



SLOVENSKI STANDARD SIST EN 62541-5:2015

01-oktober-2015

Nadomešča:
SIST EN 62541-5:2012

Enotna arhitektura OPC - 5. del: Informacijski model (IEC 62541-5:2015)

OPC Unified Architecture -- Part 5: Information Model (IEC 62541-5:2015)

OPC unified architecture - Part 5: Information Model (IEC 62541-5:2015)

Architecture unifiée OPC - Partie 5: Modèle d'informations (IEC 62541-5:2015)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **EN 62541-5:2015**

<https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-e9051ed92eb6/sist-en-62541-5-2015>

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

SIST EN 62541-5:2015

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62541-5:2015

<https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015>

EUROPEAN STANDARD

EN 62541-5

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2015

ICS 25.040.40; 35.100

Supersedes EN 62541-5:2011

English Version

**OPC unified architecture - Part 5: Information Model
(IEC 62541-5:2015)**Architecture unifiée OPC - Partie 5: Modèle d'informations
(IEC 62541-5:2015)OPC Unified Architecture - Teil 5: Informationsmodell
(IEC 62541-5:2015)

This European Standard was approved by CENELEC on 2015-04-29. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

<https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015>



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 65E/376/CDV, future edition 2 of IEC 62541-5, 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 62541-5:2015.

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) 2016-01-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-04-29

This document supersedes EN 62541-5:2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

[SIST EN 62541-5:2015](https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015)

<https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015>

Endorsement notice

The text of the International Standard IEC 62541-5:2015 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When 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.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC/TR 62541-1	-	OPC unified architecture - Part 1: Overview and concepts	CLC/TR 62541-1	-
IEC 62541-3	-	OPC unified architecture Part 3: Address Space Model	EN 62541-3	-
IEC 62541-4	-	OPC Unified Architecture Part 4: Services	EN 62541-4	-
IEC 62541-6	-	OPC unified architecture - Part 6: Mappings	EN 62541-6	-
IEC 62541-7	-	OPC unified architecture - Part 7: Profiles	EN 62541-7	-
IEC 62541-9	-	OPC unified architecture - Part 9: Alarms and conditions	EN 62541-9	-
IEC 62541-10	-	OPC Unified Architecture - Part 10: Programs	EN 62541-10	-
IEC 62541-11	-	OPC unified architecture - Part 11: Historical Access	EN 62541-11	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62541-5:2015

<https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015>



IEC 62541-5

Edition 2.0 2015-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



OPC unified architecture –
Part 5: Information Model

STANDARD PREVIEW
(standards.iteh.ai)

Architecture unifiée OPC –
Partie 5: Modèle d'informations

[SIST EN 62541-5:2015](https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015)

<https://standards.iteh.ai/catalog/standards/sist/79d8f56c-3b5c-4a73-9e08-c9051ed92eb6/sist-en-62541-5-2015>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 25.040.40; 35.100

ISBN 978-2-8322-2384-0

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	12
1 Scope	14
2 Normative references	14
3 Terms, definitions and conventions	14
3.1 Terms and definitions	14
3.2 Abbreviations and symbols	14
3.3 Conventions for Node descriptions	15
4 NodeIds and BrowseNames	16
4.1 NodeIds	16
4.2 BrowseNames	16
5 Common Attributes	17
5.1 General	17
5.2 Objects	17
5.3 Variables	17
5.4 VariableTypes	17
6 Standard ObjectTypes	18
6.1 General	18
6.2 BaseObjectType	18
6.3 ObjectTypes for the Server Object	18
6.3.1 ServerType	18
6.3.2 ServerCapabilitiesType	20
6.3.3 ServerDiagnosticsType	22
6.3.4 SessionsDiagnosticsSummaryType	23
6.3.5 SessionDiagnosticsObjectType	24
6.3.6 VendorServerInfoType	25
6.3.7 ServerRedundancyType	25
6.3.8 TransparentRedundancyType	25
6.3.9 NonTransparentRedundancyType	26
6.3.10 NonTransparentNetworkRedundancyType	26
6.3.11 OperationLimitsType	27
6.3.12 AddressSpaceFileType	29
6.3.13 NamespaceMetadataType	29
6.3.14 NamespacesType	31
6.4 ObjectTypes used as EventTypes	31
6.4.1 General	31
6.4.2 BaseEventType	31
6.4.3 AuditEventType	33
6.4.4 AuditSecurityEventType	34
6.4.5 AuditChannelEventType	35
6.4.6 AuditOpenSecureChannelEventType	35
6.4.7 AuditSessionEventType	36
6.4.8 AuditCreateSessionEventType	36
6.4.9 AuditUrlMismatchEventType	37
6.4.10 AuditActivateSessionEventType	38
6.4.11 AuditCancelEventType	38
6.4.12 AuditCertificateEventType	39

