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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

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- *“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

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- Use Cases details

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

=> Loong scoping exercise

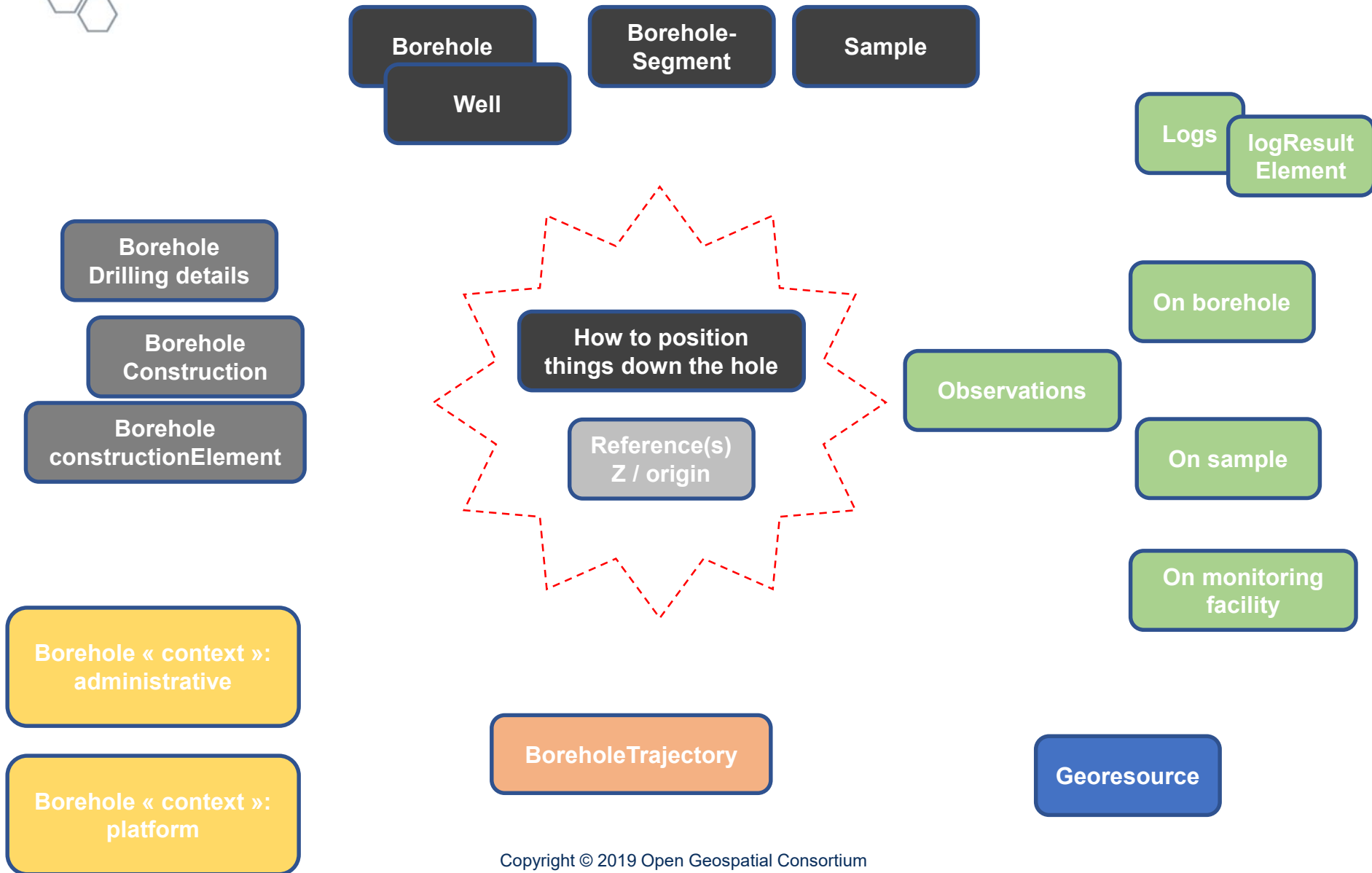
# Vocabulary needs

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- Consolidated
  - From the Use Case
  - [https://github.com/opengeospatial/boreholeie/blob/master/Vocabulary/BoreholeIE\\_consolidated\\_vocab.xlsx](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



# Linear referencing down the hole

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- 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>

