Business To Manufacturing Markup Language

Workflow Specification

Version 6.0 - March 2013

B2MML-WorkflowSpecification

IMPORTANT: While the information, data, and standards provided in this publication were developed and are presented in good faith in accordance with a reasonable process that was subject to intellectual property and antitrust policies to benefit the industry as a whole, the publication is provided “as is” for information and guidance only, and there is no representation or warranty of any type or kind, including but not limited to warranties of merchantability or fitness for a particular purpose, and no warranty that use of the information, data, or standards will not infringe patent, copyright, trademark, trade secret, or other intellectual property rights of any party.

Material from ANSI/ISA-88 and ANSI/ISA-95 series of standards used with permission of ISA - The Instrumentation, Systems, and Automation Society, www.isa.org

Table of Contents

CHANGE HISTORY

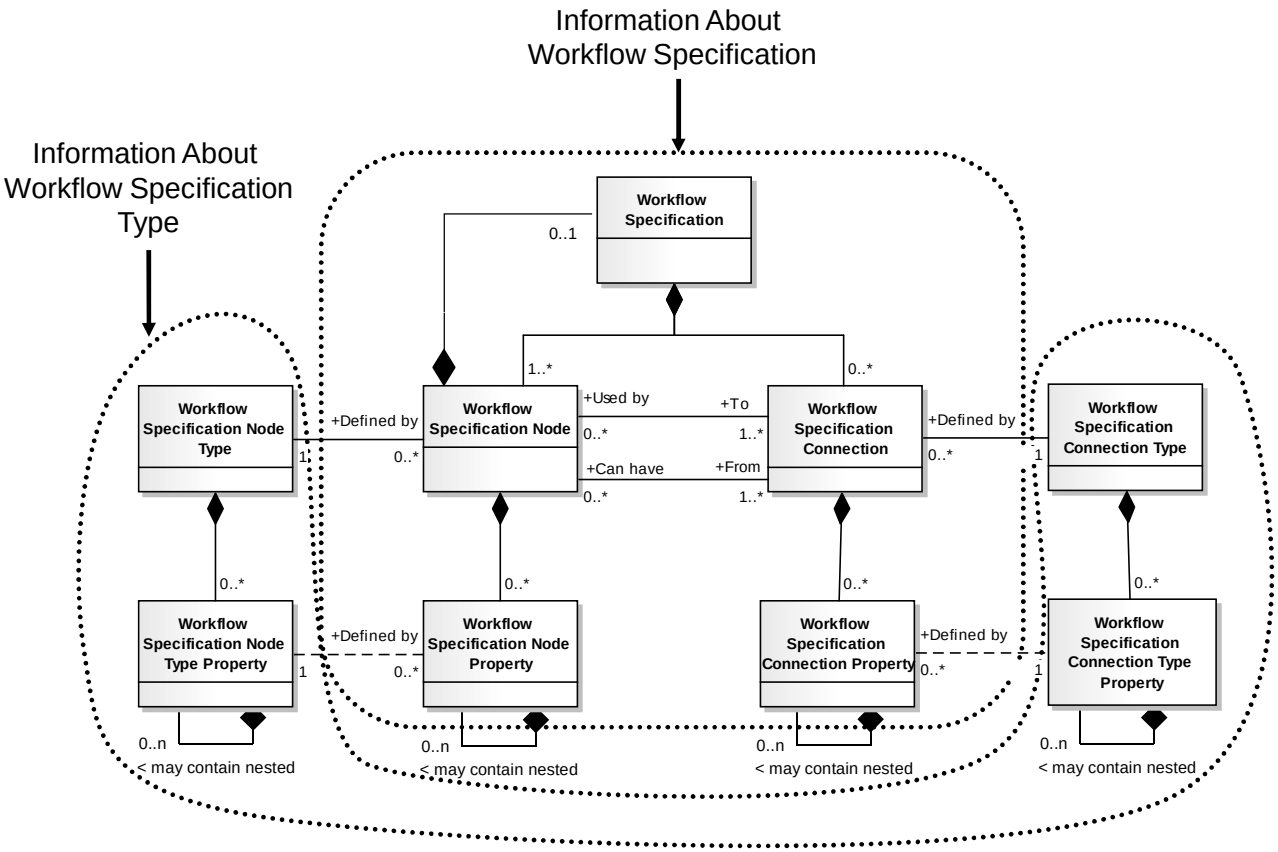
Change	Date	Person	Description
V0600	Aug 2012	D. Brandl	• Initial Version

SCHEMA SCOPE

This document defines the information about the definition of operations 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 workflow will be accessed as part of a Work Master, or a Work Directive, or as an independent WorkflowSpecification element. The assumption is that the WorkflowSpecificaiton Type information will be exchanged as a single element, or as a collection of WorkflowSpecificationTypes in a WorkflowSpecificationInformation element.



