Business To Manufacturing Markup Language

Work Schedule

Version 6.0 - March 2013

B2MML-Work Schedule

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CHANGE HISTORY

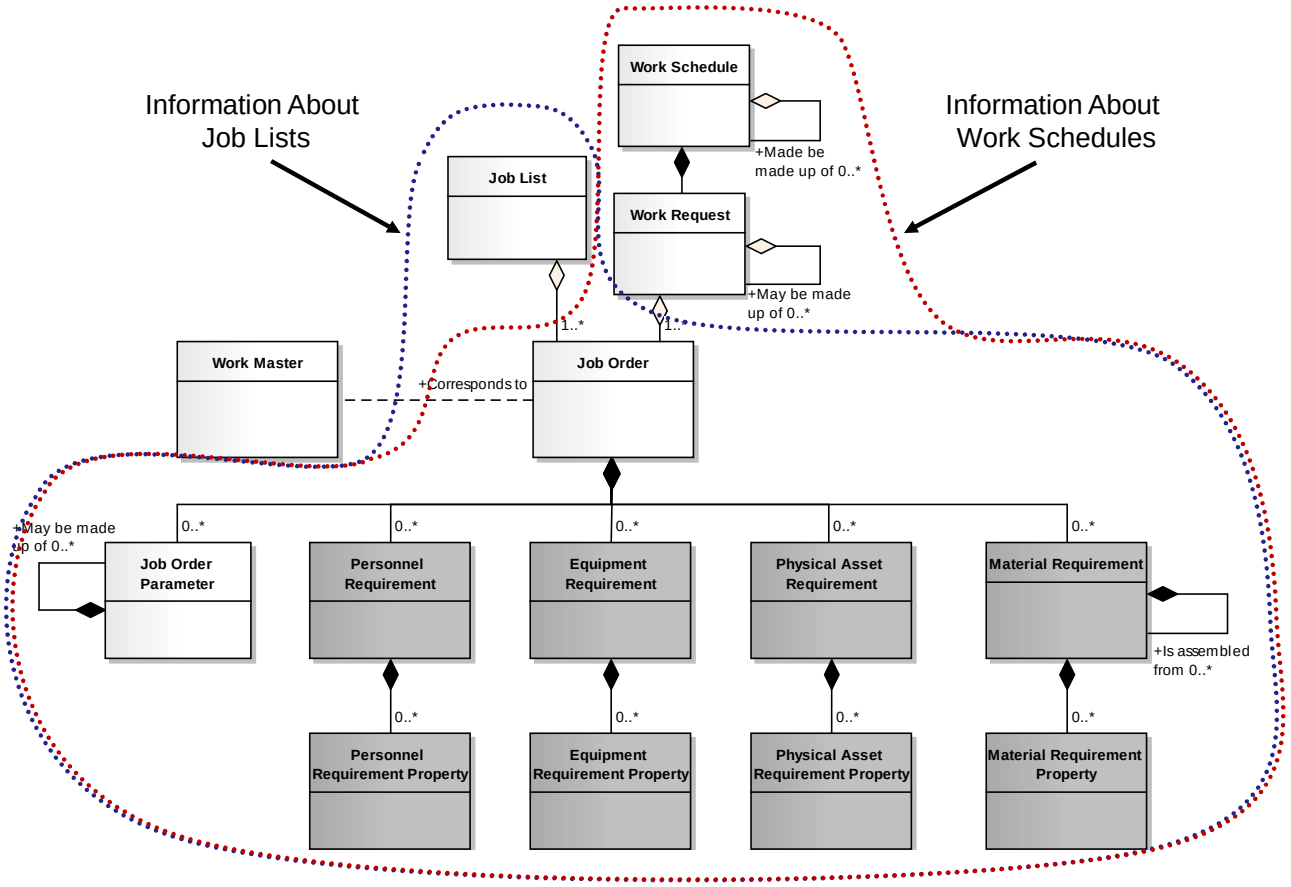
Change	Date	Person	Description
V0600	Aug 2012	D. Brandl	Initial Version

1 SCHEMA SCOPE

This document defines the information about work schedules and job lists. 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.

