Spatially aware sublayer overview

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Agenda

- Objectives
- Problem overview
- Solution overview
- Spatially aware sublayer DB operations

Terminology and terms

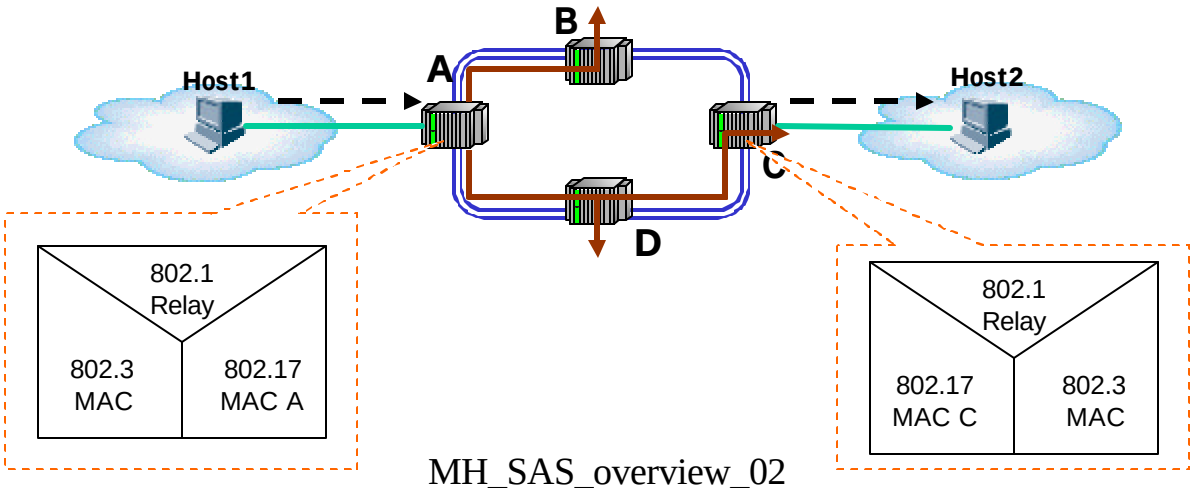
- Directed transmissions – Refers to a RPR source station transmitting to a designated (unicast) destination address on the ring
- Undirected transmission – Refers to a RPR source station flooding a frame over the ring
- Local address – A unicast MAC address found in the RPR topology DB
- Remote address – A unicast address not found in the RPR topology DB

Objectives

- Outline the high level operations of the spatially aware sublayer (SAS)

Problem overview

- Learned addresses use directed transmission over the ring (via unicast target addressing), rather than undirected transmissions over the ring (via flooding indicators)
- Current 802.17 specifications treat all bridged frames as undirected transmissions, and thus persistently floods these frames



Solution overview

- Enhance RPR MAC by introducing (optional) sublayer to allow bridged frames to use directed transmissions
  - Optional sublayer referred to as spatially aware sublayer (SAS)
  - The SAS will associate a client provided MAC address and optional VLAN identifier, with the local MAC address of a RPR station that provides an attachment interface

Spatially aware sublayer (SAS)

- SAS is below MAC service interface (and within data link layer)
- An optional sublayer of RPR MAC