6.4.13	AuditCertificateDataMismatchEventType.....	39
6.4.14	AuditCertificateExpiredEventType.....	39
6.4.15	AuditCertificateInvalidEventType.....	40
6.4.16	AuditCertificateUntrustedEventType.....	40
6.4.17	AuditCertificateRevokedEventType.....	40
6.4.18	AuditCertificateMismatchEventType.....	41
6.4.19	AuditNodeManagementEventType.....	41
6.4.20	AuditAddNodesEventType.....	42
6.4.21	AuditDeleteNodesEventType.....	42
6.4.22	AuditAddReferencesEventType.....	42
6.4.23	AuditDeleteReferencesEventType.....	43
6.4.24	AuditUpdateEventType.....	43
6.4.25	AuditWriteUpdateEventType.....	44
6.4.26	AuditHistoryUpdateEventType.....	44
6.4.27	AuditUpdateMethodEventType.....	45
6.4.28	SystemEventType.....	45
6.4.29	DeviceFailureEventType.....	45
6.4.30	SystemStatusChangeEvent.....	46
6.4.31	BaseModelChangeEvent.....	46
6.4.32	GeneralModelChangeEvent.....	46
6.4.33	SemanticChangeEvent.....	47
6.4.34	EventQueueOverflowEventType.....	47
6.4.35	ProgressEventType.....	48
6.5	ModellingRuleType.....	48
6.6	FolderType.....	48
6.7	DataTypeEncodingType.....	49
6.8	DataTypeSystemType.....	49
6.9	AggregateFunctionType.....	49
7	Standard VariableTypes.....	50
7.1	General.....	50
7.2	BaseVariableType.....	50
7.3	PropertyType.....	50
7.4	BaseDataVariableType.....	50
7.5	ServerVendorCapabilityType.....	51
7.6	DataTypeDictionaryType.....	51
7.7	DataTypeDescriptionType.....	52
7.8	ServerStatusType.....	52
7.9	BuildInfoType.....	52
7.10	ServerDiagnosticsSummaryType.....	53
7.11	SamplingIntervalDiagnosticsArrayType.....	53
7.12	SamplingIntervalDiagnosticsType.....	54
7.13	SubscriptionDiagnosticsArrayType.....	54
7.14	SubscriptionDiagnosticsType.....	54
7.15	SessionDiagnosticsArrayType.....	55
7.16	SessionDiagnosticsVariableType.....	56
7.17	SessionSecurityDiagnosticsArrayType.....	57
7.18	SessionSecurityDiagnosticsType.....	58
7.19	OptionSetType.....	58
8	Standard Objects and their Variables.....	59

