July 2007 IEEE Plenary Meeting

P802.1ah D3.6 comments

Alex Conta

Current Figures and Specification Elements

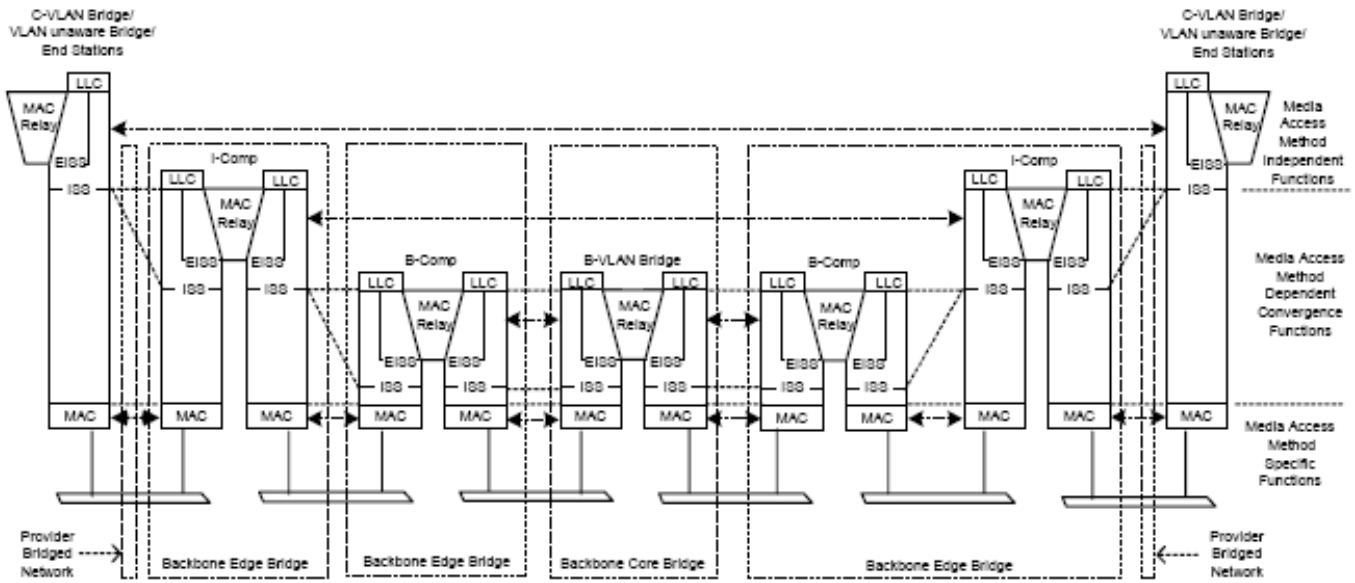


Figure 25-1—Internal organization of the MAC sublayer in a PBBN

And the other figures part of this family….

Current Ethertypes and Headers

Table 6-7—Encapsulated Addresses Type

Name	Value
802.1Q Encapsulated Addresses Type	<<to be assigned>>

Table 9-1—IEEE 802.1Q Ethernet Type allocations

Tag Type	Name	Value
Customer VLAN Tag	802.1Q Tag Protocol Type (802.1QTagType)	81-00
Service VLAN Tag or Backbone VLAN Tag	802.1Q Service Tag Type (802.1QSTagType)	88-a8
Service Instance Tag	802.1Q Service Instance Tag Type (802.1QITagType)	<< to be assigned>>

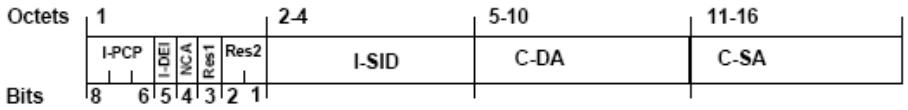
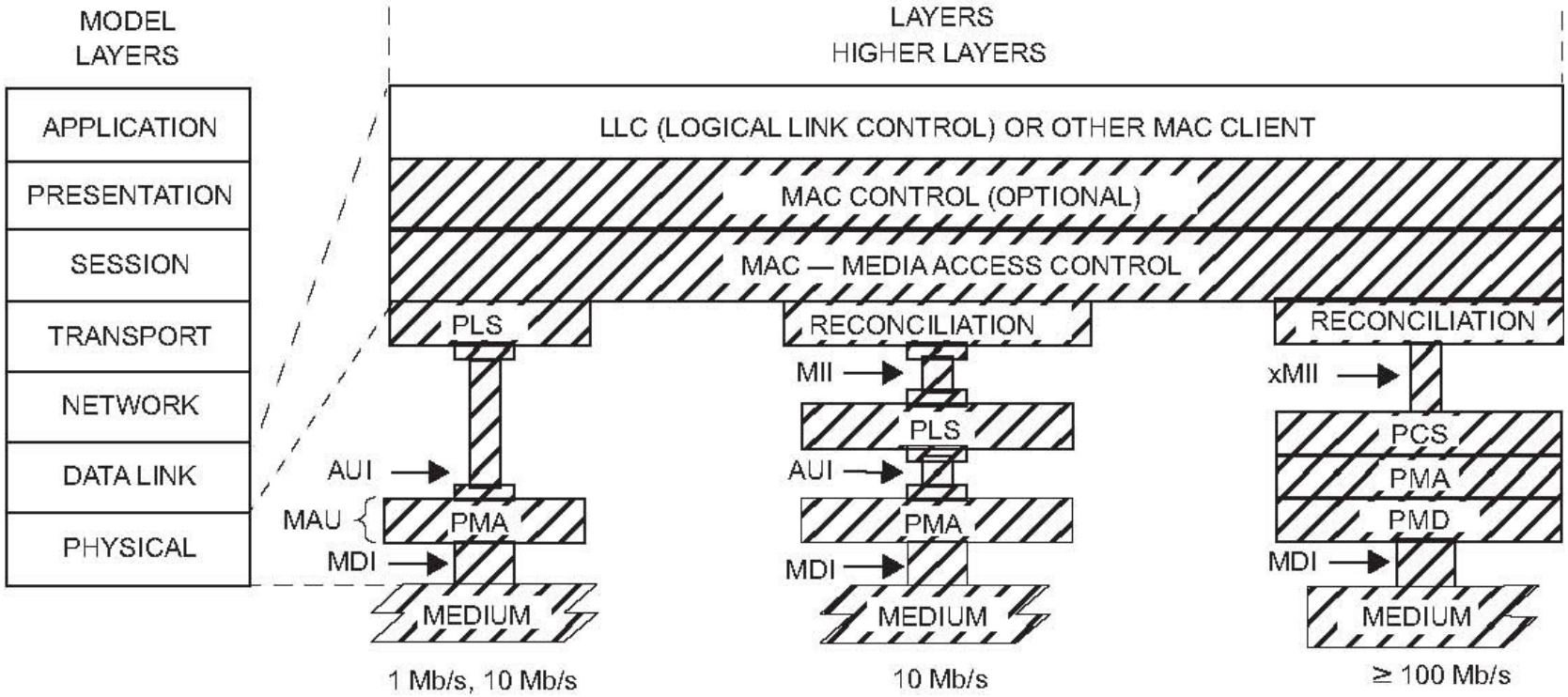


Figure 9-3—I-TAG TCI Format

Some illustrations of tunneling, and pseudo-wires

From IETF RFCs:

IP in IP, IPv6 Tunneling, MPLS tunnels, PWE3, etc…

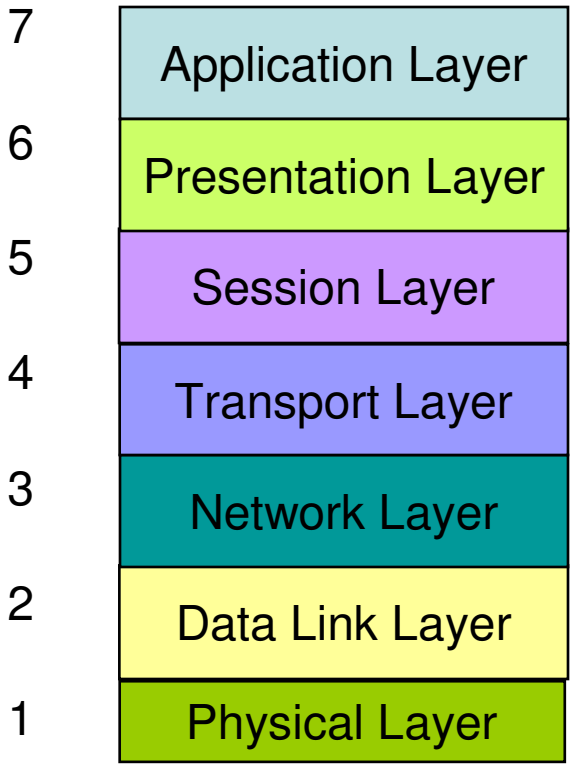


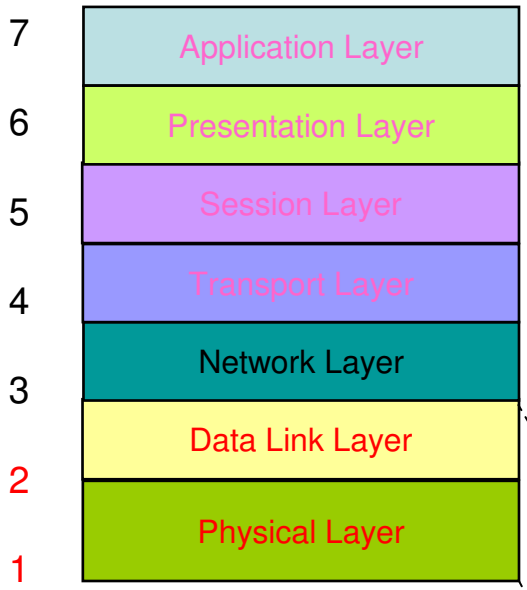
AUI = ATTACHMENT UNIT INTERFACE PCS = PHYSICAL CODING
SUBLAYER MAU = MEDIUM ATTACHMENT UNIT PHY = PHYSICAL LAYER
DEVICE MDI = MEDIUM DEPENDENT INTERFACE PLS = PHYSICAL LAYER
SIGNALING MII = MEDIA INDEPENDENT INTERFACE PMA = PHYSICAL
MEDIUM ATTACHMENT PMD = PHYSICAL MEDIUM DEPENDENT

