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The CF data model

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NetCDF CF conventions for WMO data exchange, Exeter, 2019-09-19

Reference

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- https://doi.org/10.5194/gmd-10-4619-2017

Geosci. Model Dev., 10, 1–28, 2017
https://doi.org/10.5194/gmd-10-1-2017

Geoscientific Model Development
Open Access
EGU

A data model of the Climate and Forecast metadata conventions (CF-1.6) with a software implementation (cf-python v2.1)

David Hassell[1], Jonathan Gregory[1,2], Jon Blower[3], Bryan N. Lawrence[1], and Karl E. Taylor[4]

What is a data model

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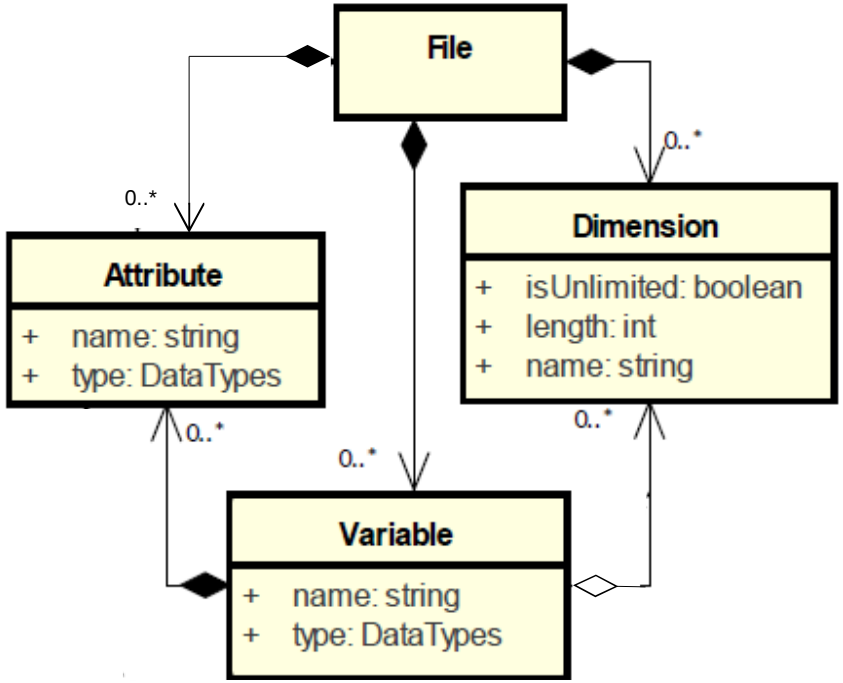
- A data model identifies the distinct elements of data and describes how they relate to each other and to the real world

- The netCDF classic data model:



Benefits of a data model to CF

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- To achieve a better understanding of CF
- To create better enhancements to CF
- To enable better software to be written
- To make it easier to represent CF-compliant data in other file formats

Design criteria for the CF data model

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- The data model should be composed of a **minimal** set of elements that are sufficient for accommodating all aspects of the CF

- The data model should not introduce additional elements not presently needed or used by CF

- The data model should be **independent of any encoding**
  - Logical data model

Elements of CF-netCDF

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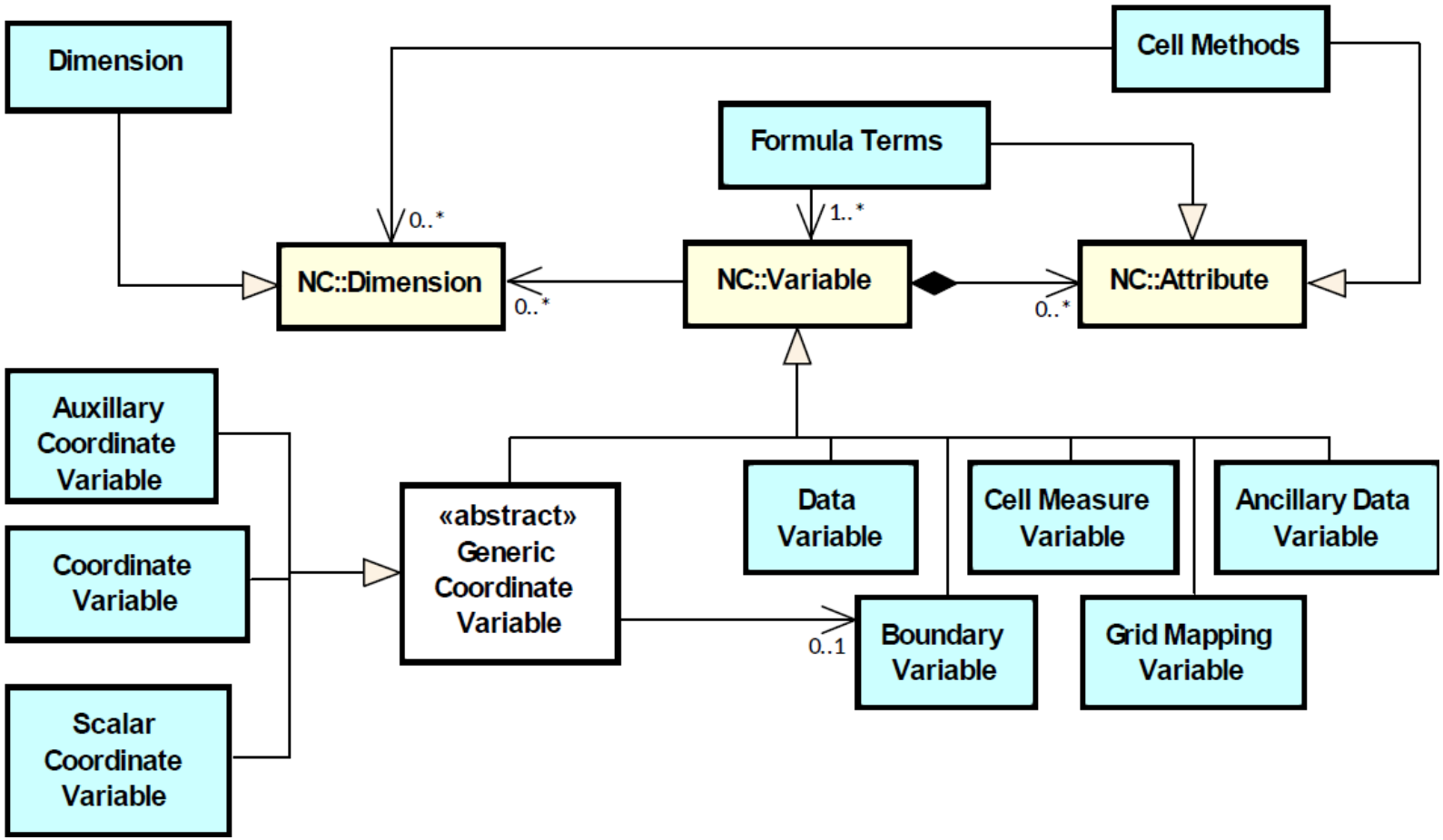

