

# ISIS SPB PCR for TSN

16-07-2013

IEEE 802.3 Plenary Meeting – Geneva

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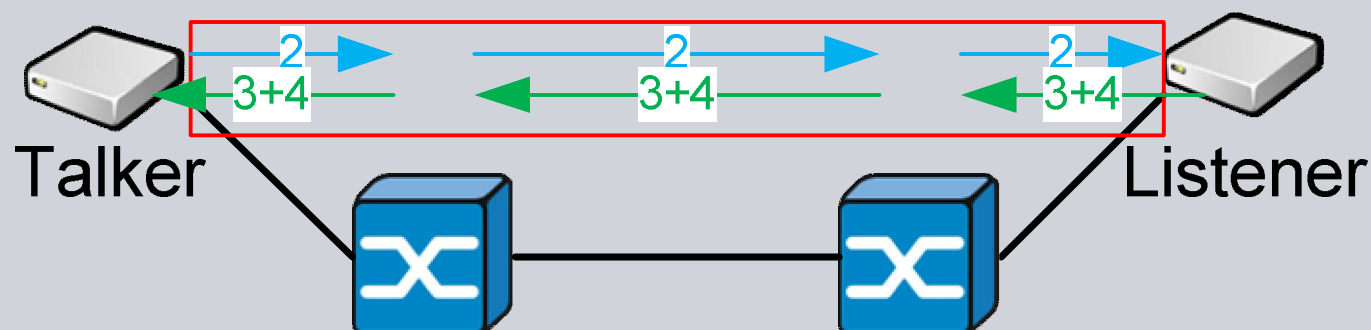
## Recap – Basic AVB Functions (Gen 1)

- 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) announces reception of the stream
- 4 MSRP makes Reservation + Signaling



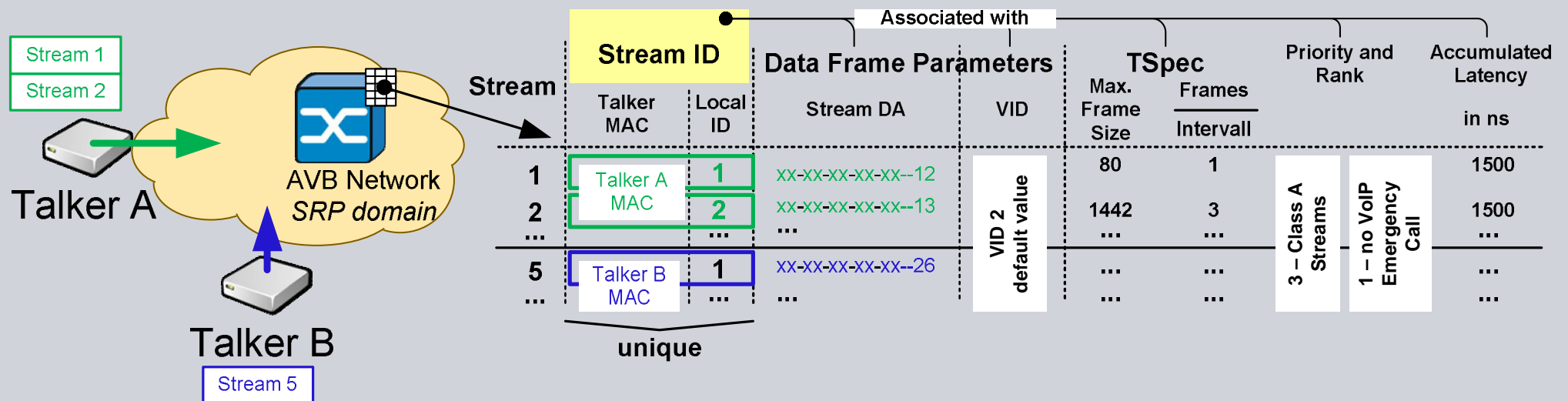
# Recap – Criteria for Management of AVB Gen 1 Streams

