PBB-TE Domain, Layers and Components Clarification

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Introduction

PBB-TE networking differs from PBB networking

Which elements of 802.1ah are to be modified in 802.1Qay?

Initial questions for clarification

❑ What is the interpretation of "domain" in the 802.1Qay PAR

❑ Which layers are present in a PBB-TE network

❑ Which components are present in PBB-TE BEB nodes

Several alternatives are presented for discussion

PBB-TE Domain Clarification

PBB-TE "will not take account of multi domain networks" (PAR)
- ❑ Three interpretations
  - single administrative domain, which may include one or more PBB-TE Networks
  - single PBB-TE Network with IB-BEB, I-BEB, B-BEB and PB nodes
  - single PBB-TE Network with IB-BEB and PB nodes only (i.e. no I-BEBs)
- ❑ Interpretation on 802.1 mailing list, June 29, 2007
  - Network with PBs and IB-BEBs only
  - S-LAN and B-LAN interfaces, no I-LAN

PBB-TE Layers Clarification
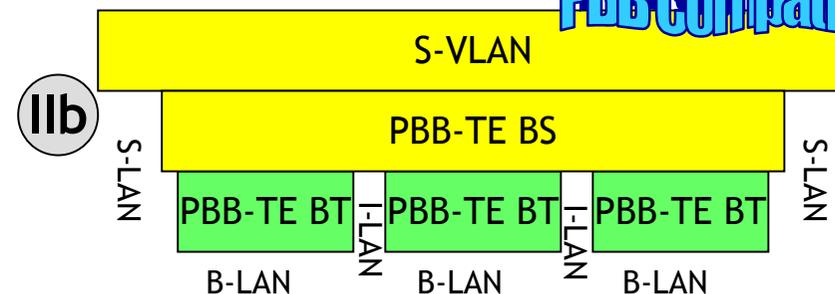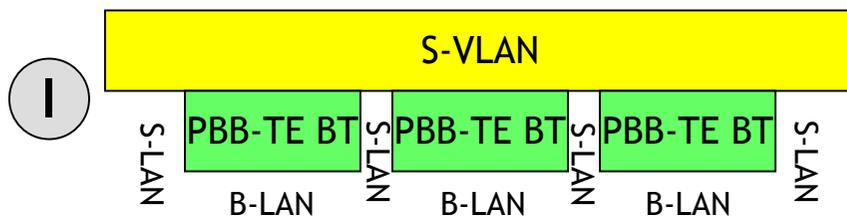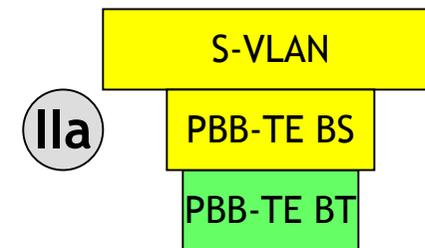
How many PBB-TE layers?

❑ Two alternatives

  • **One PBB-TE layer** performing a backbone tunnel (BT) layer role
    – layer stack includes S-VLAN + PBB-TE BT layers

  • **Two PBB-TE layers** performing backbone service (BS) and backbone tunnel (BT) layer roles
    – layer stack includes S-VLAN + PBB-TE BS + PBB-TE BT layers

❑ S-VLAN + PBB-TE BT (I)

  • S-VLAN layer acts as Service Layer; p2p and mp services

  • PBB-TE BT layer acts as Tunnel Layer; p2p tunnels

❑ S-VLAN + PBB-TE BS + PBB-TE BT (IIa, IIb)

