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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

OGC® Making location count.

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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 pace*"….
- "*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

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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

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Use Cases

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

=> Looong scoping exercise

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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…

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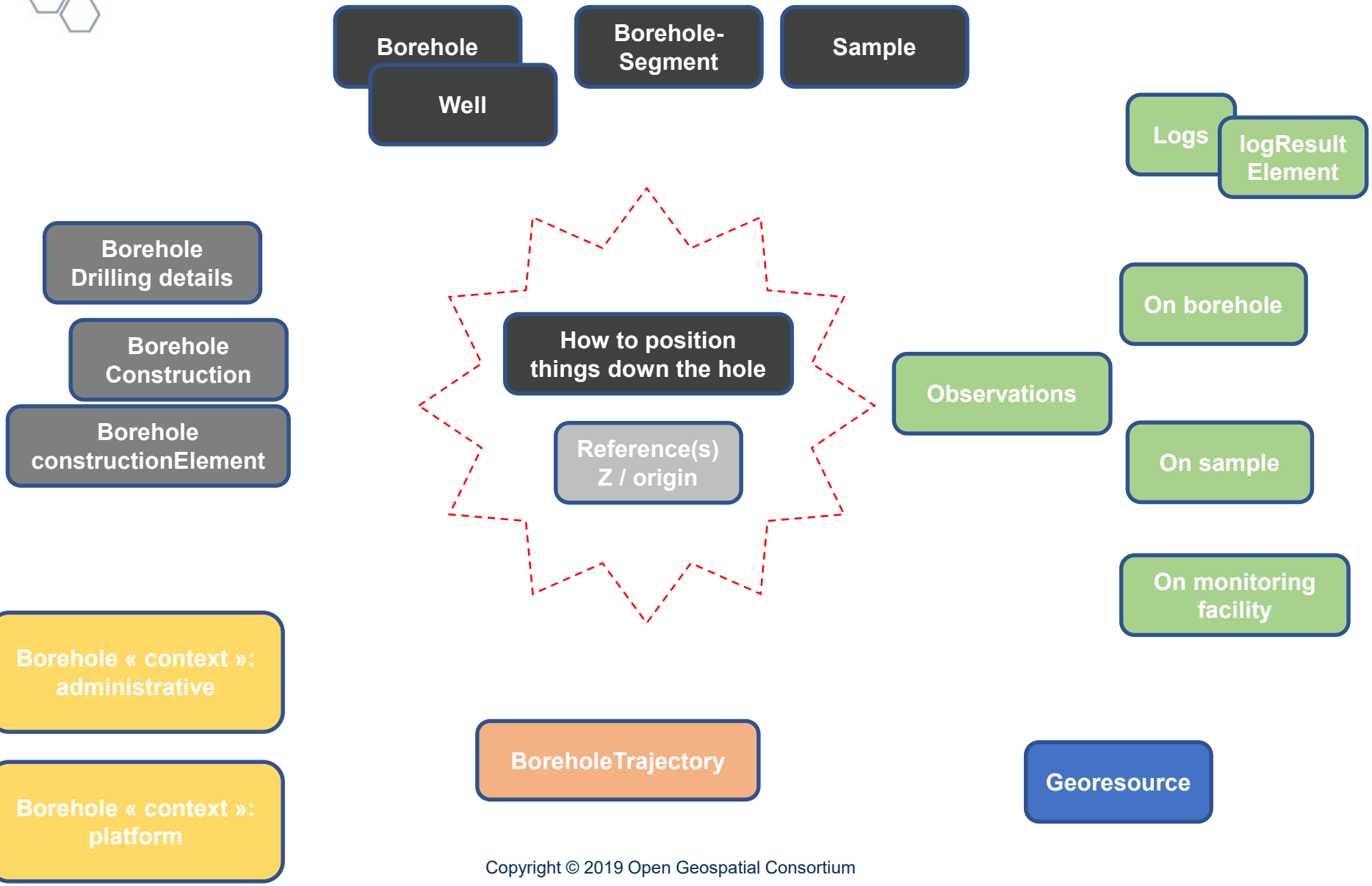
Vocabulary needs



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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

