Spatially aware bridging sublayer

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Agenda

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

Objectives

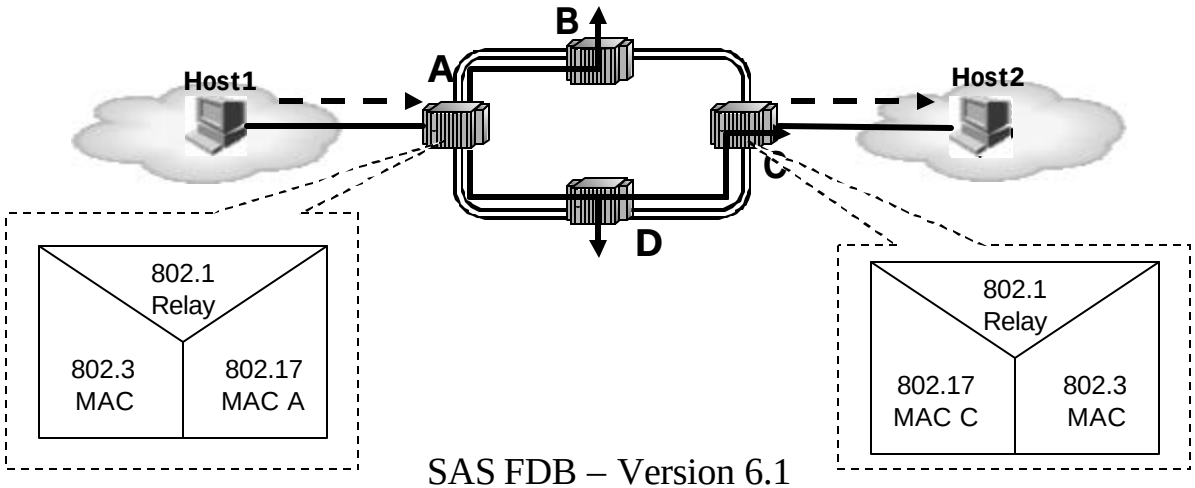
- Outline the operations of the address learning process used by the spatially aware sublayer/shim (SAS), in support of spatially aware bridging

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
- Remote address – A MAC address of a client that is not resident on the ring

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/shim (SAS)
  - The SAS will associate a remote MAC address and optional VLAN, with the local MAC address of the station RPR station MAC address that provides an attachment interface

Spatially aware shim (SAS)