  • S-VLAN layer acts as Service Layer; p2p and mp services

  • PBB-TE BS layer acts as Backbone Service Layer; p2p services

  • PBB-TE BT layer acts as Backbone Tunnel Layer; p2p tunnels
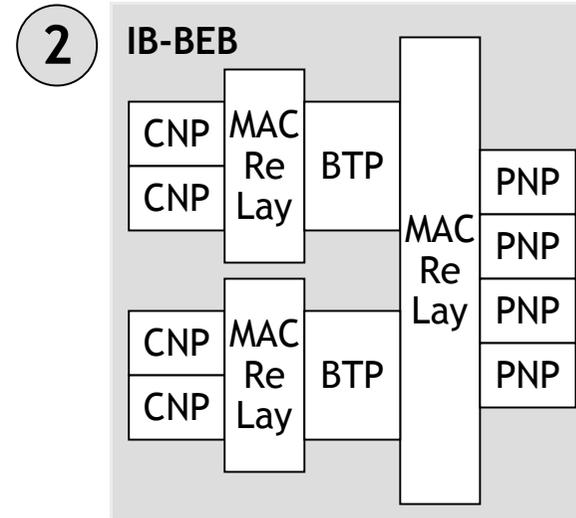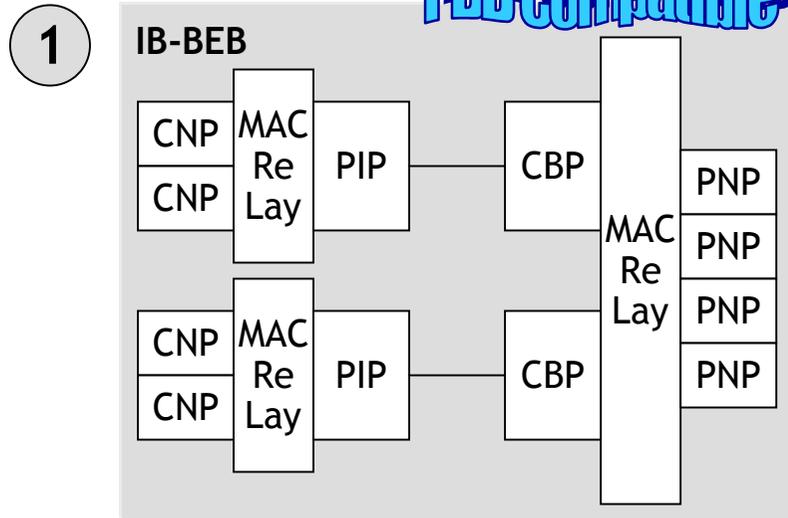

IIa
- S-VLAN
- PBB-TE BS
- PBB-TE BT

I
- S-VLAN
- S-LAN | PBB-TE BT | S-LAN | PBB-TE BT | S-LAN | PBB-TE BT | S-LAN
- B-LAN | B-LAN | B-LAN

IIb
- S-VLAN
- PBB-TE BS
- S-LAN | PBB-TE BT | I-LAN | PBB-TE BT | I-LAN | PBB-TE BT | S-LAN
- B-LAN | B-LAN | B-LAN

PBB Compatible

PBB-TE Components Clarification
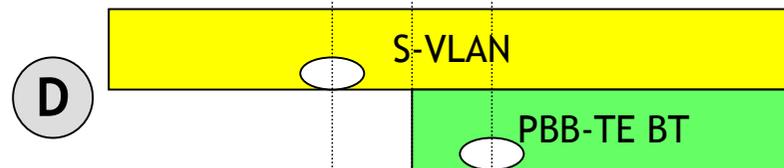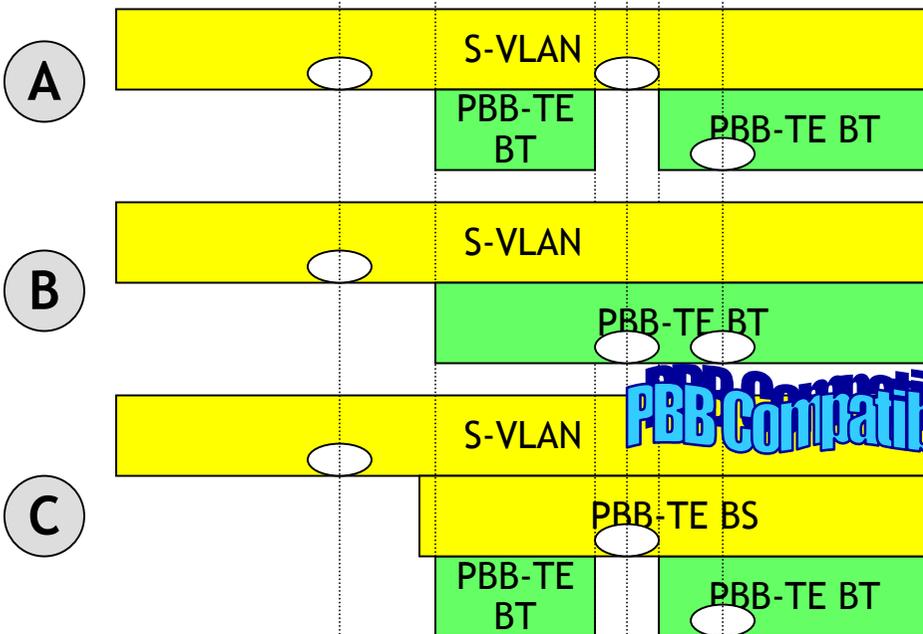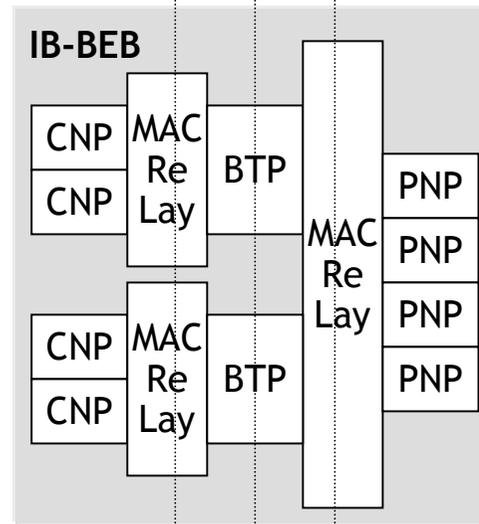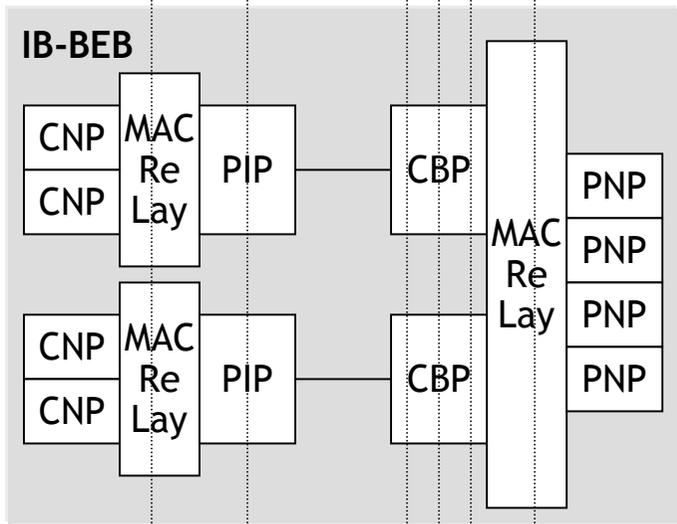
IB-BEB Components

