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(Amendment to IEEE Std 802.1Q™-2022, as amended by IEEE Std 802.1Qcz™-2023)

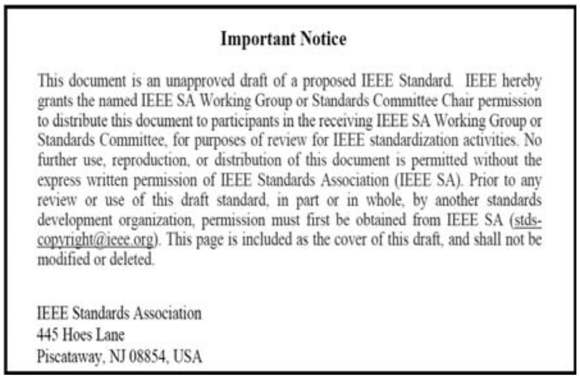
Draft Standard for Local and metropolitan area networks—

Bridges and Bridged Networks- Amendment: Automatic Attachment to Provider Backbone Bridging (PBB) Services

Sponsor

LAN/MAN Standards Committee
of the IEEE Computer Society

Prepared by the Time Sensitive Networking Task Group of IEEE 802.1



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Abstract: This amendment to IEEE Std 802.1Q-2022 as amended by IEEE Std 802.1Qcz-2023 specifies the protocols, procedures and management objects for auto attachment of network devices to Provider Backbone service instances by using Type, Length, Value (TLVs) within the Link Layer Discovery Protocol (LLDP).

Keywords: Bridged Network, IEEE 802.1Q™, LAN, local area network, MAC Bridge, metropolitan area network, Shortest Path Bridging Protocol, SPB protocol, Time-Sensitive Networking, TSN, Virtual Bridged Network, virtual LAN, VLAN Bridge, Provider Backbone Bridged Network, PBBN, auto attach, auto attach protocol, AAP, auto attach Backbone Edge Bridge, AAB, auto attach device, AAD

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Participants

At the time this draft standard was completed, the IEEE 802.1Working Group had the following membership:

Glenn Parsons, *Chair*
Jessy Rouyer, *Acting Vice Chair*
Janos Farkas*, Chair, Time-Sensitive Networking Task Group*
Craig Gunther*, Vice Chair, Time-Sensitive Networking Task Group*
Paul Bottorff*, Editor*

The following members of the individual Standards Association balloting group voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

When the IEEE SA Standards Board approved this standard on XX Month 20XX, it had the following membership:

IEEE Standard for local and metropolitan area networks—

Bridges and Bridged Networks - Amendment: Automatic Attachment to Provider Backbone Bridging (PBB) Services

(This amendment is based on IEEE Std 802.1Q™-2022 as amended by IEEE Std 802.1Qcz™-2023.)

NOTE—The editing instructions contained in this amendment define how to merge the material contained therein into the existing base standard and its amendments to form the comprehensive standard. The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using ~~strikethrough~~ (to remove old material) and underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Deletions and insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editing instructions, change markings, and this NOTE will not be carried over into future editions because the changes will be incorporated into the base standard.[b]

[b] Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

1. Overview

1.3 Introduction

Insert the following text to the end of clause 1.3 in the appropriate sequence before the second to last paragraph, re-numbering as appropriate:

This standard specifies the protocols, procedures and management objects for auto attachment of network devices to Backbone Service Instances (BSIs) by adding an Auto Attach Protocol (AAP) over the Link Layer Discovery Protocol (LLDP). The AAP simplifies the deployment and administration of PBB networks by automatically coupling end station or bridges to BSIs.

To this end, it:

a) Introduces the concepts of Auto Attach Protocol (AAP), Auto Attach System (AAS) on devices supporting auto attach; non-PBB based Auto Attach Devices (AAD) and PBB based Auto Attach BEBs (AAB).
b) Describes the process of discovery and advertising of capabilities for AADs and AABs supporting the AAP acting as an AAS.
c) Describes the bindings between Backbone Service Instance Identifiers (I-SIDs) and VLAN Identifiers.
d) Specifies 2 new IEEE 802.1 Organizationally Specific TLVs for discovery and capabilities advertising, and attachment of C-VLANs to Backbone Service Instances.
e) Specifies SNMP extensions to the PBB MIB and to the LLDP MIB module in support of the auto attach functionality.
f) Specifies YANG for the auto attach IEEE 802.1 Organizationally Specific TLVs

3. Definitions

Insert the following definitions in the appropriate collating sequence, re-numbering as appropriate:

3.1 Auto Attach Protocol (AAP): A protocol operating over LLDP used by an Auto Attach System (AAS) which provides auto attachment to a PBBN.

3.2 Auto Attach System (AAS): An end station or bridge acting as an Auto Attach Device (AAD) or Auto Attach BEB (AAB) which implements the Auto Attach Protocol (AAP).

3.3 Auto Attach Device (AAD): An end station, MAC bridge, C-VLAN bridge, or S-VLAN bridge that uses the AAP to request attachment to a backbone service instance within a PBBN.

3.4 Auto Attach BEB (AAB) Bridge component: A Backbone Edge Bridge having at least one I-Component that uses the AAP to respond to requests from AADs to couple LANs or VLANs to backbone service instances within a PBBN.

4. Abbreviations

Insert the following abbreviations in the appropriate sequence, re-ordering as appropriate:

AAB	Auto Attach BEB
AAD	Auto Attach Device
AAP	Auto Attach Protocol
AAS	Auto Attach System

5. Conformance

5.9 C-VLAN Bridge conformance

Insert the following subclause after 5.9.1:

5.9.2 C-VLAN Bridge requirements for PBBN auto attach (optional)

A C-VLAN Bridge that conforms to the provisions of auto attach (Clause 50) shall:

a) Support Link Layer Discovery Protocol (LLDP) transmit and receive mode (IEEE Std 802.1AB™).
b) Support the PBBN Auto Attach System TLV (D.2.17).
c) Support the PBBN Auto Attach Assignment TLV (D.2.18).
d) Support the AAD state machine (50.6).
e) Support the management entities for AA as specified in Clause 12.34.

An auto attach C-VLAN Bridge may:

f) Support SNMP MIB extensions for AAP (17.7.26).
g) Support SNMP MIB extensions for AAP LLDP TLVs (D.5.6).
h) Support YANG for AAP LLDP TLVs (D.6.6.7).

5.10 Provider Bridge conformance

Insert the following subclause after 5.10.2

5.10.3 S-VLAN Bridge requirements for PBBN auto attach (optional)

A S-VLAN Bridge that conforms to the provisions of auto attach (Clause 50) shall:

a) Support Link Layer Discovery Protocol (LLDP) transmit and receive mode (IEEE Std 802.1AB™).
b) Support the PBBN Auto Attach System TLV (D.2.17).
c) Support the PBBN Auto Attach Assignment TLV (D.2.18).
d) Support the AAD state machine (50.6)
e) Support the management entities for AA as specified in Clause 12.34.

An auto attach S-VLAN Bridge may:

f) Support SNMP MIB extensions for AAP (17.7.26).
g) Support SNMP MIB extensions for AAP LLDP TLVs (D.5.6).
h) Support YANG for AAP LLDP TLVs (D.6.6.7).

5.12 Backbone Edge Bridge (BEB) conformance

Insert the following subclause after 5.12.1:

5.12.2 Backbone Edge Bridge (AAB) requirements for PBBN auto attach (optional)

An AAB shall be a conformant Backbone Edge Bridge (BEB, 5.12) with at least one I-component () and shall have one or more C-VLAN components providing externally visible Customer Edge Ports (CEP) as specified in 50.2.

Each externally accessible AAB port providing auto attach service shall:

a) Support Link Layer Discovery Protocol (LLDP) transmit and receive mode (IEEE Std 802.1AB™).
b) Support the PBBN Auto Attach System TLV (D.2.17).
c) Support the PBBN Auto Attach Assignment TLV (D.2.18).
d) Support the C-tagging service interface (50.2)
e) Support the AAB state machine (50.7)
f) Support the management entities for auto attach as specified in Clause 12.34.

Each externally accessible AAB port providing auto attach service may:

g) Support the 802.1Q Organizationally Specific Management VID TLV (D2.6)
h) Support SNMP MIB extensions for AAP (17.7.26).
i) Support SNMP MIB extensions for AAP LLDP TLVs (D.5.6).
j) Support YANG for AAP LLDP TLVs (D.6.6.7).

5.14 MAC Bridge conformance

Insert the following subclause after 5.14.1:

5.14.2 MAC Bridge (AAD) requirements for PBBN auto attach (optional)

A MAC Bridge that conforms to the provisions of auto attach (Clause 50) shall:

a) Support Link Layer Discovery Protocol (LLDP) transmit and receive mode (IEEE Std 802.1AB™).
b) Support the PBBN Auto Attach System TLV (D.2.17).
c) Support the PBBN Auto Attach Assignment TLV (D.2.18).
d) Support the AAD state machine (50.6).
e) Support the management entities for AA as specified in Clause 12.34.

An auto attach MAC Bridge implementation may:

f) Support SNMP MIB extensions for AAP (17.7.26).
g) Support SNMP MIB extensions for AAP LLDP TLVs (D.5.6).
h) Support YANG for AAP LLDP TLVs (D.6.6.7).

Insert the following subclause after 5.32:

5.33 End station (AAD) requirements for PBBN auto attach (optional)

An end station that conforms to the provisions of auto attach (Clause 50) shall:

a) Support Link Layer Discovery Protocol (LLDP) transmit and receive mode (IEEE Std 802.1AB™).
b) Support the PBBN Auto Attach System TLV (D.2.17).
c) Support the PBBN Auto Attach Assignment TLV (D.2.18).

d) Support the AAD state machine (50.6)
e) Support the management entities for AA as specified in Clause 12.34

An auto attach end station implementation may:

f) Support SNMP MIB extensions for AAP (17.7.26).
g) Support SNMP MIB extensions for AAP LLDP TLVs (D.5.6).
h) Support YANG for AAP LLDP TLVs (D.6.6.7).

12. Bridge Management

Insert new subclause 12.35 and its subclauses and tables, as shown, re-numbering as necessary.

12.34 Managed objects for PBBN auto attach

The conformance requirements for supporting auto attach are specified in subclauses 5.9.2, 5.12.2, 5.14.2, and 5.33. The enhancements for support of auto attach are defined in Clause 50.

The auto attach specific managed objects defined here:

a) Provide managed objects for identifying and configuring an Auto Attach System (12.34.1).
b) Provide managed objects for configuring bridge ports, LAGs, and DRNIs for auto attach (12.34.2).
c) Provide managed objects to cataloging discovered remote ports supporting the auto attach (12.34.3).
d) Provide managed objects that indicate the desired VID to I-SID assignments for AADs and the operating assignments for AABs for each bridge port, LAG or DRNI (12.34.4).
e) Provide per port auto attach statistics (12.34.5).

Figure 12-8 shows the relationship of these objects.

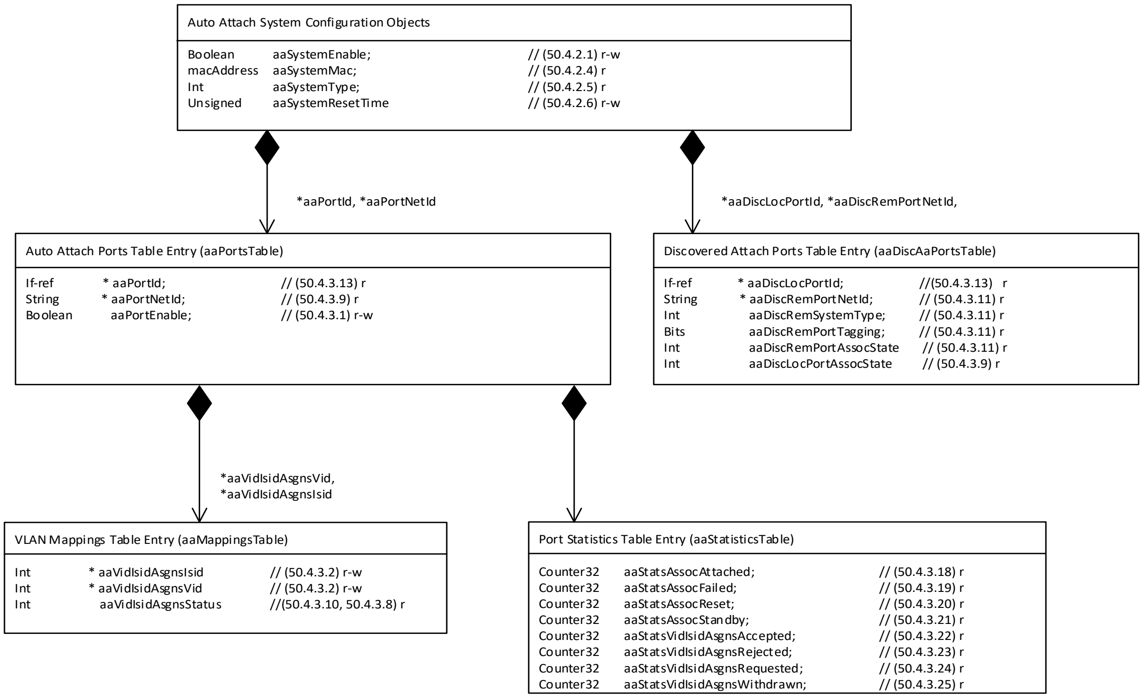
Auto Attach System Configuration Objects
Boolean aaSystemEnable; // (50.4.2.1) r-w
macAddress aaSystemMac; // (50.4.2.4) r
Int aaSystemType; // (50.4.2.5) r
Unsigned aaSystemResetTime // (50.4.2.6) r-w
*aaPortId, *aaPortNetId
*aaDiscLocPortId, *aaDiscRemPortNetId,
Auto Attach Ports Table Entry (aaPortsTable)
If-ref * aaPortId; // (50.4.3.13) r
String * aaPortNetId; // (50.4.3.9) r
Boolean aaPortEnable; // (50.4.3.1) r-w
Discovered Attach Ports Table Entry (aaDiscAaPortsTable)
If-ref * aaDiscLocPortId; //(50.4.3.13) r
String * aaDiscRemPortNetId; // (50.4.3.11) r
Int aaDiscRemSystemType; // (50.4.3.11) r
Bits aaDiscRemPortTagging; // (50.4.3.11) r
Int aaDiscRemPortAssocState // (50.4.3.11) r
Int aaDiscLocPortAssocState // (50.4.3.9) r
*aaVidIsidAsgnsVid,
*aaVidIsidAsgnsIsid
VLAN Mappings Table Entry (aaMappingsTable)
Int * aaVidIsidAsgnsIsid // (50.4.3.2) r-w
Int * aaVidIsidAsgnsVid // (50.4.3.2) r-w
Int aaVidIsidAsgnsStatus //(50.4.3.10, 50.4.3.8) r
Port Statistics Table Entry (aaStatisticsTable)
Counter32 aaStatsAssocAttached; // (50.4.3.18) r
Counter32 aaStatsAssocFailed; // (50.4.3.19) r
Counter32 aaStatsAssocReset; // (50.4.3.20) r
Counter32 aaStatsAssocStandby; // (50.4.3.21) r
Counter32 aaStatsVidIsidAsgnsAccepted; // (50.4.3.22) r
Counter32 aaStatsVidIsidAsgnsRejected; // (50.4.3.23) r
Counter32 aaStatsVidIsidAsgnsRequested; // (50.4.3.24) r
Counter32 aaStatsVidIsidAsgnsWithdrawn; // (50.4.3.25) r

Figure 12-8—PBBN auto attach managed objects

12.34.1 System configuration objects

The auto attach system objects (Table 12-46) identify the AAS within the administrative domain, indicate type of AAS, either AAB or one of two AAD types, and enable auto attach within the AAS. The aaSystemMAC uniquely identifies the system including all associated components.

In the case of an AAB a single aaSystemMAC identifies all I-Components and T-Components as well as all embedded S-Components and C-Components used to support external C-VLAN interfaces. In the case where we have a pair of BEBs forming a DRNI the single aaSystemMAC identifies all components of both BEBs coupled to form a DRNI.

For an AAD the single aaSystemMAC identifies all end station and bridge components within the AAD.

Table 12-46—PBBN auto attach system objects

Name	Data Type	Operations Supported[a]	Conformance[b]	References
aaSystemEnable	Boolean	RW	BD	50.4.2.1
aaSystemMAC	macAddress	R	BD	50.4.2.4
aaSystemType	enumerated {AAB, CVLAN-AWARE-AAD, VLAN-UNAWARE-AAD, SVLAN-AWARE-AAD}	R	BD	50.4.2.5
aaSystemResetTime	unsigned (1...1200)	RW	BD	50.4.2.6

[a] R = Read only access; RW = Read/Write access.
[b] B = required for AAB; D= required AAD.

The object aaSystemEnable defaults to FALSE allowing configuration of the system before auto attach begins operation. Changing aaSystemEnable from FALSE to TRUE will start auto attach on all configured and enabled ports. Setting aaSystemEnable to FALSE will break all attachments and disable the auto attach feature on all ports of the AAS.

12.34.2 Port table

Each AAS has a port table which lists the ports which can be advertised by this system using the AAP.

Table 12-47—PBBN auto attach port table entry

Name	Data Type	Operations Supported[a]	Conformance[b]	References
aaPortId	If-ref	R	BD	50.4.3.13
aaPortNetId	String	R	BD	50.4.3.9 `.portNetId`
aaPortEnable	Boolean	RW	BD	50.4.3.1

[a] R = Read only access; RW = Read/Write access.
[b] B = required for AAB; D= required AAD.

Each entry in the auto attach port table (Table 12-47) can be created, deleted, and updated by the system administrator to configure ports for auto attach.

Each local port is uniquely identified within the AAS by its aaPortId and uniquely identified over the administrative domain by aaPortNetId. The aaPortNetId is composed of the aaSystemMAC and the aaPortID. The management object aaPortNetId reflects the content of the state machine variable aaOperLocSysTlv.portNetId.

The object aaPortEnable controls the state machine variable aaAdminPortEnable which enables/disables auto attach operation on this port. Setting aaPortEnable == FALSE will force the AAP state machines for this port to restart, detaching all active associations and clearing the current statistics.

12.34.3 Discovered auto attach systems table

The discovered AAS table (Table 12-48) object provides information about active remote auto attach ports identified by the auto attach protocol (AAP) through the auto attach LLDP database system objects. The discovered auto attach systems table is read only.

The aaDiscLocPortId provides a reference to the local port, LAG or DRNI where the remote attach port was discovered. The aaDiscRemPortNetId uniquely identifies the remote port, LAG or DRNI discovered at the local port.

Table 12-48—PBBN discovered AAS table entry

Name	Data Type	Op Sup[a]	Conform-ance[b]	References
aaDiscLocPortId	If-ref	R	BD	50.4.3.13
aaDiscRemPortNetId	String	R	BD	50.4.3.11, D.2.17.10 `.portNetId`
aaDiscRemSystemType	Enumeration {AAB, CVLAN-AWARE-AAD, VLAN-UNAWARE-AAD, SVLAN-AWARE-AAD}	R	BD	50.4.3.11, D.2.17.6 `.sysType`
aaDiscRemPortTagging	Enumeration {TAG-ALL, TAG-OR-UNTAG, UNTAG-ONLY}	R	BD	50.4.3.11, D.2.17.8 `.portTagging`
aaDiscRemPortAssocState	Enumeration {NOT_READY, READY_TO_ASSOC, READY_TO_ATTACH, ASSOC_FAILED_TYPES, ASSOC_FAILED_TAGS, ASSOC_FAILED_TOPO, ASSOC_FAILED_OTHER, ASSOC_ATTACHED, ASSOC_STANDBY, ASSOC_INVALID}	R	BD	50.4.3.11, D.2.17.5 .state

Table 12-48—PBBN discovered AAS table entry

Name	Data Type	Op Sup[a]	Conform-ance[b]	References
aaDiscLocPortAssocState	Enumeration {NOT_READY, READY_TO_ASSOC, READY_TO_ATTACH, ASSOC_FAILED_TYPES, ASSOC_FAILED_TAGS, ASSOC_FAILED_TOPO, ASSOC_FAILED_OTHER, ASSOC_ATTACHED, ASSOC_STANDBY, ASSOC_INVALID}	R	BD	50.4.3.9, D.2.17.5 .state

[a]Operations Supported: R = Read only access; RW = Read/Write access.
[b]B = required for AAB; D= required AAD.

12.34.4 Assignment table

There is one auto attach assignment table for each port configured in the auto attach port table (12.34.2). The auto attach assignment table is used by management to set the VLAN ID / I-SID assignments desired by the AAD and to monitor the current auto attach assignment requests received at the AAB. Entries in the auto attach assignment table can be created, updated and deleted at the AAD management database however are read only in the AAB management database.

Each entry of the auto attach assignment table (Table 12-49) contains 3 variables specifying the VID, I-SID, and status of each assignment. In an AAD the desired assignments are stored and read from the per port state machine variable aaAdminVidIsidAsgns[] (50.4.3.2). One aaAdminVidIsidAsgns[] exists for each local port identified by the auto attach port table.

Table 12-49—PBBN auto attach assignment table

Name	Data Type	Operations Supported[a]	Conformance[b]	References
aaVidIsidAsgnsVid	unsigned[1...4094]	R for AAB, RW for AAD	BD	50.4.3.2 .vid
aaVidIsidAsgnsIsid	unsigned [1, 256...16777214]	R for AAB, RW for AAD	BD	50.4.3.2 .isid
aaVidIsidAsgnsStatus	Enumerated { PENDING, ACCEPTED, REJECTED, REJ-RES-UNAVAIL, REJ-INVALID-VID, REJ-VLAN-UNAVAIL, REJ-INVALID-I-SID, REJ-I-SID-UNAVAIL, REJ-APP-ISSUE, REJ-NOT-ALLOWED	R	BD	AAD 50.4.3.10, AAB 50.4.3.8 .asgnsArray[] .status

[a]R = Read only access; RW = Read/Write access.
[b]B = required for AAB; D= required AAD.

The status indicated in the auto attach assignment table for each VID to I-SID assignment is determined from the state machine variable aaOperRemAsgnsTlv.asgnsArray.status (50.4.3.10) in AADs or from the state machine variable aaOperLocAsgnsTlv.asgns.status (50.4.3.8) in AABs. The status at the AAD is the status from the VID / I-SID assignments reported in the remote LLDP assignment objects received from the AAB. The status at the AAB is the status determined by the AAB for the VID / I-SID assignment requests received from the AAD. At the AAD if no remote LLDP assignment objects exist in the LLDP database or if the VID/I-SID assignment is not listed in the remote AAB LLDP database objects, then the status is set to PENDING in the auto attach assignment table.

The AAD administrator can create new entries, delete entries, and update entries in the auto attach assignment table. When the administrator deletes, adds, or updates an entry in the auto attach assignment table the AAP state machine aaAdminVidIsidAsgn[] associated with the affected port will be updated to match the auto attach assignment table. When a new entry is created or updated, the new VID and I-SID will be provided by management and the status will begin as PENDING and then transition to reflect the current status indicated in the remote AAB LLDP objects.

In an AAB the auto attach assignment table is read only and reflects the current assignments within the local LLDP assignment database. The auto attach assignment table contains the status, VID, and I-SID (D.2.18.6, D.2.18.7, D.2.18.8) from the local LLDP assignment database objects.

12.34.5 Statistics table

There is one auto attach statistics table for each port configured in the auto attach port table (Table 12-47). Each auto attach statistics table (Table 12-50) provides per port statistics. All objects of the auto attach statistics table are read only. The contents of the table is maintained by the auto attach state machines (50.6, 50.7). All statistic counters on all ports are cleared on system reset.

Table 12-50—PBBN auto attach statistics table

Name	Data Type	Operations Supported[a]	Conformance[b]	References
aaStatsAssocAttached	Counter32	R	BD	50.4.3.18
aaStatsAssocFailed	Counter32	R	BD	50.4.3.19
aaStatsAssocReset	Counter32	R	BD	50.4.3.20
aaStatsAssocStandby	Counter32	R	BD	50.4.3.21
aaStatsVidIsidAsgnsAccepted	Counter32	R	BD	50.4.3.22
aaStatsVidIsidAsgnsRejected	Counter32	R	BD	50.4.3.23
aaStatsVidIsidAssgnsRequested	Counter32	R	BD	50.4.3.24
aaStatsVidIsidAsgnsWithdrawn	Counter32	R	BD	50.4.3.25

[a] R = Read only access; RW = Read/Write access.
[b] B = required for AAB; D= required AAD.

The counters provided are as follows:

f) aaStatsAssocAttached: Counts the number association which were attached.
g) aaStatsAssocFailed: Counts the number of association which failed.
h) aaStatsAssocReset: Counts the number of association resets.
i) aaStatsAssocStandby: Counts the number of associations which were standby.
j) aaStatsVidIsidAsgnsRequested: Counts the number of new VID to I-SID assignments requested.
k) aaStatsVidIsidAsgnsAccepted: Counts the number of VID to I-SID assignments accepted.
l) aaStatsVidIsidAsgnsRejected: Counts the number of VID to I-SID assignments rejected.
m) aaStatsVidIsidAsgnsWithdrawn: Counts the number of VID to I-SID assignment requests withdrawn.

17. Management Information Base (MIB)

17.2 Structure of the MIB

Insert new row at the end of Table 17-1.

Table 17-1—Structure of the MIB Modules

Module	Subclause	Defining IEEE Standard	Reference	Notes
IEEE8021-PBBN-AA-MIB	17.7.26	802.1Qcj	Clause 50	Initial version in IEEE Std 802.1Qcj

Insert new subclause 17.2.26 and Table 17-30 at the end of 17.2, as shown, re-numbering as necessary.

17.2.26 Structure of the IEEE8021-PBBN-AA-MIB

The IEEE8021-PBBN-AA-MIB provides objects to configure and manage AAP.

Objects in this MIB module are arranged into subtrees. Each subtree is organized as a set of related objects. Where appropriate, the corresponding Clause 12 management reference is also included.

Table 17-30 indicates the structure of the IEEE8021-PBBN-AA-MIB module.

