



IEC 62541-5

Edition 3.0 2020-07
REDLINE VERSION

INTERNATIONAL STANDARD



OPC unified architecture – Part 5: Information Model

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 25.040.40; 35.100.05

ISBN 978-2-8322-8656-2

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

CONTENTS

FOREWORD	15
1 Scope	18
2 Normative references	18
3 Terms, definitions, abbreviated terms and conventions	19
3.1 Terms and definitions	19
3.2 Abbreviated terms	19
3.3 Conventions for Node descriptions	19
4 NodeIds and BrowseNames	21
4.1 NodeIds	21
4.2 BrowseNames	21
5 Common Attributes	21
5.1 General	21
5.2 Objects	22
5.3 Variables	22
5.4 VariableTypes	23
5.5 Methods	23
6 Standard ObjectTypes	23
6.1 General	23
6.2 BaseObjectType	24
6.3 ObjectTypes for the Server Object	24
6.3.1 ServerType	24
6.3.2 ServerCapabilitiesType	27
6.3.3 ServerDiagnosticsType	30
6.3.4 SessionsDiagnosticsSummaryType	31
6.3.5 SessionDiagnosticsObjectType	32
6.3.6 VendorServerInfoType	32
6.3.7 ServerRedundancyType	33
6.3.8 TransparentRedundancyType	33
6.3.9 NonTransparentRedundancyType	34
6.3.10 NonTransparentNetworkRedundancyType	34
6.3.11 OperationLimitsType	35
6.3.12 AddressSpaceFileType	37
6.3.13 NamespaceMetadataType	37
6.3.14 NamespacesType	39
6.4 ObjectTypes used as EventTypes	40
6.4.1 General	40
6.4.2 BaseEventType	40
6.4.3 AuditEventType	42
6.4.4 AuditSecurityEventType	43
6.4.5 AuditChannelEventType	44
6.4.6 AuditOpenSecureChannelEventType	44
6.4.7 AuditSessionEventType	45
6.4.8 AuditCreateSessionEventType	46
6.4.9 AuditUrlMismatchEventType	47
6.4.10 AuditActivateSessionEventType	47
6.4.11 AuditCancelEventType	48

6.4.12	AuditCertificateEventType	49
6.4.13	AuditCertificateDataMismatchEventType	49
6.4.14	AuditCertificateExpiredEventType	50
6.4.15	AuditCertificateInvalidEventType	50
6.4.16	AuditCertificateUntrustedEventType	50
6.4.17	AuditCertificateRevokedEventType	51
6.4.18	AuditCertificateMismatchEventType	51
6.4.19	AuditNodeManagementEventType	52
6.4.20	AuditAddNodesEventType	52
6.4.21	AuditDeleteNodesEventType	52
6.4.22	AuditAddReferencesEventType	53
6.4.23	AuditDeleteReferencesEventType	53
6.4.24	AuditUpdateEventType	54
6.4.25	AuditWriteUpdateEventType	54
6.4.26	AuditHistoryUpdateEventType	55
6.4.27	AuditUpdateMethodEventType	56
6.4.28	SystemEventType	56
6.4.29	DeviceFailureEventType	56
6.4.30	SystemStatusChangeEvent	57
6.4.31	BaseModelChangeEvent	57
6.4.32	GeneralModelChangeEvent	58
6.4.33	SemanticChangeEvent	58
6.4.34	EventQueueOverflowEventType	59
6.4.35	ProgressEventType	59
6.5	ModellingRuleType	60
6.6	FolderType	60
6.7	DataTypeEncodingType	60
6.8	DataTypeSystemType	61
6.8	AggregateFunctionType	61
7	Standard VariableTypes	61
7.1	General	61
7.2	BaseVariableType	61
7.3	PropertyType	62
7.4	BaseDataVariableType	62
7.5	ServerVendorCapabilityType	63
7.6	DataTypeDictionaryType	64
7.7	DataTypeDescriptionType	65
7.6	ServerStatusType	64
7.7	BuildInfoType	65
7.8	ServerDiagnosticsSummaryType	65
7.9	SamplingIntervalDiagnosticsArrayType	66
7.10	SamplingIntervalDiagnosticsType	67
7.11	SubscriptionDiagnosticsArrayType	67
7.12	SubscriptionDiagnosticsType	67
7.13	SessionDiagnosticsArrayType	68
7.14	SessionDiagnosticsVariableType	69
7.15	SessionSecurityDiagnosticsArrayType	72
7.16	SessionSecurityDiagnosticsType	72
7.17	OptionSetType	73

7.18	SelectionListType	74
7.19	AudioVariableType.....	75
8	Standard Objects and their Variables.....	76
8.1	General.....	76
8.2	Objects used to organise the AddressSpace structure	76
8.2.1	Overview	76
8.2.2	Root	76
8.2.3	Views	77
8.2.4	Objects	77
8.2.5	Types	78
8.2.6	ObjectTypes	78
8.2.7	VariableTypes	79
8.2.8	ReferenceTypes	80
8.2.9	DataTypes	81
8.2.10	OPC Binary	81
8.2.11	XML Schema	81
8.2.10	EventTypes	83
8.3	Server Object and its containing Objects.....	83
8.3.1	General	83
8.3.2	Server Object	84
8.4	ModellingRule Objects	85
8.4.1	ExposesItsArray	85
8.4.2	Mandatory	85
8.4.3	Optional.....	86
8.4.4	OptionalPlaceholder	86
8.4.5	MandatoryPlaceholder	86
9	Standard Methods	86
9.1	GetMonitoredItems	86
9.2	ResendData	87
9.3	SetSubscriptionDurable	88
9.4	RequestServerStateChange.....	88
10	Standard Views	89
11	Standard ReferenceTypes	90
11.1	References	90
11.2	HierarchicalReferences.....	90
11.3	NonHierarchicalReferences	90
11.4	HasChild	91
11.5	Aggregates	91
11.6	Organizes	92
11.7	HasComponent	92
11.8	HasOrderedComponent	92
11.9	HasProperty.....	92
11.10	HasSubtype	93
11.11	HasModellingRule.....	93
11.12	HasTypeDefinition.....	93
11.13	HasEncoding	94
11.14	HasDescription	94
11.14	HasEventSource	94

11.15	HasNotifier.....	95
11.16	GeneratesEvent.....	95
11.17	AlwaysGeneratesEvent.....	95
12	Standard DataTypes.....	96
12.1	Overview.....	96
12.2	DataTypes defined in IEC 62541-3.....	96
12.3	DataTypes defined in IEC 62541-4.....	103
12.4	BuildInfo.....	104
12.5	RedundancySupport.....	104
12.6	ServerState.....	105
12.7	RedundantServerDataType.....	106
12.8	SamplingIntervalDiagnosticsDataType.....	106
12.9	ServerDiagnosticsSummaryDataType.....	107
12.10	ServerStatusDataType.....	108
12.11	SessionDiagnosticsDataType.....	108
12.12	SessionSecurityDiagnosticsDataType.....	111
12.13	ServiceCounterDataType.....	112
12.14	StatusResult.....	113
12.15	SubscriptionDiagnosticsDataType.....	113
12.16	ModelChangeStructureDataType.....	115
12.17	SemanticChangeStructureDataType.....	116
12.18	BitFieldMaskDataType.....	116
12.19	NetworkGroupDataType.....	116
12.20	EndpointUrlListDataType.....	117
12.21	KeyValuePair.....	117
12.22	EndpointType.....	118
Annex A	(informative) Design decisions when modelling the server information.....	119
A.1	Overview.....	119
A.2	ServerType and Server Object.....	119
A.3	Typed complex Objects beneath the Server Object.....	119
A.4	Properties versus DataVariables.....	119
A.5	Complex Variables using complex DataTypes.....	120
A.6	Complex Variables having an array.....	120
A.7	Redundant information.....	120
A.8	Usage of the BaseDataVariableType.....	121
A.9	Subtyping.....	121
A.10	Extensibility mechanism.....	121
Annex B	(normative) StateMachines.....	122
B.1	General.....	122
B.2	Examples of finite state machines.....	122
B.2.1	Simple state machine.....	122
B.2.2	State machine containing substates.....	123
B.3	Definition of state machine.....	124
B.4	Representation of state machines in the AddressSpace.....	124
B.4.1	Overview.....	124
B.4.2	StateMachineType.....	125
B.4.3	StateVariableType.....	126
B.4.4	TransitionVariableType.....	127
B.4.5	FiniteStateMachineType.....	128

B.4.6	FiniteStateVariableType	130
B.4.7	FiniteTransitionVariableType	131
B.4.8	StateType	132
B.4.9	InitialStateType	132
B.4.10	TransitionType	133
B.4.11	FromState	133
B.4.12	ToState	134
B.4.13	HasCause	134
B.4.14	HasEffect	135
B.4.15	HasSubStateMachine	135
B.4.16	TransitionEventType	136
B.4.17	AuditUpdateStateEventType	136
B.4.18	Special Restrictions on subtyping StateMachines	137
B.4.19	Specific StatusCodes for StateMachines	137
B.5	Examples of StateMachines in the AddressSpace	138
B.5.1	StateMachineType using inheritance	138
B.5.2	StateMachineType with a sub-machine SubStateMachine using inheritance	139
B.5.3	StateMachineType using containment	140
B.5.4	Example of a StateMachine having Transition to SubStateMachine	140
Annex C (normative)	File Transfer	143
C.1	Overview	143
C.2	FileType	143
C.2.1	General	143
C.2.2	Open	144
C.2.3	Close	145
C.2.4	Read	146
C.2.5	Write	147
C.2.6	GetPosition	148
C.2.7	SetPosition	148
C.3	File System	149
C.3.1	FileDirectoryType	149
C.3.2	FileSystem Object	150
C.3.3	CreateDirectory	150
C.3.4	CreateFile	151
C.3.5	Delete	152
C.3.6	MoveOrCopy	153
C.4	Temporary file transfer	154
C.4.1	TemporaryFileTransferType	154
C.4.2	File transfer sequences	155
C.4.3	GenerateFileForRead	156
C.4.4	GenerateFileForWrite	157
C.4.5	CloseAndCommit	157
C.4.6	FileTransferStateMachineType	158
C.4.7	Reset	161
Annex D (normative)	DataTypeDictionary	162
D.1	Overview	162
D.2	Data Type Model	162