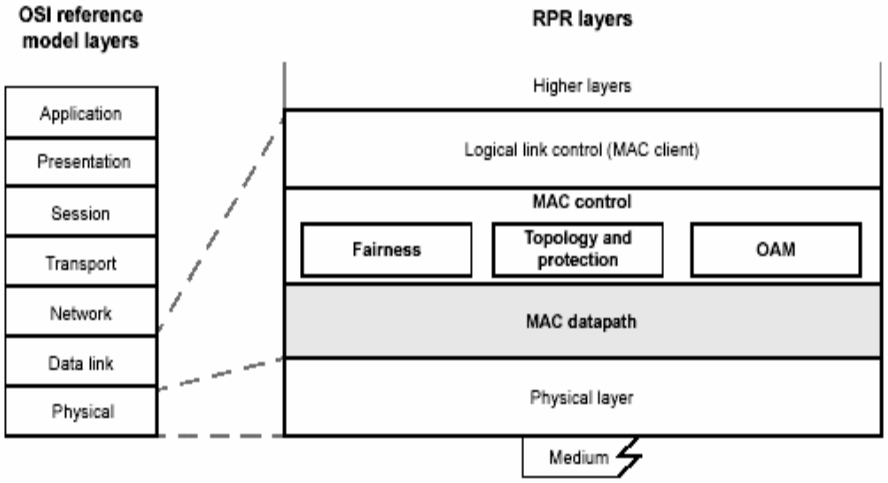
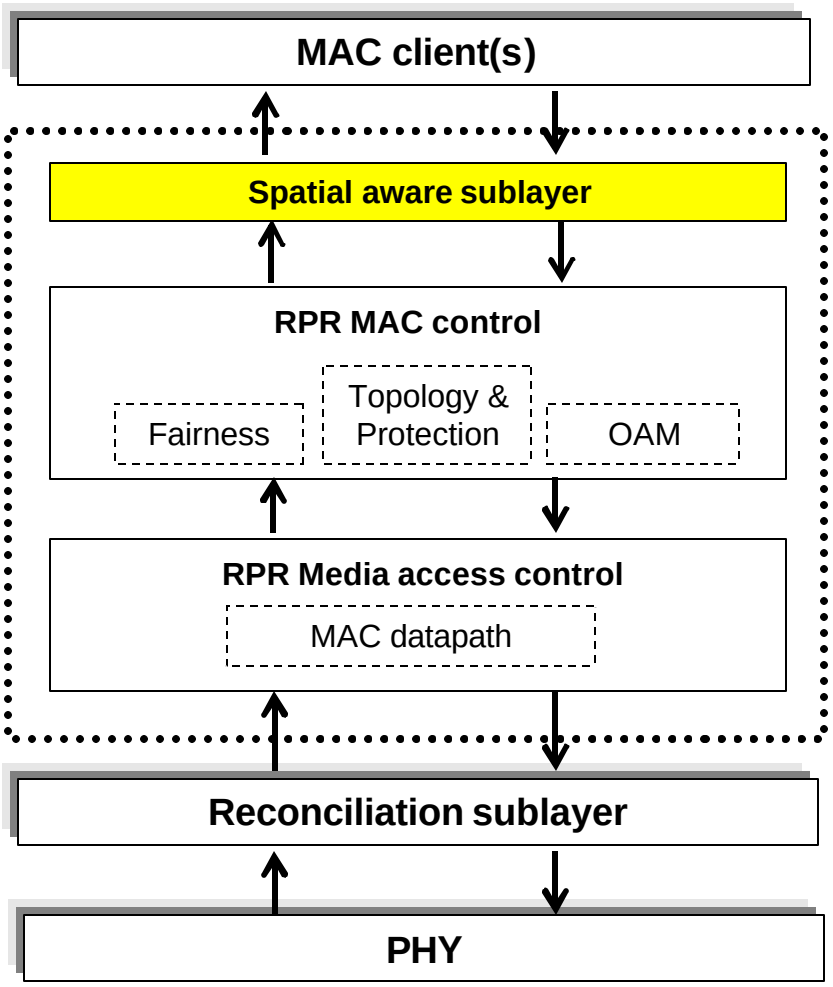