1.1 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 assumption is that information would be exchanged by either a work schedule or by a job list.



Model of Exchanged Work Schedule and Job List Information

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

1.2 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 = "OpPersonnelRequirement"  type = "
OpPersonnelRequirementType"/>

<xsd:complexType name = " OpPersonnelRequirementType">
    <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

1.3 WorkSchedule

A work schedule is made up of a set of one or more work requests. The work schedule also contains the information that defines the context of the schedule, such as start time, end time, location, and published date. A work schedule may be made up of optional sub-work schedules.

1.4 WorkRequest

A work request defines set of job orders. A work request may be made up of optional sub-work requests.

1.5 JobList

A job list defines a set of job orders for a specific period of time and for specific resources.

1.6 JobOrder

A job order defines a job to be performed. It defines the parameters, personnel, equipment, physical assets, and material requirements associated with the job order. It optionally defines the associated work master that defines the work to be performed for the job.

1.7 EquipmentRequirement

The job order may include one or more requirements for, or constraints upon, the equipment that the facility should use in the job. Requirements can be as generic as materials of construction, or it can as specific as a particular piece of equipment. Each of these requirements is defined in an EquipmentRequirement element and property.

1.8 PersonnelRequirement

A personnel requirement and the associated personnel requirement property elements define to the number, type, duration, and scheduling of specific certifications and job classifications needed to support a job order.

1.9 PhysicalAssetRequirement

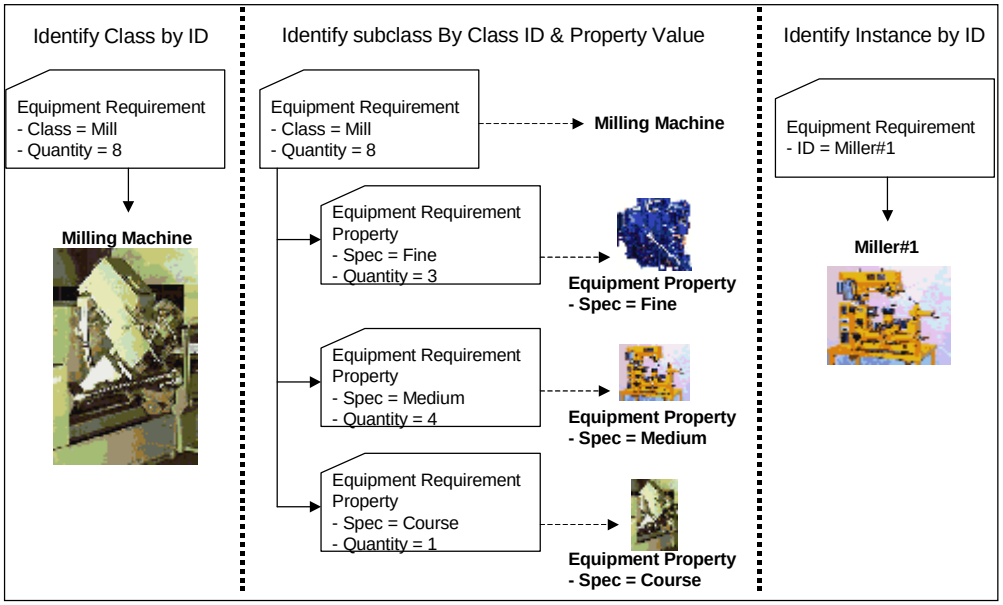
The job order may include one or more requirements for, or constraints upon, the physical assets that the facility shall use in the job.