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

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

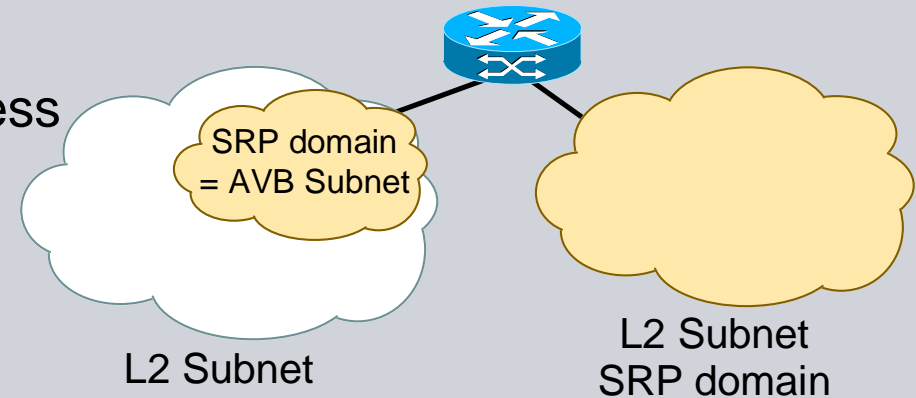
## Associated Parameters:

- 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

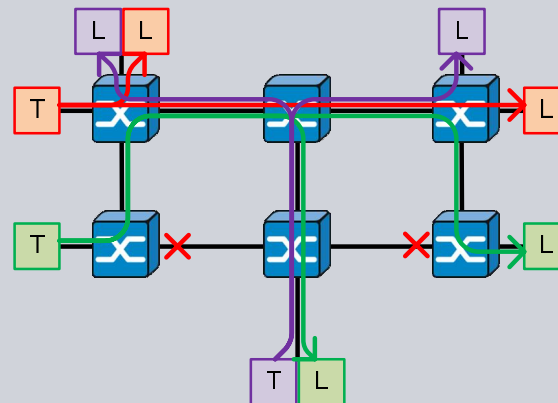
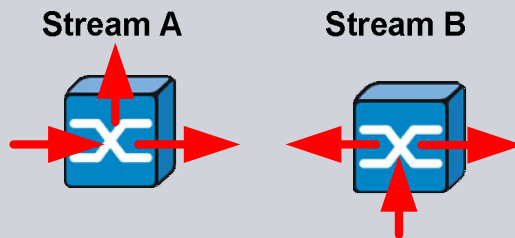
A stream has a **unique** stream MAC address  
(per VLAN in a L2 Subnet)  
and comes from **one Source** (Talker)



unique stream MAC address because of **“unique” Forwarding**  
(Forwarding is unique for every Stream – basic L2 functionality)

DA	SA	VLAN Tag		Data	CRC
		VID	Prio		

DA + VLAN ID  
= Forwarding

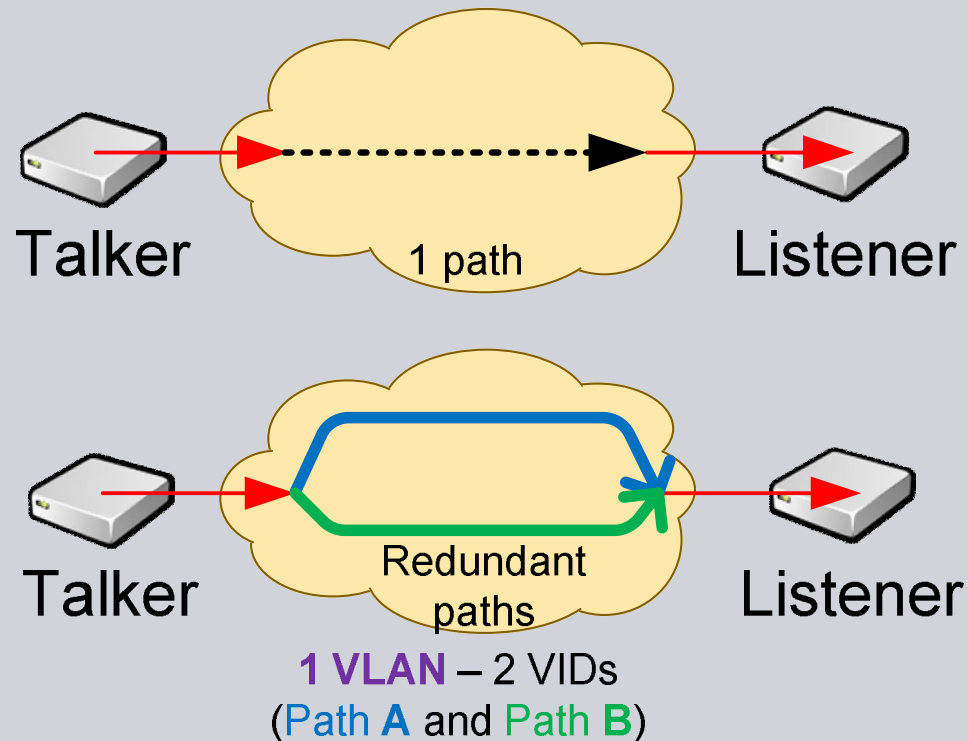


**Legend**

- T Talker
- L Listener
- DA Streams with different DAs
- DA Streams with different DAs
- DA Streams with different DAs
- X Disabled Port  
RSTP Loop-prevention