D.3	DataTypeDictionary, DataTypeDescription, DataTypeEncoding and DataTypeSystem.....	163
D.4	AddressSpace organization.....	165
D.5	Node definitions	167
D.5.1	HasDescription	167
D.5.2	DataTypeDictionaryType.....	167
D.5.3	DataTypeDescriptionType.....	168
D.5.4	DataTypeSystemType.....	168
D.5.5	OPC Binary	168
D.5.6	XML Schema	169
Annex E (normative)	OPC Binary Type Description System	170
E.1	Concepts	170
E.2	Schema description	171
E.2.1	TypeDictionary	171
E.2.2	TypeDescription.....	171
E.2.3	OpaqueType.....	172
E.2.4	EnumeratedType	172
E.2.5	StructuredType	173
E.2.6	FieldType	173
E.2.7	EnumeratedValue	175
E.2.8	ByteOrder	175
E.2.9	ImportDirective	176
E.3	Standard Type descriptions.....	176
E.4	Type description examples.....	177
E.4.1	A 128-bit signed integer.....	177
E.4.2	A 16-bit value divided into several fields	177
E.4.3	A structured type with optional fields	177
E.4.4	An array of integers	177
E.4.5	An array of integers with a terminator instead of a length prefix	177
E.4.6	A simple union.....	177
E.4.7	An enumerated type	178
E.4.8	A nillable array	178
E.5	OPC Binary XML schema.....	178
E.6	OPC Binary Standard TypeDictionary	180
Annex F (normative)	User Authorization.....	182
F.1	Overview.....	182
F.2	RoleSetType	182
F.2.1	RoleSetType definition.....	182
F.2.2	AddRole Method	182
F.2.3	RemoveRole Method	183
F.3	RoleType	184
F.3.1	RoleType definition.....	184
F.3.2	IdentityMappingRuleType	185
F.3.3	AddIdentity Method.....	186
F.3.4	RemoveIdentity Method	186
F.3.5	AddApplication Method	187
F.3.6	RemoveApplication Method	187
F.3.7	AddEndpoint Method	188
F.3.8	RemoveEndpoint Method.....	188

F.4 RoleMappingRuleChangedAuditEventType 189

Figure 1 – Standard AddressSpace structure	76
Figure 2 – Views organization	77
Figure 3 – Objects organization	78
Figure 4 – ObjectTypes organization.....	79
Figure 5 – VariableTypes organization	79
Figure 6 – ReferenceType definitions.....	80
Figure 7 – DataType Organization	83
Figure 7 – EventTypes organization.....	83
Figure 8 – Excerpt of diagnostic information of the Server	84
Figure B.1 – Example of a simple state machine	123
Figure B.2 – Example of a state machine having a sub-machine	123
Figure B.3 – The StateMachine Information Model	125
Figure B.4 – Example of a FiniteStateMachine type	130
Figure B.5 – Example of a FiniteStateMachine instance	130
Figure B.6 – Example of an initial State in a sub-machine	132
Figure B.7 – Example of a StateMachineType using inheritance	138
Figure B.8 – Example of a StateMachineType with a SubStateMachine using inheritance.....	139
Figure B.9 – Example of a StateMachineType using containment.....	140
Figure B.10 – Example of a StateMachine with Transitions from sub-states	141
Figure B.11 – Example of a StateMachineType having Transition to SubStateMachine	142
Figure C.1 – FileSystem example	150
Figure C.2 – Read file transfer example sequence	155
Figure C.3 – Write file transfer example sequence	155
Figure C.4 – File transfer States	158
Figure C.5 – FileTransferStateMachineType	159
Figure D.1 – DataType model	162
Figure D.2 – Example of DataType modelling	165
Figure D.3 – DataTypes organization	166
Figure E.1 – OPC Binary Dictionary structure	170

Table 1 – Examples of DataTypes.....	20
Table 2 –TypeDefinitionTable	20
Table 3 – Common Node Attributes	22
Table 4 – Common Object Attributes.....	22
Table 5 – Common Variable Attributes	23
Table 6 – Common VariableType Attributes	23
Table 7 – Common Method Attributes	23
Table 8 – BaseObjectType definition.....	24
Table 9 – ServerType definition	25
Table 10 – ServerCapabilitiesType definition	28
Table 11 – ServerDiagnosticsType definition	30

Table 12 – SessionsDiagnosticsSummaryType definition	31
Table 13 – SessionDiagnosticsObjectType definition	32
Table 14 – VendorServerInfoType definition	33
Table 15 – ServerRedundancyType definition	33
Table 16 – TransparentRedundancyType definition	33
Table 17 – NonTransparentRedundancyType definition	34
Table 18 – NonTransparentNetworkRedundancyType definition	35
Table 19 – OperationLimitsType definition	36
Table 20 – AddressSpaceFileType definition	37
Table 21 – NamespaceMetadataType definition	38
Table 22 – NamespacesType definition	39
Table 23 – BaseEventType definition	40
Table 24 – AuditEventType definition	43
Table 25 – AuditSecurityEventType definition	44
Table 26 – AuditChannelEventType definition	44
Table 27 – AuditOpenSecureChannelEventType definition	45
Table 28 – AuditSessionEventType definition	46
Table 29 – AuditCreateSessionEventType definition	46
Table 30 – AuditUrlMismatchEventType definition	47
Table 31 – AuditActivateSessionEventType definition	48
Table 32 – AuditCancelEventType definition	48
Table 33 – AuditCertificateEventType definition	49
Table 34 – AuditCertificateDataMismatchEventType definition	49
Table 35 – AuditCertificateExpiredEventType definition	50
Table 36 – AuditCertificateInvalidEventType definition	50
Table 37 – AuditCertificateUntrustedEventType definition	51
Table 38 – AuditCertificateRevokedEventType definition	51
Table 39 – AuditCertificateMismatchEventType definition	51
Table 40 – AuditNodeManagementEventType definition	52
Table 41 – AuditAddNodesEventType definition	52
Table 42 – AuditDeleteNodesEventType definition	53
Table 43 – AuditAddReferencesEventType definition	53
Table 44 – AuditDeleteReferencesEventType definition	54
Table 45 – AuditUpdateEventType definition	54
Table 46 – AuditWriteUpdateEventType definition	55
Table 47 – AuditHistoryUpdateEventType definition	55
Table 48 – AuditUpdateMethodEventType definition	56
Table 49 – SystemEventType definition	56
Table 50 – DeviceFailureEventType definition	57
Table 51 – SystemStatusChangeEvent definition	57
Table 52 – BaseModelChangeEvent definition	57
Table 53 – GeneralModelChangeEvent definition	58
Table 54 – SemanticChangeEvent definition	58

Table 55 – EventQueueOverflowEventType definition	59
Table 56 – ProgressEventType definition	59
Table 57 – ModellingRuleType definition	60
Table 58 – FolderType definition	60
Table 59 – DataTypeEncodingType definition	60
Table 60 – AggregateFunctionType definition	61
Table 61 – BaseVariableType definition	62
Table 62 – PropertyType definition	62
Table 63 – BaseDataVariableType definition	63
Table 64 – ServerVendorCapabilityType definition	63
Table 65 – DataTypeDictionaryType Definition	64
Table 66 – DataTypeDescriptionType Definition	64
Table 65 – ServerStatusType definition	65
Table 66 – BuildInfoType definition	65
Table 67 – ServerDiagnosticsSummaryType definition	66
Table 68 – SamplingIntervalDiagnosticsArrayType definition	66
Table 69 – SamplingIntervalDiagnosticsType definition	67
Table 70 – SubscriptionDiagnosticsArrayType definition	67
Table 71 – SubscriptionDiagnosticsType definition	68
Table 72 – SessionDiagnosticsArrayType definition	69
Table 73 – SessionDiagnosticsVariableType definition	70
Table 74 – SessionSecurityDiagnosticsArrayType definition	72
Table 75 – SessionSecurityDiagnosticsType definition	73
Table 76 – OptionSetType definition	74
Table 77 – SelectionListType definition	75
Table 78 – AudioVariableType definition	75
Table 79 – Root definition	76
Table 80 – Views definition	77
Table 81 – Objects definition	78
Table 82 – Types definition	78
Table 83 – ObjectTypes definition	79
Table 84 – VariableTypes definition	80
Table 85 – ReferenceTypes definition	81
Table 86 – DataTypes definition	82
Table 87 – OPC Binary Definition	83
Table 88 – XML Schema Definition	83
Table 87 – EventTypes definition	83
Table 88 – Server definition	85
Table 89 – ExposesItsArray definition	85
Table 90 – Mandatory definition	85
Table 91 – Optional definition	86
Table 92 – OptionalPlaceholder definition	86
Table 93 – MandatoryPlaceholder definition	86

Table 94 – GetMonitoredItems Method AddressSpace definition	87
Table 95 – ResendData Method AddressSpace definition	88
Table 96 – SetSubscriptionDurable Method AddressSpace definition	88
Table 97 – RequestServerStateChange Method AddressSpace definition	89
Table 98 – References ReferenceType	90
Table 99 – HierarchicalReferences ReferenceType	90
Table 100 – NonHierarchicalReferences ReferenceType	91
Table 101 – HasChild ReferenceType	91
Table 102 – Aggregates ReferenceType	91
Table 103 – Organizes ReferenceType	92
Table 104 – HasComponent ReferenceType	92
Table 105 – HasOrderedComponent ReferenceType	92
Table 106 – HasProperty ReferenceType	93
Table 107 – HasSubtype ReferenceType	93
Table 108 – HasModellingRule ReferenceType	93
Table 109 – HasTypeDefinition ReferenceType	94
Table 110 – HasDescription ReferenceType	94
Table 110 – HasEncoding ReferenceType	94
Table 111 – HasEventSource ReferenceType	94
Table 112 – HasNotifier ReferenceType	95
Table 113 – GeneratesEvent ReferenceType	95
Table 114 – AlwaysGeneratesEvent ReferenceType	96
Table 115 – IEC 62541-3 DataType definitions	97
Table 116 – BaseDataType definition	98
Table 117 – Structure definition	99
Table 118 – Enumeration definition	100
Table 119 – ByteString definition	100
Table 120 – Number definition	100
Table 121 – Double definition	101
Table 122 – Integer definition	101
Table 123 – DateTime definition	101
Table 124 – String definition	101
Table 125 – UInteger definition	102
Table 126 – Image definition	102
Table 127 – UInt64 definition	102
Table 128 – DataTypeDefinition definition	102
Table 129 – EnumValueType definition	103
Table 130 – IEC 62541-4 DataType definitions	103
Table 131 – UserIdentityToken definition	104
Table 132 – BuildInfo structure	104
Table 133 – BuildInfo definition	104
Table 134 – RedundancySupport values	105

Table 135 – RedundancySupport definition	105
Table 136 – ServerState values	105
Table 137 – ServerState definition	106
Table 138 – RedundantServerDataType Structure	106
Table 139 – RedundantServerDataType definition	106
Table 140 – SamplingIntervalDiagnosticsDataType Structure	106
Table 141 – SamplingIntervalDiagnosticsDataType definition.....	107
Table 142 – ServerDiagnosticsSummaryDataType Structure.....	107
Table 143 – ServerDiagnosticsSummaryDataType definition.....	107
Table 144 – ServerStatusDataType Structure	108
Table 145 – ServerStatusDataType definition	108
Table 146 – SessionDiagnosticsDataType Structure	109
Table 147 – SessionDiagnosticsDataType definition	111
Table 148 – SessionSecurityDiagnosticsDataType Structure	112
Table 149 – SessionSecurityDiagnosticsDataType definition.....	112
Table 150 – ServiceCounterDataType Structure	113
Table 151 – ServiceCounterDataType definition.....	113
Table 152 – StatusResult Structure.....	113
Table 153 – StatusResult definition.....	113
Table 154 – SubscriptionDiagnosticsDataType structure.....	114
Table 155 – SubscriptionDiagnosticsDataType definition	115
Table 156 – ModelChangeStructureDataType structure	115
Table 157 – ModelChangeStructureDataType definition	116
Table 158 – SemanticChangeStructureDataType structure	116
Table 159 – SemanticChangeStructureDataType definition.....	116
Table 160 – BitFieldMaskDataType definition.....	116
Table 161 – NetworkGroupDataType Structure	117
Table 162 – NetworkGroupDataType definition	117
Table 163 – EndpointUrlListDataType Structure.....	117
Table 164 – EndpointUrlListDataType definition	117
Table 165 – KeyValuePair structure.....	117
Table 166 – EndpointType structure.....	118
Table B.1 – StateMachineType definition	126
Table B.2 – StateVariableType definition	127
Table B.3 – TransitionVariableType definition	128
Table B.4 – FiniteStateMachineType definition	129
Table B.5 – FiniteStateVariableType definition.....	131
Table B.6 – FiniteTransitionVariableType definition	131
Table B.7 – StateType definition	132
Table B.8 – InitialStateType definition.....	133
Table B.9 – TransitionType definition	133
Table B.10 – FromState ReferenceType	134

