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IEEE Standard for Local and metropolitan area networks—

Port-Based Network Access Control

Amendment 1: MAC Security Key Agreement Protocol (MKA) Extensions

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

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IEEE Std 802.1Xbx™-2014
(Amendment to
IEEE Std 802.1X™-2010)

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Approved 10 December 2014

IEEE-SA Standards Board

Abstract: Media Access Control security (MACsec) Key Agreement protocol (MKA) data elements and procedures that provide additional security and manageability capabilities, including the ability to maintain secure communication while the operation of MKA is suspended, when used in conjunction with MACsec Cipher Suites that support Extended Packet Numbering are added in this amendment.

Keywords: authorized port, confidentiality, data origin authenticity, IEEE 802.1X™, IEEE 802.1Xbx™, integrity, LANs, local area networks, MAC Bridges, MAC security, MAC Service, MANs, metropolitan area networks, port based network access control, secure association, security, transparent bridging

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Introduction

This introduction is not part of IEEE Std 802.1Xbx™-2014, IEEE Standard for Local and metropolitan area networks—Port-Based Network Access Control—Amendment 1: MAC Security Key Agreement Protocol (MKA) Extenstions.

This first amendment to IEEE Std 802.1X-2010, extends MKA to realize additional security and manageability capabilities made possible by the IEEE Std 802.1AEbw™ amendment that added extended packet numbering Cipher Suites to IEEE Std 802.1AE™-2006. Secure connectivity association (CA) members can now temporarily suspend MKA operation without causing protocol timeouts that would disrupt secure data transfer, thus allowing in-service control plane software upgrades.

The first edition of IEEE Std 802.1X was published in 2001. The second edition, IEEE Std 802.1X-2004 clarified areas related to mutual authentication and the interface between IEEE 802.1X specified state machine, and those specified by 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, clarifying and generalizing 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 in IETF RFCs. Further changes updated the standard to reflect best current practice, insisting, for example, upon 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 upon the security of the network accessed, and some prior provisions, with a more comprehensive treatment of segregating and limiting connectivity to unauthenticated systems. Applications of port-based network access that use IEEE Std 802.1AE MAC Security (MACsec) and/or MKA (MACsec Key Agreement protocol) are described.

Every effort was made to ensure that systems conformant to IEEE Std 802.1X-2010 will 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 in respect of 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. IEEE Std 802.1X-2010 includes 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.

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