SRP – IS-IS Interworking

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Outline

› Background

› 802.1aq SPB and SRP Gen1

› 802.1Qca PCR and 802.1Qcc SRP Gen2

Background: Registration protocols for SRP

› SRP utilizes MMRP, MVRP, and MSRP to establish stream reservations across a bridged network

› MMRP is optionally used to control the propagation of Talker registrations throughout the bridged network

› MVRP is used by end stations and Bridges to declare membership in a VLAN where a Stream is being sourced

› MSRP is a signaling protocol that provides end stations with the ability to reserve network resources, puts Stream DA into FDB

Background: Contexts
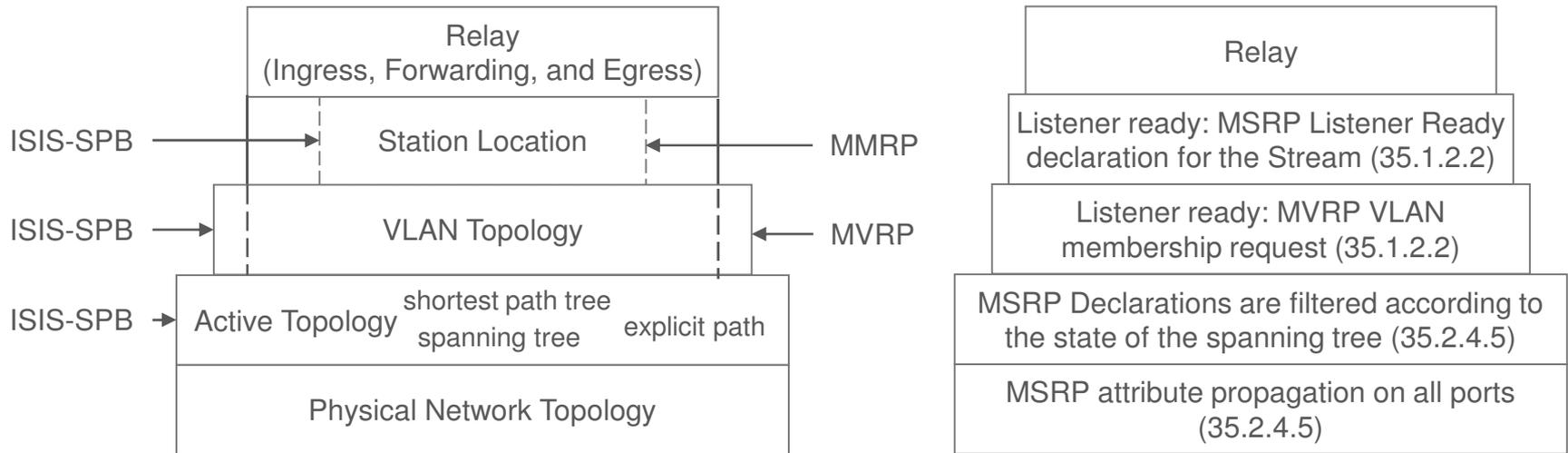
based on Figure 7-1

› Active topology is controlled by SPB, MSTP or RSTP

› SRP operates on various Contexts

– 35.2.4.5 MAP Context for MSRP
MSRPDUs can carry information about Streams in multiple VLANs, which in an MST environment, can be in different Spanning Tree Instances. ... Therefore, there is a single context for MSRP attribute propagation that includes all Bridge Ports. The Declarations are filtered according to the state of the spanning tree, as described in 35.2.4.

– 35.1.2.2 Listeners
If the Listener receives a Talker Advertise declaration, and the Listener is ready to receive the Stream, the Listener shall declare the following in the order specified:
1) An MVRP VLAN membership request for the vlan_identifier contained in the Talker Advertise DataFrameParameters
2) An MSRP Listener Ready declaration for the Stream.

802.1aq SPB and SRP Gen1

› 802.1aq specifies interworking with MVRP (27.13) and MMRP (28.10)
  – No MMRPDU or MVRPDU within an SPT Domain
› 802.1aq does not specify interworking with MSRP
  › Listener's MVRP VLAN membership request → ISIS-SPB performs VLAN registration within the SPT Domain
  › What about other MSRP actions?
    › MSRP attribute propagation on all ports within the SPT Domain?
      › Filtered according to the SPT(s) of the corresponding VLAN?
    › MSRP registrations on the VLAN (Context) provided by SPB?
      › Should work
› Should we do anything with respect to 802.1aq SPB – SRP Gen1 interworking?

# 802.1Qca PCR and 802.1Qcc SRP Gen2

Solution alternatives

› ***MSRP is used to perform reservation actions***

› *Variant 1*: Talker Advertisement is translated into an LSP, which is flooded within an SPT Domain

› *Variant 2*: Some part of the Talker Advertisement information is carried in LSP, the rest in MSRPDU

› *Variant 3*: Talker Advertisement is sent in MSRPDU within an SPT Domain

› **Option A**: Active topology is only controlled by IS-IS

1. Explicit path/tree computed by IS-IS (PCE)
2. Explicit path/tree established by IS-IS
3. MSRP performs reservation on top of existing path

