To: 802exec@hepnrc.hep.net@internet
cc: stds-802-5@mail.ieee.org@internet
From: Robert Love/Raleigh/IBM @ IBMUS
Subject: Proposed PAR and 5 Criteria for Token Ring Trunking and Link Aggregation

Attached is a proposed PAR and 5 Criteria for IEEE 802.5 Trunking and Link Aggregation.

Final copies of the PAR and 5 Criteria will be available at the November 802 meeting. They will also be posted at the 802.5 web site (www.8025.org) Click on [NEW] for a pointer to the files.

Proposed PAR:

IEEE Standards Board

Project Authorization Request (PAR) Form

1. Sponsor Date of Request	2. Assigned Project Number	3. PAR Approval Date
[1998 Nov 12]	[P802.5z]	_____

[...] PAR Signature Page received {IEEE Staff to check box}

4. Project Title, Recorder and Working Group/Sponsor for this Project

Document type and title: {Place an X in only one option below}

[X] **Standard for**{document stressing the verb "shall"}

[..] **Recommended Practice for**{document stressing the verb "should"}

[..] **Guide for** {document stressing the verb "may"}

Title: [Supplement to - Information technology Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific Requirements—Part 5: Token ring access method and physical layer specifications—Aggregation of Multiple Link Segments]

{Copyright release must be submitted with appropriate signatures by postal mail or FAX (1-732-562-1571)}

Name of Working Group:	[IEEE 802.5 Token Ring Working Group]
Name of Official Reporter (usually the W.G. Chair)	[Robert D. Love]

Title in WG:	[Chair, IEEE 802.5 Working Group]	IEEE/Affiliate Member #	[1609353]
Company:	[IBM]	Telephone:	[919 543-2746]
Address:	[PO Box 12195 DGTA/664]	FAX:	[919 254-5410]
City/State/Zip:	[Research Triangle Park/NC/27709]	Email:	[rdlove@us.ibm.com]

Name of Working Group Chair (if different): [...]

		IEEE/Affiliate Member #	[...]
Company:	[...]	Telephone:	[...]
Address:	[...]	FAX:	[...]
City/State/Zip:	[...]	Email:	[...]

Name of Sponsoring Society and Committee:	[IEEE Computer Society / LAN MAN Standards Committee]
Name of Committee Sponsor Chair:	[James Carlo]

		IEEE/Affiliate Member #	[05572953]
Company:	[Texas Instruments Inc.]	Telephone:	[972-480-2524]
Address:	[9208 Heatherdale Drive]	FAX:	[972-480-2611]
City/State/Zip:	[Dallas/TX/75243]	Email:	[jcarlo@ti.com]

5. Describe This Project; *Answer each of four questions below:*

a. Update an existing PAR [NO]

If YES, indicate PAR Number/Approval Date [P####-YEAR]

If YES, attache a cover letter indicating changes/rationale for changes.

If YES, is this project in ballot now? [yes/no]

b. Choose one from the following:

[NO] New Standard

[NO] Revision of existing Standard {number and year} [NO]

[YES] Supplement to an existing standard {number and year) [802.5/1998]

c. Choose one from the following:

[X] Full Use (5-year life cycle)

[...] Trial Use (2-year life cycle)

d. Fill in Target Completion Date to IEEE RevCom : [07/00]

6. Scope of Proposed Project:

[

Specify a DTE to DTE logical link, which consists of n parallel instances of an 802.5 point-to-point link segment. The logical link will support existing 802.5 MAC Clients.

]

7. Purpose of Proposed Project:

[

To increase link availability and bandwidth between DTEs by specifying the necessary mechanisms for parallel link segment aggregation.

]

8. Intellectual Property {Answer each of the questions below}

a. Are you aware of any patents relevant to this project?

[NO] {Yes, with detailed explanation below / No}

[We are not aware of patents in particular at this time but expect that patents or patents under application may exist in this active technical area. We will actively pursue this matter with regular call for patents to solicit disclosure and terms according to IEEE policy.] {Explaination}

b. Are you aware of any copyrights relevant to this project?

[NO] {Yes, with detailed explanation below / No}

[...] {Explaination}

c. Are you aware of any trademarks relevant to this project?

[NO] {Yes, with detailed explanation below / No}

[...] {Explaination}

9. Are you aware of any other standards or projects with a similar scope?

[YES] {Yes, with detailed explanation below / No}

[IEEE 802.3 has a program of similar scope, but focused on supporting attachment of 802.3 MAC clients rather than 802.5 MAC clients.] {Explaination}

10. International Harmonization

Is this standard planned for adoption by another international organization?

[YES] {Yes/No/?? if you don't know at this time}

If Yes: Which International Organization [ISO/IEC JTC/1 SC/6]

If Yes: Include coordination in question 13 below

If No: Explanation [...]

11. Is this project intended to focus on health, safety or environmental issues?

[NO] {Yes/No/?? if you don't know at this time}

If Yes: Explanation [...]

