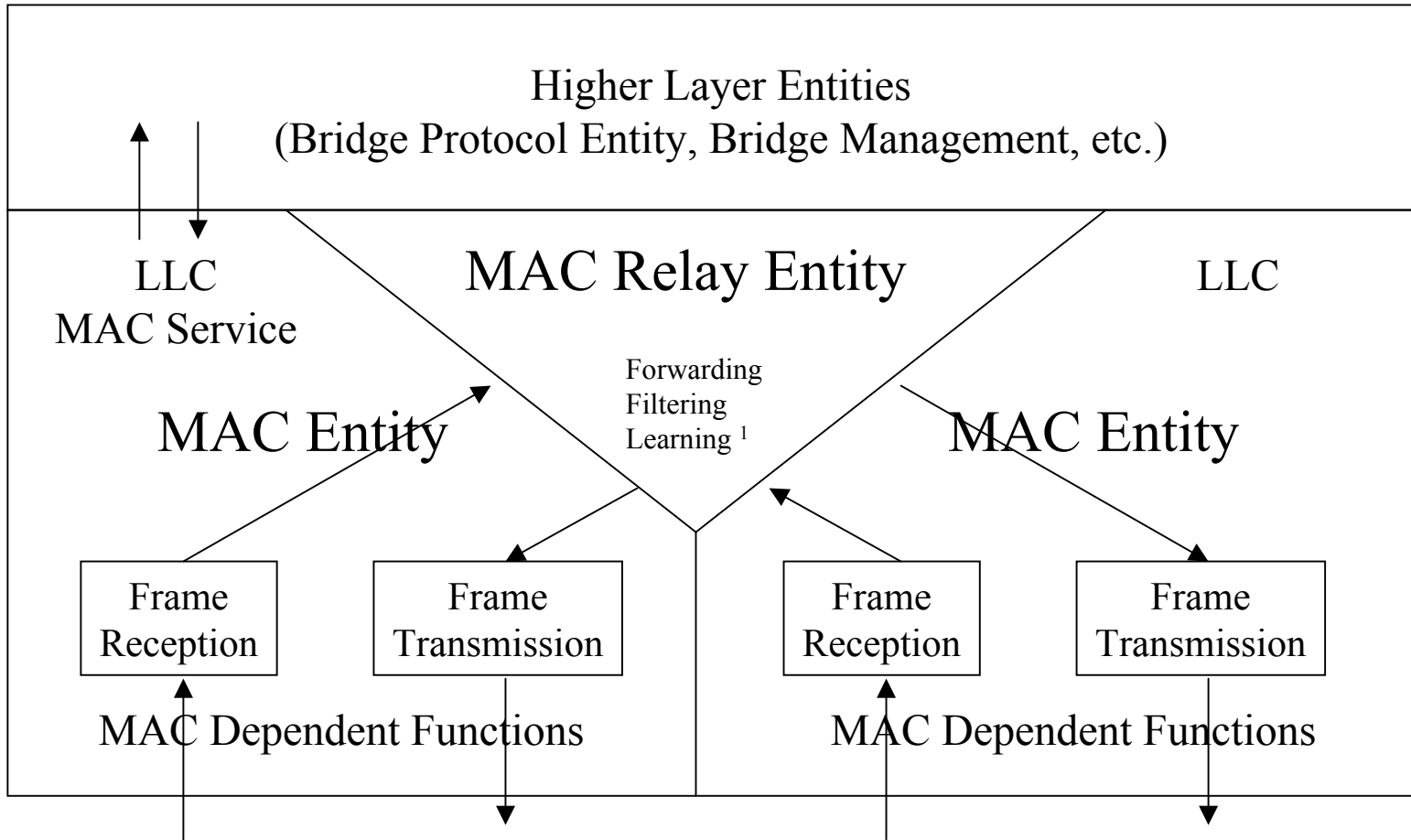


Encapsulation Bridging and 802.17

Robert Castellano, Jedai Broadband Networks

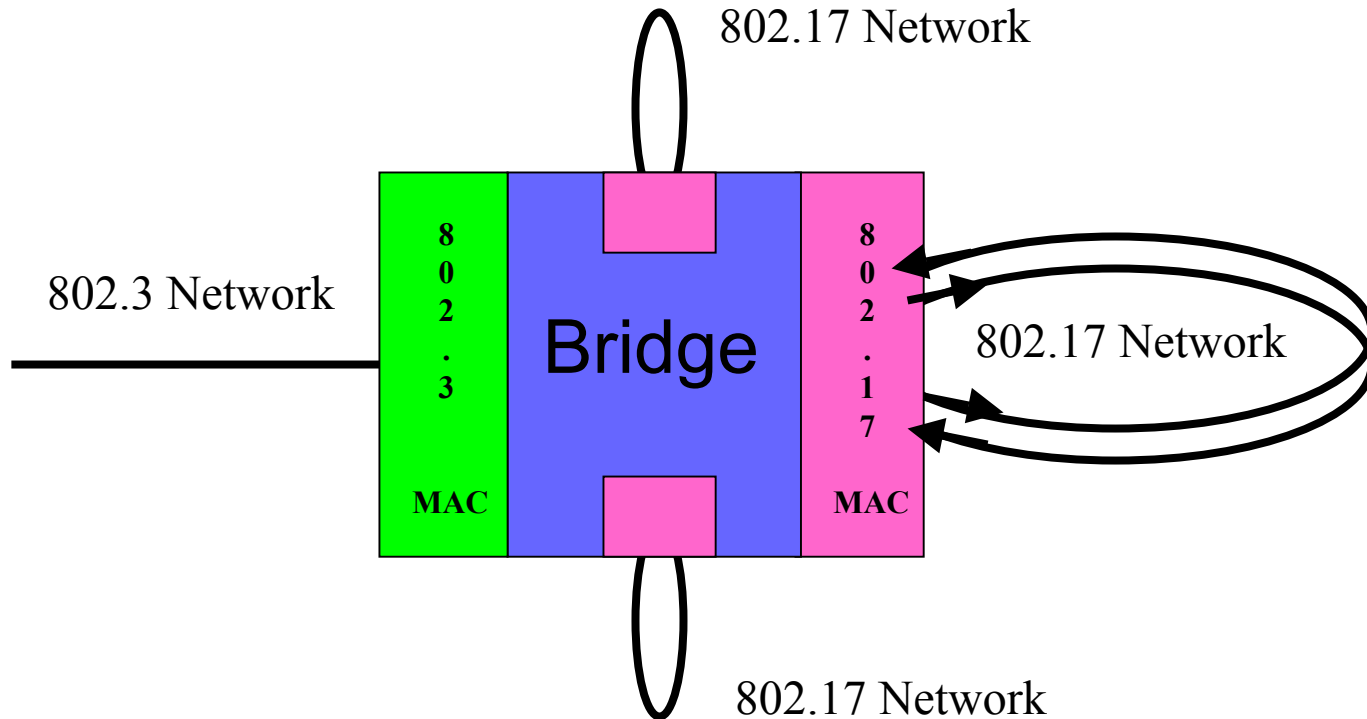
- 802.1D - Media Access Control Bridges (scope)
 - Specifies an architecture and protocol for the interconnection of IEEE 802 LANs below the MAC Service boundary
 - Interconnection of stations of different MAC types
 - Positions the bridging function within an architectural description of the MAC Sublayer

