Business To Manufacturing Markup Language

Work Definition

Version 6.0 - March 2013

B2MML-WorkDefinition

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CHANGE HISTORY

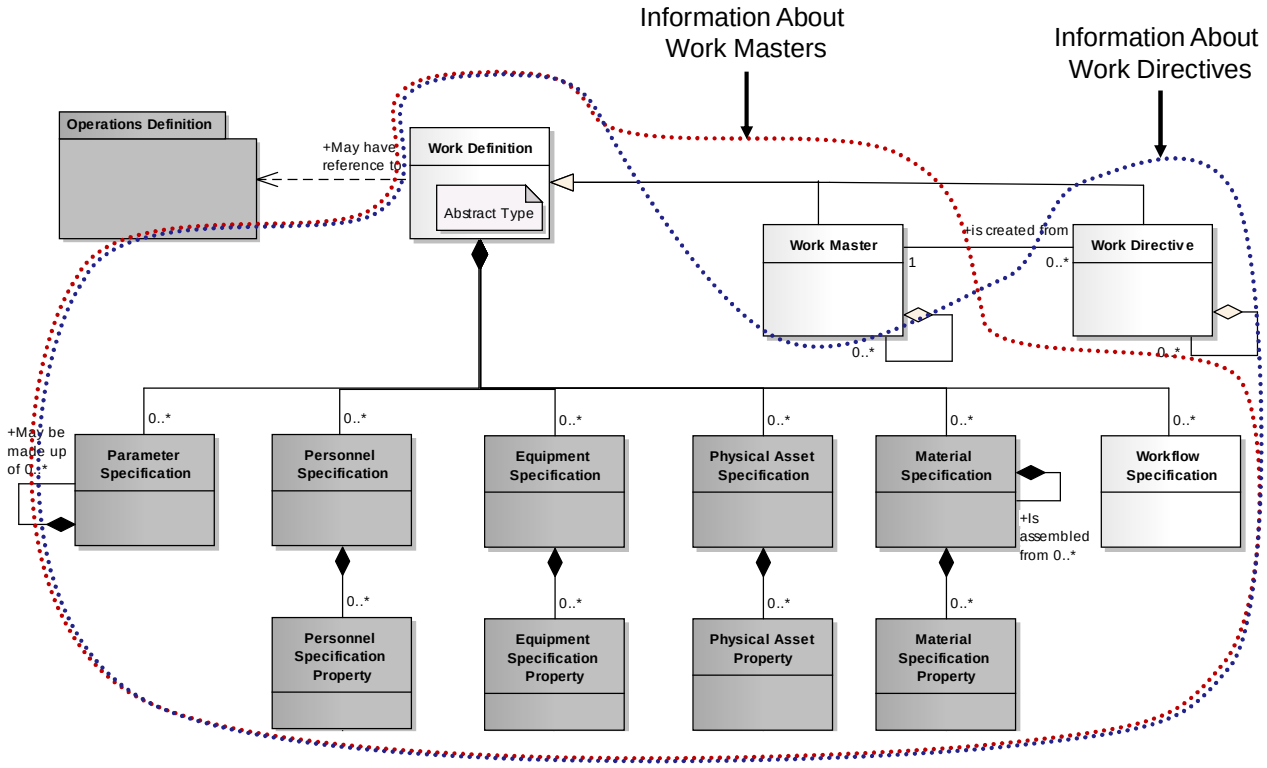
Change	Date	Person	Description
V0600	Aug 2012	D. Brandl	• Initial Version

SCHEMA SCOPE

This document defines the information about the definition of work definition information that may be exchanged by manufacturing operations management systems. This information is based on the data models and attributes defined in the ANSI/ISA 95.00.04 Enterprise/Control System Integration standard. Contact ISA (The Instrumentation, System, and Automation Society) for copies of the standard. Additional information on the standard is available at www.isa.org.

Key Information Assumptions

The data represented in these schemas is derived from the UML model below. This model is defined in the ANSI/ISA 95.00.04 standard. The key assumption is that the information will be accessed by a Work Master, a Work Directive, or a Work Definition Information element which allows for the exchange of multiple WorkDirectives and WorkMasters in a single WorkDirectiveInformation message.



