SLOVENSKI STANDARD
oSIST prEN IEC 62541-6:2018

01-november-2018

Enotna arhitektura OPC - 6. del: Načrtovanje

OPC unified architecture - Part 6: Mappings

OPC Unified Architecture - Teil 6: Protokollabbildungen

Architecture unifiée OPC - Partie 6: Correspondances

Ta slovenski standard je istoveten z: prEN IEC 62541-6:2018

ICS:

25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.240.50	Uporabniške rešitve IT v industriji	IT applications in industry

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65E/607/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62541-6 ED3**	
DATE OF CIRCULATION: **2018-08-17**	CLOSING DATE FOR VOTING: **2018-11-09**
SUPERSEDES DOCUMENTS: **65E/555/RR**	

IEC SC 65E : DEVICES AND INTEGRATION IN ENTERPRISE SYSTEMS	
SECRETARIAT: United States of America	SECRETARY: Mr Donald (Bob) Lattimer
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT	☐ QUALITY ASSURANCE ☐ SAFETY
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

OPC unified architecture - Part 6: Mappings

PROPOSED STABILITY DATE: 2021

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPC UNIFIED ARCHITECTURE –

Part 6: Mappings

FOREWORD

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IEC 62541-6 has been prepared by subcommittee 65E: Devices and integration in enterprise systems, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
65E/XX/DTR	65E/XX/RVC

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

This third edition cancels and replaces the second edition of IEC 62541, published in 2015.

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

a) Encodings:
   - Added JSON encoding for PubSub (non-reversible)
   - Added JSON encoding for Client/Server (reversible)
   - Added support for optional fields in structures
   - Added support for Unions

b) Transport mappings:
   - Added WebSocket secure connection - WSS
   - Added support for reverse connectivity.
   - Added support for session-less service invocation in HTTPS

c) Deprecated Transport (missing support on most platforms):
   - SOAP/HTTP with WS-SecureConversation (all encodings)

d) Added mapping for JSON Web Token

e) Added support for Unions to NodeSet Schema

f) Added batch operations to add/delete nodes to NodeSet Schema

g) Added support for multi-dimensional arrays outside of Variants

h) Added binary representation for Decimal data types

i) Added mapping for an OAuth2 Authorization Framework

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

Throughout this document and the referenced 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 definition” 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 of 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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The National Committees are requested to note that for this publication the stability date is 2021.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

OPC Unified Architecture Specification

Part 6: Mappings

1 Scope

This part specifies the OPC Unified Architecture (OPC UA) mapping between the security model described in IEC TR 62541-2, the abstract service definitions, described in IEC 62541-4, the data structures defined in IEC 62541-5 and the physical network protocols that can be used to implement the OPC UA specification.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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 62541-7, *OPC Unified Architecture – Part 7: Profiles*

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

IEC 62541-14, *OPC Unified Architecture – Part 14: PubSub*

XML Schema Part 1: XML Schema Part 1: Structures
http://www.w3.org/TR/xmlschema-1/

XML Schema Part 2: XML Schema Part 2: Datatypes
http://www.w3.org/TR/xmlschema-2/

SOAP Part 1: SOAP Version 1.2 Part 1: Messaging Framework
http://www.w3.org/TR/soap12-part1/

SOAP Part 2: SOAP Version 1.2 Part 2: Adjuncts
http://www.w3.org/TR/soap12-part2/

XML Encryption: XML Encryption Syntax and Processing
http://www.w3.org/TR/xmlenc-core/

XML Signature: XML-Signature Syntax and Processing
http://www.w3.org/TR/xmldsig-core/

WS Security: SOAP Message Security 1.1
http://www.oasis-open.org/committees/download.php/16790/wss-v1.1-spec-os-SOAPMessageSecurity.pdf

WS Addressing: Web Services Addressing (WS-Addressing)
http://www.w3.org/Submission/ws-addressing/