Elements of CF-netCDF

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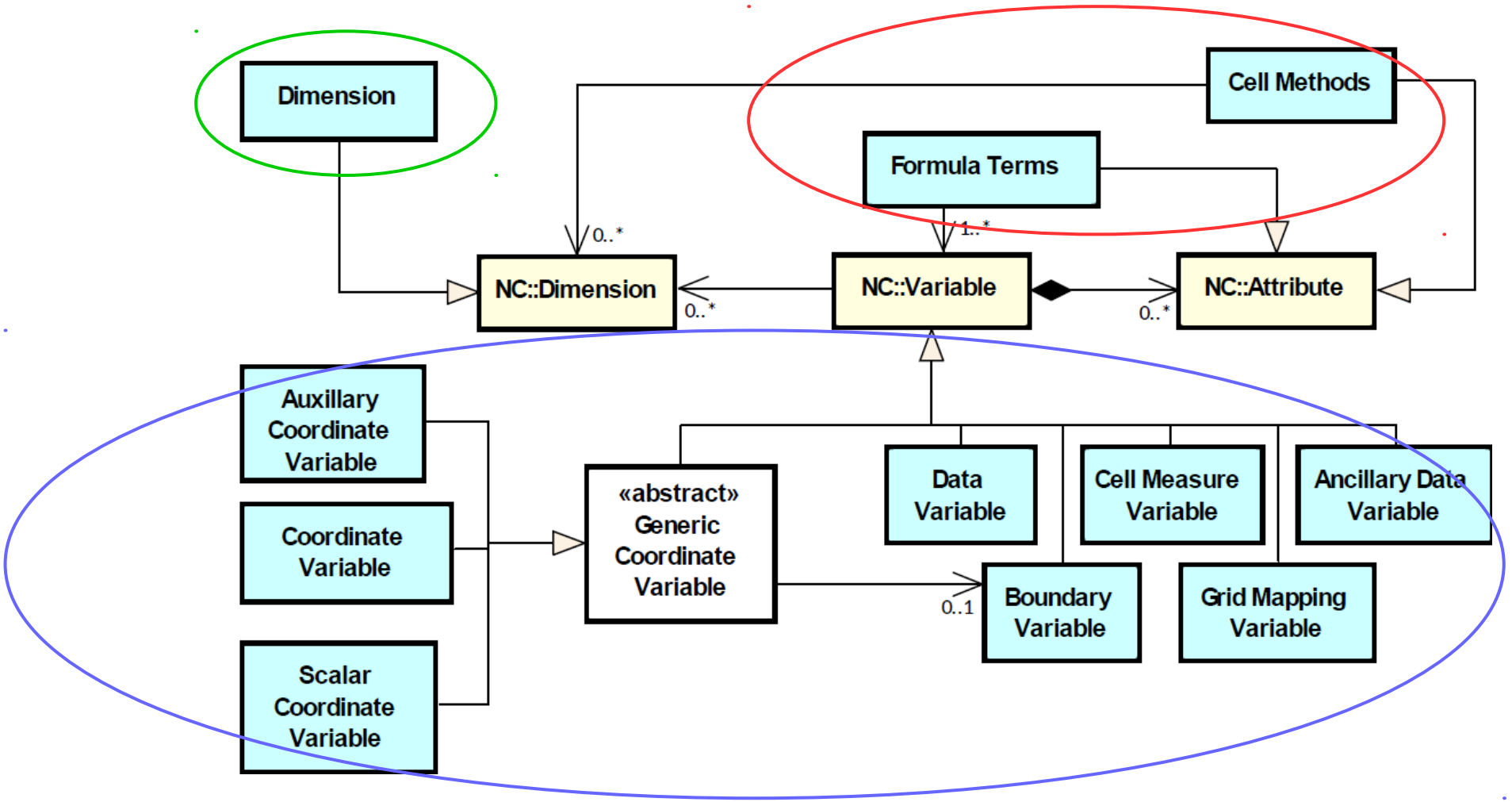

