

1. 802.1D and 802.1Q Bridging Conformance

1.1 Overview

This section of the draft does not define a new Bridging specification. It demonstrates that a bridge device fully compliant with the IEEE 802.1D and IEEE 802.1Q standards can be built on an IEEE 802.17 MAC. Because the IEEE 802.17 MAC does not operate in a manner similar to other broadcast MACs such as IEEE 802.3 and IEEE 802.5, this section clarifies the behavior of an IEEE 802.17 MAC when used in a station configured for operation in a MAC bridge. The section also describes the primitives when using an IEEE 802.17 MAC that are required for supporting the Internal Sublayer Service (ISS) and the Extended Internal Sublayer Service (E-ISS), as defined in IEEE 802.1D and IEEE 802.1Q respectively.

The MAC Bridging reference model for 802.17 is shown in Figure 1-1. The stations on the Ring act as the MAC Bridge, while the Ring acts as the shared media. Stations acting as Bridges are configured to do so through the appropriate Layer Management function.

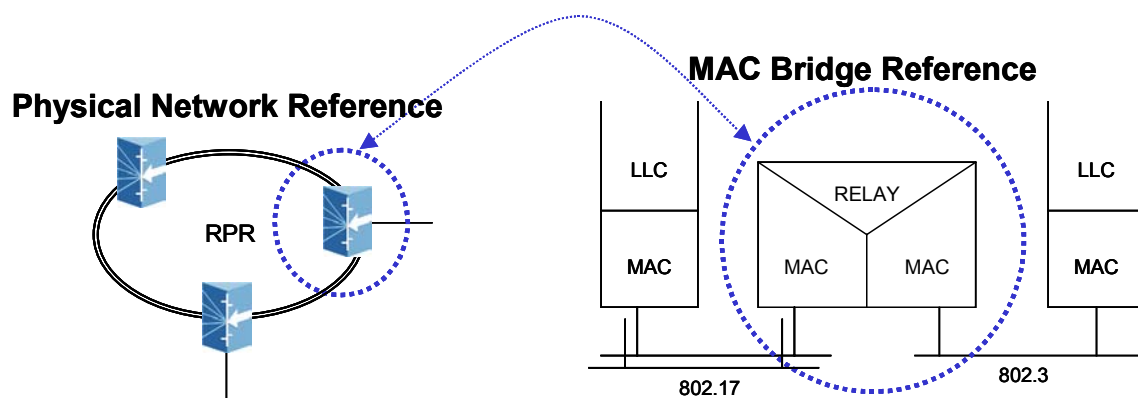


Figure 1-1: Bridge Architecture Reference

The 802.17 MAC conformance to the aforementioned Bridging standards¹ can be achieved if the 802.17 MAC satisfies the following requirements:

¹ IEEE 802.1D and 802.1Q Standards.

- 1) The RPR MAC must provide an Internal Sub-Layer Service (ISS), which is used to interface with the Bridging Relay Entity. The ISS will conform to Section 6.4 of the IEEE Std 802.1D and Section 7.1 of the IEEE Std 802.1Q, when appropriate.
- 2) The RPR MAC must be able to communicate with the Bridge Protocol Entity via the LLC sub-layer, in conformance with the Bridging specifications.
- 3) The RPR MAC must be able to transmit bridged frames appropriately over the RPR shared media. This includes handling of unknown unicast, broadcast, and multicast frames.
- 4) The RPR MAC must be able to receive frames from the Ring (i.e., shared media) and determine whether they need to be bridged or not.
- 5) The RPR MAC transmission and reception rules shall allow end stations and bridges to coexist on the Ring.

1.2 802.17 MAC Internal Sub-Layer Service

The ISS is provided by a MAC Entity to communicate with the MAC Relay Entity. The interface for this sub-layer is defined in the 802.1D and 802.1Q specifications. The RPR MAC will adhere to these specifications.

1.2.1 802.17 MAC Support of Internal Sub-Layer Service

The RPR MAC access method is specified in the draft. Clause 8 specifies the MAC frame structure, and Clause 5 specifies the MAC method.

On receipt of a MA_UNITDATA.request primitive, the local RPR MAC Entity performs Transmit Data Encapsulation, assembling a frame using the parameters supplied as specified below.

On receipt of an RPR MAC frame by Receive Media Access Management, the MAC frame is passed to the Reconciliation Sub-layer which disassembles the frame into parameters, as specified below, that are supplied with the MA_UNITDATA.indication primitive.