Table B.11 – ToState ReferenceType	134
Table B.12 – HasCause ReferenceType.....	135
Table B.13 – HasEffect ReferenceType	135
Table B.14 – HasSubStateMachine ReferenceType	136
Table B.15 – TransitionEventType	136
Table B.16 – AuditUpdateStateEventType	137
Table B.17 – Specific StatusCodes for StateMachines	137
Table C.1 – FileType.....	144
Table C.2 – Open Method AddressSpace definition	145
Table C.3 – Close Method AddressSpace definition	146
Table C.4 – Read Method AddressSpace definition.....	147
Table C.5 – Write Method AddressSpace definition.....	148
Table C.6 – GetPosition Method AddressSpace definition.....	148
Table C.7 – SetPosition Method AddressSpace definition	149
Table C.8 – FileDirectoryType.....	149
Table C.9 – CreateDirectory Method AddressSpace definition	151
Table C.10 – CreateFile Method AddressSpace definition.....	152
Table C.11 – Delete Method AddressSpace definition	153
Table C.12 – MoveOrCopy Method AddressSpace definition.....	154
Table C.13 – TemporaryFileTransferType	154
Table C.14 – GenerateFileForRead Method AddressSpace definition	156
Table C.15 – GenerateFileForWrite Method AddressSpace definition.....	157
Table C.16 – CloseAndCommit Method AddressSpace definition	158
Table C.17 – FileTransferStateMachineType.....	160
Table C.18 – FileTransferStateMachineType transitions	161
Table D.1 – HasDescription ReferenceType.....	167
Table D.2 – DataTypeDictionaryType definition.....	167
Table D.3 – DataTypeDescriptionType definition.....	168
Table D.4 – DataTypeSystemType definition.....	168
Table D.5 – OPC Binary definition	168
Table D.6 – XML Schema definition	169
Table E.1 – TypeDictionary components	171
Table E.2 – TypeDescription components	172
Table E.3 – OpaqueType components	172
Table E.4 – EnumeratedType components.....	173
Table E.5 – StructuredType components.....	173
Table E.6 – FieldType components	174
Table E.7 – EnumeratedValue components.....	175
Table E.8 – ImportDirective components.....	176
Table E.9 – Standard Type descriptions.....	176
Table F.1 – RoleSetType definition	182
Table F.2 – RoleType definition	184

Table F.3 – IdentityMappingRuleType	185
Table F.4 – RoleMappingRuleChangedAuditEventType definition	189

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPC UNIFIED ARCHITECTURE –

Part 5: Information Model

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.

International Standard IEC 62541-5 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) Added Annex F on User Authentication. Describes the Role Information Model that also allows configuration of Roles.
- b) Added new data types: "Union", "Decimal", "OptionSet", "DateString", "TimeString", "DurationString", "NormalizedString", "DecimalString", and "AudioDataType".
- c) Added Method to request a state change in a Server.
- d) Added Method to set Subscription to persistent mode.
- e) Added Method to request resending of data from a Subscription.
- f) Added concept allowing to temporarily create a file to write to or read from a server in C.4.
- g) Added new Variable type to support Selection Lists.
- h) Added optional properties to FiniteStateMachineType to expose currently available states and transitions.
- i) Added UrisVersion Property to ServerType. This version information can be used for session-less service invocation.

The text of this standard is based on the following documents:

FDIS	Report on voting
65E/717/FDIS	65E/733/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 the IEC 62541 series, 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 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 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.

OPC UNIFIED ARCHITECTURE –

Part 5: Information Model

1 Scope

This part of IEC 62541 defines the Information Model of the OPC Unified Architecture. The Information Model describes standardized *Nodes* of a *Server's AddressSpace*. These *Nodes* are standardized types as well as standardized instances used for diagnostics or as entry points to server-specific *Nodes*. Thus, the Information Model defines the *AddressSpace* of an empty OPC UA *Server*. However, it is not expected that all *Servers* will provide all of these *Nodes*.

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

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

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

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

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

IEC 62541-10, *OPC Unified Architecture – Part 10: Programs*

IEC 62541-11, *OPC Unified Architecture – Part 11: Historical Access*

ISO/IEC/IEEE 60559:2011, *Information technology – Microprocessor Systems – Floating-Point arithmetic*

IETF RFC 2045, Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies
<http://www.ietf.org/rfc/rfc2045.txt>

IETF RFC 2046, Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types
<https://www.ietf.org/rfc/rfc2046.txt>

IETF RFC 2047, Multipurpose Internet Mail Extensions (MIME) Part Three: Message Header Extensions for Non-ASCII Text
<http://www.ietf.org/rfc/rfc2047.txt>

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

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

Xpath: XML Path Language
<http://www.w3.org/TR/xpath/>

IETF RFC 3629: UTF-8, a transformation format of ISO 10646
<http://www.ietf.org/rfc/rfc3629.txt>

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**OPC unified architecture –
Part 5: Information Model**

**Architecture unifiée OPC –
Partie 5: Modèle d'information**

CONTENTS

FOREWORD	14
1 Scope	16
2 Normative references	16
3 Terms, definitions, abbreviated terms and conventions	17
3.1 Terms and definitions	17
3.2 Abbreviated terms	17
3.3 Conventions for Node descriptions	17
4 NodeIds and BrowseNames	19
4.1 NodeIds	19
4.2 BrowseNames	19
5 Common Attributes	19
5.1 General	19
5.2 Objects	20
5.3 Variables	20
5.4 VariableTypes	21
5.5 Methods	21
6 Standard ObjectTypes	21
6.1 General	21
6.2 BaseObjectType	22
6.3 ObjectTypes for the Server Object	22
6.3.1 ServerType	22
6.3.2 ServerCapabilitiesType	25
6.3.3 ServerDiagnosticsType	28
6.3.4 SessionsDiagnosticsSummaryType	29
6.3.5 SessionDiagnosticsObjectType	29
6.3.6 VendorServerInfoType	30
6.3.7 ServerRedundancyType	30
6.3.8 TransparentRedundancyType	31
6.3.9 NonTransparentRedundancyType	31
6.3.10 NonTransparentNetworkRedundancyType	32
6.3.11 OperationLimitsType	33
6.3.12 AddressSpaceFileType	34
6.3.13 NamespaceMetadataType	35
6.3.14 NamespacesType	36
6.4 ObjectTypes used as EventTypes	37
6.4.1 General	37
6.4.2 BaseEventType	37
6.4.3 AuditEventType	40
6.4.4 AuditSecurityEventType	41
6.4.5 AuditChannelEventType	42
6.4.6 AuditOpenSecureChannelEventType	42
6.4.7 AuditSessionEventType	43
6.4.8 AuditCreateSessionEventType	44
6.4.9 AuditUrlMismatchEventType	45
6.4.10 AuditActivateSessionEventType	45

6.4.11	AuditCancelEventType	46
6.4.12	AuditCertificateEventType	47
6.4.13	AuditCertificateDataMismatchEventType	47
6.4.14	AuditCertificateExpiredEventType	48
6.4.15	AuditCertificateInvalidEventType	48
6.4.16	AuditCertificateUntrustedEventType	48
6.4.17	AuditCertificateRevokedEventType	49
6.4.18	AuditCertificateMismatchEventType	49
6.4.19	AuditNodeManagementEventType	50
6.4.20	AuditAddNodesEventType	50
6.4.21	AuditDeleteNodesEventType	50
6.4.22	AuditAddReferencesEventType	51
6.4.23	AuditDeleteReferencesEventType	51
6.4.24	AuditUpdateEventType	52
6.4.25	AuditWriteUpdateEventType	52
6.4.26	AuditHistoryUpdateEventType	53
6.4.27	AuditUpdateMethodEventType	54
6.4.28	SystemEventType	54
6.4.29	DeviceFailureEventType	54
6.4.30	SystemStatusChangeEvent	55
6.4.31	BaseModelChangeEvent	55
6.4.32	GeneralModelChangeEvent	56
6.4.33	SemanticChangeEvent	56
6.4.34	EventQueueOverflowEventType	57
6.4.35	ProgressEventType	57
6.5	ModellingRuleType	58
6.6	FolderType	58
6.7	DataTypeEncodingType	58
6.8	AggregateFunctionType	58
7	Standard VariableTypes	59
7.1	General	59
7.2	BaseVariableType	59
7.3	PropertyType	59
7.4	BaseDataVariableType	60
7.5	ServerVendorCapabilityType	60
7.6	ServerStatusType	61
7.7	BuildInfoType	61
7.8	ServerDiagnosticsSummaryType	62
7.9	SamplingIntervalDiagnosticsArrayType	63
7.10	SamplingIntervalDiagnosticsType	63
7.11	SubscriptionDiagnosticsArrayType	63
7.12	SubscriptionDiagnosticsType	64
7.13	SessionDiagnosticsArrayType	65
7.14	SessionDiagnosticsVariableType	66
7.15	SessionSecurityDiagnosticsArrayType	69
7.16	SessionSecurityDiagnosticsType	69
7.17	OptionSetType	70
7.18	SelectionListType	71
7.19	AudioVariableType	72

8	Standard Objects and their Variables.....	73
8.1	General.....	73
8.2	Objects used to organise the AddressSpace structure	73
8.2.1	Overview	73
8.2.2	Root	73
8.2.3	Views	74
8.2.4	Objects	74
8.2.5	Types	75
8.2.6	ObjectTypes	75
8.2.7	VariableTypes	76
8.2.8	ReferenceTypes	77
8.2.9	DataTypes	78
8.2.10	EventTypes	78
8.3	Server Object and its containing Objects.....	79
8.3.1	General	79
8.3.2	Server Object	80
8.4	ModellingRule Objects	80
8.4.1	ExposesItsArray	80
8.4.2	Mandatory	81
8.4.3	Optional.....	81
8.4.4	OptionalPlaceholder	81
8.4.5	MandatoryPlaceholder	82
9	Standard Methods	82
9.1	GetMonitoredItems	82
9.2	ResendData.....	83
9.3	SetSubscriptionDurable	83
9.4	RequestServerStateChange.....	84
10	Standard Views	85
11	Standard ReferenceTypes	85
11.1	References	85
11.2	HierarchicalReferences.....	86
11.3	NonHierarchicalReferences	86
11.4	HasChild.....	87
11.5	Aggregates	87
11.6	Organizes	87
11.7	HasComponent	87
11.8	HasOrderedComponent	88
11.9	HasProperty.....	88
11.10	HasSubtype	88
11.11	HasModellingRule.....	89
11.12	HasTypeDefinition.....	89
11.13	HasEncoding	89
11.14	HasEventSource	90
11.15	HasNotifier.....	90
11.16	GeneratesEvent.....	90
11.17	AlwaysGeneratesEvent	91
12	Standard DataTypes	91
12.1	Overview.....	91

