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OGC Borehole IE progress report - potential impact on GeoSciML (borehole package) / GWML2

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OGC Borehole IE progress report - potential impact on GeoSciML (borehole package) / GWML2

111th OGC Technical Committee

Leuven, Belgium

S.Grellet (BRGM)

25 June 2019

Charter - extract



- *“Borehole and associated data are crucial for many domains. They are used in any domain that need to probe the underground; geology (hydrogeology, oil and gas, mining), civil engineering (utilities, constructions, transportation) and environment (ice coring, limnology, etc.) A key element of boreholes is a spatial reference system that defines the trace of the borehole and the location of observations in 3D space”*
- *“Even though several standards already exist to describe a borehole, its associated data and their position along a borehole (including OGC standards), they all restrict themselves to a specific viewpoint.” ...*
- *“Involving key implementers and editors of the existing standards”*
 - OGC: GeoSciML GroundWaterML 2, O&M (not Borehole specific but specialized)
 - Industry: Energistics (RESQML, WITSML, PPDM), AGS
 - Continental/National: EU EPOS RI Borehole Model, BoreholeML, Geological Surveys national models
 - Legal Obligation : Europe’s INSPIRE Geology theme data specification

Charter - extract



- *“The IE will produce the semantic umbrella and an OGC engineering report summarizing the achievements and listing the potential adjustments to be made on the pre-existing standards so that the system as a whole is at the end coherent”*
- Kicked-off : 27/06/2018
- Due : Sept TC 2019

Use Cases



- Use Cases details

- <https://github.com/opengeospatial/boreholeie/wiki/Example-Use-Case-Summaries>
- ~ 16

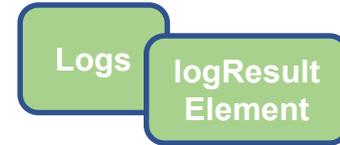
=> Loong scoping exercise

Vocabulary needs



- Consolidated
 - From the Use Case
 - https://github.com/opengeospatial/boreholeie/blob/master/Vocabulary/BoreholeIE_consolidated_vocab.xlsx
- 80% of which are related to positioning things along borehole trajectory
 - Observations,
 - Segment, Samples,
 - Construction elements,
 - Etc...

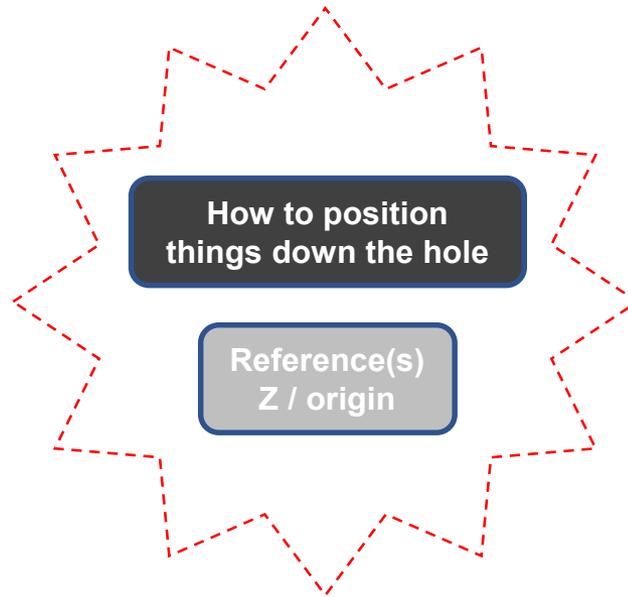
Vocabulary needs



Borehole
Drilling details

Borehole
Construction

Borehole
constructionElement



Observations

On borehole

On sample

On monitoring
facility

Borehole « context »:
administrative

Borehole « context »:
platform

BoreholeTrajectory

Georesource

Linear referencing down the hole



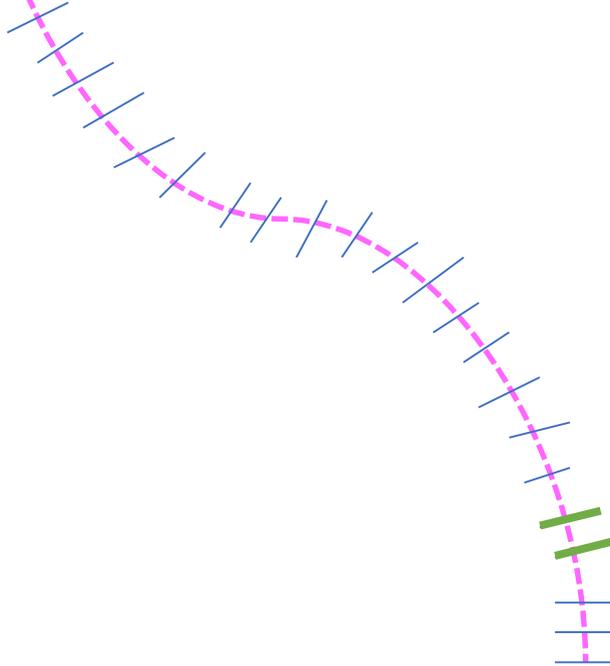
- ISO 19148 flavoured, with a hint of Borehole in it
- Current version of the ‘Positioning’ package after these slides
- UML model
 - <https://github.com/opengeospatial/boreholeie/wiki/BhML>
- Instances example
 - <https://github.com/opengeospatial/boreholeie/tree/master/instances>
- Presentation
 - <https://github.com/opengeospatial/boreholeie/blob/master/Vocabulary/LinearReferencing.pptx>