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

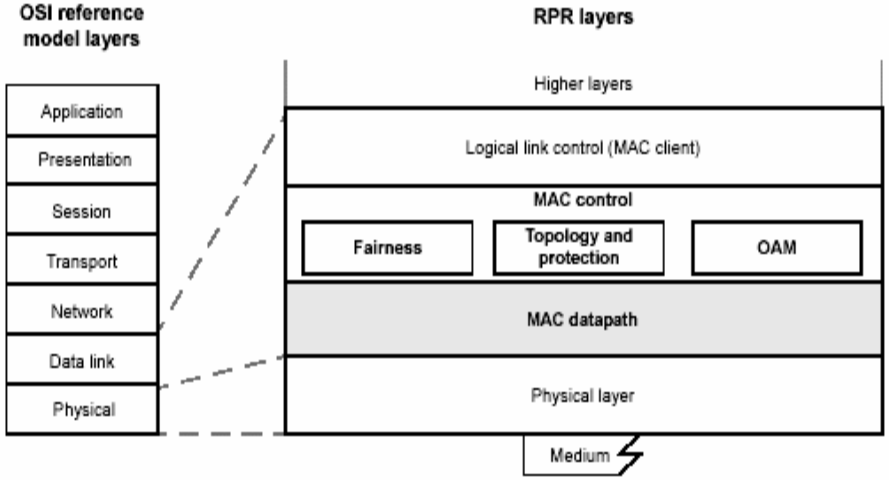
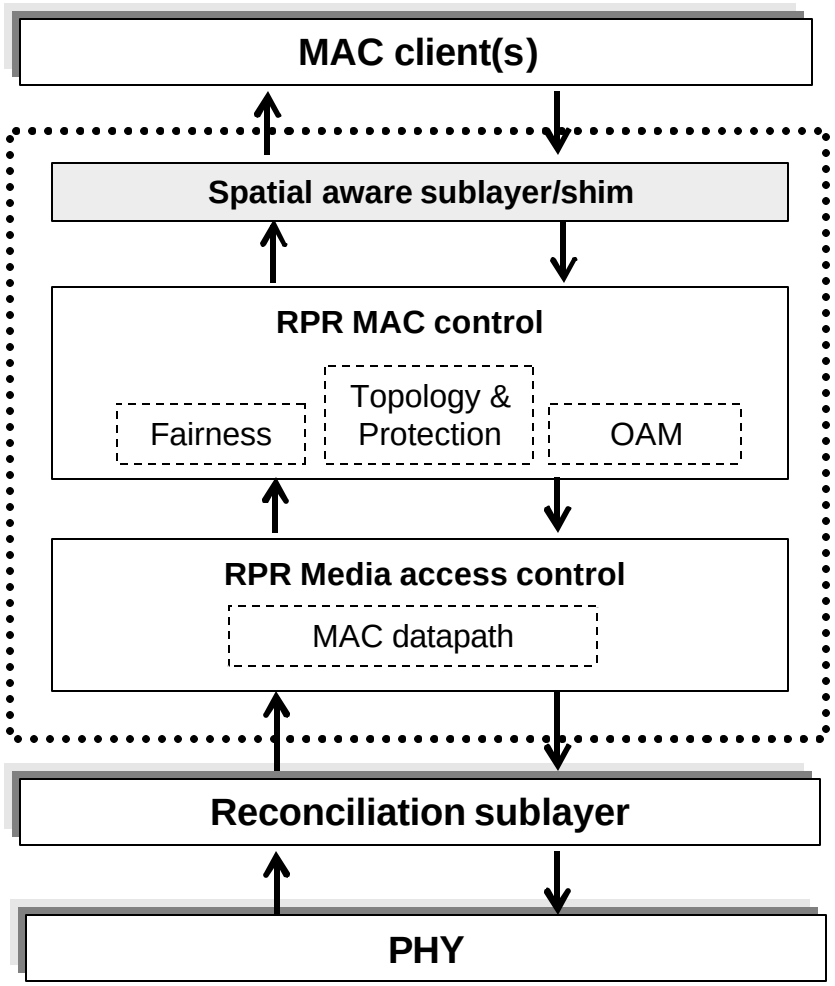
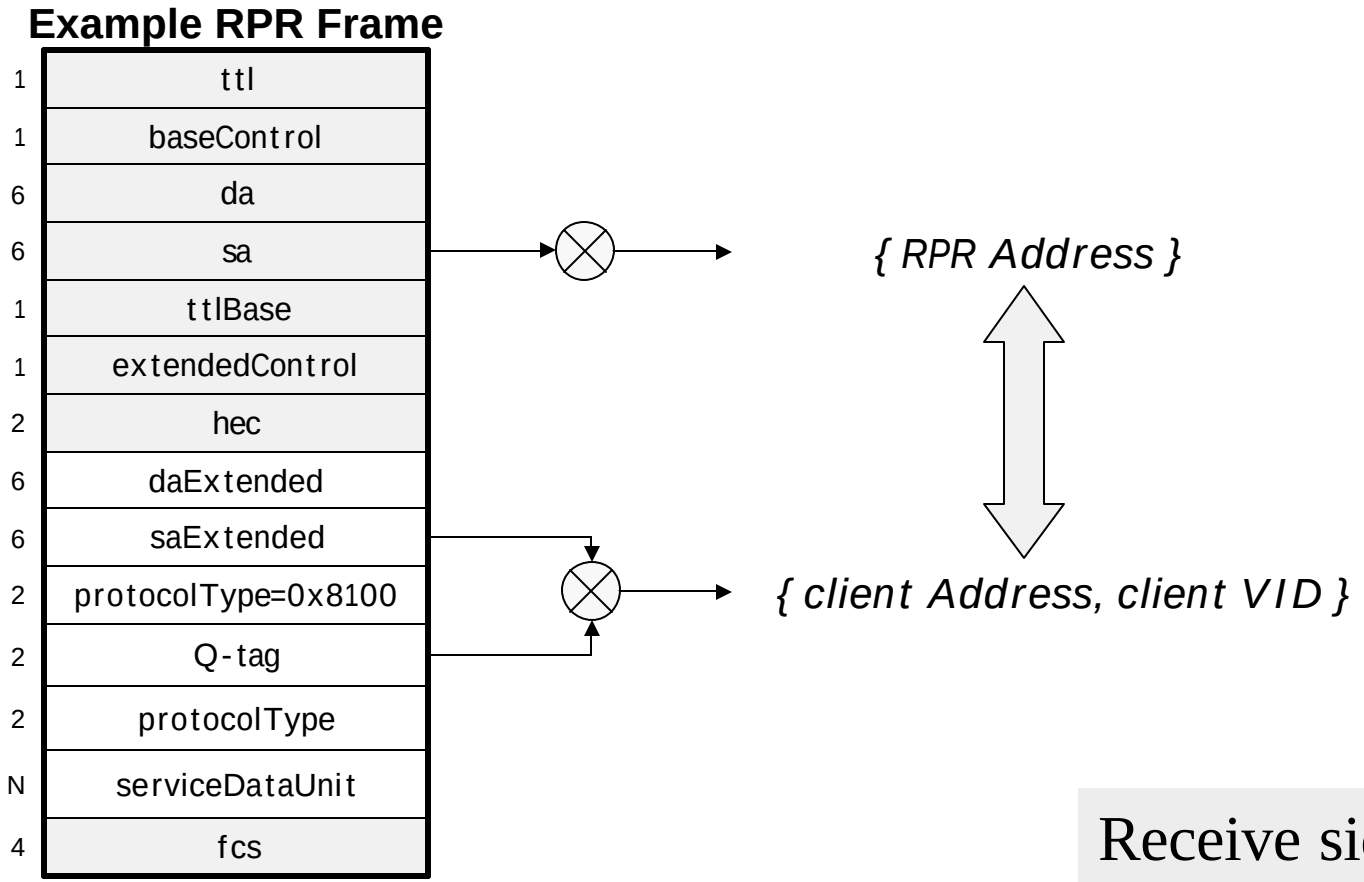


