MTConnect® Standard
Guide: MTConnect and OPC/UA Companion Specification
Version 2.0

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MTConnect® Specification and Materials

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1 Introduction

The following conventions will be used throughout the document to provide a clear and consistent understanding of the use of each type of data and information used to define the MTConnect® standard and associated data.

1.1 Overview

Overview of the standards...

2 Types

2.1 Components

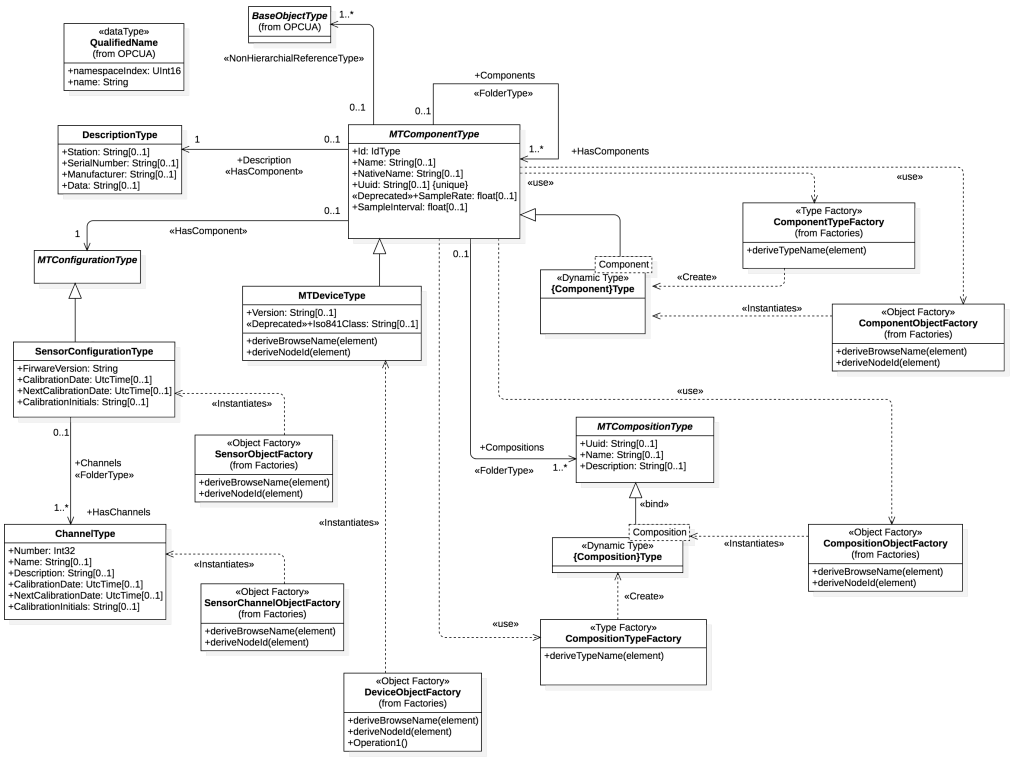

Figure 1: Components Diagram

The Components documents the Component models and the owned objects.

2.1.1 Defintion of ChannelType

Refer to Table 1 for detailed definition.

Table 1: ChannelType Definition

Attribute	**Value**				
BrowseName	ChannelType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of BaseObjectType (See OPCUA Documentation)					
HasProperty	Variable	Number	Int32	PropertyType	Manditory
HasProperty	Variable	Name	String	PropertyType	Optional
HasProperty	Variable	MTDescription	String	PropertyType	Optional
HasProperty	Variable	CalibrationDate	UtcTime	PropertyType	Optional
HasProperty	Variable	NextCalibrationDate	UtcTime	PropertyType	Optional
HasProperty	Variable	CalibrationInitials	String	PropertyType	Optional

2.1.2 Defintion of DescriptionType

The desription provides some general information about the manufacture and serial number of the component. In the XML, the `CDATA` is freeform text that is represented in the `Data` Property of the Description Object.

Refer to Table 2 for detailed definition.