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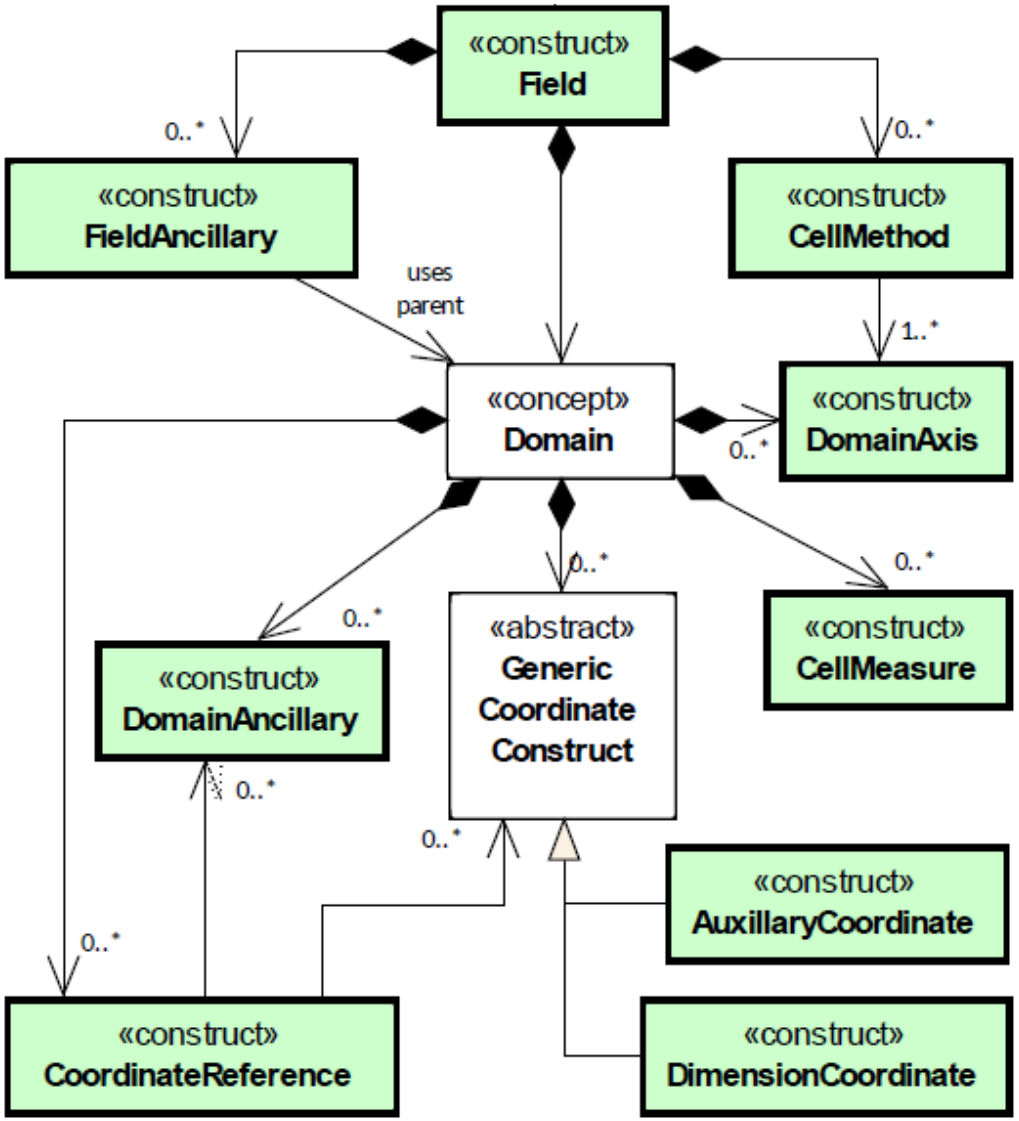

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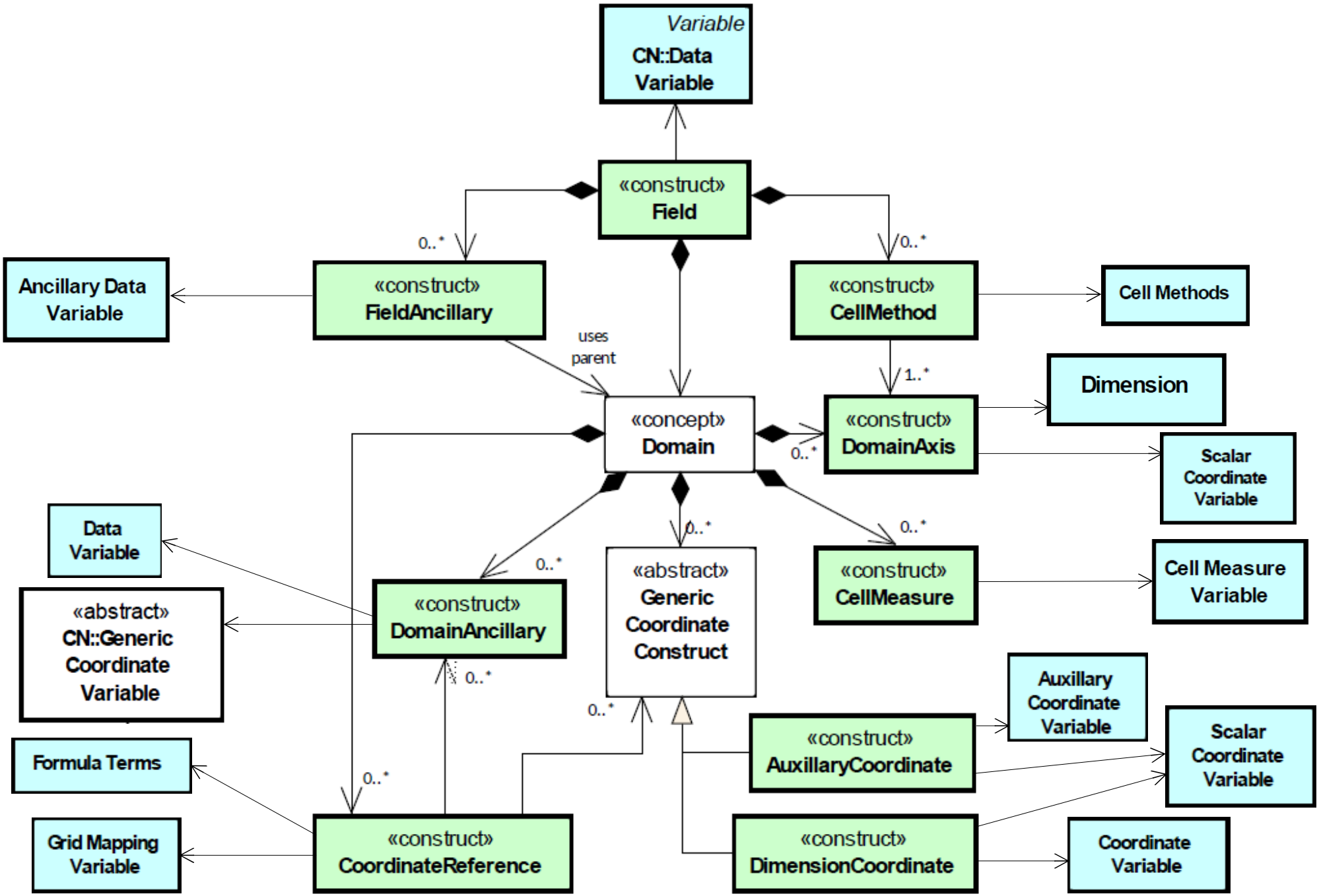

