

Resilient Packet Ring 5 Criteria (2. Compatibility)

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

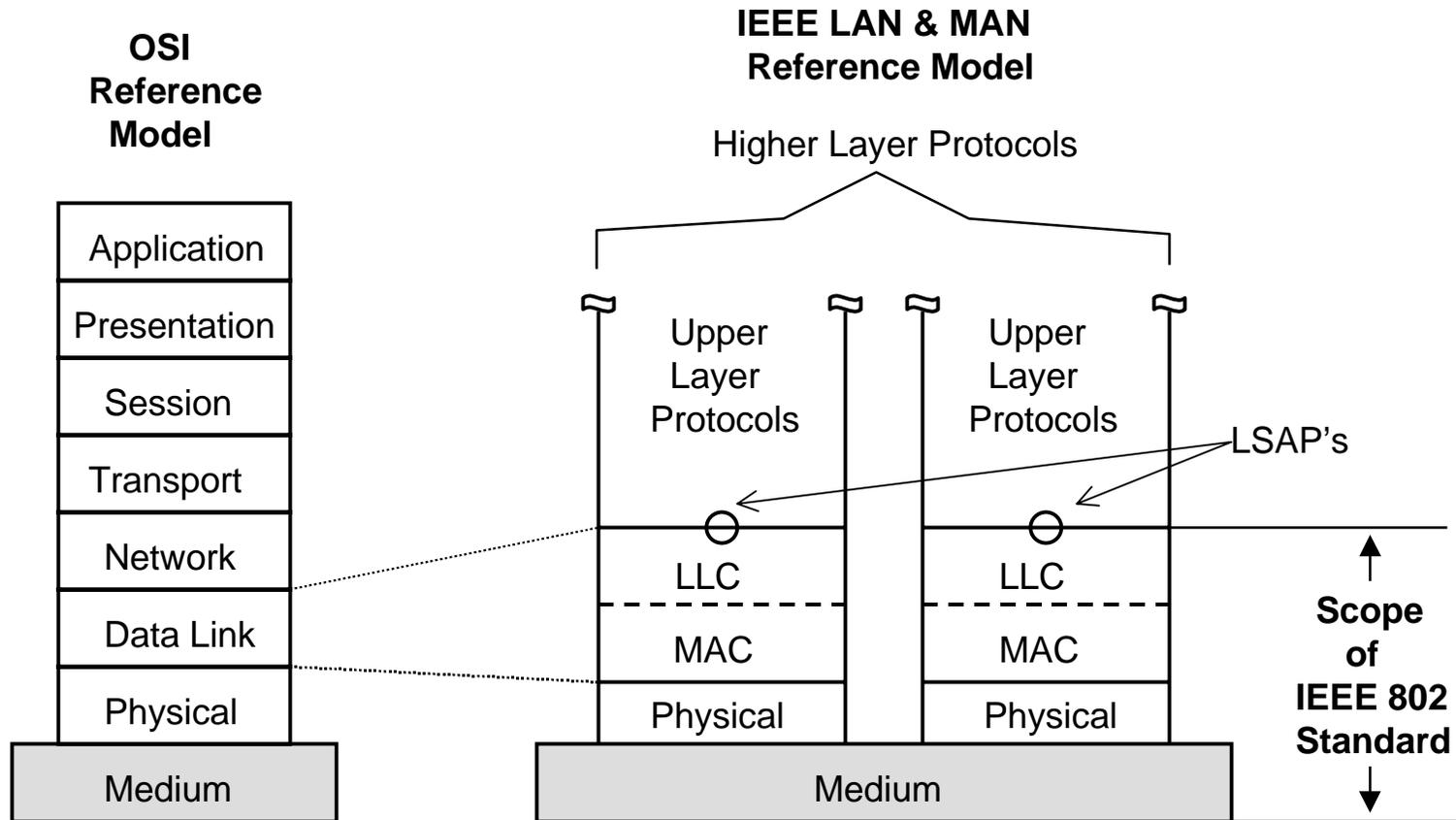
Byoung-Joon (BJ) Lee



Outline

- 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 Std 802. Overview and Architecture



IEEE 802 Reference Model (LAN & MAN/RM)