› **Option B**: Active topology is also controlled by MSRP

1. Explicit path/tree computed by IS-IS (PCE)
2. MSRP establishes the path and performs the reservation

Notations: Applications in a Bridge

› A bridge hosts both MSRP and IS-IS applications

› The IS-IS Application (App) includes 802.1Qca extensions including PCE

› The MSRP App includes 802.1Qcc extensions

› There is an Interface between the MSRP and IS-IS applications for control exchange
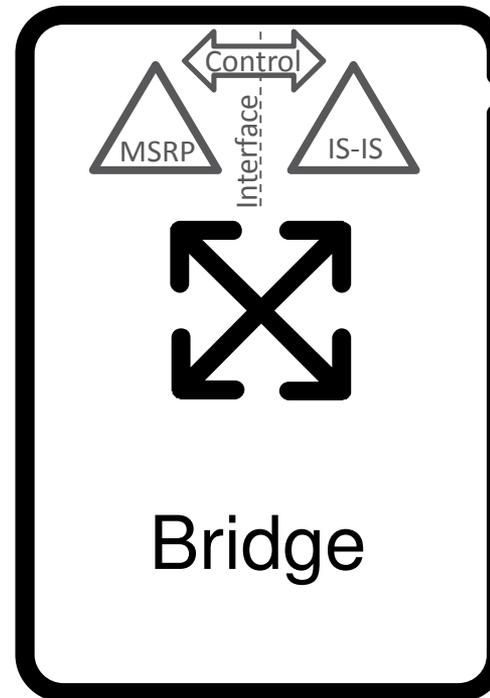

Bridge

Variant 1:
Talker Advertisement by LSP

› Talker Advertisement (TA) is translated into LSP

› TA is flooded in LSP to every SPT Bridge of the Domain

› Link State Database (LSDB) includes all TA information
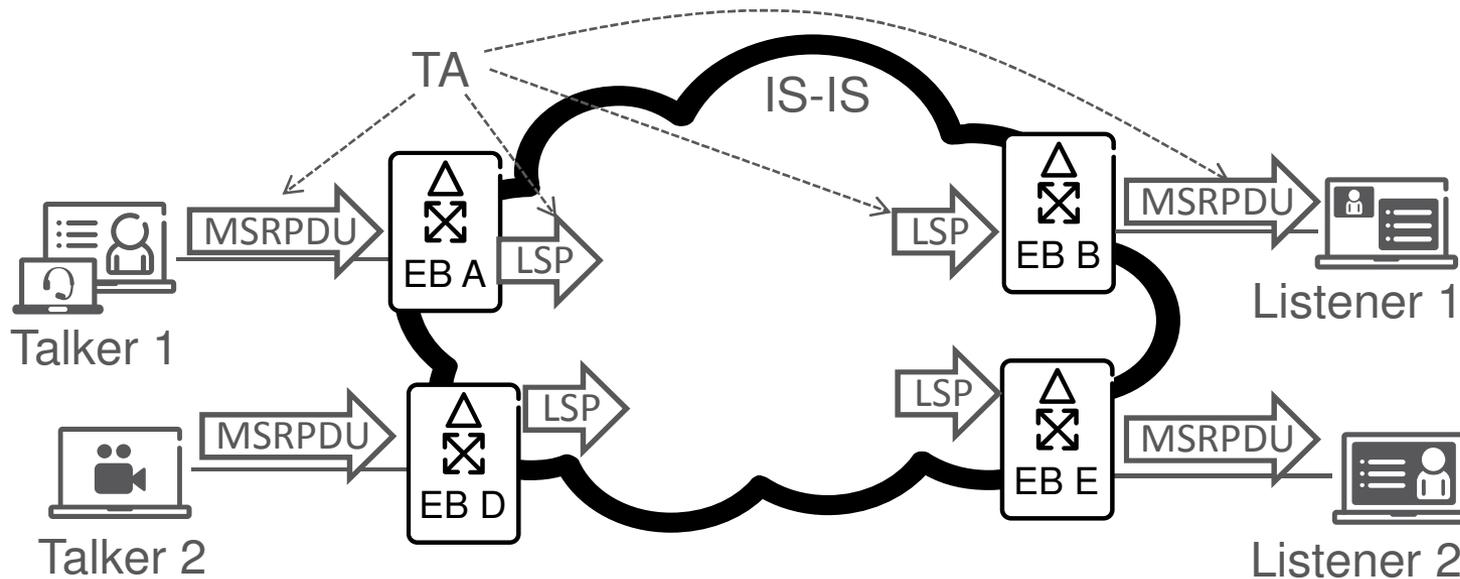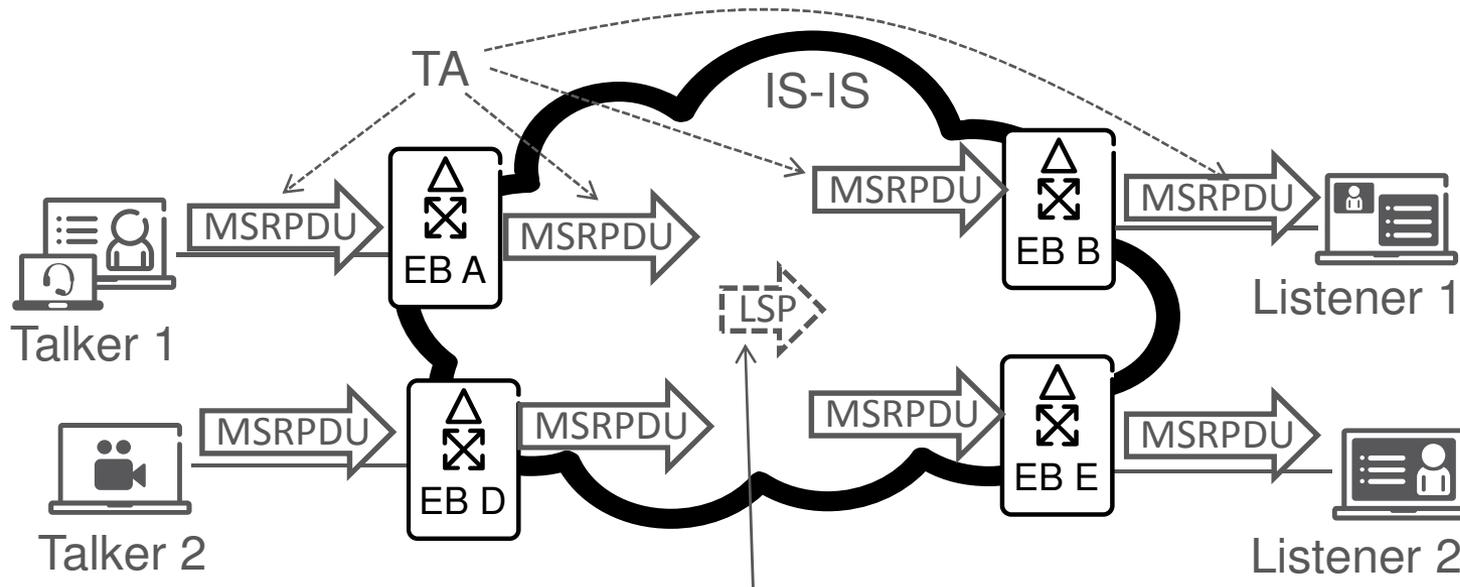
Variant 2: Talker Advertisement both in LSP and MRPDU