8.1	General.....	59
8.2	Objects used to organise the AddressSpace structure	59
8.2.1	Overview	59
8.2.2	Root.....	60
8.2.3	Views.....	60
8.2.4	Objects	61
8.2.5	Types	61
8.2.6	ObjectTypes	62
8.2.7	VariableTypes.....	63
8.2.8	ReferenceTypes.....	64
8.2.9	DataTypes	64
8.2.10	OPC Binary.....	66
8.2.11	XML Schema	66
8.2.12	EventTypes.....	66
8.3	Server Object and its containing Objects.....	67
8.3.1	General.....	67
8.3.2	Server Object.....	68
8.4	ModellingRule Objects	69
8.4.1	ExposesItsArray.....	69
8.4.2	Mandatory.....	69
8.4.3	Optional.....	69
8.4.4	OptionalPlaceholder.....	70
8.4.5	MandatoryPlaceholder.....	70
9	Standard Methods	70
9.1	GetMonitoredItems.....	70
10	Standard Views	71
11	Standard ReferenceTypes	71
11.1	References	71
11.2	HierarchicalReferences	71
11.3	NonHierarchicalReferences	71
11.4	HasChild	72
11.5	Aggregates	72
11.6	Organizes	72
11.7	HasComponent	73
11.8	HasOrderedComponent	73
11.9	HasProperty.....	73
11.10	HasSubtype	73
11.11	HasModellingRule.....	74
11.12	HasTypeDefinition.....	74
11.13	HasEncoding	74
11.14	HasDescription	75
11.15	HasEventSource	75
11.16	HasNotifier.....	75
11.17	GeneratesEvent	75
11.18	AlwaysGeneratesEvent	76
12	Standard DataTypes	76
12.1	Overview.....	76
12.2	DataTypes defined in IEC 62541-3.....	76

12.3	DataTypes defined in IEC 62541-4.....	81
12.4	BuildInfo	82
12.5	RedundancySupport	82
12.6	ServerState.....	83
12.7	RedundantServerDataType	83
12.8	SamplingIntervalDiagnosticsDataType	84
12.9	ServerDiagnosticsSummaryDataType	84
12.10	ServerStatusDataType	85
12.11	SessionDiagnosticsDataType.....	86
12.12	SessionSecurityDiagnosticsDataType	87
12.13	ServiceCounterDataType	88
12.14	StatusResult	88
12.15	SubscriptionDiagnosticsDataType	89
12.16	ModelChangeStructureDataType	90
12.17	SemanticChangeStructureDataType	90
12.18	BitFieldMaskDataType	91
12.19	NetworkGroupDataType.....	91
12.20	EndpointUrlListDataType	92
Annex A (informative) Design decisions when modelling the server information		93
A.1	Overview.....	93
A.2	ServerType and Server Object	93
A.3	Typed complex Objects beneath the Server Object	93
A.4	Properties versus DataVariables	93
A.5	Complex Variables using complex DataTypes	94
A.6	Complex Variables having an array	94
A.7	Redundant information	94
A.8	Usage of the BaseDataVariableType.....	95
A.9	Subtyping	95
A.10	Extensibility mechanism.....	95
Annex B (normative) StateMachines		96
B.1	General.....	96
B.2	Examples of finite state machines	96
B.2.1	Simple state machine.....	96
B.2.2	State machine containing substates	97
B.3	Definition of state machine.....	98
B.4	Representation of state machines in the AddressSpace	98
B.4.1	Overview	98
B.4.2	StateMachineType	99
B.4.3	StateVariableType	100
B.4.4	TransitionVariableType	101
B.4.5	FiniteStateMachineType	101
B.4.6	FiniteStateVariableType.....	102
B.4.7	FiniteTransitionVariableType	103
B.4.8	StateType	103
B.4.9	InitialStateType.....	104
B.4.10	TransitionType.....	105
B.4.11	FromState.....	105
B.4.12	ToState.....	106
B.4.13	HasCause	106

