C-TAGGED SERVICE INTERFACES IN PBB
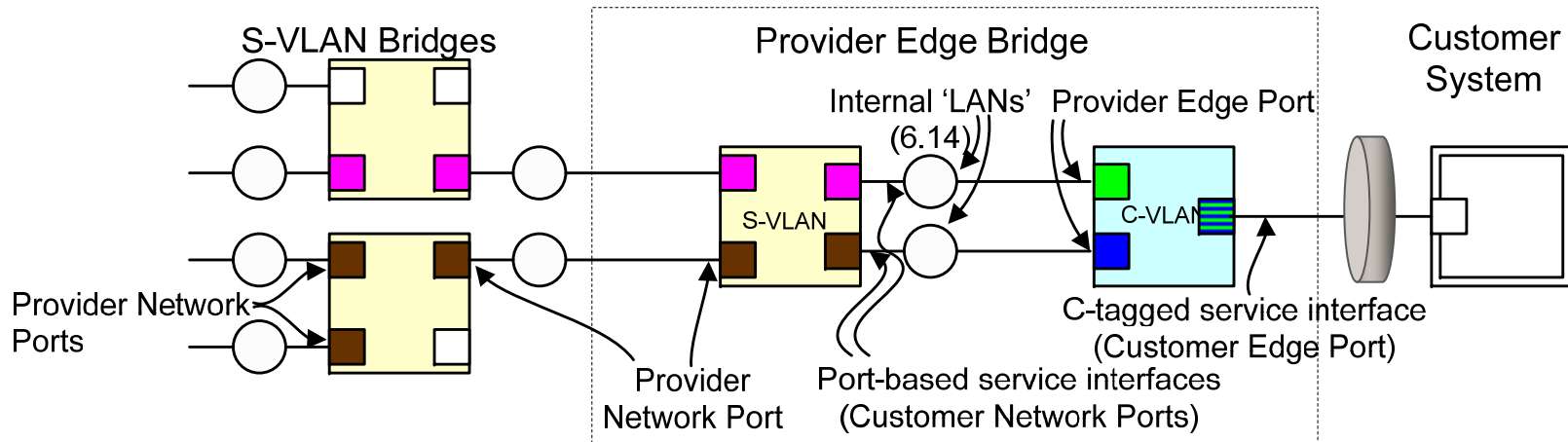
PANAGIOTIS SALTSIDIS

C-TAGGED INTERFACE

EVC 2
S-VID$_2$

EVC 1
S-VID$_1$

UNI

C-VID$_5$

C-VID$_4$

C-VID$_3$

C-VID$_2$

C-VID$_1$
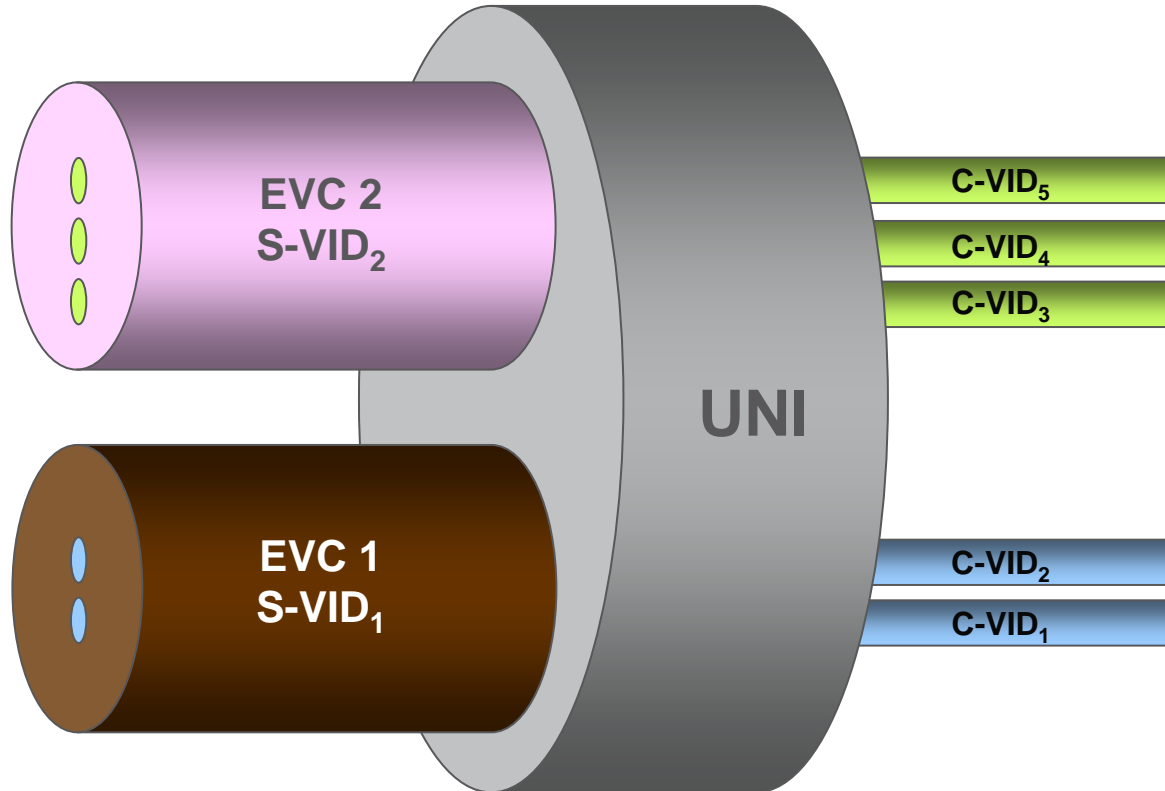
› UNI interface enabling service multiplexing and bundling

