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**OPC unified architecture –
Part 3: Address Space Model**

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CONTENTS

FOREWORD	11
1 Scope	14
2 Normative references	14
3 Terms, definitions, abbreviated terms and conventions	15
3.1 Terms and definitions	15
3.2 Abbreviated terms	16
3.3 Conventions	16
3.3.1 Conventions for AddressSpace figures	16
3.3.2 Conventions for defining NodeClasses	17
4 AddressSpace concepts	18
4.1 Overview	18
4.2 Object Model	18
4.3 Node Model	19
4.3.1 General	19
4.3.2 NodeClasses	19
4.3.3 Attributes	20
4.3.4 References	20
4.4 Variables	21
4.4.1 General	21
4.4.2 Properties	21
4.4.3 DataVariables	21
4.5 TypeDefinitionNodes	21
4.5.1 General	21
4.5.2 Complex TypeDefinitionNodes and their InstanceDeclarations	22
4.5.3 Subtyping	23
4.5.4 Instantiation of complex TypeDefinitionNodes	23
4.6 Event Model	24
4.6.1 General	24
4.6.2 EventTypes	25
4.6.3 Event Categorization	25
4.7 Methods	26
4.8 Roles	26
4.8.1 Overview	26
4.8.2 Well-known Roles	27
4.8.3 Evaluating Permissions with Roles	27
5 Standard NodeClasses	29
5.1 Overview	29
5.2 Base NodeClass	30
5.2.1 General	30
5.2.2 NodeId	30
5.2.3 NodeClass	30
5.2.4 BrowseName	30
5.2.5 DisplayName	31
5.2.6 Description	31
5.2.7 WriteMask	31
5.2.8 UserWriteMask	32

5.2.9	RolePermissions	32
5.2.10	UserRolePermissions	33
5.2.11	AccessRestrictions	34
5.3	ReferenceType NodeClass	34
5.3.1	General	34
5.3.2	Attributes	35
5.3.3	References	37
5.4	View NodeClass	37
5.5	Objects	40
5.5.1	Object NodeClass	40
5.5.2	ObjectType NodeClass	42
5.5.3	Standard ObjectType FolderType	44
5.5.4	Client-side creation of Objects of an ObjectType	44
5.6	Variables	44
5.6.1	General	44
5.6.2	Variable NodeClass	45
5.6.3	Properties	51
5.6.4	DataVariable	51
5.6.5	VariableType NodeClass	52
5.6.6	Client-side creation of Variables of an VariableType	55
5.7	Method NodeClass	55
5.8	DataTypes	57
5.8.1	DataType Model	57
5.8.2	Encoding rules for different kinds of DataTypes	59
5.8.3	DataType NodeClass	60
5.8.4	DataTypeDictionary, DataTypeDescription, DataTypeEncoding and DataTypeSystem encoding information	63
5.9	Summary of Attributes of the NodeClasses	66
6	Type Model for ObjectTypes and VariableTypes	67
6.1	Overview	67
6.2	Definitions	67
6.2.1	InstanceDeclaration	67
6.2.2	Instances without ModellingRules	68
6.2.3	InstanceDeclarationHierarchy	68
6.2.4	Similar Node of InstanceDeclaration	68
6.2.5	BrowsePath	68
6.2.6	Attribute Handling of InstanceDeclarations	68
6.2.7	Attribute Handling of Variable and VariableTypes	68
6.2.8	NodeIds of InstanceDeclarations	69
6.3	Subtyping of ObjectTypes and VariableTypes	69
6.3.1	Overview	69
6.3.2	Attributes	69
6.3.3	InstanceDeclarations	69
6.4	Instances of ObjectTypes and VariableTypes	73
6.4.1	Overview	73
6.4.2	Creating an Instance	73
6.4.3	Constraints on an Instance	74
6.4.4	ModellingRules	75
6.5	Changing type definitions that are already used	82

7	Standard ReferenceTypes	83
7.1	General.....	83
7.2	References ReferenceType.....	83
7.3	HierarchicalReferences ReferenceType	84
7.4	NonHierarchicalReferences ReferenceType	84
7.5	HasChild ReferenceType	84
7.6	Aggregates ReferenceType.....	84
7.7	HasComponent ReferenceType.....	84
7.8	HasProperty ReferenceType	85
7.9	HasOrderedComponent ReferenceType	85
7.10	HasSubtype ReferenceType.....	85
7.11	Organizes ReferenceType.....	86
7.12	HasModellingRule ReferenceType	86
7.13	HasTypeDefinition ReferenceType	86
7.14	HasEncoding ReferenceType	86
7.15	HasDescription ReferenceType	86
7.15	GeneratesEvent	87
7.16	AlwaysGeneratesEvent	87
7.17	HasEventSource	87
7.18	HasNotifier.....	88
8	Standard DataTypes	89
8.1	General.....	89
8.2	Nodeld.....	89
8.2.1	General	89
8.2.2	NamespaceIndex	89
8.2.3	IdentifierType	90
8.2.4	Identifier value.....	90
8.3	QualifiedName	91
8.4	LocaleId.....	91
8.5	LocalizedText	92
8.6	Argument	92
8.7	BaseDataType	93
8.8	Boolean	93
8.9	Byte.....	93
8.10	ByteString.....	93
8.11	DateTime	93
8.12	Double	94
8.13	Duration.....	94
8.14	Enumeration	94
8.15	Float	94
8.16	Guid.....	94
8.17	SByte.....	94
8.18	IdType	94
8.19	Image	94
8.20	ImageBMP	94
8.21	ImageGIF.....	94
8.22	ImageJPG.....	95
8.23	ImagePNG	95
8.24	Integer	95

8.25	Int16	95
8.26	Int32	95
8.27	Int64	95
8.28	TimeZoneDataType.....	95
8.29	NamingRuleType	95
8.30	NodeClass	96
8.31	Number.....	96
8.32	String.....	96
8.33	Structure.....	96
8.34	UInteger.....	96
8.35	UInt16.....	96
8.36	UInt32.....	96
8.37	UInt64.....	96
8.38	UtcTime	97
8.39	XmlElement	97
8.40	EnumValueType.....	97
8.41	OptionSet	98
8.42	Union	98
8.43	DateString	98
8.44	DecimalString	98
8.45	DurationString.....	98
8.46	NormalizedString	99
8.47	TimeString	99
8.48	DataTypeDefinition	99
8.49	StructureDefinition	99
8.50	EnumDefinition	100
8.51	StructureField	100
8.52	EnumField	101
8.53	AudioDataType	101
8.54	Decimal	101
8.55	PermissionType	102
8.56	AccessRestrictionsType.....	103
8.57	AccessLevelType	103
8.58	AccessLevelExType	104
8.59	EventNotifierType	105
8.60	AttributeWriteMask.....	105
9	Standard EventTypes	106
9.1	General.....	106
9.2	BaseEventType.....	107
9.3	SystemEventType	107
9.4	ProgressEventType.....	107
9.5	AuditEventType	108
9.6	AuditSecurityEventType	109
9.7	AuditChannelEventType.....	109
9.8	AuditOpenSecureChannelEventType	109
9.9	AuditSessionEventType	109
9.10	AuditCreateSessionEventType.....	109
9.11	AuditUrlMismatchEventType	110
9.12	AuditActivateSessionEventType.....	110

