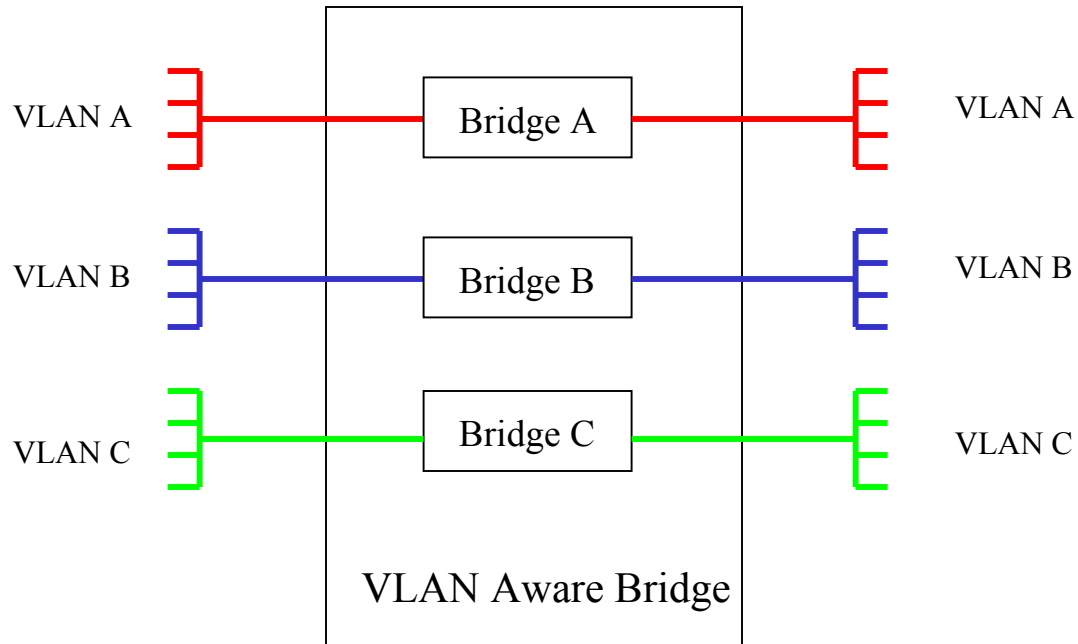


VLANs and 802.17 SAS

Robert Castellano

Introduction

- VLANs provide method for partitioning physical LAN networks into logical LAN segments.

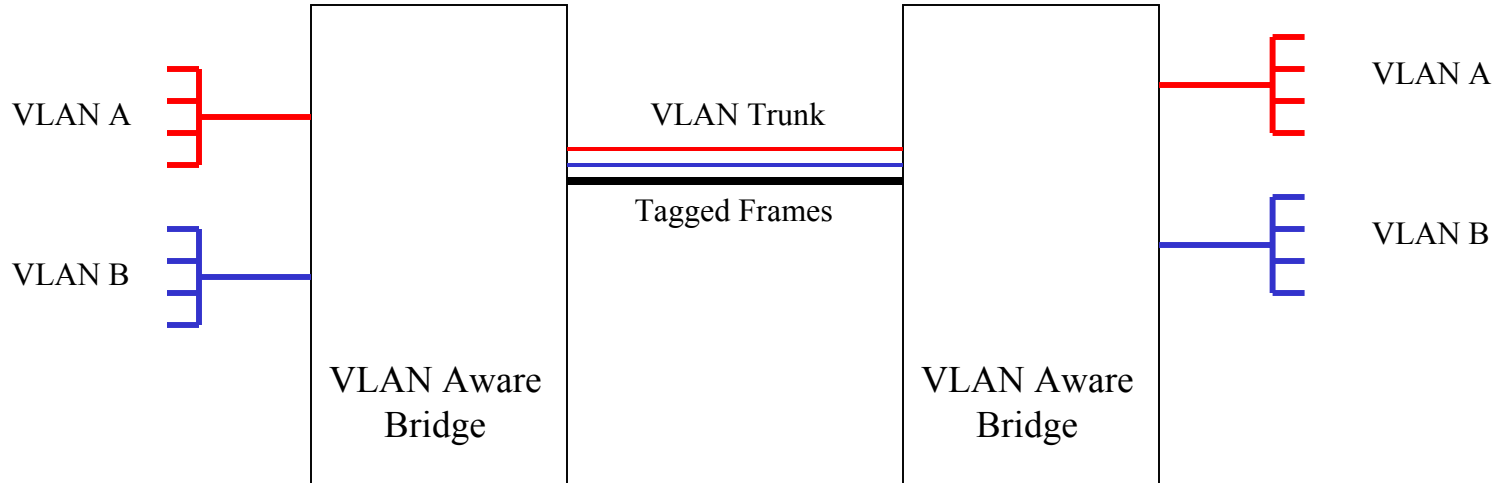


802.1Q

- IEEE Std 802.1Q defines an architecture for Virtual Bridged LANs, services provided in Bridged LANs, and the protocols and algorithms involved in the provision of those services.

