

6 **Draft Standard for**  
7 **Local and metropolitan area networks—**  
8 **Bridges and Bridged Networks**

9 **Amendment 39:**  
10 **YANG Data Models for the**  
11 **Credit-Based Shaper**

12 Prepared by the

13 **Time-Sensitive Networking (TSN) Task Group of IEEE 802.1**

14 Sponsor

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

18 **This and the following cover pages are not part of the draft.** They provide revision and other information  
19 for IEEE 802.1 Working Group members and participants in the IEEE Standards Association ballot process,  
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## 1 **Current draft**

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

5 Changes are identified by change bars with the following exceptions:

- 6 — The YANG schema and module incorporated in Clause 48 in this amendment are imported as  
7 complete UTF-8 files without the possibility of inadvertent change, which rules out selective change  
8 bar marking. The modules are attached as plain text (UTF-8) files.

## 9 **Base standard**

10 This draft is being submitted to SA Ballot prior to completion of the SA Ballot of another amendment  
11 (P802.1Qdj) to the base standard, IEEE Std 802.1Q. There is currently no technical overlap between these  
12 amendments, and the editorial interaction is limited to the numbering of minor clauses and figures which are  
13 added to the end of their enclosing clause. The current numbering in this draft anticipates the prior approval  
14 and pre-publication editing of P802.1Qdj, while the editing instructions accommodate the possibility of further  
15 numbering changes. The list of prior amendments to IEEE Std 802.1Q-2022 that appears on the Title Page  
16 will be updated in pre-publication editing to reflect the approval or publication order of these amendments as  
17 determined by IEEE Staff.

## 18 **MIB and YANG modules**

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

20

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1 **Abstract:** This amendment to IEEE Std 802.1Q-2022 as amended by IEEE Std 802.1Qcz-2023,  
2 IEEE Std 802.1Qcw-2023, and IEEE Std 802.1Qcj-2023 specifies a YANG data model that  
3 supports configuration and status reporting for credit-based shaper algorithm capabilities in bridges  
4 and end stations.

5 **Keywords:** Bridged Network, IEEE 802.1Q™, LAN, local area network, MAC Bridge, metropolitan  
6 area network, credit-based shaper algorithm, YANG.

7

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PDF: ISBN 978-X-XXX-XXX-X STDXXXXX  
Print: ISBN 978-X-XXX-XXX-X STDPDXXXXX

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9 **Abdul Jabbar**, *Editor*  
10

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<sup>8</sup>  
<sup>9</sup>

## 1 Introduction

This introduction is not part of IEEE Std 802.1Qdx™-2024, IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks—Amendment 38: YANG Data Models for the Credit-Based Shaper.

2 IEEE Std 802.1Qdx™-2024: YANG Data Models for the Credit-Based Shaper addresses the need to manage  
3 the credit-based shaper algorithm via a YANG model compatible with modern management systems.

4 This standard contains state-of-the-art material. The area covered by this standard is undergoing evolution.  
5 Revisions are anticipated within the next few years to clarify existing material, to correct possible errors, and  
6 to incorporate new related material. Information on the current revision state of this and other IEEE 802  
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1

2 **IEEE Standard for**  
3 **Local and Metropolitan Area Networks—**

4 **Bridges and Bridged Networks**

5 **Amendment 39:**  
6 **YANG Data Models for the**  
7 **Credit-Based Shaper**

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, and IEEE Std 802.1Qcj™-2023.)

10 NOTE—The editing instructions contained in this amendment define how to merge the material contained therein into  
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16 and insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is  
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19 changes will be incorporated into the base standard.<sup>6</sup>

20

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<sup>6</sup> Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

