



802.17/802.1 joint meeting on bridging related topics

Presentation from 802.17 bridging adhoc group



Objectives for Meeting with 802.1



- Discuss with 802.1 WG the various ideas and/or proposals made within 802.17 WG that pertain to the topics of bridging, Customer Separation Ids, and type definition.
- Feedback from 802.1 WG regarding scope and compliance
 - Assessment from 802.1 WG whether they see any issues with proposals being made by 802.17 WG as they relate to 802 architecture, and 802.1 bridging architecture. Discuss with 802.1 WG the scope of work and division of responsibility in these various areas. Discuss how 802.1 and 802.17 WGs proceed for areas which are believed to have overlap or belong to 802.1?



Topics /1



1. **Bridging Compatibility w/802.1D & 802.1Q**
2. Alternatives for 802.17 MAC support of ISS / ESS
3. Encapsulation Bridging
4. Customer separation Ids (CIDs)
5. Assignment of 802.17 type values
6. Bridging of larger MTUs



802.17 5 Criteria Compatibility Requirements



- Fully compatible with 802 Overview and Architecture Document
- Compatible with relevant portions of 802.1d, 802.1q, and 802.1f
- Selection of frame format subject to investigation of working group. Allow for simple mapping between 802.3 frames and RPR frames and vice versa.



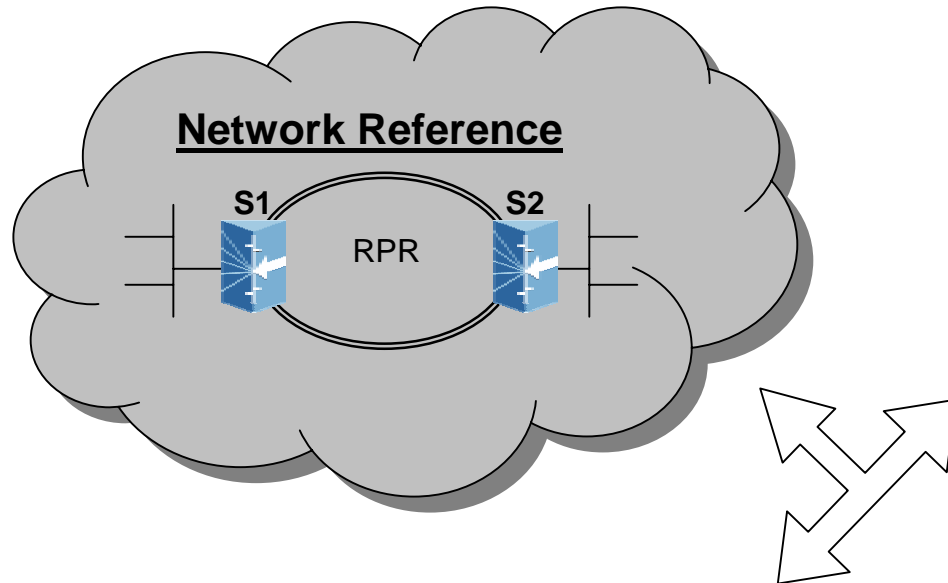
802.1D/802.1Q MAC Compatibility Requirements



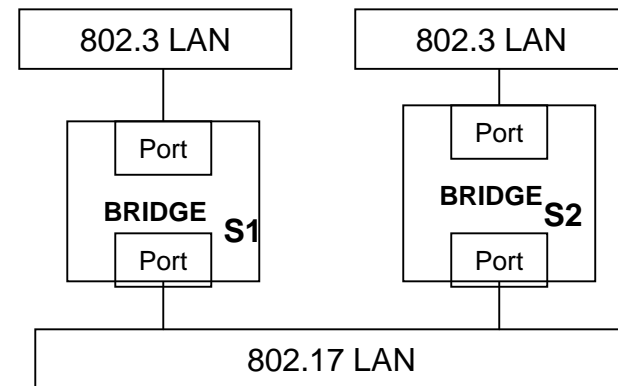
- Preservation of the MAC service
- Must handle frames with all types of end station MAC addresses
 - unicast, multicast, broadcast
- Must be able to communicate with the Higher Layer Bridge Entities (Bridge Protocol Entity / Bridge Management Entity, etc.) via the LLC sublayer
- Must be able support the Internal Sublayer Service (ISS) and the Extended ISS (E-ISS) defined in 802.1D and 802.1Q respectively through specific MAC procedures



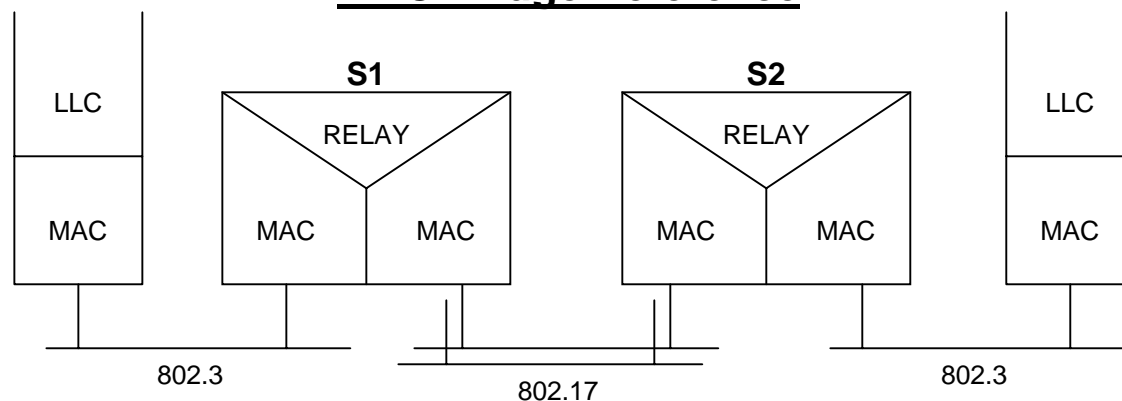
Bridging Reference for 802 / 802.17 Networks