9.13	AuditCancelEventType	110
9.14	AuditCertificateEventType	110
9.15	AuditCertificateDataMismatchEventType	110
9.16	AuditCertificateExpiredEventType	110
9.17	AuditCertificateInvalidEventType	110
9.18	AuditCertificateUntrustedEventType	110
9.19	AuditCertificateRevokedEventType	110
9.20	AuditCertificateMismatchEventType	111
9.21	AuditNodeManagementEventType	111
9.22	AuditAddNodesEventType	111
9.23	AuditDeleteNodesEventType	111
9.24	AuditAddReferencesEventType	111
9.25	AuditDeleteReferencesEventType	111
9.26	AuditUpdateEventType	111
9.27	AuditWriteUpdateEventType	111
9.28	AuditHistoryUpdateEventType	111
9.29	AuditUpdateMethodEventType	111
9.30	DeviceFailureEventType	111
9.31	SystemStatusChangeEvent	112
9.32	ModelChangeEvents	112
9.32.1	General	112
9.32.2	NodeVersion Property	112
9.32.3	Views	112
9.32.4	Event compression	112
9.32.5	BaseModelChangeEvent	112
9.32.6	GeneralModelChangeEvent	113
9.32.7	Guidelines for ModelChangeEvents	113
9.33	SemanticChangeEvent	113
9.33.1	General	113
9.33.2	ViewVersion and NodeVersion Properties	113
9.33.3	Views	114
9.33.4	Event compression	114
Annex A (informative) How to use the Address Space Model		115
A.1	Overview	115
A.2	Type definitions	115
A.3	ObjectTypes	115
A.4	VariableTypes	115
A.4.1	General	115
A.4.2	Properties or DataVariables	116
A.4.3	Many Variables and/or structured DataTypes	116
A.5	Views	117
A.6	Methods	117
A.7	Defining ReferenceTypes	117
A.8	Defining ModellingRules	117
Annex B (informative) OPC UA Meta Model in UML		118
B.1	Background	118
B.2	Notation	118
B.3	Meta Model	120
B.3.1	Base	120

B.3.2	ReferenceType	120
B.3.3	Predefined ReferenceTypes.....	121
B.3.4	Attributes	121
B.3.5	Object and ObjectType	122
B.3.6	EventNotifier.....	123
B.3.7	Variable and VariableType.....	123
B.3.8	Method	124
B.3.9	DataType.....	125
B.3.10	View	126
Annex C (normative) OPC Binary Type Description System		
C.1 Concepts		
C.2 Schema Description		
C.2.1 TypeDictionary		
C.2.2 TypeDescription.....		
C.2.3 OpaqueType		
C.2.4 EnumeratedType		
C.2.5 StructuredType		
C.2.6 FieldType		
C.2.7 EnumeratedValue		
C.2.8 ByteOrder		
C.2.9 ImportDirective		
C.3 Standard Type Descriptions		
C.4 Type Description Examples		
C.5 OPC Binary XML Schema		
C.6 OPC Binary Standard TypeDictionary		
Annex C (normative)	Graphical notation.....	139
C.1	General.....	139
C.2	Notation	139
C.2.1	Overview	139
C.2.2	Simple notation.....	139
C.2.3	Extended notation.....	141
Bibliography	144
Figure 1	– AddressSpace Node diagrams	17
Figure 2	– OPC UA Object Model.....	19
Figure 3	– AddressSpace Node Model	19
Figure 4	– Reference Model.....	20
Figure 5	– Example of a Variable defined by a VariableType.....	22
Figure 6	– Example of a Complex TypeDefinition	23
Figure 7	– Object and its Components defined by an ObjectType.....	24
Figure 8	– Permissions in the Address Space	33
Figure 9	– Symmetric and Non-Symmetric References.....	36
Figure 10	– Variables, VariableTypes and their DataTypes	58
Figure 11	– DataType Model.....	58
Figure 12	– Example of DataType Modelling	66
Figure 13	– Subtyping TypeDefinitionNodes.....	70
Figure 14	– The Fully-Inherited InstanceDeclarationHierarchy for BetaType	72

Figure 15 – An Instance and its TypeDefinitionNode	73
Figure 16 – Example of several References between InstanceDeclarations	74
Figure 17 – Example of changing instances based on InstanceDeclarations	76
Figure 18 – Example of changing InstanceDeclarations based on an InstanceDeclaration	77
Figure 19 – Use of the Standard ModellingRule New Mandatory	78
Figure 20 – Example using the Standard ModellingRules Optional and Mandatory	79
Figure 21 – Example of using ExposesItsArray	80
Figure 22 – Complex example of using ExposesItsArray	80
Figure 23 – Example on using OptionalPlaceholder with an Object and Variable	80
Figure 24 – Example using OptionalPlaceholder with a Method	81
Figure 25 – Example of using MandatoryPlaceholder for Object and Variable	82
Figure 26 – Standard ReferenceType Hierarchy	83
Figure 27 – Event Reference Example	88
Figure 28 – Complex Event Reference Example	89
Figure 29 – Standard EventType Hierarchy	107
Figure 30 – Audit Behaviour of a Server	108
Figure 31 – Audit Behaviour of an Aggregating Server	109
Figure B.1 – Background of OPC UA Meta Model	118
Figure B.2 – Notation (I)	119
Figure B.3 – Notation (II)	119
Figure B.4 – Base	120
Figure B.5 – Reference and ReferenceType	120
Figure B.6 – Predefined ReferenceTypes	121
Figure B.7 – Attributes	122
Figure B.8 – Object and ObjectType	123
Figure B.9 – EventNotifier	123
Figure B.10 – Variable and VariableType	124
Figure B.11 – Method	125
Figure B.12 – DataType	125
Figure B.13 – View	126
Figure C.1 – OPC Binary Dictionary Structure	140
Figure C.1 – Example of a Reference connecting two Nodes	140
Figure C.2 – Example of using a TypeDefinition inside a Node	142
Figure C.3 – Example of exposing Attributes	142
Figure C.4 – Example of exposing Properties inline	143
Table 1 – NodeClass Table Conventions	17
Table 2 – Well-known Roles	27
Table 3 – Example Roles	28
Table 4 – Example Nodes	28
Table 5 – Example Role assignment	29
Table 6 – Examples of evaluating access	29

