suspend/Resume and Bridges
Presenter: David Wooten

Presentation slides available as Document BR043R00 at P1394.1 web site.

This presentation deals with "Suspend & Resume" of connections between nodes and bridge portals. When a connection is suspended a bus reset is generated which results in a new assignment of node ids and which in turn alters the virtual to physical node id mapping. When SelfIDs are generated after the bus reset the bridge portal can determine if the connection was suspended or if it is really lost. Based on this determination, a bridge portals can take appropriate actions regarding requests, responses, and acks to the suspended/lost side. For a suspended connection the virtual node ids mappings need not change, however, for lost connections virtual node id mappings for the lost nodes can be unmapped. See the handout BR043R00 for further details.

During the discussions after this presentation it was questioned that when a connection is suspended will there be election of a new prime portal on one side of the portal. This has to be looked into. One idea was that if we need to talk to the prime portal then we should try to "resume" the suspended connection. If "resume" does not work then a new prime portal may be elected.

It was noted that wireless bridges might be able to model their links using "suspend/resume". Also it was suggested that bridges should not allow suspend/resume between bridge portals. However, in the case of a battery operated PC isolating connection to outside world via a bridge needs to suspend inter-portal connection in power-down or sleep mode.

G. Discussion on SCAT List:

Dick Scheel provided an update on where we stand on the items in the SCAT list (Document no. BR035R02). Then he led a discussion in which each item was considered one by one. All the discussion and decisions made on the SCAT items are well documented in Document No. BR035R03 (Revision 3). It can be obtained from the P1394.1 web site.

H. Status Update on Command Delivery proposal in 1212r Group

David James provided an update on ongoing work on command delivery proposal in P1212r group. Command delivery packet resembles GASP (see Item C) with 24-bit rack id and another 24-bit rack-dependent field. This format might restrict the address space. This restriction can be overcome by using short messages with pointers to different address spaces. P1394.1 will be assigned a 24-bit id. A 24-bit field will specify the protocol number and command set version. Details on this proposal will be available on P1212r web site (<http://www.zayante.com/p1212r/>).

I. Misc.

Straub Gilles (straubg@thmulti.com) had sent an email to P1394.1 reflector on 8 Dec. 1998 on "Clock Synchronization Requirements." Dick Scheel requested comments on this important topic.

Meeting was adjourned at around 11:46PM.

Handouts distributed at the meeting:

- (1) Agenda (see Pg. 1)
- (2) Administrative Information (available on the web site)
- (3) Minutes of October 15-16, 1998 meeting, Maui (available on the web site)
- (4) Emails exchanged between P1394.1, 802, and MSC
- (5) Email from Straub Gilles on clock synchronization, dated December 8, 1998
- (6) Project Status Report
- (7) IEEE 1394.1 SCAT (Document BR035R02)

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