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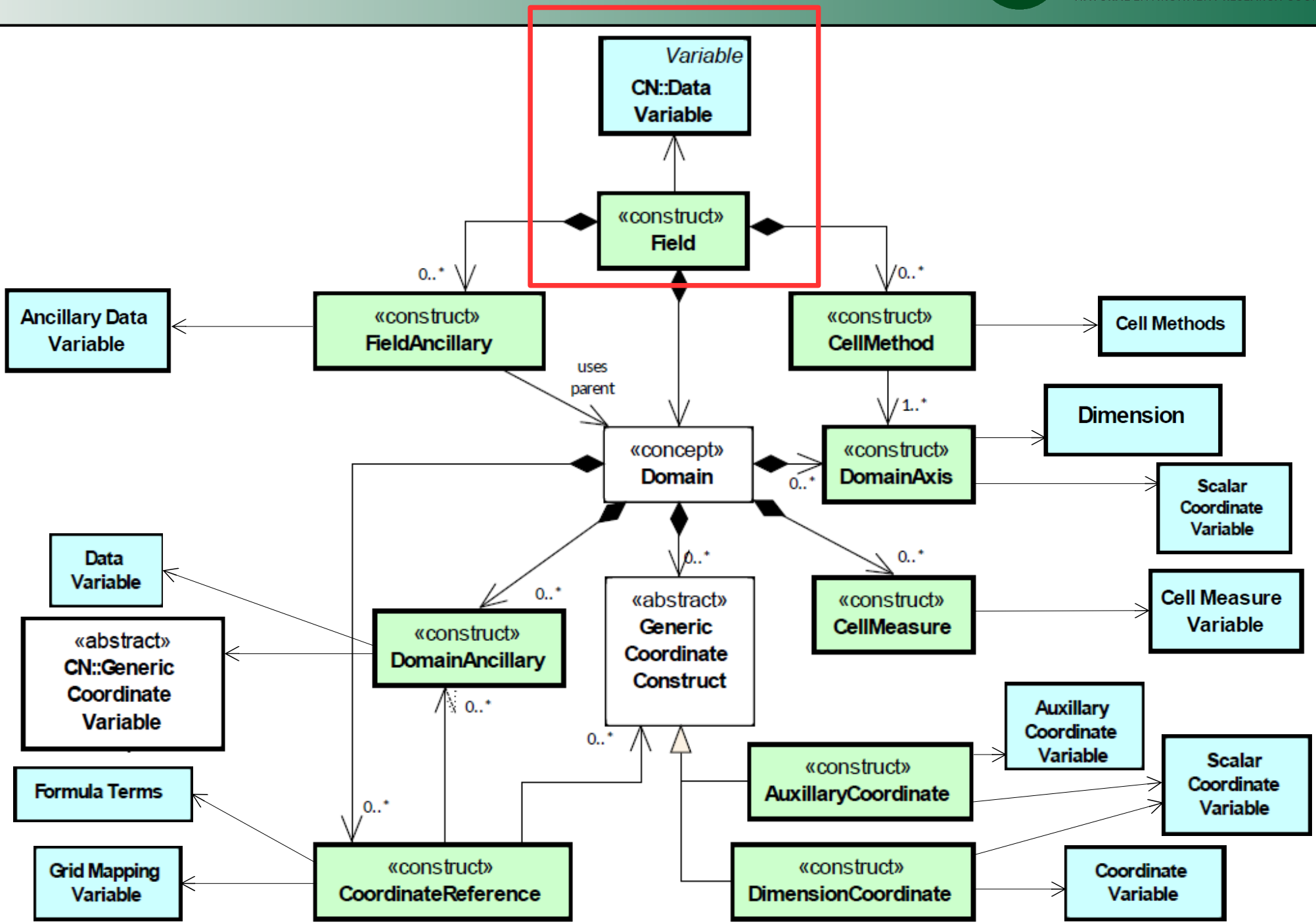