802.1D Bridge Architecture Model

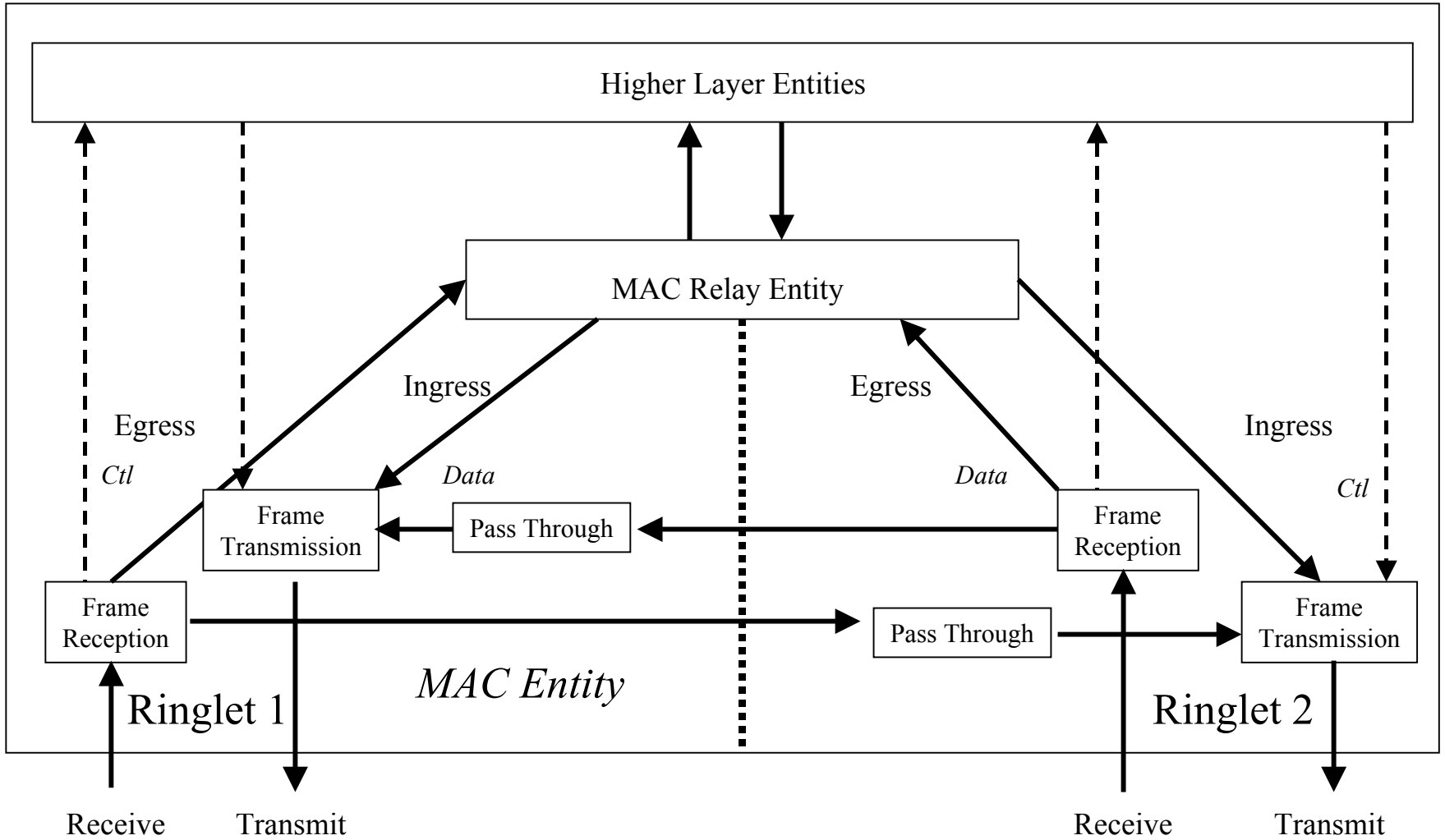


1. Internal Sublayer Service

Bridging w/ 802.17 and other interface types



802.17 MAC



Bridging Presentations from July Meeting

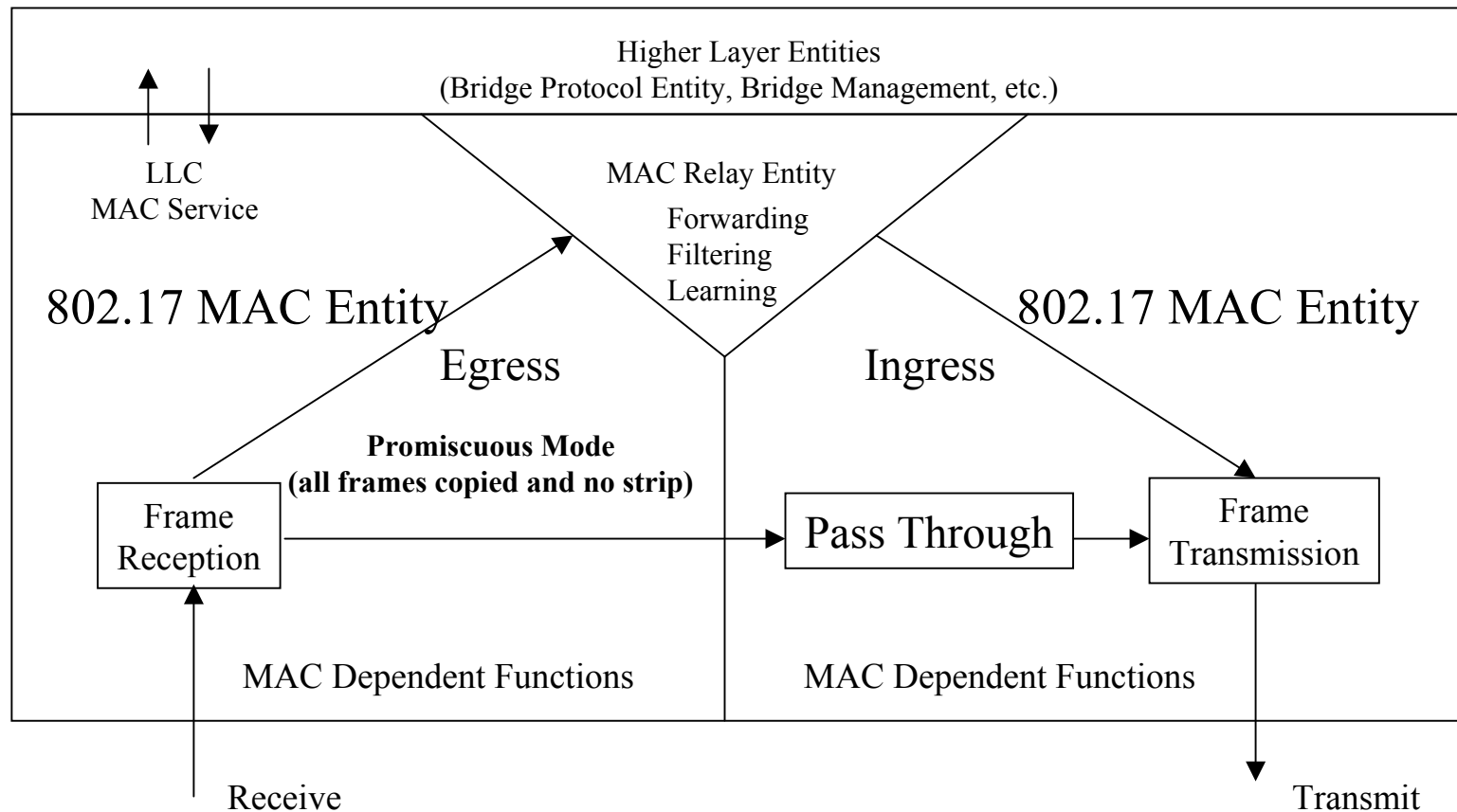
- Bridging over RPR ([ga_tbridg_01.pdf](#)) – Kao, Aybay, Uzun
 - **Recommend** Encapsulation Bridging is simplest solution for RPR
 - Encapsulation Bridging function done in the MAC Relay Entity
- Bridging Packet Walkthroughs ([hp_brdg_02.pdf](#)) – Wui, Peng, Bassias
 - Single/Double Encapsulation Bridging
 - Single – Bridging is done in the MAC Entity
 - Double – Bridging is done in the MAC Relay Entity
(Recommended)
 - Ethernet Service with Encapsulated Bridge – Bridging done in the MAC Relay Entity

Bridging Issues

- How to handle the Egress vs. Pass-through Traffic?
 - Transparent Bridging (Bridge FDB in MAC Relay – Promiscuous mode).
 - Transparent Bridging (Bridge FDB in the MAC Entity)
 - Encapsulation Bridging (Bridge FDB in MAC Entity)
 - Encapsulation Bridging (Bridge FDB in MAC Relay)
- How to handle bridging between 802.17 end stations

