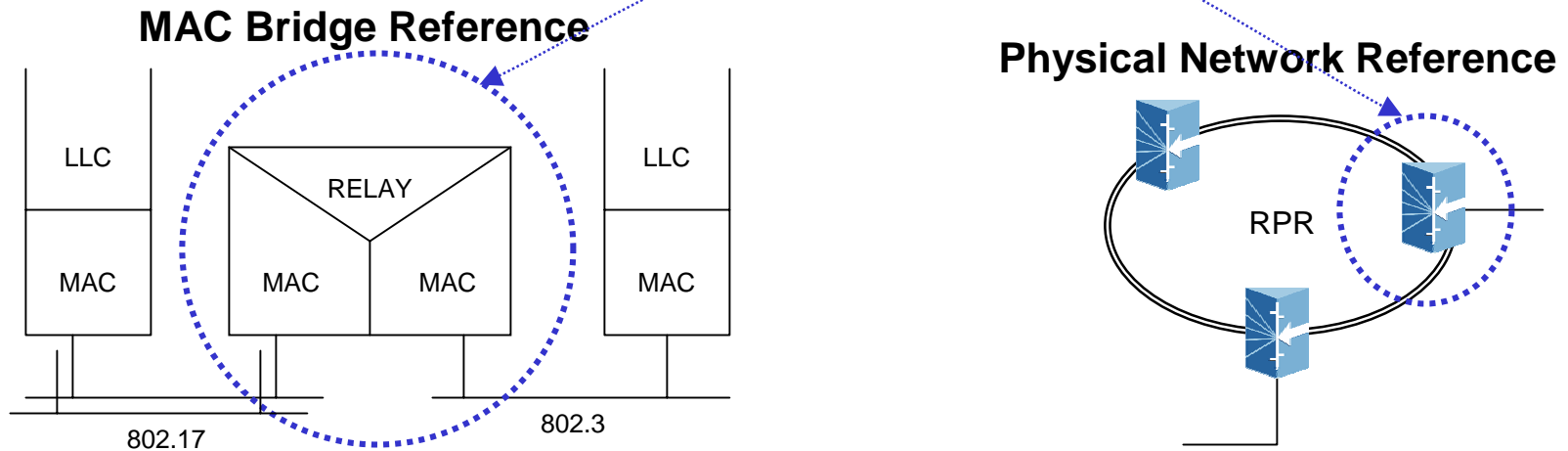# RPR Bridging Compliance

Marc Holness
Nortel Networks
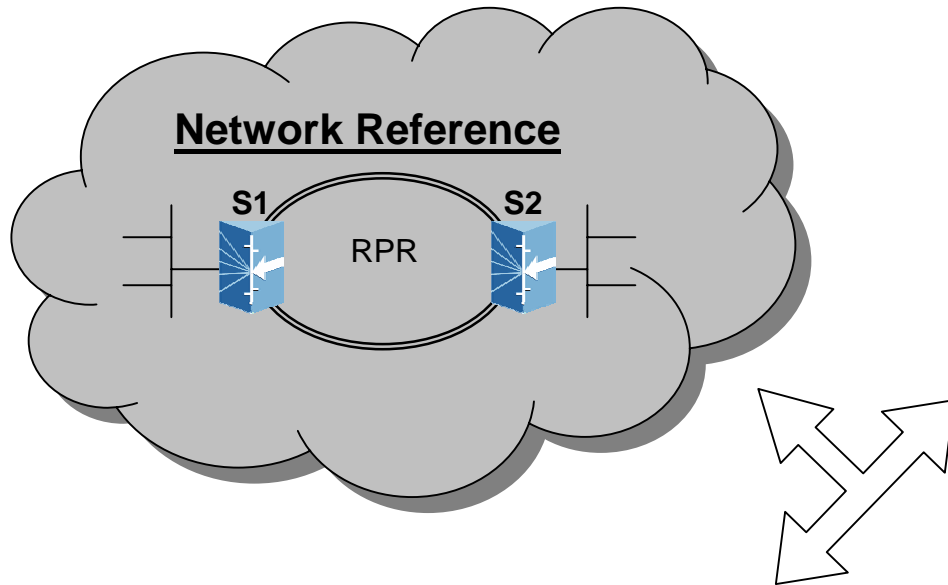
802.17 Bridge

Station on Ring is (Transparent) Bridge and the Ring is the shared LAN media.
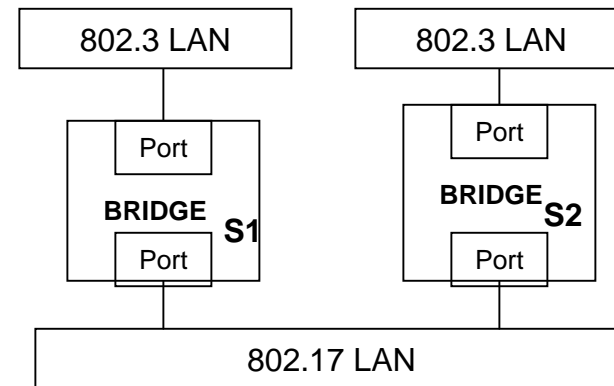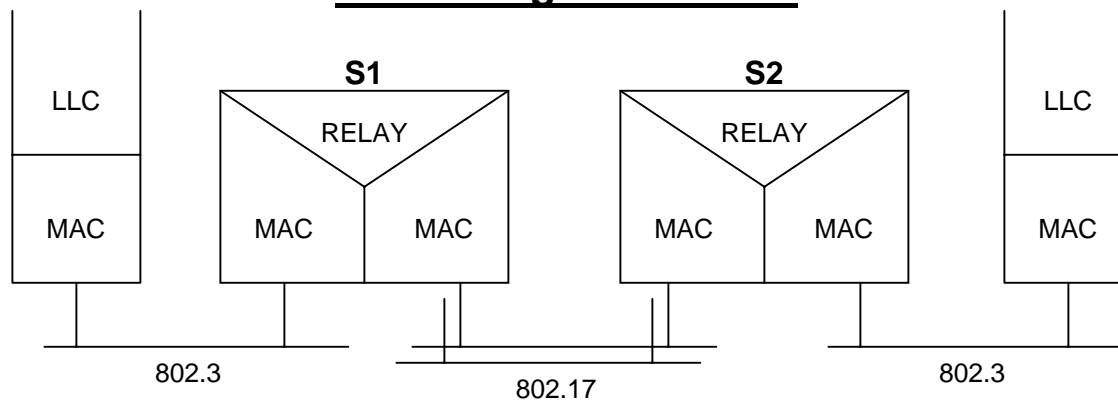
MAC Bridge Reference