Table 17-30—IEEE8021-PBBN-AA-MIB Structure

Variable	Reference	IEEE MIB table/object (17.7.26)
	12.34.1	**ieee8021AaConfig**
aaSystemEnable	12.34.1	**ieee8021AaSystemEnable**
aaSystemType	12.34.1	**ieee8021AaSystemType**
aaSystemMAC	12.34.1	**ieee8021AaSystemMAC**
aaSystemResetTime	12.34.1	**ieee8021AaSystemResetTime**
	12.34.2	**ieee8021AaPortTable**
	-	ieee8021AaPortEntry
aaPortId	12.34.2	ieee8021AaPortIfIndex*
aaPortNetId	12.34.2	ieee8021AaPortNetId*
aaPortEnable	12.34.2	ieee8021AaPortEnable
	-	ieee8021AaPortRowStatus
Discovered Auto Attach Ports	12.34.3	**ieee8021AaDiscSystemsTable**
	-	ieee8021AaDiscSystemsEntry
aaDiscLocPortId	12.34.3	ieee8021AaDiscLocPortIfIndex*

Table 17-30—IEEE8021-PBBN-AA-MIB Structure

Variable	Reference	IEEE MIB table/object (17.7.26)
aaDiscRemSystemType	12.34.3	ieee8021AaDiscRemSystemType
aaDiscRemPortNetId	12.34.3	ieee8021AaDiscRemPortNetId*
aaDiscRemPortTagging	12.34.3	ieee8021AaDiscRemPortTagging
aaDiscRemPortAssocState	12.34.3	ieee8021AaDiscRemPortAssocState
aaDiscLocPortAssocState	12.34.3	ieee8021AaDiscLocPortAssocState
Auto Attach Assignments	12.34.4	**ieee8021AaIsidVidAsgnsTable**
	-	ieee8021AaIsidVidAsgnsEntry
aaPortId	12.34.4	ieee8021AaIsidVidAsgnsIfIndex*
aaVidIsidAsgnsIsid	12.34.4	ieee8021AaIsidVidAsgnsIsid*
aaVidIsidAsgnsVid	12.34.4	ieee8021AaIsidVidAsgnsVlan*
aaVidIsidAsgnsStatus	12.34.4	ieee8021AaIsidVidAsgnsStatus
	-	ieee8021AaIsidVidAsgnsRowStatus
Auto Attach Statistics	12.34.5	**ieee8021AaStatsTable**
	-	ieee8021AaStatsEntry
		ieee8021AaStatsPortIfIndex*
aaStatsAssocAttached	12.34.5	ieee8021AaStatsAssocAttached
aaStatsAssocFailed	12.34.5	ieee8021AaStatsAssocFailed
aaStatsAssocReset	12.34.5	ieee8021AaStatsAssocReset
aaStatsAssocStandby	12.34.5	ieee8021AaStatsAssocStandby
aaStatsVidIsidAsgnsRequested	12.34.5	ieee8021AaStatsAsgnsRequested
aaStatsVidIsidAsgnsAccepted	12.34.5	ieee8021AaStatsAsgnsAccepted
aaStatsVidIsidAsgnsRejected	12.34.5	ieee8021AaStatsAsgnsRejected
aaStatsVidIsidAsgnsWithdrawn	12.34.5	ieee8021AaStatsAsgnsWithdrawn
	-	**ieee8021AaNotifications**
	-	ieee8021AaDiscoveredSystem
aaDiscRemSystemType	12.34.3	ieee8021AaDiscRemSystemType
aaDiscRemPortNetId	12.34.3	ieee8021AaDiscRemPortNetId
	802.1AB-2016 8.5.7.2	ieee8021AaDiscSystemsDescr
	802.1AB-2016 8.5.9.8	ieee8021AaDiscSystemsMgmtOid

Table 17-30—IEEE8021-PBBN-AA-MIB Structure

Variable	Reference	IEEE MIB table/object (17.7.26)
	-	**ieee8021AaNotifyObjects**
	802.1AB-2016 8.5.7.2	ieee8021AaDiscSystemsDescr
	802.1AB-2016 8.5.9.8	ieee8021AaDiscSystemsMgmtOid

*This object is an INDEX of the table in which it resides.

17.3 Relationship to other MIBs

Insert new subclause 17.3.26 at the end of 17.3, as shown, re-numbering as necessary.

17.3.26 Relationship of the IEEE8021-PBBN-AA-MIB Structure to other MIB modules

The IEEE8021-PBBN-AA-MIB provides objects that extend the functionality of IEEE802.1AB LLDP.

17.4 Security considerations

Insert new subclause 17.4.26 at the end of 17.4, as shown, re-numbering as necessary.

17.4.26 Security considerations for the IEEE8021-PBBN-AA-MIB

There are a number of management objects defined in the IEEE8021-PBBN-AA-MIB module that have a MAX-ACCESS clause of read-write. Such objects can be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

The following tables and objects in the IEEE8021-PBBN-AA-MIB can be mis-configured to interfere with the operation of the forwarding and queuing mechanisms in a manner that would be detrimental to the transmission of scheduled traffic:

```
ieee8021AaSystemEnable
ieee8021AaPortRowStatus
ieee8021AaPortEnable
ieee8021AaIsidVidAsgnsRowStatus
ieee8021AaIsidVidAsgnsIsid
ieee8021AaIsidVidAsgnsVlan
```

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not accessible) can be considered sensitive or vulnerable in some network environments. It is thus important to control all types of access (including GET and/or NOTIFY) to these objects and possibly to encrypt the values of these objects when sending them over the network via SNMP.

17.7 MIB modules

Insert new subclause 17.7.26 at the end of 17.7, as shown, re-numbering as necessary.

- Copyright release for MIBs: users of this standard can freely reproduce the MIBs contained in this subclause so that they can be used for their intended purpose.

- An ASCII version of this MIB module can be obtained by Web browser from the IEEE 802.1 Website at http://www.ieee802.org/1/pages/MIBs.html.

17.7.26 Definitions for the IEEE8021-PBBN-AA-MIB module

```
IEEE8021-PBBN-AA-MIB DEFINITIONS ::= BEGIN

-- ============================================================
-- MIB for support of PBBN auto attach to Provider Backbone
-- Bridging (PBB) services.
-- ============================================================

IMPORTS
    MODULE-IDENTITY, OBJECT-TYPE, Integer32, Gauge32, Unsigned32, Counter32,
    NOTIFICATION-TYPE
        FROM SNMPv2-SMI
    SnmpAdminString
            FROM SNMP-FRAMEWORK-MIB
    RowStatus, TruthValue, MacAddress
            FROM SNMPv2-TC
    MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
            FROM SNMPv2-CONF;

ieee8021PbbnAutoAttachMib MODULE-IDENTITY
    LAST-UPDATED "202209260000Z"     -- September 26, 2022
    ORGANIZATION "IEEE 802.1 Working Group"
    CONTACT-INFO
        "  WG-URL: http://www.ieee802.org/1/
         WG-EMail: stds-802-1-l@ieee.org
          Contact: IEEE 802.1 Working Group Chair
           Postal: C/O IEEE 802.1 Working Group
                   IEEE Standards Association
                   445 Hoes Lane
                   Piscataway, NJ 08854
                   USA
           E-mail: stds-802-1-chairs@ieee.org"
    DESCRIPTION
        "This Management Information Base module contains objects related to the
       configuration and statistics for PBBN auto attach support."

    REVISION    "202209260000Z" -- September 26, 2022
     DESCRIPTION
        "Updated IEEE 802.1Qcj MIB based on ballot comments on
       draft D1.4 and D1.5 reviewed at the September 2022 interim. The naming
prefix
       has been changed to ieee8021Aa. The SystemID has been renamed portNetId.
       The authentication objects have been removed. The expired discovered
system
       table has been removed. New objects forthe systemMAC, local portNetId,
       DiscSystemsRemAssocState, and DiscSystemsLocAssocState have been added.
The
       statistics counter clearing functions StatsClearErrorCounters and
       StatsClearPortErrorCounters have been removed and the statistics
       StatsAssocAttempts and StatsAssocErrors have been replaced by the new
       statistics StatsAssocAttached, StatsAssocFailed, StatsAssocStandby, and
       StatsAssocReset. The SystemType now is extended to include S-VLAN aware
AADs.
       The DiscRemPortAssocState and DiscLocPortAssocState are now updated with
       with new state names.


    REVISION    "202106020000Z" -- June 2, 2021
     DESCRIPTION
        "Published as part of IEEE 802.1Qcj initial draft."

   ::= { iso std(0) iso8802(8802) ieee802dot1(1) ieee802dot1mibs(1) xx }

ieee8021AaNotifications OBJECT IDENTIFIER ::= { ieee8021PbbnAutoAttachMib 0 }
ieee8021AaObjects       OBJECT IDENTIFIER ::= { ieee8021PbbnAutoAttachMib 1 }
ieee8021AaNotifyObjects OBJECT IDENTIFIER ::= { ieee8021PbbnAutoAttachMib 2 }

ieee8021AaConfig  OBJECT IDENTIFIER ::= { ieee8021AaObjects 1 }
ieee8021AaStats  OBJECT IDENTIFIER ::= { ieee8021AaObjects 2 }

-- ===============================================================
-- Auto attach scalar attributes
-- ===============================================================

ieee8021AaSystemEnable OBJECT-TYPE
    SYNTAX         INTEGER {
                       enabled(1),
                       disabled(2)
                   }
    MAX-ACCESS     read-write
    STATUS         current
    DESCRIPTION
        "Exports the status of the auto attach service on this system."
    ::= { ieee8021AaConfig 1 }

ieee8021AaSystemType OBJECT-TYPE
    SYNTAX         INTEGER {
                       aaBeb(1),
                       aaDeviceVlanAware(2),
                       aaDeviceVlanUnaware(3)
                   }
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "Defines the AAS type indicating the services supported by the
       system. May be read-only on platforms that only support a single system
type."
    ::= { ieee8021AaConfig 2 }

ieee8021AaSystemMac OBJECT-TYPE
    SYNTAX         MacAddress
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
           "Defines the auto attach system MAC used to uniquely identify this
system."
    ::= { ieee8021AaConfig 3 }
```

```
ieee8021AaSystemResetTime OBJECT-TYPE
    SYNTAX         Integer32 (1..1200)
    MAX-ACCESS     read-write
    STATUS         current
    DESCRIPTION
        "AAP reset time delay used to re-synchronize the associated AASs"
    ::= { ieee8021AaConfig 4 }

-- ===============================================================
-- Auto attach VID/I-SID assignment table support
-- ===============================================================

ieee8021AaVidIsidAsgnsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AaVidIsidAsgnsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
         "This table contains the VID <-> I-SID assignments for the auto attach
application."
    ::= { ieee8021AaConfig 4 }

ieee8021AaVidIsidAsgnsEntry OBJECT-TYPE
    SYNTAX      Ieee8021AaVidIsidAsgnsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
          "Information about the I-SID <-> VID assignments for the auto attach
application."
    INDEX { ieee8021AaVidIsidAsgnsIfIndex,
            ieee8021AaVidIsidAsgnsIsid,
            ieee8021AaVidIsidAsgnsVid }
    ::= { ieee8021AaVidIsidAsgnsTable 1 }

Ieee8021AaVidIsidAsgnsEntry ::= SEQUENCE {
    ieee8021AaVidIsidAsgnsIfIndex    Integer32,
    ieee8021AaVidIsidAsgnsIsid       Integer32,
    ieee8021AaVidIsidAsgnsVid       Integer32,
    ieee8021AaVidIsidAsgnsStatus     INTEGER,
    ieee8021AaVidIsidAsgnsRowStatus  RowStatus }

ieee8021AaVidIsidAsgnsIfIndex OBJECT-TYPE
    SYNTAX         Integer32 (0..65535)
    MAX-ACCESS     not-accessible
    STATUS         current
    DESCRIPTION
        "Interface identifier component of the I-SID <-> VID assignment."
    ::= { ieee8021AaVidIsidAsgnsEntry 1 }

ieee8021AaVidIsidAsgnsIsid OBJECT-TYPE
    SYNTAX         Integer32 (1,256..16777214)
    MAX-ACCESS     not-accessible
    STATUS         current
    DESCRIPTION
        "I-SID component of the I-SID <-> VID assignment."
    ::= { ieee8021AaVidIsidAsgnsEntry 2 }

ieee8021AaVidIsidAsgnsVid OBJECT-TYPE
    SYNTAX         Integer32 (1..4094)
    MAX-ACCESS     not-accessible
    STATUS         current
    DESCRIPTION
        "VLAN ID component of the I-SID <-> VID assignment."
    ::= { ieee8021AaVidIsidAsgnsEntry 3 }

ieee8021AaVidIsidAsgnsStatus OBJECT-TYPE
    SYNTAX         INTEGER {
                       pending(1),
             accepted(2),
                       rejected(3),
                       rejectedAutoAttachResourcesUnavailable(4),
                       rejectedInvalidVLANID(5),
                       rejectedVLANResourcesUnavailable(6),
                       rejectedInvalidISID(7),
                       rejectedISIDResourcesUnavailable(8),
                       rejectedApplicationInteractionIssue(9),
                       rejectedAssignmentNotAllowed(10)
                   }
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
            "The current state of the auto attach I-SID <-> VID assignment.
Rejections can be from multiple causes including resources unavailable,
duplicate, application interaction, etc."
    ::= { ieee8021AaVidIsidAsgnsEntry 4 }

ieee8021AaVidIsidAsgnsRowStatus OBJECT-TYPE
    SYNTAX         RowStatus
    MAX-ACCESS     read-write
    STATUS         current
    DESCRIPTION
             "This object allows entries to be created and deleted in the
ieee8021AaVidIsidAsgnsTable."
    ::= { ieee8021AaVidIsidAsgnsEntry 5 }

-- ===============================================================
-- Auto attach port table support
-- ===============================================================

ieee8021AaPortTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AaPortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
       "This table contains port-specific data for the auto attach application."
    ::= { ieee8021AaConfig 5 }

ieee8021AaPortEntry OBJECT-TYPE
    SYNTAX      Ieee8021AaPortEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Port-specific data related to the auto attach application."
    INDEX { ieee8021AaPortIfIndex,
          ieee8021AaPortNetId }
    ::= { ieee8021AaPortTable 1 }

Ieee8021AaPortEntry ::= SEQUENCE {
    ieee8021AaPortIfIndex        Integer32,
   ieee8021AaPortNetId  OCTET STRING,
    ieee8021AaPortEnable         INTEGER,
    ieee8021AaPortRowStatus      RowStatus }

ieee8021AaPortIfIndex OBJECT-TYPE
    SYNTAX         Integer32 (0..65535)
    MAX-ACCESS     not-accessible
    STATUS         current
    DESCRIPTION
        "IfIndex on the interface (port) identifier attribute."
    ::= { ieee8021AaPortEntry 1 }

ieee8021AaPortNetId OBJECT-TYPE
    SYNTAX         OCTET STRING (SIZE (0..12))
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "Identifies an AAS port uniquely within the adminstrative
       domain. The object is the concatenation of the ieee8021AaSystemMAC and
       ieee8021AaPortIfIndex.  The  identified  port  can  be  simple,  a  LAG,  or  a
DRNI."
    ::= { ieee8021AaPortEntry 2 }

ieee8021AaPortEnable OBJECT-TYPE
    SYNTAX         INTEGER {
                       enabled(1),
                       disabled(2)
                   }
    MAX-ACCESS     read-create
    STATUS         current
    DESCRIPTION
        "The current port auto attach protocol enable. Indicates
   whether auto attach TLVs will be included in LLDPDUs generated on
   the port (enabled) or not (disabled)."
    ::= { ieee8021AaPortEntry 3 }

ieee8021AaPortRowStatus OBJECT-TYPE
    SYNTAX         RowStatus
    MAX-ACCESS     read-create
    STATUS         current
    DESCRIPTION
        "This object allows entries to be created, deleted and modified in the
       ieee8021AaPortTable, if the operation is supported by the agent."
    ::= { ieee8021AaPortEntry 4 }

-- ===============================================================
-- Auto attach discovered systems table support
-- ===============================================================

ieee8021AaDiscSystemsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF Ieee8021AaDiscSystemsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains details about locally connected AASs that have
       been discovered."
    ::= { ieee8021AaConfig 6 }
```

```
ieee8021AaDiscSystemsEntry OBJECT-TYPE
    SYNTAX      Ieee8021AaDiscSystemsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Contains details about a locally connected AAS."
    INDEX { ieee8021AaDiscLocPortIfIndex,
          ieee8021AaDiscRemPortNetId }
    ::= { ieee8021AaDiscSystemsTable 1 }

Ieee8021AaDiscSystemsEntry ::= SEQUENCE {
    ieee8021AaDiscLocPortIfIndex       Integer32,
    ieee8021AaDiscRemSystemType        INTEGER,
    ieee8021AaDiscRemPortNetId         OCTET STRING,
    ieee8021AaDiscRemPortTagging       BITS,
    ieee8021AaDiscRemPortAssocState        INTEGER,
    ieee8021AaDiscLocPortAssocState        INTEGER }

ieee8021AaDiscLocPortIfIndex OBJECT-TYPE
    SYNTAX         Integer32 (0..65535)
    MAX-ACCESS     not-accessible
    STATUS         current
    DESCRIPTION
        "Identifies the interface through which the AAS
   represented by this entry was discovered."
    ::= { ieee8021AaDiscSystemsEntry 1 }

ieee8021AaDiscRemSystemType OBJECT-TYPE
    SYNTAX         INTEGER {
                       aaBeb(1),
                       aaDeviceCVlanAware(2),
                       aaDeviceVlanUnaware(3),
             aaDeviceSVlanAware(4),
                   }
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "Identifies the AAS type as advertised through LLDP."
    ::= { ieee8021AaDiscSystemsEntry 2 }

ieee8021AaDiscRemPortNetId OBJECT-TYPE
    SYNTAX         OCTET STRING (SIZE (0..12))
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "Identifies an AAS port uniquely within the adminstrative
       domain. The object is the concatenation of the ieee8021AaSystemMAC and
       port IfIndex. The identified port can be simple, a LAG, or a DRNI."
    ::= { ieee8021AaDiscSystemsEntry 3 }

ieee8021AaDiscRemPortTagging OBJECT-TYPE
    SYNTAX         BITS {
                       trafficTagged(0),
                       trafficTaggedAndUntagged(1),
                       trafficUntaggedOnly(2)
                   }
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
```

```
        "Exports the tagging data associated with the discovered Auto
   Attach System as advertised through LLDP. When bit 0 is set to 0,
   it means that all traffic is tagged the on link; when bit 0 is set
   to 1, it means that the link supports both tagged and untagged traffic.
   When bit 2 is set to 1 it means that the link supports only untagged traffic."
    ::= { ieee8021AaDiscSystemsEntry 4 }

ieee8021AaDiscRemPortAssocState OBJECT-TYPE
    SYNTAX         INTEGER {
                not_ready(0), -- initializing, not ready
          ready_to_assoc(1), -- ready to associate
                ready_to_attach(2), -- viable partner
               assoc-fail_types(18), -- System type mismatched
          assoc-fail_tags(34), -- Tagging mismatched
          assoc-fail_topo(50), -- Multipoint link detected
          assoc_fail_other(66), -- Parsing or resourcing error
               assoc_attached(3), -- port is active
                assoc_standby(19) -- at AAD, active elsewhere
          assoc_invalid(35) -- at AAB, AAD active elsewhere
                   }
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The current remote operational status for the associated interface."
    ::= { ieee8021AaDiscSystemsEntry 5 }

ieee8021AaDiscLocPortAssocState OBJECT-TYPE
    SYNTAX    INTEGER {
                not_ready(0), -- initializing, not ready
          ready_to_assoc(1), -- advertising ready to associate
                ready_to_attach(2), -- viable partner
               assoc-fail_types(18), -- System type mismatched
          assoc-fail_tags(34), -- Tagging mismatched
          assoc-fail_topo(50), -- Multipoint link detected
          assoc_fail_other(66), -- Parsing or resourcing error
               assoc_attached(3), -- port is active
                assoc_standby(19) -- at AAD, active elsewhere
          assoc_invalid(35) -- at AAB, AAD active elsewhere
                   }
    MAX-ACCESS     read-only
    STATUS         current
    DESCRIPTION
        "The current local operational status for the associated interface."
    ::= { ieee8021AaDiscSystemsEntry 6 }

-- ===============================================================
-- AAS statistics and error counters table
-- ===============================================================

ieee8021AaStatsTable  OBJECT-TYPE
    SYNTAX        SEQUENCE OF Ieee8021AaStatsEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "This table contains auto attach port statistics data."
    ::= { ieee8021AaStats 1 }

ieee8021AaStatsEntry OBJECT-TYPE
    SYNTAX        Ieee8021AaStatsEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "Each entry contains auto attach operational statistics for a
   specific auto attach System port. Ports are identified by their MIB II
   ifIndex value."
    INDEX         { ieee8021AaStatsPortIfIndex }
    ::= { ieee8021AaStatsTable 1 }

Ieee8021AaStatsEntry ::= SEQUENCE {
    ieee8021AaStatsPortIfIndex            Integer32,
    ieee8021AaStatsAssocAttached       Counter32,
   ieee8021AaStatsAssocFailed         Counter32,
   ieee8021AaStatsAssocReset  Counter32,
   ieee8021AaStatsAssocStandby  Counter32,
    ieee8021AaStatsAsgnsRequested         Counter32,
    ieee8021AaStatsAsgnsAccepted          Counter32,
    ieee8021AaStatsAsgnRejected           Counter32,
    ieee8021AaStatsAsgnsWithdrawn         Counter32 }

ieee8021AaStatsPortIfIndex OBJECT-TYPE
    SYNTAX        Integer32 (0..65535)
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "An index value that uniquely identifies a port. This value
   corresponds to a MIB II ifIndex."
    ::= { ieee8021AaStatsEntry 1 }

ieee8021AaStatsAssocAttached OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "Indicates the number of PBBN Auto Attach System TLVs received on the
       identified port."
    ::= { ieee8021AaStatsEntry 2 }

ieee8021AaStatsAsgnsRequested OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "Indicates the number of I-SID/VID bindings received in PBBN Auto Attach
   Assignment TLVs on the identified port."
    ::= { ieee8021AaStatsEntry 3 }

ieee8021AaStatsAsgnsAccepted OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
          "Indicates the number of I-SID/VID bindings from received PBBN Auto
Attach
   Assignment TLVs that are accepted (activated) on the
   identified port. Counter is incremented when the binding transitions
   from a non-accepted state (e.g., 'pending', 'rejected') to the
   accepted state. The AAD counts the number received from the AAB while
   the AAB counts the number transmitted to the AAD."
```

```
    ::= { ieee8021AaStatsEntry 4 }

ieee8021AaStatsAsgnRejected OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "Indicates the number of I-SID/VID bindings from received Auto Attach
   Assignment TLVs that are rejected on the identified port.
   Counter is incremented when the binding transitions from a non-rejected
   state (e.g., 'pending', 'accepted') to the rejected state.The AAD counts
   the number received from the AAB while the AAB counts the number
   transmitted to the AAD."
    ::= { ieee8021AaStatsEntry 5 }

ieee8021AaStatsAssocFailed OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "Indicates the number of discovered AAS from received
   AA System TLVs that have failed association or attachment due to errors
   such as system mismatches, multi-point link, incompatible tagging, etc."
    ::= { ieee8021AaStatsEntry 6 }

ieee8021AaStatsAsgnsWithdrawn OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
          "Indicates the number of I-SID/VID bindings from received PBBN Auto
Attach
   Assignment TLVs that have been deleted on the identified
   port. Counter is only incremented when bindings are deleted for
   reasons other than expiration."
    ::= { ieee8021AaStatsEntry 7 }

ieee8021AaStatsAssocReset OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "Indicates the number of discovered AAS from received
   AA System TLVs that have reset an association or attachment due deleted
   discovered system tlvs, etc. This condition is most commonly a result of an
   AAS being reset or powered down."
    ::= { ieee8021AaStatsEntry 8 }

ieee8021AaStatsAssocStandby OBJECT-TYPE
    SYNTAX        Counter32
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "Indicates the number of discovered AAS from received
   AA System TLVs that have had an association in standby."
    ::= { ieee8021AaStatsEntry 9 }

-- =============================================================
-- Auto attach notification objects
-- ===============================================================

ieee8021AaDiscSystemsDescr OBJECT-TYPE
    SYNTAX         SnmpAdminString (SIZE(0..255))
    MAX-ACCESS     accessible-for-notify
    STATUS         current
    DESCRIPTION
        "The string value used to identify the LLDP system description of the
   remote system distributed through LLDPDUs."
    REFERENCE
        "IEEE 802.1AB-2016 8.5.7.2"
    ::= { ieee8021AaNotifyObjects 1 }

ieee8021AaDiscSystemsMgmtOid OBJECT-TYPE
    SYNTAX         OBJECT IDENTIFIER
    MAX-ACCESS     accessible-for-notify
    STATUS         current
    DESCRIPTION
        "The OID value used to identify the type of hardware component or
   protocol entity associated with the management address advertised by
   the remote system agent distributed through LLDP."
    REFERENCE
        "IEEE 802.1AB-2016 8.5.9.8"
    ::= { ieee8021AaNotifyObjects 2 }

-- ===============================================================
-- Auto attach notifications
-- ===============================================================

ieee8021AaDiscoveredSystem NOTIFICATION-TYPE
    OBJECTS        {
                       ieee8021AaDiscRemSystemType,
                       ieee8021AaDiscRemPortNetId,
                       ieee8021AaDiscSystemsDescr,
                       ieee8021AaDiscSystemsMgmtOid
                   }
    STATUS         current
    DESCRIPTION
        "This notification is generated when an AAS is discovered."
    ::= { ieee8021AaNotifications  1 }


-- ===================================================================
-- IEEE 802.1 - Auto attach conformance information
-- ===================================================================

ieee8021AaConformance OBJECT IDENTIFIER ::= { ieee8021PbbnAutoAttachMib 4 }

ieee8021AaCompliances
    OBJECT IDENTIFIER ::= { ieee8021AaConformance 1 }
ieee8021AaGroups
    OBJECT IDENTIFIER ::= { ieee8021AaConformance 2 }


--
-- Auto attach - compliance statements
--

ieee8021AaCompliance MODULE-COMPLIANCE
```

```
    STATUS            current
    DESCRIPTION
         "A compliance statement for SNMP entities that implement
         the IEEE 802.1Qcj auto attach MIB.

         This group is mandatory for agents that implement the
         auto attach aaSet TLV set."
    MODULE            -- this module
        MANDATORY-GROUPS  { ieee8021AaGroup }
    ::= { ieee8021AaCompliances 1 }


--
-- Auto attach - MIB groupings
--

ieee8021AaGroup  OBJECT-GROUP
    OBJECTS {
       ieee8021AaSystemEnable,
       ieee8021AaSystemType,
       ieee8021AaSystemMAC,
       ieee8021AaVidIsidAsgnsStatus,
       ieee8021AaVidIsidAsgnsRowStatus,
       ieee8021AaPortNetId,
       ieee8021AaPortEnable,
       ieee8021AaDiscRemPortNetId,
       ieee8021AaStatsAssocAttached,
       ieee8021AaStatsAsgnsRequested,
       ieee8021AaStatsAsgnsAccepted,
       ieee8021AaStatsAsgnRejected,
       ieee8021AaDiscSystemsDescr,
       ieee8021AaDiscSystemsMgmtOid
      }
    STATUS  current
    DESCRIPTION
        "The collection of objects that support configuration of the PBBN
       auto attach service"
    ::= { ieee8021AaGroups 1 }

END
```

