

**P802.1Qdy/D2.2  
November 24, 2024**

(Amendment to IEEE Std 802.1Q™-2022 as amended by IEEE Std 802.1Qcz™-2023,  
IEEE Std 802.1Qcw™-2023, IEEE Std 802.1Qcj™-2023, IEEE Std 802.1Qdj™-2024, and  
IEEE Std 802.1Qdx™-2024)

7 **Draft Standard for**  
8 **Local and Metropolitan Area Networks—**

9 **Bridges and Bridged Networks**

10 **Amendment 40:**  
11 **YANG for the Multiple Spanning Tree**  
12 **Protocol**

13 Prepared by the  
14 **Time-Sensitive Networking (TSN) Task Group of IEEE 802.1**

15 Sponsor  
**LAN/MAN Standards Committee  
of the  
IEEE Computer Society**

19 **This and the following cover pages are not part of the draft.** They provide revision and other information  
20 for IEEE 802.1 Working Group members and participants in the IEEE Standards Association ballot process,  
21 and will be updated as convenient. The text proper of this draft begins with the [Title page](#).

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## 2 **Current draft**

3 This draft, P802.1Qdy/D2.2, has been prepared for a second Standards Association (SA) Recirculation Ballot  
4 following the successful Initial SA Ballot of P802.1Qdy/D2.0 and the first recirculation ballot of  
5 P802.1Qdy/D2.1. The comments received on those ballots, and their disposition by the CRG (Comment  
6 Resolution Group), are available in myProject.

7 The changes in this draft as a result of comment disposition are solely to the `ieee802-dot1q-rstp.yang`  
8 ([48.6.26](#)) and `ieee802-dot1q-mstp.yang` ([48.6.28](#)) YANG modules, their resulting bridge schema ([48.5.27](#),  
9 [48.5.29](#)), and their depiction in Figures [48-24](#) and [48-25](#) as follows:

- 10 — The revision date of both modules has been updated, as required when any change has been made  
11 to a module, and the anticipated year of publication of the amendment updated to 2025 to avoid the  
12 need to further revise the modules solely to make that change.
- 13 — The typedef `rstp:id-priority` now specifies the default of '8'.
- 14 — The leaves `port-path-cost` in the `rstp` module and `internal-port-path-cost` for the `ist` and each `msti` in  
15 the `mstp` module have been made `config false` (read-only). Leaves `fix-port-path-cost` (in the `rstp`  
16 module) and `fix-internal-port-path-cost` (for the `ist`, and for each `msti`, in the `mstp` module) allow those  
17 Port Path Costs to be managed, but if zero (the default, and not a permissible Port Path Cost) allow  
18 the bridge component to set those values dependent on the interface speed (as described in detail in  
19 the base standard).
- 20 — The updated `rstp` and `mstp` model schema, and Figures 48-24 and 48-25, include the added  
21 `fix-port-path-cost` and `fix-internal-port-path-cost` leaves.

22 These changes are not change barred in the updated draft because the YANG schema and modules  
23 incorporated in Clause 48 are imported as complete UTF-8 files without the possibility of inadvertent change,  
24 which rules out selective change bar marking. Selective change bar marking of the figures is likewise  
25 impractical.

## 26 **YANG modules**

27 The YANG modules specified by this standard are attached to the draft pdf as plain text (UTF-8) .yang files.

- <sup>1</sup> This page intentionally left blank, to allow for the addition of information (e.g. pointers to changed text) during  
<sup>2</sup> the SA Ballot process without the need to renumber the following pages in the draft.

## **Draft Standard for Local and Metropolitan Area Networks—**

## **Bridges and Bridged Networks**

# **Amendment 40: YANG for the Multiple Spanning Tree Protocol**

Prepared by the  
**Time-Sensitive Networking (TSN) Task Group of IEEE 802.1**

Sponsor  
**LAN/MAN Standards Committee**  
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2 **Abstract:** This amendment to IEEE Std 802.1Q-2022 as amended by IEEE Std 802.1Qcz-2023,  
3 IEEE Std 802.1Qcw-2023, IEEE Std 802.1Qcj-2023, IEEE Std 802.1Qdj-2024, and  
4 IEEE Std 802.1Qdx-2024 addresses Multiple Spanning Tree Protocol (MSTP) requirements arising  
5 from industrial automation networks. It specifies YANG for Bridge and Bridge component RSTP and  
6 MSTP configuration and status reporting.

7 **Keywords:** Bridged Network, IEEE 802.1Q™, IEEE 802.1Qdy™, LAN, local area network, MAC  
8 Bridge, metropolitan area network, MSTP, Multiple Spanning Tree Protocol, MIB, Rapid Spanning  
9 Tree Protocol, RSTP, Virtual Bridged Network, virtual LAN, VLAN Bridge, YANG.

10

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7 **János Farkas**, *Chair, Time-Sensitive Networking Task Group*  
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<sup>10</sup>

## 1 Introduction

This introduction is not part of IEEE Std 802.1Qdy™-2024, IEEE Standard for Local and metropolitan area networks— Bridges and Bridged Networks—Amendment 40: YANG for Multiple Spanning Trees.

2 IEEE Std 802.1Qdy™-202X: YANG for Multiple Spanning Trees addresses requirements arising from  
3 industrial automation networks, specifying YANG for bridge and bridge component MSTP configuration  
4 and status reporting.

5 This standard contains state-of-the-art material. The area covered by this standard is undergoing evolution.  
6 Revisions are anticipated within the next few years to clarify existing material, to correct possible errors, and  
7 to incorporate new related material. Information on the current revision state of this and other IEEE 802  
8 standards may be obtained from

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1

2 **IEEE Standard for**  
3 **Local and metropolitan area networks—**

4 **Bridges and Bridged Networks**

5 **Amendment 40:**  
6 **YANG for the Multiple Spanning Tree**  
7 **Protocol**

8 [This amendment is based on IEEE Std 802.1Q™-2022 as amended by IEEE Std 802.1Qcz™-2023,  
9 IEEE Std 802.1Qcw™-2023, IEEE Std 802.1Qcj™-2023, IEEE Std 802.1Qdj™-2024, and IEEE Std  
10 802.1Qdx™-2024.]

11 NOTE—The editing instructions contained in this amendment define how to merge the material contained therein into  
12 the existing base standard and its amendments to form the comprehensive standard.

13 The editing instructions are shown in ***bold italics***. Four editing instructions are used: change, delete, insert, and replace.  
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20 changes will be incorporated into the base standard.



## 1 5. Conformance

### 2 5.4.1.1 Multiple Spanning Tree (MST) operation (optional)

3 *Insert new list item q) after item p) in 5.4.1.1 as follows:*

- 4 q) Support YANG modules for the management of MSTP (48.6.24).

5

# 13. Spanning tree protocols

## 13.25 State machine timers

3

*Change Table 13-5 and the following NOTE as follows:*

**Table 13-5—Timer and related parameter values**

Parameter	Default	Permitted range	Interoperability recommendations
Migrate Time	3.0	— <sup>a</sup>	— <sup>a</sup>
(Bridge) Hello Time	2.0	— <sup>a</sup>	— <sup>a</sup>
Bridge Max Age	20.0	6.0–40.0	20.0
Bridge Forward Delay	15.0	4.0–30.0	15.0
Transmit Hold Count	6	1–10	6
Max Hops	20	6– <del>40</del> <a href="#">100</a>	—

All times are in seconds. —<sup>a</sup> Not applicable, value is fixed.

4 NOTE—Changes to Bridge Forward Delay do not affect reconfiguration times, unless the network includes Bridges that  
5 do not conform to this revision of this standard. Changes to Bridge Max Age can have an effect, as it is possible for old  
6 information to persist in loops in the physical topology for a number of “hops” equal to the value of Max Age in seconds,  
7 and thus exhaust the Transmit Hold Count in small loops. [The IEEE Std 802.1Qdy amendment to this standard increased](#)  
8 [the permitted range of Max Hops to allow a spanning tree to provide initial and remedial connectivity in extended ring](#)  
9 [topologies whenever physical connectivity is possible. Once configured such networks are not expected to depend on](#)  
10 [spanning tree for failure protection.](#)

11

## 48. YANG Data Models

### 48.2 IEEE 802.1Q YANG models

*Insert 48.2.14 and 48.2.15 at the end of 48.2 as follows:*

#### 48.2.14 Rapid Spanning Tree Protocol (RSTP) model

The RSTP model augments the VLAN Bridge component model (48.2.1, Figure 48-4) and the Interface management model for Bridge Ports (48.2.1, Figure 48-5) with nodes common to both RSTP and MSTP. These nodes control the configuration of the CST (and the CIST, when augmented by the Multiple Spanning Trees model, 48.2.15) and report on protocol operation. The RSTP model is illustrated in Figure 48-24.