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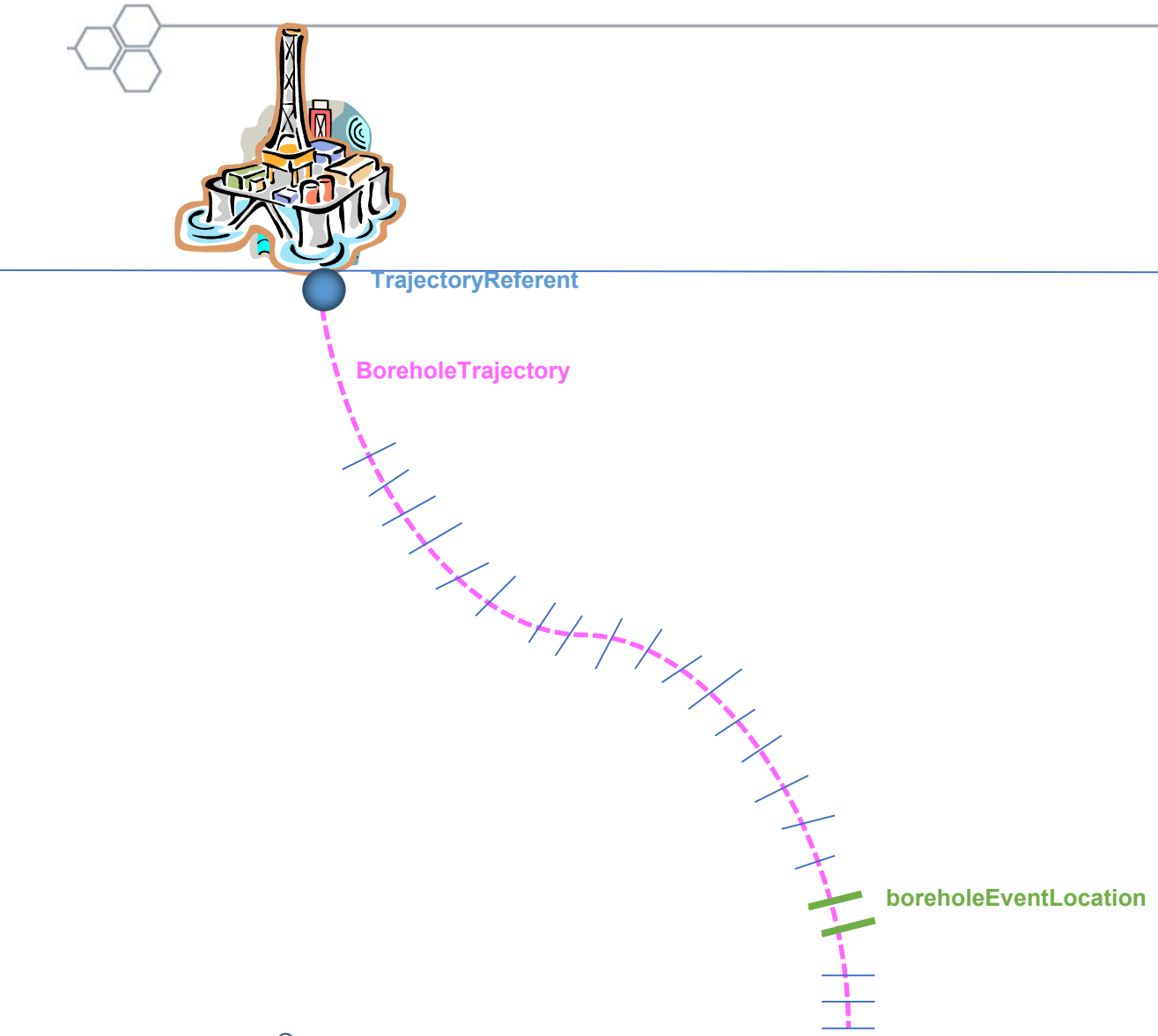
Linear referencing down the hole



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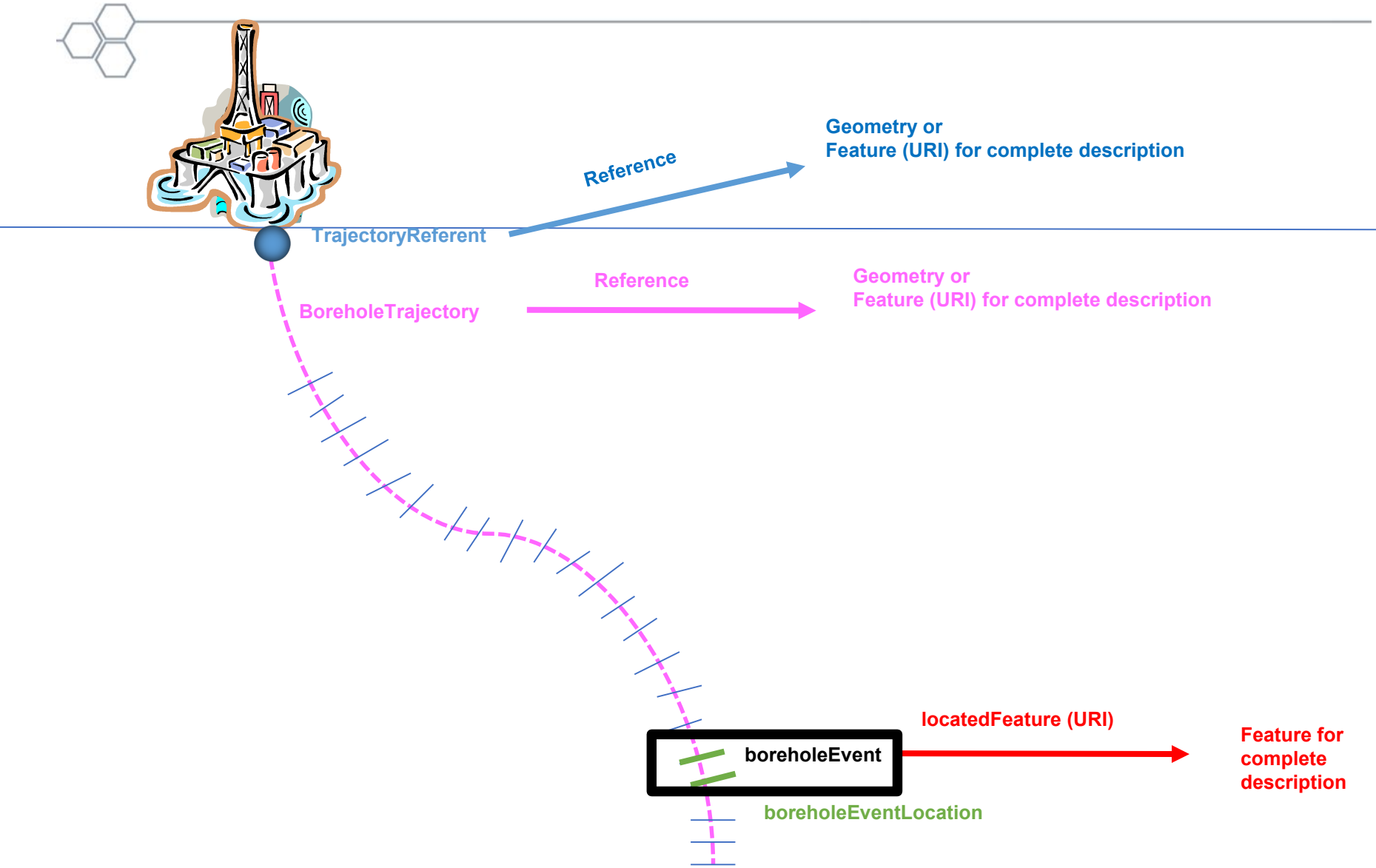
Linear referencing down the hole



