

INTERNATIONAL
STANDARD

ISO/IEC
15802-3

ANSI/IEEE
Std 802.1D

First edition
1998-12-01

**Information technology —
Telecommunications and information
exchange between systems — Local and
metropolitan area networks — Common
specifications —**

Part 3:
Media Access Control (MAC) Bridges

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseaux locaux et métropolitains —
Spécifications communes —*
Partie 3: Ponts de contrôle d'accès au support



Reference number

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ISO/IEC 15802-3:1998

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ISO/IEC 15802-3: 1998
ANSI/IEEE Std 802.1D, 1998 Edition

(Revision and redesignation of
ISO/IEC 10038: 1993
[ANSI/IEEE Std 802.1D, 1993 Edition],
incorporating IEEE supplements
P802.1p, 802.1j-1996, 802.6k-1992,
802.11c-1998, and P802.12e)

**Information technology—
Telecommunications and information exchange
between systems—
Local and metropolitan area networks—
Common specifications—
Part 3: Media Access Control (MAC) Bridges**

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International Standard ISO/IEC 15802-3:1998(E)

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International Standard ISO/IEC 15802-3 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

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This edition cancels and replaces ISO/IEC 10038:1993.

ISO/IEC 15802 consists of the following parts, under the general title *Information technology — Telecommunications and information exchange between systems* — *Local and metropolitan area networks — Common specifications*:

- *Part 1: Medium Access Control (MAC) service definition*
- *Part 2: LAN/MAN management*
- *Part 3: Media Access Control (MAC) Bridges*
- *Part 4: System load protocol*
- *Part 5: Remote Media Access Control (MAC) bridging*

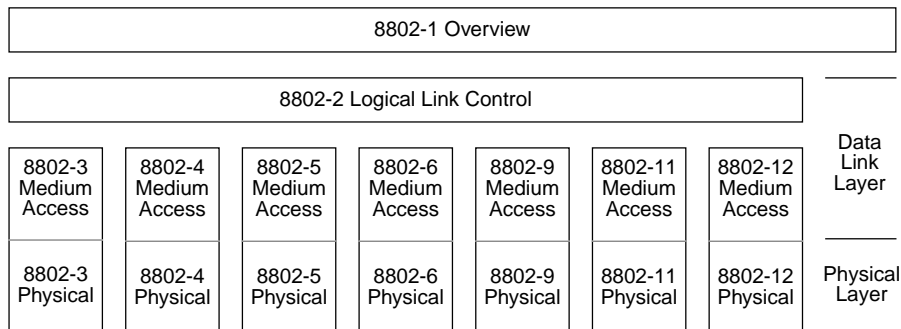
Annexes A, C, D and E form an integral part of this part of ISO/IEC 15802. Annexes B, F, G and H are for information only.



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Foreword to International Standard ISO/IEC 15802-3: 1998

This International Standard is part of a family of International Standards for Local and Metropolitan Area Networks. The relationship between this International Standard and the other members of the family is shown below. (The numbers in the figure refer to ISO/IEC Standard numbers.)



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

The International Standards defining the access technologies are as follows:

- a) ISO/IEC 8802-3, utilizing carrier sense multiple access with collision detection (CSMA/CD) as the access method.
- b) ISO/IEC 8802-4, utilizing token passing bus as the access method.
- c) ISO/IEC 8802-5, utilizing token passing ring as the access method.
- d) ISO/IEC 8802-6, utilizing distributed queuing dual bus as the access method.
- e) ISO/IEC 8802-9, a unified access method offering integrated services for backbone networks.
- f) ISO/IEC DIS 8802-11, a wireless LAN utilizing carrier sense multiple access with collision avoidance (CSMA/CA) as the access method.
- g) ISO/IEC 8802-12, utilizing Demand Priority as the access method.

ISO/IEC TR 8802-1, *Overview of Local Area Network Standards*, provides an overview of the series of ISO/IEC 8802 standards.

ISO/IEC 8802-2, *Logical Link Control*, is used in conjunction with the medium access standards to provide the data link layer service to network layer protocols.

