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**P802.1Qdx/D1.1**  
**November 29, 2023**  
(Amendment to IEEE Std 802.1Q-2022 as amended by IEEE Std 802.1Qcz-2023, IEEE Std 802.1Qcw-2023,  
and IEEE Std 802.1Qcj-2023)

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

10 **Amendment 38:**  
11 **YANG Data Models for the**  
12 **Credit-Based Shaper**

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

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

19

20 **Draft for first working group ballot**

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

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

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<sup>10</sup>

## 1 Introduction

This introduction is not part of IEEE Std 802.1Qdx™-2023, 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™-2023: 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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## Contents

2	48.	YANG Data Models .....	15
3	48.2	IEEE 802.1Q YANG models.....	15
4	48.2.12	Credit-based shaper algorithm model .....	15
5	48.3	Structure of the YANG models .....	16
6	48.3.12	Credit-based shaper algorithm model .....	16
7	48.4	Security considerations .....	17
8	48.4.12	Security considerations of the credit-based shaper algorithm model .....	17
9	48.5	YANG schema tree definitions.....	18
10	48.5.23	Schema for the ieee802-dot1q-cbsa YANG module .....	18
11	48.5.24	Schema for the ieee802-dot1q-cbsa-bridge YANG module .....	18
12	48.6	YANG modules .....	19
13	48.6.23	The ieee802-dot1q-cbsa YANG module .....	20
14	48.6.24	The ieee802-dot1q-cbsa-bridge YANG module .....	22
15	Annex A (normative)	PICS proforma—Bridge implementations .....	23
16	A.5	Major capabilities .....	24
17	A.55	Credit-based shaper algorithm .....	24
18	A.47	YANG .....	25
19	Annex B (normative)	PICS proforma—End station implementations .....	26
20	B.5	Major capabilities .....	26
21	B.21	Credit-based shaper algorithm .....	26

1	Figure 48-1	Credit-based shaper algorithm model .....	15
---	-------------	---	----

1	Table 48-1 Summary of the YANG modules.....	16
2	Table 48-13 Credit-based shaper algorithm model YANG modules .....	16

1

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

## 4 **Bridges and Bridged Networks**

### 5 **Amendment 38:** 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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12 The editing instructions are shown in ***bold italics***. Four editing instructions are used: change, delete, insert, and replace.  
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20

<sup>1</sup> Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard.

148. YANG Data Models

248.2 IEEE 802.1Q YANG models

3

4insert the following at the end of clause 48.2 and re-number as necessary.

5

648.2.12 Credit-based shaper algorithm model

7The credit-based shaper algorithm model augments the Bridge Port model (48.2.1) with nodes that represent

8the managed objects of credit-based shaper algorithm in Table 12-4.

9The credit-based shaper algorithm model is illustrated in Figure 48-23.

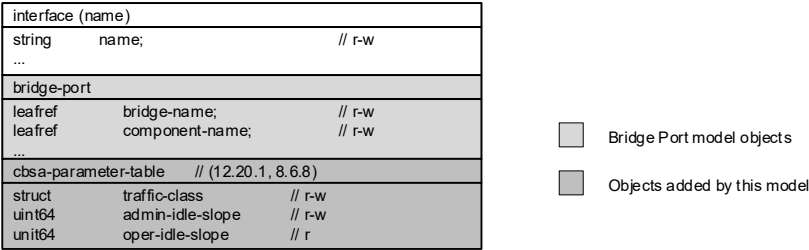


Figure 48-23—Credit-based shaper algorithm model

10

11

## 48.3 Structure of the YANG models

2

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

*Insert the following rows at the end of Table 48-1 as shown.*

Module	References	Managed functionality	Initial YANG specification Notes
ieee802-dot1q-cbsa	48.6.23	8.6.8.2	IEEE Std 802.1Qdx credit-based shaper algorithm module
ieee802-dot1q-cbsa-bridge	48.6.24	8.6.8.2	IEEE Std 802.1Qdx Augments Bridge Port with credit-based shaper algorithm module.

3

*4 Insert the following at the end of clause 48.3 and re-number as necessary.*

### 48.3.12 Credit-based shaper algorithm model

6 A bridge implementing the credit-based shaper algorithm model (48.2.12) implements the YANG modules  
7 in Table 48-13.

**Table 48-13—Credit-based shaper algorithm model YANG modules**

YANG Module
ieee802-types
ieee802-dot1q-types
ieee802-dot1q-bridge
ieee802-dot1q-cbsa
ieee802-dot1q-cbsa-bridge



## **48.4 Security considerations**

*Insert the following at the end of clause 48.4 and re-number as necessary.*

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

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

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

## 1 48.5 YANG schema tree definitions

2

3 *Insert new 48.5.23, and 48.5.24 at the end of clause 48.5, re-numbering as required.*

### 4 48.5.23 Schema for the ieee802-dot1q-cbsa YANG module

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

### 6 48.5.24 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-parameters {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
```

## <sup>1</sup> **48.6 YANG modules**

<sup>2</sup>

*1 Insert 48.6.23 and 48.6.24 at the end of clause 48.6, re-numbering as required.*

## 2 48.6.23 The ieee802-dot1q-cbsa YANG module