Bridged Local Area Network



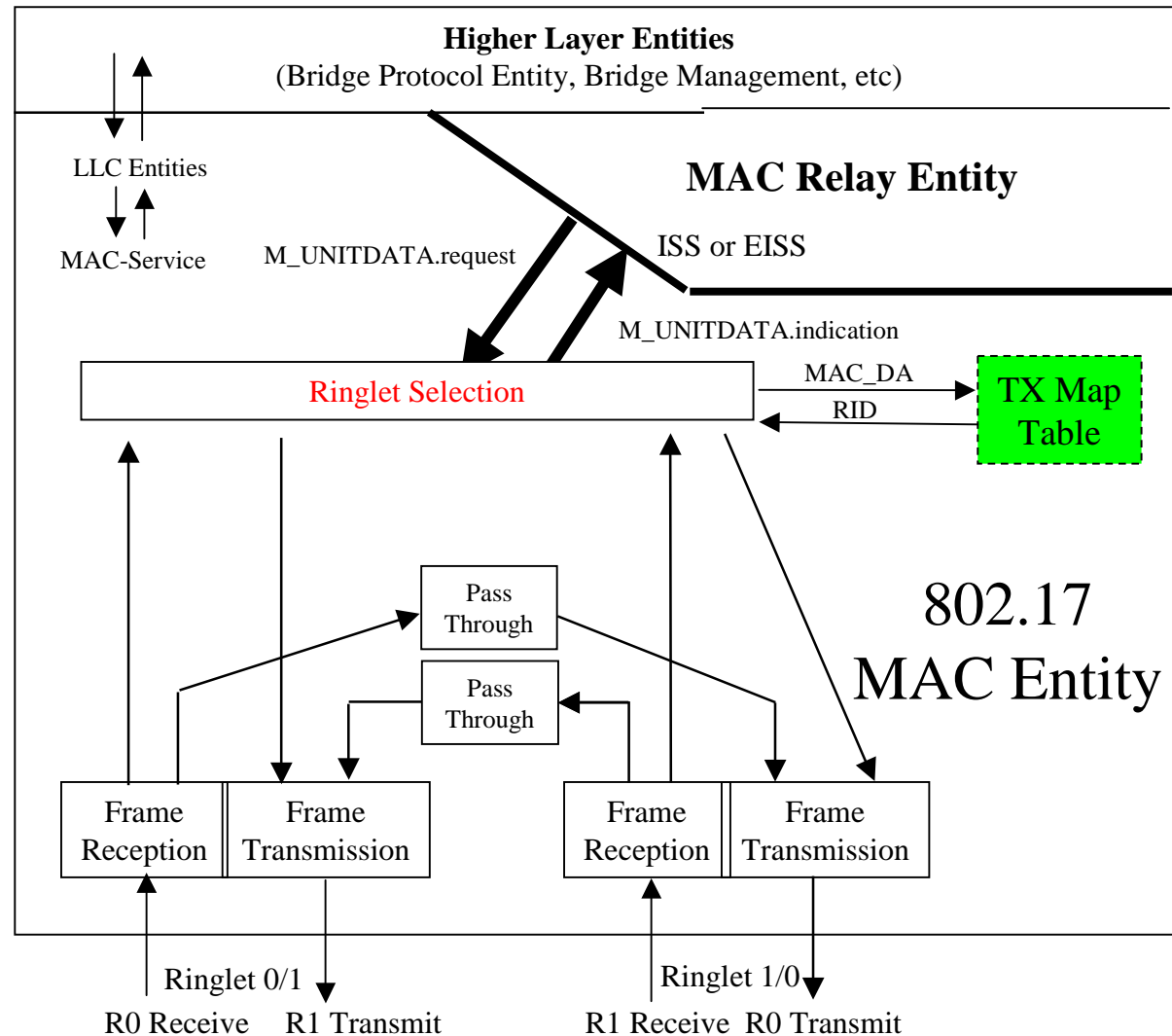
MAC Bridge Reference



- The station on the RPR is a transparent bridge; the ring is the shared medium



802.17 MAC Entity within 802.1 bridge architectural model





ISS Service Mappings for 802.17 MAC



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

802.17 Frame Fields

RPR Ctl Fields
DA
SA
MSDU
FCS

user_data_frame

request_with_no_response

Not
Applicable

Fixed mapping

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



