MSRP Attribute Declaration, Propagation and Bandwidth Allocation
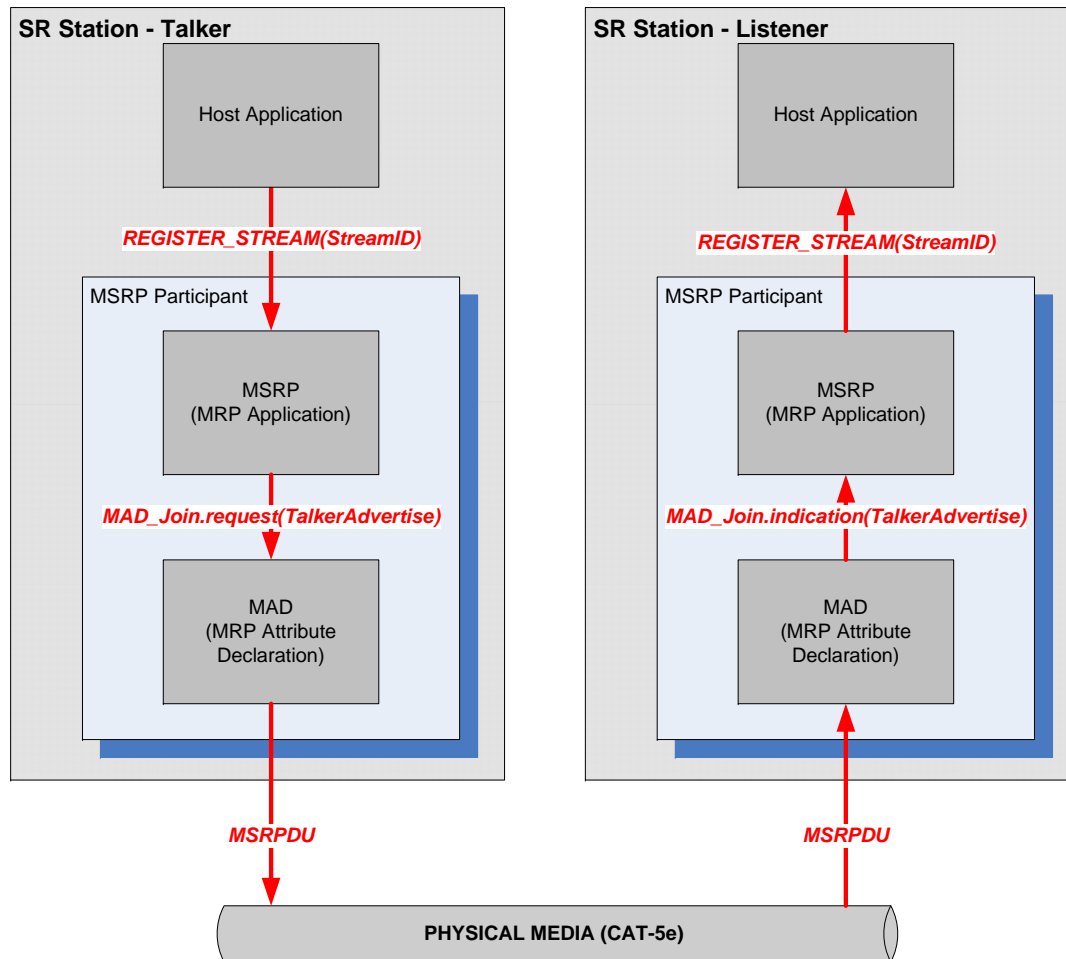