1.10 MaterialRequirement

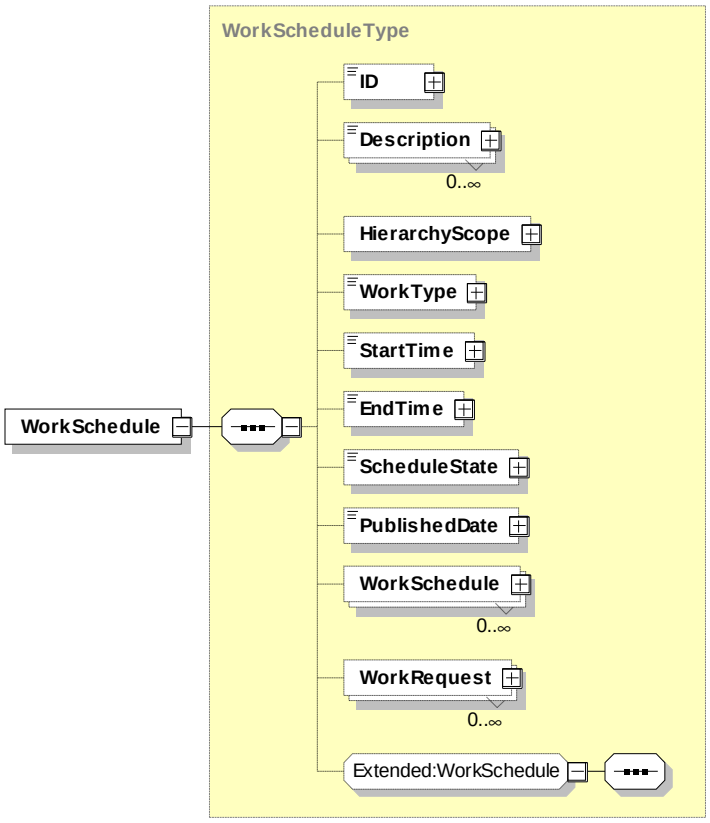
A MaterialRequirement defines a requirement for a material to be produced or used. A material requirement may include the total quantity of the material to be produced or consumed and unit of measure, such as 5000 Lbs, and an acceptable range for the quantity of material. Material may be defined by Material Class ID, Material Definition ID, Material Lot ID, and/or Material Sublot ID. A MaterialRequirement element includes an element that specifies if the material is to be consumed, produced, or is a consumable material

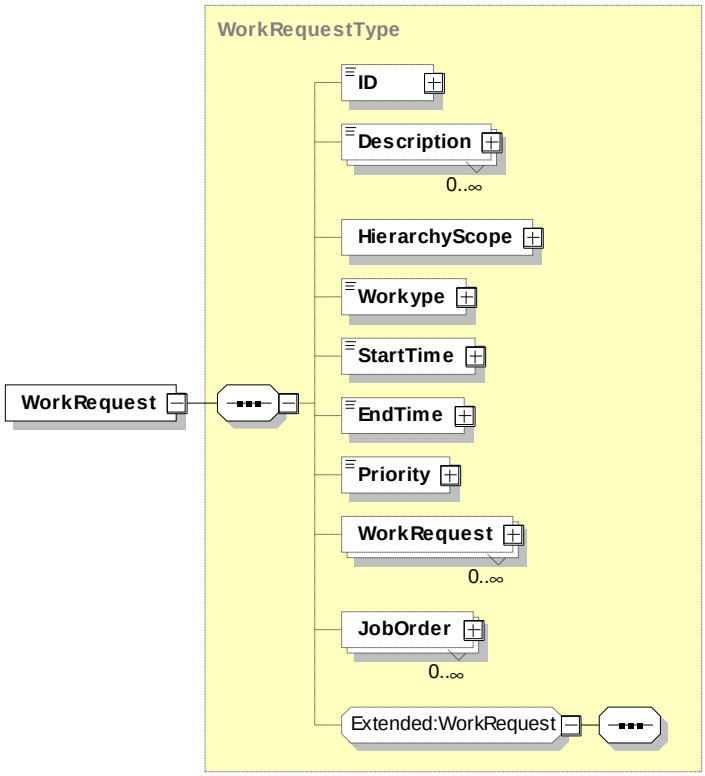
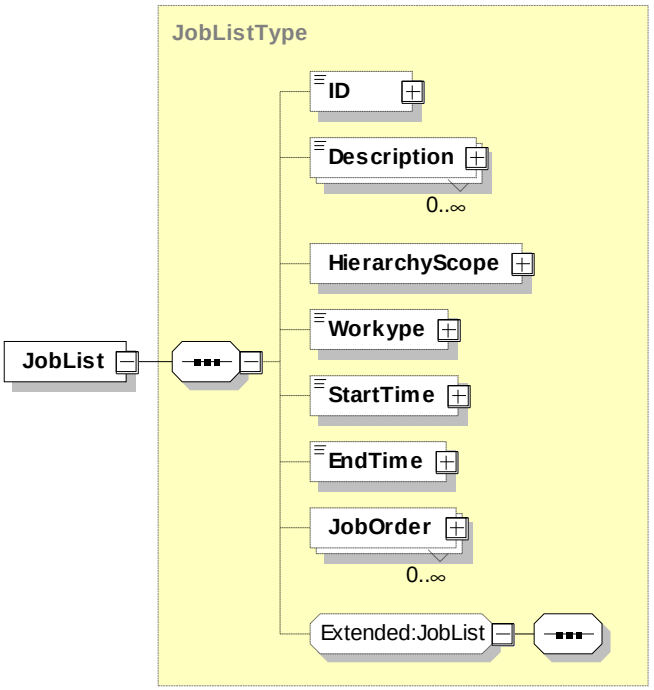
1.11 Resource Identification