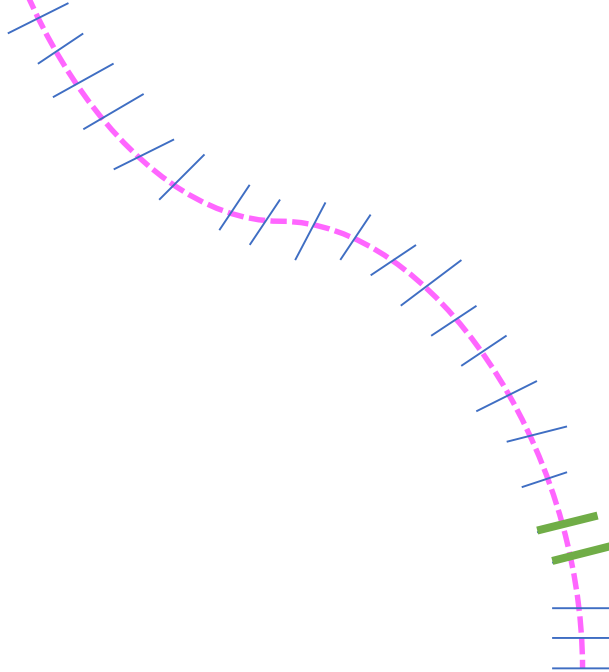


# Linear referencing down the hole



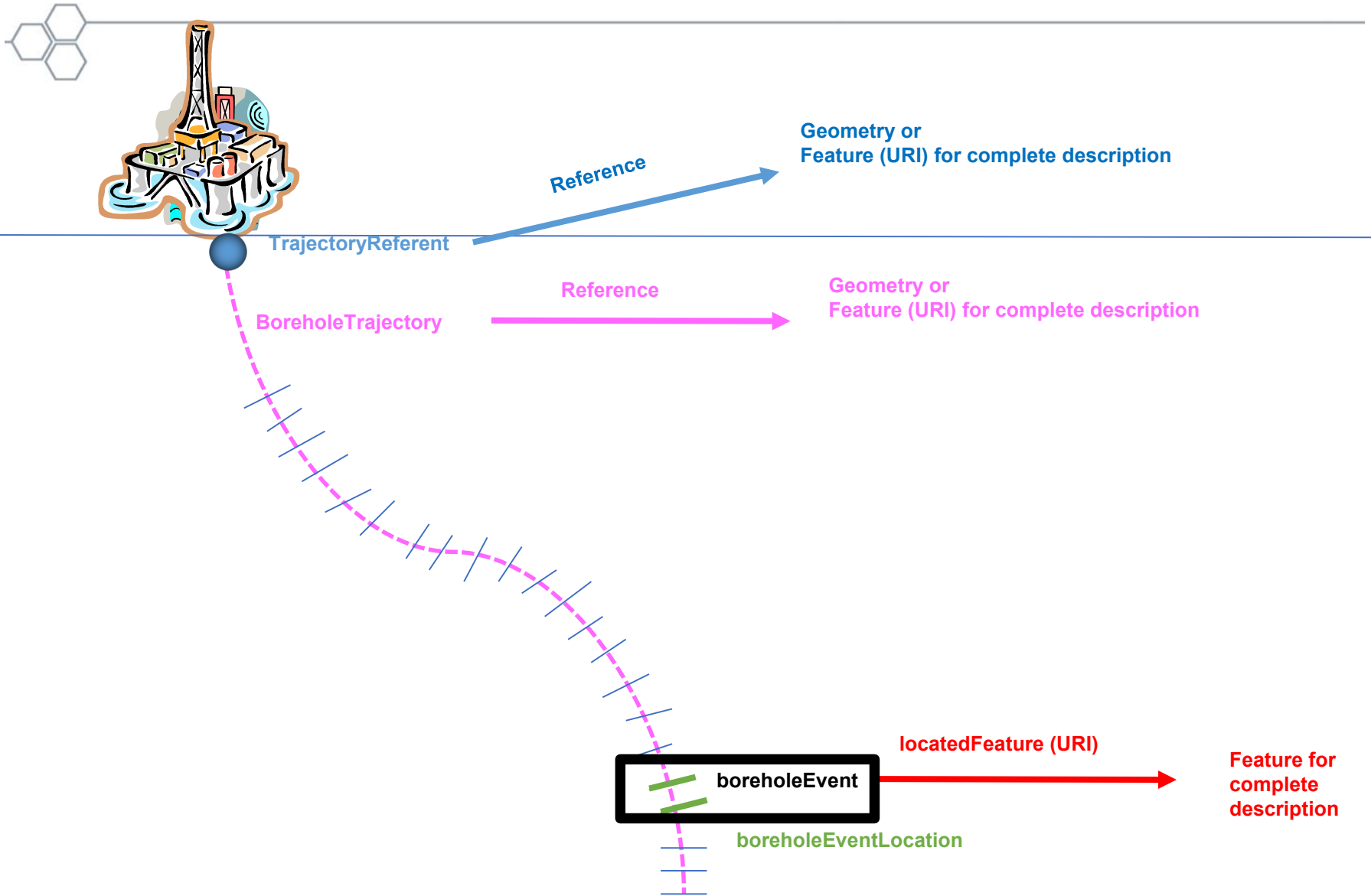
TrajectoryReferent

BoreholeTrajectory



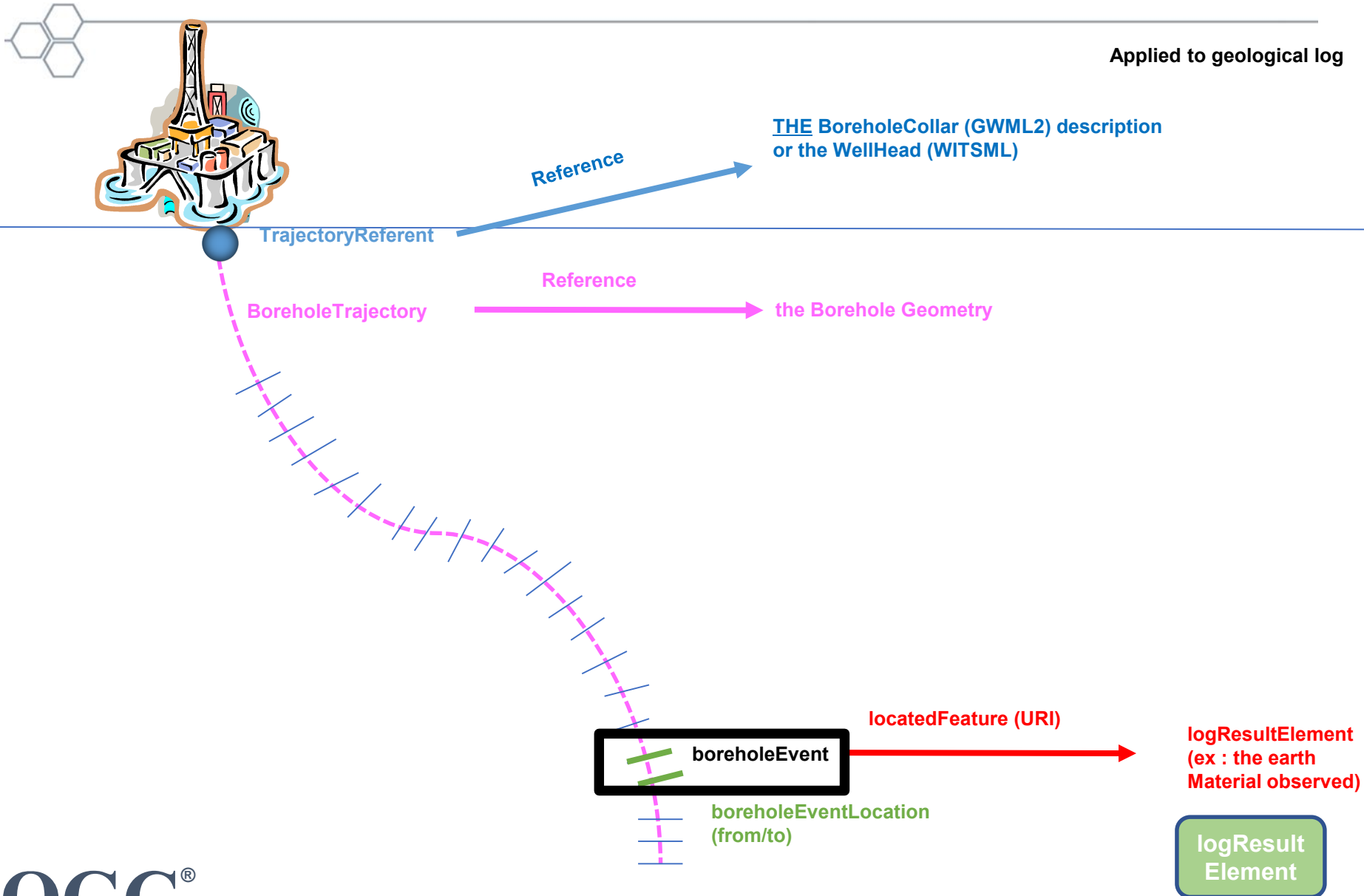
boreholeEventLocation

