PFC and MACSec Interworking Interpretation

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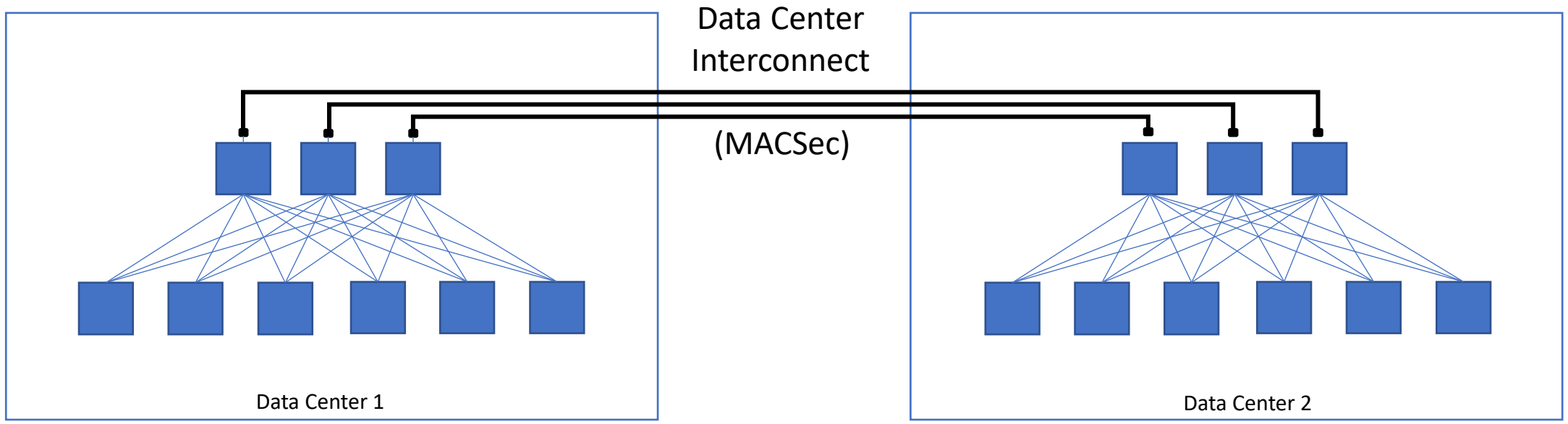
Use Case Under Consideration



NOTE: The RDMA protocol over Ethernet (RoCEv2) necessitates the use PFC to avoid frame loss

MACSec implementations used

1. MACSec outside of the bridge chipset (e.g. in the PHY chip)
   - Intended to act as an Ethernet Data Encryption (EDE) device (IEEE Std 802.1AE-2018 Clause 15)
   - Modeled as a frame forwarding device with two physical ports (somewhat like a TPMR)
   - Red side port faces existing bridge, black side port is encrypted, faces another EDE.
   - Several types of EDEs supporting different bindings to bridge components (MAC Relay, C-VLAN, S-VLAN, PBBN, and combinations).

2. Native MACSec in the bridge chipset
   - Incorporates a MAC Security Entity (SecY) above the MAC in a bridge port
   - Works as an ISS shim layer to provide a ‘controlled’ and ‘uncontrolled’ port access to the common physical port.

Ethernet Data Encryption (EDE-M)