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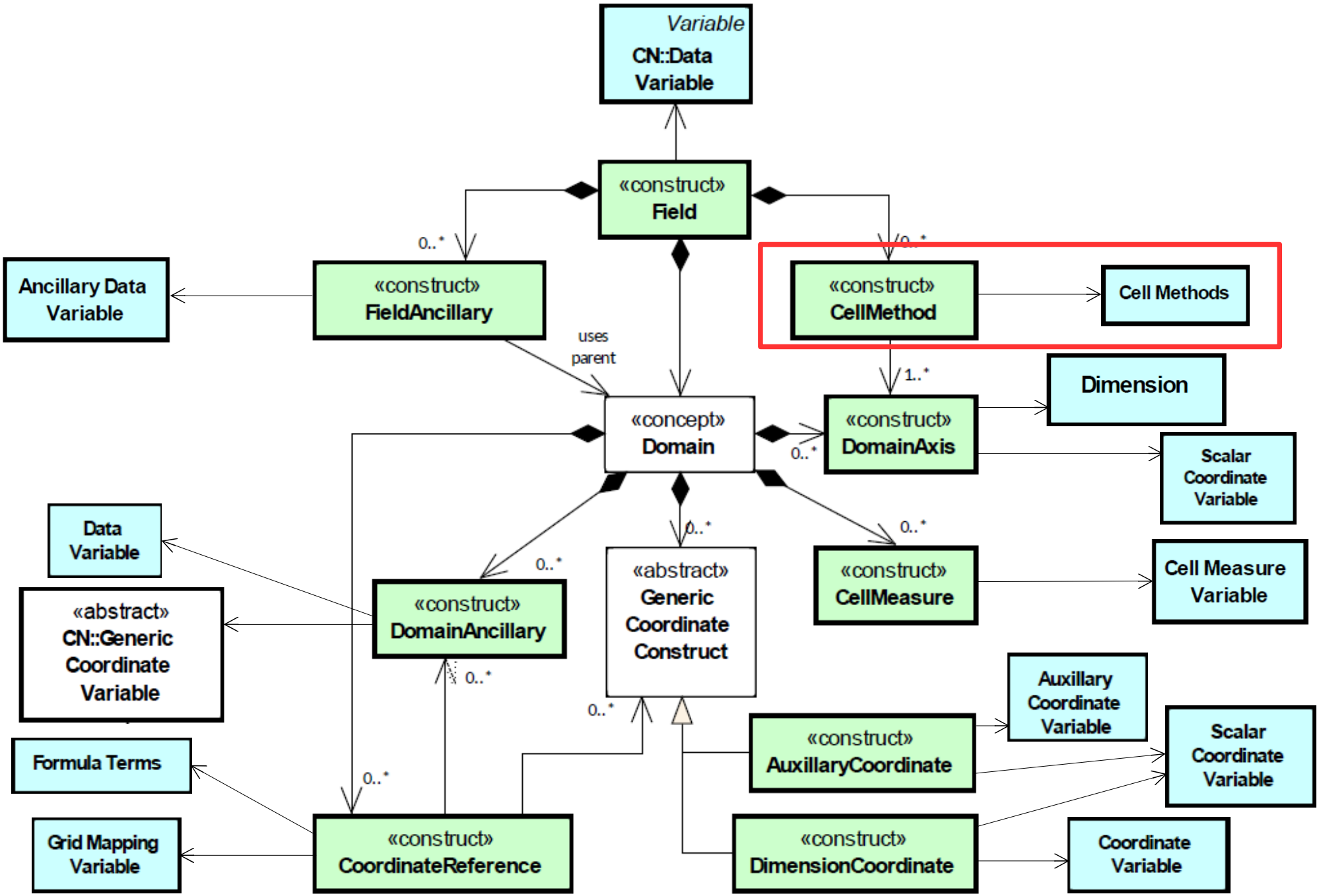

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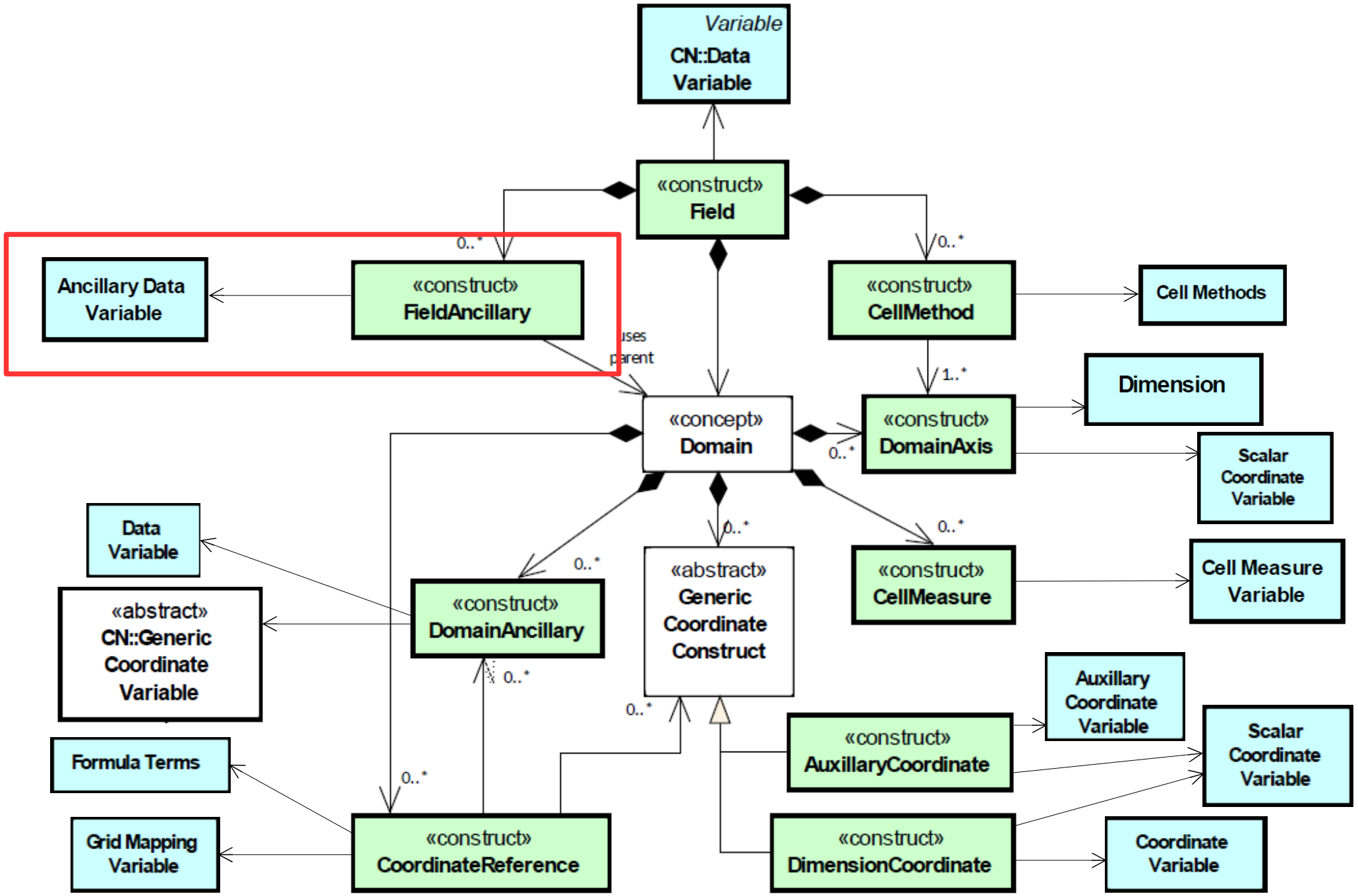