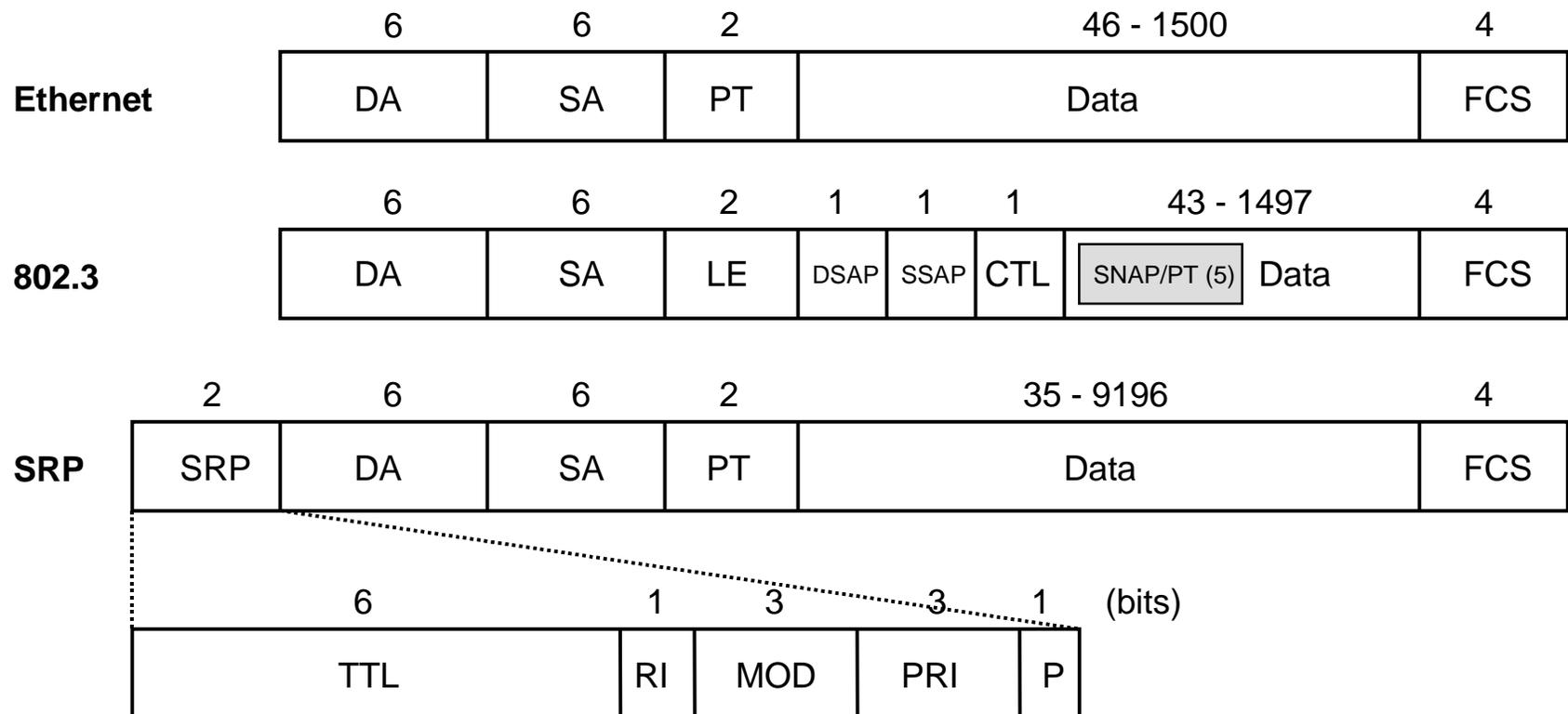
IEEE Std 802. Overview and Architecture

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- 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