Craig Gunther (cgunther@harman.com)
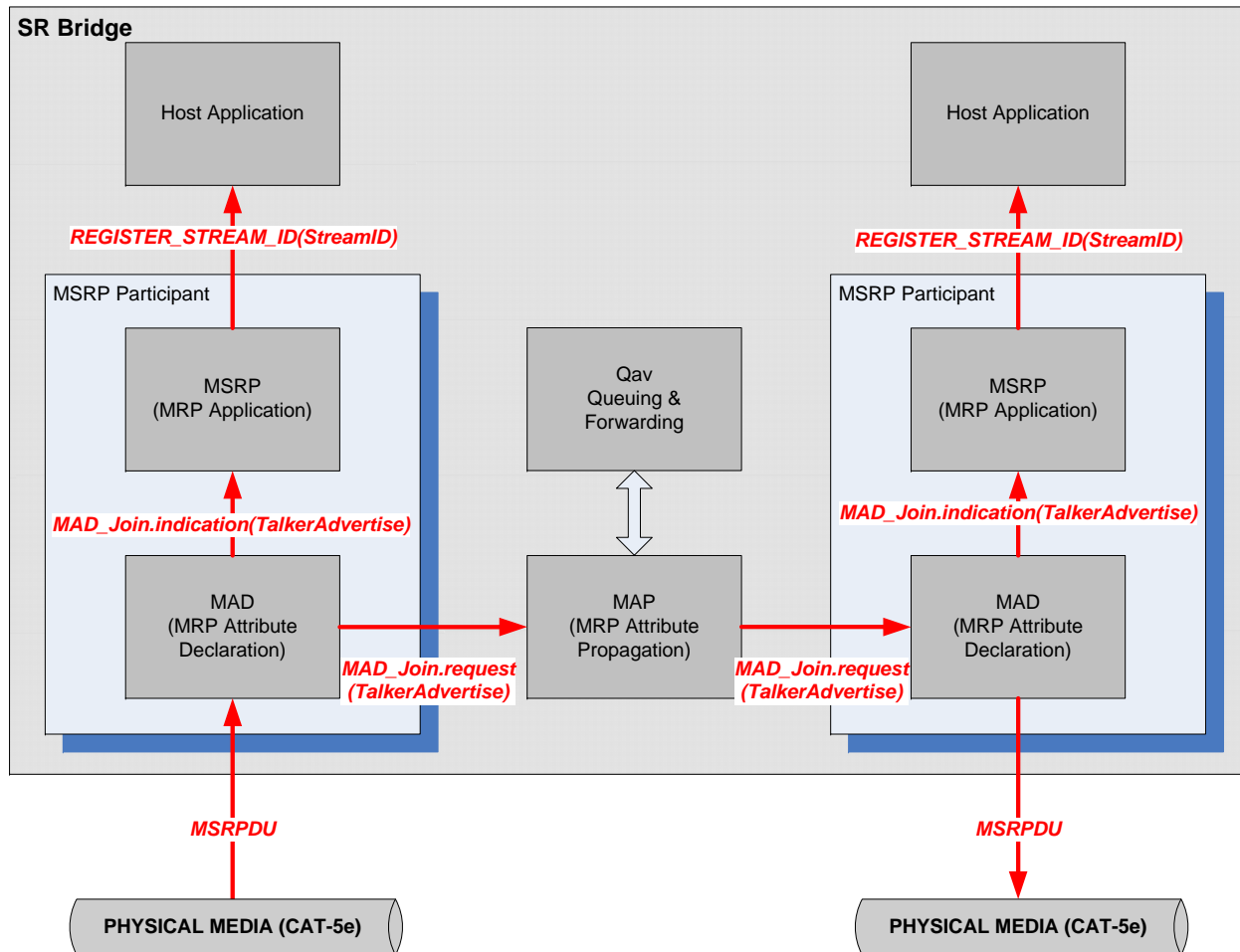
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Topics