802.1Q VLAN Trunking

- 802.1Q specifies tagged frames for supporting VLAN trunking



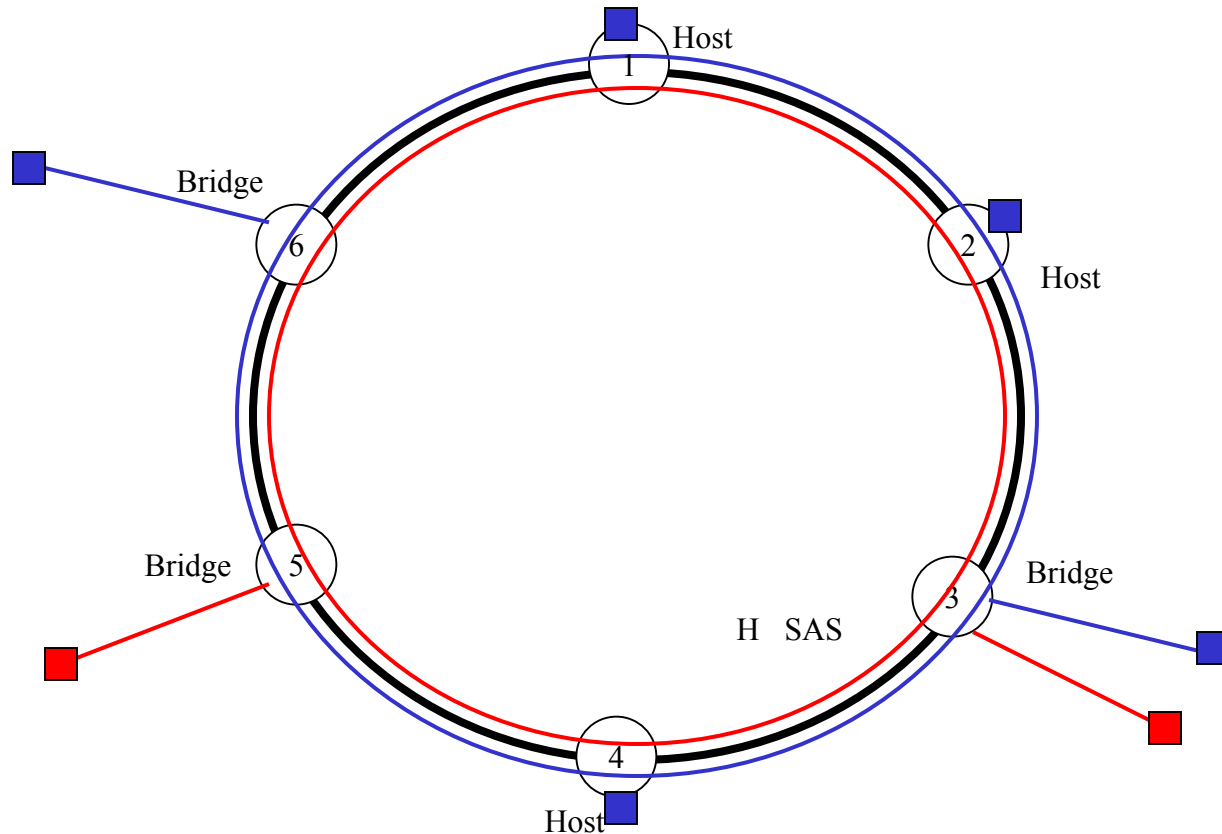
- Tagged frames relay VLAN associations across trunk ports

Bridging over 802.17 Rings

- 802.17 meets the 802.1D/802.1Q bridging requirements by treating the RPR as a shared LAN media
 - Bridged frames are flooded on RPR (i.e. non-local)
 - Only non bridged frames may be directed (local-local)