❑ Two alternatives

- Separate I-Component and B-Component interconnected via clause 6.14 shims
  - Supports two PBB-TE (BS and BT) layers case
  - Supports one PBB-TE (BT) layer case
- Single B-Component with integrated "PIP/CBP" function (Backbone Tunnel Port (BTP))
  - Supports one PBB-TE (BT) layer case

PBB Compatible

① IB-BEB

CNP	MAC Re Lay	PIP		CBP		
CNP					PNP	
					PNP	
				MAC Re Lay	PNP	
CNP	MAC Re Lay	PIP		CBP	PNP	
CNP						

② IB-BEB

| CNP	MAC Re Lay	BTP		
CNP			PNP	
			PNP	
		MAC Re Lay	PNP	
CNP	MAC Re Lay	BTP	PNP	
CNP				

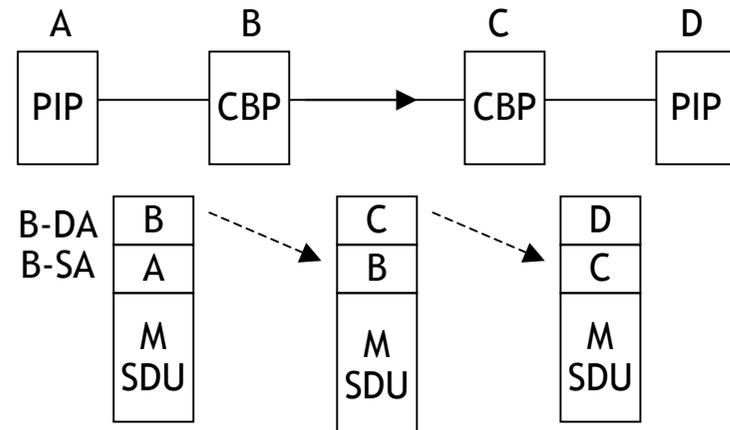# PBB-TE Components and Layers
Four Alternative Combinations

A: PBB-TE BT Instances terminate in CBP
(Extra PBB-TE BT Instance between PIP and CBP
S-VLAN switch (Service Instance Table) in CBP)

B: PBB-TE BT Instances terminate in PIP
(PBB-TE BT switch in CBP)

C: PBB-TE BS Instances terminate in PIP,
PBB-TE BT Instances terminate in CBP
(Extra PBB-TE BT Instance between PIP and CBP
PBB-TE BS switch (Service Instance Table) in CBP)