Table 2: DescriptionType Definition

Attribute	**Value**				
BrowseName	DescriptionType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of BaseObjectType (See OPCUA Documentation)					
HasProperty	Variable	Station	String	PropertyType	Optional
HasProperty	Variable	SerialNumber	String	PropertyType	Optional
HasProperty	Variable	Manufacturer	String	PropertyType	Optional
HasProperty	Variable	Data	String	PropertyType	Optional

2.1.3 Defintion of MTComponentType

The base Component Type from which all MTConnect Components are derived from. The component type factory is used to create the specific OPC/UA types as subtypes of the MTConnect ‘MTComponentType‘. The component types will be created once for all Component objects of that type based on the ‘QName‘ of the MTConnect XML element.

The object factory will instantiate the Component Objects and insert them into the Components folder with a browse name of the Component QName and the ‘name‘ element if specified surrounded by square brackets, ‘[]‘. For example if the MTConnect Element is:

‘<Linear name=’X’>...</...>‘

The OPC/UA Object with browse name ‘Linear[X]‘ will be created with the HasTypeDefinition referencing the ‘Linear‘ OPC/UA type.

The meta data for the component and it’s relationships are static. The dynamic data will be represented using the _OPC/UA Part 8_

Refer to Table 3 for detailed definition.

Table 3: MTComponentType Definition

Attribute	**Value**				
BrowseName	MTComponentType				
IsAbstract	True				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
HasProperty	Variable	Id	IdType	PropertyType	Manditory
HasProperty	Variable	Name	String	PropertyType	Optional
HasProperty	Variable	NativeName	String	PropertyType	Optional
HasProperty	Variable	Uuid	String	PropertyType	Optional
HasProperty	Variable	SampleRate	float	PropertyType	Optional
HasProperty	Variable	SampleInterval	float	PropertyType	Optional
HasComponent	Object	Description		DescriptionType	Optional
HasComponent	Object	Configuration		MTConfigurationType	Optional
Organizes	Object	Components	MTComponentType	FolderType	Optional
Organizes	Object	Compositions	MTCompositionType	FolderType	Optional
HasProperty	Variable	<Dynamic>	DataItemType	<Dynamic>	Optional
HasProperty	Variable	<Dynamic>	BaseObjectType	<Dynamic>	Optional
Organizes	Object	Conditions	MTNonExclusiveConditionType	FolderType	Optional
HasProperty	Variable	<Dynamic>	DataItemType	<Dynamic>	Manditory

2.1.4 Defintion of MTCompositionType

134 Refer to Table 4 for detailed definition.

Table 4: MTCompositionType Definition

Attribute	**Value**				
BrowseName	MTCompositionType				
IsAbstract	True				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of BaseObjectType (See OPCUA Documentation)					
HasProperty	Variable	Uuid	String	PropertyType	Optional
HasProperty	Variable	Name	String	PropertyType	Optional
HasProperty	Variable	MTDescription	String	PropertyType	Optional
NonHierarchialReference	ObjectType	composition	DataItemType	NonHierarchialReferenceType	Optional

2.1.5 Defintion of MTConfigurationType

135 Refer to Table 5 for detailed definition.

Table 5: MTConfigurationType Definition

Attribute	**Value**				
BrowseName	MTConfigurationType				
IsAbstract	True				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of BaseObjectType (See OPCUA Documentation)					

2.1.6 Defintion of MTDeviceType

136 The MTDevice is a special type whose object will be the root of the device graph.
137 The Device uses the component type factory and the component object factories
138 to create each of the first level components.

139 The compositions, relationships, and data items are then recursively created as
140 one decendes the MTConnect informaiton model.

141 Refer to Table 6 for detailed definition.

Table 6: MTDeviceType Definition

Attribute	**Value**				
BrowseName	MTDeviceType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTComponentType (see section 2.1.3)					
HasProperty	Variable	Version	String	PropertyType	Optional
HasProperty	Variable	Iso841Class	String	PropertyType	Optional

2.1.7 Defintion of SensorConfigurationType

142 The SensorConfiguration browse name will be created as an Object relationship
143 with the parent component.

144 Refer to Table 7 for detailed definition.

Table 7: SensorConfigurationType Definition

Attribute	**Value**				
BrowseName	SensorConfigurationType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTConfigurationType (see section 2.1.5)					
HasProperty	Variable	FirwareVersion	String	PropertyType	Manditory
HasProperty	Variable	CalibrationDate	UtcTime	PropertyType	Optional
HasProperty	Variable	NextCalibrationDate	UtcTime	PropertyType	Optional
HasProperty	Variable	CalibrationInitials	String	PropertyType	Optional
Organizes	Object	Channels	ChannelType	FolderType	Optional