Figure 1–1—IEEE 802.3 standard relationship to the ISO/IEC Open Systems Interconnection (OSI) reference model

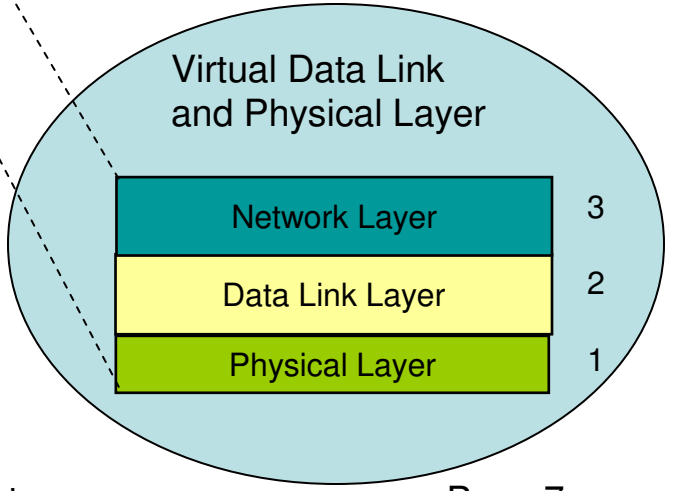
Extended Layering
- tunnels - IP tunnels (IP in IP)

ISO Model

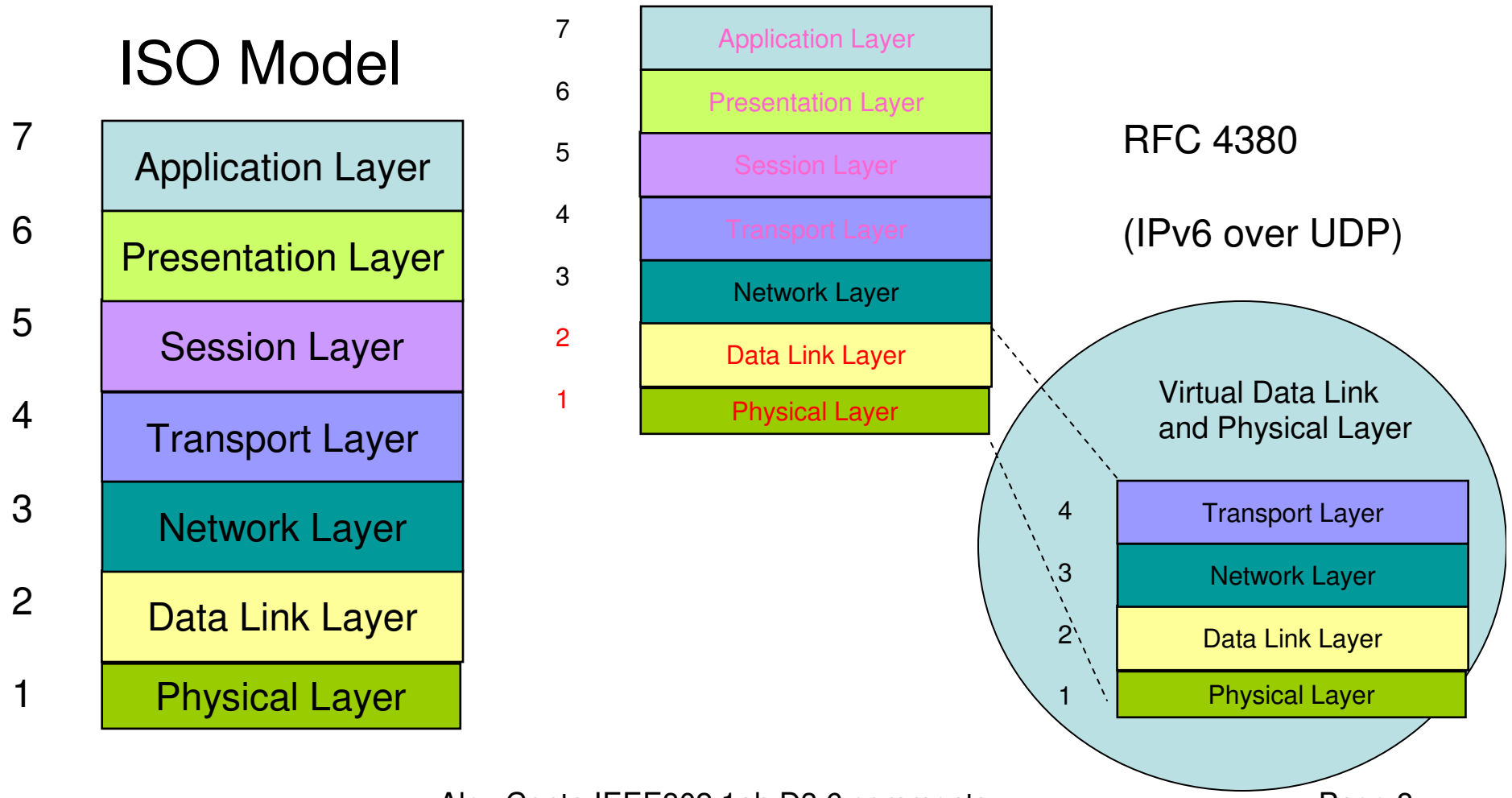




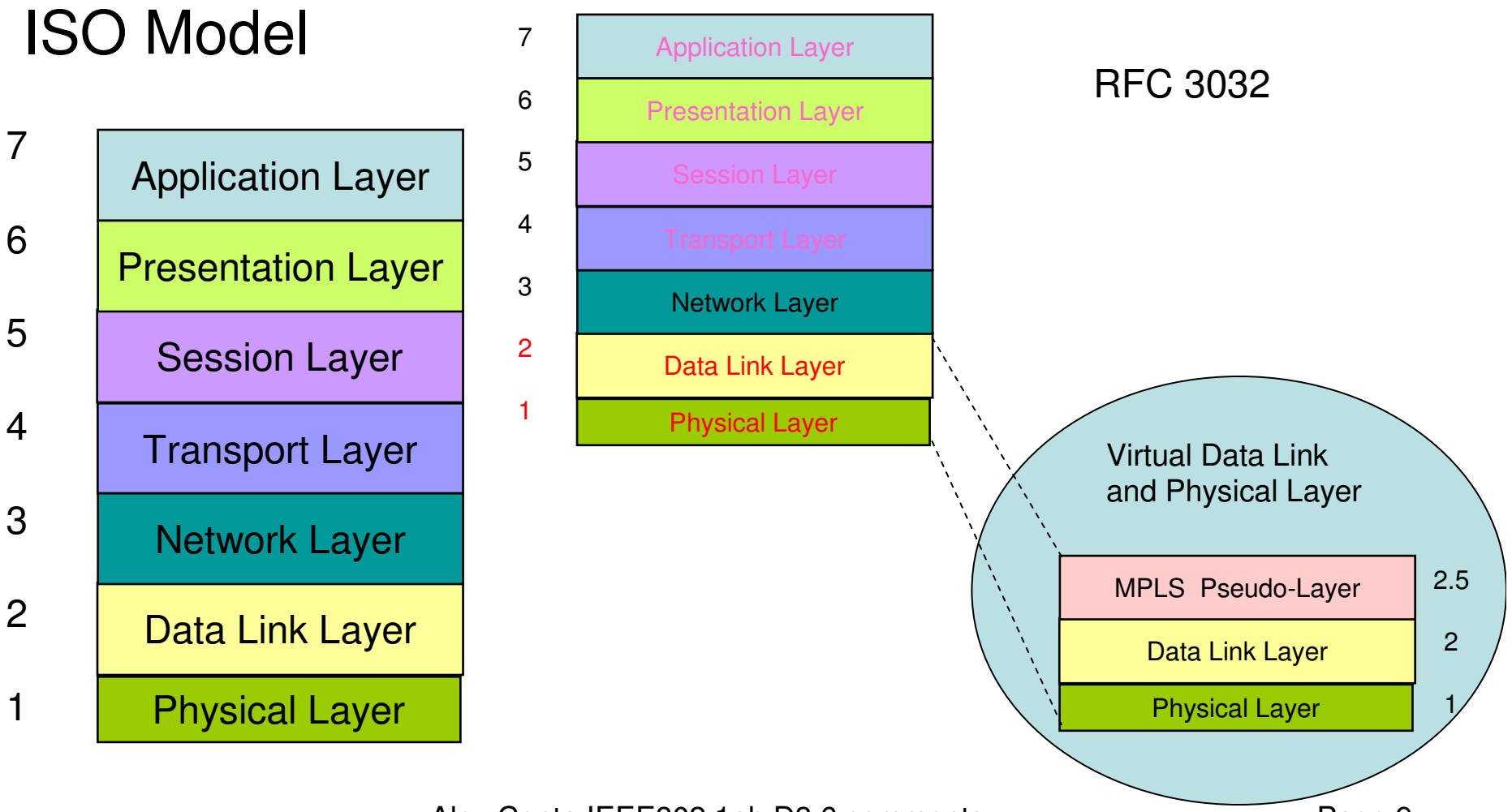
RFC 2003 (IP in IP)
RFC 2473 (IPv6 tunnels)