› Some TA information is carried in LSPs the rest in MSRPDU

   – e.g. latency parameter kept in MSRPDU

› LSDB includes some TA information
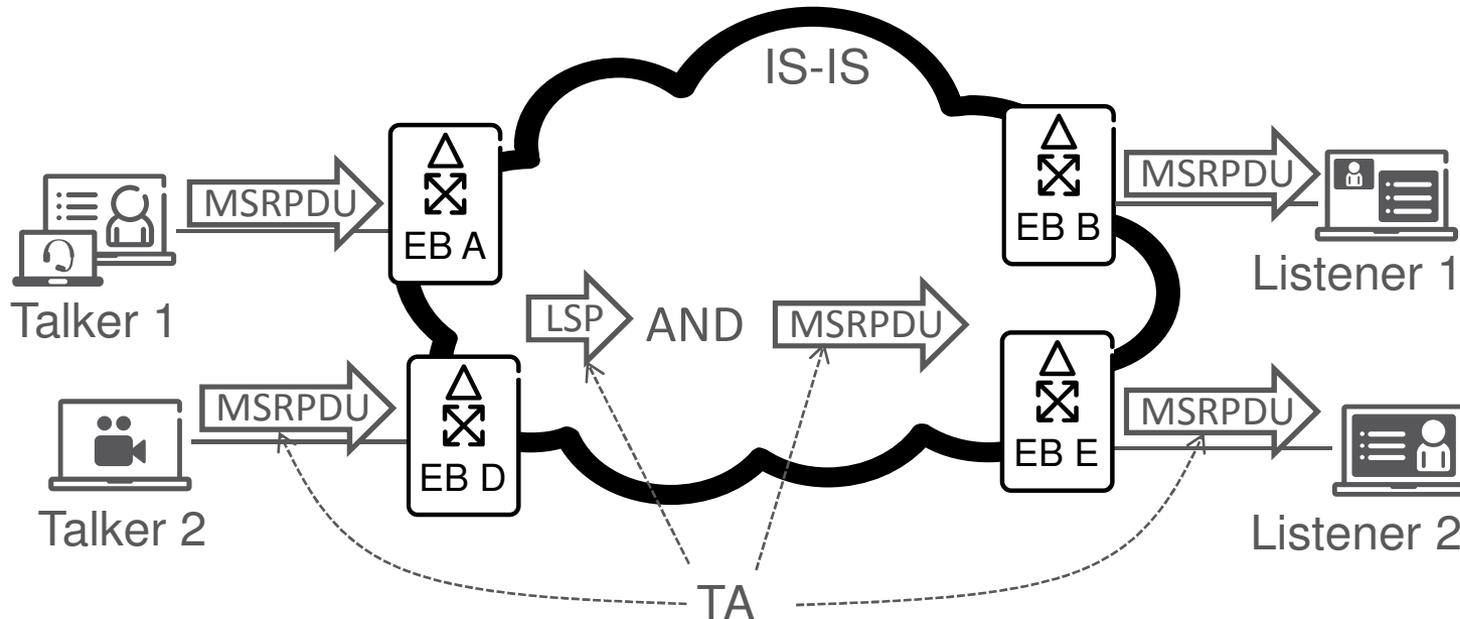
Variant 3:
Talker Advertisement in MRPDU

› TA is carried in MSRPDU within the SPT Domain as well
  – TA MSRPDU flooded on the all ports Context?
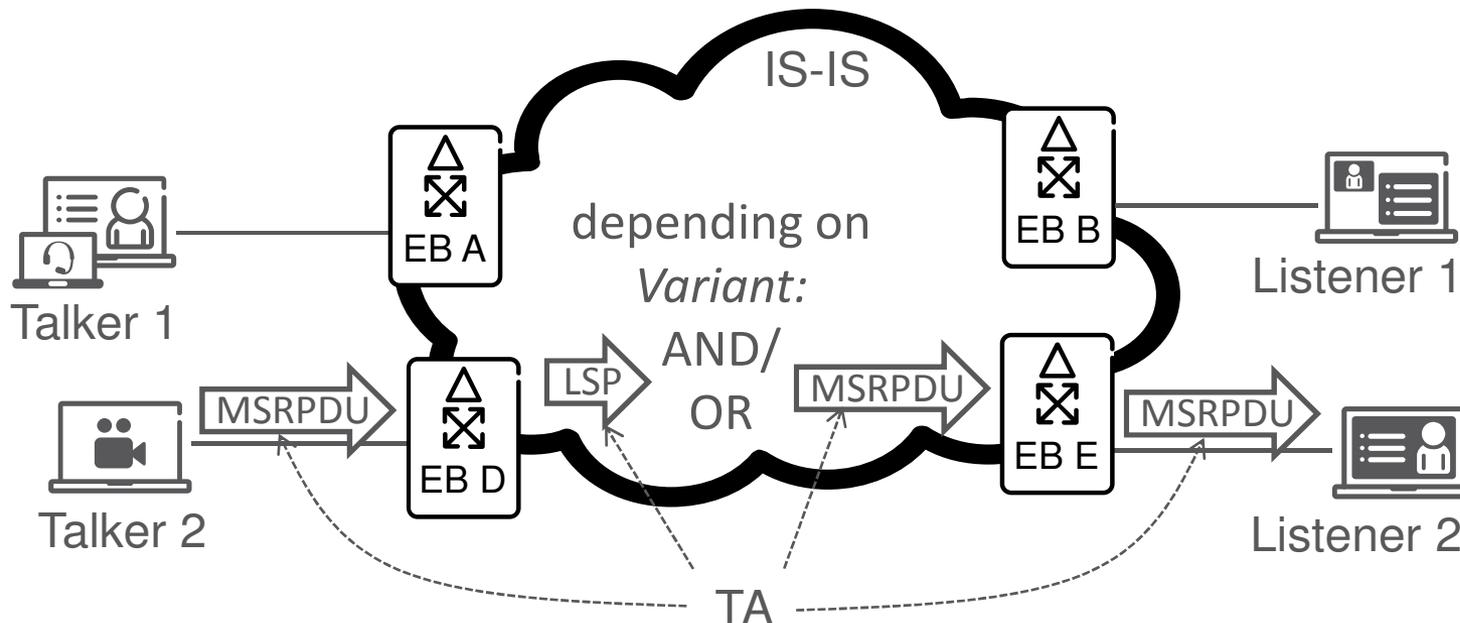› LSDB does not include TA information