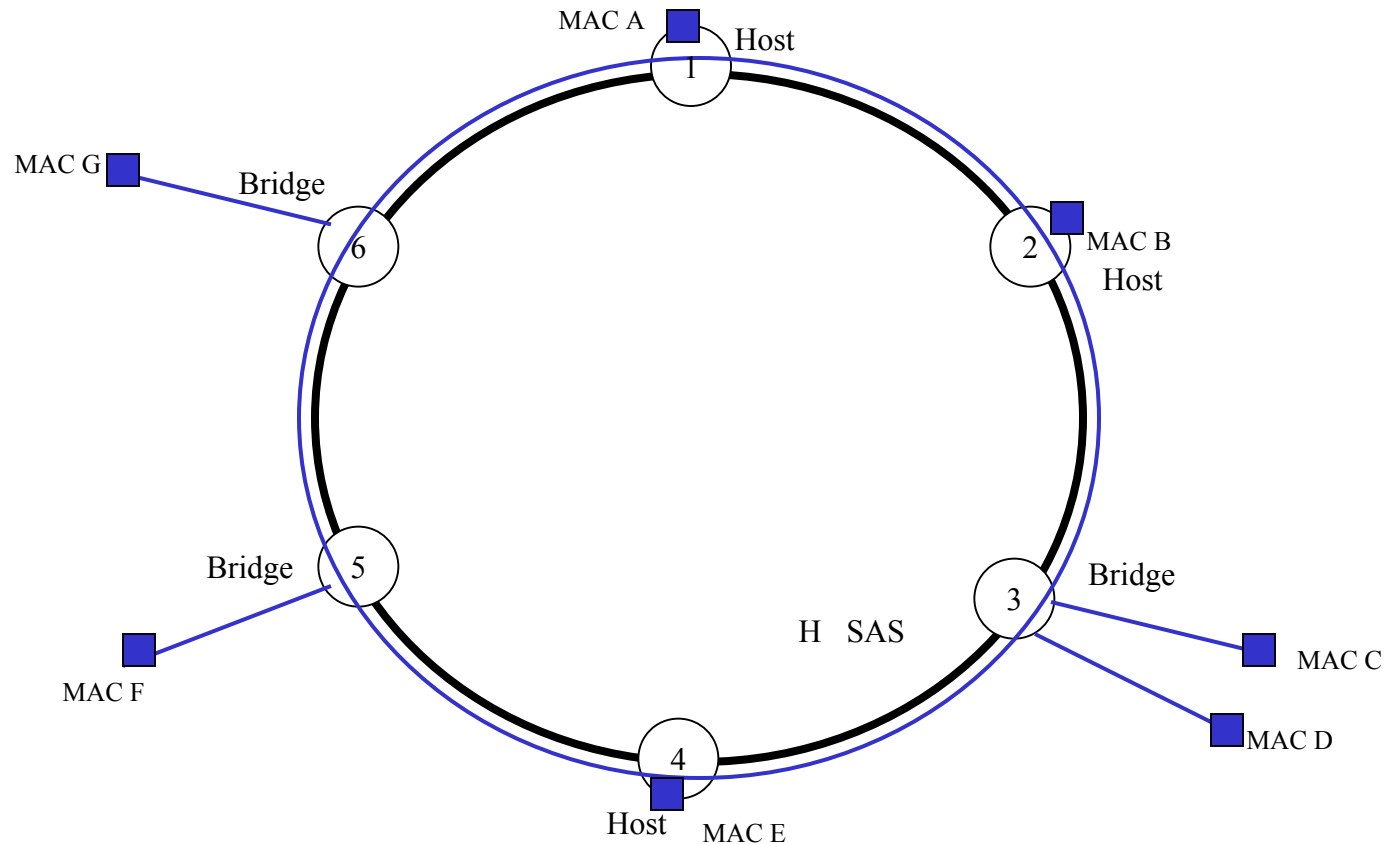
802.1Q over 802.17

Transforms the ring into a VLAN Trunk Port



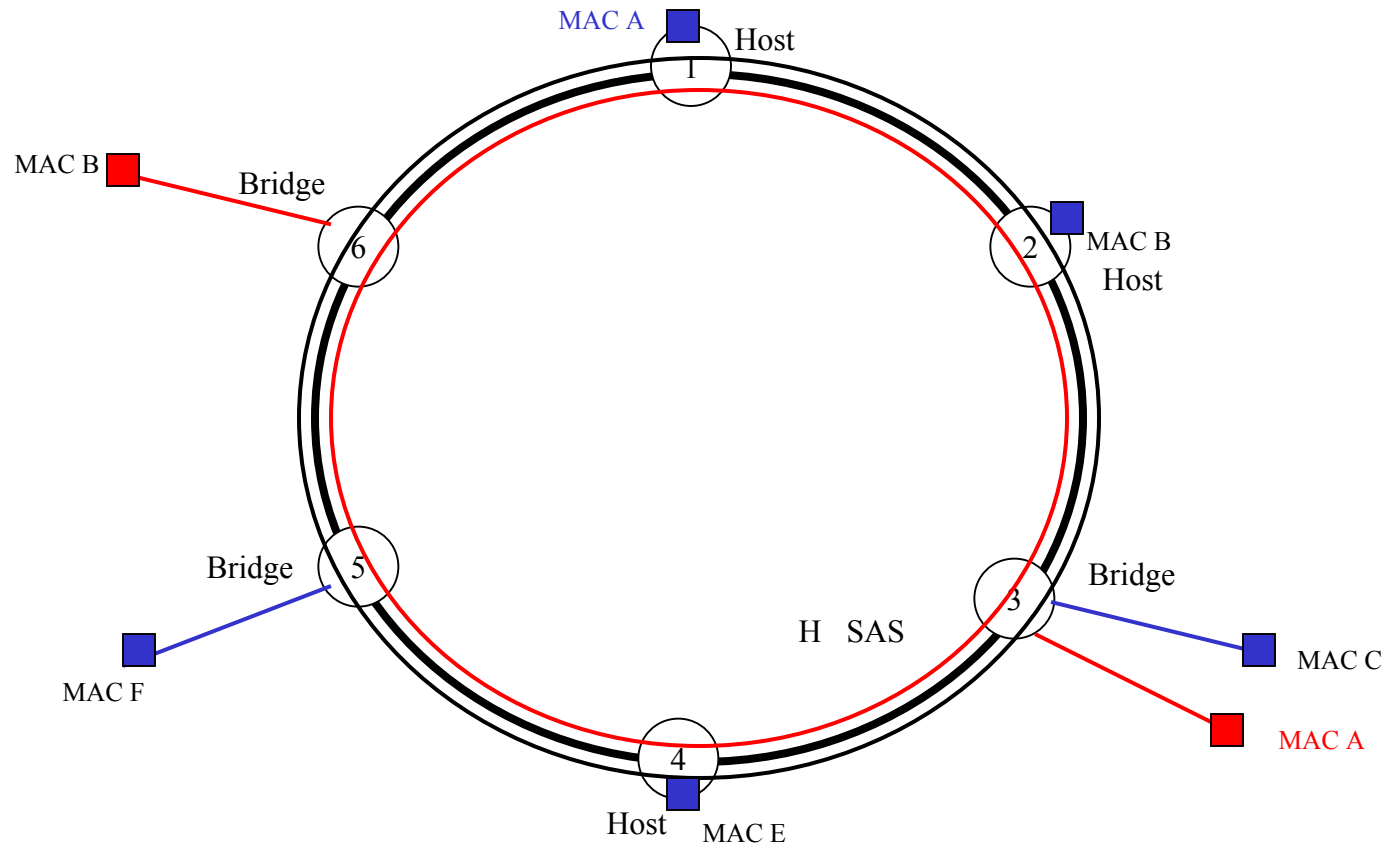
While not explicitly stated in 802.17 standard, hosts sitting on an 802.17 ring with 802.1Q tagged traffic should filter any tagged frames received for VLANs in which they are not a member.

802.1Q over 802.17 Basic VLAN Rules



In 802.17, any off ring stations which are members of the host RPR VLAN, must have unique MAC addresses as is required for normal LAN operation

