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ISIS SPB PCR for TSN

16-07-2013

IEEE 802.3 Plenary Meeting – Geneva

Marcel Kießling, Siemens AG

Notes from discussion are marked with *

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Recap – Basic AVB Functions (Gen 1)

- **AVB Gen 1 is based on the RSTP tree**
- **details about AVB Gen 1 (and plans for Gen 2):**

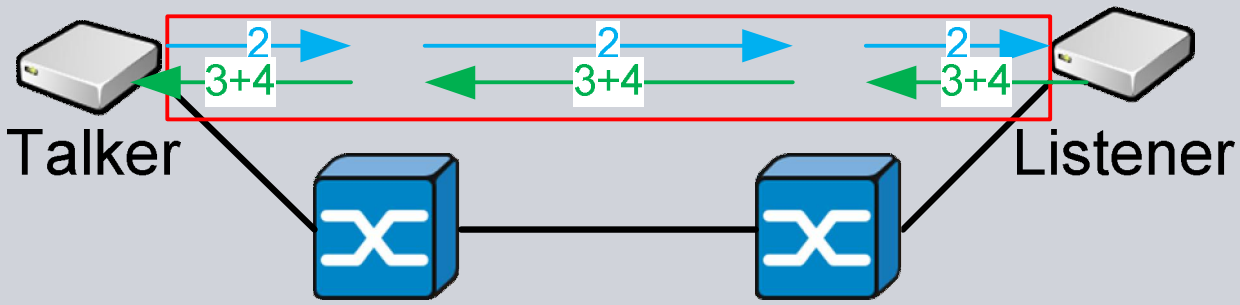
http://www.ieee802.org/1/files/public/docs2012/ca-goetz-SPB-PCR-stream-ext-1112-v01.pdf

1 RSTP limits Forwarding Path to loop-free tree

2 Talker uses MSRP to announces stream

3 Listener (MSRP) aunnounces reception of the stream

4 MSRP makes Reservation + Signaling



Recap –
Criteria for Management of AVB Gen 1 Streams

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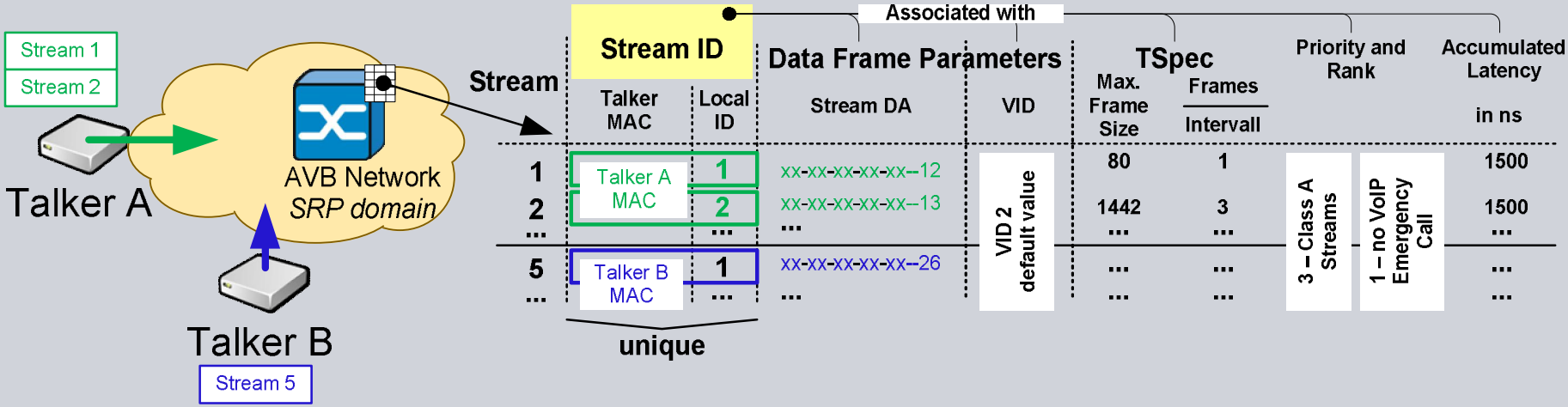
A stream has a **unique** Stream ID for management of Streams

