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

Part 1X:
Port-based network access control

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

Partie 1X: Contrôle d'accès au réseau basé sur le port

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IEEE Std 802.1X™-2020
(Revision of IEEE Std 802.1X™-2010
Incorporating IEEE Std 802.1Xbx™-2014
and IEEE Std 802.1Xck™-2018)

IEEE Standard for Local and Metropolitan Area Networks—

Port-Based Network Access Control

Developed by the

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

Approved 30 January 2020

IEEE SA Standards Board

Abstract: Port-based network access control allows a network administrator to restrict the use of IEEE 802® LAN service access points (ports) to secure communication between authenticated and authorized devices. This standard specifies a common architecture, functional elements, and protocols that support mutual authentication between the clients of ports attached to the same LAN and that secure communication between the ports, including the media access method independent protocols that are used to discover and establish the security associations used by IEEE 802.1AE™ MAC Security.

Keywords: access control, authentication, authorization, controlled port, EAP, EAPOL, IEEE 802.1X, key agreement, LANs, local area networks, MACsec, MACsec Key Agreeement, MAC security, MAC Service, MANs, metropolitan area networks, MKA, port-based network access control, secure association, security, service access point, uncontrolled port

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Introduction

This introduction is not part of IEEE Std 802.1X™-2020, IEEE Standard for Local and Metropolitan Area Networks—Port-Based Network Access Control.

This edition of IEEE Std 802.1X™ incorporates IEEE Std 802.1X-2010 and its amendments, IEEE Std 802.1Xbx-2014 and IEEE Std 802.1Xck-2018.

The first edition of IEEE Std 802.1X™ was published in 2001. The second edition, IEEE Std 802.1X-2004, clarified mutual authentication and the interface between the IEEE 802.1X state machines and the Extensible Authentication Protocol (EAP) and by IEEE Std 802.11™ in support of IEEE Std 802.1X.

The third edition, IEEE Std 802.1X-2010, added authenticated key agreement in support of IEEE Std 802.1AE™ MAC Security (MACsec) and clarified and generalized the relationship between the common architecture specified for port-based network access control and the functional elements and protocols that support that architecture as specified in IEEE Std 802.1X, other IEEE 802® standards, and IETF RFCs. Further changes updated the standard to reflect best current practice, insisting, for example, on mutual authentication methods and using such methods in examples. A greater emphasis was placed on the security of systems accessing the network, as well as on the security of the network accessed, with a more comprehensive treatment of segregating and limiting connectivity to unauthenticated systems. Applications of port-based network access that use MACsec and/or MACsec Key Agreement protocol (MKA) were described.

IEEE Std 802.1X-2010 included a number of improvements to the specification of the port access control protocol (PACP) state machines and their relationship to EAP methods and state machines. Systems conformant to IEEE Std 802.1X-2020 or IEEE Std 802.1X-2010 should interoperate, without prior configuration, with implementations conforming to IEEE Std 802.1X-2004 and IEEE Std 802.1X-2001. However, it is anticipated that claims of conformance with respect to some existing implementations, not needing to support IEEE Std 802.1AE and already conforming to best current practice as of 2010, will continue to refer to IEEE Std 802.1X-2004.

The first amendment to IEEE Std 802.1X-2010, IEEE Std 802.1Xbx-2014, extended MKA to further support and use the extended packet numbering Cipher Suites specified by the IEEE Std 802.1AEbw™-2013. Secure connectivity association (CA) members can temporarily suspend MKA operation without causing protocol timeouts that would disrupt secure data transfer, thus allowing in-service control plane software upgrades.

The second amendment to IEEE Std 802.1X-2010, IEEE Std 802.1Xck-2018, specified a YANG data model for configuration and status reporting, using the information model previously specified in this standard.

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