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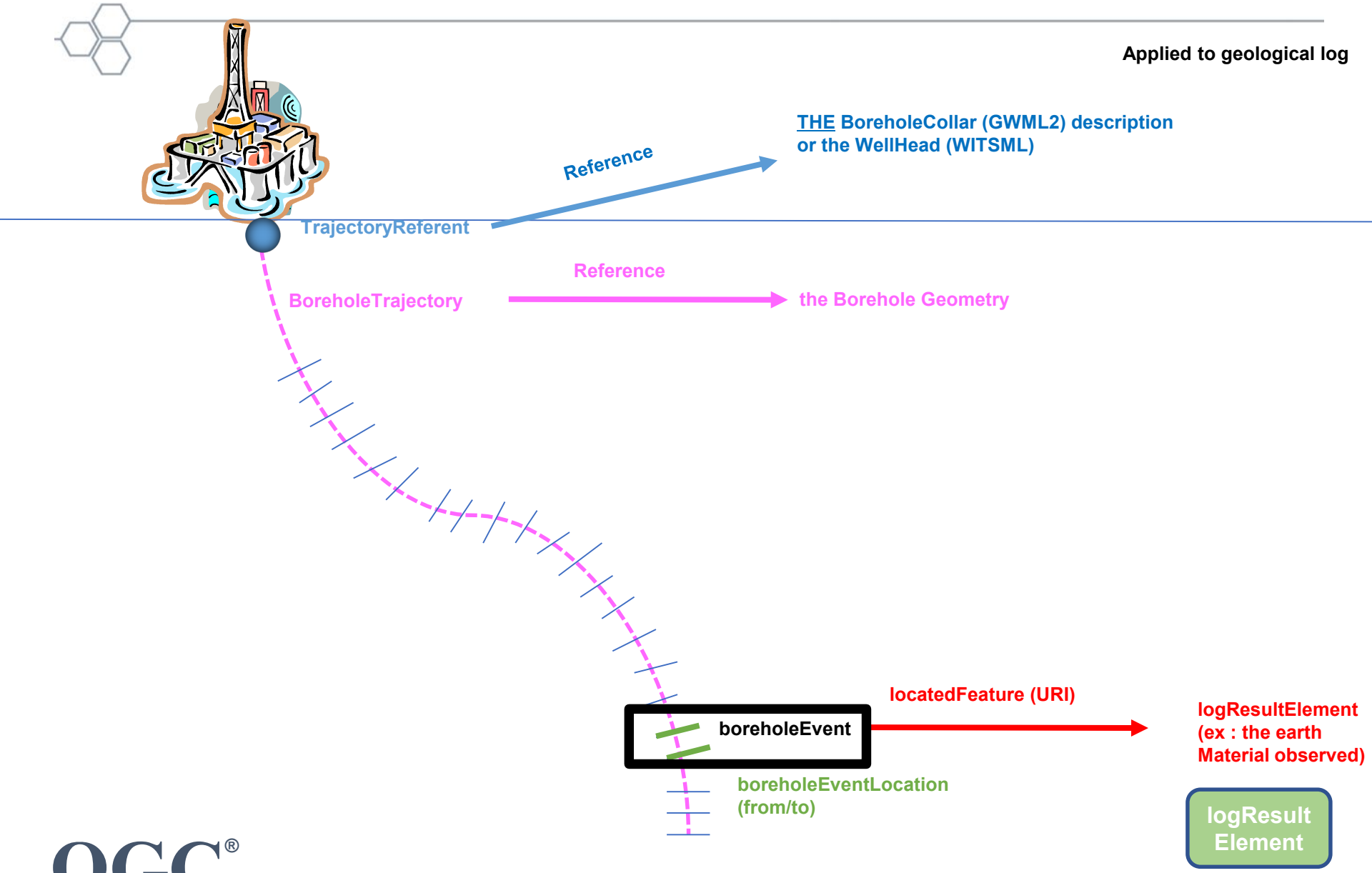
Linear referencing down the hole