Linear referencing down the hole



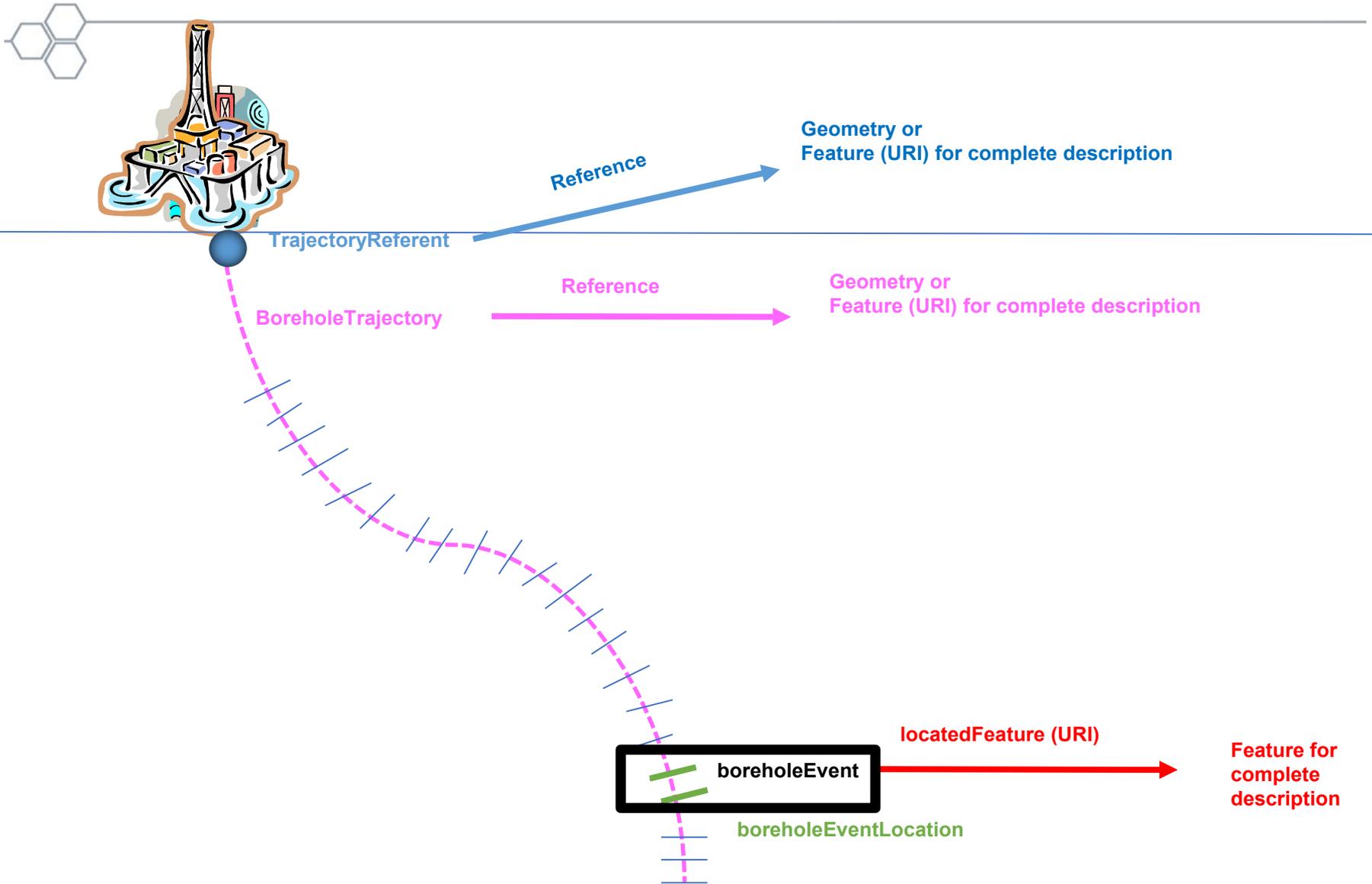
TrajectoryReferent

BoreholeTrajectory



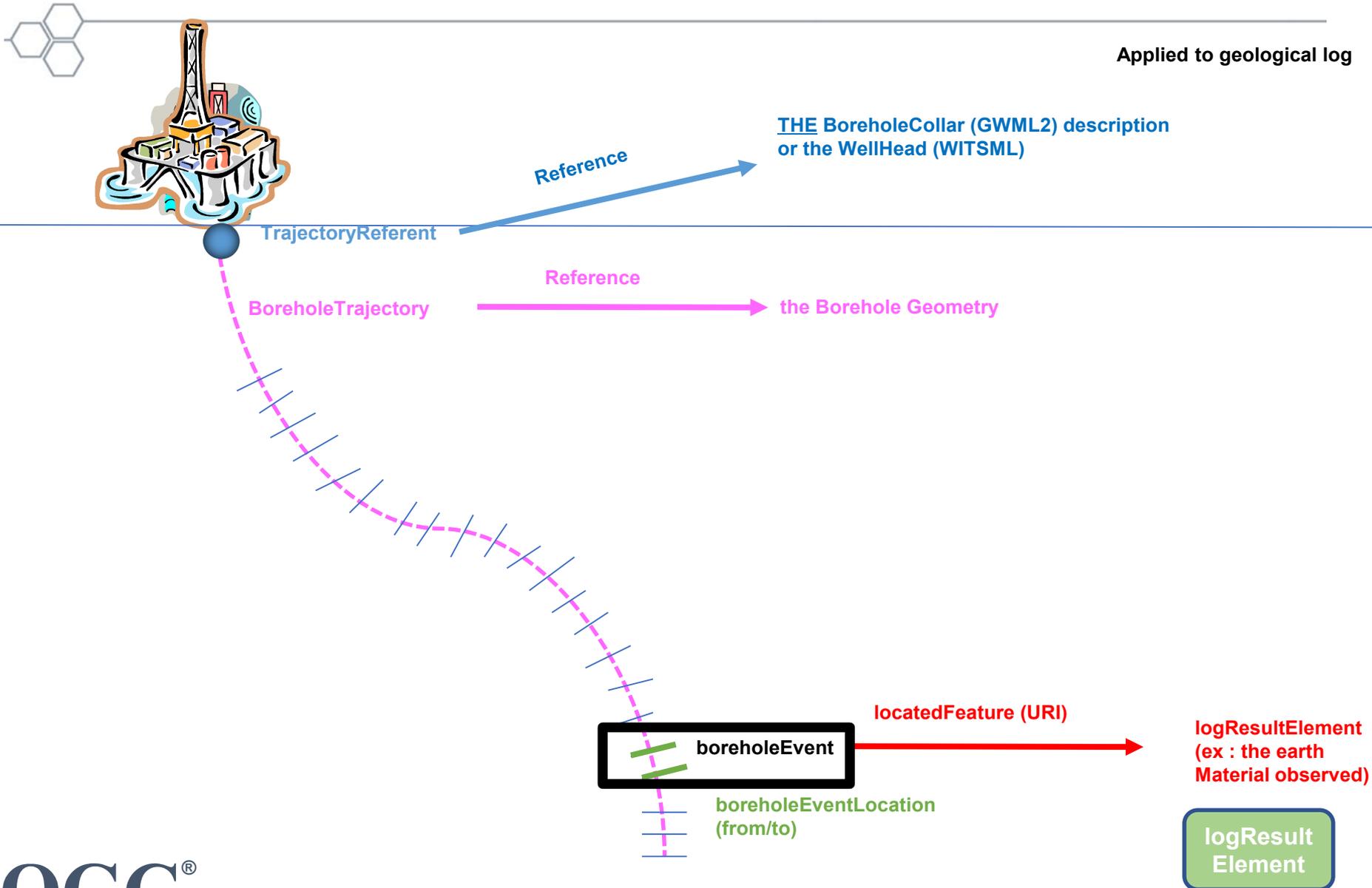
boreholeEventLocation

