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# **802.1 Qat Policy Proposals**

## **IEEE 802.1 AVB Conference Call**

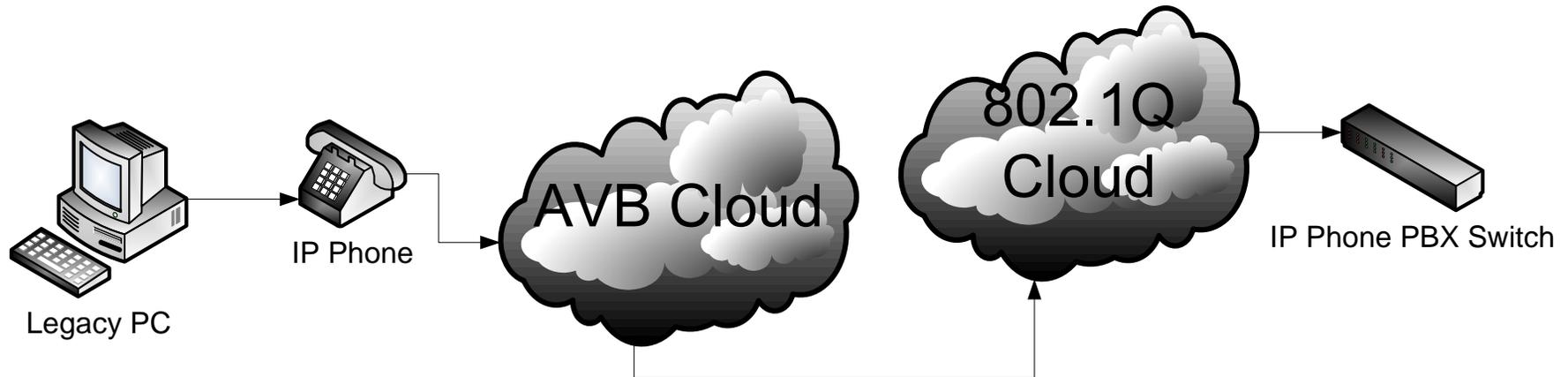
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# Qat Policy Goals

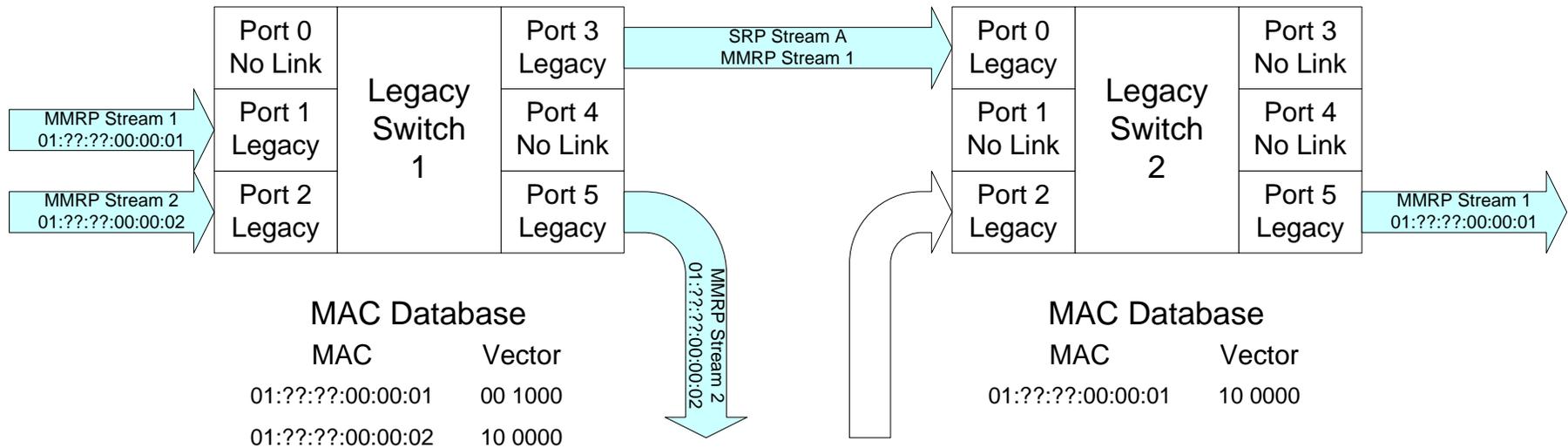
- Add an AVB Network on top of a Legacy Ethernet Network
  - i.e. both co-exist together
- Insure the AVB Network is not disrupted by the Legacy Ethernet flows
  - Rates/Bandwidth are NOT measured or policed in Qat – Rates are handled in Qav – so not going to cover that here
  - Insure masquerading AVB flows cannot disrupt real AVB flows
- Insure the Legacy Ethernet Network continues to function
  - Although most likely at a lower performance due giving preference to the AVB flows
  - Hopefully without modifying any Legacy Frame content (i.e., for Vista and IP Phones)

