PAR FOR 802.3 Aggregation of Multiple Link Segments

PAR FORM
Fill in the answers to the questions in the bracket provided. A Hard Copy
of this document must be printed, signed with the appropriate signatures and mailed or faxed to the Standards Department for submission to NesCom.

1. Sponsor Date of Request [**February 4, 1998**]

2. Assigned Project Number (confer with staff) [expected to be **P802.3ad**]

3. PAR Approval Date (leave blank) [ ]

4. Project Title, Copyright Agreement and Working Group Chair for this Project

I will write/revise a Standards Publication with the following TITLE (Spell
out all acronyms)

[**X**] **Standard** [**for**] (Document stressing the verb "SHALL."), or
[ ] Recommended Practice for (Document stressing the verb "SHOULD.") or
[ ] Guide for (Document stressing the verb "MAY.")

WRITE TITLE HERE [
Supplement to:
Information Technology -
Local & Metropolitan Area Networks - Part 3:
Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method & Physical Layer Specifications -
Aggregation of Multiple Link Segments]

I hereby acknowledge my appointment as Official Reporter (usually the W.G.
Chair) to the (Name of Working Group) [IEEE P802.3 CSMA/CD Working Group]
In consideration of my appointment and the publication of the Standards Publication identifying me, at my option, as an Official Reporter, I agree
to avoid knowingly incorporating in the Standards Publication any copyrighted or proprietary material of another without such other's consent
and acknowledge that the Standards Publication shall constitute a "work made for hire" as defined by the Copyright Act, and, that as to any work defined, I agree to and do hereby transfer any right or interest I may have
in the copyright to said Standards Publication to IEEE.

Signature of Official Reporter
Chair _____

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5. Describe this project: (Choose ONE from each group below)
a. [No] Update an existing PAR
(No or Yes/project number/approval date)
Is this in ballot now? (Yes or No)

b. [No] New standard (Yes or No)

[No] Revision of an existing standard
(No or Yes/standard number/year)

[**YES / ANSI / IEEE Std 802.3 1996 Edition**] Supplement to an existing standard
(No or Yes/standard number/year)

c. [**X**] **Full Use** (5-year life cycle)
[ ] Trial Use (2-year life cycle)

d. [**December 1999**] Fill in **target completion date** for submittal to IEEE Standards Review Committee (RevCom)

6. **Scope** of Proposed Project (What is being done including the technical boundaries of the project):
Specify a DTE to DTE logical link which consists of n parallel instances of an 802.3 point-to-point link segment. The logical link will support existing 802.3 MAC Clients.

Define the necessary management objects and protocols to support link aggregation, including identification, addition and deletion of link segments to and from the logical link.

7. **Purpose** of Proposed Project (Why is it being done, including the intended user(s) and benefits to that user(s)):
To increase link availability and bandwidth between DTEs by specifying the necessary mechanisms for parallel link segment aggregation.

8. Sponsor (Give full name; spell out all Acronyms)
Society/Committee:
[Computer Society/
Local and Metropolitan Area Network Standards Committee (LMSC)]

9. (a.1) [No] **Are you aware of any patents** relevant to this project? (Yes [attach explanation], or 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 according to IEEE policy.
(a.2) [No] Are you aware of any copyrights relevant to this project? (Yes [attach explanation], or No)

(a.3) [No] Are you aware of any trademarks relevant to this project? (Yes [attach explanation], or No)

b. [No] Are you aware of any other standards or projects with a similar scope?

c. [Yes/explanation] Is this standard intended to form the basis of an international standard? (Yes, or No [attach explanation])
It is intended to submit this work to ISO through SC6 at the time it is submitted for Sponsor Ballot. It would be an addendum to ISO/IEC 8802-3.

d. [No] Is this project inteded to focus on health, safety or environmental issues? (Yes [attach explanation], No, or Do Not Know)

10. Proposed Coordination / Recommended Method of Coordination: (Coordination is accomplished in any of the following three ways: Ciculation of Drafts or Liaison Membership or Common Membership.)

a. Mandatory Coordination

SCC 10 (IEEE Dictionary)	Circulation of Drafts
IEEE Staff Editorial Review	Circulation of Drafts
SCC 14 (Quantities, Units, & Letter Symbols)	Circulation of Drafts

b. IEEE Coordination requested by Sponsor: (Use additional page if necessary). If you believe your project will require a Registration Authority, please list IEEE RAC (refer to WorkingGuide). [

US TAG for SC6	Circulation of Drafts
ISO/IEC/JTC1 SC6/WG3	Circulation of Drafts (via US TAG)
ISO/IEC/JTC1 SC25/WG4 TAG	Circulation of Drafts

If coordination is not required, please attach an explanation.

c. Additional Coordination requested by Others. (Leave blank. This will be completed by the Standard Staff). [ ]

11. Submitted by: (This MUST be the Sponsor Chair or the Sponsor's Liaison representative to the IEEE Standards Board)

Signature of Submitter _____

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Date [, 1998]

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5 CRITERIA FOR 802.3 Aggregation of Multiple Link Segments

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 802.3 technology.

Multiple vendors and users have demonstrated interest by attending the "Trunking and Link Aggregation" tutorial, attending the preliminary study group meeting, and subscribing to the "stds-802-3-trunking" e-mail reflector. Additionally, many vendors have brought products to market that aggregate parallel 802.3 links into a single logical link in some manner. At the study group meeting in Irvine, March 1998, 94 participants from 54 companies 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.

2. Compatibility with IEEE standard 802.3

- Conformance with CSMA/CD MAC, PLS
- Conformance with 802.2
- Conformance with 802 FR

The proposed standard will conform to the CSMA/CD MAC and PLS, with currently authorized extensions.

The proposed standard will conform to the 802.2 LLC interface.

The proposed standard will conform to the 802 Functional Requirements document, with possible relaxation of the frame ordering requirements.

3. Distinct Identity

- Substantially different from other 802.3 specs / solutions
- Unique solution for problem (not two alternatives / problem)
- Easy for document reader to select relevant spec

The proposed standard is an upgrade for 802.3 users, based upon the 802.3 CSMA/CD MAC. It differs from other 802.3 specifications and solutions in that it enables users to operate aggregated links at bandwidths incremental to the links specified in current 802.3 standards.

The proposed standard will be the only solution achieving incrementally scaleable bandwidth per link, 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 a supplement to the existing 802.3 standard and will be formatted as a new clause(s), making it easy for the reader to select the relevant specification.

4. Technical Feasibility

- Demonstrated feasibility; reports - working models
- Proven technology, reasonable testing
- Confidence in reliability

Technical feasibility has been demonstrated in widely deployed products from numerous 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 802.3 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.

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 802.3 technologies, and will benefit from the "economy of scale" of the very large installed base and market forecasts for 802.3 technology.

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 and/or availability increases in proportion to the number of links, the cost will scale incrementally with the performance and/or availability.

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 Media Access Control or Physical Layer technologies.