D: PBB-TE Instances terminate in BTP

PBB-TE Components and Layers
## *Alternative A*
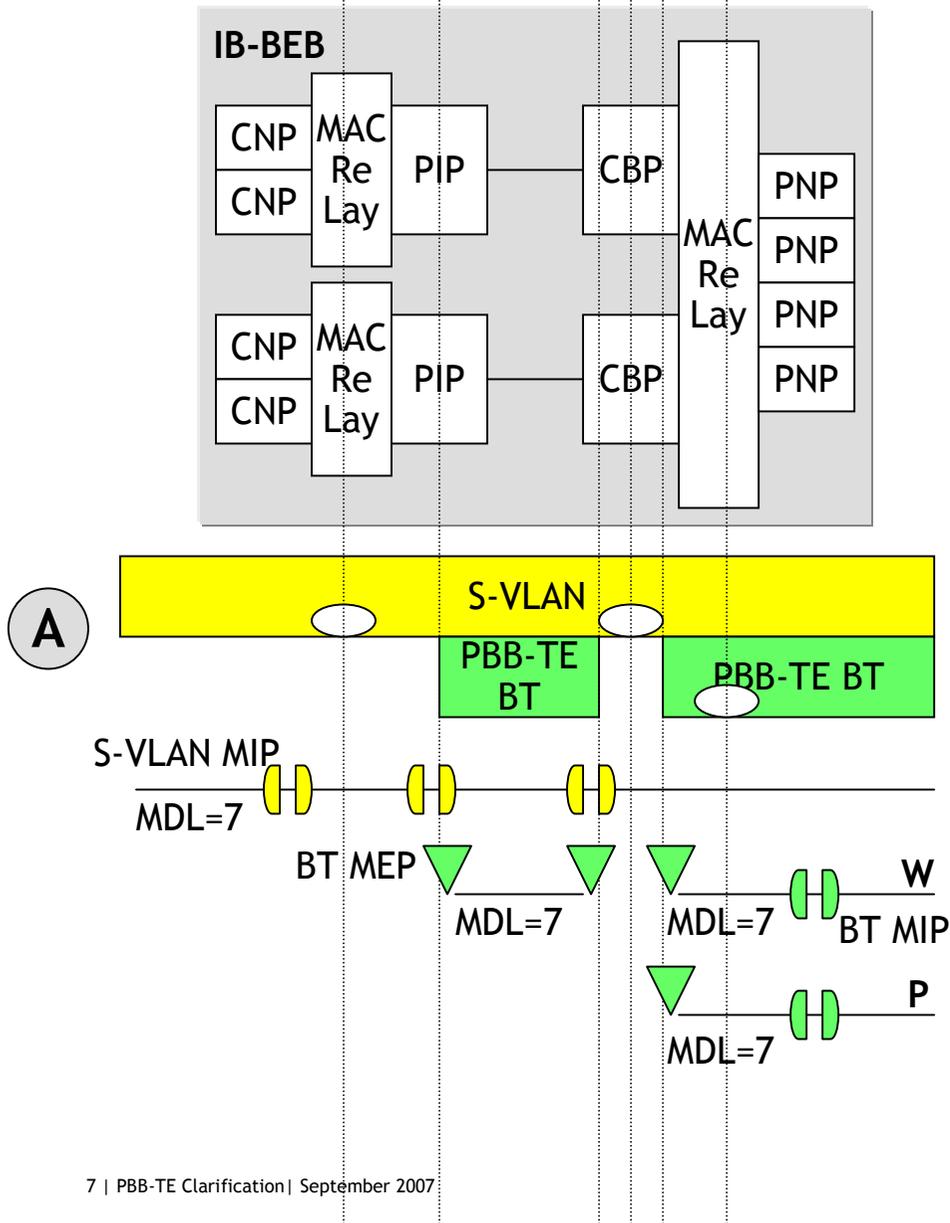
- S-VLAN over BT, no BS layer
- not compatible with PBB model
- additional BT connection between PIP and CBP
  - BT label: B-DA+B-SA, no B-VID!
  - B-DA/SA carry PIP and CBP addresses
- BT connections between CBPs
  - BT label: B-DA+B-SA+B-VID
  - B-DA/SA carry CBP addresses
- CBPs strip off B-DA/SA, forward S-VLAN frame, insert new B-DA/SA
- CBPs extended with S-VLAN protection, switching groups of S-VLANs (load sharing)

