THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA

NATIONAL INSTITUTE OF BUILDING SCIENCES

agcXML

SUBMITTALS

DATA SPECIFICATION AND SCHEMA

VERSION 1.0

MARCH 4, 2009

The agcXML Project

The Associated General Contractors of America

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1 . SUBMITTAL

The agcXML `Submittal` schema is discussed in this document as a class diagram using the Unified Modeling Language (UML) notation. The document presents the overall structure of the agcXML schema and discusses 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 `Submittal` 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 `Submittal` schema

The `Submittal` schema is the schema to be used for sending and receiving submittal information between parties involved in electronic exchange of business messages. An electronic submittal transaction is typically accompanied by or refers to documents or physical objects that constitute the actual submittal, such as shop drawings, building product or material samples, sample records, or technical specifications. The schema deals with the project-specific content (the variable elements of a typical submittal form) of the submittal transaction only, and not with the format of any particular submittal transaction form. In scope are:

- The meta-data of the submittal document (who, when, with what application)
- The sender, recipient and notifiee role (for owner, contractor, subcontractor, construction manager and architect information)
- The project information
- The submittal items
- The start and end date of the submittal

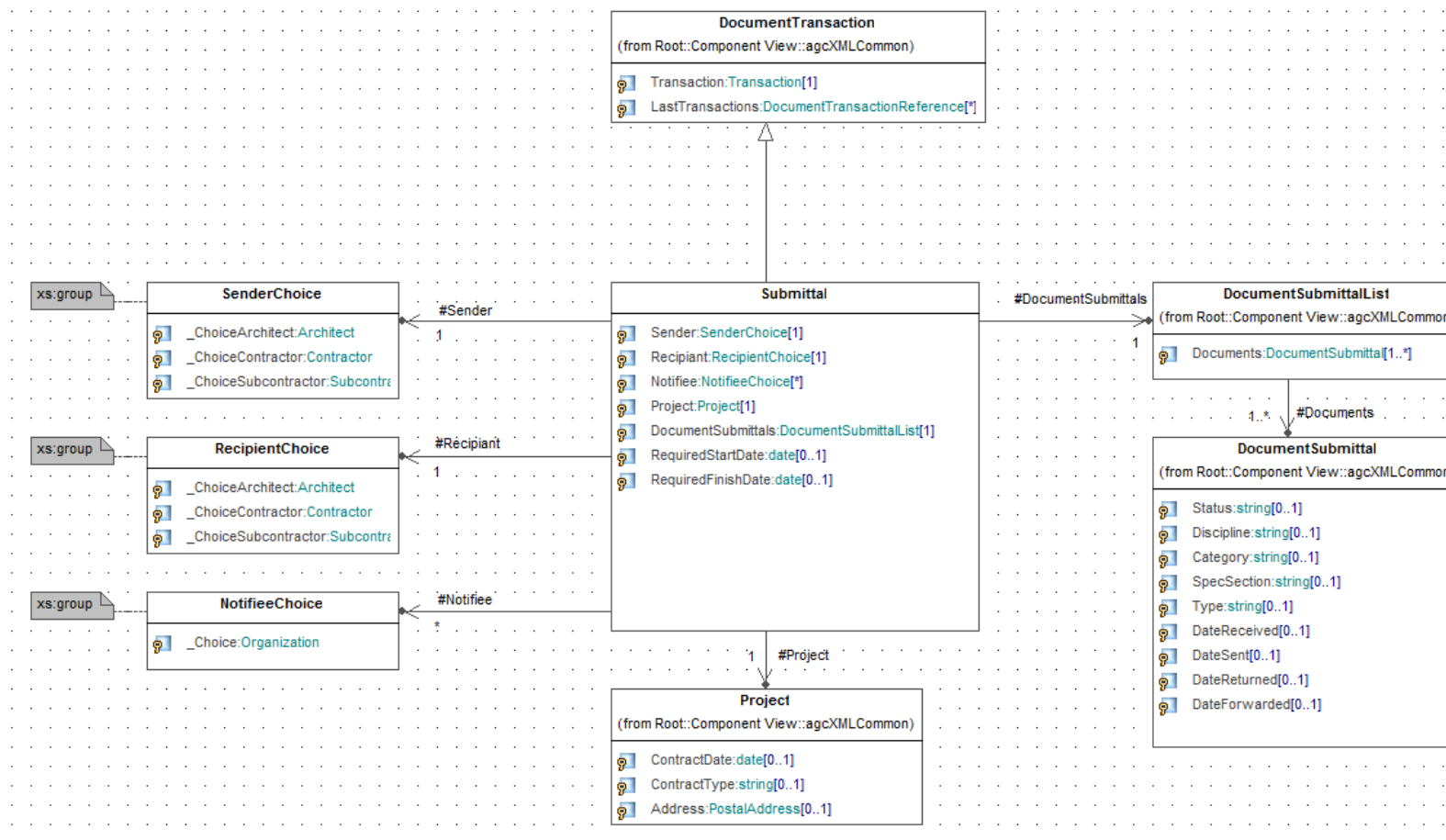### 1.1.1   Name space considerations

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"
- Submittal:
  - xmlns:agcsbm="http://www.aecXML.org/agcXML/Submittal"

1.2   The `Submittal` root element

The root element of the xml exchange document is the `Submittal` element. It is defined in the `Submittal` 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 `Submittal` element adds the following submittal specific elements:

DocumentTransaction

(from Root::Component View::agcXMLCommon)

- Transaction:Transaction[1]
- LastTransactions:DocumentTransactionReference[*]

xs:group

SenderChoice

- _ChoiceArchitect:Architect
- _ChoiceContractor:Contractor
- _ChoiceSubcontractor:Subcontra

#Sender

1

Submittal

- Sender:SenderChoice[1]
- Recipiant:RecipientChoice[1]
- Notifiee:NotifieeChoice[*]
- Project:Project[1]
