



# Traffic-Engineered Path Selection for Carrier-grade Ethernet Networks

Amendment to 802.1Q

Nurit Sprecher

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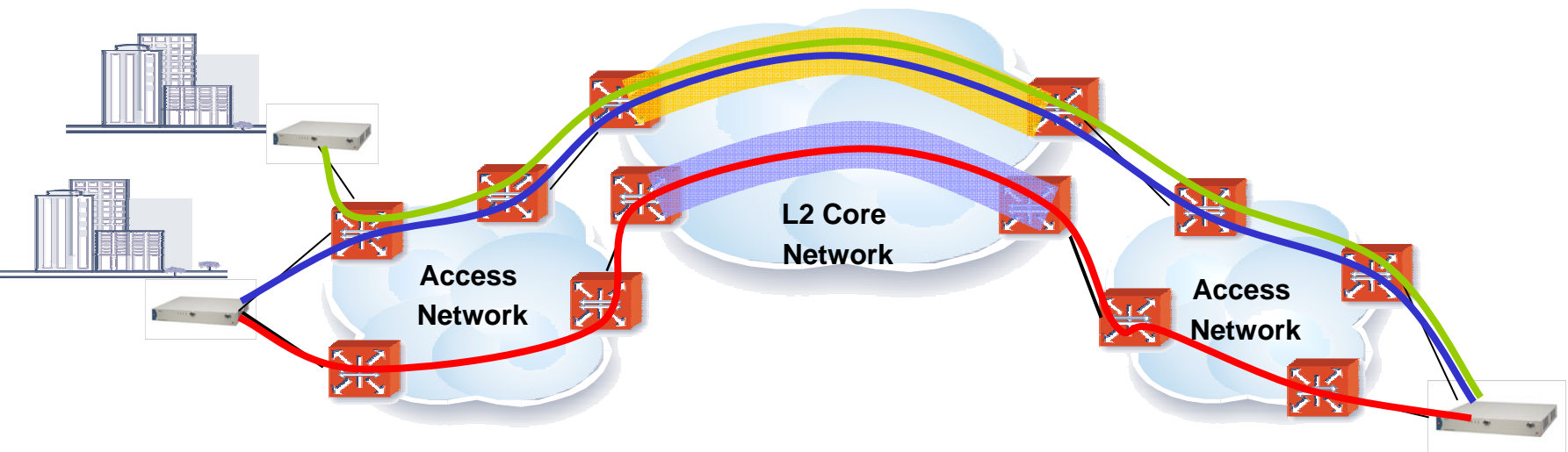
# Background

- Carriers are demanding a simple, scalable and reliable solution which will provide traffic engineering and transport mechanisms in carrier-grade Ethernet networks.  
These requirements are addressed by the VLAN-XC method.
- The VLAN-XC concept was presented and discussed at the last three IEEE meetings. Please refer to the following:
  - <http://www.ieee802.org/1/files/public/docs2006/new-sprecher-provider-vlan-transport-0506.zip> (Beijing)
  - <http://www.ieee802.org/1/files/public/docs2006/new-sprecher-vlan-xc-second-presnetation-0306.zip> (Denver)
  - <http://www.ieee802.org/1/files/public/docs2006/new-sprecher-vlan-xc-ieee-0106.pps> (Sacramento)

# VLAN-XC: A Distinct Solution from the CPE Site

VLAN-XC can be implemented from the CPE site without causing scalability problems.