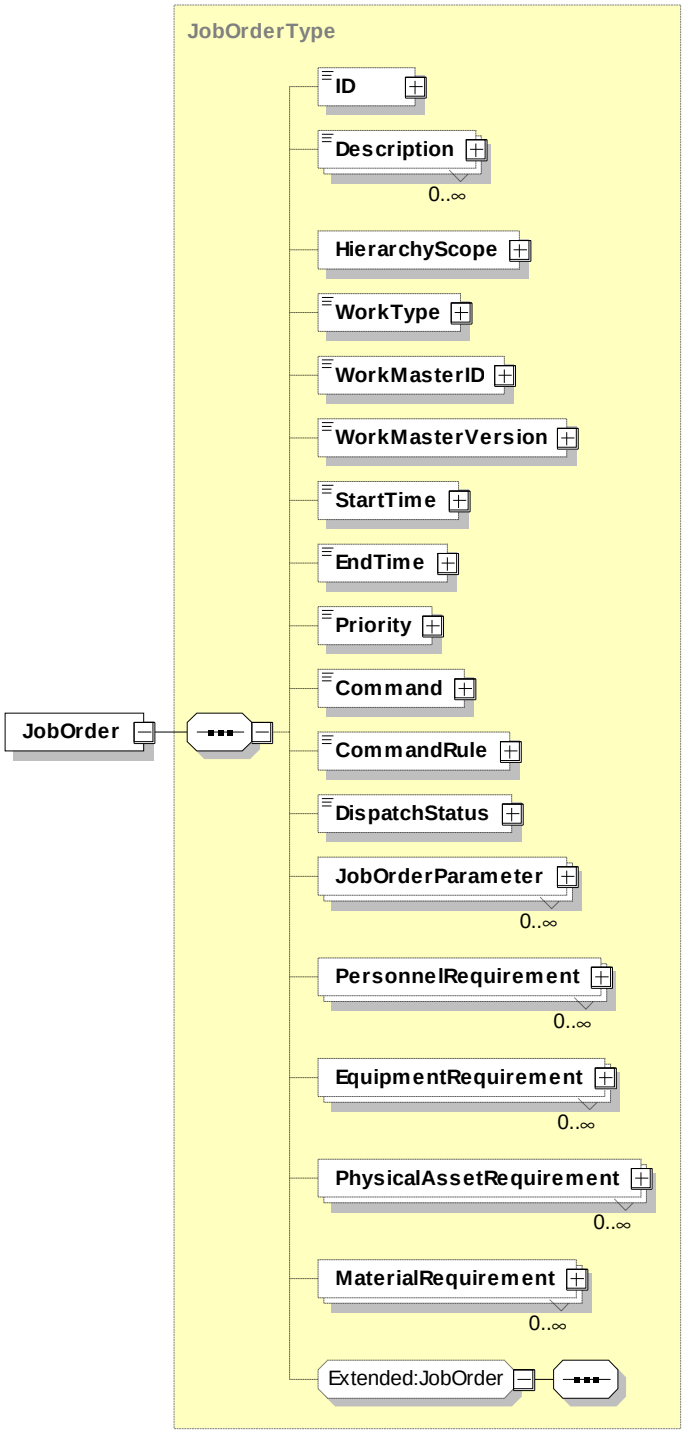
The schemas follow the ANSI/ISA-95 standard by defining resources by class ID or instance ID, or by defining them by class ID and a property value that is used to define a subset of the resource. For example, the figure below illustrates that a segment may require a certain number of milling machine, 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. Alternately a specific resource may be specified for a work schedule, such as requiring milling machine with ID=”Miller#1”.