LLC

RELAY

LLC

MAC

MAC

MAC

MAC

802.17

802.3

Physical Network Reference

RPR

802-17-01-nnnnn, iii_xxxxx_vv Marc Holness

802.17 Bridging Reference

Network Reference

S1   S2

RPR

Bridged Local Area Network

802.3 LAN	802.3 LAN

Port

BRIDGE S1

Port

Port

BRIDGE S2

Port

802.17 LAN

MAC Bridge Reference

LLC

MAC

S1

RELAY

MAC   MAC

S2

RELAY

MAC   MAC

LLC

MAC

802.3

802.17

802.3

802-17-01-nnnnn, iii_xxxxx_vv   Marc Holness
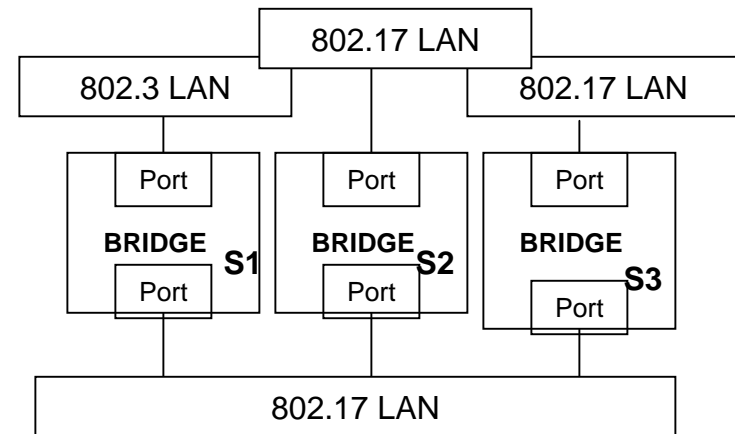
802.17 Bridging Reference

Bridged Local Area Network

Network Reference

S1   S2

RPR

S3

802.17 LAN

802.3 LAN

802.17 LAN

| Port | Port | Port |

| BRIDGE **S1** | BRIDGE **S2** | BRIDGE **S3** |

| Port | Port | Port |

802.17 LAN

MAC Bridge Reference

| LLC | **S1** RELAY | **S2** RELAY | LLC |

| MAC | MAC   MAC | MAC   MAC | MAC |

802.3

802.17

802.17

S3 RELAY

MAC

MAC

802.17

802-17-01-nnnnn, iii_xxxxx_vv   Marc Holness
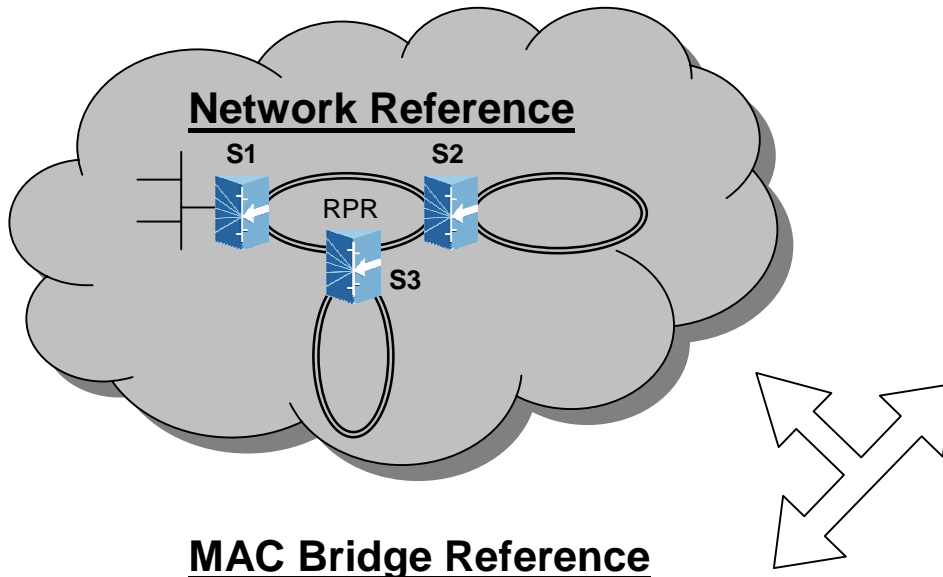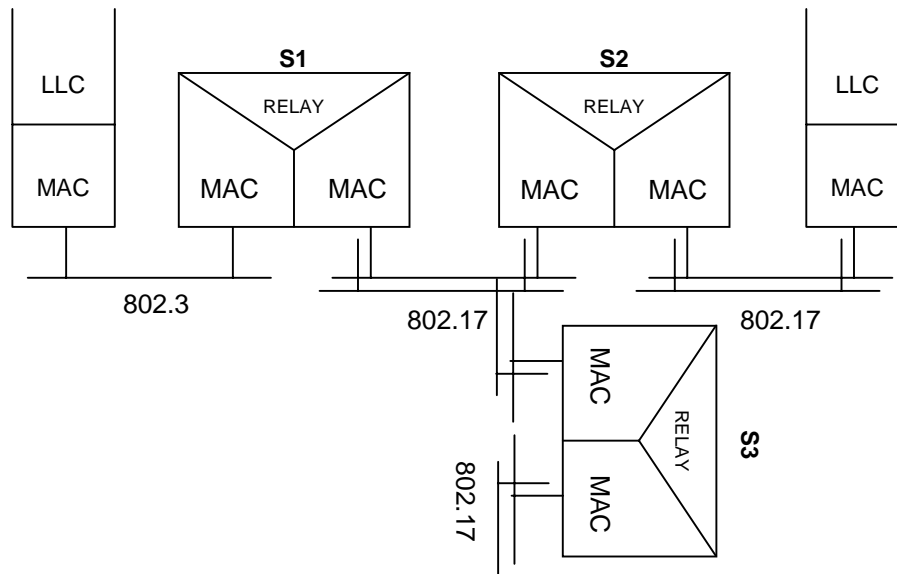
Transparent Bridging (802.1D) Reference