```
3 module ieee802-dot1q-cbsa {
4   namespace "urn:ieee:std:802.1Q:yang:ieee802-dot1q-cbsa";
5   prefix cbsa;
6
7   import ieee802-dot1q-types {
8     prefix dot1q-types;
9   }
10
11   organization
12     "IEEE 802.1 Working Group";
13   contact
14     "WG-URL: http://www.ieee802.org/1/
15      WG-Email: stds-802-1-L@ieee.org
16
17     Contact: IEEE 802.1 Working Group Chair
18     Postal: C/O IEEE 802.1 Working Group
19             IEEE Standards Association
20             445 Hoes Lane
21             Piscataway
22             NJ 08854
23             USA
24
25     E-mail: STDS-802-1-L@IEEE.ORG";
26   description
27     "This module provides for management of IEEE Std 802.1Q bridges
28      that support the credit-based shaper algorithm.
29
30      Copyright (C) IEEE (2023)
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 2023-11-20 {
36     description
37       "Published as part of IEEE Std 802.1Qdx-2024.
38        The following reference statement identifies each referenced IEEE
39        Standard as updated by applicable amendments.";
40     reference
41       "IEEE Std 802.1Q Bridges and Bridged Networks:
42        IEEE Std 802.1Q-2022, IEEE Std 802.1Qcz-2023, IEEE Std 802.1Qcw-2023,
43        IEEE Std 802.1Qcj-2023, IEEE Std 802.1Qdx-2024.";
44   }
45
46   grouping cbsa-config {
47     description
48       "cbsa-config comprises all the parameters associated
49        with credit-based shaper algorithm.";
50     container cbsa-parameters {
51       description
52         "This container comprises all credit-based shaper algorithm related nodes.";
53       list cbsa-parameter-table {
54         key "traffic-class";
55         description
56           "There is one cbsa parameter table per Port of a Bridge component.
57            Each table row contains a set of parameters for each traffic class
58            configured to use credit-based shaper algorithm (8.6.8.2), as detailed
59            in Table 12-4. This cbsa parameter table is valid for a Bridge port
60            only when used in the absence of SRP.";
61         reference
62           "12.20 of IEEE Std 802.1Q";
63       }
64       leaf traffic-class {
65         type dot1q-types:traffic-class-type;
66         description
67           "An 802.1 traffic class value. This is the numerical
68            value associated with a traffic class in a Bridge. Larger
69            values are associated with higher priority traffic classes.";
69         reference
```

```
1      "8.6.8 of IEEE Std 802.1Q";
2  }
3  leaf admin-idle-slope {
4      type uint64;
5      units "bits/second";
6      default "0";
7      description
8          "The bandwidth, in bits per second, that has been requested by management to
9              be reserved for use by the queue associated with this traffic class.
10
11              If SRP is in operation for this traffic class, this parameter has no effect.
12
13              If SRP is not in operation for this traffic class, then the value of
14                  oper-idle-slope is always equal to the value of admin-idle-slope";
15      reference
16          "34.3 of IEEE Std 802.1Q";
17  }
18  leaf oper-idle-slope {
19      type uint64;
20      units "bits/second";
21      default "0";
22      config false;
23      description
24          "The actual bandwidth, in bits per second, that is currently reserved for use
25              by the queue associated with this traffic class (see 34.6.1 and 34.6.2).";
26      reference
27          "34.3 of IEEE Std 802.1Q";
28  }
29  }
30  }
31  }
32 }
33
```

## 148.6.24 The ieee802-dot1q-cbsa-bridge YANG module

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

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

<sup>2</sup> (normative)

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

<sup>4</sup>

## <sup>1</sup> A.5 Major capabilities

*Insert the following rows at the end of Table A.5:*

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

<sup>2</sup>

<sup>3</sup> *Insert new 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 definitions specified in 8.6.8.2	CBSA:M	8.6.8.2	Yes [ ]	No [ ]
CBSA-2	Does the implementation support the management attributes defined in 12.20.1 and specified in 48.2.12	CBSA:M	12.20.1, 48.2.12	Yes [ ]	No [ ]

<sup>4</sup>



## <sup>7</sup> A.47 YANG

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

Item	Feature	Status	References	Support	
YANG-CBSA	Is the <i>ieee802-dot1q-cbsa</i> module supported?	CBSA:O	48.6.23	Yes [ ]	No [ ]
YANG-CBSA-BRIDGE	Is the <i>ieee802-dot1q-cbsa-bridge</i> module supported?	CBSA:O	48.6.24	Yes [ ]	No [ ]

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

<sup>2</sup>(normative)

### <sup>3</sup>PICS proforma—End station implementations<sup>2</sup>

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

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

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>6</sup>*Insert new 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 definitions specified in 8.6.8.2	CBS:M	8.6.8.2	Yes [ ]	No [ ]
CBSA-2	Does the implementation support the management entities defined in 12.35	CBS:M	12.35	Yes [ ]	No [ ]
CBSA-3	Is the ieee802-dot1q-cbsa YANG module supported?	CBS:O	48.6.23	Yes [ ]	No [ ]
CBSA-4	Is the ieee802-dot1q-cbsa-bridge YANG module supported?	CBS:O	48.6.24	Yes [ ]	No [ ]

<sup>7</sup>

<sup>2</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.