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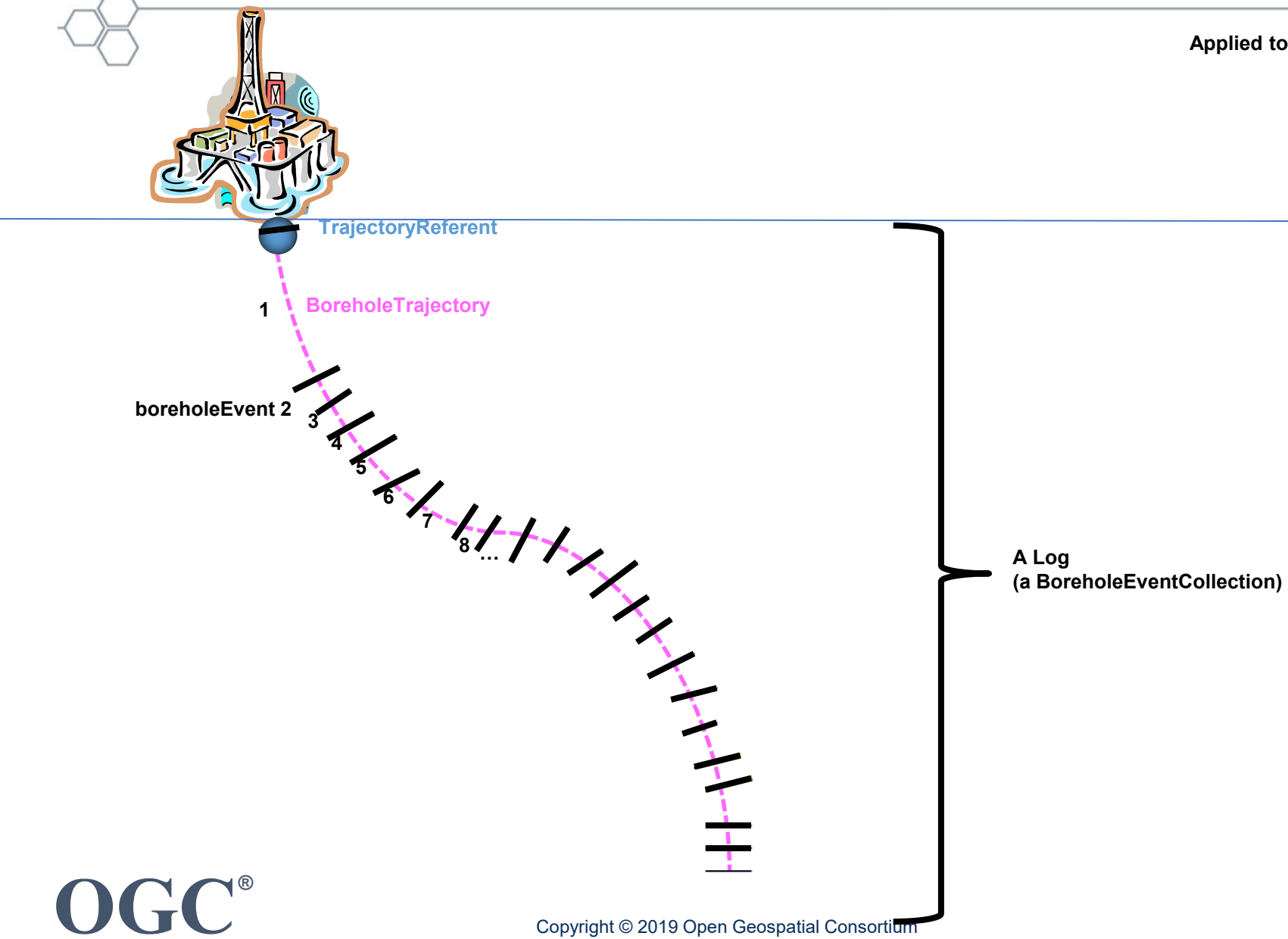
Linear referencing down the hole

Applied to geological log



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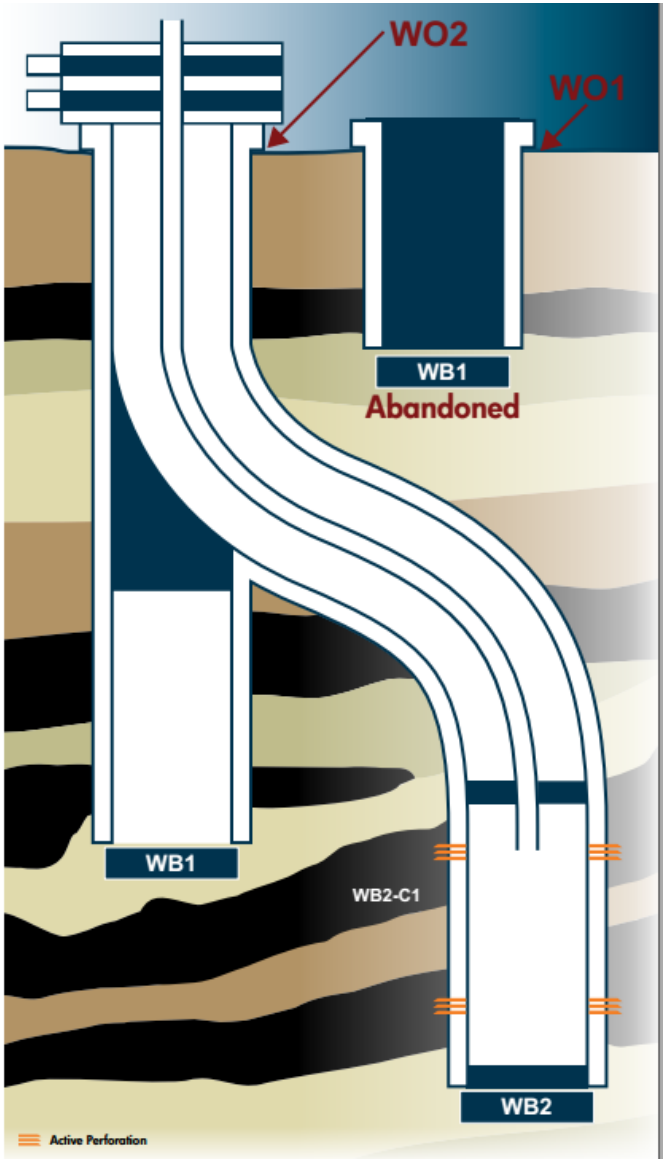
Borehole / Well

- We lack consistency accross OGC standards GeoSciML & GroundWater ML2

- What is a Borehole ?
- What is a Well ?