E-ISS Service Mappings for 802.17 MAC



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

802.17 Frame Fields

RPR HEADER Fields
DA
SA
Ethernet Type
Q-Tag
MSDU
FCS

VLAN Id

*VLAN assigned
to frame from
Ingress Rules.*

*Determines
inclusion of tag
header derived
from Egress Rules.*

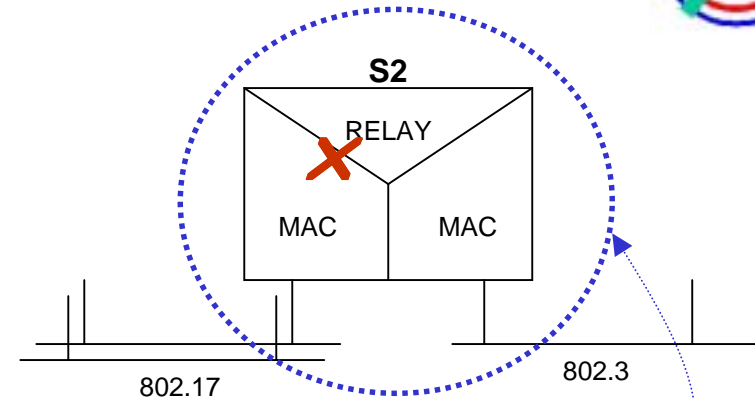
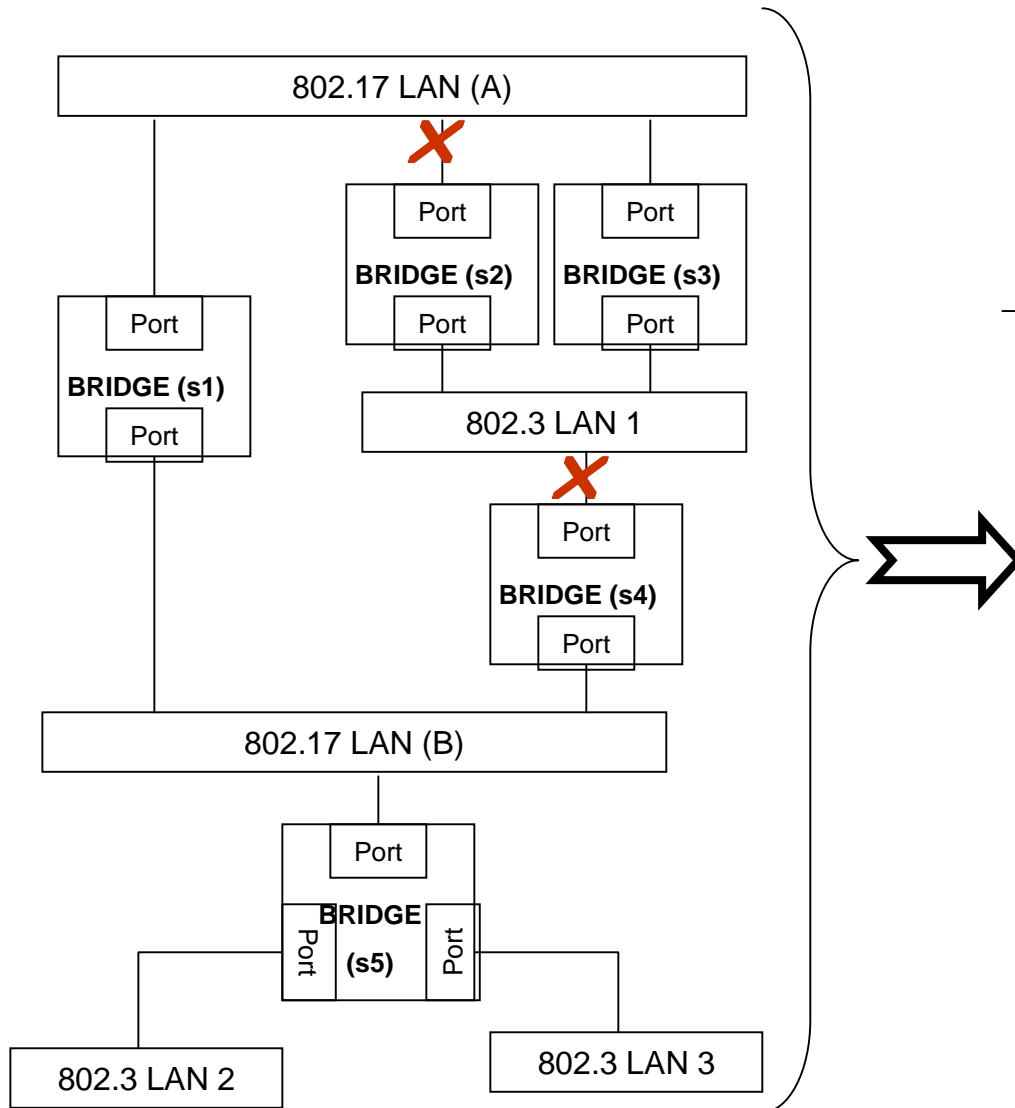
[Optional]

EM-UNITDATA.indication(MA-UNITDATA.indication.parameters, cfi, vlan_id, rif_info)