Linear referencing down the hole



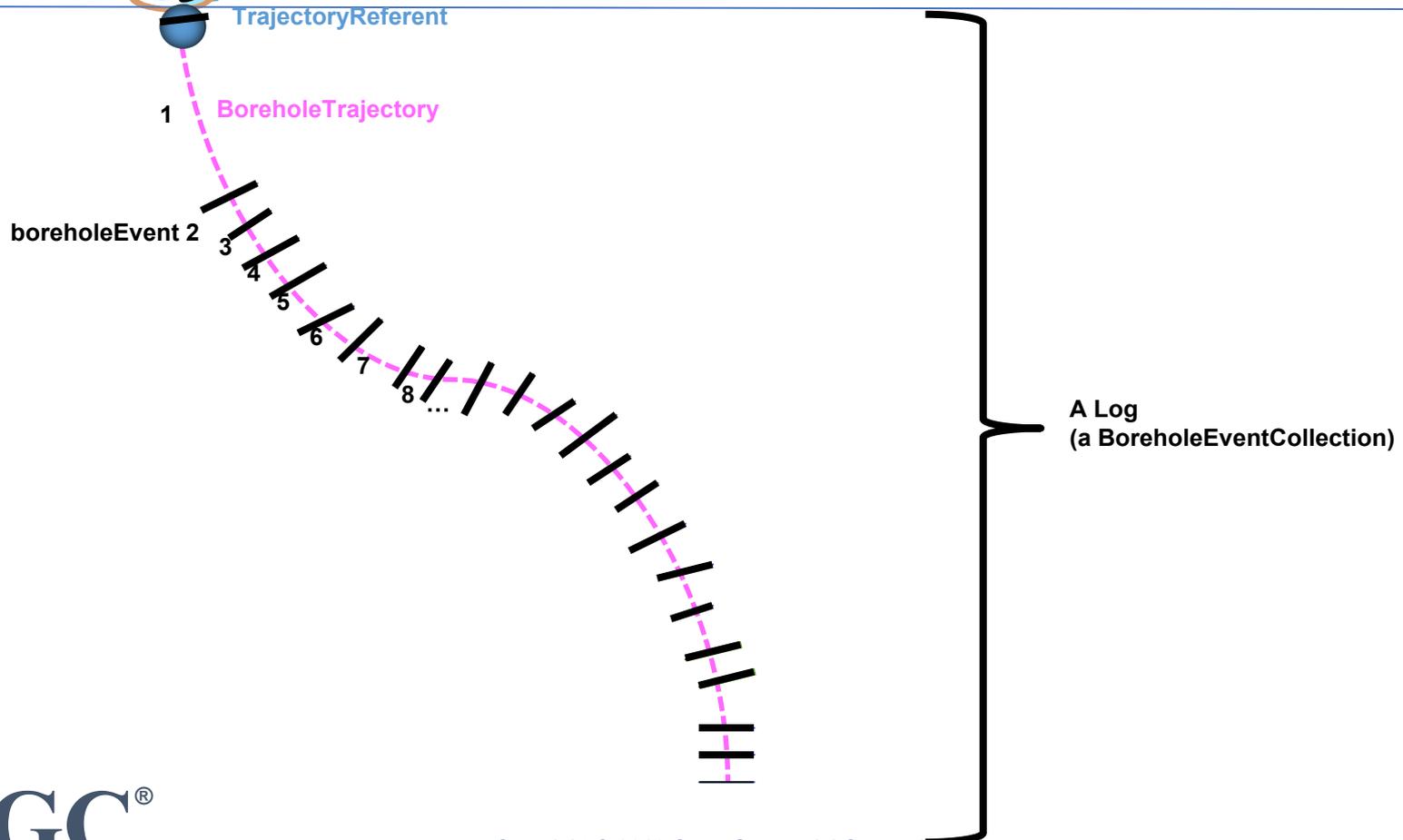
Linear referencing down the hole

Applied to geological log



Linear referencing down the hole