- MSRP Attribute Propagation
- Triggers for Bandwidth Reallocation
- Bandwidth Allocation Algorithm
- Listener Attribute Propagation
- Qat/Qav - What runs where?
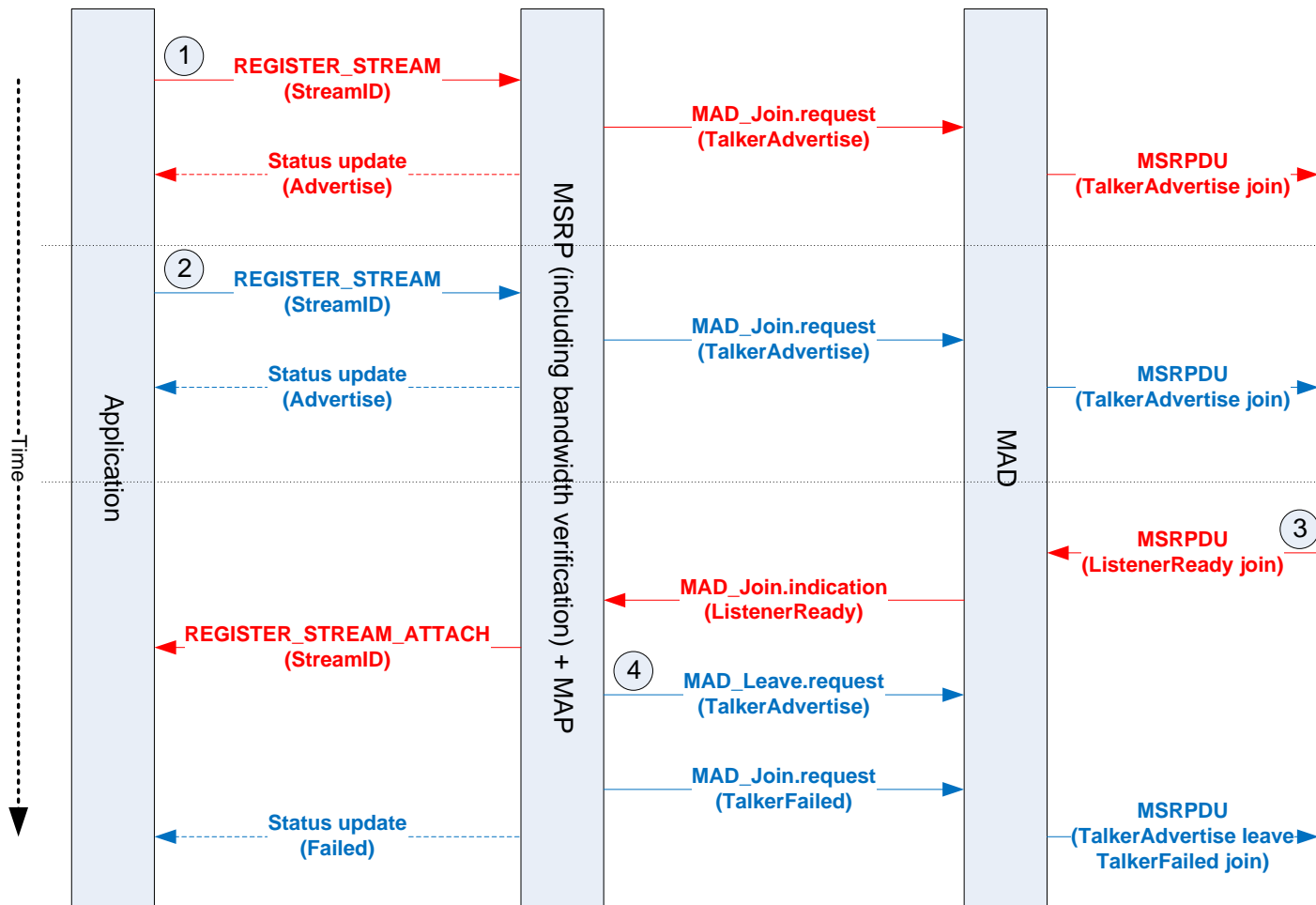- MSRPDU Talker Attributes