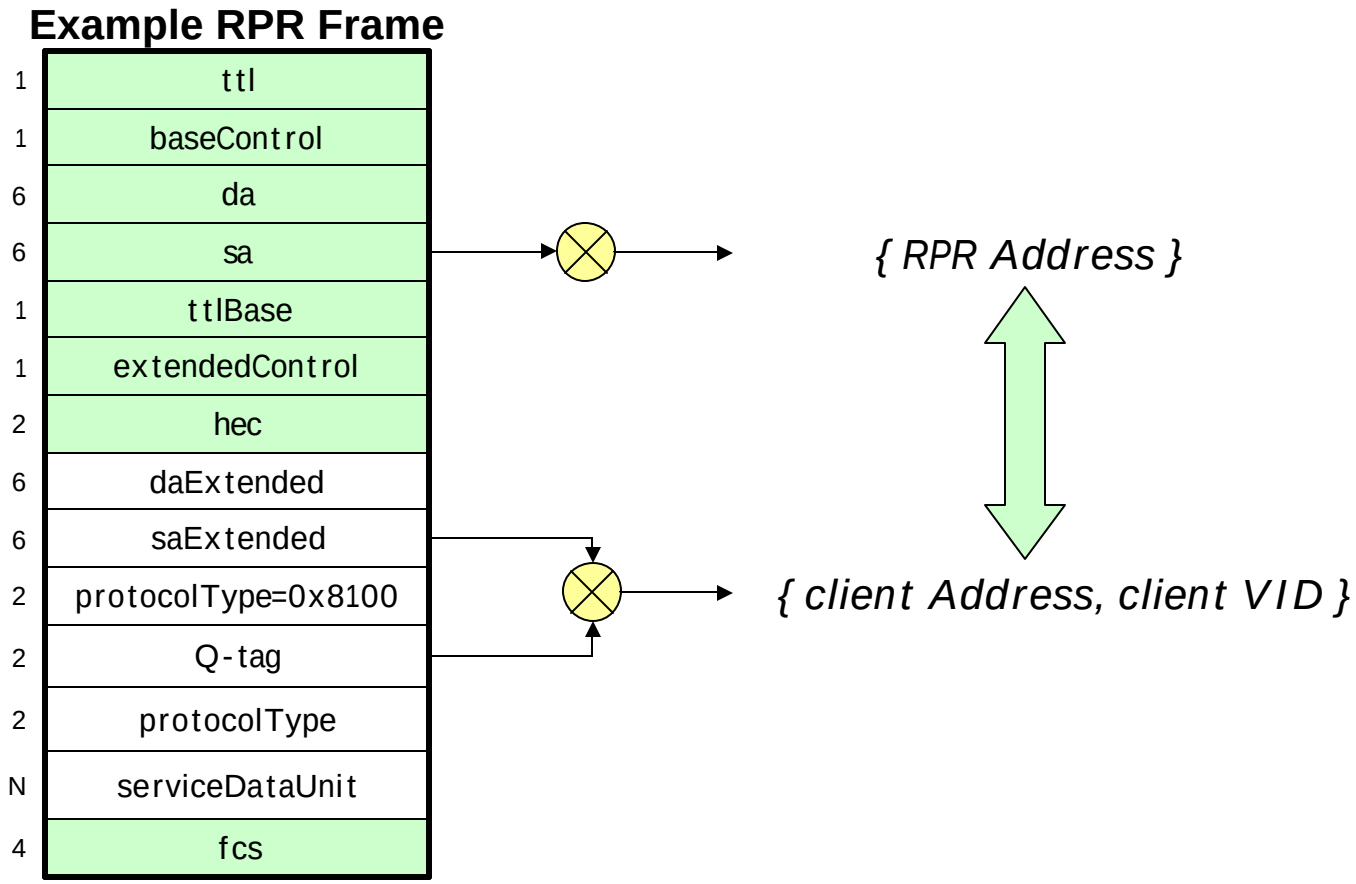