Model of Exchanged Workflow Specification 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.

NOTE: Properties may be nested, which is an extension to the ISA 95.04 model, to make it consistent with other ISA 95.02 models.

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.

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

WorkflowSpecificationInformation

A main structuring element of the schema definition is WorkflowSpecificationInformation. This element allows for the exchange of multiple WorkflowSpecification and WorkflowSpecificationType elements in a single message.

WorkflowSpecificationType

A WorkflowSpecificationType element defines the exchange information structure for all of the node types and connection types that makeup a workflow, as defined in ANSI/ISA95 Part 4.

For example, if the workflow is defined using a flow chart, then the following node and connection types could be defined:

Element Type	Element ID	Description
Workflow Specification Node Type	Process	Show a Process or action step. This is the most common symbol in both process flowcharts and process maps.
Workflow Specification Node Type	Defined Process	A Predefined Process symbol is a marker for another process step or series of process flow steps that are formally defined elsewhere. This shape commonly depicts sub-processes (or subroutines in programming flowcharts).
Workflow Specification Node Type	Decision	Indicates a question or branch in the process flow. Typically, a Decision flowchart shape is used when there are 2 options (Yes/No, No/No-Go, etc.)
Workflow Specification Connection Type	Connector	Flow line connectors show the direction that the process flows.
Workflow Specification Node Type	Terminator	Terminators show the start and stop points in a process. When used as a Start symbol, terminators depict a trigger action that sets the

		process flow into motion.

WorkflowSpecificationNodeType

A WorkflowSpecificationNodeType element defines a type of node in a workflow specification. There may be properties (WorkflowSpecificationNodeTypeProperty) that may be used to represent additional information about the node type, such as a property for a flowchart Defined Process that contains the name of the sub-process.

WorkflowSpecificationConnectionType

A WorkflowSpecificationConnectionType element defines a type of connection in a workflow specification. There may be properties (WorkflowSpecificationConnectionTypeProperty) that may be used to represent additional information about the connection type, such as a property for a flowchart connection from a decision that contains the value (Yes or No) associated with the connection.

WorkflowSpecification

A WorkflowSpecification defines the exchange information structure for a workflow specification, as defined in ANSI/ISA95 Part 4. The exchange information optionally includes the ID of the WorkflowSpecificationType or WorkflowSpecification the workflow specification.

Workflows specifications are represented as a set of nodes and connections.

WorkflowSpecificationNode

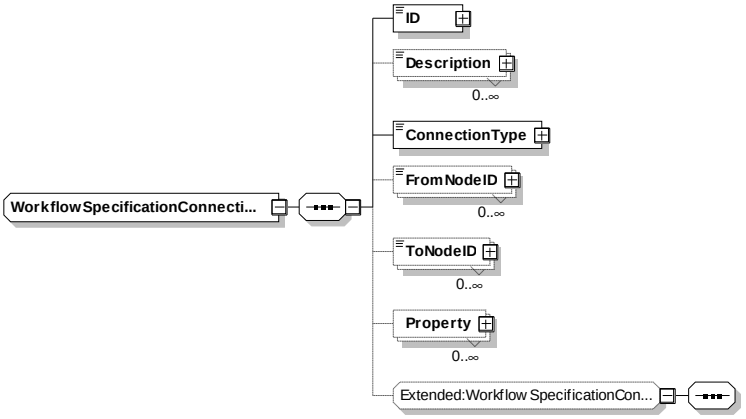
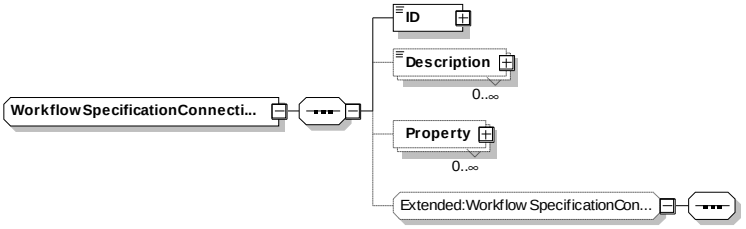
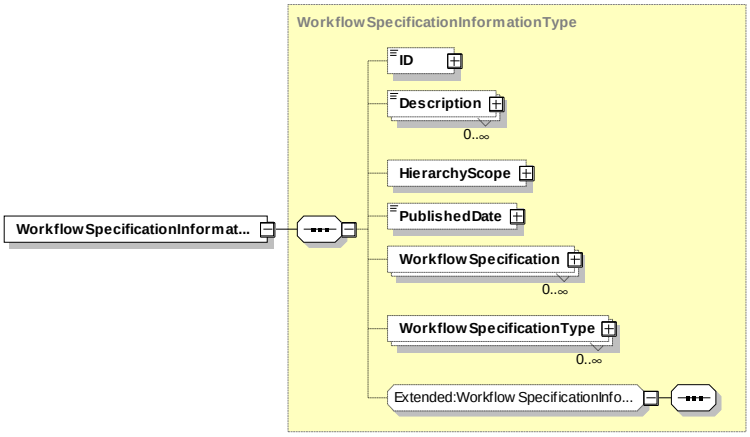
A WorkflowSpecificationNode element defines a node in a workflow specification. There may be properties (WorkflowSpecificationNodeProperty) that may be used to represent additional information about the node, such as a property for a flowchart Defined Process that contains the name of the sub-process.

