|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| |  | | --- | |  | |  |  | OPC UA |
|  | | |
| OPC for Example  Part 1: Example (Exp)  Draft 1.0.0  2022-01-06 | | |

**CONTENTS**

[**Figures** ii](#_Toc95825526)

[**Tables** iii](#_Toc95825527)

[1 Scope 4](#_Toc95825528)

[2 Normative references 4](#_Toc95825529)

[3 Terms, abbreviated terms and conventions 5](#_Toc95825530)

[4 General information to Example and OPC UA 6](#_Toc95825531)

[5 Use Cases 6](#_Toc95825532)

[6 Example Information Model overview 7](#_Toc95825533)

[7 OPC UA ObjectTypes 8](#_Toc95825534)

[7.1 {browsename} 8](#_Toc95825535)

[8 OPC UA EventTypes 10](#_Toc95825536)

[8.1 {browsename} 10](#_Toc95825537)

[9 OPC UA VariableTypes 11](#_Toc95825538)

[9.1 {browsename} 11](#_Toc95825539)

[10 OPC UA DataTypes 12](#_Toc95825540)

[10.1 {browsename} 12](#_Toc95825541)

[10.2 {browsename} 13](#_Toc95825542)

[11 OPC UA ReferenceTypes 14](#_Toc95825543)

[11.1 <someReferenceType> 14](#_Toc95825544)

[12 Namespaces 15](#_Toc95825545)

[12.1 Namespace Metadata 15](#_Toc95825546)

[12.2 Handling of OPC UA Namespaces 15](#_Toc95825547)

[Annex A (normative) Example Namespace and mappings 17](#_Toc95825548)

[A.1 Namespace and identifiers for Example Information Model 17](#_Toc95825549)

**Figures**

**No table of figures entries found.**

**Tables**

[Table 1 – {*browsename*} Definition 7](#_Toc95825661)

[Table 2 – {*browsename*} Definition 9](#_Toc95825662)

[Table 3 – {*browsename*} Definition 10](#_Toc95825663)

[Table 4 – {*browsename*} Structure Definition 11](#_Toc95825664)

[Table 5 – {*browsename*} Definition 11](#_Toc95825665)

[Table 6 – {*browsename*} Items 12](#_Toc95825666)

[Table 7 – {*browsename*} Definition 12](#_Toc95825667)

[Table 8 - NamespaceMetadata Object for this Document 14](#_Toc95825668)

[Table 9 – Namespaces used in a Example Server 14](#_Toc95825669)

[Table 10 – Namespaces used in this document 15](#_Toc95825670)

Example

Part 1: Example

# Scope

This document specifies the object model for an example node set.

OPC Foundation

OPC is the interoperability standard for the secure and reliable exchange of data and information in the industrial automation space and in other industries. It is platform independent and ensures the seamless flow of information among devices from multiple vendors. The OPC Foundation is responsible for the development and maintenance of this standard.

OPC UA is a platform independent service-oriented architecture that integrates all the functionality of the individual OPC Classic specifications into one extensible framework. This multi-layered approach accomplishes the original design specification goals of:

* Platform independence: from an embedded microcontroller to cloud-based infrastructure
* Secure: encryption, authentication, authorization and auditing
* Extensible: ability to add new features including transports without affecting existing applications
* Comprehensive information modelling capabilities: for defining any model from simple to complex

# Normative references

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

The minimum required version for the following OPC Unified Architecture parts is 1.04.03.

OPC 10000-1, *OPC Unified Architecture - Part 1: Overview and Concepts*

<http://www.opcfoundation.org/UA/Part1/>

OPC 10001-1, *OPC Unified Architecture V1.04 - Amendment 1: AnalogItem Types*

<http://www.opcfoundation.org/UA/Amendment1/>

OPC 10000-2, *OPC Unified Architecture - Part 2: Security Model*

<http://www.opcfoundation.org/UA/Part2/>

OPC 10000-3, *OPC Unified Architecture - Part 3: Address Space Model*

<http://www.opcfoundation.org/UA/Part3/>

OPC 10000-5, *OPC Unified Architecture - Part 5: Information Model*

<http://www.opcfoundation.org/UA/Part5/>

OPC 10000-8, *OPC Unified Architecture - Part 8: Data Access*

<http://www.opcfoundation.org/UA/Part8/>

# Terms, abbreviated terms and conventions

<Add your content>

# General information to Example and OPC UA

<Add your content>

# Use Cases

<Add your content>

# Example Information Model overview

<Add your content>

# OPC UA ObjectTypes

{#objectTypes}

## {browsename}

The {*browsename*} is a subtype of the {superType}. {description}

The {*browsename*} is formally defined in Table 1.