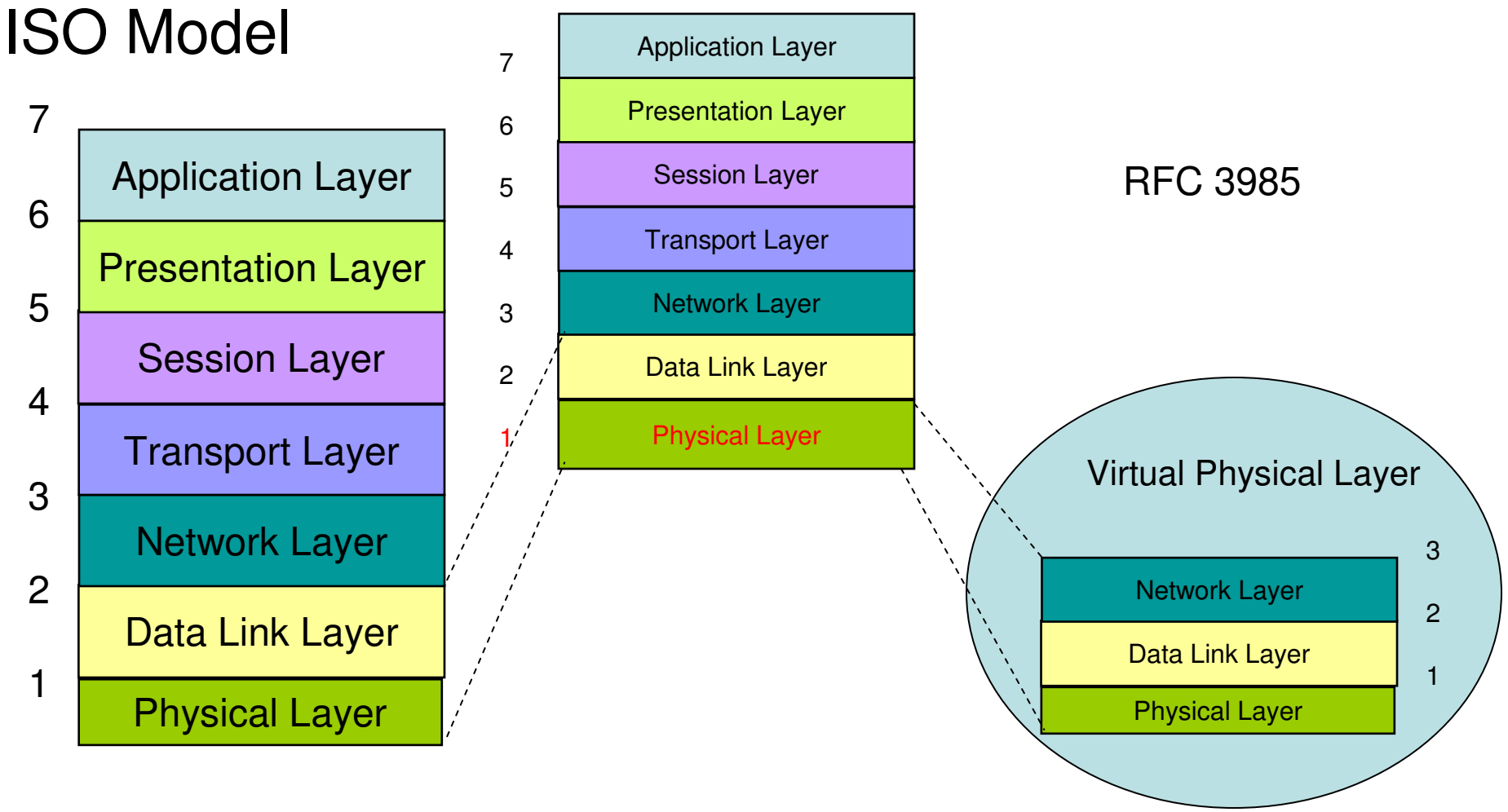
Extended Layering
- tunnels - UDP tunnels (layer 4 tunnel)



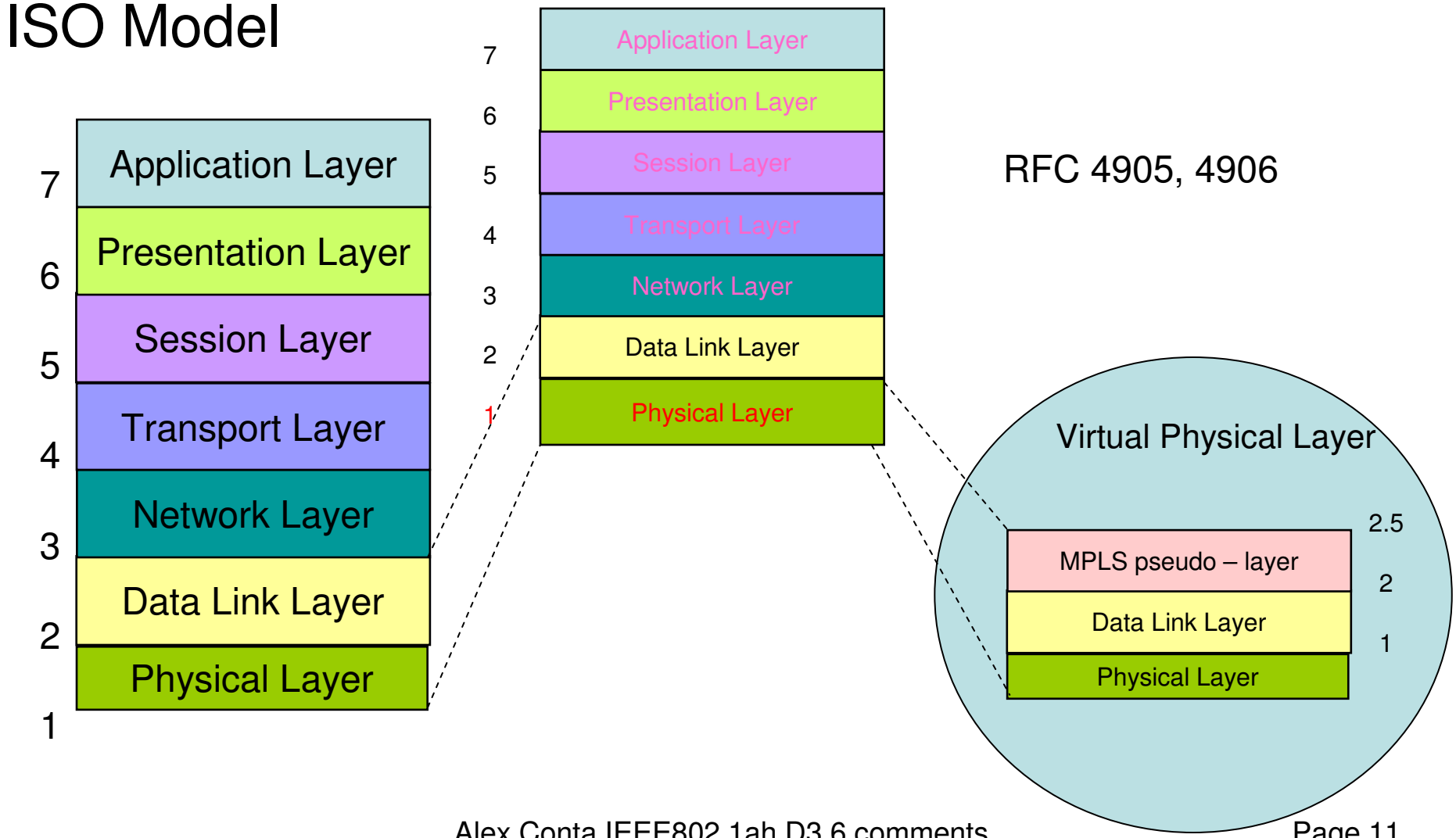
Extended Layering
- tunnels - MPLS tunnels (IP over MPLS)



