802.1ah: CFM in Provider Backbone Bridges

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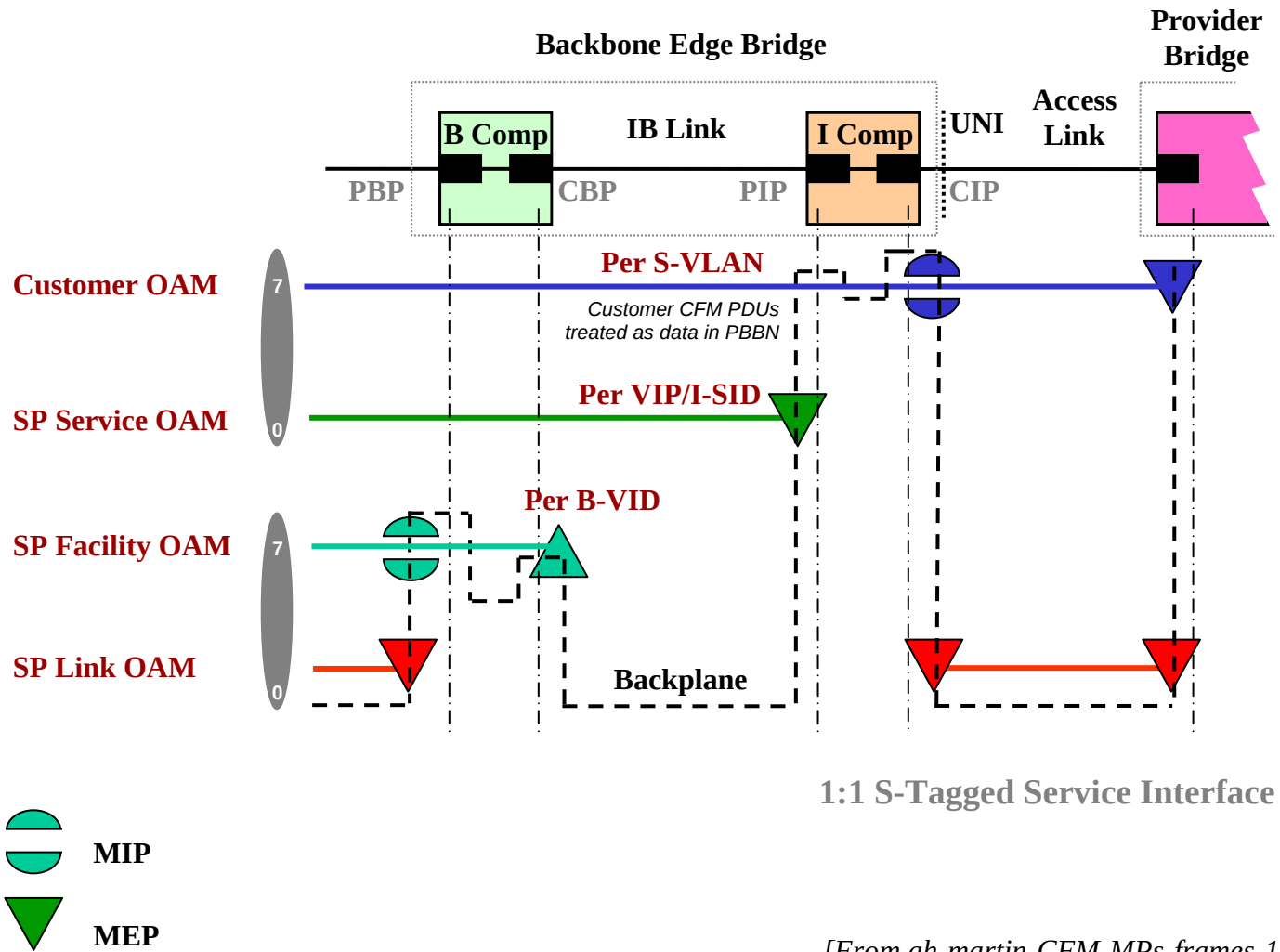
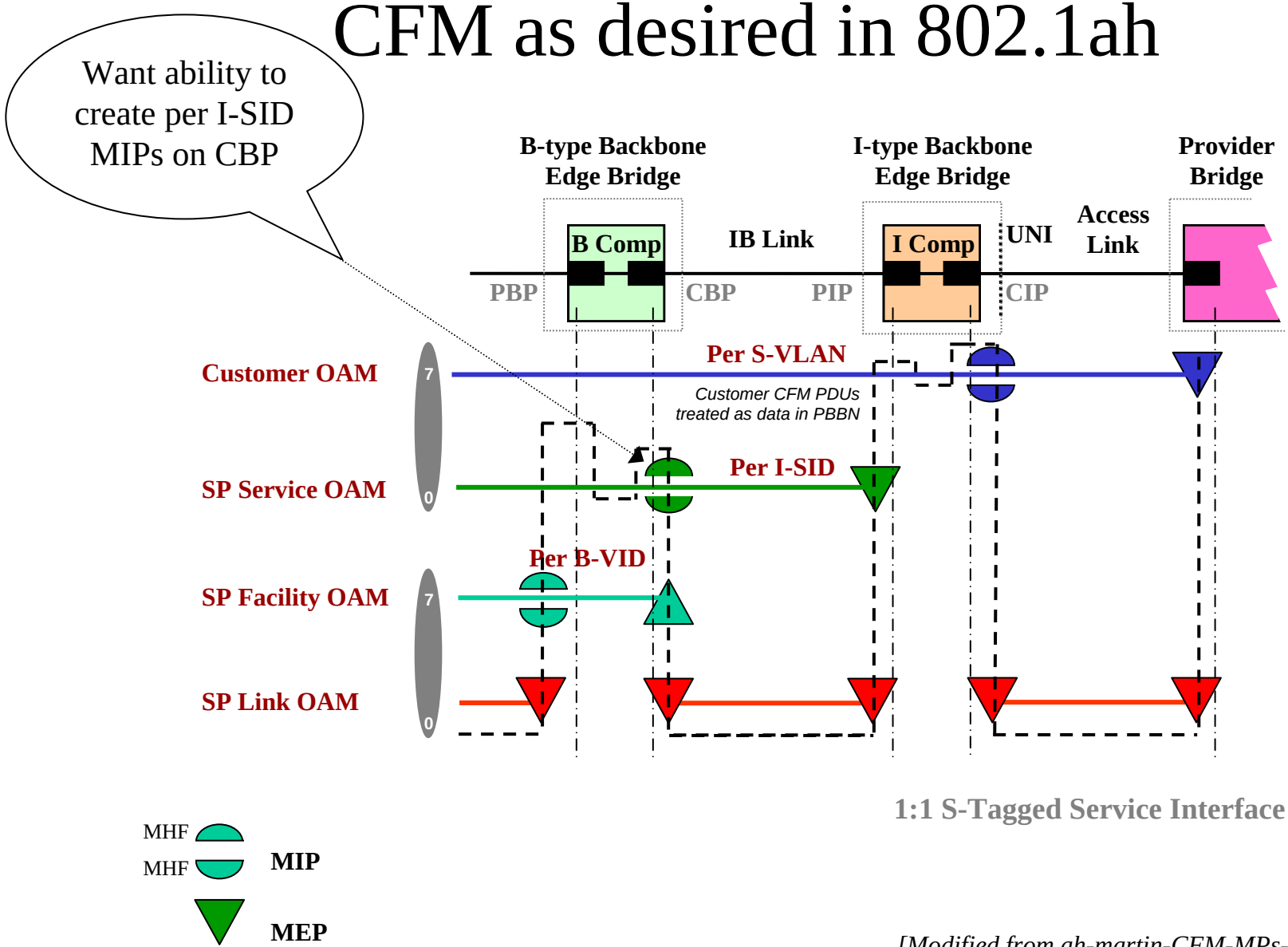
CFM as supported in 802.1ah-d3.0