- DocumentSubmittals:DocumentSubmittalList[1]
- RequiredStartDate:date[0..1]
- RequiredFinishDate:date[0..1]

#DocumentSubmittals

1

DocumentSubmittalList

(from Root::Component View::agcXMLCommon)

- Documents:DocumentSubmitta[1..*]

1..* #Documents

xs:group

RecipientChoice

- _ChoiceArchitect:Architect
- _ChoiceContractor:Contractor
- _ChoiceSubcontractor:Subcontra

#Récipiant

1

DocumentSubmittal

(from Root::Component View::agcXMLCommon)

- Status:string[0..1]
- Discipline:string[0..1]
- Category:string[0..1]
- SpecSection:string[0..1]
- Type:string[0..1]
- DateReceived[0..1]
- DateSent[0..1]
- DateReturned[0..1]
- DateForwarded[0..1]

xs:group

NotifieeChoice

- _Choice:Organization

#Notifiee

*

1 #Project

Project

(from Root::Component View::agcXMLCommon)

- ContractDate:date[0..1]
- ContractType:string[0..1]
- Address:PostalAddress[0..1]

Figure 1: the root element `Submittal` in `Submittal` name space

1.2.1   Basic document information

The **Submittal** carries (if fully instantiated) the following information:

- Submittal name, number, and transaction date
- The governing form (i.e. the template for the submittal document)
- The information about the parties involved in the submittal
    - The sender information, being either:
        - Architect
        - Contractor
        - Subcontractor
        - Construction Manager / Adviser
        - Construction Manager / Constructor
    - The recipient information, being either:
        - Architect
        - Contractor
        - Subcontractor
        - Construction Manager / Adviser
        - Construction Manager / Constructor
        - Owner
    - The notifiee information, being zero, one, or many of:
        - any organization
- The project information (name, address and reference number)
- The submittal information consisting of 1 to many submittal line items, each having
    - Dates of sending, returning, forwarding and receiving the submittal items
    - Number, title, revision, and status of the submittal documents
    - Discipline, category, specification section, drawing number and submittal type information
- The start and finish date of the submittal process

1.2.2   Governing form

The exchange of the submittals is based on the data requirements of the standard forms published by the American Institute of Architects (AIA), the Associated General Contractors of America (AGC) or other standard forms. The element **GoverningForm** is defined at **Document**.