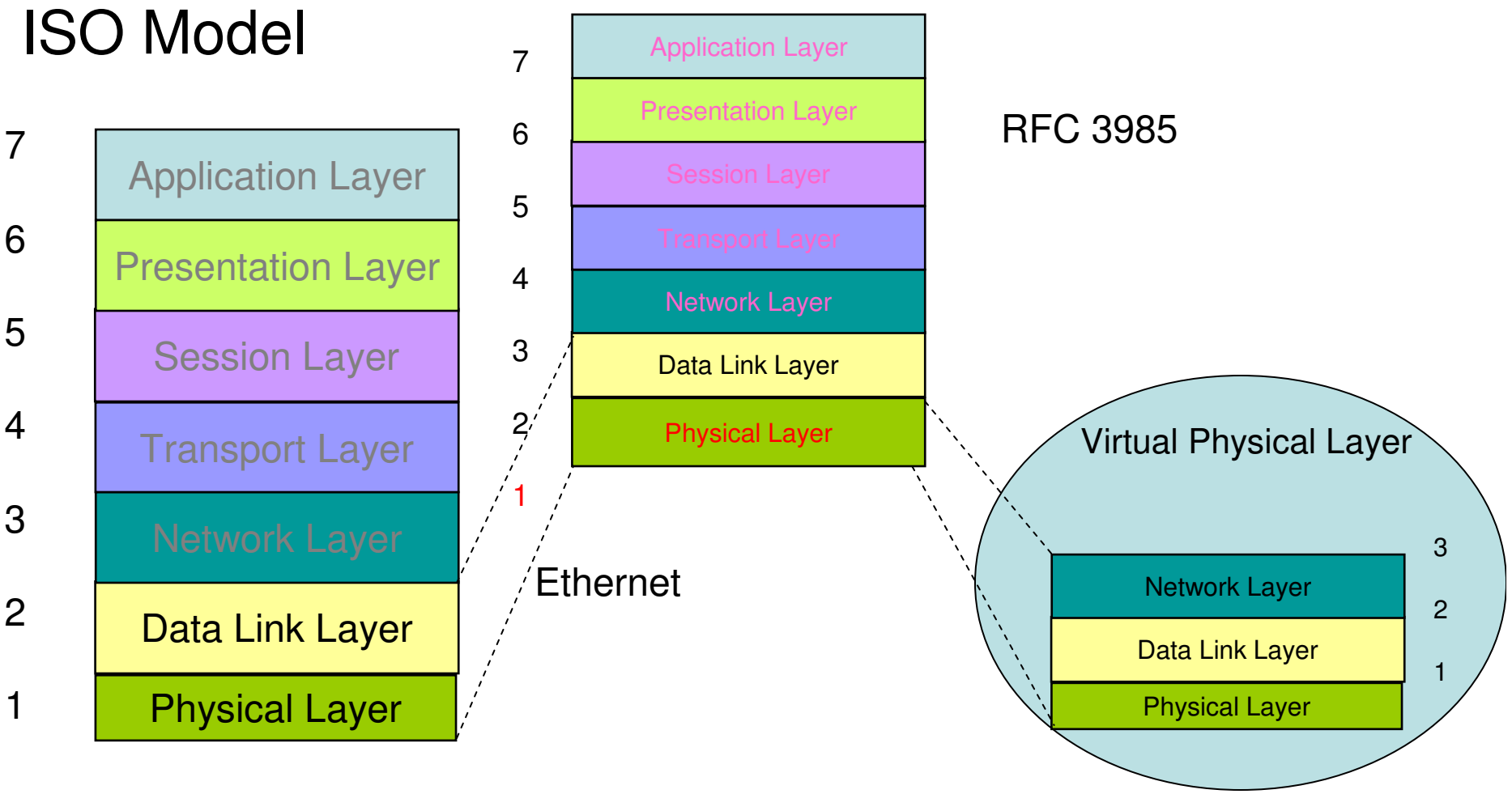
Extended Layering
- pseudo wires over IP



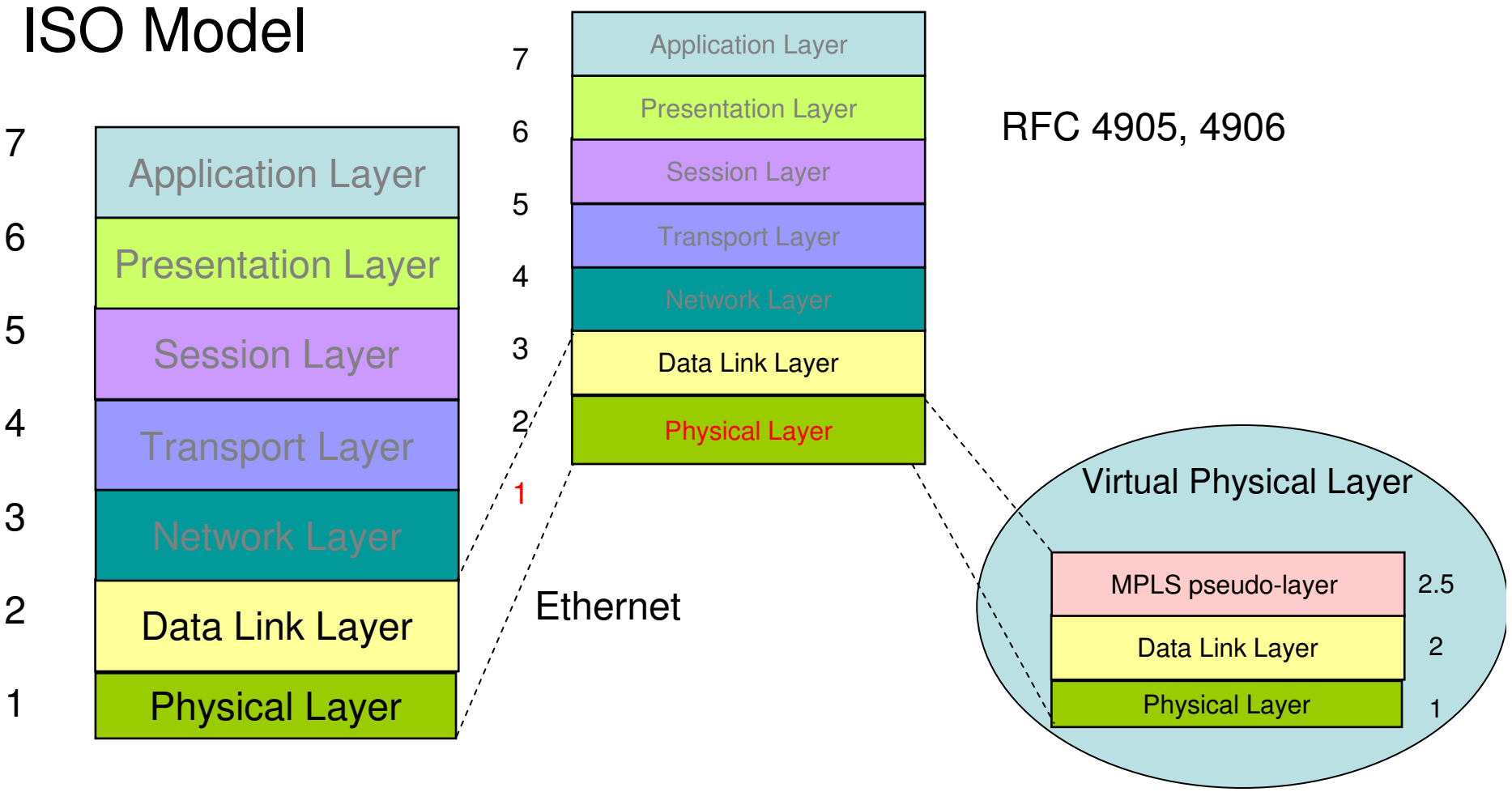
Extended Layering
- pseudo wires over MPLS