48. YANG Data Models

48.6 YANG modules

48.6.2 The ieee802-dot1q-types YANG module

Replace the text of subclause 48.6.2 with the following text:

```
module ieee802-dot1q-types {
  namespace urn:ieee:std:802.1Q:yang:ieee802-dot1q-types;
  prefix dot1q-types;
  import ietf-yang-types {
    prefix yang;
  }
  organization
    "IEEE 802.1 Working Group";
  contact
    "WG-URL: http://ieee802.org/1/
    WG-EMail: stds-802-1-l@ieee.org

    Contact: IEEE 802.1 Working Group Chair
    Postal: C/O IEEE 802.1 Working Group
          IEEE Standards Association
          445 Hoes Lane
          Piscataway, NJ 08854
          USA

    E-mail: stds-802-1-chairs@ieee.org";
  description
    "Common types used within dot1Q-bridge modules.

    Copyright (C) IEEE (2022).

    This version of this YANG module is part of IEEE Std 802.1Q;
    see the standard itself for full legal notices.";
  revision 2022-09-29 {
    description
      "Published as part of IEEE Std 802.1Qcj-2023.";
    reference
      "IEEE Std 802.1Qcj-2023, Bridges and Bridged Networks - Automatic
      Attachment to Provider Backbone Bridging (PBB) Services.";
  }
  revision 2022-03-29 {
    description
      "Published as part of IEEE Std 802.1Qcz-2022.";
    reference
      "IEEE Std 802.1Qcz-2022, Bridges and Bridged Networks - Congestion
      Isolation.";
  }
  revision 2022-01-19 {
    description
      "Published as part of IEEE Std 802.1Q-2022.";
    reference
      "IEEE Std 802.1Q-2022, Bridges and Bridged Networks.";
  }
  revision 2020-06-04 {
```

```
  description
    "Published as part of IEEE Std 802.1Qcx-2020.";
  reference
    "IEEE Std 802.1Qcx-2020, Bridges and Bridged Networks - YANG Data
    Model for Connectivity Fault Management.";
}
revision 2018-03-07 {
  description
    "Published as part of IEEE Std 802.1Q-2018.";
  reference
    "IEEE Std 802.1Q-2018, Bridges and Bridged Networks.";
}
identity dot1q-vlan-type {
  description
    "Base identity from which all 802.1Q VLAN tag types are derived
    from.";
}
identity c-vlan {
  base dot1q-vlan-type;
  description
    "An 802.1Q Customer VLAN, using the 81-00 EtherType";
  reference
    "5.5 of IEEE Std 802.1Q-2022";
}
identity s-vlan {
  base dot1q-vlan-type;
  description
    "An 802.1Q Service VLAN, using the 88-A8 EtherType originally
    introduced in 802.1ad, and incorporated into 802.1Q (2011)";
  reference
    "5.6 of IEEE Std 802.1Q-2022";
}
identity transmission-selection-algorithm {
  description
    "Specify the transmission selection algorithms of IEEE Std
    802.1Q-2022 Table 8-6";
}
identity strict-priority {
  base transmission-selection-algorithm;
  description
    "Indicates the strict priority transmission selection algorithm.";
  reference
    "Table 8-6 of IEEE Std 802.1Q-2022";
}
identity credit-based-shaper {
  base transmission-selection-algorithm;
  description
    "Indicates the credit based shaper transmission selection
    algorithm.";
  reference
    "Table 8-6 of IEEE Std 802.1Q-2022";
}
identity enhanced-transmission-selection {
  base transmission-selection-algorithm;
  description
    "Indicates the enhanced transmission selection algorithm.";
  reference
    "Table 8-6 of IEEE Std 802.1Q-2022";
}
```

```
identity asynchronous-traffic-shaping {
  base transmission-selection-algorithm;
  description
    "Indicates the asynchronous transmission selection algorithm.";
  reference
    "Table 8-6 of IEEE Std 802.1Q-2022";
}
identity vendor-specific {
  base transmission-selection-algorithm;
  description
    "Indicates a vendor specific transmission selection algorithm.";
  reference
    "Table 8-6 of IEEE Std 802.1Q-2022";
}
typedef name-type {
  type string {
    length "0..32";
  }
  description
    "A text string of up to 32 characters, of locally determined
    significance.";
}
typedef port-number-type {
  type uint32 {
    range "1..4095";
  }
  description
    "The port number of the Bridge port for which this entry contains
    Bridge management information.";
}
typedef priority-type {
  type uint8 {
    range "0..7";
  }
  description
    "A range of priorities from 0 to 7 (inclusive). The Priority Code
    Point (PCP) is a 3-bit field that refers to the class of service
    associated with an 802.1Q VLAN tagged frame. The field specifies a
    priority value between 0 and 7, these values can be used by quality
    of service (QoS) to prioritize different classes of traffic.";
}
typedef num-traffic-class-type {
  type uint8 {
    range "1..8";
  }
  description
    "The number of traffic classes supported or participating in a
    particular feature. There are between 1 and 8 supported traffic
    classes defined by IEEE Std 802.1Q.";
}
typedef vid-range-type {
  type string {
    pattern
      "([1-9]"+
      "[0-9]{0,3}"+
      "(-[1-9][0-9]{0,3})?"+
      "(,[1-9][0-9]{0,3}(-[1-9][0-9]{0,3})?)*)";
  }
  description
```

```
    "A list of VLAN Ids, or non overlapping VLAN ranges, in ascending
    order, between 1 and 4094.

    This type is used to match an ordered list of VLAN Ids, or
    contiguous ranges of VLAN Ids. Valid VLAN Ids must be in the range
    1 to 4094, and included in the list in non overlapping ascending
    order.

    For example: 1,10-100,250,500-1000";
}
typedef vlanid {
  type uint16 {
    range "1..4094";
  }
  description
    "The vlanid type uniquely identifies a VLAN. This is the 12-bit
    VLAN-ID used in the VLAN Tag header. The range is defined by the
    referenced specification. This type is in the value set and its
    semantics equivalent to the VlanId textual convention of the SMIv2.";
}
typedef vlan-index-type {
  type uint32 {
    range "1..4094 | 4096..4294967295";
  }
  description
    "A value used to index per-VLAN tables. Values of 0 and 4095 are
    not permitted. The range of valid VLAN indices. If the value is
    greater than 4095, then it represents a VLAN with scope local to
    the particular agent, i.e., one without a global VLAN-ID assigned
    to it. Such VLANs are outside the scope of IEEE 802.1Q, but it is
    convenient to be able to manage them in the same way using this
    YANG module.";
  reference
    "9.6 of IEEE Std 802.1Q-2022";
}
typedef mstid-type {
  type uint32 {
    range "1..4094";
  }
  description
    "In an MSTP Bridge, an MSTID, i.e., a value used to identify a
    spanning tree (or MST) instance";
  reference
    "13.8 of IEEE Std 802.1Q-2022";
}
typedef pcp-selection-type {
  type enumeration {
    enum 8P0D {
      description
        "8 priorities, 0 drop eligible";
    }
    enum 7P1D {
      description
        "7 priorities, 1 drop eligible";
    }
    enum 6P2D {
      description
        "6 priorities, 2 drop eligible";
    }
    enum 5P3D {
      description
        "5 priorities, 3 drop eligible";
    }
  }
  description
    "Priority Code Point selection types.";
  reference
    "12.6.2.5.3, 6.9.3 of IEEE Std 802.1Q-2022";
}
typedef protocol-frame-format-type {
  type enumeration {
    enum Ethernet {
      description
        "Ethernet frame format";
    }
    enum rfc1042 {
      description
        "RFC 1042 frame format";
    }
    enum snap8021H {
      description
        "SNAP 802.1H frame format";
    }
    enum snapOther {
      description
        "Other SNAP frame format";
    }
    enum llcOther {
      description
        "Other LLC frame format";
    }
  }
  description
    "A value representing the frame format to be matched.";
  reference
    "12.10.1.7.1 of IEEE Std 802.1Q-2022";
}
typedef ethertype-type {
  type string {
    pattern "[0-9a-fA-F]{2}-[0-9a-fA-F]{2}";
  }
  description
    "The EtherType value represented in the canonical order defined by
    IEEE 802. The canonical representation uses uppercase characters.";
  reference
    "9.2 of IEEE Std 802-2014";
}
typedef dot1q-tag-type {
  type identityref {
    base dot1q-vlan-type;
  }
  description
    "Identifies a specific 802.1Q tag type";
  reference
    "9.5 IEEE Std 802.1Q-2022";
}
typedef traffic-class-type {
  type uint8 {
    range "0..7";
  }
  description
    "This is the numerical value associated with a traffic class in a
    Bridge. Larger values are associated with higher priority traffic
    classes.";
  reference
    "3.273 of IEEE Std 802.1Q-2022";
}
typedef isid-type {
  type uint32 {
    range "1|255..16777214";
  }
  description
    "The i-sid type represents a backbone service instance identifier
    (I-SID). This is the 24-bit I-SID field used in the I-TAG TCI of a
    provider backbone bridging frame. The values 0, 2-254, and 16777215 are
   reserved for future standardization. The value 255 is dedicated to
   use by the SPB protocol.";
  reference
    "3.108, 9.7 of IEEE Std 802.1Q-2022";
}
grouping dot1q-tag-classifier-grouping {
  description
    "A grouping which represents an 802.1Q VLAN, matching both the
    EtherType and a single VLAN Id.";
  leaf tag-type {
    type dot1q-tag-type;
    mandatory true;
    description
      "VLAN type";
  }
  leaf vlan-id {
    type vlanid;
    mandatory true;
    description
      "VLAN Id";
  }
}
grouping dot1q-tag-or-any-classifier-grouping {
  description
    "A grouping which represents an 802.1Q VLAN, matching both the
    EtherType and a single VLAN Id or 'any' to match on any VLAN Id.";
  leaf tag-type {
    type dot1q-tag-type;
    mandatory true;
    description
      "VLAN type";
  }
  leaf vlan-id {
    type union {
      type vlanid;
      type enumeration {
        enum any {
          value 4095;
          description
            "Matches 'any' VLAN in the range 1 to 4094 that is not
            matched by a more specific VLAN Id match";
        }
      }
    }
    mandatory true;
    description
      "VLAN Id or any";
  }
}
grouping dot1q-tag-ranges-classifier-grouping {
  description
    "A grouping which represents an 802.1Q VLAN that matches a range of
    VLAN Ids.";
  leaf tag-type {
    type dot1q-tag-type;
    mandatory true;
    description
      "VLAN type";
  }
  leaf vlan-ids {
    type vid-range-type;
    mandatory true;
    description
      "VLAN Ids";
  }
}
grouping dot1q-tag-ranges-or-any-classifier-grouping {
  description
    "A grouping which represents an 802.1Q VLAN, matching both the
    EtherType and a single VLAN Id, ordered list of ranges, or 'any' to
    match on any VLAN Id.";
  leaf tag-type {
    type dot1q-tag-type;
    mandatory true;
    description
      "VLAN type";
  }
  leaf vlan-id {
    type union {
      type vid-range-type;
      type enumeration {
        enum any {
          value 4095;
          description
            "Matches 'any' VLAN in the range 1 to 4094.";
        }
      }
    }
    mandatory true;
    description
      "VLAN Ids or any";
  }
}
grouping priority-regeneration-table-grouping {
  description
    "The priority regeneration table provides the ability to map
    incoming priority values on a per-Port basis, under management
    control.";
  reference
    "6.9.4 of IEEE Std 802.1Q-2022";
  leaf priority0 {
    type priority-type;
    default "0";
    description
      "Priority 0";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority1 {
    type priority-type;
    default "1";
    description
      "Priority 1";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority2 {
    type priority-type;
    default "2";
    description
      "Priority 2";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority3 {
    type priority-type;
    default "3";
    description
      "Priority 3";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority4 {
    type priority-type;
    default "4";
    description
      "Priority 4";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority5 {
    type priority-type;
    default "5";
    description
      "Priority 5";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority6 {
    type priority-type;
    default "6";
    description
      "Priority 6";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
  leaf priority7 {
    type priority-type;
    default "7";
    description
      "Priority 7";
    reference
      "12.6.2.3, 6.9.4 of IEEE Std 802.1Q-2022";
  }
}
grouping pcp-decoding-table-grouping {
  description
    "The Priority Code Point decoding table enables the decoding of the
    priority and drop-eligible parameters from the PCP.";
  reference
    "6.9.3 of IEEE Std 802.1Q-2022";
  list pcp-decoding-map {
    key "pcp";
    description
      "This map associates the priority code point field found in the
      VLAN to a priority and drop eligible value based upon the
      priority code point selection type.";
    leaf pcp {
      type pcp-selection-type;
      description
        "The priority code point selection type.";
      reference
        "12.6.2.7, 6.9.3 of IEEE Std 802.1Q-2022";
    }
    list priority-map {
      key "priority-code-point";
      description
        "This map associated a priority code point value to priority
        and drop eligible parameters.";
      leaf priority-code-point {
        type priority-type;
        description
          "Priority associated with the pcp.";
        reference
          "12.6.2.7, 6.9.3 of IEEE Std 802.1Q-2022";
      }
      leaf priority {
        type priority-type;
        description
          "Priority associated with the pcp.";
        reference
          "12.6.2.7, 6.9.3 of IEEE Std 802.1Q-2022";
      }
      leaf drop-eligible {
        type boolean;
        description
          "Drop eligible value for pcp";
        reference
          "12.6.2.7, 6.9.3 of IEEE Std 802.1Q-2022";
      }
    }
  }
}
grouping pcp-encoding-table-grouping {
  description
    "The Priority Code Point encoding table encodes the priority and
    drop-eligible parameters in the PCP field of the VLAN tag.";
  reference
    "12.6.2.9, 6.9.3 of IEEE Std 802.1Q-2022";
  list pcp-encoding-map {
    key "pcp";
    description
      "This map associated the priority and drop-eligible parameters to
      the priority used to encode the PCP of the VLAN based upon the
      priority code point selection type.";
    leaf pcp {
      type pcp-selection-type;
      description
        "The priority code point selection type.";
      reference
        "12.6.2.7, 6.9.3 of IEEE Std 802.1Q-2022";
    }
    list priority-map {
      key "priority dei";
      description
        "This map associated the priority and drop-eligible parameters
        to the priority code point field of the VLAN tag.";
      leaf priority {
        type priority-type;
        description
          "Priority associated with the pcp.";
        reference
          "12.6.2.7, 6.9.3 of IEEE Std 802.1Q-2022";
      }
      leaf dei {
        type boolean;
        description
          "The drop eligible value.";
        reference
          "12.6.2, 8.6.6 of IEEE Std 802.1Q-2022";
      }
      leaf priority-code-point {
        type priority-type;
        description
          "PCP value for priority when DEI value";
        reference
          "12.6.2.9, 6.9.3 of IEEE Std 802.1Q-2022";
      }
    }
  }
}
grouping service-access-priority-table-grouping {
  description
    "The Service Access Priority Table associates a received priority
    with a serice access priority.";
  reference
    "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  leaf priority0 {
    type priority-type;
    default "0";
    description
      "Service access priority value for priority 0";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority1 {
    type priority-type;
    default "1";
    description
      "Service access priority value for priority 1";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority2 {
    type priority-type;
    default "2";
    description
      "Service access priority value for priority 2";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority3 {
    type priority-type;
    default "3";
    description
      "Service access priority value for priority 3";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority4 {
    type priority-type;
    default "4";
    description
      "Service access priority value for priority 4";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority5 {
    type priority-type;
    default "5";
    description
      "Service access priority value for priority 5";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority6 {
    type priority-type;
    default "6";
    description
      "Service access priority value for priority 6";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
  leaf priority7 {
    type priority-type;
    default "7";
    description
      "Service access priority value for priority 7";
    reference
      "12.6.2.17, 6.13.1 of IEEE Std 802.1Q-2022";
  }
}
grouping traffic-class-table-grouping {
  description
    "The Traffic Class Table models the operations that can be
    performed on, or inquire about, the current contents of the Traffic
    Class Table (8.6.6) for a given Port.";
  reference
    "12.6.3, 8.6.6 of IEEE Std 802.1Q-2022";
  list traffic-class-map {
    key "priority";
    description
      "The priority index into the traffic class table.";
    leaf priority {
      type priority-type;
      description
        "The priority of the traffic class entry.";
      reference
        "8.6.6 of IEEE Std 802.1Q-2022";
    }
    list available-traffic-class {
      key "num-traffic-class";
      description
        "The traffic class index associated with a given priority
        within the traffic class table.";
      reference
        "8.6.6 of IEEE Std 802.1Q-2022";
      leaf num-traffic-class {
        type uint8 {
          range "1..8";
        }
        description
          "The available number of traffic classes.";
        reference
          "8.6.6 of IEEE Std 802.1Q-2022";
      }
      leaf traffic-class {
        type traffic-class-type;
        description
          "The traffic class index associated with a given traffic
          class entry.";
        reference
          "8.6.6 of IEEE Std 802.1Q-2022";
      }
    }
  }
}
grouping transmission-selection-table-grouping {
  description
    "The Transmission Selection Algorithm Table models the operations
    that can be performed on, or inquire about, the current contents of
    the Transmission Selection Algorithm Table (12.20.2) for a given
    Port.";
  reference
    "12.20.2, 8.6.8 of IEEE Std 802.1Q-2022";
  list transmission-selection-algorithm-map {
    key "traffic-class";
    description
      "The traffic class to index into the transmission selection
      table.";
    leaf traffic-class {
      type traffic-class-type;
      description
        "The traffic class of the entry.";
      reference
        "8.6.6 of IEEE Std 802.1Q-2022";
    }
    leaf transmission-selection-algorithm {
      type identityref {
        base dot1q-types:transmission-selection-algorithm;
      }
      description
        "Transmission selection algorithm";
      reference
        "8.6.8, Table 8-6 of IEEE Std 802.1Q-2022";
    }
  }
}
grouping port-map-grouping {
  description
    "A set of control indicators, one for each Port. A Port Map,
    containing a control element for each outbound Port";
  reference
    "8.8.1, 8.8.2 of IEEE Std 802.1Q-2022";
  list port-map {
    key "port-ref";
    description
      "The list of entries composing the port map.";
    leaf port-ref {
      type port-number-type;
      description
        "The interface port reference associated with this map.";
      reference
        "8.8.1 of IEEE Std 802.1Q-2022";
    }
    choice map-type {
      description
        "Type of port map";
      container static-filtering-entries {
        description
          "Static filtering entries attributes.";
        leaf control-element {
          type enumeration {
            enum forward {
              description
                "Forwarded, independently of any dynamic filtering
                information held by the FDB.";
            }
            enum filter {
              description
                "Filtered, independently of any dynamic filtering
                information.";
            }
            enum forward-filter {
              description
                "Forwarded or filtered on the basis of dynamic
                filtering information, or on the basis of the default
                Group filtering behavior for the outbound Port (8.8.6)
                if no dynamic filtering information is present
                specifically for the MAC address.";
            }
          }
          description
            "containing a control element for each outbound Port,
            specifying that a frame with a destination MAC address, and
            in the case of VLAN Bridge components, VID that meets this
            specification.";
          reference
            "8.8.1 of IEEE Std 802.1Q-2022";
        }
        leaf connection-identifier {
          type port-number-type;
          description
            "A Port MAP may contain a connection identifier (8.8.12)
            for each outbound port. The connection identifier may be
            associated with the Bridge Port value maintained in a
            Dynamic Filtering Entry of the FDB for Bridge Ports.";
          reference
            "8.8.1, 8.8.12 of IEEE Std 802.1Q-2022";
        }
      }
      container static-vlan-registration-entries {
        description
          "Static VLAN registration entries.";
        leaf registrar-admin-control {
          type enumeration {
            enum fixed-new-ignored {
              description
                "Registration Fixed (New ignored).";
            }
            enum fixed-new-propagated {
              description
                "Registration Fixed (New propagated.";
            }
            enum forbidden {
              description
                "Registration Forbidden.";
            }
            enum normal {
              description
                "Normal Registration.";
            }
          }
          description
            "The Registrar Administrative Control values for MVRP and
            MIRP for the VID.";
          reference
            "8.8.2 of IEEE Std 802.1Q-2022";
        }
        leaf vlan-transmitted {
          type enumeration {
            enum tagged {
              description
                "VLAN-tagged";
            }
            enum untagged {
              description
                "VLAN-untagged";
            }
          }
          description
            "Whether frames are to be VLAN-tagged or untagged when
            transmitted.";
          reference
            "8.8.2 of IEEE Std 802.1Q-2022";
        }
      }
      container mac-address-registration-entries {
        description
          "MAC address registration entries attributes.";
        leaf control-element {
          type enumeration {
            enum registered {
              description
                "Forwarded, independently of any dynamic filtering
                information held by the FDB.";
            }
            enum not-registered {
              description
                "Filtered, independently of any dynamic filtering
                information.";
            }
          }
          description
            "containing a control element for each outbound Port,
            specifying that a frame with a destination MAC address, and
            in the case of VLAN Bridge components, VID that meets this
            specification.";
          reference
            "8.8.4 of IEEE Std 802.1Q-2022";
        }
      }
      container dynamic-vlan-registration-entries {
        description
          "Dynamic VLAN registration entries attributes.";
        leaf control-element {
          type enumeration {
            enum registered {
              description
                "Forwarded, independently of any dynamic filtering
                information held by the FDB.";
            }
          }
          description
            "containing a control element for each outbound Port,
            specifying that a frame with a destination MAC address, and
            in the case of VLAN Bridge components, VID that meets this
            specification.";
          reference
            "8.8.5 of IEEE Std 802.1Q-2022";
        }
      }
      container dynamic-reservation-entries {
        description
          "Dynamic reservation entries attributes.";
        leaf control-element {
          type enumeration {
            enum forward {
              description
                "Forwarded, independently of any dynamic filtering
                information held by the FDB.";
            }
            enum filter {
              description
                "Filtered, independently of any dynamic filtering
                information.";
            }
          }
          description
            "Containing a control element for each outbound Port,
            specifying that a frame with a destination MAC address, and
            in the case of VLAN Bridge components, VID that meets this
            specification.";
          reference
            "8.8.7 of IEEE Std 802.1Q-2022";
        }
      }
      container dynamic-filtering-entries {
        description
          "Dynamic filtering entries attributes.";
        leaf control-element {
          type enumeration {
            enum forward {
              description
                "Forwarded, independently of any dynamic filtering
                information held by the FDB.";
            }
          }
          description
            "Containing a control element for each outbound Port,
            specifying that a frame with a destination MAC address, and
            in the case of VLAN Bridge components, VID that meets this
            specification.";
          reference
            "8.8.3 of IEEE Std 802.1Q-2022";
        }
      }
    }
  }
}
grouping bridge-port-statistics-grouping {
  description
    "Grouping of bridge port statistics.";
  reference
    "12.6.1.1.3 of IEEE Std 802.1Q-2022";
  leaf delay-exceeded-discards {
    type yang:counter64;
    description
      "The number of frames discarded by this port due to excessive
      transit delay through the Bridge. It is incremented by both
      transparent and source route Bridges.";
    reference
      "12.6.1.1.3, 8.6.6 of IEEE Std 802.1Q-2022";
  }
  leaf mtu-exceeded-discards {
    type yang:counter64;
    description
      "The number of frames discarded by this port due to an excessive
      size. It is incremented by both transparent and source route
      Bridges.";
    reference
      "Item g) in 12.6.1.1.3 of IEEE Std 802.1Q-2022";
  }
  leaf frame-rx {
    type yang:counter64;
    description
      "The number of frames that have been received by this port from
      its segment. Note that a frame received on the interface
      corresponding to this port is only counted by this object if and
      only if it is for a protocol being processed by the local
      bridging function, including Bridge management frames.";
    reference
      "12.6.1.1.3 of IEEE Std 802.1Q-2022";
  }
  leaf octets-rx {
    type yang:counter64;
    description
      "The total number of octets in all valid frames received
      (including BPDUs, frames addressed to the Bridge as an end
      station, and frames that were submitted to the Forwarding
      Process).";
    reference
      "12.6.1.1.3 of IEEE Std 802.1Q-2022";
  }
  leaf frame-tx {
    type yang:counter64;
    description
      "The number of frames that have been transmitted by this port to
      its segment. Note that a frame transmitted on the interface
      corresponding to this port is only counted by this object if and
      only if it is for a protocol being processed by the local
      bridging function, including Bridge management frames.";
  }
  leaf octets-tx {
    type yang:counter64;
    description
      "The total number of octets that have been transmitted by this
      port to its segment.";
  }
  leaf discard-inbound {
    type yang:counter64;
    description
      "Count of received valid frames that were discarded (i.e.,
      filtered) by the Forwarding Process.";
    reference
      "12.6.1.1.3 of IEEE Std 802.1Q-2022";
  }
  leaf forward-outbound {
    type yang:counter64;
    description
      "The number of frames forwarded to the associated MAC Entity
      (8.5).";
    reference
      "12.6.1.1.3 of IEEE Std 802.1Q-2022";
  }
  leaf discard-lack-of-buffers {
    type yang:counter64;
    description
      "The count of frames that were to be transmitted through the
      associated Port but were discarded due to lack of buffers.";
    reference
```

```
        "12.6.1.1.3 of IEEE Std 802.1Q-2022";
    }
    leaf discard-transit-delay-exceeded {
      type yang:counter64;
      description
        "The number of frames discarded by this port due to excessive
        transit delay through the Bridge. It is incremented by both
        transparent and source route Bridges.";
      reference
        "12.6.1.1.3 of IEEE Std 802.1Q-2022";
    }
    leaf discard-on-error {
      type yang:counter64;
      description
        "The number of frames that were to be forwarded on the associated
        MAC but could not be transmitted (e.g., frame would be too large,
        6.5.8).";
      reference
        "12.6.1.1.3 of IEEE Std 802.1Q-2022";
    }
  }
}
```

50. PBBN auto attach

When a C-VLAN aware system is connected to Provider Backbone Bridged Network (PBBN) the Backbone Edge Bridge's (BEB's) mapping of the Backbone Service Instance Identifiers (I-SIDs) to the C-VLAN Identifiers (C-VIDs) used by the system needs to be configured. This clause specifies an Auto Attach Protocol (AAP) that runs over the Link Layer Discovery Protocol (LLDP, IEEE Std 802.1AB) and allows auto attach capable devices (AADs) and BEBs (AABs) to automate this configuration. Clause 12 (Bridge Management) and Clause 17 (Management Information Base) specify supporting management functionality, and Annex D specifies LLDP TLVs and TLV management for auto attach..