Table 7 – Base NodeClass	30
Table – Bit mask for WriteMask and UserWriteMask	30
Table 8 – RolePermissionType	32
Table 9 – ReferenceType NodeClass	35
Table 10 – View NodeClass	39
Table 11 – Object NodeClass	41
Table 12 – ObjectType NodeClass	43
Table 13 – Variable NodeClass	46
Table 14 – VariableType NodeClass	53
Table 15 – Method NodeClass	56
Table 16 – DataType NodeClass	61
Table 17 – Overview of Attributes	67
Table 18 – The InstanceDeclarationHierarchy for BetaType	70
Table 19 – The Fully-Inherited InstanceDeclarationHierarchy for BetaType	71
Table 20 – Rule for ModellingRules Properties when Subtyping	76
Table 21 – Properties of ModellingRules	77
Table 22 – NodeId Definition	89
Table 23 – IdentifierType Values	90
Table 24 – NodeId Null Values	91
Table 25 – QualifiedName Definition	91
Table 26 – LocaleId Examples	92
Table 27 – LocalizedText Definition	92
Table 28 – Argument Definition	93
Table 29 – TimeZoneDataType Definition	95
Table 30 – NamingRuleType Values	95
Table 31 – NodeClass Values	96
Table 32 – EnumValueType Definition	97
Table 33 – OptionSet Definition	98
Table 34 – StructureDefinition Structure	100
Table 35 – EnumDefinition Structure	100
Table 36 – StructureField Structure	101
Table 37 – EnumField Structure	101
Table 38 – PermissionType Definition	102
Table 39 – AccessRestrictionsType Definition	103
Table 40 – AccessLevelType Definition	104
Table 41 – AccessLevelExType Definition	104
Table 42 – EventNotifierType Definition	105
Table 43 – Bit mask for WriteMask and UserWriteMask	106
Table C.1 – TypeDictionary Components	106
Table C.2 – TypeDescription Components	106
Table C.3 – OpaqueType Components	106
Table C.4 – EnumeratedType Components	106
Table C.5 – StructuredType Components	106

Table C.6 – FieldType Components	
Table C.7 – EnumeratedValue Components	
Table C.8 – ImportDirective Components	
Table C.9 – Standard Type Descriptions	
Table C.1 – Notation of Nodes depending on the NodeClass	140
Table C.2 – Simple Notation of Nodes depending on the NodeClass	141

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPC UNIFIED ARCHITECTURE –

Part 3: Address Space Model

FOREWORD

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International Standard IEC 62541-3 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 includes the following significant technical changes with respect to the previous edition:

- a) Added new improved approach for exposing structure definitions. An Attribute on the DataType Node now simply contains a binary description.
- b) Added new flags for Variables to indicate atomicity when reading or writing.
- c) Added Roles and Permissions to allow configuration of a role-based authorization.
- d) Added new data types: “Union”, “Decimal”, “OptionSet”, “DateString”, “TimeString”, “DurationString”, NormalizedString”, “DecimalString”, and “AudioDataType”.
- e) Added definition on how to use the ModellingRules OptionalPlaceHolder and MandatoryPlaceHolder for Methods.
- f) Added optional Properties “MaxCharacters” and “MaxByteStringLength” to Variable Nodes.

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

FDIS	Report on voting
65E/715/FDIS	65E/731/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, with a few exceptions, written in camel-case (the practice of writing compound words or phrases in which the elements are joined without spaces, with each element’s initial letter capitalized within the compound). For example the defined term is *AddressSpace* instead of Address Space. This makes it easier to understand that there is a single definition for *AddressSpace*, not separate definitions for Address and Space.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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OPC UNIFIED ARCHITECTURE –

Part 3: Address Space Model

1 Scope

This part of IEC 62541 ~~describes~~ defines the OPC Unified Architecture (OPC UA) *AddressSpace* and its *Objects*. This document is the OPC UA meta model on which OPC UA information models are based.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

IEC 62541-8, *OPC Unified Architecture – Part 8: Data Access*

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

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

~~ISO/IEC 10918-1, *Information technology – Digital compression and coding of continuous-tone still images: Requirements and guidelines*~~

~~ISO/IEC 15948, *Information technology – Computer graphics and image processing – Portable Network Graphics (PNG): Functional specification*~~

ISO 639 (all parts), *Codes for the representation of names of languages*

ISO 3166 (all parts), *Codes for the representation of names of countries and their subdivisions*

~~IEEE 754-1985, *IEEE Standard for Binary Floating-Point Arithmetic*, <http://ieeexplore.ieee.org/servlet/opac?punumber=2355>~~

~~IETF RFC 3066, *Tags for the Identification of Languages*, <http://tools.ietf.org/html/rfc3066>~~

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

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

~~XPATH: <http://www.w3.org/TR/xpath/>~~

ISO 8601 (all parts), *Date and time – Representations for information interchange*

IETF RFC 5646, Tags for Identifying Languages
<http://tools.ietf.org/html/rfc5646>

Unicode Standard Annex #15: Unicode Normalization Forms,
<http://www.unicode.org/reports/tr15/>

W3C XML Schema Definition Language (XSD) Part 2: DataTypes
<http://www.w3.org/TR/xmlschema-2/>

TAI: International Atomic Time
<http://www.bipm.org/en/bipm-services/timescales/tai.html>

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**OPC unified architecture –
Part 3: Address Space Model**

**Architecture unifiée OPC –
Partie 3: Modèle d'espace d'adressage**

CONTENTS

FOREWORD	10
1 Scope	12
2 Normative references	12
3 Terms, definitions, abbreviated terms and conventions	13
3.1 Terms and definitions	13
3.2 Abbreviated terms	14
3.3 Conventions	14
3.3.1 Conventions for AddressSpace figures	14
3.3.2 Conventions for defining NodeClasses	15
4 AddressSpace concepts	16
4.1 Overview	16
4.2 Object Model	16
4.3 Node Model	16
4.3.1 General	16
4.3.2 NodeClasses	17
4.3.3 Attributes	17
4.3.4 References	17
4.4 Variables	18
4.4.1 General	18
4.4.2 Properties	18
4.4.3 DataVariables	18
4.5 TypeDefinitionNodes	19
4.5.1 General	19
4.5.2 Complex TypeDefinitionNodes and their InstanceDeclarations	20
4.5.3 Subtyping	21
4.5.4 Instantiation of complex TypeDefinitionNodes	21
4.6 Event Model	22
4.6.1 General	22
4.6.2 EventTypes	22
4.6.3 Event Categorization	23
4.7 Methods	23
4.8 Roles	24
4.8.1 Overview	24
4.8.2 Well-known Roles	24
4.8.3 Evaluating Permissions with Roles	25
5 Standard NodeClasses	27
5.1 Overview	27
5.2 Base NodeClass	28
5.2.1 General	28
5.2.2 NodeId	28
5.2.3 NodeClass	28
5.2.4 BrowseName	28
5.2.5 DisplayName	29
5.2.6 Description	29
5.2.7 WriteMask	29
5.2.8 UserWriteMask	29