Extended Layering
- pseudo wire - Ethernet over IP



Extended Layering
- pseudo wire - Ethernet over MPLS

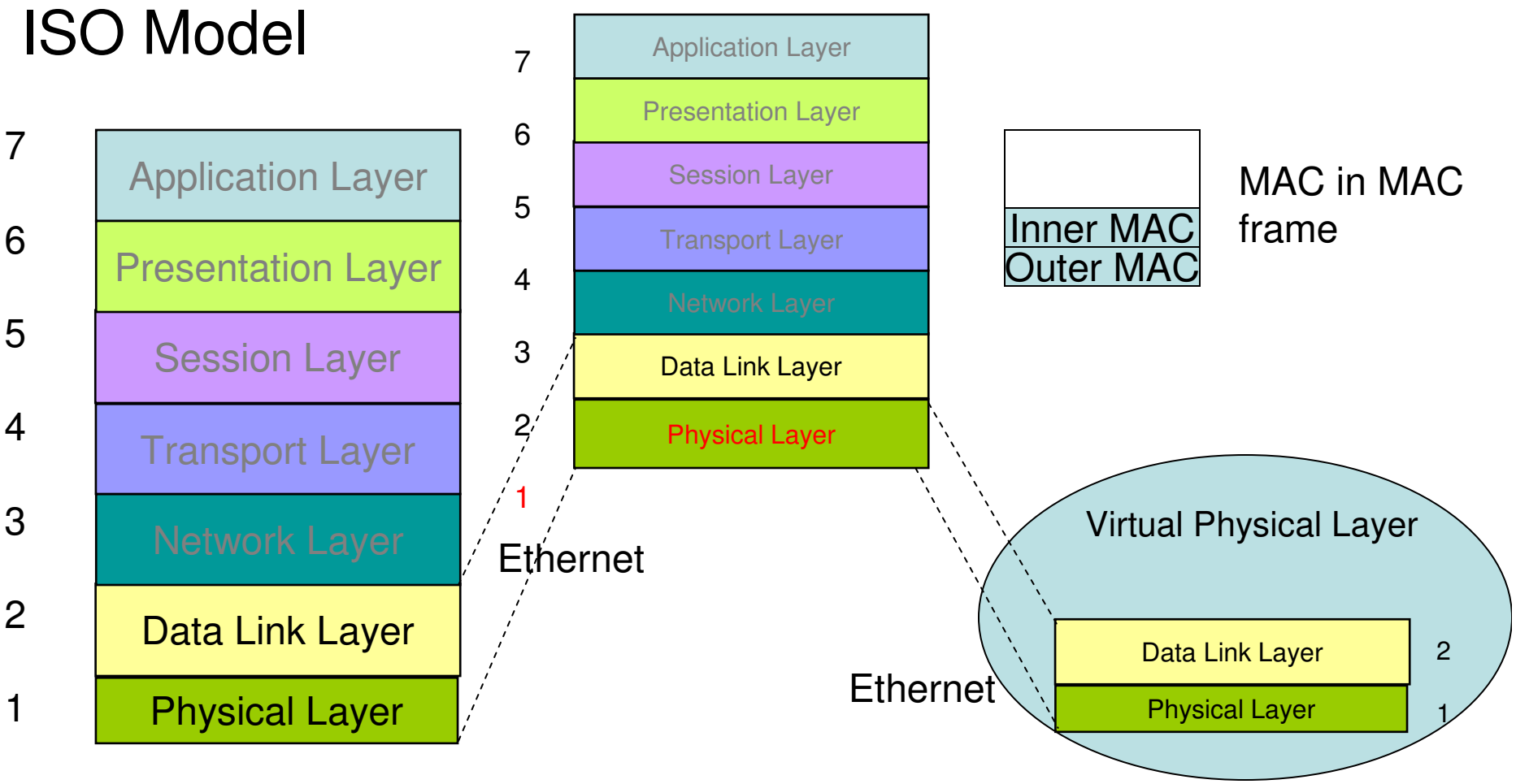


Based on the above

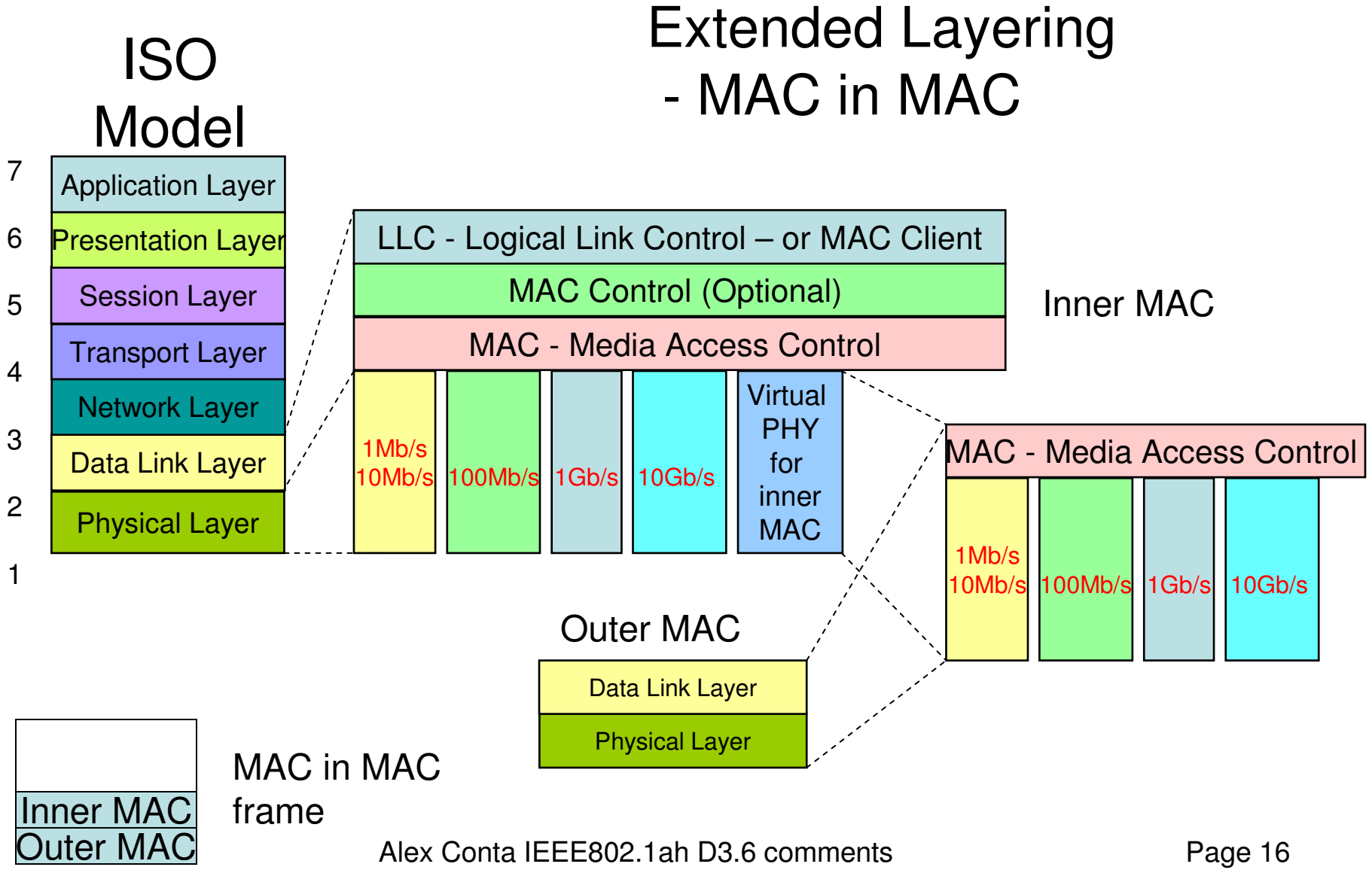
MAC in MAC

can be illustrated as follows

Extended Layering
- MAC in MAC (Ethernet over Ethernet)