component (name)			bridge-port		
string	name;	// r-w	leafref	bridge-name;	// r-w
...			leafref	component-name;	// r-w
...			...		
rstp // (13.4)			rstp // (13.4)		
enum	force-protocol-version;	// (13.7.2) r-w	bool	admin-bridge-port-enabled;	// (8.4) rw
bridge-id	bridge-id;	// (13.26.2) r	port-state	port-state;	// (8.4) r
{ uint64	bridge-id;	// (13.26.2) r	port-role	port-role;	// (13.4) r
id-priority	bridge-priority;	// (14.2) r-w	bool	restricted-role;	// (13.20) rw
uint16	system-id-extension;	// (13.26.2) r	bool	restricted-tcn;	// (13.20) rw
ieee:macaddress	bridge-address; ;	// (8.13.8) r	port-id	port-id;	// (13.26) r
bridge-id	root-id;	// (13.4) r	{ uint16	port-id;	// (13.26) r
{ uint64	bridge-id;	// (13.4) r	id-priority	port-priority;	// (14.2) rw
id-priority	bridge-priority;	// (14.2) r	id-port-number	port-number; ;	// (12.3) r
uint16	system-id-extension;	// (13.26) r	uint32	fix-port-path-cost;	// (13.10) r-w
ieee:macaddress	bridge-address; ;	// (8.13.8) r	uint32	port-path-cost;	// (13.4) r-w
uint32	root-path-cost;	// (13.4) r	uint8	designated-protocol-version;	// (14.2) r
union	root-port;	// (13.4) r	bridge-id	root-id;	// (13.4) r
uint8	max-age;	// (13.15) r	{ uint64	bridge-id;	// (13.4) r
uint8	hello-time;	// (13.25) r	id-priority	bridge-priority;	// (14.2) r
uint8	forward-delay;	// (13.25) r	uint16	system-id-extension;	// (13.26) r
uint8	bridge-max-age;	// (13.25) rw	ieee:macaddress	bridge-address; ;	// (8.13.8) r
uint8	bridge-forward-delay;	// (13.25) rw	uint32	root-path-cost;	// (13.4) r
uint8	tx-hold-count;	// (13.25) rw	bridge-id	designated-bridge-id	// (13.4) r
yang:date-and-time	last-topology-change;	// (13.25) r	{ uint64	bridge-id;	// (13.4) r
			id-priority	bridge-priority;	// (14.2) r-w
			uint16	system-id-extension;	// (13.26) r
			ieee:macaddress	bridge-address; ;	// (8.13.8) r
			port-id	designated-port-id	// (13.4) r
			{ uint16	port-id;	// (13.26) r
			id-priority	port-priority;	// (14.2) r
			id-port-number	port-number; ;	// (12.3) r
			bool	admin-edge-port;	// (13.33) r-w
			bool	oper-edge-port;	// (13.33) r
			bool	auto-edge-port;	// (13.33) r-w
			bool	disputed-port;	// (13.21) r
			bool	isolate-port;	// (13.23) r
			action	port-protocol-migration-check;	// (13.32)

- VLAN Bridge component and port nodes
- Objects added or augmented by this model

Figure 48-24—RSTP model

## 48.2.15 Multiple Spanning Tree Protocol (MSTP) model

The Multiple Spanning Tree Protocol model augments the bridge-mst container of the VLAN Bridge components model (48.2.1) and the RSTP model (48.2.14) with nodes for MSTP. These nodes control the configuration of the CIST and MSTIs and the assignment of VLANs and VIDs to MSTIs (8.9) within MST Regions. They also report on MSTP protocol operation. The Multiple Spanning Tree Protocol model is illustrated in Figure 48-25.

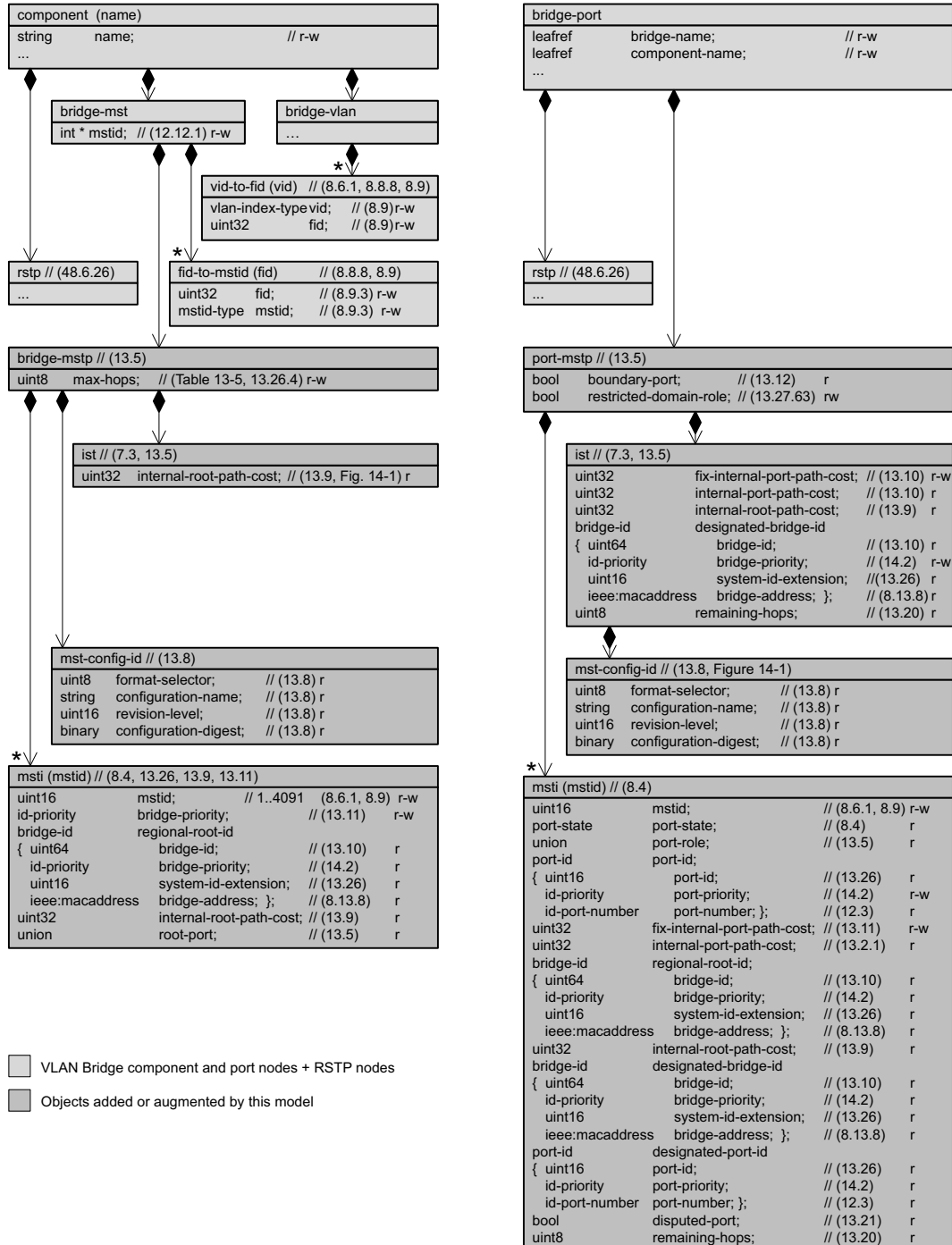


Figure 48-25—MSTP model

## 48.3 Structure of the YANG models

*Insert four new rows at the end of Table 48-1 as follows (unchanged rows not shown):*

**Table 48-1—Summary of the YANG modules**

Module	References	Managed functionality	Initial YANG specification Notes
ieee802-dot1q-rstp	48.5.26, 48.6.26	8.4, 8.7, 8.8, 8.10, Clause 13	IEEE Std 802.1Qdy Bridge and Bridge Port RSTP parameters.
ieee802-dot1q-rstp-bridge	48.5.27, 48.6.27		IEEE Std 802.1Qdy Augments Bridge components and Bridge Ports with RSTP parameters.
ieee802-dot1q-mstp	48.5.28, 48.6.28	8.4, 8.7, 8.8, 8.8, 8.9, 8.10, Clause 13	IEEE Std 802.1Qdy Bridge and Bridge Port MSTP parameters.
ieee802-dot1q-mstp-bridge	48.5.29, 48.6.29		IEEE Std 802.1Qdy Augments RSTP-capable Bridge components and Bridge Ports with MSTP parameters.

*Insert 48.3.14 and 48.3.15 after 48.3.13 (inserted by IEEE Std 802.1Qdx-2024) as follows:*

### 48.3.14 RSTP model

A bridge implementing the RSTP model (48.2.14) implements the YANG modules in Table 48-15.