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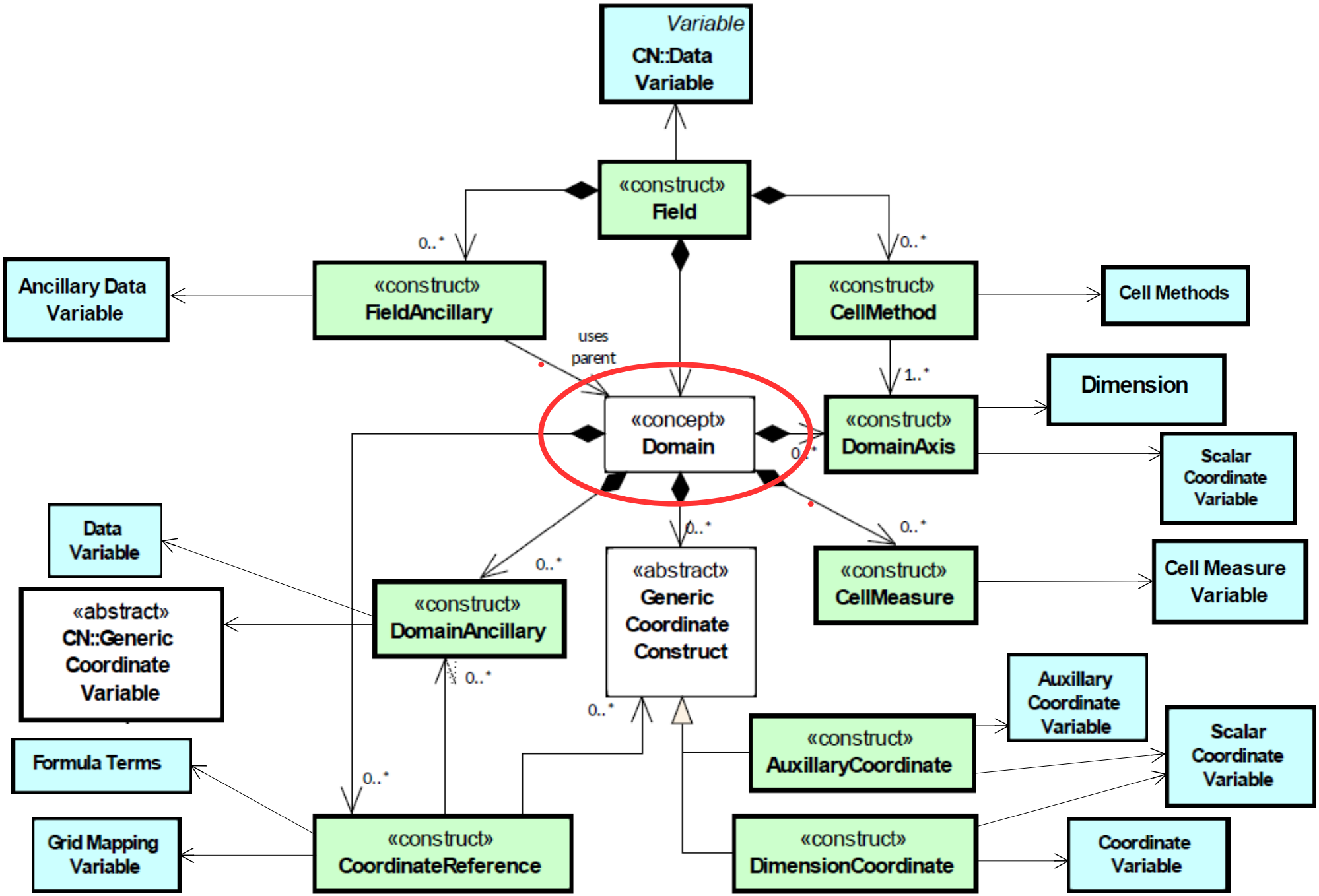