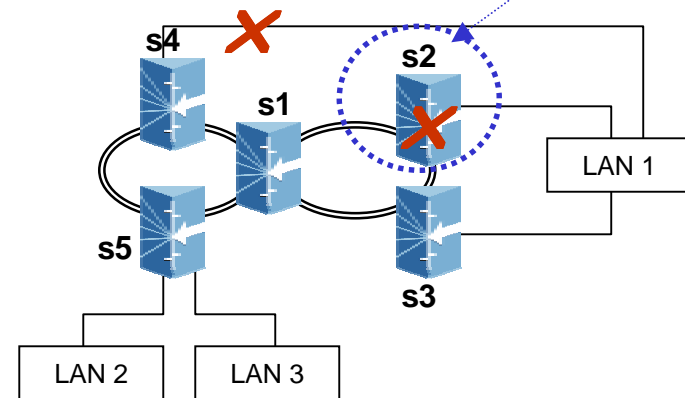


STP Interactions With 802.17

Bridged Local Area Network



Network Reference



X Denotes blocking port state due to STP.



Questions to 802.1WG on bridging compatibility



- If 802.17 standard conforms to the aforementioned criteria, models, and mappings, is 802.1D/802.1Q compatibility achieved?
- Any other criteria the MAC has to adhere to?



Topics /2



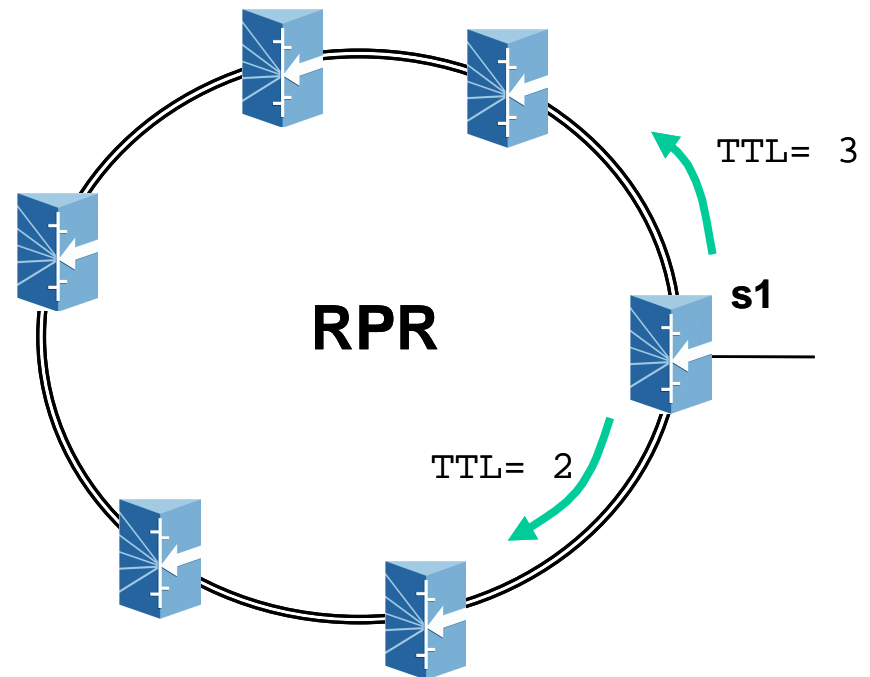
1. Bridging Compatibility w/802.1D & 802.1Q
2. **Alternatives for 802.17 MAC support of ISS / ESS**
 - Gratuitous Copying
 - 802.17 MAC enhancements to achieve spatial reuse
3. Encapsulation Bridging
4. Customer separation Ids (CIDs)
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802.1D Transparent Bridging w/Gratuitous Copying by 802.17 MAC