Model of Exchanged Work Definition Information

This schema uses a common schema for definition of elements that are used in multiple schemas, such as ID, Description, and Value. See the document defining the Common schema for definition of the common elements.

Type Definitions

The XML schema uses a model that defines simple and complex data types for each element. The data types all follow the convention of a suffix of "Type" added to the element name. Elements that have the same name in other B2MML schemas are also prefixed with "Op" to uniquely identify the extension group.

Schema definition:

```
<xsd:element name = "OpPersonnelSpecification"  type = "
OpPersonnelSpecificationType"/>

<xsd:complexType name = "OpPersonnelSpecificationType">
    <xsd:sequence>
      <xsd:element name = "PersonnelClassID" type = "PersonnelClassIDType"
                                             minOccurs = "0" />
     …
</xsd:complexType>
```

The method is a modification of the "Venetian Blind Model", defined in the book Professional XML Schemas, 2001, published by WROX (ISBN 1-861005-47-4). It makes all of the type names global and usable in user derived works, without a loss of context or additional information required to identify the element as of being of the same type as related B2MML elements

WorkDefinitionInformation

A main structuring element of the schema definition is WorkDefinitionInformation. This element allows for the exchange of multiple WorkMaster and WorkDirective elements in a single message.

WorkMaster

A WorkMaster element defines the exchange information structure for a Work Master, as defined in ANSI/ISA95 Part 4. This is a recursive structure that allows for the exchange of Work Masters that contain subservient Work Masters.

WorkDirective

A WorkDirective element defines the exchange information structure for a Work Directive, as defined in ANSI/ISA95 Part 4. The exchange information includes the ID of the WorkMaster the WorkDirective was derived from. This is a recursive structure that allows for the exchange of Work Directives that contain subservient Work Directives.

PersonnelSpecification

PersonnelSpecification elements define the personnel resources, by class or instance, required for production of the product within a work definition, such as 2 hours of a painter for a work master for a lot size of one widget.

EquipmentSpecification

EquipmentSpecification elements define the equipment resources, by class or instance, required for production of the product within a work definition, such as 2 hours for a paint station for a lot size of one widget.

PhyscialAssetSpecification

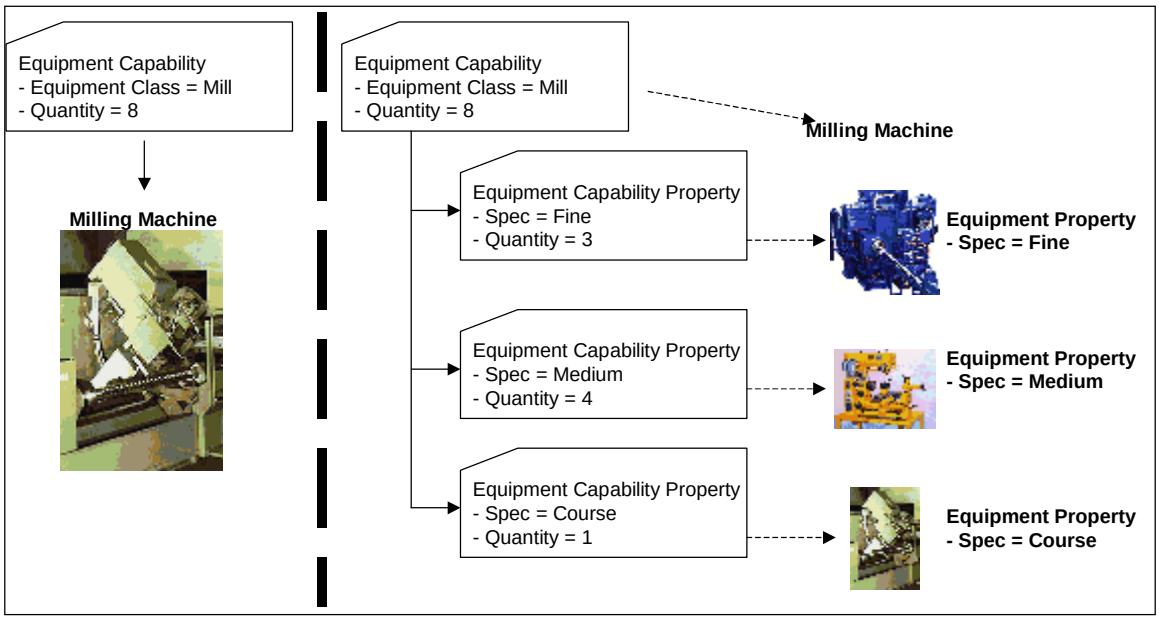
PhysicalAssetSpecification elements define the physical assets resources, by class or instance, required for work, such as 2 hours for a paint station for a lot size of one widget.