MSRP Attribute Propagation
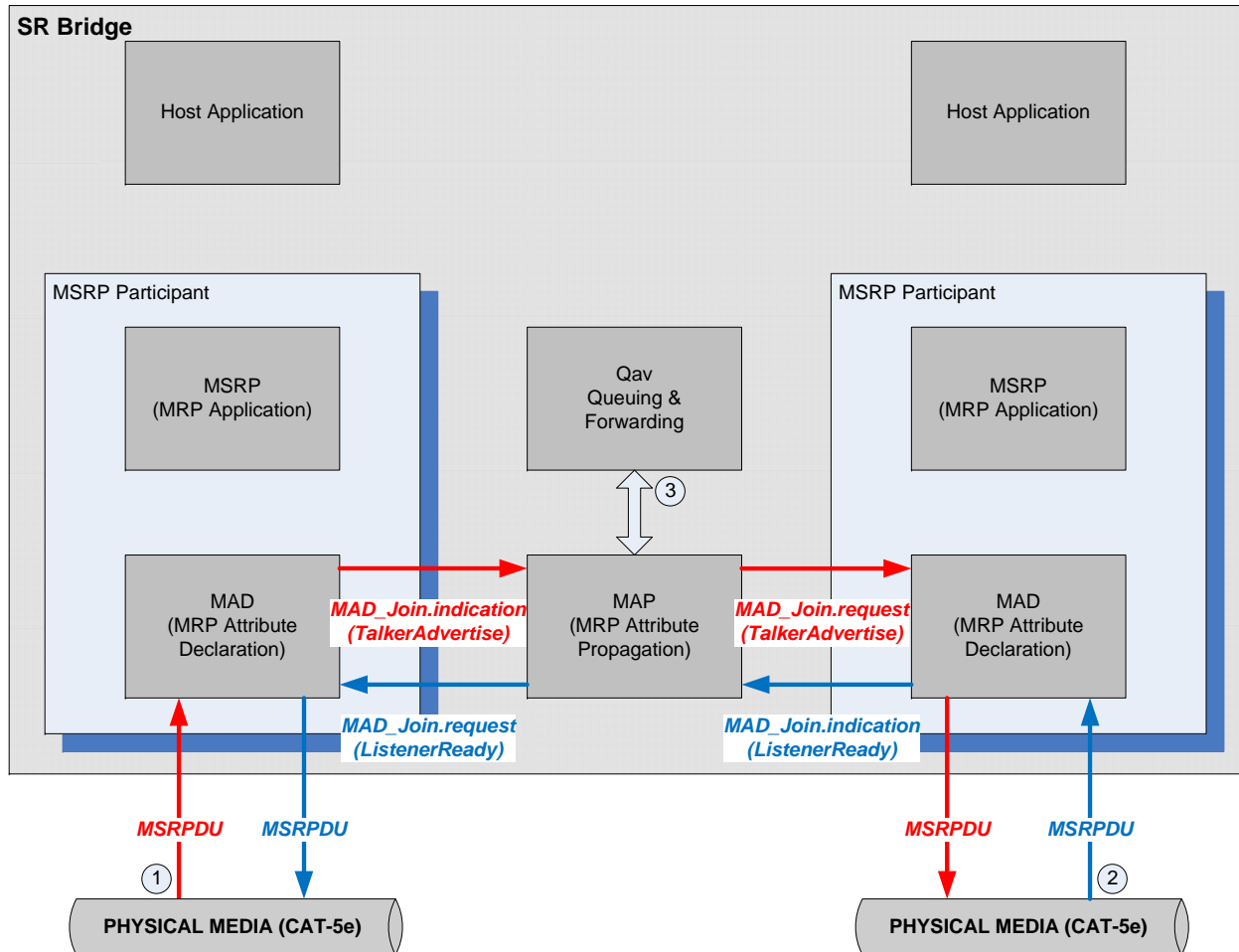
MSRP Attribute Propagation