Bridge Protocol Entity

LLC

LLC

Port State Information

Forwarding Process

Port State Information

Filter DataBase

Frame Transmit

Frame Receive

Frame Transmit

Frame Receive

LAN 1

LAN 2
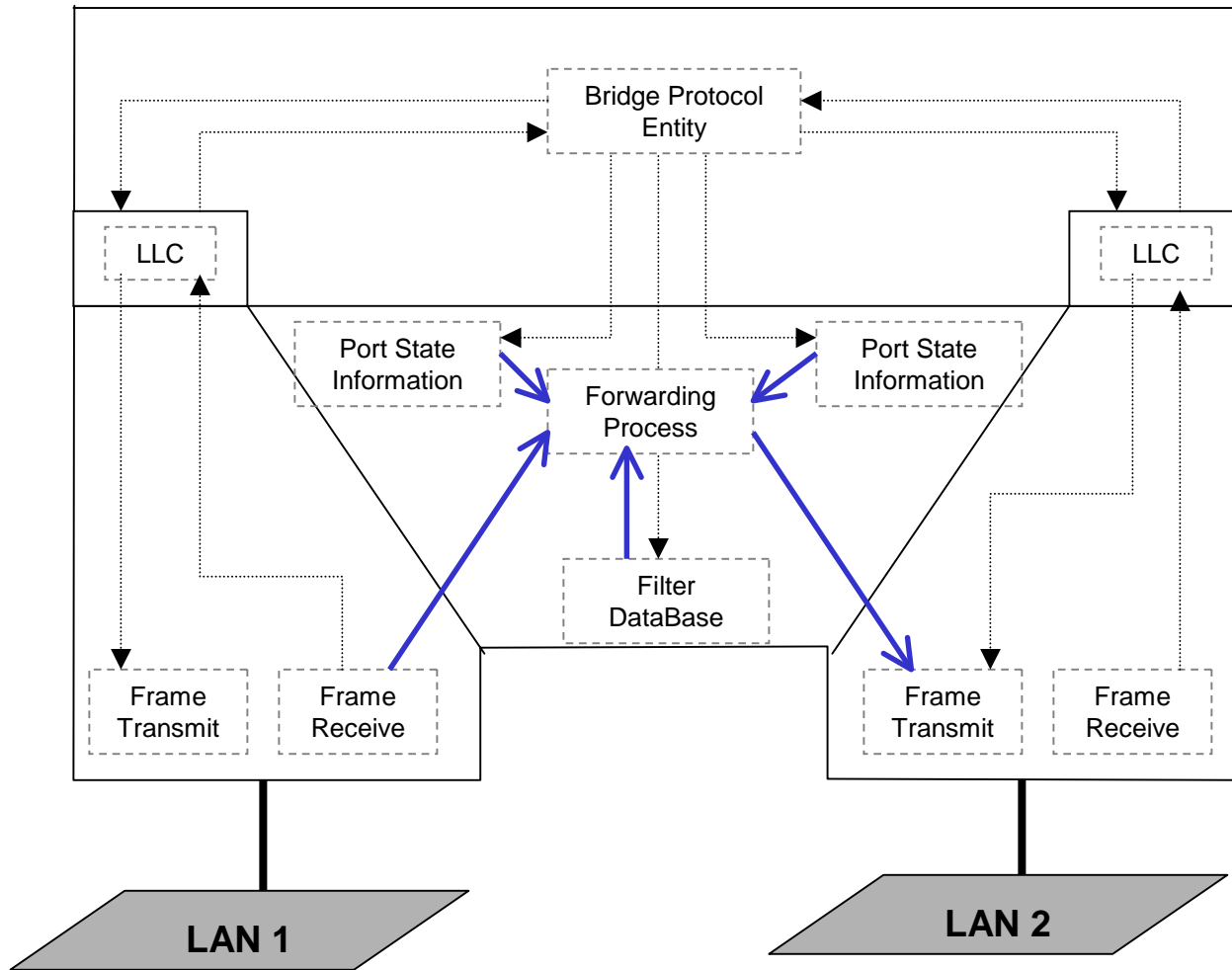
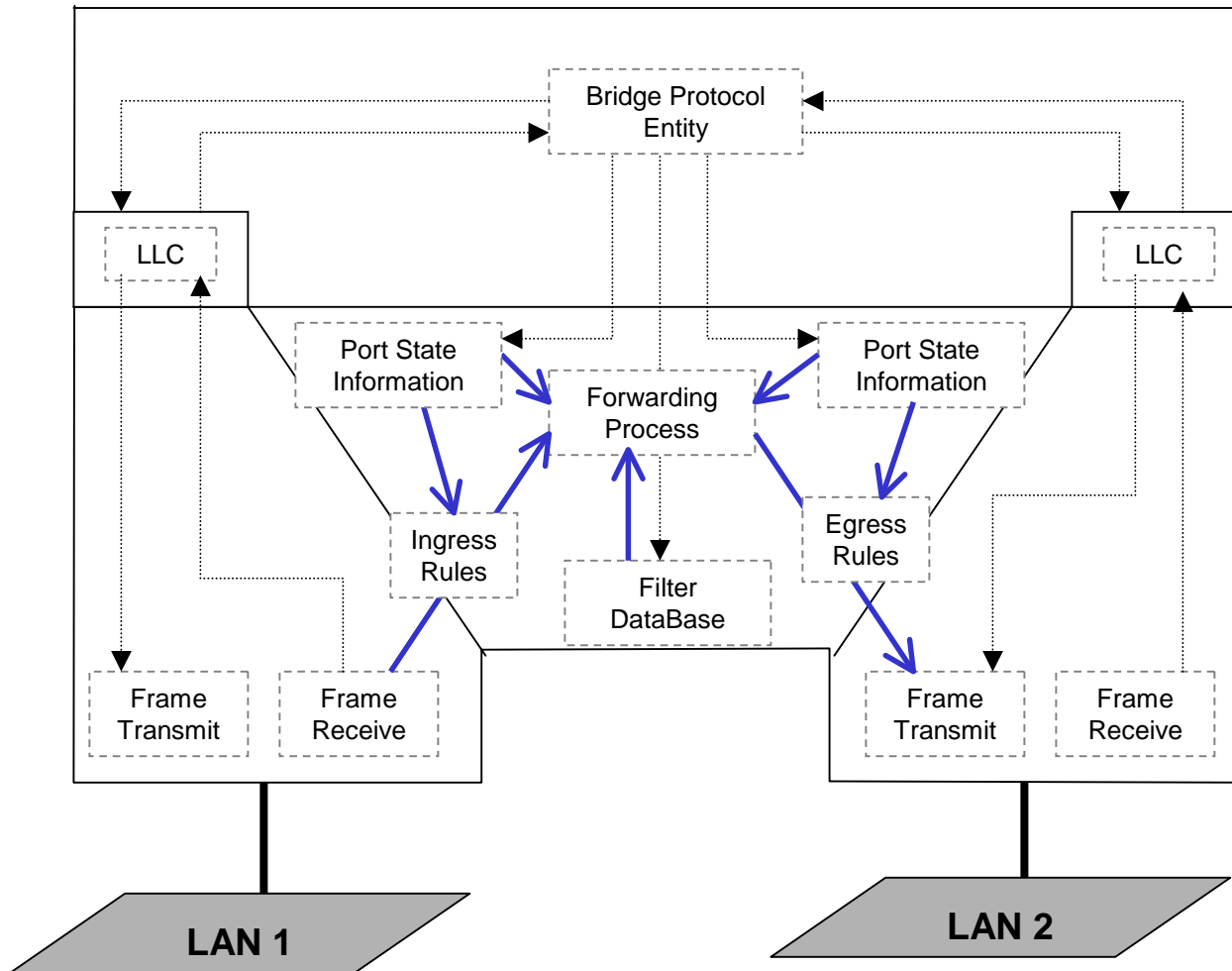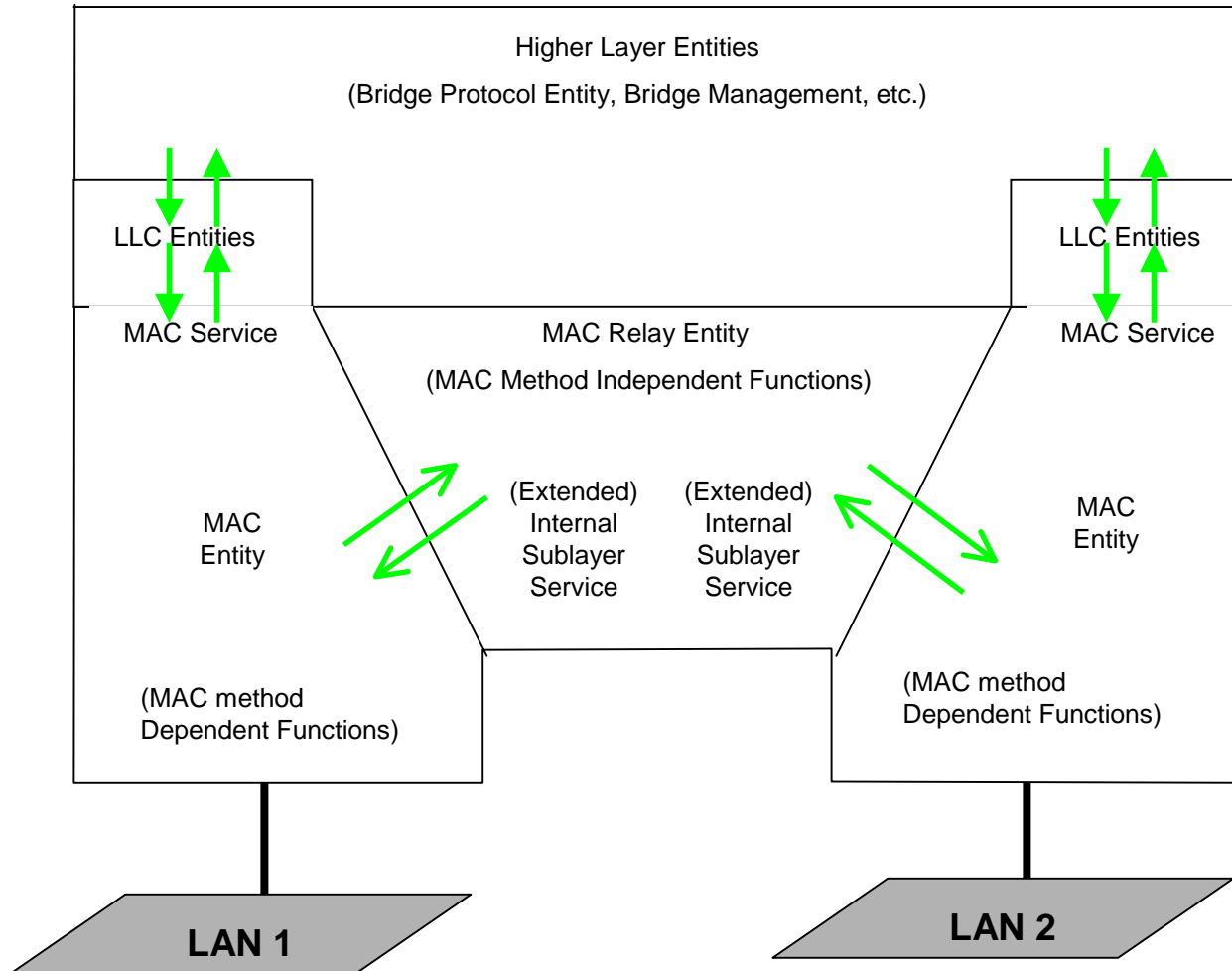- Denotes Relaying MAC frames
- Denotes reception and transmission of BPDUs