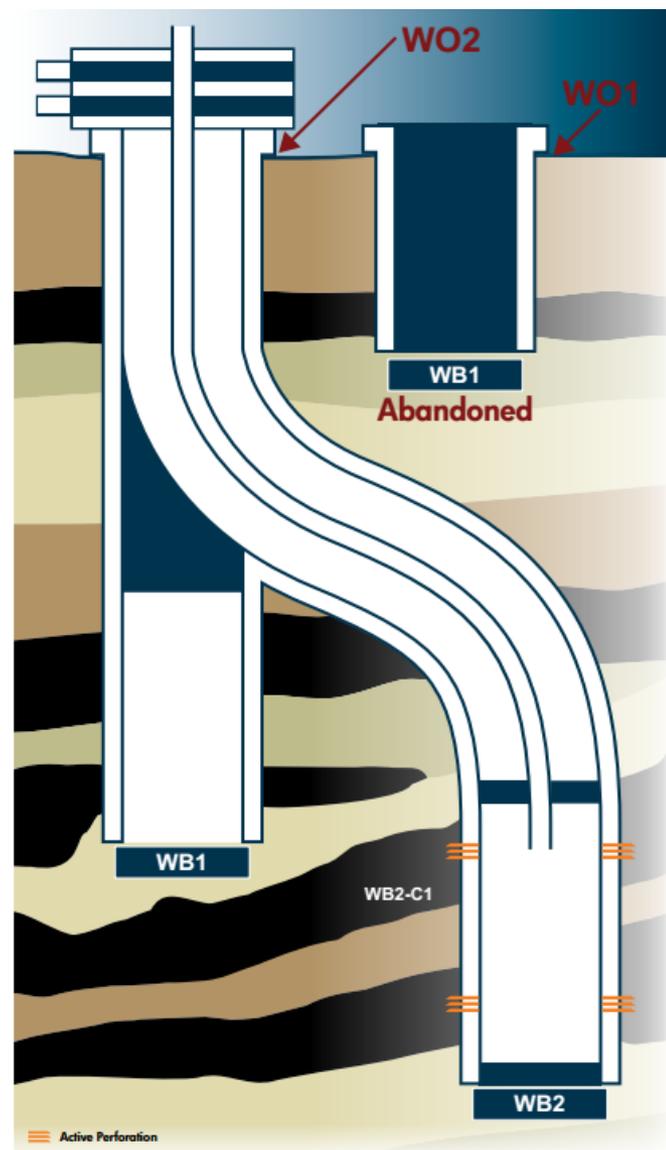
Applied to geological log



Borehole / Well



- We lack consistency accross OGC standards GeoSciML & GroundWater ML2
- What is a Borehole ?
- What is a Well ?