**Table 48-15—RSTP model YANG modules**

YANG module
ieee802-types
ieee802-dot1q-types
ieee802-dot1q-bridge
ieee802-dot1q-rstp
ieee802-dot1q-rstp-bridge

### 48.3.15 MSTP model

A bridge implementing the MSTP model (48.2.15) implements the YANG modules in Table 48-16.

**Table 48-16—MSTP model YANG modules**

YANG module
ieee802-types
ieee802-dot1q-types
ieee802-dot1q-bridge
ieee802-dot1q-rstp
ieee802-dot1q-rstp-bridge
ieee802-dot1q-mstp
ieee802-dot1q-mstp-bridge

**1 48.4 Security considerations**

*2 Insert 48.4.14 and 48.4.15 after 48.4.13 (inserted by IEEE Std 802.1Qdx-2024) as follows:*

**3 48.4.14 Security considerations of the RSTP model**

4 All writeable nodes in the ieee802-dot1q-rstp YANG module could be manipulated to interfere with basic  
5 networking connectivity.

6 See 48.4.1 for related ieee802-dot1q-bridge YANG model security considerations.

**7 48.4.15 Security considerations of the Multiple Spanning Trees model**

8 All writeable nodes in the ieee802-dot1q-mstp YANG module could be manipulated to interfere with basic  
9 networking connectivity.

10 See 48.4.1 for related ieee802-dot1q-bridge YANG model security considerations.

11

## 1 48.5 YANG schema tree definitions

2 A simplified graphical representation of the data model is used in this document. The meaning of the  
3 symbols in these diagrams is as follows:

- 4 — Brackets “[” and “]” enclose list keys.
- 5 — Abbreviations before data node names: “rw” means configuration (read-write), and “ro” means state  
6 data (read-only).
- 7 — Symbols after data node names: “?” means an optional node, “!” means a presence container, and  
8 “\*” denotes a list and leaf-list.
- 9 — Parentheses enclose choice and case nodes, and case nodes are also marked with a colon (“:”).
- 10 — Ellipsis (“...”) stands for contents of subtrees that are not shown.

11 *Insert 48.5.26, 48.5.27, 48.5.28, and 48.5.29 at the end of 48.5 as follows:*

### 12 48.5.26 Schema for the ieee802-dot1q-rstp YANG module

13 This YANG module does not have a YANG schema tree.

### 14 48.5.27 Schema for the ieee802-dot1q-rstp-bridge YANG module

```
15 module: ieee802-dot1q-rstp-bridge
16
17   augment /dot1q:bridges/dot1q:bridge/dot1q:component:
18     +--rw rstp!
19       +--rw force-protocol-version?    enumeration
20       +--rw bridge-id
21         | +--ro bridge-id?             uint64
22         | +--rw bridge-priority?       id-priority
23         | +--ro system-id-extension?   uint16
24         | +--ro bridge-address?        ieee:mac-address
25       +--ro root-id
26         | +--ro bridge-id?             uint64
27         | +--ro bridge-priority?       id-priority
28         | +--ro system-id-extension?   uint16
29         | +--ro bridge-address?        ieee:mac-address
30       +--ro root-path-cost?            uint32
31       +--ro root-port?                 union
32       +--ro max-age?                   uint8
33       +--ro hello-time?                uint8
34       +--ro forward-delay?             uint8
35       +--rw bridge-max-age?            uint8
36       +--rw bridge-forward-delay?      uint8
37       +--rw tx-hold-count?             uint8
38       +--ro last-topology-change?      yang:date-and-time
39   augment /if:interfaces/if:interface/dot1q:bridge-port:
40     +--rw rstp!
41       +--rw admin-bridge-port-enabled? boolean
42       +--ro port-state?                 port-state
43       +--ro port-role?                  port-role
44       +--rw restricted-role?            boolean
45       +--rw restricted-tcn?             boolean
46       +--rw port-id
47         | +--ro port-id?               uint16
48         | +--rw port-priority?         id-priority
49         | +--ro port-number?           id-port-number
50       +--rw fix-port-path-cost?         uint32
51       +--ro port-path-cost?             uint32
52       +--ro designated-protocol-version? uint8
53       +---x port-protocol-migration-check
54       +--ro root-id
55         | +--ro bridge-id?             uint64
56         | +--ro bridge-priority?       id-priority
57         | +--ro system-id-extension?   uint16
58         | +--ro bridge-address?        ieee:mac-address
59       +--ro root-path-cost?             uint32
```



```

1      +--ro designated-bridge-id
2      |   +--ro bridge-id?          uint64
3      |   +--ro bridge-priority?    id-priority
4      |   +--ro system-id-extension? uint16
5      |   +--ro bridge-address?     ieee:mac-address
6      +--ro designated-port-id
7      |   +--ro port-id?            uint16
8      |   +--ro port-priority?      id-priority
9      |   +--ro port-number?        id-port-number
10     +--rw admin-edge-port?         boolean
11     +--ro oper-edge-port?          boolean
12     +--rw auto-edge-port?          boolean
13     +--ro disputed-port?           boolean
14     +--ro isolate-port?            boolean
15

```

#### 16 48.5.28 Schema for the ieee802-dot1q-mstp YANG module

17 This YANG module does not have a YANG schema tree.

#### 18 48.5.29 Schema for the ieee802-dot1q-mstp-bridge YANG module

```

19 module: ieee802-dot1q-mstp-bridge
20
21   augment /dot1q:bridges/dot1q:bridge/dot1q:component/dot1q:bridge-mst:
22     +--rw bridge-mstp!
23       +--rw mst-config-id
24       |   +--ro format-selector?    uint8
25       |   +--rw configuration-name?  string
26       |   +--ro revision-level?     uint16
27       |   +--ro configuration-digest? binary
28       +--rw max-hops?               uint8
29       +--rw ist
30       |   +--ro internal-root-path-cost? uint32
31       +--rw msti* [mstid]
32       |   +--rw mstid                uint16
33       |   +--rw bridge-priority?     rstp:id-priority
34       |   +--ro regional-root-id
35       |   |   +--ro bridge-id?      uint64
36       |   |   +--ro bridge-priority? id-priority
37       |   |   +--ro system-id-extension? uint16
38       |   |   +--ro bridge-address?  ieee:mac-address
39       |   +--ro internal-root-path-cost? uint32
40       |   +--ro root-port?           union
41   augment /if:interfaces/if:interface/dot1q:bridge-port:
42     +--rw port-mstp!
43     |   +--ro boundary-port?         boolean
44     |   +--rw restricted-domain-role? boolean
45     |   +--rw ist
46     |   |   +--ro mst-config-id
47     |   |   |   +--ro format-selector?    uint8
48     |   |   |   +--rw configuration-name?  string
49     |   |   |   +--ro revision-level?     uint16
50     |   |   |   +--ro configuration-digest? binary
51     |   |   +--rw fix-internal-port-path-cost? uint32
52     |   |   +--ro internal-port-path-cost? uint32
53     |   |   +--ro internal-root-path-cost? uint32
54     |   |   +--ro designated-bridge
55     |   |   |   +--ro bridge-id?      uint64
56     |   |   |   +--ro bridge-priority? id-priority
57     |   |   |   +--ro system-id-extension? uint16
58     |   |   |   +--ro bridge-address?  ieee:mac-address
59     |   |   +--ro remaining-hops?      uint8
60     +--rw msti* [mstid]
61     |   +--rw mstid                uint16
62     |   +--ro port-state?           rstp:port-state
63     |   +--ro port-role?            union
64     |   +--rw port-id
65     |   |   +--ro port-id?          uint16
66     |   |   +--rw port-priority?    id-priority

```

```

1      |  +-ro port-number?      id-port-number
2      +-rw fix-internal-port-path-cost?  uint32
3      +-ro internal-port-path-cost?      uint32
4      +-ro regional-root-id
5      |  +-ro bridge-id?          uint64
6      |  +-ro bridge-priority?     id-priority
7      |  +-ro system-id-extension? uint16
8      |  +-ro bridge-address?      ieee:mac-address
9      +-ro internal-root-path-cost?  uint32
10     +-ro designated-bridge-id
11     |  +-ro bridge-id?          uint64
12     |  +-ro bridge-priority?     id-priority
13     |  +-ro system-id-extension? uint16
14     |  +-ro bridge-address?      ieee:mac-address
15     +-ro designated-port-id
16     |  +-ro port-id?            uint16
17     |  +-ro port-priority?       id-priority
18     |  +-ro port-number?        id-port-number
19     +-ro disputed-port?         boolean
20     +-ro remaining-hops?        uint8
21

