Proposed changes to support protection with load sharing

(page 70, line 45) Change section title to:

26.10 Protection S~~s~~witching for Point-to-Point PBB-TE ~~Trunks~~Services

(page 70, line 50) Edit paragraph as follows:

In contrast to PBB, spanning tree protocols and broadcasting/flooding are not used in PBB-TE. Filtering databases are populated using a network management system or a~~n enhanced~~ control plane, allowing Ethernet Switched Paths (ESPs) to be engineered and provisioned across the network. One of the key points addressed in PBB-TE is how to provide end-to-end linear protection for PBB-TE ~~trunks~~services, where either a dedicated protection PBB-TE trunk is established for one particular working PBB-TE trunk, and the traffic is automatically switched from the working (primary) PBB-TE trunk to the protection (backup) PBB-TE trunk when a failure occurs on the primary trunk, or two or more PBB-TE trunks are established over which backbone service instances are distributed and when a failure or partial failure occurs on one or more of the trunks traffic is automatically redistributed to the remaining operable trunks. In the descriptions that follow the protection mechanisms are described for two PBB-TE trunks.

(page 71, line 16) Change "two" to "three"

(page 71, line 20) Add item:

c) in the load sharing arrangement a portion of the traffic is sent on each path.

(page 71, line 21) Edit paragraph as follows:

In ~~both~~ each of the protection arrangements the receiving end selects traffic from the working and/or protection trunk based on information from Operations, Administration and Management (OAM) processes or network operators. In the 1 for 1 case the sending *protection bridge* and receiving *selector* ~~must~~ may be coordinated. In the load sharing case each of the trunks serves in both a working and protection role.

(page 71, line 30) Edit as follows:

In unidirectional linear protection schemes, the *protection bridges* and *selectors* at each end …

(page 71, line 50) Change "order faster" to "order of magnitude faster"

(page 72, line 1) Change "top" to "to"

(page 72, line 4) Add load sharing:

The description herein, defines and provides a scalable end-to-end resiliency mechanism that offers bidirectional end-to-end 1:1 linear protection capabilities with load sharing for PBB-TE ~~trunks~~ services in a PBB-TE region.

(page 72,line 9) Edit as:

Since spanning tree protocols are not used in PBB-TE, their use is excluded ~~from the onset~~ as a potential

(page 72, line 17) Add at the end of the pargraph:

The protection switching mechanism described here goes beyond the methods defined for circuit switching, taking advantage of PBB-TE's packet structure to allow load sharing and recovery from a partial failure of a PBB-TE trunk.

(page 73, line 1) Edit paragraph as follows:

The ESPs are provided by configuring entries in the Filtering Databases on all the Bridges that these ESPs need to pass through. On the terminating IB-BEBs, the VLAN membership of each participating port has to be configured for the B-components. In Figure 26-10, this is depicted by the color of the boxes that are placed inside each of the B-Component boxes. Each of ~~these colored boxes represent~~the PNPs and CBPs is a Bridge Port on ~~the~~ a B-component~~s~~. For example the upper right PN~~B~~P-1 port on the West B-component is a member of the VID-1 (black) VLAN, while the CBP-A port on the same component is a member of VID-2 (gray) and VID-4 (shaded gray) VLANs. Correspondingly in this example only VID-1 VLAN-tagged frames (black) can egress the top right PN~~B~~P-1 port and only VID-2 (gray) and VID-4 (shaded gray) VLAN-tagged frames can egress ~~from~~ the CBP-A port on the same B-Component.

(page 73, line 24) Edit paragraphs as follows:

Data traffic is mapped to a PBB-TE trunk by configuring the CBP parameters (6.11). In particular the CBP backbone ~~instance service~~service instance identifier is used to allow ~~only~~ specific service instances to be carried by ~~the~~ each PBB-TE trunk while the CBP's PVID parameter or the B-VID column (if it is supported) in the backbone service instance table are used to map the identified service instances to a specific ESP. The CBP's ~~B-~~PVID value is depicted in Figure 26-10 by the color of the box just outside the box representing the B-component.

Note: If the backbone service instance table is not used, load sharing is not supported as the CBP can map service instances to only one ESP to a destination at a given time using the PVID.