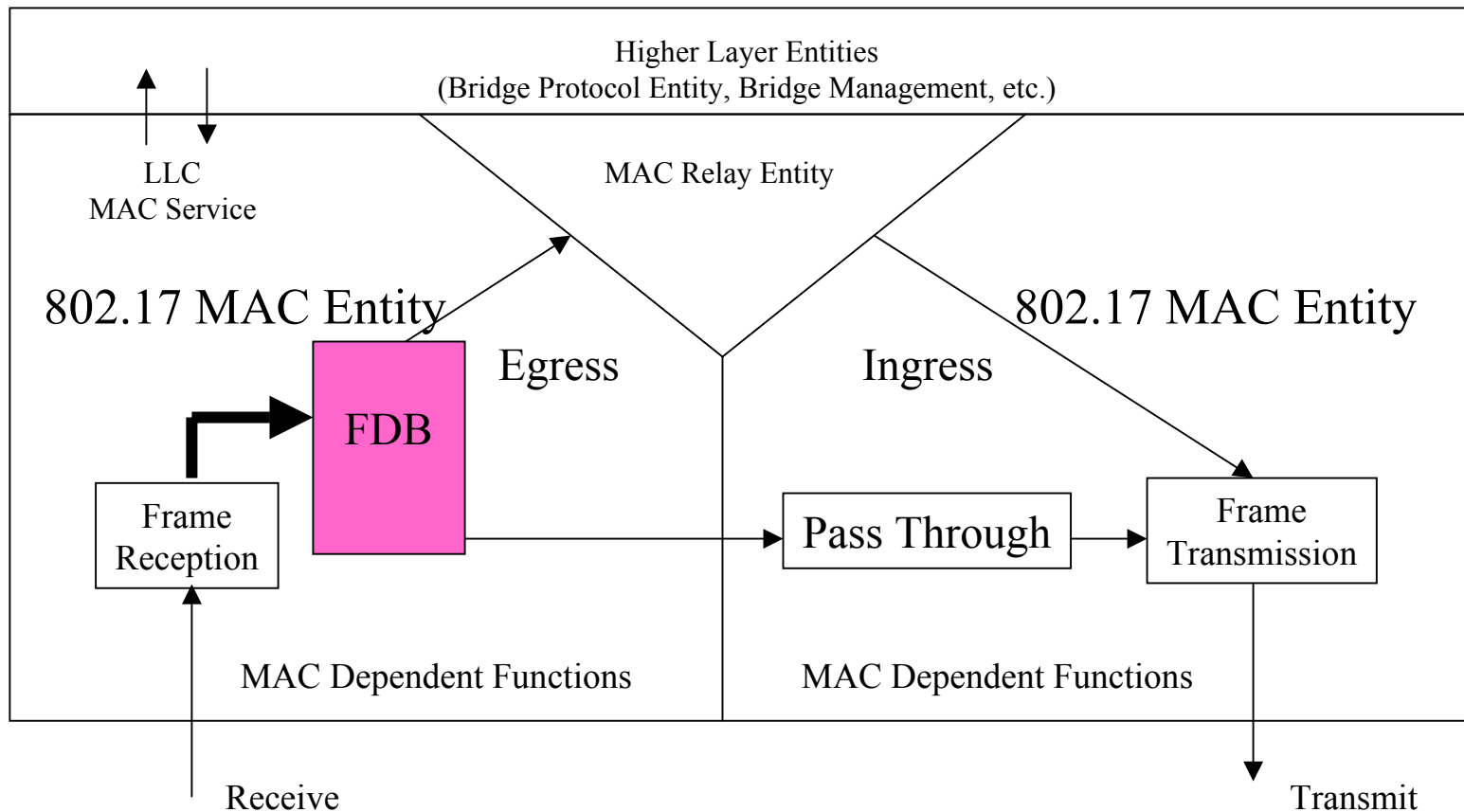
Transparent Bridging with Promiscuous Mode