LSP is only for IS-IS
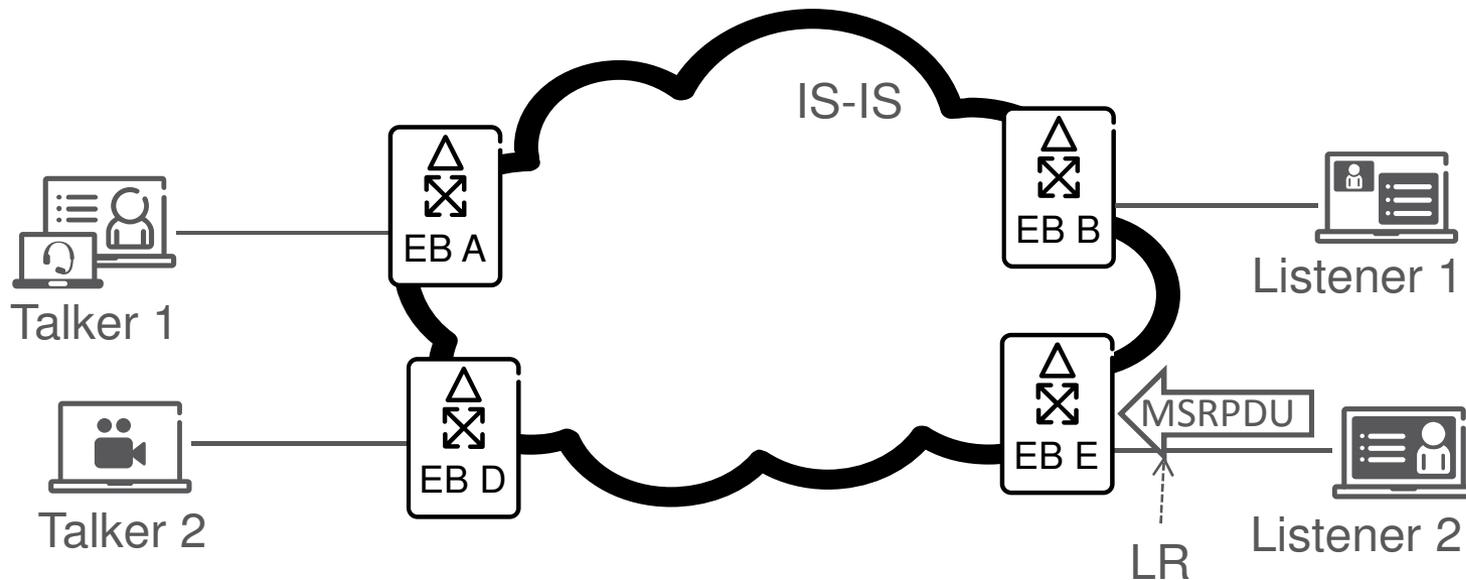operations not for MSRP TA

Stream reservation example

› A Stream from Talker 2 to Listener 2 is used in the following as an example

› First, Talker 2 advertises the Stream

› TA gets to EB E in LSP or MSRPDU depending on the *Variant*

› TA MSRPDU gets to Listener 2

Listener 2 is ready

› Listener Ready (LR) is sent by Listener 2 to EB E

› What happens then?

MSRP to IS-IS Request

› After reception of Listener Ready MSRPDU at a Boundary Port, the Edge Bridge (EB) has to figure out which path to use for the Stream

› As the paths are determined by IS-IS, the MSRP App requests the path to be used from the IS-IS App