2.1.8 Defintion of ComponentType

145 Refer to Table 8 for detailed definition.

Table 8: ComponentType Definition

Attribute	**Value**				
BrowseName	ComponentType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTComponentType (see section 2.1.3)					

2.1.9 Defintion of CompositionType

146 Refer to Table 9 for detailed definition.

Table 9: CompositionType Definition

Attribute	**Value**				
BrowseName	CompositionType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTCompositionType (see section 2.1.4)					

2.2 Data Items

Items.png Items.png

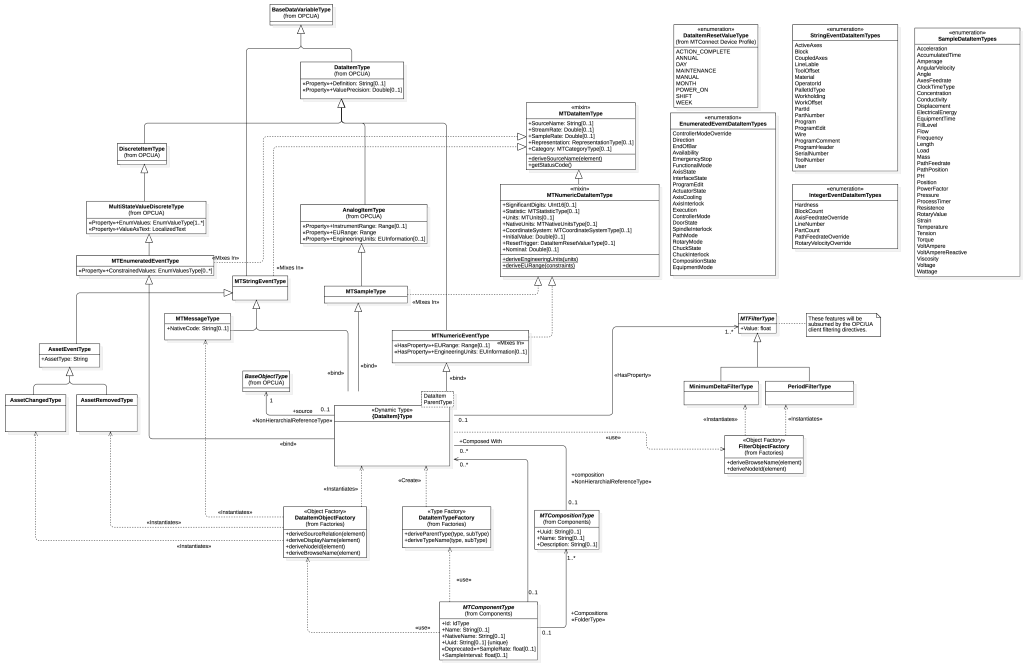

Figure 2: Data Items Diagram

2.2.1 Defintion of AssetChangedType

147 Refer to Table 10 for detailed definition.

Table 10: AssetChangedType Definition

Attribute	**Value**				
BrowseName	AssetChangedType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of AssetEventType (see section 2.2.2)					

2.2.2 Defintion of AssetEventType

148 Refer to Table 11 for detailed definition.

Table 11: AssetEventType Definition

Attribute	**Value**				
BrowseName	AssetEventType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTStringEventType (see section 2.2.11)					
HasProperty	Variable	AssetType	String	PropertyType	Manditory

2.2.3 Defintion of AssetRemovedType

149 Refer to Table 12 for detailed definition.

Table 12: AssetRemovedType Definition

Attribute	**Value**				
BrowseName	AssetRemovedType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of AssetEventType (see section 2.2.2)					

2.2.4 Defintion of MTDataItemType

150 The data item mixin will inject the properties and the methods into the related
151 classes. This facility is similar to the Ruby module mixin or the Scala traits.