Extremely Bandwidth Inefficient



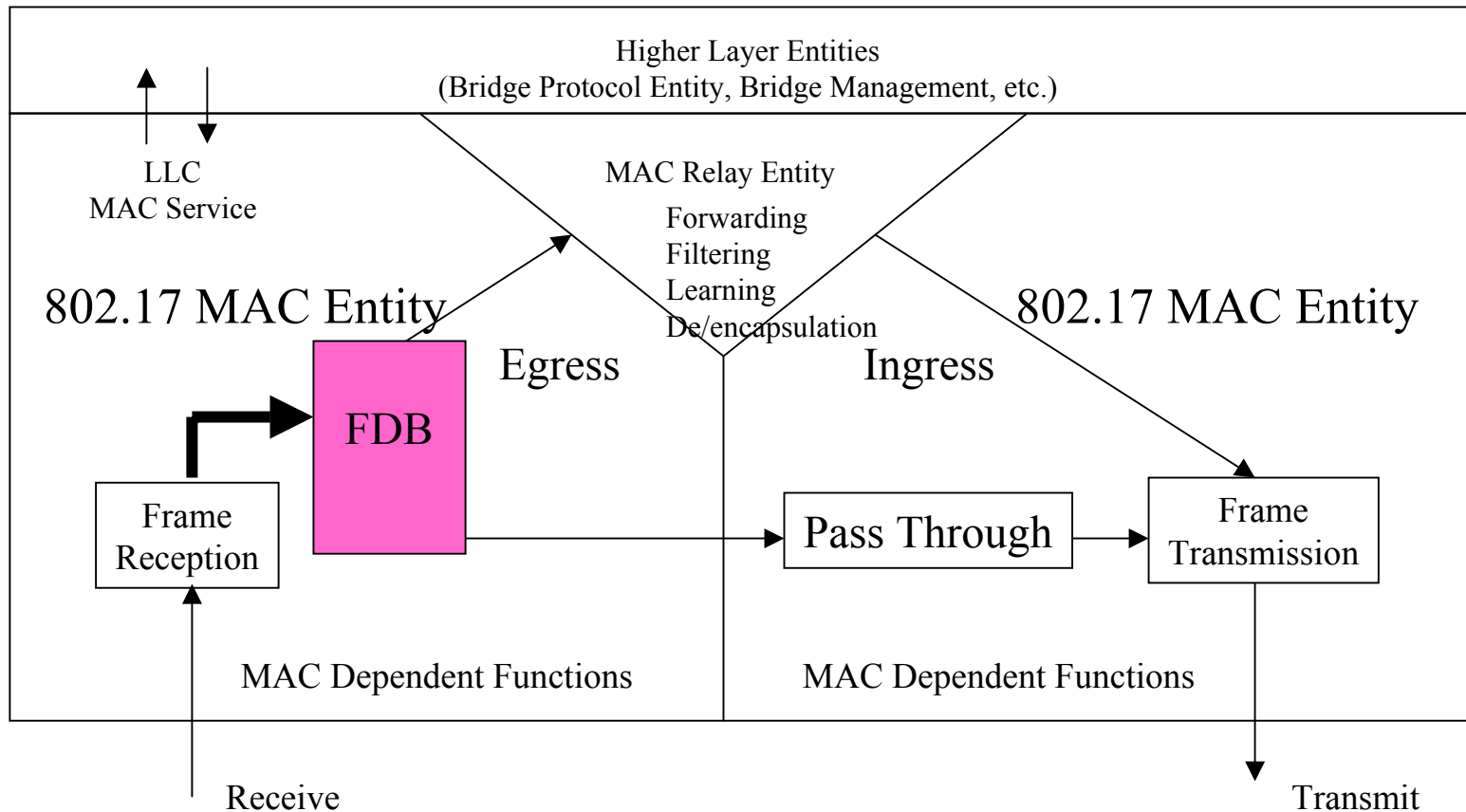
Transparent Bridging w/FDB in MAC Entity

Significant Complexity, Not Scalable, Not always Required,
Outside Scope of 802.17 Standard???



Encapsulation Bridging w/FDB in MAC Entity

Issues same as identified w/transparent bridging,
additional complexity and overhead of encapsulation