50.1 Overview

In order to automate the attachment of Auto Attach Devices (AADs) to an Auto Attach BEB (AAB), the Auto Attach Protocol (AAP) is used. The AAP, which runs over LLDP, avoids manual configuration by mapping C-VIDs to I-SIDs to establish a C-VLAN to BSI mapping at the AAB. The AAP is only supported over a point-to-point single peer-to-peer topology.

Figure 50-1 depicts the auto attach architectural framework model that allows an AAD to communicate VLAN to BSI mappings requests for attachment over a PBBN.

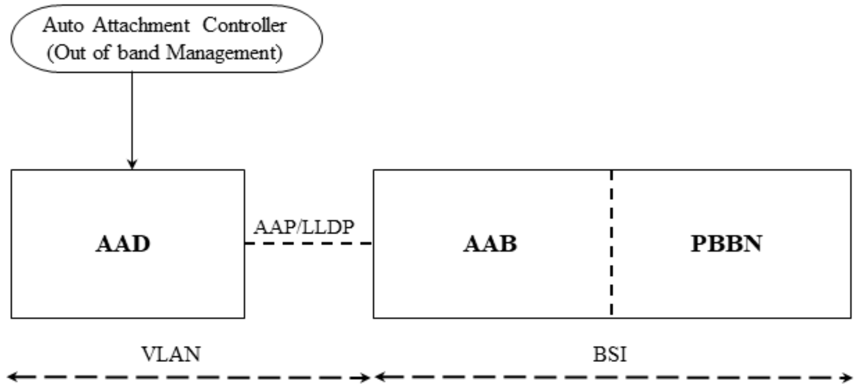

Figure 50-1—PBBN auto attach model

The conceptual example in Figure 50-1depicts the process where an AAD end station or bridge uses AAP running over LLDP to communicate the need to connect a C-VLAN to the appropriate BSI via the AAB. This is enabled by LLDP agents exchanging LLDP 802.1 organizationally specific auto attach TLVs defined in this document (D.2.17, D.2.18) to automate VID to I-SID assignment and registration.

An AAD is an end station, C-VLAN bridge or MAC bridge that advertises desired C-VID to I-SID assignments using the LLDP PBBN Auto Attach System TLV (D.2.17) and PBBN Auto Attach Assignment TLV (D.2.18).

An AAB is a BEB along with C-VLAN components that manages and maintains C-VID to I-SID assignments used to attach AADs. An AAB uses LLDP auto attach system and assignment TLVs to activate C-VID to I-SID assignments advertised by the assignment TLVs.

The AAP operates between an AAB and an AAD port. The AAP controls the exchange of LLDP auto attach TLVs, and configuration of VLAN and BSI mappings between the participating systems.

The AAP invokes LLDP when there is a change to an auto attach TLV by invoking the SomethingChangedLocal() procedure, specified by IEEE Std 802.1AB, causing transmission to a peer AAS. Likewise, an AAS will be invoked by LLDP when there is an update to an auto attach TLV triggering the SomethingChangedRemote() procedure, specified by IEEE Std 802.1AB.

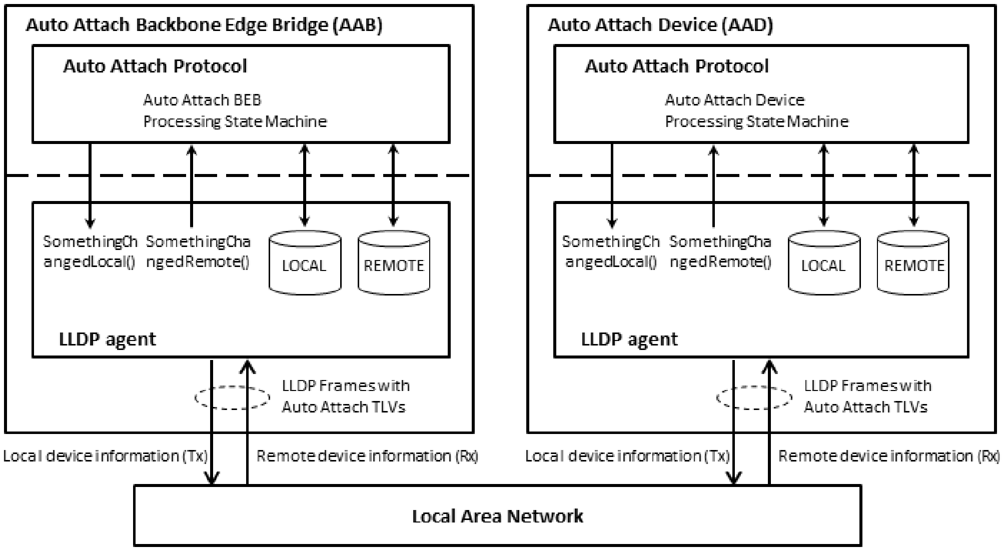

Figure 50-2—PBBN auto attach functions diagram

Figure 50-2 depicts the auto attach functions that invoke the base LLDP transmission and reception of LLDPDUs. The LLDP state machines are defined in Clause 9 of IEEE Std 802.1AB-2016™.

50.2 Service interfaces

An AAB provides two types of service interfaces one for S-VLAN service and another for C-VLAN service. Which of these interfaces is selected is determined by the AAD system type requesting attachment. If the AAD system type is S-VLAN aware AAD then the AAB provides and S-VLAN service interface and all mappings within the assignment TLV are for S-VID to I-SID. For all other AAD types a C-VLAN service interface is provided and all mappings within the assignment TLV are for C-VID to I-SID.

50.2.1 S-VLAN service interface

The S-tagged service interface maps a service instance from a Provider Bridged Network (PBN), identified by a S-VID, to a backbone service instance on the PBBN, identified by an I-SID. The S-tagged service interface performs a one-to-one mapping of S-VIDs to I-SIDs. Frames that are mapped to the I-SID are carried over the PBBN while frames that are not mapped to an I-SID are not carried over the PBBN.

A S-tagged service interface is provided by an AAB over a Customer Network Port provided by the AAB's I-Component. The S-tagged interface does not carry the S-TAG over the PBBN. The DEI and PCP bits are regenerated on ingress and are then carried in the I-DEI and I-PCP bits in the I-TAG across the PBBN. On egress to a S-tagged interface, the S-TAG can be deduced from the I-TAG received from the PBBN (the I-SID is mapped to an S-VID, the I-DEI and I-PCP bits are regenerated and then carried in the DEI and PCP bits).

50.2.2 C-VLAN service interface

The C-tagged service interface maps a service instance from a Customer Bridged Network (CBN), identified by a C-VID, to a backbone service instance on the PBBN, identified by an I-SID. The C-tagged service interface performs a one-to-one mapping of C-VIDs to I-SIDs. Frames that are mapped to the I-SID are carried over the PBBN while frames that are not mapped to an I-SID are not carried over the PBBN.

A C-tagged service interface is provided by an AAB over a Customer Edge Port (CEP) as illustrated by Figure 50-3. The C-tagged interface does not carry the C-TAG over the PBBN. The DEI and PCP bits are regenerated on ingress and are then carried in the I-DEI and I-PCP bits in the I-TAG across the PBBN. On egress to a C-tagged interface, the C-TAG can be deduced from the I-TAG received from the PBBN (the I-SID is mapped to an C-VID, the I-DEI and I-PCP bits are regenerated and then carried in the DEI and PCP bits).

Each of the C-VLAN components used to provide CEP service at the edge of an AAB is comprised of a single CEP and a single Provider Edge Port (PEP) for each service instance that can be provided through that CEP. Each PEP is connected within the AAB, as specified in 6.14, to a distinct CNP on the I-component. Each C-VLAN component will implement RSTP, with the enhancements to support CEPs, as specified in 13.41.

NOTE 1-The restriction that each CBN C-VLAN map to a single backbone service instance on the PBBN allows the CBN equipment receiving frames to correctly identify the service instance used to deliver that frame and prevents the configuration of the I-component to create a multi-point service from point-to-point service instances, which could result in accidental creation of data loops. The backbone provider can offer a multi-point service through appropriate configuration of the B-VLAN component.

Figure 50-3 illustrates a CBN attached to a PBBN using an C-tagged service interface. The customer network uses C-VLAN aware end stations or bridges connecting to the PBBN. The PBBN in turn is composed of AABs or BEBs interfacing to the customer Provider Bridges and BCBs used to forward frames between the AABs or BEBs.

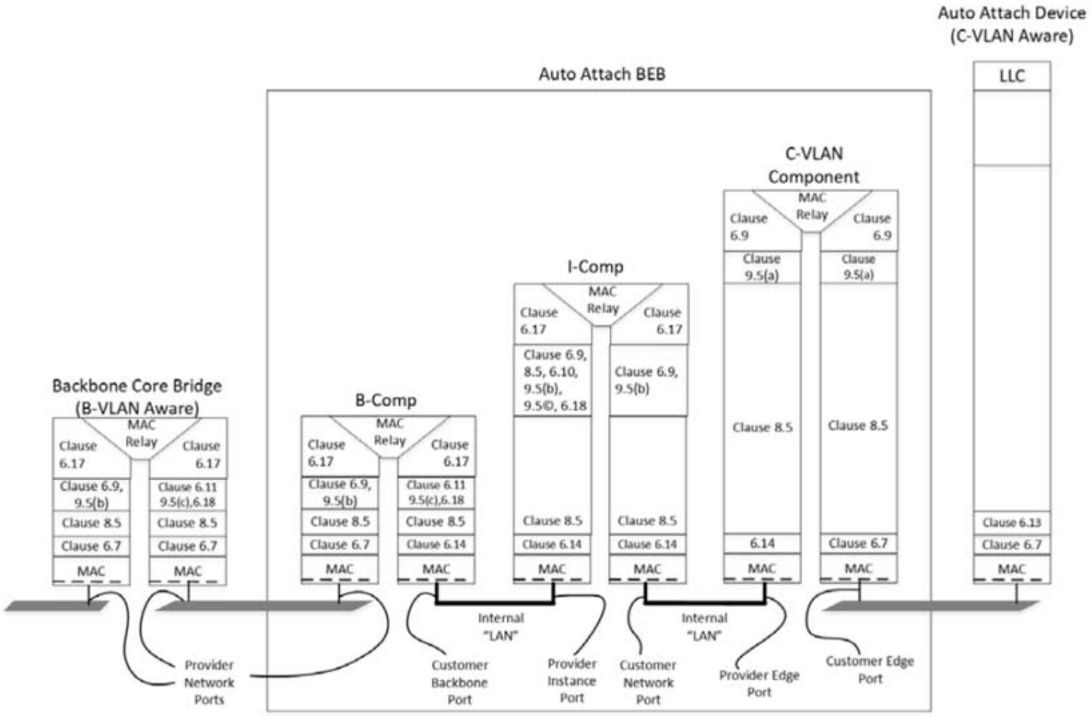

Figure 50-3—PBBN auto attach for customer networks

Customer VLAN unaware bridges and MAC relay end station equipment can connect to Customer Network Port s(CNPs) using an unprotected port based service interface (25.3).

Service attachment requests from VLAN unaware (untagged) AADs send an assignment TLV with one VID / I-SID assignment to the AAB. The port based service interface on the AAB uses the specified VID to update port VLAN membership used by the CNP to map the VID to an I-Component.

The port based service interface allows a single mapping instance of an untagged service to an I-SID.

NOTE 2: An AAB includes both BEB and Provider Edge Bridge components. In particular, an AAB supports a C-tagged service interface (15.4) for attachment to a CBN by including a C-VLAN component with PEPs that connect to the CNPs of an I-component.

50.3 State machine overview

The AAP is specified by the external behavior indicated by the AAD state machine in 50.6 and the AAB state machine in 50.7. These AAP state machines operate over LLDP on a point-to-point single peer-to-peer topology. Each port enabled for auto attach runs an independent copy of the AAP.

When auto attach is enabled on a port, the AAP begins to write and read information to the local system LLDP database. The initial process for an AAS is to write system information into the local LLDP database. Information written into the LLDP database is transmitted on the port within the PBBN Auto Attach System TLV in the next LLDPDU interval. Once an AAS has learned its neighbors and formed an association with a neighboring AAS, the AAD can update the local LLDP database with assignment mappings which will be transmitted on the port within the PBBN Auto Attach Assignment TLV. The AAB will receive the assignment mappings advertised by the AAD in the remote LLDP database. When the AAB receives new VID / I-SID assignments from the AAD it will determine if it can activate them. The AAB will then update its local database with the VID/I-SID pairs from the AAD and indicate the status as pending, active, or rejected-with reasons. For rejected assignments the AAB will supply some further information with the cause for the rejection.

The AAP state machines diagrams (50.6, 50.7) specify state transitions based on changes to the local structures aaRemSysTlv and aaRemAsgnsTlv. These structures are updated whenever the LLDP routine SomethingChangedRemote() calls the auto attach LLDP call back procedure (50.5.16). The structure aaRemSysTlv reflects the current PBBN Auto Attach System TLV within the remote LLDP database, however transformed to machine local byte and bit order. The structure aaRemAsgnsTlv reflects the current PBBN Auto Attach Assignment TLV within the remote LLDP database, however transformed to machine local byte and bit order. If no remote database is present or if either auto attach TLV is absent in the remote database then aaRemSysTlv and(or) aaRemAsgnsTlv will be set to NULL.

When an system TLV (D.2.17) is received, the AAS enters the ValidateRemoteAssociation state to determine whether an association can be formed with the AAS neighbor.

The following actions are performed by the state machine to validate an association:

— for an AAS verify we have a point-to-point single peer-to-peer topology on this port by verifying there is only a single remote LLDP database
— for an AAS verify there is only a single system TLV in the remote database
— for an AAD verify the assoc state of the remote system is READY-TO-ASSOC
— for an AAD verify the remote system type is AAB
— for an AAD verify the AAB tagging matches the AAD
— for an AAB verify the remote system type is AAD
— for an AAB verify the AAD tagging is supported and indicated in the AAB system TLV

If there is an error validating the remote system, such as a system type mismatch, ValidateRemoteAssociation continues to check any received system TLVs until an error free configuration is detected.

Note: In the event that two AASs of the same type are connected, for example AAB to an AAB or AAD to an AAD, auto attach system TLVs are still exchanged allowing systems to discover each other. However, no association is formed and no assignment TLV processing occurs.

Once the system TLV validation has completed the AAD verifies if it already has an active association on a different port. If no other association is active, then the AAD activates the association on this port and begins sending assignment TLVs. If the AAD finds it already has an active association on a different port it holds this association in standby and does not issue an assignment TLV for this port. If the AAD active association is disabled or fails, the AAD state machine will reset the port and restart the association process on that port. On restart the AAD breaks all assignments on the reset port, withdraws all auto attach LLDP TLVs, resynchronizes with the peer AAB state machine and starts the association process over. If the AAD has any associations in standby the first to recognize the active association has broken will become active and issue an assignment TLV.

The AAB can only accept assignment TLVs from an AAD with a valid system TLV. The AAB only allows a single active association for each AAD. If the AAB finds an AAD attempting to activate a port with an invalid system TLV or if the AAD attempts to activate more than one association, the AAB will reset its port invalidating the association and forcing a restart of the peer AAD state machine. On restart the AAB breaks all assignments on the reset port, withdraws all auto attach LLDP TLVs, resynchronizes with the peer AAD state machine and starts the association process over.

An AAD is responsible for initiating one or more VID / I-SID assignment binding requests and sending them to the AAB in the assignment TLV. The AAD uses aaAdminPortVidIsidAsgns[] (50.4.3.2) to determine the requested assignments. Bindings are individually processed by the AAB to determine whether the specified VID can be bound to the I-SID. If the binding is allowed, the AAB creates the VLAN and BSI as indicated by the AAD assignment TLV. Once all assignments are updated, the assignment TLV is updated by the AAB and sent to the AAD with the status of all assignment requests. The AAD updates all VID / I-SID assignments and reflects the current status back to the AAB in its assignment TLV.

50.3.1 System inactivity

If the remote LLDP database for an AAS is deleted or if the LLDP auto attach TLVs are deleted from the database or if the LLDP system TLVs are not received, then all operating VID to I-SID assignments are deactivated and the AAP restarts.

50.3.2 Multiple AAD systems

The auto attach function is intended to operate in a point-to-point single peer-to-peer topology. Multiple AADs are not permitted to form an association on a single AAB port. Only one AAD system is permitted to form an association per port interface of an AAB.

50.3.3 AAD assignment requests

Assignment mapping requests are communicated from the AAD to the AAB using the auto attach assignment TLV (D.2.18). These service assignment requests are a combination of the VID / I-SID mapping and assignment status.

Assignment mappings are established when two criteria are met:

1) An AAB is discovered by an AAD and has a valid remote association determined by the ValidateRemoteAssociation state machine procedures (50.6).
2) The auto attach variable aaAdminPortVidIsidAsgns[] for this port is configured with one or more VID / I-SID assignments using the management interface (12.34.4).

50.3.4 AAB assignment request processing

Each VLAN that is associated with an VID / I-SID assignment mapping is held on the AAD. The port associated with the link connecting the AAD to the AAB is a member of the VLAN(s) in the VID / I-SID assignment list received and accepted by the AAB. This allows traffic on these VLANs to pass into the BSI.

All initial VID / I-SID assignment mapping requests are sent by the AAD with an assignment status of pending until the AAB completes processing the request. The AAD updates and reflects the assignment status changes for each VID / I-SID according to the last assignment status received from the AAB.

Each VID / I-SID assignment request received by the AAB is processed individually and is either accepted or rejected. Assignment requests are processed for interfaces on which the port is in operation, LLDP is enabled, auto attach TLV processing is enabled, and AAS valid association has occurred.

If an assignment is accepted the following happens:

— Each VLAN that is associated with an accepted VID / I-SID assignment is instantiated on the AAB if it does not already exist, in order that proper data packet encapsulation and decapsulation is supported.

There are two conditions associated with the interface assignment mapping and binding process:

1) If the I-SID already exists on the AAB, due to a previous configuration from any type of interface binding method, then the AAB configures the associated interface to the pre-existing I-SID.
2) If the I-SID does not exist on the AAB already, then it is responsible for creating the BSI with the associated I-SID.

Port tagging and port VLAN membership updates are performed by the AAD based on assignment acceptance.

If an assignment is rejected, a response with a reason is returned to the AAD based on the following:

- generic (undefined rejection error)
- auto attach resources unavailable
- invalid VLAN ID
- VLAN resources unavailable
- invalid I-SID
- I-SID resources unavailable
- application interaction (VLAN, PBB) issue
- assignment not allowed

Rejected assignments are returned to the originating AAD with a rejected status and indicate why the rejection occurred using status as defined in subclause D.2.18.6. An AAD will continue to request a rejected assignment until the assignment is administratively removed.

50.3.5 Assignment updates

All active VID / I-SID assignments on the AAB are updated using the current assignment TLV information from the AAD.

When a new assignment TLV is received at the AAB containing additional mapping requests, removing existing mapping requests, or changing existing mapping requests the AAB state machine will process the new requests by adding, deleting or updating the assignment which were changed in the new assignment TLV.

If one or more VID / I-SID assignments are not present in any subsequent assignment TLVs from the AAD, the AAB removes the mapping of those missing assignments from the active list and releases the binding.

50.4 State machine variables

The auto attach state machines use both port local (50.4.3) and system wide variables (50.4.2). Updating a system wide variable requires locked assess to assure consistency since multiple instances of the state machines (one per port) can access the system wide variables.

The auto attach state machines uses some complex structures (50.4.1). These structures are copied and compared within the state machines in the same manner as strings. Copies will result in a new structure of the same length and content duplicated in a new variable. Compares will test equal when two structures are exactly the same size and content, otherwise they are not equal.

Arrays are indexed with their first element starting at zero.

When manipulating structures the state machine diagrams use dot notation to illustrate access to objects within a structure. The syntax for accessing the objects within a structure used in the state machines is:

```
<structure instance>.<object name>
```

At times the state machine diagrams need to exclude a field from a structure which is being compared as a string. This is expressed by prefixing the object name with “except”:

```
      <structure instance>.<except><object name>
```

50.4.1 Structure type definitions

This subclause contains type definitions which are used to define some of the state machine variables. They are represented by C style typedefs. Though C structures can not be manipulated and compared as though they are strings the state machine both copies and compares these structures to simplify the state machine description.

50.4.1.1 Assignment TLV type definition

The type *ASGNSstring* models the LLDP assignment TLV (D.2.18). It contains elements for all the fields defined for the assignment TLV, however transformed into machine local byte and bit order.

Part of the *ASGNSsting* type is an array of triples, ASGNStriple, identifying the assignment status / VID / I-SID. This array is variable in size and so instances of ASGNSstring can vary in size.

```
typedef struct {
      Unsigned          status : 4;
      Unsigned          vid : 12;
      Unsigned          isid : 24;
} ASGNStriple;
typedef struct {
      Unsigned Char     numAsgns;
      ASGNStriple       asgnsArray[];
} ASGNSstring;
```

50.4.1.2 Discovered association table object

The structure used by an AAS state machine for each object of the discovered remote attach port table (50.4.2.2).

```
typedef struct {
      Unsigned            locPortId;
      PORTNETIDstring     remPortNetId;
} DISCport;
```

50.4.1.3 System TLV type definition

The type *SYSstring* models the LLDP system TLV (D.2.17). It contains elements for all the fields defined for the system TLV, however transformed into machine local byte and bit order.

```
typedef struct {
      Unsigned          sysMAC : 48;
      Unsigned16        reserved;
      Unsigned32        portId;
} PORTNETIDstring;
typedef struct {
      Unsigned char     state;
      Unsigned          sysType : 4;
      Unsigned          portTagging : 4;
      Unsigned char     reserved;
      PORTNETIDstring   portNetId;
} SYSstring;
```

50.4.1.4 VID to I-SID assignment table object

The 2-tuples *VIDISIDpair* containing a single VID to I-SID assignment. This type is used by the state machine for typing arrays of the assignment requests.

```
typedef struct {
      Unsigned     vid : 12;
      Unsigned     isid : 24;
} VIDISIDpair;
```

50.4.2 Per AAS variables

50.4.2.1 aaAdminSystemEnable

When FALSE this Boolean variable causes all AAP state machines on all ports to immediately enter the INIT state. When set to TRUE this variable allows the AAP state machines to progress. The aaAdminSystemEnable is set by the management system object aaSystemEnable (12.34.1).

50.4.2.2 aaOperDiscAssocTable[]

This table lists all the currently associated ports discovered on remote AASs. It is an array of type DISCport (50.4.1.2). When accessing or updating this table the state machine's implementation takes care of any required interlocking for sharing this table.

50.4.2.3 aaOperAadActiveAssocIndex

This variable provides an index into the aaOperDiscAssocTable[] for the active association on this AAD. If no association is active, then aaOperAadActiveAssocIndex is set to NO_ACTIVE_ASSOC. When updating or accessing this variable the state machine's implementation takes care of any required interlocking for sharing this variable.

50.4.2.4 aaSystemMAC

A MAC address selected to uniquely identify this AAS over the administrative domain. This variable is set by the system to an appropriate value (such as the LLDP ChassisID) at system startup. If the system is a DRNI the single aaSystemMAC refers to both devices in the DRNI pair.

50.4.2.5 aaSystemType

The system type can take the values (1)AAB, (2)VLAN_AWARE_AAD, or (3)VLAN_UNAWARE_AAD. This variable is set by the system to an appropriate value at system startup.

50.4.2.6 aaSystemResetTime

Used to initialize the aaResetTimer during a state machine reset. The time in seconds can range from 1 to 1200 seconds.

50.4.2.7 BEGIN

This Boolean variable is controlled by the system initialization process. A value of TRUE causes all state machines to continuously execute their initial state. A value of FALSE allows all state machines to perform transitions out of their initial state.

50.4.3 Per port variables

50.4.3.1 aaAdminPortEnable

When FALSE this Boolean variable causes the AAP state machine on this port to immediately enter the INIT state. A value of TRUE allows the AAP state machine on the port to progress. The aaAdminPortEnable is set by the management port table object aaPortEnable (12.34.2).

50.4.3.2 aaAdminVidIsidAsgns[]

The administratively assigned VID / I-SID pairs desired by an AAD on this port. The array is loaded by management with the assignments table entries (12.34.4) for this port. This array is only used by the AAD state machine.