## 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**



# Background for VID usage

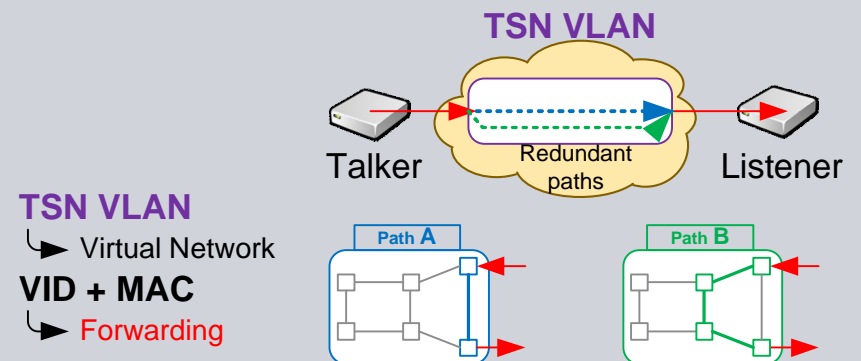
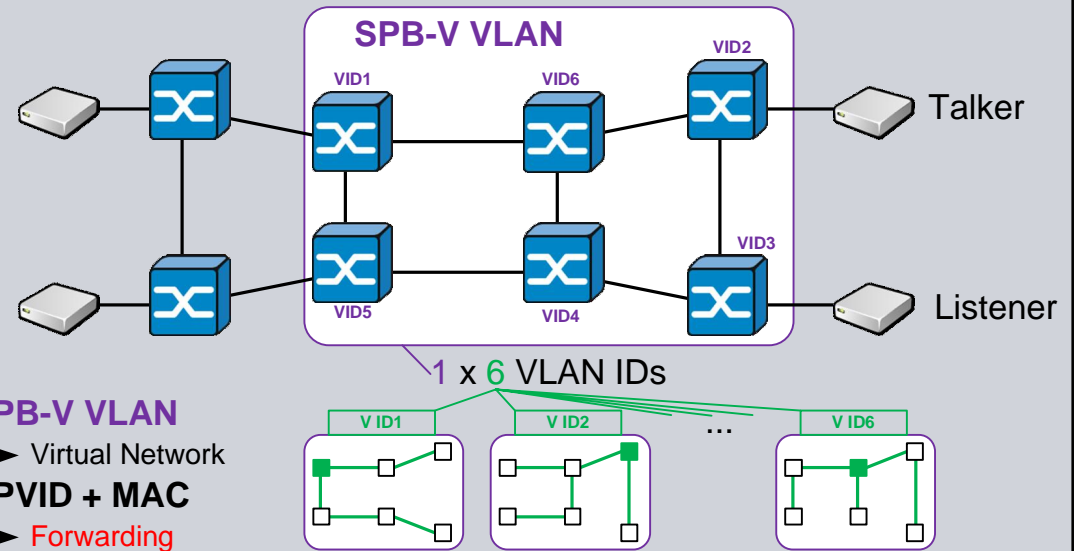
Redundant Streams must

- 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** 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**