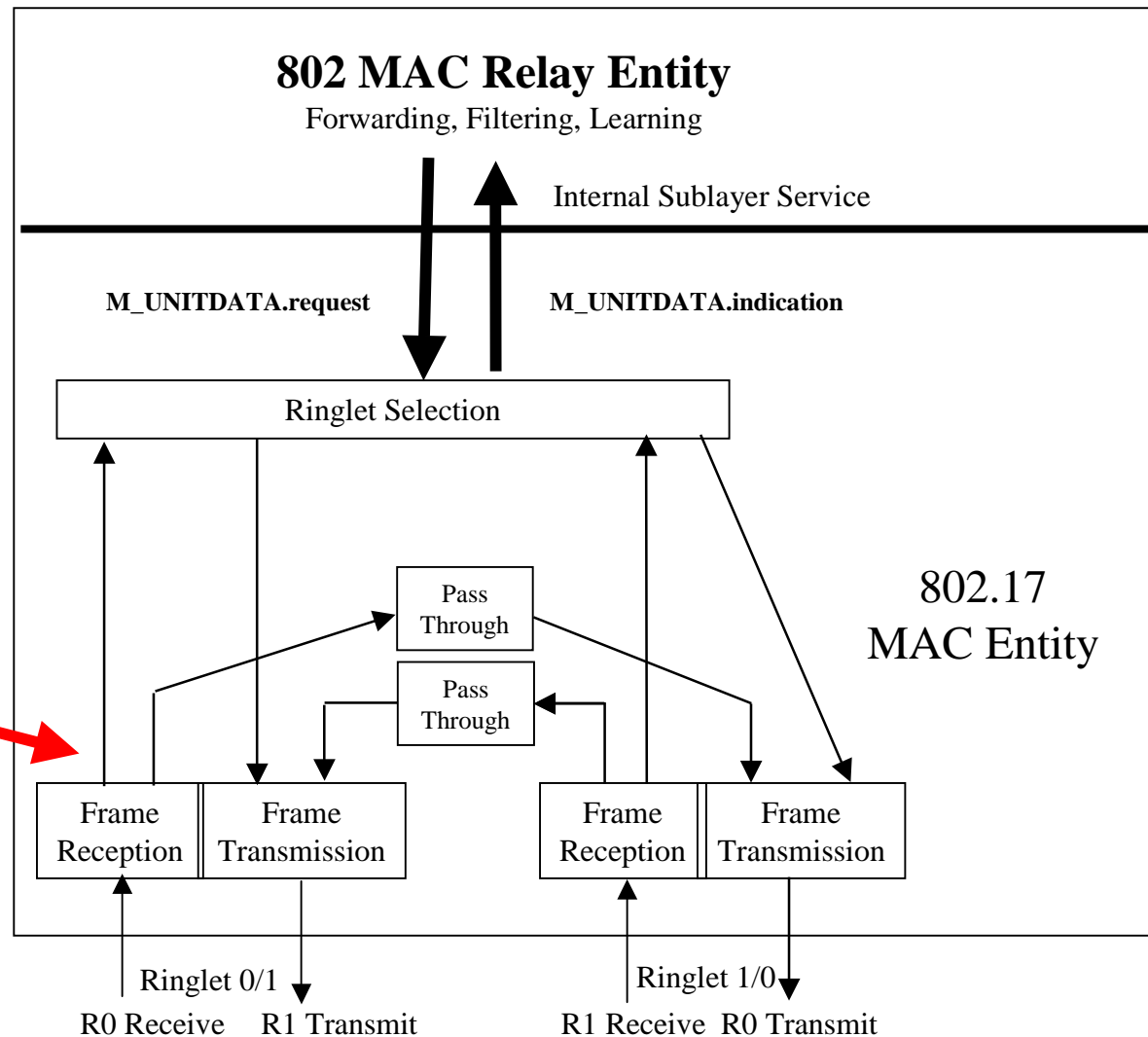
- All packets (unicast multicast, broadcast) are broadcast on the ring
- All bridge stations copy frame up to their relay entities, and replicate the packet on the transit path
- TTL is used to strip packet from ring. (TTL set to ensure stations do not receive a duplicate frame)
- Every frame traverses every segment of the entire ring
- **No Spatial Reuse**





Gratuitous Copy by 802.17 MAC

Gratuitous Copy
(all received frames copied
and no DA/SA strip,
TTL strip only)





802.17 Spatial Reuse Requirements



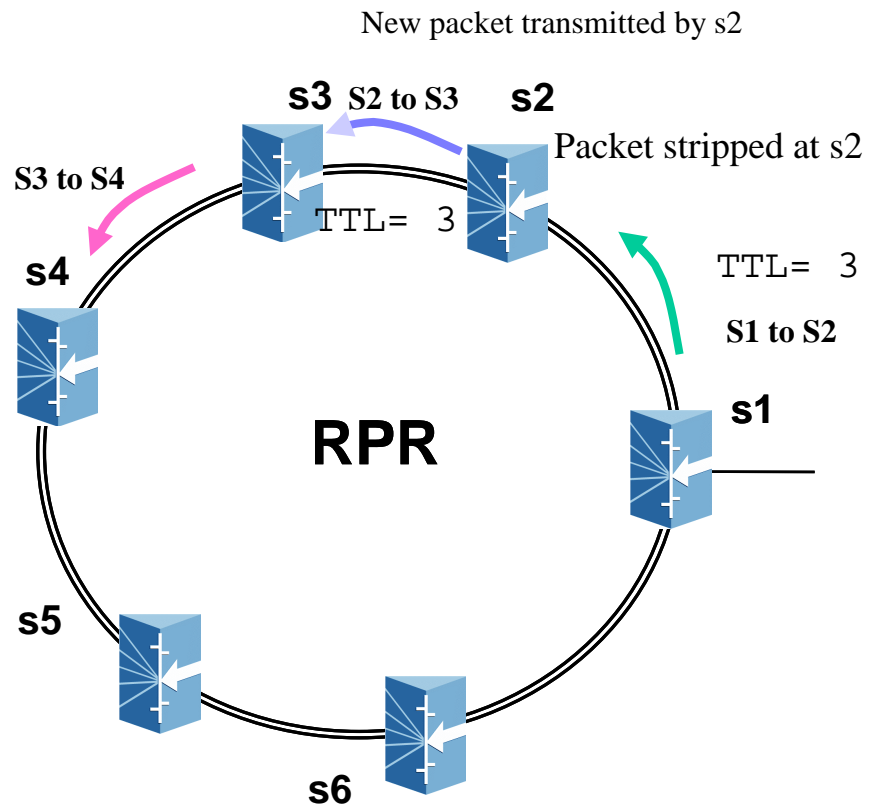
- 802.17 5 Criteria (Distinct Identity)
802.17 addresses the unique combination of :
 - **bandwidth multiplication with dynamic and fair bandwidth allocation on a ring.**
 - high speed (622 Mbps and above) ring topologies optimized for packet transmission.
 - specifies a bandwidth sharing algorithm for high data rates and wide area network distances
- 802.17 Technical Motion (89 / 1 / 4 Pass)
 - Requirement: The MAC shall support destination removal for unicast packets during normal operation.