```

## 1 48.6 YANG modules<sup>6 7 8</sup>

2 *Insert 48.6.26 at the end of 48.6 as follows::*

### 3 48.6.26 The ieee802-dot1q-rstp YANG module

```
4 module ieee802-dot1q-rstp {
5   yang-version 1.1;
6   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-rstp";
7   prefix rstp;
8
9   import ietf-yang-types {
10     prefix yang;
11   }
12   import ietf-interfaces {
13     prefix if;
14   }
15   import ieee802-types {
16     prefix ieee;
17   }
18
19   organization
20     "IEEE 802.1 Working Group";
21   contact
22     "WG-URL: http://www.ieee802.org/1/
23     WG-EMail: stds-802-1-1@ieee.org
24
25     Contact: IEEE 802.1 Working Group Chair
26     Postal: C/O IEEE 802.1 Working Group
27             IEEE Standards Association
28             445 Hoes Lane
29             Piscataway, NJ 08854
30             USA
31
32     E-mail: stds-802-1-chairs@ieee.org";
33   description
34     "This module provides management of IEEE Std 802.1Q Bridge components
35     that support the Rapid Spanning Tree Algorithm and Protocol (RSTP).
36     The managed objects specified also support those aspects of Multiple
37     Spanning Tree Algorithm and Protocol (MSTP) and Shortest Path Bridging
38     (SPB) operation that provide plug-and-play interoperability with RSTP.
39
40     References specify constraints on, and consequences of, settings of
41     leaf values and the creation and deletion of list entries. The values
42     of all configured objects are retained across system reinitialization.
43
44     Copyright (C) IEEE (2024).
45
46     This version of this YANG module is part of IEEE Std 802.1Q; see the
47     standard itself for full legal notices.";
48
49   revision 2024-11-17 {
50     description
51       "Published as part of IEEE Std 802.1Qdy-2025.
52
53       The following reference statement identifies each referenced IEEE
54       Standard as updated by applicable amendments.";
55     reference
56       "IEEE Std 802.1Q Bridges and Bridged Networks:
57       IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023,
58       IEEE Std 802.1Qcw-2023, IEEE Std 802.1Qcj-2023,
59       IEEE Std 802.1Qdj-2024, IEEE Std 802.1Qdx-2024,
```

<sup>6</sup> Copyright release for YANG: Users of this standard may freely reproduce the YANG modules contained in this standard so that they can be used for their intended purpose.

<sup>7</sup> An ASCII version of each YANG module is attached to the PDF of this standard and can also be obtained from the IEEE 802.1 Website at <https://1.ieee802.org/yang-modules/>.