1 **48. YANG Data Models**

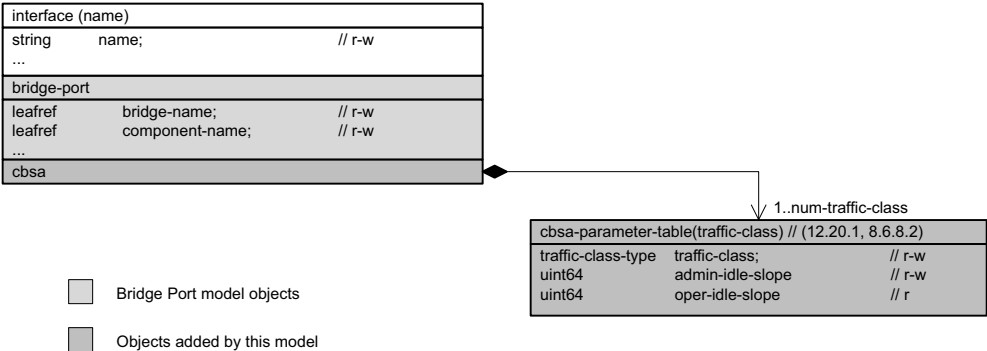
2 **48.2 IEEE 802.1Q YANG models**

3 *Insert 48.2.13 as follows:*

4 **48.2.13 Credit-based shaper algorithm model**

5 The credit-based shaper algorithm model augments the Bridge Port model (48.2.1) with nodes that represent  
6 the managed objects of the credit-based shaper algorithm in Table 12-4.

7 The credit-based shaper algorithm model is illustrated in Figure 48-23.



**Figure 48-23—Credit-based shaper algorithm model**



## 48.3 Structure of the YANG models

*Insert the following 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-cbsa	48.6.24	8.6.8.2	IEEE Std 802.1Qdx credit-based shaper algorithm module
ieee802-dot1q-cbsa-bridge	48.6.25	8.6.8.2	IEEE Std 802.1Qdx Augments Bridge Port with credit-based shaper algorithm module.

*Insert 48.3.13 at the end of 48.3 as follows:*

### 48.3.13 Credit-based shaper algorithm model

A bridge implementing the credit-based shaper algorithm model (48.2.13) implements the YANG modules in Table 48-14.

**Table 48-14—Credit-based shaper algorithm model YANG modules**

YANG Module
ieee802-types
ieee802-dot1q-types
ieee-802-dot1q-tsn-types
ieee802-dot1q-bridge
ieee802-dot1q-cbsa
ieee802-dot1q-cbsa-bridge

## 1 **48.4 Security considerations**

2 *Insert 48.4.13 at the end of 48.4 as follows:*

### 3 **48.4.13 Security considerations of the credit-based shaper algorithm model**

4 The following objects in the ieee802-dot1q-cbsa YANG module could be manipulated to interfere with the  
5 operation of the credit-based shaper algorithm. This could, for example, be used to force a reinitialization of  
6 credit-based shaper algorithm state, thus causing network instability.

7       interfaces/interface/bridge-port/cbsa/cbsa-parameter-table

8

## 1 **48.5 YANG schema tree definitions**

2 *Insert 48.5.24 at the end of 48.5 as follows:*

### 3 **48.5.24 Schema for the ieee802-dot1q-cbsa YANG module**

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

5 *Insert 48.5.25 as follows:*

### 6 **48.5.25 Schema for the ieee802-dot1q-cbsa-bridge YANG module**

```
7 module: ieee802-dot1q-cbsa-bridge
8
9   augment /if:interfaces/if:interface/dot1q:bridge-port:
10     +--rw cbsa {credit-based-shaper-algorithm}?
11       +--rw cbsa-parameter-table* [traffic-class]
12         +--rw traffic-class          dot1q-types:traffic-class-type
13         +--rw admin-idle-slope?      uint64
14         +--ro oper-idle-slope?       uint64
15
16
```

