802.1ah™

IEEE Standard for Local and metropolitan area networks—

Virtual Bridged Local Area Networks

Amendment 7: Provider Backbone Bridges

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997, USA

14 August 2008

IEEE Std 802.1ah™-2008
(Amendment to
IEEE Std 802.1Q™-2005)

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Approved 12 June 2008

IEEE-SA Standards Board

Abstract: This amendment defines an architecture and bridge protocols for interconnection of multiple Provider Bridged Networks, allowing a Provider to support up to 2^{24} service instances.

Keywords: Bridged Local Area Networks, LANs, local area networks, MAC Bridges, MANs, metropolitan area networks, MRP, MSTP, Multiple Registration Protocol, Multiple Spanning Tree Protocol, Multiple VLAN Registration Protocol, MVRP, Provider Bridged Local Area Networks, Virtual Bridged Local Area Networks, virtual LANs

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

PDF: ISBN 973-07381-5762-7 STD95803
Print: ISBN 973-07381-5763-4 STDPD95803

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Contents

Figures

Tables

IEEE Standard for
Local and metropolitan area networks—

Virtual Bridged Local Area Networks

Amendment 7: Provider Backbone Bridges

[This amendment is based on IEEE Std 802.1Q™-2005.]

Editorial Note

This amendment specifies changes to IEEE Std 802.1Q-2005, as amended by IEEE Std 802.1ad™-2005, IEEE Std 802.1ak™-2007 and IEEE Std 802.1ag™-2007, that enable a provider to scale a Provider Bridged Network by interconnecting many Provider Bridged Networks over a Provider Backbone Bridged Network. The resulting backbone network can support interconnection of up to 2^{24} equivalent of separate LANs, Bridged Local Area Networks, or Virtual Bridged Local Area Networks. Changes are applied to the base text of IEEE Std 802.1Q-2005 as amended by IEEE Std 802.1ad-2005, IEEE Std 802.1ak-2007, and IEEE Std 802.1ag-2007. Text shown in bold italics in this amendment defines the editing instructions for changes to this base text. Three editing instructions are used: ***change***, ***delete***, and ***insert***. ***Change*** is used to make a change to existing material. The editing instruction specifies the location of the change and describes what is being changed. Changes to existing text may be clarified using ~~strikeout~~ markings to indicate removal of old material, and underscore markings to indicate addition of new material). ***Delete*** removes existing material. ***Insert*** adds new material without changing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. Editorial notes will not be carried over into future editions of IEEE Std 802.1Q.

1. Overview

1.1 Scope

Insert the following text and bullets immediately after bullet z:

To allow scaling of Provider Networks to at least 2^{24} Service Virtual LANs, this standard further specifies the operation of Provider Backbone Bridges (PBBs) by means of an architecture and bridge protocols compatible and interoperable with Provider Bridged Network protocols and equipment, allowing interconnection of multiple Provider Bridged Networks. To this end, it

aa) Introduces Backbone Edge Bridges that, by exchanging backbone frames that encapsulate the addresses, VLAN tags, and data of customer frames, support the virtual, media independent, equivalent of a number of independent instances of the service provided by media dependent frame transmission procedures.

ab) Extends the parameters of the Internal Sublayer Service (ISS) and Enhanced Internal Sublayer Service (EISS) to include a connection identifier, capable of referencing the backbone addresses and other parameters, used to convey customer frames from one Backbone Edge Bridge (BEB) to all, or one of, the other BEBs supporting a particular backbone service instance.

ac) Specifies the format of the Backbone Service Instance tag (I-TAG) that encapsulates the customer addresses, and introduces a Backbone Service Instance Identifier (I-SID) that allows each BEB to support a number of backbone service instances and permits the unambiguous identification of up to 2^{24} backbone service instances within a single Provider Backbone Bridged Network (PBBN).

ad) Provides a model of Backbone Edge Bridge operation in terms of VLAN-aware bridge components that allows the use of Provider Bridges as Backbone Core Bridges, with PBBN traffic carried as frames containing I-TAGs on particular Backbone VLANs (B-VLANs) potentially coexisting with PBN traffic carried as frames without I-TAGs on other Backbone VLANs.

ae) Specifies the interfaces that a Provider Backbone Bridged Network can provide to transport service frames. These comprise a Port-based service interface that assigns all received untagged and priority-tagged frames to a single S-VLAN transported over a single backbone service instance, an S-tagged service interface capable of mapping individual S-VLANs to different backbone service instances, and an I-tagged service interface capable of mapping frames from one set of backbone service instances to another.

af) Describes the use of redundant bridges and access LANs to protect backbone service access against failure of any of those systems or components.

ag) Specifies the management of Backbone Edge Bridges in terms of the model of operation [item ad) above], making use of defined management objects for the individual VLAN-aware bridge components, and adding managed objects to facilitate service creation.

ah) Describes the use of connectivity fault management (CFM) to detect and isolate faults in the connectivity provided to individual S-VLANs across the PBBN, in the connectivity provided to the group of S-VLANs supported by a single backbone service instance (identified by an I-SID), and in the connectivity provided to individual B-VLANs within the backbone itself.

ai) Specifies extensions to the Multiple Spanning Tree Protocol (MSTP) to allow network administrators to protect against loops through peered PBBNs without requiring coupling of spanning trees that operate independently for each PBBN.