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Information Exchange

**THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA
NATIONAL INSTITUTE OF BUILDING SCIENCES**

agcXML

**SCHEDULE OF VALUES
DATA SPECIFICATION AND SCHEMA**

**VERSION 1.0
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The agcXML Project

The Associated General Contractors of America

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1 SCHEDULE OF VALUES

The AGCxml [ScheduleOfValues](#) schema is discussed in this document as a class diagram using the Unified Modeling Language notation, UML. The document should present the overall structure of the agcXML schema and discuss its components and dependencies – particularly the interrelationship between the common layer for aecXML definitions, common agcXML definitions and the particular usage and extension for the [ScheduleOfValues](#) schema. It also shows where components from ifcXML are reused and where IFC based BIM information can be handled and mapped into agcXML.

1.1 The ScheduleOfValues schema

The [ScheduleOfValues](#) schema is the schema to be used for sending and receiving schedule of values between parties involved in electronic exchange of business messages. The schema deals with the variable part of the schedule of values, not with the layout of the documents. In scope are:

- The meta-data of the schedule of values document (who, when, with what application)
- The reference to the application for payment
- The owner, contractor, prime designer and project information and references
- The schedule of values for this application and accumulation of previous applications.

1.1.1 Name space considerations

The following name spaces are assigned:

- ifcXML – not part of the XML schema, will be handled by XSLT based mapping, when required
- aecXMLCOS:
 - `xmlns:cos="http://www.aecXML.org/aecXML/cos"`
- agcXMLCommon:
 - `xmlns:agcxml="http://www.aecXML.org/agcXML/agcXMLCommon"`
- ScheduleOfValues:
 - `xmlns:agcsov="http://www.aecXML.org/agcXML/ScheduleOfValues"`

1.2 The ScheduleOfValues root element

The root element of the xml exchange document is the [ScheduleOfValues](#) element. It is defined in the [ScheduleOfValues](#) name space, and inherits from the [DocumentTransaction](#) in the [agcXMLCommon](#) name space. All attributes and elements of [DocumentTransaction](#) are explained in the document “agcXML common definitions”.

The [ScheduleOfValues](#) element adds the following schedule of values specific elements:

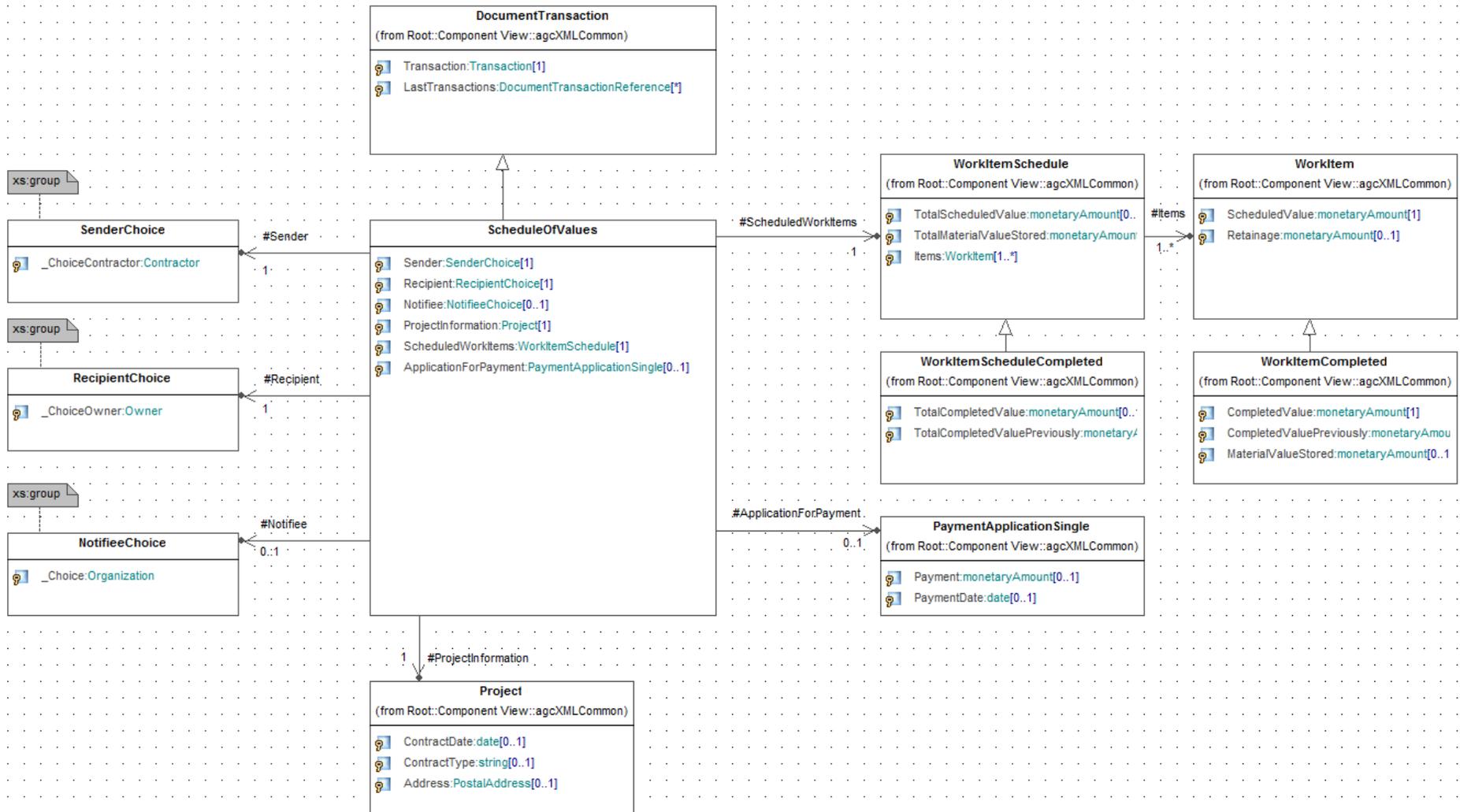


Figure 1: the root element *ScheduleOfValues* in *ScheduleOfValues* name space

1.2.1 Basic document information

The `ScheduleOfValues` carries (if fully instantiated) the following information:

- The governing form (i.e. the template for the schedule of values document)
- The information about the parties of the schedule of value
 - The sender information, being either:
 - Contractor
 - Owner
 - The recipient information, being either:
 - Contractor
 - Owner
 - The notifyee information (optionally), being
 - any organization
- The project information (name and reference number)
- The application of payment (number, date, period)
- The schedule of values
 - Work item number, description and scheduled value
 - Work completed
 - Retainage.

1.2.2 Governing form

The exchange of the schedule of values is based on the standard forms published by AGC (or potentially also other standard forms). The first element `GoverningForm` provides the underlying and governing form. The element `GoverningForm` is defined at `Document`.

It identifies the underlying and governing form, which currently may be any one of the following:

- ConsensusDOCS 293 Schedule of Values
(formerly AGC Document 293)
- AIA Document G703-1992 Application for Payment Continuation Sheet (Schedule of Values)

1.3 The parties involved in the schedule of values

A schedule of values transaction is established between a sender and a recipient. In addition, others can be notified.

Information about organization and person information of the parties is provided in the document "agcXML common definitions" section "Person and organization".

1.3.1 The sender information

The sender for the `ScheduleOfValues` is presented by the `Contractor`. It is accessible as `Sender`.

1.3.2 The recipient information

The recipient for the `ScheduleOfValues` is presented by the `Owner`. It is accessible as `Recipient`.

1.3.3 The notifyee information

The notifyee for the `ScheduleOfValues` can be presented by any organization. The notifyee information is optional.

1.4 The project information of the schedule of values

1.4.1 Project information

The `ProjectInformation` is provided by `Project`. The minimum information required is `ProjectInformation.Name` and `ProjectInformation.ProjectId`.