The **frame_type** parameter takes only the value *user_data_frame* and is not explicitly encoded in MAC frames.

The **mac_action** parameter takes only the value *request_with_no_response* and is not explicitly encoded in MAC frames.

The **destination_address** parameter is either the address of an individual MAC entity or a group of MAC entities. It is the MAC address of the intended destination entity, independent of whether the entity is local or non-local (e.g., bridged) to the Ring.

The **source_address** parameter is the individual address of the source MAC entity. It is the MAC address of the originating entity, independent of whether the source entity is local or non-local (bridged) to the Ring.

The **mac_service_data_unit** parameter is the service user data.



The **user_priority** parameter provided in a data request primitive is not encoded in the 802.17 MAC frame. The user_priority parameter provided in a data indication primitive takes the value of the Default User Priority parameter for the Port through which the MAC frame was received.

The **access_priority** parameter provided in a data request primitive is derived by a fixed 802.17 mapping. The fixed mapping is depicted in Table 1-1. The values shown are not modifiable by management or other means.

Table 1-1: Outbound Access Priorities

user_priority	Outbound Access Priority per MAC method									
	802.3	802.17	8802-4	8802-5 (default)	8802-5 (alternate)	8802-6	802.9a	8802.11	8802-12	FDDI
0	0	0	0	0	4	0	0	0	0	0
1	0	0	1	1	4	1	0	0	0	1
2	0	0	2	2	4	2	0	0	0	2
3	0	0	3	3	4	3	0	0	0	3
4	0	0	4	4	4	4	0	0	4	4
5	0	0	5	5	5	5	0	0	4	5
6	0	0	6	6	6	6	0	0	4	6
7	0	0	7	6	6	7	0	0	4	6

The **frame_check_sequence** parameter is encoded in the FCS field of the MAC frame. The FCS is computed as a function of the destination address, source address, length, RPR Header, and data fields. If a MA_UNITDATA.request primitive is not accompanied by this parameter, it is calculated in accordance with Annex G of this draft.

Figure 1-3 below shows the mapping of the MA-UNITDATA.request primitive parameters to the RPR MAC frame fields, and the mapping of the RPR MAC frame fields to the MA-UNITDATA.indication primitive parameters.