[From ah-martin-CFM-MPs-frames-1106]

CFM as desired in 802.1ah

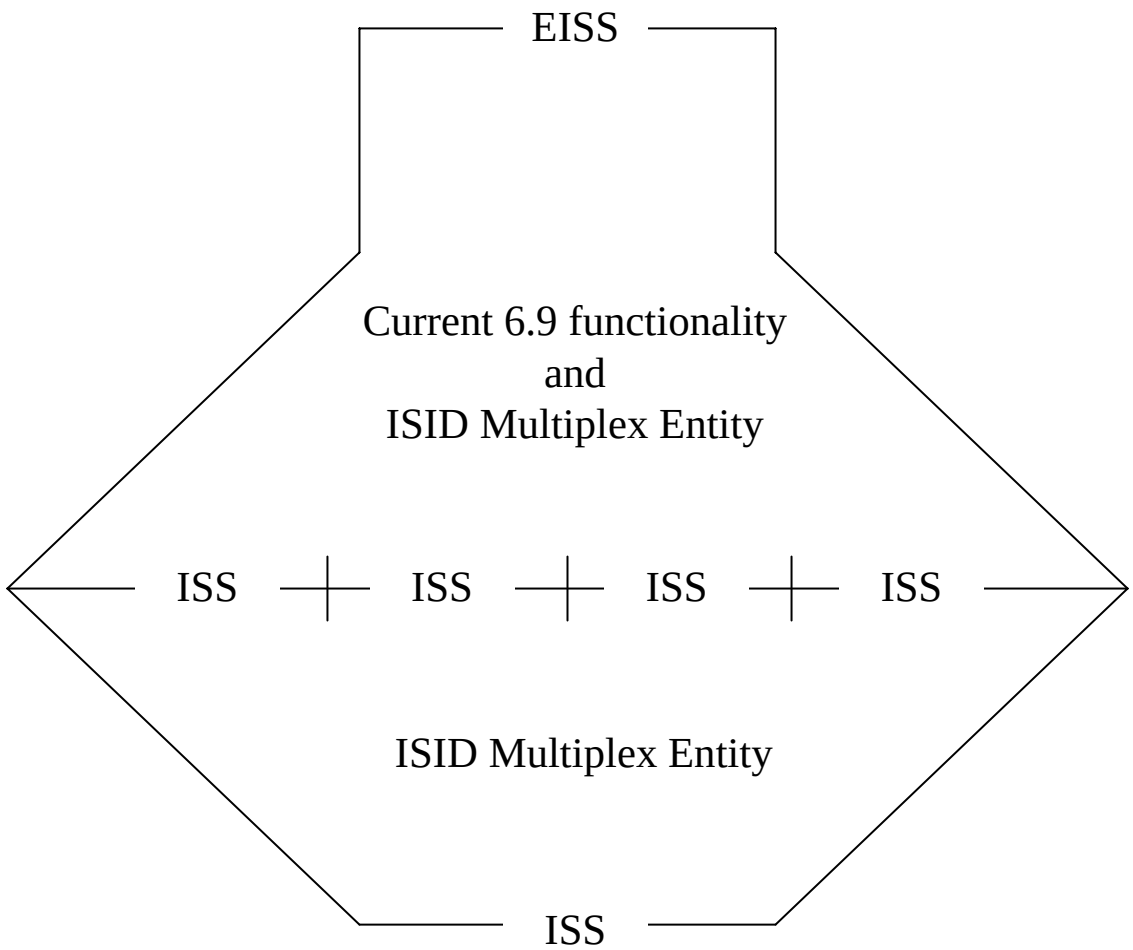


[Modified from ah-martin-CFM-MPs-frames-1106]

Required CBP structure

- Currently the Customer Backbone Port (CBP) functions in subclause 6.9 support an EISS at the relay using an ISS from the MAC. There are no interfaces in the structure that are per service instance (per I-SID).
- 802.1ag added a new subclause that describes an EISS Multiplex Entity that examines the VLAN tag and separates the EISS into a set of per-VLAN ISS interfaces.
- We need an analogous structure that examines the I-TAG and separates an ISS into a set of per-ISID ISS interfaces.
- We can then configure MIPs on the per-ISID ISS interfaces.