Bridge MSRP Propagation

Talker's Second Stream Fails

Bridge Forwarding a Stream

Triggers for Bandwidth Reallocation

Bandwidth Reallocation

Actions that might cause a bandwidth allocation change

- TalkerAdvertise
- TalkerFailed
- ListenerReady
- ListenerReadyFailed
- ListenerAskingFailed
- Media bandwidth changed

Bandwidth Reallocation - 2

WARNINGS:

In normal operation you would expect to see Talker declarations registered before Listener declarations, although this is not a requirement.

You might also see unexpected interaction in MSRP attribute processing for a short period of time after a Spanning Tree reconfiguration.

Bandwidth Allocation Algorithm

Definitions & Notes

- Bandwidth reservation is done on the TX side

- Definition: Active Listener = Listener Ready or Listener Ready Failed (bandwidth will be consumed if this stream is Approved)

- On Non-shared media: Talker Advertise from another port is associated with Active Listener on the current port

- On Shared media: the Talker Advertise may also come from the current port (e.g. 802.11)

Definitions & Notes - 2

- Merging Listener Declarations:

Table 19-1 Listener Declaration Type Summation

FIRST DECLARATION TYPE	SECOND DECLARATION TYPE	RESULTANT DECLARATION TYPE
Ready	Ready	Ready
Ready	Ready Failed or Asking Failed	Ready Failed
Ready Failed	Any	Ready Failed
Asking Failed	Ready or Ready Failed	Ready Failed
Asking Failed	Asking Failed	Asking Failed

Per-Port Bandwidth Analysis

- Do the following for each TX port (completing the analysis for each port before proceeding to the next port):
  - Create a list of Talker declarations from any other port that could be sent out this port
  - This list is divided into two sections:
    - Streams with Active Listeners on this port are at the top of the list
    - Streams without Active Listeners on this port are at the bottom of the list
  - Sort each section by Talker Rank + StreamID

Per-Port Bandwidth Analysis - 2

- Include the following information with each Talker declaration in the list:
  - Stream ID
  - Talker Attribute (Advertise or Failed)
  - Talker Traffic Class (A or B)
  - TSpec
  - Talker is on same port "flag" (True or False)
    - Bandwidth requirements double if True
  - Stream MAC DA
  - Stream VID
  - Approved/Disapproved "flag" (set by Qav)

Qav Bandwidth Analysis

- Ask Qav to do a Trial Reservation based on information in the list
  - Qav will set Approved/Disapproved flag
  - Qav may adjust Talker attribute
- Qav processes the list as follows:
  - Work from top of list to bottom
  - Calculate bandwidth requirements based on:
    - TSpec + additional media overhead
    - Double bandwidth requirement if Talker is also on this port

Qav Bandwidth Analysis - 2

- Qav continues processing as follows:
  - If bandwidth is not available for this stream with this traffic class, or attribute declaration is Talker Failed:
    - Flag list entry as Disapproved
    - Set attribute in list to Talker Failed on this port
    - Move to next entry in the list

Qav Bandwidth Analysis - 3

- Qav continues processing as follows (There is sufficient bandwidth for this stream):
  - If there are Active Listeners on this port:
    - Flag list entry as Approved
    - Reduce available bandwidth for remaining streams
    - Move to next entry in the list
  - If there are no Active Listeners on this port:
    - Flag list entry as Approved
    - Do not reduce available bandwidth (no stream data will flow)
    - Move to next entry in the list

Bandwidth Allocation

- Qav has finished processing this port's list
- Compare Approved/Disapproved flag for every stream against current reservations, as specified on following pages

Bandwidth Allocation - 2

- Process list from top to bottom looking for Disapproved streams:
  - If stream is currently Approved:
    - Set port to filter Stream MAC DA
    - Remove bandwidth allocation from Qav
    - Deregister Talker Advertise from this port
  - Register a Talker Failed on this port
  - If there is a Listener attribute registered on this port declare a pending Listener Asking Failed on the port the Talker is registered on (this may require merging other Listener attributes)
  - Move to next entry in the list

Bandwidth Allocation - 3

- Reprocess list from top to bottom looking for Approved streams:
  - Deregister Talker Failed if it was declared for this port
  - Register a Talker Advertise for this port
  - If stream is currently not Approved allocate bandwidth via Qav
  - Set port to forward Stream MAC DA
  - Declare a pending Listener attribute on the port the Talker is registered on that is identical to this port's Listener attribute (this may require merging other Listener attributes)
  - Move to next entry in the list

Bandwidth Allocation - 4

- If there are more ports on the bridge:
  - Build a new list for the next port by returning to the "Per-Port Bandwidth Analysis" slide #14

- If all ports have been processed:
  - Proceed to the next slide and process the "pending Listener attributes"

Listener Attribute Propagation

Listener Attribute Propagation

- Bandwidth Allocation for all ports in the bridge has been completed

- Process each port's pending Listener attributes
  - If pending Listener attribute does not match current Listener attribute
    - Deregister current Listener attribute
    - Register pending Listener attribute

Qat/Qav
What runs where?

What runs in the Talker?

- 802.1Qav for:
  - Bandwidth query and reservation
  - Queuing and shaping traffic

- 802.1Qat for:
  - TalkerAdvertise request and ListenerReady indication processing
  - Bandwidth related Advertise/Failed changes

What runs in the Bridge?