This variable is an array of 2-tuples each containing a VID to I-SID assignment of type VIDISIDpair (50.4.1.4). The state machine can compare or copy the entire array to an array of the same type with an assignment, compare equal, or compare not equal operator. To be equal the two arrays must be of the same size and contain the same elements in each 2-tuple.

The variables aaAdminVidIsidAsgns[n].vid and aaAdminVidIsidAsgns[n].isid of each 2-tuple within aaAdminVidIsidAsgns[] is exposed at the management interface. Each row of the management database assignment table represents an index into aaAdminVidIsidAsgns[]. So, for instance, the first row refers to aaAdminVidIsidAsgns[0] and value of the first VID / ISID pair is set to the objects of the first row of the auto attach assignment table entry for this port.

50.4.3.3 aaAsgnsTlvEnable

Enables and disables transmission of the LLDP assignment TLV on this port. This variable is the LLDP management database variable lldpXdot1AaConfigAsgnsTxEnable (D.5.6).

The LLDP auto attach assignment TLV transmission is controlled by the auto attach state machine. When aaAsgnsTlvEnable is FALSE LLDP does not include the LLDP assignment TLV in its transmissions. When the aaAsgnsTlvEnable is TRUE LLDP includes the LLDP assignment TLV in its transmissions.

50.4.3.4 aaCurVidIsidAsgns[]

This variable is an array of 2-tuples each containing a VID to I-SID assignment of type VIDISIDpair (50.4.1.4). It contains the VID/I-SID assignments currently advertised by an AAD in LLDP assignment TLVs.

50.4.3.5 aaCurRemAsgnsTlv

A structure of type ASGNSstring (50.4.1.1) containing the state machine’s current assignment TLV.

50.4.3.6 aaLocAsgnsTlv

A structure of type ASGNSstring (50.4.1.1) containing the current LLDP local database assignment TLV (D.2.18) in machine local byte and bit format. This structure is transfered to the LLDP local database object lldpV2Xdot1LocAaAsgnsTlvString in network byte and bit order by the procedure aaSetAsgnsTlv() (50.5.14).

50.4.3.7 aaLocSysTlv

A structure of type SYSstring (50.4.1.3) containing the current LLDP local database system TLV (D.2.17) in machine local byte and bit format. This structure is transfered to the LLDP local database object lldpV2Xdot1LocAaSysTlvString in network byte and bit order by the procedure aaSetSysTlv() (50.5.15).

50.4.3.8 aaOperLocAsgnsTlv

A structure of type ASGNSstring (50.4.1.1) containing the state machine's operational assignment TLV.

50.4.3.9 aaOperLocSysTlv

A structure of type SYSstring (50.4.1.3) containing the state machine's operational system TLV.

50.4.3.10 aaOperRemAsgnsTlv

A structure of type ASGNSstring (50.4.1.1) containing the state machine's operational assignment TLV.

50.4.3.11 aaOperRemSysTlv

A structure of type SYSstring (50.4.1.3) containing the state machine's operational system TLV.

50.4.3.12 aaPendingCompleted

An AAB boolean used to indicate when a pending operation has completed. When TRUE a pending operation has completed. The conditions setting this boolean to TRUE are implementation dependent. The AAB state machine uses this boolean to process the completion of operations which are delayed pending completion of requests to management or control functions.

50.4.3.13 aaPortId

Set by the system at startup to the if-ref for this port.

50.4.3.14 aaPortTagging

Set by the system to the tagging options currently configured on the port. This variable can take the values specified for the LLDP system TLV tagging field listed in table D-18.

50.4.3.15 aaRemAsgnsTlv

A structure of type ASGNSstring (50.4.1.1) containing the current LLDP remote database assignment TLV (D.2.18) derived from lldpV2Xdot1RemAaAsgnsTlvString(D.5.6). If no remote entry exists or if more than a single remote entry exists then aaRemSysTlv == NULL.

50.4.3.16 aaRemSysTlv

A structure of type SYSstring (50.4.1.3) containing the current LLDP remote database system TLV (D.2.17) derived from lldpV2Xdot1RemAaSysTlvString (D.5.6) for this port. If no remote entry exists or if more than a single remote entry exists then aaRemSysTlv == NULL.

50.4.3.17 aaResetTimer

The auto attach state machines use a timer to allow the AAB and AAD to return to synchronization after a reset condition. This timer operates as countdown timers (i.e., it expires when its value reaches zero). The aaTimer:

a) Has a resolution of one second.
b) Is started by loading an initial integer value, n, where $0 < n \leq 1200$.
c) Is decremented by one per timer tick, as long as $n > 0$; the interval between timer ticks is the same as the timer resolution.
d) Represents the remaining time in the period.

50.4.3.18 aaStatsAssocAttached

A statistic counter providing the number of times an association attached.

50.4.3.19 aaStatsAssocFailed

A statistic counter providing the number of times an association failed.

50.4.3.20 aaStatsAssocReset

A statistic counter providing the number of times an association was reset.

50.4.3.21 aaStatsAssocStandby

A statistic counter providing the number of times an association was a standby.

50.4.3.22 aaStatsVidIsidAsgnsAccepted

A statistic counter providing the number of VID / ISID assignments accepted by the AAB.

50.4.3.23 aaStatsVidIsidAsgnsRejected

A statistic counter providing the number of VID / ISID assignments rejected by the AAB.

50.4.3.24 aaStatsVidIsidAsgnsRequested

A statistic counter providing the number of VID / ISID assignments requested by the AAD.

50.4.3.25 aaStatsVidIsidAsgnsWithdrawn

A statistic counter providing the number of VID / ISID assignment requests withdrawn by the AAD.

50.4.3.26 aaSysTlvEnable

Enables and disables transmission of LLDP system TLV on this port. This variable is the LLDP management database variable lldpXdot1AaConfigSysTxEnable (D.5.6).

The LLDP auto attach system TLV transmission is controlled by the auto attach state machine. When aaSysTlvEnable is FALSE LLDP does not include the LLDP system TLV in its transmissions. When the aaSysTlvEnable is TRUE LLDP includes the LLDP system TLV in its transmissions.

50.4.3.27 aaTopologyError

A boolean indicating a topology error. If the port is attached to a point-to-point single peer-to-peer network then aaTopologyError is set to FALSE, otherwise aaTopologyError is set to TRUE. When this variable is set to TRUE the state machines will immediately exit their current state and enter the RESET state.

50.5 State machine functions

The state machine functions described here are expressed in both words and pseudo code fragments. Code fragments use C style syntax, however when implementation specific operations are required that extend outside the scope of this standard a word description is inserted in the pseudo code and italicized. These functions are intended to describe the external behavior requirements of the AAP, however are not intended to be an implementation of the protocol.

Many of these functions operate on SYSstring and ASGNSstring structures. The functions operating on these structures directly modify the structure instance within the state machine. Some of these function also provide return codes containing status of the operations performed.

50.5.1 aaBuildSysTlv(SYSstring tlv)

The function loads the argument tlv with the current parameters for this port. The following values are set in tlv. The function returns with the modified tlv.

```
tlv->state = NOT_READY;
tlv->sysType = aaSystemType;
tlv->portTagging = aaPortTagging;
tlv->reserved = 0;
tlv->portNetId.sysMAC = aaSystemMAC;
tlv->portNetId.reserved = 0;
tlv->portNetId.portId = aaPortId;
```

No errors are reported by this routine, however in an implementation there can be internal errors found.

50.5.2 aaBuildAsgnsTlv(ASGNSstring tlv,VIDISIDpair vidIsidArray[],ASGNSstring operTlv)

The function loads tlv with the current parameters for this port, the assignment requests contained in vidIsidArray[], and with the current operational status from operTlv. Any new assignment status will be set to PENDING. In an AAD the operTlv is an internal copy of the current auto attach LLDP remote assignment TLV from the AAB.

The function begins by determining the number of elements in the argument vidIsidArray[]. This number is designated here by n. The function then initializes the header variables of the tlv argument as follows:

```
tlv->numAsngs = n;
```

Next the function loads the asgnsArray with the VID / ISID pairs requested by the AAD. For each element of the vidIsidArray[] designated by i aaBuildAsgnsTlv() sets:

```
if ( n > 0 ){
       For ( i=0, i < n, i++ ) {
              tlv->asgnsArray[i].status = PENDING;
              tlv->asgnsArray[i].vid = vidIsidArray[i].vid;
              tlv->asgnsArray[i].isid = vidIsidArray[i].isid;
       };
};
```

Next the function loads the asgnsArray with current status for each old VID / ISID pair using the operTlv.

```
oldRequestMatches = 0;
For ( i=0, i < n, i++ ) {
      For ( j=0, j < operTlv->numAsgns, j++ ) {
            if (tlv->asgnsArray[i].vid == operTlv->asgnsArray[j].vid &&
             tlv->asgnsArray[i].isid == operTlv->asgnsArray[j].isid ) {
                  tlv->asgnsArray[i].status = operTlv->asgnsArray[j].status;
                  break;
            };
      };
};
```

No errors are reported by this routine, though in an implementation there can be internal system errors.

50.5.3 aaConfigAabAsgn(unsigned vid, unsigned isid)

This function configures the AAB to attach a Customer Edge Port (CEP) on the AAB and a VLAN on the CEP to a Backbone Service Instance (BSI, 50.2). The function uses the state machine variables aaPortId and aaOperRemSysTlv to identify the AAB port where the VLAN attaches to the AAB and to determine the tagging type to use to interface to the AAD. The settings required to configure the AAB are implementation dependent.

To perform the configuration the AAB needs to configure:

a) The Customer Edge Port, Provider Edge Port, and filtering database are configured in the C-VLAN component providing customer service on this AAB port identified by the aaPortId state machine variable and with tagging parameters specified in the aaOperRemSysTlv for this port. (50.2)
b) The Customer Network Port, Provider Instance Port, and filtering database are configured in the I-Component.
c) The Customer Backbone Port and filtering database are configured in the B-Component.
d) If the desired BSI identified by the I-SID is not already coupled to the AAB, the AAB advertises the I-SID to the network using either Shortest Path Bridging (SPB) or requests to a central management plane (PBB) to form an attachment to the desired BSI.
e) The function returns ACCEPT if the configuration is complete or PENDING if the configuration is in progress. Once the pending action is complete the system sets the state machine variable aaPendingCompleted = TRUE.

50.5.4 aaDisableAabVidIsidAsgns(ASGNSstring tlvNew, ASGNSstring tlvOld)

This function determines which VID to I-SID assignments to disable on this port. The function compares the list of VID to I-SID assignments in tlvOld to tlvNew and disables all the assignments found in tlvOld with status ACCEPT but either missing in tlvNew or REJECTED in tlvNew. A pseudocode sketch of aaDisableAabVidIsidAsgns() is as follows:

```
If ( tlvOld == NULL || tlvOld->numAsgns == 0 ) return; // no running assignments
For ( i=0, i < tlvOld->numAsgns, i++ ) {
      match = FALSE;
      If ( tlvNew != NULL && tlvNew->numAsgns != 0 )
            For ( j=0, j < tlvNew->numAsgns, j++ ) {
                  if ( tlvOld->asgnsArray[i].vid == tlvNew->asgnsArray[j].vid
                  && tlvOld->asgnsArray[i].isid==tlvNew->asgnsArray[j].isid )
                  { match = TRUE; k = j; };
            }; // for each j
        If ( match == FALSE ) { // tlvOld vid/isid not in tlvNew
            if ( tlvOld->asgnsArray[i].status == ACCEPT ) {
                disable tlvOld->asgnsArray[i];
            };
            /* the disable operation indicates removing all operating state */
            /* within the AAB for this VID to I-SID mapping */
        };
        If ( match == TRUE // tlvOld vid/isid ACCEPT but tlvNew vid/isid REJECT
            && tlvOld->asgnsArray[i].status == ACCEPT
            && tlvOld->asgnsArray[i].status != tlvNew->asgnsArray[k].status )
                disable tlvOld.asgnsArray[i];
                /* the disable operation indicates removing all operating */
                /* state within the AAB for this VID to I-SID mapping */
}; //for each i
```

In the pseudo code the italicized “*disable tlvOld->asgnsArray[i]*” indicates execution of an implementation dependent operation to disable the VID to I-SID mapping.

50.5.5 aaDisableLldpAaTlvTx()

This function disables LLDP transmission of the auto attach TLVs. Pseudocode for aaDisableLldpAaTlvTx() is as follows:

```
If ( aaSysTlvEnable == ENABLED ||
        aaAsgnsTlvEnable == ENABLED ) {
                aaAsgnsTlvEnable = DISABLED;
                aaSysTlvEnable = DISABLED;
                SomethingChangedLocal();
}
```

50.5.6 aaDisableVidIsidAsgns()

This function disables all active VID to I-SID assignments on this port. All AAS internal state required to activate the VID to I-SID assignment on this port is deleted.

50.5.7 aaDiscAssocAabTblCheck(unsigned port, SYSstring tlv)

This function is used to search aaOperDiscAssocTable[] for an entry where the auto attach system MAC address contained within a aaOperDiscAssocTable.remPortNetId object matches the auto attach system MAC address contained within tlv.portNetId or for an existing entry for this AAB port. The function returns OK if no match was found or if the AAD is already discovered on this AAB port. The function returns REJECT if the AAD is already discovered on a different AAB port or this is new AAD identified on the AAB port.

A pseudocode sketch of the function is as follows:

```
For ( each i an index to aaOperDiscAssocTable[] ) {
        if ( aaOperDiscAssocTable[i].remPortNetId == tlv->portNetId &&
            aaOperDiscAssocTable[i].locPortId == port ) return ASSOC_ATTACHED;
        if ( aaOperDiscAssocTable[i].remPortNetId.sysMAC
            == tlv->portNetId.sysMAC ) return ASSOC_INVALID;
        if ( aaOperDiscAssocTable[i].locPortId == port ) return ASSOC_INVALID;
} //for each i
return ASSOC_ATTACHED;
```

Within the pseudo code the italicized for operator “*each i an index to aaOperDiscAssocTable[]*” replaces the normal C for loop conditions because the structure of the table aaOperDiscAssocTable is implementation dependent. The for loop within the pseudo code executes for each member of the aaOperDiscAssocTable, regardless of the table implementation.

50.5.8 aaDiscAssocAadTblCheck(unsigned port, SYSstring tlv)

An AAD can only have a single active association. It is assumed the aaOperDiscAssocTable[] has already inserted a discovery entry for this port. The aaOperDiscAssocTable[] entry for the active association is indexed by the variable aaOperAadActiveAssocIndex. The function returns ASSOC_ATTACHED if there is no other active association or if the current active association is this local port with this remote port. Otherwise the function returns ASSOC_STANDBY.

```
If ( aaOperAadActiveAssocIndex == NO_ACTIVE_ASSOC ) {
       for ( each i an index of aaOperDiscAssocTable[] ) {
              if ( aaOperDiscAssocTable[i].locPortId == port &&
               aaOperDiscAssocTable[i].remPortNetId == tlv->portNetId ) {
                     aaOperAadActiveAssocIndex = i; return ASSOC_ATTACHED;
              };
       };
} else {
       i= aaOperAadActiveAssocIndex;
       if ( aaOperDiscAssocTable[i].locPortId == port &&
        aaOperDiscAssocTable[i].remPortNetId == tlv->portNetId )
              return ASSOC_ATTACHED;
}
return ASSOC_STANDBY;
```

Within the pseudo code the italicized for operator “*each i an index to aaOperDiscAssocTable[]*” replaces the normal C for loop conditions because the structure of the table aaOperDiscAssocTable is implementation dependent. The for loop within the pseudo code executes for each member of the aaOperDiscAssocTable, regardless of the table implementation.

50.5.9 aaDiscAssocTblDelete(unsigned port)

This function deletes an entry in aaOperDiscAssocTable[]. The function deletes the table entry i matching the condition aaOperDiscAssocTable[i].locPortId == port.

50.5.10 aaDiscAssocTblInsert(unsigned port, SYSstring tlv)

This function inserts a new entry in aaOperDiscAssocTable[]. The function builds a DISCport entry and inserts it into a new table entry i. It is assumed the table is already check to assure a duplicate entry is not present. The entry is as follows:

```
aaOperDiscAssocTable[i].locPortId = port;
aaOperDiscAssocTable[i].remPortNetId = tlv->portNetID;
```

50.5.11 aaEnableAabVidIsidAsgns(ASGNSstring tlv)

This function determines which VID to I-SID assignments to activate. The function is responsible for determining if each pending VID to I-SID pair contained in the tlv argument can be activated. In addition, this function builds all state required by the AAB to activate a VID to I-SID assignment.

The function modifies the status associated with each VID to I-SID pair to reflect the action taken on the pair. The codes that can be returned are listed in Table D-20. A pseudo-code sketch is as follows:

```
If ( tlv == NULL || tlv->numAsgns == 0 ) return;
For ( i=0, i < tlv->numAsgns, i++ ) {
      if ( tlv->asgnsArray[i].status == PENDING ) {
       if ( the VID to I-SID assignment is acceptable to the AAB ) {
            st=aaConfigAabAsgn(tlv->asgnsArray[i].vid,
                                         tlv->asgnsArray[i].isid);
            /* The aaConfigAabAsgn() builds all operating state */
            /* within the AAB for this VID to I-SID mapping */
            tlv->asgnsArray[i].status = st;
       } else tlv->asgnsArray[i].status = REJECT; //including reason
      };
}; //for each i
```

In this pseudo code the condition "t*he VID to I-SID assignment is acceptable to the AAB*" is a catch all for any internal checks the AAB performs to allow the assignment before attempting configuration.

50.5.12 aaEnableAadVidIsidAsgns(ASGNSstring tlv)

This function enables VID to I-SID assignments. It sets all the AAD internal state required to enable or disable each VID to I-SID pair. Each pair marked with tlv->asgnsArray[i].status == ACCEPT is enabled, otherwise the pair is disabled. The operations required to enable or disable the identified VLAN are system dependent and so not explicitly described in the pseudo code. Instead the italicized *enable* and *disable* operations are used to indicate the implementation dependent operations.

```
If ( tlv == NULL || tlv->numAsgns == 0 ) return; // no assigns received
For ( i=0, i < tlv->numAsgns, i++ ) {
      if ( tlv->asgnsArray[i].status == ACTIVE )
            enable the VLAN identified by tlv.asgnsArray[i].vid
      else  disable the VLAN identified by tlv.asgnsArray[i].vid;
};
```

50.5.13 aaPortClearStats()

This function clears all the statistic counters for this port.

50.5.14 aaSetAsgnsTlv(ASGNSstring tlv)

The function is used to place a state machine internal structure of type ASGNSstring into the LLDP database. The ASGNSstring referenced by tlv is transformed from the local machine byte and bit order to the assignment TLV byte and bit order as it is moved into the LLDP database object lldpV2Xdot1LocAaAsgnsTlvString(D.5.6) for this port.

The function aaSetAsgnsTlv() locks out LLDP from building an LLDPDU during the update. Once the TLV is transfered and LLDP unlocked the routine sets aaAsgnsTlvEnable = ENABLED, calls SomethingChangedLocal() and returns.

50.5.15 aaSetSysTlv(SYSstring tlv)

The aaSetSysTlv() function is used to place a state machine internal structure of type SYSstring into the LLDP database. The object referenced by tlv is transformed from the local machine byte and bit order to the system TLV byte and bit order as it is moved into the LLDP database object lldpV2Xdot1LocAaSysTlvString (D.5.6) for this port.

The function aaSetSysTlv() locks out LLDP from building an LLDPDU during the update. Once the TLV is transfered and LLDP unlocked the routine sets aaSysTlvEnable = ENABLED then calls SomethingChangedLocal() and returns.

50.5.16 aaSomethingChangedRemote()

This procedure is called by the LLDP routine SomethingChangedRemote() (IEEE Std 802.1AB-2016™ clause 9.2.7.9) when something changes in the remote LLDP database. The procedure performs the following operations:

The remote LLDP database entries are check to determine if multiple remote databases are present on this port. If multiple databases are present, then the port is not connected to a point-to-point single peer-to-peer topology and so the procedure sets aaTopologyError = TRUE, aaRemSysTlv = NULL, aaRemAsgnsTlv = NULL. Otherwise the routine sets aaTopologyError = FALSE.

If aaTopologyError == FALSE, then the procedure updates the aaRemSysTlv as follows:
If a PBBN Auto Attach System TLV is not present in the remote database or if multiple system TLVs are present, then aaRemSysTlv = NULL, otherwise the contents of the PBBN Auto Attach System TLV are transformed from the big ending format used for network transmission into the local machine format and placed in aaRemSysTlv.

If aaTopologyError == FALSE, then the procedure updates the aaRemAsgnsTlv as follows:
If a PBBN Auto Attach Assignment TLV is not present in the remote database or if multiple copies are present, then aaRemAsgnsTlv = NULL, otherwise the contents of the PBBN Auto Attach Assignment TLV are transfered from the big ending format used for network transmission into the local machine format and placed in aaRemAsgnsTlv.

50.5.17 aaSomethingChangeRemoteInit()

This procedure used to initialize the LLDP callback routine aaSomethingChangedRemote(). The function registers aaSomethingChangedRemote() with LLDP for call back by the LLDP routine SomethingChangedRemote() and initializes aaTopologyError = FALSE, then calls aaSomethingChangedRemote() to initialize the variables aaTopologyError, aaRemSysTlv, and aaRemAsgnsTlv.

50.5.18 aaUpdateReqDelVidIsidStats(ASGNSstring tlvNew, ASGNSstring tlvOld)

This routine is used to update the requested and withdrawn VID to I-SID assignment statistics for both the AAB and AAD. The VID to I-SID assignment status indicated in tlvOld is compared with the VID to I-SID status in tlvNew. Only VID to I-SID assignments that are different in tlvOld and tlvNew are considered in the counts. A pseudocode sketch of aaUpdateVidIsidStats() is as follows:

```
if ( tlvOld == NULL && tlvNew == NULL ) return;
If ( tlvOld != NULL && tlvOld->numAsgns != 0 )
      if ( tlvNew == NULL || tlvNew->numAsgns == 0 ) {
            aaStatsVidIsidAsgnsWithdrawn =+ tlvOld->numAsgns;
            return;
      };
If ( tlvNew != NULL && tlvNew->numAsgns != 0 )
      if ( tlvOld == NULL || tlvOld->numAsgns == 0 ) {
            aaStatsVidIsidAsgnsRequested =+ tlvNew->numAsgns;
            return;
      };
if ( tlvOld != NULL && tlvOld->numAsgns == 0
&& tlvNew != NULL && tlvNew->numAsgns != 0 ) {
      For ( i=0, i < tlvNew->numAsgns, i++ ) {
            flag = FALSE;
            For ( j=0, j < tlvOld->numAsgns, j++ ) {
             if ( tlvNew->asgnsArray[i].vid == tlvOld->asgnsArray[j].vid
             && tlvNew->asgnsArray[i].isid == tlvOld->asgnsArray[j].isid )
                   flag = TRUE;
            }; // for each j
            If ( flag == FALSE )  aaStatsVidIsidAsgnsRequested++;
      }; // for each i
      For ( i=0, i < tlvOld->numAsgns, i++ ) {
            flag = FALSE;
            For ( j=0, j < tlvNew->numAsgns, j++ ) {
             if ( tlvNew->asgnsArray[i].vid == tlvOld->asgnsArray[j].vid
             && tlvNew->asgnsArray[i].isid == tlvOld->asgnsArray[j].isid )
                   flag = TRUE;
            }; // for each j
            If ( flag == FALSE )  aaStatsVidIsidAsgnsWithdrawn++;
      }; // for each i
}; //for each i
```

50.5.19 aaUpdateAcptRejVidIsidStats(ASGNSstring tlvNew, ASGNSstring tlvOld)

This routine is used to update the accepted and rejected VID to I-SID assignment statistics for both the AAB and AAD. The VID to I-SID assignment status indicated in tlvOld is compared with the VID to I-SID status in tlvNew. Only VID to I-SID assignments that are different in tlvOld and tlvNew are considered in the counts. A pseudocode sketch of aaUpdateVidIsidStats() is as follows:

```
If ( tlvNew == NULL || tlvNew->numAsgns == 0 ) return;
if ( tlvOld == NULL || tlvOld->numAsgns == 0 ) {
       For ( i=0, i < tlvNew->numAsgns, i++ ) {
             if ( tlvNew->asgnsArray[i].status == ACCEPTED )
                           aaStatsVidIsidAsgnsAccepted++
             else if ( tlvNew->asgnsArray[i].status != PENDING )
                           aaStatsVidIsidAsgnsRejected++;
       };
} else
       For ( i=0, i < tlvNew->numAsgns, i++ ) {
             flag = FALSE;
             For ( j=0, j < tlvOld->numAsgns, j++ ) {
              if ( tlvNew->asgnsArray[i].vid == tlvOld->asgnsArray[j].vid
                    && tlvNew->asgnsArray[i].isid == tlvOld->asgnsArray[j].isid
                    && tlvNew->asgnsArray[i].status ==
                                        tlvOld->asgnsArray[j].status )
                           flag = TRUE;
             }; // for each j
       If ( flag == FALSE ) {
             if ( tlvNew->asgnsArray[i].status == ACCEPTED )
                           aaStatsVidIsidAsgnsAccepted++
             else if ( tlvNew->asgnsArray[i].status != PENDING )
                           aaStatsVidIsidAsgnsRejected++;
       };
}; //for each i
```

50.5.20 SomethingChangedLocal()

This is an LLDP routine which is called when the auto attach state machines make updates to the local LLDP database entries. The routine is defined in IEEE Std 802.1AB state machines.

50.6 AAD state machine

In an implementation that supports auto attachment, the Auto Attach Device (AAD) state machine implements the functions specified by Figure 50-4. The state machine requires the AAD to form a valid association with one AAB. Therefore, all VID / I-SID requests from an AAD will be received on one AAB port supporting an independent VID space.

