PBB/PBB-TE Layer Stack

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Introduction

PBB and PBB-TE coexist on

- provider backbone networks
- provider backbone LAN interfaces
- provider backbone networks network management
- I-Components
- B-Components
- BCB nodes

What will be the layer stack of such network and its interfaces
“Alternative C2”

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”

Characteristics

- 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)
Layer Stack PBB and PBB-TE for “Alternative C2”

- c6.9 shim config’d with “Allow Only VLAN Tagged Frames” and VIP not a member of “untagged set”
- c6.9 shim config’d with “Allow Only Untagged & Priority-Tagged Frames” and VIP member of “untagged set”
- future extension; separate I-BEB and B-BEB

PBB and PBB-TE have different S-Space domains !!
Layer Stack PBB and PBB-TE for “Alternative C2”

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PBB Signals

destination_address/source_address parameters represented as fields

Untagged PBB BSI frame

I-Tagged PBB BSI frame

I-Tagged PBB B-VLAN frame

B-Tagged PBB B-VLAN frame
PBB-TE Signals ("Alternative C2")

destination_address/source_address parameters represented as fields

Untagged PBB-TE BS frame

PBB-TE BS OAM

ETH OAM PDU

TYPE 0x8902

MSDU

C-SA

SA

C-DA

DA

I-SID

RES1+2

NCA=0

I-DEI

I-PCP

I-Tagged PBB-TE BS frame

PBB-TE BS Tag

I-TPID Ox????

I-Tagged PBB-TE BS frame

PBB-TE BT OAM

ETH OAM PDU

TYPE 0x8902

MSDU

C-SA

SA

C-DA

DA

I-SID

RES1+2

NCA=0

I-DEI

I-PCP

I-TPID Ox????

B-Tagged PBB-TE BT frame

PBB-TE BT Tag

T-VID

T-DEI

T-PCP

T-TPID Ox????

T-SA

T-DA

T-VID

T-DEI

T-PCP

T-TPID Ox????

T-SA

T-DA

Untagged PBB-TE BT frame
PBB and PBB-TE Signal comparison (I)

- Untagged PBB BSI frame includes B-DA, B-SA and TYPE fields
- Untagged PBB-TE BS frame does not include B-DA, B-SA and TYPE fields

- PBB BSI has two Tag formats
  - One for OAM frames, including C-SA and C-DA fields with value all-0’s
  - One for non-OAM frames, which removes the “Encapsulated Addresses” TYPE field when inserted

- PBB-TE BS has single Tag format
  - Applicable for both OAM and non-OAM frames

- PBB MAC-in-MAC (PBB-MiM) process learns B-MAC ↔ C-MAC relation
- B-DA is a function of C-DA

- PBB configures SVID ↔ ISID relation
- PBB-TE configures SVID ↔ ISID relation
PBB and PBB-TE Signal comparison (II)

- Untagged PBB B-VLAN frame includes B-DA and B-SA fields
- Untagged PBB-TE BT frame does not include B-DA and B-SA fields
- PBB-TE BT Tag includes T-DA and T-SA fields

- PBB-TE MAC-in-MAC (PBB-TE-MiM) process does not learn T-MAC⇔C-MAC relation
- T-DA is not a function of C-DA

- PBB configures ISID⇔BVID relation
- PBB-TE configures ISID⇔TVID+TMAC relations
Layer Stack PBB and PBB-TE for “Alternative C2”

**B-LAN**
Layer Stack PBB and PBB-TE for “Alternative C2”

Future I-LAN
PIP function in PBB and PBB-TE for "Alternative C2"

Decomposed PIP view

**PIP function in PBB**

- MAC Relay Entity (Clause 8)
  - Support of the EISS (6.9)
  - VIP-ISS
  - VIP-ISS
  - VIP-ISS

**PIP function in PBB-TE**

- MAC Relay Entity (Clause 8)
  - Support of the EISS (6.9)
  - VIP-ISS
  - VIP-ISS
  - VIP-ISS