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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
  - Developped 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

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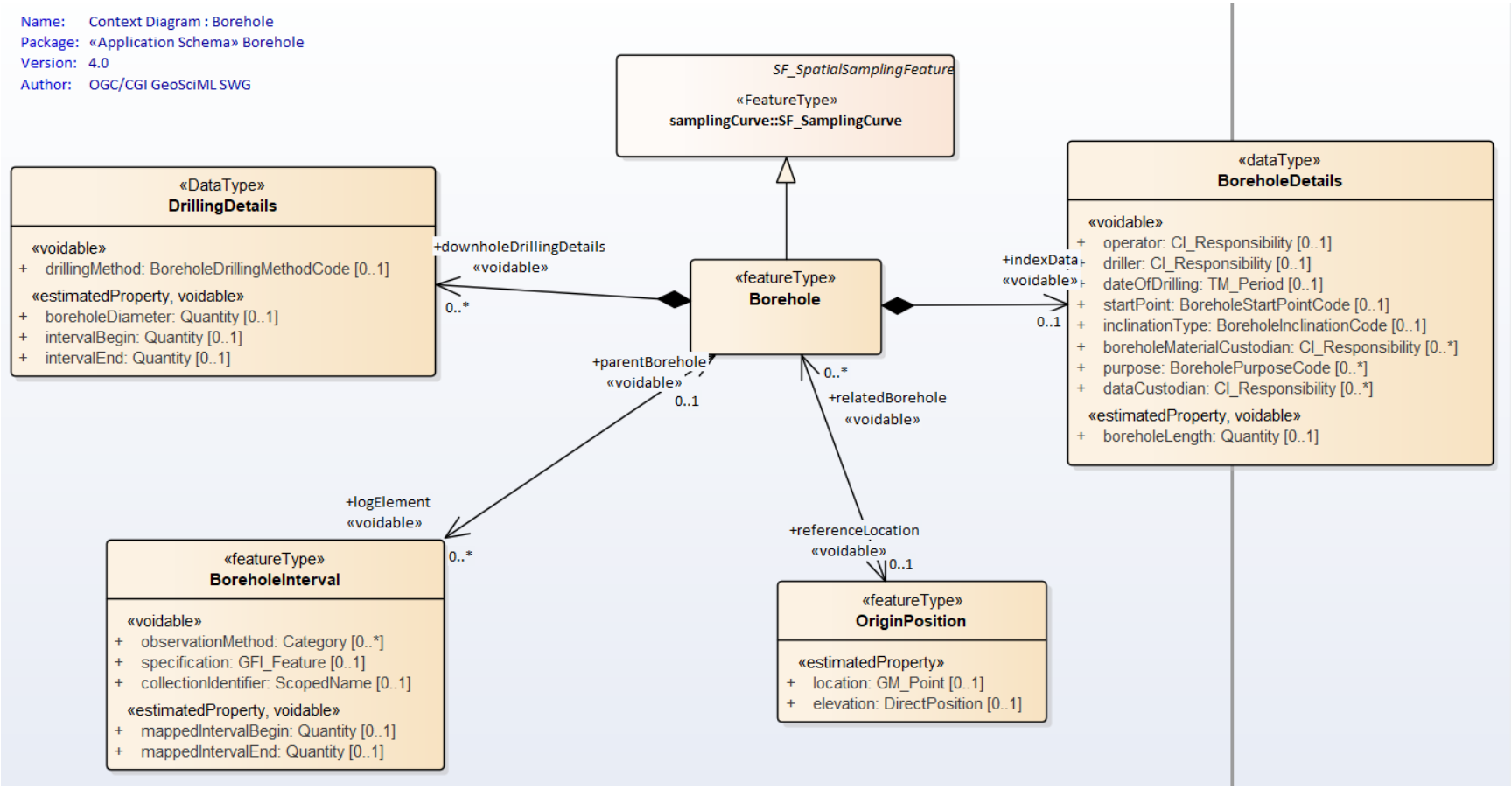
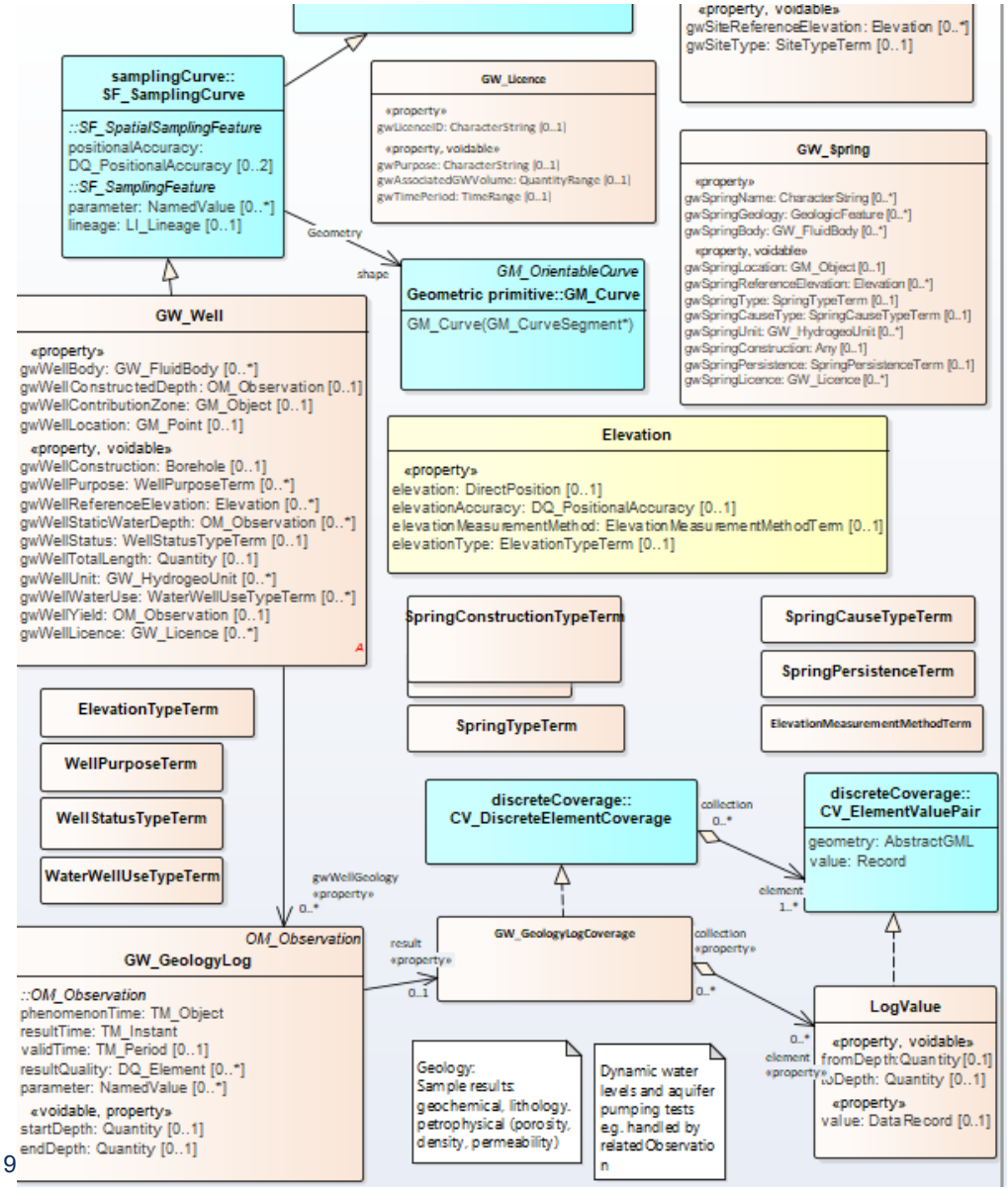
Potential impact on GeoSciML