152 Refer to Table 13 for detailed definition.

Table 13: MTDataItemType Definition

Attribute	**Value**				
BrowseName	MTDataItemType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
HasProperty	Variable	SourceName	String	PropertyType	Optional
HasProperty	Variable	StreamRate	Double	PropertyType	Optional
HasProperty	Variable	SampleRate	Double	PropertyType	Optional
HasProperty	Variable	Representation	RepresentationType	PropertyType	Optional
HasProperty	Variable	Category	MTCategoryType	PropertyType	Optional
HasProperty	Variable	<Dynamic>	MTFilterType	<Dynamic>	Optional
HasComponent	Object	source		BaseObjectType	Optional

2.2.5 Defintion of MTEnumeratedEventType

153 All Data Items with Category EVENT having a Controlled Vocabularies will be
154 of this type. Otherwise, MTString

155 Refer to Table 14 for detailed definition.

Table 14: MTEnumeratedEventType Definition

Attribute	**Value**				
BrowseName	MTEnumeratedEventType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MultiStateValueDiscreteType (See OPCUA Documentation)					
HasProperty	Variable	ConstrainedValues	EnumValuesType	PropertyType	Manditory

2.2.6 Defintion of MTFilterType

156 These features will be subsumed by the OPC/UA client filtering directives.

157 Refer to Table 15 for detailed definition.

Table 15: MTFilterType Definition

Attribute	**Value**				
BrowseName	MTFilterType				
IsAbstract	True				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
HasProperty	Variable	Value	float	PropertyType	Manditory

2.2.7 Defintion of MTMessageType

158 Refer to Table 16 for detailed definition.

Table 16: MTMessageType Definition

Attribute	**Value**				
BrowseName	MTMessageType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTStringEventType (see section 2.2.11)					
HasProperty	Variable	NativeCode	String	PropertyType	Optional

2.2.8 Defintion of MTNumericDataItemType

These are the additional attributes that are relevent to numeric data items. The factory will evaluate these values and will set the engineering units and the range associated with the parent entity.

Refer to Table 17 for detailed definition.

Table 17: MTNumericDataItemType Definition

Attribute	**Value**				
BrowseName	MTNumericDataItemType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTDataItemType (see section 2.2.4)					
HasProperty	Variable	SignificantDigits	UInt16	PropertyType	Optional
HasProperty	Variable	Statistic	MTStatisticType	PropertyType	Optional
HasProperty	Variable	Units	MTUnits	PropertyType	Optional
HasProperty	Variable	NativeUnits	MTNativeUnitsType	PropertyType	Optional
HasProperty	Variable	CoordinateSystem	MTCoordinateSystemType	PropertyType	Optional
HasProperty	Variable	InitialValue	Double	PropertyType	Optional
HasProperty	Variable	ResetTrigger	DataItemResetValueType	PropertyType	Optional
HasProperty	Variable	Nominal	Double	PropertyType	Optional

2.2.9 Defintion of MTNumericEventType

163 All data items with category EVENT and a numeric value.

164 Refer to Table 18 for detailed definition.

Table 18: MTNumericEventType Definition

Attribute	**Value**				
BrowseName	MTNumericEventType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of DataItemType (See OPCUA Documentation)					
HasProperty	Variable	EURange	Range	PropertyType	Optional
HasProperty	Variable	EngineeringUnits	EUInformation	PropertyType	Optional

2.2.10 Defintion of MTSampleType

165 Data Items with category SAMPLE

166 Refer to Table 19 for detailed definition.

Table 19: MTSampleType Definition

Attribute	**Value**				
BrowseName	MTSampleType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of AnalogItemType (See OPCUA Documentation)					

2.2.11 Defintion of MTStringEventType

167 All data items with category EVENT where the data is freeform text. The set_-
168 data_type constraint derives makes the data type a string for this type.

169 Refer to Table 20 for detailed definition.

Table 20: MTStringEventType Definition

Attribute	**Value**				
BrowseName	MTStringEventType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of BaseDataVariableType (See OPCUA Documentation)					

2.2.12 Defintion of MinimumDeltaFilterType

170 Refer to Table 21 for detailed definition.

Table 21: MinimumDeltaFilterType Definition

Attribute	**Value**				
BrowseName	MinimumDeltaFilterType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTFilterType (see section 2.2.6)					

2.2.13 Defintion of PeriodFilterType

171 Refer to Table 22 for detailed definition.

Table 22: PeriodFilterType Definition

Attribute	**Value**				
BrowseName	PeriodFilterType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTFilterType (see section 2.2.6)					

2.2.14 Defintion of DataItemType

172 For each DataItem the Sub Type, and the Type will be composed to be the HasType-
173 Definition relationship of the object. The BrowseName will also include the Com-
174 position Type if a composition Id is provided.