Potential impact on standards



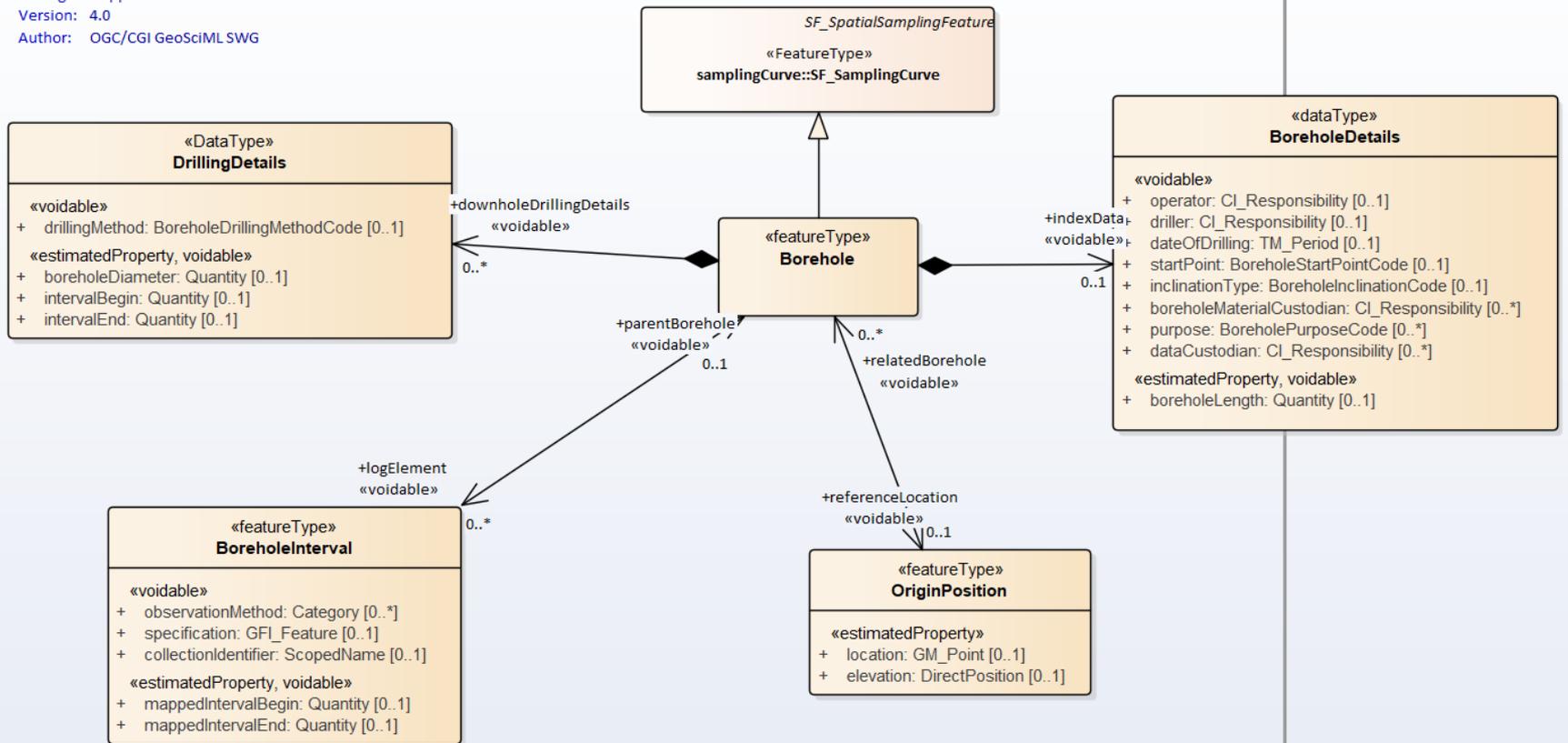
- Borehole IE ER conclusions may lead to a proposal for a an OGC specification (BhML ?)
 - Core : ‘Positioning’ aspect
 - Extension : mainly generic classes to avoid the ‘yet another standard syndrom’ and allow pre-existing standards reuse
- Then various approaches from the other standards point of view
 - Developed on the [GitHub](#)
 - Use an existing encoding/model that has no dependency with BhML model (BhML ‘Positioning’ package pointing to any Feature)
 - Use an existing model and create a dependency
 - Use "soft" dependency (ie SWE)
 - Define a mapping between both models

Potential impact on GeoSciML



- Mainly BoreholeInterval and OriginPosition
- Maybe also definitions adjustments