5.2.9	RolePermissions.....	30
5.2.10	UserRolePermissions	31
5.2.11	AccessRestrictions	31
5.3	ReferenceType NodeClass	31
5.3.1	General	31
5.3.2	Attributes	32
5.3.3	References	34
5.4	View NodeClass.....	34
5.5	Objects	36
5.5.1	Object NodeClass	36
5.5.2	ObjectType NodeClass	38
5.5.3	Standard ObjectType FolderType	40
5.5.4	Client-side creation of Objects of an ObjectType	40
5.6	Variables	40
5.6.1	General	40
5.6.2	Variable NodeClass	41
5.6.3	Properties.....	45
5.6.4	DataVariable.....	45
5.6.5	VariableType NodeClass	46
5.6.6	Client-side creation of Variables of an VariableType	49
5.7	Method NodeClass.....	49
5.8	DataTypes	51
5.8.1	DataType Model	51
5.8.2	Encoding rules for different kinds of DataTypes	52
5.8.3	DataType NodeClass	53
5.8.4	DataTypeEncoding and encoding information	56
5.9	Summary of Attributes of the NodeClasses	56
6	Type Model for ObjectTypes and VariableTypes	57
6.1	Overview.....	57
6.2	Definitions.....	57
6.2.1	InstanceDeclaration	57
6.2.2	Instances without ModellingRules	58
6.2.3	InstanceDeclarationHierarchy	58
6.2.4	Similar Node of InstanceDeclaration	58
6.2.5	BrowsePath	58
6.2.6	Attribute Handling of InstanceDeclarations	58
6.2.7	Attribute Handling of Variable and VariableTypes	58
6.2.8	NodeIds of InstanceDeclarations	59
6.3	Subtyping of ObjectTypes and VariableTypes	59
6.3.1	Overview	59
6.3.2	Attributes	59
6.3.3	InstanceDeclarations	59
6.4	Instances of ObjectTypes and VariableTypes.....	63
6.4.1	Overview	63
6.4.2	Creating an Instance	63
6.4.3	Constraints on an Instance	64
6.4.4	ModellingRules	65
6.5	Changing type definitions that are already used	72
7	Standard ReferenceTypes	73

7.1	General.....	73
7.2	References ReferenceType.....	73
7.3	HierarchicalReferences ReferenceType	74
7.4	NonHierarchicalReferences ReferenceType	74
7.5	HasChild ReferenceType	74
7.6	Aggregates ReferenceType.....	74
7.7	HasComponent ReferenceType.....	74
7.8	HasProperty ReferenceType	75
7.9	HasOrderedComponent ReferenceType	75
7.10	HasSubtype ReferenceType.....	75
7.11	Organizes ReferenceType.....	76
7.12	HasModellingRule ReferenceType	76
7.13	HasTypeDefinition ReferenceType	76
7.14	HasEncoding ReferenceType	76
7.15	GeneratesEvent	77
7.16	AlwaysGeneratesEvent	77
7.17	HasEventSource	77
7.18	HasNotifier	77
8	Standard DataTypes	79
8.1	General.....	79
8.2	Nodeld	79
8.2.1	General	79
8.2.2	NamespaceIndex	79
8.2.3	IdentifierType	80
8.2.4	Identifier value.....	80
8.3	QualifiedName	81
8.4	LocaleId.....	81
8.5	LocalizedText	82
8.6	Argument	82
8.7	BaseDataType	83
8.8	Boolean	83
8.9	Byte	83
8.10	ByteString	83
8.11	DateTime	83
8.12	Double	83
8.13	Duration.....	84
8.14	Enumeration	84
8.15	Float	84
8.16	Guid.....	84
8.17	SByte.....	84
8.18	IdType	84
8.19	Image	84
8.20	ImageBMP	84
8.21	ImageGIF.....	84
8.22	ImageJPG	84
8.23	ImagePNG	84
8.24	Integer	85
8.25	Int16	85
8.26	Int32	85

8.27	Int64	85
8.28	TimeZoneDataType.....	85
8.29	NamingRuleType	85
8.30	NodeClass	85
8.31	Number.....	86
8.32	String.....	86
8.33	Structure.....	86
8.34	UInteger.....	86
8.35	UInt16.....	86
8.36	UInt32.....	86
8.37	UInt64.....	86
8.38	UtcTime	86
8.39	XmlElement	87
8.40	EnumValueType.....	87
8.41	OptionSet	87
8.42	Union	88
8.43	DateString	88
8.44	DecimalString	88
8.45	DurationString.....	88
8.46	NormalizedString	89
8.47	TimeString	89
8.48	DataTypeDefinition	89
8.49	StructureDefinition	89
8.50	EnumDefinition	90
8.51	StructureField	90
8.52	EnumField	91
8.53	AudioDataType	91
8.54	Decimal	91
8.55	PermissionType	92
8.56	AccessRestrictionsType.....	93
8.57	AccessLevelType	93
8.58	AccessLevelExType.....	94
8.59	EventNotifierType	95
8.60	AttributeWriteMask.....	95
9	Standard EventTypes	96
9.1	General.....	96
9.2	BaseEventType.....	97
9.3	SystemEventType	97
9.4	ProgressEventType.....	97
9.5	AuditEventType	98
9.6	AuditSecurityEventType	99
9.7	AuditChannelEventType.....	99
9.8	AuditOpenSecureChannelEventType	99
9.9	AuditSessionEventType	99
9.10	AuditCreateSessionEventType.....	99
9.11	AuditUrlMismatchEventType	100
9.12	AuditActivateSessionEventType.....	100
9.13	AuditCancelEventType.....	100
9.14	AuditCertificateEventType.....	100

9.15	AuditCertificateDataMismatchEventType	100
9.16	AuditCertificateExpiredEventType	100
9.17	AuditCertificateInvalidEventType	100
9.18	AuditCertificateUntrustedEventType	100
9.19	AuditCertificateRevokedEventType	100
9.20	AuditCertificateMismatchEventType	101
9.21	AuditNodeManagementEventType	101
9.22	AuditAddNodesEventType	101
9.23	AuditDeleteNodesEventType	101
9.24	AuditAddReferencesEventType	101
9.25	AuditDeleteReferencesEventType	101
9.26	AuditUpdateEventType	101
9.27	AuditWriteUpdateEventType	101
9.28	AuditHistoryUpdateEventType	101
9.29	AuditUpdateMethodEventType	101
9.30	DeviceFailureEventType	101
9.31	SystemStatusChangeEvent	102
9.32	ModelChangeEvents	102
9.32.1	General	102
9.32.2	NodeVersion Property	102
9.32.3	Views	102
9.32.4	Event compression	102
9.32.5	BaseModelChangeEvent	102
9.32.6	GeneralModelChangeEvent	103
9.32.7	Guidelines for ModelChangeEvents	103
9.33	SemanticChangeEvent	103
9.33.1	General	103
9.33.2	ViewVersion and NodeVersion Properties	103
9.33.3	Views	103
9.33.4	Event compression	104
Annex A	(informative) How to use the Address Space Model	105
A.1	Overview	105
A.2	Type definitions	105
A.3	ObjectTypes	105
A.4	VariableTypes	106
A.4.1	General	106
A.4.2	Properties or DataVariables	106
A.4.3	Many Variables and/or structured DataTypes	106
A.5	Views	107
A.6	Methods	107
A.7	Defining ReferenceTypes	107
A.8	Defining ModellingRules	107
Annex B	(informative) OPC UA Meta Model in UML	108
B.1	Background	108
B.2	Notation	108
B.3	Meta Model	110
B.3.1	Base	110
B.3.2	ReferenceType	110
B.3.3	Predefined ReferenceTypes	111