MaterialSpecification

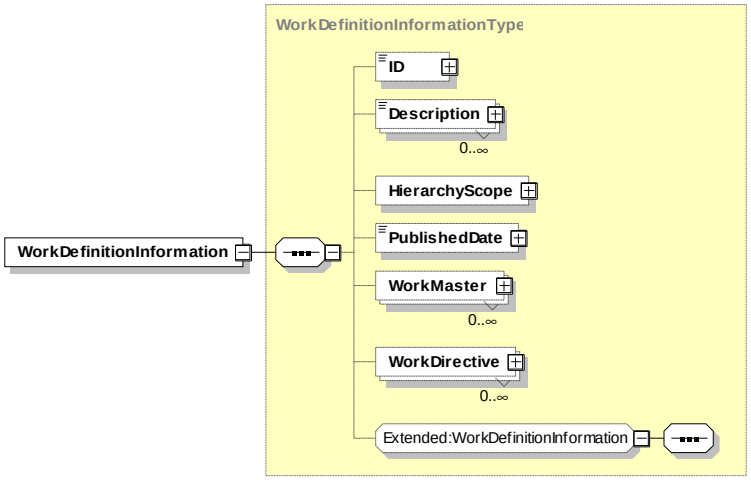
MaterialSpecification elements define the material resources, by material class or material definition, required for production of the product within a work definition, such as 30 Kg of cooking oil (material class) required for the cooking segment for a lot size of 50 Kg.