802.1Q over 802.17 Basic VLAN Rules

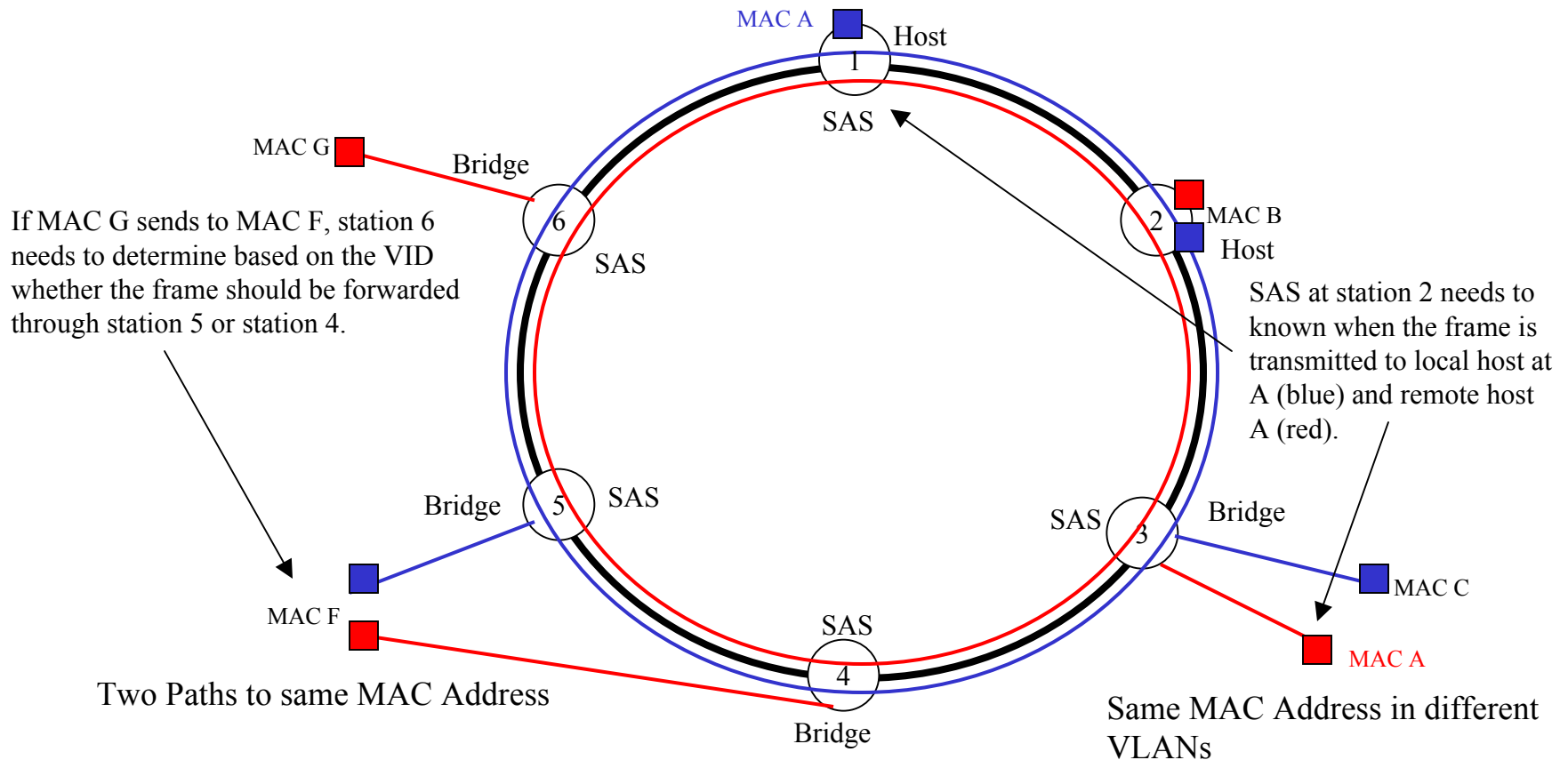


In 802.1Q MAC end station addresses need not be unique. IVL and Mixed IVL/SVL properly resolves any MAC address conflicts.

Bridging and SAS

- Intent of SAS is to optimize RPR for bridged networks by sending directed frames in cases where possible rather than flooding.
 - SAS needs to be VLAN aware to ensure that traffic in different VLANs is properly delivered.
 - The same MAC address may reside in different VLANs.
 - Two stations with the same MAC address
 - Two different paths to the same station.
- SAS absolutely needs to distinguish between frames which are destined to different VLANs