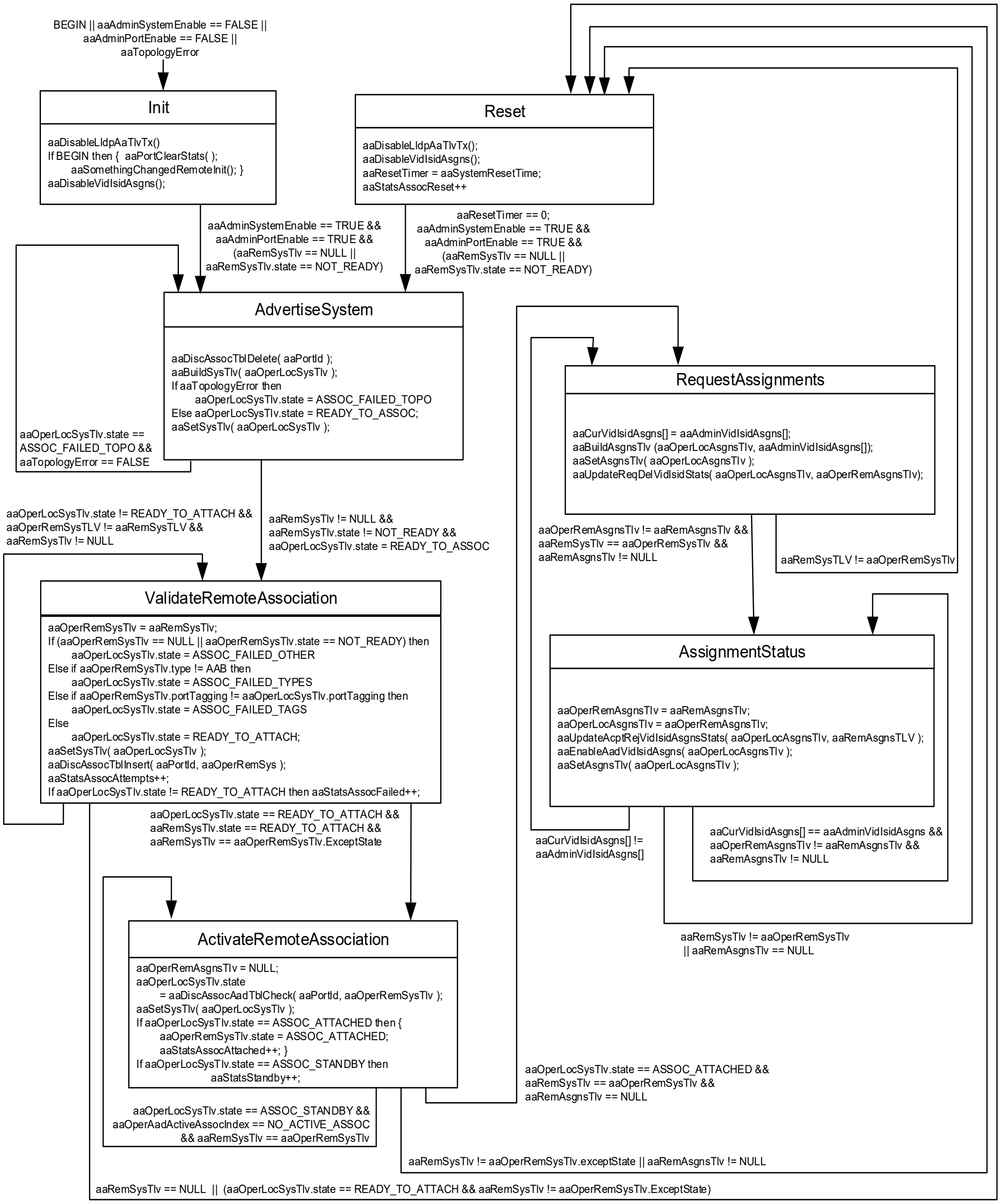
BEGIN || aaAdminSystemEnable == FALSE ||
aaAdminPortEnable == FALSE ||
aaTopologyError
Init
aaDisableLldpAaTlvTx()
If BEGIN then { aaPortClearStats( );
aaSomethingChangedRemoteInit(); }
aaDisableVidIsidAsgns();
Reset
aaDisableLldpAaTlvTx();
aaDisableVidIsidAsgns();
aaResetTimer = aaSystemResetTime;
aaStatsAssocReset++
aaAdminSystemEnable == TRUE &&
aaAdminPortEnable == TRUE &&
(aaRemSysTlv == NULL ||
aaRemSysTlv.state == NOT_READY)
aaResetTimer == 0;
aaAdminSystemEnable == TRUE &&
aaAdminPortEnable == TRUE &&
(aaRemSysTlv == NULL ||
aaRemSysTlv.state == NOT_READY)
AdvertiseSystem
aaDiscAssocTblDelete(aaPortId);
aaBuildSysTlv(aaOperLocSysTlv);
If aaTopologyError then
aaOperLocSysTlv.state = ASSOC_FAILED_TOPO
Else aaOperLocSysTlv.state = READY_TO_ASSOC;
aaSetSysTlv(aaOperLocSysTlv);
aaOperLocSysTlv.state ==
ASSOC_FAILED_TOPO &&
aaTopologyError == FALSE
RequestAssignments
aaCurVidIsidAsgns[] = aaAdminVidIsidAsgns[];
aaBuildAsgnsTlv (aaOperLocAsgnsTlv, aaAdminVidIsidAsgns[]);
aaSetAsgnsTlv(aaOperLocAsgnsTlv);
aaUpdateReqDelVidIsidStats(aaOperLocAsgnsTlv, aaOperRemAsgnsTlv);
aaOperLocSysTlv.state != READY_TO_ATTACH &&
aaOperRemSysTLV != aaRemSysTLV &&
aaRemSysTlv != NULL
aaRemSysTlv != NULL &&
aaRemSysTlv.state != NOT_READY &&
aaOperLocSysTlv.state = READY_TO_ASSOC
aaOperRemAsgnsTlv != aaRemAsgnsTlv &&
aaRemSysTlv == aaOperRemSysTlv &&
aaRemAsgnsTlv != NULL
aaRemSysTLV != aaOperRemSysTlv
ValidateRemoteAssociation
aaOperRemSysTlv = aaRemSysTlv;
If (aaOperRemSysTlv == NULL || aaOperRemSysTlv.state == NOT_READY) then
aaOperLocSysTlv.state = ASSOC_FAILED_OTHER
Else if aaOperRemSysTlv.type != AAB then
aaOperLocSysTlv.state = ASSOC_FAILED_TYPES
Else if aaOperRemSysTlv.portTagging != aaOperLocSysTlv.portTagging then
aaOperLocSysTlv.state = ASSOC_FAILED_TAGS
Else
aaOperLocSysTlv.state = READY_TO_ATTACH;
aaSetSysTlv(aaOperLocSysTlv);
aaDiscAssocTblInsert(aaPortId, aaOperRemSys);
aaStatsAssocAttempts++;
If aaOperLocSysTlv.state != READY_TO_ATTACH then aaStatsAssocFailed++;
AssignmentStatus
aaOperRemAsgnsTlv = aaRemAsgnsTlv;
aaOperLocAsgnsTlv = aaOperRemAsgnsTlv;
aaUpdateAcptRejVidIsidAsgnsStats(aaOperLocAsgnsTlv, aaRemAsgnsTLV);
aaEnableAadVidIsidAsgns(aaOperLocAsgnsTlv);
aaSetAsgnsTlv(aaOperLocAsgnsTlv);
aaOperLocSysTlv.state == READY_TO_ATTACH &&
aaRemSysTlv.state == READY_TO_ATTACH &&
aaRemSysTlv == aaOperRemSysTlv.ExceptState
aaCurVidIsidAsgns[] !=
aaAdminVidIsidAsgns[]
aaCurVidIsidAsgns[] == aaAdminVidIsidAsgns &&
aaOperRemAsgnsTlv != aaRemAsgnsTlv &&
aaRemAsgnsTlv != NULL
ActivateRemoteAssociation
aaOperRemAsgnsTlv = NULL;
aaOperLocSysTlv.state
= aaDiscAssocAadTblCheck(aaPortId, aaOperRemSysTlv);
aaSetSysTlv(aaOperLocSysTlv);
If aaOperLocSysTlv.state == ASSOC_ATTACHED then {
aaOperRemSysTlv.state = ASSOC_ATTACHED;
aaStatsAssocAttached++; }
If aaOperLocSysTlv.state == ASSOC_STANDBY then
aaStatsStandby++;
aaRemSysTlv != aaOperRemSysTlv
|| aaRemAsgnsTlv == NULL
aaOperLocSysTlv.state == ASSOC_ATTACHED &&
aaRemSysTlv == aaOperRemSysTlv &&
aaRemAsgnsTlv == NULL
aaOperLocSysTlv.state == ASSOC_STANDBY &&
aaOperAadActiveAssocIndex == NO_ACTIVE_ASSOC
&& aaRemSysTlv == aaOperRemSysTlv
aaRemSysTlv != aaOperRemSysTlv.exceptState || aaRemAsgnsTlv != NULL
aaRemSysTlv == NULL || (aaOperLocSysTlv.state == READY_TO_ATTACH && aaRemSysTlv != aaOperRemSysTlv.ExceptState)

Figure 50-4—PBBN Auto Attach Device (AAD) state machine

50.7 AAB state machine

In an implementation that supports auto attachment, the Auto Attach BEB (AAB) state machine implements the functions specified by the diagram in Figure 50-5. The state machine requires the AAB to provide a VLAN service specified by the AAD and requires the AAB to have an independent VID space for each port, therefore only one AAD is supported per AAB port.

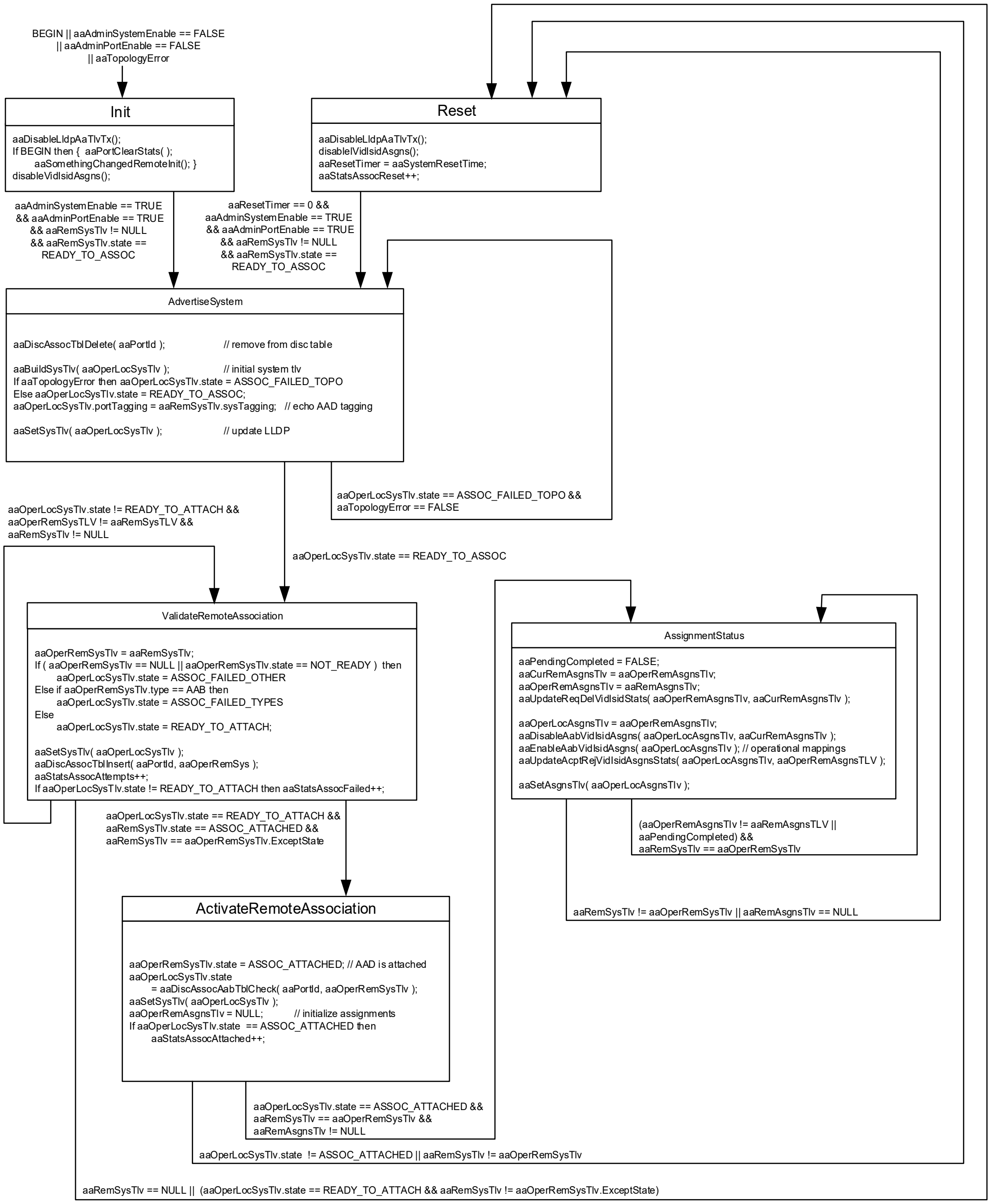
BEGIN || aaAdminSystemEnable == FALSE
|| aaAdminPortEnable == FALSE
|| aaTopologyError
Init
aaDisableLldpAaTlvTx();
If BEGIN then { aaPortClearStats( );
aaSomethingChangedRemoteInit(); }
disableVidIsidAsgns();
Reset
aaDisableLldpAaTlvTx();
disableIVidIsidAsgns();
aaResetTimer = aaSystemResetTime;
aaStatsAssocReset++;
aaAdminSystemEnable == TRUE
&& aaAdminPortEnable == TRUE
&& aaRemSysTlv != NULL
&& aaRemSysTlv.state ==
READY_TO_ASSOC
aaResetTimer == 0 &&
aaAdminSystemEnable == TRUE
&& aaAdminPortEnable == TRUE
&& aaRemSysTlv != NULL
&& aaRemSysTlv.state ==
READY_TO_ASSOC
AdvertiseSystem
aaDiscAssocTblDelete(aaPortId); // remove from disc table
aaBuildSysTlv(aaOperLocSysTlv); // initial system tlv
If aaTopologyError then aaOperLocSysTlv.state = ASSOC_FAILED_TOPO
Else aaOperLocSysTlv.state = READY_TO_ASSOC;
aaOperLocSysTlv.portTagging = aaRemSysTlv.sysTagging; // echo AAD tagging
aaSetSysTlv(aaOperLocSysTlv); // update LLDP
aaOperLocSysTlv.state == ASSOC_FAILED_TOPO &&
aaTopologyError == FALSE
aaOperLocSysTlv.state != READY_TO_ATTACH &&
aaOperRemSysTLV != aaRemSysTLV &&
aaRemSysTlv != NULL
aaOperLocSysTlv.state == READY_TO_ASSOC
ValidateRemoteAssociation
aaOperRemSysTlv = aaRemSysTlv;
If (aaOperRemSysTlv == NULL || aaOperRemSysTlv.state == NOT_READY) then
aaOperLocSysTlv.state = ASSOC_FAILED_OTHER
Else if aaOperRemSysTlv.type == AAB then
aaOperLocSysTlv.state = ASSOC_FAILED_TYPES
Else
aaOperLocSysTlv.state = READY_TO_ATTACH;
aaSetSysTlv(aaOperLocSysTlv);
aaDiscAssocTblInsert(aaPortId, aaOperRemSys);
aaStatsAssocAttempts++;
If aaOperLocSysTlv.state != READY_TO_ATTACH then aaStatsAssocFailed++;
AssignmentStatus
aaPendingCompleted = FALSE;
aaCurRemAsgnsTlv = aaOperRemAsgnsTlv;
aaOperRemAsgnsTlv = aaRemAsgnsTlv;
aaUpdateReqDelVidIsidStats(aaOperRemAsgnsTlv, aaCurRemAsgnsTlv);
aaOperLocAsgnsTlv = aaOperRemAsgnsTlv;
aaDisableAabVidIsidAsgns(aaOperLocAsgnsTlv, aaCurRemAsgnsTlv);
aaEnableAabVidIsidAsgns(aaOperLocAsgnsTlv); // operational mappings
aaUpdateAcptRejVidIsidAsgnsStats(aaOperLocAsgnsTlv, aaOperRemAsgnsTLV);
aaSetAsgnsTlv(aaOperLocAsgnsTlv);
aaOperLocSysTlv.state == READY_TO_ATTACH &&
aaRemSysTlv.state == ASSOC_ATTACHED &&
aaRemSysTlv == aaOperRemSysTlv.ExceptState
(aaOperRemAsgnsTlv != aaRemAsgnsTLV ||
aaPendingCompleted) &&
aaRemSysTlv == aaOperRemSysTlv
ActivateRemoteAssociation
aaOperRemSysTlv.state = ASSOC_ATTACHED; // AAD is attached
aaOperLocSysTlv.state
= aaDiscAssocAabTblCheck(aaPortId, aaOperRemSysTlv);
aaSetSysTlv(aaOperLocSysTlv);
aaOperRemAsgnsTlv = NULL; // initialize assignments
If aaOperLocSysTlv.state == ASSOC_ATTACHED then
aaStatsAssocAttached++;
aaRemSysTlv != aaOperRemSysTlv || aaRemAsgnsTlv == NULL
aaOperLocSysTlv.state == ASSOC_ATTACHED &&
aaRemSysTlv == aaOperRemSysTlv &&
aaRemAsgnsTlv != NULL
aaOperLocSysTlv.state != ASSOC_ATTACHED || aaRemSysTlv != aaOperRemSysTlv
aaRemSysTlv == NULL || (aaOperLocSysTlv.state == READY_TO_ATTACH && aaRemSysTlv != aaOperRemSysTlv.ExceptState)

Figure 50-5—PBBN Auto Attach BEB (AAB) state machine

Annex A

(normative)

PICS proforma—Bridge implementations[c]

A.5 Major Capabilities

Insert the following row at the end of Table A.5:

Item	Feature	Status	References	Support	
AAB	Does the implementation support AAB functionality?	(BEB-I AND BEB-1):O	Clause 50, Clause 5.12.2	Yes [ ]	No [ ]
AAD	Does the implementation support AAD functionality?	(VLAN OR MBRIDGE):O ~(BEB OR TMPR):X	Clause 50, Clause 5.9.2, Clause 5.10.3, Clause 5.14.2, Clause 5.33	Yes [ ]	No [ ]

A.14 Bridge Management

Insert the following row at the end of Table A.14:

Item	Feature	Status	References	Support	
MGT-223	Does the implementation support auto attach management entities defined in 12.34?	(AAB OR AAD):M	12.34	Yes [ ]	No [ ]

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A.24 Management Information Base (MIB)

Insert the following rows at the end of Table A.24, renumbering MIB-45, MIB-46 if necessary:

Item	Feature	Status	References	Support	
MIB-45	Is the IEEE8021-PBBN-AA-MIB module fully supported (per its MODULE-COMPLIANCE)?	MIB AND (AAB OR AAD):O	17.2.26	Yes [ ]	N/A [ ]
MIB-46	Is the IEEE8021-LLDP-EXT-DOT1-EVB-EXTENSIONS-MIB module fully supported (per its MODULE-COMPLIANCE)?	MIB AND (AAB OR AAD):O	D.5.6	Yes [ ]	N/A [ ]

A.47 YANG

Insert the following rows at the end of Table A.47:

Item	Feature	Status	References	Support	
YANG-LLDP-PBBN-AA	Is the ieee802-dot1q-lldp-pbbn-aa-tlv module supported?	YANG AND (AAB OR AAD): O	D.6.6.7	Yes[ ]	N/A[ ]

A.54 PBBN auto attach

Insert new clause A.54 at the end of Annex A as shown, renumbering as necessary:

Item	Feature	Status	References	Support	
AAB-1	Does the AAB support one or more I-components?	AAB:M	5.12.2	Yes [ ]	N/A [ ]
AAB-2	Does the AAB support the Link Layer Discovery Protocol (LLDP) transmit and receive mode?	AAB:M	IEEE Std 802.1AB™	Yes [ ]	N/A [ ]
AAB-3	Does the AAB implementation support PBBN Auto Attach System TLV?	AAB:M	5.12.2, D.2.17	Yes [ ]	N/A [ ]
AAB-4	Does the AAB implementation support PBBN Auto Attach Assignment TLV?	AAB:M	5.12.2, D.2.18	Yes [ ]	N/A [ ]

Item	Feature	Status	References	Support	
AAB-5	Does the AAB support the C-tagging interface?	AAB:M	5.12.2, 50.2, D.2.17.8	Yes [ ]	N/A [ ]
AAB-6	Does the AAB support the AAB State Machine	AAB:M	5.12.2, 50.7	Yes [ ]	N/A [ ]
AAB-7	Does the AAB support the 802.1Q Management VID TLV as specified in D.2.6?	O	D.2.6	Yes [ ]	N/A [ ]
AAD-1	Does the AAD support the Link Layer Discovery Protocol (LLDP) transmit and receive mode?	AAD:M	IEEE Std 802.1AB™	Yes [ ]	N/A [ ]
AAD-2	Does the AAD implementation support PBBN Auto Attach System TLV?	AAD:M	5.14.2, 5.9.2, D.2.17	Yes [ ]	N/A [ ]
AAD-3	Does the AAD implementation support PBBN Auto Attach Assignment TLV?	AAD:M	5.14.2, 5.9.2, D.2.18	Yes [ ]	N/A [ ]
AAD-4	Does the AAD support the AAD State Machine	AAD:M	5.14.2, 5.9.2, 50.6	Yes [ ]	N/A [ ]

Annex B

(normative)

PICS proforma—End station implementations[d]

B.5 Major Capabilities

Insert the following row at the end of Table B.5:

Item	Feature	Status	References	Support	
AAD	Does the implementation support AAD functionality?	O	Clause 50, Clause 5.33	Yes [ ]	No [ ]

Insert new clause B.18 at the end of Annex B as shown, renumbering as necessary

B.18 PBBN auto attach

Item	Feature	Status	References	Support	
AAD-1	Does the AAD support the Link Layer Discovery Protocol (LLDP) transmit and receive mode?	AAD:M	IEEE Std 802.1AB™	Yes [ ]	No [ ]
AAD-2	Does the AAD implementation support PBBN Auto Attach System TLV?	AAD:M	5.33, D.2.17	Yes [ ]	No [ ]
AAD-3	Does the AAD implementation support PBBN Auto Attach Assignment TLV?	AAD:M	5.33, D.2.18	Yes [ ]	No [ ]
AAD-4	Does the AAD support the AAD State Machine?	AAD:M	5.33, 50.6	Yes [ ]	No [ ]
AAD-5	Does the AAD support the management objects as specified in 12.34?	AAD:M	5.33, 12.34	Yes [ ]	No [ ]

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Annex D

(normative)

IEEE 802.1 Organizationally Specific TLVs

D.1 Requirements of the IEEE 802.1 Organizationally Specific TLV sets

Insert the following rows at the end of Table D-1:

Table D-1—IEEE 802.1 Organizationally Specific TLVs

IEEE 802.1 subtype	TLV name	TLV set name	TLV reference	Feature Clause reference
15	PBBN Auto Attach System TLV	aaSet	D.2.17	50.
16	PBBN Auto Attach Assignment TLV	aaSet	D.2.18	50.

D.2 Organizationally Specific TLVs

Insert new subclauses D.2.17 and D.2.18 with Figures and Tables at the end of D.2, as shown, re-numbering as necessary.

D.2.17 PBBN Auto Attach System TLV

The PBBN Auto Attach System TLV is an optional IEEE 802.1 organizationally specific LLDP TLV that allows bridges and IEEE 802 LAN stations to discover each other and exchange type and configuration information. Refer to Clause 50 for usage of auto attach TLVs.

The format of the system TLV is represented in Figure D-17:

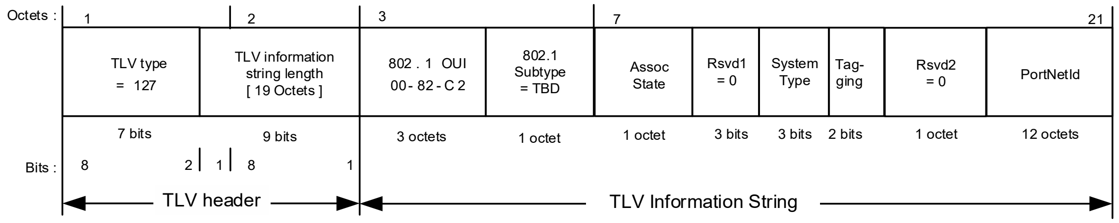

Figure D-17—PBBN Auto Attach System TLV format

D.2.17.1 TLV type

A 7-bit integer value occupying the most significant bits of the first octet of the system TLV. Always contains the value 127.

D.2.17.2 TLV information string length

The TLV information string length field contains the length, in octets, of the fixed length system TLV fields which is 19 octets.

D.2.17.3 802.1 OUI

The 3-octet Organizational Unit Identifier assigned to IEEE 802.1 (00-82-C2).

D.2.17.4 Subtype

A one octet value occupying the 6th octet of the TLV. Contains the value designating the system TLV type as specified in Table D-1.

D.2.17.5 Assoc state

A one octet field that identifies the current state of the association between the AAS entities on the link.

Table D-16—PBBN auto attach association state

State	Value	Notes
NOT_READY	0x00	not ready to associate
READY_TO_ASSOC	0x01	ready to associate
READY_TO_ATTACH	0x02	associated, viable partner
ASSOC_FAILED_TYPES	0x12	not AAD to AAB
ASSOC_FAILED_TAGS	0x22	tagging mis-matched
ASSOC_FAILED_TOPO	0x32	multi-point link detected
ASSOC_FAILED_OTHER	0x42	parsing or resourcing error
ASSOC_ATTACHED	0x03	association attached
ASSOC_STANDBY	0x13	association not attached, AAD already attached
ASSOC_INVALID	0x23	association rejected at AAB because AAD is already attached elsewhere
Reserved	All Other	

D.2.17.6 Rsvd1

Three reserved bits. The octet is set to zero on transmission. The rsvd1 is ignored on receipt.

D.2.17.7 System type

The system type field is a 3-bit unsigned integer that identifies the capability of the advertising system type.