Information about `Project` is provided in the document “agcXML common definitions” within the section “Project”.

1.5 The application for payment information

The `ApplicationForPayment` provides the information about the application for payment to which this `ScheduleOfValues` applies. It reuses the `PaymentApplication` element within the `agcXMLCommon` name space. In particular, it restricts it to `PaymentApplicationSingle`.

The `PaymentApplicationSingle` (referring to a single application versus recurring application) provides:

- `Name` (or `Id`) of the application for payment
- `Description` for any optional remarks
- `PaymentPeriod` and
- `PaymentDate`

Information about `PaymentApplicationSingle` is provided in the document “agcXML common definitions” within the section “Payment application”.

1.6 The list of work items within the schedule of values

The `ScheduledWorkItems` provides a `WorkItemsSchedule`, being a group of the individual items of the schedule of values. The `WorkItemsSchedule` groups the individual items of the schedule. The total schedule is given by a name or number, an optional description and the:

- `TotalScheduleValue`
- `TotalMaterialValueStored`
- the two additional elements are available as `WorkItemsScheduleCompleted` for completed work item schedules:
 - `TotalCompletedValue`
 - `TotalCompletedValuePreviously` (from the previous schedule of value)

Each of the `Items` has:

- The `Name` (or `Id`) of the item
- The `Description` to optionally capture any remarks
- The `ScheduledValue` of the item
- Any `Retainage` (only given, if variable rate)

- And an included information about the rate of completion:
 - The **CompletedValue** within this period of the application for payment,
 - The **CompletedValuePreviously** showing the work completed from previous applications
 - The **MaterialValueStored**

Information about **WorkItemSchedule** and **WorkItem** is provided in the document "agcXML common definitions" within the section "Work items and work item schedule".

2 XML SCHEMA

The XML schema definitions are defined in different name spaces following the agcXML technical framework.

- The most general definitions are included in the [aecXMLCOS](#) name space; some of those definitions are taken from other standards, such as [ifcXML](#) for general elements and ISO-IEC_82045-5 for document metadata.
- Definitions that are common to AGC document exchanges within the scope of [agcXML](#) are included in the [agcXMLCommon](#) name space.
- Definitions that are specific to the exchange of schedules of values are included in the [ScheduleOfValue](#) name space.

2.1 aecXMLCOS name space

The XML schema definitions of the aecXMLCOS schema are provided in the document “agcXML common definitions”, section “aecXML schema”.

2.2 agcXMLCommon name space

The XML schema definitions of the agcXMLCommon schema are provided in the document “agcXML common definitions”, section “agcXMLCommon schema”.