**replacement functions in future PBB-TE I-LAN within multi-domain PBB-TE**

- PBB-TE Support of the (I-Tagged) EISS
- Support of the ISS-TE

**Support of the (I-Tagged) EISS**

- 6.7 or 6.14
CBP function in PBB and PBB-TE for “Alternative C2”

Decomposed CBP view

CBP function in PBB

- MAC Relay Entity (Clause 8)
  - EISS
  - ISS
  - Support of the ISS (6.7 or 6.14)
- EISS Multiplex Entity
  - Support of the (I-Tagged) EISS*
  - ISS
  - Support of the (I-Tagged) EISS*
- Backbone Service Instance Switch
- Support of the (I-Tagged) EISS

CBP function in PBB-TE

- MAC Relay Entity (Clause 8)
- EISS-TE Multiplex Entity
- ISS-TE
  - PBB-TE Support of the (I-Tagged) EISS*
  - ISS-TE
  - Support of the (I-Tagged) EISS*
  - PBB-TE Support of the (I-Tagged) EISS*
- PBB-TE Backbone Service Switch
  - EISS
- PBB-TE Support of the (I-Tagged) EISS
  - ISS-TE
  - Support of the ISS-TE (6.7 or 6.14)

Replacement functions in future PBB-TE I-LAN within multi-domain PBB-TE

Replacement functions in future PBB-TE I-LAN within multi-domain PBB-TE

Support of the ISS (6.7 or 6.14)
PBB and PBB-TE shim stacks

Different position of MAC Encapsulation functions

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Illustrating difference between B-MAC and T-MAC

PBB B-Service over PBB-TE B-Tunnel
Layer Stack “PBB B-Service over PBB-TE B-Tunnel”
Another alternative as illustration for B-MAC/T-MAC difference

Another alternative layer stack for PBB-TE could have been PBB BSI layer on top of PBB-TE BT layer

- multipoint-to-multipoint Backbone VLAN in PBB is replaced by set of point-to-point Backbone Tunnels in PBB-TE

B-MAC address identifies endpoint of a Backbone Service Instance (I-Component)
T-MAC address identifies endpoint of a Backbone Tunnel instance (B-Component)

PBB and PBB-TE S-Space domains are the same!
PBB-TE has additional T-Space domain!
Layer Stack “PBB B-Service over PBB-TE B-Tunnel”

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PBB/PBB-TE Signals for “PBB B-Service over PBB-TE B-Tunnel”

destination_address/source_address parameters represented as fields

Untagged PBB BSI frame

PBB BSI non-OAM Tag

OAM Tag

PBB BSI

OAM

MSDU

C-SA

C-DA

TYPE
0x<EA>

B-SA

B-DA

I-SID

RES1+2

NCA=0

I-DEI

I-PCP

I-TPID

0xITAG

PBB BSI

non-OAM Tag

OAM Tag

MSDU

C-SA

C-DA

TYPE
0x8902

C-SA=0

C-DA=0

MSDU

PBB-TE BT frame

B-SA

B-DA

TYPE
0x<EA>

TYPE
0x8902

B-Tagged PBB-TE BSI frame

PBB BSI

OAM

MSDU

B-SA

B-DA

I-SID

RES1+2

NCA=1

I-DEI

I-PCP

I-TPID

0xITAG

PBB-TE

BT OAM

ETH OAM PDU

TYPE
0x8902

C-SA=0

C-DA=0

I-SID

RES1+2

NCA=1

I-DEI

I-PCP

I-TPID

0xITAG

Untagged PBB-TE BT frame

PBB-TE BT Tag

B-Tagged PBB-TE BT frame

B-SA

B-DA

TYPE
0x<EA>

TYPE
0x8902

T-VID

T-DEI

T-PCP

T-TPID

0x????

T-SA

T-DA

B-SA

B-DA

T-VID

T-DEI

T-PCP

T-TPID

0x????

T-SA

T-DA