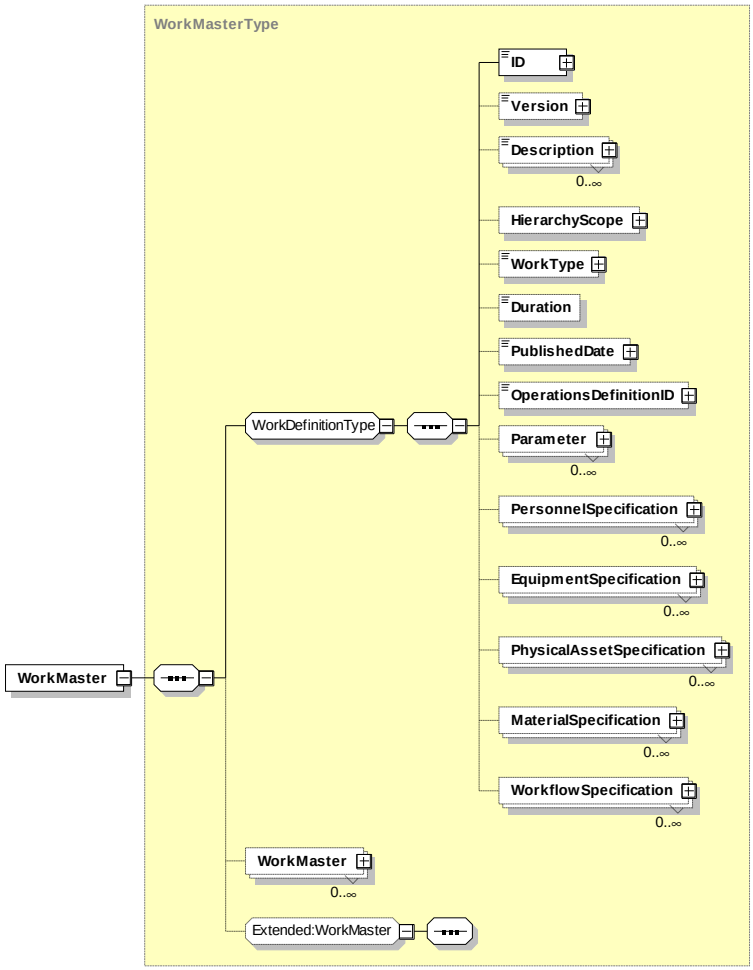
Resource Identification

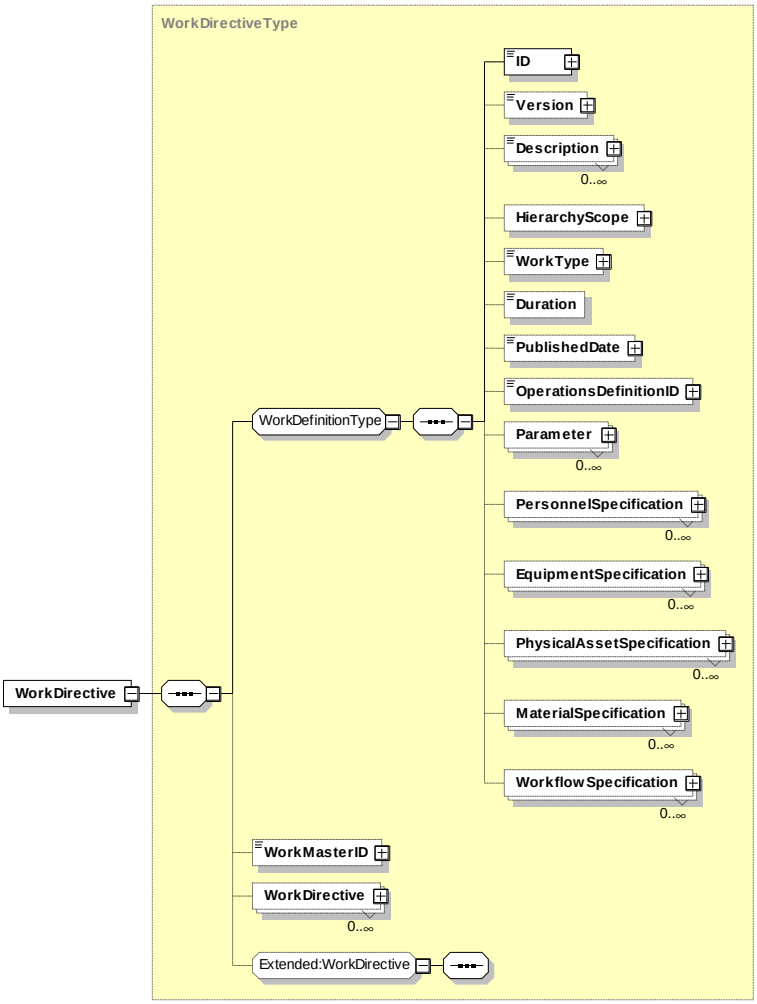
The schemas follow the ANSI/ISA-95 standard by defining resources by class ID or instance ID, or by defining them by class ID and a property value that is used to define a subset of the resource. For example, the figure below illustrates that a segment may require a certain number of milling machine, an equipment class. Other segments may require a subset of milling machine, such as "Fine" milling machines only. In the first case the class name, "Mill", is sufficient to identify the resource required. In the second case the class name, "Mill", and property name and value, "Spec" and "Fine", define the required resource.