ISO/IEC 15802-1, *Medium Access Control (MAC) service definition*, specifies the characteristics of the common MAC Service provided by all IEEE 802 LAN MACs. The service is defined in terms of primitives that can be passed between peer service users, their parameters, their interrelationship and valid sequences, and the associated events of the service.

ISO/IEC 15802-2, *LAN/MAN Management*, defines an OSI management-compatible architecture, and services and protocol elements for use in a LAN/MAN environment for performing remote management.

ISO/IEC 15802-3, *Media Access Control (MAC) Bridges*, specifies an architecture and protocol for the interconnection of IEEE 802 LANs below the level of the logical link control protocol.

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.

ISO/IEC 15802-5, *Remote Media Access Control (MAC) bridging*, specifies extensions for the interconnection, using non-LAN communication technologies, of geographically separated IEEE 802 LANs below the level of the logical link control protocol.

ANSI/IEEE Std 802.1D, 1998 Edition

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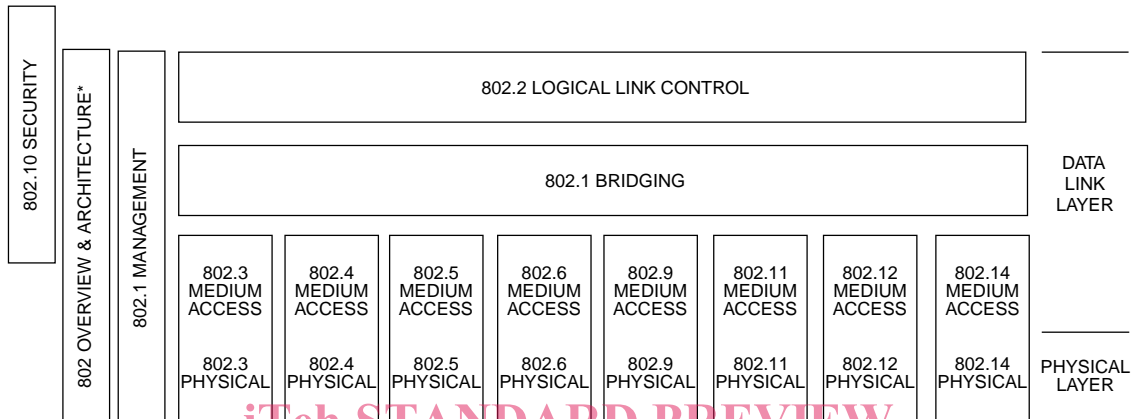
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Introduction to ANSI/IEEE Std 802.1D, 1998 Edition

[This introduction is not part of ANSI/IEEE Std 802.1D, 1998 Edition, Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Common specifications—Part 3: Media Access Control (MAC) Bridges.]

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 (ISO) Open Systems Interconnection (OSI) Basic Reference Model (ISO/IEC 7498-1 : 1994). The access standards define seven 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 technologies noted above are as follows:

- IEEE Std 802 *Overview and Architecture*. This standard provides an overview to the family of IEEE 802 Standards.
- ANSI/IEEE Std 802.1B and 802.1k [ISO/IEC 15802-2] *LAN/MAN Management*. Defines an 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 15802-3] *Media Access Control (MAC) Bridges*. 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 802.1F *Common Definitions and Procedures for IEEE 802 Management Information*
- ANSI/IEEE Std 802.1G [ISO/IEC 15802-5] *Remote Media Access Control (MAC) bridging*. Specifies extensions for the interconnection, using non-LAN communication technologies, of geographically separated IEEE 802 LANs below the level of the logical link control protocol.
- 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 (DQDB) 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 [ISO/IEC DIS 8802-11] *Wireless LAN Medium Access Control (MAC) and physical layer specifications*
- ANSI/IEEE Std 802.12 [ISO/IEC 8802-12] *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:

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

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

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

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 802.1D, 1998 Edition

The MAC Bridge standardization activities that resulted in the development of IEEE Std 802.1D-1990 (subsequently republished as ISO/IEC 10038:1993 [IEEE Std 802.1D, 1993 Edition]) specified an architecture and protocol for the interconnection of IEEE 802 LANs below the MAC Service boundary. IEEE Std 802.1D-1990 also introduced the concept of filtering services in Bridged LANs, and mechanisms whereby filtering information in such LANs may be acquired and held in a Filtering Database. This revision of ISO/IEC 10038: 1993 extends this concept of filtering services in order to define additional capabilities in Bridged LANs aimed at the following:

- The provision of expedited traffic capabilities, to support the transmission of time-critical information in a LAN environment;
- The provision of filtering services that support the dynamic definition and establishment of Groups in a LAN environment, and the filtering of frames by Bridges such that frames addressed to a given

Group are forwarded only on those LAN segments that are required in order to reach the members of that Group.

To this end, this document incorporates a set of changes and additions to ISO/IEC 10038: 1993 that define the following:

- a) The nature of Filtering Services in Bridged LANs;
- b) The concept of Traffic Classes and the effect on the operation of the Forwarding Process of supporting multiple Traffic Classes in Bridges;
- c) The structure of the Filtering Database that is needed in order to support Dynamic Multicast Filtering services;
- d) The registration protocol that is required in order to provide Dynamic Multicast Filtering Services;
- e) The management services and operations that are required in order to support administration of Dynamic Multicast Filtering Services.

Relationship between IEEE Std 802.1D and IEEE P802.1Q

A further IEEE standard under development, IEEE P802.1Q, extends the concepts of filtering services and MAC Bridging in order to provide a set of capabilities that allow MAC Bridges to support the definition and management of Virtual LANs (VLANs).

The capabilities defined in IEEE P802.1Q include the definition of a VLAN frame format that is able to carry VLAN identification and user priority information over LAN technologies, such as CSMA/CD, that have no inherent capability to signal priority information. This information is carried in an additional header field, known as the *Tag Header*, which is inserted immediately following the Destination MAC Address, and Source MAC Address (and Routing Information field, if present) of the original frame. IEEE P802.1Q extends the priority handling aspects of this standard to make use of the ability of the VLAN frame format to carry user priority information end to end across any set of concatenated underlying MACs.

[ISO/IEC 15802-3:1998](https://standards.ieee.org/iso/15802-3:1998)

The VLAN Bridging specification contained in IEEE 802.1Q is independent of this standard, in the sense that IEEE 802.1Q makes a separate and distinct statement of the conformance requirements for VLAN Bridges from the conformance requirements for MAC Bridges defined in this standard. However, IEEE 802.1Q makes use of many of the elements of the specification contained in this standard, in particular

- a) The Bridge architecture;
- b) The Internal Sublayer Service, and the specification of its provision by IEEE 802 LAN MACs;
- c) The major features of the operation of the Forwarding Process;
- d) The Spanning Tree Algorithm and Protocol;
- e) The Generic Attribute Registration Protocol (GARP); and
- f) The GARP Multicast Registration Protocol (GMRP).

Participants

The following is a list of participants in the Interworking activities of the IEEE 802.1 Working Group. Voting members at the time of publication are marked with an asterisk (*).

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IEEE Std 802.11c-1998

IEEE Std 802.11c-1998 adds the necessary information to map the IEEE 802.11 MAC parameters onto ISO/IEC 15802-3 (IEEE Std 802.1D) parameters.

Participants

At the time the draft of IEEE Std 802.11c was sent to sponsor ballot, the IEEE 802.11 working group had the following voting members:

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Abstract: The concept of Media Access Control (MAC) Bridging, introduced in the 1993 edition of this standard, has been expanded to define additional capabilities in Bridged LANs aimed at providing for expedited traffic capabilities, to support the transmission of time-critical information in a LAN environment; and providing filtering services that support the dynamic use of Group MAC Addresses in a LAN environment. (standards.iteh.ai)

Keywords: local area networks, MAC Bridge management, MAC bridges, media access control (MAC) bridges, multicast address filtering, traffic class expediting

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