<sup>8</sup> References in this standard's YANG module definitions are not clickable, as each module has been incorporated unchanged after development and verification using YANG tools.

```
1     IEEE Std 802.1Qdy-2024.";
2 }
3
4 typedef id-priority {
5     type uint8 {
6         range "0..15";
7     }
8     default "8";
9     description
10        "Priority for Bridge and Bridge Port identifiers. Lower numeric
11        values indicate the better identifier.";
12 }
13
14 typedef id-port-number{
15     type uint16 {
16         range "0..4095";
17     }
18     description
19        "A system assigned Bridge Port number, unique in the context of
20        a Bridge component, used in a Port Identifier.";
21 }
22
23 grouping bridge-id {
24     description
25        "A 64-bit Bridge Identifier and its components: a manageable
26        priority in the four most-significant bits, a system ID extension in
27        the next 12 bits, and the Bridge Address in the remaining 48 bits.";
28     reference
29        "13.26.2, 14.1.2, 14.2.5, and item e) in 13.26 of IEEE Std 802.1Q.";
30     leaf bridge-id {
31         type uint64;
32         config false;
33         description
34            "The Bridge Identifier as used in protocol and tree computation.";
35     }
36     leaf bridge-priority {
37         type id-priority;
38         description
39            "The manageable bridge priority.";
40     }
41     leaf system-id-extension {
42         type uint16 {
43             range "0..4095";
44         }
45         config false;
46         description
47            "The system ID extension.";
48         reference
49            "13.26.2, 13.41.5, 13.42, 14.2.5, and 14.4 of IEEE Std 802.1Q.";
50     }
51     leaf bridge-address {
52         type ieee:mac-address;
53         config false;
54         description
55            "A Bridge Address.";
56     }
57 }
58
59 grouping port-id {
60     description
61        "A 16-bit Port Identifier and its components: a priority in the four
62        most-significant bits, and a twelve-bit Bridge Port number.";
63     reference
64        "13.26.2, 14.1.2, 14.2.5, and item e) in 13.26 of IEEE Std 802.1Q.";
65     leaf port-id {
66         type uint16;
67         config false;
68         description
69            "The Port Identifier as used in protocol and tree computation.";
70     }
71     leaf port-priority {
72         type id-priority;
```

```
1      description
2          "The manageable port priority, encoded in the four most-significant
3          bits of octet 26 of Configuration BPDUs for the CIST and in the
4          four most-significant bits of octet 15 of the MSTI Configuration
5          Message for an MSTI.";
6      reference
7          "13.2, 13.18, Table 13-3, 14.27, and item e) in 14.4.1
8          of IEEE Std 802.1Q.";
9  }
10 leaf port-number {
11     type id-port-number;
12     config false;
13     description
14         "The system assigned Port Number, encoded in the twelve
15         least-significant bits of octets 26 and 27 of Configuration BPDUs.";
16     reference
17         "12.3, 12.4.2, 13.2, and 14.2.7 of IEEE Std 802.1Q.";
18 }
19 }
20
21 typedef port-state {
22     type enumeration {
23         enum discarding {
24             value 1;
25             description
26                 "Received frames are not submitted to the Learning Process or
27                 to the Forwarding Process. The Forwarding Process does not relay
28                 frames to the port for transmission. The Discarding state
29                 includes an inability to receive or transmit frames or BPDUs
30                 because MAC_Operational is false (if:oper-status not up).";
31         }
32         enum learning {
33             value 2;
34             description
35                 "Received frames are submitted to the Learning Process, but not
36                 to the Forwarding Process. The Forwarding Process does not
37                 relay frames to the port for transmission.";
38         }
39         enum forwarding {
40             value 3;
41             description
42                 "Received frames are submitted to the Learning Process and the
43                 Forwarding Process. The Forwarding Process can relay frames to
44                 the port for transmission.";
45         }
46     }
47     description
48         "The Port State for frames assigned to a given spanning tree,
49         governing submission of frames received by the port to the Learning
50         and Forwarding Processes and relay of frames to the port by the
51         Forwarding Process.";
52     reference
53         "8.4, 8.6, 8.7, 13.4, and items aw) and item ba) in 13.27
54         of IEEE Std 802.1Q.";
55 }
56
57 typedef port-role {
58     type enumeration {
59         enum disabled-port {
60             value 1;
61             description
62                 "The port's MAC_Operational status is false (if:oper-status not
63                 up), or admin-bridge-port-enabled is false.";
64         }
65         enum root-port {
66             value 2;
67             description
68                 "The Root Port.";
69         }
70         enum designated-port {
71             value 3;
72             description
```

```
1      "A Designated Port.";
2    }
3    enum alternate-port {
4      value 4;
5      description
6        "An Alternate Port.";
7    }
8    enum backup-port {
9      value 5;
10     description
11       "A Backup Port.";
12   }
13 }
14 description
15   "The Port Role assigned by the Bridge's spanning tree protocol entity
16   for a given spanning tree.";
17 reference
18   "13.4, 13.5, 13.12, 13.24, 13.27.66, and item bn) in 13.27
19   of IEEE Std 802.1Q.";
20 }
21
22 grouping bridge-component-parameters {
23   description
24     "This grouping comprises per-Bridge component parameters.";
25   container rstp {
26     presence "The presence of this container indicates that RSTP is
27     supported.";
28     description
29       "Per-Bridge component parameters common to RSTP, MST, and SPB.";
30     leaf force-protocol-version {
31       type enumeration {
32         enum emulate-stp {
33           value 0;
34           description
35             "Forces transmission of STP BPDUs. Slows reconfiguration and
36             ageing of FDB entries.";
37         }
38         enum rstp {
39           value 2;
40           description
41             "RST BPDUs are transmitted. MCID, MSTI, and SPT information
42             is not transmitted and is ignored on receipt, treating a
43             neighboring Bridge as in a separate MST or SPT region even
44             if MSTP and/or SPB are implemented.";
45         }
46         enum rstp-mstp {
47           value 3;
48           description
49             "If MSTP is implemented, full MSTP behavior is enabled and
50             transmitted BPDUs include RSTP and MSTP information.";
51         }
52         enum rstp-mstp-spb{
53           value 4;
54           description
55             "Shortest Path Bridging (SPB) and MSTP (if implemented) are
56             both enabled. Transmitted BPDUs can include RSTP, MSTP,
57             and SPB information.";
58         }
59       }
60     }
61     description
62       "Each Bridge implementing RSTP, MSTP, or SPT is plug-and-play
63       interoperable with neighboring Bridges using a different subset
64       of those protocols. Force Protocol Version applies to all ports,
65       and can restrict protocol use. Each Bridge Port also detects a
66       neighbor(s) using STP (IEEE Std 802.1D-1998, now withdrawn)
67       and uses STP BPDUs and slow reconfiguration to interwork with
68       those neighbors independently of Force Protocol Version.
69       Force Protocol Version value 1 was previously assigned to
70       IEEE Std 802.1G-1996 (now withdrawn) and is not to be used.";
71     reference
72       "5.4, 5.4.1.1, 5.4.5, 13.7.2, 13.26, 13.28.21, 13.29.13, and
73       13.29.28 of IEEE Std 802.1Q.";
```

```
1      }
2      container bridge-id {
3          uses bridge-id;
4          description
5              "The Bridge Identifier used by this Bridge for the single spanning
6              tree (the Common Spanning Tree, CST) supported by RSTP, and for
7              that tree and its extension (the CIST) through MST and SPT Regions
8              supported by MSTP and SPB.";
9          reference
10             "13.26.2, 14.1.2, 14.2.5, and item e) in 13.26 of IEEE Std 802.1Q.";
11     }
12     container root-id {
13         uses bridge-id;
14         config false;
15         description
16             "The Root Bridge of the single spanning tree (the CST) supported
17             by RSTP, and its extension (the CIST) through MST and SPT Regions
18             supported by MSTP and SPB, as currently determined by this node.";
19         reference
20             "13.9, 14.1.2, and item f) in 13.26 of IEEE Std 802.1Q.";
21     }
22     leaf root-path-cost {
23         type uint32;
24         config false;
25         description
26             "The Root Path Cost for the single spanning tree (the CST)
27             supported by RSTP and the External Root Path Cost for its
28             extension (the CIST) through MST and SPT Regions supported by
29             MSTP and SPB. Includes the Port Path Cost of the Bridge's Root
30             Port unless the Bridge is the Root Bridge or its Root Port is not
31             a Boundary Port of its MST or SPT Region.";
32         reference
33             "13.9, 13.10, 13.5.3, and item i) in 13.26 of IEEE Std 802.1Q.";
34     }
35     leaf root-port {
36         type union {
37             type if:interface-ref;
38             type empty;
39         }
40         config false;
41         description
42             "A reference to the Root Port for the single spanning tree
43             (the CST) supported by RSTP or its extension (the CIST) through
44             MST and SPT Regions supported by MSTP and SPB, empty if this
45             Bridge is the Root Bridge.";
46         reference
47             "13.5 and 13.26.9 of IEEE Std 802.1Q.";
48     }
49     leaf max-age {
50         type uint8;
51         units "seconds";
52         config false;
53         description
54             "The maximum age of the spanning tree information (Max Age)
55             currently used by this Bridge for the common spanning tree
56             supported by RSTP, MSTP, and SPB. Set to the bridge-max-age if
57             the Bridge is the Root Bridge, and to the whole seconds part of
58             the value received on the Root Port otherwise.";
59         reference
60             "13.15, 13.20, 13.25, item l) in 13.28, and item g) in 13.26 of
61             IEEE Std 802.1Q.";
62     }
63     leaf hello-time {
64         type uint8;
65         units "seconds";
66         config false;
67         description
68             "The interval (Hello Time) between the periodic transmission
69             of Configuration Bridge PDUs on Designated Ports. Set to
70             2 seconds if the Bridge is currently acting as the Root
71             Bridge, and to the whole seconds part of the value received on
72             the Root Port for the common spanning tree supported by RSTP,
```

```
1      MSTP, and SPB otherwise.";
2      reference
3      "Table 13-5, 13.25.3, and 13.28.11 of IEEE Std 802.1Q.";
4  }
5  leaf forward-delay {
6      type uint8;
7      units "seconds";
8      config false;
9      description
10         "If a Port is using STP because STP BPDUs are being received or
11         force-protocol-version is set to emulate-stp (0), Forward Delay
12         determines the time to transition from Discarding to Learning
13         and from Learning to Forwarding, and to age FDB entries after a
14         topology change. Set to bridge-forward-delay if the Bridge is the
15         CIST Root, and to the whole seconds part of the value received on
16         the CIST Root Port otherwise. Does not affect RSTP, MSTP, and SPB
17         rapid Port State transitions and FDB flushing.";
18      reference
19      "Table 13-5, 13.25.2, 13.28.10, and item g) in 13.26.4 of
20      IEEE Std 802.1Q.";
21  }
22  leaf bridge-max-age {
23      type uint8 {
24          range "6..40";
25      }
26      units "seconds";
27      default "20";
28      description
29          "The value of Max Age when this Bridge is the Root Bridge for the
30          common spanning tree supported by RSTP, MSTP, and SPB.";
31      reference
32          "Table 13-5, 13.26.4, and item g) in 13.26 of IEEE Std 802.1Q.";
33  }
34  leaf bridge-forward-delay {
35      type uint8 {
36          range "4..30";
37      }
38      units "seconds";
39      default "15";
40      description
41          "The value of Forward Delay when this Bridge is the Root Bridge
42          for the common spanning tree supported by RSTP, MSTP, and SPB.";
43      reference
44          "Table 13-5, 13.26.4, and item a) in 13.26.4 of IEEE Std 802.1Q.";
45  }
46  leaf tx-hold-count {
47      type uint8 {
48          range "1..10";
49      }
50      default "6";
51      description
52          "Limits the rate of BPDU transmission. If the variable txCount
53          (which is incremented on each transmission and decremented once a
54          second) reaches TxHoldCount, transmission is delayed.";
55      reference
56          "Table 13-5, 13.27.75, 13.26.12, and item b) in 13.26 of
57          IEEE Std 802.1Q.";
58  }
59  leaf last-topology-change {
60      type yang:date-and-time;
61      config false;
62      description
63          "The time at which the Topology Change timer, tcWhile, for any
64          Bridge Port was last running: when Topology Change Notification
65          (TCN) Messages were last transmitted.";
66      reference
67          "13.25.9 of IEEE Std 802.1Q.";
68  }
69  }
70  }
71
72  grouping bridge-port-parameters {
```



```
1  description
2    "This grouping comprises per-interface parameters.";
3  container rstp {
4    presence "The presence of this container indicates that RSTP is
5    supported";
6    description
7      "Per-Bridge Port interface parameters common to RSTP, MSTP, and SPB.";
8    leaf admin-bridge-port-enabled {
9      type boolean;
10     default "true";
11     description
12       "The Administrative Bridge Port State for the port. If false, the
13       port is excluded from the active topology for all spanning trees
14       and Ethernet Switched Paths (ESPs), and BPDUs are not transmitted
15       or received.";
16     reference
17       "8.4, 8.6.1, 8.13.9, 13.12, and 13.27.45 of IEEE Std 802.1Q.";
18   }
19   leaf port-state {
20     type port-state;
21     config false;
22     description
23       "The Port State for RSTP, and for the CIST for MSTP and SPB.";
24     reference
25       "8.4, 8.6, 8.7, 13.4, item aw) and item ba) in 13.27
26       of IEEE Std 802.1Q.";
27   }
28   leaf port-role {
29     type port-role;
30     config false;
31     description
32       "The Port Role for the single spanning tree (the CST) supported
33       by RSTP, and for its extension (the CIST) through MST and SPT
34       Regions supported by MSTP and SPB.";
35     reference
36       "13.4, 13.5, 13.12, 13.24, 13.27.66, and item bn) in 13.27
37       of IEEE Std 802.1Q.";
38   }
39   leaf restricted-role {
40     type boolean;
41     default "false";
42     description
43       "Set to prevent selection of the port as Root Port for the CIST
44       or any MSTI, even if it has the best spanning tree priority
45       vector, at the risk of causing a lack of spanning tree
46       connectivity, thus preventing Bridges external to a core region
47       of the network influencing the spanning tree active topology.
48       The port will be selected as an Alternate Port rather than a
49       Root Port.";
50     reference
51       "13.20, 13.27.64, 13.29.34, 16.2, 16.3, 26.5, 27.6, 27.20,
52       item s) in 13.27 of IEEE Std 802.1Q.";
53   }
54   leaf restricted-tcn {
55     type boolean;
56     default "false";
57     description
58       "Set to prevent propagation of topology changes and topology change
59       notifications to other ports. Set to prevent a Bridge external to
60       a core region of the network causing address flushing. If set can
61       cause temporary loss of connectivity after a topology change.";
62     reference
63       "13.20, 13.27.65, 13.29.25, 16.2, 16.3, item t) in 13.27
64       of IEEE Std 802.1Q.";
65   }
66   container port-id {
67     uses port-id;
68     description
69       "The Port Identifier used by this Bridge Port by RSTP for the
70       CST and by MSTP and SPB for the CIST.";
71     reference
72       "13.27.46, 14.1.2, items bd) and be) in 13.27
```

```
1      of IEEE Std 802.1Q.";
2    }
3    leaf fix-port-path-cost {
4      type uint32 {
5        range "0..200000000";
6      }
7      default "0";
8      description
9        "Zero if the port-path-cost is to be determined by the Bridge,
10       and the value to be used otherwise.";
11      reference
12        "13.10, 13.18, and Table 13-4 of IEEE Std 802.1Q.";
13    }
14    leaf port-path-cost {
15      type uint32 {
16        range "1..200000000";
17      }
18      config false;
19      description
20        "The port's contribution to the Bridge's External Root Path Cost,
21       when the port is the CST Root Port (for RSTP and MSTP) or the
22       CIST Master Port (for MSTP and ISIS-SPB).";
23      reference
24        "13.5.3, 13.27.25, Table 13-4, and item g) of 13.27
25       of IEEE Std 802.1Q.";
26    }
27    leaf designated-protocol-version {
28      type uint8;
29      config false;
30      description
31        "The Protocol Version Identifier in BPDUs transmitted by the
32       Designated Bridge for the attached LAN.";
33      reference
34        "14.2.2, 14.3, and Figure 14-1 of IEEE Std 802.1Q.";
35    }
36    action port-protocol-migration-check {
37      description
38        "Executing port-protocol-migration-check (mcheck) forces
39       transmission of RST (or MST or SPT) BPDUs for migrate-time to
40       check that all STP Bridges have been removed from the port's
41       attached LAN, so RST/MST/SPT BPDU transmission can persist.
42       Has no effect if force-protocol-version is emulate-stp(0).";
43      reference
44        "13.27.38, 13.32, and item j) in 13.27 of IEEE Std 802.1Q.";
45    }
46    container root-id {
47      uses bridge-id;
48      config false;
49      description
50        "The CIST Root Identifier in Configuration BPDUs transmitted by
51       the Designated Bridge for the attached LAN.";
52      reference
53        "14.1.2, 13.27.20, 13.10, and item ar) in 13.27
54       of IEEE Std 802.1Q.";
55    }
56    leaf root-path-cost {
57      type uint32;
58      config false;
59      description
60        "The CIST External Path Cost advertised in BPDUS by the
61       Designated Bridge for the CIST for the attached LAN.";
62      reference
63        "14.1.2, 13.27.20, item ar) in 13.27, and 27.6
64       of IEEE Std 802.1Q.";
65    }
66    container designated-bridge-id {
67      uses bridge-id;
68      config false;
69      description
70        "The Bridge Identifier of the Bridge that this port considers to
71       be the Designated Bridge for the attached LAN for RSTP, and the
72       CIST Regional Root for MSTP and SPB.";
```

```
1      reference
2      "14.1.2, 13.27.20, 13.10, item ar) in 13.27, and Figure 14-1
3      of IEEE Std 802.1Q.";
4  }
5  container designated-port-id {
6      uses port-id;
7      config false;
8      description
9          "The Port Identifier of the Bridge Port that this port considers
10         to be the Designated Port for the CIST for the attached LAN.";
11      reference
12          "13.27.20, 13.10, item ar) in 13.27, and octets 26 and 27 of
13          Figure 14-1 of IEEE Std 802.1Q.";
14  }
15  leaf admin-edge-port {
16      type boolean;
17      default "false";
18      description
19          "Set if the port is to be identified as an Edge Port on
20          initialization without a delay to detect other Bridges attached
21          to the LAN. Recommended default false(2). The operational value,
22          oper-edge-port, becomes false(2) if a BPDU has been received.";
23      reference
24          "13.33, and item a) in 13.27 of IEEE Std 802.1Q.";
25  }
26  leaf oper-edge-port {
27      type boolean;
28      config false;
29      description
30          "Set if the port is currently identified as an Edge Port.
31          Initialized to the value of admin-edge-port, and controlled
32          by the Bridge Detection state machine.";
33      reference
34          "13.33, and item l) in 13.27 of IEEE Std 802.1Q.";
35  }
36  leaf auto-edge-port {
37      type boolean;
38      default "true";
39      description
40          "Administratively set true(1) to allow oper-edge-port
41          is to be maintained automatically, with continuous monitoring of
42          the presence or absence of other Bridges attached to the LAN.
43          If admin-edge-port and auto-edge-port are both false and the port
44          is attached to a point-to-point LAN, the port is presumed to
45          provide connectivity to another bridge, and a failure to receive
46          BPDUs when the port is attempting to become Forwarding is taken
47          to be an indication of the failure of that other bridge's Spanning
48          Tree Protocol Entity (or its transmission and/or reception),
49          isolate-port will be set and the port will remain Discarding.";
50      reference
51          "13.33, 13.27.18, and item c) in 13.27 of IEEE Std 802.1Q.";
52  }
53  leaf disputed-port {
54      type boolean;
55      config false;
56      description
57          "Set when more than one Bridge Port apparently believes itself to
58          be the CIST Designated Port for the LAN and has incorrectly
59          transitioned to a Learning or Forwarding port state.";
60      reference
61          "13.21, 13.29.16, Figure 13-20 of IEEE Std 802.1Q.";
62  }
63  leaf isolate-port {
64      type boolean;
65      config false;
66      description
67          "Set by the Bridge Detection state machine when the Spanning Tree
68          Protocol Entity of a neighboring Bridge has apparently failed.";
69      reference
70          "13.23, 13.27.27, 13.33, and item i) in 13.27
71          of IEEE Std 802.1Q.";
72  }
```

