IEC 62541-6

Edition 3.0 2020-07
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

OPC unified architecture –
Part 6: Mappings

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

IEC 62541-6:2020-07 RLV(en)

THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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 IEC publications
The technical content of IEC publications is kept under constant review by the IEC. 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 It also gives information on projects, replaced and withdrawn publications.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.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

IEC 62541-6

Edition 3.0 2020-07
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

OPC unified architecture – Part 6: Mappings

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40; 35.100.05

ISBN 978-2-8322-8665-4

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

® Registered trademark of the International Electrotechnical Commission

CONTENTS

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-a271-49a5-850e-e251cabf6137/iec-62541-6-2020

iTeh Standards (https://standards.iteh.ai) Document Preview IEC 62541-6:2020 https://standards.iteh.ai/catalog/standards/iec/90d7843d-a271-49a5-850e-a251eabf6137/iec-62541-6-2020

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cab6137/iec-62541-6-2020

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/e250d5f8-42d1-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

iTeh Standards
(https://standards.iteh.ai)
Document Preview

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

OPC UNIFIED ARCHITECTURE –

Part 6: Mappings

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 Publication(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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements 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.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC 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 transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is 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 its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees 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 Publication or any other IEC 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 some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

iTeh Standards
Document Preview
IEC 62541-6:2020

International Standard 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.

This third edition cancels and replaces the second edition published in 2015. This edition constitutes a technical revision.

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/from 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.

iTeh Standards (https://standards.iteh.ai) Document Preview IEC 62541-6:2020 https://standards.iteh.ai/catalog/standards/iec/90d7845d-e271-49d5-850c-e251cabf6137/iec-62541-6-2020

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

FDIS	Report on voting
65E/718/FDIS	65E/734/RVD

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

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

Throughout this document and the other parts of IEC 62541, certain document conventions are used:

Italics are used to denote a defined term or definition that appears in Clause 3 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, with a few exceptions, 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

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.

iTeh Standards
(https://standards.iteh.ai)
Document Preview

IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

OPC UNIFIED ARCHITECTURE –

Part 6: Mappings

1 Scope

This part of IEC 62541 specifies the OPC Unified Architecture (OPC UA) mapping between the security model described in IEC TR 62541-2, the abstract service definitions~~, described~~ specified 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*

iTeh Standards (https://standards.iteh.ai) Document Preview
IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020

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

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

ISO 8601-1:2019, *Date and time – Representations for information interchange – Part 1: Basic rules*

~~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/

WS Trust: WS Trust 1.3

http://docs.oasis-open.org/ws-sx/ws-trust/v1.3/ws-trust.html

WS Secure Conversation: WS Secure Conversation 1.3

http://docs.oasis-open.org/ws-sx/ws-secureconversation/v1.3/ws-secureconversation.html

WS Security Policy: WS Security Policy 1.2

http://docs.oasis-open.org/ws-sx/ws-securitypolicy/200702/ws-securitypolicy-1.2-spec-os.html

SSL/TLS: RFC 5246 – The TLS Protocol Version 1.2

http://tools.ietf.org/html/rfc5246.txt

X509: X.509 Public Key Certificate Infrastructure

http://www.itu.int/rec/T-REC-X.509-200003-I/e

WS-I Basic Profile 1.1: WS-I Basic Profile Version 1.1

http://www.ws-i.org/Profiles/BasicProfile-1.1.html

WS-I Basic Security Profile 1.1: WS-I Basic Security Profile Version 1.1

http://www.ws-i.org/Profiles/BasicSecurityProfile-1.1.html

HTTP: RFC 2616 – Hypertext Transfer Protocol – HTTP/1.1

http://www.ietf.org/rfc/rfc2616.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

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

FIPS 180-2: Secure Hash Standard (SHA)

http://csrc.nist.gov/publications/fips/fips180-2/fips180-2.pdf

FIPS 197: Advanced Encyption Standard (AES)

http://www.csrc.nist.gov/publications/fips/fips197/fips-197.pdf

UTF8: UTF-8, a transformation format of ISO 10646

http://tools.ietf.org/html/rfc3629

iTeh Standards
(https://standards.iteh.ai)
Document Preview
IEC 62541-6:2020
https://standards.iteh.ai/catalog/standards/iec/90d7843d-e271-49a5-850c-e251cabf6137/iec-62541-6-2020