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# Power systems management and associated information exchange - Data and communications security - Part 3: Communication network and system security - Profiles including TCP/IP

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# EN IEC 62351-3

July 2023

ICS 33.200

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English Version

# Power systems management and associated information exchange - Data and communications security - Part 3: Communication network and system security - Profiles including TCP/IP
# (IEC 62351-3:2023)

Gestion des systèmes de puissance et échanges d'informations associés - Sécurité des communications et des données - Partie 3: Sécurité des réseaux et des systèmes de communication - Profils comprenant TCP/IP
(IEC 62351-3:2023)

Datenmodelle, Schnittstellen und Informationsaustausch für Planung und Betrieb von Energieversorgungsunternehmen - Daten- und Kommunikationssicherheit - Teil 3: Sicherheit von Kommunikationsnetzen und Systemen - Profile einschließlich TCP/IP
(IEC 62351-3:2023)

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The text of document 57/2578/FDIS, future edition 2 of IEC 62351-3, prepared by IEC/TC 57 "Power systems management and associated information exchange" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62351-3:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2024-04-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-07-11

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Edition 2.0 2023-06

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## Power systems management and associated information exchange – Data and communications security – Part 3: Communication network and system security – Profiles including TCP/IP

## Gestion des systèmes de puissance et échanges d'informations associés – Sécurité des communications et des données – Partie 3: Sécurité des réseaux et des systèmes de communication – Profils comprenant TCP/IP

IEC 62351-3:2023-06(en-fr)

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## Power systems management and associated information exchange – Data and communications security – Part 3: Communication network and system security – Profiles including TCP/IP

## Gestion des systèmes de puissance et échanges d'informations associés – Sécurité des communications et des données – Partie 3: Sécurité des réseaux et des systèmes de communication – Profils comprenant TCP/IP

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – DATA AND COMMUNICATIONS SECURITY –

## Part 3: Communication network and system security – Profiles including TCP/IP

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IEC 62351-3 has been prepared by IEC technical committee 57: Power systems management and associated information exchange. It is an International Standard.

This second edition cancels and replaces the first edition published in 2014, Amendment 1:2018 and Amendment 2:2020. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Inclusion of the TLSv1.2 related parameter required in IEC 62351-3 Ed.1.2 to be specified by the referencing standard. This comprises the following parameter:
   - Mandatory TLSv1.2 cipher suites to be supported.
   - Specification of session resumption parameters.
   - Specification of session renegotiation parameters.

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- Revocation handling using CRL and OCSP.
- Handling of security events.

b) Inclusion of a TLSv1.3 profile to be applicable for the power system domain in a similar way as for TLSv1.2 session.

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

| Draft | Report on voting |
|---|---|
| 57/2578/FDIS | 57/2593/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 ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, 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.

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# INTRODUCTION

This edition of IEC 62351-3 is a self-contained document profiling the usage of TLS for to secure power system communication. It is recommended to refer to this edition of this document rather than any previous edition, because this edition updates the utilized cryptographic algorithms (ciphersuites), provides enhanced functionality, and covers different TLS versions. In contrast to previous editions, this document specifies all necessary TLS specific settings and does not require the referencing standard to define specific settings for TLS.

Note that the recommendation to use this edition, potentially also with older referencing standards, requires technical support by implementations of the TLS settings specified in this edition of the document.

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# POWER SYSTEMS MANAGEMENT AND ASSOCIATED INFORMATION EXCHANGE – DATA AND COMMUNICATIONS SECURITY –

## Part 3: Communication network and system security – Profiles including TCP/IP

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## 1 Scope

### 1.1 Scope

This part of IEC 62351 specifies how to provide confidentiality, integrity protection, and message level authentication for protocols that make use of TCP/IP as a message transport layer and utilize Transport Layer Security when cyber-security is required. This may relate to SCADA/telecontrol, protection, automation and control protocols.

IEC 62351-3 specifies how to secure TCP/IP-based protocols through constraints on the specification of the messages, procedures, and algorithms of Transport Layer Security (TLS) (TLSv1.2 defined in RFC 5246, TLSv1.3 defined in RFC 8446). In the specific clauses, there will be subclauses to note the differences and commonalities in the application depending on the target TLS version. The use and specification of intervening external security devices (e.g., "bump-in-the-wire") are considered out-of-scope.

In contrast to previous editions of this document, this edition is self-contained in terms of completely defining a profile of TLS. Hence, it can be applied directly, without the need to specify further TLS parameters, except the port number, over which the communication will be performed. Therefore, this part can be directly utilized from a referencing standard and can be combined with further security measures on other layers. Providing the profiling of TLS without the need for further specifying TLS parameters allows declaring conformity to the described functionality without the need to involve further IEC 62351 documents.

This document is intended to be referenced as a normative part of other IEC standards that have the need for providing security for their TCP/IP-based protocol exchanges under similar boundary conditions. However, it is up to the individual protocol security initiatives to decide if this document is to be referenced.

The document also defines security events for specific conditions, which support error handling, security audit trails, intrusion detection, and conformance testing. Any action of an organization in response to events to an error condition described in this document are beyond the scope of this document and are expected to be defined by the organization’s security policy.

This document reflects the security requirements of the IEC power systems management protocols. Should other standards bring forward new requirements, this document may need to be revised.

### 1.2 Intended audience

The initial audience for this document is intended to be experts developing or making use of protocols in the field of power systems management and associated information exchange. For the measures described in this document to take effect, they must be accepted and referenced by the specifications of protocols making use of TCP/IP security by applying TLS. This document is written to enable that process.

The subsequent audience for this document is intended to be the developers of products that implement these protocols.

Portions of this document may also be of use to managers and executives in order to understand the purpose and requirements of the work.

## 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.

IEC TS 62351-1:2007, *Power systems management and associated information exchange – Data and communications security – Part 1: Communication network and system security – Introduction to security issues*

IEC TS 62351-2:2008, *Power systems management and associated information exchange – Data and communications security – Part 2: Glossary of terms*

IEC 62351-9, *Power systems management and associated information exchange – Data and communications security – Part 9: Cyber security key management for power system equipment*

ISO/IEC 9594-8:2020 | Rec. ITU-T X.509 (2019), *Information technology – Open systems interconnection – The Directory: Public-key and attribute certificate frameworks*

RFC 5246:2008, *The TLS Protocol Version 1.2*[1]

RFC 5280:2008, *Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile*

RFC 5288:2008, *AES Galois Counter Mode (GCM) Cipher Suites for TLS*

RFC 5289:2008, *TLS Elliptic Curve Cipher Suites with SHA-256/384 and AES Galois Counter Mode (GCM)*

RFC 5746:2010, *Transport Layer Security (TLS) Renegotiation Indication Extension*

RFC 6066:2011, *Transport Layer Security Extensions*

RFC 6176:2011, *Prohibiting Secure Sockets Layer (SSL) Version 2.0*

RFC 8422:2018, *ECC Cipher Suites for TLSv1.2 and earlier*

RFC 8446:2018, *The TLS Protocol Version 1.3*

RFC 9150:2021, *TLS 1.3 Authentication and Integrity only Cipher Suites*

## 3 Terms, definitions and abbreviated terms

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC TS 62351-2 and the following apply.

[1] This is typically referred to as SSL/TLS.

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