TimeSeriesML:

the planned evolution of WaterML 2.0 Part 1 - Timeseries to a generalised standard for Time Series data

James Tomkins

@jamestomkins

james.tomkins@metoffice.gov.uk

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Background

OGC WaterML 2.0 Part 1 - TimeSeries

Approved as OGC Implementation Standard in 2012

Standard information model for the representation and exchange of water observations

Conceptual UML model for timeseries observations as a profile of ISO 19156 Observations and Measurements

Model implementation within a GML 3.2 Application Schema

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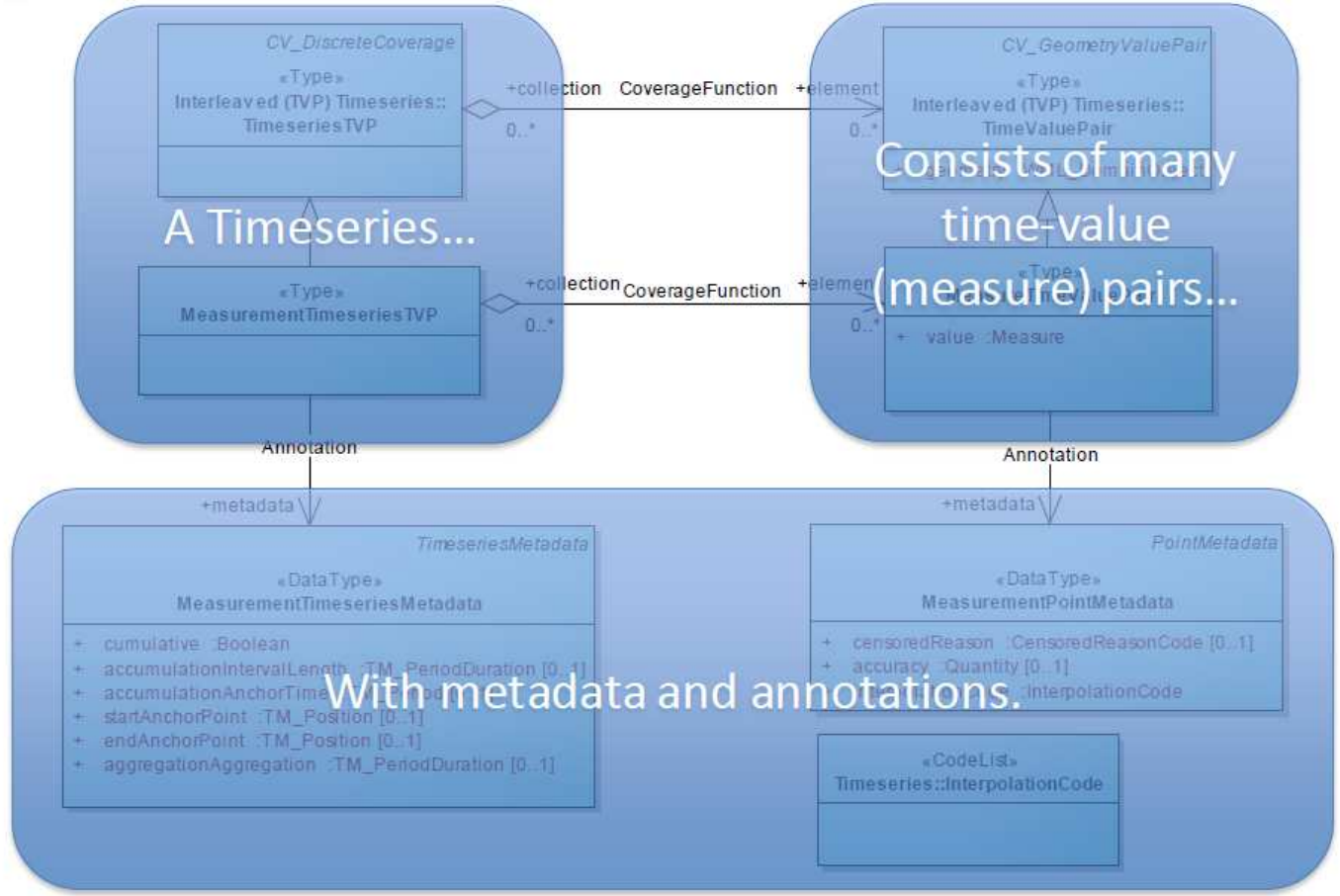
O&M Profile