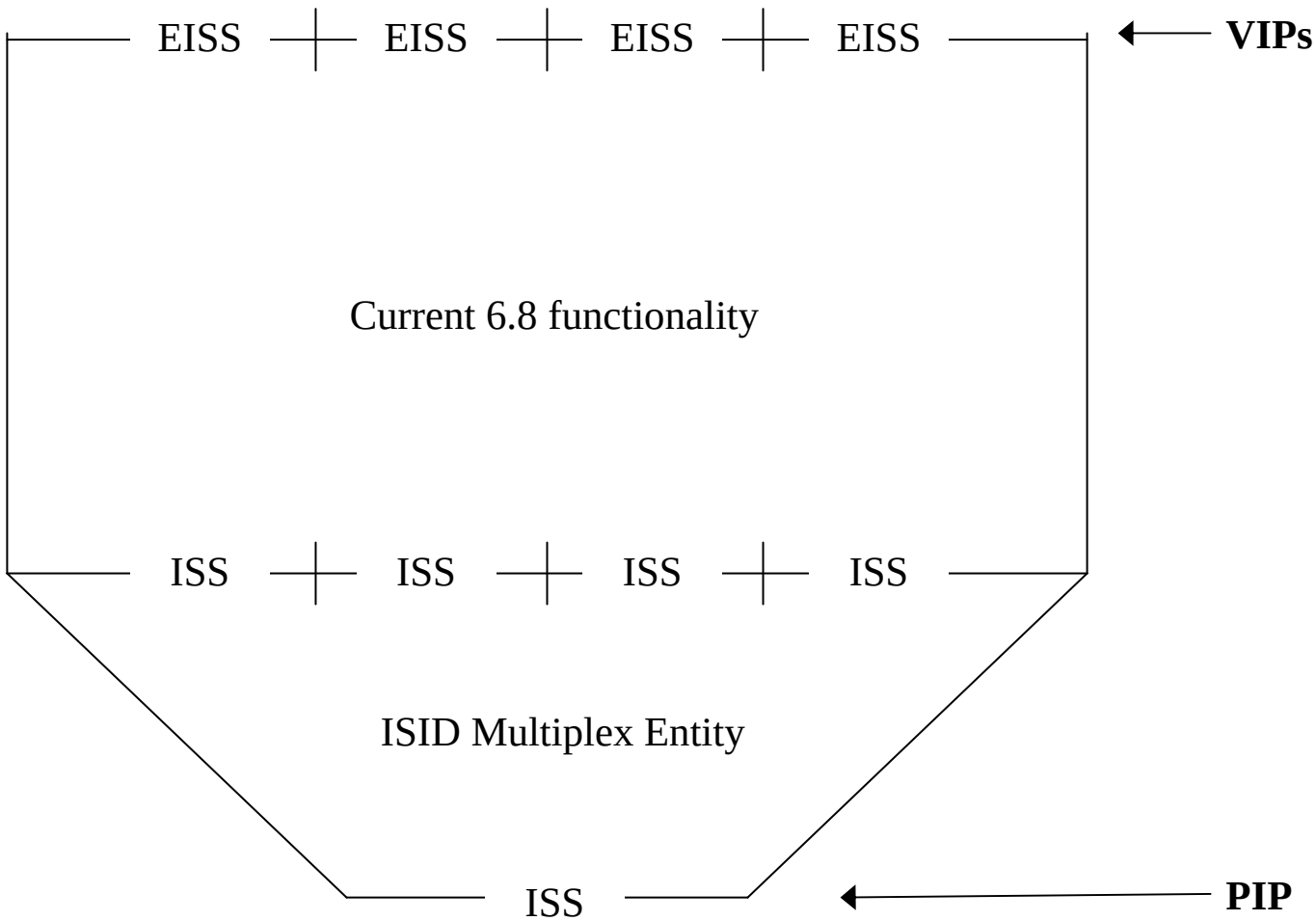
New CBP structure



Required PIP Structure

- Currently the Provider Instance Port (PIP) functions in subclause 6.8 support a set of per-ISID EISS interfaces at the relay (the Virtual Instance Ports or VIPs) using a single ISS interface from the MAC.
- Since the PIP already has a per-ISID structure there are several options for how to configure per-ISID MEPs at the PIP. We will focus on the one that has no changes to CFM and the minimal impact on the PIP functionality.
- The change to the PIP is to explicitly call out a set per-ISID ISS interfaces (where MEPs could be configured). The functions currently in subclause 6.8 support a per-ISID EISS using the per-ISID ISS. An ISID multiplexing entity is added to convert the set of per-ISID ISS interfaces to a single ISS interface.