VLAN Bridging (802.1Q) Reference

- Denotes Relaying MAC frames
- Denotes reception and transmission of BPDUs

802.17 Bridging Architecture

Higher Layer Entities

(Bridge Protocol Entity, Bridge Management, etc.)

LLC Entities

MAC Service

MAC Relay Entity

(MAC Method Independent Functions)

LLC Entities

MAC Service

MAC
Entity

(Extended)
Internal
Sublayer
Service

(Extended)
Internal
Sublayer
Service

MAC
Entity

(MAC method
Dependent Functions)

(MAC method
Dependent Functions)

LAN 1

LAN 2

Service Primitives (Bridge Relay)

Service Primitive	Transparent Bridge (802.1)	VLAN Bridge (802.1Q)	Source Route Bridge	SRT (Source Route Transparent)	Remote Bridge
Indication	• Frame_Type • Mac_Action • DA • SA • RI • MSDU • User_Priority • FCS	• CFI • VLAN_Id • RIF_Info			• Cluster_Id
Request	• Frame_Type • Mac_Action • DA • SA • RI • MSDU • User-Priority • Access_Priority • FCS	• CFI • VLAN_Class • RIF_Info • Include_Tag			• Cluster_Id

802-17-01-nnnnn, iii_xxxxx_vv
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802.17 Bridge Requirements

802.1D/Q Compliance achieved by:

- ❑ Conformance to 802.1D/Q mapping 802.17 MAC protocol to MAC Service primitives.