12.2	DataTypes defined in IEC 62541-3.....	91
12.3	DataTypes defined in IEC 62541-4.....	98
12.4	BuildInfo	99
12.5	RedundancySupport	99
12.6	ServerState.....	100
12.7	RedundantServerDataType	101
12.8	SamplingIntervalDiagnosticsDataType	101
12.9	ServerDiagnosticsSummaryDataType	102
12.10	ServerStatusDataType	102
12.11	SessionDiagnosticsDataType.....	103
12.12	SessionSecurityDiagnosticsDataType	106
12.13	ServiceCounterDataType	107
12.14	StatusResult	107
12.15	SubscriptionDiagnosticsDataType.....	107
12.16	ModelChangeStructureDataType	109
12.17	SemanticChangeStructureDataType	110
12.18	BitFieldMaskDataType	110
12.19	NetworkGroupDataType.....	110
12.20	EndpointUrlListDataType	111
12.21	KeyValuePair	111
12.22	EndpointType.....	112
Annex A	(informative) Design decisions when modelling the server information	113
A.1	Overview.....	113
A.2	ServerType and Server Object	113
A.3	Typed complex Objects beneath the Server Object	113
A.4	Properties versus DataVariables	113
A.5	Complex Variables using complex DataTypes	114
A.6	Complex Variables having an array.....	114
A.7	Redundant information.....	114
A.8	Usage of the BaseDataVariableType.....	115
A.9	Subtyping	115
A.10	Extensibility mechanism.....	115
Annex B	(normative) StateMachines	116
B.1	General.....	116
B.2	Examples of finite state machines	116
B.2.1	Simple state machine	116
B.2.2	State machine containing substates	117
B.3	Definition of state machine.....	118
B.4	Representation of state machines in the AddressSpace	118
B.4.1	Overview	118
B.4.2	StateMachineType	119
B.4.3	StateVariableType	120
B.4.4	TransitionVariableType.....	121
B.4.5	FiniteStateMachineType	122
B.4.6	FiniteStateVariableType	124
B.4.7	FiniteTransitionVariableType	125
B.4.8	StateType	126
B.4.9	InitialStateType	126
B.4.10	TransitionType.....	127

B.4.11	FromState.....	127
B.4.12	ToState.....	128
B.4.13	HasCause.....	128
B.4.14	HasEffect.....	129
B.4.15	HasSubStateMachine	129
B.4.16	TransitionEventType.....	130
B.4.17	AuditUpdateStateEventType	130
B.4.18	Special Restrictions on subtyping StateMachines	131
B.4.19	Specific StatusCodes for StateMachines.....	131
B.5	Examples of StateMachines in the AddressSpace	132
B.5.1	StateMachineType using inheritance	132
B.5.2	StateMachineType with a SubStateMachine using inheritance	133
B.5.3	StateMachineType using containment.....	134
B.5.4	Example of a StateMachine having Transition to SubStateMachine	134
Annex C	(normative) File Transfer	137
C.1	Overview.....	137
C.2	FileType.....	137
C.2.1	General	137
C.2.2	Open	138
C.2.3	Close.....	139
C.2.4	Read	140
C.2.5	Write.....	141
C.2.6	GetPosition.....	142
C.2.7	SetPosition	142
C.3	File System.....	143
C.3.1	FileDirectoryType	143
C.3.2	FileSystem Object	144
C.3.3	CreateDirectory	144
C.3.4	CreateFile.....	145
C.3.5	Delete.....	146
C.3.6	MoveOrCopy	147
C.4	Temporary file transfer.....	148
C.4.1	TemporaryFileTransferType.....	148
C.4.2	File transfer sequences	149
C.4.3	GenerateFileForRead	150
C.4.4	GenerateFileForWrite	151
C.4.5	CloseAndCommit.....	151
C.4.6	FileTransferStateMachineType	152
C.4.7	Reset.....	155
Annex D	(normative) DataTypeDictionary.....	156
D.1	Overview.....	156
D.2	Data Type Model.....	156
D.3	DataTypeDictionary, DataTypeDescription, DataTypeEncoding and DataTypeSystem.....	157
D.4	AddressSpace organization.....	159
D.5	Node definitions	161
D.5.1	HasDescription	161
D.5.2	DataTypeDictionaryType.....	161
D.5.3	DataTypeDescriptionType.....	162

D.5.4	DataTypeSystemType	162
D.5.5	OPC Binary	162
D.5.6	XML Schema	163
Annex E (normative)	OPC Binary Type Description System	164
E.1	Concepts	164
E.2	Schema description	165
E.2.1	TypeDictionary	165
E.2.2	TypeDescription	165
E.2.3	OpaqueType	166
E.2.4	EnumeratedType	166
E.2.5	StructuredType	167
E.2.6	FieldType	167
E.2.7	EnumeratedValue	169
E.2.8	ByteOrder	169
E.2.9	ImportDirective	170
E.3	Standard Type descriptions	170
E.4	Type description examples	171
E.4.1	A 128-bit signed integer	171
E.4.2	A 16-bit value divided into several fields	171
E.4.3	A structured type with optional fields	171
E.4.4	An array of integers	171
E.4.5	An array of integers with a terminator instead of a length prefix	171
E.4.6	A simple union	171
E.4.7	An enumerated type	172
E.4.8	A nillable array	172
E.5	OPC Binary XML schema	172
E.6	OPC Binary Standard TypeDictionary	174
Annex F (normative)	User Authorization	176
F.1	Overview	176
F.2	RoleSetType	176
F.2.1	RoleSetType definition	176
F.2.2	AddRole Method	176
F.2.3	RemoveRole Method	177
F.3	RoleType	178
F.3.1	RoleType definition	178
F.3.2	IdentityMappingRuleType	179
F.3.3	AddIdentity Method	180
F.3.4	RemoveIdentity Method	180
F.3.5	AddApplication Method	181
F.3.6	RemoveApplication Method	181
F.3.7	AddEndpoint Method	182
F.3.8	RemoveEndpoint Method	182
F.4	RoleMappingRuleChangedAuditEventType	183
Figure 1 – Standard AddressSpace structure		73
Figure 2 – Views organization		74
Figure 3 – Objects organization		75
Figure 4 – ObjectTypes organization		76

Figure 5 – VariableTypes organization	76
Figure 6 – ReferenceType definitions	77
Figure 7 – EventTypes organization	78
Figure 8 – Excerpt of diagnostic information of the Server	80
Figure B.1 – Example of a simple state machine	117
Figure B.2 – Example of a state machine having a sub-machine	117
Figure B.3 – The StateMachine Information Model	119
Figure B.4 – Example of a FiniteStateMachine type	124
Figure B.5 – Example of a FiniteStateMachine instance	124
Figure B.6 – Example of an initial State in a sub-machine	126
Figure B.7 – Example of a StateMachineType using inheritance	132
Figure B.8 – Example of a StateMachineType with a SubStateMachine using inheritance	133
Figure B.9 – Example of a StateMachineType using containment	134
Figure B.10 – Example of a StateMachine with Transitions from sub-states	135
Figure B.11 – Example of a StateMachineType having Transition to SubStateMachine	136
Figure C.1 – FileSystem example	144
Figure C.2 – Read file transfer example sequence	149
Figure C.3 – Write file transfer example sequence	149
Figure C.4 – File transfer States	152
Figure C.5 – FileTransferStateMachineType	153
Figure D.1 – DataType model	156
Figure D.2 – Example of DataType modelling	159
Figure D.3 – DataTypes organization	160
Figure E.1 – OPC Binary Dictionary structure	164
Table 1 – Examples of DataTypes	18
Table 2 – TypeDefinitionTable	18
Table 3 – Common Node Attributes	20
Table 4 – Common Object Attributes	20
Table 5 – Common Variable Attributes	21
Table 6 – Common VariableType Attributes	21
Table 7 – Common Method Attributes	21
Table 8 – BaseObjectType definition	22
Table 9 – ServerType definition	23
Table 10 – ServerCapabilitiesType definition	26
Table 11 – ServerDiagnosticsType definition	28
Table 12 – SessionsDiagnosticsSummaryType definition	29
Table 13 – SessionDiagnosticsObjectType definition	30
Table 14 – VendorServerInfoType definition	30
Table 15 – ServerRedundancyType definition	31
Table 16 – TransparentRedundancyType definition	31
Table 17 – NonTransparentRedundancyType definition	32

Table 18 – NonTransparentNetworkRedundancyType definition	32
Table 19 – OperationLimitsType definition	33
Table 20 – AddressSpaceFileType definition.....	34
Table 21 – NamespaceMetadataType definition	35
Table 22 – NamespacesType definition.....	37
Table 23 – BaseEventType definition	38
Table 24 – AuditEventType definition	41
Table 25 – AuditSecurityEventType definition	42
Table 26 – AuditChannelEventType definition	42
Table 27 – AuditOpenSecureChannelEventType definition.....	43
Table 28 – AuditSessionEventType definition.....	44
Table 29 – AuditCreateSessionEventType definition	44
Table 30 – AuditUrlMismatchEventType definition.....	45
Table 31 – AuditActivateSessionEventType definition	46
Table 32 – AuditCancelEventType definition	46
Table 33 – AuditCertificateEventType definition	47
Table 34 – AuditCertificateDataMismatchEventType definition	47
Table 35 – AuditCertificateExpiredEventType definition	48
Table 36 – AuditCertificateInvalidEventType definition.....	48
Table 37 – AuditCertificateUntrustedEventType definition	49
Table 38 – AuditCertificateRevokedEventType definition	49
Table 39 – AuditCertificateMismatchEventType definition	49
Table 40 – AuditNodeManagementEventType definition.....	50
Table 41 – AuditAddNodesEventType definition	50
Table 42 – AuditDeleteNodesEventType definition	51
Table 43 – AuditAddReferencesEventType definition	51
Table 44 – AuditDeleteReferencesEventType definition	52
Table 45 – AuditUpdateEventType definition.....	52
Table 46 – AuditWriteUpdateEventType definition.....	53
Table 47 – AuditHistoryUpdateEventType definition	53
Table 48 – AuditUpdateMethodEventType definition	54
Table 49 – SystemEventType definition	54
Table 50 – DeviceFailureEventType definition.....	55
Table 51 – SystemStatusChangeEvent definition	55
Table 52 – BaseModelChangeEvent definition.....	55
Table 53 – GeneralModelChangeEvent definition	56
Table 54 – SemanticChangeEvent definition	56
Table 55 – EventQueueOverflowEventType definition	57
Table 56 – ProgressEventType definition	57
Table 57 – ModellingRuleType definition.....	58
Table 58 – FolderType definition.....	58
Table 59 – DataTypeEncodingType definition	58
Table 60 – AggregateFunctionType definition	59