Stream ID (Talker MAC + local unique ID) for **Management**

Associated Parameters:

- Stream bandwidth
- unique Stream MAC Address (and used VID)
- Registration status for Streams
- ***Future**: more SRP Gen 2 Parameters (Stream Redundancy, …)*



Recap –
Criteria for Forwarding of AVB Gen 1 Streams

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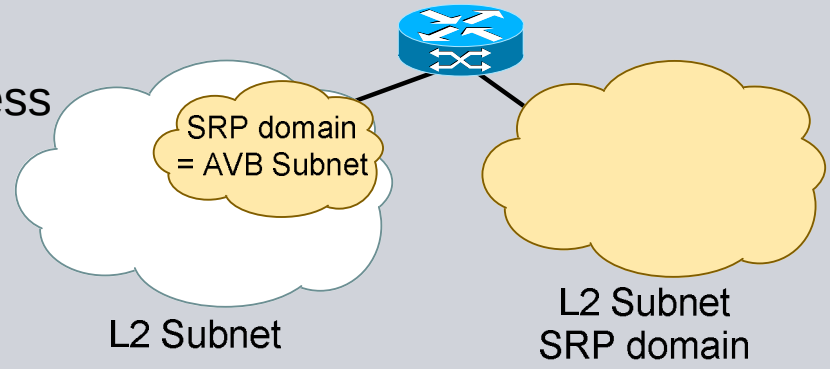
A stream has a unique stream MAC address

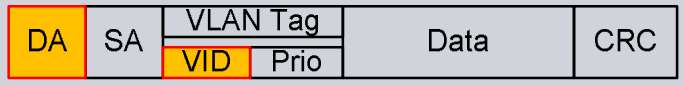
(*per VLAN in a L2 Subnet*)

and comes from one Source (Talker)

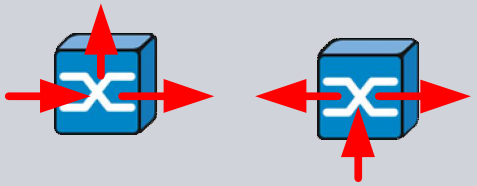


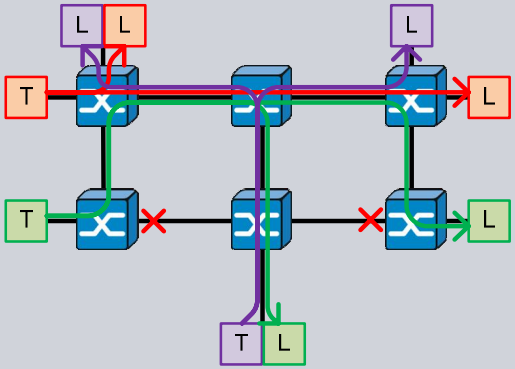
unique stream MAC address because of "unique" **Forwarding**

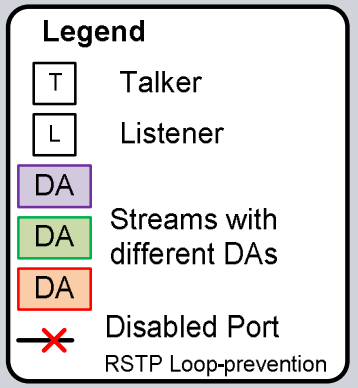
(Forwarding is unique for every Stream – basic L2 functionality)