Bridging and SAS

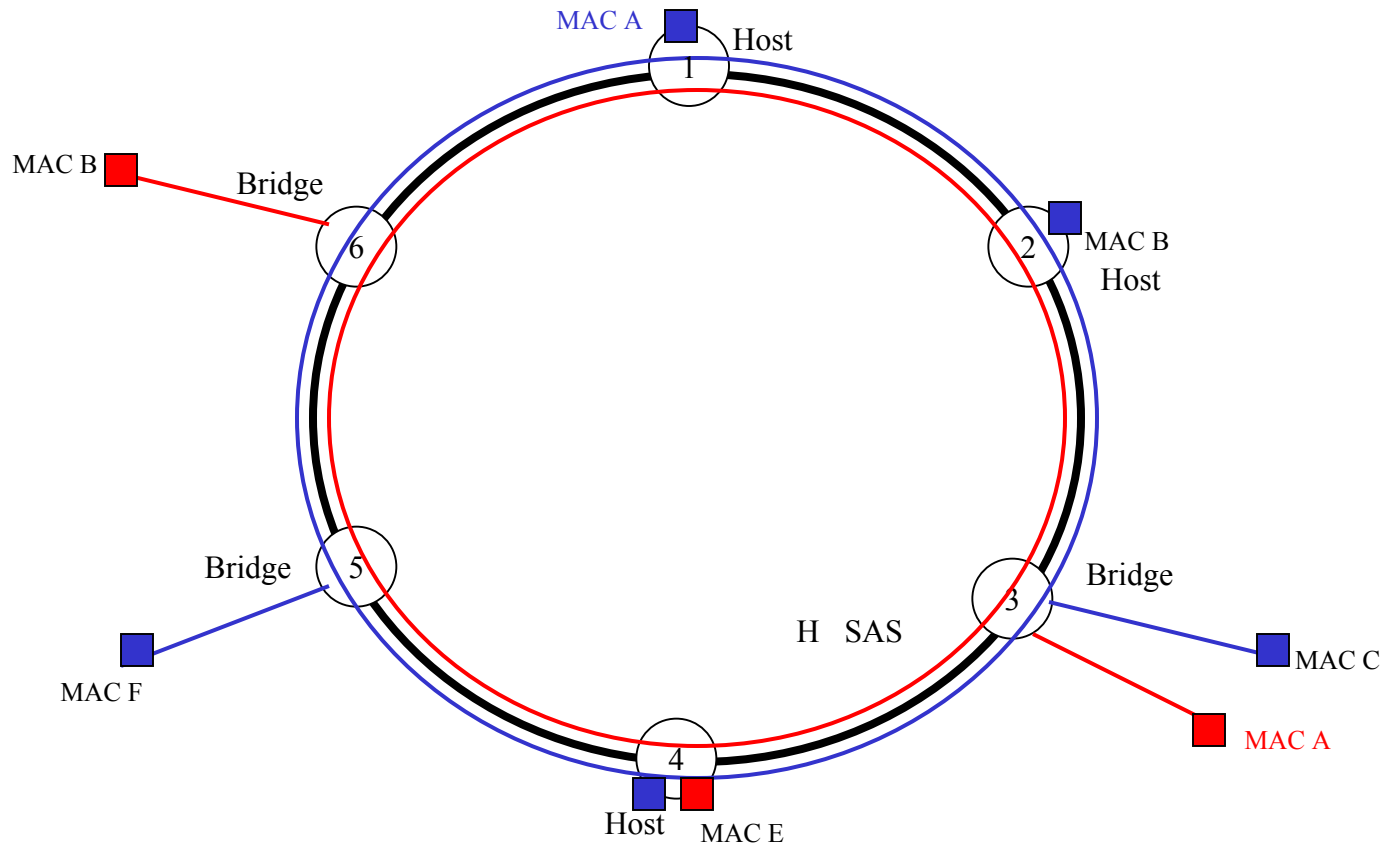


Issue with 802.17 and VLANs

- There is one scenario where 802.17 transmission rules do not operate properly.
 - A local host station on the RPR is a member of two different VLANs implementing IVL and communicates with an off ring host which happens to have the same MAC address as one of the local stations on the ring (but resides in a different VLAN).
 - In this case, the off ring station with the duplicate MAC address in the other VLAN is not reachable. The 802.17 MAC transmits using a directed transmission to the station in the incorrect VLAN violating the operation of the VLAN.
- The solution is for either the host to distinguish the VLAN and control the frame transmission, or restrict the host from communicating with duplicate MAC addresses.
- This problem can be corrected by the SAS by having the SAS learn VLAN bindings from local host transmission.