- ❑ Conformance to MAC Bridge requirements as outlined by 802.1D/Q specifications (Section 5.1 "Static Conformance Requirements").
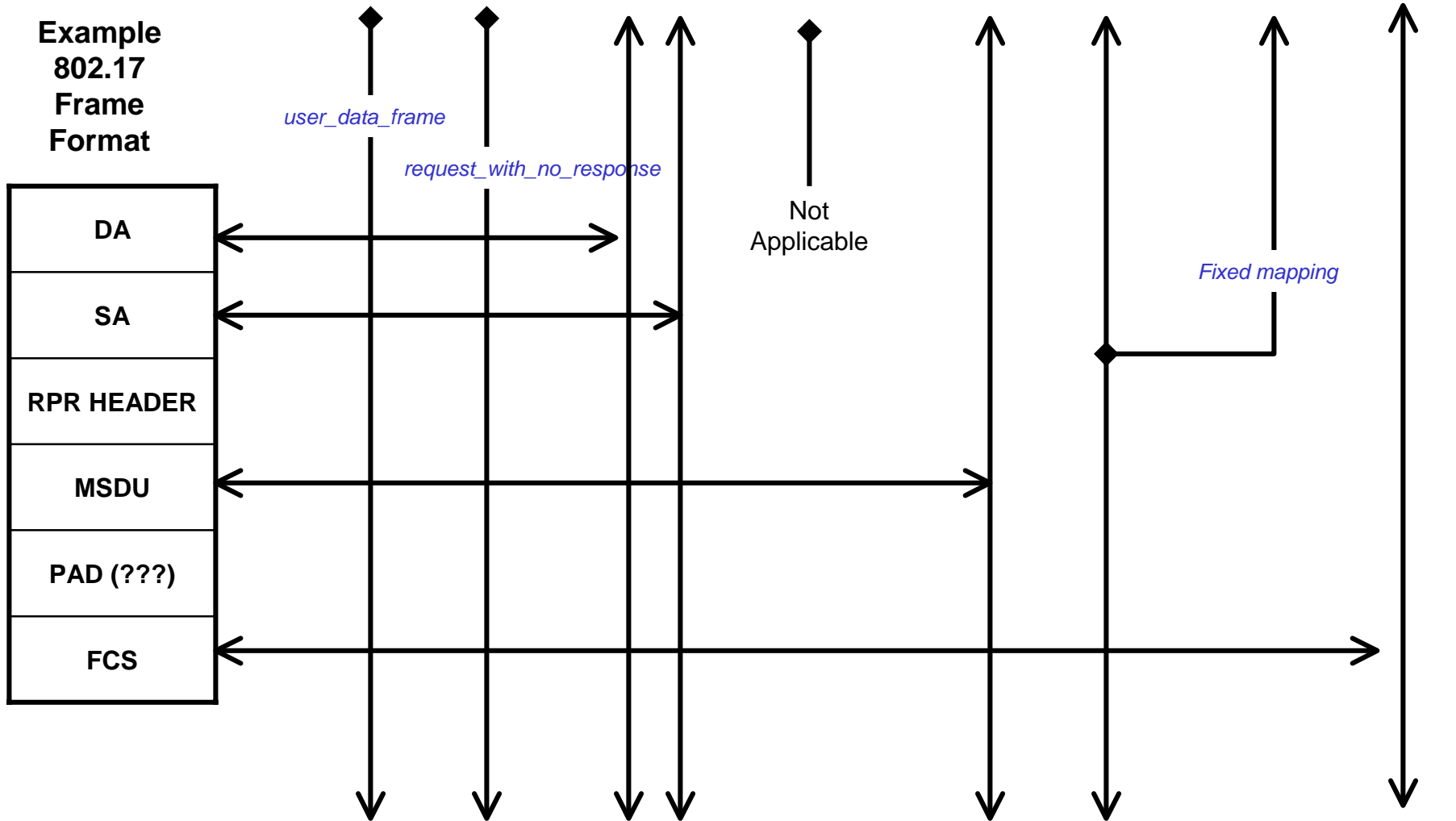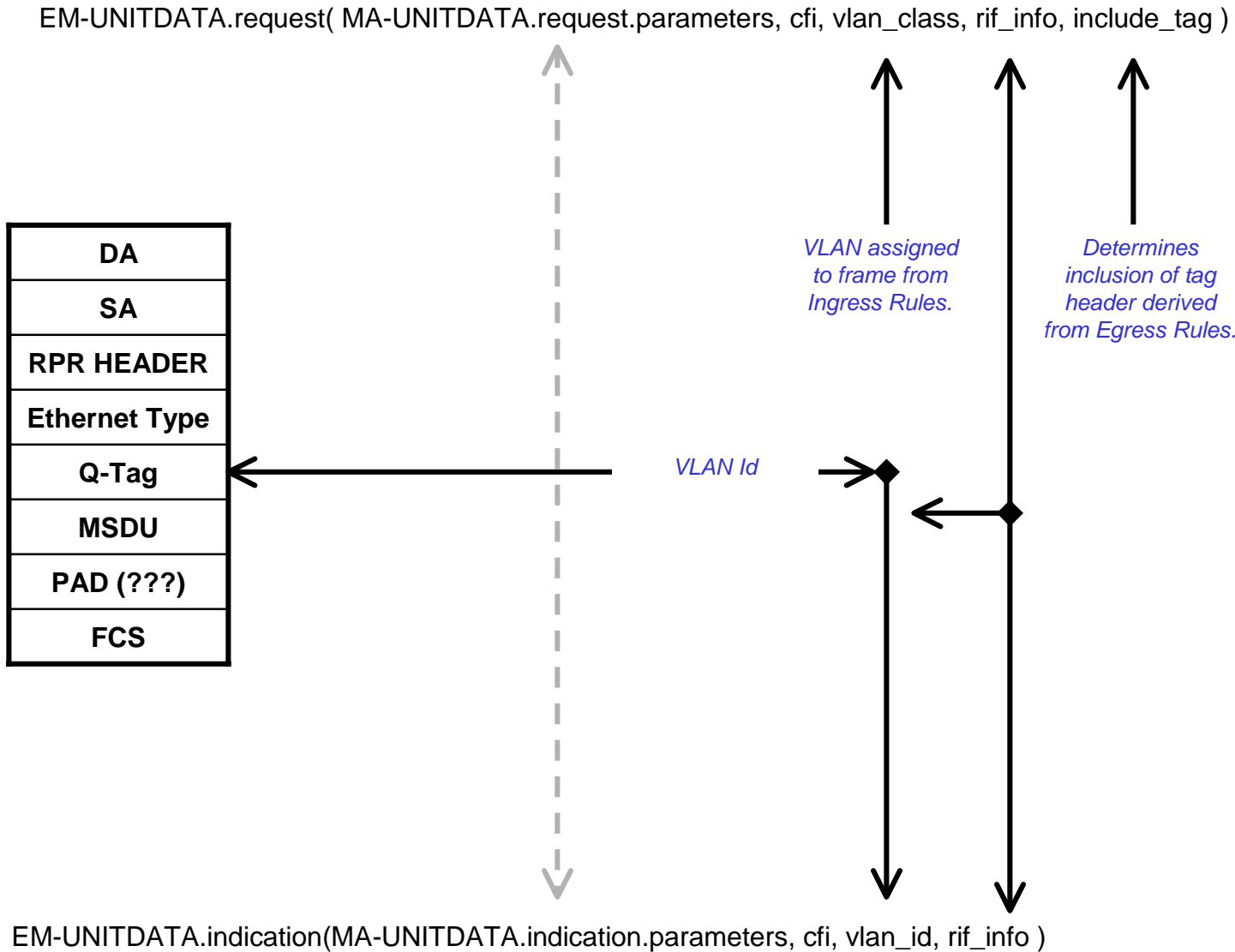
802.1D Mapping MAC Service to/from 802.17 MAC

MA-UNITDATA.request(frame_type, mac_action, DA, SA, Routing Information, MSDU, user_priority, access_priority, FCS)

Example 802.17 Frame Format

user_data_frame

request_with_no_response

Not Applicable

Fixed mapping

DA
SA
RPR HEADER
MSDU
PAD (???)
FCS

MA-UNITDATA.indication(frame_type, mac_action, DA, SA, Routing Information, MSDU, user_priority, _____ FCS)

802.1Q Mapping MAC Service to/from 802.17 MAC

EM-UNITDATA.request(MA-UNITDATA.request.parameters, cfi, vlan_class, rif_info, include_tag)

DA
SA
RPR HEADER
Ethernet Type
Q-Tag
MSDU
PAD (???)
FCS

VLAN assigned to frame from Ingress Rules.

Determines inclusion of tag header derived from Egress Rules.