B.4.14	HasEffect.....	106
B.4.15	HasSubStateMachine.....	107
B.4.16	TransitionEventType.....	107
B.4.17	AuditUpdateStateEventType.....	108
B.4.18	Special Restrictions on subtyping StateMachines.....	108
B.4.19	Specific StatusCodes for StateMachines.....	109
B.5	Examples of StateMachines in the AddressSpace.....	110
B.5.1	StateMachineType using inheritance.....	110
B.5.2	StateMachineType with a sub-machine using inheritance.....	111
B.5.3	StateMachineType using containment.....	112
B.5.4	Example of a StateMachine having Transition to SubStateMachine.....	113
Annex C (normative)	File Transfer.....	115
C.1	Overview.....	115
C.2	FileType.....	115
C.3	Open.....	116
C.4	Close.....	117
C.5	Read.....	117
C.6	Write.....	118
C.7	GetPosition.....	118
C.8	SetPosition.....	119
iTeh STANDARD PREVIEW (standards.iteh.ai)		
Figure 1	– Standard AddressSpace Structure.....	59
Figure 2	– Views Organization.....	60
Figure 3	– Objects Organization.....	61
Figure 4	– ObjectTypes Organization.....	62
Figure 5	– VariableTypes Organization.....	63
Figure 6	– ReferenceType Definitions.....	64
Figure 7	– DataTypes Organization.....	65
Figure 8	– EventTypes Organization.....	67
Figure 9	– Excerpt of Diagnostic Information of the Server.....	68
Figure B.1	– Example of a simple state machine.....	97
Figure B.2	– Example of a state machine having a sub-machine.....	97
Figure B.3	– The StateMachine Information Model.....	99
Figure B.4	– Example of an initial State in a sub-machine.....	104
Figure B.5	– Example of a StateMachineType using inheritance.....	110
Figure B.6	– Example of a StateMachineType with a SubStateMachine using inheritance.....	111
Figure B.7	– Example of a StateMachineType using containment.....	112
Figure B.8	– Example of a state machine with transitions from sub-states.....	113
Figure B.9	– Example of a StateMachineType having Transition to SubStateMachine.....	114
Table 1	– Examples of DataTypes.....	15
Table 2	– Type Definition Table.....	16
Table 3	– Common Node Attributes.....	17
Table 4	– Common Object Attributes.....	17
Table 5	– Common Variable Attributes.....	17

Table 6 – Common VariableType Attributes	18
Table 7 – BaseObjectType Definition	18
Table 8 – ServerType Definition	19
Table 9 – ServerCapabilitiesType Definition	21
Table 10 – ServerDiagnosticsType Definition	23
Table 11 – SessionsDiagnosticsSummaryType Definition	24
Table 12 – SessionDiagnosticsObjectType Definition	24
Table 13 – VendorServerInfoType Definition	25
Table 14 – ServerRedundancyType Definition	25
Table 15 – TransparentRedundancyType Definition	25
Table 16 – NonTransparentRedundancyType Definition	26
Table 17 – NonTransparentNetworkRedundancyType Definition	27
Table 18 – OperationLimitsType Definition	28
Table 19 – AddressSpaceFileType Definition	29
Table 20 – NamespaceMetadataType Definition	30
Table 21 – NamespacesType Definition	31
Table 22 – BaseEventType Definition	31
Table 23 – AuditEventType Definition	34
Table 24 – AuditSecurityEventType Definition	34
Table 25 – AuditChannelEventType Definition	35
Table 26 – AuditOpenSecureChannelEventType Definition	35
Table 27 – AuditSessionEventType Definition	36
Table 28 – AuditCreateSessionEventType Definition	37
Table 29 – AuditUrlMismatchEventType Definition	37
Table 30 – AuditActivateSessionEventType Definition	38
Table 31 – AuditCancelEventType Definition	38
Table 32 – AuditCertificateEventType Definition	39
Table 33 – AuditCertificateDataMismatchEventType Definition	39
Table 34 – AuditCertificateExpiredEventType Definition	40
Table 35 – AuditCertificateInvalidEventType Definition	40
Table 36 – AuditCertificateUntrustedEventType Definition	40
Table 37 – AuditCertificateRevokedEventType Definition	41
Table 38 – AuditCertificateMismatchEventType Definition	41
Table 39 – AuditNodeManagementEventType Definition	41
Table 40 – AuditAddNodesEventType Definition	42
Table 41 – AuditDeleteNodesEventType Definition	42
Table 42 – AuditAddReferencesEventType Definition	43
Table 43 – AuditDeleteReferencesEventType Definition	43
Table 44 – AuditUpdateEventType Definition	43
Table 45 – AuditWriteUpdateEventType Definition	44
Table 46 – AuditHistoryUpdateEventType Definition	44
Table 47 – AuditUpdateMethodEventType Definition	45
Table 48 – SystemEventType Definition	45