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

- AIA Document G712-1972 (if applicable to overall scope of work for agcXML)

1.3   The parties involved in the submittal

A submittal is established between a sender and a recipient of the submittal. 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 client for the **Submittal** is presented by the **Architect**, **ConstructionManagerAdviser**, **ConstructionManagerConstructor**, **Contractor** or **Subcontractor**. It is accessible as **Sender**.

1.3.2   The recipient information

The recipient for the **Submittal** is presented by the **Architect**, **Owner**, **ConstructionManagerAdviser**, **ConstructionManagerConstructor**, **Contractor** or **Subcontractor**. It is accessible as **Recipient**.

1.3.3   The notifiee information

The notifiee for the **Submittal** can be presented by any organization. The notifiee information is optional.

1.3.4   Choice of roles for sender, recipient and notifiee

Information about **Contractor**, **Subcontractor**, **ConstructionManager**, **Owner** and **Architect** is provided in the document "agcXML common definitions". The information is independent of whether the organization is the sender, recipient or notifiee in this transaction.

1.4   The Project information of the submittal

The notifiee, or adviser, for the **Submittal** can be presented by any organization. The notifiee information is optional.

1.5   The Document Submittals information

The **Submittal** provides information about the individual items or documents to support the submittal. These items are normally shop drawings, sample records (building product or material samples) or specification sections. A submittal transaction can include one or many submittal items.

The list of one or many submittal items is available as **DocumentSubmittals** with the type **DocumentSubmittalList** defined in the **agcXMLCommon** name space.

For each submittal item, defined as **DocumentSubmittal** within the **agcXMLCommon** name space, the following information can be provided:

- The dates of the submittal process, being
    - **DateReceived**, **DateSent**, **DateReturned**, and **DateForwarded**
- The status of the submittal item
    - The status can be used to express the information of how it had been reviewed for comformance to design intent.
- The **Category**, the **Discipline** , the **DrawingNumber**, and the **SpecSection** of the item,
- The **Type**, which could include allowable values such as shop drawing, product data, material sample, design data, test report, inspection report, warranty, installation instructions, record document, extra materials
- The document (drawing, sample, specification section) with
    - The unique number of the document as **documentId**
    - The name or title of the document as **Name**
    - Any additional textual explanation as **Description**
    - The **href** attribute providing the URL of the document (optional)

1.6   The required start and end date

The two elements **RequiredStartDate** and **RequiredEndDate** can be specified to transport the start and end date of the submittal process.