# Linear referencing down the hole



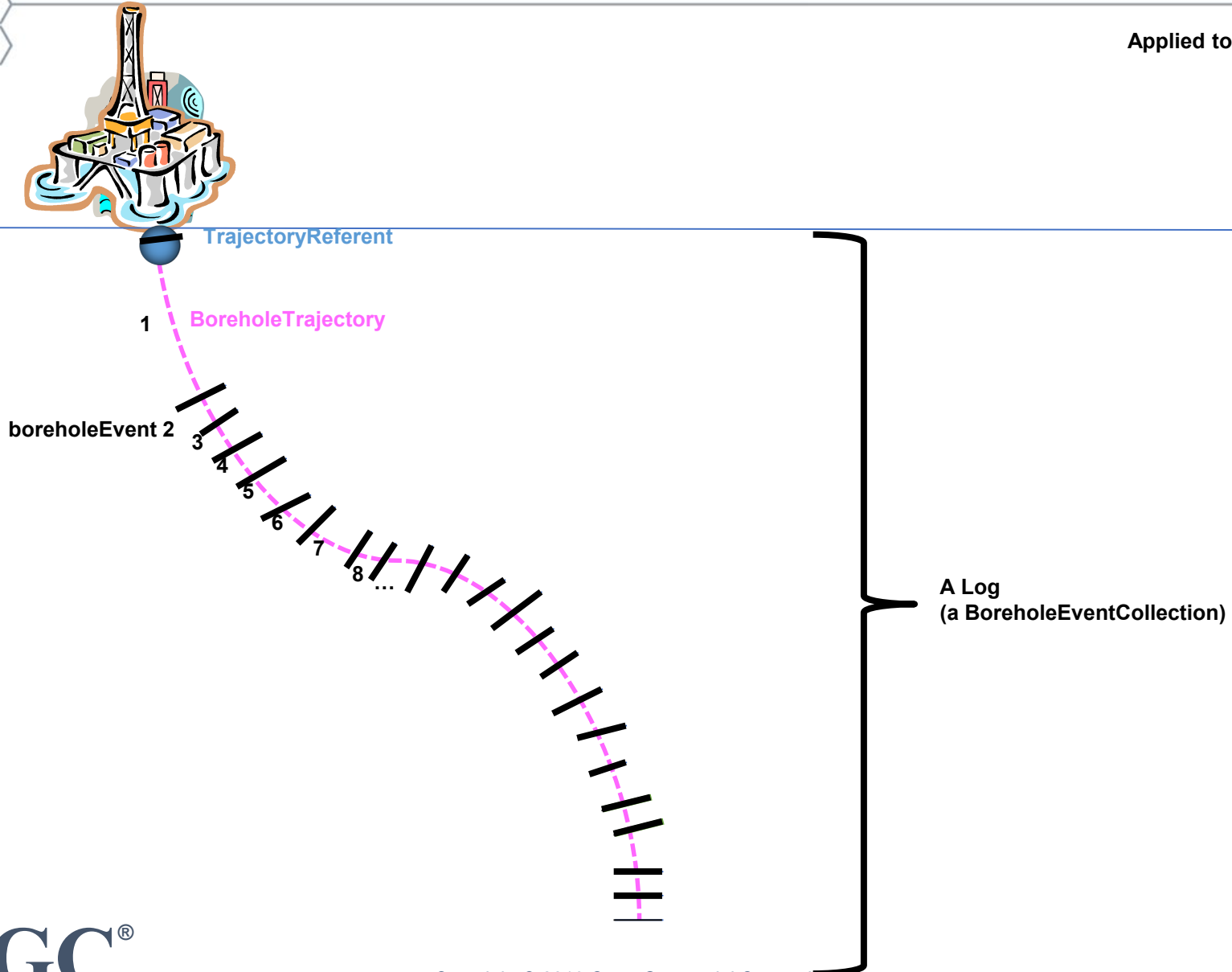
# Linear referencing down the hole

Applied to geological log



# Linear referencing down the hole

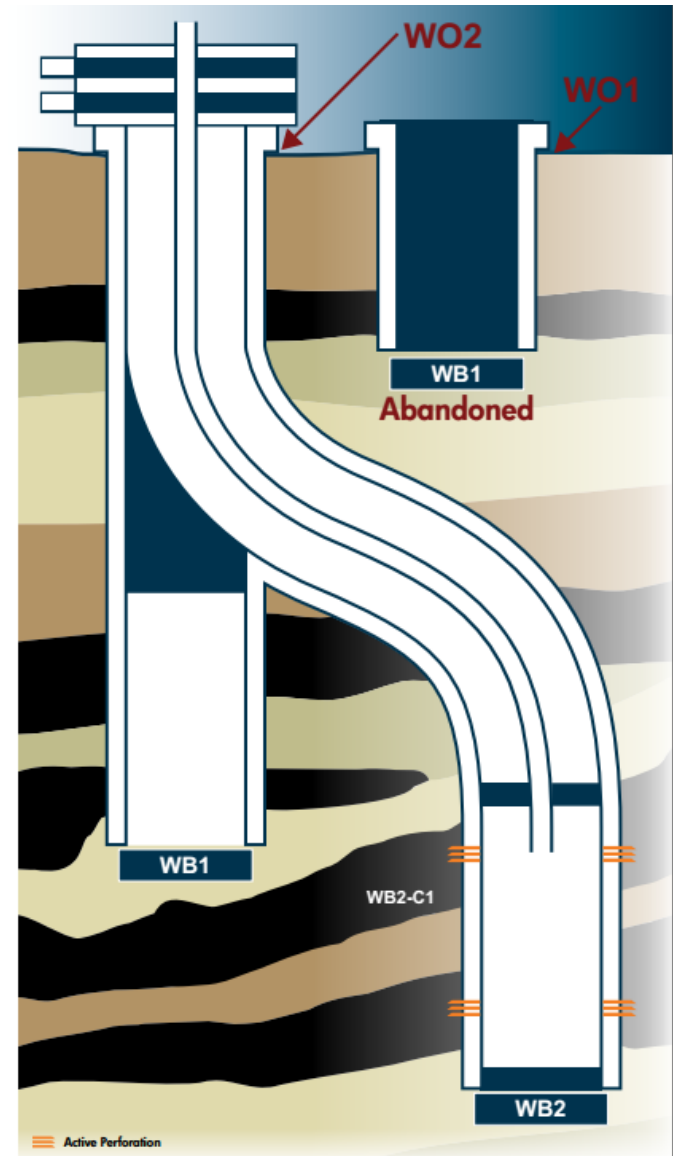
Applied to geological log



