IEEE STANDARDS ASSOCIATION

IEEE Standard for Local and Metropolitan Area Networks—

Bridges and Bridged Networks

Amendment 31: Stream Reservation Protocol (SRP) Enhancements and Performance Improvements

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

IEEE
3 Park Avenue
New York, NY 10016-5997
USA

IEEE Std 802.1Qcc™-2018
(Amendment to
IEEE Std 802.1Q™-2018
as amended by
IEEE Std 802.1Qcp™-2018)

IEEE Std 802.1Qcc™-2018
(Amendment to
IEEE Std 802.1Q™-2018
as amended by
IEEE Std 802.1Qcp™-2018)

IEEE Standard for
Local and Metropolitan Area Networks—

Bridges and Bridged Networks

Amendment 31: Stream Reservation Protocol (SRP) Enhancements and Performance Improvements

Sponsor

LAN/MAN Standards Committee
of the
IEEE Computer Society

Approved 14 June 2018

IEEE-SA Standards Board

Abstract: Enhancements to the configuration of time-sensitive streams are provided by this amendment to IEEE Std 802.1Q-2018.

Keywords: amendment, Bridged Local Area Networks, IEEE 802©, IEEE 802.1Q™, IEEE 802.1Qcc™, SRP, Stream Reservation Protocol, MSRP, Multiple Stream Registration Protocol, Time-Sensitive Networking, TSN

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Copyright © 2018 by The Institute of Electrical and Electronics Engineers, Inc.
All rights reserved. Published 31 October 2018. Printed in the United States of America.

IEEE and IEEE 802 are registered trademarks in the U.S. Patent & Trademark Office, owned by The Institute of Electrical and Electronics Engineers, Incorporated.

PDF: ISBN 978-1-5044-5064-5 STD23223
Print: ISBN 978-1-5044-5065-2 STDPD23223

IEEE prohibits discrimination, harassment and bullying.
For more information, visit https://www.ieee.org/about/corporate/governance/p9-26.html.
No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Important Notices and Disclaimers Concerning IEEE Standards Documents

IEEE documents are made available for use subject to important notices and legal disclaimers. These notices and disclaimers, or a reference to this page, appear in all standards and may be found under the heading "Important Notices and Disclaimers Concerning IEEE Standards Documents." They can also be obtained on request from IEEE or viewed at https://standards.ieee.org/IPR/disclaimers.html.

Notice and Disclaimer of Liability Concerning the Use of IEEE Standards Documents

IEEE Standards documents (standards, recommended practices, and guides), both full-use and trial-use, are developed within IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association ("IEEE-SA") Standards Board. IEEE ("the Institute") develops its standards through a consensus development process, approved by the American National Standards Institute ("ANSI"), which brings together volunteers representing varied viewpoints and interests to achieve the final product. IEEE Standards are documents developed through scientific, academic, and industry-based technical working groups. Volunteers in IEEE working groups are not necessarily members of the Institute and participate without compensation from IEEE. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

IEEE Standards do not guarantee or ensure safety, security, health, or environmental protection, or ensure against interference with or from other devices or networks. Implementers and users of IEEE Standards documents are responsible for determining and complying with all appropriate safety, security, environmental, health, and interference protection practices and all applicable laws and regulations.

IEEE does not warrant or represent the accuracy or content of the material contained in its standards, and expressly disclaims all warranties (express, implied and statutory) not included in this or any other document relating to the standard, including, but not limited to, the warranties of: merchantability; fitness for a particular purpose; non-infringement; and quality, accuracy, effectiveness, currency, or completeness of material. In addition, IEEE disclaims any and all conditions relating to: results; and workmanlike effort. IEEE standards documents are supplied "AS IS" and "WITH ALL FAULTS."

Use of an IEEE standard is wholly voluntary. The existence of an IEEE standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard.

In publishing and making its standards available, IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity nor is IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing any IEEE Standards document, should rely upon his or her own independent judgment in the exercise of reasonable care in any given circumstances or, as appropriate, seek the advice of a competent professional in determining the appropriateness of a given IEEE standard.

IN NO EVENT SHALL IEEE BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO: PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE PUBLICATION, USE OF, OR RELIANCE UPON ANY STANDARD, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE AND REGARDLESS OF WHETHER SUCH DAMAGE WAS FORESEEABLE.

Translations

The IEEE consensus development process involves the review of documents in English only. In the event that an IEEE standard is translated, only the English version published by IEEE should be considered the approved IEEE standard.

Copyright © 2018 IEEE. All rights reserved.

