INTERNATIONAL STANDARD

ISO/IEC/ IEEE 8802-1BR

First edition 2016-10-15

Information technology —
Telecommunications and information exchange between systems — Local and metropolitan area networks —
Specific requirements —

iTeh ST Part 1BR: PREVIEW Virtual bridged local area networks (standards iteh a) area pridge port extension

https://standards.iteh.Technologies de l'information — Télécommunications et échange f71d4 d'informations entre systèmes — Réseaux de zones locales et métropolitaines — Exigences spécifiques —

Partie 1BR: Réseaux de zone locale virtuelle pontée — Extension du port de pontage



iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO/IEC/IEEE 8802-1BR:2016
https://standards.iteh.ai/catalog/standards/sist/6ff8ca5d-8bc7-43e8-b876-f71d4551374d/iso-iec-ieee-8802-1br-2016



COPYRIGHT PROTECTED DOCUMENT

© IEEE 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from ISO or IEEE at the respective address below or ISO's member body in the country of the requester.

ISO copyright office Ch. de Blandonnet 8 • CP 401 CH-1214 Vernier, Geneva, Switzerland Tel. +41 22 749 01 11 Fax +41 22 749 09 47 copyright@iso.org www.iso.org

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

stds.ipr@ieee.org www.ieee.org

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of ISO/IEC JTC 1 is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is called to the possibility that implementation of this standard may require the use of subject matter covered by patent rights. By publication of this standard no position is taken with respect to the existence or validity of any patent rights in connection therewith. ISO/IEEE is not responsible for identifying essential patents or patent claims for which a license may be required, for conducting inquiries into the legal validity or scope of patents or patent claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance or a Patent Statement and Licensing Declaration Form, 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 ISO or the IEEE Standards Association.

ISO/IEC/IEEE 8802-1BR was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information Technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems* in cooperation with the Systems and Software Engineering Standards Committee of the IEEE Computer Society, under the Partner Standards Development Organization cooperation agreement between ISO and IEEE.

© IEEE 2012 – All rights reserved

iTeh STANDARD PREVIEW (standards.iteh.ai)

IEEE Standard for Local and metropolitan area networks—

Virtual Bridged Local Area Networks— Bridge Port Extension

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO/IEC/IEEE 8802-1BR:2016

IEEE Computer Society s.iteh.ai/catalog/standards/sist/6ff8ca5d-8bc7-43e8-b876-f71d4551374d/iso-iec-ieee-8802-1br-2016

Sponsored by the LAN/MAN Standards Committee

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

IEEE Std 802.1BR™-2012

iTeh STANDARD PREVIEW (standards.iteh.ai)

IEEE Std 802.1BR™-2012

IEEE Standard for Local and metropolitan area networks—

Virtual Bridged Local Area Networks— **Bridge Port Extension**

Sponsor

LAN/MAN Standards Committee

iTeh STANDARD PREVIEW

IEEE Computer Society (standards.iteh.ai)

ISO/IEC/IEEE 8802-1BR:2016

Approved 14 May 2012 https://standards.iteh.ai/catalog/standards/sist/6ff8ca5d-8bc7-43e8-b876-

IEEE-SA Standards Board71d4551374d/iso-iec-ieee-8802-1br-2016

Abstract: This standard specifies the operation of Bridge Port Extenders, including management, protocols, and algorithms. Bridge Port Extenders operate in support of the MAC Service by Extended Bridges.

Keywords: Bridged Local Area Networks, Data Center Bridging, DCB, Edge Virtual Bridging, EVB, IEEE 802.1BR, LANs, local area networks, MAC Bridges, MANs, metropolitan area networks, Virtual Bridged Local Area Networks

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO/IEC/IEEE 8802-1BR:2016
https://standards.iteh.ai/catalog/standards/sist/6ff8ca5d-8bc7-43e8-b876-f71d4551374d/iso-iec-ieee-8802-1br-2016

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

Copyright © 2012 by The Institute of Electrical and Electronics Engineers, Inc. All rights reserved. Published 16 July 2012. Printed in the United States of America.

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

Print: ISBN 978-0-7381-7281-1 STD97256 PDF: ISBN 978-0-7381-7387-0 STDPD97256

IEEE prohibits discrimination, harassment and bullying. For more information, visit http://www.ieee.org/web/aboutus/whatis/policies/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.

Notice and Disclaimer of Liability Concerning the Use of IEEE Documents: IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. 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.

Use of an IEEE Standard is wholly voluntary. IEEE disclaims liability for any personal injury, property or other damage, of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance upon any IEEE Standard document.