Encapsulation Bridging in MAC Relay /1

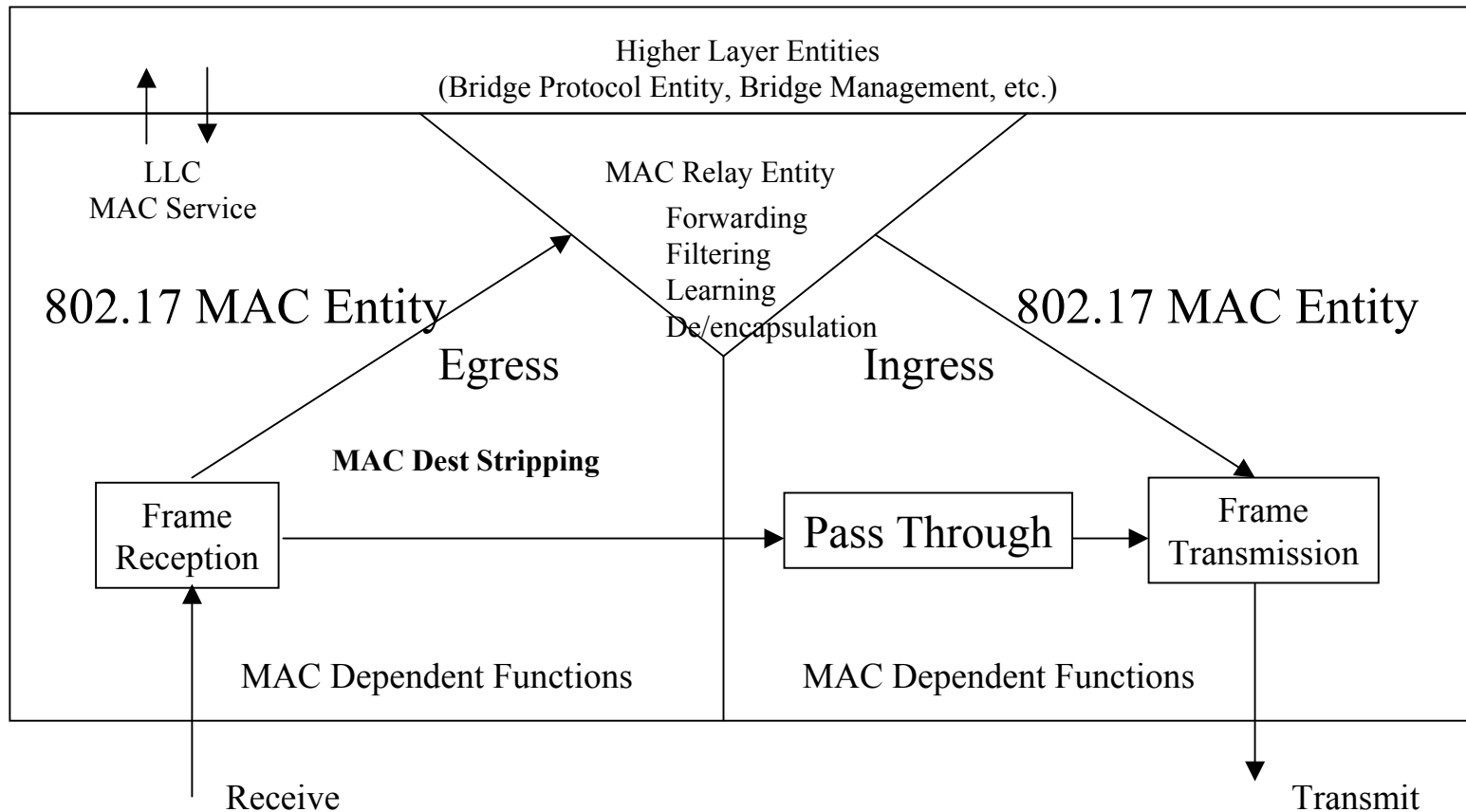
- Encapsulation bridging is performed in the MAC Relay function.
- RPR MAC addresses are local to an 802.17 ring
 - The MAC entity copies frames to the upper layer based on either an exact match of frame's MAC_D with the RPR station's MAC address and all broadcast/multicast frames.
 - Frames where MAC_D is not the stations's address nor the broadcast address are not stripped and passed through to the ingress ringlet.
 - RPR MAC station address is not propagated across multiple rings

Encapsulation Bridging in MAC Relay /2

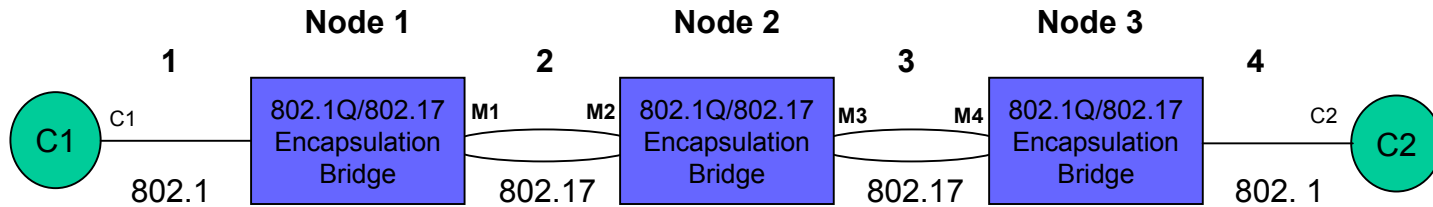
- Egress Path Processing
 - Receive frames are copied/stripped or copied/not-stripped based on the above addressing rules.
 - RPR MAC addresses are de-encapsulated by MAC relay entity. RPR MACs is learned and bound to Client MACs in the FDB.
 - Client MAC_D is looked up in the FDB to determine destination interface. If known, RPR MAC_D is added to the RPR encapsulation header, and unicast to the destination interface. If unknown, the packet is flooded to all interfaces (except ringlets associated with incoming ring interface).
- Ingress Path Processing
 - MAC relay entity adds the RPR interface MAC address to the frame's MACs in the RPR encapsulation header.