PBB-TE Components and Layers
Alternative B
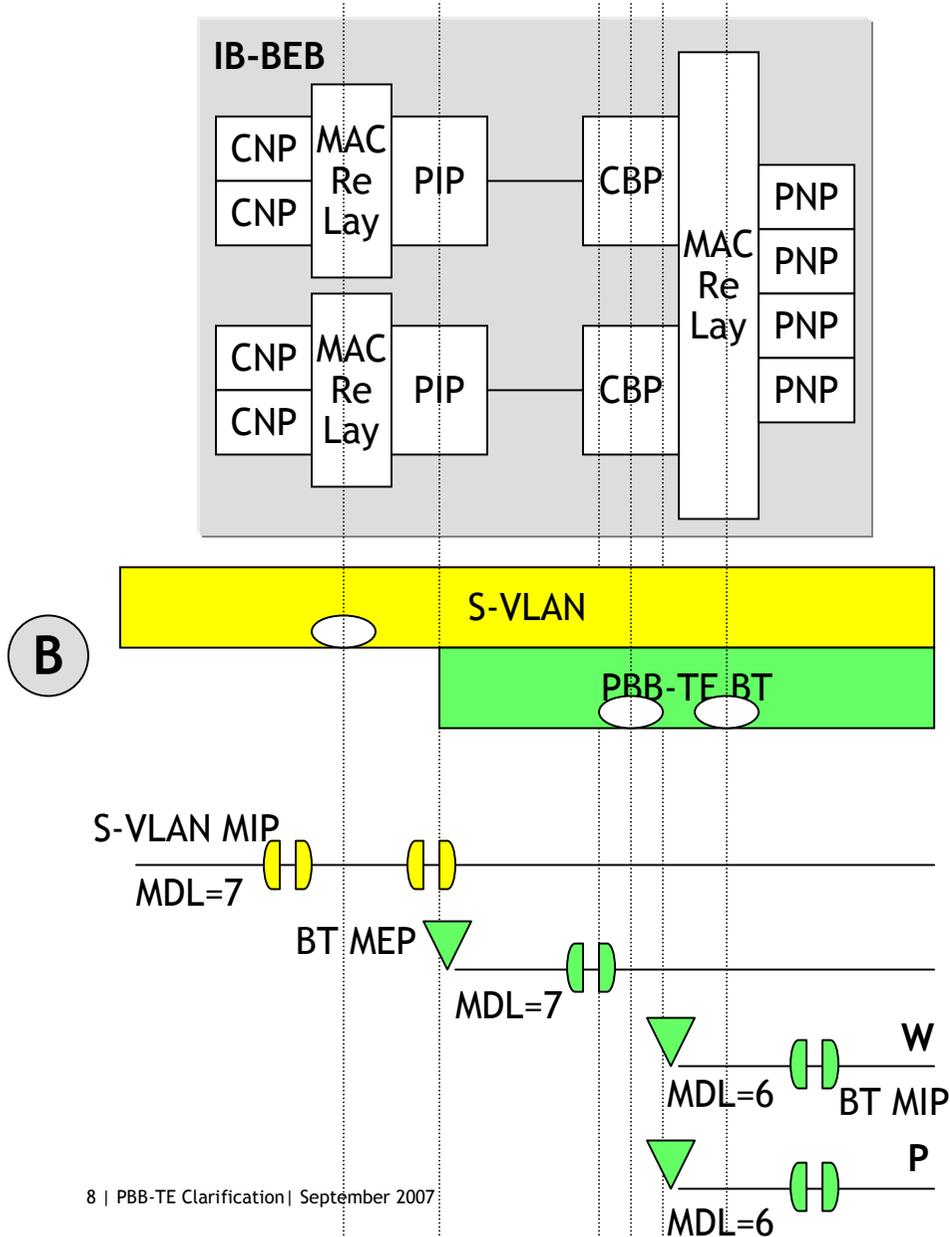
- S-VLAN over BT, no BS layer
- not compatible with PBB model
- BT endpoint in PIP, replacing the PBB BS endpoint
- service switch function in PBB CBP (Service Instance Table) replaced by tunnel (BT) switch function supporting protection (with load sharing)
  - must pass through untagged frames (BT OAM)
- extra BT MD level to monitor working/protection connections
- 1+1 or 1:1 SNC Protection (no load sharing) or Tunnel Aggregation (TAG) (load sharing)
  - Tunnel Aggregation, a kind of LAG/ECMP for the BT
  - selection based on ISID and BT OAM
- BT MIP in CBP, replacing PBB BS MIP