VLAN Id

EM-UNITDATA.indication(MA-UNITDATA.indication.parameters, cfi, vlan_id, rif_info)
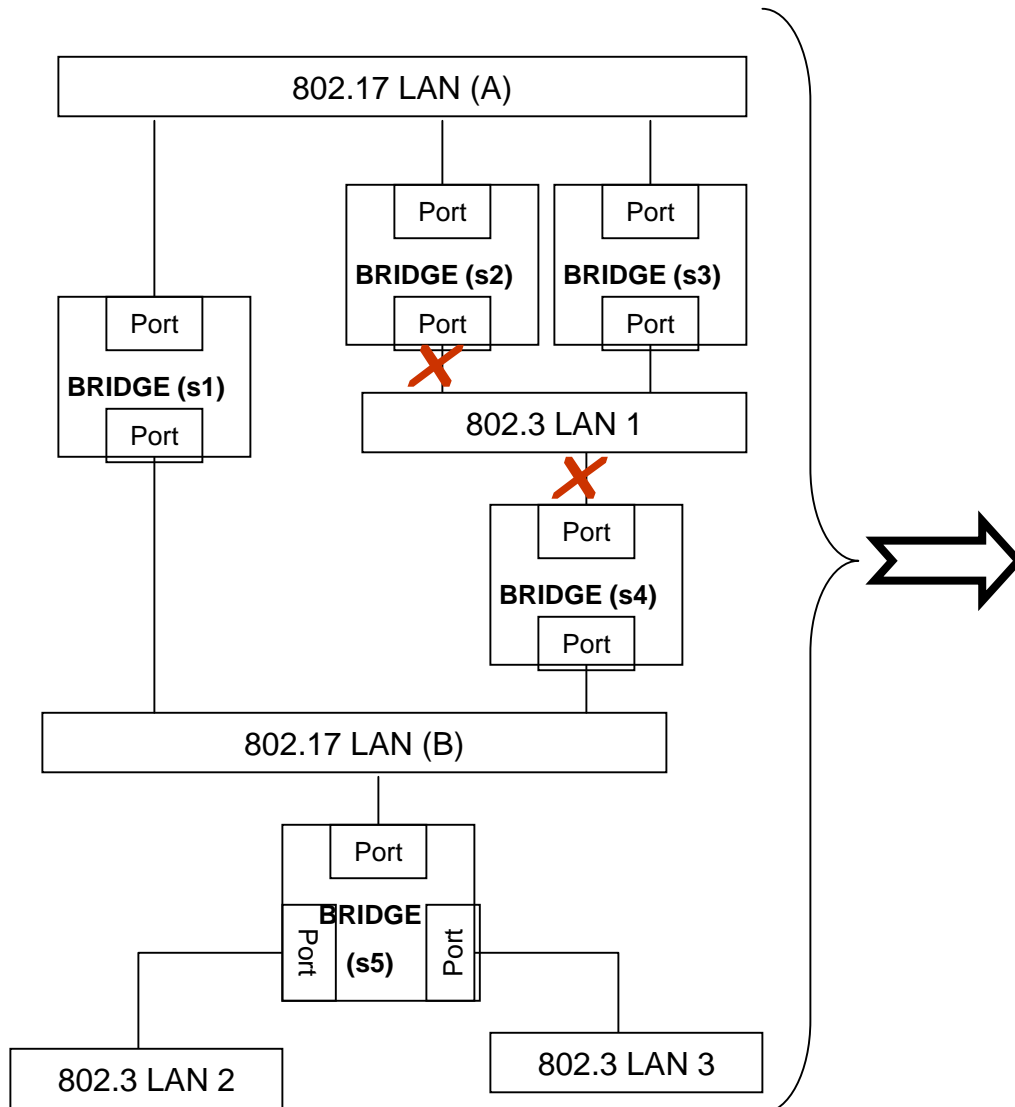
802-17-01-nnnnn, iii_xxxxx_vv