- ## 802.1Qav for:
  - Bandwidth query and reservation
  - Queuing and shaping traffic
- ## 802.1Qat for:
  - Bandwidth related Advertise/Ready/Failed changes
  - Talker & Listener attribute propagation
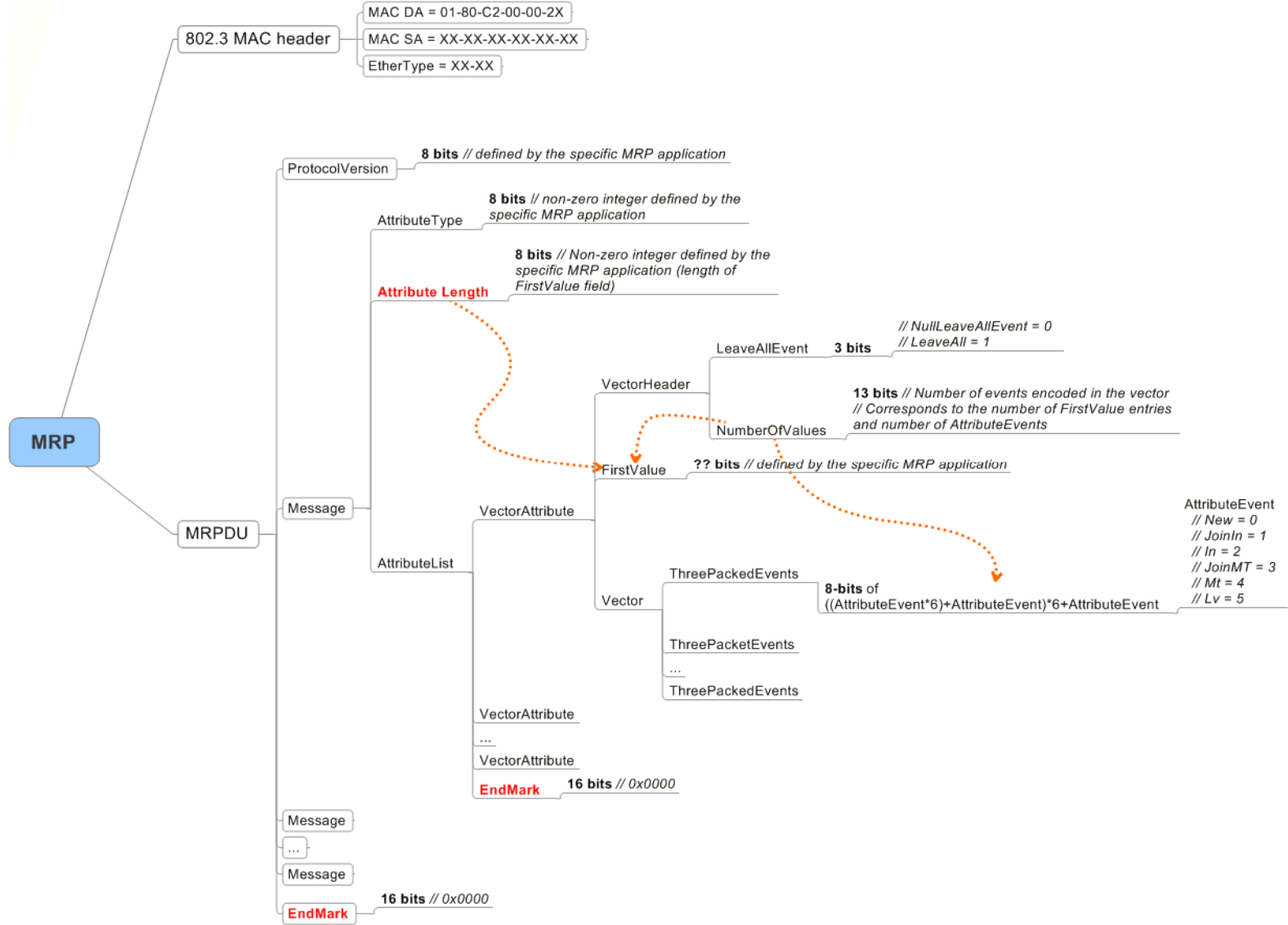- ## 802.1ak (MMRP) for:
  - Optional Talker pruning

What runs in the Listener?