PBB-TE Components and Layers
Alternative C
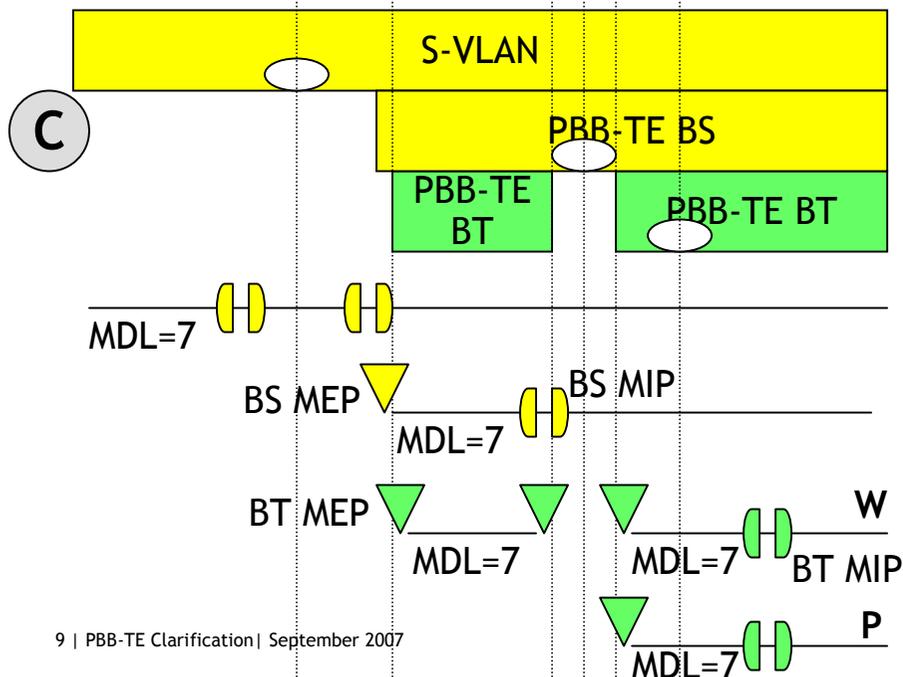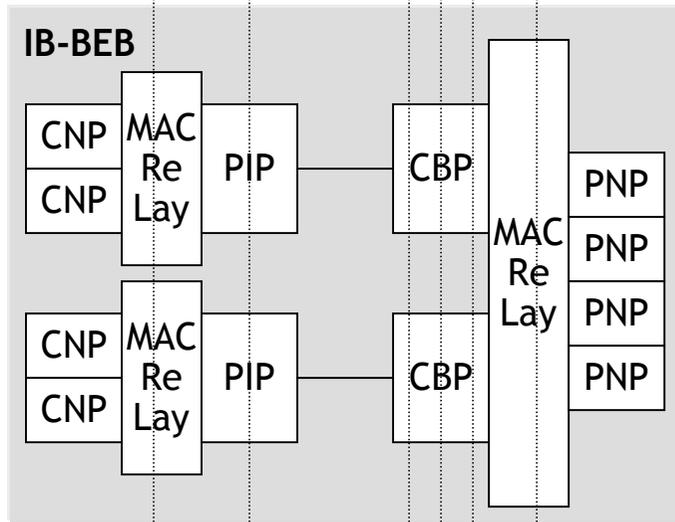
- ❑ PBB compatible model
  - • S-VLAN is customer service layer
  - • PBB BSI ⇔ PBB-TE BS
  - • PBB B-VLAN ⇔ PBB-TE BT
- ❑ mixed PBB/PBB-TE operation supported on PIPs and CBPs
- ❑ additional BT connection between PIP and CBP
  - • see alternative A
- ❑ BT connections between CBPs
  - • see alternative A
- ❑ CBPs strip off B-DA/SA, forward BS-frame, insert new B-DA/SA/VID
- ❑ service switch function in CBP (Service Instance Table) extended with BS protection switch function, switching groups of BS signals (load sharing)