B.3.4	Attributes	111
B.3.5	Object and ObjectType	112
B.3.6	EventNotifier	113
B.3.7	Variable and VariableType	113
B.3.8	Method	114
B.3.9	DataType	115
B.3.10	View	116
Annex C (normative)	Graphical notation	117
C.1	General	117
C.2	Notation	117
C.2.1	Overview	117
C.2.2	Simple notation	117
C.2.3	Extended notation	119
Bibliography	122
Figure 1	– AddressSpace Node diagrams	14
Figure 2	– OPC UA Object Model	16
Figure 3	– AddressSpace Node Model	17
Figure 4	– Reference Model	18
Figure 5	– Example of a Variable defined by a VariableType	20
Figure 6	– Example of a Complex TypeDefinition	20
Figure 7	– Object and its Components defined by an ObjectType	21
Figure 8	– Permissions in the Address Space	31
Figure 9	– Symmetric and Non-Symmetric References	33
Figure 10	– Variables, VariableTypes and their DataTypes	52
Figure 11	– DataType Model	52
Figure 12	– Example of DataType Modelling	56
Figure 13	– Subtyping TypeDefinitionNodes	60
Figure 14	– The Fully-Inherited InstanceDeclarationHierarchy for BetaType	62
Figure 15	– An Instance and its TypeDefinitionNode	63
Figure 16	– Example of several References between InstanceDeclarations	64
Figure 17	– Example of changing instances based on InstanceDeclarations	66
Figure 18	– Example of changing InstanceDeclarations based on an InstanceDeclaration	67
Figure 19	– Use of the Standard ModellingRule Mandatory	68
Figure 20	– Example using the Standard ModellingRules Optional and Mandatory	69
Figure 21	– Example of using ExposesItsArray	70
Figure 22	– Complex example of using ExposesItsArray	70
Figure 23	– Example using OptionalPlaceholder with an Object and Variable	70
Figure 24	– Example using OptionalPlaceholder with a Method	71
Figure 25	– Example of using MandatoryPlaceholder for Object and Variable	72
Figure 26	– Standard ReferenceType Hierarchy	73
Figure 27	– Event Reference Example	78
Figure 28	– Complex Event Reference Example	79
Figure 29	– Standard EventType Hierarchy	97

Figure 30 – Audit Behaviour of a Server.....	98
Figure 31 – Audit Behaviour of an Aggregating Server.....	99
Figure B.1 – Background of OPC UA Meta Model	108
Figure B.2 – Notation (I)	109
Figure B.3 – Notation (II)	109
Figure B.4 – Base	110
Figure B.5 – Reference and ReferenceType.....	110
Figure B.6 – Predefined ReferenceTypes.....	111
Figure B.7 – Attributes	112
Figure B.8 – Object and ObjectType	113
Figure B.9 – EventNotifier	113
Figure B.10 – Variable and VariableType	114
Figure B.11 – Method	115
Figure B.12 – DataType	115
Figure B.13 – View	116
Figure C.1 – Example of a Reference connecting two Nodes	118
Figure C.2 – Example of using a TypeDefinition inside a Node	120
Figure C.3 – Example of exposing Attributes.....	120
Figure C.4 – Example of exposing Properties inline	121
Table 1 – NodeClass Table Conventions.....	15
Table 2 – Well-known Roles.....	25
Table 3 – Example Roles	26
Table 4 – Example Nodes	26
Table 5 – Example Role assignment	27
Table 6 – Examples of evaluating access.....	27
Table 7 – Base NodeClass.....	28
Table 8 – RolePermissionType	30
Table 9 – ReferenceType NodeClass	32
Table 10 – View NodeClass	35
Table 11 – Object NodeClass	37
Table 12 – ObjectType NodeClass	39
Table 13 – Variable NodeClass.....	41
Table 14 – VariableType NodeClass	47
Table 15 – Method NodeClass	50
Table 16 – DataType NodeClass.....	54
Table 17 – Overview of Attributes	57
Table 18 – The InstanceDeclarationHierarchy for BetaType	60
Table 19 – The Fully-Inherited InstanceDeclarationHierarchy for BetaType.....	61
Table 20 – Rule for ModellingRules Properties when Subtyping.....	66
Table 21 – Properties of ModellingRules	67
Table 22 – NodeId Definition.....	79
Table 23 – IdentifierType Values.....	80

Table 24 – NodeId Null Values	81
Table 25 – QualifiedName Definition	81
Table 26 – LocaleId Examples	82
Table 27 – LocalizedText Definition	82
Table 28 – Argument Definition	83
Table 29 – TimeZoneDataType Definition	85
Table 30 – NamingRuleType Values	85
Table 31 – NodeClass Values	86
Table 32 – EnumValueType Definition	87
Table 33 – OptionSet Definition	88
Table 34 – StructureDefinition Structure	90
Table 35 – EnumDefinition Structure	90
Table 36 – StructureField Structure	91
Table 37 – EnumField Structure	91
Table 38 – PermissionType Definition	92
Table 39 – AccessRestrictionsType Definition	93
Table 40 – AccessLevelType Definition	94
Table 41 – AccessLevelExType Definition	94
Table 42 – EventNotifierType Definition	95
Table 43 – Bit mask for WriteMask and UserWriteMask	96
Table C.1 – Notation of Nodes depending on the NodeClass	118
Table C.2 – Simple Notation of Nodes depending on the NodeClass	119

INTERNATIONAL ELECTROTECHNICAL COMMISSION

OPC UNIFIED ARCHITECTURE –

Part 3: Address Space Model

FOREWORD

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International Standard IEC 62541-3 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 includes the following significant technical changes with respect to the previous edition:

- a) Added new improved approach for exposing structure definitions. An Attribute on the Data Type Node now simply contains a binary description.
- b) Added new flags for Variables to indicate atomicity when reading or writing.
- c) Added Roles and Permissions to allow configuration of a role-based authorization.
- d) Added new data types: “Union”, “Decimal”, “OptionSet”, “DateString”, “TimeString”, “DurationString”, “NormalizedString”, “DecimalString”, and “AudioDataType”.