Table 49 – DeviceFailureEventType Definition	46
Table 50 – SystemStatusChangeEventDefinition	46
Table 51 – BaseModelChangeEventDefinition	46
Table 52 – GeneralModelChangeEventDefinition	47
Table 53 – SemanticChangeEventDefinition	47
Table 54 – EventQueueOverflowEventType Definition	47
Table 55 – ProgressEventType Definition	48
Table 56 – ModellingRuleType Definition	48
Table 57 – FolderType Definition	49
Table 58 – DataTypeEncodingType Definition	49
Table 59 – DataTypeSystemType Definition	49
Table 60 – AggregateFunctionType Definition	49
Table 61 – BaseVariableType Definition	50
Table 62 – PropertyType Definition	50
Table 63 – BaseDataVariableType Definition	51
Table 64 – ServerVendorCapabilityType Definition	51
Table 65 – DataTypeDictionaryType Definition	51
Table 66 – DataTypeDescriptionType Definition	52
Table 67 – ServerStatusType Definition	52
Table 68 – BuildInfoType Definition	53
Table 69 – ServerDiagnosticsSummaryType Definition	53
Table 70 – SamplingIntervalDiagnosticsArrayType Definition	54
Table 71 – SamplingIntervalDiagnosticsType Definition	54
Table 72 – SubscriptionDiagnosticsArrayType Definition	54
Table 73 – SubscriptionDiagnosticsType Definition	55
Table 74 – SessionDiagnosticsArrayType Definition	55
Table 75 – SessionDiagnosticsVariableType Definition	56
Table 76 – SessionSecurityDiagnosticsArrayType Definition	58
Table 77 – SessionSecurityDiagnosticsType Definition	58
Table 78 – OptionSetType Definition	59
Table 79 – Root Definition	60
Table 80 – Views Definition	61
Table 81 – Objects Definition	61
Table 82 – Types Definition	62
Table 83 – ObjectTypes Definition	63
Table 84 – VariableTypes Definition	63
Table 85 – ReferenceTypes Definition	64
Table 86 – DataTypes Definition	66
Table 87 – OPC Binary Definition	66
Table 88 – XML Schema Definition	66
Table 89 – EventTypes Definition	67
Table 90 – Server Definition	69
Table 91 – ExposesItsArray Definition	69

Table 92 – Mandatory Definition	69
Table 93 – Optional Definition.....	70
Table 94 – OptionalPlaceholder Definition	70
Table 95 – MandatoryPlaceholder Definition	70
Table 96 – GetMonitoredItems Method AddressSpace Definition	71
Table 97 – References ReferenceType	71
Table 98 – HierarchicalReferences ReferenceType.....	71
Table 99 – NonHierarchicalReferences ReferenceType	72
Table 100 – HasChild ReferenceType.....	72
Table 101 – Aggregates ReferenceType	72
Table 102 – Organizes ReferenceType	73
Table 103 – HasComponent ReferenceType	73
Table 104 – HasOrderedComponent ReferenceType	73
Table 105 – HasProperty ReferenceType.....	73
Table 106 – HasSubtype ReferenceType	74
Table 107 – HasModellingRule ReferenceType	74
Table 108 – HasTypeDefinition ReferenceType	74
Table 109 – HasEncoding ReferenceType.....	74
Table 110 – HasDescription ReferenceType	75
Table 111 – HasEventSource ReferenceType	75
Table 112 – HasNotifier ReferenceType.....	75
Table 113 – GeneratesEvent ReferenceType	76
Table 114 – AlwaysGeneratesEvent ReferenceType.....	76
Table 115 – IEC 62541-3 DataType Definitions.....	77
Table 116 – BaseDataType Definition	78
Table 117 – Structure Definition.....	78
Table 118 – Enumeration Definition	79
Table 119 – ByteString Definition.....	79
Table 120 – Number Definition.....	79
Table 121 – Double Definition	79
Table 122 – Integer Definition.....	80
Table 123 – DateTime Definition.....	80
Table 124 – String Definition.....	80
Table 125 – UInteger Definition	80
Table 126 – Image Definition	80
Table 127 – UInt64 Definition.....	81
Table 128 – IEC 62541-4 DataType Definitions.....	81
Table 129 – UserIdentityToken Definition.....	82
Table 130 – BuildInfo Structure.....	82
Table 131 – BuildInfo Definition	82
Table 132 – RedundancySupport Values	82
Table 133 – RedundancySupport Definition	83
Table 134 – ServerState Values.....	83