PBB-TE Components and Layers
Alternative D
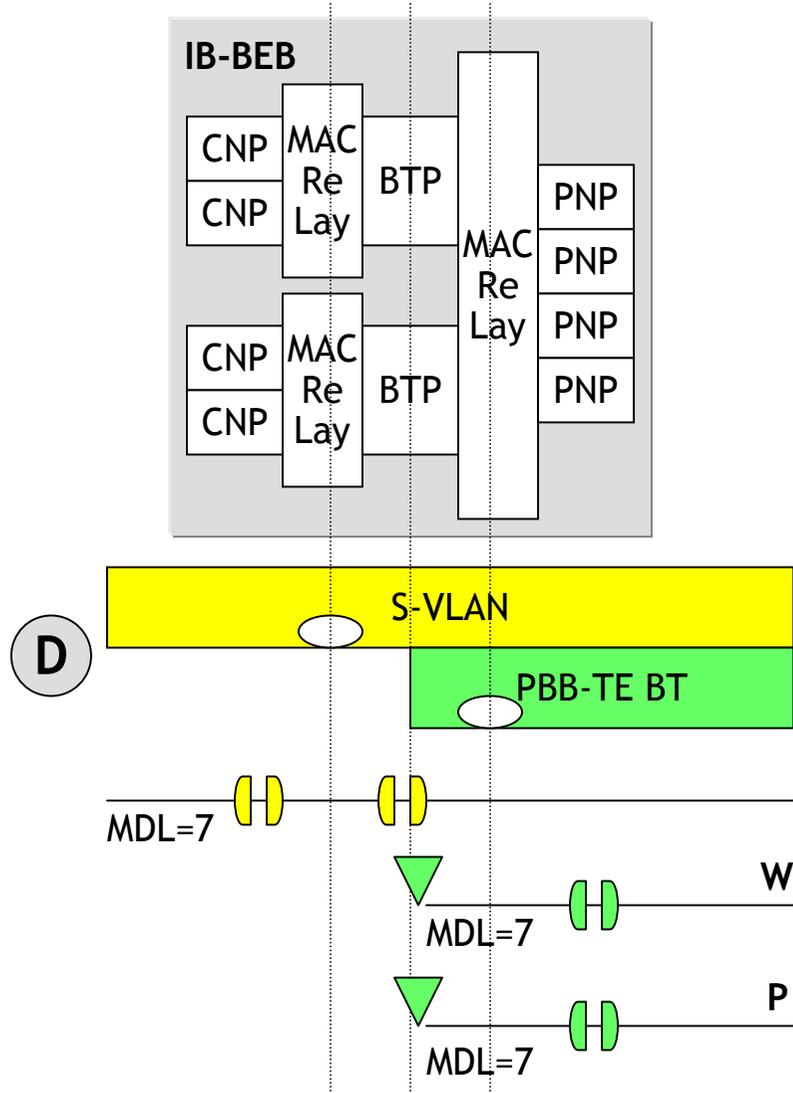
- minimized complexity model
- single service layer (S-VLAN) in provider network
- S-VLAN MAC Relay extended with S-VLAN protection switch function, switching groups of S-VLAN signals
- BT layer with single MD level
- not PBB compatible
  - within scope of PBB-TE PAR?
  - S-VLAN MAC Relays and Service Instance Tables of PBB and PBB-TE must be co-located; in this alternative every Service Instance Table is replaced by S-VLAN MAC Relay function

Result of the discussion on Thursday 6 Sept 2007

## Domains and layers
❑ Alternative IIa is selected

Nodes
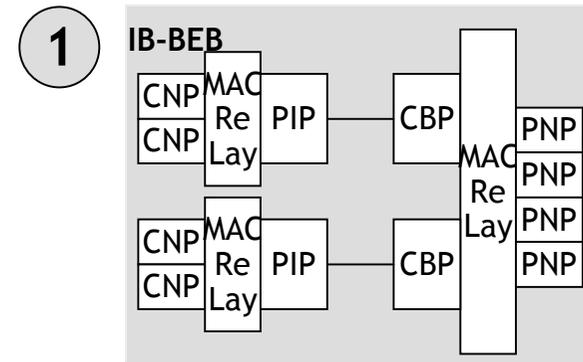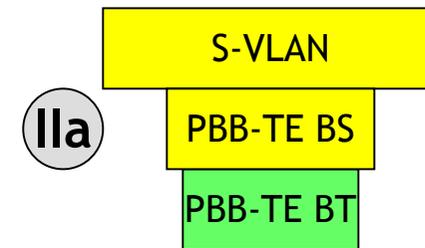❑ IB-BEB and BCB/PB