12. Proposed Coordination/Recommended Method of Coordination

a. Mandatory Coordination

SCC 10 (IEEE Dictionary)	by **DR**	{Circulation of **DR**afts}
IEEE Staff Editorial Review by	by **DR**	
SCC 14 (Quantities, Units and Letter symbols)	by **DR**	

b. Coordination requested by Sponsor:

[US TAG for JTC1/SC6 WG	by [DR (via US	{circulation of **DR**afts/**LI**aison memb/**CO**mmon

3]	TAG)]	memb}
[US TAG for SC25/WG4]	by [DR]	{circulation of **DR**afts/**LI**aison memb/**CO**mmon memb}
[]	by […]	{circulation of **DR**afts/**LI**aison memb/**CO**mmon memb}
[.....]	by [...]	{circulation of **DR**afts/**LI**aison memb/**CO**mmon memb}

c. Coordination Requested by Others:

[...] {added by staff}

Additional Explanation Notes: {Item Number and Explanation}

[...]{If necessary, these can be continued on additional pages}

The PAR Copyright Release and Signature Page must be submitted by FAX or physical delivery before this PAR will be sent on for NesCom and Standards Board approval.

----------End of Proposed PAR

PAR adopted by 802.5 vote 11-07: vote was 9/0/1 (Pass)

----------Proposed 5 Criteria

5 CRITERIA:

1. Broad Market Potential
- Broad set(s) of applications
- Multiple vendors, multiple users
- Balance cost, LAN vs. attached stations

Many applications and environments will benefit from this capability, in particular:

- The ability to incrementally scale the bandwidth and increase the availability of server connections to the network and of switch-to-switch connections within the network.
- Provide a network upgrade path utilizing existing physical layer media and the corresponding supported distances as existing 802.5 technology.

Multiple vendors have brought products to market that aggregate parallel 802.5 links into a single logical link in some manner. 10~~???~~ participants from 5~~???~~ companies have indicated their support for creating an interoperable standard.

When link aggregation is used for attaching end-stations to the network, the cost is balanced between the LAN and the attached station by requiring a symmetrical number of MACs and physical layer connections at each end of the aggregated link.

Approved by 802.5 vote: 10/0/0 (Pass)

2.IEEE Project 802 defines a family of standards. All standards shall be in conformance with 802.1 Architecture, Management and Interworking. All LLC and MAC standards shall be compatible with ISO/IEC 10039, MAC Service Definition at the LLC/MAC interface. Within the LLC Working Group there shall be one LLC standard, including one or more LLC protocols, with a common LLC/MAC interface. Within a MAC Working Group there shall be one MAC standard and one or more Physical Layer standards with a common MAC / Physical Layer interface.

Each standard in the IEEE Project 802 family of standards shall include a definition of managed objects which are compatible with OSI systems management standards.

The proposed standard will be compatible with the LLC/MAC interfaces and 802.1 interworking. It will be conformant to 802 Functional Requirements. The proposed standard shall include a definition of managed objects that are compatible with OSI systems management standards.

Approved by 802.5 vote: 10/0/0 (Pass)

3. Distinct Identity
- Substantially different from other 802.5 specs / solutions
- Unique solution for problem (not two alternatives / problem)
- Specifically addresses the needs of 802.5, as opposed to 802.3
- Easy for document reader to select relevant spec

The proposed standard is an upgrade for 802.5 users, based upon the 802.5 MAC. It differs from other 802.5 specifications and solutions in that it enables users to operate network connections at bandwidths incremental to those specified in current 802.5 standards.

The proposed standard will be the only solution achieving linearly scaleable bandwidth per network connection, while simultaneously providing high availability and reliability through multiple links.

Additionally, the proposed standard will achieve this without requiring the development of a new physical layer.

The proposed standard will be the only solution focussing on these goals for 802.5 networks.

The proposed standard will be a supplement to the existing 802.5 standard and will be formatted as a new clause(s)~~.~~, making it easy for the reader to select the relevant specification.

Approved by 802.5 vote: 10/0/0 (Pass)

4. Technical Feasibility
- Demonstrated feasibility; reports - working models
- Proven technology, reasonable testing
- Confidence in reliability

Technical feasibility has been demonstrated by products deployed from multiple vendors, which provide link aggregation capabilities similar to those proposed for this standard. These capabilities provide a new operating mode layered upon the existing and well-proven 802.5 MAC and Physical Layer technologies. In particular, the proposed standard would not require the development of a new physical layer or a new physical medium.

Approved by 802.5 vote: 10/0/0 (Pass)

5. Economic Feasibility
- Cost factors known, reliable data
- Reasonable cost for performance expected
- Total installation costs considered

The cost factors for the existing standard can be extrapolated from the cost of current 802.5 technologies.

The incremental cost of aggregating multiple links is not expected to be a significant increase over the sum of the cost of the individual links.

Because the performance increases in proportion to the number of links, the cost will scale linearly with the performance.

Link aggregation is a very cost-effective way of adding bandwidth to a network installation, because it does not require the adoption and installation of new Data Link Layer or Physical Layer technologies.

Approved by 802.5 vote: 10/0/0 (Pass)

Motion 11-08: That 802.5/98/11-09, containing the PAR and 5 criteria for 802.5z (Aggregation of Multiple Link segments) be adopted and submitted to the SEC for their approval. Vote: 9/0/1 (Pass).

----------End of Proposed 5 Criteria

Best regards.

Robert D. Love
Chair IEEE 802.5 Token Ring Working Group
IBM
800 Park Offices
P. O. Box 12195 DGTA/664
Research Triangle Park, NC 27709, USA
Phone: +1 919 543-2746
Fax: +1 919 254-5483
E-Mail: rdlove@us.ibm.com