
Enotna arhitektura OPC - 21. del: Vzpostavitev naprav (IEC 62541-21:2026)

OPC Unified architecture - Part 21: Device onboarding (IEC 62541-21:2026)

OPC Unified Architecture – Teil 21: Onboarding von Geräten (IEC 62541-21:2026)

Architecture unifiée OPC - Partie 21: Mise en service d'appareils (IEC 62541-21:2026)

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EUROPEAN STANDARD

EN IEC 62541-21

NORME EUROPÉENNE

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February 2026

ICS 25.040

English Version

**OPC Unified architecture - Part 21: Device Onboarding
(IEC 62541-21:2026)**Architecture unifiée OPC - Partie 21: Mise en service
d'appareils
(IEC 62541-21:2026)OPC Unified Architecture - Teil 21: Onboarding von
Geräten
(IEC 62541-21:2026)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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EN IEC 62541-21:2026 (E)

European foreword

The text of document 65E/1046/CDV, future edition 1 of IEC 62541-21, prepared by SC 65E "Devices and integration in enterprise systems" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62541-21:2026.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2027-02-28 level by publication of an identical national standard or by endorsement
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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62541-1	-	OPC Unified Architecture - Part 1: Overview and concepts	EN IEC 62541-1	-
IEC 62541-2	-	OPC unified architecture - Part 2: Security model	EN IEC 62541-2 ¹	-
IEC 62541-3	-	OPC Unified Architecture - Part 3: Address Space Model	EN IEC 62541-3	-
IEC 62541-4	-	OPC unified architecture - Part 4: Services	EN IEC 62541-4	-
IEC 62541-5	-	OPC Unified architecture - Part 5: Information Model	EN IEC 62541-5	-
IEC 62541-6	-	OPC unified architecture - Part 6: Mappings	EN IEC 62541-6	-
IEC 62541-9	-	OPC Unified Architecture - Part 9: Alarms and Conditions	EN IEC 62541-9	-
IEC 62541-12	-	OPC unified architecture - Part 12: Discovery and global services	EN IEC 62541-12	-
IEC 62541-22	-	OPC unified architecture - Part 22: Base Network Model	EN IEC 62541-22	-
IEC 62541-100	-	OPC unified architecture - Part 100: Devices	EN IEC 62541-100	-
IEEE Std 802.1AR-2018	-	IEEE Standard for Local and Metropolitan Area Networks - Secure Device Identity	-	-
IETF RFC 2045	-	Multipurpose Internet Mail Extensions (MIME) Part 1: Format of Internet Message Bodies	-	-
IETF RFC 4648	-	The Base16, Base32, and Base64 Data Encodings	-	-

¹ Under preparation. Stage at the time of publication: FprEN IEC 62541-2:2025.

EN IEC 62541-21:2026 (E)

IETF RFC 5280	-	Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile	-	-
IETF RFC 7515	-	JSON Web Signature (JWS)	-	-
IETF RFC 7518	-	JSON Web Algorithms (JWA)	-	-

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IEC 62541-21

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INTERNATIONAL STANDARD

**OPC Unified architecture –
Part 21: Device Onboarding**

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**OPC unified architecture -
Part 21: Device Onboarding**

FOREWORD

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IEC 62541-21 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation. It is an International Standard.

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

Draft	Report on voting
65E/1046/CDV	65E/1103/RVC

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.

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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.

Throughout this document and the other Parts of the series, certain document conventions are used:

Italics are used to denote a defined term or definition that appears in the “Terms and definitions” clause in one of the parts of the series.

Italics are also used to denote the name of a service input or output parameter or the name of a structure or element of a structure that are usually defined in tables.

The *italicized terms* and *names* are also often written in camel-case (the practice of writing compound words or phrases in which the elements are joined without spaces, with each element's initial letter capitalized within the compound). For example, the defined term is *AddressSpace* instead of Address Space. This makes it easier to understand that there is a single definition for *AddressSpace*, not separate definitions for Address and Space.

A list of all parts in the IEC 62541 series, published under the general title *OPC Unified Architecture*, can be found on the IEC website.

The committee has 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.

1 Scope

This part of IEC 62541 defines the life cycle of *Devices* and *Composites* and mechanisms to verify their authenticity, set up their security and maintain their configuration.

The *Nodelds* of all *Nodes* described in this standard are only symbolic names. Annex A defines the *NamespaceUri* for all *Nodelds* and the actual *Nodelds*.