- e) Added definition on how to use the ModellingRules OptionalPlaceholder and MandatoryPlaceholder for Methods.
- f) Added optional Properties “MaxCharacters” and “MaxByteStringLength” to Variable Nodes.

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

FDIS	Report on voting
65E/715/FDIS	65E/731/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, with a few exceptions, written in camel-case (the practice of writing compound words or phrases in which the elements are joined without spaces, with each element's initial letter capitalized within the compound). For example the defined term is *AddressSpace* instead of Address Space. This makes it easier to understand that there is a single definition for *AddressSpace*, not separate definitions for Address and Space.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

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

OPC UNIFIED ARCHITECTURE –

Part 3: Address Space Model

1 Scope

This part of IEC 62541 defines the OPC Unified Architecture (OPC UA) *AddressSpace* and its *Objects*. This document is the OPC UA meta model on which OPC UA information models are based.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

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

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

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

IEC 62541-8, *OPC Unified Architecture – Part 8: Data Access*

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

ISO 639 (all parts), *Codes for the representation of names of languages*

ISO 3166 (all parts), *Codes for the representation of names of countries and their subdivisions*

ISO 8601 (all parts), *Date and time – Representations for information interchange*

IETF RFC 5646, Tags for Identifying Languages
<http://tools.ietf.org/html/rfc5646>

Unicode Standard Annex #15: Unicode Normalization Forms,
<http://www.unicode.org/reports/tr15/>

W3C XML Schema Definition Language (XSD) Part 2: DataTypes
<http://www.w3.org/TR/xmlschema-2/>

TAI: International Atomic Time
<http://www.bipm.org/en/bipm-services/timescales/tai.html>

SOMMAIRE

AVANT-PROPOS	132
1 Domaine d'application	134
2 Références normatives	134
3 Termes, définitions, termes abrégés et conventions	135
3.1 Termes et définitions	135
3.2 Termes abrégés	136
3.3 Conventions	136
3.3.1 Conventions pour les figures d'AddressSpace	136
3.3.2 Conventions pour la définition des NodeClasses	137
4 Concepts de l'AddressSpace	138
4.1 Vue d'ensemble	138
4.2 Modèle d'objet	138
4.3 Modèle de nœud	139
4.3.1 Généralités	139
4.3.2 NodeClasses	139
4.3.3 Attributs	139
4.3.4 Références	140
4.4 Variables	140
4.4.1 Généralités	140
4.4.2 Propriétés	140
4.4.3 DataVariables	141
4.5 TypeDefinitionNodes	141
4.5.1 Généralités	141
4.5.2 TypeDefinitionNodes complexes et leurs InstanceDeclarations	142
4.5.3 Sous-typage	143
4.5.4 Instanciation de TypeDefinitionNodes complexes	143
4.6 Modèle d'événement	145
4.6.1 Généralités	145
4.6.2 EventTypes	145
4.6.3 Catégorisation des Evénements	146
4.7 Méthodes	146
4.8 Rôles	147
4.8.1 Vue d'ensemble	147
4.8.2 Rôles notoires	147
4.8.3 Evaluation des Autorisations avec les Rôles	148
5 NodeClasses normalisées	151
5.1 Vue d'ensemble	151
5.2 NodeClass Base	151
5.2.1 Généralités	151
5.2.2 NodeId	151
5.2.3 NodeClass	151
5.2.4 BrowseName	152
5.2.5 DisplayName	152
5.2.6 Description	152
5.2.7 WriteMask	152
5.2.8 UserWriteMask	153

5.2.9	RolePermissions.....	153
5.2.10	UserRolePermissions	154
5.2.11	AccessRestrictions	154
5.3	NodeClass ReferenceType	155
5.3.1	Généralités	155
5.3.2	Attributs.....	156
5.3.3	Références	157
5.4	NodeClass Vue	158
5.5	Objets.....	160
5.5.1	NodeClass Objet	160
5.5.2	NodeClass ObjectType	162
5.5.3	ObjectType FolderType normalisé	164
5.5.4	Création du côté client d'Objets d'un ObjectType donné	164
5.6	Variables	165
5.6.1	Généralités	165
5.6.2	NodeClass Variables	165
5.6.3	Propriétés.....	169
5.6.4	DataVariable.....	170
5.6.5	NodeClass VariableType	171
5.6.6	Création du côté client de Variables VariableType	174
5.7	NodeClass Méthode.....	174
5.8	DataTypes	177
5.8.1	Modèle de DataType.....	177
5.8.2	Règles d'encodage pour différents types de DataTypes	178
5.8.3	NodeClass DataType	179
5.8.4	DataTypeEncoding et information sur l'encodage.....	182
5.9	Récapitulatif des Attributs des NodeClasses	182
6	Modèle type d'ObjectTypes et de VariableTypes.....	183
6.1	Vue d'ensemble	183
6.2	Définitions.....	183
6.2.1	InstanceDeclaration	183
6.2.2	Instances sans ModellingRules.....	184
6.2.3	InstanceDeclarationHierarchy	184
6.2.4	Nœud similaire à l'InstanceDeclaration	184
6.2.5	BrowsePath	184
6.2.6	Traitement des Attributs des InstanceDeclarations	184
6.2.7	Traitement des Attributs de Variables et de VariableTypes	184
6.2.8	NodeIds des InstanceDeclarations	185
6.3	Sous-typage d'ObjectTypes et de VariableTypes	185
6.3.1	Vue d'ensemble	185
6.3.2	Attributs.....	185
6.3.3	InstanceDeclarations	185
6.4	Instances d'ObjectTypes et de VariableTypes	190
6.4.1	Vue d'ensemble	190
6.4.2	Création d'une Instance	190
6.4.3	Contraintes applicables à une Instance.....	191
6.4.4	ModellingRules	192
6.5	Modifications des définitions de type déjà utilisées	200
7	ReferenceTypes normalisés	201

7.1	Généralités	201
7.2	ReferenceType Références.....	201
7.3	ReferenceType HierarchicalReferences	202
7.4	ReferenceType NonHierarchicalReferences	202
7.5	ReferenceType HasChild	202
7.6	ReferenceType	202
7.7	ReferenceType HasComponent	203
7.8	ReferenceType HasProperty	203
7.9	ReferenceType HasOrderedComponent.....	203
7.10	ReferenceType HasSubtype.....	203
7.11	ReferenceType Organizes.....	204
7.12	ReferenceType HasModellingRule	204
7.13	ReferenceType HasTypeDefinition	204
7.14	ReferenceType HasEncoding.....	204
7.15	GeneratesEvent.....	205
7.16	AlwaysGeneratesEvent	205
7.17	HasEventSource	205
7.18	HasNotifier.....	206
8	DataTypes normalisés	207
8.1	Généralités	207
8.2	Nodeld.....	207
8.2.1	Généralités.....	207
8.2.2	NamespaceIndex.....	208
8.2.3	IdentifiantType	208
8.2.4	Valeur d'identificateur	209
8.3	QualifiedName	209
8.4	LocaleId.....	209
8.5	LocalizedText	210
8.6	Argument	210
8.7	BaseDataType	211
8.8	Boolean	211
8.9	Byte	211
8.10	ByteString.....	211
8.11	DateTime	211
8.12	Double.....	211
8.13	Duration.....	212
8.14	Enumeration	212
8.15	Float	212
8.16	Guid.....	212
8.17	SByte.....	212
8.18	IdType	212
8.19	Image	212
8.20	ImageBMP	212
8.21	ImageGIF.....	212
8.22	ImageJPG	212
8.23	ImagePNG	213
8.24	Entier.....	213
8.25	Int16	213
8.26	Int32	213

