Introduction to Resilient Packet Rings

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History

• March/00:	RPR Tutorial and call for interest
• May & July:	Vendors and Users present
• August:	Agreed on PAR & 5 Criteria and Understanding standards process;
• October:	Submit PAR and 5 Criteria to IEEE SEC
• November:	Won Support from other WGs and unanimous approval by IEEE to form 802.17 working group
• January/01	1st WG preliminary meeting, straw man timeline
• March	Agree upon goals, objectives, timeline and election of officers

Information

- Information: http://grouper.ieee.org/groups/802/rprsg
- Alliance formed: http://www.rpralliance.org
- Email Reflector: majordomo@ieee.org
  - "subscribe stds-802-rprsg *your_email*"
- IETF Working group: IPoRPR; Email Reflector: iporpr-request@cisco.com
  - "subscribe iporpr"

Why is RPR needed?

- SONET is not cost effective as data traffic increases
- Circuit oriented static bandwidth allocations are inefficient for data packet transfer
- Non-working, protection bandwidth reservation is wasteful
- Provisioning of service is slow

Why Not Ethernet

- Spanning tree does not allow a multi-node ring topology
- Protection is slow
- Customer or Service separation at layer 2 is not scalable – often requires MPLS or layer 3 based isolation.

RPR features

- Variable length Packet switched multi-node rings
  - Nodes on Ring have 802 Address
  - Header has 802 type DA and SA
  - Destination strips unicast packets (Spatial Reuse)
  - Drop and continue for broadcast and multicast
  - Source node strips broadcast packets
  - Time-To-Live field to prevent packets circulating forever.
  - Class of Service indication in header to support multiple traffic priorities on ring

RPR Features (cont'd)

- Dual Counter Rotating rings
  - Nodes have more than one direction on the ring to reach another node
  - Both rings carry working traffic
    - No circuit based reserved protection BW
- Master-less ring
  - Every Node can discover layer 2 topology independently – Plug and Play

RPR Features (cont'd)

- Resiliency
  - Goal to achieve sub 50 msec protection performance
  - Wrapped or source re-route
- Media independent: leverage use of Ethernet PHY or SONET PHY
- Distributed BW and congestion management control

5 Criteria

- Broad Market Potential
  - many companies working in this area
  - MAN market growing to $13B by 2004 (RHK)
- Compatibility with 802 Architecture
  - RPR Study Group members researched requirements and determined no impediments exist (802.1D/f/Q)

5 Criteria (cont)

- Distinct Identity
  - Met with WG members of 802.1 and 802.3
    - could the same job be done with Ethernet Switches and simple extensions to existing protocols?
  - Concern from 802.3 about confusion in the marketplace caused by re-use of Ethernet PHYs
    - Pledged not to say that RPR is a variant of Ethernet

5 Criteria (cont)

- Technical Feasibility
  - Several vendors have products on similar paradigm
- Economic Feasibility
  - Solutions shipping today based on cost-effective rationale

TimeLine

- March – Finalize Goals and Objectives
- November – Cutoff for last technical proposals
- January/02 – 1st Draft for WG review
- March – Add/Change minor technical by WG
- June – WG ballot
- September – Comments addressed and Last technical changes
- November/02 – LMSC Sponsor Ballot

Decisions for WG

- Network Features
  - Expose certain features/functions to Layer 3
  - Same physical layers on all spans
  - No Packet loss except during protection event
  - Fairness scheme?
- MAC features
  - Transit buffer design
  - BW management mechanism
  - Transmit path priority

Decisions….

- Media Independent MAC
  - Which PHY(s) do we focus on first?
  - SONET/SDH
    - Frame delineation mechanism
  - Ethernet PHY
    - 1 Gbps
    - 10 Gbps
      - LAN or WAN?

Decisions

- Frame Format & Services
  - Header fields
  - VLAN services
  - 802.3 frames in 802.17
  - Packet size
- Protection
  - Degree of data loss during recovery
  - Protection messaging
  - Topology messaging
  - Wrap or re-route

Administrative decisions

- Chair Mike Takefman
- Vote for Vice Chair
- Vote for Secretary (incumbent is B.J.Lee)
- Election of other office positions will be held later on as needed basis