IEEE-SA Standards Board Project Authorization Request (PAR)
(2000-Rev 1)

1. Sponsor Date of Request   [2000 Nov]

2. Assigned Project Number   [P802.17]

3. PAR Approval DATE   [   ] {IEEE-Standards Staff to fill in box
{Copyright release must be received with appropriate signatures
by FAX (1-732-562-1571)}
[ ] PAR Signature Page on File {IEEE Staff to check Box}

4. Project Title 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 {Documents in which good practices are suggested}

TITLE: [Information Technology -
Telecommunications and information exchange between systems -
Local and metropolitan area networks -
Specific requirements -
Resilient Packet Ring Access Method & Physical Layer Specifications

Name of Working Group(WG) : [Resilient Packet Ring Working
Group]

Name of Official Reporter (usually the WG Chair) who MUST be an
SA member as

well as an IEEE/Affiliate Member: [Michael Takefman-41320348]
IEEE-Standards Staff has verified that the Official Reporter (or
Working Group Chair) is an
IEEE and an IEEE-SA Member: [ ] (Staff to check box}
Telephone: [613-271-3399]   FAX: [613-271-3333]
EMAIL: [tak@cisco.com]

Name of WG Chair (if different than Reporter): [ ]
IEEE-Standards Staff has verified that the Working Group Chair is an
IEEE and an IEEE-SA
Member: [ ] (Staff to check box}
Telephone: [ ]   FAX: [ ]
EMAIL: [ ]

Name of Sponsoring Society and Committee: [Computer Society,
LAN/MAN Standards Committee]
Name of Sponsoring Committee Chair: [Jim Carlo]
IEEE-Standards Staff has verified that the Sponsor is an IEEE and an
IEEE-SA Member: [ ]
(Staff to check box}
Telephone: [214-693-1776]   FAX: [214-853-5274]
EMAIL: [jcarlo@ti.com]

5. Type of Project:

5a.   Is this an update to an existing PAR? {Yes/No} [NO]
If YES: Indicated PAR number/approval date [ ]
If YES: Is this project in ballot now? [ ] {Yes/No}
[Indicate changes/rationale for revised PAR in Item #16. This should
be no more than 5 lines.]

5b. Choose from one of the following:
[X] New Standard
[ ] Revision of existing standard {number and year} [ ]
[ ] Amendment (Supplement) to existing standard {number and year}
]
[ ] Corrigenda to existing standard {number and year} [ ]

6. Life Cycle
[X] Full Use (5-year life cycle)
[ ] Trial Use (2-year life cycle)

7. Balloting Information
Choose one of the following:
[X] Individual Sponsor Ballot Process
[ ] Entity (not Individual) Sponsor Ballot Process
[ ] Mixed Balloting (combination of Individual and Entity Sponsor
     Balloting)

Expected Date of Submission for Initial Sponsor Ballot: [Nov 2002]

8. Fill in Projected Completion Date for Submittal to RevCom
[March 2003]

9. Scope of Proposed Project
[what is being done, including technical boundaries on the work.]

Define a Resilient Packet Ring Access Protocol for use in Local, Metropolitan, and Wide Area Networks, along with appropriate Physical Layer specifications for transfer of data packets at rates scalable to multiple gigabits per second.

10. Purpose of Proposed Project:
[Why it is being done, including intended users, and benefits to users.]

The standard will define a very high-speed network protocol that is optimized for packet transmission in resilient ring topologies. Current standards are either optimized for TDM transport, or optimized for mesh topologies. There is no high-speed (greater than 1 billion bits pe second) networking standard in existence, which is optimized for packet transmission in ring topologies.

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

Are you aware of any patents relevant to this project?
[No] {Yes, with detailed explanation below/ No}
[ ] {Explanation}

Are you aware of any copyrights relevant to this project?
[No] {Yes, with detailed explanation below/ No}
[ ] {Explanation}

Are you aware of any trademarks relevant to this project?
[No] {Yes, with explanation below/ No}
[ ] {Explanation}

Are you aware of any registration of objects or numbers relevant to thi project?
[Yes] {Yes, with explanation below/ No}
The Media Access Controller defined in this standard will use Organizational Unique Identifiers as administered by the IEEE Registration Authority. May also require the assignment of Ethertypes

12. Are you aware of other standards or projects with a similar scope?
[Yes] {Yes, with explanation below/ No}
[ ] {Explanation}
ANSI T1X1.5 are working on related issues to improve SONET carriage of data packets. Their current scope does not include a bandwidth allocation scheme.

13. 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 JTC1 SC6]
If Yes: Include coordination in question 15 below
If No: Explanation [ ]

14. 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? [ ]

15. Proposed Coordination/Recommended Method of Coordination

Mandatory Coordination
SCC 10 (IEEE Dictionary)   by DR
IEEE Staff Editorial Review   by DR
SCC 14 (Quantities, Units and Letter symbols) by DR

Coordination requested by Sponsor and Method:
[JTC1 SC6] by [DR] {circulation of DRafts/LIaison memb/COmmo
memb}
[ANSI T1X1.5] by [DR] {circulation of DRafts/LIaison
memb/COmmon memb}
[   ] by [ ] {circulation of DRafts/LIaison memb/COmmon memb}
[   ] by [ ] {circulation of DRafts/LIaison memb/COmmon memb}
{Choose DR or LI or CO for each coordination request}

Coordination Requested by Others:
[ ] {added by staff}

16.   Additional Explanation Notes: {Item Number and Explanation}
[ ]{If necessary, these can be continued on additional pages}

RPRSG

5 Criteria

1. Broad Market Potential
- Broad sets of applicability.
- Multiple vendors and numerous users.
- Balanced costs (LAN versus attached stations).