2.3 agcXMLScheduleofValues name space

```
<? xml version="1.0" encoding="UTF-8"?>
<!-- XMLSpy v2007 sp2 (http://www.altova.com) Thomas Liebich (AEC3 Deutschland GmbH) -->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:agcsov="http://www.aecXML.org/agcXML/ScheduleOfValues"
xmlns:agcxml="http://www.aecXML.org/agcXML/agcXMLCommon" xmlns:cos="http://www.aecXML.org/aecXML/cos"
targetNamespace="http://www.aecXML.org/agcXML/ScheduleOfValues" elementFormDefault="qualified"
attributeFormDefault="unqualified">
  <xs:import namespace="http://www.aecXML.org/aecXML/cos" schemaLocation="aecXMLCOS.xsd"/>
  <xs:import namespace="http://www.aecXML.org/agcXML/agcXMLCommon"
schemaLocation="agcXMLCommon.xsd"/>
  <!--schedule of values diagram-->
  <xs:element name="ScheduleOfValues" type="agcsov:ScheduleOfValues"
substitutionGroup="agcxml:DocumentTransaction" nillable="false"/>
  <xs:complexType name="ScheduleOfValues">
    <xs:complexContent>
      <xs:extension base="agcxml:DocumentTransaction">
        <xs:sequence>
          <xs:element name="Sender">
            <xs:complexType>
              <xs:group ref="agcsov:SenderChoice"/>
            </xs:complexType>
          </xs:element>
          <xs:element name="Recipient">
            <xs:complexType>
              <xs:group ref="agcsov:RecipientChoice"/>
            </xs:complexType>
          </xs:element>
          <xs:element name="Notifiee" minOccurs="0">
            <xs:complexType>
              <xs:group ref="agcsov:NotifieeChoice"/>
            </xs:complexType>
          </xs:element>
          <xs:element name="ProjectInformation" type="agcxml:Project"/>
          <xs:element name="ScheduledWorkItems"
type="agcxml:WorkItemSchedule"/>
          <xs:element name="ApplicationForPayment"
type="agcxml:PaymentApplicationSingle"
minOccurs="0"/>
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
</xs:element>
```

```
        </xs:sequence>
      </xs:extension>
    </xs:complexContent>
  </xs:complexType>
  <!--Actor definition diagram-->
  <xs:group name="SenderChoice">
    <xs:choice>
      <xs:element ref="agcxml:Contractor"/>
    </xs:choice>
  </xs:group>
  <xs:group name="RecipientChoice">
    <xs:choice>
      <xs:element ref="agcxml:Owner"/>
    </xs:choice>
  </xs:group>
  <xs:group name="NotiffeeChoice">
    <xs:choice>
      <xs:element ref="agcxml:Architect"/>
      <xs:element ref="agcxml:Engineer"/>
    </xs:choice>
  </xs:group>
</xs:schema>
```

A ASSIGNMENT TO COMPARATIVE ANALYSIS

The following table shows each agcXML element reference (defined as a path from root element **ScheduleOfValue** in **ScheduleOfValue** name space) assigned to the corresponding data field obtained from the comparative analysis of the existing transaction media for schedule of values transactions (the commonly accepted standard contract forms published by the AIA, AGC, and EJCDC, and others). The table is NOT intended to represent the entire content of the schema or the actual cardinality of each element in the schema. The full comparative analysis is published separately and can be obtained from AGC.

agcXML Comparative Analysis

Schedule of Values

Data Field Description/Content	Cardinality	Path from root element in current agcXML schema
Application for Payment Information		
Application for Payment Number	[1]	ApplicationForPayment.Name
Application for Payment Date	[1]	ApplicationForPayment.Date
Application for Payment Period	[1]	ApplicationForPayment.Period
Owner Information		
Owner Company Name	[1]	Recipient: Owner.Name
Contractor Information		
Contractor Company Name	[1]	Sender: Name
Project Information		
Project Name 1 (e.g., Smith Biophysics Laboratory)	[1]	ProjectInformation.Name
Project Reference Number	[1]	ProjectInformation.ProjectId
Prime Design Professional Information		
Architect/Engineer Company Name	[0..1]	Notiffee: Architect.Name Notiffee: Engineer.Name
Architect/Engineer Project Number	[0..1]	Notiffee: Architect.ProjectNumber Notiffee: Engineer.ProjectNumber
Schedule of Values Information		
Item Number	[1..*]	ScheduledWorkItems.Items[n].Name
Item Description	[1..*]	ScheduledWorkItems.Items[n].Description
Item: Scheduled Value	[1..*]	ScheduledWorkItems.Items[n].ScheduledValue
Item: Value of work completed from previous applications	[1..*]	ScheduledWorkItems.Items[n].Completion.CompletedValuePreviously
Item: Value of work completed this period	[1..*]	ScheduledWorkItems.Items[n].Completion.CompletedValue
Item: Value of materials stored on site	[1..*]	ScheduledWorkItems.Items[n].Completion.MaterialValueStored
Item: Total value of work completed and materials stored to date	[1..*]	<to be calculated>
Item: Percent of work complete	[1..*]	<to be calculated>
Item: Value of work remaining to be completed	[1..*]	<to be calculated>
Item: Retainage (only if variable rate)	[1..*]	ScheduledWorkItems.Items[n].Retainage

Table 1: AGCxml path information assigned to the fields of the comparative analysis