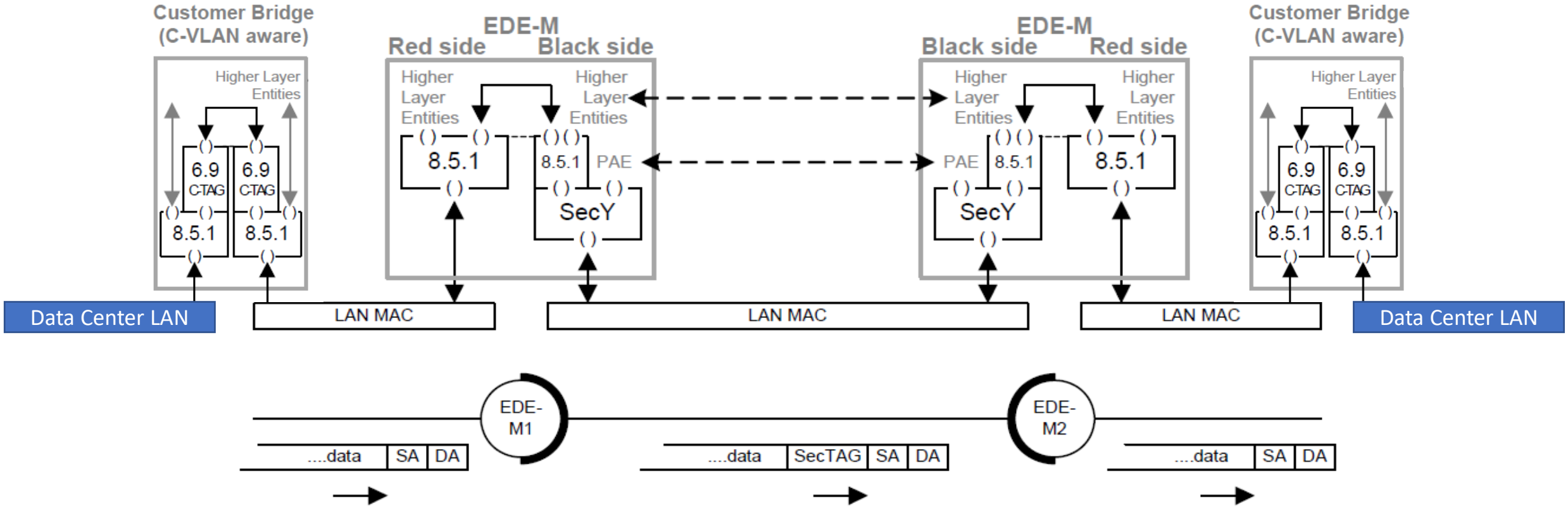


Figure 15-1—EDE-Ms connected by a point-to-point LAN

EDE-M Conformance:

a) Comprise a VLAN-unaware MAC Bridge as specified by IEEE Std 802.1Q (5.14 of IEEE Std 802.1Q-2018) with the constraints and exceptions specified in this standard.