An AAB advertises itself as an AAB system type so that connected AADs know that it performs the AAB function of receiving and processing VID / I-SID assignment requests and provide responses to such requests.

An AAD could be a VLAN aware or VLAN unaware system. A VLAN aware system can be a VLAN aware bridge, a VLAN aware Wireless LAN Access Point, or VLAN aware end station. A VLAN unaware system can be a MAC bridge or an end station.

All AASs use the system type field to provide information about the type of system it is representing.

Table D-17—PBBN auto attach system type values

System Type	Value
Auto Attach BEB (AAB)	1
C-VLAN aware Auto Attach Device (AAD)	2
VLAN unaware Auto Attach Device (AAD)	3
S-VLAN aware Auto Attach Device (AAD)	4
Reserved for future standardization	0,5-7

D.2.17.8 Tagging

The settings of the tagging field indicate AAD link tagging requirements in AAD-sourced frames and current provisioning mode information. AABs adhere to the state field setting requested by the AAD.

Table D-18—PBBN auto attach tagging field values

Bit Numbers	Name	Value
0-1	Link VLAN Tagging requirements	0 - All traffic tagged on link 1 - Untagged and Tagged traffic on Link 2 - Untagged traffic only on Link 3 - Reserved

D.2.17.9 Rsvd2

One octet reserved for future alternative formats. The octet is set to zero on transmission. All other values are reserved for future use. The rsvd2 octet is zero on receipt.

D.2.17.10 PortNetId

A 12 octet field that uniquely identifies a system auto attach port within the administrative domain used for auto attach connection management. This information is particularly important to an AAD to determine which AAB in a given network it is attached to. AADs only form an association to one AAB, and an AAB forms an association to one AAD per AAB port.

When the AAB function resides on two physical BEBs comprising a DRNI (IEEE Std 802.1AX), the AAD requires an association with a single logical AAB system. AABs in a DRNI configuration use a single unique PortNetId to ensure the AAD is associated logically with one AAB.

Table D-19—PBBN auto attach PortNetId values

Octets	Type	Values
6	System MAC Address	Base Chassis MAC or Virtual BMAC
2	Reserved	0 on transmit can be anything on receive
4	Integer	Port IfIndex, Aggregator IfIndex

D.2.17.11 PBBN Auto Attach System TLV usage rules

An LLDPDU shall contain no more than one PBBN Auto Attach System TLV.

D.2.18 PBBN Auto Attach Assignment TLV

The assignment TLV is a TLV that allows an AAD to request VID / I-SID assignments that it would like enabled by a directly connected AAB.

Figure D-18 depicts an assignment TLV containing multiple VID / I-SID assignments. The minimum number of assignments is zero VID / I-SID assignments. The maximum number of assignments in an assignment TLV is determined by the maximum TLV information string size of 511 bytes. This allows a 101 VID / I-SID assignments resulting in a TLV size of 510 bytes.

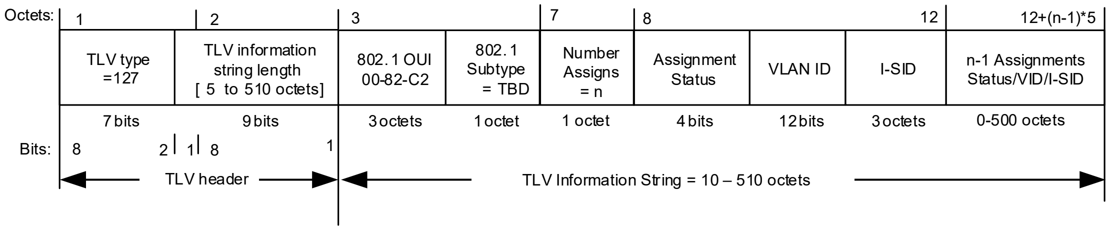

Figure D-18—PBBN Auto Attach Assignment TLV format

D.2.18.1 TLV type

A 7-bit integer value occupying the most significant bits of the first octet of the TLV. Always contains the value 127.

D.2.18.2 TLV information string length

The TLV information string length field contains the length, in octets, of the assignment TLV. The length of this TLV is variable between 5 and 510 octets depending on the number of VID / I-SID assignments carried.

D.2.18.3 802.1 OUI

The 3-octet Organizational Unit Identifier assigned to IEEE 802.1 (00-82-C2).

D.2.18.4 802.1 TLV subtype

A 1-octet integer value specifying the assignment TLV subtype specified in Table D-1.

D.2.18.5 Number assignments

A 1-octet field containing the number n of Status/VID/I-SID triples in this TLV. The number can range from 0-101. Zero indicates no Status/VID/I-SID triples are present while 101 is the maximum number allowed in an assignment TLV.

D.2.18.6 Assignment status

The assignment status data is returned by the AAB for each VID / I-SID assignment request. If multiple AADs are connected to the AAB, assignment status data is returned independently on each port. This field is only valid when generated by an AAB.

Table D-20—PBBN auto attach assignment status values

Assignment Status	Value
Pending	1
Accepted	2
Rejected: Generic	3
Rejected: Auto attach resources unavailable	4
Rejected: Invalid VLAN ID	5
Rejected: VLAN resources unavailable	6
Rejected: Invalid I-SID	7
Rejected: I-SID resources unavailable	8
Rejected: Application interaction issue	9
Rejected: Assignment not allowed	10

Pending: AAB is processing assignment - used by the AAD while it is waiting for a response from the AAB.

Accepted: AAB assignment request processing is complete for the VID / I-SID and the VLAN to BSI connection has been established.

Rejected: Generic - used when an undefined rejection occurs.

Rejected: Auto attach resources unavailable - used when the auto attach process is unable to process a request due to system resources being unavailable. Eg: memory or CPU processing.

Rejected: Invalid VLAN ID - used when the VID value is outside the range of 1 to 4094.

Rejected: VLAN resources unavailable - used when VID resources limits have been reached. Eg, maximum number of VLANs are already in use for the port or AAB.

Rejected: Invalid I-SID - used when the I-SID value is outside the allowed values of 1 or 256 through 16777214.

Rejected: I-SID resources unavailable - used when I-SID resources limits have been reached. Eg, maximum number of I-SIDs are already in use for the port or AAB.

Rejected: Application interaction issue - used when auto attach assignment processing is not able to complete due to an issue with auto attach agent functions on the AAB. Eg, State Machine issue.

Rejected: Assignment not allowed - used when auto attach assignment processing is subject to a policy or rule on the AAB where the assignment requested is not permitted or denied.

D.2.18.7 VLAN ID

VLAN ID of the VLAN being mapped by this attachment. If this is an attachment with a VLAN unaware AAD this field is transmitted as zero and ignored on receive. If this is a C-VLAN aware AAD, then this field is a valid C-VID. If this is a S-VLAN aware AAD, then this field is a valid S-VID.

D.2.18.8 I-SID

I-SID value of the PBBN Backbone Service Instance (BSI) identifier mapped by this peering.

D.2.18.9 PBBN Auto Attach Assignment TLV usage rules

An LLDPDU shall contain no more than one PBBN Auto Attach Assignment TLV.

D.3 IEEE 802.1 Organizationally Specific TLV management

Insert new subclause D.3.2.13 with text for TLV variables at the end of clause D.3.2, as shown, re-numbering as necessary.

D.3.2.13 PBBN auto attach TLV managed objects

a) **PBBN Auto Attach System TLV:** see D.2.17.
b) **PBBN Auto Attach Assignment TLV:** see D.2.18.

D.4 PICS proforma for IEEE 802.1 Organizationally Specific TLV Extensions

Insert the following rows to table D.4.3:

D.4.3 Major capabilities and options

Item	Feature	Status	References	Support
dot1AaSet	Are the 802.1 Organizationally Specific TLV aaSet implemented?	O:1	D.2.17, D.2.18, Table D-1	Yes[] No[]
dot1AaTlv	Is each TLV in the IEEE 802.1 Organizationally Specific TLV aaSet implemented?	dot1AaSet: M	D.2.17, D.2.18, Table D-1	Yes [] N/A []

D.5 IEEE 802.1/LLDP extension MIB

D.5.2 Structure of the IEEE 802.1/LLDP extension MIB

Renumber table D-16 to D-21

Insert the following rows into D-17 renumbering the table to D-22

Table D-22—IEEE 802.1/LLDP extension MIB object cross reference

MIB table	MIB object	LLDP reference
Configuration group		Augments lldpV2Xdot1ConfigPortVlanTable
lldpXdot1AaConfigAaTable		Augments lldpV2Xdot1LocManVidEntry
	lldpXdot1AaConfigSysTxEnable	Normal LLPDUs, see IEEE Std 802.1AB
	lldpXdot1AaConfigAsgnsTxEnable	Normal LLDPDUs, see IEEE Std 802.1AB
Local system information		
lldpV2Xdot1LocAaTlvTable		D.2.17, D.2.18
	lldpV2Xdot1PortIfIndex	(Table index)
	lldpV2Xdot1LocAaSysTlvString	system TLV string D.2.17
	lldpV2Xdot1LocAaAsgnsTlvString	assignment TLV string D.2.18
Remote system information		
lldpV2Xdot1RemAaTlvTable		D.2.17, D.2.18
	lldpV2RemTimeMark	(Table index)
	lldpV2RemLocalIfIndex	(Table index)
	lldpV2RemLocaldestMACAddress	(Table index)
	ldpV2RemIndex	(Table index)
	lldpV2Xdot1RemAaSysTlvString	AA TLV string, D.2.17
	lldpV2Xdot1RemAaAsgnsTlvString	AA TLV string, D.2.18

Replace clause D.5.6 with the following D.5.6

D.5.6 Other extensions to the IEEE 802.1 LLDP extension MIB module

In the following MIB definition, if any discrepancy between the DESCRIPTION text and the corresponding definition in D.2.1 through D.5 occur, the definition in D.2.1 through D.5 shall take precedence.

```
LLDP-EXT-DOT1-EVB-EXTENSIONS-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE
        FROM SNMPv2-SMI
    TruthValue
        FROM SNMPv2-TC
    MODULE-COMPLIANCE,
    OBJECT-GROUP
        FROM SNMPv2-CONF
    ifGeneralInformationGroup
        FROM IF-MIB
    lldpV2LocPortIfIndex,
    lldpV2RemTimeMark,
    lldpV2RemLocalIfIndex,
    lldpV2RemLocalDestMACAddress,
    lldpV2RemIndex,
    lldpV2PortConfigEntry
        FROM LLDP-V2-MIB
    lldpV2Xdot1MIB
        FROM LLDP-EXT-DOT1-V2-MIB;

-- Define the MIB module
        lldpXDot1EvbExtensions MODULE-IDENTITY
    LAST-UPDATED "202208080000Z" -- August 8, 2022
    ORGANIZATION "IEEE 802.1 Working Group"
    CONTACT-INFO
        "  WG-URL: http://www.ieee802.org/1/
         WG-EMail: stds-802-1-l@ieee.org
          Contact: IEEE 802.1 Working Group Chair
           Postal: C/O IEEE 802.1 Working Group
                   IEEE Standards Association
                   445 Hoes Lane
                   Piscataway, NJ 08854
                   USA
           E-mail: stds-802-1-chairs@ieee.org"
    DESCRIPTION
            "The LLDP Management Information Base extension module for
            IEEE 802.1 organizationally defined discovery information
            for the EVB and auto attach extension objects.

            This MIB module is rooted under the lldpXdot1StandAloneExtensions
            OID arc, in order to allow it to be defined independently
            of other 802.1 LLDP extension MIBs.

        Unless otherwise indicated, the references in this MIB
        module are to IEEE Std 802.1Q-2022.

        Copyright (C) IEEE (2022).
        This version of this MIB module is part of IEEE Std 802.1Q;
        see that standard for full legal notices."

    REVISION "202208080000Z" -- August 8, 2022
    DESCRIPTION
            "Published as part of IEEE Std 802.1Qcj-2023.
```

```
                    Adds auto attach LLDP objects"

    REVISION "202201010000Z" -- January 1, 2022
    DESCRIPTION
            "Published as part of IEEE Std 802.1Q-2021.
            Cross references and contact information updated."

    REVISION "201807010000Z" -- July 1, 2018
    DESCRIPTION
            "Published as part of IEEE Std 802.1Q 2018 revision.
            Cross references updated and corrected."

    REVISION "201412150000Z" -- December 15, 2014
    DESCRIPTION
            "Published as part of IEEE Std 802.1Q 2014 revision.
            Cross references updated and corrected."

    REVISION "201202150000Z" -- February 15, 2012
    DESCRIPTION
            "Initial version published as part of IEEE Std 802.1Qbg"

-- Hang this MIB module under the stand-alone extension MIBs arc:
   ::= { lldpXdot1StandAloneExtensions 1 }

-- Define the root arc for stand-alone extension MIBs in 802.1
lldpXdot1StandAloneExtensions OBJECT IDENTIFIER ::= { lldpV2Xdot1MIB 7 }

-----------------------------------------------------------------------
-----------------------------------------------------------------------
--
-- Organizationally Defined Information Extension - IEEE 802.1
-- Definitions to support the evbSet TLV set (Table D-1)
-- for Edge Virtual Bridging
--
-----------------------------------------------------------------------
-----------------------------------------------------------------------

lldpXdot1EvbMIB OBJECT IDENTIFIER ::= { lldpXDot1EvbExtensions 1 }
lldpXdot1EvbObjects OBJECT IDENTIFIER ::= { lldpXdot1EvbMIB 1 }

-- EVB 802.1 MIB Extension groups

lldpXdot1EvbConfig OBJECT IDENTIFIER ::= { lldpXdot1EvbObjects 1 }
lldpXdot1EvbLocalData OBJECT IDENTIFIER ::= { lldpXdot1EvbObjects 2 }
lldpXdot1EvbRemoteData OBJECT IDENTIFIER ::= { lldpXdot1EvbObjects 3 }

-------------------------------------------------------------------
-- IEEE 802.1 - EVB Configuration
-------------------------------------------------------------------

--
--  lldpXdot1EvbConfigEvbTable : configure the
--  transmission of the EVB TLV on a set of ports
--

lldpXdot1EvbConfigEvbTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF LldpXdot1EvbConfigEvbEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "A table that controls selection of EVB
         TLVs to be transmitted on individual ports."
    ::= { lldpXdot1EvbConfig 1 }

lldpXdot1EvbConfigEvbEntry OBJECT-TYPE
    SYNTAX        LldpXdot1EvbConfigEvbEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "LLDP configuration information that controls the
        transmission of IEEE 802.1 organizationally defined
        EVB TLV on LLDP transmission-capable ports.

        This configuration object augments the lldpV2PortConfigEntry of
        the LLDP-MIB, therefore it is only present along with the port
        configuration defined by the associated lldpV2PortConfigEntry
        entry.

        Each active lldpConfigEntry is restored from non-volatile
        storage (along with the corresponding lldpV2PortConfigEntry)
        after a re-initialization of the management system."
    AUGMENTS      { lldpV2PortConfigEntry }
    ::= { lldpXdot1EvbConfigEvbTable 1 }

LldpXdot1EvbConfigEvbEntry ::= SEQUENCE {
    lldpXdot1EvbConfigEvbTxEnable TruthValue
}

lldpXdot1EvbConfigEvbTxEnable OBJECT-TYPE
    SYNTAX        TruthValue
    MAX-ACCESS    read-write
    STATUS        current
    DESCRIPTION
        "The lldpXdot1EvbConfigEvbTxEnable, which is
        defined as a truth value and configured by the network
        management, determines whether the IEEE 802.1 organizationally
        defined EVB TLV transmission is allowed
        on a given LLDP transmission-capable port.

        The value of this object is restored from non-volatile
        storage after a re-initialization of the management system."
    REFERENCE
        "D.2.12"
    DEFVAL         { false }
    ::= { lldpXdot1EvbConfigEvbEntry 1 }

--
--  lldpXdot1EvbConfigCdcpTable : configure the
--  transmission of the CDCP TLV on a set of ports
--

lldpXdot1EvbConfigCdcpTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF LldpXdot1EvbConfigCdcpEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "A table that controls selection of EVB
         TLVs to be transmitted on individual ports."
    ::= { lldpXdot1EvbConfig 2 }

lldpXdot1EvbConfigCdcpEntry OBJECT-TYPE
    SYNTAX         LldpXdot1EvbConfigCdcpEntry
    MAX-ACCESS     not-accessible
    STATUS         current
    DESCRIPTION
        "LLDP configuration information that controls the
        transmission of IEEE 802.1 organizationally defined
        CDCP TLV on LLDP transmission-capable ports.

        This configuration object augments the lldpV2PortConfigEntry of
        the LLDP-MIB, therefore it is only present along with the port
        configuration defined by the associated lldpV2PortConfigEntry
        entry.

        Each active lldpConfigEntry is restored from non-volatile
        storage (along with the corresponding lldpV2PortConfigEntry)
        after a re-initialization of the management system."
    AUGMENTS       { lldpV2PortConfigEntry }
    ::= { lldpXdot1EvbConfigCdcpTable 1 }

LldpXdot1EvbConfigCdcpEntry ::= SEQUENCE {
    lldpXdot1EvbConfigCdcpTxEnable TruthValue
}

lldpXdot1EvbConfigCdcpTxEnable OBJECT-TYPE
    SYNTAX         TruthValue
    MAX-ACCESS     read-write
    STATUS         current
    DESCRIPTION
        "The lldpXdot1EvbConfigCdcpTxEnable, which is
        defined as a truth value and configured by the network
        management, determines whether the IEEE 802.1 organizationally
        defined CDCP TLV transmission is allowed
        on a given LLDP transmission-capable port.

        The value of this object is restored from non-volatile
        storage after a re-initialization of the management system."
    REFERENCE
        "D.2.13"
    DEFVAL          { false }
    ::= { lldpXdot1EvbConfigCdcpEntry 1 }

------------------------------------------------------------------------
-- IEEE 802.1 - EVB Local System Information
------------------------------------------------------------------------

---
---
--- lldpV2Xdot1LocEvbTlvTable: EVB TLV Information Table
---
---

lldpV2Xdot1LocEvbTlvTable OBJECT-TYPE
    SYNTAX       SEQUENCE OF LldpV2Xdot1LocEvbTlvEntry
    MAX-ACCESS   not-accessible
    STATUS       current
    DESCRIPTION
```

```
            "This table contains one row per port of EVB
            TLV information (as a part of the LLDP
            802.1 organizational extension) on the local system
            known to this agent."
    ::= { lldpXdot1EvbLocalData 1 }

lldpV2Xdot1LocEvbTlvEntry OBJECT-TYPE
    SYNTAX      LldpV2Xdot1LocEvbTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "EVB TLV information about a
            particular port component."
    INDEX   { lldpV2LocPortIfIndex }
    ::= { lldpV2Xdot1LocEvbTlvTable 1 }

LldpV2Xdot1LocEvbTlvEntry ::= SEQUENCE {
      lldpV2Xdot1LocEvbTlvString     OCTET STRING
      }

lldpV2Xdot1LocEvbTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the EVB TLV information string
            for the Port, as defined in D.2.13.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.12"
    ::= { lldpV2Xdot1LocEvbTlvEntry 1 }


---
---
--- lldpV2Xdot1LocCdcpTlvTable: CDCP TLV Information Table
---
---

lldpV2Xdot1LocCdcpTlvTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF LldpV2Xdot1LocCdcpTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table contains one row per port of CDCP
            TLV information (as a part of the LLDP
            802.1 organizational extension) on the local system
            known to this agent."
    ::= { lldpXdot1EvbLocalData 2 }

lldpV2Xdot1LocCdcpTlvEntry OBJECT-TYPE
    SYNTAX      LldpV2Xdot1LocCdcpTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
```

```
            "CDCP TLV information about a
            particular port component."
    INDEX   { lldpV2LocPortIfIndex }
    ::= { lldpV2Xdot1LocCdcpTlvTable 1 }

LldpV2Xdot1LocCdcpTlvEntry ::= SEQUENCE {
      lldpV2Xdot1LocCdcpTlvString     OCTET STRING
      }

lldpV2Xdot1LocCdcpTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE(0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the CDCP TLV information string
            for the Port, as defined in D.2.14.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.13"
    ::= { lldpV2Xdot1LocCdcpTlvEntry 1 }

------------------------------------------------------------------------
-- IEEE 802.1 - EVB Remote System Information
------------------------------------------------------------------------

---
---
--- lldpV2Xdot1RemEvbTlvTable: EVB TLV Information Table
---
---

lldpV2Xdot1RemEvbTlvTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF LldpV2Xdot1RemEvbTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table contains one row per port of EVB
            TLV information (as a part of the LLDP
            802.1 organizational extension) on the remote system
            known to this agent."
    ::= { lldpXdot1EvbRemoteData 1 }

lldpV2Xdot1RemEvbTlvEntry OBJECT-TYPE
    SYNTAX      LldpV2Xdot1RemEvbTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "EVB TLV information about a
            particular port component."
    INDEX   { lldpV2RemTimeMark,
              lldpV2RemLocalIfIndex,
              lldpV2RemLocalDestMACAddress,
              lldpV2RemIndex }
    ::= { lldpV2Xdot1RemEvbTlvTable 1 }
```

```
LldpV2Xdot1RemEvbTlvEntry ::= SEQUENCE {
      lldpV2Xdot1RemEvbTlvString     OCTET STRING
      }

lldpV2Xdot1RemEvbTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the EVB TLV information string
            for the Port, as defined in D.2.13.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.12"
    ::= { lldpV2Xdot1RemEvbTlvEntry 1 }


---
---
--- lldpV2Xdot1RemCdcpTlvTable: CDCP TLV Information Table
---
---

lldpV2Xdot1RemCdcpTlvTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF LldpV2Xdot1RemCdcpTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table contains one row per port of CDCP
            TLV information (as a part of the LLDP
            802.1 organizational extension) on the remote system
            known to this agent."
    ::= { lldpXdot1EvbRemoteData 2 }

lldpV2Xdot1RemCdcpTlvEntry OBJECT-TYPE
    SYNTAX      LldpV2Xdot1RemCdcpTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "CDCP TLV information about a
            particular port component."
    INDEX   { lldpV2RemTimeMark,
              lldpV2RemLocalIfIndex,
              lldpV2RemLocalDestMACAddress,
              lldpV2RemIndex }
    ::= { lldpV2Xdot1RemCdcpTlvTable 1 }

LldpV2Xdot1RemCdcpTlvEntry ::= SEQUENCE {
      lldpV2Xdot1RemCdcpTlvString     OCTET STRING
      }

lldpV2Xdot1RemCdcpTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the CDCP TLV information string
            for the Port, as defined in D.2.14.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.13"
    ::= { lldpV2Xdot1RemCdcpTlvEntry 1 }

------------------------------------------------------------------------
-- IEEE 802.1 - EVB Conformance Information
------------------------------------------------------------------------

lldpXdot1EvbConformance OBJECT IDENTIFIER ::= { lldpXDot1EvbExtensions 2 }

lldpXdot1EvbCompliances
    OBJECT IDENTIFIER ::= { lldpXdot1EvbConformance 1 }
lldpXdot1EvbGroups
    OBJECT IDENTIFIER ::= { lldpXdot1EvbConformance 2 }

--
-- EVB - Compliance Statements
--

lldpXdot1EvbCompliance MODULE-COMPLIANCE
    STATUS        current
    DESCRIPTION
         "A compliance statement for SNMP entities that implement
         the IEEE 802.1 organizationally defined Congestion
         Notification LLDP extension MIB.

         This group is mandatory for agents that implement the
         EVB evbSet TLV set."
    MODULE        -- this module
        MANDATORY-GROUPS  { lldpXdot1EvbGroup,
                            ifGeneralInformationGroup }
    ::= { lldpXdot1EvbCompliances 1 }


--
-- EVB - MIB groupings
--

lldpXdot1EvbGroup  OBJECT-GROUP
    OBJECTS {
      lldpXdot1EvbConfigEvbTxEnable,
      lldpXdot1EvbConfigCdcpTxEnable,
      lldpV2Xdot1LocEvbTlvString,
      lldpV2Xdot1LocCdcpTlvString,
      lldpV2Xdot1RemEvbTlvString,
      lldpV2Xdot1RemCdcpTlvString
      }
    STATUS  current
    DESCRIPTION
        "The collection of objects that support the
        EVB evbSet TLV set."
    ::= { lldpXdot1EvbGroups 1 }


-----------------------------------------------------------------------
-----------------------------------------------------------------------
--
-- Organizationally Defined Information Extension - IEEE 802.1
-- Definitions to support the aaSet TLV set (Table D-1) for auto attach
--
-----------------------------------------------------------------------
-----------------------------------------------------------------------

lldpXdot1AaMIB OBJECT IDENTIFIER ::= { lldpXDot1EvbExtensions 3 }
lldpXdot1AaObjects OBJECT IDENTIFIER ::= { lldpXdot1AaMIB 1 }

-- Auto attach MIB extension groups

lldpXdot1AaConfig OBJECT IDENTIFIER ::= { lldpXdot1AaObjects 1 }
lldpXdot1AaLocalData OBJECT IDENTIFIER ::= {lldpXdot1AaObjects 2 }
lldpXdot1AaRemoteData OBJECT IDENTIFIER ::= { lldpXdot1AaObjects 3 }


-------------------------------------------------------------------
-- IEEE 802.1 - PBBN auto attach configuration
-------------------------------------------------------------------

--
--  lldpXdot1AaConfigAaTable : configure the
--  transmission of the auto attach TLV on a set of ports
--

lldpXdot1AaConfigAaTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF LldpXdot1AaConfigAaEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "A table that controls selection of auto attach
         TLVs to be transmitted on individual ports."
    ::= { lldpXdot1AaConfig 1 }

lldpXdot1AaConfigAaEntry OBJECT-TYPE
    SYNTAX        LldpXdot1AaConfigAaEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "LLDP configuration information that controls the
        transmission of IEEE 802.1 organizationally defined
        PBBN auto attach system and assignment TLVs on LLDP
        transmission-capable ports.

        This configuration object augments the lldpV2PortConfigEntry of
        the LLDP-MIB, therefore it is only present along with the port
        configuration defined by the associated lldpV2PortConfigEntry
        entry.

        Each active lldpConfigEntry is restored from non-volatile
        storage (along with the corresponding lldpV2PortConfigEntry)
        after a re-initialization of the management system."
    AUGMENTS      { lldpV2PortConfigEntry }
    ::= { lldpXdot1AaConfigAaTable 1 }

LldpXdot1AaConfigAaEntry ::= SEQUENCE {
    lldpXdot1AaConfigSysTxEnable TruthValue,
    lldpXdot1AaConfigAsgnsTxEnable TruthValue
}

lldpXdot1AaConfigSysTxEnable OBJECT-TYPE
    SYNTAX        TruthValue
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The lldpXdot1AaConfigSysTxEnable, which is
        defined as a truth value and configured by the auto attach
        state machine, determines whether the IEEE 802.1 organizationally
        defined PBBN Auto Attach System TLV transmission is allowed
        on a given LLDP transmission-capable port.

        The value of this object is return to FALSE after a re-initialization
        of the management system."
    REFERENCE
        "D.2.17"
    DEFVAL         { false }
    ::= { lldpXdot1AaConfigAaEntry 1 }

lldpXdot1AaConfigAsgnsTxEnable OBJECT-TYPE
    SYNTAX        TruthValue
    MAX-ACCESS    read-only
    STATUS        current
    DESCRIPTION
        "The lldpXdot1AaConfigAsgnsTxEnable, which is
        defined as a truth value and configured by the auto attach
        state machine, determines whether the IEEE 802.1 organizationally
        defined PBBN Auto Attach Assignment TLV transmission is allowed
        on a given LLDP transmission-capable port.

        The value of this object is return to FALSE after a re-initialization
        of the management system."
    REFERENCE
        "D.2.18"
    DEFVAL         { false }
    ::= { lldpXdot1AaConfigAaEntry 2 }

------------------------------------------------------------------------
-- IEEE 802.1 - PBBN auto attach local system information
------------------------------------------------------------------------

---
---
--- lldpV2Xdot1LocAaTlvTable: auto attach TLVs information table
---
---

lldpV2Xdot1LocAaTlvTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF LldpV2Xdot1LocAaTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table contains one row per port of auto attach
            TLV information (as a part of the LLDP
            802.1 organizational extension) on the local system
            known to this agent."
    ::= { lldpXdot1AaLocalData 1 }

lldpV2Xdot1LocAaTlvEntry OBJECT-TYPE
    SYNTAX      LldpV2Xdot1LocAaTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "Auto attach TLV information about a
            particular port component."
    INDEX     { lldpV2LocPortIfIndex }
    ::= { lldpV2Xdot1LocAaTlvTable 1 }

LldpV2Xdot1LocAaTlvEntry ::= SEQUENCE {
      lldpV2Xdot1LocAaSysTlvString     OCTET STRING,
      lldpV2Xdot1LocAaAsgnsTlvString     OCTET STRING
      }

lldpV2Xdot1LocAaSysTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the PBBN Auto Attach System TLV information
            string for the Port, as defined in D.2.17.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.17"
    ::= { lldpV2Xdot1LocAaTlvEntry 1 }

lldpV2Xdot1LocAaAsgnsTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the PBBN Auto Attach Assignment TLV
            information string for the Port, as defined in D.2.18.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.18"
    ::= { lldpV2Xdot1LocAaTlvEntry 2 }

------------------------------------------------------------------------
-- IEEE 802.1 - PBBN auto attach remote system information
------------------------------------------------------------------------

---
---
--- lldpV2Xdot1RemAaTlvTable: auto attach TLV information table
```

```
---
---

lldpV2Xdot1RemAaTlvTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF LldpV2Xdot1RemAaTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "This table contains one row per port of auto attach
            TLV information (as a part of the LLDP
            802.1 organizational extension) on the remote system
            known to this agent."
    ::= { lldpXdot1AaRemoteData 1 }

lldpV2Xdot1RemAaTlvEntry OBJECT-TYPE
    SYNTAX      LldpV2Xdot1RemAaTlvEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
            "auto attach TLV information about a
            particular port component."
    INDEX   { lldpV2RemTimeMark,
              lldpV2RemLocalIfIndex,
              lldpV2RemLocalDestMACAddress,
              lldpV2RemIndex }
    ::= { lldpV2Xdot1RemAaTlvTable 1 }

LldpV2Xdot1RemAaTlvEntry ::= SEQUENCE {
      lldpV2Xdot1RemAaSysTlvString     OCTET STRING,
      lldpV2Xdot1RemAaAsgnsTlvString   OCTET STRING
      }

lldpV2Xdot1RemAaSysTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the PBBN Auto Attach System TLV
            information string for the Port, as defined in D.2.17.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.17"
    ::= { lldpV2Xdot1RemAaTlvEntry 1 }

lldpV2Xdot1RemAaAsgnsTlvString OBJECT-TYPE
    SYNTAX      OCTET STRING (SIZE (0..514))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
            "This object contains the PBBN Auto Attach Assignment TLV
            information string for the Port, as defined in D.2.18.
            As the elements within the string are not individually
            manipulated via SNMP (they are of concern only to the
            state machines), the sub-structure of the string
            is not visible as separate objects within the
            local database."
    REFERENCE
            "D.2.18"
    ::= { lldpV2Xdot1RemAaTlvEntry 2 }

------------------------------------------------------------------------
-- IEEE 802.1 - PBBN auto attach conformance information
------------------------------------------------------------------------

lldpXdot1AaConformance OBJECT IDENTIFIER ::= { lldpXDot1EvbExtensions 4 }

lldpXdot1AaCompliances
    OBJECT IDENTIFIER ::= { lldpXdot1AaConformance 1 }
lldpXdot1AaGroups
    OBJECT IDENTIFIER ::= { lldpXdot1AaConformance 2 }

--
-- Auto attach - compliance statements
--

lldpXdot1AaCompliance MODULE-COMPLIANCE
    STATUS        current
    DESCRIPTION
         "A compliance statement for SNMP entities that implement
         the IEEE 802.1 organizationally defined auto attach LLDP
         extension MIB.

         This group is mandatory for agents that implement the
         auto attach aaSet TLV set."
    MODULE        -- this module
        MANDATORY-GROUPS  { lldpXdot1AaGroup,
                            ifGeneralInformationGroup }
    ::= { lldpXdot1AaCompliances 1 }


--
-- Auto attach - MIB groupings
--

lldpXdot1AaGroup  OBJECT-GROUP
    OBJECTS {
      lldpXdot1AaConfigSysTxEnable,
      lldpXdot1AaConfigAsgnsTxEnable,
      lldpV2Xdot1LocAaSysTlvString,
      lldpV2Xdot1LocAaAsgnsTlvString,
      lldpV2Xdot1RemAaSysTlvString,
      lldpV2Xdot1RemAaAsgnsTlvString
      }
    STATUS  current
    DESCRIPTION
        "The collection of objects that support the
        auto attach aaSet TLV set."
    ::= { lldpXdot1AaGroups 1 }

END
```

