Conformance and Rules for WS-Calendar and Referencing Specifications

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1. Introduction

This is a discussion paper describing proposed approaches to conformance, inheritance, and use of WS-Calendar. This document gives examples for how EMIX would define conformance to WS-Calendar for EMIX artifacts.

Not all attributes are correctly named in this draft.

There are five kinds of conformance that must be addressed for WS-Calendar and specifications that reference WS-Calendar.

1. Conformance to the inheritance rules in WS-Calendar, including the direction of inheritance
2. Specific attributes for each type that MUST or MUST NOT be inherited.
3. Conformance rules that Referencing Specifications MUST follow
4. Description of Covarying attributes with respect to the Reference Specification
5. Semantic Conformance for the information within the artifacts exchanged.

We address each of these in the following sections.

2. Rules in WS-Calendar

In this section we define rules that define inheritance including direction.

I1: Proximity Rule Within a given sequence the Parent Gluon closest (with respect to number of links to the Designated Interval) SHALL bequeath attributes to the Designated Interval.

I2: Direction Rule Intervals MAY inherit attributes from the nearest gluon subject to the Proximity Rule and Override Rule, provided those attributes are defined as Inheritable.

I3: Override Rule If and only if there is no value for a given attribute of a Gluon or Interval, that Gluon or Interval SHALL inherit the value for that attribute from its nearest Ancestor in conformance to the Proximity Rule.

I4: Comparison Rule Two Sequences are equivalent if a comparison of the respective Intervals succeeds as if each Sequence were fully Bound and redundant Gluons are removed.
15: Designated Interval Inheritance [To facilitate composition of Sequences] the
Designated Interval in the ultimate Ancestor of a Gluon is the Designated Interval of
the composed Sequence.¹ Special conformance rules for Designated Intervals apply
only to the Interval linked from the Designator Gluon.

3. Specific Attribute Inheritance in WS-Calendar

In WS-Calendar the following attributes MUST be inherited in conformance to the
Rules (same for Gluons and Intervals):

- dtStart
- dtEnd
- duration
- DesignatedInterval (Gluon, special upward inheritance rule)
- ...

In WS-Calendar the following attributes MUST NOT be inherited

- UID (Gluons and Intervals)
- Temporal Relationships (Intervals)
- ...

¹ We are assuming here that sequences can be composed to form new sequences.
This needs detailed discussion as the rules for Designated Intervals cannot easily be
applied to a sequence of sequences.
4. Conformance in WS-Calendar

In this section we propose conformance clauses for WS-Calendar.

Some of these are modeled and described as constraints in the UML models that have been produced separately.

1. Gluons and Intervals SHALL have values assigned for dtStart and duration
2. Gluons and Intervals SHALL have no value assigned for dtEnd
3. Within a Sequence at most the Designated Interval may have dtStart and duration with a value specified or inherited.
4. Any specification claiming conformance to WS-Calendar MUST satisfy all of the following conditions:
   a. Follow the same style of inheritance (per the Rules)
   b. Specify attribute inheritability in the specification claiming conformance
   c. Specify whether certain sets of elements must be inherited as a group or specify that all elements can be inherited or not on an individual basis.

While VTODO objects allow for all three of dtStart, dtEnd, and duration, the scheduling use for automation is simpler if only dtStart and duration are used. This should be considered a canonical representation for WS-Calendar.

Note that composition of Sequences to create other Sequences raises issues both of inheritance direction and the meaning of subsequences. We suggest an approach of ignoring Designated Intervals with respect to the composed sequence as simpler than having the new subsequences change form and not be reusable.
5. Sketch Application to EMIX

In this section we propose a set of rules and conformance statements that would allow EMIX to claim conformance to WS-Calendar.

Inheritance Rules for EMIX [sketch]

Attribute names and grouping is not precise in this draft.

1. The use of Sequences in EMIX SHALL follow the WS-Calendar rules for inheritance

2. The following attributes MUST be inherited in conformance to the WS-Calendar Rules:
   a. All WS-Calendar attributes used, including dtStart, duration, and Designated Interval links
   b. The following EMIX attributes SHALL be inheritable in conformance to the Rules:
      i. Price
      ii. Product Definition / emixTerms
      iii. Quantifiers for Products
      iv. Currency
      v. [complete for all potentially inheritable attributes tied to a Sequence]

3. The following EMIX attributes MUST NOT be inherited:
   i. Voltage
   ii. Frequency
   iii. interfacePricingPoint
   iv. transactiveState
   v. uid
   vi. createdDateTime
   vii. [complete for all potentially inheritable attributes tied to a Sequence]

4. For Power.xsd the following EMIX attributes SHALL be inherited in conformance to the Rules: [offerPower is similar]
   i. mRID/uid
   ii. Notification Interval
   iii. Transaction Node

\[^4\] Location, choice of pNode, anode, serviceLocation, serviceArea
iv. MinOperatingPower

v. MaxOperatingPower
e. For Power.xsd the following EMIX attributes MUST NOT be inherited:
   i. powerAttributes including hertz, voltage, ac/dc
   ii. [complete for all potentially inheritable attributes tied to a Sequence]
f. For Tenders the following attributes MUST NOT be inherited:
   i. Uid
   ii. createdDateTime
   iii. Price
   iv. [complete for all potentially inheritable attributes tied to a Tender]

Conformance for EMIX [sketch]
Attribute names and group is not precise in this draft.

1. Syntactic: all EMIX artifacts MUST be well-formed and valid XML.
2. Semantic conformance is partially defined to include the Transactive State of the EMIX artifact.
3. Further semantic conformance, out of scope for EMIX, may be defined within the marketContext (e.g., by market rules related to the marketContext)
4. A product type that is not known to the interpreting software MUST be ignored.
5. Partially Bound artifacts SHALL be processed subject to semantic constraints
6. Market rules within the referenced marketContext MAY be applied

The following table suggests the relationship between transactive state and time and binding of artifacts:

<table>
<thead>
<tr>
<th>Transactive State</th>
<th>Time</th>
<th>Binding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tender</td>
<td>—</td>
<td>&gt;= Partial Bound</td>
</tr>
<tr>
<td>Contract</td>
<td>Partially Anchored</td>
<td>&gt;= Partially Bound</td>
</tr>
<tr>
<td>Performance</td>
<td>Fully Anchored</td>
<td>Fully Bound</td>
</tr>
</tbody>
</table>