› MSRP App WAITS, no MSRPDU is sent
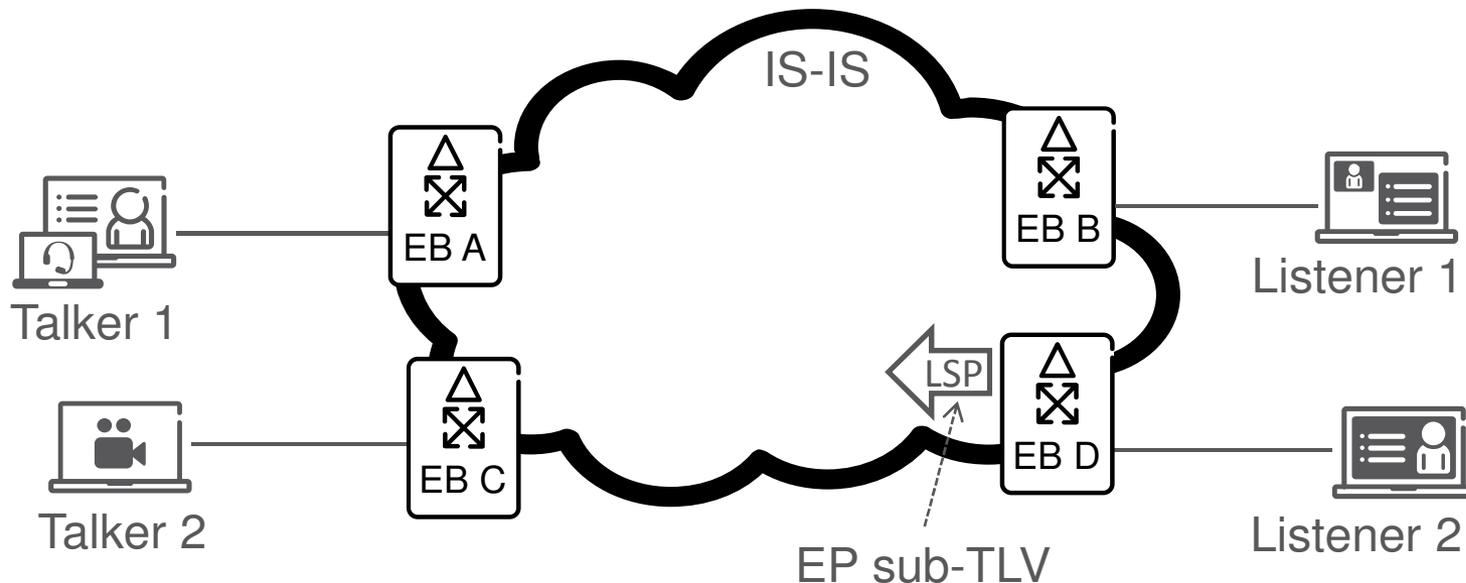
Request

Interface

MSRP   IS-IS

Edge
Bridge
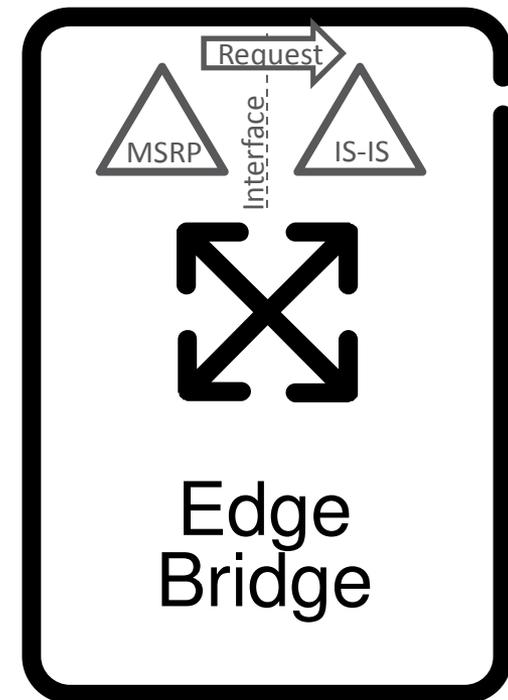
Option A
IS-IS establishes path

› If no existing path meets the needs of the Stream, then IS-IS establishes a new path, e.g. Explicit Path (EP)

 – PCE computes the path
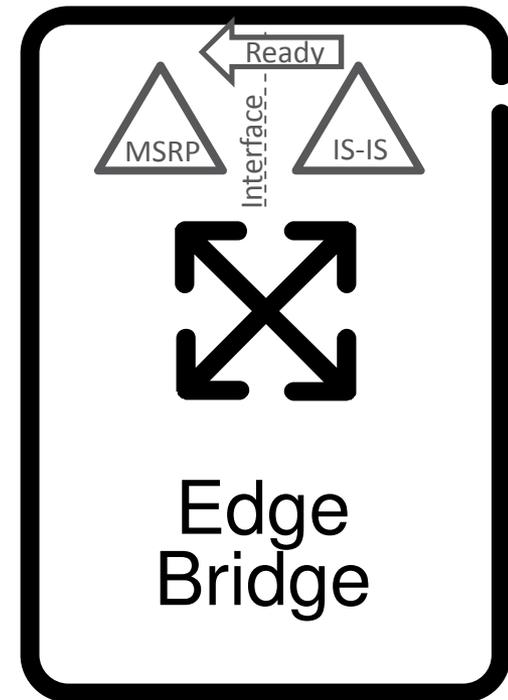 – EP sub-TLV is flooded in LSP and installed by IS-IS
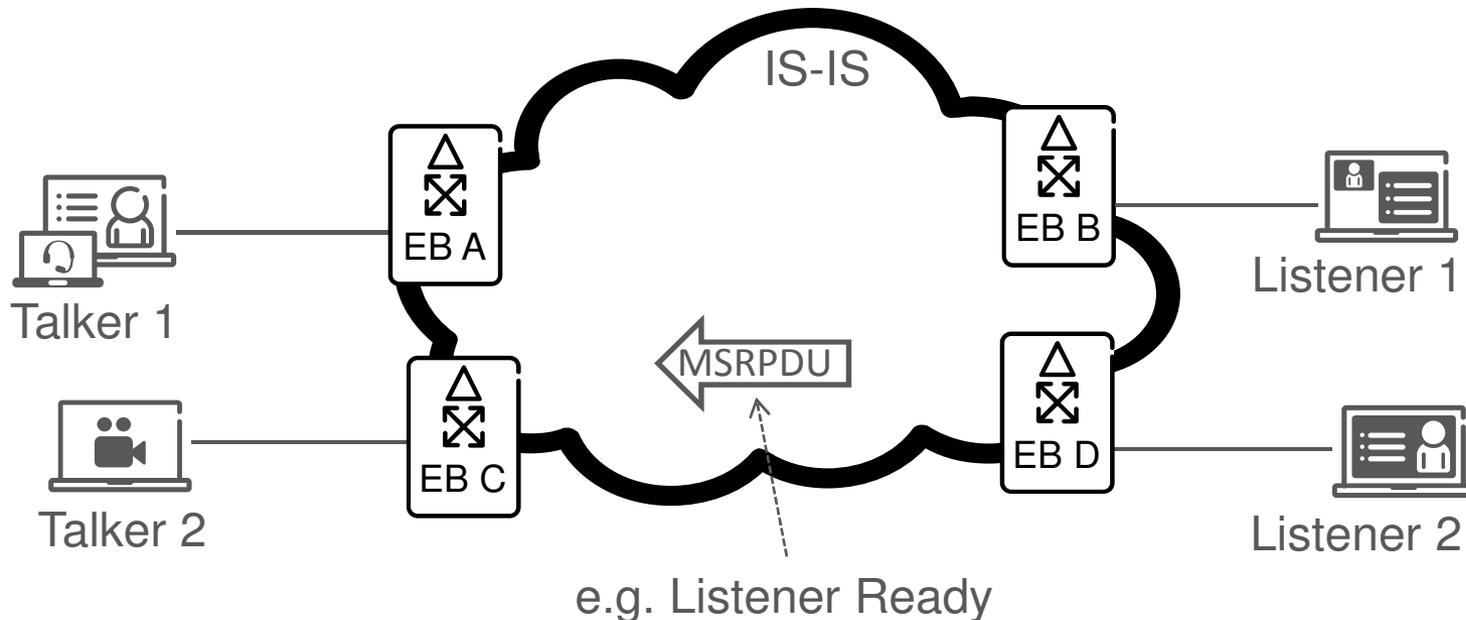
Option A
Path is ready to be used