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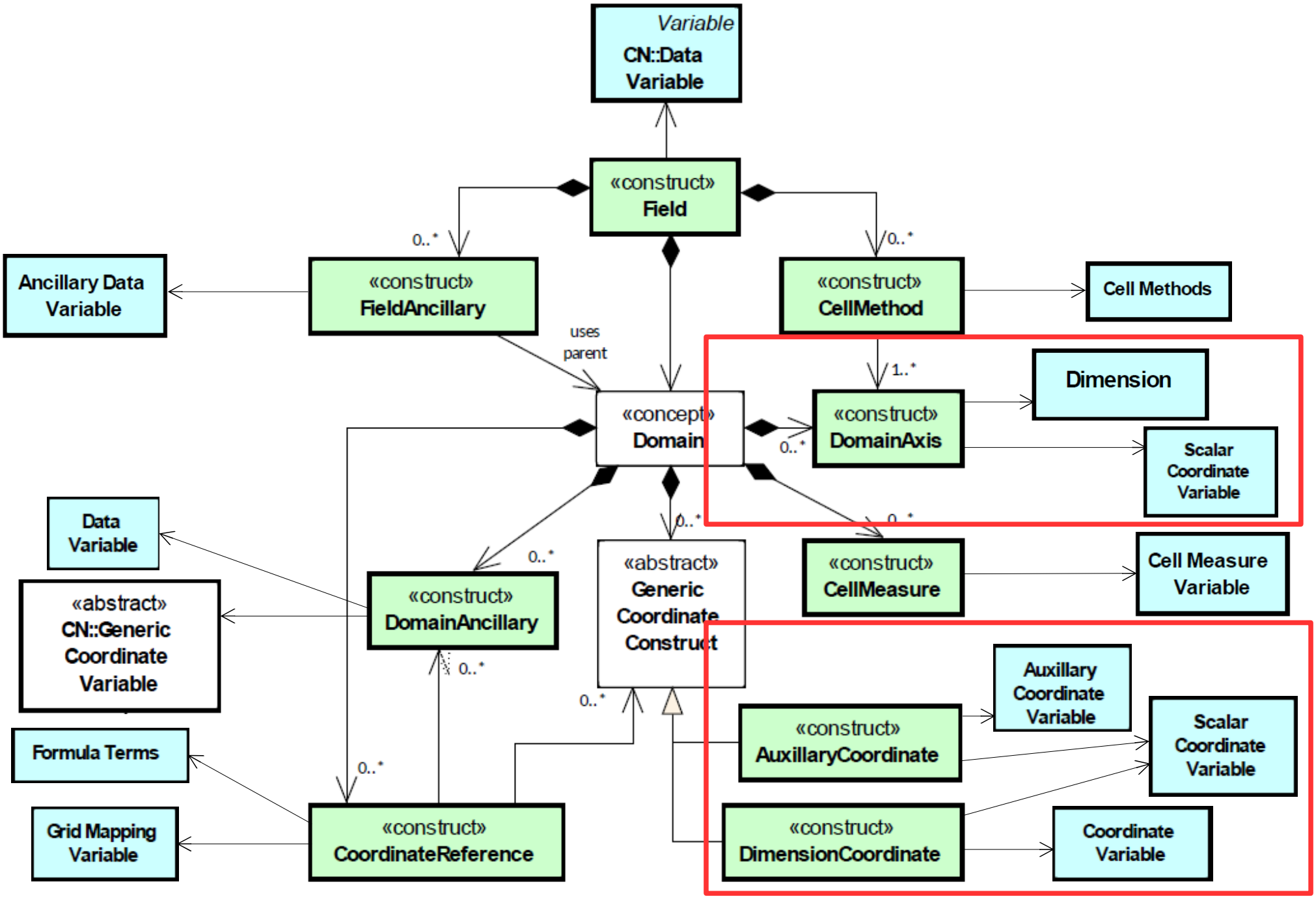

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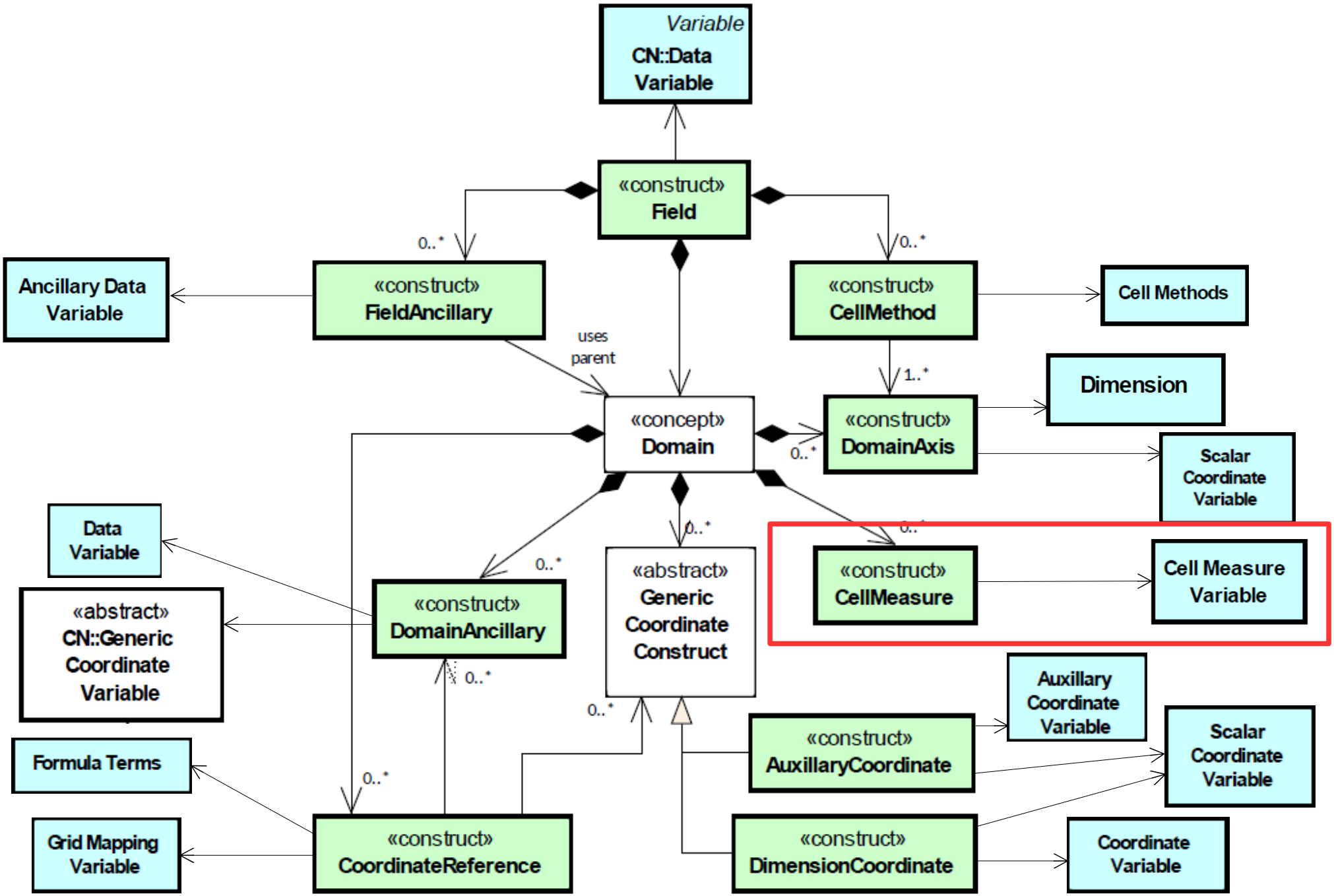