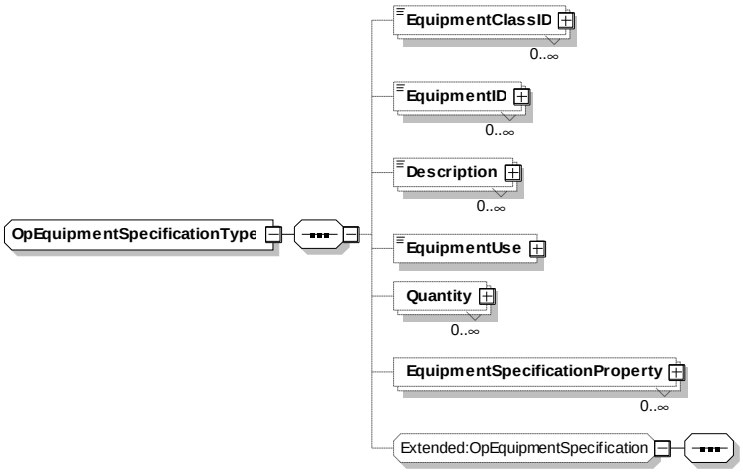
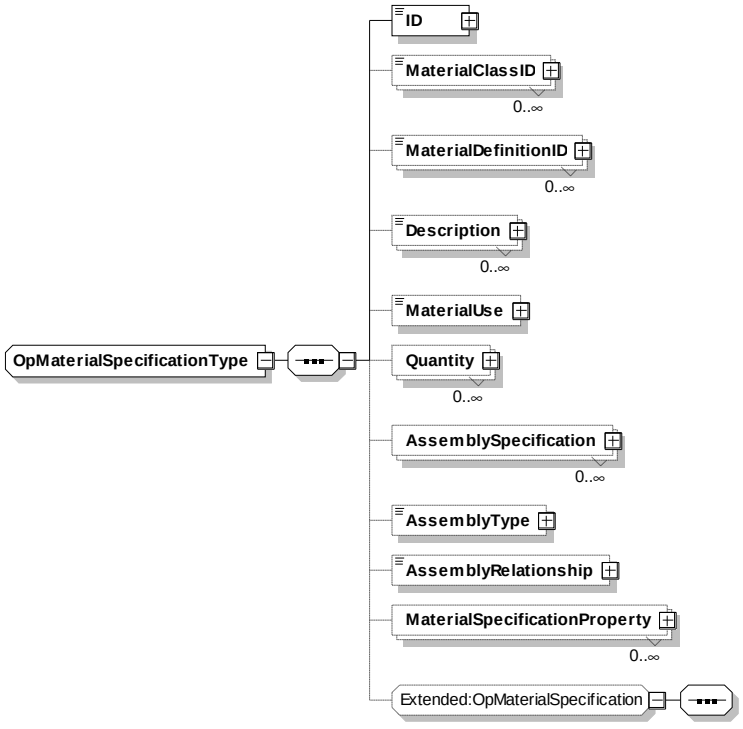


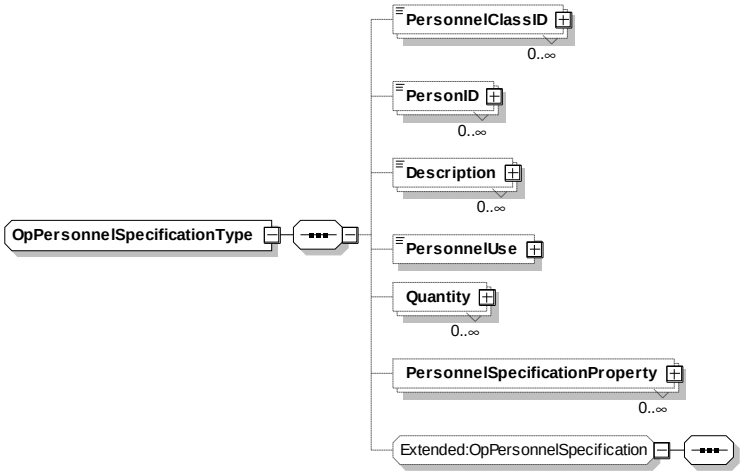
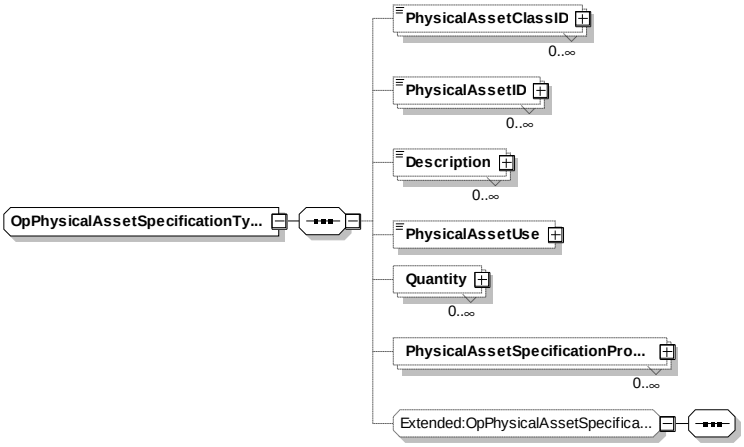
ELEMENT DEFINITIONS

Element/Type	Description
WorkDefinitionInformation ***WorkDefinitionInformationType***	Contains a list of work masters and/or work directives. Includes the hierarchy scope of the information, and the date of publication of the information. 