Official statements

A statement, written or oral, that is not processed in accordance with the IEEE-SA Standards Board Operations Manual shall not be considered or inferred to be the official position of IEEE or any of its committees and shall not be considered to be, or be relied upon as, a formal position of IEEE. At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position of IEEE.

Comments on standards

Comments for revision of IEEE Standards documents are welcome from any interested party, regardless of membership affiliation with IEEE. However, IEEE does not provide consulting information or advice pertaining to IEEE Standards documents. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Since IEEE standards represent a consensus of concerned interests, it is important that any responses to comments and questions also receive the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to comments or questions except in those cases where the matter has previously been addressed. For the same reason, IEEE does not respond to interpretation requests. Any person who would like to participate in revisions to an IEEE standard is welcome to join the relevant IEEE working group.

Comments on standards should be submitted to the following address:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854 USA

Laws and regulations

Users of IEEE Standards documents should consult all applicable laws and regulations. Compliance with the provisions of any IEEE Standards document does not imply compliance to any applicable regulatory requirements. Implementers of the standard are responsible for observing or referring to the applicable regulatory requirements. IEEE does not, by the publication of its standards, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

IEEE draft and approved standards are copyrighted by IEEE under U.S. and international copyright laws. They are made available by IEEE and are adopted for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of engineering practices and methods. By making these documents available for use and adoption by public authorities and private users, IEEE does not waive any rights in copyright to the documents.

Photocopies

Subject to payment of the appropriate fee, IEEE will grant users a limited, non-exclusive license to photocopy portions of any individual standard for company or organizational internal use or individual, non-commercial use only. To arrange for payment of licensing fees, please contact Copyright Clearance Center, Customer Service, 222 Rosewood Drive, Danvers, MA 01923 USA; +1 978 750 8400. Permission to photocopy portions of any individual standard for educational classroom use can also be obtained through the Copyright Clearance Center.

Copyright © 2018 IEEE. All rights reserved.

Updating of IEEE Standards documents

Users of IEEE Standards documents should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of amendments, corrigenda, or errata. A current IEEE document at any point in time consists of the current edition of the document together with any amendments, corrigenda, or errata then in effect.

Every IEEE standard is subjected to review at least every ten years. When a document is more than ten years old and has not undergone a revision process, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE standard.

In order to determine whether a given document is the current edition and whether it has been amended through the issuance of amendments, corrigenda, or errata, visit the IEEE-SA Website at https://ieeexplore.ieee.org or contact IEEE at the address listed previously. For more information about the IEEE SA or IEEE's standards development process, visit the IEEE-SA Website at https://standards.ieee.org.

Errata

Errata, if any, for all IEEE standards can be accessed on the IEEE-SA Website at the following URL: https://standards.ieee.org/findstds/errata/index.html. Users are encouraged to check this URL for errata periodically.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken by the IEEE with respect to the existence or validity of any patent rights in connection therewith. If a patent holder or patent applicant has filed a statement of assurance via an Accepted Letter of Assurance, then the statement is listed on the IEEE-SA Website at https://standards.ieee.org/about/sasb/patcom/patents.html. Letters of Assurance may indicate whether the Submitter is willing or unwilling to grant licenses under patent rights without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination to applicants desiring to obtain such licenses.

Essential Patent Claims may exist for which a Letter of Assurance has not been received. The IEEE is not responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patents Claims, or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility. Further information may be obtained from the IEEE Standards Association.

Copyright © 2018 IEEE. All rights reserved.

Participants

At the time this amendment was submitted to the IEEE-SA Standards Board for approval, the IEEE 802.1 Working Group had the following membership:

Glenn Parsons, *Chair*
John Messenger, *Vice Chair* and *Acting Chair*
Jessy V. Rouyer, *Acting Vice Chair*
János Farkas, *Chair, Time-Sensitive Networking Task Group*
Rodney Cummings, *Editor*

Ralf Assmann
Shenghua Bao
Jens Bierschenk
Steinar Bjornstad
Christian Boiger
Paul Bottorff
Radhakrishna Canchi
David Chen
Feng Chen
Weiying Cheng
Paul Congdon
Hesham Elbakoury
Norman Finn
Geoffrey Garner
Eric W. Gray
Craig Gunther
Marina Gutierrez
Stephen Haddock
Mark Hantel
Lokesh Kabra
Michael Karl
Stephan Kehrer
Hajime Koto
Christophe Mangin
Scott Mansfield
James McIntosh
Tero Mustala
Tomoki Ohsawa
Donald R. Pannell
Walter Pienciak
Michael Potts
Wei Qiu
Karen Randall
Maximilian Riegel
Atsushi Sato
Frank Schewe
Michael Seaman
Johannes Specht
Patricia Thaler
Paul Unbehagen
Xinyuan Wang
Tongtong Wang
Hao Wang
Karl Weber
Brian Weis
Jordon Woods
Takahiro Yamaura
Xiang Yu
Nader Zein

The following members of the individual balloting committee voted on this amendment. Balloters may have voted for approval, disapproval, or abstention.