IEEE does not warrant or represent the accuracy or content of the material contained in its standards, and expressly disclaims any express or implied warranty, including any implied warranty of merchantability or fitness for a specific purpose, or that the use of the material contained in its standards is free from patent infringement. IEEE Standards documents are supplied "AS IS."

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. 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 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.

(standards.iteh.ai)

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.

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 the official position of IEEE or any of its committees and shall not be considered to be, nor 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 to ensure 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. Any person who would like to participate in evaluating comments or revisions to an IEEE standard is welcome to join the relevant IEEE working group at http://standards.ieee.org/develop/wg/.

Comments on standards should be submitted to the following address:

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

Photocopies: Authorization to photocopy portions of any individual standard for internal or personal use is granted by The Institute of Electrical and Electronics Engineers, Inc., provided that the appropriate fee is paid to Copyright Clearance Center. To arrange for payment of licensing fee, 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.

Notice to users

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

This document is copyrighted by the IEEE. It is made available 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 this document available for use and adoption by public authorities and private users, the IEEE does not waive any rights in copyright to this document.

Updating of IEEE-documents NDARD PREVIEW

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. An official 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. 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 http://standards.ieee.org/index.html or contact the IEEE at the address listed previously. For more information about the IEEE Standards Association or the IEEE standards development process, visit IEEE-SA Website at http://standards.ieee.org/index.html.

Errata

Errata, if any, for this and all other standards can be accessed at the following URL: http://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 http://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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

Participants

At the time this standard was approved, the IEEE 802.1 Working Group had the following voting members:

Tony Jeffree, Chair Glenn Parsons, Vice Chair

Patricia Thaler, Data Center Bridging Task Group Chair

Joe Pelissier, Editor

Zehavit Alon Eric Gray Yafan An Yingjie Gu Ting Ao Craig Gunther Peter Ashwood-Smith Stephen Haddock Christian Boiger Hitoshi Hayakawa Girault Jones Paul Bottorff Rudolf Brandner Daya Kamath Craig Carlson Hal Keen Xin Chang Srikanth Keesara Weiying Cheng Yongbum Kim Paul Congdon Philippe Klein Rodney Cummings Oliver Kleineberg Claudio DeSanti Michael Krause Zhemin Ding Lin Li Donald Eastlake, 3rd Jeff Lynch Janos Farkas Ben Mack-Crane Donald Fedyk David Martin

David Olsen
Donald Pannell
Mark Pearson
Rene Raeber
Karen Randall
Josef Roese
Dan Romascanu
Jessy Rouyer
Ali Sajassi
Panagiotis Saltsidis
Michael Seaman

Koichiro Seto

Rakesh Sharma

Takeshi Shimizu

Kevin Stanton

Donald Fedyk
Norman Finn
Geoffrey Garner
Anoop Ghanwani
Franz Goetz
Mark Gravel

David Martin

David Martin

STA John Messenger
John Morris

(StarFric Multaren
Yukihiro Nakagawa

Robert Sultan
Michael Johas Teener
Jeremy Touve
Maarten Vissers
Yuehua Wei
Min Xiao

Herbert Ruck

ISO/IEC/IEEE 8802-1BR:2016

https://standards.iteh.ai/catalog/standards/sist/6ff8ca5d-8bc7-43e8-b876-

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

Tony Jeffree

Thomas Alexander **Hugh Barrass** Nancy Bravin William Byrd Craig Carlson Keith Chow Charles Cook Rodney Cummings Claudio DeSanti Patrick Diamond Thomas Dineen Sourav Dutta Richard Edgar Yukihiro Fujimoto Ilango Ganga Evan Gilman Randall C. Groves Stephen Haddock Noriyuki Ikeuchi Atsushi Ito Raj Jain

Peter Jones Shinkyo Kaku Piotr Karocki Stuart Kerry Yongbum Kim Paul Lambert Brian L'Ecuyer Greg Luri Michael Lynch Elvis Maculuba Arthur Marris David Martin Gary Michel Jose Morales Yukihiro Nakagawa Michael S. Newman Nick S.A. Nikjoo Satoshi Obara Maximilian Riegel Benjamin Rolfe

Jessy Rouyer

Panagiotis Saltsidis Bartien Sayogo Rich Seifert Gil Shultz Kapil Sood Matthew Squire Manikantan Srinivasan Thomas Starai Walter Struppler Joseph Tardo William Taylor Michael Johas Teener Patricia Thaler Dmitri Varsanofiev Prabodh Varshney John Vergis Karl Weber Yuehua Wei Ludwig Winkel Oren Yuen