C-TAGGED INTERFACE IN 802.1AD

S-VLAN Bridges

Provider Edge Bridge

Customer System

Internal 'LANs' (6.14)

Provider Edge Port

S-VLAN

C-VLAN

Provider Network Ports

Provider Network Port

Port-based service interfaces (Customer Network Ports)

C-tagged service interface (Customer Edge Port)

C-VLAN COMPONENTS IN PEBS

› The C-VLAN components in PEBs are special as the allowed connectivity is constrained.

- Only one CEP is allowed
- Supported C-VLANs are allowed access only to one of the internal PEPs.

As a result

- Learning is not required for the supported services
- In principle these components behave as "Port-mapping C-VLAN components" (similarly to the Port-mapping S-VLAN components in P802.1Qbc which were actually modeled based on these C-VLAN components)

CONFIGURING CEPS ON PROVIDER BRIDGES

› Due to the relatively simplicity of the C-VLAN components in PEBs, IEEE802.1ad enables instantiation of CEPs on PBs.

› Designating a port as a Customer Edge Port implies PEB functionality and, specifically, the existence of a (Port Mapping) C-VLAN component associated with that port.

› CEP is configured with C-VID/S-VID translation table which enables to associate subsets of Customer VLAN services to Provider S-VLAN services. In the S-VLAN/C-VLAN component model this corresponds to:

  − configuring the PVID of the internal Customer Network Port on the S-VLAN component;

  − adding the corresponding Provider Edge Port on the C-VLAN component to the member set of the C-VLAN;

  − adding the Provider Edge Port and/or Customer Edge Port to the untagged set of the C-VLAN (if it is desired that frames forwarded to that port are transmitted untagged for this C-VLAN).
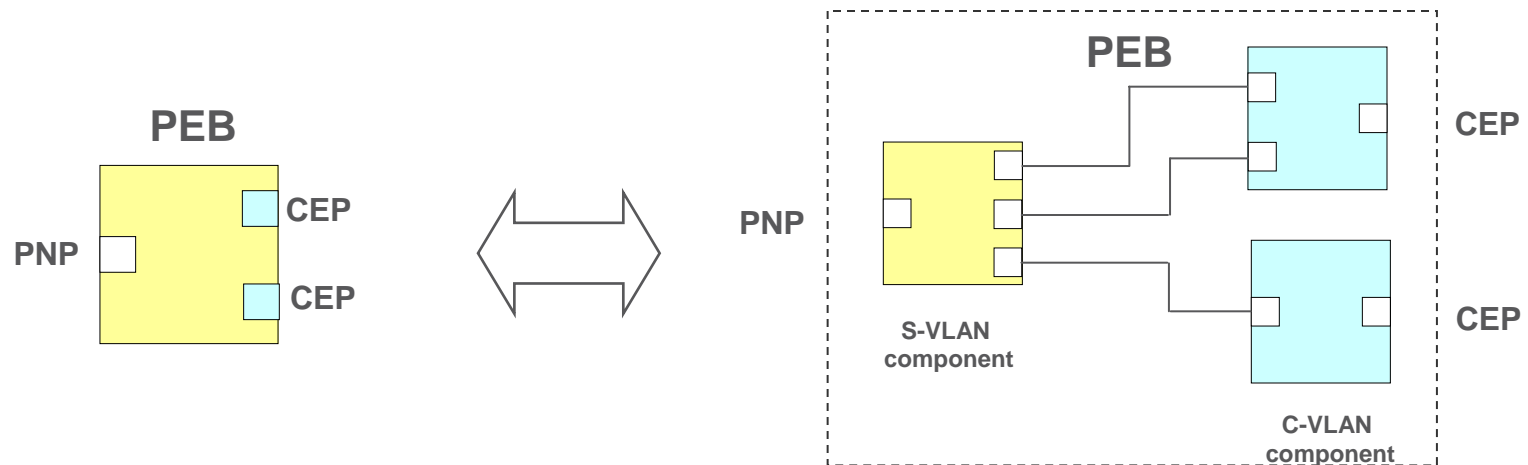
BEBS

› An I-component (as well as a B-Component) is just an S-VLAN component with a VIP/PIP (or a CBP) that enable support of special encapsulating/filtering capabilities. All the other ports can be regular S-VLAN component Bridge Ports.