1       }  
2       }  
3       }  
4  
5

1 *Insert 48.6.27 after 48.6.26 (inserted above) as follows:*

2 **48.6.27 The ieee802-dot1q-rstp-bridge YANG module**

```
3 module ieee802-dot1q-rstp-bridge {
4   yang-version 1.1;
5   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-rstp-bridge";
6   prefix rstp-bridge;
7
8   import ietf-interfaces {
9     prefix if;
10  }
11  import ieee802-dot1q-bridge {
12    prefix dot1q;
13  }
14  import ieee802-dot1q-rstp {
15    prefix rstp;
16  }
17
18  organization
19    "IEEE 802.1 Working Group";
20  contact
21    "WG-URL: http://www.ieee802.org/1/
22     WG-EMail: stds-802-1-1@ieee.org
23
24     Contact: IEEE 802.1 Working Group Chair
25     Postal: C/O IEEE 802.1 Working Group
26             IEEE Standards Association
27             445 Hoes Lane
28             Piscataway, NJ 08854
29             USA
30
31     E-mail: stds-802-1-chairs@ieee.org";
32  description
33    "This module provides management of IEEE Std 802.1Q Bridge components
34     that support the Rapid Spanning Tree Algorithm and Protocol (RSTP).
35
36     Copyright (C) IEEE (2024).
37
38     This version of this YANG module is part of IEEE Std 802.1Q; see the
39     standard itself for full legal notices.";
40
41  revision 2024-08-13 {
42    description
43      "Published as part of IEEE Std 802.1Qdy-2024.
44
45      The following reference statement identifies each referenced IEEE
46      Standard as updated by applicable amendments.";
47    reference
48      "IEEE Std 802.1Q Bridges and Bridged Networks:
49       IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023,
50       IEEE Std 802.1Qcw-2023, IEEE Std 802.1Qcj-2023,
51       IEEE Std 802.1Qdj-2024, IEEE Std 802.1Qdx-2024,
52       IEEE Std 802.1Qdy-2024.";
53  }
54
55  augment "/dot1q:bridges/dot1q:bridge/dot1q:component" {
56    description
57      "Augment Bridge component with RSTP parameters.";
58    reference
59      "13.24, 13.25, and 13.26 of IEEE Std 802.1Q.";
60    uses rstp:bridge-component-parameters;
61  }
62
63  augment "/if:interfaces/if:interface/dot1q:bridge-port" {
64    description
65      "Augment Bridge Port with RSTP configuration.";
66    reference
67      "13.24, 13.25, and 13.27 of IEEE Std 802.1Q.";
68    uses rstp:bridge-port-parameters;
69  }
```