Figure 7.1—MAC datapath sublayer relationship to the ISO/IEC OSI reference model



SAS DB learning

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



Receive side

SAS DB lookup

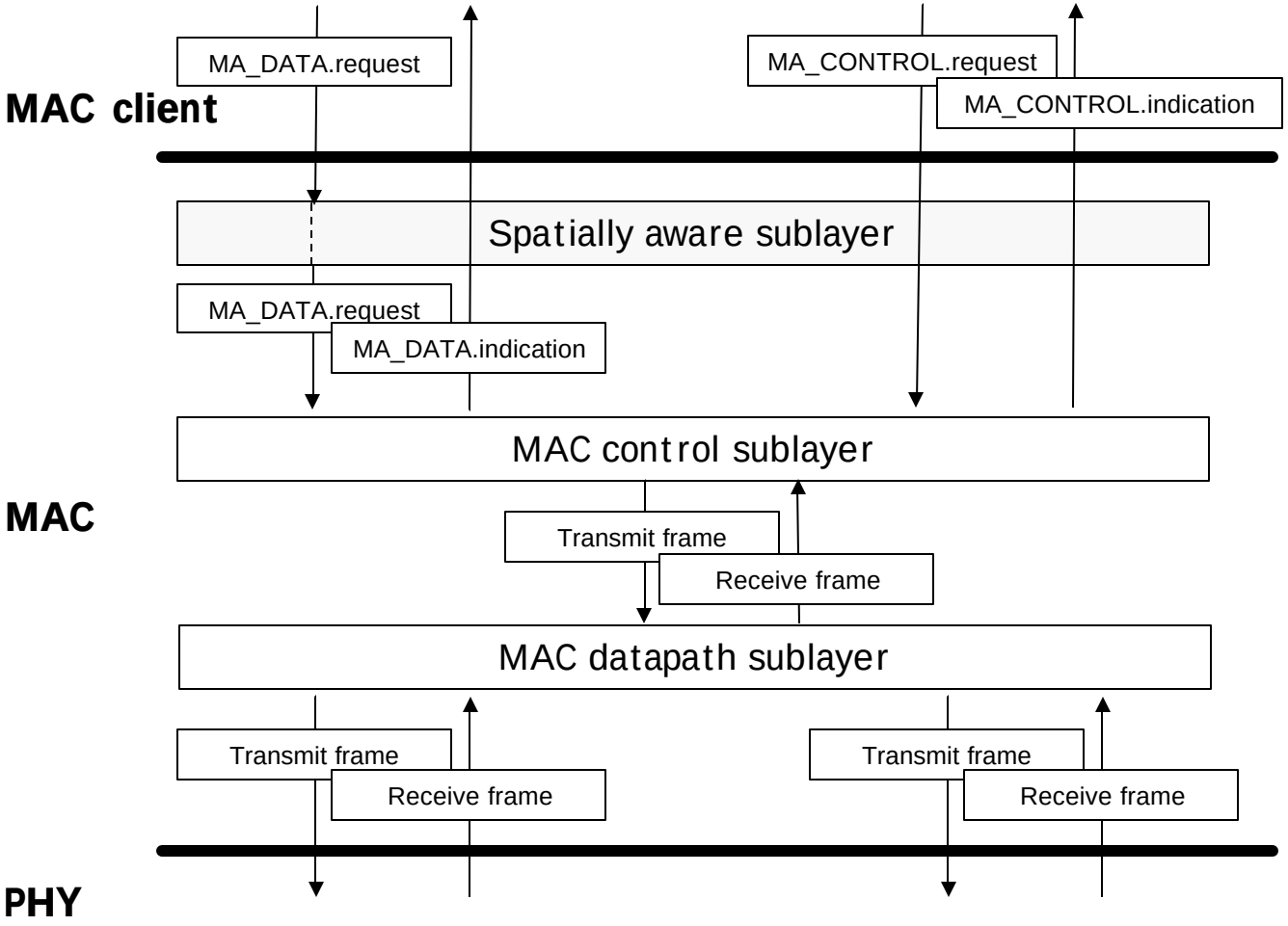
- Requests by MAC clients to dispatch a frame over the RPR media are processed by the SAS
- If the client destination address is a remote address, then client destination address (and optional VID) is indexed into the SAS DB to determine if a RPR MAC address is associated
  - If RPR MAC address association 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)