Figure 7.1—MAC datapath sublayer relationship to the ISO/IEC OSI reference model



SAS Rx operations

- Observes source MAC address and VLAN of client and associates with local RPR source MAC address



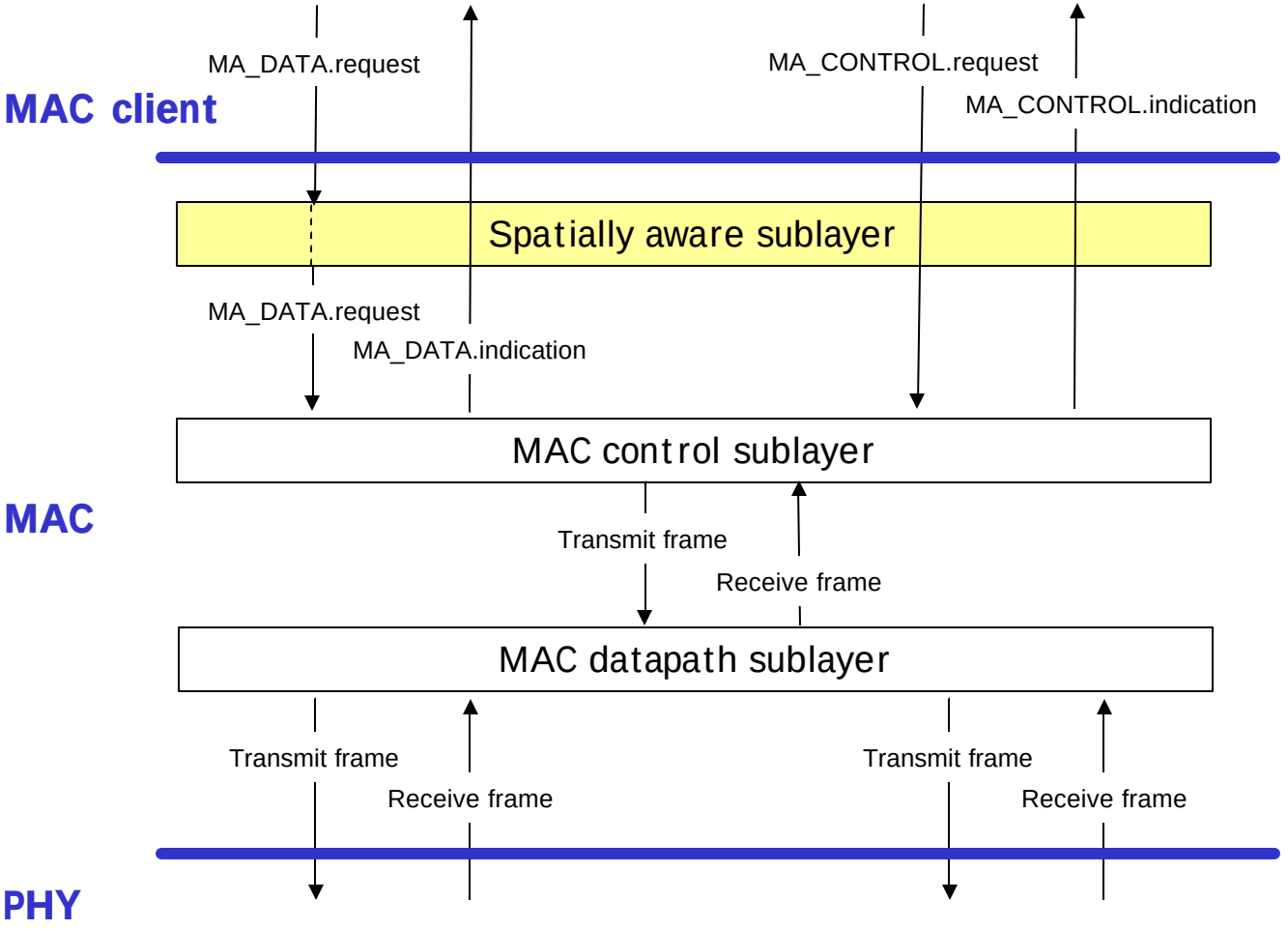
SAS Tx operations

- Requests by MAC clients to dispatch a frame over the RPR media are processed by the SAS
- SAS not involved in ring local transmissions
- Otherwise, SAS looks up client provided destination address (and optional vid) in SAS DB
  - If target RPR MAC address found, then da field of RPR header is populated with associated value and directed transmission of frame is used,
  - Else, an undirected transmission of frame is used (i.e., the frame is flooded over the ring)