PFC Peering with Native MACSec

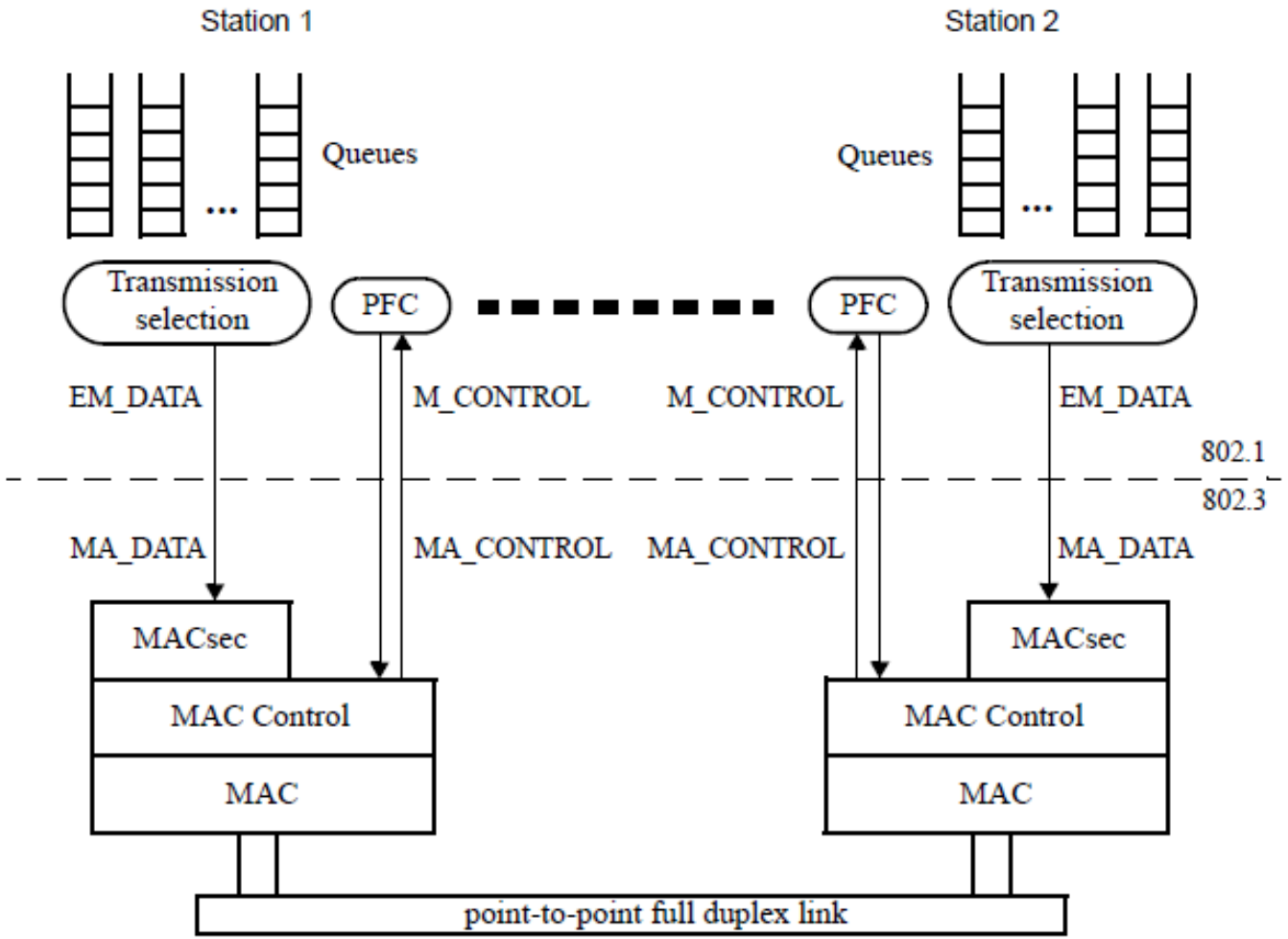


Figure 36-1—PFC peering

NOTE: Figure indicates that PFC Frames are not intended to be encrypted

PFC Frame Format

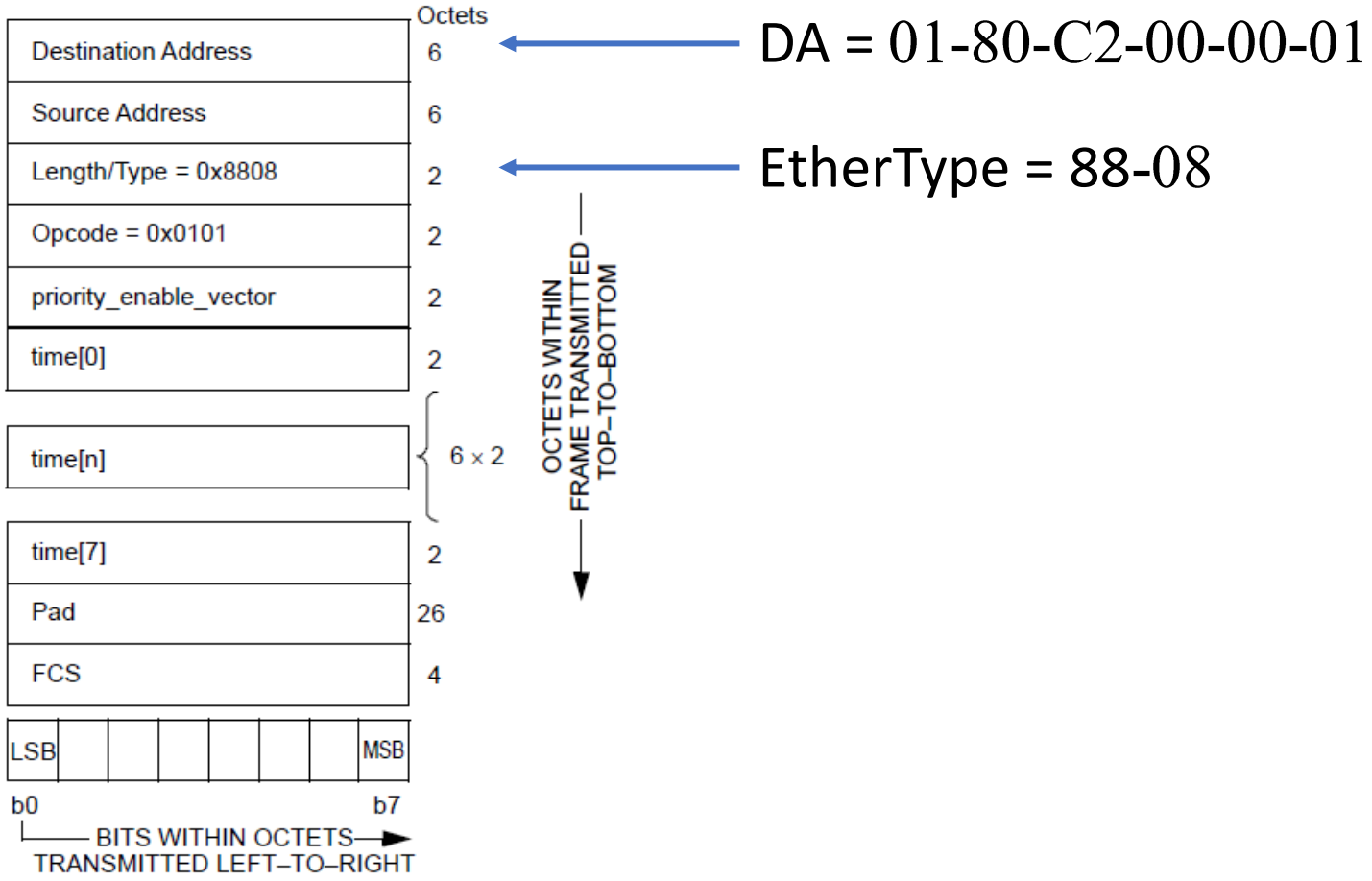


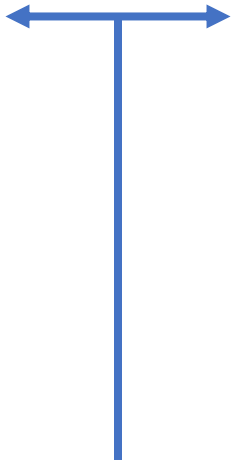
Figure 31D–1—MAC Control EXTENSION Frame

TMPRs and MAC Relays do NOT forward PFC

Table 8-1—C-VLAN and MAC Bridge component Reserved addresses

Assignment	Value
Bridge Group Address, Nearest Customer Bridge group address[a]	01-80-C2-00-00-00
IEEE MAC-specific Control Protocols group address	01-80-C2-00-00-01
IEEE 802.3 Slow_Protocols_Multicast address	01-80-C2-00-00-02
Nearest non-TPMR Bridge group address	01-80-C2-00-00-03
IEEE MAC-specific Control Protocols group address	01-80-C2-00-00-04
Reserved for future standardization	01-80-C2-00-00-05
Reserved for future standardization	01-80-C2-00-00-06
MEF Forum ELMI protocol group address[b]	01-80-C2-00-00-07
Provider Bridge Group Address	01-80-C2-00-00-08
Reserved for future standardization	01-80-C2-00-00-09
Reserved for future standardization	01-80-C2-00-00-0A
EDE-SS PEP Address (IEEE Std 802.1AEcg™ [B10])	01-80-C2-00-00-0B
Reserved for future standardization	01-80-C2-00-00-0C
Provider Bridge MVRP Address	01-80-C2-00-00-0D
Individual LAN Scope group address[c], Nearest Bridge group address	01-80-C2-00-00-0E
Reserved for future standardization	01-80-C2-00-00-0F

[a] As stated in 13.41, in a Provider Edge Bridge, a C-VLAN component supporting a single service instance (i.e., with a single PEP) may forward (not filter) frames with the Nearest Customer Bridge Address as the destination address.
[b] This address is not exclusively reserved for this purpose; other uses are reserved for future standardization.
[c] It is intended that no IEEE 802.1 relay device will be defined that will forward frames that carry this destination address.



Address used by PFC

Table 8-3—TPMR component Reserved addresses

Assignment	Value
IEEE MAC-specific Control Protocols group address	01-80-C2-00-00-01
IEEE 802.3 Slow_Protocols_Multicast address	01-80-C2-00-00-02
IEEE MAC-specific Control Protocols group address	01-80-C2-00-00-04
Individual LAN Scope group address[a], Nearest Bridge group address	01-80-C2-00-00-0E

[a] It is intended that no IEEE 802.1 relay device will be defined that will forward frames that carry this destination address.

The Issue

Current State

- MACSec outside bridge chipset encrypts and forwards PFC frames
- Native MACSec sends PFC frames in the clear

Desired State

- Native and External MACSec implementations should interoperate
- PFC Frames optionally would be forwarded/propagated and encrypted