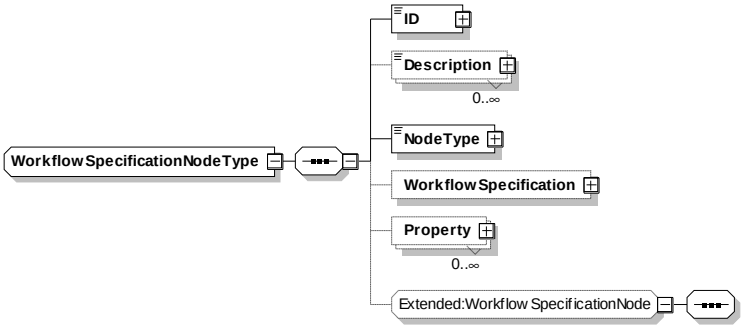
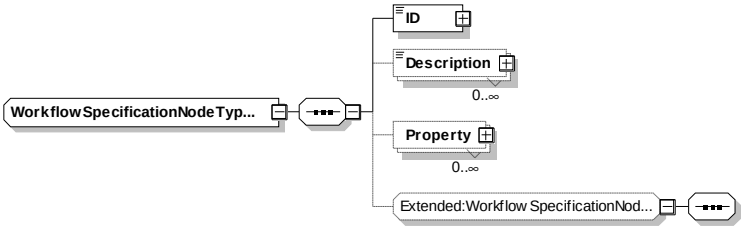
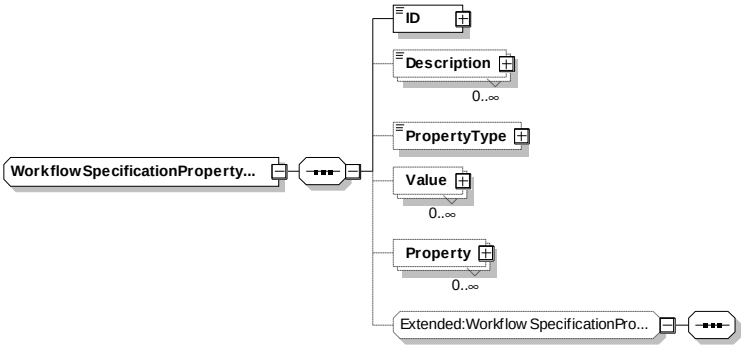
The WorkflowSpecificationNode may contain an optional WorkflowSpecification, such as when a flowchart sub-process node contains a definition of the sub-process.

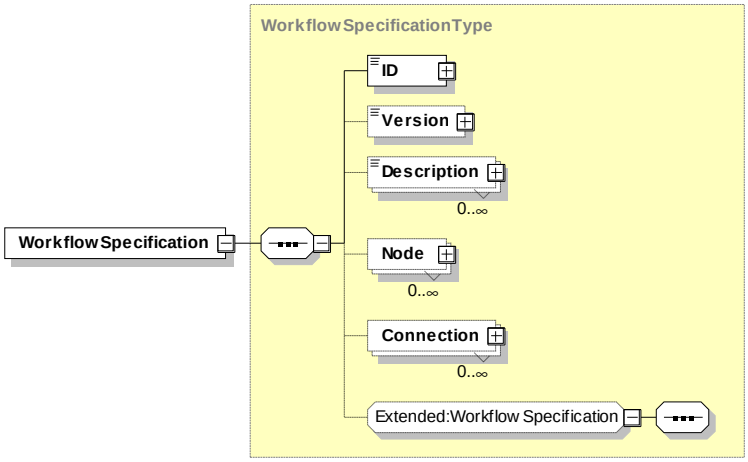
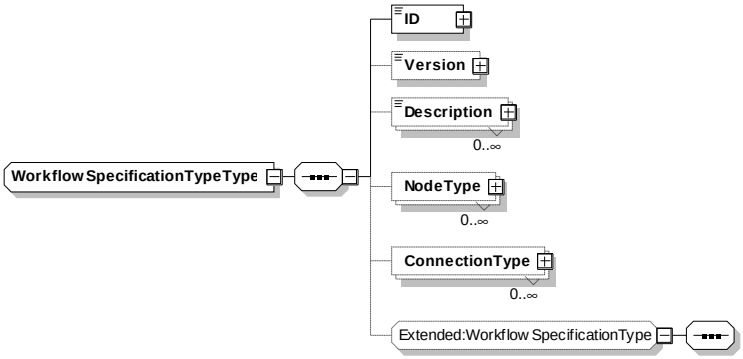
WorkflowSpecificationConnection