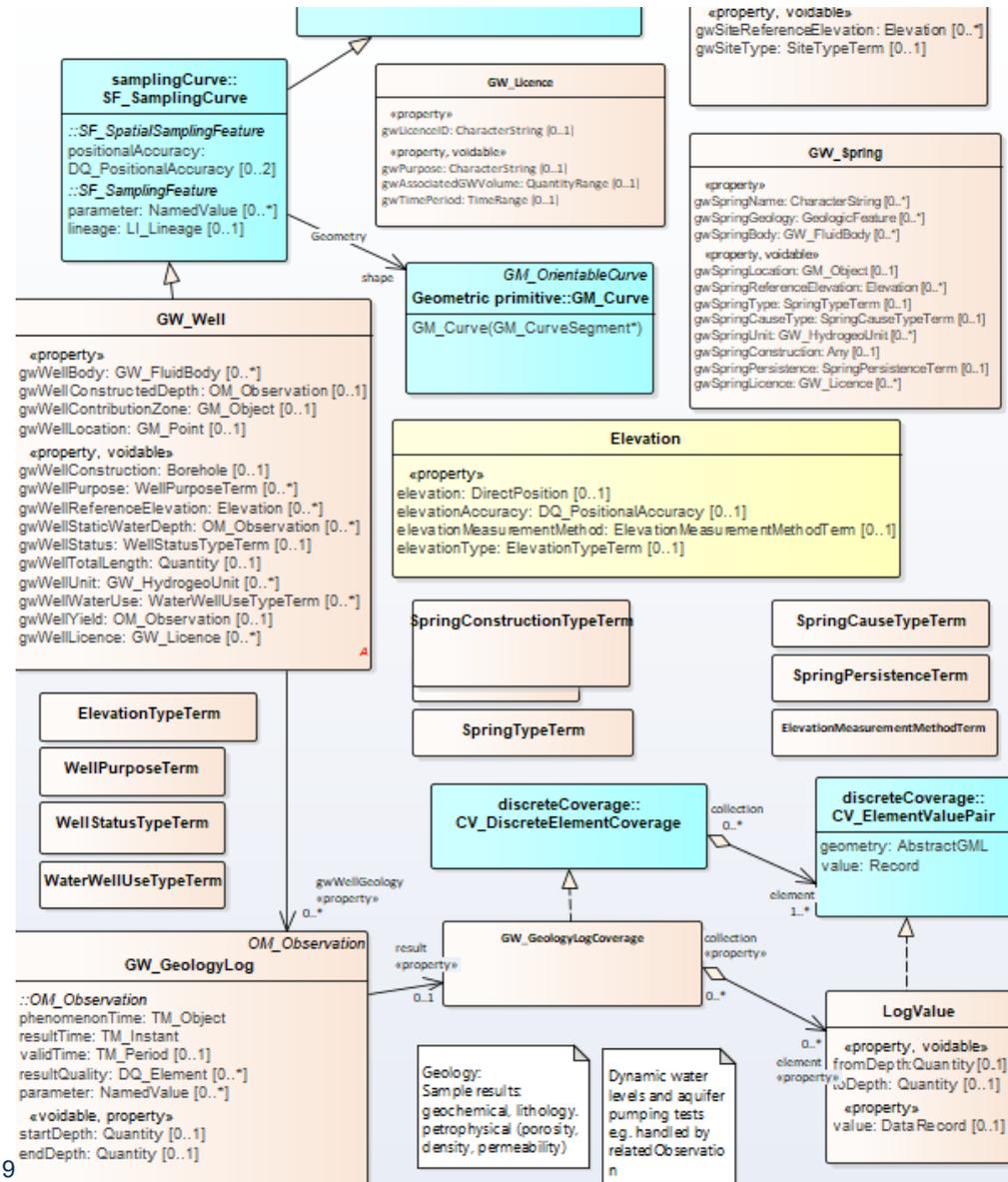
Name: Context Diagram : Borehole
Package: «Application Schema» Borehole
Version: 4.0
Author: OGC/CGI GeoSciML SWG