Indicate GroupAddress

SAS DB operations

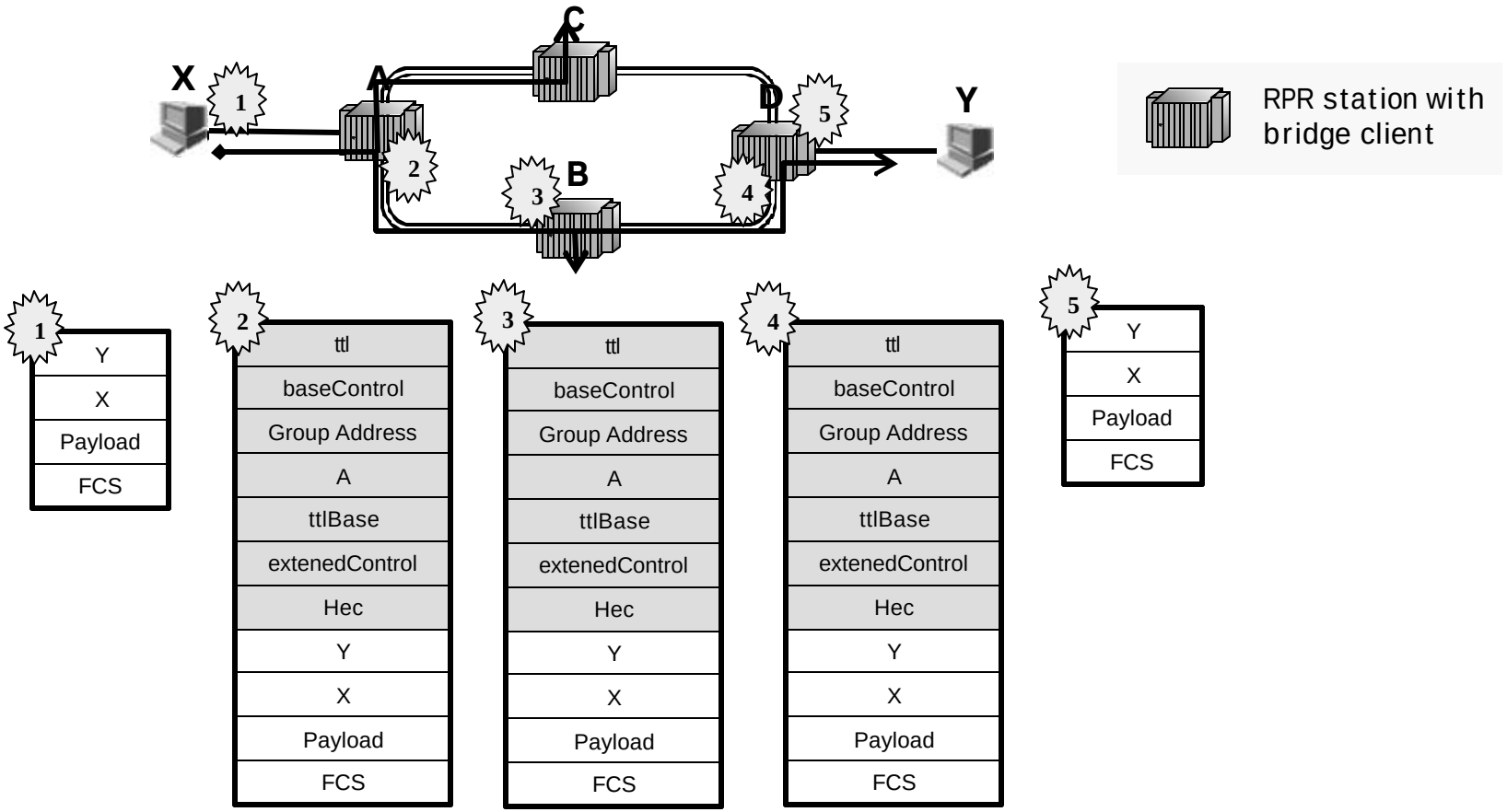
- Operation of SAS DB is similar to operation (e.g., learning, aging, etc.) of 802.1D/Q specified FDB
  - Support of static and dynamic entries
  - Dynamic entries can be aged out
  - DB can be queried by management entity
  - Etc.