A WorkflowSpecificationConnection element defines a connection in a workflow specification. There may be properties (WorkflowSpecificationConnectionProperty) that may be used to represent additional information about the connection type, such as a property for a flowchart connection from a decision that contains the value (Yes or No) associated with the connection.

ELEMENT DEFINITIONS

Element/Type	Description
WorkflowSpecificationConnectionType ConnectionType	Contains a connection for a workflow specification. It contains an ID of the connection, the ID of the connection type, optional descriptions, optional properties, the IDs of the "from" nodes in the connection, and the IDs of the "to" nodes in the connection. 
WorkflowSpecificationConnectionTypeType ConnectionType	Contains a connection type for a workflow specification type. It contains an ID of the connection type, optional descriptions, and optional properties. 
WorkflowSpecificationInformationType WorkflowSpecificationInformation	Contains a list of workflow specifications and workflow specification types. Includes the hierarchy scope of the information, and the date of publication of the information. 

Element/Type	Description
WorkflowSpecificationNodeType Node	Contains a node for a workflow specification. It contains an ID of the node, the ID of the node type, optional descriptions, optional properties, and an optional definition of a sub workflow specification. 
WorkflowSpecificationNodeTypeType NodeType	Contains a node type for a workflow specification type. It contains an ID of the node type, optional descriptions, and optional properties. 
WorkflowSpecificationPropertyType Property	Contains a property for a workflow node, a workflow connection, a workflow node type, or a workflow connection type. Includes the ID of the property, optional descriptions, the Property Type (no default values are defined), and any nested properties. 

Element/Type	Description
WorkflowSpecificationType WorkflowSpecification	Contains a workflow specification. 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. 
WorkflowSpecificationTypeType WorkflowSpecificationType	Contains a WorkflowSpecificationType. Includes the list of node types and connection types that make up a workflow specification type. 

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.

Workflow Specification Information Elements	Description
GetWorkflowSpecificationInformation	Get *WorkflowSpecificationInformation* definitions.
ShowWorkflowSpecificationInformation	Returned information from the *Get*WorkflowSpecification*Information* message.
ProcessWorkflowSpecificationInformation	Process *WorkflowSpecificationInformation* definitions.
AcknowledgeWorkflowSpecificationInformation	Returned status from the *ProcessWorkflowSpecificationInformation* message.
ChangeWorkflowSpecificationInformation	Change *WorkflowSpecificationInformation* definitions.
RespondWorkflowSpecificationInformation	Returned status from the *ChangeWorkflowSpecificationInformation* message.
CancelWorkflowSpecificationInformation	Cancel *WorkflowSpecificationInformation* definitions.
SyncWorkflowSpecificationInformation	Published *WorkflowSpecificationInformation* definitions.