## 1 48.6 YANG modules<sup>7 8 9</sup>

2 *Insert 48.6.24 at the end of 48.6, renumbering as necessary, as follows:*

### 3 48.6.24 The ieee802-dot1q-cbsa YANG module

```
4 module ieee802-dot1q-cbsa {
5   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-cbsa";
6   prefix cbsa;
7
8   import ieee802-dot1q-types {
9     prefix dot1q-types;
10  }
11
12  organization
13    "IEEE 802.1 Working Group";
14  contact
15    "WG-URL: http://www.ieee802.org/1/
16    WG-EMail: stds-802-1-L@ieee.org
17
18    Contact: IEEE 802.1 Working Group Chair
19    Postal: C/O IEEE 802.1 Working Group
20    IEEE Standards Association
21    445 Hoes Lane
22    Piscataway, NJ 08854
23    USA
24
25    E-mail: stds-802-1-chairs@ieee.org";
26  description
27    "This module provides for management of IEEE Std 802.1Q components
28    that support the credit-based shaper algorithm.
29
30    Copyright (C) IEEE (2024)
31
32    This version of this YANG module is part of IEEE Std 802.1Q; see the
33    standard itself for full legal notices.";
34
35  revision 2024-03-22 {
36    description
37      "Published as part of IEEE Std 802.1Qdx-2024.
38
39      The following reference statement identifies each referenced IEEE
40      Standard as updated by applicable amendments.";
41    reference
42      "IEEE Std 802.1Q Bridges and Bridged Networks:
43      IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023, IEEE Std 802.1Qcw-2023,
44      IEEE Std 802.1Qcj-2023, IEEE Std 802.1Qdx-2024.";
45  }
46
47  grouping cbsa-parameters {
48    description
49      "cbsa-parameters comprises all the parameters associated
50      with the credit-based shaper algorithm.";
51    container cbsa {
52      description
53        "This container comprises all credit-based shaper algorithm related
54        nodes.";
55      list cbsa-parameter-table {
56        key "traffic-class";
57        max-elements 8;
58        description
59          "There is one cbsa-parameter-table list per Port. Each list entry
60          corresponds to the set of parameters (12.20.1) for each traffic class
```

<sup>7</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>8</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>9</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      configured for use with the credit-based shaper algorithm (8.6.8.2).
2      The cbsa-parameter-table list is valid for a Bridge Port only when
3      used in the absence of the stream reservation protocol.";
4  reference
5      "8.6.8.2, 34.3, 34.6, and 12.20.1 of IEEE Std 802.1Q.";
6  leaf traffic-class {
7      type dot1q-types:traffic-class-type;
8      description
9          "An 802.1 traffic class value. This is the numerical value
10         associated with a traffic class. Larger values are associated with
11         higher priority traffic classes.";
12      reference
13          "8.6.8 of IEEE Std 802.1Q.";
14  }
15  leaf admin-idle-slope {
16      type uint64;
17      units "bits/second";
18      default "0";
19      description
20          "The bandwidth, in bits per second, that has been requested by
21          management to be reserved for use by the queue associated with
22          this traffic class.
23
24          If the stream reservation protocol is in operation for this traffic
25          class, this parameter has no effect.
26
27          If the stream reservation protocol is not in operation for this
28          traffic class, then the value of oper-idle-slope is equal to the
29          value of admin-idle-slope.";
30      reference
31          "34.3 of IEEE Std 802.1Q.";
32  }
33  leaf oper-idle-slope {
34      type uint64;
35      units "bits/second";
36      default "0";
37      config false;
38      description
39          "The actual bandwidth, in bits per second, that is currently
40          reserved for use by the queue associated with this traffic class
41          (see 34.6.1 and 34.6.2).";
42      reference
43          "34.3, 34.6.1, and 34.6.2 of IEEE Std 802.1Q.";
44  }
45  }
46  }
47  }
48 }
```

1 *Insert 48.6.25 at the end of 48.6, renumbering as necessary, as follows:*

2 **48.6.25 The ieee802-dot1q-cbsa-bridge YANG module**

