

**IEEE Recommended Practice for Information technology—
Telecommunications and information exchange between systems—
Local and metropolitan area networks—
Technical reports and guidelines—**

Part 5: Media Access Control (MAC) Bridging of Ethernet V2.0 in Local Area Networks

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Abstract: Extensions to the behavior of ISO/IEC 10038 (IEEE 802.1D) media access control (MAC) Bridges, in order to facilitate interoperability in bridged local area networks (LANs) comprising CSMA/CD networks interconnected with other types of LAN using MAC Bridges, where the CSMA/CD networks contain a mixture of ISO/IEC 8802-3 and Ethernet V2.0 end stations, are specified. Additionally, guidelines are provided for the development of nonstandard 802 protocols, with particular emphasis on conversion of existing Ethernet protocols and the behavior to be expected from a Bridge, for the purpose of avoiding future incompatibilities.

Keywords: carrier sense multiple access with collision detection (CSMA/CD), data processing, Ethernet, fibre distributed data interface (FDDI), information interchange, LAN protocols, local area network (LAN), media access control (MAC) bridges, network interconnection, selective translation, selective translation table

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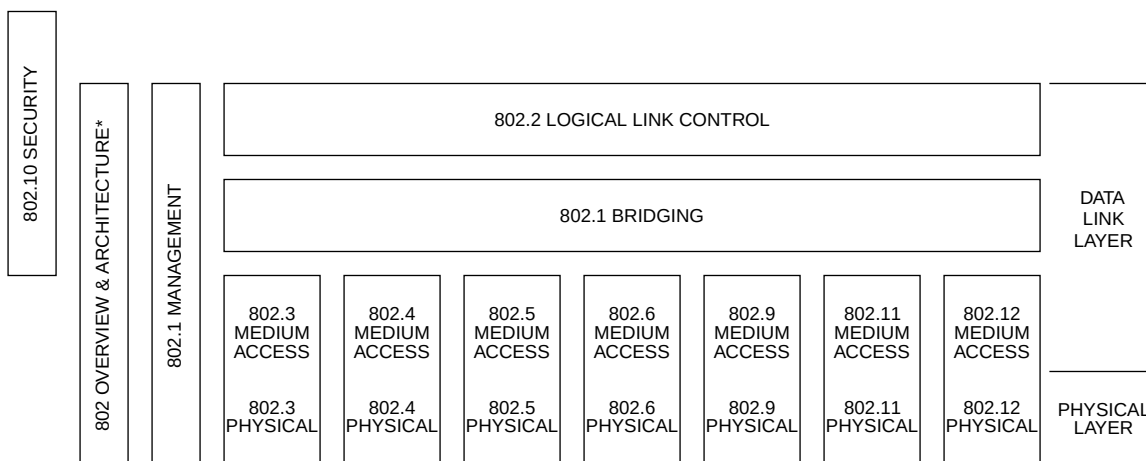
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Foreword to ANSI/IEEE Std 802.1H, 1997 Edition

This standard is part of a family of standards for local and metropolitan area networks. The relationship between the standard and other members of the family is shown below. (The numbers in the figure refer to IEEE standard numbers.)



* Formerly IEEE Std 802.1A.

This family of standards deals with the Physical and Data Link layers as defined by the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) Open Systems Interconnection Basic Reference Model (ISO/IEC 7498-1: 1994). The access standards define several types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Other types are under investigation.

The standards defining the access technologies are as follows:

- IEEE Std 802 *Overview and Architecture.* This standard provides an overview to the family of IEEE 802 Standards. This document forms part of the 802.1 scope of work.
- ANSI/IEEE Std 802.1B and 802.1k [ISO/IEC 15802-2] *LAN/MAN Management.* Defines an Open Systems Interconnection (OSI) management-compatible architecture, and services and protocol elements for use in a LAN/MAN environment for performing remote management.
- ANSI/IEEE Std 802.1D [ISO/IEC 10038] *MAC Bridging.* Specifies an architecture and protocol for the interconnection of IEEE 802 LANs below the MAC service boundary.
- ANSI/IEEE Std 802.1E [ISO/IEC 15802-4] *System Load Protocol.* Specifies a set of services and protocol for those aspects of management concerned with the loading of systems on IEEE 802 LANs.
- ANSI/IEEE Std 802.2 [ISO/IEC 8802-2] *Logical Link Control*
- ANSI/IEEE Std 802.3 [ISO/IEC 8802-3] *CSMA/CD Access Method and Physical Layer Specifications*
- ANSI/IEEE Std 802.4 [ISO/IEC 8802-4] *Token Passing Bus Access Method and Physical Layer Specifications*