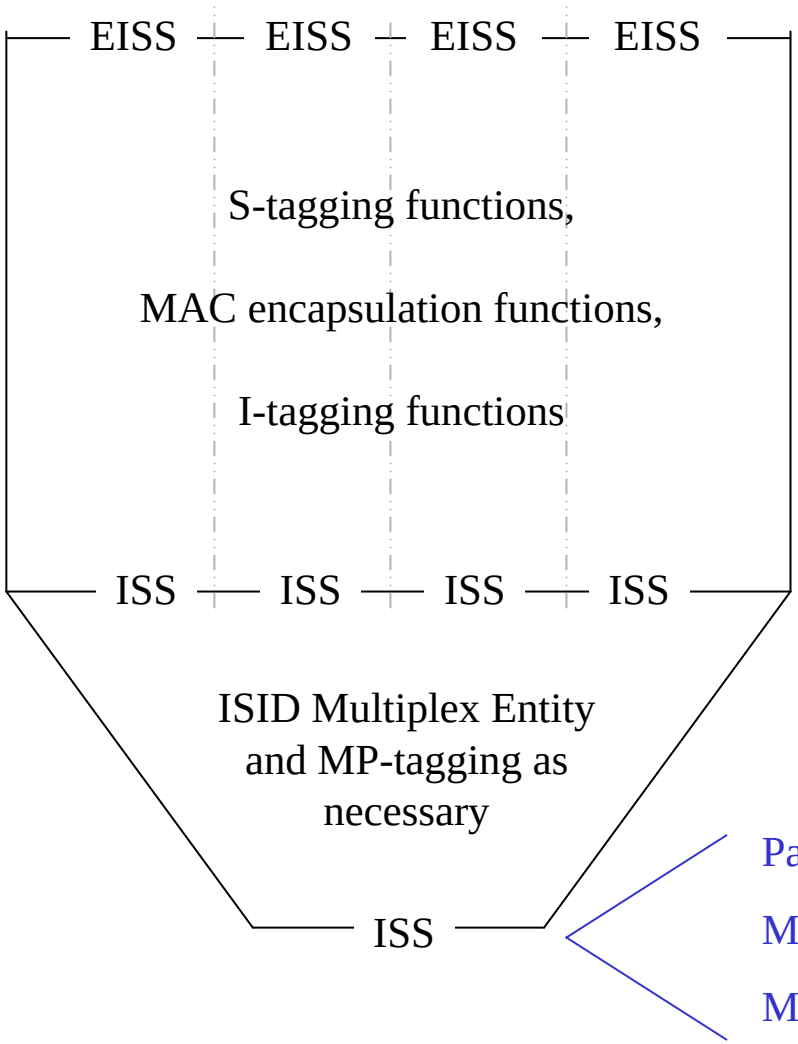
New PIP structure



ISID Multiplexer Functionality

- In Multiplexing direction:
  - Examine M_SDU for an I-tag.
    - If I-tag present then no change to M_SDU
    - If no I-tag present then create one using Multiprotocol I-tag Ethertype (this will put a Multiprotocol I-tag on CFM frames for example).
- In Demultiplexing direction
  - Examine M_SDU for an I-tag
    - If no I-tag, discard frame
    - If Multiprotocol I-tag, remove the I-tag and use I-SID for demux (i.e. to select the per-ISID ISS)
    - If Encapsulated-Ethernet I-tag, do not remove the I-tag but still use I-SID for demux.