175 Refer to Table 23 for detailed definition.

Table 23: DataItemType Definition

Attribute	**Value**				
BrowseName	DataItemType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of MTNumericEventType (see section 2.2.9)					

2.3 Conditions

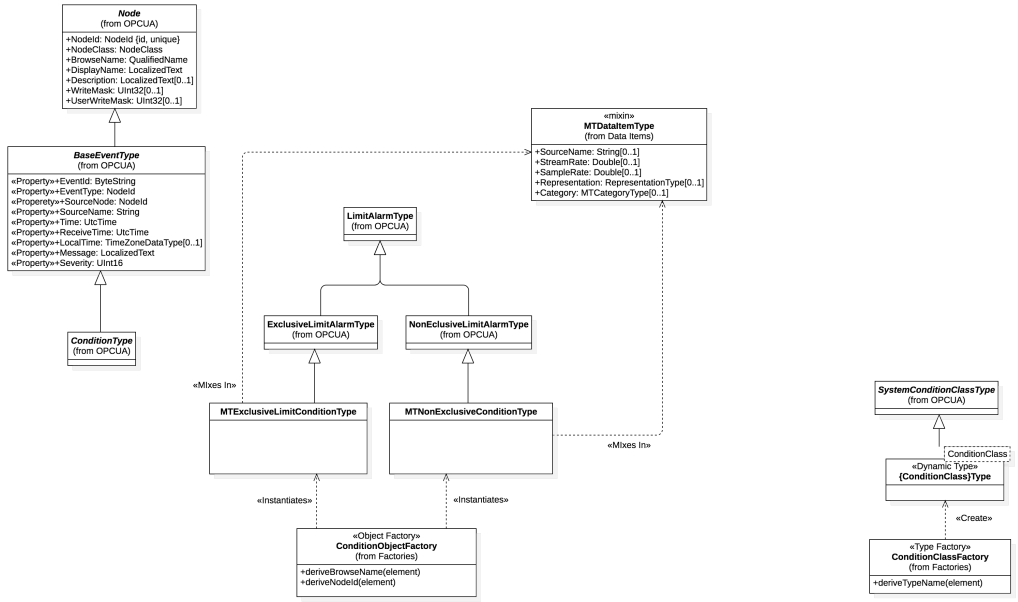

Figure 3: Conditions Diagram

2.3.1 Defintion of MTExclusiveLimitConditionType

176 Refer to Table 24 for detailed definition.

Table 24: MTExclusiveLimitConditionType Definition

Attribute	**Value**				
BrowseName	MTExclusiveLimitConditionType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ExclusiveLimitAlarmType (See OPCUA Documentation)					

2.3.2 Defintion of MTNonExclusiveConditionType

177 Refer to Table 25 for detailed definition.

Table 25: MTNonExclusiveConditionType Definition

Attribute	**Value**				
BrowseName	MTNonExclusiveConditionType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of NonEclusiveLimitAlarmType (See OPCUA Documentation)					

2.3.3 Defintion of ConditionClassType

178 Refer to Table 26 for detailed definition.

Table 26: ConditionClassType Definition

Attribute	**Value**				
BrowseName	ConditionClassType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of SystemConditionClassType (See OPCUA Documentation)					

2.4 Factories

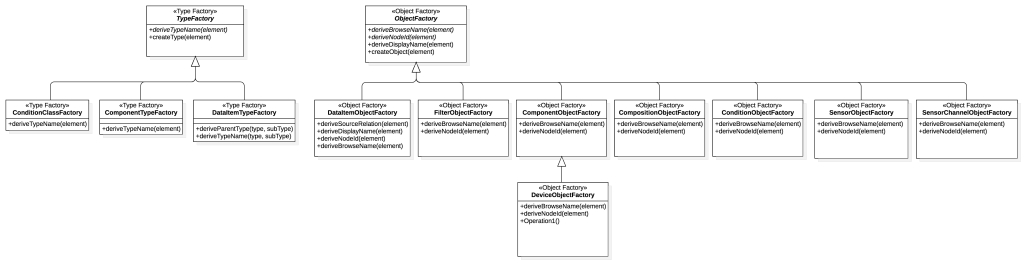

Figure 4: Factories Diagram

The factories are not part of the OPC/UA information model. They are a set of helper classes that are used to create dynamic types and objects. Since the MTConnect information model can be layered on top of the OPC/UA abstrations, the factories provide the rules for creating the browse and display names for each type.

