Resilient Packet Ring 5 Criteria
(2. Compatibility)

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

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This report presents high-level description of IEEE 802. Overview and Architecture, 802.1D and 802.1Q Bridge architecture, 802.1F, and also discusses the compatibility issues in view of future RPR standard.

Where appropriate, SRP (Cisco implementation of RPR) is used as an example.

Due to layered approach of IEEE 802 standard, it is believed that the compatibility can be achieved rather easily. However, the following issues warrant more study for minimal changes required:

- MAC/LLC frame format and addressing
- Implementation issues due to the spatial reuse property of RPR
IEEE 802 LAN & MAN Reference Model

OSI Reference Model
- Application
- Presentation
- Session
- Transport
- Network
- Data Link
- Physical

IEEE LAN & MAN Reference Model
- Higher Layer Protocols
- Upper Layer Protocols
  - LLC
  - MAC
- Physical

IEEE 802 Reference Model (LAN & MAN/RM)
Due to the shared-medium nature of the IEEE 802 LANs, there is always a MAC sublayer.

**LLC Sublayer:**
- **Type 1:** unacknowledged connectionless (supported in SRP)
- Type 2: acknowledged connection-oriented
- Type 3: acknowledged connectionless

**MAC Sublayer:**
- access control functions
- addressing and recognition of frames in support of LLC
- frame check sequence
- LLC protocol data unit (PDU) delimiting

**Physical Layer**
IEEE Std 802. Compatibility Issues

- Frame formats with Addressing and Protocol Identifier

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<th>PT</th>
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(bits)
• SRP frame format is h/w compatible with IEEE 802.3 (as does Ethernet)
  – Protocol Type (PT) is set to larger than 1500 bytes to be distinguished from
    802.3 frames whose Length field (LE) <= 1500 bytes

• Ethernet format is preferred for RPR for the following reasons:
  – Incurs less overhead (e.g., w/o DSAP, SSAP, CTL, and 5 byte PT)
  – Allows larger MTU
  – Less complexity
• Likely scenario for interconnecting end stations in a LAN
• Scalability issue in MAN and WAN applications interconnecting L2 switches and routers
Bridge Architecture

High Layer Entities
(Bridge Protocol Entity, Bridge Management, etc)

MAC Relay Entity (MAC method Independent Functions)

MAC Entity
(MAC method Dependent Functions)

LAN 1

MAC Service

IEEE 802.1D

IEEE 802.1Q (VLAN)

High Layer Entities
(Bridge Protocol Entity, Bridge Management, etc)

MAC Relay Entity (MAC method Independent Functions)

MAC Entity
(MAC method Dependent Functions)

LAN 2

MAC Service

MAC Service users

LAN 1

LAN 2

MAC Service

Extended Internal Sublayer Service

Extended Internal Sublayer Service

MAC Service

Internal Sublayer Service

Internal Sublayer Service

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802.1D/Q Compatibility Issues

• Is L2 bridging considered essential for RPR applications?
  – Concern for large spanning tree convergence time
  – Flat broadcast domain

• As noted in the bridge architecture, most of the bridging functionalities are *MAC method independent*. However, the following properties of RPR need further investigation for 802.1D and 802.1Q compliance:
  – Spatial reuse property (i.e., destination stripping) may not be fully effective unless bridges strips the outbound packets
  – MTU extension due to VLAN tagging
  – A need for a group MAC address to identify the Bridge Protocol Entity, if 48-bit Universally Administered Addresses are not used
  – Any others?
• Bridge does not learn anything due to spatial reuse?
  • No, due to ARP packets

• For the spatial reuse effective in bridged networks, the bridge should be able to strip the packet destined to the outbound LANs
SRP (Cisco implementation of RPR) management information is compatible with SNMP, and its MIB has been submitted as an IETF draft;

“Definitions of Managed Objects for Spatial Reuse Protocol (SRP)”
http://search.ietf.org/internet-drafts/draft-jedrysiak-srp-mib-00.txt

If necessary, the RPR standard will further be made compatible with relevant sections of the IEEE Std 802.1F-1993.

– Compatibility with 802.1F may not be an issue, since the RPRSG envisions an IETF defined MIB instead?