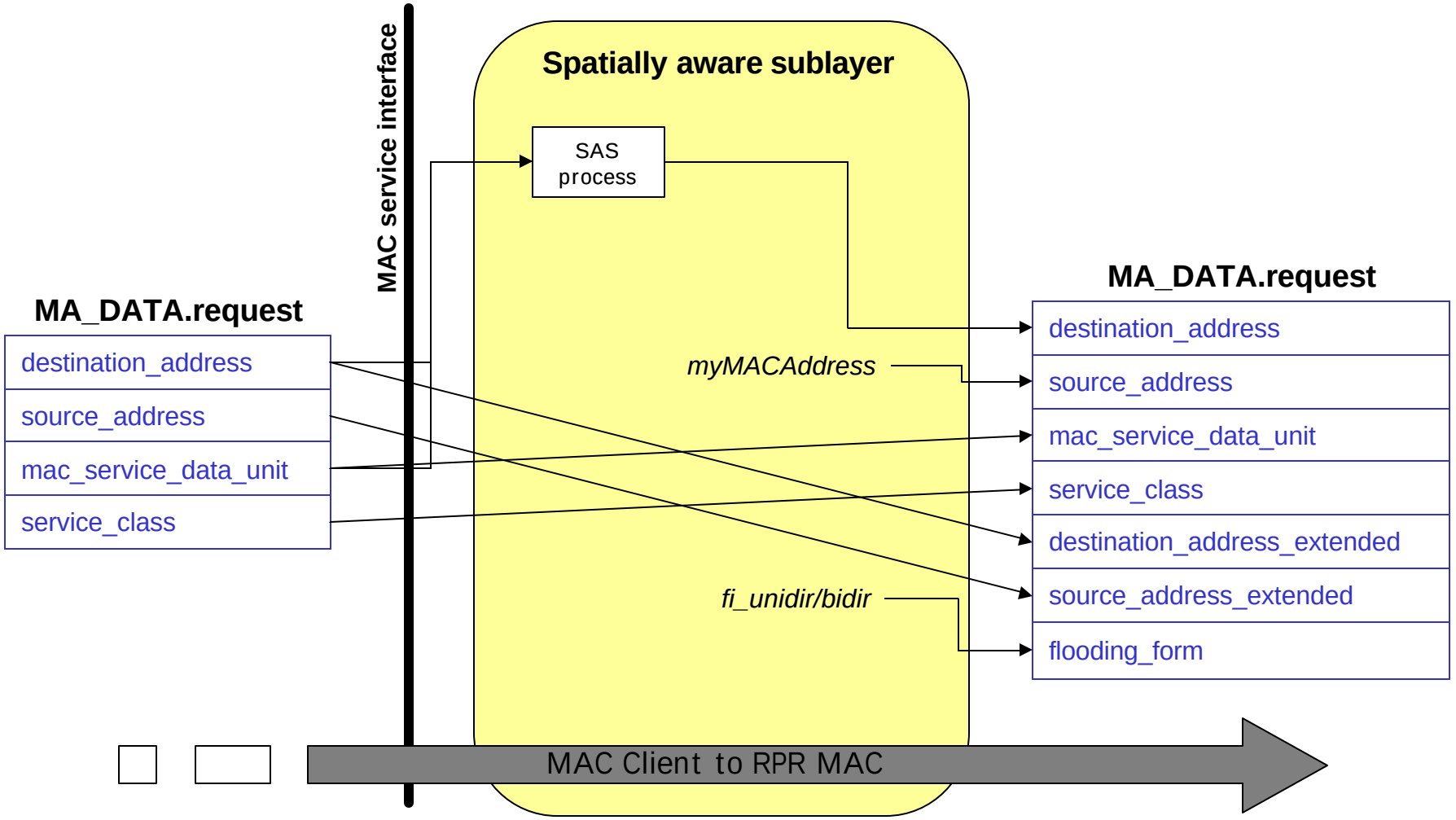
SAS DB operations

- Operation of SAS DB is similar to operation (e.g., learning, aging, etc.) of 802.1D/Q specified FDB
  - Support of static and dynamic entries
  - Dynamic entries can be aged out
  - DB can be queried by management entity
  - Etc.