- Mainly BoreholeInterval and OriginPosition
- Maybe also definitions adjustments



Potential impact on GWML2

- Well / Borehole
- GW_GeologyLog



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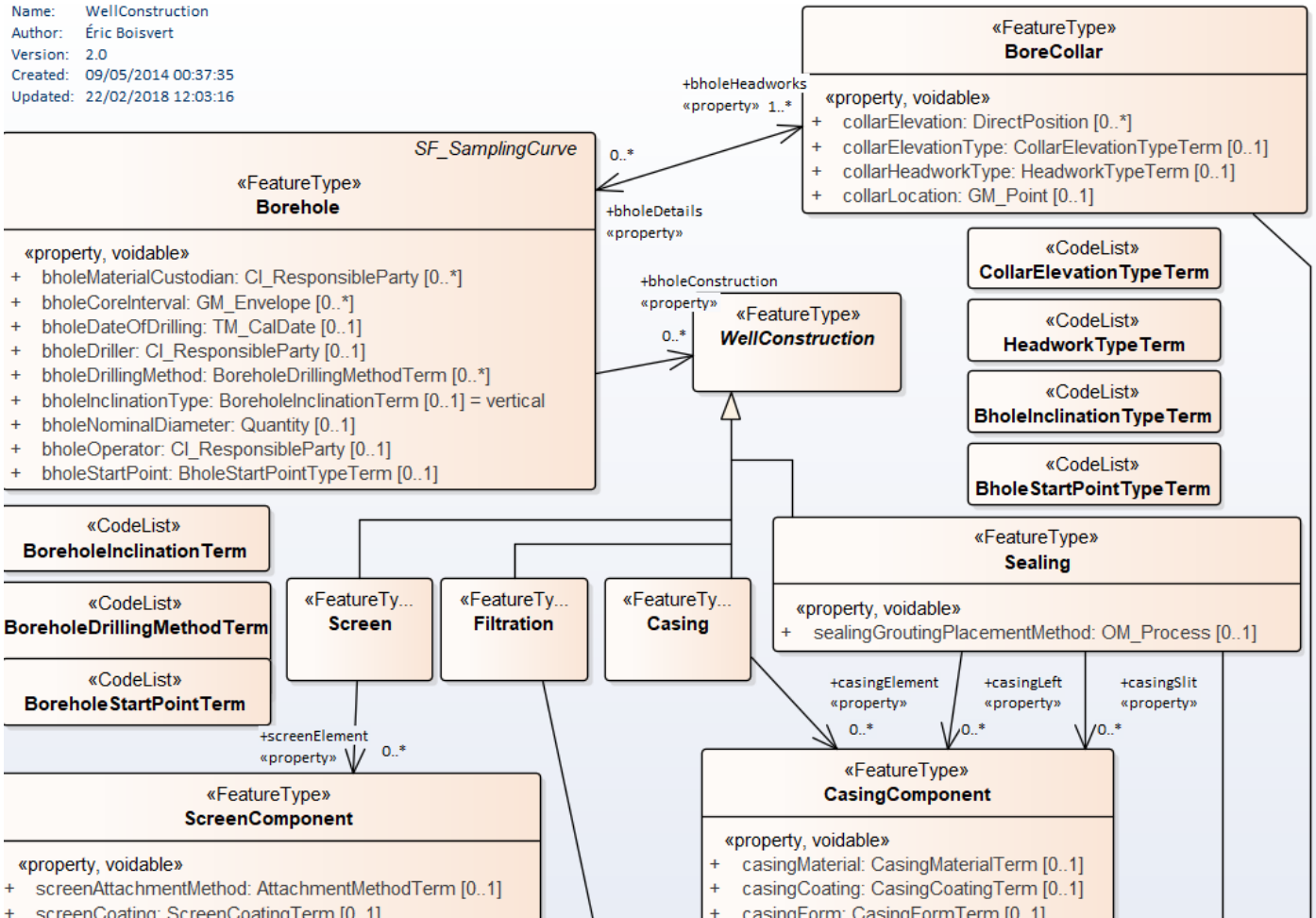
Potential impact on GWML2