› The IS-IS App of the EB waits until the EP is there and can be used

  – Note: the path may have existed

› If the path is ready, then IS-IS App sends Ready to MSRP App

  – Ready contains Path Information

› How does IS-IS App know whether the path is ready?

  – One possible solution:
    http://www.ieee802.org/1/files/public/docs2013/ca-farkas-path-status-notification-0513-v01.pdf

Option A
Reservation by MSRP

› Having the path established in the network,

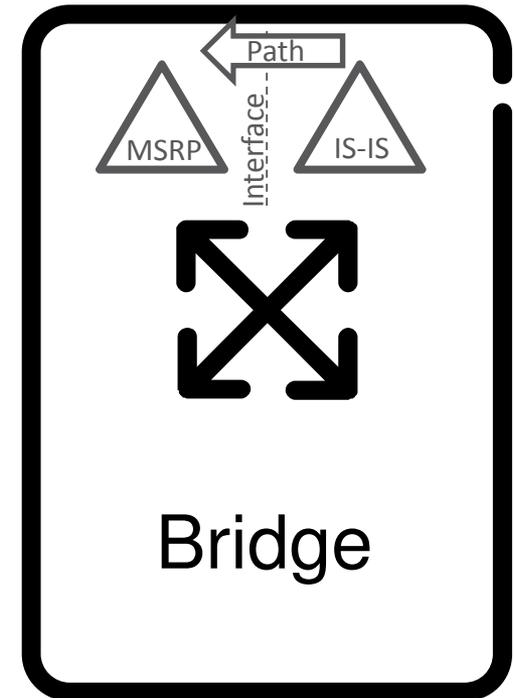› MSRP performs the reservation actions along the path provided by IS-IS


e.g. Listener Ready

Option B
Path given to MSRP

› After receiving the Request from the MSRP App,

› The IS-IS App determines the path to be used by the stream, which can be
  - an existing path
  - or a new path

› IS-IS App hands Path information to MSRP App

MSRP Path IS-IS

Interface

Bridge

Option B – path exists
Reservation by MSRP
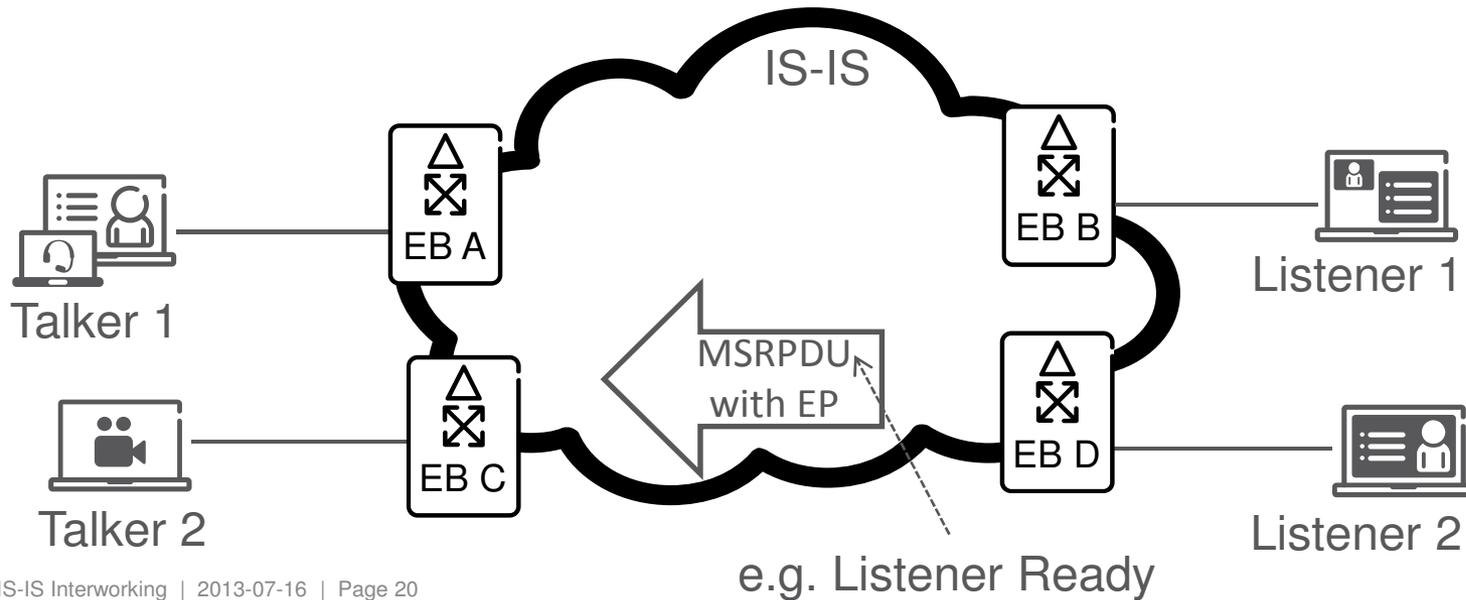
› Having the path established in the network,

