



International
Standard

**ISO/IEC/IEEE
8802-1Q**

**Telecommunications and exchange
between information technology
systems — Requirements for local
and metropolitan area networks —**

**Part 1Q:
Bridges and bridged networks**

*Télécommunications et échange entre systèmes informatiques —
Exigences pour les réseaux locaux et métropolitains —*

Partie 1Q: Ponts et réseaux pontés

**Third edition
2024-08**

Reference number
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This third edition cancels and replaces the second edition (ISO/IEC/IEEE 8802-1Q:2020), which has been technically revised. It also incorporates the Amendments: ISO/IEC/IEEE 8802-1Q:2020/Amd 2:2021, ISO/IEC/IEEE 8802-1Q:2020/Amd 3:2021, ISO/IEC/IEEE 8802-1Q:2020/Amd 31:2021.

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IEEE Std 802.1Q™-2022
(Revision of IEEE Std 802.1Q-2018)

IEEE Standard for Local and metropolitan area networks— Bridges and Bridged Networks

LAN/MAN Standards Committee
of the
IEEE Computer Society

Approved 21 September 2022
IEEE SA Standards Board

Abstract: This standard specifies how the Media Access Control (MAC) Service is supported by Bridged Networks, the principles of operation of those networks, and the operation of MAC Bridges and VLAN Bridges, including management, protocols, and algorithms.

Keywords: Bridged Network, IEEE 802.1Q™, LAN, local area network, MAC Bridge, metropolitan area network, MSTP, Multiple Spanning Tree Protocol, PBN, Provider Bridged Network, Rapid Spanning Tree Protocol, RSTP, Shortest Path Bridging Protocol, SPB Protocol, Time-Sensitive Networking, TSN, Virtual Bridged Network, virtual LAN, VLAN Bridge

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IEEE Std 802.1s-2002	11 December 2002	Tony Jeffree , <i>Chair</i> Neil Jarvis , <i>Vice Chair</i> Mick Seaman , <i>Chair, Interworking Task Group</i> Norman W. Finn , <i>Editor</i>
IEEE Std 802.1ad-2005	28 March 2005	Tony Jeffree , <i>Chair</i> Paul Congdon , <i>Vice Chair</i> Mick Seaman , <i>Chair, Interworking Task Group</i> Stephen R. Haddock , <i>Editor</i>
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IEEE Std 802.1Qau-2010	25 March 2010	Tony Jeffree , <i>Chair</i> Paul Congdon , <i>Vice Chair</i> Patricia Thaler , <i>Chair, Data Center Bridging Task Group</i> Norman W. Finn , <i>Editor</i>
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IEEE Std 802.1Qbc-2011	16 June 2011	Tony Jeffree , <i>Chair</i> Paul Congdon , <i>Vice Chair</i> Stephen Haddock , <i>Chair, Interworking Task Group</i> Norman Finn , <i>Editor</i>
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IEEE Std 802.1Qbf-2011	7 December 2011	Tony Jeffree , <i>Chair</i> Paul Congdon , <i>Vice Chair</i> Stephen Haddock , <i>Chair, Interworking Task Group</i> Robert Sultan , <i>Editor</i>
IEEE Std 802.1aq-2012	29 March 2012	Tony Jeffree , <i>Chair</i> Glenn Parsons , <i>Vice Chair</i> Stephen Haddock , <i>Chair, Interworking Task Group</i> Donald Fedyk , Mick Seaman , <i>Editors</i>
IEEE Std 802.1Qbg-2012	14 May 2012	Tony Jeffree , <i>Chair and Editor</i> Paul Congdon , <i>Vice Chair</i> Patricia Thaler , <i>Chair, Data Center Bridging Task Group</i> Paul Bottorff , <i>Editor; Clauses 12 and 17</i>
IEEE Std 802.1Q-2011/Cor-2-2012	19 October 2012	Tony Jeffree , <i>Chair and Editor</i> Glenn Parsons , <i>Vice Chair and Chair, Maintenance Task Group</i>
IEEE Std 802.1Qbp-2014	27 March 2014	Tony Jeffree , <i>Chair</i> Glenn Parsons , <i>Vice Chair</i> Stephen Haddock , <i>Chair, Interworking Task Group</i> Ben Mack-Crane , <i>Editor</i>

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IEEE Std 802.1D-2004	9 February 2004	Tony Jeffree , <i>Chair and Editor</i> Paul Congdon , <i>Vice Chair</i> Mick Seaman , <i>Chair, Interworking Task Group and Editor</i>
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IEEE Std 802.1Qcd-2015	16 February 2015	Glenn Parsons , <i>Chair</i> John Messenger , <i>Vice Chair</i> Patricia Thaler , <i>Chair, Data Center Bridging Task Group</i> Eric Multanen , <i>Editor</i>
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IEEE Std 802.1Q-2014/Cor 1-2015	5 December 2015	Glenn Parsons , <i>Chair</i> John Messenger , <i>Vice-Chair and Chair, Maintenance Task Group</i> Tony Jeffree , <i>Editor</i>
IEEE Std 802.1Qbv-2015	5 December 2015	Glenn Parsons , <i>Chair</i> John Messenger , <i>Vice-Chair</i> Michael Johas Teener , <i>Chair, Time-Sensitive Networking Task Group</i> Tony Jeffree , <i>Editor</i>
IEEE Std 802.1Qbu-2016	30 June 2016	Glenn Parsons , <i>Chair</i> John Messenger , <i>Vice-Chair</i> Michael Johas Teener , <i>Chair, Time-Sensitive Networking Task Group</i> Tony Jeffree , <i>Editor</i>
IEEE Std 802.1Qbz-2016	30 June 2016	Glenn Parsons , <i>Chair</i> John Messenger , <i>Vice-Chair</i> Michael Johas Teener , <i>Chair, Time-Sensitive Networking Task Group</i> Norm Finn , <i>Editor</i>
IEEE Std 802.1Qci-2017	14 February 2017	Glenn Parsons , <i>Chair</i> John Messenger , <i>Vice-Chair</i> János Farkas , <i>Chair, Time-Sensitive Networking Task Group</i> Tony Jeffree , <i>Editor</i>
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Introduction