Table 1 – {*browsename*} Definition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute** | **Value** | | | | |
| Browsename | {*browsename*} | | | | |
| IsAbstract | {*isAbstract*} | | | | |
| **References** | **Node Class** | **Browsename** | **DataType** | **TypeDefinition** | **Other** |
| Subtype of the {superType} defined in {superTypeSrc} i.e. inheriting the InstanceDeclarations of that Node. | | | | | |
| {#childrows}{referenceType} | {nodeClass} | {*browsename*} | {#datatype}{datatype}{/datatype} | {typedefinition} | {modelingrule}{/childrows} |

{#childrows**}**

**{browsename}:** {description}

{#baseObject}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute** | **Value** | | | | |
| Browsename | {*browsename*} | | | | |
| **References** | **Node Class** | **Browsename** | **DataType** | **TypeDefinition** | **Other** |
| BaseObjectType used in the ObjectType definition {objectType*Browsename*}. | | | | | |
| {#childrows}{referenceType} | {nodeClass} | {*browsename*} | {#datatype}{datatype}{/datatype} | {typedefinition} | {modelingrule}{/childrows} |

{#childrows**}**

**{browsename}:** {description}

{#multiStateValue}Enum Values for *MultiStateValueDiscreteTyp*e Variable:

|  |  |  |
| --- | --- | --- |
| **Value** | **Name** | **Description** |
| {#rows}{value} | {browsename} | {description}{/rows} |

{/multiStateValue}{#property}Additional Properties of the Variable:

|  |  |  |
| --- | --- | --- |
| **Browsename** | **DataType** | **Description** |
| {#rows}{browsename} | {datatype} | {description}{/rows} |

{/property}{#method}Method Arguments:

|  |  |  |
| --- | --- | --- |
| **Browsename** | **DataType** | **Description** |
| **InputArguments** | | |
| {#inputrows}{browsename} | {datatype} | {description}{/inputrows} |
| **OutputArguments** | | |
| {#outputrows}{browsename} | {datatype} | {description}{/outputrows} |

{/method}{/childrows**}**{/baseObject}{#multiStateValue}Enum Values for *MultiStateValueDiscreteTyp*e Variable:

|  |  |  |
| --- | --- | --- |
| **Value** | **Name** | **Description** |
| {#rows}{value} | {browsename} | {description}{/rows} |

{/multiStateValue}{#property}Additional Properties of the Variable:

|  |  |  |
| --- | --- | --- |
| **Browsename** | **DataType** | **Description** |
| {#rows}{browsename} | {datatype} | {description}{/rows} |

{/property}{#method}Method Arguments:

|  |  |  |
| --- | --- | --- |
| **Browsename** | **DataType** | **Description** |
| **InputArguments** | | |
| {#inputrows}{browsename} | {datatype} | {description}{/inputrows} |
| **OutputArguments** | | |
| {#outputrows}{browsename} | {datatype} | {description}{/outputrows} |

{/method}{/childrows}{/objectTypes}

# OPC UA EventTypes

{#eventTypes}

## {browsename}

The {*browsename*} is a subtype of the {superType}. {description}

The {*browsename*} is formally defined in Table 2.

Table 2 – {*browsename*} Definition

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Attribute** | | **Value** | | | | | |
| Browsename | | {*browsename*} | | | | | |
| IsAbstract | | {*isAbstract*} | | | | | |
| **References** | **NodeClass** | | **Browsename** | **DataType** | **TypeDefinition** | | **Other** |
| Subtype of the {superType} defined in {superTypeSrc} i.e. inheriting the InstanceDeclarations of that Node. | | | | | | | |
| {#childrows}{referenceType} | {nodeClass} | | {*browsename*} | {#datatype}{datatype}{/datatype} | {typedefinition} | {modelingrule}{/childrows} | |

{#childrows}

**{browsename}:** {description}

{/childrows}

{/eventTypes}

# OPC UA VariableTypes

{#variableTypes}

## {browsename}

The {*browsename*} is a subtype of the {superType}. {description}

It is formally defined in Table 3.