Element/Type	Description
WorkMaster ***WorkMasterType***	Contains a Work Master. Includes the hierarchy scope of the information, the date of publication of the information, the equipment, material, personnel, physical asset, and workflow specification of the Work Master. 

Element/Type	Description
WorkDirective ***WorkDirectiveType***	Contains a Work Directive. Includes the hierarchy scope of the information, the date of publication of the information, the equipment, material, personnel, physical asset, and workflow specification of the Work Directive, and the ID of the associated Work Master. 

Element/Type	Description
EquipmentSpecification ***OpEquipmentSpecificationType***	Contains a definition of the equipment resources required for the work definition. Includes the identification of the class or instance of the resources, the quantity of the resource, and the property specification if required to identify the resource. 
EquipmentSpecificationProperty ***OpEquipmentSpecificationPropertyType***	Contains a definition of an equipment property required for the work definition, including the quantity of the resource, and a value used to identify the subset of the class.
MaterialSpecification ***OpMaterialSpecificationType***	Contains a definition of the material resources required for the work definition. Includes the identification of the class or instance of the resources, the quantity of the resource, the use (consumed, produced), any specification assemblies, and the property specification if required to identify the resource. A **ManufacturingSpecification** element may have a set of contained **AssemblySpecification** elements to support hierarchical manufacturing bills. 

Element/Type	Description
MaterialSpecificationProperty ***OpMaterialSpecificationPropertyType***	Contains a definition of a material property required for the work definition, including the quantity of the resource, and a value used to identify the subset of the class.
PersonnelSpecification ***OpPersonnelSpecificationType***	Contains a definition of the personnel resources required for the work definition. Includes the identification of the class or instance of the resources, the quantity of the resource, and the property specification if required to identify the resource. 
PersonnelSpecificationProperty ***OpPersonnelSpecificationPropertyType***	Contains a definition of a personnel property required for the work definition, including the quantity of the resource, and a value used to identify the subset of the class.
PhysicalAssetSpecification ***OpPhysicalAssetSpecificationType***	Contains a definition of the physical asset resources required for the work definition. Includes the identification of the class or instance of the resources, the quantity of the resource, and the property specification if required to identify the resource. 
PhysicalAssetSpecificationProperty ***OpPhysicalAssetSpecificationPropertyType***	Contains a definition of a physical asset property required for the work definition, including the quantity of the resource, and a value used to identify the subset of the class.
WorkflowSpecification ***WorkflowSpecificationType***	Contains a workflow specification. See the Workflow Specification documentation for details.

TRANSACTION ELEMENTS

The following elements are defined to support the ISA 95 Part 5 transactions, using the transaction data types defined in the B2MML-Common.xsd schema.