Table 61 – BaseVariableType definition	59
Table 62 – PropertyType definition	60
Table 63 – BaseDataVariableType definition.....	60
Table 64 – ServerVendorCapabilityType definition	61
Table 65 – ServerStatusType definition.....	61
Table 66 – BuildInfoType definition	62
Table 67 – ServerDiagnosticsSummaryType definition.....	62
Table 68 – SamplingIntervalDiagnosticsArrayType definition	63
Table 69 – SamplingIntervalDiagnosticsType definition.....	63
Table 70 – SubscriptionDiagnosticsArrayType definition	64
Table 71 – SubscriptionDiagnosticsType definition	65
Table 72 – SessionDiagnosticsArrayType definition	66
Table 73 – SessionDiagnosticsVariableType definition.....	67
Table 74 – SessionSecurityDiagnosticsArrayType definition	69
Table 75 – SessionSecurityDiagnosticsType definition.....	70
Table 76 – OptionSetType definition	71
Table 77 – SelectionListType definition.....	72
Table 78 – AudioVariableType definition	72
Table 79 – Root definition	73
Table 80 – Views definition	74
Table 81 – Objects definition	75
Table 82 – Types definition	75
Table 83 – ObjectTypes definition	76
Table 84 – VariableTypes definition	77
Table 85 – ReferenceTypes definition	78
Table 86 – DataTypes definition.....	78
Table 87 – EventTypes definition	79
Table 88 – Server definition	80
Table 89 – ExposesItsArray definition	81
Table 90 – Mandatory definition	81
Table 91 – Optional definition	81
Table 92 – OptionalPlaceholder definition	81
Table 93 – MandatoryPlaceholder definition.....	82
Table 94 – GetMonitoredItems Method AddressSpace definition	83
Table 95 – ResendData Method AddressSpace definition	83
Table 96 – SetSubscriptionDurable Method AddressSpace definition	84
Table 97 – RequestServerStateChange Method AddressSpace definition	85
Table 98 – References ReferenceType	86
Table 99 – HierarchicalReferences ReferenceType.....	86
Table 100 – NonHierarchicalReferences ReferenceType	86
Table 101 – HasChild ReferenceType	87
Table 102 – Aggregates ReferenceType	87
Table 103 – Organizes ReferenceType	87

Table 104 – HasComponent ReferenceType	88
Table 105 – HasOrderedComponent ReferenceType	88
Table 106 – HasProperty ReferenceType	88
Table 107 – HasSubtype ReferenceType	89
Table 108 – HasModellingRule ReferenceType	89
Table 109 – HasTypeDefinition ReferenceType	89
Table 110 – HasEncoding ReferenceType	90
Table 111 – HasEventSource ReferenceType	90
Table 112 – HasNotifier ReferenceType	90
Table 113 – GeneratesEvent ReferenceType	91
Table 114 – AlwaysGeneratesEvent ReferenceType	91
Table 115 – IEC 62541-3 DataType definitions	92
Table 116 – BaseDataType definition	93
Table 117 – Structure definition	94
Table 118 – Enumeration definition	95
Table 119 – ByteString definition	95
Table 120 – Number definition	95
Table 121 – Double definition	96
Table 122 – Integer definition	96
Table 123 – DateTime definition	96
Table 124 – String definition	96
Table 125 – UInteger definition	97
Table 126 – Image definition	97
Table 127 – UInt64 definition	97
Table 128 – DataTypeDefinition definition	97
Table 129 – EnumValueType definition	98
Table 130 – IEC 62541-4 DataType definitions	98
Table 131 – UserIdentityToken definition	99
Table 132 – BuildInfo structure	99
Table 133 – BuildInfo definition	99
Table 134 – RedundancySupport values	100
Table 135 – RedundancySupport definition	100
Table 136 – ServerState values	100
Table 137 – ServerState definition	101
Table 138 – RedundantServerDataType Structure	101
Table 139 – RedundantServerDataType definition	101
Table 140 – SamplingIntervalDiagnosticsDataType Structure	101
Table 141 – SamplingIntervalDiagnosticsDataType definition	101
Table 142 – ServerDiagnosticsSummaryDataType Structure	102
Table 143 – ServerDiagnosticsSummaryDataType definition	102
Table 144 – ServerStatusDataType Structure	103
Table 145 – ServerStatusDataType definition	103
Table 146 – SessionDiagnosticsDataType Structure	104

Table 147 – SessionDiagnosticsDataType definition	106
Table 148 – SessionSecurityDiagnosticsDataType Structure	106
Table 149 – SessionSecurityDiagnosticsDataType definition.....	106
Table 150 – ServiceCounterDataType Structure	107
Table 151 – ServiceCounterDataType definition.....	107
Table 152 – StatusResult Structure.....	107
Table 153 – StatusResult definition.....	107
Table 154 – SubscriptionDiagnosticsDataType structure	108
Table 155 – SubscriptionDiagnosticsDataType definition	109
Table 156 – ModelChangeStructureDataType structure	109
Table 157 – ModelChangeStructureDataType definition	109
Table 158 – SemanticChangeStructureDataType structure	110
Table 159 – SemanticChangeStructureDataType definition	110
Table 160 – BitFieldMaskDataType definition.....	110
Table 161 – NetworkGroupDataType Structure	111
Table 162 – NetworkGroupDataType definition	111
Table 163 – EndpointUrlListDataType Structure.....	111
Table 164 – EndpointUrlListDataType definition	111
Table 165 – KeyValuePair structure	111
Table 166 – EndpointType structure.....	112
Table B.1 – StateMachineType definition	120
Table B.2 – StateVariableType definition	121
Table B.3 – TransitionVariableType definition	122
Table B.4 – FiniteStateMachineType definition	123
Table B.5 – FiniteStateVariableType definition.....	125
Table B.6 – FiniteTransitionVariableType definition	125
Table B.7 – StateType definition	126
Table B.8 – InitialStateType definition.....	127
Table B.9 – TransitionType definition	127
Table B.10 – FromState ReferenceType	128
Table B.11 – ToState ReferenceType	128
Table B.12 – HasCause ReferenceType.....	129
Table B.13 – HasEffect ReferenceType	129
Table B.14 – HasSubStateMachine ReferenceType	130
Table B.15 – TransitionEventType	130
Table B.16 – AuditUpdateStateEventType	131
Table B.17 – Specific StatusCodes for StateMachines	131
Table C.1 – FileType.....	138
Table C.2 – Open Method AddressSpace definition	139
Table C.3 – Close Method AddressSpace definition	140
Table C.4 – Read Method AddressSpace definition.....	141
Table C.5 – Write Method AddressSpace definition.....	142
Table C.6 – GetPosition Method AddressSpace definition.....	142

Table C.7 – SetPosition Method AddressSpace definition	143
Table C.8 – FileDirectoryType.....	143
Table C.9 – CreateDirectory Method AddressSpace definition	145
Table C.10 – CreateFile Method AddressSpace definition.....	146
Table C.11 – Delete Method AddressSpace definition.....	147
Table C.12 – MoveOrCopy Method AddressSpace definition.....	148
Table C.13 – TemporaryFileTransferType	148
Table C.14 – GenerateFileForRead Method AddressSpace definition	150
Table C.15 – GenerateFileForWrite Method AddressSpace definition.....	151
Table C.16 – CloseAndCommit Method AddressSpace definition	152
Table C.17 – FileTransferStateMachineType.....	154
Table C.18 – FileTransferStateMachineType transitions	155
Table D.1 – HasDescription ReferenceType.....	161
Table D.2 – DataTypeDictionaryType definition.....	161
Table D.3 – DataTypeDescriptionType definition.....	162
Table D.4 – DataTypeSystemType definition.....	162
Table D.5 – OPC Binary definition	162
Table D.6 – XML Schema definition	163
Table E.1 – TypeDictionary components	165
Table E.2 – TypeDescription components	166
Table E.3 – OpaqueType components	166
Table E.4 – EnumeratedType components.....	167
Table E.5 – StructuredType components.....	167
Table E.6 – FieldType components	168
Table E.7 – EnumeratedValue components.....	169
Table E.8 – ImportDirective components.....	170
Table E.9 – Standard Type descriptions.....	170
Table F.1 – RoleSetType definition	176
Table F.2 – RoleType definition	178
Table F.3 – IdentityMappingRuleType	179
Table F.4 – RoleMappingRuleChangedAuditEventType definition	183

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPC UNIFIED ARCHITECTURE –

Part 5: Information Model

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.

International Standard IEC 62541-5 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) Added Annex F on User Authentication. Describes the Role Information Model that also allows configuration of Roles.
- b) Added new data types: "Union", "Decimal", "OptionSet", "DateString", "TimeString", "DurationString", "NormalizedString", "DecimalString", and "AudioDataType".
- c) Added Method to request a state change in a Server.
- d) Added Method to set Subscription to persistent mode.

- e) Added Method to request resending of data from a Subscription.
- f) Added concept allowing to temporarily create a file to write to or read from a server in C.4.
- g) Added new Variable type to support Selection Lists.
- h) Added optional properties to FiniteStateMachineType to expose currently available states and transitions.
- i) Added UrisVersion Property to ServerType. This version information can be used for session-less service invocation.

The text of this standard is based on the following documents:

FDIS	Report on voting
65E/717/FDIS	65E/733/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 the IEC 62541 series, 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 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 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.

OPC UNIFIED ARCHITECTURE –

Part 5: Information Model

1 Scope

This part of IEC 62541 defines the Information Model of the OPC Unified Architecture. The Information Model describes standardized *Nodes* of a *Server's AddressSpace*. These *Nodes* are standardized types as well as standardized instances used for diagnostics or as entry points to server-specific *Nodes*. Thus, the Information Model defines the *AddressSpace* of an empty OPC UA *Server*. However, it is not expected that all *Servers* will provide all of these *Nodes*.