Table 3 – {*browsename*} Definition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Attribute** | | **Value** | | | | |
| Browsename | | *{browsename*} | | | | |
| IsAbstract | | {*isAbstract*} | | | | |
| ValueRank | | −1 (−1 = Scalar) | | | | |
| DataType | | String | | | | |
| **References** | **NodeClass** | | **Browsename** | **DataType** | **TypeDefinition** | **Other** |
| Subtype of the {superType} defined in {superTypeSrc} i.e. inheriting the InstanceDeclarations of that Node. | | | | | | |
| {#childrows}{referenceType} | {nodeClass} | | {*browsename*} | {#datatype}{datatype}{/datatype} | {typedefinition} | {modelingrule}{/childrows} |

{#childrows}

**{browsename}:** {description}

{/childrows}

{/variableTypes}

# OPC UA DataTypes

{#structures}

## {browsename}

{description}

The structure is defined in Table 4.

Table 4 – {*browsename*} Structure Definition

|  |  |  |
| --- | --- | --- |
| Name | Type | Description |
| *{browsename*} | structure | Subtype of {superType} defined in {superTypeSrc} |
| {#childrows}{*browsename}* | {#datatype}{datatype}{/datatype} | {description}{/childrows} |

Its representation in the *AddressSpace* is defined in Table 5.

Table 5 – {*browsename*} Definition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Attribute** | | **Value** | | | | |
| Browsename | | *{browsename*} | | | | |
| IsAbstract | | {*isAbstract*} | | | | |
| **References** | **NodeClass** | | **Browsename** | **DataType** | **TypeDefinition** | **Other** |
| Subtype of the {superType} defined in {superTypeSrc} . | | | | | | |

{/structures}

{#enumerations}

## {browsename}

{description}

The enumeration is defined in Table 6

Table 6 – {*browsename*} Items

|  |  |  |
| --- | --- | --- |
| Name | Value | Description |
| {#childrows}{*browsename}* | {value} | {description}{/childrows} |

Its representation in the AddressSpace is defined in Table 9.

Table 7 – {*browsename*} Definition

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Attribute** | | **Value** | | | | |
| Browsename | | *{browsename*} | | | | |
| IsAbstract | | {*isAbstract*} | | | | |
| **References** | **NodeClass** | | **Browsename** | **DataType** | **TypeDefinition** | **Other** |
| Subtype of the {superType} defined in {superTypeSrc}. | | | | | | |
| 0:HasProperty | Variable | | 0:EnumStrings | 0:LocalizedText [] | 0:PropertyType |  |

{/enumerations}

# OPC UA ReferenceTypes

## <someReferenceType>

The <someReferenceType> is a concrete *ReferenceType* and can be used directly. It is a subtype of <someParentReferenceType>.

The semantic of this *ReferenceType* is to link …...

The *SourceNode* of *References* of this type shall be an…...

The *TargetNode* of this *ReferenceType* shall be an …..

The *<*someReferenceType*>* is formally defined in Table 12.

Table 12 – <someReferenceType> Definition

|  |  |  |  |
| --- | --- | --- | --- |
| **Attributes** | **Value** | | |
| Browsename | <someReferenceType> | | |
| InverseName | <someinverseName> | | |
| Symmetric | <True/False> | | |
| IsAbstract | <True/False> | | |
| **References** | **NodeClass** | **Browsename** | **Comment** |
| Subtype <someParentReferenceType> | | | |

# Namespaces

## Namespace Metadata

Table 5 defines the namespace metadata for this document. The *Object* is used to provide version information for the namespace and an indication about static *Nodes*. Static *Nodes* are identical for all *Attributes* in all *Servers*, including the *Value Attribute*. See OPC 10000-5 for more details.

The information is provided as *Object* of type *NamespaceMetadataType*. This *Object* is a component of the *Namespaces* *Object* that is part of the *Server Object*. The *NamespaceMetadataType ObjectType* and its *Properties* are defined in OPC 10000-5.

The version information is also provided as part of the ModelTableEntry in the UANodeSet XML file. The UANodeSet XML schema is defined in Error: Reference source not found.