Service primitives



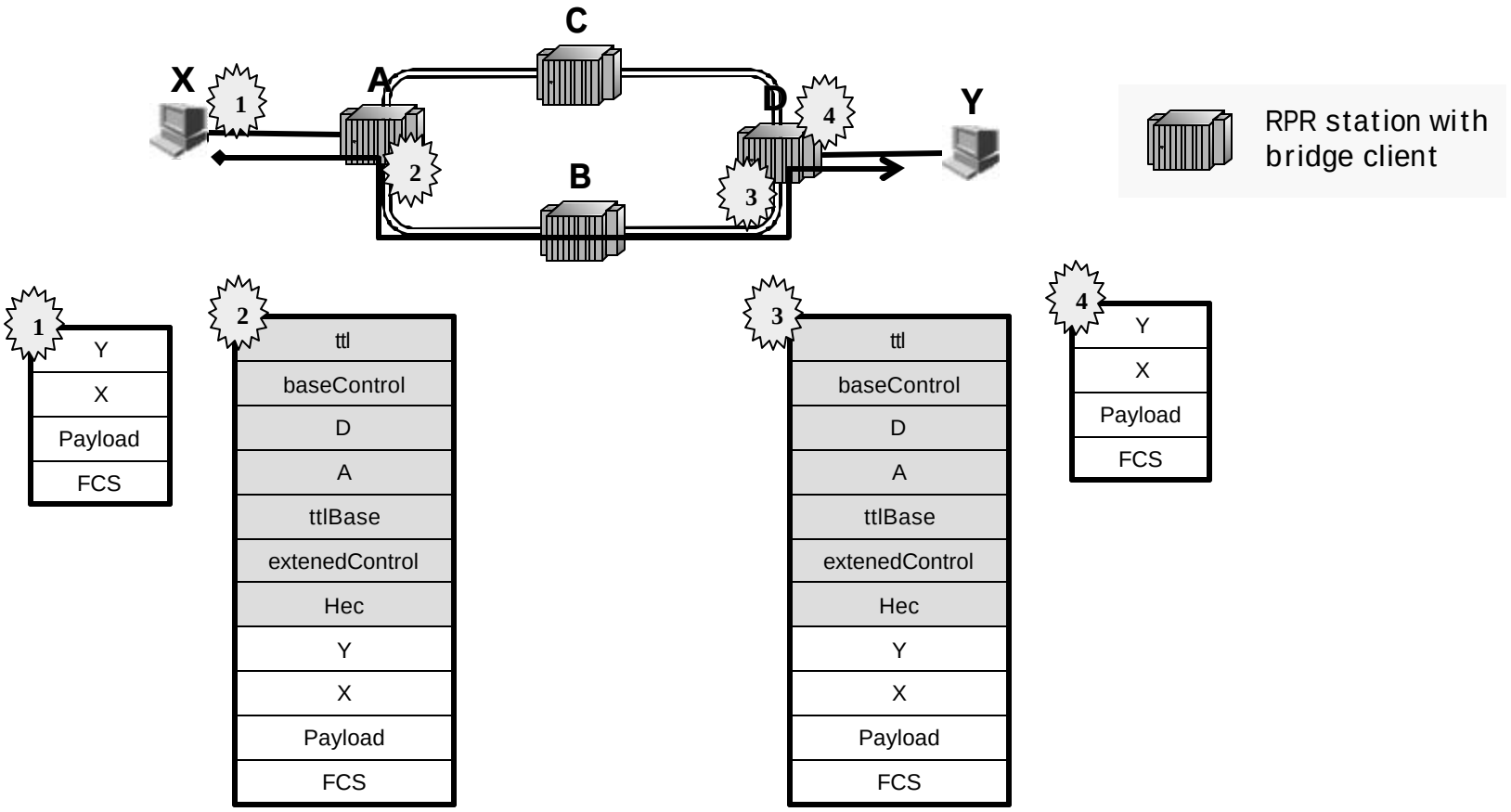
Back Up

Bridging over RPR



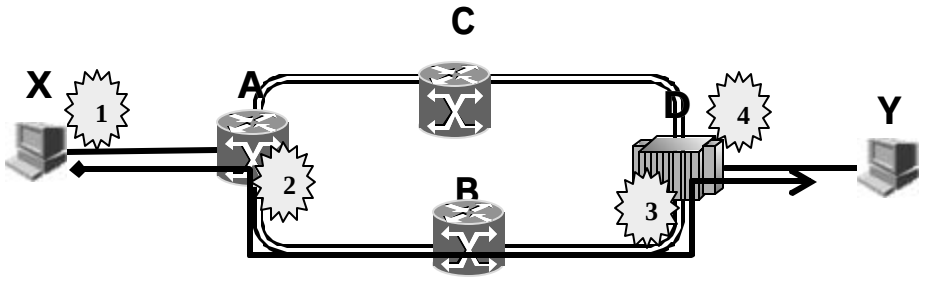
Assume the SAS FDB at station A has not learnt where client MAC address Y is located, then undirected transmission is (temporally) applied. In RPR frame header: extended frame (ef) bit = 1, flooding indication = uni/bi-directional flood, source address = source RPR MAC address, and destination address = RPR_reserved_group_Address.