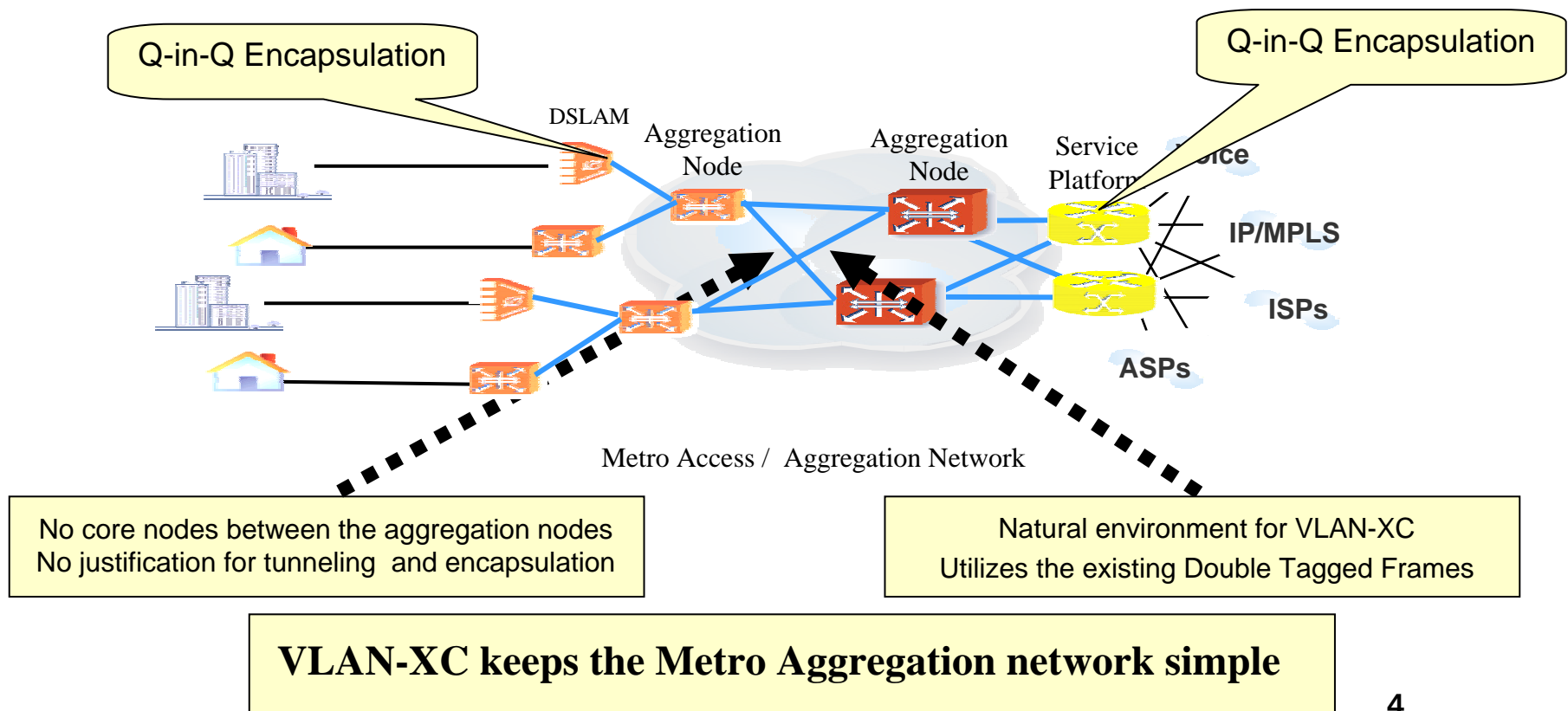
- The VID only has local port significance and the network can scale up to millions of services.
- The encapsulation solution, deployed from the CPE, again leads to a problem of MAC scalability. This solution should start in the provider space.
- Deploying VLAN-XC from the CPE site enables support for end-to-end service monitoring and protection. The CPE can be attached to the access network by dual homing to enhance network resiliency.



# VLAN-XC: A Distinct Solution for Metro Aggregation Networks

VLAN-XC is naturally appropriate for the delivery of residential and broadband services in metro access/aggregation networks.

Typically, an aggregation network consists of DSLAMs, a service platform (BRAS), and a maximum of two levels of aggregation nodes.



# VLAN-XC: Guidelines

- Complies with IEEE Std. 802.1 architecture, management and interworking standards.

Specifically complies with the following:

- 802 Overview and Architecture
- 802.1Q as amended by P802.1ad
- 802.1ah
- 802.1ag

- A simple and technically feasible solution which interoperates and coexists with Ethernet bridging. Free intermixing of the following bridge types:

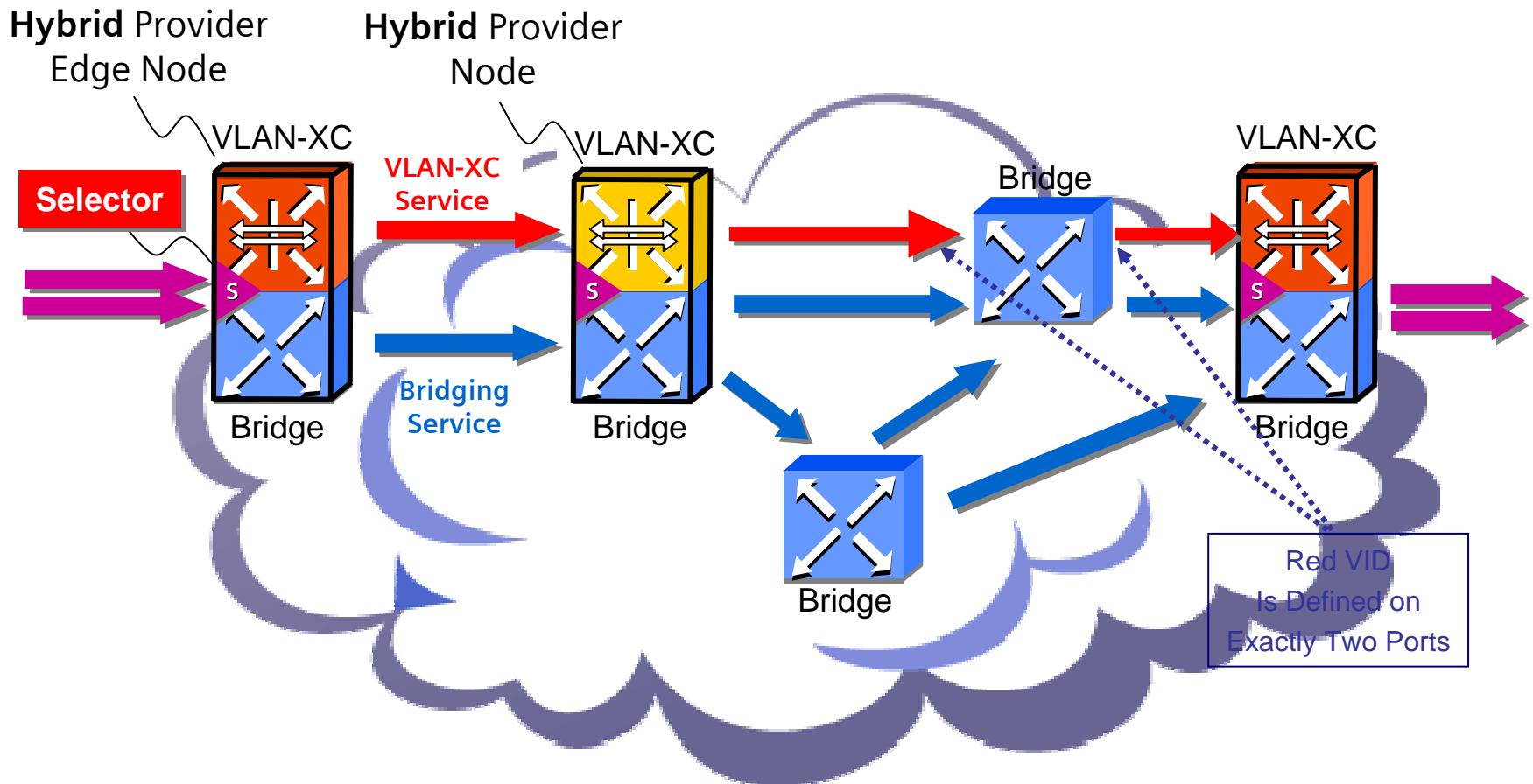
- VLAN-XC-capable
- legacy bridges

VLAN-XC works over legacy bridges.

No new headers. Uses the standard frame format, encapsulations and tags. The VID acts as the method selector.