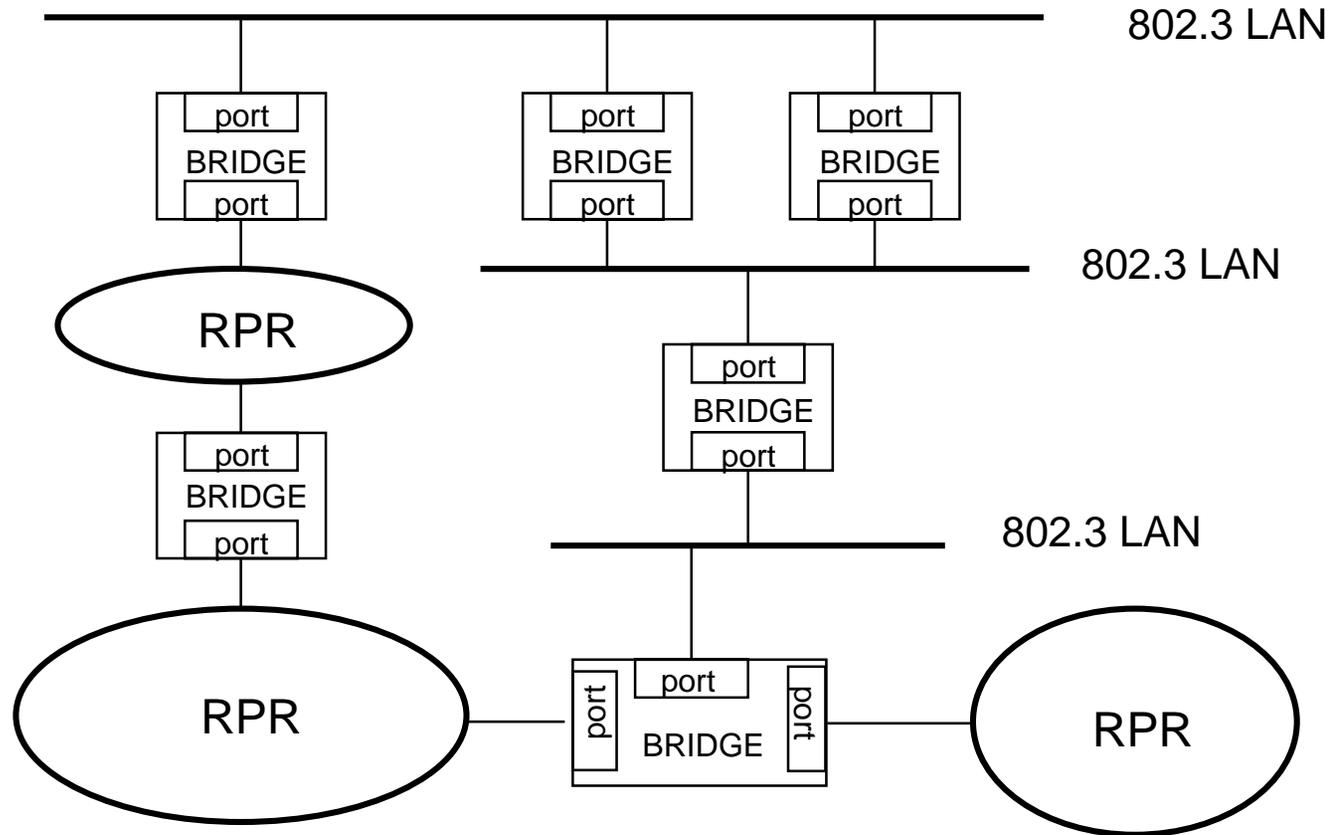


IEEE Std 802. Compatibility Issues

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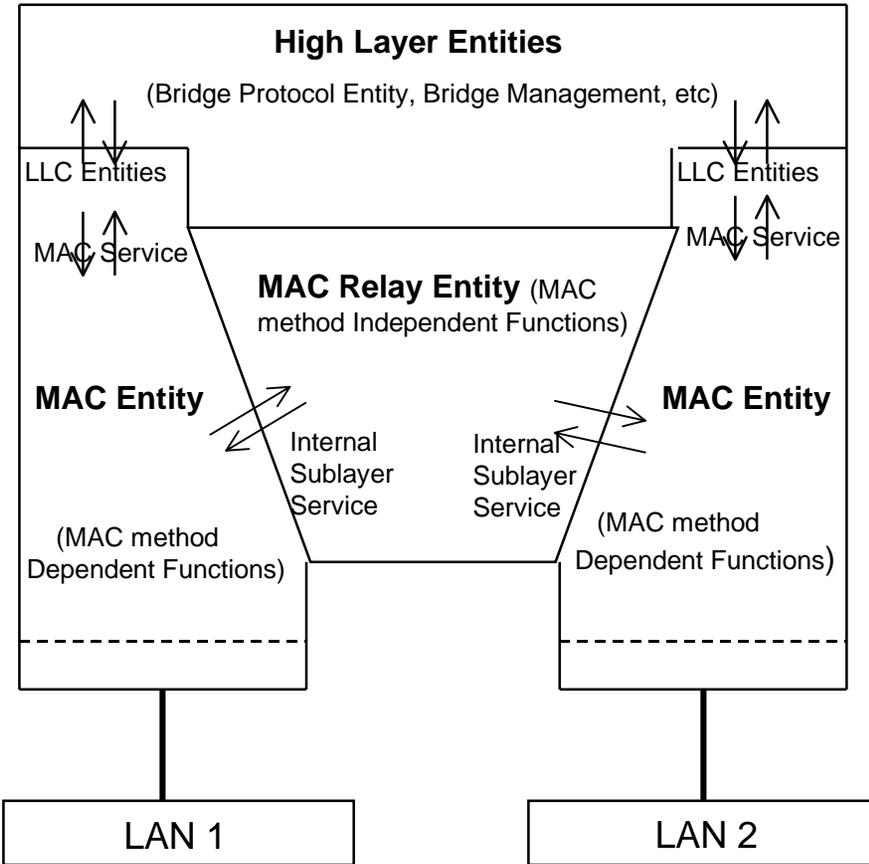
- SRP frame format is h/w compatible with IEEE 802.3 (as does Ethernet)
 - Protocol Type (PT) is set to larger than 1500 bytes to be distinguished from 802.3 frames whose Length field (LE) \leq 1500 bytes