# Borehole / Well



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



# Potential impact on standards



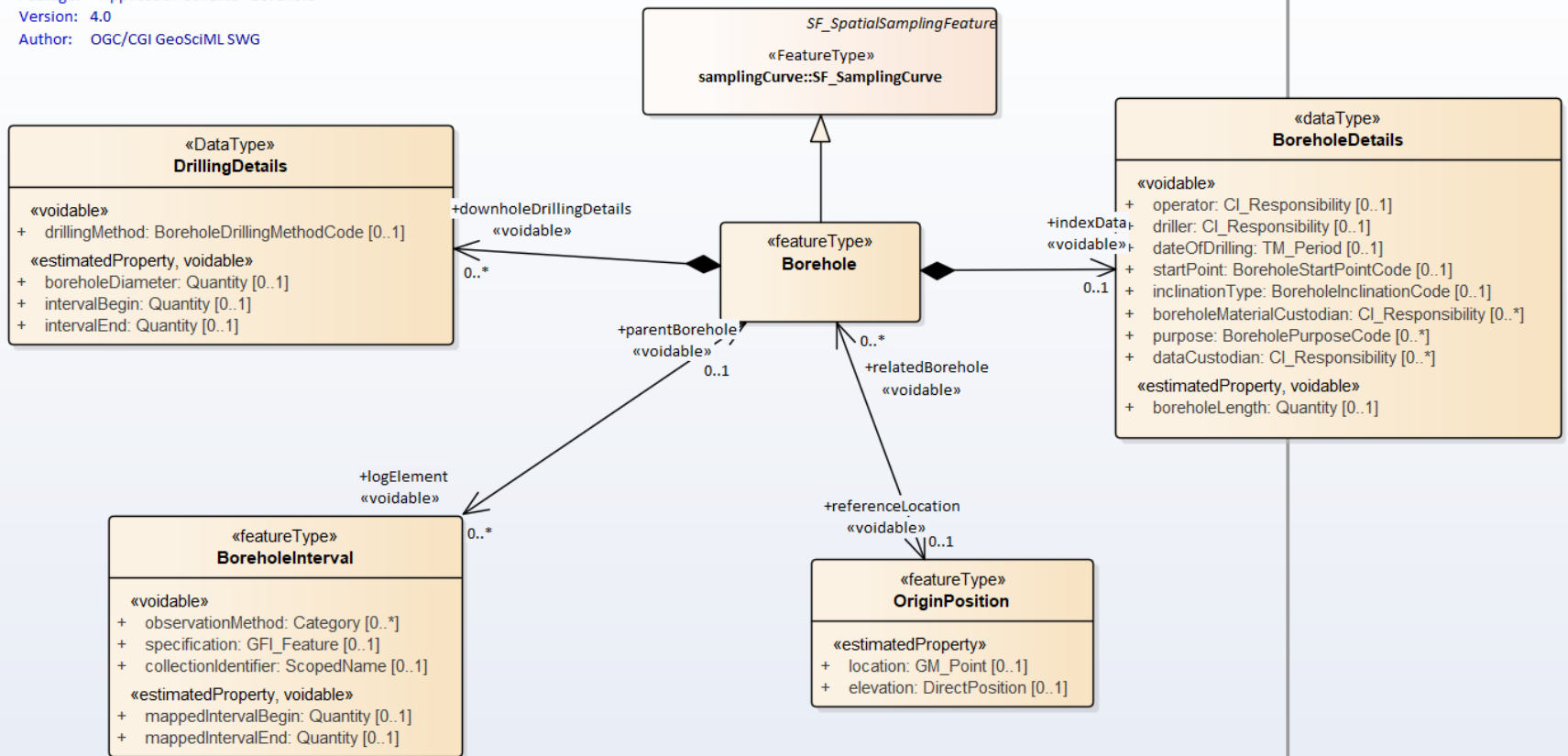
- Borehole IE ER conclusions may lead to a proposal for a an OGC specification (BhML ?)
  - Core : ‘Positioning’ aspect
  - Extension : mainly generic classes to avoid the ‘yet another standard syndrom’ and allow pre-existing standards reuse
- Then various approaches from the other standards point of 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