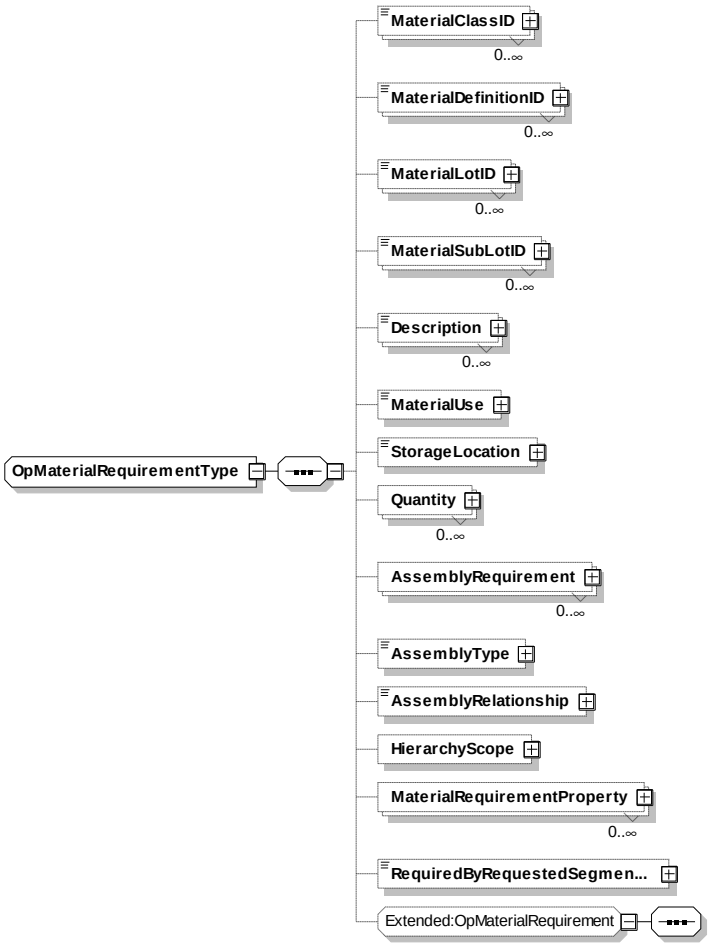


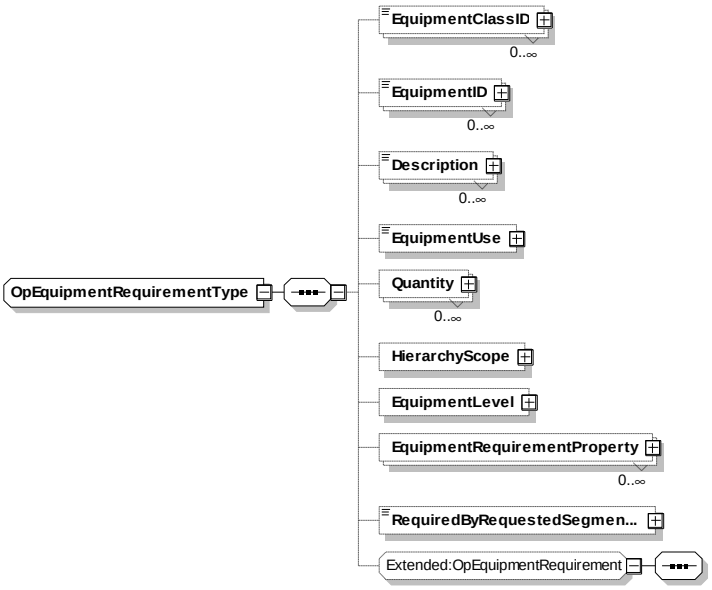
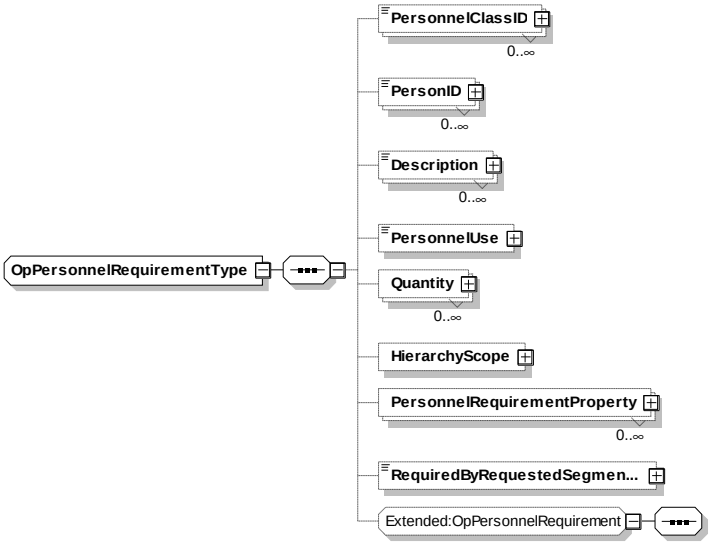
2 ELEMENT DEFINITIONS

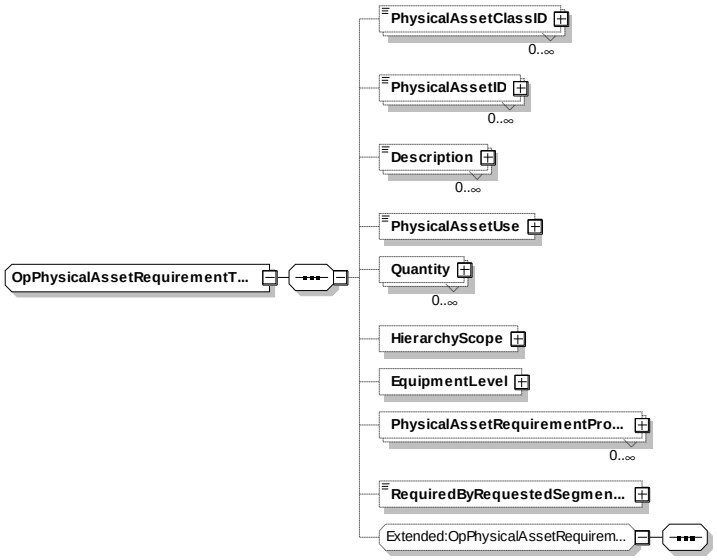
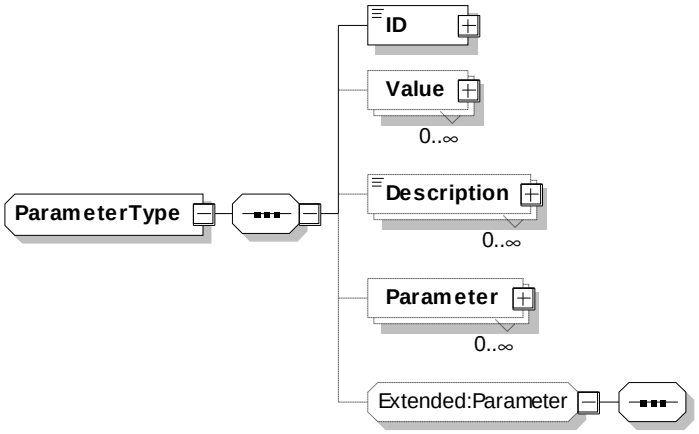
Element/Type	Description
WorkSchedule ***WorkScheduleType***	Contains a definition of a work schedule, including the hierarchy scope of the scheduled elements, the publication date of the schedule, the time range of the schedule, the list of work requests that make up the schedule, and the optional sub work schedules. 