# IP Phone Issue



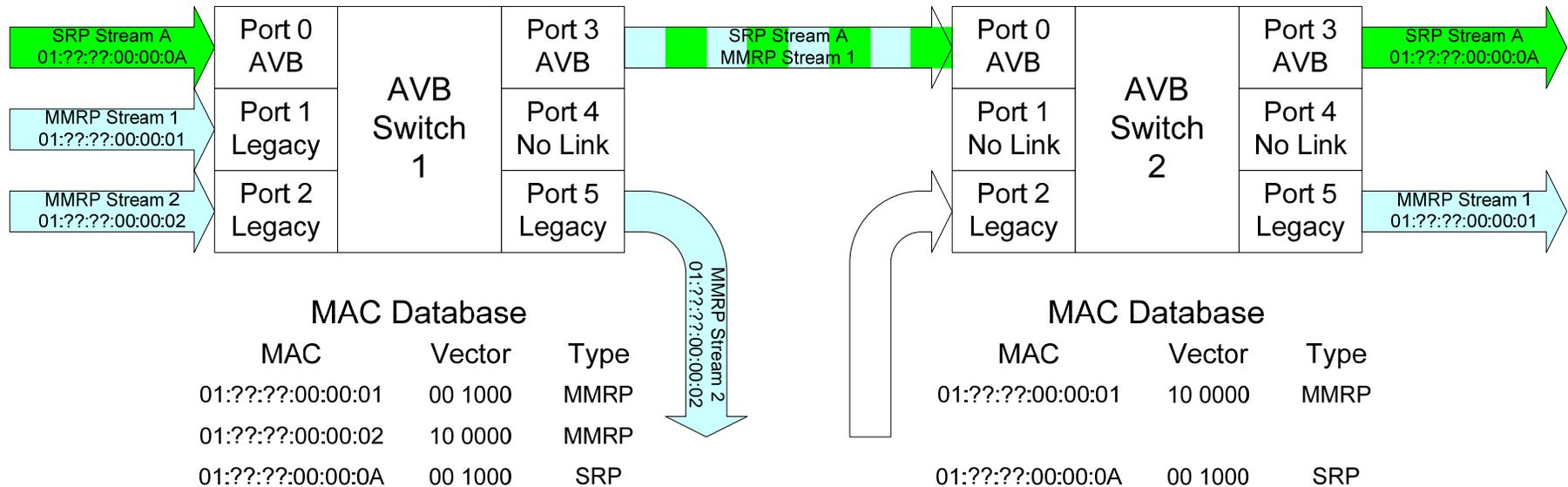
- Many IP Phones use 802.1Q Tagged frames with PRI 5 for Voice frames and some other PRI for Legacy PC data (that passes thru the phone)
- They may also use a specific VID for voice, but AVB Clouds will ignore the frame's VID (as we have already agreed to)
- If these Phones are connected through an AVB Cloud and if the AVB Clouds Re-Mark the Legacy Frame PRI's away from PRI 4 & 5 then the voice frames may not get treated correctly in the legacy 802.1Q Cloud on their way to the IP Phone PBX Switch (which used PRI 5 to insure voice QoS)
- Its better to 'Do No Harm' if at all possible! And this is solvable. Read on.