PIP Details



Customer data frames are constructed just as currently described in subclause 6.8 using the service-instance-with-encapsulated-ethernet tag (I-type).

Parameters: B-DA, B-SA, Priority, M-SDU

M-SDU: I-type + I-SID + C-DA + C-SA + data

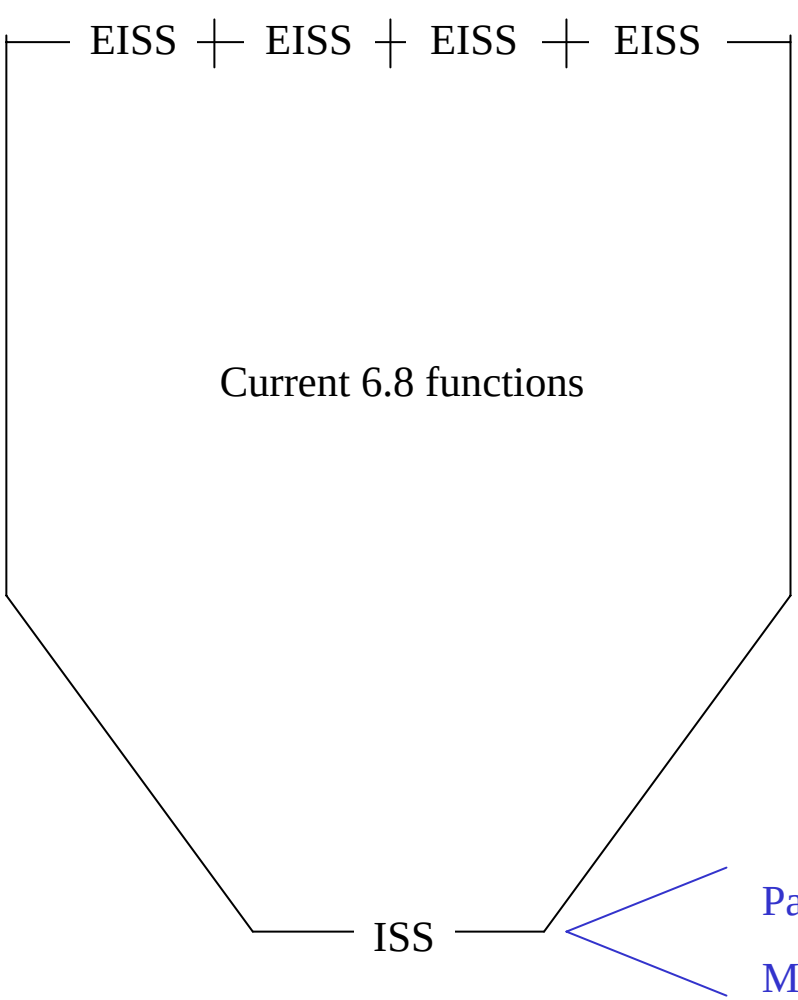
Frames injected by CFM are constructed with a multiprotocol service instance tag (MP-type) by the .

Parameters: B-DA, B-SA, Priority, M-SDU

M-SDUa: I-type + I-SID + C-DA + C-SA + data

M-SDUb: MP-type + I-SID + data (e.g. CFM-type …)

PIP Option B



Per ISID MEPs are configured at the VIP EISS.