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 submittals are included in the **Submittal** 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   agcXML Submittal name space

```
<? xml version="1.0" encoding="UTF-8"?>
<!-- Mit XMLSpy v2007 sp2 (http://www.altova.com) von Thomas Liebich (AEC3 Deutschland GmbH) bearbeitet
-->
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:cos="http://www.aecXML.org/aecXML/cos"
xmlns:agcxml="http://www.aecXML.org/agcXML/agcXMLCommon"
xmlns:agcsbm="http://www.aecXML.org/agcXML/Submittal"
targetNamespace="http://www.aecXML.org/agcXML/Submittal" 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"/>
   <!--submittal diagram-->
   <xs:element name="Submittal" type="agcsbm:Submittal" substitutionGroup="agcxml:DocumentTransaction"
      nillable="false">
      <xs:annotation>
         <xs:documentation>Root element for the XML exchange document for AGC
         submittals</xs:documentation>
      </xs:annotation>
   </xs:element>
   <xs:complexType name="Submittal">
      <xs:complexContent>
         <xs:extension base="agcxml:DocumentTransaction">
            <xs:sequence>
               <xs:element name="Sender">
                  <xs:complexType>
                     <xs:group ref="agcsbm:SenderChoice"/>
                  </xs:complexType>
               </xs:element>
               <xs:element name="Recipiant">
                  <xs:complexType>
                     <xs:group ref="agcsbm:RecipientChoice"/>
                  </xs:complexType>
               </xs:element>
               <xs:element name="Notifiee">
                  <xs:complexType>
                     <xs:choice>
                        <xs:element ref="agcxml:Organization"/>
                     </xs:choice>
                  </xs:complexType>
               </xs:element>
               <xs:element name="Project" type="agcxml:Project"/>
               <xs:element name="DocumentSubmittals" type="agcxml:DocumentSubmittalList"/>
```

```xml
                    <xs:element name="RequiredStartDate" type="xs:date" minOccurs="0"/>
                    <xs:element name="RequiredEndDate" type="xs:date" minOccurs="0"/>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>
    <!--submittal actor diagram - Group definition for choice of sender, recipiant, and notifiee-->
    <xs:group name="SenderChoice">
        <xs:choice>
            <xs:element ref="agcxml:Architect"/>
            <xs:element ref="agcxml:Contractor"/>
            <xs:element ref="agcxml:Subcontractor"/>
            <xs:element ref="agcxml:ConstructionManagerAdviser"/>
            <xs:element ref="agcxml:ConstructionManagerConstructor"/>
        </xs:choice>
    </xs:group>
    <xs:group name="RecipientChoice">
        <xs:choice>
            <xs:element ref="agcxml:Architect"/>
            <xs:element ref="agcxml:Contractor"/>
            <xs:element ref="agcxml:Subcontractor"/>
            <xs:element ref="agcxml:ConstructionManagerAdviser"/>
            <xs:element ref="agcxml:ConstructionManagerConstructor"/>
            <xs:element ref="agcxml:Owner"/>
        </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 **Submittal** in **Submittal** name space) assigned to the corresponding data field obtained from the comparative analysis of the existing transaction media for submittals 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.

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

agcXML Comparative Analysis		
Data Field Description/Content	**Cardinality**	**agcXML Schema Definition**
Contractor Information		
Contractor Company Name	[1]	Sender	Receiver: Contractor.Name
Contractor Project Number	[1]	Sender	Receiver: Contractor.ProjectNumber
Contractor Address 1	[1]	Sender	Receiver: Contractor.PostalAddress.AddressLine1
Contractor Address 2	[1]	Sender	Receiver: Contractor.PostalAddress.AddressLine2
Contractor City	[1]	Sender	Receiver: Contractor.PostalAddress.Town
Contractor State	[1]	Sender	Receiver: Contractor.PostalAddress.Region
Contractor Country	[0..1]	Sender	Receiver: Contractor.PostalAddress.Country
Contractor Company Phone	[1]	Sender	Receiver: Contractor.TelecomAddress.Telephone
Contractor Company Fax	[1]	Sender	Receiver: Contractor.TelecomAddress.Facsimile
Contractor Representative Last Name	[0..1]	Sender	Receiver: Contractor.Representative.FamilyName
Contractor Representative First Name	[0..1]	Sender	Receiver: Contractor.Representative.GivenName
Contractor Representative Title	[0..1]	Sender	Receiver: Contractor. Representative.RepresentativeTitle
Contractor Representative Phone	[0..1]	Sender	Receiver: Contractor.Representative.Addresses.Telephone