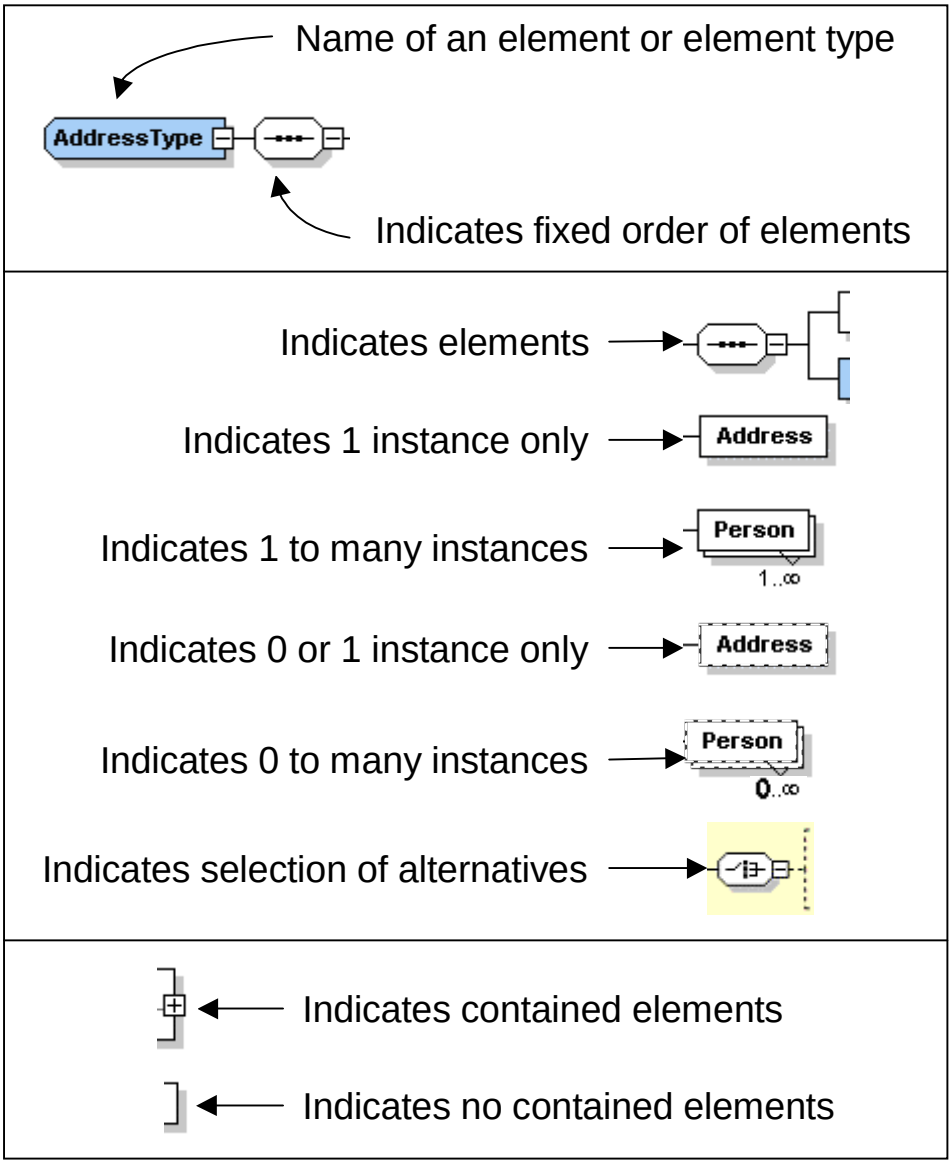
Work Definition Information Elements	Description
GetWorkDefinitionInformation	Get *WorkDefinitionInformation* definitions.
ShowWorkDefinitionInformation	Returned information from the *Get*Work*DefinitionInformation* message.
ProcessWorkDefinitionInformation	Process *WorkDefinitionInformation* definitions.
AcknowledgeWorkDefinitionInformation	Returned status from the *ProcessWorkDefinitionInformation* message.
ChangeWorkDefinitionInformation	Change *WorkDefinitionInformation* definitions.
RespondWorkDefinitionInformation	Returned status from the *ChangeWorkDefinitionInformation* message.
CancelWorkDefinitionInformation	Cancel *WorkDefinitionInformation* definitions.
SyncWorkDefinitionInformation	Published *WorkDefinitionInformation* definitions.

Work Master Definition Elements	Description
GetWorkMaster	Get a *WorkMaster* definition.
ShowWorkMaster	Returned information from the *GetWorkMaster* message.
ProcessWorkMaster	Process a *WorkMaster* definition.
AcknowledgeWorkMaster	Returned status from the *ProcessWorkMaster* message.
ChangeWorkMaster	Change a *WorkMaster* definition.
RespondWorkMaster	Returned status from the *ChangeWorkMaster* message.
CancelWorkMaster	Cancel a *WorkMaster* definition.
SyncWorkMaster	Published *WorkMaster* definition.

Work Directive Definition Elements	Description
GetWorkDirective	Get a *WorkDirective* definition.
ShowWorkDirective	Returned information from the *GetWorkDirective* message.
ProcessWorkDirective	Process a *WorkDirective* definition.
AcknowledgeWorkDirective	Returned status from the *ProcessWorkDirective* message.
ChangeWorkDirective	Change a *WorkDirective* definition.
RespondWorkDirective	Returned status from the *ChangeWorkDirective* message.
CancelWorkDirective	Cancel a *WorkDirective* definition.
SyncWorkDirective	Published *WorkDirective* definition.

DIAGRAM CONVENTION

The schema diagrams using the following convention to illustrate the structure of the schema elements, the type of the elements and attributes, and the rules for optional elements and repetition.



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About the XML Committee: The XML Committe was formed within MESA to provide a forum for the development of the B2MML and BatchML specifications.