- Presentations given to the Resilient Packet Ring Study Group has identified customer demand for resilient packet rings in the following application areas (source RHK)
  - ISP Intra-POP LANs
  - Inter-POP MANs and WANs (e.g. ISP; MSO; *LEC)
  - Enterprise Campus LAN Backbones
  - Enterprise MANs and WANs
  - Single and Multi-provider customer access MANs

- An efficient bandwidth sharing mechanism for ring topologies will provide optimum cost / performance for the identified application areas.

- At an 802 tutorial session, 33 individuals representing 14 organizations (including vendors of computer systems, networking systems, networking silicon, and Internet Service Providers) expressed interest in working on a standards project in this area. An RPRSG interim meeting was attended by 26 individuals representing 13 organizations. An RPRSG plenary meeting was attended by 29 individuals representing 19 organizations. An RPRSG interim meeting was attended by 40 individuals representing 23 organizations.

- In Metropolitan and Wide Area Networks, there is massive deployment of fiber optic rings. These rings are currently using protocols that do not scale to the demands of packet networks. These demands include: reducing equipment & operational cost; speed of deployment; bandwidth allocation and throughput; and resiliency to faults.

2. Compatibility

- 802. Overview and Architecture
- 802.1D, 802.1Q, 802.1f.
- Systems management standards.

- The Resilient Packet Ring standard will be fully compatible with the 802 Overview and Architecture document.

- The Resilient Packet Ring standard will be compatible with the relevant portions of 802.1D, 802.1Q and 802.1f.

- The Resilient Packet Ring standard will be compatible with the Simple Network Management Protocol. The MIB for RPR will be defined and submitted to the IETF.

- Selection of the frame format for the RPR is subject to investigation by the working group. The format will allow for a simple mapping of 802.3 frames into RPR frames and vise-versa.

3. Distinct Identity

- Substantially different from other IEEE 802 standards.
- One unique solution per problem (not two solutions to a problem).
- Easy for the document reader to select the relevant specification.

- There is no other IEEE 802 standard which address the unique combination of:
  - bandwidth multiplication with dynamic and fair bandwidth allocation on a ring.
  - high speed (622 Mbps and above) ring topologies optimized for packet transmission.
  - specifies a bandwidth sharing algorithm for high data rates and wide area network distances
- This standard will provide a solution which provides high speed, scalable, resilient ring based networks featuring spatial reuse and protection mechanisms (capable of sub 50 ms switching) and frame sizes in excess of 1518 bytes (size/method to be determined).
- The standard will define a single Media Access Control algorithm, along with multiple Physical Layer options, formatted in a fashion similar to other 802 standards.

4. Technical Feasibility

- Demonstrated system feasibility.
- Proven technology, reasonable testing.
- Confidence in reliability.

- Several implementations of candidate protocols exist in the industry, embodied in commercially available products comprising:

    – Systems (routers, switches, Add drop nodes for optical networks, hubs);

    – Host interfaces (NICs);

    – Chipsets;

    – Optical components;

- Implementations of candidate protocols are currently deployed in major Service Provider and enterprise environments.

- The adoption of existing physical layer medium will avoid a significant amount of technical risk .

- Presentations given to the RPRSG have demonstrated the technical feasibility of candidate protocols using system level simulation.

- Traffic models, configurations, metrics for evaluating candidate protocols and empirical results will be developed and presented as part of the working group.

5. Economic Feasibility
- Known cost factors, reliable data.
- Reasonable cost for performance.
- Consideration of installation costs.

- Several implementations of high speed resilient packet ring networks exist in the industry from different vendors. The cost factors for the various components and sub-assemblies, as well as complete systems, are well known.

- The cost of installations based on a ring topology has been given prime consideration in the development of this project proposal. Ring topologies are preferred for MAN and WAN applications because they entail a lower installation cost than a mesh topology. This standard capitalizes on and will optimize the use of installed and planned fiber cable plant.

- In high speed networks, fiber optic components dominate the cost of a station. For data rates of 1 Gbps and below, the cost associated with these components is declining rapidly as technologies such as Gigabit Ethernet and Fibre Channel increase in volume. For data rates greater than 1 Gbps, this standard, as well as 802.3ae, and other industry standards (Fibre Channel, InfiniBand, etc) will generate the volumes necessary in order to produce similar cost reductions.

- The costs associated with infrastructure based on this standard will be competitive with other technologies operating at similar data transmission rates. The goals of this project are to eliminate layers of equipment, reduce the port counts in a typical customer's network, and provide operational efficiency, thus reducing the total cost.