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Introduction: Provider Backbone Transport (PBT) has been described in a paper submitted for the IEEE Beijing meeting and posted on the IEEE WEB at http://www.ieee802.org/1/files/public/docs2006/ah-bottorff-pbt-v1-0506.pdf . Further two presentations have been made to IEEE at the July 2006 and September 2005 meetings. Copies of these presentations are posted at: http://www.ieee802.org/1/files/public/docs2006/ah-bottorff-pbt4ieee-v2-0706.pdf and at http://www.ieee802.org/1/files/public/docs2005/ah-bottorff-pbt-for-iee-v41-0905.pdf . The discussion of PBT indicates that the few normative changes to 802.1Q-2005 and described in the July 2005 presentation referenced above will require a new PAR. Following is a PAR proposal for PBT for discussion.

Type of Project: Amendment to IEEE Standard

Status: Unapproved PAR, Std 802.1Q-2005

Project No.: P802.1??

Title: IEEE Standard for Local and Metropolitan Area Networks---Virtual Bridged Local Area Networks – Amendment ??: Provider Backbone Transport

Amendment/Corrigenda Title: ??: Provider Backbone Transport

Scope: The scope of this standard is to define feature extensions to 802.1Q-2005 supporting provisioning of scalable, traffic engineered, point-to-point trunks within Provided Backbone Bridged (802.1ah) networks which may be used in addition to B-VLANs for carrying services, while not over taxing the 12 bit B-VID address space.

An 802.1Q bridge with PBT extensions will provide the features necessary to allow an external provisioning or control system to program any desired path through the network. The selection of paths and the management of the bandwidth allocated to the paths is part of the external provisioning or control system and therefore out of the project scope. This project uses MIB management as the method by which external provisioning or control systems program the 802.1Q bridges to create PBT trunks.

The features specified by this project include support for data forwarding for PBT trunks, CFM CCM messages (see ITU-T Y.1731) on PBT trunks and 1:1 protection switching (see ITU-T G.8031) for PBT trunks. The modifications to 802.1Q needed for PBT data forwarding are a method to support discarding rather than forwarding for broadcast and unknown frames, a method for splitting and configuring the VID space between spanning tree (or shortest path bridging) and an external provisioning system and a method for setting the port state for the VID space allocated to PBT to forwarding and not learning in a way which is compatible and interoperable with Provider Backbone Bridged network (P802.1ah) protocols and equipment. The provisioned, traffic engineered, point-to-point paths will operate on the allocated VIDs simultaneously allowing multiple spanning tree or the new shortest path bridging to manage the topologies of the other VIDs. SNMP management will be supported.

Purpose: An essential requirement of provider networks is supporting traffic engineered paths. These paths must not be limited to following a small number of spanning trees or shortest path routes. Instead complete route selection freedom must be allowed. This amendment enables a Service Provider to traffic engineer provisioned point-to-point trunks in a Provider Backbone Bridge network while scaling the number of point-to-point trunks to the limits of the 802 MAC address space.

Need for the Project: Provider networks rely on the ability to directly control the routing of point-to-point trunks used to transport services. The control of path routing in turn supports traffic engineering for the allocation of bandwidth, assurance of diverse backup path routing, and selection of path performance as required by service level agreements. This project provides essential features used to support direct control of route selection of point-to-point trunks within Provider Backbone Bridged networks, while allowing scaling to the limit of the 802 MAC address space. Despite the demand and initial deployments of point-to-point traffic engineered backbone trunks for carrying customer VLAN traffic, there is currently no interoperability between different vendors, nor a coherent management framework for different techniques. Most major carriers, who will be the users of this standard, are currently deploying point-to-point service networks which need traffic engineering of provisioned point-to-point trunks to meet the demands of transition from existing leased line service.

Stakeholders for the Standard: Developers and users of networking for Provider network environments including networking IC developers, switch and NIC vendors, and users.

5 Criteria for P802.1ah

1 Broad Market Potential

A standards project authorized by IEEE 802 shall have a broad market potential. Specifically, it shall have the potential for:
a) Broad sets of applicability.
b) Multiple vendors and numerous users.
c) Balanced costs (LAN versus attached stations).

This project is intended to provide traffic engineered point-to-point trunks for Provider Backbone Bridged P802.1ah networks using existing Bridged and Virtual Bridged LAN technologies. Despite user demand and initial deployment of scalable, traffic engineered, point-to-point trunk solutions for 802 networks no standards currently exist.

Most major carriers are currently deploying traffic engineered point-to-point trunk solutions within their networks to meet the demands of transition from existing leased line service.

The costs related to this technology should be broadly similar to those of existing Bridging technology based on 802.1Q-2005/802.1ad.

2 Compatibility

IEEE 802 defines a family of standards. All standards shall be in conformance with the IEEE 802.1 Architecture, Management and Interworking documents as follows: 802. Overview and Architecture, 802.1D, 802.1Q, and parts of 802.1f. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with 802. Each standard in the IEEE 802 family of standards shall include a definition of managed objects which are compatible with systems management standards.

This standard will be compatible with work evolving in the current projects P802.1ah and P802.1ag.

This project will be compatible with existing 802.1 Architecture, Management and Interworking standards.

3 Distinct Identity

Each IEEE 802 standard shall have a distinct identity. To achieve this, each authorized project shall be:
a) Substantially different from other IEEE 802 standards.
b) One unique solution per problem (not two solutions to a problem).
c) Easy for the document reader to select the relevant specification.

There is no other IEEE standards or projects that allows traffic engineered point-to-point trunks with complete route selection freedom within a Bridged network.

4 Technical Feasibility

For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:
a) Demonstrated system feasibility.
b) Proven technology, reasonable testing.
c) Confidence in reliability.

The proposed standard will be based on existing, proven, standardized, Bridged LAN and Virtual Bridged LAN technology. This technology is widely implemented, is highly reliable.

5 Economic Feasibility

For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated), for its intended applications. At a minimum, the proposed project shall show:
a) Known cost factors, reliable data.
b) Reasonable cost for performance.
c) Consideration of installation costs.

The technology that will be developed in the proposed standard will not differ significantly from the economic factors associated with existing Bridged LAN and Virtual Bridged LAN technologies. The costs factors for Virtual Bridged LAN technology are favorable when compared to existing provider networks based on MPLS or SONET.