- Borehole
- Maybe also definitions adjustments



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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

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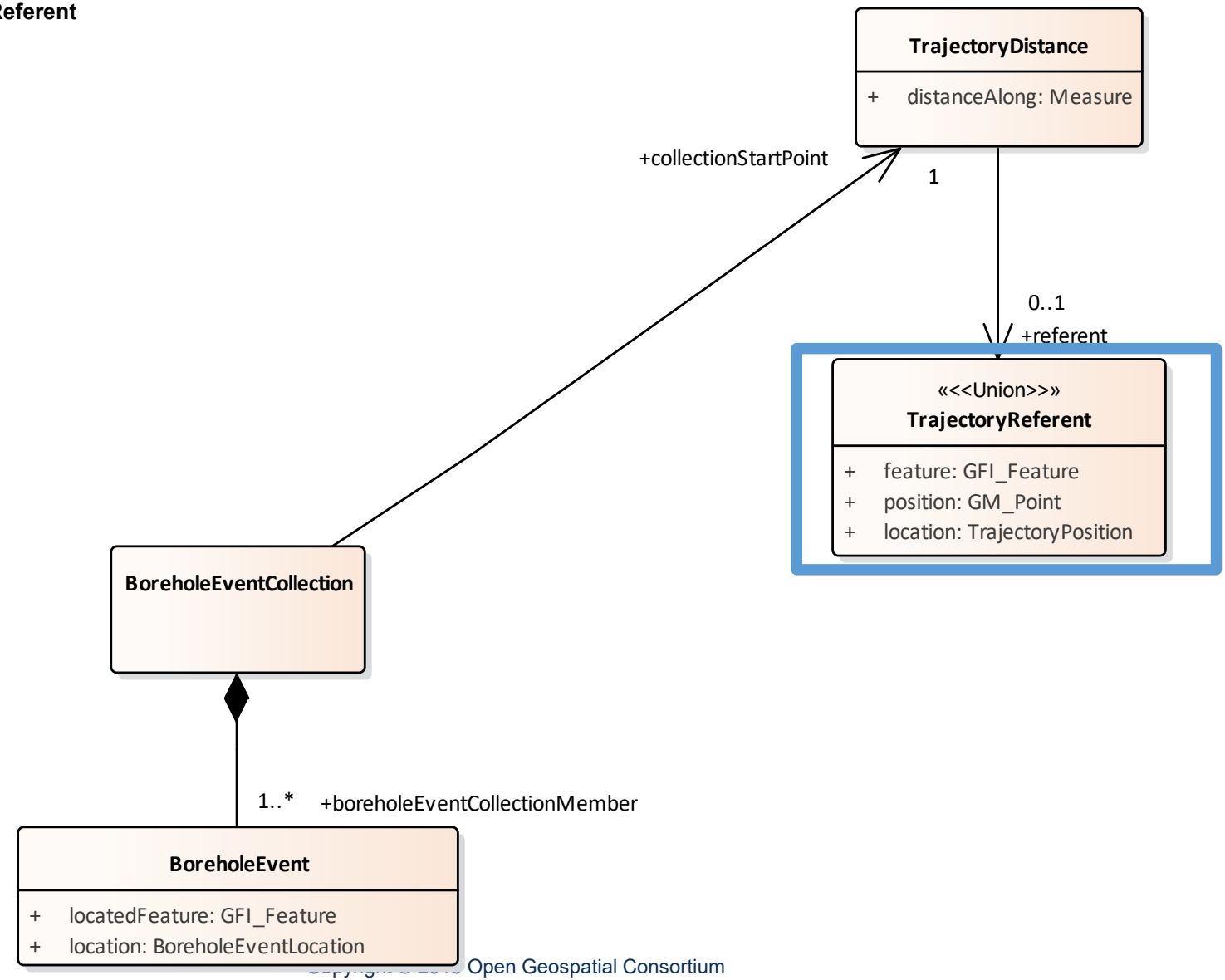
https://github.com/opengeospatial/boreholeie