› MSRP performs the reservation actions along the path provided by IS-IS

› same as **Option A**

e.g. Listener Ready
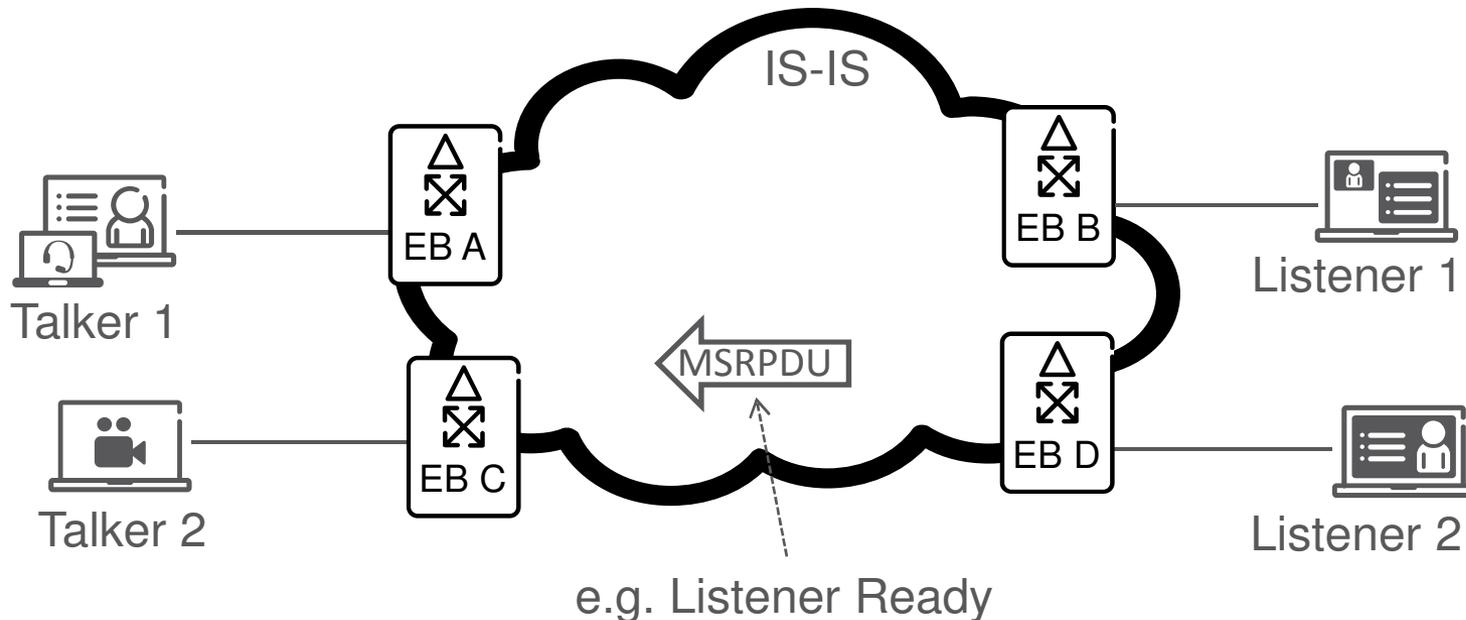
Option B – new path for Stream Reservation and path establishment by MSRP

› In case of a new path,

› MSRP performs both the path establishment and reservation actions

  – EP sub-TLV is carried by MSRPDUs

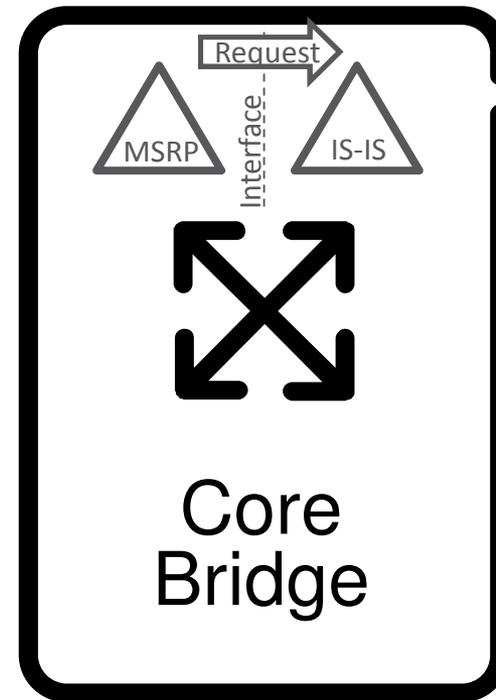 – MSRP App of Coe Bridges (CB) processes EP sub-TLV