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

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

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

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

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

IEC 62541-10, *OPC Unified Architecture – Part 10: Programs*

IEC 62541-11, *OPC Unified Architecture – Part 11: Historical Access*

ISO/IEC/IEEE 60559:2011, *Information technology – Microprocessor Systems – Floating-Point arithmetic*

IETF RFC 2045, Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies
<http://www.ietf.org/rfc/rfc2045.txt>

IETF RFC 2046, Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types
<https://www.ietf.org/rfc/rfc2046.txt>

IETF RFC 2047, Multipurpose Internet Mail Extensions (MIME) Part Three: Message Header Extensions for Non-ASCII Text
<http://www.ietf.org/rfc/rfc2047.txt>

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

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

Xpath: XML Path Language
<http://www.w3.org/TR/xpath/>

IETF RFC 3629: UTF-8, a transformation format of ISO 10646
<http://www.ietf.org/rfc/rfc3629.txt>

SOMMAIRE

AVANT-PROPOS	196
1 Domaine d'application	199
2 Références normatives	199
3 Termes, définitions, termes abrégés et conventions	200
3.1 Termes et définitions	200
3.2 Termes abrégés	200
3.3 Conventions pour les descriptions de Nœuds	200
4 NodeIds et BrowseNames	202
4.1 NodeIds	202
4.2 BrowseNames	202
5 Attributs communs	203
5.1 Généralités	203
5.2 Objets	203
5.3 Variables	203
5.4 VariableTypes	204
5.5 Méthodes	204
6 ObjectTypes normalisés	205
6.1 Généralités	205
6.2 BaseObjectType	205
6.3 ObjectTypes pour l'Objet Serveur	206
6.3.1 ServerType	206
6.3.2 ServerCapabilitiesType	208
6.3.3 ServerDiagnosticsType	211
6.3.4 SessionsDiagnosticsSummaryType	212
6.3.5 SessionDiagnosticsObjectType	213
6.3.6 VendorServerInfoType	213
6.3.7 ServerRedundancyType	214
6.3.8 TransparentRedundancyType	214
6.3.9 NonTransparentRedundancyType	215
6.3.10 NonTransparentNetworkRedundancyType	215
6.3.11 OperationLimitsType	216
6.3.12 AddressSpaceFileType	218
6.3.13 NamespaceMetadataType	218
6.3.14 NamespacesType	220
6.4 ObjectTypes utilisés comme EventTypes	221
6.4.1 Généralités	221
6.4.2 BaseEventType	221
6.4.3 AuditEventType	224
6.4.4 AuditSecurityEventType	225
6.4.5 AuditChannelEventType	226
6.4.6 AuditOpenSecureChannelEventType	226
6.4.7 AuditSessionEventType	227
6.4.8 AuditCreateSessionEventType	228
6.4.9 AuditUrlMismatchEventType	229
6.4.10 AuditActivateSessionEventType	229
6.4.11 AuditCancelEventType	230

6.4.12	AuditCertificateEventType	231
6.4.13	AuditCertificateDataMismatchEventType	231
6.4.14	AuditCertificateExpiredEventType	232
6.4.15	AuditCertificateInvalidEventType	232
6.4.16	AuditCertificateUntrustedEventType	233
6.4.17	AuditCertificateRevokedEventType	233
6.4.18	AuditCertificateMismatchEventType	233
6.4.19	AuditNodeManagementEventType	234
6.4.20	AuditAddNodesEventType	234
6.4.21	AuditDeleteNodesEventType	235
6.4.22	AuditAddReferencesEventType	235
6.4.23	AuditDeleteReferencesEventType	236
6.4.24	AuditUpdateEventType	236
6.4.25	AuditWriteUpdateEventType	237
6.4.26	AuditHistoryUpdateEventType	238
6.4.27	AuditUpdateMethodEventType	238
6.4.28	SystemEventType	239
6.4.29	DeviceFailureEventType	239
6.4.30	SystemStatusChangeEvent	239
6.4.31	BaseModelChangeEvent	240
6.4.32	GeneralModelChangeEvent	240
6.4.33	SemanticChangeEvent	241
6.4.34	EventQueueOverflowEventType	241
6.4.35	ProgressEventType	241
6.5	ModellingRuleType	242
6.6	FolderType	242
6.7	DataTypeEncodingType	243
6.8	AggregateFunctionType	243
7	VariableTypes normalisés	243
7.1	Généralités	243
7.2	BaseVariableType	244
7.3	PropertyType	244
7.4	BaseDataVariableType	244
7.5	ServerVendorCapabilityType	245
7.6	ServerStatusType	246
7.7	BuildInfoType	246
7.8	ServerDiagnosticsSummaryType	247
7.9	SamplingIntervalDiagnosticsArrayType	247
7.10	SamplingIntervalDiagnosticsType	248
7.11	SubscriptionDiagnosticsArrayType	248
7.12	SubscriptionDiagnosticsType	249
7.13	SessionDiagnosticsArrayType	250
7.14	SessionDiagnosticsVariableType	251
7.15	SessionSecurityDiagnosticsArrayType	254
7.16	SessionSecurityDiagnosticsType	255
7.17	OptionSetType	255
7.18	SelectionListType	256
7.19	AudioVariableType	257
8	Objets normalisés et leurs Variables	258

8.1	Généralités	258
8.2	Objets utilisés pour organiser la structure de l'AddressSpace	258
8.2.1	Vue d'ensemble	258
8.2.2	Root	258
8.2.3	Vues	259
8.2.4	Objets	259
8.2.5	Types	260
8.2.6	ObjectTypes	260
8.2.7	VariableTypes	261
8.2.8	ReferenceTypes	262
8.2.9	DataTypes	263
8.2.10	EventTypes	263
8.3	Objet Serveur et ses objets conteneurs	264
8.3.1	Généralités	264
8.3.2	Objet Serveur	265
8.4	Objets ModellingRule	265
8.4.1	ExposesItsArray	265
8.4.2	Mandatory	266
8.4.3	Optional	266
8.4.4	OptionalPlaceholder	266
8.4.5	MandatoryPlaceholder	267
9	Méthodes normalisées	267
9.1	GetMonitoredItems	267
9.2	ResendData	268
9.3	SetSubscriptionDurable	268
9.4	RequestServerStateChange	269
10	Vues normalisées	270
11	ReferenceTypes normalisés	270
11.1	Références	270
11.2	HierarchicalReferences	271
11.3	NonHierarchicalReferences	271
11.4	HasChild	272
11.5	Aggregates	272
11.6	Organizes	272
11.7	HasComponent	272
11.8	HasOrderedComponent	273
11.9	HasProperty	273
11.10	HasSubtype	273
11.11	HasModellingRule	274
11.12	HasTypeDefinition	274
11.13	HasEncoding	274
11.14	HasEventSource	275
11.15	HasNotifier	275
11.16	GeneratesEvent	275
11.17	AlwaysGeneratesEvent	276
12	DataTypes normalisés	276
12.1	Vue d'ensemble	276
12.2	DataTypes définis dans l' IEC 62541-3	276

12.3	DataTypes définis dans l'IEC 62541-4.....	283
12.4	BuildInfo	284
12.5	RedundancySupport	284
12.6	ServerState.....	285
12.7	RedundantServerDataType	286
12.8	SamplingIntervalDiagnosticsDataType	287
12.9	ServerDiagnosticsSummaryDataType	287
12.10	ServerStatusDataType	288
12.11	SessionDiagnosticsDataType.....	289
12.12	SessionSecurityDiagnosticsDataType	292
12.13	ServiceCounterDataType	293
12.14	StatusResult	293
12.15	SubscriptionDiagnosticsDataType.....	293
12.16	ModelChangeStructureDataType	295
12.17	SemanticChangeStructureDataType	296
12.18	BitFieldMaskDataType	296
12.19	NetworkGroupDataType.....	296
12.20	EndpointUrlListDataType	297
12.21	KeyValuePair	297
12.22	EndpointType.....	298
Annexe A (informative) Décisions de conception pour modéliser les informations du serveur		299
A.1	Vue d'ensemble	299
A.2	ServerType et Objet Serveur.....	299
A.3	Objets complexes typés sous l'Objet Serveur.....	299
A.4	Propriétés par rapport aux DataVariables.....	299
A.5	Variables complexes utilisant des DataTypes complexes	300
A.6	Variables complexes ayant une matrice	300
A.7	Informations redondantes	300
A.8	Utilisation du BaseDataVariableType	301
A.9	Sous-typage	301
A.10	Mécanisme d'extensibilité	301
Annexe B (normative) StateMachines		302
B.1	Généralités	302
B.2	Exemples de diagrammes d'états finis	302
B.2.1	Diagramme d'états simple.....	302
B.2.2	Diagramme d'états contenant des sous-états.....	303
B.3	Définition de diagramme d'états	304
B.4	Représentation des diagrammes d'états dans l'AddressSpace	304
B.4.1	Vue d'ensemble	304
B.4.2	StateMachineType	305
B.4.3	StateVariableType	306
B.4.4	TransitionVariableType	307
B.4.5	FiniteStateMachineType	308
B.4.6	FiniteStateVariableType	310
B.4.7	FiniteTransitionVariableType	311
B.4.8	StateType	312
B.4.9	InitialStateType	312
B.4.10	TransitionType.....	313

B.4.11	FromState.....	314
B.4.12	ToState.....	314
B.4.13	HasCause.....	315
B.4.14	HasEffect.....	315
B.4.15	HasSubStateMachine	316
B.4.16	TransitionEventType.....	316
B.4.17	AuditUpdateStateEventType	317
B.4.18	Restrictions spéciales sur le sous-typage des StateMachines	318
B.4.19	StatusCodes spécifiques pour StateMachines.....	318
B.5	Exemples de StateMachines dans l'AddressSpace.....	319
B.5.1	StateMachineType utilisant la relation d'héritage	319
B.5.2	StateMachineType avec un SubStateMachine utilisant la relation d'héritage	320
B.5.3	StateMachineType utilisant la hiérarchie d'appartenance	321
B.5.4	Exemple de StateMachine ayant une Transition vers un SubStateMachine	321
Annexe C (normative)	Transfert de fichiers	324
C.1	Vue d'ensemble	324
C.2	FileType.....	324
C.2.1	Généralités	324
C.2.2	Open	325
C.2.3	Close.....	327
C.2.4	Read	327
C.2.5	Write.....	328
C.2.6	GetPosition.....	329
C.2.7	SetPosition	330
C.3	Système de fichiers	330
C.3.1	FileDirectoryType	330
C.3.2	Objet du FileSystem	331
C.3.3	CreateDirectory	332
C.3.4	CreateFile.....	332
C.3.5	Delete.....	333
C.3.6	MoveOrCopy	334
C.4	Transfert de fichiers temporaires.....	335
C.4.1	TemporaryFileTransferType.....	335
C.4.2	Séquences de transfert de fichier	336
C.4.3	GenerateFileForRead	337
C.4.4	GenerateFileForWrite	338
C.4.5	CloseAndCommit.....	339
C.4.6	FileTransferStateMachineType	339
C.4.7	Reset.....	343
Annexe D (normative)	DataTypeDictionary.....	344
D.1	Vue d'ensemble	344
D.2	Modèle de Type de données	344
D.3	DataTypeDictionary, DataTypeDescription, DataTypeEncoding et DataTypeSystem.....	345
D.4	Organisation de l'AddressSpace	347
D.5	Définitions de Nœud	349
D.5.1	HasDescription	349