802.17 Transparent Bridging w/Spatial Reuse Bridging Enhancements



- 802.17 Frame Tx/Rcv enhancements allow frames to be destination stripped from ring allowing spatial reuse property to be achieved on the ring.
- TX MAC entity uses a tx mapping table to encode an absolute/relative station_ID in the 802.17 frame which will be used by receiving stations to strip frames from the ring
- **Spatial Reuse**





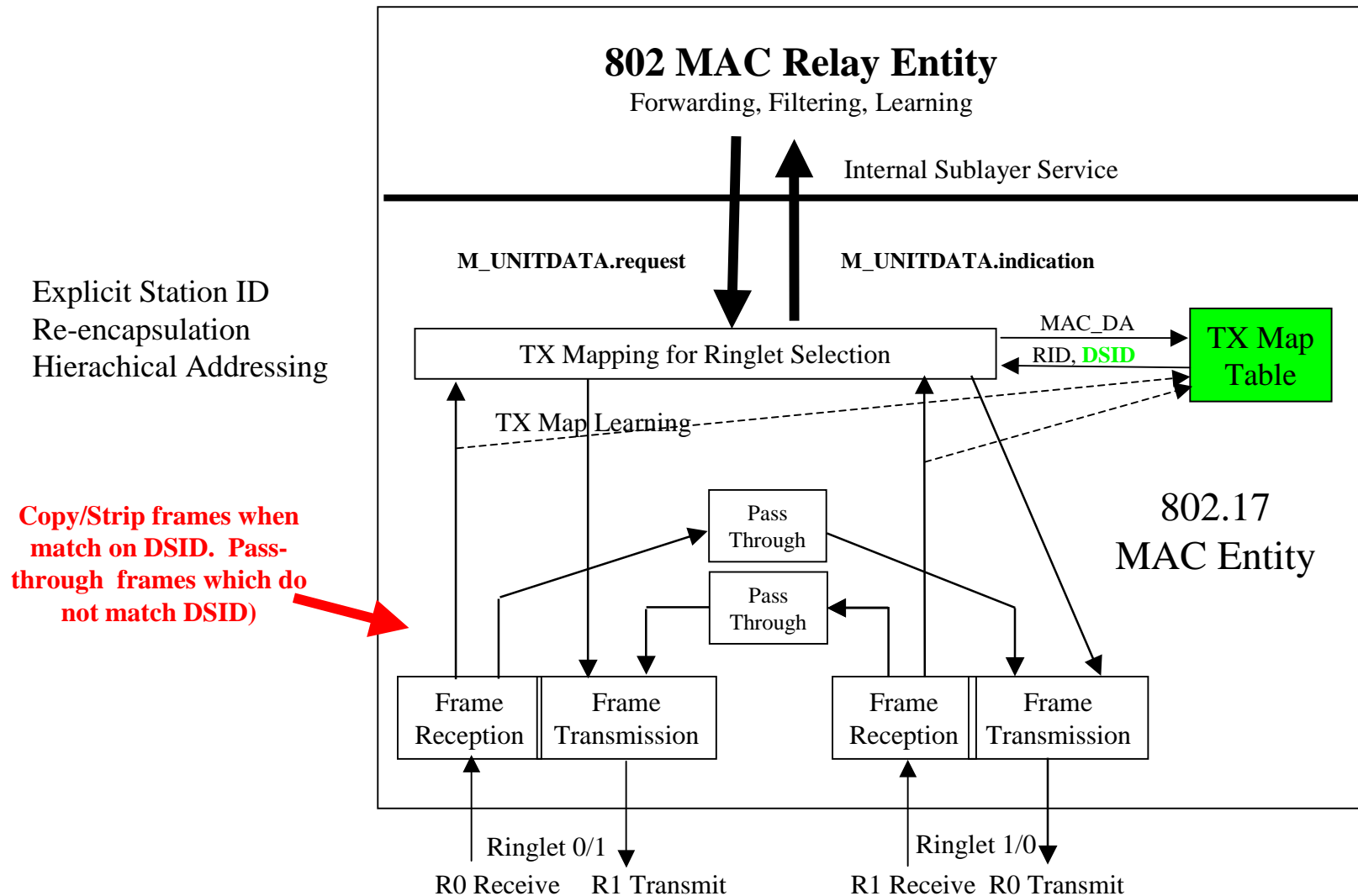
Bridging Proposals for Spatial Reuse



- Explicit Station ID as part of the 802.17 frame header
- Re-encapsulation of MAC PDU header with full 48-bit source/destination/type ID. Specific type required to indicate full reencapsulation header.
- FDB in Transit Path
- Hierarchical addressing with MAC SA/DA + RingID