8.27	Int64	213
8.28	TimeZoneDataType.....	213
8.29	NamingRuleType	213
8.30	NodeClass	213
8.31	Nombre.....	214
8.32	String.....	214
8.33	Structure.....	214
8.34	UInteger.....	214
8.35	UInt16.....	214
8.36	UInt32.....	214
8.37	UInt64.....	214
8.38	UtcTime	214
8.39	XmlElement	215
8.40	EnumValueType.....	215
8.41	OptionSet	216
8.42	Union	216
8.43	DateString	216
8.44	DecimalString	216
8.45	DurationString.....	217
8.46	NormalizedString	217
8.47	TimeString	217
8.48	DataTypeDefinition	218
8.49	StructureDefinition	218
8.50	EnumDefinition	218
8.51	StructureField	218
8.52	EnumField	219
8.53	Type d'AudioData	219
8.54	Décimal	220
8.55	PermissionType	220
8.56	AccessRestrictionsType.....	221
8.57	AccessLevelType	221
8.58	AccessLevelExType.....	222
8.59	EventNotifierType	223
8.60	AttributeWriteMask.....	223
9	EventTypes normalisés.....	224
9.1	Généralités	224
9.2	BaseEventType.....	225
9.3	SystemEventType	225
9.4	ProgressEventType.....	225
9.5	AuditEventType	226
9.6	AuditSecurityEventType	227
9.7	AuditChannelEventType.....	227
9.8	AuditOpenSecureChannelEventType	227
9.9	AuditSessionEventType	228
9.10	AuditCreateSessionEventType.....	228
9.11	AuditUrlMismatchEventType	228
9.12	AuditActivateSessionEventType.....	228
9.13	AuditCancelEventType.....	228
9.14	AuditCertificateEventType.....	228

9.15	AuditCertificateDataMismatchEventType	228
9.16	AuditCertificateExpiredEventType	228
9.17	AuditCertificateInvalidEventType	228
9.18	AuditCertificateUntrustedEventType	229
9.19	AuditCertificateRevokedEventType	229
9.20	AuditCertificateMismatchEventType	229
9.21	AuditNodeManagementEventType	229
9.22	AuditAddNodesEventType	229
9.23	AuditDeleteNodesEventType	229
9.24	AuditAddReferencesEventType	229
9.25	AuditDeleteReferencesEventType	229
9.26	AuditUpdateEventType	229
9.27	AuditWriteUpdateEventType	230
9.28	AuditHistoryUpdateEventType	230
9.29	AuditUpdateMethodEventType	230
9.30	DeviceFailureEventType	230
9.31	SystemStatusChangeEvent	230
9.32	ModelChangeEvents	230
9.32.1	Généralités	230
9.32.2	Propriété NodeVersion	230
9.32.3	Vue	230
9.32.4	Compression d'Evénements	231
9.32.5	BaseModelChangeEvent	231
9.32.6	GeneralModelChangeEvent	231
9.32.7	Lignes directrices des ModelChangeEvents	231
9.33	SemanticChangeEvent	232
9.33.1	Généralités	232
9.33.2	Propriétés ViewVersion et Nodeversion	232
9.33.3	Vue	232
9.33.4	Compression d'Evénements	232
Annexe A (informative) Comment utiliser le Modèle d'espace d'adressage		233
A.1	Vue d'ensemble	233
A.2	Définitions de type	233
A.3	ObjectTypes	233
A.4	VariableTypes	234
A.4.1	Généralités	234
A.4.2	Propriétés ou DataVariables	234
A.4.3	Variables nombreuses et/ou DataTypes structurés	234
A.5	Vue	235
A.6	Méthodes	235
A.7	Définition des ReferenceTypes	235
A.8	Définition des ModellingRules	236
Annexe B (informative) Métamodèle OPC UA en langage UML		237
B.1	Contexte	237
B.2	Notation	237
B.3	Métamodèle	239
B.3.1	Base	239
B.3.2	ReferenceType	239
B.3.3	ReferenceTypes prédéfinis	241

B.3.4	Attributs	241
B.3.5	Objet et ObjectType	242
B.3.6	EventNotifier	243
B.3.7	Variable et VariableType	243
B.3.8	Méthode	244
B.3.9	DataType	245
B.3.10	Vue	246
Annexe C (normative)	Notation graphique	247
C.1	Généralités	247
C.2	Notation	247
C.2.1	Vue d'ensemble	247
C.2.2	Notation Simple	247
C.2.3	Notation étendue	249
Bibliographie		252
Figure 1	– Diagrammes des Nœuds de l'AddressSpace	136
Figure 2	– Modèle d'objet OPC UA	138
Figure 3	– Modèle de nœud de l'AddressSpace	139
Figure 4	– Modèle de référence	140
Figure 5	– Exemple d'une Variable définie par un VariableType	142
Figure 6	– Exemple d'une TypeDefinition complexe	143
Figure 7	– Objet et ses composants définis par un ObjectType	144
Figure 8	– Autorisations dans l'Espace d'adressage	154
Figure 9	– Références symétriques et non symétriques	156
Figure 10	– Variables, VariableTypes et DataTypes correspondants	177
Figure 11	– Modèle de DataType	178
Figure 12	– Exemple de modélisation de DataType	182
Figure 13	– Sous-typage des TypeDefinitionNodes	186
Figure 14	– InstanceDeclarationHierarchy intégralement héritée pour "BetaType"	189
Figure 15	– Instance et son TypeDefinitionNode	190
Figure 16	– Exemple de plusieurs Références entre InstanceDeclarations	192
Figure 17	– Exemple de modification d'instances sur la base des InstanceDeclarations	194
Figure 18	– Exemple de modification d'InstanceDeclarations reposant sur une InstanceDeclaration	195
Figure 19	– Utilisation de la ModellingRule normalisée Mandatory	196
Figure 20	– Exemple d'utilisation des ModellingRules normalisées Optional et Mandatory	197
Figure 21	– Exemple d'utilisation de la ModellingRule ExposesItsArray	198
Figure 22	– Exemple complexe d'utilisation d'ExposesItsArray	198
Figure 23	– Exemple d'utilisation d'OptionalPlaceholder avec un Objet et une Variable	198
Figure 24	– Exemple d'utilisation d'OptionalPlaceholder avec une Méthode	199
Figure 25	– Exemple d'utilisation de MandatoryPlaceholder pour un Objet et une Variable	200
Figure 26	– Hiérarchie d'un ReferenceType normalisé	201
Figure 27	– Exemple de Références Événement	206