- ANSI/IEEE Std 802.5 [ISO/IEC 8802-5] *Token Ring Access Method and Physical Layer Specifications*
- ANSI/IEEE Std 802.6 [ISO/IEC 8802-6] *Distributed Queue Dual Bus Access Method and Physical Layer Specifications*
- ANSI/IEEE Std 802.9 [ISO/IEC 8802-9] *Integrated Services (IS) LAN Interface at the Medium Access Control (MAC) and Physical (PHY) Layers*
- ANSI/IEEE Std 802.10 *Interoperable LAN/MAN Security*
- ANSI/IEEE Std 802.11 *Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*
- ANSI/IEEE Std 802.12 *Demand Priority Access Method, Physical Layer and Repeater Specifications*

In addition to the family of standards, the following is a recommended practice for a common Physical Layer technology:

- IEEE Std 802.7 *IEEE Recommended Practice for Broadband Local Area Networks*

The following additional working group has authorized standards projects under development:

- IEEE 802.14 *Standard Protocol for Cable-TV Based Broadband Communication Network*

The reader of this standard is urged to become familiar with the complete family of standards.

Conformance test methodology

An additional standards series, identified by the number 1802, has been established to identify the conformance test methodology documents for the 802 family of standards. Thus the conformance test documents for 802.3 are numbered 1802.3.

ANSI/IEEE Std 802.1H, 1997 Edition

This document specifies extensions to the behavior of ISO/IEC 10038 (IEEE Std 802.1D) MAC Bridges for use in dealing with Ethernet V2.0 frames.

ISO/IEC 8802-3 (IEEE 802.3) and Ethernet V2.0 frames often share the same LAN media, but the two kinds of frames do not have the same structure. Specifically, Ethernet V2.0 defines the two octets following the MAC addresses as a type, and ISO/IEC 8802-3 defines these same octets as a length. Footnote 7 in 3.2.6 of ISO/IEC 8802-3 : 1993 (footnote 6 in earlier editions) alludes to this difference and points out a way by which ISO/IEC 8802-3 and Ethernet V2.0 MAC frames may be distinguished.

The difference in frame structure means that Ethernet V2.0 frames cannot be directly forwarded by a Bridge to a different type of IEEE 802 LAN (e.g., token ring or FDDI), although they can be forwarded between pairs of LANs that both support Ethernet V2.0 (as, in practice, almost all ISO/IEC 8802-3 LANs do). The Internet Engineering Task Force (IETF) has specified, in RFC1042, a mechanism for conveying the Ethernet-based Internet Protocol (IP) and related protocols over IEEE 802 LANs. This uses the Subnetwork

Access Protocol (SNAP) mechanism specified in IEEE Std 802, with the Ethernet-type values encapsulated in the protocol identifier values of SNAP PDUs. Subsequently, other (non-IP) uses of the RFC1042 mechanism have occurred that were incompatible with the IP protocol suite, and have caused interoperability problems for Bridges wanting to support both.

This recommended practice specifies extensions to the behavior of Bridges in order to facilitate restoration of the interoperability that was lost by such conflicting uses of the RFC1042 mechanism. It also provides guidelines to protocol designers so that they can migrate old Ethernet-based protocols, and design new IEEE 802-based protocols, in such a way that they will interoperate smoothly with Bridges.

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Note that editorial changes were made to the IEEE standard to accommodate concerns raised during the ISO/IEC JTC 1 balloting process. These are indicated in the text by a change bar (such as shown at the left of this paragraph).

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