IEC/IEEE 60802

Edition 1.0 2026-06

INTERNATIONAL STANDARD

Time-sensitive networking profile for industrial automation

ICS 35.110; 25.040.40

ISBN 978-2-8327-1287-0

IEC/IEEE 60802:2026-06(en)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue
New York, NY 10016-5997
United States of America
stds.ipr@ieee.org
www.ieee.org

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About the IEEE
IEEE is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity. IEEE and its members inspire a global community through its highly cited publications, conferences, technology standards, and professional and educational activities.

About IEC/IEEE publications
The technical content of IEC/IEEE publications is kept under constant review by the IEC and IEEE. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

Time-sensitive networking profile for industrial automation

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC document(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation.

   IEEE Standards documents are developed within IEEE Societies and subcommittees of IEEE Standards Association (IEEE SA) Board of Governors. IEEE develops its standards through an accredited consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. IEEE standards are documents developed by volunteers with scientific, academic, and industry-based expertise in technical working groups. Volunteers involved in technical working groups are not necessarily members of IEEE or IEEE SA and participate without compensation from IEEE. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information or the soundness of any judgments contained in its standards.

   IEC collaborates closely with IEEE in accordance with conditions determined by agreement between the two organizations. This Dual Logo International Standard was jointly developed by the IEC and IEEE under the terms of that agreement.

2) The formal decisions of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees. The formal decisions of IEEE on technical matters, once consensus within IEEE Societies and Standards Coordinating Committees has been reached, is determined by a balanced ballot of materially interested parties who indicate interest in reviewing the proposed standard. Final approval of the IEEE standards document is given by the IEEE Standards Association (IEEE SA) Standards Board.

3) IEC/IEEE Publications have the form of recommendations for international use and are accepted by IEC National Committees/IEEE Societies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC/IEEE Publications is accurate, IEC or IEEE cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications (including IEC/IEEE Publications) transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC/IEEE Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC and IEEE do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC and IEEE are not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or IEEE or their directors, employees, servants or agents including individual experts and members of technical committees and IEC National Committees, or volunteers of IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE SA) Standards Board, for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC/IEEE Publication or any other IEC or IEEE Publications.

8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that implementation of this IEC/IEEE Publication may require use of material covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. IEC or IEEE shall not be held responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patent Claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

IEC/IEEE 60802 was prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation, in cooperation with IEEE 802.1: Higher Layer LAN Protocols Working Group of IEEE 802: LAN/MAN Standards Committee of the IEEE computer society, under the IEC/IEEE Dual Logo Agreement between IEC and IEEE. It is an International Standard.

This document is published as an IEC/IEEE Dual Logo standard.

This publication contains attached files in the form of YANG files and a Word document.

The text of this International Standard is based on the following IEC documents:

Draft	Report on voting
65C/1406/FDIS	65C/1438/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with the rules given in the ISO/IEC Directives, Part 2, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

The IEC Technical Committee and IEEE Technical Committee have decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

This document defines time-sensitive networking profiles for industrial automation. The profile selects features, options, configurations, defaults, protocols, and procedures of bridges, end stations, and LANs to build industrial automation networks. This document also specifies YANG modules for the digital data sheet and for remote procedure calls.

The profile meets the industrial automation market objective of converging Operations Technology (OT) and Information Technology (IT) networks by defining a common, standardized network infrastructure. This objective is accomplished by taking advantage of the improvements that Time-Sensitive Networking provides to IEEE 802.1 and IEEE 802.3 standard Ethernet networks by providing guaranteed data transport with bounded low latency, low latency variation, zero congestion loss for critical traffic, and high availability.

The profile helps the convergence of industrial communication networks by referring only to international standards to build the lower layers of the communication stack and their management.

Ethernet extended with Time-Sensitive Networking technology provides the features required in the area of industrial communication networks, such as:

– meeting low latency and latency variation requirements concerning data transmission;
– efficient exchange of data records on a frequent time period;
– reliable communications with calculable downtime;
– high availability meeting application requirements;
– efficient mechanisms for bandwidth utilization of exchanges of data records, with zero congestion loss;
– improved clock synchronization mechanisms, including support of multiple gPTP domains.