As a result customer frames that need to be transported by a traffic engineered PBB-TE trunk and are identified by a specific I-SID and reach the CBP on the West B-component from the left can be mapped to the black ESP or the shanded black ESP while frames on the same service that reach the CBP on the East B-component from the right will be mapped to the gray ESP or the shaded gray ESP. ~~This effectively means that~~If all service instances are normally mapped to the black ESP and gray ESP the~~n~~n PBB-TE trunk-1 would correspond to the working entity and PBB-TE trunk-2 to a stand-by protection entity in a 1 for 1 protection arrangement without load sharing. Irrespective of how the data traffic is mapped to the PBB-TE trunks, CCM frames are exchanged on both ~~the working and protected entities~~PBB-TE trunks in order to regularly check the provided connectivity.

If a fault occurs at any of the ESPs, the MEP on the receiving end will detect the fault and may also be notified by an intermediate node detecting a physical fault. In particular if a fault on the black ESP occurs, the MEP on the East B-component will declare a remote MEP defect by setting the rMEPCCMdefect parameter (20.19.1). The timer counter for timing out CCMs has a granularity finer than or equal to 1/4 of the time represented by the CCMinterval variable (20.8.1). A Bridge does not set rMEPCCMdefect within (3.25*CCMinterval) seconds of the receipt of a CCM, and sets rMEPCCMdefect within (3.5*CCMinterval) seconds after the receipt of the last CCM. The setting the rMEPCCMdefect parameter will result in a change of the ~~B-~~PVID parameter of the CBP or the appropriate B-VID entries in the backbone service instance table from the gray VID-2 to the ~~black~~ gray shaded ~~B-~~VID-4 which is the ESP~~B~~-VID of the associated provisioned ESP on the protection PBB-TE trunk

NOTE-The P~~B-~~VID parameter ~~will~~ may also be changed when the xConCCMdefect (20.23.3) or the errorCCMdefect (20.21.3) parameters are set as these indicate a ~~very serious~~ misconfiguration problem.

All subsequent CCMs send by the gray MEP will have the RDI field set (for as long as proper CCMs are not received by the MEP.) A reception of a CCM frame with the RDI field set (or an event that causes setting of the someRMEPCCMdefect, xConCCMdefect or errorCCMdefect) will cause a change of the ~~B-~~PVID parameter or the appropriate B-VID entries in the backbone service instance table of the CBP on West B-component, to the pre-configured value of the protection ESP. The result~~ed behavior~~ will be to move the ~~specific~~ affected backbone service instances to the protection PBB-TE trunk as depicted in Figure 26-11.

(page 74, line 20) Edit sentence as follows:

The protection group consists of the two or more ~~protected~~ PBB-TE service instances, providing the working and the protection PBB-TE service instances for a set of backbone service instances.

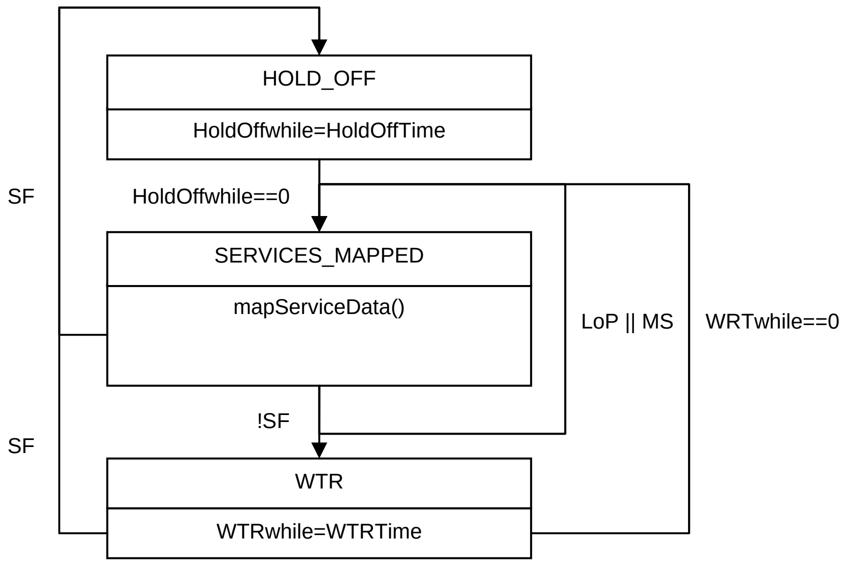
(page 76) Add protection switching procedure as follows:

mapServiceData()

Maps each backbone service that is to be transported by a PBB-TE Protection Group, to the appropriate working or protection PBBTE trunk according to the following:

a) If the backbone service instance’s working trunk is operational and MSProtection is not set, or if the backbone service instance’s protection trunk is not operational or has LoP or MSWorking set, map the service instance to the working trunk,
b) Otherwise, map the service instance to the protection trunk.

(page 77) Change the Protection Switching State Machine diagram to the following:



Protection Switching State Machine