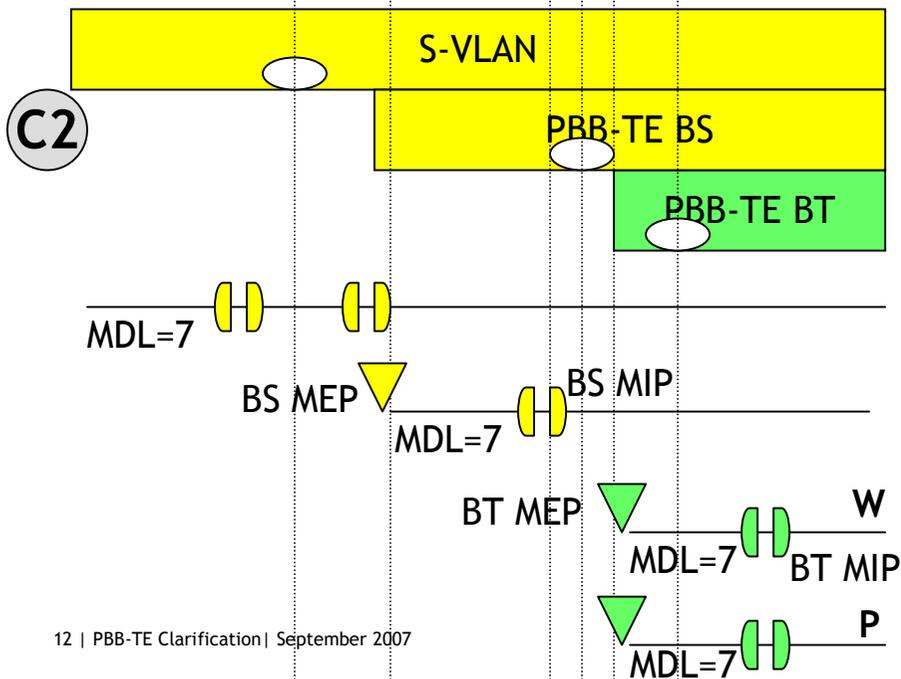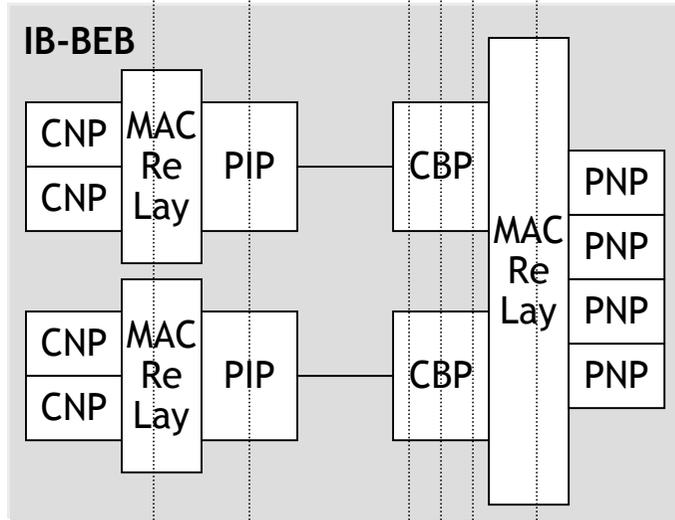## Components
❑ Alternative 1 is selected

MEPs and MIPs
❑ Variation of alternative C is selected (C2)
❑ C2: PBB-TE BT connection between PIP and CBP is removed

Investigate what additional functionality would be required when in future a multi-domain PBB-TE network is to be supported
❑ Such functionality is not required to support under this PAR
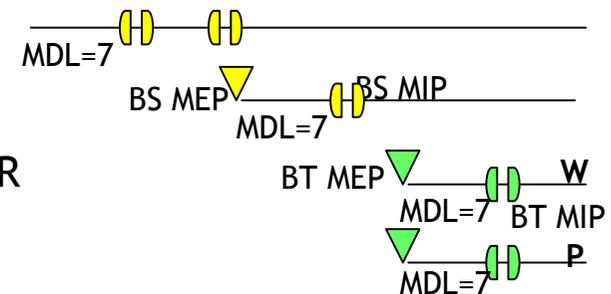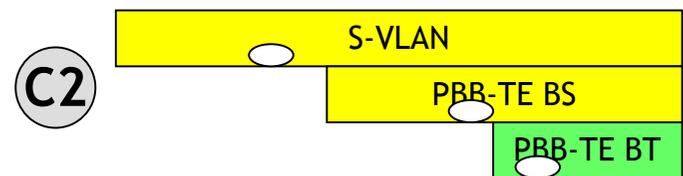
Alternative C2

- ❑ PBB compatible model
  - S-VLAN is customer service layer
  - PBB BSI ⇔ PBB-TE BS
  - PBB B-VLAN ⇔ PBB-TE BT
- ❑ mixed PBB/PBB-TE operation supported on PIPs and CBPs
- ❑ BT connections between CBPs
  - BT label: B-DA+B-SA+B-VID
  - B-DA/SA carry CBP addresses
- ❑ PIP-to-CBP interconnect is logical connection within IB-BEB
- ❑ PIP→CBP: CBPs forward received BS-frame and insert B-DA/SA/VID
- ❑ CBP→PIP: CBPs strip off B-DA/SA/VID in received BS-frame and forward BS-frame
- ❑ service switch function in CBP (Service Instance Table) extended with BS protection switch function, switching groups of BS signals (load sharing)