Marc Holness

802.17 STP Interactions with 802.17 Reference

Bridged Local Area Network

802.17 LAN (A)

Port

BRIDGE (s2)
Port

Port

BRIDGE (s3)
Port

Port

BRIDGE (s1)
Port

802.3 LAN 1

Port

BRIDGE (s4)
Port

802.17 LAN (B)

Port

BRIDGE
Port (s5) Port

802.3 LAN 2

802.3 LAN 3

Network Reference
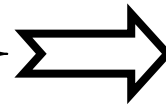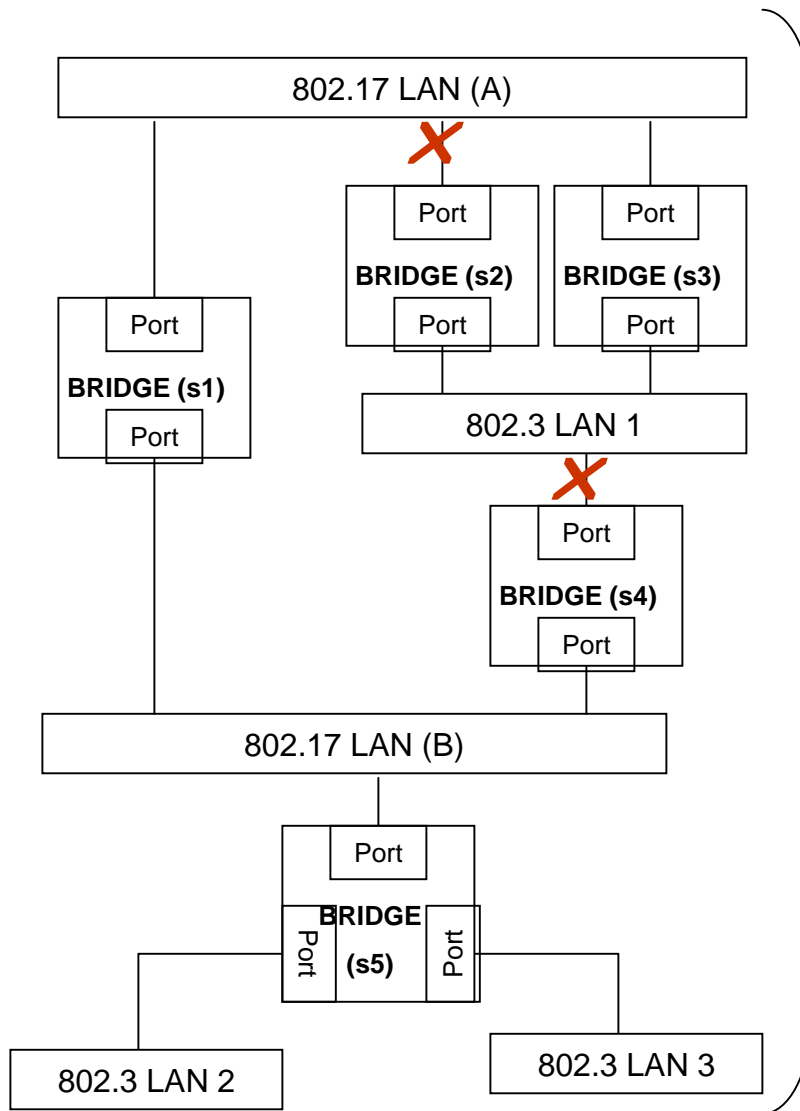
s4

s2

s1

s5

s3

LAN 1

LAN 2

LAN 3

✗ Denotes blocking port state due to STP.

802.17 STP Interactions with 802.17 Reference

Bridged Local Area Network

802.17 LAN (A)

Port
BRIDGE (s2)
Port

Port
BRIDGE (s3)
Port

Port
BRIDGE (s1)
Port

802.3 LAN 1

Port
BRIDGE (s4)
Port

802.17 LAN (B)

Port
BRIDGE
Port | **(s5)** | Port

802.3 LAN 2

802.3 LAN 3

Network Reference

s4
s1
s2
s5
s3
LAN 1
LAN 2
LAN 3
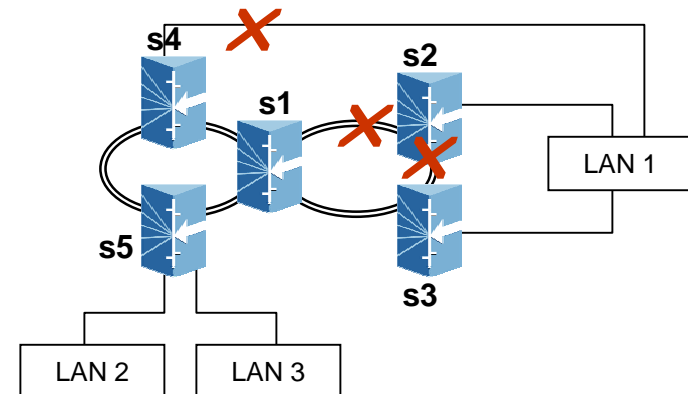
✗ Denotes blocking port state due to STP.

802.17 MAC Bridge Example

Scenario #1

- S1 sends unicast packet destined to S3. The direction of the packet is indicated by the arrow (I.e., via S2). S2 has Bridging enabled.

- At S2, packet received at WAN port_in is tandem out WAN port_out. Note: both WAN ports have the same MAC address from our Bridging model.

- Since Bridging is enabled at S2 however, the packet received at WAN port_in is flooded out all LAN ports of S2.

- Packet is received at S3, and terminated appropriately.

s3

RPR

s2

s1
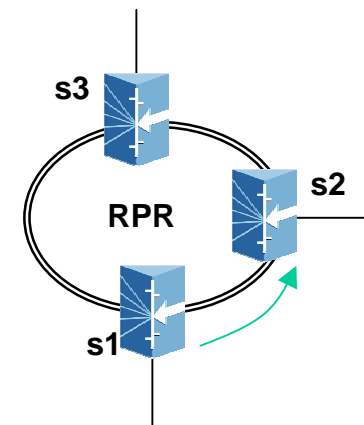
802.17 MAC Bridge Example Walk-Thru

Scenario #1: Walk-Thru

1. At S1:

   a. Client passes DATA.request to MAC Control Sublayer or MAC.

   b. Media Access Rate Policing entity receive primitive and eventually queues packet on Insertion Queue.

   c. Packet is removed off Queue by Arbiter Entity and placed on outgoing Ringlet.

2. At S2:

   a. Header Processor Entity receives packet off ringlet.

   b. TTL gets decremented.

   c. Stripper configured (by Management Object) to denote MAC is part of MAC Bridge. Consequently, the stripper will pass a DATA.indicate primitive to the MAC Bridge Client

   d. Stripper checks DA of packet. Since unicast and not equal to address of MAC entity, pass packet onto Tandem Buffer.

   e. Bridge Relay Entity will perform appropriate Bridging functions (forwarding, learning, etc.).

   f. Tandem Buffered packet is passed to Arbiter Entity to be sent out outgoing ringlet.

3. At S3:

   a. Header Processor Entity receives packet off ringlet.

   b. TTL gets decremented.

   c. Stripper checks DA of packet. Since unicast and equal to address of MAC entity, packet removed from the ring, and DATA.indicate primitive is sent to MAC client.

Conclusions

- 802.17 MAC can be compliant to 802.1D/Q Bridging.

- Spanning Tree Protocol conformance can be achieved. Careful engineering of the RPR within the network would be required if STP is enabled.

- 802.17 to 802.17 Transparent Bridging does not transparently transfer the RPR Header from Ring to Ring. The contents of the RPR Header is local to the Ring.