The factories also create dynamic objects when requried for variables of various classes when they are required, such as the Data Items and the Components. Some of the relationships are more complex since they require a dynamic super-type relationship that relies on the correct placement of the MTConnect elements to be correctly represented using the OPC/UA base types.

This is especially evident when mapping the DataItems and the Conditions to the MTConnect Information Models and providing sufficent definition to allow for unambiguous implementation.

2.4.1 Defintion of ComponentObjectFactory

Refer to Table 27 for detailed definition.

Table 27: ComponentObjectFactory Definition

Attribute	**Value**				
BrowseName	ComponentObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.2 Defintion of ComponentTypeFactory

The ‘ComponentTypeFactory‘ creates component types using the MTConnect XML element as an input. The factory takes the ‘QName‘ (or qualified name) of the XML element and then appends ‘Type‘. For example an ‘<Controller

196 id='...'></...>‘ element will create an OPC/UA ‘ControllerType‘ type definition
197 as an extension of the base ‘MTControllerType‘.

198 Currently there is no additional abstractions or super types required by the com-
199 panion specification. The types will be a single level where each Component is a
200 sub-type of the base ‘MTComponentType‘.

201 Refer to Table 28 for detailed definition.

Table 28: ComponentTypeFactory Definition

Attribute	**Value**				
BrowseName	ComponentTypeFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of TypeFactory (see section 2.4.14)					

2.4.3 Defintion of CompositionObjectFactory

202 Refer to Table 29 for detailed definition.

Table 29: CompositionObjectFactory Definition

Attribute	**Value**				
BrowseName	CompositionObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.4 Defintion of CompositionTypeFactory

203 Refer to Table 30 for detailed definition.

Table 30: CompositionTypeFactory Definition

Attribute	**Value**				
BrowseName	CompositionTypeFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.4.5 Defintion of ConditionClassFactory

204 Refer to Table 31 for detailed definition.

Table 31: ConditionClassFactory Definition

Attribute	**Value**				
BrowseName	ConditionClassFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of TypeFactory (see section 2.4.14)					

2.4.6 Defintion of ConditionObjectFactory

205 Refer to Table 32 for detailed definition.

Table 32: ConditionObjectFactory Definition

Attribute	**Value**				
BrowseName	ConditionObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.7 Defintion of DataItemObjectFactory

206 Refer to Table 33 for detailed definition.

Table 33: DataItemObjectFactory Definition

Attribute	**Value**				
BrowseName	DataItemObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.8 Defintion of DataItemTypeFactory

207 Based on the data item category, type, and subType, this class creates a new
208 OPC/UA type and also provides the template parameter for the ParentType from
209 which this type is derived.

210 See the Data Item Type Factory.

211 Refer to Table 34 for detailed definition.

Table 34: DataItemTypeFactory Definition

Attribute	**Value**				
BrowseName	DataItemTypeFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of TypeFactory (see section 2.4.14)					

2.4.9 Defintion of DeviceObjectFactory

212 The model instantiation for MTConnect begins with the ‘Device‘ MTConnect
213 element and then recursively traverses the sub-elements. The device will the ca-

214 pabilities in the component factory to generate all the data items and component
215 types.

216 Refer to Table 35 for detailed definition.

Table 35: DeviceObjectFactory Definition

Attribute	**Value**				
BrowseName	DeviceObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ComponentObjectFactory (see section 2.4.1)					

2.4.10 Defintion of FilterObjectFactory

217 Creates filters based on the type attribute of the Filter element.

218 Refer to Table 36 for detailed definition.

Table 36: FilterObjectFactory Definition

Attribute	**Value**				
BrowseName	FilterObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.11 Defintion of ObjectFactory

219 Refer to Table 37 for detailed definition.

Table 37: ObjectFactory Definition

Attribute	**Value**				
BrowseName	ObjectFactory				
IsAbstract	True				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.4.12 Defintion of SensorChannelObjectFactory

220 Refer to Table 38 for detailed definition.

Table 38: SensorChannelObjectFactory Definition

Attribute	**Value**				
BrowseName	SensorChannelObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.13 Defintion of SensorObjectFactory