Bridging over RPR



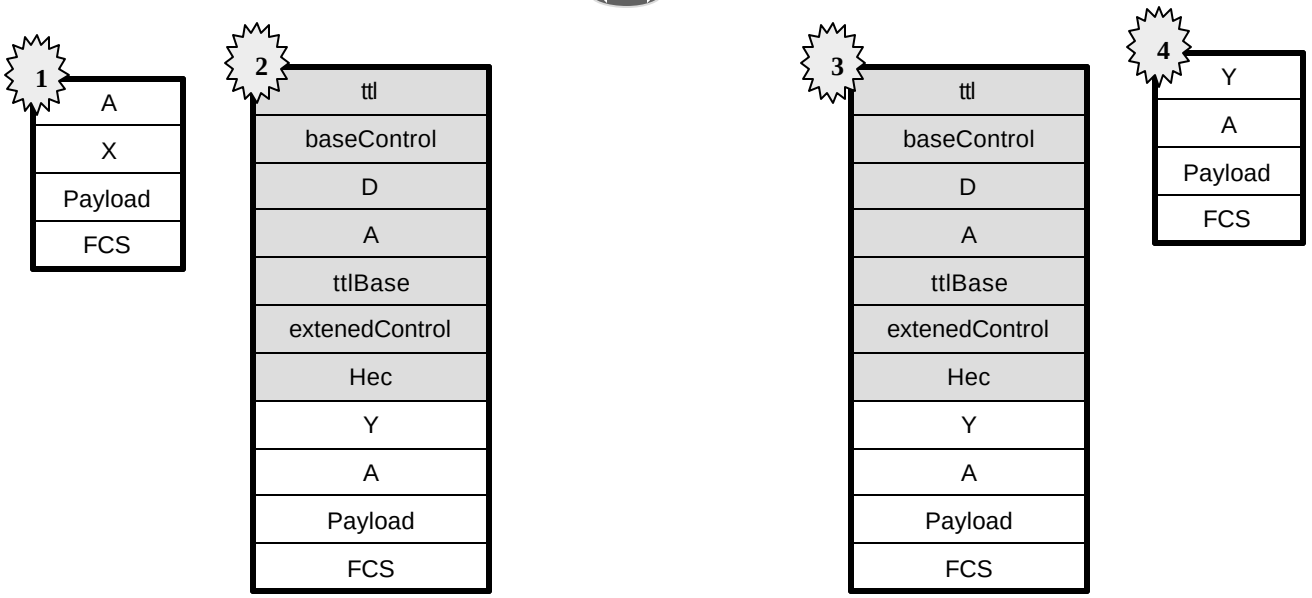
Assume the SAS FDB at station A has learnt where client MAC address Y is located, then directed transmission occurs. In RPR frame header: extended frame (ef) bit = 1, flooding indication = no flood, source address = source RPR MAC address, and destination address = destination RPR MAC address (D).