Potential impact on GWML2



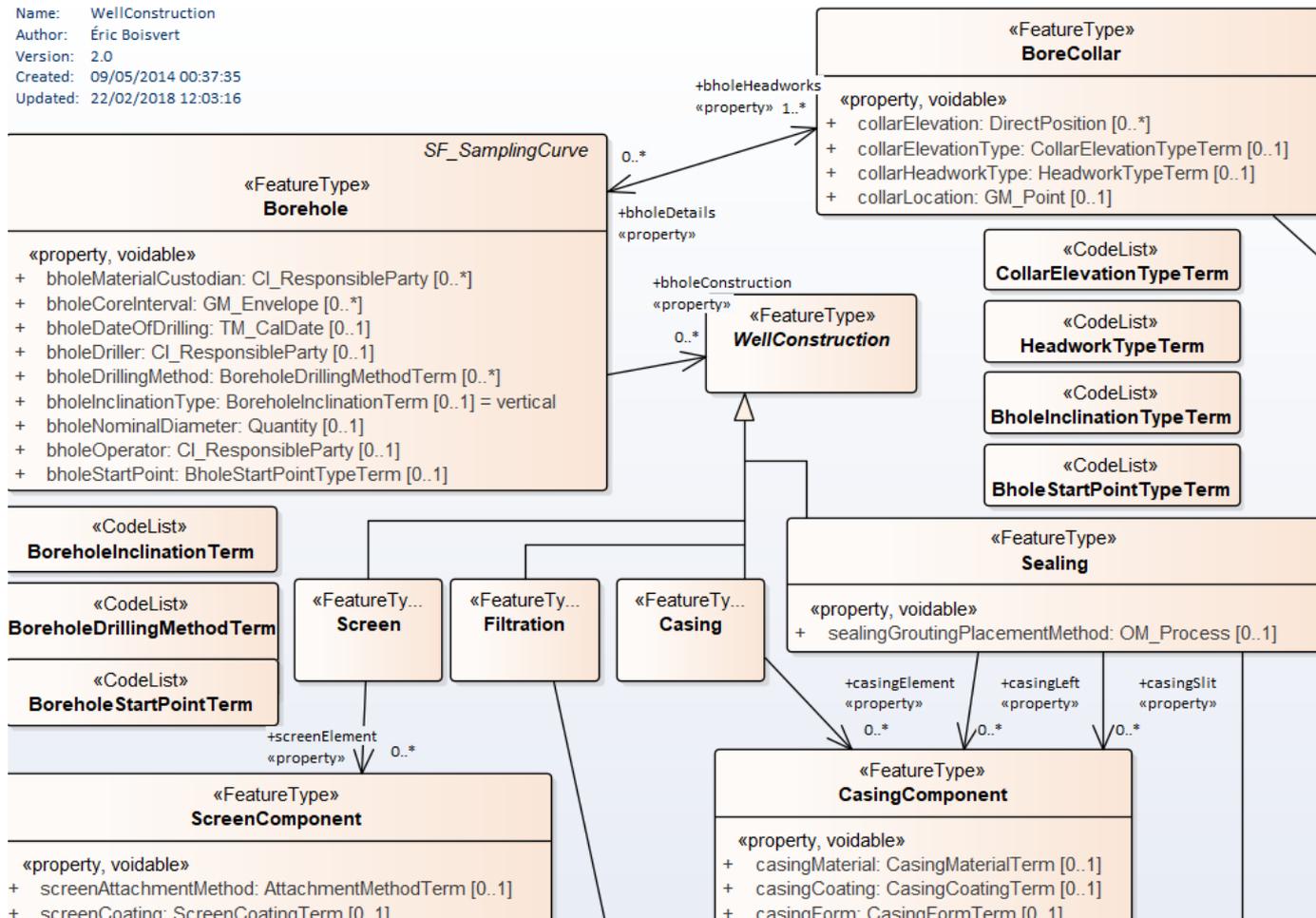
- Well / Borehole
- GW_GeologyLog



Potential impact on GWML2



- Borehole
- Maybe also definitions adjustments



Next steps



- Physical meeting Wed 26/06 in Louvain side to the TC
- Agenda (main points)
 - Polish ‘Positioning’ package
 - Discuss Well / Borehole
 - ER timeline
- Webconf rythm: bi-weekly