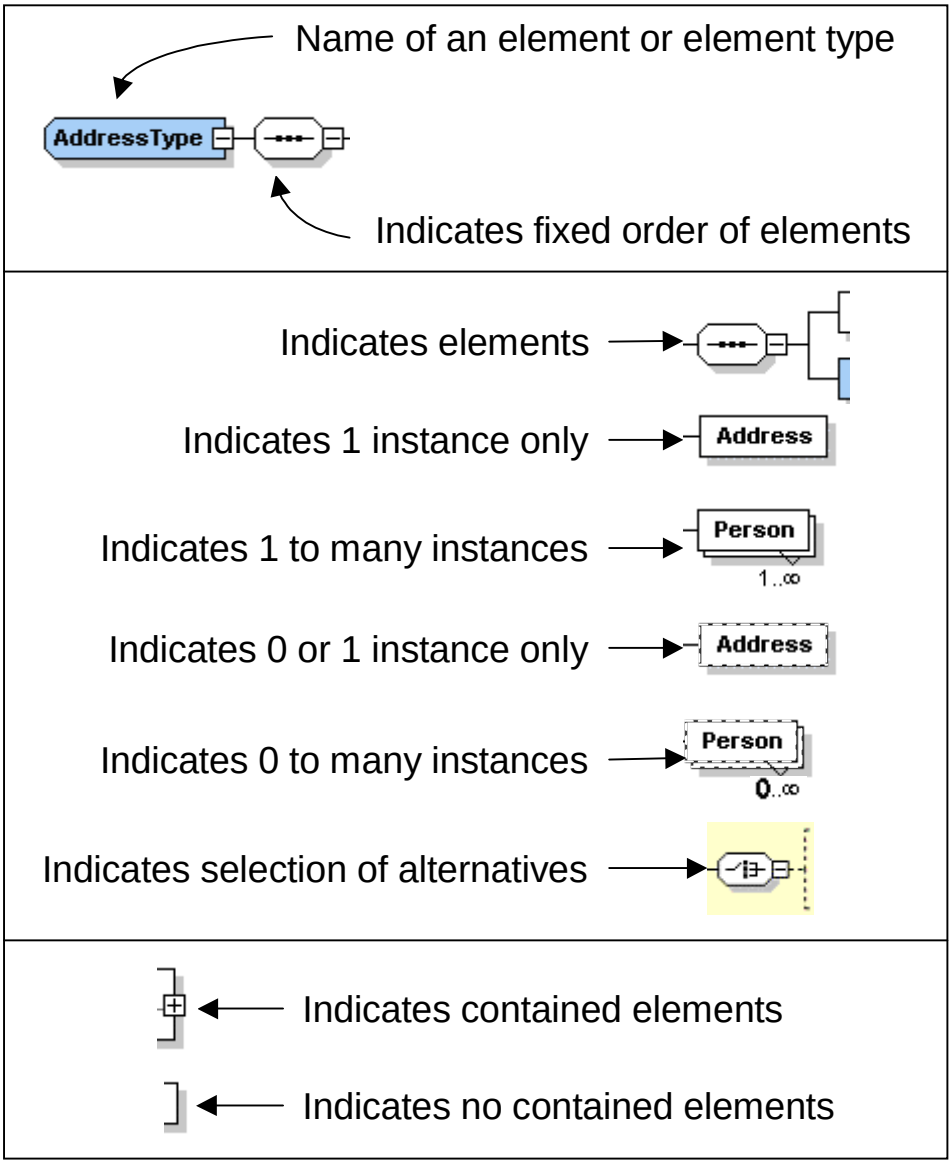
Workflow Specification Type Elements	Description
GetWorkflowSpecificationType	Get a *WorkflowSpecificationType* definition.
ShowWorkflowSpecificationType	Returned information from the *GetWorkflowSpecificationType* message.
ProcessWorkflowSpecificationType	Process a *WorkflowSpecificationType* definition.
AcknowledgeWorkflowSpecificationType	Returned status from the *ProcessWorkflowSpecificationType* message.
ChangeWorkflowSpecificationType	Change a *WorkflowSpecificationType* definition.
RespondWorkflowSpecificationType	Returned status from the *ChangeWorkflowSpecificationType* message.
CancelWorkflowSpecificationType	Cancel a *WorkflowSpecificationType* definition.
SyncWorkflowSpecificationType	Published *WorkflowSpecificationType* definition.

Workflow Specification Elements	Description
GetWorkflowSpecification	Get a *WorkflowSpecification* definition.
ShowWorkflowSpecification	Returned information from the *GetWorkflowSpecification* message.

Workflow Specification Elements	Description
ProcessWorkflowSpecification	Process a *WorkflowSpecification* definition.
AcknowledgeWorkflowSpecification	Returned status from the *ProcessWorkflowSpecification* message.
ChangeWorkflowSpecification	Change a *WorkflowSpecification* definition.
RespondWorkflowSpecification	Returned status from the *ChangeWorkflowSpecification* message.
CancelWorkflowSpecification	Cancel a *WorkflowSpecification* definition.
SyncWorkflowSpecification	Published *WorkflowSpecification* 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.



About MESA: MESA promotes the exchange of best practices, strategies and innovation in managing manufacturing operations and in achieving operations excellence. MESA's industry events, symposiums, and publications help manufacturers achieve manufacturing leadership by deploying practical solutions that combine information, business, manufacturing and supply chain processes and technologies. Visit us online at http://www.mesa.org.

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