DA + VLAN ID
= Forwarding







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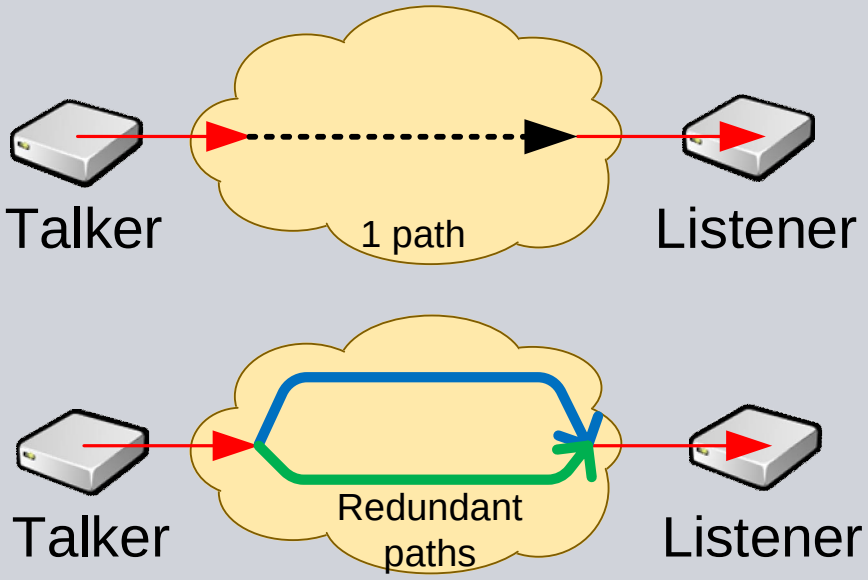
Mapping for redundant Streams

***Idea**:* Use 2 VLAN ID's for redundant streams to distinguish Stream **paths A** and **B** in the **VLAN for TSN** *



1 VLAN – 2 VIDs
(Path **A** and Path **B**)

*) There is a need in some applications for more than 2 paths – each path will have a own VID in the TSN VLAN
This example shows two paths for simplicity

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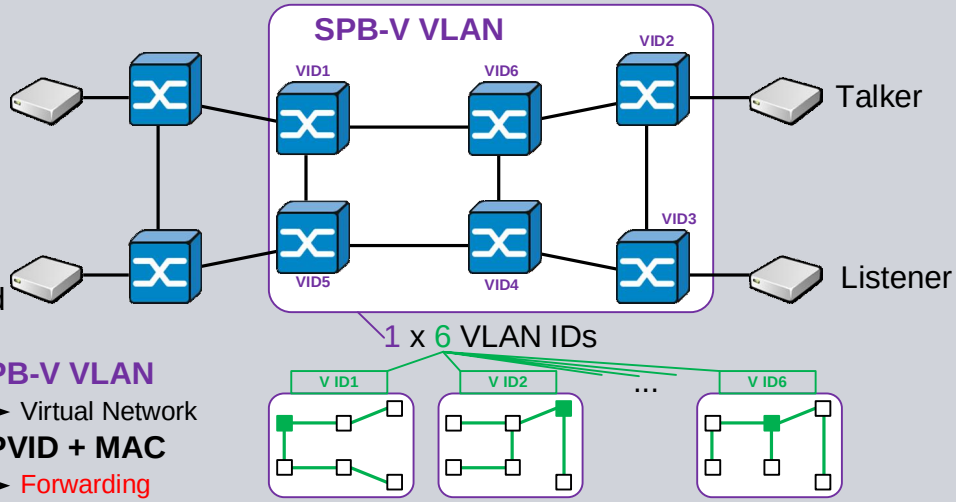
Background for VID usage

Redundant Streams must

- use max. disjoint paths
  ("complete" disjoint paths for real redundancy)
- be identifiable in the network
  (specially important for "802.1 Qcb Frame Replication and Elimination for Reliability")

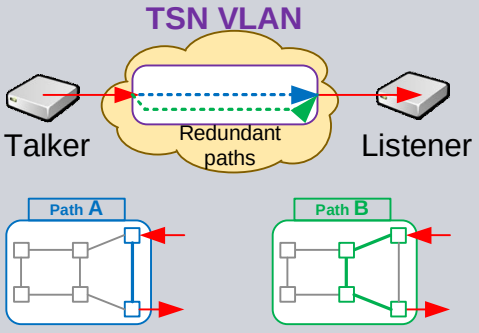


SPB-V VLAN
↳ Virtual Network
SPVID + MAC
↳ Forwarding

SPB-V uses **VLAN ID's** to select the forwarding tree in the SPB-V VLAN

http://www.ieee802.org/1/files/public/docs2012/new-AVB-nfinn-more-spb-v-0412-v01.ppt