EM_unitdata.requests generated by the MEP have a DA parameter appropriate for the CFM function, an SA parameter set to the PIP address, and a connection_identifier that references the same address as the DA parameter.

The result of the 6.8 functions on CFM frames will be an I-tagged frame with:

B-DA = C-DA = CFM destination

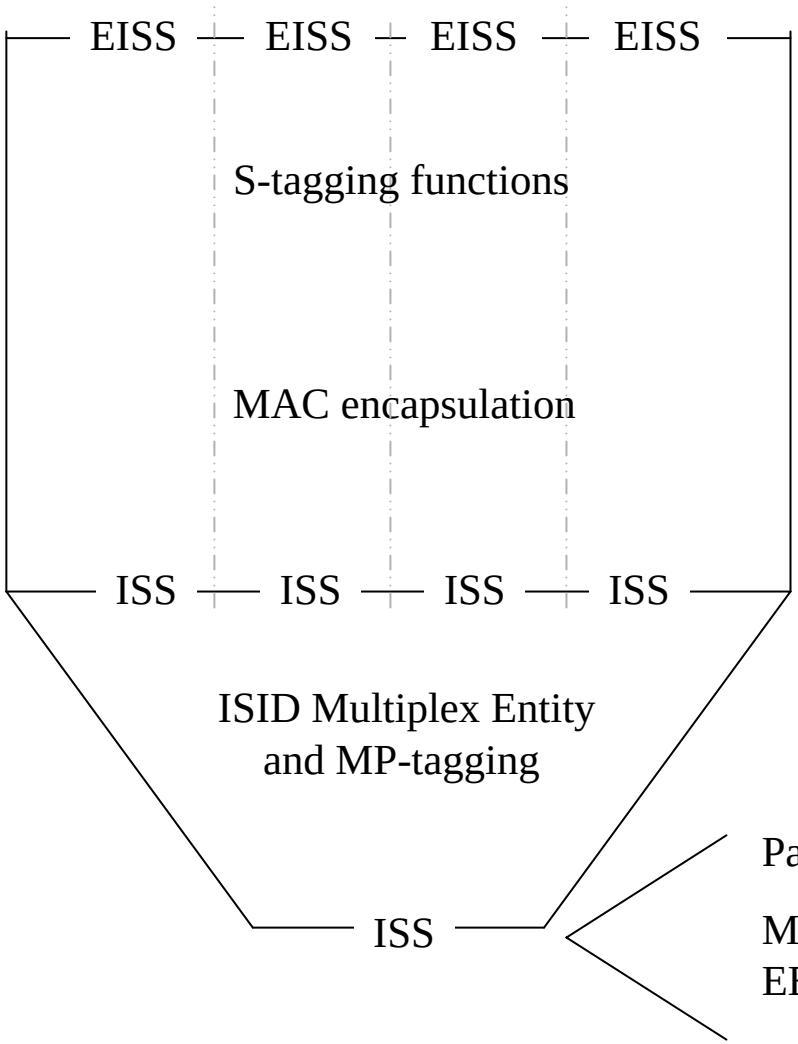
B-SA = C-SA = PIP address

The CBP still needs the ISID Multiplexer Entity to break this frame format down to a ISS parameter list to be passed to a CFM shim

Parameters: B-DA, B-SA, Priority, M-SDU

M-SDU: I-type + I-SID + C-DA + C-SA + data

PIP Option C



Option C moves all I-tag operations to the ISID multiplex entity.

In so doing it creates the need for an "Encapsulated Ethernet" tag that consists of a new ethertype followed by the customer destination and source addresses.

It eliminates the "I-tag with encapsulated Ethernet" frame format.