```
3 module ieee802-dot1q-cbsa-bridge {
4   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-cbsa-bridge";
5   prefix cbsa-bridge;
6
7   import ietf-interfaces {
8     prefix if;
9   }
10  import ieee802-dot1q-cbsa {
11    prefix cbsa;
12  }
13  import ieee802-dot1q-bridge {
14    prefix dot1q;
15  }
16
17  organization
18    "IEEE 802.1 Working Group";
19  contact
20    "WG-URL: http://www.ieee802.org/1/
21    WG-EMail: stds-802-1-L@ieee.org
22
23    Contact: IEEE 802.1 Working Group Chair
24    Postal: C/O IEEE 802.1 Working Group
25    IEEE Standards Association
26    445 Hoes Lane
27    Piscataway, NJ 08854
28    USA
29
30    E-mail: stds-802-1-chairs@ieee.org";
31  description
32    "This module provides for management of IEEE Std 802.1Q Bridges
33    that support the credit-based shaper algorithm.
34
35    Copyright (C) IEEE (2024).
36
37    This version of this YANG module is part of IEEE Std 802.1Q; see the
38    standard itself for full legal notices.";
39
40  revision 2024-03-22 {
41    description
42      "Published as part of IEEE Std 802.1Qdx-2024.
43
44      The following reference statement identifies each referenced IEEE
45      Standard as updated by applicable amendments.";
46    reference
47      "IEEE Std 802.1Q Bridges and Bridged Networks:
48      IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023, IEEE Std 802.1Qcw-2023,
49      IEEE Std 802.1Qcj-2023, IEEE Std 802.1Qdx-2024.";
50  }
51
52  feature credit-based-shaper-algorithm {
53    description
54      "Credit-based shaper algorithm supported.";
55    reference
56      "8.6.8.2 of IEEE Std 802.1Q.";
57  }
58
59  augment "/if:interfaces/if:interface/dot1q:bridge-port" {
60    if-feature "credit-based-shaper-algorithm";
61    description
62      "Augment dot1q:bridge-port with credit-based shaper algorithm
63      configuration.";
64    uses cbsa:cbsa-parameters;
65  }
66 }
```

<sup>1</sup> **Annex A**

<sup>2</sup> (normative)

<sup>3</sup> **PICS proforma—Bridge implementations<sup>10</sup>**

<sup>4</sup> **A.5 Major capabilities**

*Insert the following row at the end of the table in A.5 (unchanged rows not shown):*

Item	Feature	Status	References	Support	
CBSA	Does the implementation support the credit-based shaper algorithm?	O	8.6.8.2	Yes [ ]	No [ ]

<sup>5</sup>

<sup>10</sup> *Copyright release for PICS proformas:* Users of this standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

1

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-CBSA	Is the <i>ieee802-dot1q-cbsa</i> module supported?	CBSA:O	48.6.25	Yes [ ]	No [ ]
YANG-CBSA-BRIDG E	Is the <i>ieee802-dot1q-cbsa-bridge</i> module supported?	CBSA:O	48.6.24	Yes [ ]	No [ ]



<sup>1</sup>  
*Insert A.55 at the end of Annex A, as follows:*

### A.55 Credit-based shaper algorithm

Item	Feature	Status	References	Support
	If CBSA is not supported, mark N/A and ignore the remainder of this table.			N/A[ ]
CBSA-1	Does the implementation support the algorithm and associated parameters specified in 8.6.8.2?	CBSA:M	8.6.8.2	Yes [ ]    No [ ]
CBSA-2	Does the implementation support the management parameters adminIdleSlope and operIdleSlope as defined in 12.20.1?	CBSA:M	12.20.1	Yes [ ]    No [ ]

<sup>2</sup>

## <sup>1</sup> Annex B

<sup>2</sup> (normative)

### <sup>3</sup> PICS proforma—End station implementations<sup>11</sup>

#### <sup>4</sup> B.5 Major capabilities

*Insert the following rows at the end of the table in B.5 (unchanged rows not shown):*

Item	Feature	Status	References	Support	
CBSA	Does the implementation support the credit-based shaper algorithm?	O	8.6.8.2	Yes [ ]	No [ ]

<sup>5</sup>

*Insert B.21 at the end of Annex B, as follows:*

#### B.21 Credit-based shaper algorithm

Item	Feature	Status	References	Support	
	If the credit-based shaper algorithm is not supported, mark N/A and ignore the remainder of this table.			N/A [ ]	
CBSA-1	Does the implementation support the credit based shaper algorithm and associated parameters specified in 8.6.8.2?	CBSA:M	8.6.8.2	Yes [ ]	No [ ]
CBSA-2	Does the implementation support the management parameters adminIdleSlope and operIdleSlope as defined in 12.20.1?	CBSA:M	12.20.1	Yes [ ]	No [ ]

<sup>6</sup>

<sup>11</sup> Copyright release for PICS proformas: Users of this standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.