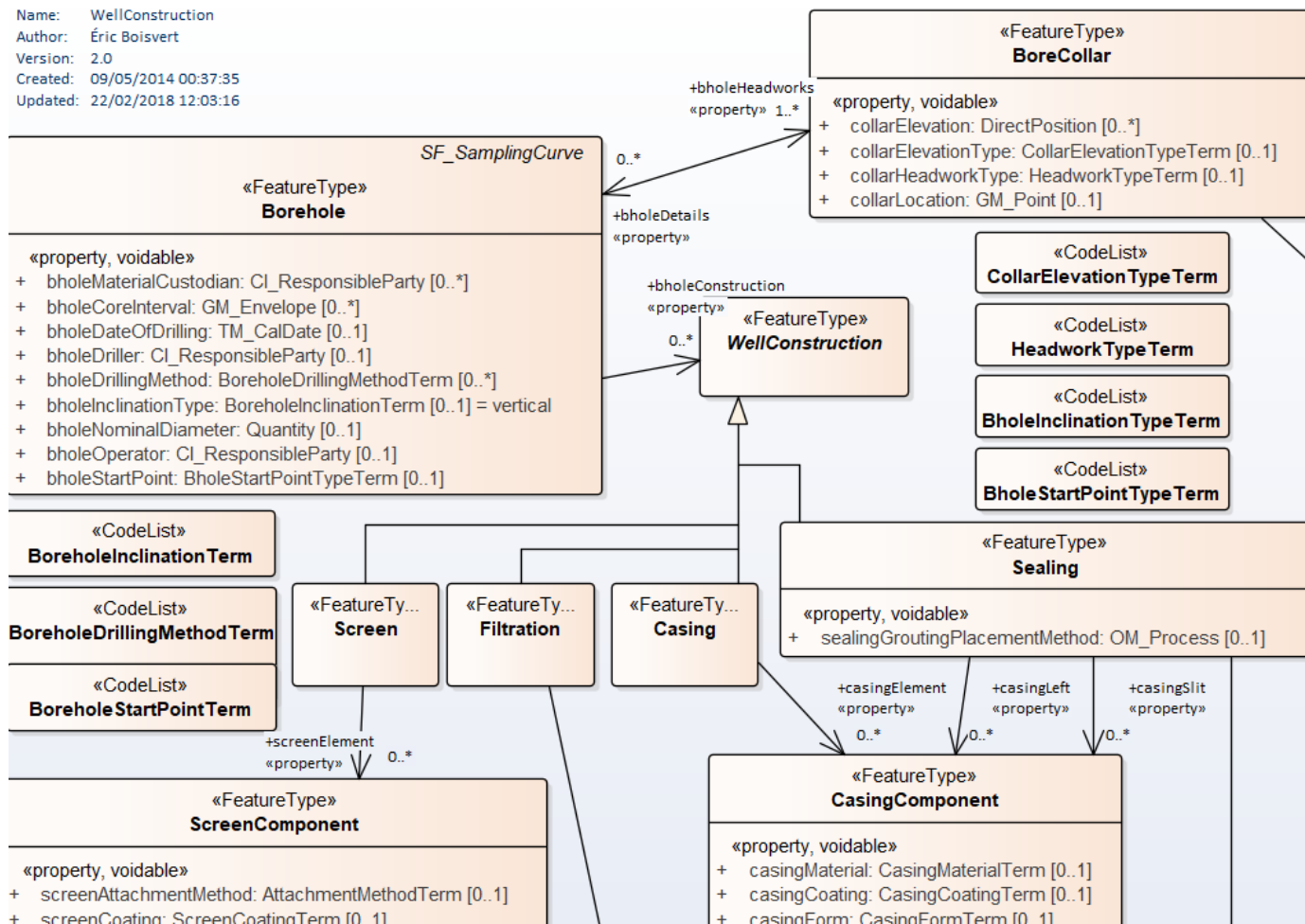




# Potential impact on GWML2



- Borehole
- Maybe also definitions adjustments



# Next steps

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- 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