<https://github.com/opengeospatial/boreholeie>



check the wiki for meetings date and minutes

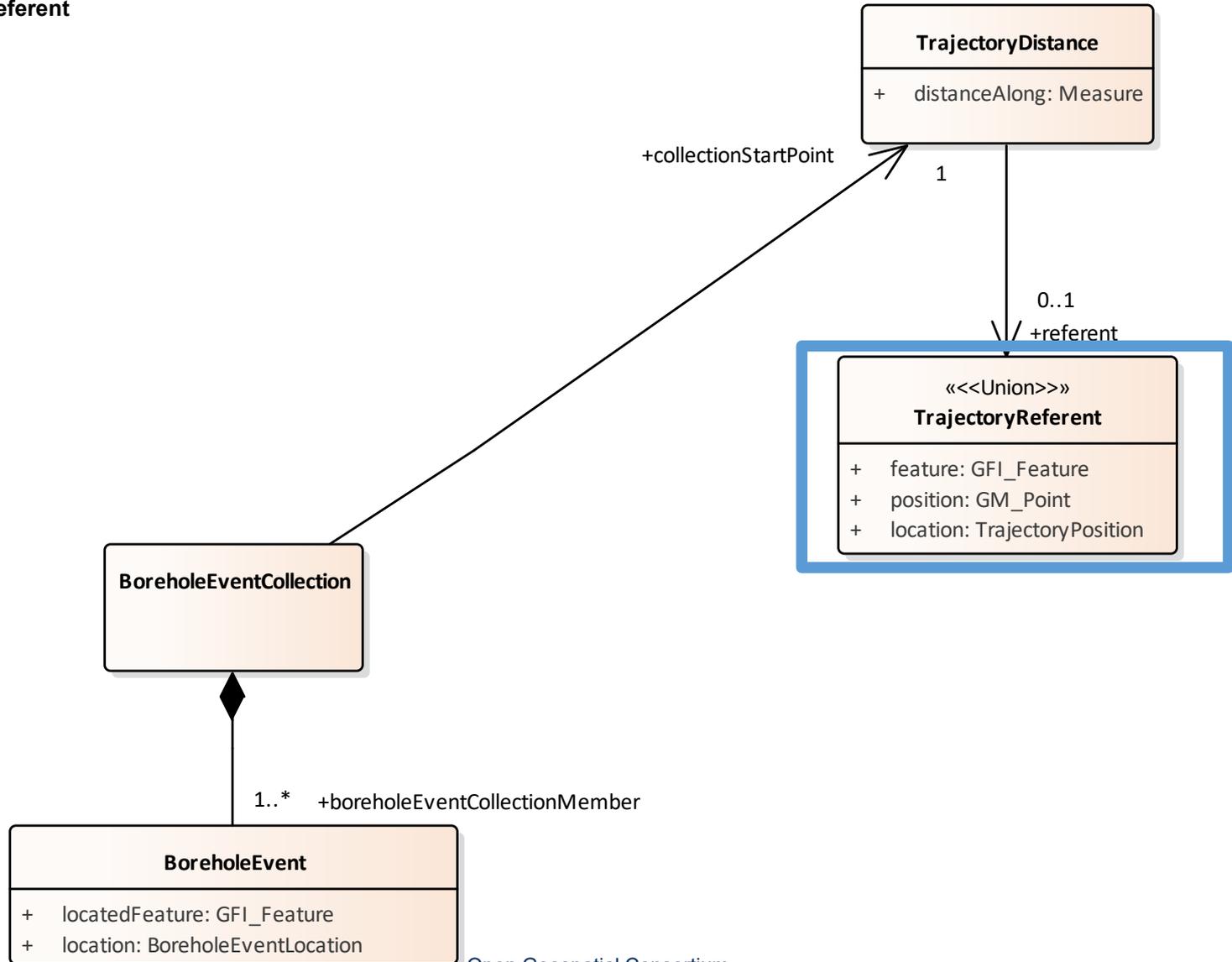


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Additional slides



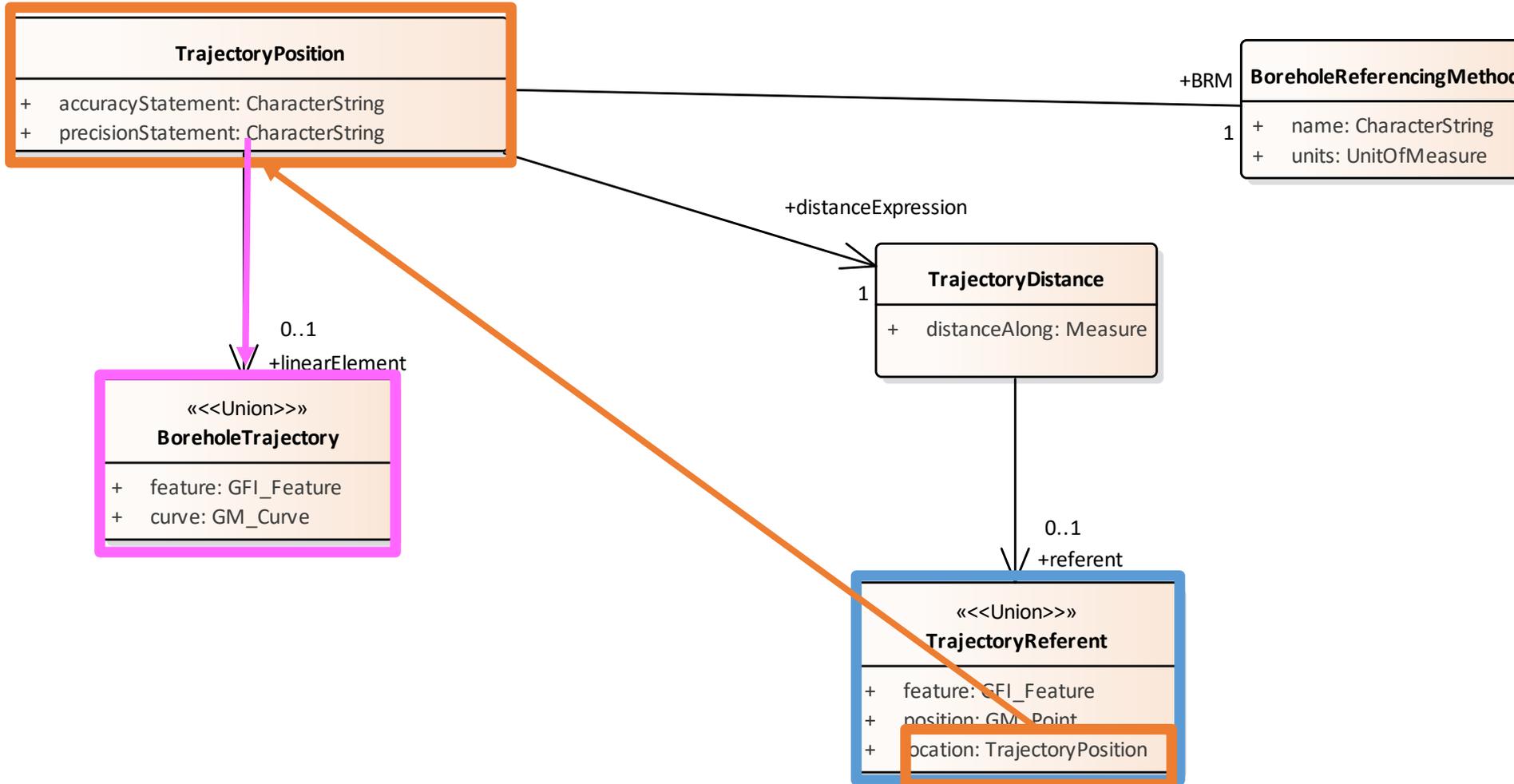
The collection defines its start and TrajectoryReferent



Additional slides



The **TrajectoryReferent** makes the connection between the local reference system (linear referencing) and the 3D geometry one



Additional slides



Within this linear referencing system, events locate Features at a given BoreholeEventLocation (at, fromMeasure/toMeasure, fromEvent/toEvent)