-> *Idea*:* Use Stream MAC address for forwarding and 2 VLAN ID's to distinguish Stream **paths** **A** and **B** in the **VLAN for TSN**



TSN VLAN
↳ Virtual Network
VID + MAC
↳ Forwarding

*) Forwarding based on setup paths using MAC + VID – an example using this mechanism is SPB-V
The ISIS PCR has nothing to do with the SPB-V concept for setting up forwarding trees for each bridge using a SPVID, instead a forwarding path is set up for each stream

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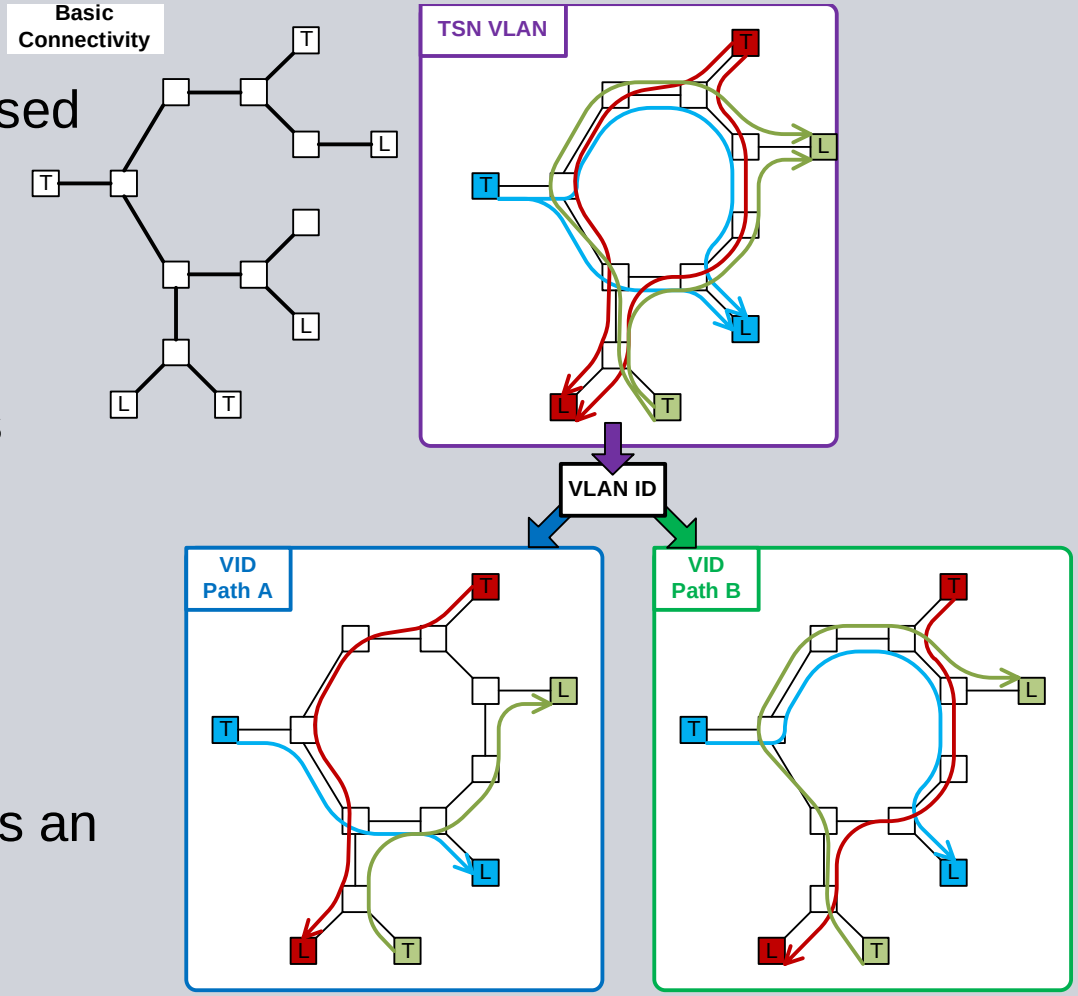
Meaning for redundant Streams