Element/Type	Description
WorkRequest ***WorkRequestType***	Contains a definition of a work request element of a work schedule, including the time range of the request, the priority of the request, the job orders of the request, and optional sub work requests. 
JobList ***JobListType***	Contains a list of job orders for a specific resource (HierarchyScope) for a specific time period (StartTime and EndTime). 

Element/Type	Description
JobOrder ***JobOrderType***	Contains a definition of a job order, including an identification and version of the associated work master, the time range of the request, the expected duration of the request, parameters for the job order, and the definition of the personnel, equipment, physical assets, material produced, material consumed, and consumables to be used in the job order. 

Element/Type	Description
MaterialRequirement ***OpMaterialRequirementType***	Contains a definition of a material, including an identification of the use of the material, the quantity of the material or a definition of required subsets identified by resource properties. A **MaterialRequirement** element may have a set of contained **AsemblyRequirement** elements to support hierarchical manufacturing bills. 
MaterialRequirementProperty ***OpMaterialRequirementPropertyType***	Contains a definition of a subset of a material used in a segment requirement, including the value used to identify the subset and the quantity of the material used.

Element/Type	Description
EquipmentRequirement ***OpEquipmentRequirementType***	Contains a definition of an equipment requirement for a segment requirement, including an identification of the quantity of the resource used, or a definition of required subsets identified by resource properties. 
EquipmentRequirementProperty ***OpEquipmentRequirementPropertyType***	Contains a definition of a subset of an equipment resource used in a segment requirement, including the value used to identify the subset and the quantity of the resource used.
PersonnelRequirement ***OpPersonnelRequirementType***	Contains a definition of a personnel requirement for a segment requirement, including an identification of the quantity of the resource used, or a definition of required subsets identified by resource properties. 
PersonnelRequirementProperty ***OpPersonnelRequirementPropertyType***	Contains a definition of a subset of a personnel resource used in a segment requirement, including the value used to identify the subset and the quantity of the resource used.

Element/Type	Description
PhysicalAssetRequirement ***OpPhysicalAssetRequirementType***	Contains a definition of a physical asset requirement for a segment requirement, including an identification of the quantity of the resource used, or a definition of required subsets identified by resource properties. 
PhysicalAssetRequirementProperty ***OpPhysicalAssetRequirementPropertyType***	Contains a definition of a subset of a physical asset resource used in a segment requirement, including the value used to identify the subset and the quantity of the resource used.
JobOrderParameter ***ParameterType***	Contains a definition of a job order parameter, as a ParameterType, including the value for the parameter. 