Encapsulation Bridging with FDB in MAC Relay

Addresses Transparent Bridging Issues Bridging Complexity located in the MAC Relay



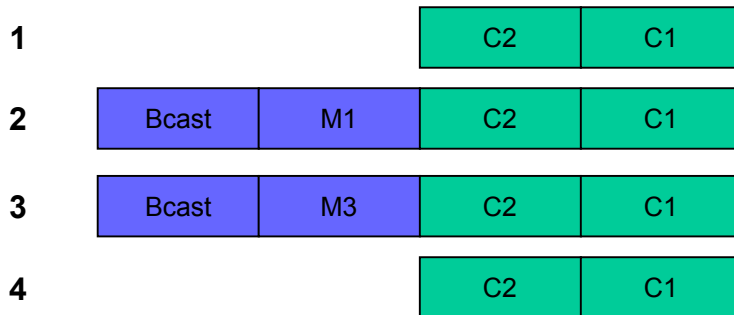
Encapsulation Bridging over RPR - Example



Packet from C1 to C2

Encapsulation Header

RPR DA	RPR SA	802.1 DA	802.1 SA
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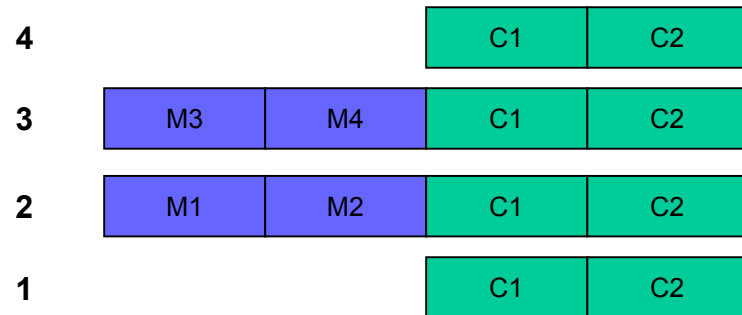


Bridge Table at Node 2
C1 learned RPR DA/SA – M2/M1
C2 Unknown

Packet from C2 to C1

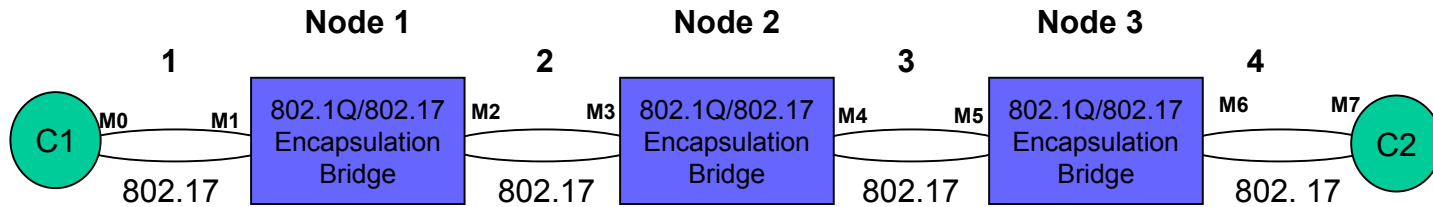
Encapsulation Header

RPR DA	RPR SA	802.1 DA	802.1 SA
--------	--------	----------	----------



Bridge Table at Node 2
C1 – RPR DA/SA - M2/M1
C2 – learned RPR DA/SA – M3/M4

Bridging between 802.17 End Stations



Packet from C1 to C2

Encapsulation Header

RPR DA	RPR SA	802.1 DA	802.1 SA
--------	--------	----------	----------

1	Bcast	M0	C2	C1
2	Bcast	M2	C2	C1
3	Bcast	M4	C2	C1
4	Bcast	M6	C2	C1

Bridge Table at Node 2

C1 learned RPR DA/SA – M3/M2
C2 Unknown

Packet from C2 to C1

Encapsulation Header

RPR DA	RPR SA	802.1 DA	802.1 SA
--------	--------	----------	----------

4	M6	M7	C1	C2
3	M4	M5	C1	C2
2	M2	M3	C1	C2
1	M0	M1	C1	C2

Bridge Table at Node 2

C1 – RPR DA/SA – M3/M2
C2 – learned RPR DA/SA – M4/M5

Conclusions

- Encapsulation Bridging allows bridging function to be performed outside the 802.17 MAC
 - Supports bridging of 802.1 frames over 802.17
 - Supports bridging between 802.1 and 802.17end stations
 - Simplifies MAC definition and implementation
 - Single encapsulation header is sufficient, no need for a double
 - Consistent with 802 architectural model
 - Specification for Encapsulation Bridging as part of 802.17 Annex