IS-IS

Talker 1

EB A

Talker 2

EB C

MSRPDU with EP

EB B

Listener 1

EB D

Listener 2

e.g. Listener Ready

Option B
MSRP Request in Core Bridge

› If the EP contains loose hop,

› then MSRP cannot install EP on its own

› MSRP App Requests the next hop from IS-IS App
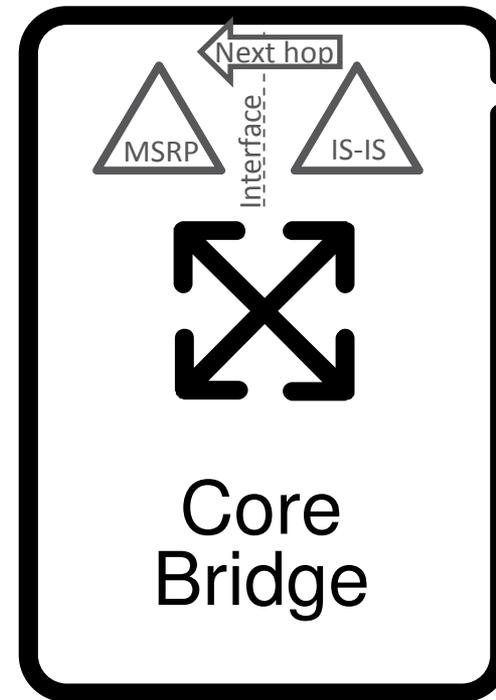

Request

MSRP Interface IS-IS

Core Bridge

Option B
Next hop by IS-IS in Core Bridge

› IS-IS App performs (constrained or shortest path routing) computation to determine next hop for the loose hop of the EP

› IS-IS App then hands next hop to MSRP App

› MSRP App then can send the MSRPDU to the proper next hop

Listener Ready gets to Talker

› At the end, the Listener Ready gets to the Talker in an MSRPDU irrespective of *Variant* or **Option**
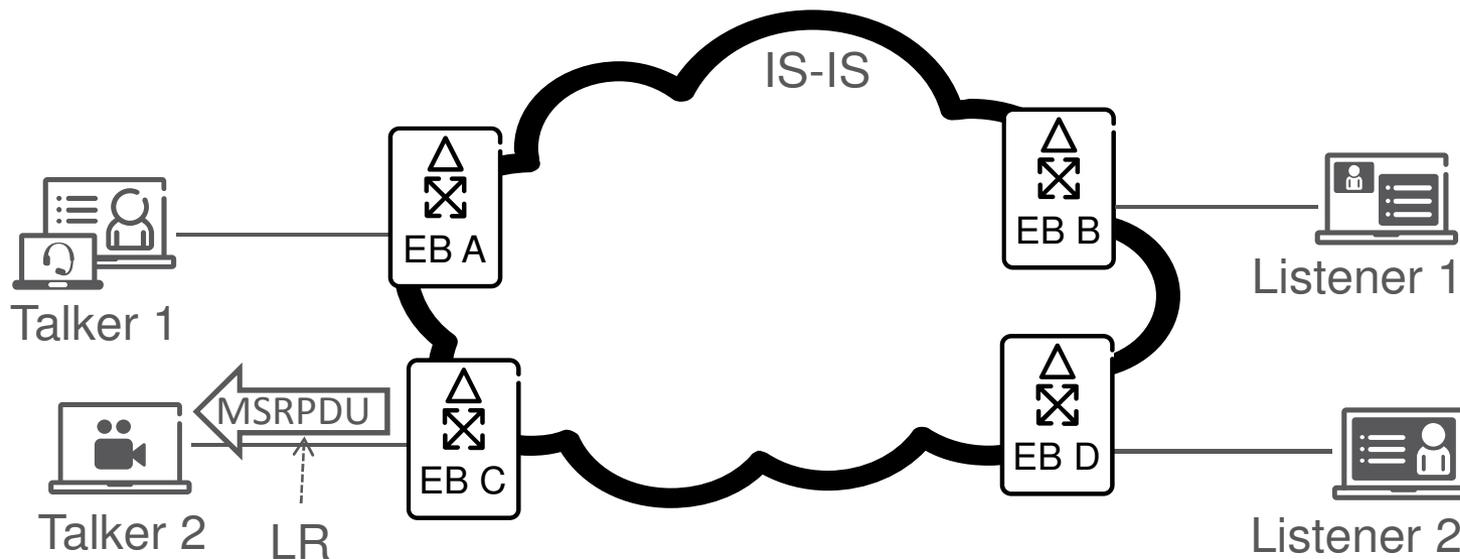
Summary

› *Variant* and **Option** are orthogonal, can be combined
› Variant is about how to propagate Talker Advertisement within an SPT Domain
› Option is all about who does the establishment of explicit paths
  - **Option A**: IS-IS establishes all the paths
    › Active topology is only controlled IS-IS
    › MSRP performs reservation on the Context provided by IS-IS
    › IS-IS establishing many explicit paths said to be problematic
  - **Option B**: Explicit paths are installed by MSRP
    › MSRP gets involved in Active topology establishment
    › MSRP – IS-IS interworking/interface is also needed in Core Bridges for loose hops
› also see table on next slide

Which way to go?

MSRP performs the reservation in all combinations	Variant 1	Variant 2	Variant 3
Option A	- Talker Adv. by IS-IS - Explicit Path by IS-IS	- Talker Adv. by IS-IS and MSRP - Explicit Path by IS-IS	- Talker Adv. by MSRP - Explicit Path by IS-IS
Option B	- Talker Adv. by IS-IS - Explicit Path by MSRP	- Talker Adv. by IS-IS and MSRP - Explicit Path by IS-IS	- Talker Adv. by MSRP - Explicit Path by MSRP

› **What to put exactly into IS-IS?**