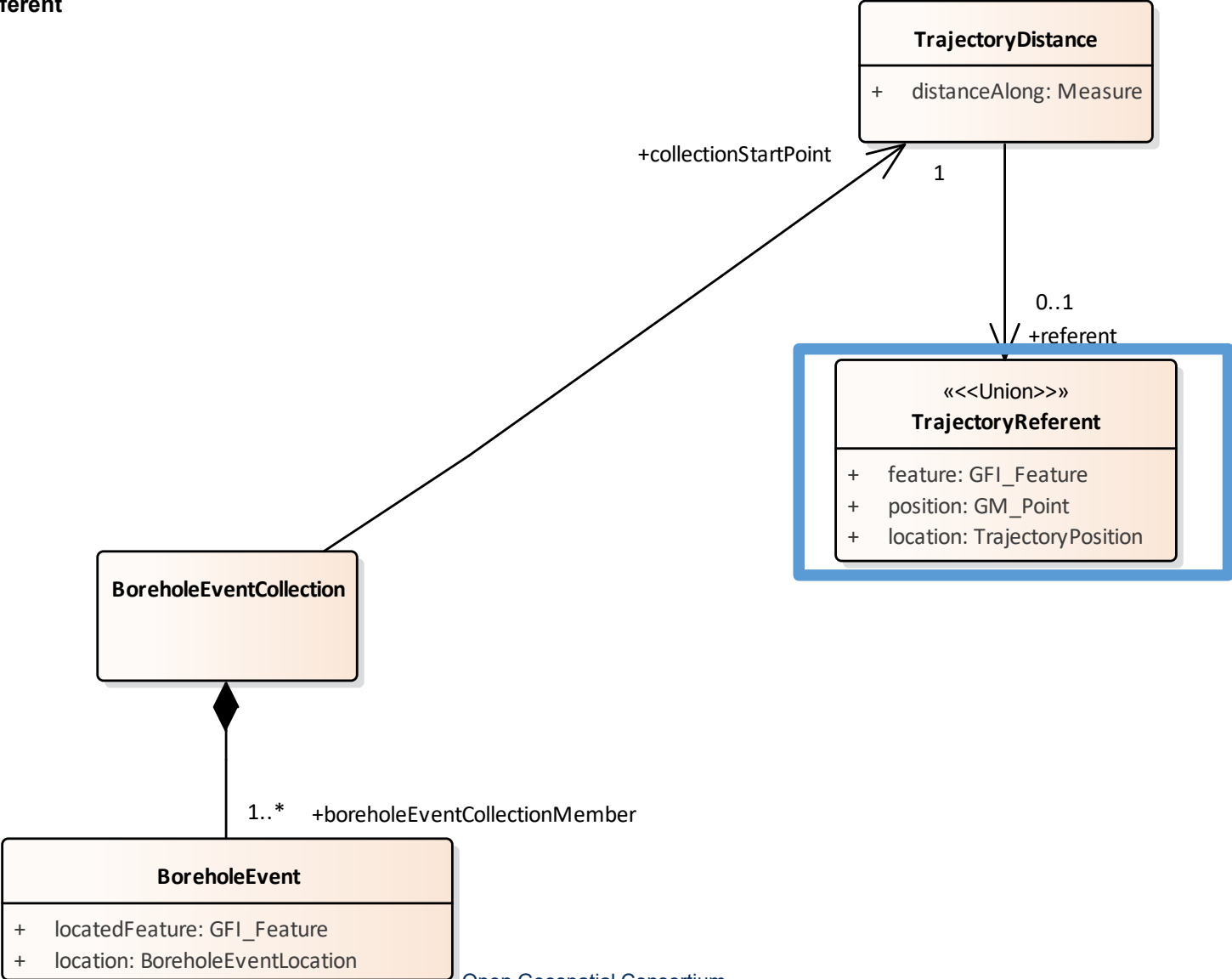


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# Additional slides