D.5.2	DataTypeDictionaryType.....	349
D.5.3	DataTypeDescriptionType.....	350
D.5.4	DataTypeSystemType.....	350
D.5.5	OPC Binary	350
D.5.6	XML Schema	351
Annexe E (normative)	Système de description du Type OPC Binary	352
E.1	Concepts	352
E.2	Description de schéma.....	353
E.2.1	TypeDictionary	353
E.2.2	TypeDescription.....	354
E.2.3	OpaqueType.....	354
E.2.4	EnumeratedType	355
E.2.5	StructuredType	355
E.2.6	FieldType	356
E.2.7	EnumeratedValue	357
E.2.8	ByteOrder.....	357
E.2.9	ImportDirective	358
E.3	Descriptions de Types normalisés.....	358
E.4	Exemples de Descriptions de Types.....	359
E.4.1	Entier signé de 128 bits	359
E.4.2	Valeur de 16 bits divisée en plusieurs champs.....	359
E.4.3	Type structuré avec des champs facultatifs.....	359
E.4.4	Matrice d'entiers	359
E.4.5	Matrice d'entiers avec un terminateur au lieu d'un préfixe de longueur.....	359
E.4.6	Union simple.....	359
E.4.7	Type énuméré	360
E.4.8	Matrice nillable	360
E.5	Schéma XML OPC Binary	360
E.6	TypeDictionary normalisé OPC Binary	362
Annexe F (normative)	Autorisations des utilisateurs.....	364
F.1	Vue d'ensemble	364
F.2	RoleSetType	364
F.2.1	Définition de RoleSetType	364
F.2.2	Méthode AddRole	364
F.2.3	Méthode RemoveRole	365
F.3	RoleType	366
F.3.1	Définition de RoleType	366
F.3.2	IdentityMappingRuleType	367
F.3.3	Méthode AddIdentity.....	368
F.3.4	Méthode RemoveIdentity	368
F.3.5	Méthode AddApplication	369
F.3.6	Méthode RemoveApplication	369
F.3.7	Méthode AddEndpoint	370
F.3.8	Méthode RemoveEndpoint.....	370
F.4	RoleMappingRuleChangedAuditEventType	371
Figure 1 –	Structure normalisée de l'AddressSpace	258
Figure 2 –	Organisation des Vues	259

Figure 3 – Organisation des Objects	260
Figure 4 – Organisation des ObjectTypes	261
Figure 5 – Organisation des VariableTypes.....	261
Figure 6 – Définitions du ReferenceType	262
Figure 7 – Organisation des EventTypes.....	263
Figure 8 – Extrait d'informations de diagnostic du Serveur	265
Figure B.1 – Exemple d'un diagramme d'états simple	303
Figure B.2 – Exemple d'un diagramme d'états ayant un sous-diagramme	303
Figure B.3 – Modèle d'information StateMachine	305
Figure B.4 – Exemple d'un type de FiniteStateMachine	310
Figure B.5 – Exemple d'une instance de FiniteStateMachine	310
Figure B.6 – Exemple d'un Etat initial d'un sous-diagramme	313
Figure B.7 – Exemple d'un StateMachineType utilisant la relation d'héritage	319
Figure B.8 – Exemple d'un StateMachineType avec un SubStateMachine utilisant la relation d'héritage	320
Figure B.9 – Exemple d'un StateMachineType utilisant la hiérarchie d'appartenance	321
Figure B.10 – Exemple d'un diagramme d'états avec des transitions partant de sous-états	322
Figure B.11 – Exemple d'un StateMachineType avec une Transition vers un SubStateMachine.....	323
Figure C.1 – Exemple de FileSystem	331
Figure C.2 – Exemple de Séquence de transfert de lecture de fichier	336
Figure C.3 – Exemple de Séquence de transfert d'écriture de fichier	336
Figure C.4 – Etats de transfert de fichier.....	340
Figure C.5 – FileTransferStateMachineType	341
Figure D.1 – Modèle de DataType.....	344
Figure D.2 – Exemple de modélisation de DataType	347
Figure D.3 – Organisation des DataTypes.....	348
Figure E.1 – Structure du Dictionnaire OPC Binary	352
 Tableau 1 – Exemples de DataTypes	 201
Tableau 2 – Table de définition des types	202
Tableau 3 – Attributs de Nœud communs	203
Tableau 4 – Attributs d'Objet communs.....	203
Tableau 5 – Attributs de Variable communs	204
Tableau 6 – Attributs de VariableType communs	204
Tableau 7 – Attributs de Méthode communs.....	204
Tableau 8 – Définition de BaseObjectType	205
Tableau 9 – Définition de ServerType	206
Tableau 10 – Définition de ServerCapabilitiesType	209
Tableau 11 – Définition de ServerDiagnosticsType	211
Tableau 12 – Définition de SessionsDiagnosticsSummaryType	212
Tableau 13 – Définition de SessionDiagnosticsObjectType	213
Tableau 14 – Définition de VendorServerInfoType	214

Tableau 15 – Définition de ServerRedundancyType	214
Tableau 16 – Définition de TransparentRedundancyType	214
Tableau 17 – Définition de NonTransparentRedundancyType	215
Tableau 18 – Définition de NonTransparentNetworkRedundancyType.....	216
Tableau 19 – Définition de OperationLimitsType	217
Tableau 20 – Définition d'AddressSpaceFileType.....	218
Tableau 21 – Définition de NamespaceMetadataType	219
Tableau 22 – Définition de NamespacesType	221
Tableau 23 – Définition de BaseEventType.....	222
Tableau 24 – Définition d'AuditEventType	225
Tableau 25 – Définition d'AuditSecurityEventType	226
Tableau 26 – Définition d'AuditChannelEventType	226
Tableau 27 – Définition d'AuditOpenSecureChannelEventType.....	227
Tableau 28 – Définition d'AuditSessionEventType.....	228
Tableau 29 – Définition d'AuditCreateSessionEventType	228
Tableau 30 – Définition d'AuditUrlMismatchEventType.....	229
Tableau 31 – Définition d'AuditActivateSessionEventType	230
Tableau 32 – Définition d'AuditCancelEventType	230
Tableau 33 – Définition d'AuditCertificateEventType	231
Tableau 34 – Définition d'AuditCertificateDataMismatchEventType	231
Tableau 35 – Définition d'AuditCertificateExpiredEventType	232
Tableau 36 – Définition d'AuditCertificateInvalidEventType	232
Tableau 37 – Définition d'AuditCertificateUntrustedEventType	233
Tableau 38 – Définition d'AuditCertificateRevokedEventType	233
Tableau 39 – Définition d'AuditCertificateMismatchEventType	234
Tableau 40 – Définition d'AuditNodeManagementEventType.....	234
Tableau 41 – Définition d'AuditAddNodesEventType	235
Tableau 42 – Définition d'AuditDeleteNodesEventType	235
Tableau 43 – Définition d'AuditAddReferencesEventType	236
Tableau 44 – Définition d'AuditDeleteReferencesEventType	236
Tableau 45 – Définition d'AuditUpdateEventType.....	237
Tableau 46 – Définition d'AuditWriteUpdateEventType.....	237
Tableau 47 – Définition d'AuditHistoryUpdateEventType	238
Tableau 48 – Définition d'AuditUpdateMethodEventType	238
Tableau 49 – Définition de SystemEventType	239
Tableau 50 – Définition de DeviceFailureEventType	239
Tableau 51 – Définition de SystemStatusChangeEventType	239
Tableau 52 – Définition de BaseModelChangeEventType	240
Tableau 53 – Définition de GeneralModelChangeEventType	240
Tableau 54 – Définition de SemanticChangeEventType	241
Tableau 55 – Définition d'EventQueueOverflowEventType	241
Tableau 56 – Définition de ProgressEventType.....	242
Tableau 57 – Définition de ModellingRuleType	242

Tableau 58 – Définition de FolderType.....	243
Tableau 59 – Définition de DataTypeEncodingType	243
Tableau 60 – Définition de AggregateFunctionType	243
Tableau 61 – Définition de BaseVariableType.....	244
Tableau 62 – Définition de PropertyType	244
Tableau 63 – Définition de BaseDataVariableType.....	245
Tableau 64 – Définition de ServerVendorCapabilityType.....	245
Tableau 65 – Définition de ServerStatusType	246
Tableau 66 – Définition de BuildInfoType.....	246
Tableau 67 – Définition de ServerDiagnosticsSummaryType.....	247
Tableau 68 – Définition de SamplingIntervalDiagnosticsArrayType	248
Tableau 69 – Définition de SamplingIntervalDiagnosticsType	248
Tableau 70 – Définition de SubscriptionDiagnosticsArrayType	249
Tableau 71 – Définition de SubscriptionDiagnosticsType	250
Tableau 72 – Définition de SessionDiagnosticsArrayType.....	251
Tableau 73 – Définition de SessionDiagnosticsVariableType	252
Tableau 74 – Définition de SessionSecurityDiagnosticsArrayType	254
Tableau 75 – Définition de SessionSecurityDiagnosticsType.....	255
Tableau 76 – Définition d'OptionSetType	256
Tableau 77 – Définition de SelectionListType.....	257
Tableau 78 – Définition d'AudioVariableType	257
Tableau 79 – Définition de Root.....	258
Tableau 80 – Définition de Vues	259
Tableau 81 – Définition d'Objets	260
Tableau 82 – Définition de Types.....	260
Tableau 83 – Définition d'ObjectTypes	261
Tableau 84 – Définition de VariableTypes	262
Tableau 85 – Définition de ReferenceTypes.....	263
Tableau 86 – Définition de DataTypes	263
Tableau 87 – Définition d'EventTypes	264
Tableau 88 – Définition de Serveur	265
Tableau 89 – Définition d'ExposesItsArray	266
Tableau 90 – Définition de Mandatory.....	266
Tableau 91 – Définition d'Optional	266
Tableau 92 – Définition d'OptionalPlaceholder	266
Tableau 93 – Définition de MandatoryPlaceholder	267
Tableau 94 – Définition de l'AddressSpace pour la Méthode GetMonitoredItems.....	268
Tableau 95 – Définition de l'AddressSpace pour la Méthode ResendData	268
Tableau 96 – Définition de l'AddressSpace pour la Méthode SetSubscriptionDurable	269
Tableau 97 – Définition de l'AddressSpace pour la Méthode RequestServerStateChange.....	270
Tableau 98 – Références ReferenceType	271
Tableau 99 – ReferenceType HierarchicalReferences	271

Tableau 100 – ReferenceType NonHierarchicalReferences	271
Tableau 101 – ReferenceType HasChild	272
Tableau 102 – ReferenceType Aggregates	272
Tableau 103 – ReferenceType Organizes	272
Tableau 104 – ReferenceType HasComponent	273
Tableau 105 – ReferenceType HasOrderedComponent	273
Tableau 106 – ReferenceType HasProperty	273
Tableau 107 – ReferenceType HasSubtype	274
Tableau 108 – ReferenceType HasModellingRule	274
Tableau 109 – ReferenceType HasTypeDefinition	274
Tableau 110 – ReferenceType HasEncoding	275
Tableau 111 – ReferenceType HasEventSource	275
Tableau 112 – ReferenceType HasNotifier	275
Tableau 113 – ReferenceType GeneratesEvent	276
Tableau 114 – ReferenceType AlwaysGeneratesEvent	276
Tableau 115 – Définitions des DataType dans l'IEC 62541-3	276
Tableau 116 – Définition de BaseDataType	278
Tableau 117 – Définition de Structure	279
Tableau 118 – Définition d'Énumération	280
Tableau 119 – Définition de ByteString	280
Tableau 120 – Définition de Number	280
Tableau 121 – Définition de Double	281
Tableau 122 – Définition d'Integer	281
Tableau 123 – Définition de DateTime	281
Tableau 124 – Définition de String	281
Tableau 125 – Définition d'UInteger	282
Tableau 126 – Définition d'Image	282
Tableau 127 – Définition d'UInt64	282
Tableau 128 – Définition de DataTypeDefinition	282
Tableau 129 – Définition d'EnumValueType	283
Tableau 130 – Définitions des DataType dans l'IEC 62541-4	283
Tableau 131 – Définition d'UserIdentityToken	284
Tableau 132 – Structure de BuildInfo	284
Tableau 133 – Définition de BuildInfo	284
Tableau 134 – Valeurs de RedundancySupport	285
Tableau 135 – Définition de RedundancySupport	285
Tableau 136 – Valeurs de ServerState	286
Tableau 137 – Définition de ServerState	286
Tableau 138 – Structure de RedundantServerDataType	286
Tableau 139 – Définition de RedundantServerDataType	287
Tableau 140 – Structure de SamplingIntervalDiagnosticsDataType	287
Tableau 141 – Définition de SamplingIntervalDiagnosticsDataType	287
Tableau 142 – Structure de ServerDiagnosticsSummaryDataType	288