Table 8 - NamespaceMetadata Object for this Document

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute** | **Value** | | |
| Browsename | <todo> | | |
| **Property** | | **DataType** | **Value** |
| NamespaceUri | | String | <todo> |
| NamespaceVersion | | String | 1.00 |
| NamespacePublicationDate | | DateTime | 2022-01-11 |
| IsNamespaceSubset | | Boolean | False |
| StaticNodeIdTypes | | IdType [] | {Numeric} |
| StaticNumericNodeIdRange | | NumericRange [] | Null |
| StaticStringNodeIdPattern | | String | Null |

Note: The *IsNamespaceSubset* *Property* is set to False as the UaNodeSet XML file contains the complete Namespace. *Servers* only exposing a subset of the Namespace need to change the value to True.

## Handling of OPC UA Namespaces

Namespaces are used by OPC UA to create unique identifiers across different naming authorities. The *Attributes* *NodeId* and *Browsename* are identifiers. A *Node* in the UA *AddressSpace* is unambiguously identified using a *NodeId*. Unlike *NodeIds*, the *Browsename* cannot be used to unambiguously identify a *Node*. Different *Nodes* may have the same *Browsename*. They are used to build a browse path between two *Nodes* or to define a standard *Property*.

*Servers* may often choose to use the same namespace for the *NodeId* and the *Browsename*. However, if they want to provide a standard *Property*, its *Browsename* shall have the namespace of the standards body although the namespace of the *NodeId* reflects something else, for example the *EngineeringUnits* *Property*. All *NodeIds* of *Nodes* not defined in this document shall not use the standard namespaces.

Table 6 provides a list of mandatory and optional namespaces used in an <ToDo> *Server*.

Table 9 – Namespaces used in an Example Server

| **NamespaceURI** | **Description** | **Use** |
| --- | --- | --- |
| http://opcfoundation.org/UA/ | Namespace for *NodeIds* and *Browsenames* defined in the OPC UA specification. This namespace shall have namespace index 0. | Mandatory |
| Local Server URI | Namespace for nodes defined in the local server. This namespace shall have namespace index 1. | Mandatory |

Table 7 provides a list of namespaces and their indices used for *Browsenames* in this document. The default namespace of this document is not listed since all *Browsenames* without prefix use this default namespace.

Table 10 – Namespaces used in this document

| **NamespaceURI** | **Namespace Index** | **Example** |
| --- | --- | --- |
| http://opcfoundation.org/UA/ | 0 | 0:EngineeringUnits |
| http://example.org/UA/Example/Exp | 2 | 2:ExampleType |

1. (normative)   
     
   Example Namespace and mappings
   1. Namespace and identifiers for Example Information Model

This appendix defines the numeric identifiers for all of the numeric *NodeIds* defined in this document. The identifiers are specified in a CSV file with the following syntax:

<SymbolName>, <Identifier>, <NodeClass>

Where the *SymbolName* is either the *Browsename* of a *Type Node* or the *BrowsePath* for an *Instance Node* that appears in the specification and the *Identifier* is the numeric value for the *NodeId*.

The *BrowsePath* for an *Instance Node* is constructed by appending the *Browsename* of the instance *Node* to the *Browsename* for the containing instance or type. An underscore character is used to separate each *Browsename* in the path. Let’s take for example, the *ConnectorType* *ObjectType* *Node* which has the *Index Property*. The **Name** for the *Index* *InstanceDeclaration* within the *ConnectorType* declaration is: *ConnectorType\_Index*.

The *NamespaceUri* for all *NodeIds* defined here is [http://opcfoundation.org/UA/<short name>/](http://opcfoundation.org/UA/%3cshort%20name%3e/)

The CSV released with this version of the specification can be found here:

<http://www.opcfoundation.org/UA/schemas/example/example/1.0/NodeIds.csv>

NOTE    The latest CSV that is compatible with this version of the specification can be found here:

<http://www.opcfoundation.org/UA/schemas/exp/example/NodeIds.csv>

A computer processible version of the complete Information Model defined in this document is also provided. It follows the XML Information Model schema syntax defined in Error: Reference source not found.

The Information Model Schema for this version of the document (including any revisions, amendments or errata) can be found here:

<http://www.opcfoundation.org/UA/schemas/example/exp/1.0/Opc.Ua.Example.NodeSet2.xml>

NOTE    The latest Information Model schema that is compatible with this version of the document can be found here:

<http://www.opcfoundation.org/UA/schemas/exp/example/Opc.Ua.Example.NodeSet2.xml>

\_\_\_\_\_\_\_