Thomas Alexander
Richard Alfvin
Butch Anton
Stefan Aust
Gordon Bechtel
Christian Boiger
Nancy Bravin
Dietmar Bruckner
Demetrio Bucaneg
Ashley Butterworth
William Byrd
Steven Carlson
Juan Carreon
Keith Chow
Charles Cook
Rodney Cummings
Sourav Dutta
János Farkas
Norman Finn
Avraham Freedman
Eric W. Gray
Randall Groves
Craig Gunther
Stephen Haddock
Mark Hantel
Marco Hernandez
Werner Hoelzl
Rita Horner
Noriyuki Ikeuchi
Atsushi Ito
Raj Jain
SangKwon Jeong
Piotr Karocki
Stephan Kehrer
Stuart Kerry
Yongbum Kim
Hyeong Ho Lee
James Lepp
Jon Lewis
Michael Lynch
Elvis Maculuba
Arthur Marris
Richard Mellitz
Charles Moorwood
Charles Ngethe
Nick S. A. Nikjoo
Paul Nikolich
Satoshi Obara
Bansi Patel
Adee Ran
Alon Regev
Maximilian Riegel
Robert Robinson
Benjamin Rolfe
Jessy V. Rouyer
Michael Seaman
Daniel Smith
Thomas Starai
Walter Struppler
Mark-Rene Uchida
Dmitri Varsanofiev
George Vlantis
Lisa Ward
Andreas Wolf
Oren Yuen
Zhen Zhou

Copyright © 2018 IEEE. All rights reserved.

When the IEEE-SA Standards Board approved this amendment on 14 June 2018, it had the following membership:

Jean-Philippe Faure, *Chair*
Gary Hoffman, *Vice Chair*
John D. Kulick, *Past Chair*
Konstantinos Karachalios, *Secretary*

Ted Burse
Guido R. Hiertz
Christel Hunter
Joseph L. Koepfinger*
Thomas Koshy
Hung Ling
Dong Liu
Xiaohui Liu
Kevin Lu
Daleep Mohla
Andrew Myles
Paul Nikolich
Ronald C. Petersen
Annette D. Reilly
Robby Robson
Dorothy Stanley
Mehmet Ulema
Phil Wennblom
Philip Winston
Howard Wolfman
Jingyi Zhou

*Member Emeritus

Copyright © 2018 IEEE. All rights reserved.

Introduction

This introduction is not part of IEEE Std 802.1Qcc-2018, IEEE Standard for Local and Metropolitan Area Networks—Bridges and Bridged Networks—Amendment 31: Stream Reservation Protocol (SRP) Enhancements and Performance Improvements.

This amendment to IEEE Std 802.1Q-2018 provides enhancements to the configuration of time-sensitive streams.

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 can be obtained from

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854-4141
USA

Copyright © 2018 IEEE. All rights reserved.

Contents

Copyright © 2018 IEEE. All rights reserved.

Copyright © 2018 IEEE. All rights reserved.

Copyright © 2018 IEEE. All rights reserved.

Figures

Copyright © 2018 IEEE. All rights reserved.

Tables

Copyright © 2018 IEEE. All rights reserved.

IEEE Standard for
Local and Metropolitan Area Networks—

Bridges and Bridged Networks

Amendment 31:
Stream Reservation Protocol (SRP)
Enhancements and Performance Improvements

(This amendment is based on IEEE Std 802.1Q™-2018, as amended by IEEE Std 802.1Qcp™-2018.)

NOTE—Text shown in ***bold italics*** in this amendment defines the editing instructions necessary to change to the base standard. Three editing instructions are used: change, delete, and insert. ***Change*** is used to make changes to existing material. The editing instruction specifies the location of the change and describes what is being changed by using ~~strikethrough~~ to remove old material and underscore to add new material. ***Delete*** removes existing material. ***Insert*** adds new material without changing the existing material. Insertions, however, may require renumbering. If so, renumbering instructions are given in the editing instruction. Editing instructions, change markings, and this NOTE will not be carried over into future editions of IEEE Std 802.1Q because the changes will be incorporated into the base standard.[1]

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

Copyright © 2018 IEEE. All rights reserved.