Service primitives

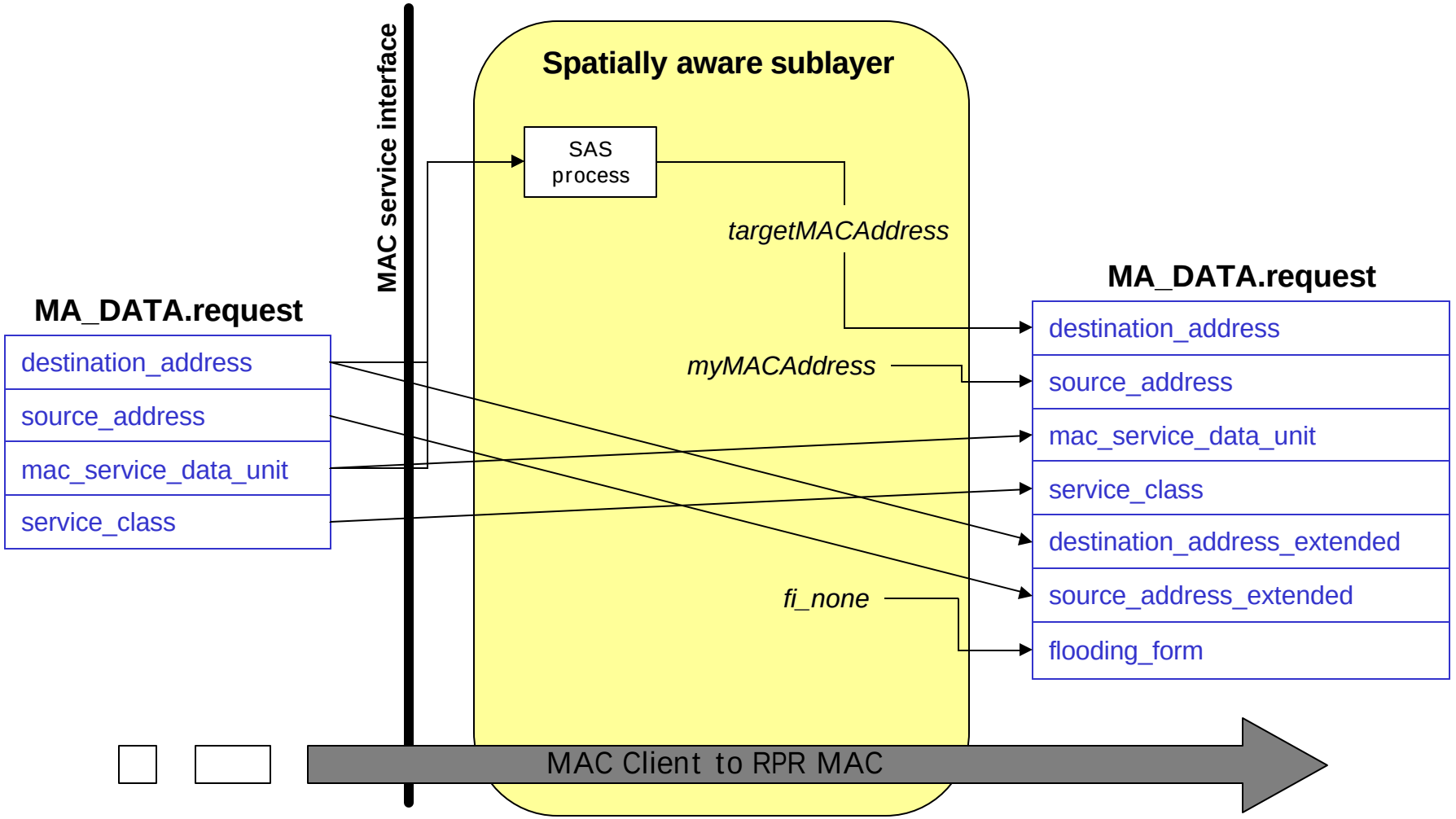


Service data request primitive



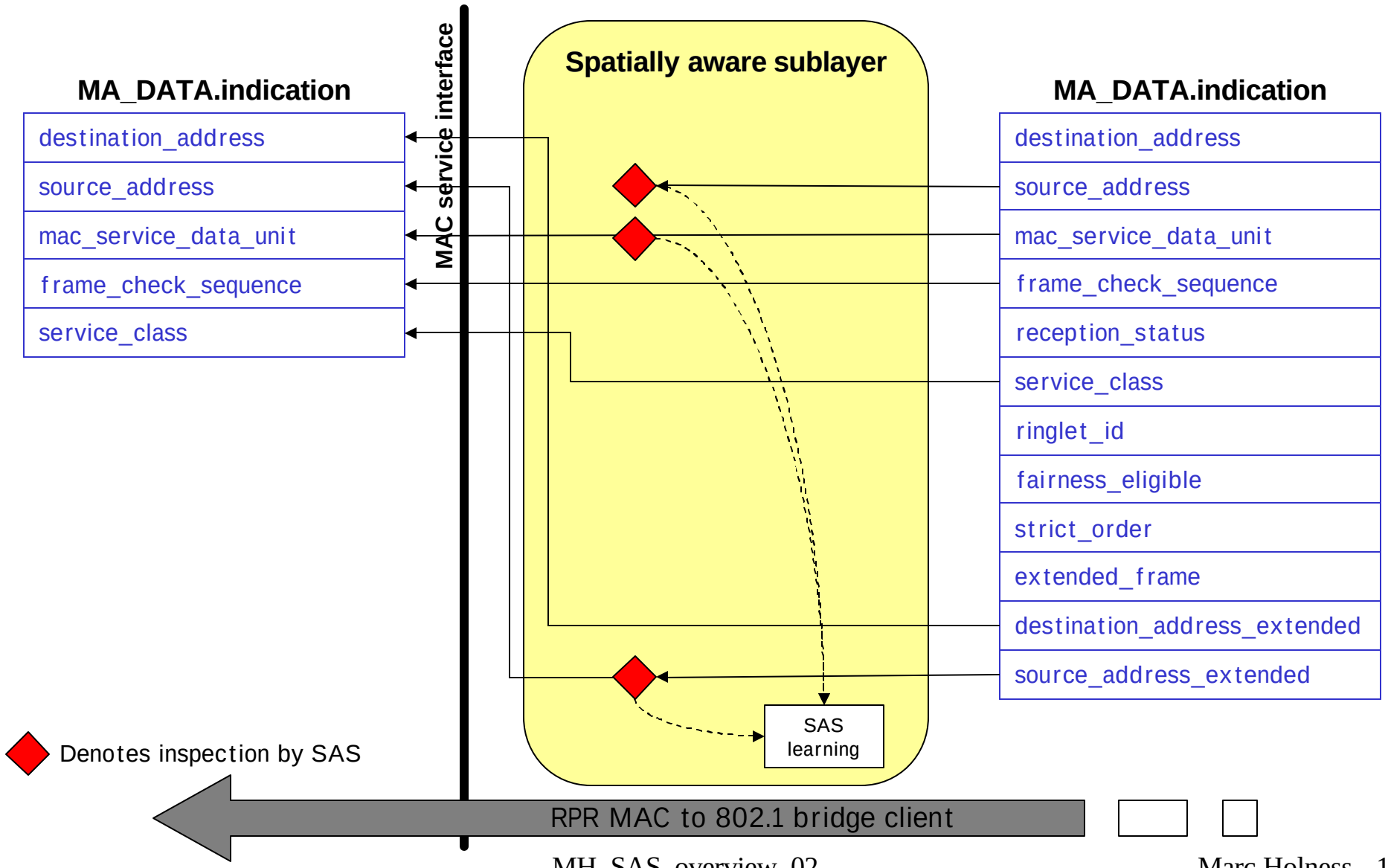
Assumptions: The provided source_address parameter is not myMACAddress and the provided destination_address parameter is remote. Undirected transmission is used since destination address is not found in SAS DB.