Extended Layering - MAC in MAC

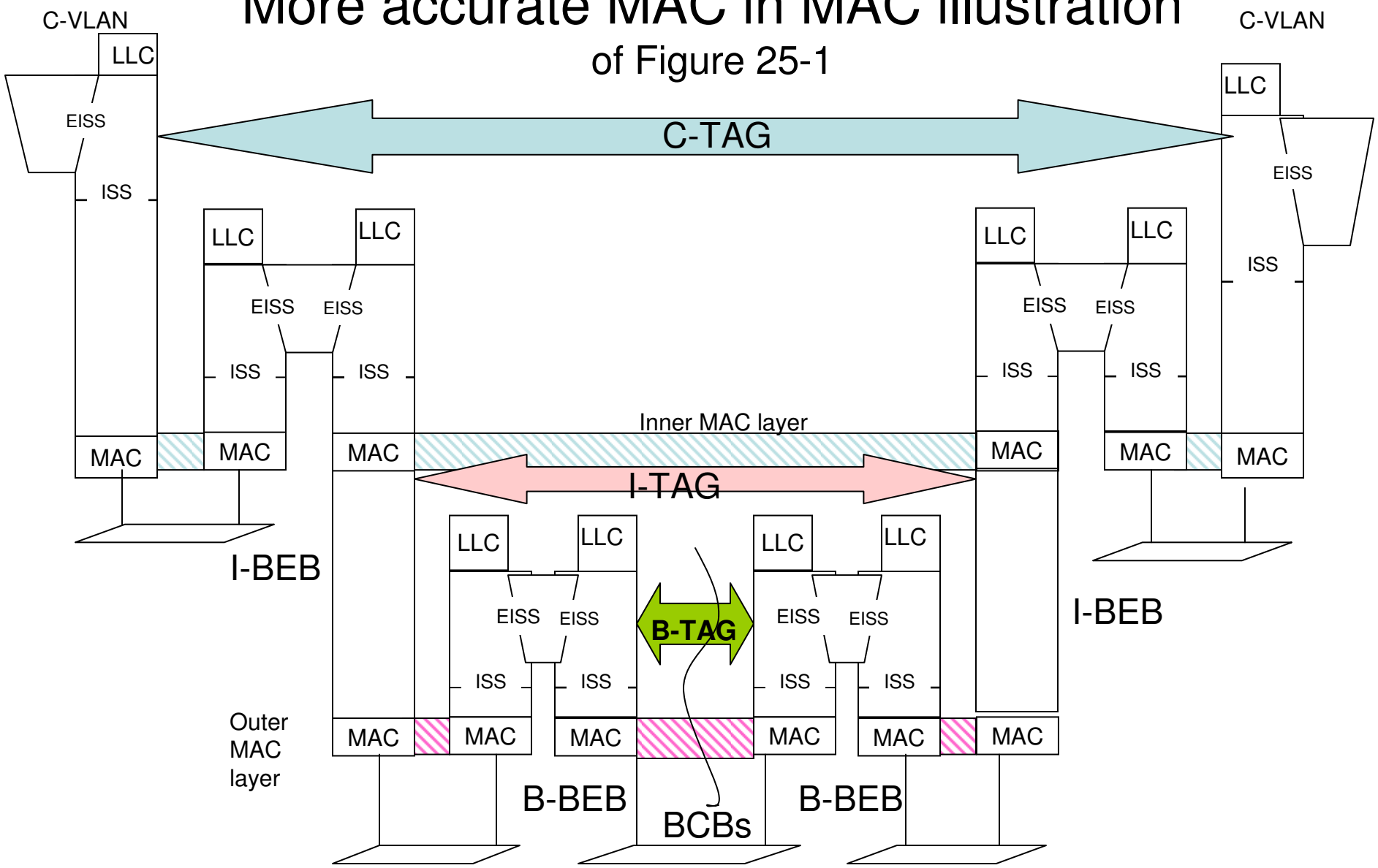


Back to P802.1ah figures

How MAC in MAC could/should be illustrated

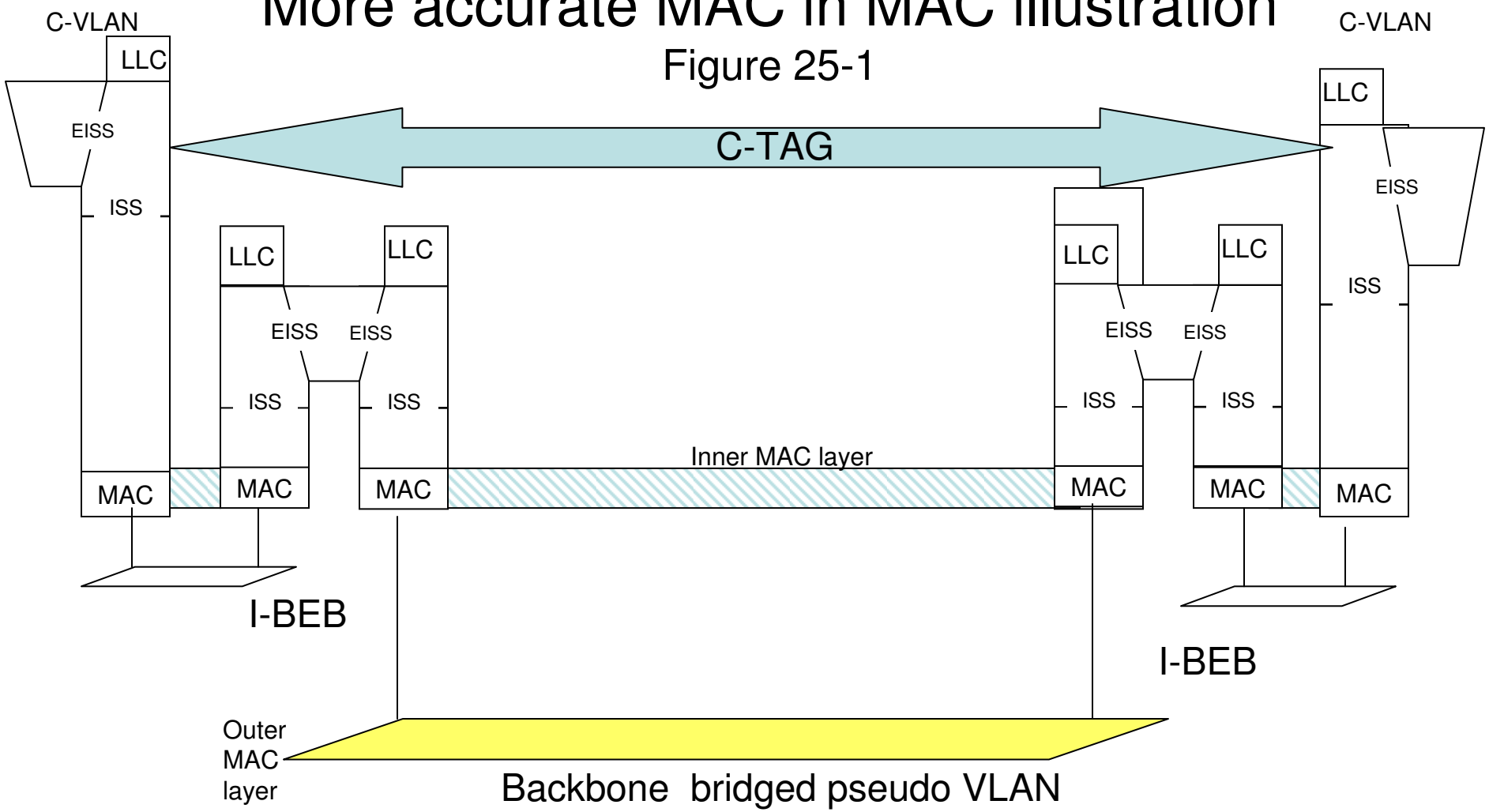
More accurate MAC in MAC illustration

of Figure 25-1



More accurate MAC in MAC illustration

Figure 25-1



Current level of complexity:

- number of elements required - ports and bridges

P802.1ah proposed changes

- Simpler, easier to manage, and control
  - fewer types of ports required for basic Backbone Bridge (BB) tunnels
    - Simplest case for basic BB tunnels
      - 12 bit TAG, and MAC header
    - Simplest case for extended TAG BB tunnels
      - 24 bit TAG, and MAC header
- Cheaper
  - fewer types of bridges for basic BB tunnels

- Provides Alternatives for more complex cases

  - provide various combinations of 24, and 12 bit TAGs

Current types of ports

CIP Customer Instance Port – incoming/outgoing customer frames
PIP Provider Instance Port - encapsulate/decapsulate I-TAG
VIP Virtual Instance Port - encapsulate/decapsulate I-TAG
CBP Customer Backbone Port – translate I-TAG to B-TAG
PNP Provide Network Port - switching on B-TAG

Ports needed for basic BB tunnel – CIP, PIP/VIP, CBP, PNP
Components at end of tunnels: I-COMP, B-COMP

Proposed use of Ethertypes and Headers

Table 6-7—Encapsulated Addresses Type

Name	Value
802.1Q Encapsulated Addresses Type	<<to be assigned>>

Use this EAT as is

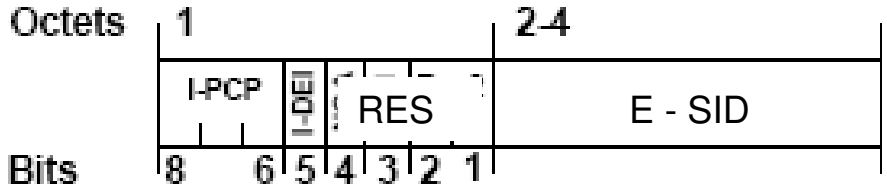
Table 9-1—IEEE 802.1Q Ethernet Type allocations

Tag Type	Name	Value
Customer VLAN Tag	802.1Q Tag Protocol Type (802.1QTagType)	81-00
Service VLAN Tag or Backbone VLAN Tag	802.1Q Service Tag Type (802.1QSTagType)	88-a8
Service Extended Tag	802.1Q Service Extended Tag Type	<< to be assigned>>