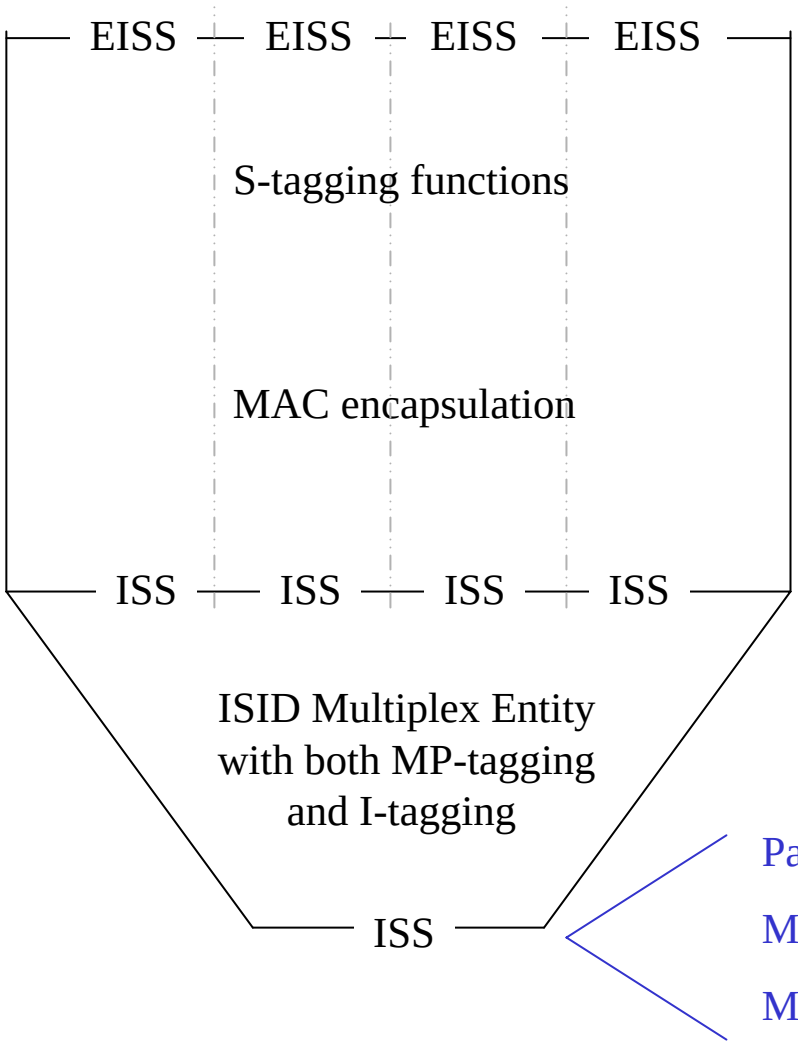
Parameters: B-DA, B-SA, Priority, M-SDU

M-SDU: EE-type + C-DA + C-SA + data

Parameters: B-DA, B-SA, Priority, M-SDU

M-SDU: MP-type + I-SID + data (e.g. CFM-type or EE-type …)

PIP Option D



Option D is similar to option C, but the ISID multiplex entity will convert the EE-tag to an I-tag.

Thus the EE-tag becomes a purely internal construct that is never externally visible. The difference between option D and A is purely a choice in how to write the document – there is no externally observable difference.

Parameters: B-DA, B-SA, Priority, M-SDU

M-SDU: EE-type + C-DA + C-SA + data

Parameters: B-DA, B-SA, Priority, M-SDU

M-SDUa: I-type + I-SID + C-DA + C-SA + data

M-SDUb: MP-type + I-SID + data (e.g. CFM-type …)

Options summary

- Option A
  - Frame format for customer data frames conforms to the “final format decision” made at the Beijing meeting.
  - CFM frames use the multiprotocol type.
- Option B
  - CFM and customer data frames use the “final format decision” made at the Beijing meeting.
  - ISID multiplexing entity functions in CBP get a little messy.
- Option C
  - Uses a new frame format for customer data frames with the multiprotocol type for the I-tag and a new ethertype preceding the C-DA.
  - CFM frames use the multiprotocol type.
- Option D
  - Frame format for customer data frames conforms to the “final format decision” made at the Beijing meeting.
  - CFM frames use the multiprotocol type.