› A CEP (C-tagged interface) could be instantiated on it, in the case way that a CEP is instantiated on a PB. As in the PB case

  − Designating a port as a Customer Edge Port implies PEB functionality and, specifically, the existence of a (Port Mapping) C-VLAN component associated with that port.

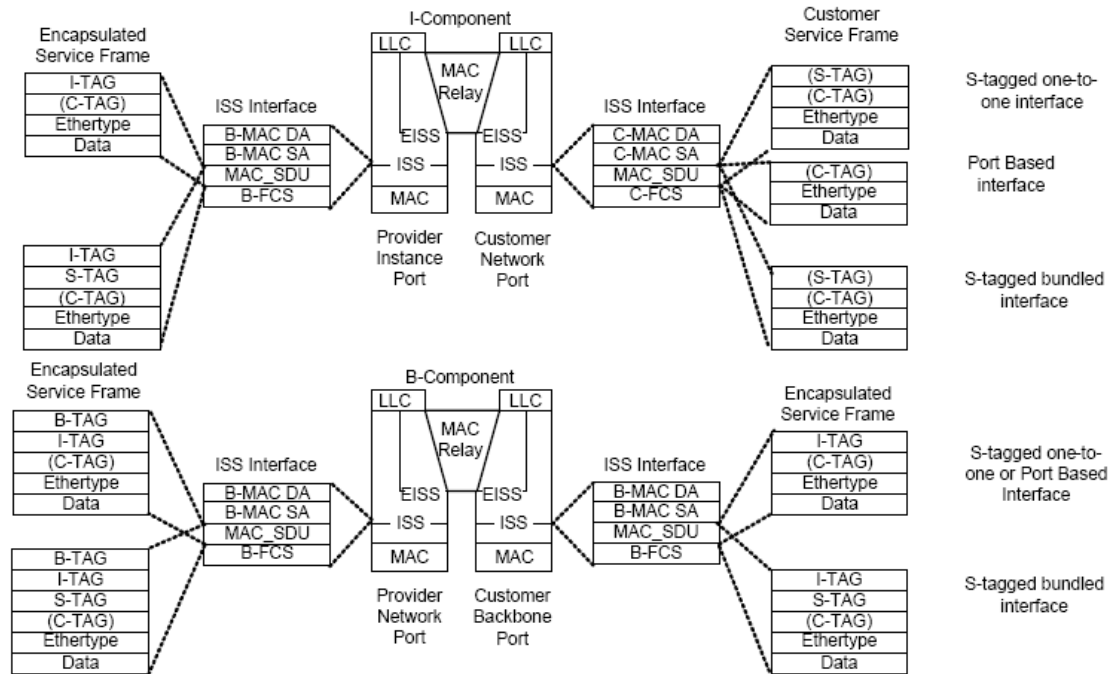 − CEP is configured with C-VID/S-VID translation table.
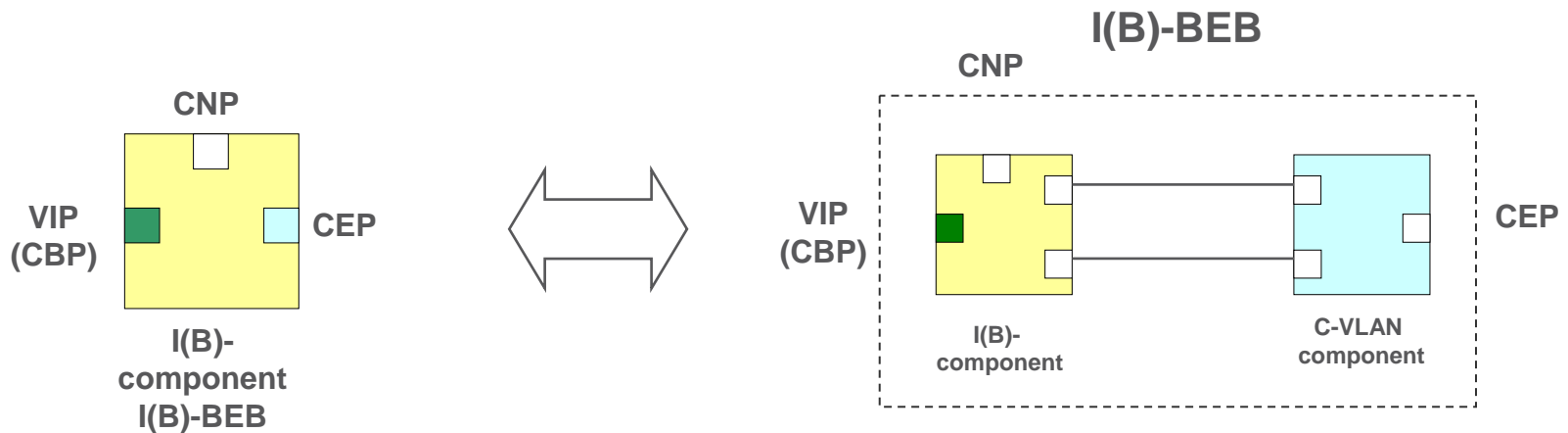
FRAME FORMAT