1 Scope

This document defines time-sensitive networking profiles for industrial automation. The profiles select features, options, configurations, defaults, protocols, and procedures of bridges, end stations, and LANs to build industrial automation networks. This document also specifies YANG modules defining read-only information available online and offline as a digital data sheet. This document also specifies YANG modules for remote procedure calls and actions to address requirements arising from industrial automation networks.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 9594-8:2020, *Information technology - Open systems interconnection - Part 8: The Directory: Public-key and attribute certificate frameworks*, available at: https://www.iso.org/obp/ui/#iso:std:iso-iec:9594:-8:en [viewed 2025-10-03]

IEEE Std 1588-2019, *IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems*[1]

IEEE Std 1588e-2024, *IEEE Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems Amendment 5: MIB and YANG Data Models*

IEEE Std 802-2024, *IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture*

IEEE Std 802.1AB-2016, *IEEE Standard for Local and metropolitan area networks - Station and Media Access Control Connectivity Discovery*

IEEE Std 802.1ABcu-2021, *IEEE Standard for Local and metropolitan networks - Station and Media Access Control Connectivity Discovery Amendment 1: YANG Data Model*

IEEE Std 802.1AR-2018, *IEEE Standard for Local and Metropolitan Area Networks - Secure Device Identity*

IEEE Std 802.1AS-2020, *IEEE Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications*

IEEE Std 802.1ASdm-2024, *IEEE Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications Amendment 3: Hot Standby and Clock Drift Error Reduction*

IEEE Std 802.1ASdn-2024, *IEEE Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications Amendment 2: YANG Data Model*

IEEE Std 802.1ASdr-2024, *IEEE Standard for Local and Metropolitan Area Networks - Timing and Synchronization for Time-Sensitive Applications Amendment 1: Inclusive Terminology*

[1] The IEEE standards or products referred to in Clause 2 are trademarks of The Institute of Electrical and Electronics Engineers, Incorporated

IEEE Std 802.1CB-2017, *IEEE Standard for Local and metropolitan area networks - Frame Replication and Elimination for Reliability*

IEEE Std 802.1CBcv-2021, *IEEE Standard for Local and metropolitan area networks - Frame Replication and Elimination for Reliability - Amendment 1: Information Model, YANG Data Model and Management Information Base Module*

IEEE Std 802.1CBdb-2021, *IEEE Standard for Local and metropolitan area networks - Frame Replication and Elimination for Reliability Amendment 2: Extended Stream Identification Functions*

IEEE Std 802.1Q-2022, *IEEE Standard for Local and Metropolitan Area Networks - Bridges and Bridged Networks*

IEEE Std 802.1Qcw-2023, *IEEE Standard for Local and Metropolitan Area Networks - Bridges and Bridged Networks Amendment 36: YANG Data Models for Scheduled Traffic, Frame Preemption, and Per-Stream Filtering and Policing*

IEEE Std 802.1Qdj-2024, *IEEE Standard for Local and Metropolitan Area Networks - Bridges and Bridged Networks Amendment 38: Configuration Enhancements for Time-Sensitive Networking*

IEEE Std 802.1Qdx-2024, *IEEE Standard for Local and Metropolitan Area Networks - Bridges and Bridged Networks Amendment 39: YANG Data Models for the Credit-Based Shaper*

IEEE Std 802.1Qdy-2025, *IEEE Standard for Local and Metropolitan Area Networks - Bridges and Bridged Networks Amendment 40: YANG for the Multiple Spanning Tree Protocol*

IEEE Std 802.3-2022, *IEEE Standard for Ethernet*

IEEE Std 802.3.2-2025, *IEEE Standard for Ethernet - YANG Data Model Definitions*

IEEE Std 802.3cx-2023, *IEEE Standard for Ethernet Amendment 6: Media Access Control (MAC) Service Interface and Management Parameters to Support Improved Precision Time Protocol (PTP) Timestamping Accuracy*

IEEE Std 802.3de-2022, *IEEE Standard for Ethernet Amendment 5: Enhancements to the MAC Merge and Time Synchronization Service Interface for Point-to-Point 10 Mb/s Single Pair Ethernet*

IETF RFC 2131, Droms, R., *Dynamic Host Configuration Protocol,* March 1997, available at https://www.rfc-editor.org/info/rfc2131 [viewed 2025-10-03]

IETF RFC 2986, Nystrom, M. and Kaliski, B., *PKCS #10: Certification Request Syntax Specification Version 1.7,* November 2000, available at https://www.rfc-editor.org/info/rfc2986 [viewed 2025-10-03]