3 TRANSACTION ELEMENTS

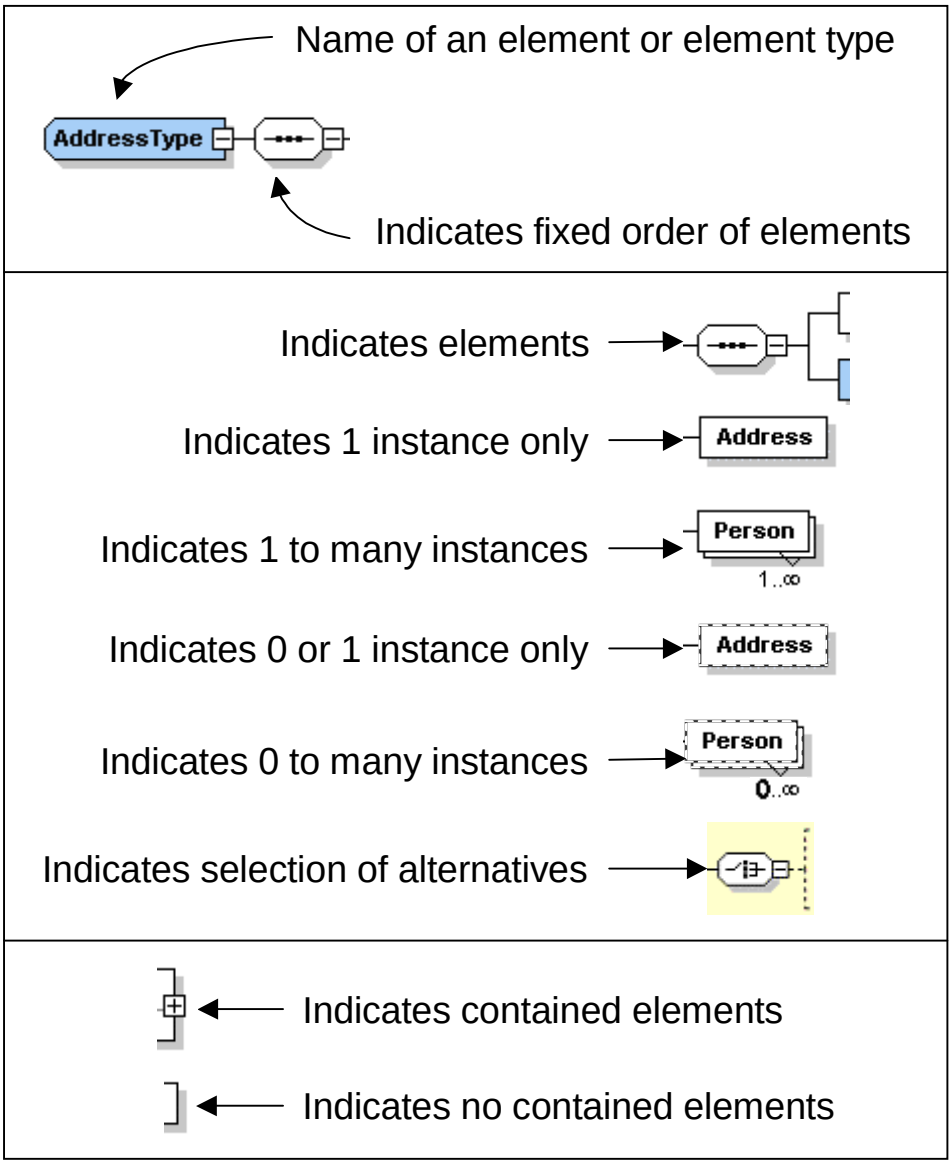
The following elements are defined to support the ISA 95 Part 5 transactions, using the transaction data types defined in the B2MML-Common.xsd schema.

Work Schedule Elements	Description
GetWorkSchedule	Get *WorkSchedule* definition.
ShowWorkSchedule	Returned information from the *GetWorkSchedule* message.
ProcessWorkSchedule	Process *WorkSchedule* definition.
AcknowledgeWorkSchedule	Returned status from the *ProcessWorkSchedule* message.
ChangeWorkSchedule	Change *WorkSchedule* definition.
RespondWorkSchedule	Returned status from the *ChangeWorkSchedule* message.
CancelWorkSchedule	Cancel *WorkSchedule* definition.
SyncWorkSchedule	Published *WorkSchedule* definition.

Job List Elements	Description
GetJobList	Get *JobList* definition.
ShowJobList	Returned information from the *GetJobList* message.
ProcessJobList	Process *JobList* definition.
AcknowledgeJobList	Returned status from the *ProcessJobList* message.
ChangeJobList	Change *JobList* definition.
RespondJobList	Returned status from the *ChangeJobList* message.
CancelJobList	Cancel *JobList* definition.
SyncJobList	Published *JobList* definition.

4 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.