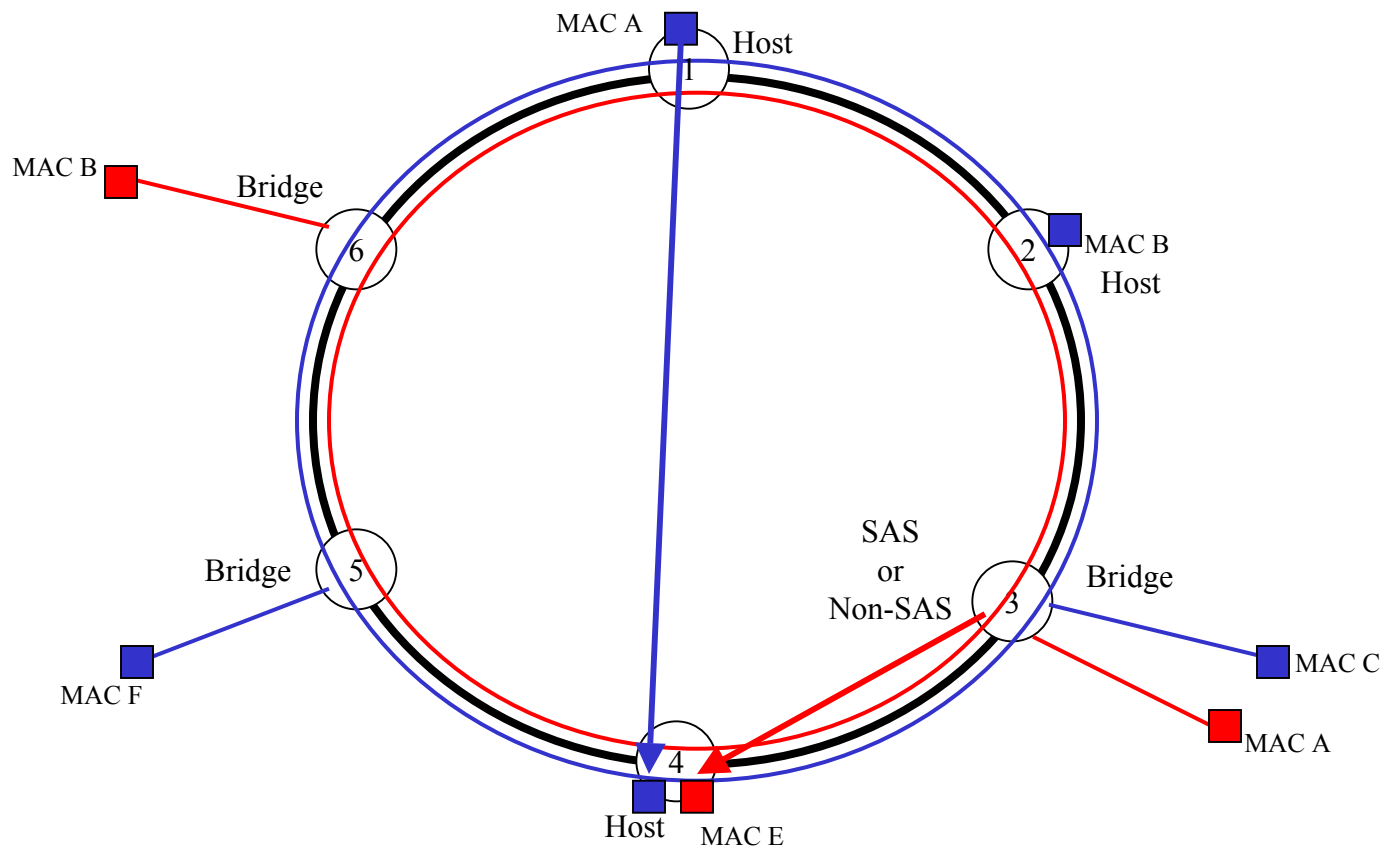
802.17 Issue

Hosts in multiple VLANs



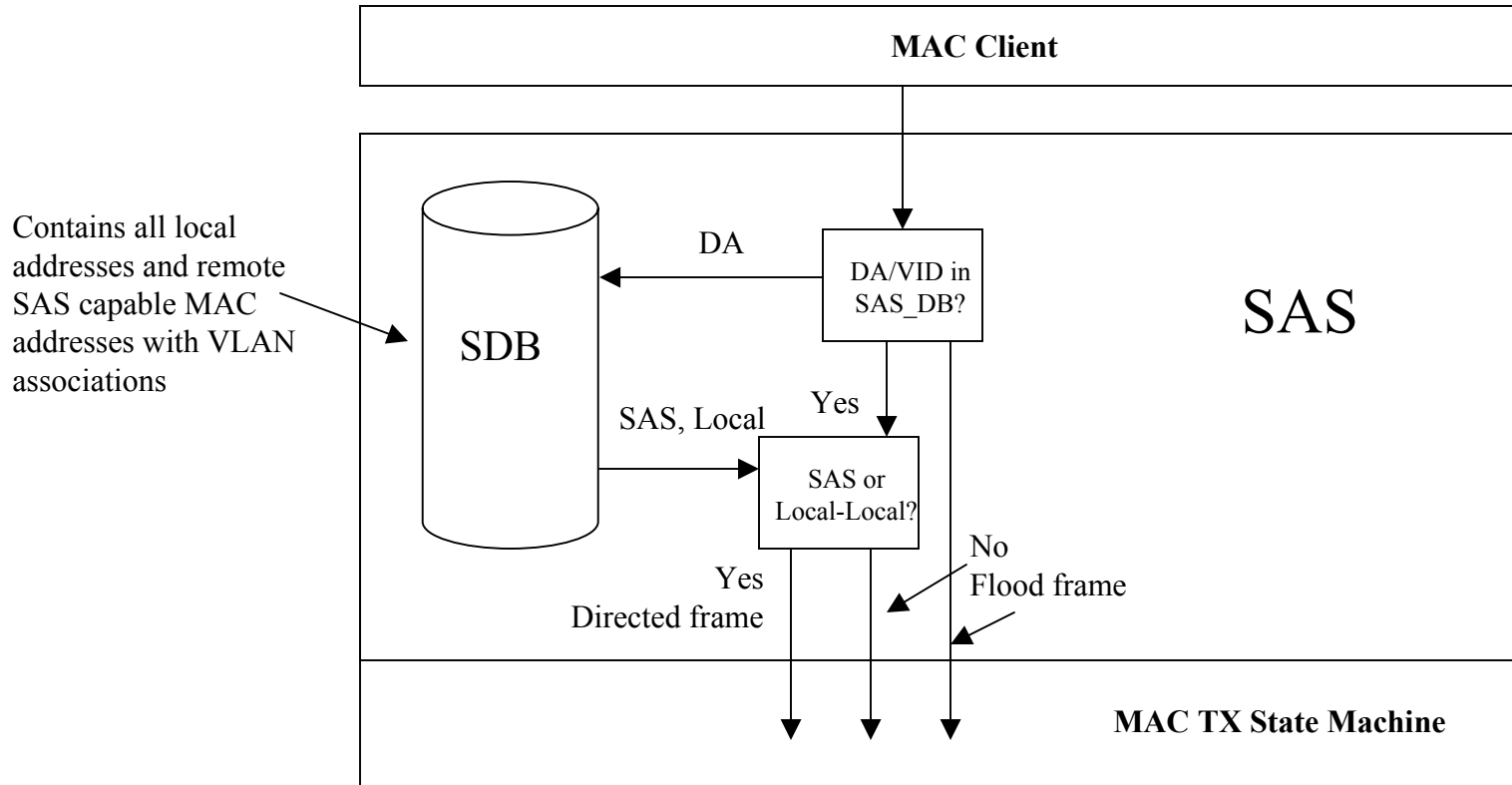
If Host 4 sends a frame to MAC address A (in red VLAN), the RPR MAC will direct the frame to Host 1 (black). MAC A (red) will never receive the frame.