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 62541-1, *OPC Unified Architecture - Part 1: Overview and Concepts*

IEC 62541-2, *OPC Unified Architecture - Part 2: Security*

IEC 62541-3, *OPC Unified Architecture - Part 3: Address Space Model*

IEC 62541-4, *OPC Unified Architecture - Part 4: Services*

IEC 62541-5, *OPC Unified Architecture - Part 5: Information Model*

IEC 62541-6, *OPC Unified Architecture - Part 6: Mappings*

IEC 62541-9, *OPC Unified Architecture - Part 9: Alarms and Conditions*

IEC 62541-12, *OPC Unified Architecture - Part 12: Discovery and Global Services*

IEC 62541-22, *OPC Unified Architecture - Part 22: Base Network Model*

IEC 62541-100, *OPC Unified Architecture - Part 100: Device Model*

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

IETF RFC 2045, N. Freed, N. Borenstein, *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*, November 1996, available at <https://tools.ietf.org/html/rfc2045>

IETF RFC 4648, S. Josefsson, *The Base16, Base32, and Base64 Data Encodings*, October 2006, available at <https://tools.ietf.org/html/rfc4648>

IETF RFC 5280, D. Cooper, S. Santesson, S. Farrell, S. Boeyen, T. Polk, Russ Housley, *Internet X.509 Public Key Infrastructure Certificate*, May 2008, available at <https://tools.ietf.org/html/rfc5280>

IETF RFC 7515, M. Jones, J. Bradley, N. Sakimura, *JSON Web Signature (JWS)*, May 2015, available at <https://tools.ietf.org/html/rfc7515>

IETF RFC 7518, M. Jones, *JSON Web Algorithms (JWA)*, May 2015, available at <https://tools.ietf.org/html/rfc7518>

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62541-1, IEC 62541-2, IEC 62541-3, IEC 62541-4, IEC 62541-6, IEC 62541-9 and IEC 62541-100 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1.1

Application

a program that runs on a *Device* and communicates with other *Applications* on the network.

Note 1 to entry: Each *Application* has an identifier that is unique within the network.

Note 2 to entry: An *OPC UA Application* is an *Application* that supports OPC UA.

3.1.2

ApplicationUri

a globally unique identifier for an *OPC UA Application* running on a particular *Device*.

Note 1 to entry: The *Application Instance Certificate* has the *ApplicationUri* in the *subjectAltName* field.

3.1.3

Composite

collection of *Devices* or *Composites* assembled into a single unit

Note 1 to entry: Each *Composite* has a globally unique identifier.

Note 2 to entry: A *Composite* can act as a single *Device* when connected to a network.

Note 3 to entry: A *Composite* can appear as multiple *Devices* when connected to a network.

3.1.4

CompositeBuilder

organization that creates *Composites*

3.1.5

CompositeInstanceUri

globally unique resource identifier assigned by a builder to a *Composite*

3.1.6

DCA Client

DCA which is a *Client* and supports *PullManagement*

3.1.7

DCA Server

DCA which is a *Server* and supports *PushManagement*

3.1.8**Device**

independent physical entity capable of performing one or more specified functions in a particular context and delimited by its interfaces as defined in IEC 62541-100

Note 1 to entry: For this document a *Device* also executes one or more *OPC UA Applications*.

Note 2 to entry: a generic computer or mobile device can be a *Device* if it has a *DeviceIdentity Certificate*

3.1.9**Device Configuration Application (DCA)**

Client or *Server* installed on a *Device* used to configure other applications installed on the same *Device*

Note 1 to entry: a DCA which is a *Client* uses *PullManagement* (see 7.2) to interact with the *Registrar*.

Note 2 to entry: the *Registrar* uses *PushManagement* (see 7.3) to interact with a DCA which is a *Server*.

3.1.10**DeviceIdentity Certificate**

Certificate issued to a *Device* that identifies the *Device*

Note 1 to entry: All *DeviceIdentity Certificates* have the *ProductInstanceUri* as a *subjectAltName*.

Note 2 to entry: All *DeviceIdentity Certificates* are IDDevID or LDevID Certificates as defined by IEEE Std 802.1AR-2018.

Note 3 to entry: The *ProductInstanceUri* is the *ApplicationUri* when the *DeviceIdentity Certificate* is used to create a *SecureChannel*.

3.1.11**Distributor**

organization that re-sells *Devices* and/or *Composites*

Note 1 to entry: A *Distributor* can enhance *Devices* and *Composites* by adding customized products or services.

3.1.12**Manufacturer**

organization that creates *Devices*

3.1.13**OwnerOperator**

organization deploying and operating a system that comprises of *Devices*, *Composites* or other computers connected via a network

3.1.14**Privilege**

named set of permissions or access rights which are needed to perform a task

3.1.15**ProductInstanceUri**

globally unique resource identifier assigned by the manufacturer to a *Device*

3.1.16**Registrar**

OPC UA Application that registers and authenticates *Devices* added to the network

3.1.17**SystemIntegrator**

organization that installs and configures a system for an *OwnerOperator* that comprises of *Devices*, *Composites* or other computers connected via a network