check the wiki for meetings date and minutes

Additionnal slides

The collection defines its start and TrajectoryReferent



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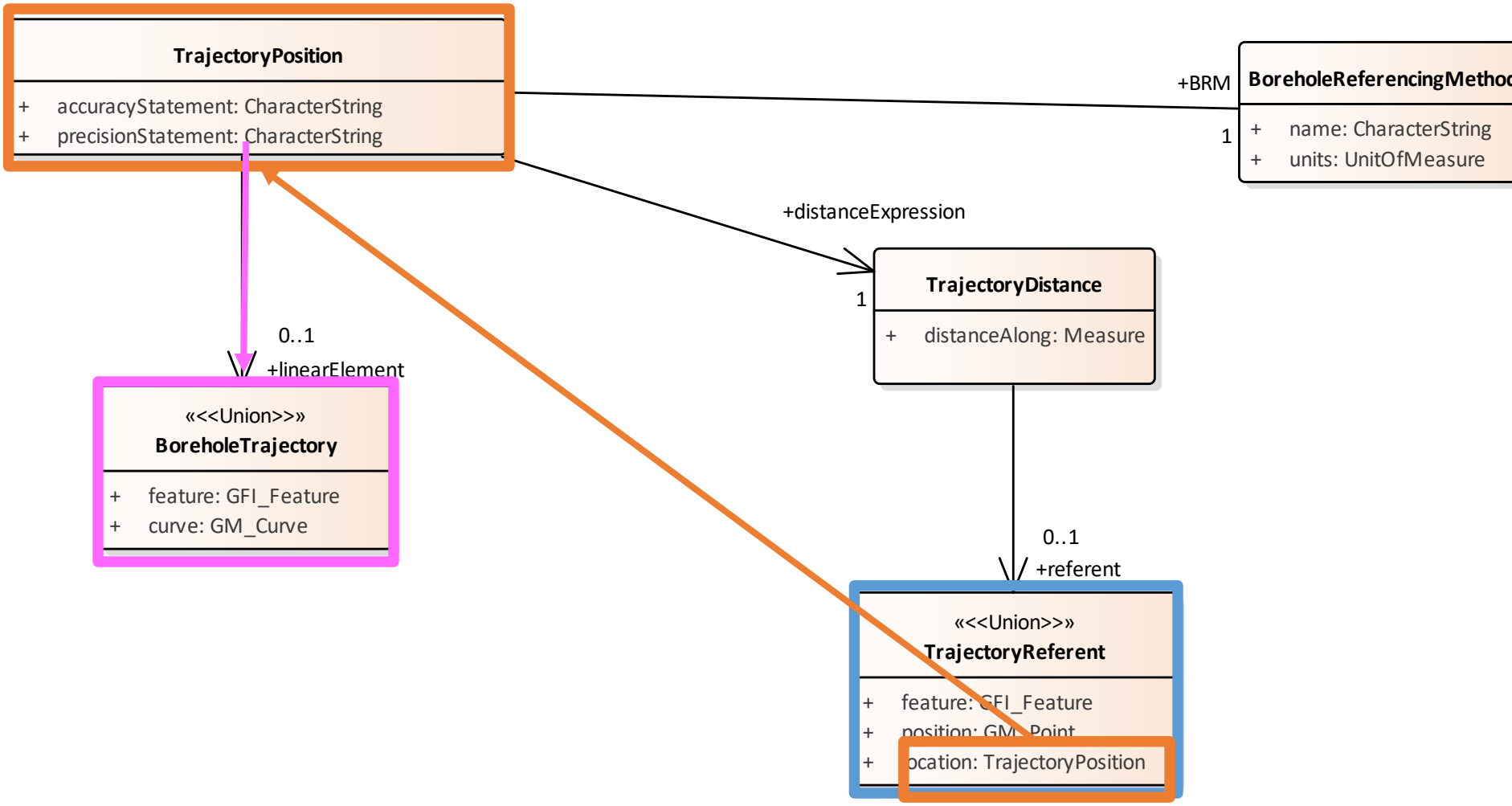
Additionnal slides

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



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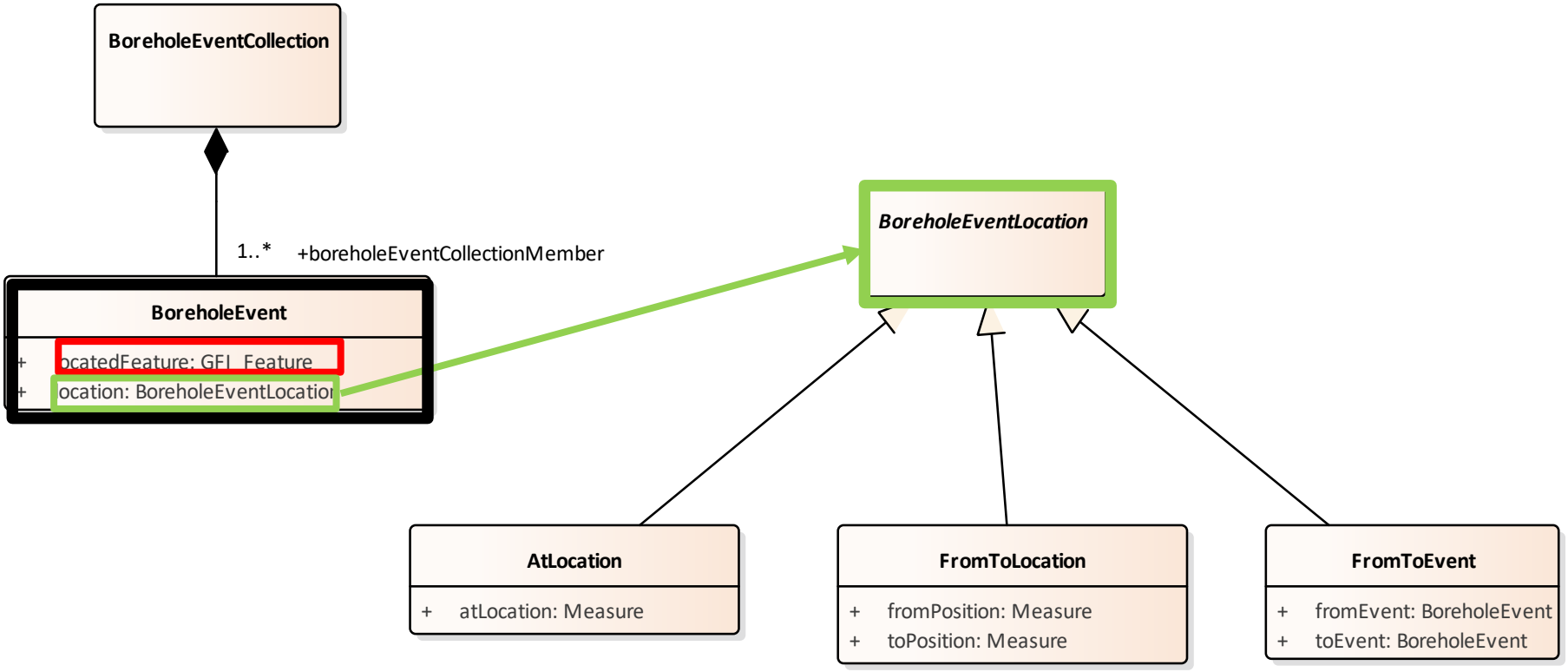
Additionnal slides

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



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