802.17B Solution

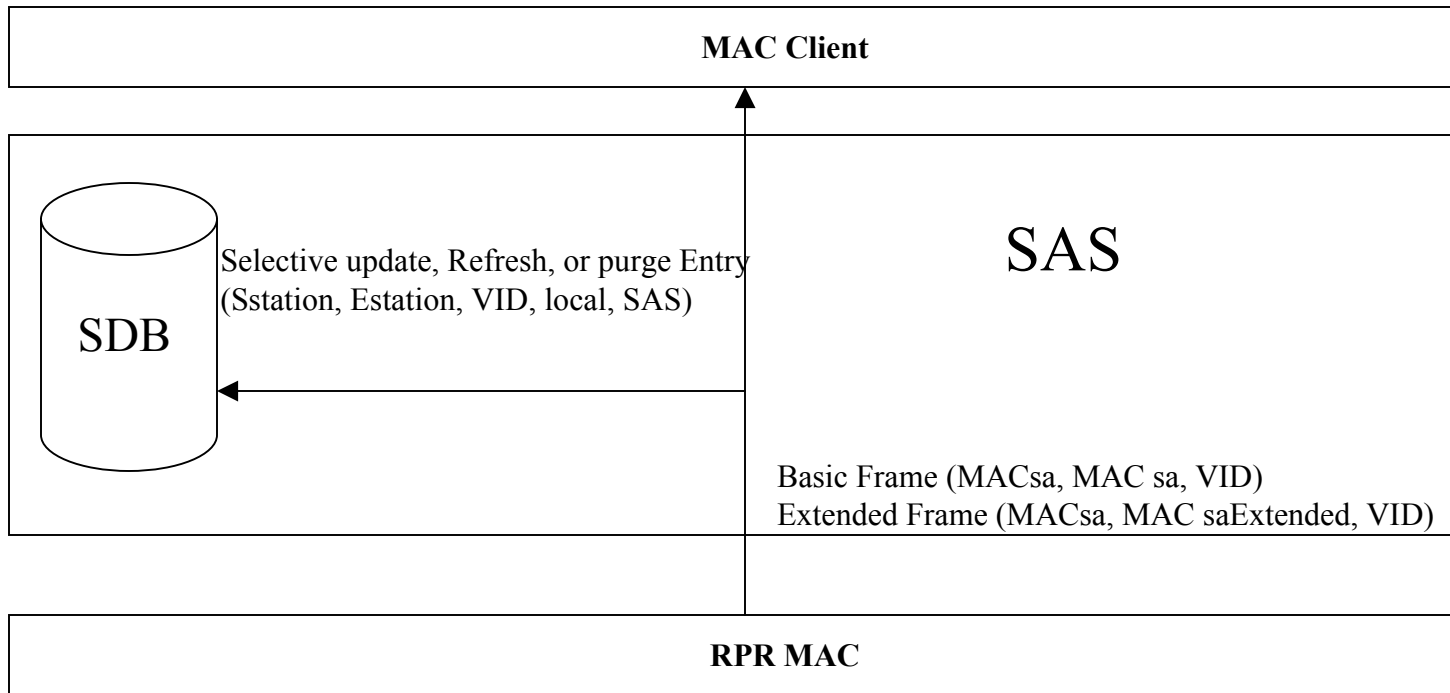


Allow SAS to learn VLAN ID's with MAC addresses for local station addresses in SDB. In this case, if host 4 sends to MAC A (blue) the frame is directed to station 1. If host 4 sends to MAC A (red) the frame will either be directed through station 3 or flooded. In either case, MAC A (red) properly receives the frame.

SAS TX for handling VIDs



Selective SAS Update



SDB updated with following :

RPR station (Sstation), End Station (Estation), VID,
(local) - if the frame came from a local RPR host
(SAS) – if the frame came from a SAS capable station

Untagged or Priority Tagged Frames

- Frames which are untagged or priority tagged should be associated with the default VLAN.
- Default VLAN in the SAS is configurable by LME.

Thank You!!