When the IEEE-SA Standards Board approved this standard on 14 May 2012, it had the following membership:

Richard H. Hulett, Chair John Kulick, Vice Chair Robert M. Grow, Past Chair

Satish Aggarwal Masayuki Ariyoshi Peter Balma William Bartley Ted Burse Clint Chaplin Wael Diab Jean-Philippe Faure Alexander Gelman Paul Houzé Jim Hughes Young Kyun Kim Joseph L. Koepfinger* David J. Law Thomas Lee Hung Ling Oleg Logvinov Ted Olsen Gary Robinson Jon Walter Rosdahl Mike Seavey Yatin Trivedi Phil Winston Yu Yuan

*Member Emeritus

Also included are the following nonvoting IEEE-SA Standards Board liaisons:

Richard DeBlasio, *DOE Representative* Michael Janezic, *NIST Representative*

Michelle Turner

EEE Standards Program Manager, Document Development

(standards iteh.ai)

Kathryn Bennett

IEEE Standards Program Manager, Technical Program Development

Introduction

This introduction is not part of IEEE Std 802.1BR-2012, IEEE Standard for Local and metropolitan area networks-Virtual Bridged Local Area Networks—Bridge Port Extension.

This standard specifies the devices, protocols, procedures, and managed objects necessary to extend a bridge and its management beyond its physical enclosure using IEEE 802® LAN technologies.

To this end, it:

- Identifies and isolates traffic between ports within an Extended Bridge;
- Specifies a tag format for this identification;
- Establishes an Extended Bridge consisting of a Controlling Bridge and one or more Bridge Port c)
- Specifies the functionality and the specific requirements of a Bridge Port Extender; d)
- Extends the MAC service of a Bridge Port across the interconnected Bridge Port Extenders, including support of Customer Virtual Local Area Networks (C-VLANs).
- Establishes the requirements of bridge components and systems for the attachment of Bridge Port Extenders;
- Specifies a protocol to provide for the configuration and monitoring of Bridge Port Extenders by a g) Controlling Bridge; and
- h) Establishes the requirements for Bridge Managemen to support Port Extension, identifying the managed objects and defining the management operations.

(standards.iteh.ai)
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: standards.iteh.ai/catalog/standards/sist/6ff8ca5d-

f71d4551374d/iso-iec-ieee-8802-1br-2016

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

Contents

1.	Overview		
	1.1	Scope	
	1.2	Purpose	2
2.	Norm	ative references	3
3.	Defin	itions	4
4.	Acror	nyms and abbreviations	<i>6</i>
5.	Conformance		7
	~ 1		_
	5.1	Terminology	
	5.2	Protocol Implementation Conformance Statement (PICS)	
	5.3	Bridge Port Extender Conformance	
	5.4	Controlling Bridge Conformance	8
6.	Principles of Bridge Port Extension		
	6.1	Bridge Port Extension Overview	10
	6.2	Bridge Port Extension Overview Extended Bridge	11
	6.3	Base and aggregating Bridge Port Extenders	13
	6.4	Base and aggregating Bridge Port Extenders Bridge Port Extender Speration 2.1.0.5.11.2.1.	14
	6.5	Bridge Port Extender architecture	
	6.6	Bridge Port Extender Model of operation 2016	
	6.7	Bridge Port Extender Frame Reception Bridge Port Extender Frame Reception Bridge Port Extender Frame Reception Bridge Bri	
	6.8	Bridge Port Extender Transmit and Receive 8802-1br-2016	19
	6.9	Bridge Port Extender tag handler	20
	6.10	Bridge Port Extender Internal Sublayer Service	
	6.11	Bridge Port Extender Forwarding Process	
	6.12	Bridge Port Extender Filtering Database	
	6.13	Determination of the Upstream Port	
	6.14	Upstream Port Addressing	
	6.15	Bridge Port Extender Initialization	
	6.16	Support of Congestion Points	
7.		ed frame format	
1.	ragge	eu trame format	32
	7.1	Representation and encoding of tag fields	
	7.2	Tag format	
	7.3	Tag Protocol Identifier (TPID) formats	
	7.4	Tag Protocol Identification	
	7.5	E-TAG Control Information	32
8.	Support of Bridge Port Extension by C-VLAN components		
	8.1	Use of Tags	36
	8.2	Bridge Port Extension Port Types	
	8.3	Internal Bridge Port Extender Cascade Ports	
	8.4	Bridge Port Extender Upstream Ports	