Legacy Traffic is forwarded based on RSTP tree, as today

Stream Frames have there unique stream MAC Address

VID's to distinguish redundant paths **A** and **B** in the TSN VLAN

Each stream MAC Address has an forwarding tree for the VID



*) Again, there is a need for more than 2 paths – each path will have a own VID
This example only shows two paths for simplicity

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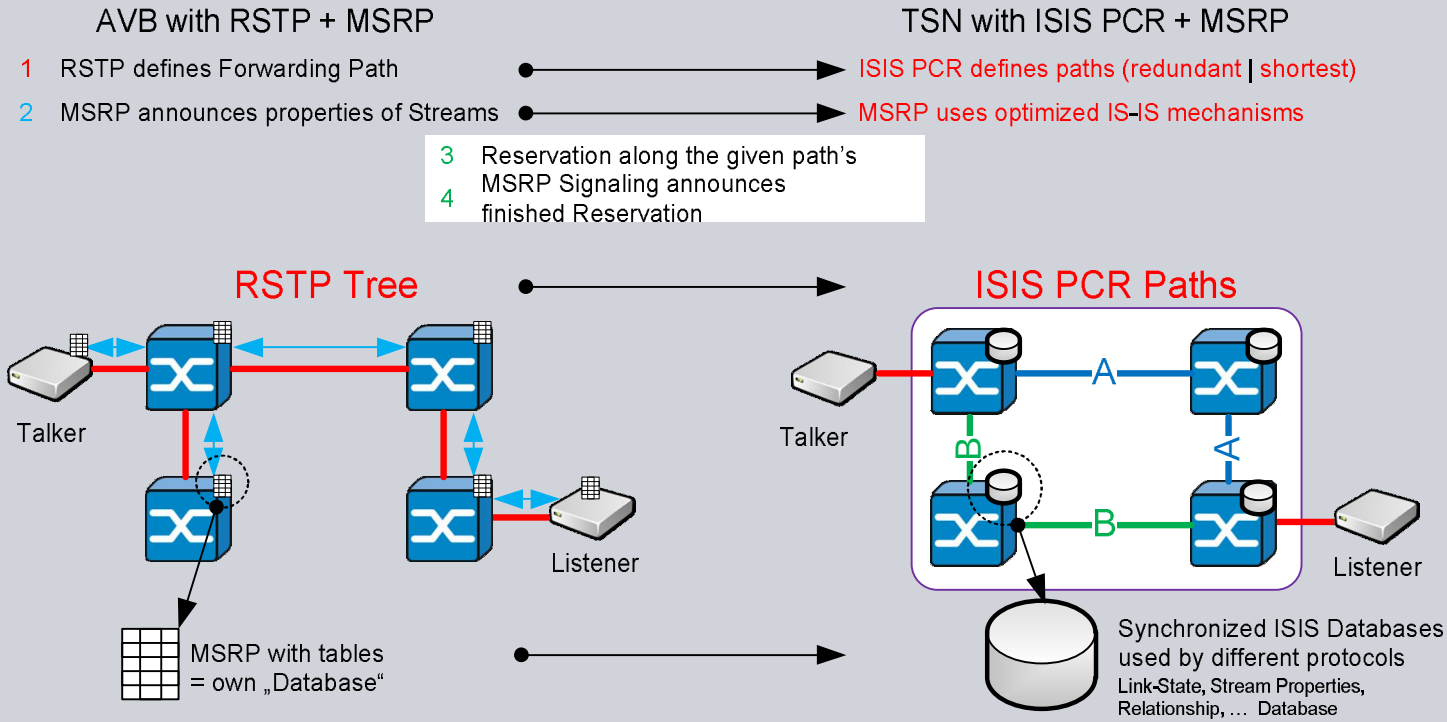
Changed AVB functions