221 Refer to Table 39 for detailed definition.

Table 39: SensorObjectFactory Definition

Attribute	**Value**				
BrowseName	SensorObjectFactory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of ObjectFactory (see section 2.4.11)					

2.4.14 Defintion of TypeFactory

222 Refer to Table 40 for detailed definition.

Table 40: TypeFactory Definition

Attribute	**Value**				
BrowseName	TypeFactory				
IsAbstract	True				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5 MTConnect Device Profile

Device Profile.png Device Profile.png

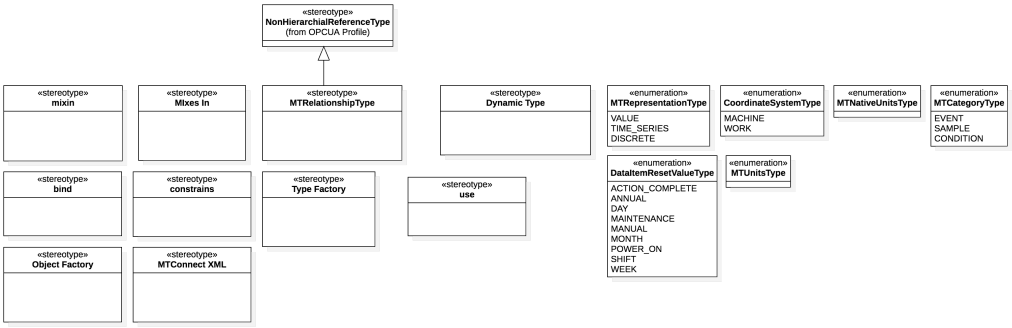

Figure 5: MTConnect Device Profile Diagram

The device profile documents the common data types and stereotypes that are used to construct the model. A stereotype is a design or modeling pattern that provides additional information about the type or the relationship between types.

It can also identify the behavior of a property or the role the type or relation will play in the model.

Stereotypes are used throughout the model to provide additional information that will halp provide context and definition to aid in better understanding the data model.

2.5.1 Defintion of Dynamic Type

Refer to Table 41 for detailed definition.

Table 41: Dynamic Type Definition

Attribute	**Value**				
BrowseName	Dynamic Type				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.2 Defintion of MIxes In

232 Refer to Table 42 for detailed definition.

Table 42: MIxes In Definition

Attribute	**Value**				
BrowseName	MIxes In				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.3 Defintion of MTConnect XML

233 Refer to Table 43 for detailed definition.

Table 43: MTConnect XML Definition

Attribute	**Value**				
BrowseName	MTConnect XML				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.4 Defintion of MTRelationshipType

234 Refer to Table 44 for detailed definition.

Table 44: MTRelationshipType Definition

Attribute	**Value**				
BrowseName	MTRelationshipType				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**
Subtype of NonHierarchialReferenceType (See OPCUA Profile Documentation)					

2.5.5 Defintion of Object Factory

235 Refer to Table 45 for detailed definition.

Table 45: Object Factory Definition

Attribute	**Value**				
BrowseName	Object Factory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.6 Defintion of Type Factory

236 Refer to Table 46 for detailed definition.

Table 46: Type Factory Definition

Attribute	**Value**				
BrowseName	Type Factory				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.7 Defintion of bind

237 Refer to Table 47 for detailed definition.

Table 47: bind Definition

Attribute	**Value**				
BrowseName	bind				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.8 Defintion of constrains

238 Refer to Table 48 for detailed definition.

Table 48: constrains Definition

Attribute	**Value**				
BrowseName	constrains				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.9 Defintion of mixin

239 The contents properties and the behavior of the class are combined with another
240 class.

241 Refer to Table 49 for detailed definition.

Table 49: mixin Definition

Attribute	**Value**				
BrowseName	mixin				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**

2.5.10 Defintion of use

The use stereotype indicates that one class uses as a helper to perform a specific operation or activity. This stereotype is mainly used to indicate that a specific factory is being employed by another type to create dynamic properties or relationships.

Refer to Table 50 for detailed definition.

Table 50: use Definition

Attribute	**Value**				
BrowseName	use				
IsAbstract	False				
References	**NodeClass**	**BrowseName**	**DataType**	**TypeDefinition**	**Modeling Rule**