IEEE802.1Qay

Current Status
PBB-TE Current Status

- Draft P802.1Qay/D2.0 is the second draft to enter a Task Group. Ballot closed on March 11\textsuperscript{th}
- Aim is to enter a Sponsor Ballot in the 2\textsuperscript{nd} quarter of 2009
  - 7 more meetings till March 2009
  - One new draft version per meeting
P802.1Qay/D2.0 major new items

- The addition of the TE Service Instance Multiplex Entities and related changes on the CFM operation;
- Addition of the Load sharing functionality;
- Updates on the main 1:1 Protection Switching operation;
- Updates on PBB-TE terminology; and
- A number of editorial changes.
- It still lacks MIB support.
Ballot statistics

- 73 members have answered (the current total number of voting members is 98)
- 29 members have sent disapprove ballots (same number as in previous ballot)
  - 44 abstained
- A total of 424 comments have been sent

<table>
<thead>
<tr>
<th></th>
<th>1st TG Ballot</th>
<th>2nd TG Ballot</th>
</tr>
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<tbody>
<tr>
<td>TR</td>
<td>221</td>
<td>50.80%</td>
</tr>
<tr>
<td>T</td>
<td>36</td>
<td>8.28%</td>
</tr>
<tr>
<td>ER</td>
<td>121</td>
<td>27.82%</td>
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<tr>
<td>E</td>
<td>54</td>
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<td>Other</td>
<td>3</td>
<td>0.69%</td>
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Major comments

- TE service instance definition
- MIBs
- TE service instance multiplexer
- Loopback
- G.8031
- Protection Switching State machine changes
- Managed objects for the PS state machine
- Load sharing issues
- Load sharing method choice
Definitions/ESP

- **ESP**: A provisioned traffic engineered unidirectional connectivity path between CBPs that extends over a PBBN. The path is identified by a 3-tuple `<ESP-MAC DA, ESP-MAC SA, ESP-VID>`, where ESP-MAC DA, and ESP-MAC SA are MAC addresses and ESP-VID is a VID allocated to TE-MSTID. An Ethernet Switched Path is point-to-point or point-to-multipoint.

- **Point to point ESP**: An ESP where the ESP-MAC DA and the ESP-MAC SA in its 3-tuple identifier are individual MAC addresses.

- **Point to multipoint ESP**: An ESP between one root CBP to n leaves CBPs, identified by a 3-tuple where the ESP-MAC DA is a group MAC address identifying the n leaves CBPs, and the ESP-MAC SA is the individual MAC address of the root.
Definitions/TE service instance

- **TE service instance**: An instance of the MAC service provided by a set of ESPs and identified by TE-SID, forming a bidirectional service. A TE service instance is point to point or point to multipoint.

- **Point to point TE service instance**: An instance of the MAC service provided by two co-routed point-to-point ESPs forming a bidirectional service where the ESPs' endpoints have the same CBP MAC addresses.

- **Point to multipoint ESP**: A TE service instance provided by a set of ESPs which comprises one point-to-multipoint ESP from a root to each of n leaves plus n point-to-point ESPs, routed from each of the n leaves to the root along the branches of the point-to-multipoint ESP.
Definitions/Other

- **TE-SID:** An implementation dependent identifier of the TE service instance which corresponds to a series of 3-tuples \(<\text{ESP-MAC DA, ESP-MAC SA, ESP-VID}>\), each one identifying one of the TE service instance's component ESPs. The TE-SID is not used as a tag parameter.

- **TE:** Traffic Engineering (TE) is the process that controls the traffic through a network, in order to optimize the resource utilization and to ensure respect of quality of service objectives for each defined class of service.

- **Co-routed paths:** Two paths are co-routed if they traverse exactly the same bridge ports in the bi-partite graph that describes the active topology, but in the reverse order, within known bounded time after the last change in active topology.
MIBs

- Subclause 17 will be updated in the next P802.1Qay draft.
TE SI Multiplex Entity

- **Up TE Service Instance Multiplex Entity**
  - Single SAP -> Multiplexed SAPs: selection based on SA
- **Down TE Service Instance Multiplex Entity**
  - Single SAP -> Multiplexed SAPs: selection based on DA
- Frame parameters remain unchanged in Single SAP <-> Multiplexed SAP
Figure 26-8—PBB-TE MEP placement in a CBP
PtMP/PtP (Destination Address)
PtMP/PtP (VID)

<CBP-G, CBP-1, ESP-1>
<CBP-1, CBP-3, ESP-2>
<CBP-1, CBP-4, ESP-3>

<CBP-1, CBP-4, ESP-2>
<CBP-4, CBP-1, ESP-1>
Updated TE SI Multiplex Entity

- *(Up & Down) TE Service Instance Multiplex Entity*
  - Single SAP -> Multiplexed SAPs: selection based on DA, SA and VID (the last check is not needed if we required all the return paths in a PtMP to use the same ESP-VID)

- Frame parameters remain unchanged in
  Single SAP <-> Multiplexed SAP
LBM in a PtMP MA

PtMP TE service instance:
- <CBP-G, CBP-1, ESP-1>
- <CBP-1, CBP-4, ESP-2>
- <CBP-1, CBP-3, ESP-3>
Updates in the PBB-TE MIP TLV

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Type = 9</td>
<td>1</td>
</tr>
<tr>
<td>Length</td>
<td>2 - 3</td>
</tr>
<tr>
<td>MIP MAC address</td>
<td>4 - 9</td>
</tr>
<tr>
<td>Reverse VID</td>
<td>10 - 11</td>
</tr>
<tr>
<td>Reverse MAC</td>
<td>12 - 17</td>
</tr>
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</table>

- In PBB-TE MEP associated with a point to multipoint MA
  - An LBM to an MHF has to carry a PBB-TE MIP TLV with the Reverse MAC field providing the MAC SA to be used by the associated LBR
Figure 26-12—Protection Switching State Machine
PS with load sharing

- Protection Group is configured with
  - A reference to one PBB-TE MA -> working entity
  - A reference to one (but can be extended to a list of PBB-TE MAs) -> protection entity(-ies)
- A list of services protected by a Protection Group defined by their I-SID values
- For each I-SID in the protection group the following is provided
  - Preferred PBB-TE MA: by default the PBB-TE MA associated with the working entity, can be configured to be any of the PBB-TE MAs in the Protection Group
  - Alternate PBB-TE MAs: by default the PBB-TE MA associated with the highest priority protection entity, can be configured to be any of the PBB-TE MAs in the Protection Group
BSI Table for PS with load sharing

<table>
<thead>
<tr>
<th>Protected Group</th>
<th>“Working” PBB-TE MA</th>
<th>Protection1 PBB-TE MA</th>
<th>Protection2 PBB-TE MA</th>
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</thead>
<tbody>
<tr>
<td>Protected Group</td>
<td>I-SID1</td>
<td>Preferred</td>
<td>Alternate</td>
</tr>
<tr>
<td>BSI2</td>
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<td>Preferred</td>
<td>Alternate</td>
</tr>
<tr>
<td></td>
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<td>Alternate</td>
<td>Preferred</td>
</tr>
<tr>
<td></td>
<td>I-SID4</td>
<td>Alternate</td>
<td>Preferred</td>
</tr>
</tbody>
</table>
PBB-TE 1:1 Protection Switching Example
Path state machine for working entity
Backbone service instance

BEGIN

PREFERRED
UsePreferred()

!pre.Available &&
a.Available

ALTERNATE
UseAlternate()

!a.Available