D.6 IEEE 802.1/LLDP extension YANG

Renumber the figures of D.6 starting with D-19

D.6.1 YANG framework

D.6.2 IEEE 802.1 Organizationally Specific TLV YANG data models

Insert the following subclause after D.6.2.6

D.6.2.7 IEEE 802.1/LLDP extension aaSet TLV model

The attributes for the TLVs in the aaSet are obtained from both system wide and per-port managed objects of the IEEE8021-PBBN-AA-MIB. The model augments the LLDP port model. The UML for the IEEE 802.1/LLDP extension aaSet is derived from the UML specified in IEEE Std 802.1AB and is shown in Figure D-7. The highlighted portions of the UML show how the LLDP model has been augmented.

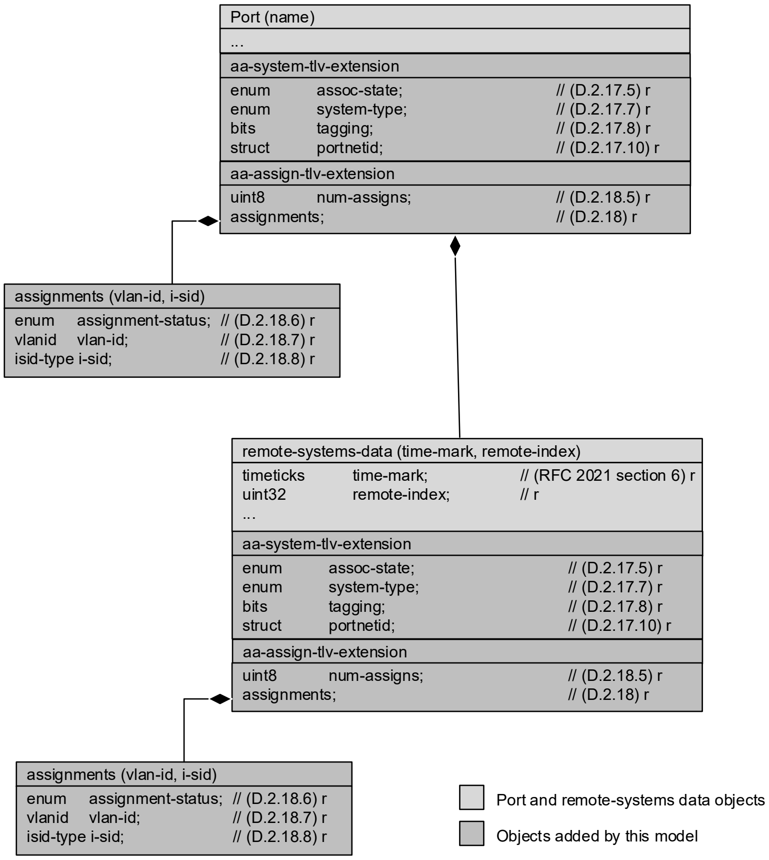
Port (name)
...
aa-system-tlv-extension
enum assoc-state; // (D.2.17.5) r
enum system-type; // (D.2.17.7) r
bits tagging; // (D.2.17.8) r
struct portnetid; // (D.2.17.10) r
aa-assign-tlv-extension
uint8 num-assigns; // (D.2.18.5) r
assignments; // (D.2.18) r
assignments (vlan-id, i-sid)
enum assignment-status; // (D.2.18.6) r
vlanid vlan-id; // (D.2.18.7) r
isid-type i-sid; // (D.2.18.8) r
remote-systems-data (time-mark, remote-index)
timeticks time-mark; // (RFC 2021 section 6) r
uint32 remote-index; // r
...
aa-system-tlv-extension
enum assoc-state; // (D.2.17.5) r
enum system-type; // (D.2.17.7) r
bits tagging; // (D.2.17.8) r
struct portnetid; // (D.2.17.10) r
aa-assign-tlv-extension
uint8 num-assigns; // (D.2.18.5) r
assignments; // (D.2.18) r
assignments (vlan-id, i-sid)
enum assignment-status; // (D.2.18.6) r
vlanid vlan-id; // (D.2.18.7) r
isid-type i-sid; // (D.2.18.8) r
□ Port and remote-systems data objects
▨ Objects added by this model

Figure D-25—PBBN auto attach aaSet TLV model

D.6.3 Structure of the IEEE 802.1/LLDP extension YANG model

Insert the following row at the end of Table D-18 re-numbering the table to D-23.

Table D-23—Structure of the YANG modules

Module	Reference	Notes
ieee802-dot1q-lldp-pbbn-aa-tlv	Annex D.6.6.7	PBBN auto attach set of IEEE 802.1 Organizationally Specific TLVs.

D.6.4 Security considerations

Insert the following subclause after D.6.4.6

D.6.4.7 Security considerations of the ieee802-dot1q-lldp-pbbn-aa-tlv YANG module

All objects in ieee802-dot1q-lldp-pbbn-aa-tlv are read only and so can not be manipulated. The objects

```
      assoc-state
      system-type
      tagging
      portnetid
      assignments

```

provide information about attachments between AADs and AABs which could be useful information for an attacker.

D.6.5 Definition of the IEEE 802.1/LLDP extension YANG modules

Insert the following subclause after D.6.5.6

D.6.5.7 Data scheme definition for the ieee802-dot1q-lldp-pbbn-aa-tlv YANG module

```
module: ieee802-dot1q-lldp-pbbn-aa-tlv

  augment /lldp:lldp/lldp:port:
    +--ro tlvs-tx-org-aa-system-enable?   bits
    +--rw aa-system-tlv-extension
    |  +--ro assoc-state?   identityref
    |  +--ro system-type?   identityref
    |  +--ro tagging?       identityref
    |  +--ro portnetid?     port-netid-type
    +--rw aa-assign-tlv-extension
       +--ro num-assigns?   uint8
       +--ro assignments* [vlan-id i-sid]
          +--ro assignment-status?   identityref
          +--ro vlan-id              dot1qtypes:vlanid
          +--ro i-sid                dot1qtypes:isid-type
  augment /lldp:lldp/lldp:port/lldp:remote-systems-data:
    +--ro aa-system-tlv-extension
    |  +--ro assoc-state?   identityref
    |  +--ro system-type?   identityref
    |  +--ro tagging?       identityref
    |  +--ro portnetid?     port-netid-type
    +--ro aa-assign-tlv-extension
       +--ro num-assigns?   uint8
       +--ro assignments* [vlan-id i-sid]
          +--ro assignment-status?   identityref
          +--ro vlan-id              dot1qtypes:vlanid
          +--ro i-sid                dot1qtypes:isid-type
```

D.6.6 IEEE 802.1/LLDP extension YANG modules

Insert the following subclause after D.6.6.6

D.6.6.7 Definition for the ieee802-dot1q-lldp-pbbn-aa-tlv YANG module

```
module ieee802-dot1q-lldp-pbbn-aa-tlv {
  yang-version "1.1";
  namespace urn:ieee:std:802.1Q:yang:ieee802-dot1q-lldp-pbbn-aa-tlv;
  prefix lldp-aa-tlv;
  import ieee802-dot1ab-lldp {
    prefix lldp;
  }
  import ieee802-dot1q-types {
    prefix dot1qtypes;
  }
  organization
    "Institute of Electrical and Electronics Engineers";
  contact
    "WG-URL: http://ieee802.org/1/
    WG-EMail: stds-802-1-l@ieee.org
    Contact: IEEE 802.1 Working Group Chair
    Postal: C/O IEEE 802.1 Working Group
    IEEE Standards Association
         445 Hoes Lane
         Piscataway, NJ 08854
         USA

    E-mail: stds-802-1-chairs@ieee.org";
  description
    "IEEE Std 802.1Qcj extension TLVs for LLDP

    Copyright (C) IEEE (2022).

    This version of this YANG module is part of IEEE Std 802.1Q; see the
    standard itself for full legal notices.";
  revision 2022-09-29 {
    description
      "LLDP extension tlv for auto attach. Published as part of IEEE Std
      802.1Qcj-2023.";
    reference
      "Annex D of IEEE Std 802.1Qcj-2023";
  }
  identity assoc-state-selector {
    description
      "Specify the state of the association between the AAS entities as
      described by Table D-16 of IEEE Std 802.1Qcj-2023";
  }
```

```
identity not-ready {
  base assoc-state-selector;
  description
    "Indicates the association state of NOT_READY as specified in Table
    D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value 0x00.";
}
identity ready-to-assoc {
  base assoc-state-selector;
  description
    "Indicates the association state of READY_TO_ASSOC as specified in
    Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value 0x01.";
}
identity ready-to-attach {
  base assoc-state-selector;
  description
    "Indicates the association state of READY_TO_ATTACH as specified in
    Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value 0x02.";
}
identity assoc-failed-types {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_FAILED_TYPES as specified
    in Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value
    0x12.";
}
identity assoc-failed-tags {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_FAILED_TAGS as specified
    in Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value
    0x22.";
}
identity assoc-failed-topo {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_FAILED_TOPO as specified
    in Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value
    0x32.";
}
identity assoc-failed-other {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_FAILED_OTHER as specified
    in Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value
    0x42.";
}
identity assoc-attached {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_ATTACHED as specified in
    Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value 0x03.";
}
identity assoc-standby {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_STANDBY as specified in
    Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value 0x13.";
}
identity assoc-invalid {
  base assoc-state-selector;
  description
    "Indicates the association state of ASSOC_INVALID as specified in
    Table D-16 of IEEE Std 802.1Qcj-2023. Signalled as the value 0x23.";
}
identity system-type-selector {
  description
    "Specify the selection of the PPBN Auto-attach system type as
    secified in Table D-17 of IEEE Std 802.1Qcj-2023";
}
identity aab-system {
  base system-type-selector;
  description
    "Indicates the system type of an Auto Attach BEB (AAB) in the PPBN
    Auto Attach System TLV specifie in D.2.17 of IEEE Std
    802.1Qcj-2023. Signalled as value 1.";
}
identity aad-cvlan-system {
  base system-type-selector;
  description
    "Indicates the system type of a C-VLAN aware Auto Attach Device
    (AAD) in the PPBN Auto Attach System TLV specifie in D.2.17 of IEEE
    Std 802.1Qcj-2023. Signalled as value 2.";
}
identity aad-vlan-unaware-system {
  base system-type-selector;
  description
    "Indicates the system type of a VLAN unaware Auto Attach Device
    (AAD) in the PPBN Auto Attach System TLV specifie in D.2.17 of IEEE
    Std 802.1Qcj-2023. Signalled as value 3.";
}
identity aad-svlan-system {
  base system-type-selector;
  description
    "Indicates the system type of a S-VLAN aware Auto Attach Device
    (AAD) in the PPBN Auto Attach System TLV specifie in D.2.17 of IEEE
    Std 802.1Qcj-2023. Signalled as value 4.";
}
identity tagging-selector {
  description
    "Specify the tagging field selection of the PPBN Auto Attach System
    TLV as secified in Table D-18 of IEEE Std 802.1Qcj-2023";
}
identity tagged-only {
  base tagging-selector;
  description
    "Indicates the AAD link tagging requirement of all VLAN tagged in
    AAD sourced frames. Signalled as value 0 in the PPBN Auto Attach
    System TLV specified in D.2.17 of IEEE Std 802.1Qcj-2023.";
}
identity untagged-or-tagged {
  base tagging-selector;
  description
    "Indicates the AAD link tagging requirement of untagged and VLAN
    tagged in AAD sourced frames. Signalled as value 1 in the PPBN Auto
    Attach System TLV specified in D.2.17 of IEEE Std 802.1Qcj-2023.";
}
identity untagged-only {
  base tagging-selector;
  description
    "Indicates the AAD link tagging requirement of all untagged in AAD
    sourced frames. Signalled as value 2 in the PPBN Auto Attach System
    TLV specified in D.2.17 of IEEE Std 802.1Qcj-2023.";
}
identity assignment-status-selector {
  description
    "Specify the status of an auto attachment assignment in the PBBN
    Auto Attach assignment TLV sent by the AAB for each VID / I-SID
    assignment request.";
}
identity pending {
  base assignment-status-selector;
  description
    "Indicates the AAB is processing the assignment. This status is
    used by the AAD while it is waiting for a response from the AAB as
    described in D.2.18.6 of IEEE Std 802.1Qcj-2023. Signalled as value
    1.";
}
identity accepted {
  base assignment-status-selector;
  description
    "Indicates the AAB assignment processing request is complete for
    the VID / I-SID and the VLAN to BSI connection has been established
    as described in D.2.18.6 of IEEE Std 802.1Qcj-2023. Signalled as
    value 2.";
}
identity rejected-generic {
  base assignment-status-selector;
  description
    "Indicates an undefined rejection has occured as described in
    D.2.18.6 of IEEE Std 802.1Qcj-2023. Signalled as value 3.";
}
identity rejected-resource {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured due to system resources being
    unavailable as described in D.2.18.6 of IEEE Std 802.1Qcj-2023.
    Signalled as value 4.";
}
identity rejected-invalid-vlan {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured because the VID value is outside
    the range of 1 to 4094 as described in D.2.18.6 of IEEE Std
    802.1Qcj-2023. Signalled as value 5.";
}
identity rejected-vlan-resource {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured due to maximum VLAN resource
    limits have been reached as described in D.2.18.6 of IEEE Std
    802.1Qcj-2023. Signalled as value 6.";
}
identity rejected-invalid-isid {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured because the I-SID value is
    outside of the range 1 or 256 through 16777214 as described in
```

```
       D.2.18.6 of IEEE Std 802.1Qcj-2023. Signalled as value 7.";
}
identity rejected-isid-resource {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured due to maximum I-SID resource
    limits have been reached as described in D.2.18.6 of IEEE Std
    802.1Qcj-2023. Signalled as value 8.";
}
identity rejected-application {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured because an issue with auto
    attach agent functions on the AAB as described in D.2.18.6 of IEEE
    Std 802.1Qcj-2023. Signalled as value 9.";
}
identity rejected-policy {
  base assignment-status-selector;
  description
    "Indicates a rejection has occured because the auto attach
    assignment processing is subject to a policy or rule on the AAB
    where the assignment requested is not permitted or denied as
    described in D.2.18.6 of IEEE Std 802.1Qcj-2023. Signalled as value
    10.";
}
typedef aa-isid-type {
  type dot1qtypes:isid-type {
    range "1 | 256..16777214";
  }
  description
    "The aa-i-sid type represents a backbone service instance identifier
    (I-SID). This is the 24-bit I-SID field used in the I-TAG TCI of a
    provider backbone bridging frame. The values 0, 2-254, and 16777215 are
        reserved for future standardization. The value 255 is dedicated to
       use by the SPB protocol. For Auto Attach values 2-255 are not allowed.";
  reference
    "D.2.18.8 of IEEE Std 802.1Qcj-2023.";
}
typedef port-netid-type {
  type binary {
    length "12";
  }
  description
    "A 12 octet binary string representing the NetPortID fields of the
    PPBN Auto Attach System TLV as specified in D.2.17 of IEEE Std
    802.1Qcj-2023. The 12 octet field uniquely identifies a system auto
    attach port within the administrative domain used for auto attach
    connection management. The first 6 octets of the string are the
    binary representation of the system MAC address. The next 2 octets
    are reserved and have the value 0. The last 4 octets are the
    integer IfIndex for the port.";
  reference
    "D.2.17.9 of IEEE Std 802.1Qcj-2023";
}
grouping aa-system-tlv {
  description
    "PBBN Auto Attach System TLV";
  reference
    "D.2.17 of IEEE Std 802.1Q-2022";
  leaf assoc-state {
    type identityref {
      base assoc-state-selector;
    }
    config false;
    description
      "Association state between AAS entities on the link";
    reference
      "D.2.17.5 of IEEE Std 802.1Qcj-2023.";
  }
  leaf system-type {
    type identityref {
      base system-type-selector;
    }
    config false;
    description
      "Identifies the capability of the advertising system type.";
    reference
      "D.2.17.6 of IEEE Std 802.1Qcj-2023.";
  }
  leaf tagging {
    type identityref {
      base tagging-selector;
    }
    config false;
    description
      "Indicates AAD link tagging requirements in AAD-sourced frames
      and current provisioning mode information.";
    reference
      "D.2.17.7 of IEEE Std 802.1Qcj-2023.";
  }
  leaf portnetid {
    type port-netid-type;
    config false;
    description
      "Uniquely identifies a system auto attach port within the
      administrative domain used for auto attach connection management.";
    reference
      "D.2.17.9 of IEEE Std 802.1Qcj-2023.";
  }
}
grouping aa-assign-tlv {
  description
    "PBBN Auto Attach Assignment TLV";
  reference
    "D.2.18 of IEEE Std 802.1Q-2022";
  leaf num-assigns {
    type uint8 {
      range "0..101";
    }
       config false;
    description
      "Contains the number of Status/VID/I-SID triples in the PBBN Auto
      Attach assignment TLV.";
    reference
      "D.2.18.5 of IEEE Std 802.1Qcj-2023.";
  }
  list assignments {
    key "vlan-id i-sid";
```

```
      config false;
      description
        "A triplet of fields in the PBBN Auto Attach assignment TLV that
        indicates the mapping of VLAN ID to I-SID and the status of that
        mapping.";
      leaf assignment-status {
        type identityref {
          base assignment-status-selector;
        }
        config false;
        reference
          "D.2.18.6 of IEEE Std 802.1Qcj-2023.";
      }
      leaf vlan-id {
        type dot1qtypes:vlanid;
        config false;
        description
          "Advertises the VLAN ID of the VLAN being mapped by the
          assignment. If this is an association with a VLAN unaware AAD
          this field is transmitted as zero and ignored on receive. If
          this is a VLAN aware AAD, then this field is a valid VID.";
        reference
          "D.2.18.7 of IEEE Std 802.1Qcj-2023.";
      }
      leaf i-sid {
        type aa-isid-type;
        config false;
        description
          "Advertises the I-SID value of the PBBN Backbone Service
          Instance (BSI) identifier mapped by this assignment.";
        reference
          "D.2.18.8 of IEEE Std 802.1Qcj-2023.";
      }
    }
  }
  augment "/lldp:lldp/lldp:port" {
    description
      "Augments port with the PBBN Auto Attach extension TLVs";
    leaf tlvs-tx-org-aa-system-enable {
      type bits {
        bit aaSystem {
          position "0";
          description
            "D.2.17 of IEEE Std 802.1Q-2022";
        }
        bit aaAssign {
          position "1";
          description
            "D.2.18 of IEEE Std 802.1Q-2022";
        }
      }
      config false;
      description
        "Bitmap that includes the aaSet of tlvs from Table D.1 of
        802.1Qcj-2023";
      reference
        "D.1 of IEEE Std 802.1Qcj-2023";
    }
    container aa-system-tlv-extension {
      description
        "The PBBN Auto Attach System TLV";
      uses aa-system-tlv;
    }
    container aa-assign-tlv-extension {
      description
        "The PBBN Auto Attach Assignment TLV";
      uses aa-assign-tlv;
    }
  }
  augment "/lldp:lldp/lldp:port/lldp:remote-systems-data" {
    description
      "Augments port remote-systems-data with received aa extension tlvs";
    container aa-system-tlv-extension {
      description
        "Holds a received PBBN Auto Attach System TLV";
      uses aa-system-tlv;
    }
    container aa-assign-tlv-extension {
      description
        "Holds a received PBBN Auto Attach Assignment TLV";
      uses aa-assign-tlv;
    }
  }
}
```