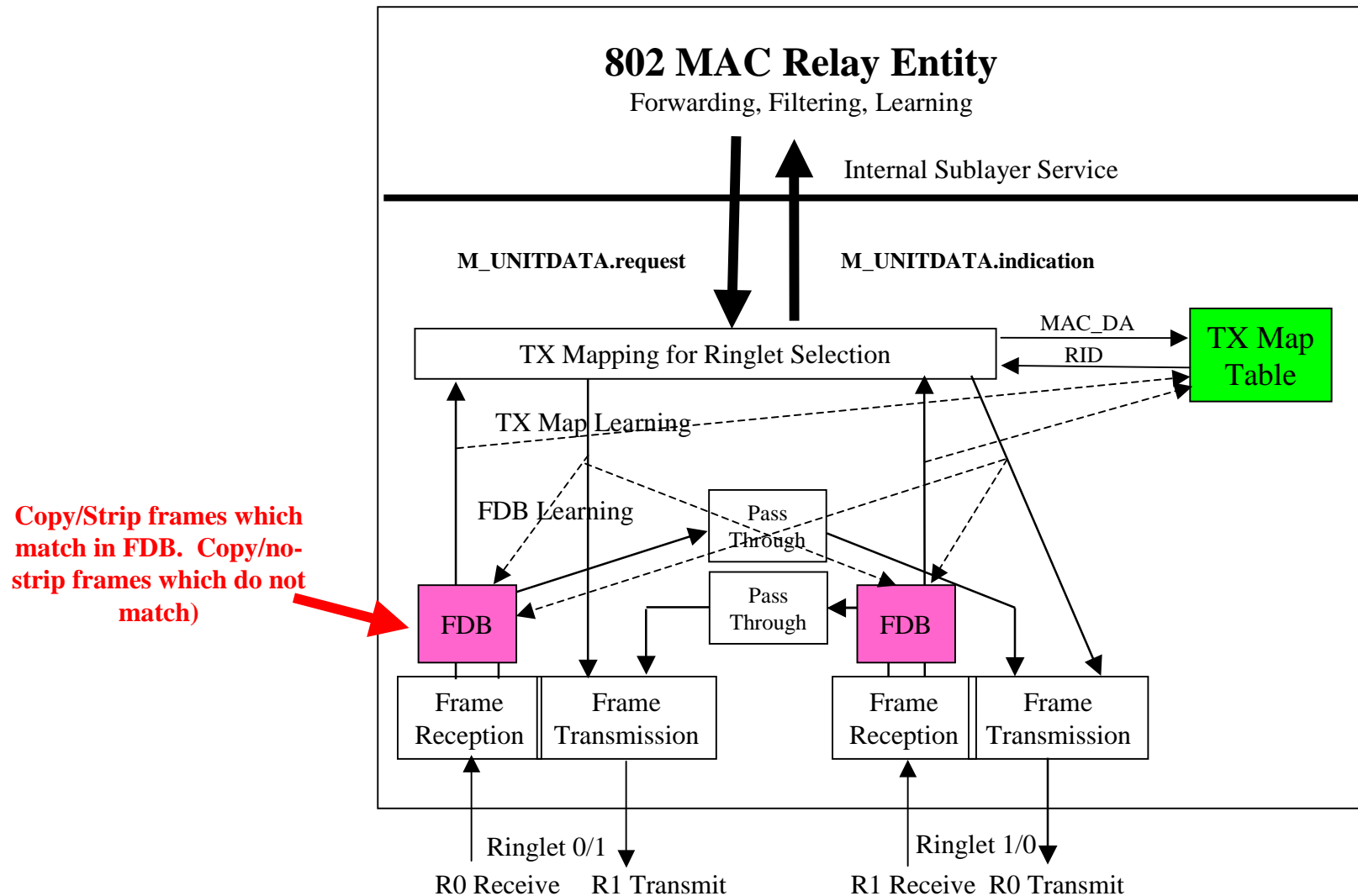


Transparent Bridging w/ explicit absolute/relative Destination Stripping





Transparent Bridging w/ FDB in Pass-through Path

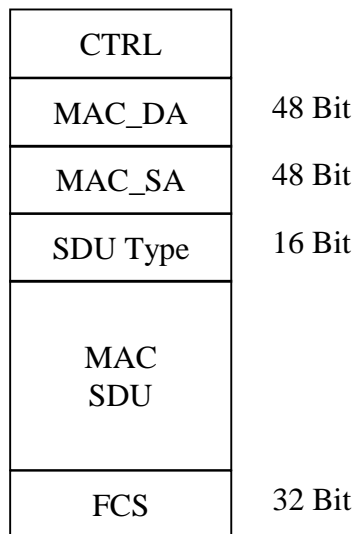




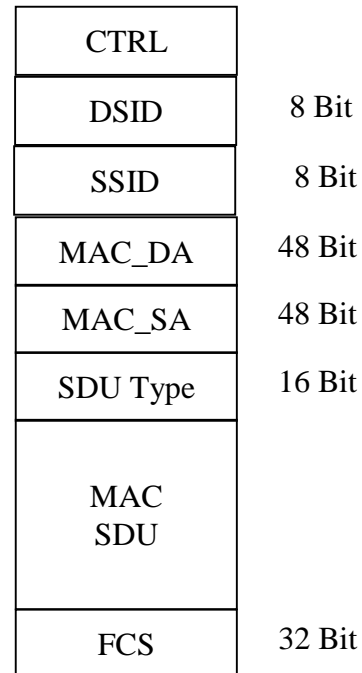
Example 802.17 frame formats for various TB techniques