Bridging over RPR



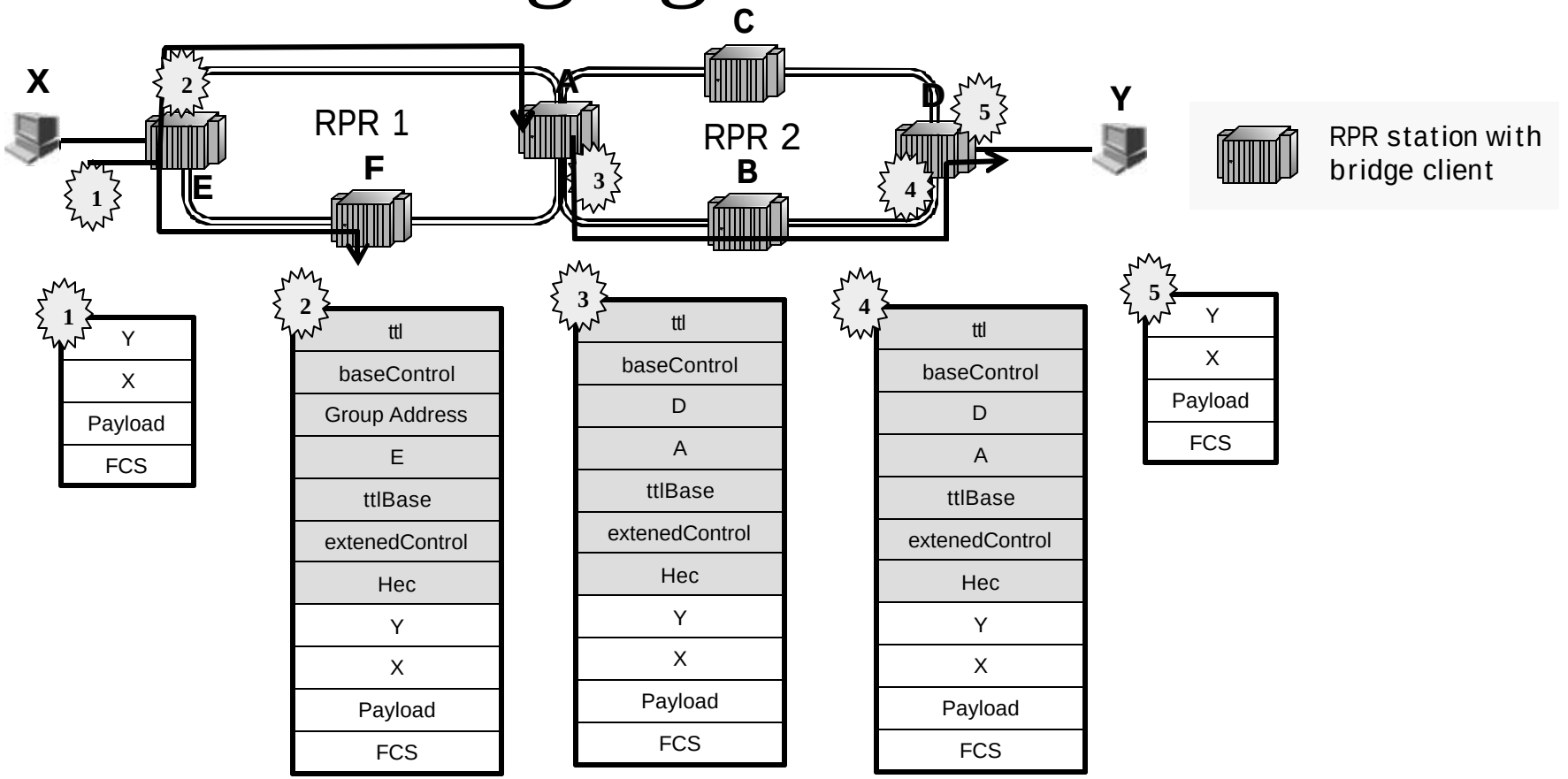
RPR station with bridge client

RPR station with router client



Assume the SAS FDB at station A has learnt where client MAC address Y is located, then directed transmission occurs. In RPR frame header: extended frame (ef) bit = 1, flooding indication = no flood, source address = source RPR MAC address, and destination address = destination RPR MAC address (D).