Contractor Representative Fax	[0..1]	Sender	Receiver: Contractor.Representative.Addresses.Facsimile
Contractor Representative e-mail Address	[0..1]	Sender	Receiver: Contractor.Representative.Addresses.Email
Project Information		
Project Name 1 (e.g., Smith Biophysics Laboratory)	[1]	ProjectInformation.Name
Project Name 2 (e.g., University of Toledo)	[1]	ProjectInformation.Description
Project Reference Number	[1]	ProjectInformation.ProjectId
Project Street Address 1	[0..1]	ProjectInformation.Address.AddressLine1
Project Street Address 2	[0..1]	ProjectInformation.Address.AddressLine2
Project City	[0..1]	ProjectInformation.Address.Town
Project State/Province	[0..1]	ProjectInformation.Address.Region
Project Country	[0..1]	ProjectInformation.Address.Country
Project Postal Code	[0..1]	ProjectInformation.Address.PostalCode

Prime Design Professional Information		
Architect/Engineer Company Name	[0..1]	Sender | Receiver: Architect.Name
Architect/Engineer Project Number	[0..1]	Sender | Receiver: Architect.ProjectNumber
Architect/Engineer Address 1	[0..1]	Sender | Receiver: Architect.PostalAddress.AddressLine1
Architect/Engineer Address 2	[0..1]	Sender | Receiver: Architect.PostalAddress.AddressLine2
Architect/Engineer City	[0..1]	Sender | Receiver: Architect.PostalAddress.Town
Architect/Engineer State	[0..1]	Sender | Receiver: Architect.PostalAddress.Region
Architect/Engineer Country	[0..1]	Sender | Receiver: Architect.PostalAddress.Country
Architect/Engineer Company Phone	[0..1]	Sender | Receiver: Architect.TelecomAddress.Telephone
Architect/Engineer Company Fax	[0..1]	Sender | Receiver: Architect.TelecomAddress.Facsimile
Architect/Engineer Representative Last Name	[0..1]	Sender | Receiver: Architect.Representative.FamilyName
Architect/Engineer Representative First Name	[0..1]	Sender | Receiver: Architect.Representative.GivenName
Architect/Engineer Representative Title	[0..1]	Sender | Receiver: Architect.Representative.RepresentativeTitle
Architect/Engineer Representative Phone	[0..1]	Sender | Receiver: Architect.Representative.Addresses.Telephone
Architect/Engineer Representative Fax	[0..1]	Sender | Receiver: Architect.Representative.Addresses.Facsimile
Architect/Engineer Representative e-mail Address	[0..1]	Sender | Receiver: Architect.Representative.Addresses.Email
Submittal Information		
Submittal Title	[1]	Name
Submittal Number	[1]	documentId
Submittal Sender	[1]	Sender
Submittal Status	[1]	Status
Submittal Tracking Dates		
Date Submittal Processing is Required to Start	[0..1]	RequiredStartDate
Date Submittal Processing is Required to Finish	[0..1]	RequiredFinishDate
Date Submittal Received	[1]	DocumentSubmittalls.Documents[n].DateReceived
Number of Elapsed Days Since Receipt	[0..1]	*not exchanged, can be calculated*
Number of Days Currently Overdue	[0..1]	*not exchanged, can be calculated*
Date Submittal is Returned to Sender	[1]	DocumentSubmittalls.Documents[n].DateReturned
Number of Days Submittal Held by Receiver	[0..1]	*not exchanged, can be calculated*
Submittal Item Information		
Submittal Item Specification Section Number	[1..*]	DocumentSubmittalls.Documents[n].documentId (if specification)
Submittal Item (Drawing or Sample) Number	[1..*]	DocumentSubmittalls.Documents[n].documentId (if drawing or sample)
Submittal Item (Drawing or Sample) Name/Description	[1..*]	DocumentSubmittalls.Documents[n].Name
		DocumentSubmittalls.Documents[n].Description
Submittal Item (Drawing or Sample) Quantity	[1..*]	DocumentSubmittalls.Documents[n].NumberOfCopies
Party to Whom Submittal Item is Forwarded for Action	[0..*]	Recipient
Date Submittal Item is Forwarded	[0..*]	DocumentSubmittalls.Documents[n].DateForwarded
Submittal Item (Drawing or Sample) Quantity Forwarded	[0..*]	is it much different from *Submittal Item (Drawing or Sample) Quantity*

Date Forwarded Submittal Item is Returned	[0..*]	DocumentSubmittalls.Documents[n].DateReturned
Submittal Action/Disposition Information		
Action/Disposition of Submittal (select one):	n/a	
Approved	[0..*]	DocumentSubmittalls.Documents[n].Approval = Approved
Approved as noted	[0..*]	DocumentSubmittalls.Documents[n].Approval = ApprovedAsNoted
Revise and resubmit	[0..*]	DocumentSubmittalls.Documents[n].Approval = ReviseAndResubmit
Not approved	[0..*]	DocumentSubmittalls.Documents[n].Approval = NotApproved
Submittal Distribution Information		
Copies to (check all that apply):	n/a	
Contractor	[0..*]	Notifiee[n]: Contractor
Owner	[0..*]	Notifiee[n]: Owner
Field	[0..*]	Notifiee[n]: ConstructionManager
File	[0..*]	*relevant for electronic exchange ?*