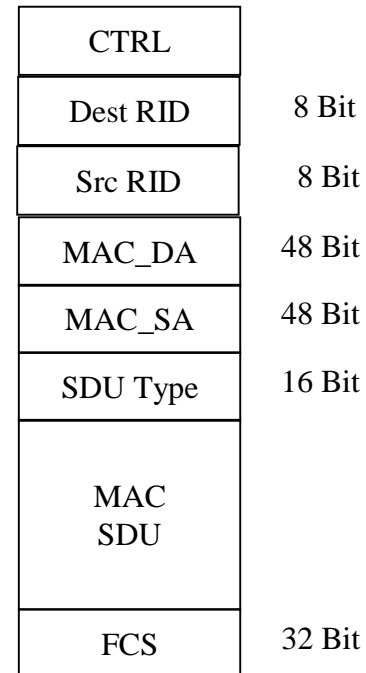
Gratuitous Copy FDB in Transit



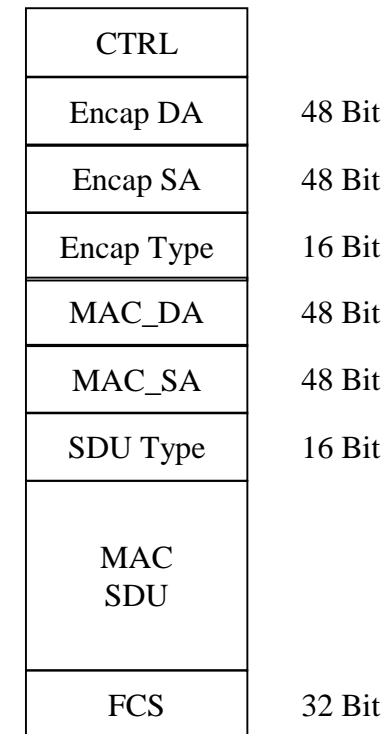
Explicit SID



Hierarch Addr



Reencapsulation





Questions to 802.1WG on proposed 802.17 TB techniques



- If Spatial reuse proposals maintain the following :
 - Do not change the end station source/destination MAC addresses
 - Only change control header information associated with the frame as frame is put onto the medium (e.g. identifiers)
 - MAC entity performs a simple mapping of 802.3 packets to 802.17 frames via mapping table or FDB
 - Mapping database between frame identifiers and end station MAC addresses
 - Conforms to the 802.1D / 802.1Q ISS/EISS definitions
 - The 802.17 ring may not always behave as a pure broadcast medium for all unicast traffic (I.e. not every packet transiting the ring will be received by every bridge relay entity).

Is compatibility with 802.1D / 802.1Q maintained?



Topics /3



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Encapsulation Bridging



- Proposals made to 802.17 the MAC address tunneling and FDB scaling benefits of encapsulation bridging for carrier environments
 - Encap bridging consistent with 802 and 802.1 architecture?
 - Is this within the scope of 802.1 and something they plan to address in future and/or something that can be defined by 802.17 under 802.1 review?
 - Have other 802 groups shown any interest in encap_bridging or solving overall bridge filtering database scalability issues?
 - Why hasn't encapsulation bridging been standardized?
 - What are the pitfalls?



Topics /4



1. Bridging Compatibility w/802.1D & 802.1Q
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Needs for Customer ID



- Customer ID (cust_id) needed for traffic separation of different customers on single/multiple 802.17 and other 802 LAN segments
- Provide isolation/administrative domains for service provider MANs
 - Distinct administrative control from 802.1Q VLANs
 - Support for significantly more cust_ids than that provided by 802.1Q (>1million?)
- Preserve customer 802.1Q VID transparency across an RPR ring
 - Customers may have overlapping VLANs
 - Also need to ensure that one customer's addresses are not learned in another's
- Needed for providing TLS over the MAN



Questions for 802.1 on CID



- Scope/Interest questions:
 - Does 802.1 consider customer separation ID within 802.1 scope or within the scope of 802.17?
 - Have other groups expressed an interest or need in CID?
 - Is this something 802.1 would consider in future or something that can be proposed to 802.17 under 802.1 review?
- Architecture question:
 - Does 802.1 see any issues with the different possible CID semantics discussed within 802.17 : Globally unique within the bridged LAN/MAN network, or locally unique within each individual LAN/MAN segment of the bridged network.



Topics /5



1. Bridging Compatibility w/802.1D & 802.1Q
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- 5. Assignment of 802.17 type values**
6. Bridging of larger MTUs



Assignment of 802.17 Type Values



- Need for Frame type definitions have been proposed for 802.17 for : control messaging, header extensions for data packets (CID, protected headers, etc.), new data formats (TDM or other data payload types).
- Is 802.17 free to define their own frame specific type values/semantics or must they be assigned by IEEE registration authority?



Topics /6



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- 6. Bridging of larger MTUs**



Bridging of large MTUs



- 802.17 has discussed support for increased MTU sizes
- We don't anticipate any architectural issues with increased MTU sizes as it pertains to 802.1 bridging. 802.1 MAC relay entity should be capable of forwarding large MTU sized frames between interfaces supporting the larger MTU, and discard frames when MTU exceeds MTU of destination interface.



Thank You !!!