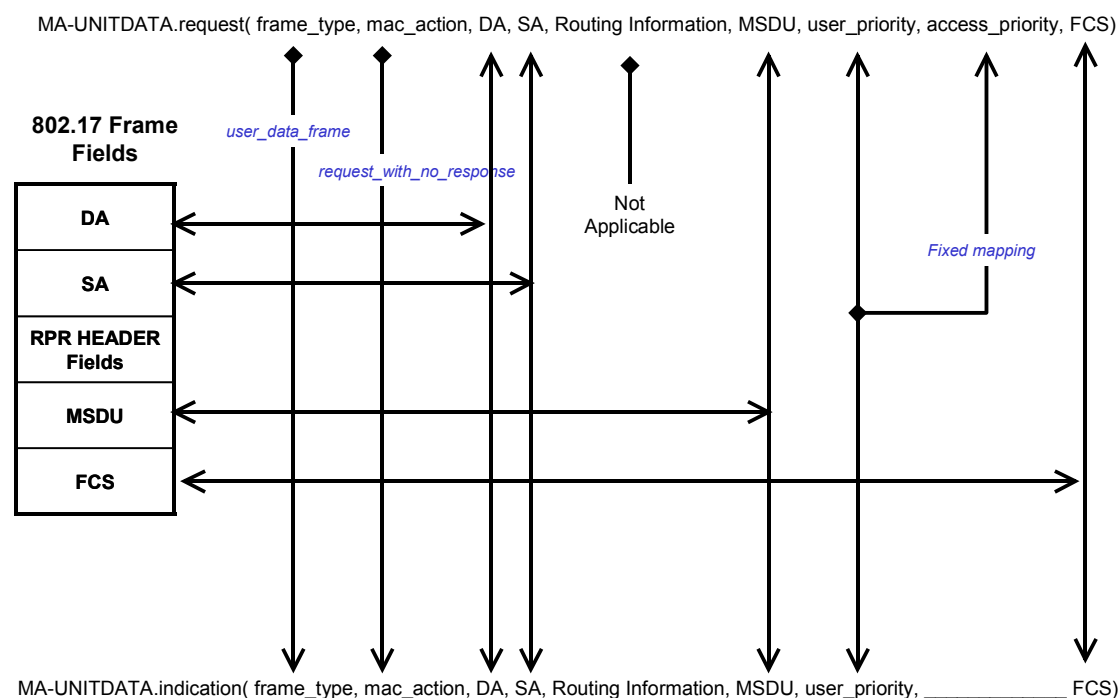


Figure 1-3: Mapping of MAC Service Primitives

1.2.2 802.17 MAC Support of Enhanced Internal Sub-Layer Service

An Enhanced Internal Sub-Layer Service (E-ISS) is derived from the ISS (defined in ISO/IEC 15802-3, 6.4) by augmenting that specification with elements necessary to the operation of the tagging and un-tagging functions of the MAC Bridge. The E-ISS provided by the RPR MAC will conform to Section 7.1 of the IEEE 802.1Q Standard.

Figure 1-4 below shows the mapping of the EM-UNITDATA.request primitive parameters to the 802.17 MAC frame fields, and the mapping of the 802.17 MAC frame fields to the EM-UNITDATA.indication primitive parameters.

The **user_priority** parameter provided in a data request primitive is not encoded in the 802.17 MAC frame. The **user_priority** parameter provided in a data indication primitive is determined as follows:

- If the received **mac_service_data_unit** parameter contained a tag header, then the value contained in the **user_priority** field of the tag header is used.
- Otherwise, the value of the received **user_priority** parameter is specified within Section 1.2.1 of this document.

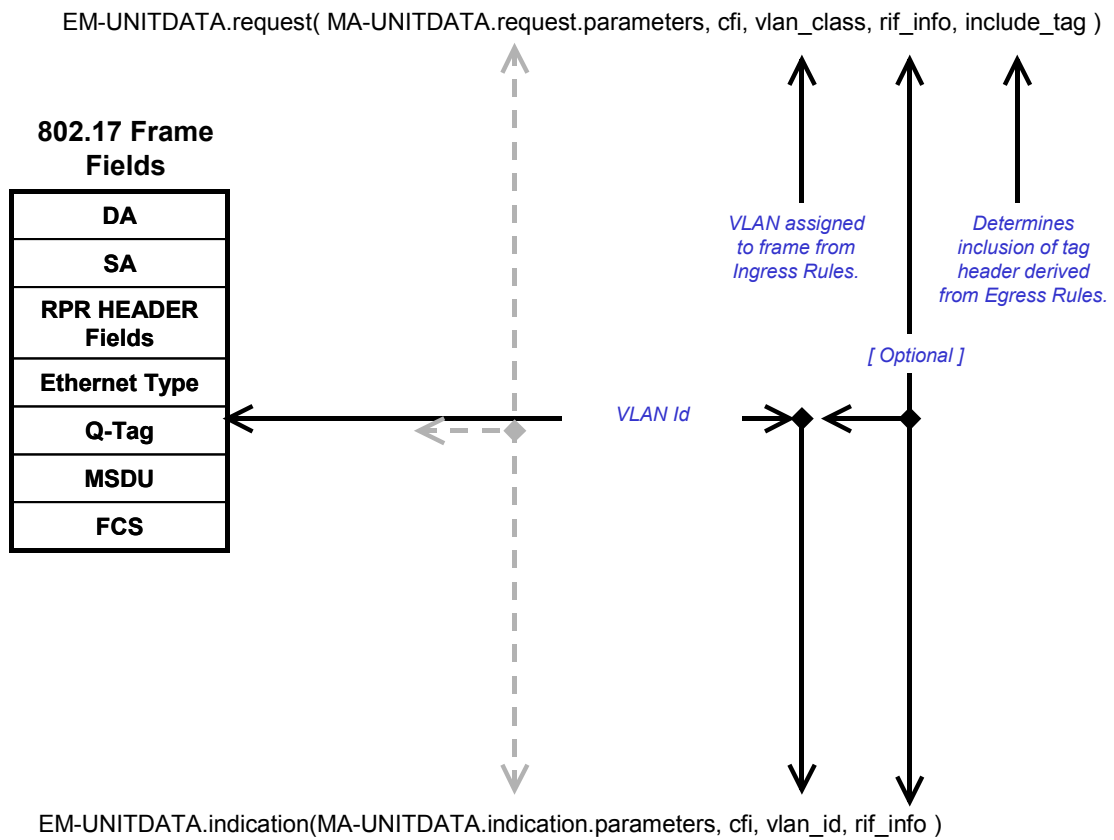


Figure 1-4: Mapping of Enhanced MAC Service Primitives

1.3 Bridge Protocol Entity Interactions

The 802.17 MAC will provide a MAC sub-layer that will conform to Section 2.2.2 of IEEE 802.2 Std.

