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.