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

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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-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)
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