# Legacy Flows Baseline



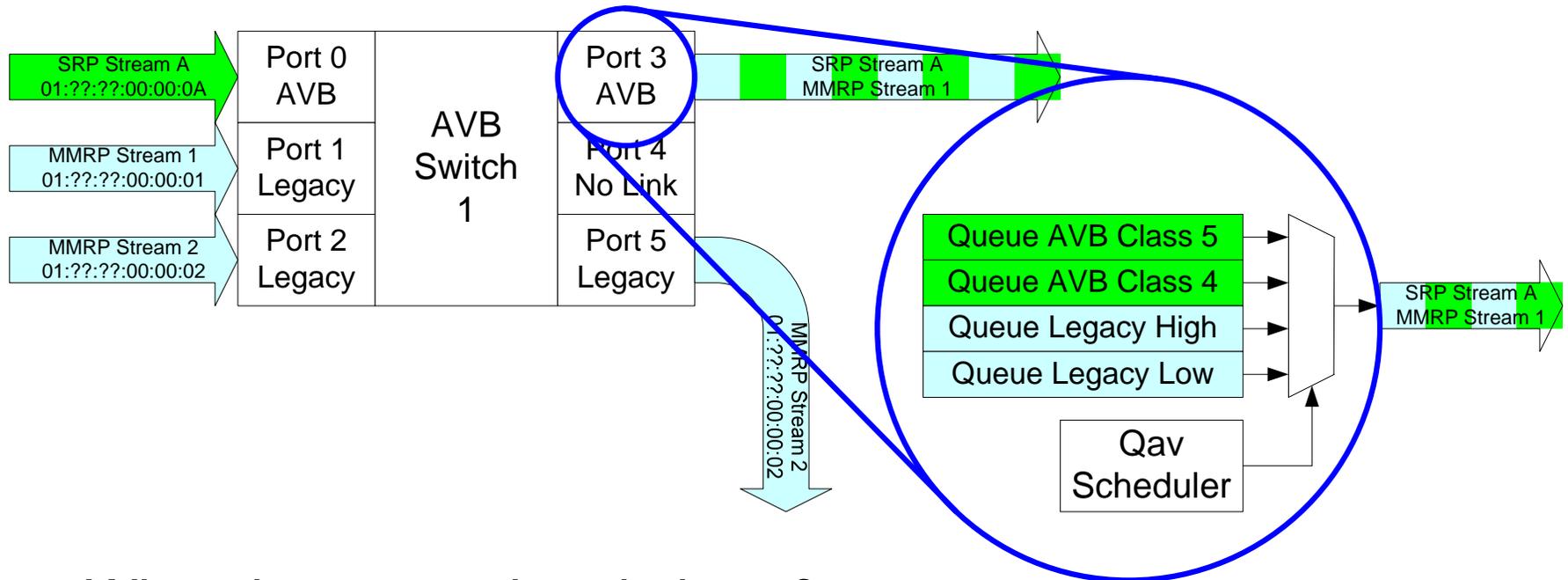
- Two MMRP Flows are shown using Legacy Switches
- QoS can be used in this case following existing Standards
  - Congestion and QoS rates are not covered in this presentation as that is part of other work (i.e., Qav)
- We want this still to work when we add AVB!

# Add AVB on top of Legacy Flows



- The same two MMRP Flows are shown using AVB Switches
- Ports 0 & 3 of both Switches are part of the AVB Cloud
- An added SRP Flow is shown between the two Switches

# Closer Look at Port 3's Egress



- What do we need to do here?
  - AVB Streams need to be separated from Legacy Streams in each AVB port's Egress Queues
- Assumption:
  - Only SRP Approved AVB Streams can use the **Green** AVB Queues

# AVB Stream Identification

- In order to Separate AVB Streams from Legacy Streams we need to define how to Identify AVB Streams!
- Currently on the table is (from avb-pannell-assumptions-0407-v3):
  - Option ‘Tag’: Any frame with a Q Tag priority 4 or 5 entering an AVB port
  - Option ‘DA’: Any frame with a MAC DA address in the Address Database entering an AVB port
- Neither is really enough if we look at how best to prevent **Legacy** frames from entering the **Green** AVB Egress Queues in a downstream AVB Switch
- Just mapping Legacy Streams to the right Egress Queues may not be enough! Some **Bad Frames** may have to be filtered or modified.

# AVB Stream Identification - Proposal

- Allow a Flow to use the **Green** AVB Queues if and only if:
  - A: Frame entered an AVB Port
    - I hope this is obvious why this is part of the decision
    - A bit per port is needed
  - B: The frame's DA is in the Address Database and Approved by SRP
    - Needed to prevent the need to 're-mark' Q Tagged frames with a priority of 4 or 5 entering Legacy (non-AVB) ports
    - 'SRP Approved' Could be defined by a multicast OUI Range
      - But this does not support unicast AVB flows
    - Or, it Could be indicated by a 'Type' bit in the Address Database
      - This supports the use of unicast AVB flows
  - C: The frame's Q Tag priority is 4 or 5
    - Making this part of the decision supports unicast AVB flows and mixed Class 4 and/or Class 5 AVB flows with the same DA
    - This is probably the best way to determine which **Green** AVB Queue the frame is to be mapped to
- Frames must meet ALL three to use the **Green** AVB Queues