# Interoperation with 802.1ad Bridges

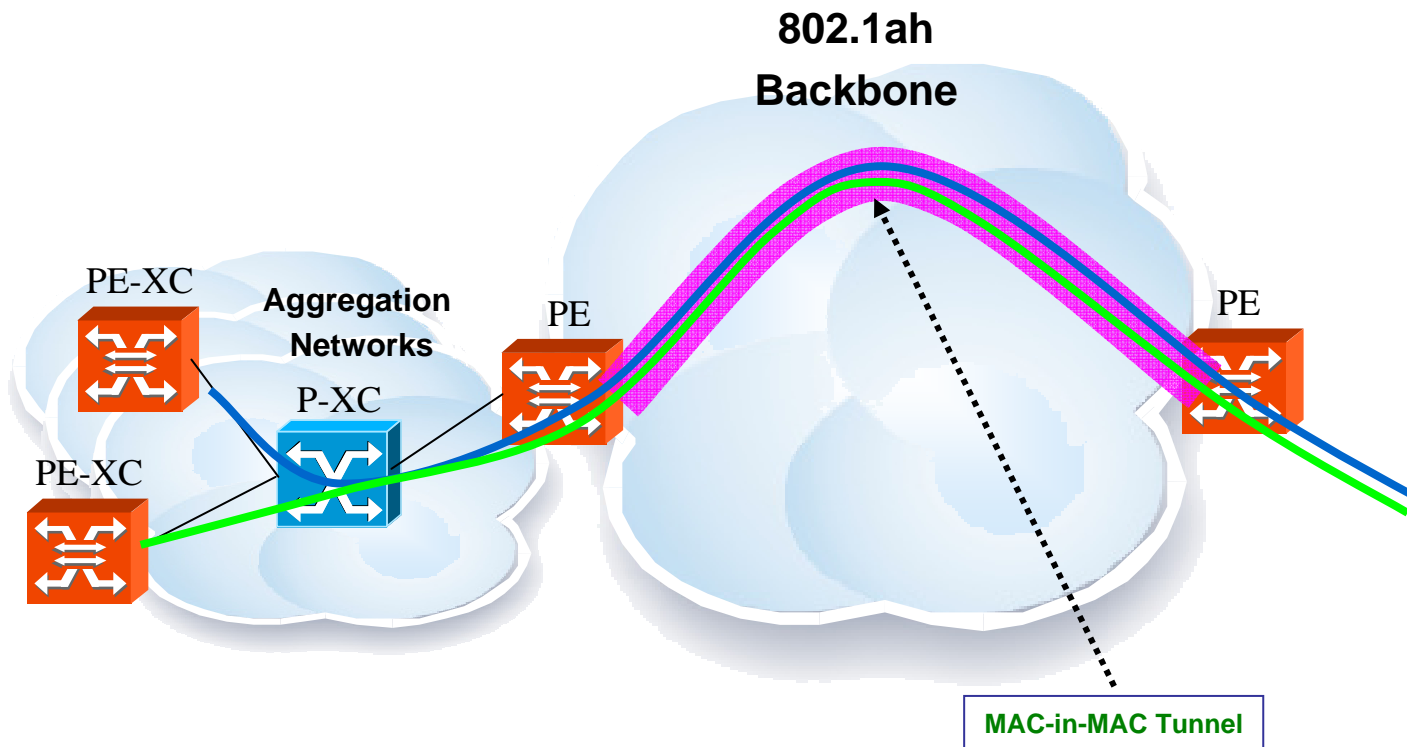
- VLAN-XC and Bridging layers co-exist in the same provider network.
- VLAN-XC can work over legacy bridges.