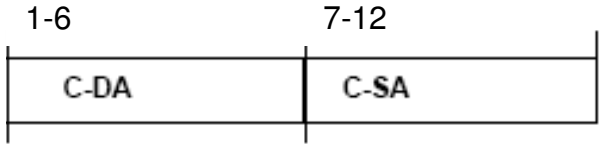
CTT
STT, BTT

Change ITT to ETT

Split current I-TAG header into two

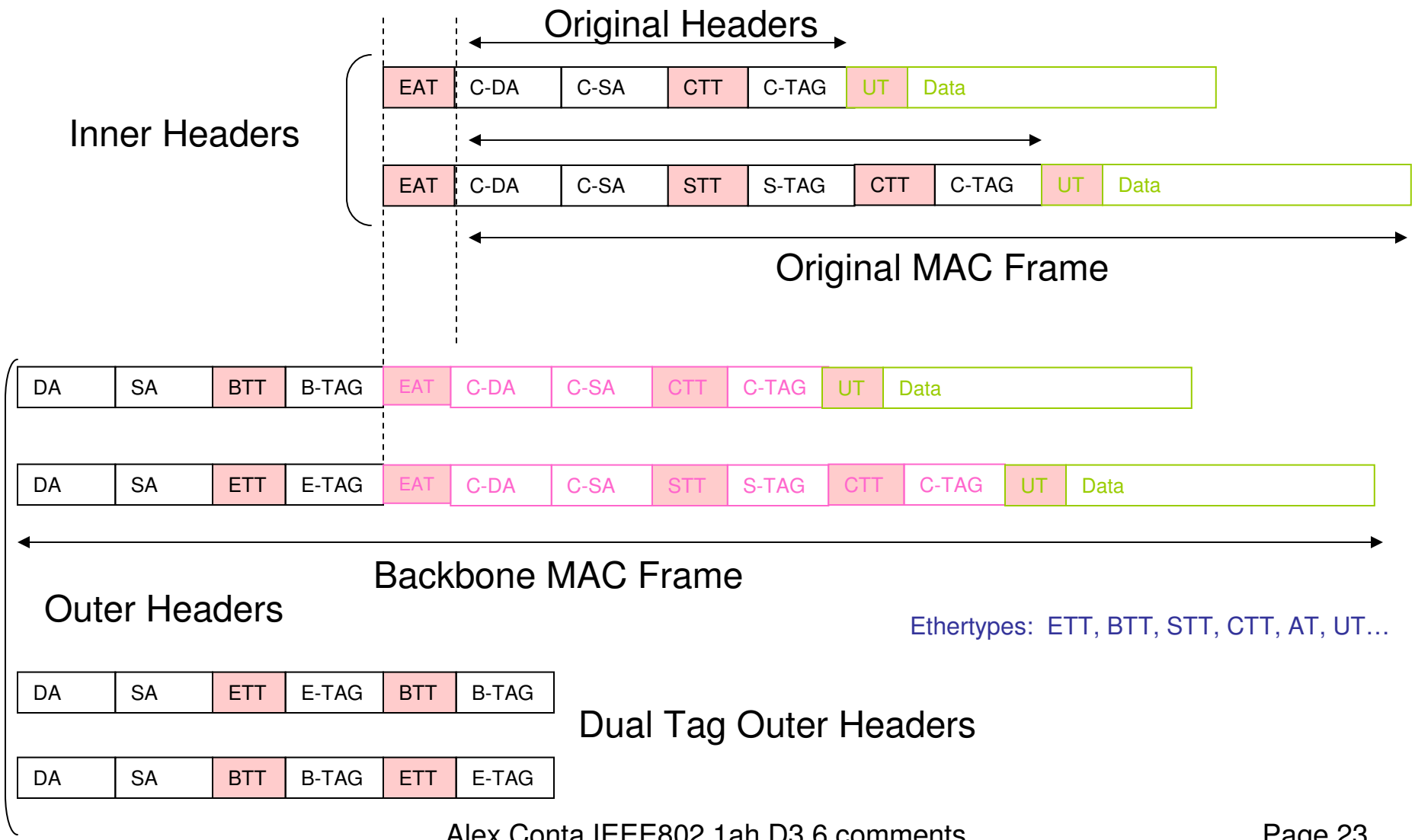


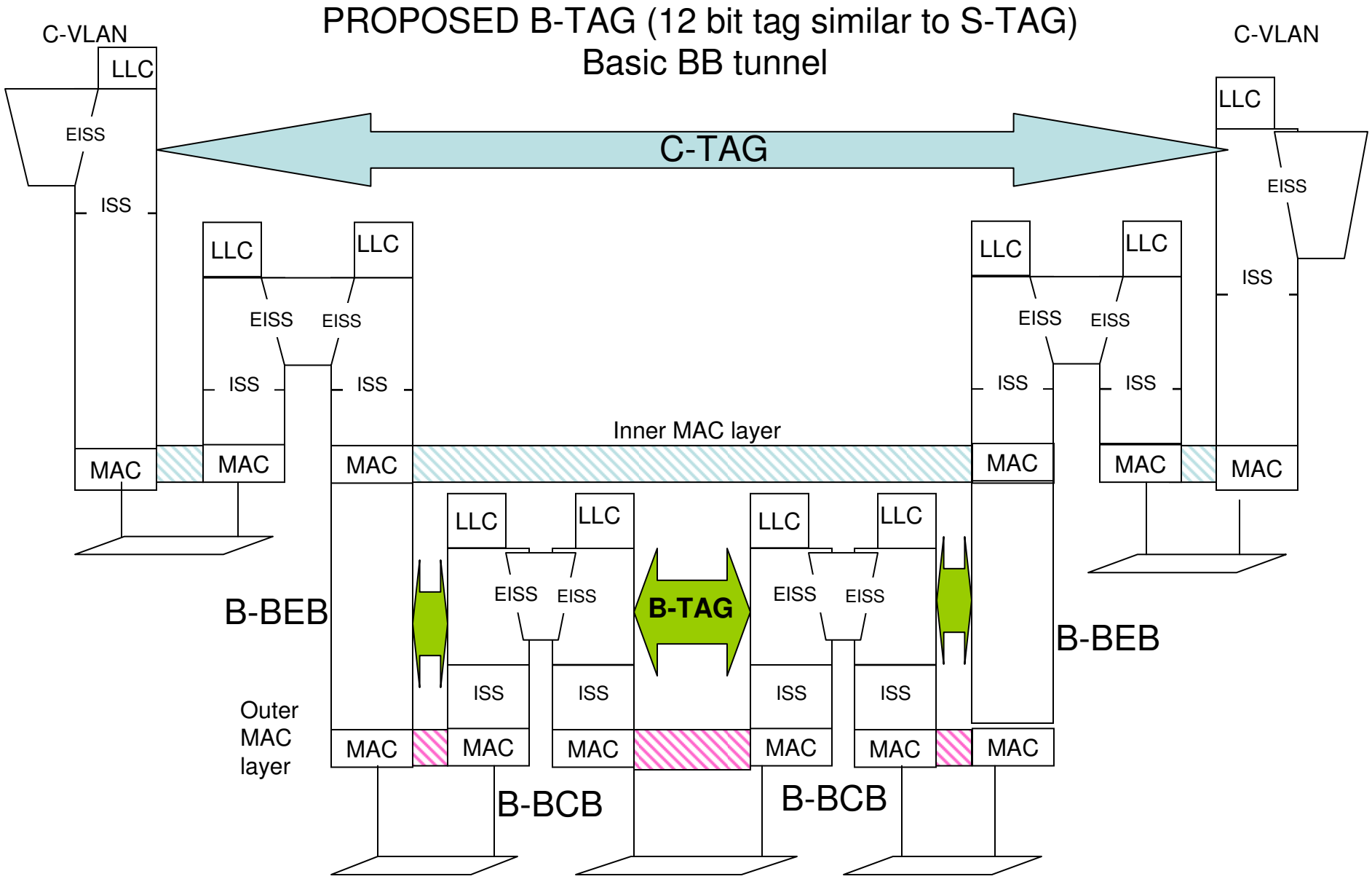
Extended Tag



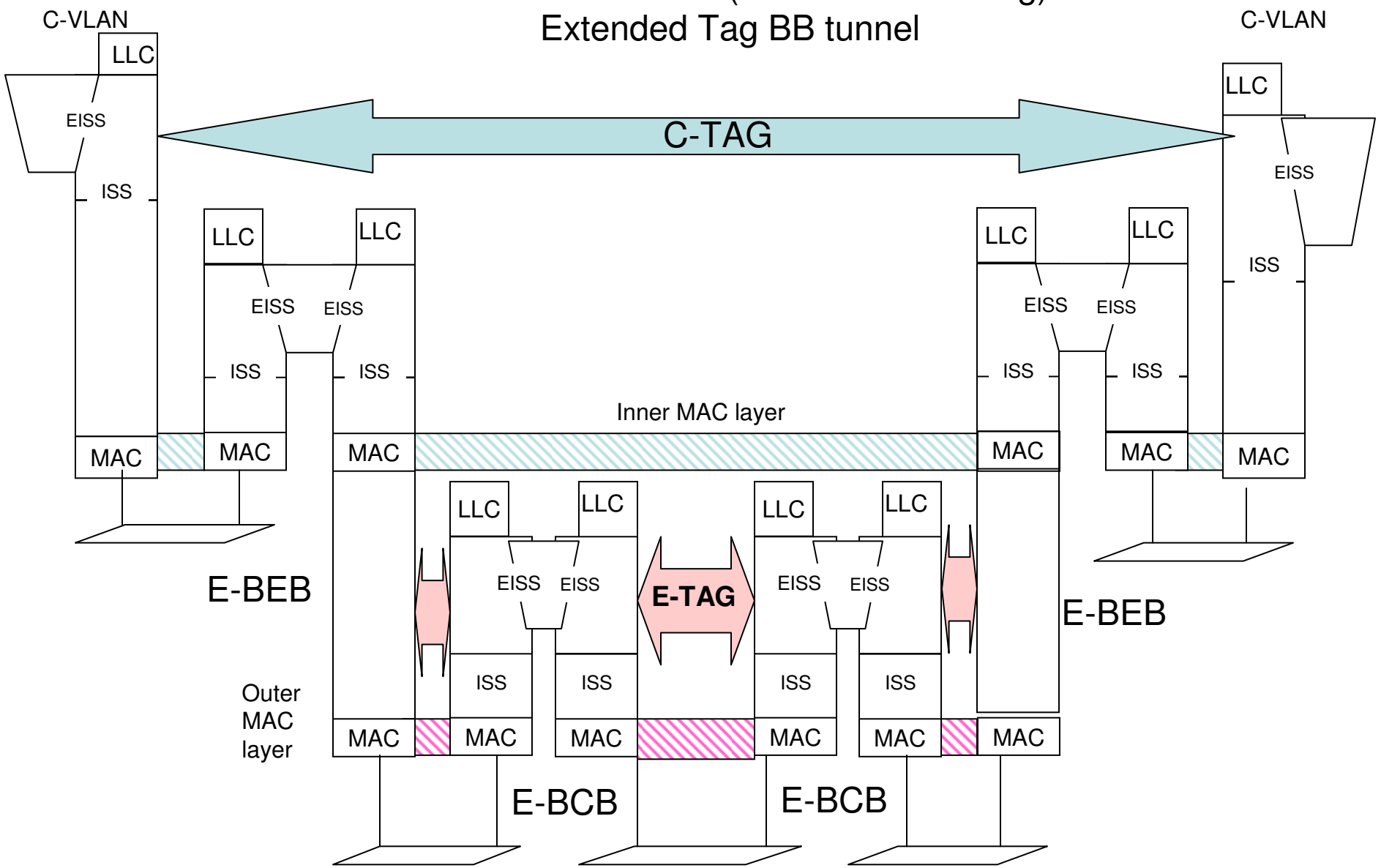
Inner MAC Addresses Header

Proposed use of Ethertypes and Headers

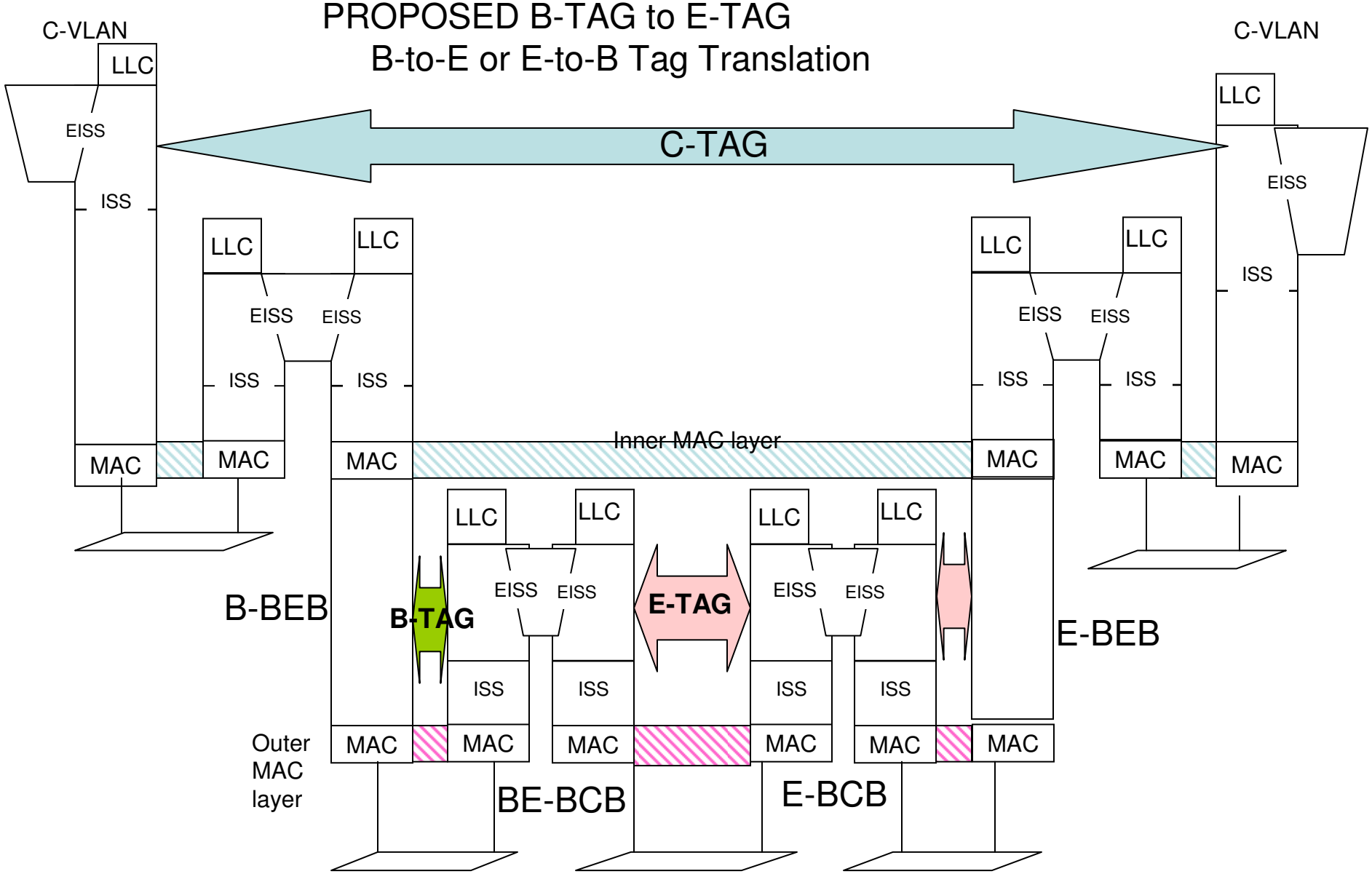


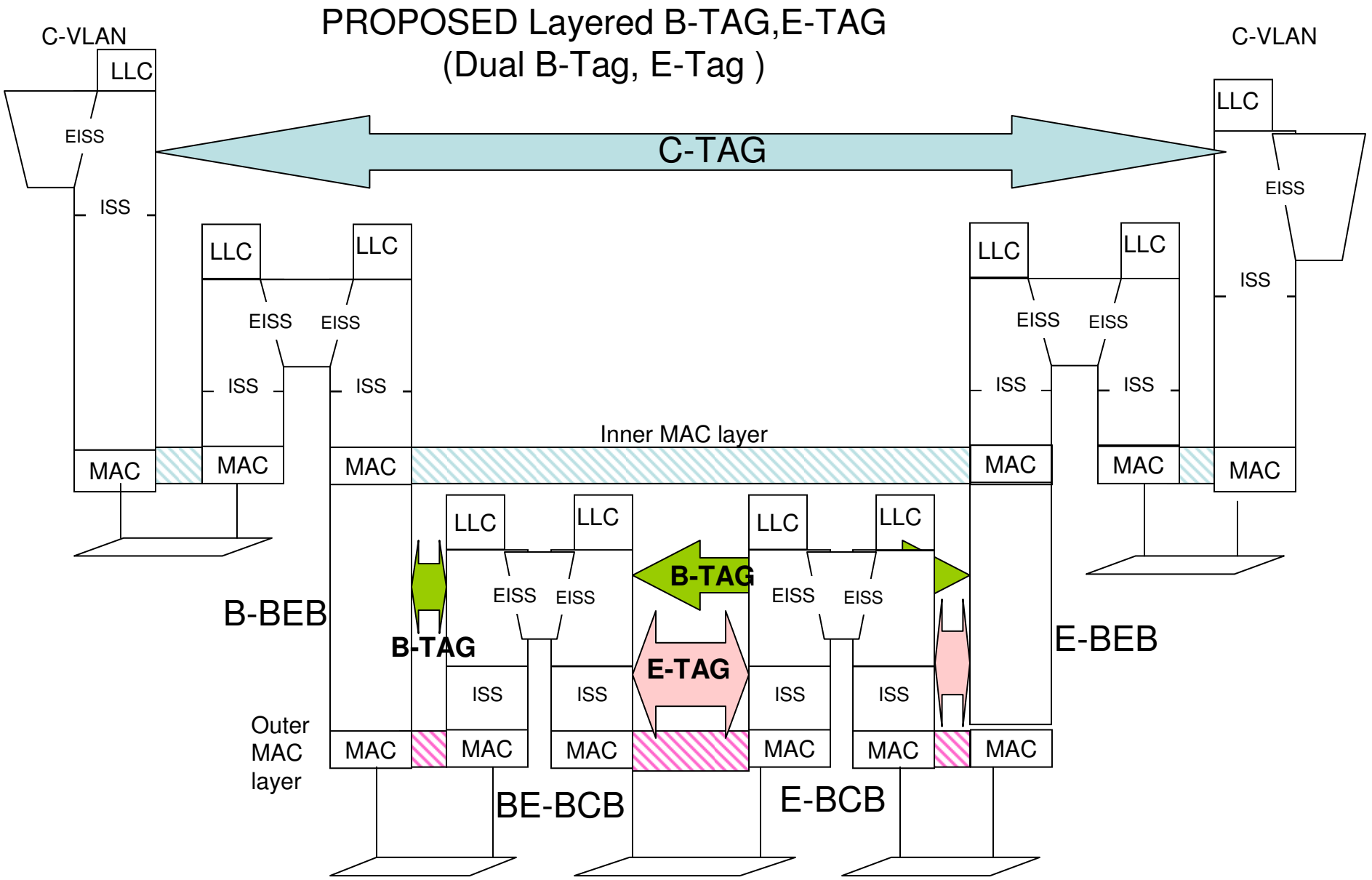

PROPOSED B-TAG (12 bit tag similar to S-TAG)
Basic BB tunnel
C-VLAN
C-VLAN
LLC
EISS
ISS
C-TAG
LLC
EISS
ISS
LLC
LLC
EISS
EISS
ISS
ISS
LLC
LLC
EISS
EISS
ISS
ISS
Inner MAC layer
MAC
MAC
MAC
MAC
MAC
MAC
LLC
LLC
LLC
LLC
EISS
EISS
EISS
EISS
B-TAG
B-BEB
B-BEB
ISS
ISS
ISS
ISS
Outer
MAC
layer
MAC
MAC
MAC
MAC
MAC
MAC
B-BCB
B-BCB

PROPOSED E-TAG (extended 24 bit tag)
Extended Tag BB tunnel



PROPOSED B-TAG to E-TAG
B-to-E or E-to-B Tag Translation




PROPOSED Layered B-TAG,E-TAG
(Dual B-Tag, E-Tag)
C-VLAN
C-VLAN
LLC
EISS
ISS
C-TAG
LLC
EISS
ISS
LLC
LLC
EISS
EISS
ISS
ISS
LLC
LLC
EISS
EISS
ISS
ISS
Inner MAC layer
MAC
MAC
MAC
MAC
MAC
MAC
B-BEB
B-TAG
B-TAG
E-TAG
E-BEB
Outer
MAC
layer
BE-BCB
E-BCB

Suggested types of ports