This introduction is not part of IEEE Std 802.1Q™-2022, IEEE Standard for Local and metropolitan area networks—Bridges and Bridged Networks.

IEEE Std 802.1Q™-2022 incorporates the text of the following amendments into IEEE Std 802.1Q™-2018.

IEEE Std 802.1Qcc™-2018	Stream Reservation Protocol (SRP) Enhancements and Performance Improvements
IEEE Std 802.1Qcp™-2018	YANG Data Model
IEEE Std 802.1Qcy™-2019	Virtual Station Interface (VSI) Discovery and Configuration Protocol (VDP) Extension to Support Network Virtualization Overlays Over Layer 3 (NVO3)
IEEE Std 802.1Qcx™-2020	YANG Data Model for Connectivity Fault Management
IEEE Std 802.1Qcr™-2020	Asynchronous Traffic Shaping

The 2018 revision of this standard incorporated the text of the following amendments into IEEE Std 802.1Q-2014.

IEEE Std 802.1Qcd™-2015	Application Virtual Local Area Network (VLAN) Type, Length, Value (TLV)
IEEE Std 802.1Qca™-2015	Path Control and Reservation
IEEE Std 802.1Q-2014 Cor 1-2015	Technical and editorial corrections
IEEE Std 802.1Qbv™-2015	Enhancements for scheduled traffic
IEEE Std 802.1Qbu™-2016	Frame preemption
IEEE Std 802.1Qbz™-2016	Enhancements to Bridging of IEEE 802.11 Media
IEEE Std 802.1Qci™-2017	Per-Stream Filtering and Policing
IEEE Std 802.1Qch™-2017	Cyclic Queuing and Forwarding

The 2014 revision of this standard incorporated the text of the following amendments into IEEE Std 802.1Q-2011.

IEEE Std 802.1Qbe™-2011	Multiple I-SID Registration Protocol
IEEE Std 802.1Qbc™-2011	Provider Bridging—Remote Customer Service Interfaces
IEEE Std 802.1Qbb™-2011	Priority-based Flow Control
IEEE Std 802.1Qaz™-2011	Enhanced Transmission Selection for Bandwidth Sharing Between Traffic Classes
IEEE Std 802.1Qbf™-2011	PBB-TE Infrastructure Segment Protection
IEEE Std 802.1Qbg™-2012	Edge Virtual Bridging
IEEE Std 802.1aq™-2012	Shortest Path Bridging
IEEE Std 802.1Q-2011/Cor 2-2012	Technical and editorial corrections
IEEE Std 802.1Qbp™-2014	Equal Cost Multiple Paths (ECMP)

The 2011 revision of this standard incorporated the text of the following amendments into IEEE Std 802.1Q-2005.

IEEE Std 802.1ad™-2005	Provider Bridges
IEEE Std 802.1ak™-2007	Multiple Registration Protocol
IEEE Std 802.1ag™-2007	Connectivity Fault Management
IEEE Std 802.1ah™-2008	Provider Backbone Bridges
IEEE Std 802.1Q-2005/Cor-1-2008	Corrections to the Multiple Registration Protocol

IEEE Std 802.1ap™-2008	Management Information Base (MIB) Definitions for VLAN Bridges
IEEE Std 802.1Qaw™-2009	Management of Data Driven and Data Dependent Connectivity Faults
IEEE Std 802.1Qay™-2009	Provider Backbone Bridge Traffic Engineering
IEEE Std 802.1aj™-2009	Two-Port Media Access Control (MAC) Relay
IEEE Std 802.1Qav™-2009	Forwarding and Queuing Enhancements for Time-Sensitive Streams
IEEE Std 802.1Qau™-2010	Congestion Notification
IEEE Std 802.1Qat™-2010	Stream Reservation Protocol

Clause 13 of IEEE Std 802.1Q-2011 was also revised to include an updated specification of the Rapid Spanning Tree Algorithm and Protocol (RSTP), superseding references to IEEE Std 802.1D™-2004 [B12].⁶

The 2005 revision of this standard incorporated the text of the following amendments into IEEE Std 802.1Q-1998.

IEEE Std 802.1u™-2001	Technical and Editorial Corrections
IEEE Std 802.1v™-2001	VLAN Classification by Protocol and Port
IEEE Std 802.1s™-2002	Multiple Spanning Trees

This standard was first published as IEEE Std 802.1Q-1998, making use of the concepts and mechanisms of LAN Bridging that were introduced by IEEE Std 802.1D and defining additional mechanisms to allow the implementation of Virtual Bridged Networks.

For an introduction to this standard that details each of the provisions introduced by amendments and revisions throughout its development, refer to 1.3.

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

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USA

⁶ The numbers in brackets correspond to those of the bibliography in Annex W.

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