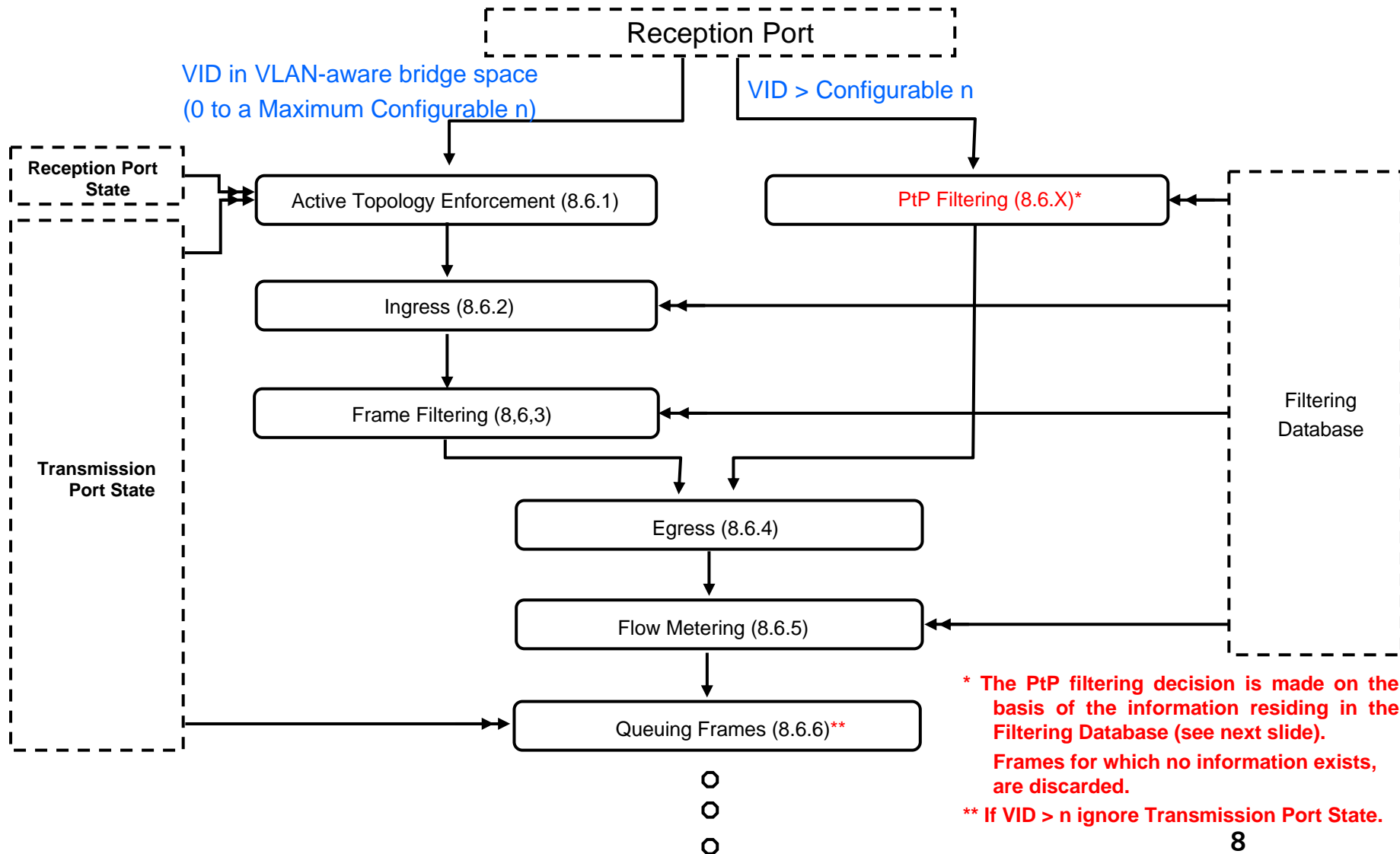
# VLAN-XC over 802.1ah Clouds

802.1ah network can interconnect VLAN-XC Networks.

The VLAN-XC can attach to a 802.1ah cloud via S-tagged service interfaces or via transparent service interfaces.



# Supplementary Function in the Forwarding Process (8.6)





## Supplementary Entry Type in the Filtering Database (8.8)

- A supplementary entry type should be defined to represent PtP filtering information (Static PtP Filtering entry).
- The filtering database may contain Static PtP Filtering\* type entries comprising:
  - Inbound port
  - Local outer VID (S-VID)
  - Local inner VID (C-VID)
  - Outbound port
  - Relay outer VID (S-VID)
  - Relay inner VID (C-VID)

Note: The inner VIDs may have a VID value of 0.

\*The Static PtP Filtering Table and its functionality should be defined in clause 12.7.

As with other managed objects, the standard should provide the definition and the operations on the tables. It is the responsibility of the distributed management system to ensure the consistent setting of the tables for all bridges in a network.

## VLAN-XC: Work to be Done

- We want to detail out which modifications to the 802.1Q should be done.
  - We consider the proposed modifications to clause 8.6 and 8.8 of the 802.1Q document.
  - We consider the proposed updates to 12.7 and 12.10 of the 802.1Q document relating to the inclusion of parameters as managed objects.
- We want to work on defining a PAR to extend the forwarding process to support traffic-engineered path selection of which VLAN-XC is an example.

# VLAN-XC: Interested Parties

- Carriers:

- Dr. Ralf-Peter Braun / T-System
- THOUENON Gilles RD-CORE-LAN, R?mi CLAVIER and Christophe BETOULE / France Telecom, DivR&D/CORE/MCN
- Mr. Liu Junmin / China Telecom (Guangzhou Telecom)

- Chip vendors:

- Mr. Uri Cummings / Fulcrum

- System vendors:

- Mr. Winkel, Ludwig / Siemens A&D
- Mr. Rudolf Brandner, Mrs. Nurit Sprecher / Siemens COM
- Mr.Himanshu Shah / Ciena
- Mr. Haim Porat / Ethos Networks
- Mrs. Linda Dunbar, Mr. Bob Sultan, Mr. Yongji Wu, Mr. Fan Lingyuan / Huawei
- Mr. Dan Romascanu, Mr. Ran Ish-Shalom / Avaya
- Mrs. Edna Ganon / MRV
- Mr. Nitsan Elfassy, Mr. Oren / Flexlight Networks



**Thank You!**