Specialised Observations with result type of TimeSeries



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O&M Profile

Interleaved

Time, Value Pairs

```
<wml2:point>
    <wml2:MeasurementTVP>
        <wml2:time>2011-04-04T00:00:00-05:00</wml2:time>
        <wml2:value>21.7</wml2:value>
    </wml2:MeasurementTVP>
</wml2:point>
<wml2:point>
    <wml2:MeasurementTVP>
        <wml2:time>2011-04-05T00:00:00-05:00</wml2:time>
        <wml2:value>21.7</wml2:value>
    </wml2:MeasurementTVP>
</wml2:point>
<wml2:point>
    <wml2:MeasurementTVP>
        <wml2:time>2011-04-06T00:00:00-05:00</wml2:time>
        <wml2:value xsi:nil="true"></wml2:value>
        <wml2:metadata>
          <wml2:TVPMeasurementMetadata>
              <wml2:nilReason xlink:href="missing"/>
              <wml2:comment>Interpreted point as missing</wml2:comment>
            </wml2:TVPMeasurementMetadata>
        </wml2:metadata>
    </wml2:MeasurementTVP>
</wml2:point>
```

Domain, Range

```
<gml:domainSet>
  <wml2:TimeList gml:id="ts_domain">
    <wml2:list>2001-01-01T00:00:00Z 2001-01-02T00:00:00Z 2001-01-03T00:00:00Z
     2001-01-04T00:00:00Z 2001-01-05T00:00:00Z 2001-01-06T00:00:00Z</wml2:list>
  </wml2:TimeList>
</gml:domainSet>

<gml:rangeSet>
  <gml:QuantityList uom="deg">21.7 22.0 22.6 missing missing 22.3</gml:QuantityList>
</gml:rangeSet>
```


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O&M Profile

- TimeSeries Structures
  - Anchor Points, Max Gap Period, Cumulative Property, Accumulation Intervals, Interpolation Types
- Monitoring Points
  - Defines one specialised sampling feature but does not mandate only point based sampling features
- Observation Procedures
  - Captures basic process information but other process descriptors e.g. SensorML may be used
- Collections of Monitoring Points
- Generic Collections

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Change Proposed

OGC Change Request #13-123

To repackage WaterML 2.0: Part 1 as TimeSeriesML and place its stewardship and further evolution under the guidance of a broader-based working group.

Other than some of the examples, there is nothing hydrology-specific in the Part 1 specification. Rather it complements O&M and SWE Common Data Model to provide a very functional advance in OGC support for the management and distribution of time series data across multiple domains.

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Progress So Far

Convened SWG – James Tomkins / Dominic Lowe

Charter – Public Comment

- CSIRO
- Australian Bureau of Meteorology (BoM)
- Météo-France
- Met Office
- Kisters
- Environment Canada
- US National Weather Service
- Landcare Research New Zealand Ltd

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Progress So Far

- Informal Meetings
- Identifying requirements classes for amendment
- Create abstract test suite
- Need Use-Cases

UML Requirements Classes

Heading Number (see OGC 10-126r4)	WaterML 2.0 Part 1 Requirements Class	Accepted	Discussion
9.4	Timeseries Observation	Yes	
9.6	Timeseries (domain range) Observation	Yes	
9.7	Measurement Timeseries (domain range) Observation	Yes	
9.8	Measurement Timeseries (domain range) Observation	Yes	
9.9	Timeseries time-value pair (interleaved) Observation	Yes	
9.10	Measurement Timeseries time-value pair (interleaved) Observation	Yes	
9.11	Categorical Timeseries time-value pair (interleaved) Observation	Yes	
9.12	Timeseries (Core)	Yes	
9.13	Timeseries Domain-Range	Yes	
9.14	Timeseries Time-Value Pair (interleaved)	Yes	
9.16	Measurement Timeseries TVP (interleaved)	Yes	
9.16	Categorical Timeseries TVP (interleaved)	Yes	
9.17	Measurement Timeseries (Domain-Range)	Yes	
9.18	Categorical Timeseries (Domain-Range)	Yes	
9.19	Monitoring Point	No	Discussion
9.20	Monitoring Point feature of interest	No	Discussion
9.21	Sampling Feature Collections	Yes	
9.22	Observation Process	No	Discussion
9.23	Collection	No	Discussion

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Progress So Far

Ambitious Timescales

- Start – NOW
- Draft – March 2015
- Release for Approval – June 2015
- Adopted Standard – August 2015

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Future Developments

- Confirm Scope – Nov 2014
- Alignment with other groups
  - Coverages WG, Temporal DWG, SWE DWG
- Develop Requirements Classes and Schema
- OGC TC Boulder Colorado - June 2015

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Future Developments

- Follow-on activities to produce alternative encodings e.g. GeoJSON
- Incorporation into WMO Technical Regulations

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TimeSeriesML Needs You!

OGC Portal

https://portal.opengeospatial.org/?m=projects&a=view&project_id=470

Wiki

https://portal.opengeospatial.org/wiki/TimeSeriesMLswg

Chairs

James Tomkins: james.tomkins@metoffice.gov.uk
Dominic Lowe: d.lowe@bom.gov.au

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Thank You

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