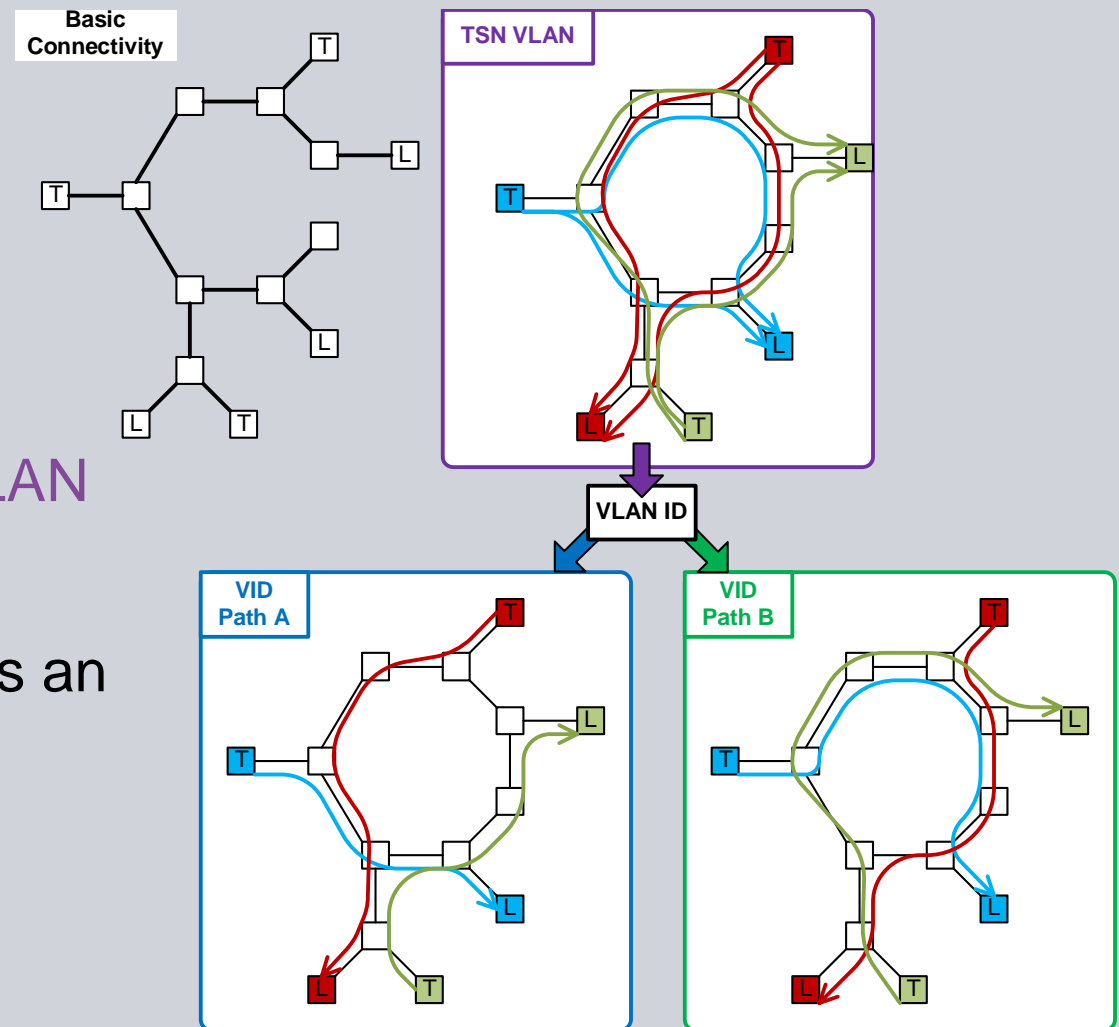
# Meaning for redundant Streams

Legacy Traffic is forwarded based on RSTP tree, as today

Stream Frames have there unique stream MAC Address

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

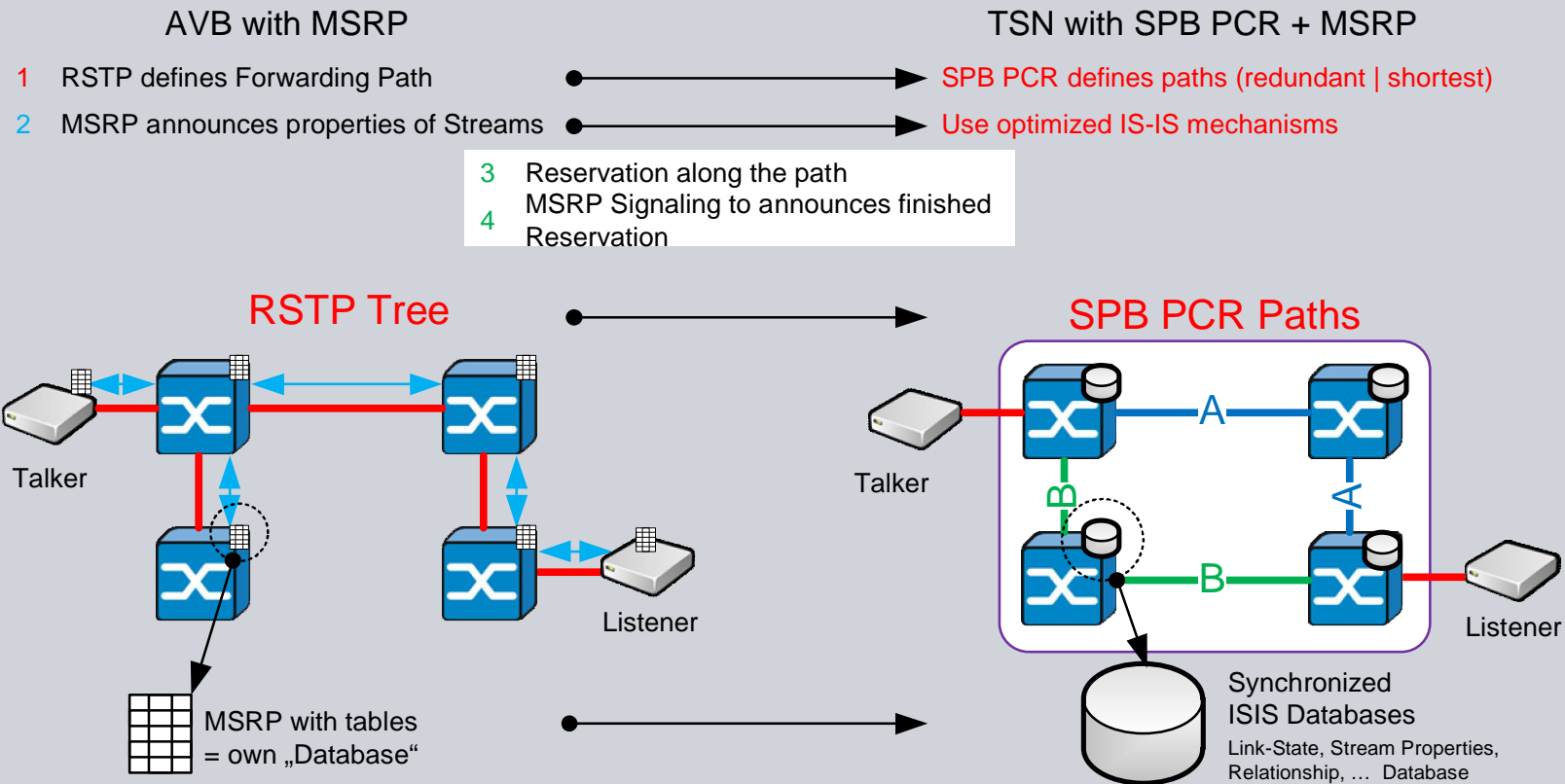
Each stream MAC Address has an forwarding tree for the VID



# Changed AVB functions

## Changes when using ISIS SPB PCR

- **Forwarding** changed for Streams from RSTP to **SPB PCR Paths**
- Distribution of **Stream Properties using IS-IS** databases
- Use ISIS Databases for Link State, Stream Properties, Relationship, ...





## Open Questions?

### Changed Principle:

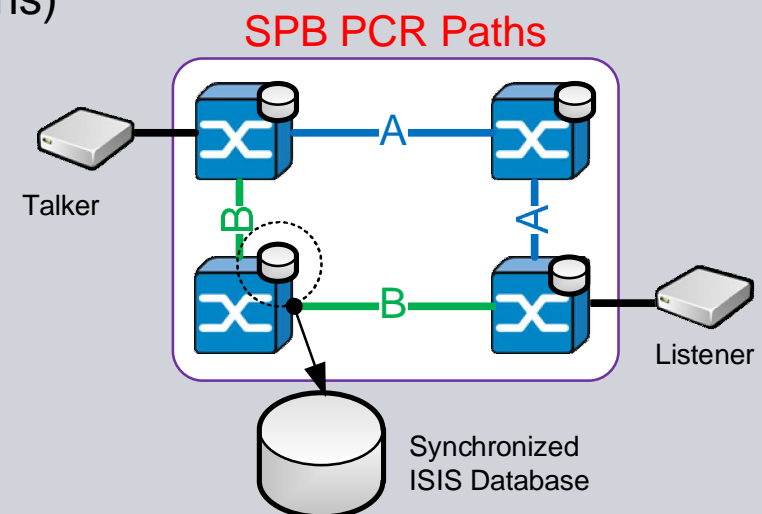
- Databases are synchronized using the ISIS mechanisms
  - Link-State, Stream Properties, Relationship, Latency Parameter, ... Databases  
<http://www.ieee802.org/1/files/public/docs2012/ca-goetz-SPB-PCR-stream-ext-1112-v01.pdf>
- Compatibility Option: MSRP Gen 1 for AVB Gen 1 Clients at the “borderline”?
  - 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 SPB PCR Paths:

- Follow the given SPB path, instead of flooding along the RSTP path  
(Talker pruning with SPB paths instead of MMRP paths)
- E2E Activation of the Reservation

### Specification to

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



## 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
  - ...

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