Service data request primitive

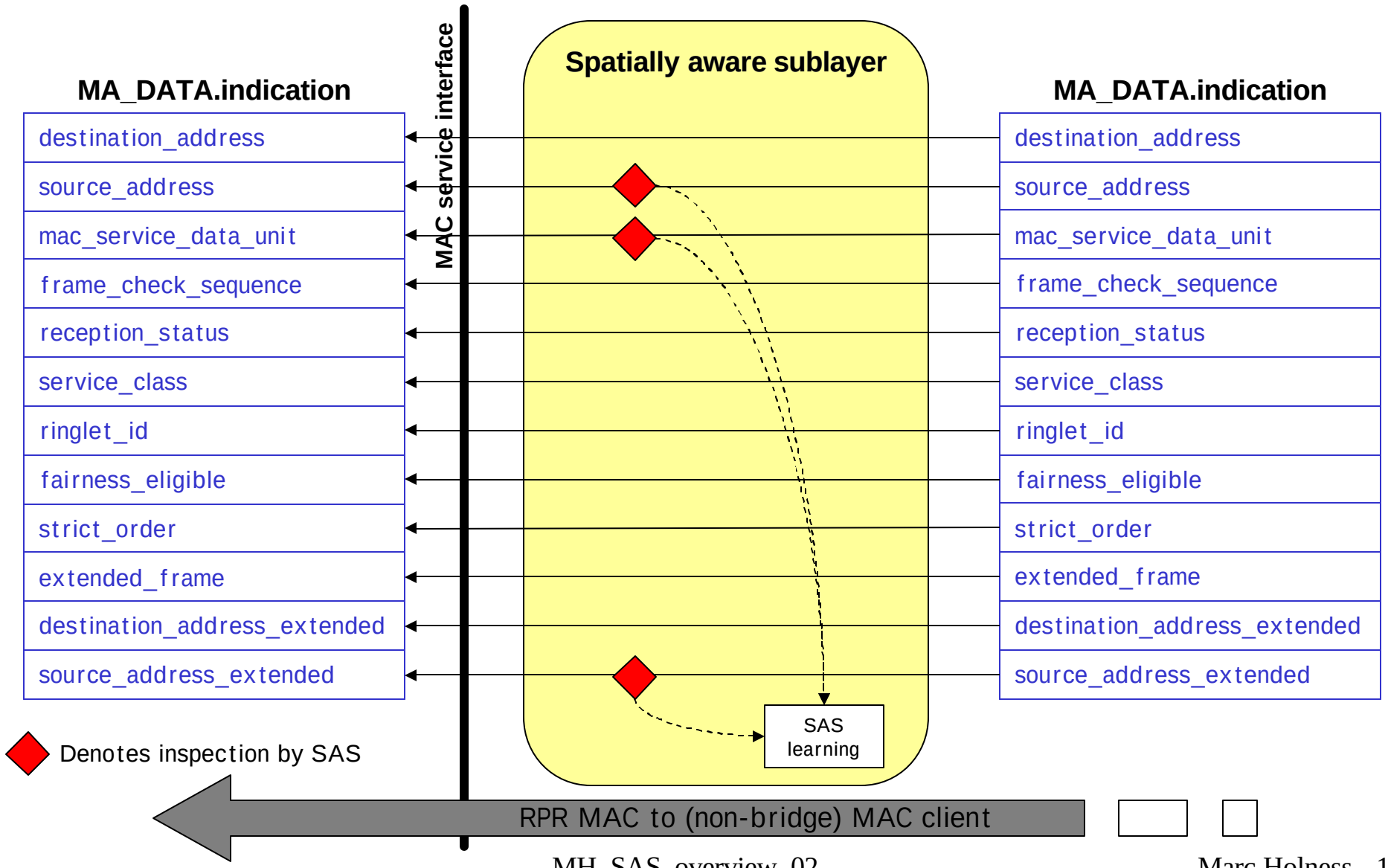


Assumptions: The destination_address parameter is remote. Directed transmission is used since destination address found in SAS DB.

Service data indication primitive



Service data indication primitive



SAS topology change handling

- RPR protection or topology changes may invalidate entries within the spatially aware sublayer (SAS) DB
  - For example, a RPR station is not reachable (e.g., removed from the ring) from a given source RPR MAC

NOTE: Handling network topology changes is out of scope. For example, network topology changes in a bridged network in which RPR participates is out of scope.

SAS DB operations as a result of topology changes

- Whenever a topology (or protection) change is detected on the ring, one considered action is to clear all entries in the SAS DB
  - This results in all subsequent frame transmissions to be undirected until re-learning takes place

NOTE: Other more intelligent pruning options will be considered. If this path is pursued, specification of a state machine will be avoided. The standard may or may not want to state the rules by which intelligent pruning should abide by. This may not be necessary. Perhaps it is sufficient to state that bulk prune is required, and leave the intelligent pruning mechanism as an implementation decision. To be determined.