SSL/TLS: RFC 5246 – The TLS Protocol Version 1.2
http://tools.ietf.org/html/rfc5246.txt
X.509 v3: X.509 Public Key Certificate Infrastructure
http://www.itu.int/rec/T-REC-X.509-200003-I/e
HTTP: RFC 2616 – Hypertext Transfer Protocol – HTTP/1.1
http://www.ietf.org/rfc/rfc2616.txt
HTTPS: RFC 2818 – HTTP Over TLS
http://www.ietf.org/rfc/rfc2818.txt
Base64: RFC 3548 – The Base16, Base32, and Base64 Data Encodings
http://www.ietf.org/rfc/rfc3548.txt
X690: ITU-T X.690 – Basic (BER), Canonical (CER) and Distinguished (DER) Encoding Rules
http://www.itu.int/ITU-T/studygroups/com17/languages/X.690-0207.pdf
X200: ITU-T X.200 – Open Systems Interconnection – Basic Reference Model
http://www.itu.int/rec/T-REC-X.200-199407-I/en
IEEE-754: Standard for Binary Floating-Point Arithmetic
http://grouper.ieee.org/groups/754/
HMAC: HMAC – Keyed-Hashing for Message Authentication
http://www.ietf.org/rfc/rfc2104.txt
PKCS #1: PKCS #1 – RSA Cryptography Specifications Version 2.0
http://www.ietf.org/rfc/rfc2437.txt
PKCS #12: PKCS 12: Personal Information Exchange Syntax
http://www.ietf.org/rfc/rfc7292.txt
FIPS 180-2: Secure Hash Standard (SHA)
http://csrc.nist.gov/publications/fips/fips180-2/fips180-2.pdf
FIPS 197: Advanced Encryption Standard (AES)
http://www.csrc.nist.gov/publications/fips/fips197/fips-197.pdf
UTF-8: UTF-8, a transformation format of ISO 10646
http://www.ietf.org/rfc/rfc3629.txt
RFC 3280: RFC 3280 – X.509 Public Key Infrastructure Certificate and CRL Profile
http://www.ietf.org/rfc/rfc3280.txt
RFC 4514: RFC 4514 – LDAP: String Representation of Distinguished Names
http://www.ietf.org/rfc/rfc4514.txt
NTP: RFC 1305 – Network Time Protocol (Version 3)
http://www.ietf.org/rfc/rfc1305.txt
Kerberos: WS Security Kerberos Token Profile 1.1
http://docs.oasis-open.org/wss/v1.1/wss-v1.1-spec-os-KerberosTokenProfile.pdf
RFC 1738: RFC 1738 - Uniform Resource Locators (URL)
http://www.ietf.org/rfc/rfc1738.txt
RFC 2141: RFC 2141 - URN Syntax
http://www.ietf.org/rfc/rfc2141.txt
RFC 6455: RFC 6455 - The WebSocket Protocol
http://www.ietf.org/rfc/rfc6455.txt
RFC 7159: The JavaScript Object Notation (JSON) Data Interchange Format

http://www.ietf.org/rfc/rfc7159.txt

RFC 7523: JSON Web Token (JWT) Profile for OAuth 2.0

https://tools.ietf.org/rfc/rfc7523.txt

RFC 6749: The OAuth 2.0 Authorization Framework

http://www.ietf.org/rfc/rfc6749.txt

OpenID-Core: OpenID Connect Core 1.0

http://openid.net/specs/openid-connect-core-1_0.html

OpenID-Discovery: OpenID Connect Discovery 1.0

https://openid.net/specs/openid-connect-discovery-1_0.html

RFC 6960: RFC 6960 - Online Certificate Status Protocol - OCSP

https://tools.ietf.org/rfc/rfc6960.txt

3 Terms, definitions and conventions

3.1 Terms and definitions

For the purposes of this document the terms and definitions given in IEC TR 62541-1 IEC TR 62541-1, IEC TR 62541-2 and IEC 62541-3 as well as the following apply.

3.1.1
CertificateDigest
a short identifer used to uniquely identify an X.509v3 *Certificate*.

Note 1 to entry: This is the SHA1 hash of DER encoded form of the *Certificate*.

3.1.2
DataEncoding
a way to serialize OPC UA *Messages* and data structures.

3.1.3
DevelopmentPlatform
a suite a tools and/or programming languages used to create software.

3.1.4
Mapping
specifies how to implement an OPC UA feature with a specific technology.

Note 1 to entry: For example, the OPC UA Binary Encoding is a *Mapping* that specifies how to serialize OPC UA data structures as sequences of bytes.

3.1.5
SecurityProtocol
ensures the integrity and privacy of UA *Messages* that are exchanged between OPC UA applications

3.1.6
StackProfile
a combination of *DataEncodings, SecurityProtocol* and *TransportProtocol Mappings*

Note 1 to entry: OPC UA applications implement one or more *StackProfiles* and can only communicate with OPC UA applications that support a *StackProfile* that they support.

3.1.7
TransportConnection
a full-duplex communication link established between OPC UA applications.

Note 1 to entry: A TCP/IP socket is an example of a *TransportConnection*.

3.1.8
TransportProtocol
a way to exchange serialized OPC UA *Messages* between OPC UA applications