Changes when using ISIS PCR

- Forwarding changed for Streams from RSTP to **ISIS PCR Paths**
- MSRP's Distribution of Stream Properties can use ISIS databases
- Use ISIS Databases for Link State, Stream Properties, Relationship, …



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Open Questions?

Changed Principle:

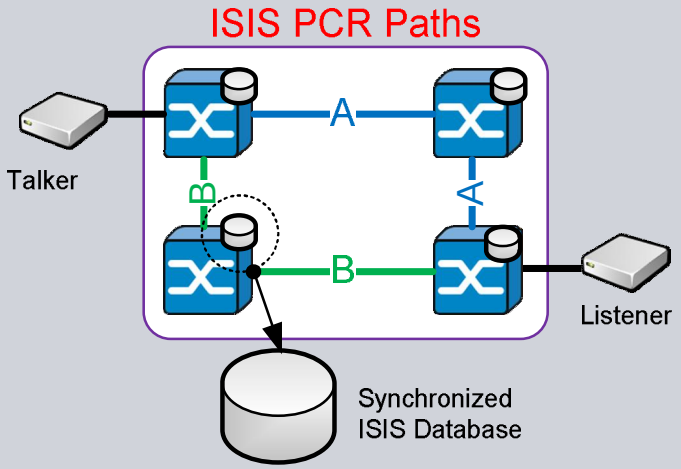
- Databases are synchronized using the ISIS mechanisms
  - Link-State, Stream Properties, Relationship, Latency Parameter, … Databases
    http://www.ieee802.org/1/files/public/docs2012/ca-goetz-SPB-PCR-stream-ext-1112-v01.pdf
- Compatibility Option: MSRP Gen 1 for AVB Gen 1 Clients at the “borderline”?
  - Talker information after Listener Registration for Gen 1 Clients (Gen 1 can’t handle all Gen 2 Streams)

Changes in MSRP – Define Signaling and Reservation on given ISIS PCR Paths:

- Follow the given PCR path, instead of flooding along the RSTP tree
  (Talker pruning with SPB paths instead of MMRP RSTP sub-tree path’s)
- E2E Synchronization / Activation of the Reservation

Specification to

- identify single or redundant Streams
- setup the Stream MAC address forwarding path
- setup max. disjoint Stream path



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Conclusion

Consider the Stream properties for ISIS SPB-PCR

- Use ISIS SPB-PCR to setup non-redundant or redundant paths for Streams
- Don’t map MSRP Signaling to ISIS SPB-PCR – use MSRP “Lite”
  - MSRP covers 19 Reservation Failures ! (s. 802.1Q-2011 Table 35-6 IEEE)
- Use ISIS for improved data distribution (Synchronized database)
  - Link-State database
  - Stream Properties database
  - Relationship database
  - Latency Parameter database
  - Time-Synchronization database
  - …

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Detailed Presentations

Suggested TLV's for IS-IS:

http://www.ieee802.org/1/files/public/docs2012/ca-goetz-SPB-PCR-stream-ext-1112-v01.pdf

SRP and ISIS-SPB:

http://www.ieee802.org/1/files/public/docs2012/new-avb-anfredette-srp-spb-v02.pdf

http://www.ieee802.org/1/files/public/docs2013/new-avb-kiessling-MSRP-Gen-2-for-TSN.pdf

SPB as Solution:

http://www.ieee802.org/1/files/public/docs2012/new-avb-nfinn-spb-tsn-0112-v01.pdf

Usage in Industry:

http://www.odva.org/Portals/0/Library/Annual%20Meeting%202012/2012_ODVA_Conference_Finn_FINAL_PPT.pdf