IETF RFC 3986, Berners-Lee, T., Fielding. R., and Masinter, L., *Uniform Resource Identifier (URI): Generic Syntax,* January 2005, available at https://www.rfc-editor.org/info/rfc3986 [viewed 2025-10-03]

IETF RFC 4836, Beili, E., *Definitions of Managed Objects for IEEE 802.3 Medium Attachment Units (MAUs),* April 2007, available at https://www.rfc-editor.org/info/rfc4836 [viewed 2025-10-03]

IETF RFC 5246, Dierks, T. and Rescorla, E., *The Transport Layer Security (TLS) Protocol,* August 2008, available at https://www.rfc-editor.org/info/rfc5246 [viewed 2025-10-03]

IETF RFC 5277, Chisholm, S. and Trevino, H., *NETCONF Event Notifications,* July 2008, available at https://www.rfc-editor.org/info/rfc5277 [viewed 2025-10-03]

IETF RFC 5280, Turner, D., Santesson, S., Farrell, S., Boeyen, S., Housley, R., and Polk, W., *Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile*, May 2008, available at https://www.rfc-editor.org/info/rfc5280 [viewed 2025-10-03]

IETF RFC 5289, Rescorla, E., *TLS Elliptic Curve Cipher Suites with SHA-256/384 and AES Galois Counter Mode (GCM)*, August 2008, available at https://www.rfc-editor.org/info/rfc5289 [viewed 2025-10-03]

IETF RFC 5480, Cooper, S., Brown, D., Yiu., K., Housley, R., and Polk, T., *Elliptic Curve Cryptography Subject Public Key Information*, March 2009, available at https://www.rfc-editor.org/info/rfc5480 [viewed 2025-10-03]

IETF RFC 6022, Scott, M. and Bjorklund, M., *YANG Module for NETCONF Monitoring*, October 2010, available at https://www.rfc-editor.org/info/rfc6022 [viewed 2025-10-03]

IETF RFC 6024, Reddy, R. and Wallace, C., *Trust Anchor Management Requirements*, October 2010, available at https://www.rfc-editor.org/info/rfc6024 [viewed 2025-10-03]

IETF RFC 6125, Saint-Andre, P. and Hodges, J., *Representation and Verification of Domain-Based Application Service Identity within Internet Public Key Infrastructure Using X.509 (PKIX) Certificates in the Context of Transport Layer Security (TLS),* March 2011, available at https://www.rfc-editor.org/info/rfc6125 [viewed 2025-10-03]

IETF RFC 6241, Enns, R., Bjorklund, M., Schoenwaelder, J. and Bierman, A., *Network Configuration Protocol (NETCONF)*, June 2011, available at https://www.rfc-editor.org/info/rfc6241 [viewed 2025-10-03]

IETF RFC 7317, Bierman, A. and Bjorklund, M., *A YANG Data Model for System Management*, August 2014, available at https://www.rfc-editor.org/info/rfc7317 [viewed 2025-10-03]

IETF RFC 7589, Badra, M., Luchuk, A. and Schoenwaelder, J., *Using the NETCONF Protocol over Transport Layer Security (TLS) with Mutual X.509 Authentication*, June 2015, available at https://www.rfc-editor.org/info/rfc7589 [viewed 2025-10-03]

IETF RFC 7950, Bjorklund, M., *The YANG 1.1 Data Modeling Language*, August 2016, available at https://www.rfc-editor.org/info/rfc7950 [viewed 2025-10-03]

IETF RFC 8069, Thomas, A., *URN Namespace for IEEE*, February 2017, available at https://www.rfc-editor.org/info/rfc8069 [viewed 2025-10-03]

IETF RFC 8141, Saint-Andre, P., and Klensin. J., *Uniform Resource Names (URNs)*, April 2017, available at https://www.rfc-editor.org/info/rfc8141 [viewed 2025-10-03]

IETF RFC 8341, Bierman, A. and Bjorklund, M., *Network Configuration Access Control Model*, March 2018, available at https://www.rfc-editor.org/info/rfc8341 [viewed 2025-10-03]

IETF RFC 8342, Bjorklund, M., Schoenwaelder, J., Shafer, P., Watsen, K. and Wilton, R., *Network Management Datastore Architecture (NMDA)*, March 2018, available at https://www.rfc-editor.org/info/rfc8342 [viewed 2025-10-03]