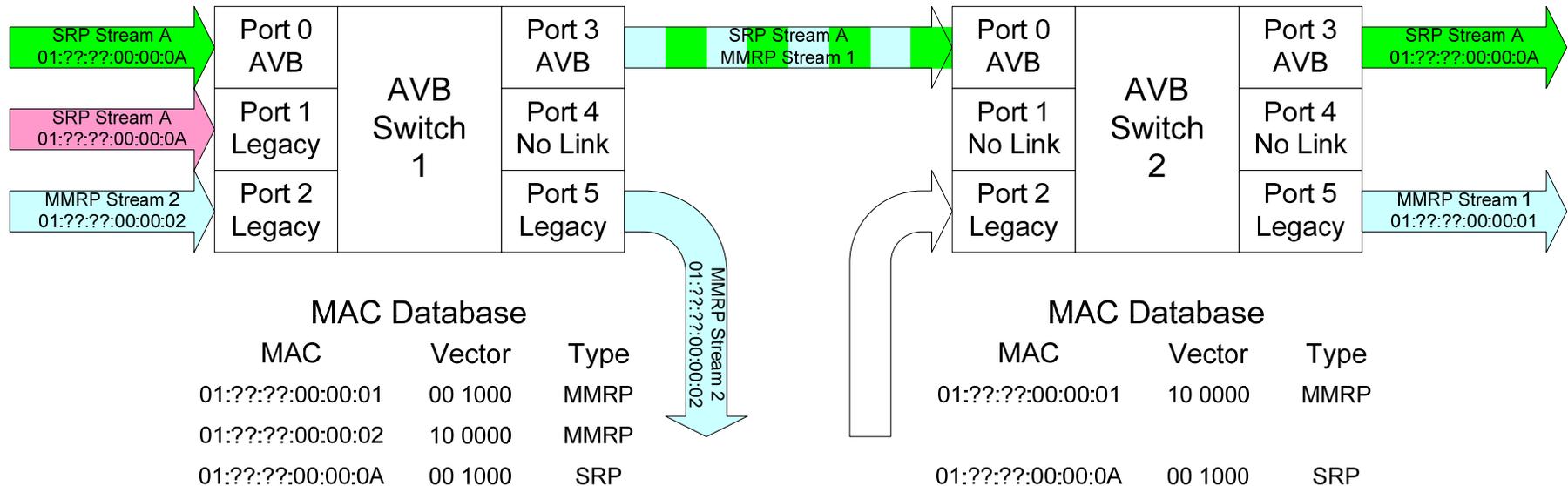
# AVB Stream Identification - Proposal

- There are 8 possibilities of A, B & C. What do each of these mean?
- A+B+C: Good AVB flow – Its OK to use the **Green** AVB Queues
- A+B: Right port & DA, but bad PRI
  - Place frame in **Legacy** Queues
    - If unicast DA, this is the legacy traffic to the end station
    - If multicast DA, could be best effort MPEG ‘B’ frames or extra quality information that could not be reserved for any other way than best effort
      - This is not the way 802.1 bridges normally work (i.e., frames could get out of order here), but this could be an interesting extension for AVB Clouds to support Dynamic Bandwidth
- A+C: Right port & PRI, but bad DA
  - Place frame in **Legacy** Queue
    - This is the IP Phone and Vista (do no harm) case that could easily occur in core AVB Switches (AVB Switch 2, Port 0, in the figures) – let the frame through – but in best effort queues only