² IEEE 802.1D and 802.1Q Standards.

1.4 Frame Transmission Impact on RPR MAC

Bridge relayed frames are submitted for transmission by the Bridge Forwarding Process. The Service request primitive associated with such a frame conveys the values of the source and destination address fields received in the Service indication primitive. Refer to Figure 1-3 and for the mappings.

Bridged frames with a multicast and broadcast destination address are broadcast around the RPR.

Bridged frames with a destination address of a station on the RPR (i.e., a local destination address) are forwarded to the station using internal 802.17 MAC topology and steering tables.

Bridged frames with a remote destination address (e.g., a destination address not matching a RPR station address) are flooded over the RPR.

1.4.1 Compliance Requirements

The RPR MAC shall flood all packets to be transmitted on behalf of the 802.1D/Q Bridge Relay Entity. The ISS/E-ISS upon reception of a request primitive will set the flooding indication in the RPR frame structure.

The RPR MAC shall flood all packets with a remote destination address found in the received request primitive. A remote address is identified if the address is not a member of the Topology Image associated with the RPR MAC.

1.4.2 Flooding a Packet over a RPR

Flooding is described in Clause 11. When the RPR MAC floods a packet on the Ring, the flooding indication bit described in Clause 8 will be set.

1.5 Frame Reception Impact on RPR MAC

Frames with the flooding indication set

The 802.17 MAC transit data path needs to incorporate logic to determine whether a received frame should be:

- Dropped: The frame is stripped from the Ring and passed to a MAC client.
- Discarded: The frame is stripped from the Ring and not passed to any MAC client. The frame is discarded.
- Passed Through: The frame is passed to the tandem buffer and dispatched to the outgoing Ringlet.

³ IEEE 802.1D and 802.1Q Standards.

- Replicated: The frame is replicated prior to the transit path drop point. One copy of the frame is Passed Through, and the other copy is Dropped.

Figure 1-7 provides a simplified view of the 802.17 MAC transit data path. Refer to Clause 6 of the 802.17 Draft for a complete description of the 802.17 MAC transit path.

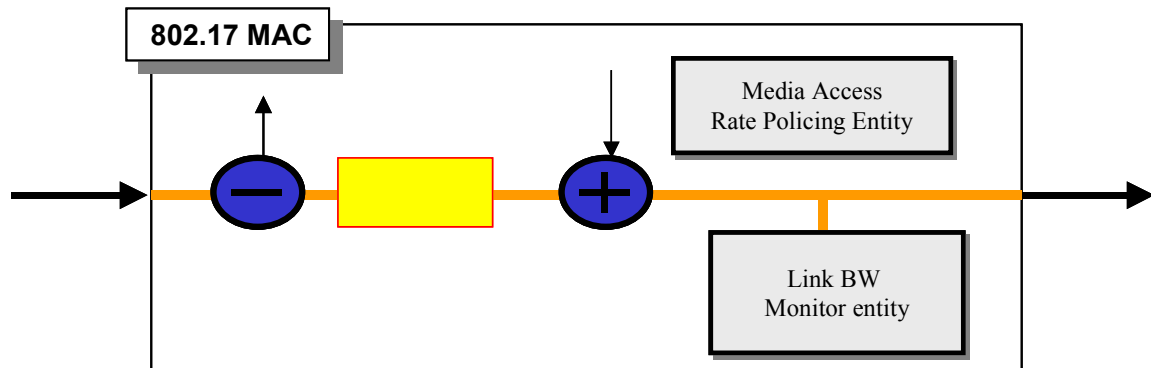


Figure 1-7: Simplified View of the 802.17 MAC Transit Data Path

When Bridging is provisioned on an RPR station, the Layer Management Entity indicates this to the 802.17 MAC transit path. The Drop/Discard point in the RPR MAC transit path needs to support the following:

- a) If the Destination Address (DA) associated with the received frame is that of the RPR Station, and Bridging is configured on the Station, the frame is Dropped and passed to the MAC Relay Entity. The RPR Compliant Bridge does not operate in promiscuous mode.
- b) If the DA of the received frame is not that of the RPR MAC, however, the flooding indication is set, the reception behavior is identical to that of multicast or broadcast handling. The frame is Replicated.