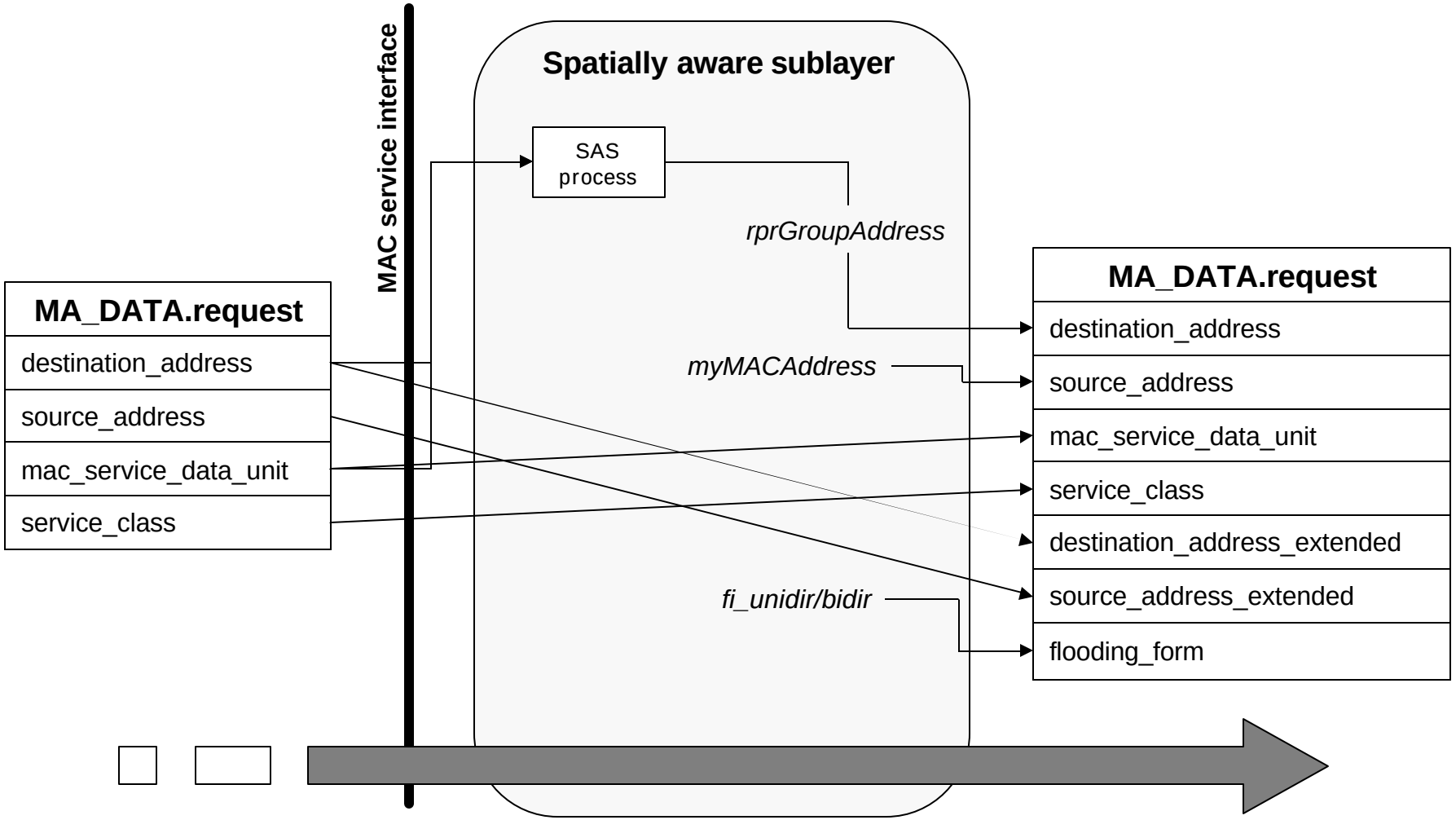
Bridging over RPR



Assume

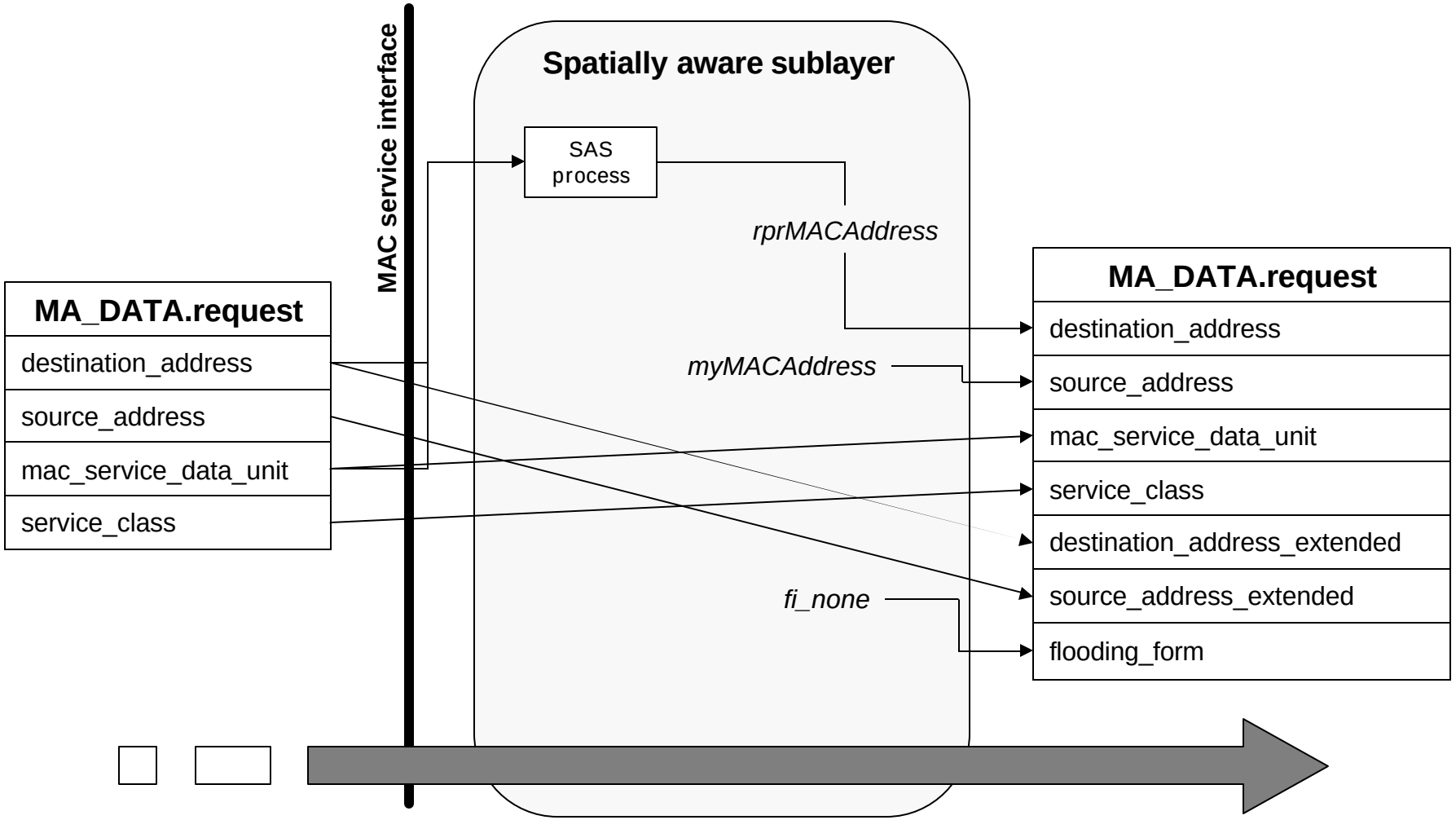
- SAS FDB at station E has not learnt where client MAC address Y is located, then *undirected* transmission is (temporally) applied. In RPR frame header on RPR #1: extended frame (ef) bit = 1, flooding indication = uni/bi-directional flood, source address = source RPR MAC address, and destination address = RPR reserved group Address.
- SAS FDB at station A (RPR #2) has learnt where client MAC address Y is located, then *directed* transmission occurs. In RPR frame header (over RPR #2): extended frame (ef) bit = 1, flooding indication = no flood, source address = source RPR MAC address, and destination address = destination RPR MAC address (D).

Service data request primitive



Assumptions: The destination_address parameter is remote. Undirected transmission is used since RPR destination address not found in SAS FDB.

Service data request primitive



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

Service data indication primitive