# AVB Stream Identification - Proposal

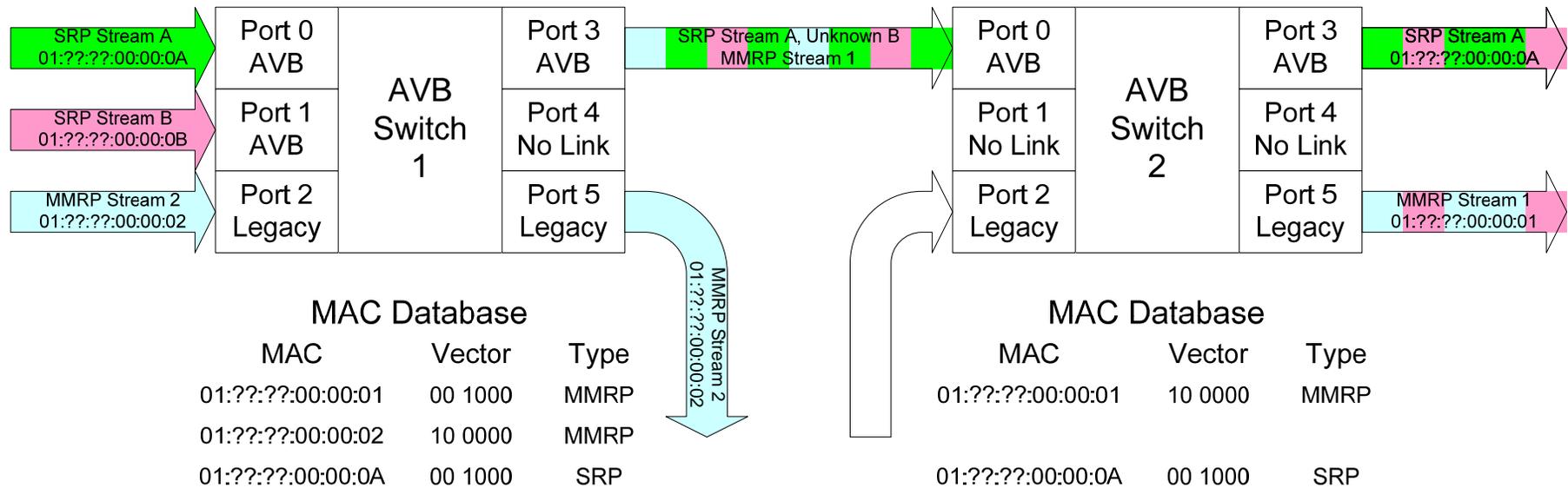
- B+C: Right DA and PRI, but bad port
  - Must **Discard** these Frames or **Re-mark** their PRI
    - Discarding prevents these frames from getting to the AVB core where they would be considered Good AVB flows
    - Re-marking also prevents these frames from being considered Good AVB flows
    - Either option causes the ‘original’ legacy flow to get ‘modified’ in some way
    - *Is this a Hacker? What is the best option here???*
    - *If Multicast – Discard? If Unicast – Re-mark?*
- A Only, B Only, C Only and Neither A, B or C
  - Place frame in **Legacy** Queues
    - A only is: Right port, but bad DA & PRI
      - Pure Legacy flow
    - B only is: Right DA, but bad port & PRI
      - Hacker with the wrong PRI? Or just unlucky Legacy flow
    - C only is: Right PRI, but bad Port & DA
      - Pure Legacy flow
    - None is: Pure Legacy

# Legacy Port Using an AVB DA



- Case B+C: Legacy Port 1 uses an AVB Stream's DA
  - Must be **Filtered** as AVB Switch 2 cannot know where it came from
    - Or let it through with **Re-marked** PRI bits (either way the switch needs to know when to take action)
  - Can be **Filtered** or **Re-marked** by either:
    - DA being an SRP OUI coming in a Legacy port (requires a known OUI and only works for multicast streams), or
    - DA's 'Type' in MAC Database is SRP and it came in a Legacy Port (requires a new bit in the MAC Database)

# AVB Port Using an Unknown AVB DA



- Case A+C: AVB Port 1 uses an unregistered AVB DA
  - Can be treated as a **Legacy** multicast (shown in **Red** using **Blue Q**)
    - Flow gets put into the best effort Legacy queues
  - No need to filter or change the frame's PRI as its assumed to be unregistered in all AVB switches (*is that a valid assumption?*)
  - Same treatment applies if this frame comes in a Legacy port
  - This is the IP Phone and Vista cases – let them work!

# AVB Stream Identification Summary

- In Summary, the Proposal is to allow a frame to use the AVB Queues if and only if:
  - It Enters an AVB Port
  - Its DA is a Registered and Approved by SRP, and
  - It is 802.1Q Tagged with a PRI of 4 or 5
- All other frames must use the Legacy Queues
- The DA is approved only if its present in the address database
  - If it is Associated to SRP with a new bit in the address database, Unicast AVB Streams can be supported (I think this is a better option)
  - If it is Associated to SRP with an OUI range, then only multicast AVB Streams can be supported (this is somewhat limiting)
- The only frames that need to **Filtered** or **Re-marked** are those with an SRP DA entering a Legacy Port with PRI 4 or 5
  - This should never occur but its easy to handle
  - Since these should never occur this proposal 'Does No Harm' to Legacy flows