1 }  
2  
3

1 *Insert 48.6.28 after 48.6.27 (inserted above) as follows:*

2 **48.6.28 The ieee802-dot1q-mstp YANG module**

```
3 module ieee802-dot1q-mstp {
4   yang-version 1.1;
5   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-mstp";
6   prefix mstp;
7
8   import ietf-interfaces {
9     prefix if;
10  }
11  import ieee802-dot1q-rstp {
12    prefix rstp;
13  }
14
15  organization
16    "IEEE 802.1 Working Group";
17  contact
18    "WG-URL: http://www.ieee802.org/1/
19     WG-Email: stds-802-1-l@ieee.org
20
21     Contact: IEEE 802.1 Working Group Chair
22     Postal: C/O IEEE 802.1 Working Group
23             IEEE Standards Association
24             445 Hoes Lane
25             Piscataway, NJ 08854
26             USA
27
28     E-mail: stds-802-1-chairs@ieee.org";
29  description
30    "This module augments ieee802-dot1q-rstp to provide management of
31     IEEE Std 802.1Q Bridge components that support the
32     Multiple Spanning Tree Algorithm and Protocol (MSTP).
33
34     References specify constraints on, and consequences of, settings of
35     leaf values and the creation and deletion of list entries. The values
36     of all configured objects are retained across system reinitialization.
37
38     Copyright (C) IEEE (2024).
39
40     This version of this YANG module is part of IEEE Std 802.1Q; see the
41     standard itself for full legal notices.";
42
43  revision 2024-11-17 {
44    description
45      "Published as part of IEEE Std 802.1Qdy-2025.
46
47      The following reference statement identifies each referenced IEEE
48      Standard as updated by applicable amendments.";
49    reference
50      "IEEE Std 802.1Q Bridges and Bridged Networks:
51       IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023,
52       IEEE Std 802.1Qcw-2023, IEEE Std 802.1Qcj-2023,
53       IEEE Std 802.1Qdj-2024, IEEE Std 802.1Qdx-2024,
54       IEEE Std 802.1Qdy-2024.";
55  }
56
57  grouping mst-config-id {
58    description
59      "A system calculated MST Configuration Identifier (MCID), reflecting
60      the assignment of VIDs to the CIST, MSTIs, SPTs, or ESPs.";
61    reference
62      "13.8, 13.9, and item d) in 13.26 of IEEE Std 802.1Q.";
63    leaf format-selector {
64      type uint8;
65      config false;
66      description
67        "The Configuration Identifier Format Selector. A value of 0
68        indicates the format specified in IEEE Std 802.1Q.";
69      reference
```

```
1      "Item a) in 13.8 of IEEE Std 802.1Q.";
2  }
3  leaf configuration-name {
4      type string {
5          length "1..32";
6      }
7      description
8          "The Configuration Name.";
9      reference
10         "Item b) in 13.8 of IEEE Std 802.1Q.";
11 }
12 leaf revision-level {
13     type uint16;
14     config false;
15     description
16         "The Revision Level.";
17     reference
18         "Item c) in 13.8 of IEEE Std 802.1Q.";
19 }
20 leaf configuration-digest {
21     type binary {
22         length "16";
23     }
24     config false;
25     description
26         "The Configuration Digest (16 octets).";
27     reference
28         "Item d) in 13.8 of IEEE Std 802.1Q.";
29 }
30 }
31
32 grouping bridge-component-parameters {
33     description
34         "This grouping comprises MSTP per-Bridge component parameters.";
35     container bridge-mstp {
36         presence "The presence of this container indicates that MSTP is
37 supported.";
38         description
39             "Per-Bridge configuration and management parameters for the IST
40 and each MSTI in an MST Region.";
41         reference
42             "Clause 13 and 13.26 of IEEE Std 802.1Q.";
43         container mst-config-id {
44             uses mst-config-id;
45             description
46                 "This Bridge's MST Configuration Identifier.";
47         }
48         leaf max-hops {
49             type uint8 {
50                 range "6..100";
51             }
52             default "20";
53             description
54                 "In an MSTP Bridge, the MaxHops parameter for the IST, and each
55 of the MSTIs.";
56             reference
57                 "Clause 13, Table 13-5, 13.26.4, item g) in 13.26
58 of IEEE Std 802.1Q.";
59         }
60         container ist {
61             description
62                 "CIST parameter(s) additional to those for RSTP.";
63             leaf internal-root-path-cost {
64                 type uint32;
65                 config false;
66                 description
67                     "The Internal Root Path Cost for the CIST including the
68 Internal Port Path Cost for the Root Port.";
69                 reference
70                     "13.9, 13.10, 13.5.3, 13.26.10, and octets 90-93 in Figure 14-1
71 of IEEE Std 802.1Q.";
72             }
69         }
70     }
71 }
72 }
```



```
1     }
2   list msti {
3     key "mstid";
4     description
5       "Per-Bridge configuration and management parameters for each MST,
6       with an MSTID in the range allocated for MSTP configuration.";
7     reference
8       "13.26, 13.9, and 13.11 of IEEE Std 802.1Q.";
9     leaf mstid {
10      type uint16 {
11        range "1..4091";
12      }
13      description
14        "MSTIDs allocated for use by MSTP (1..4091) to identify MSTIs.
15        Other MSTIDs in the 12-bit range are reserved [for use in
16        the MST Configuration Table, whose configuration is identified
17        by the Configuration Digest in the MST Configuration Identifier
18        (mst-config-id/configuration-digest)] for the CIST-MSTID,
19        SPBM-MSTID, SPBV-MSTID, TE-MSTID, and SPVID-Poll-MSTID.";
20      reference
21        "8.4, 8.6.1, 8.9.3, 13.2.1 of IEEE Std 802.1Q.";
22    }
23    leaf bridge-priority {
24      type rstp:id-priority;
25      description
26        "The priority component of this Bridge's Bridge Identifier for
27        the MSTI, encoded in the four most-significant bits of octet 14
28        of the MST Configuration Message.";
29      reference
30        "13.26.3, 13.11, 14.4.1, and item f) in 13.26
31        of IEEE Std 802.1Q.";
32    }
33    container regional-root-id {
34      uses rstp:bridge-id;
35      config false;
36      description
37        "The MSTI Regional Root Identifier for this MSTI.";
38      reference
39        "13.27.20, 13.10, and item ar) in 13.27 of IEEE Std 802.1Q.";
40    }
41    leaf internal-root-path-cost {
42      type uint32;
43      config false;
44      description
45        "The Internal Root Path Cost for the MSTI including the
46        Internal Port Path Cost for the Root Port for this MSTI.";
47      reference
48        "13.9, 13.10, 13.5.3, 13.26.10 and item i) in 13.26
49        of IEEE Std 802.1Q.";
50    }
51    leaf root-port {
52      type union {
53        type if:interface-ref;
54        type empty;
55      }
56      config false;
57      description
58        "A reference to the Root Port for the MSTI, empty if this
59        Bridge is the MSTI Regional Root.";
60      reference
61        "13.5 and 13.26.9 of IEEE Std 802.1Q.";
62    }
63  }
64 }
65 }
66
67 grouping bridge-port-parameters {
68   description
69     "This grouping comprises MSTP Bridge Port parameters.";
70   reference
71     "13.24, 13.25, and 13.27 of IEEE Std 802.1Q.";
72   container port-mstp {
```

```
1  presence "The presence of this container indicates that MSTP is
2  supported.";
3  description
4      "Per-Bridge Port interface parameters for MST Configuration,
5      for the IST, and for each MSTI.";
6  leaf boundary-port {
7      type boolean;
8      config false;
9      description
10         "True if the port is a Boundary Port of the Region.";
11     reference
12         "13.12 of IEEE Std 802.1Q.";
13 }
14 leaf restricted-domain-role {
15     type boolean;
16     description
17         "If TRUE, causes a port that is a Boundary Port of an SPT Region
18         not to be selected as Root Port for the CIST, any MSTI, or any
19         SPT, even it has the best spanning tree priority vector.";
20     reference
21         "13.27.63 of IEEE Std 802.1Q.";
22 }
23 container ist {
24     description
25         "CIST parameters additional to those for RSTP.";
26     container mst-config-id {
27         uses mst-config-id;
28         config false;
29         description
30             "The MST Configuration Identifier transmitted by the CIST's
31             Designated Bridge for the attached LAN.";
32         reference
33             "Figure 14-1 of IEEE Std 802.1Q.";
34     }
35     leaf fix-internal-port-path-cost {
36         type uint32 {
37             range "0..200000000";
38         }
39         default "0";
40         description
41             "Zero if the internal-port-path-cost is to be determined by
42             the Bridge, and the value to be used otherwise.";
43         reference
44             "13.10, 13.18, and Table 13-4 of IEEE Std 802.1Q.";
45     }
46     leaf internal-port-path-cost {
47         type uint32 {
48             range "1..200000000";
49         }
50         config false;
51         description
52             "The CIST's Internal Port Path Cost for this Bridge Port.";
53         reference
54             "13.10, 13.18, and Table 13-4 of IEEE Std 802.1Q.";
55     }
56     leaf internal-root-path-cost {
57         type uint32;
58         config false;
59         description
60             "The CIST Internal Root Path Cost advertised in BPDUs by the
61             Designated Bridge for the CIST. Zero if the field was not
62             present in the last BPDU received from that Bridge.";
63         reference
64             "13.5.3, 13.9, 13.27.20, 14.4.1, and 27.6 of IEEE Std 802.1Q.";
65     }
66     container designated-bridge {
67         uses rstp:bridge-id;
68         config false;
69         description
70             "The CIST Bridge Identifier advertised in BPDUs by the CIST's
71             Designated Bridge. Zero if the field was not present in the
72             last BPDU received from that Bridge.";
```

```
1      reference
2      "Octets 94-101 of Figure 14-1 of IEEE Std 802.1Q.";
3  }
4  leaf remaining-hops {
5      type uint8;
6      config false;
7      description
8          "The remainingHops for the CIST, received from or to be
9          transmitted by this port's CIST Designated Bridge.";
10     reference
11         "13.20, 13.26.4, 13.26.11, 13.27.40, 14.2.11, and octet 102 in
12         Figure 14-1 of IEEE Std 802.1Q.";
13 }
14 }
15 list msti {
16     key "mstid";
17     description
18         "Per-Bridge Port parameters for each MSTI with an MSTID in the
19         range allocated for MSTP configuration.";
20     reference
21         " ";
22     leaf mstid {
23         type uint16 {
24             range "1..4091";
25         }
26         description
27             "MSTIDs allocated for use by MSTP (1..4091) to identify MSTIs.";
28         reference
29             "8.4, 8.6.1, 8.9.3, 13.2.1 of IEEE Std 802.1Q.";
30     }
31     leaf port-state {
32         type rstp:port-state;
33         config false;
34         description
35             "The Port State for this MSTI.";
36         reference
37             "8.4, 8.6, 8.7, 13.4, item aw) and item ba) in 13.27
38             of IEEE Std 802.1Q.";
39     }
40     leaf port-role {
41         type union {
42             type rstp:port-role;
43             type enumeration {
44                 enum master-port {
45                     value 6;
46                     description "A Master Port.";
47                 }
48             }
49         }
50         config false;
51         description
52             "The Port Role for the MSTI.";
53         reference
54             "13.4, 13.5, 13.12, 13.24, 13.27.66, and item bn) in 13.27
55             of IEEE Std 802.1Q.";
56     }
57     container port-id {
58         uses rstp:port-id;
59         description
60             "This Bridge Port's Port Identifier for the MSTI, including the
61             manageable port-priority encoded in the four most-significant
62             bits of octet 15 of the MSTI Configuration Message.";
63         reference
64             "13.18, 13.27.64, and item e) in 14.4.1, of IEEE Std 802.1Q.";
65     }
66     leaf fix-internal-port-path-cost {
67         type uint32 {
68             range "0..2000000000";
69         }
70         default "0";
71         description
72             "Zero if the internal-port-path-cost for this Bridge Port and
```

```

1      MSTI is to be determined by the Bridge, and the value to be
2      used otherwise.";
3      reference
4      "13.11, 13.18, and Table 13-4 of IEEE Std 802.1Q.";
5  }
6  leaf internal-port-path-cost {
7      type uint32 {
8          range "1..2000000000";
9      }
10     config false;
11     description
12         "The Internal Port Path Cost for this Bridge Port and MSTI.";
13     reference
14         "Item b) of 13.2.1, and item ay) in 13.27 of IEEE Std 802.1Q.";
15 }
16 container regional-root-id {
17     uses rstp:bridge-id;
18     config false;
19     description
20         "The MSTI Regional Root Identifier in Configuration BPDUs
21         transmitted by the Designated Bridge for the attached LAN
22         and this MSTI.";
23     reference
24         "13.27.20, 13.10, and item ar) in 13.27 of IEEE Std 802.1Q.";
25 }
26 leaf internal-root-path-cost {
27     type uint32;
28     config false;
29     description
30         "The MSTI Internal Path Cost advertised in BPDUs by the
31         Designated Bridge for the attached LAN and this MSTI.";
32     reference
33         "13.5.3, 13.9, 13.27.20, 14.4.1, and 27.6 of IEEE Std 802.1Q.";
34 }
35 container designated-bridge-id {
36     uses rstp:bridge-id;
37     config false;
38     description
39         "The Bridge Identifier of the Bridge believed to be the
40         Designated Bridge for the attached LAN and this MSTI. The
41         bridge-priority component is encoded in the MSTI Configuration
42         Message, the system-id-extension component is the MSTID, and
43         the bridge-address is that of the ist/designated-bridge.";
44     reference
45         "13.27.20, 13.10, and item ar) in 13.27 of IEEE Std 802.1Q.";
46 }
47 container designated-port-id {
48     uses rstp:port-id;
49     config false;
50     description
51         "The Port Identifier of the Designated Port for this MSTI for
52         the attached LAN, transmitting the port-priority in the
53         MSTI Configuration Message and the port-number in the CIST
54         Port Identifier field.";
55     reference
56         "13.27.20, 13.10, item ar) in 13.27, octet 15 in Figure 14-3,
57         and octets 26 and 27 of Figure 14-1 of IEEE Std 802.1Q.";
58 }
59 leaf disputed-port {
60     type boolean;
61     config false;
62     description
63         "Set when more than one Bridge Port apparently believes itself
64         to be the MSTI Designated Port for the LAN and has incorrectly
65         transitioned to a Learning or Forwarding port state.";
66     reference
67         "13.21, 13.29.16, Figure 13-20 of IEEE Std 802.1Q.";
68 }
69 leaf remaining-hops {
70     type uint8;
71     config false;
72     description