Figure 25-6—Encapsulated service frames at ISS

› When there is an one-to-one S-VID to I-SID relationship, the intermediate S-Tag encapsulating the C-tagged services is dropped from the frame and correspondingly the frame on the PIP will be I-C-tagged (no S-Tag present).

IEEE802.1AH SUPPORT FOR CEPS

› Each Bridge Port in a BEB is represented by

1. a Bridge Port managed object (12.4.2),

   › provides name and type (MAC Entity type: 802.3 etc.) of the port

2. a Provider Bridge Port Type managed object (12.13.1),

   › is used to designate a port as a CNP, PNP, or CEP and

3. a BEB port configuration managed object (12.16.2).

   › is a read object to provide information on the BEB port type

12.16.2

› *"12.16.2.1 Read BEB/PB/VLAN Bridge port configuration*

› *12.16.2.1.1 Purpose*

› *All BEBs shall implement the read BEB/PB/VLAN Bridge port configuration function to obtain information regarding the port type of a Bridge Port on the BEB.*

› *12.16.2.1.2 Inputs*

  a) ComponentID—the number identifying the bridge component associated with this port.
  b) Port Number—that component's Port Number for the Bridge Port.

› *12.16.2.1.3 Outputs*

  a) Port Type—this takes one of the following values:
   1) C-VLAN Port
   2) PNP (identical to the PNP Bridge Port type specified by 12.13.1)
   3) CNP (identical to the CNP Bridge Port type specified by 12.13.1)
   4) CEP (identical to the CEP Bridge Port type specified by 12.13.1)
   5) CBP (5.11, 6.11, 12.13.1 will indicate PNP)
   6) VIP (5.11, 6.10, 12.13.1 will indicate PNP)

› *NOTE—Support for C-VLAN ports requires equipment with VLAN Bridge (5.9) functions in addition to BEB (5.11) functions. Support for CEP ports requires equipment with PB (5.10) functions in addition to BEB functions."*

› 12.16.2.2 which provided a write operation has been deleted in the sponsor ballot (functionality is already provided by other managed objects like 12.13.1 and others). There are still though multiple references to this subclause in IEEE802.1Q/IEEE802.1ah

CAUTION

› *"5.11 Backbone Edge Bridge conformance*

› *A Backbone Edge Bridge system shall comprise zero or more I-components and zero or one B-component and zero or more T-components, but at least one I-component or one B-component or one T-component, supporting externally accessible ports as specified in Clause 25. **Each externally accessible port shall be designated as one of**, and may be capable of being configured as any of the following:*

   a) A Provider Network Port

   b) A Provider Instance Port

   c) A Customer Backbone Port

   d) A Customer Network Port"

› This statement (which is not reflected in the PICS - the PICS are using the same formulation for both PEBs and BEBs) is different than the corresponding conformance statement for PEBs (which do not specify an exclusive set of types of ports on PBs) – from this perspective a device which include both CEP and VIPs/PIPs or BEBs would be rather called a PEB (instead of a BEB).

CAUTION-2

› From IEEE Std 802.1ah-2008 scl 25.4

› *"NOTE 2—It is always possible to build equipment that includes both BEB and Provider Bridge components. In particular, it is possible to build an equipment that supports a C-tagged interface for attachment to a C-VLAN bridged network by placing a Provider Edge Bridge in front of the BEB. The resulting components are B-component to I-component to S-VLAN component to C-VLAN component."*

› Since the I-component is already an S-VLAN component the additional S-VLAN component that is mentioned in the NOTE above in order to provide a C-tagged service interface is redundant.

SUMMARY

› Due to the defining properties of an I(B)-component a CEP could be supported by a BEB in the same way that a CEP is supported by a PEB.

› This support is possible through the currently provided managed objects in IEEE802.1ah but some changes would be required in order to make the overall 802.1Q text clear and consistent on the support of CEPs by BEBs.

› The described support is assuming forwarding functions in the S-VID space