- Ethernet format is preferred for RPR for the following reasons:
 - Incurs less overhead (e.g., w/o DSAP, SSAP, CTL, and 5 byte PT)
 - Allows larger MTU
 - Less complexity

A Bridged Network Example

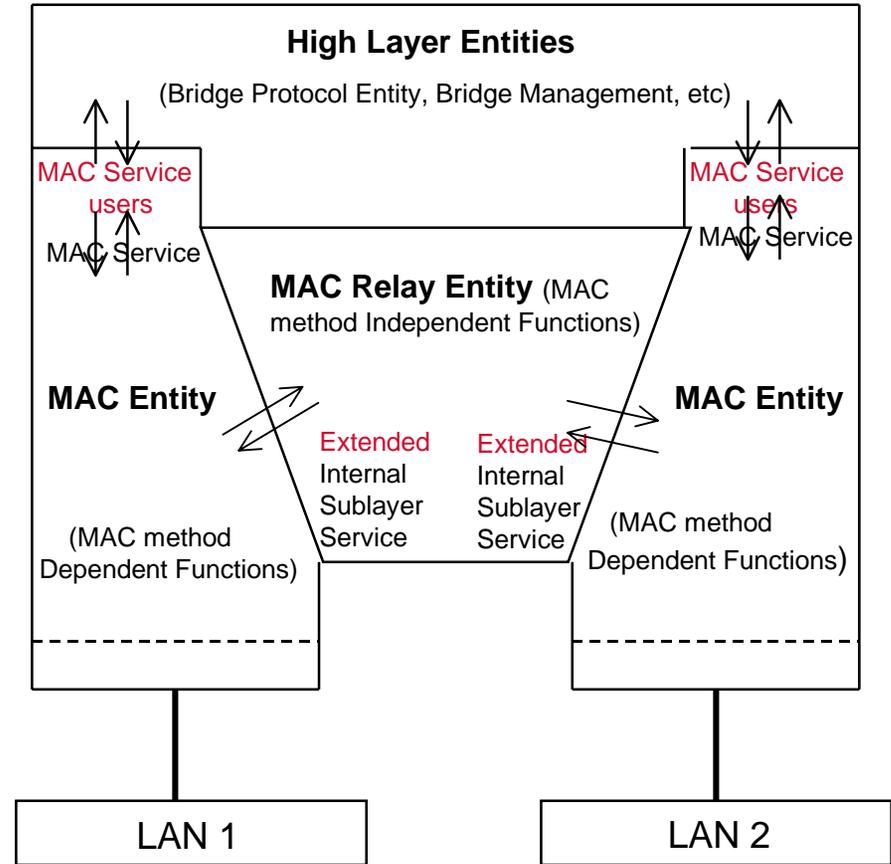


- Likely scenario for interconnecting end stations in a LAN
- Scalability issue in MAN and WAN applications interconnecting L2 switches and routers