Figure 28 – Exemple de Référence à des Evénements complexes	207
Figure 29 – Hiérarchie d'un EventType normalisé	225
Figure 30 – Comportement d'un Serveur en audit	226
Figure 31 – Comportement d'un Serveur de regroupement en audit	227
Figure B.1 – Contexte du Métamodèle OPC UA	237
Figure B.2 – Notation (I)	238
Figure B.3 – Notation (II)	238
Figure B.4 – Base	239
Figure B.5 – Reference et ReferenceType	240
Figure B.6 – ReferenceTypes prédéfinis	241
Figure B.7 – Attributs	242
Figure B.8 – Objet et ObjectType	243
Figure B.9 – EventNotifier	243
Figure B.10 – Variable et VariableType	244
Figure B.11 – Method	245
Figure B.12 – DataType	245
Figure B.13 – View	246
Figure C.1 – Exemple d'une Référence reliant deux Nœuds.....	248
Figure C.2 – Exemple d'utilisation d'une TypeDefinition dans un Nœud	250
Figure C.3 – Exemple de présentation des Attributs.....	250
Figure C.4 – Exemple de présentation de Propriétés en ligne	251
Tableau 1 – Conventions des tableaux de NodeClasses	137
Tableau 2 – Rôles notoires	148
Tableau 3 – Exemples de Rôles.....	149
Tableau 4 – Exemples de Nœuds	149
Tableau 5 – Exemple d'attribution de Rôle	150
Tableau 6 – Exemples d'évaluations d'accès	150
Tableau 7 – NodeClass Base.....	151
Tableau 9 – NodeClass ReferenceType	155
Tableau 10 – NodeClass Vue.....	159
Tableau 11 – NodeClass Objet	161
Tableau 12 – NodeClass ObjectType	163
Tableau 13 – NodeClass Variables	165
Tableau 14 – NodeClass VariableType	172
Tableau 15 – NodeClass Méthode	175
Tableau 16 – NodeClass DataType.....	180
Tableau 17 – Vue d'ensemble des Attributs	183
Tableau 18 – InstanceDeclarationHierarchy pour "BetaType".....	187
Tableau 19 – InstanceDeclarationHierarchy intégralement héritée pour "BetaType"	188
Tableau 20 – Règles applicables aux Propriétés des ModellingRules en cas de sous- typage	193
Tableau 21 – Propriétés des ModellingRules	195

Tableau 22 – Définition de NodeId	207
Tableau 23 – Valeurs d'IdentifierType	208
Tableau 24 – Valeurs de NodeId nulles	209
Tableau 25 – Définition de QualifiedName	209
Tableau 26 – Exemples de LocaleIds	210
Tableau 27 – Définition de LocalizedText	210
Tableau 28 – Définition des Arguments	211
Tableau 29 – Définition de TimeZoneDataType	213
Tableau 30 – Valeurs de NamingRuleType	213
Tableau 31 – Valeurs de NodeClass	214
Tableau 32 – Définition d'EnumValueType	215
Tableau 33 – Définition d'OptionSet	216
Tableau 34 – Structure de StructureDefinition	218
Tableau 35 – Structure d'EnumDefinition	218
Tableau 36 – Structure de StructureField	219
Tableau 37 – Structure d'EnumField	219
Tableau 38 – Définition de PermissionType	220
Tableau 39 – Définition d'AccessRestrictionsType	221
Tableau 40 – Définition d'AccessLevelType	222
Tableau 41 – Définition d'AccessLevelExType	222
Tableau 42 – Définition d'EventNotifierType	223
Tableau 43 – Masque de bits pour WriteMask et UserWriteMask	224
Tableau C.1 – Notation des Nœuds en fonction de la NodeClass	248
Tableau C.2 – Notation Simple de Nœuds en fonction de la NodeClass	249

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

ARCHITECTURE UNIFIÉE OPC –

Partie 3: Modèle d'espace d'adressage

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Cette troisième édition annule et remplace la deuxième édition parue en 2015.

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

- a) ajout d'une nouvelle approche améliorée afin de présenter les définitions de la structure (un Attribut sur le Nœud du DataType contient désormais simplement une description binaire);
- b) ajout de nouveaux fanions pour les Variables afin d'indiquer l'atomicité à la lecture ou à l'écriture;

- c) ajout de Rôles et d'Autorisations afin de permettre la configuration d'une autorisation fondée sur les rôles;
- d) ajout de nouveaux types de données: "Union", "Decimal", "OptionSet", "DateString", "TimeString", "DurationString", "NormalizedString", "DecimalString" et "AudioDataType";
- e) ajout d'une définition expliquant comment utiliser les OptionalPlaceholder et MandatoryPlaceholder de ModellingRules pour les Méthodes;
- f) ajout de Propriétés facultatives "MaxCharacters" et "MaxByteStringLength" aux Nœuds de variable.

Le texte de ce rapport technique est issu des documents suivants:

FDIS	Rapport de vote
65E/715/FDIS	65E/731/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 référencées 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, à quelques exceptions près, 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

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ARCHITECTURE UNIFIÉE OPC –

Partie 3: Modèle d'espace d'adressage

1 Domaine d'application

La présente partie de l'IEC 62541 définit l'*AddressSpace* de l'Architecture Unifiée OPC (OPC UA) et ses *Objets*. Le présent document correspond au métamodèle OPC UA sur lequel se fondent les modèles d'information OPC UA.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. 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 62541-4, *Architecture unifiée OPC – Partie 4: Services*

IEC 62541-5:–, *Architecture unifiée OPC – Partie 5: Modèle d'information*

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

IEC 62541-8, *Architecture unifiée OPC – Partie 8: Accès aux données*

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

ISO 639 (toutes les parties), *Codes pour la représentation des noms de langue*

ISO 3166 (toutes les parties), *Codes pour la représentation des noms de pays et de leurs subdivisions*

ISO 8601 (toutes les parties), *Date and time – Representations for information interchange* (disponible en anglais seulement)

IETF RFC 5646, *Tags for Identifying Languages* (disponible en anglais seulement)
<http://tools.ietf.org/html/rfc5646>

Unicode Standard Annex #15: *Unicode Normalization Forms* (disponible en anglais seulement) <http://www.unicode.org/reports/tr15/>

W3C XML Schema Definition Language (XSD) Part 2: *DataTypes* (disponible en anglais seulement) <http://www.w3.org/TR/xmlschema-2/>

TAI: Temps Atomique International
<http://www.bipm.org/en/bipm-services/timescales/tai.html>