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

Part 1BA:
Audio video bridging (AVB) systems

Technologies de l'information — Télécommunications et échange d'informations entre systèmes — Réseaux de zones locales et métropolitaines — Exigences spécifiques —

Partie 1BA: Systèmes de pontage audio-vidéo (AVB)

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Audio Video Bridging (AVB) Systems

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IEEE Standard for
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Audio Video Bridging (AVB) Systems

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Abstract: Profiles that select features, options, configurations, defaults, protocols and procedures of bridges, stations and LANs that are necessary to build networks that are capable of transporting time-sensitive audio and/or video data streams are defined in this standard.

Keywords: audio video bridging, AVB, Bridged Local Area Networks, IEEE 802.1BA, LANs, local area networks, MAC Bridges, MANs, metropolitan area networks, time sensitive data streams, Virtual Bridged Local Area Networks, virtual LANs

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1. Overview

1.1 Scope

This standard defines profiles that select features, options, configurations, defaults, protocols and procedures of bridges, stations and LANs that are necessary to build networks that are capable of transporting time sensitive audio and/or video data streams.

1.2 Purpose

The purpose of this standard is to specify defaults and profiles that manufacturers of LAN equipment can use to develop AVB-compatible LAN components, and to enable a person not skilled in networking to build a network, using those components, that does not require configuration to provide working audio and/or video services.

1.3 Introduction

The successful support of time sensitive audio and/or video data streams in a Bridged LAN requires the selection of specific features and options that are specified in a number of different standards, some of which are standards developed in IEEE 802, and others (in particular, those that relate to functionality in OSI layer 3 and above ISO/IEC 7498-1:1994 [B3]) that are developed by other bodies. In this standard, it is the selection of features and options that support OSI layer 1 and 2 LAN functionality that is of interest, in order to specify the requirements for LAN support both in Bridges and the end stations that attach to them.

The standards from which features and options are selected by this standard are as follows:

a)   The VLAN Bridge specification in IEEE Std 802.1Q.

b)   The time synchronization standard, IEEE Std 802.1AS.
c)   The MAC and PHY standards specified for the various LAN MAC/PHY technologies, such as IEEE Std 802.3, IEEE Std 802.11, ITU-T G.9960 and ITU-T G.9961 (Powerline), and MoCA.

These features and options are selected by means of the profiles described in Clause 7. These profiles support specific functions within an AVB network, such as the Bridges and LAN technologies used to carry the AV streams, and the end stations that attach to the LAN and that provide the source(s) and the destination(s) of the stream data.

In some cases, there are functions that are needed in order to construct a usable AVB network, but that are not described in any other standard. In those cases, the technical specification is included in Clause 6 of this standard, along with a statement of the conformance requirements associated with the function, so that the function can be referenced by a profile in the same way as functions defined in any other standard.

Clause 5 introduces the architecture for AVB systems and AVB networks, and some of the terminology used in describing them.

1.4 Objectives

The architecture described in Clause 5, the AVB functions specified in Clause 6, and the profiles specified in Clause 7, are intended to meet the following objectives:

a)   Describe the components that can be combined to form an AVB network (i.e., a network whose components cooperate and interoperate to allow the transmission of AV streams) and how those components can be combined.
b)   Describe some of the consequences and limitations for AVB streaming that result from the incorporation of non-AV capable devices in an AVB network.
c)   Define additional functions that are required for AVB operation that are not otherwise documented in contributing standards.
d)   Provide guidance in terms of meeting the end-to-end latency requirements for successful AVB operation.
e)   Define conformance requirements for AVB systems, in terms of the standards to which conformance is required for the various system components and the optional features of those standards that are required to be implemented. These conformance requirements address the guaranteed delivery, end-to-end latency, and time synchronization requirements for successful AVB operation.

2. Normative references

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IEEE Std 802®, IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture.[1, 2]

IEEE Std 802.1Q™, IEEE Standards for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks.

IEEE Std 802.1Qbb™, IEEE Standards for Local and Metropolitan Area Networks: Virtual Bridged Local Area Networks—Amendment: Priority-based Flow Control.

IEEE Std 802.1AS™, IEEE Standards for Local and Metropolitan Area Networks: Timing and Synchronization for Time-Sensitive Applications in Bridged Local Area Networks.

IEEE Std 802.3™, Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.

IEEE Std 802.3az™, Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications—Amendment 5: Media Access Control Parameters, Physical Layers, and Management Parameters for Energy-Efficient Ethernet.

IEEE Std 802.11™, IEEE Standards for Local and Metropolitan Area Networks: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications.

IEEE Std 802.11n™, IEEE Standards for Local and Metropolitan Area Networks: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications—Amendment 5: Enhancements for Higher Throughput.

IEEE Std 802.11v™, IEEE Standards for Local and Metropolitan Area Networks: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications—Amendment 8: IEEE 802.11 Wireless Network Management.

IEEE P802.11aa™/D5.0, IEEE Standards for Local and Metropolitan Area Networks: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications—Amendment 2: MAC Enhancements for Robust Audio Video Streaming.[3]

ITU-T G.9960 (06/2010) Unified high-speed wireline based home networking transceivers—Revision 1.[4]

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ITU-T G.9961 (06/2010) Data link layer (DLL) for unified high-speed wire-line based home networking transceivers.

MoCA MAC/PHY SPECIFICATION v2.0, (MoCA-M/P-SPEC-V2.0-20100507) Multimedia over Coax Alliance (www.mocalliance.org).

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