CIP Customer Instance Port – incoming/outgoing customer frames
PIP Provider Instance Port - encapsulate/decapsulate B-TAG
VIP Virtual Instance Port - encapsulate/decapsulate B-TAG,
PIP-E Provider Instance Port - encapsulate/decapsulate E-TAG, and/or B-TAG
VIP-E Virtual Instance Port - encapsulate/decapsulate E-TAG, and/or B-TAG
CBP Customer Backbone Port – translate E-TAG to B-TAG
PNP Provide Network Port - switching on B-TAG
PNP-E Provide Network Port - switching on B-TAG and/or E-TAG

Ports needed for basic BB tunnel (12 bit TAGs) – CIP, PIP/VIP, PNP
Ports needed for extended (24 bit TAG) BB tunnel – CIP, PIP/VIP-E, PNP-E

Translating E-TAG to B-TAG requires a CBP port

What is achieved?

•Clearer Separation between Addressing and Tagging
- clear separation of MAC Address based Identification from VLAN Tag based identification
- allows a separate growth path for nested MAC in MAC and multiple TAGs

•For Basic Tunnels, use B-TAG (4Ktags)

•Extended TAGs (24 bit) used only if needed – more than 4K backbone services

•Extended TAG (24 bit) used through the entire Backbone – extends # of backbone services beyond 4K.