Bridge Architecture



IEEE 802.1D

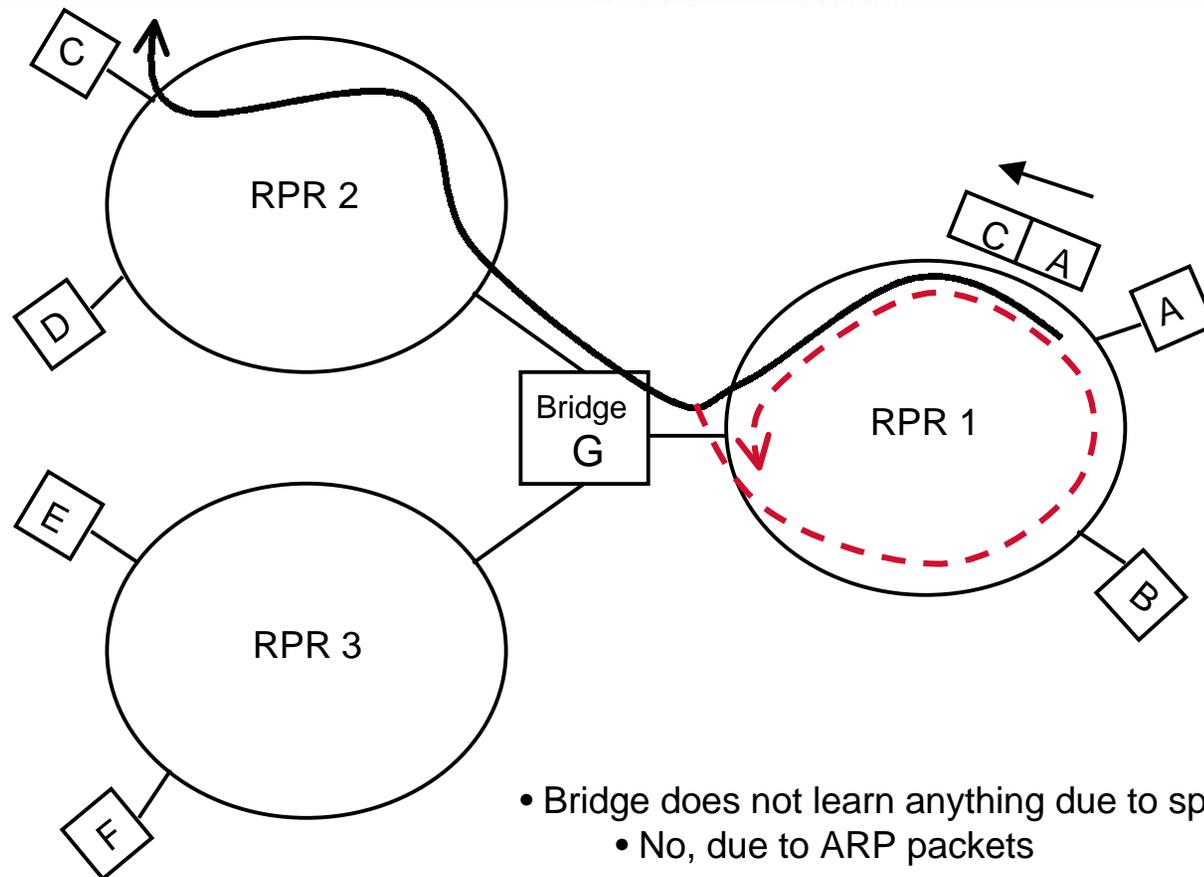


IEEE 802.1Q (VLAN)

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?

Destination Stripping and Bridging (An example)



- 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**

802.1F: Common Definitions and Procedures for IEEE 802 Management Information

- 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?*

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