```

```
1      "The remainingHops for the MSTI, received from or transmitted
2      by the MSTI's Designated Bridge for this port.";
3  reference
4      "13.20, 13.26.4, 13.26.11, 13.27.40, 14.2.11, and octet 16 in
5      Figure 14-3 of IEEE Std 802.1Q.";
6      }
7  }
8  }
9  }
10 }
11
12
```

1 *Insert 48.6.29 after 48.6.28 (inserted above) as follows:*

2 **48.6.29 The ieee802-dot1q-mstp-bridge YANG module**

```
3 module ieee802-dot1q-mstp-bridge {
4   yang-version 1.1;
5   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-mstp-bridge";
6   prefix mstp-bridge;
7
8   import ietf-interfaces {
9     prefix if;
10  }
11  import ieee802-dot1q-bridge {
12    prefix dot1q;
13  }
14  import ieee802-dot1q-rstp-bridge {
15    prefix rstp-bridge;
16  }
17  import ieee802-dot1q-mstp {
18    prefix mstp;
19  }
20
21  organization
22    "IEEE 802.1 Working Group";
23  contact
24    "WG-URL: http://www.ieee802.org/1/
25    WG-EMail: stds-802-1-1@ieee.org
26
27    Contact: IEEE 802.1 Working Group Chair
28    Postal: C/O IEEE 802.1 Working Group
29            IEEE Standards Association
30            445 Hoes Lane
31            Piscataway, NJ 08854
32            USA
33
34    E-mail: stds-802-1-chairs@ieee.org";
35  description
36    "This module provides management of IEEE Std 802.1Q Bridge components
37    that support the Multiple Spanning Tree Algorithm and Protocol (MSTP).
38
39    Copyright (C) IEEE (2024).
40
41    This version of this YANG module is part of IEEE Std 802.1Q; see the
42    standard itself for full legal notices.";
43
44  revision 2024-08-13 {
45    description
46      "Published as part of IEEE Std 802.1Qdy-2024.
47
48      The following reference statement identifies each referenced IEEE
49      Standard as updated by applicable amendments.";
50    reference
51      "IEEE Std 802.1Q Bridges and Bridged Networks:
52      IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023,
53      IEEE Std 802.1Qcw-2023, IEEE Std 802.1Qcj-2023,
54      IEEE Std 802.1Qdj-2024, IEEE Std 802.1Qdx-2024,
55      IEEE Std 802.1Qdy-2024.";
56  }
57
58  augment "/dot1q:bridges/dot1q:bridge/dot1q:component/dot1q:bridge-mst" {
59    when '../rstp-bridge:rstp';
60    description
61      "Augment RSTP-capable Bridge component with MSTP configuration and
62      management.";
63    reference
64      "13.24, 13.25, and 13.26 of IEEE Std 802.1Q.";
65    uses mstp:bridge-component-parameters;
66  }
67
68  augment "/if:interfaces/if:interface/dot1q:bridge-port" {
69    when 'rstp-bridge:rstp';
```

```
1  description
2    "Augment RSTP Bridge Port with MSTP configuration.";
3  reference
4    "13.24, 13.25, and 13.27 of IEEE Std 802.1Q.";
5  uses mstp:bridge-port-parameters;
6  }
7 }
8
9
```

# <sup>1</sup>Annex A

<sup>2</sup>(normative)

## <sup>3</sup>PICS proforma—Bridge implementations<sup>9</sup>

### <sup>4</sup>A.47 YANG

*Insert the following rows at the end of the table in A.47 (unchanged rows not shown):*

Item	Feature	Status	References	Support	
YANG-RSTP	Is the <i>ieee802-dot1q-rstp</i> module supported?	RSTP:O	48.6.26	Yes [ ] N/A [ ]	No [ ]
YANG-MSTP	Is the <i>ieee802-dot1q-mstp</i> module supported?	MSTP:O	48.6.28	Yes [ ] N/A [ ]	No [ ]

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