- ## 802.1Qat for:
  - TalkerAdvertise indication and ListenerReady request processing

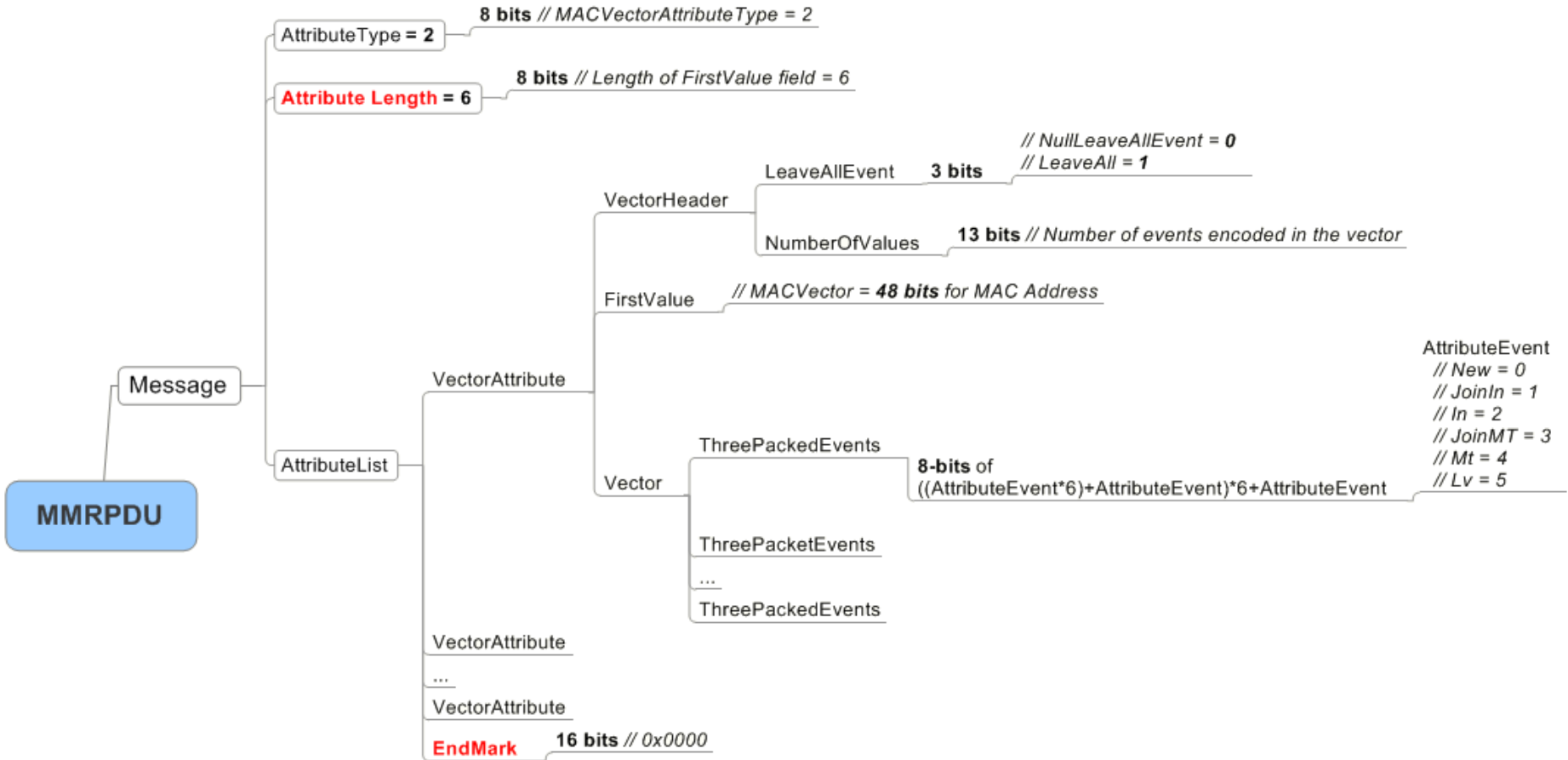- ## 802.1ak (MMRP) for:
  - Optional Talker pruning
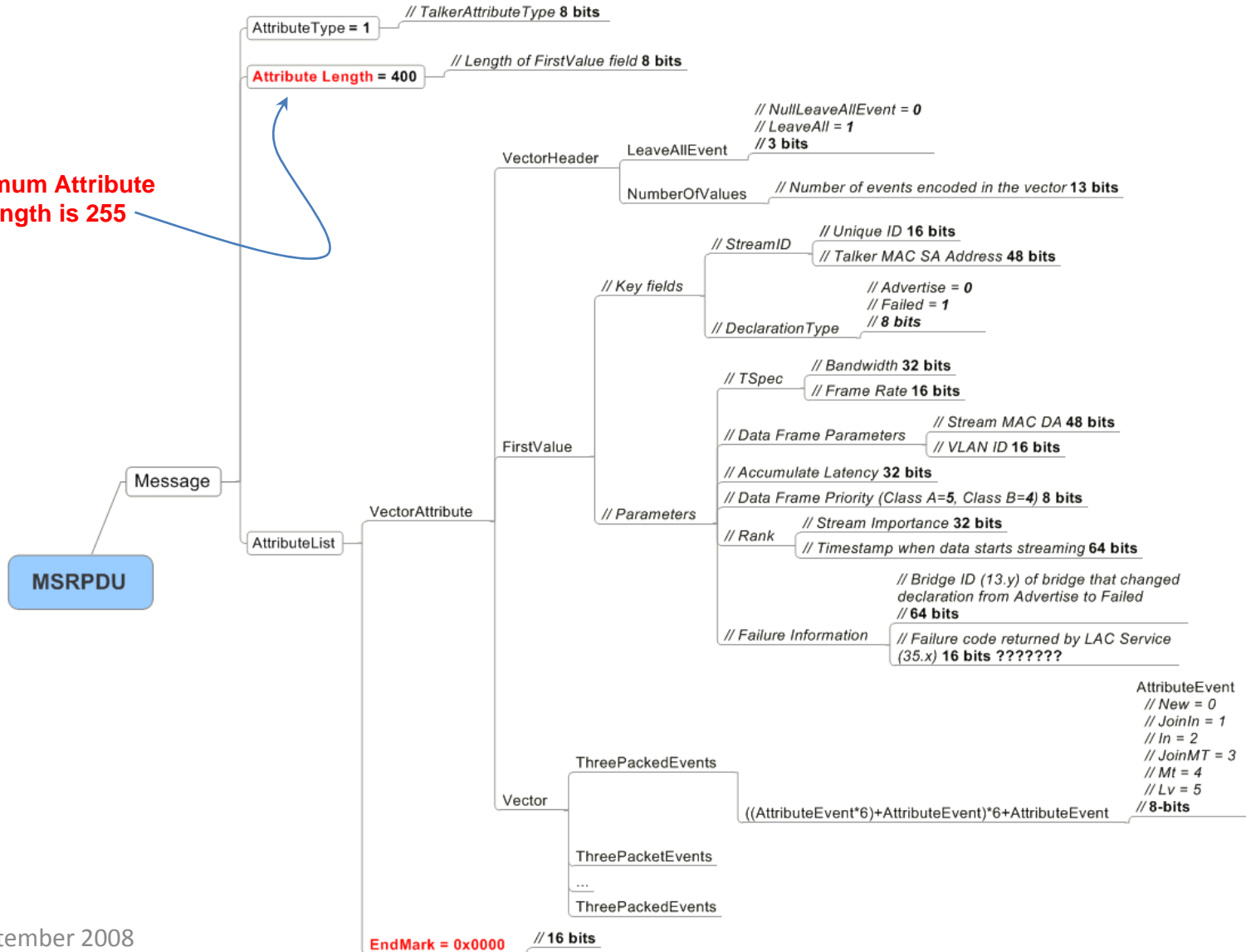
MSRPDU Talker Attributes

MRPDU

MMRPDU Message

MSRPDU Talker Message

Questions?