Tableau 143 – Définition de ServerDiagnosticsSummaryDataType	288
Tableau 144 – Structure de ServerStatusDataType	289
Tableau 145 – Définition de ServerStatusDataType	289
Tableau 146 – Structure de SessionDiagnosticsDataType	290
Tableau 147 – Définition de SessionDiagnosticsDataType	292
Tableau 148 – Structure de SessionSecurityDiagnosticsDataType	292
Tableau 149 – Définition de SessionSecurityDiagnosticsDataType	292
Tableau 150 – Structure de ServiceCounterDataType	293
Tableau 151 – Définition de ServiceCounterDataType	293
Tableau 152 – Structure de StatusResult	293
Tableau 153 – Définition de StatusResult	293
Tableau 154 – Structure de SubscriptionDiagnosticsDataType	294
Tableau 155 – Définition de SubscriptionDiagnosticsDataType	295
Tableau 156 – Structure de ModelChangeStructureDataType	295
Tableau 157 – Définition de ModelChangeStructureDataType	296
Tableau 158 – Structure de SemanticChangeStructureDataType	296
Tableau 159 – Définition de SemanticChangeStructureDataType	296
Tableau 160 – Définition de BitFieldMaskDataType	296
Tableau 161 – Structure de NetworkGroupDataType	297
Tableau 162 – Définition de NetworkGroupDataType	297
Tableau 163 – Structure d'EndpointUrlListDataType	297
Tableau 164 – Définition d'EndpointUrlListDataType Definition	297
Tableau 165 – Structure de KeyValuePair	297
Tableau 166 – Structure d'EndpointType	298
Tableau B.1 – Définition de StateMachineType	306
Tableau B.2 – Définition de StateVariableType	307
Tableau B.3 – Définition de TransitionVariableType	308
Tableau B.4 – Définition de FiniteStateMachineType	309
Tableau B.5 – Définition de FiniteStateVariableType	311
Tableau B.6 – Définition de FiniteTransitionVariableType	311
Tableau B.7 – Définition de StateType	312
Tableau B.8 – Définition d'InitialStateType	313
Tableau B.9 – Définition de TransitionType	314
Tableau B.10 – ReferenceType FromState	314
Tableau B.11 – ReferenceType ToState	315
Tableau B.12 – ReferenceType HasCause	315
Tableau B.13 – ReferenceType HasEffect	316
Tableau B.14 – ReferenceType HasSubStateMachine	316
Tableau B.15 – TransitionEventType	317
Tableau B.16 – AuditUpdateStateEventType	317
Tableau B.17 – StatusCodes spécifiques pour StateMachines	318
Tableau C.1 – FileType	325
Tableau C.2 – Définition de l'AddressSpace de la Méthode Open	327

Tableau C.3 – Définition de l'AddressSpace de la Méthode Close	327
Tableau C.4 – Définition de l'AddressSpace de la Méthode Read	328
Tableau C.5 – Définition de l'AddressSpace de la Méthode Write	329
Tableau C.6 – Définition de l'AddressSpace de la Méthode GetPosition.....	329
Tableau C.7 – Définition de l'AddressSpace de la Méthode SetPosition	330
Tableau C.8 – FileDirectoryType	331
Tableau C.9 – Définition de l'AddressSpace de la Méthode CreateDirectory	332
Tableau C.10 – Définition de l'AddressSpace de la Méthode CreateFile.....	333
Tableau C.11 – Définition de l'AddressSpace de la Méthode Delete.....	334
Tableau C.12 – Définition de l'AddressSpace de la Méthode MoveOrCopy	335
Tableau C.13 – TemporaryFileTransferType	335
Tableau C.14 – Définition de l'AddressSpace de la Méthode GenerateFileForRead	337
Tableau C.15 – Définition de l'AddressSpace de la Méthode GenerateFileForWrite	338
Tableau C.16 – Définition de l'AddressSpace de la Méthode CloseAndCommit	339
Tableau C.17 – FileTransferStateMachineType.....	342
Tableau C.18 – Transitions de FileTransferStateMachineType.....	343
Tableau D.1 – ReferenceType HasDescription	349
Tableau D.2 – Définition de DataTypeDictionaryType	349
Tableau D.3 – Définition de DataTypeDescriptionType	350
Tableau D.4 – Définition de DataTypeSystemType	350
Tableau D.5 – Définition d'OPC Binary	351
Tableau D.6 – Définition de XML Schema	351
Tableau E.1 – Composants de TypeDictionary	353
Tableau E.2 – Composants de TypeDescription	354
Tableau E.3 – Composants d'OpaqueType	354
Tableau E.4 – Composants d'EnumeratedType	355
Tableau E.5 – Composants de StructuredType	355
Tableau E.6 – Composants de FieldType	356
Tableau E.7 – Composants d'EnumeratedValue.....	357
Tableau E.8 – Composants d'ImportDirective	358
Tableau E.9 – Descriptions de Types normalisés	358
Tableau F.1 – Définition de RoleSetType	364
Tableau F.2 – Définition de RoleType	366
Tableau F.3 – IdentityMappingRuleType	367
Tableau F.4 – Définition de RoleMappingRuleChangedAuditEventType	371

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

ARCHITECTURE UNIFIÉE OPC –

Partie 5: Modèle d'information

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 62541-5 a été établie par le sous-comité 65E: Les dispositifs et leur intégration dans les systèmes de l'entreprise, du comité d'études 65 de l'IEC: Mesure, commande et automation dans les processus industriels.

Cette troisième édition annule et remplace la deuxième édition parue en 2015. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) ajout de l'Annexe F concernant l'Authentification des utilisateurs; description du Modèle d'information de rôle qui autorise également la configuration des Rôles;
- b) ajout de nouveaux types de données: "Union", "Decimal", "OptionSet", "DateString", "TimeString", "DurationString", "NormalizedString", "DecimalString" et "AudioDataType";

- c) ajout d'une méthode afin de demander un changement d'état dans un Serveur;
- d) ajout d'une méthode afin de définir un Abonnement en mode persistant;
- e) ajout d'une méthode afin de demander le renvoi de données à partir d'un Abonnement;
- f) ajout en C.4 d'un concept permettant la création temporaire d'un fichier pour l'écriture ou la lecture sur un serveur;
- g) ajout d'un nouveau type de Variable afin de prendre en charge les Listes de sélection;
- h) ajout de propriétés facultatives au FiniteStateMachineType afin de présenter les états et transitions actuellement disponibles;
- i) ajout d'une propriété UrisVersion au ServerType. Ces informations de version peuvent être utilisées pour l'invocation de services sans session.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
65E/717/FDIS	65E/733/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Tout au long du présent document et des autres parties de la série IEC 62541, certaines conventions documentaires sont utilisées:

Le format *italique* est utilisé pour mettre en évidence un terme défini ou une définition qui apparaît à l'Article 3 dans l'une des parties de la série.

Le format *italique* est également utilisé pour mettre en évidence le nom d'un paramètre d'entrée ou de sortie de service, ou le nom d'une structure ou d'un élément de structure habituellement défini dans les tableaux.

Par ailleurs, les *termes* et les *noms en italique* sont souvent écrits en camel-case (pratique qui consiste à joindre, sans espace, les éléments des mots ou expressions composés, la première lettre de chaque élément étant en majuscule). Par exemple, le terme défini est *AddressSpace* et non Espace d'adressage. Cela permet de mieux comprendre qu'il existe une définition unique pour *AddressSpace*, et non deux définitions distinctes pour Espace et pour Adressage.

Une liste de toutes les parties de la série IEC 62541, publiées sous le titre général *Architecture unifiée OPC*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "<http://webstore.iec.ch>" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

IMPORTANT – Le logo "*colour inside*" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

ARCHITECTURE UNIFIÉE OPC –

Partie 5: Modèle d'information

1 Domaine d'application

La présente partie de l'IEC 62541 définit le Modèle d'information de l'Architecture unifiée OPC. Le Modèle d'information décrit des *Nœuds* normalisés de l'*AddressSpace* d'un *Serveur*. Ces *Nœuds* sont des types normalisés ainsi que des instances normalisées utilisés pour le diagnostic ou comme des points d'entrée à des *Nœuds* spécifiques au serveur. Ainsi, le Modèle d'information définit l'*AddressSpace* d'un *Serveur* OPC UA vide. Cependant, tous les *Serveurs* ne sont pas supposés fournir la totalité de ces *Nœuds*.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC TR 62541-1, *OPC Unified Architecture – Part 1: Overview and Concepts* (disponible en anglais seulement)

IEC 62541-3, *Architecture unifiée OPC – Partie 3: Modèle d'espace d'adressage*

IEC 62541-4, *Architecture unifiée OPC – Partie 4: Services*

IEC 62541-6, *Architecture unifiée OPC – Partie 6: Mappings*

IEC 62541-7, *Architecture unifiée OPC – Partie 7: Profils*

IEC 62541-9, *Architecture unifiée OPC – Partie 9: Alarmes et conditions*

IEC 62541-10, *Architecture unifiée OPC – Partie 10: Programmes*

IEC 62541-11, *Architecture unifiée OPC – Partie 11: Accès à l'historique*

ISO/IEC/IEEE 60559:2011, *Information technology – Microprocessor Systems – Floating-Point arithmetic* (disponible en anglais seulement)

<https://www.iso.org/standard/57469.html>

IETF RFC 2045: Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies

<http://www.ietf.org/rfc/rfc2045.txt>

IETF RFC 2046: Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types

<https://www.ietf.org/rfc/rfc2046.txt>

IETF RFC 2047: Multipurpose Internet Mail Extensions (MIME) Part Three: Message Header Extensions for Non-ASCII Text

<http://www.ietf.org/rfc/rfc2047.txt>

XML Schema Tome 1: Structures
<http://www.w3.org/TR/xmlschema-1/>

XML Schema Tome 2: Datatypes
<http://www.w3.org/TR/xmlschema-2/>

Xpath: XML Path Language
<http://www.w3.org/TR/xpath/>

IETF RFC 3629: UTF-8, a transformation format of ISO 10646
<http://www.ietf.org/rfc/rfc3629.txt>