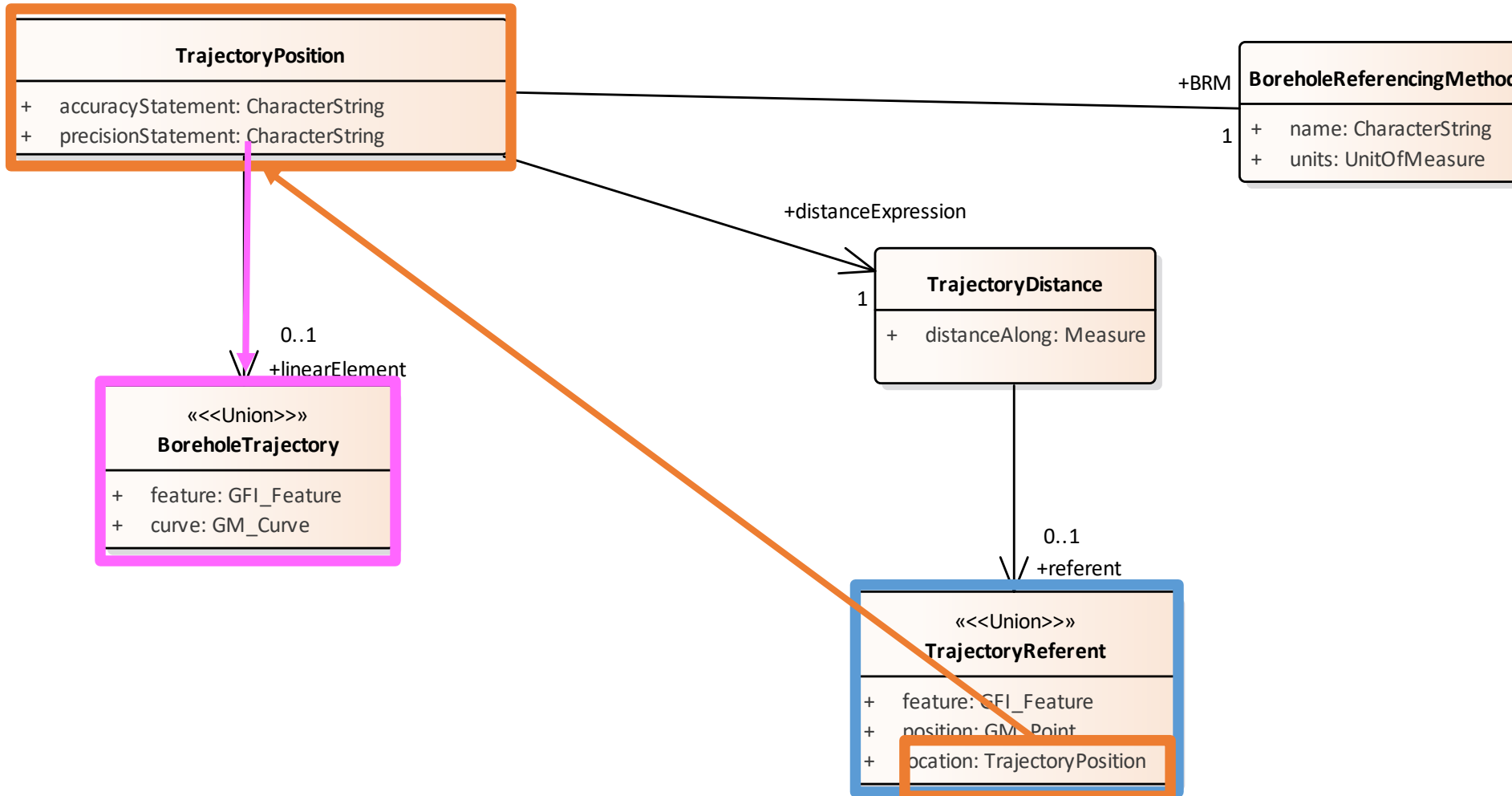
The collection defines its start and TrajectoryReferent



# 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)