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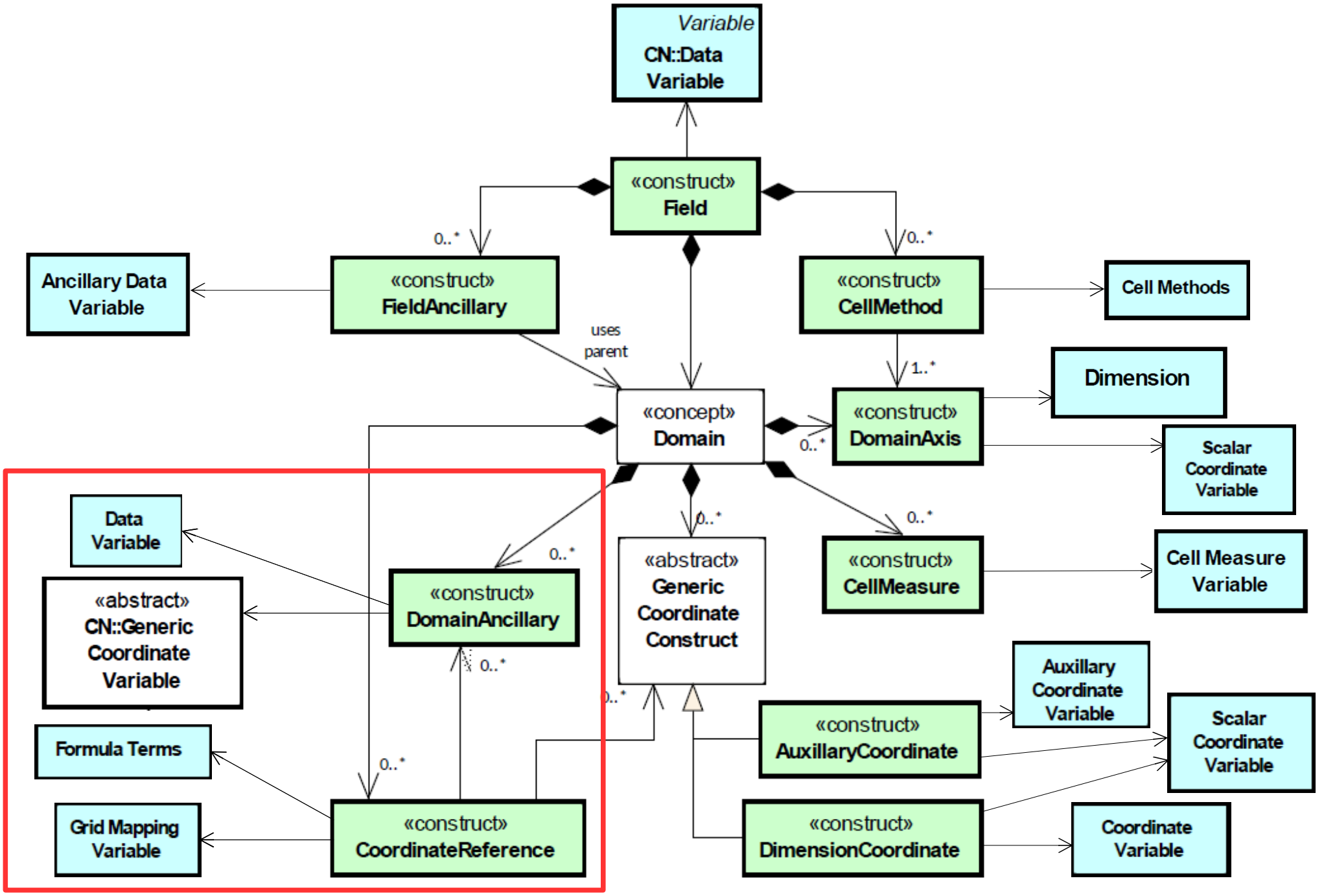

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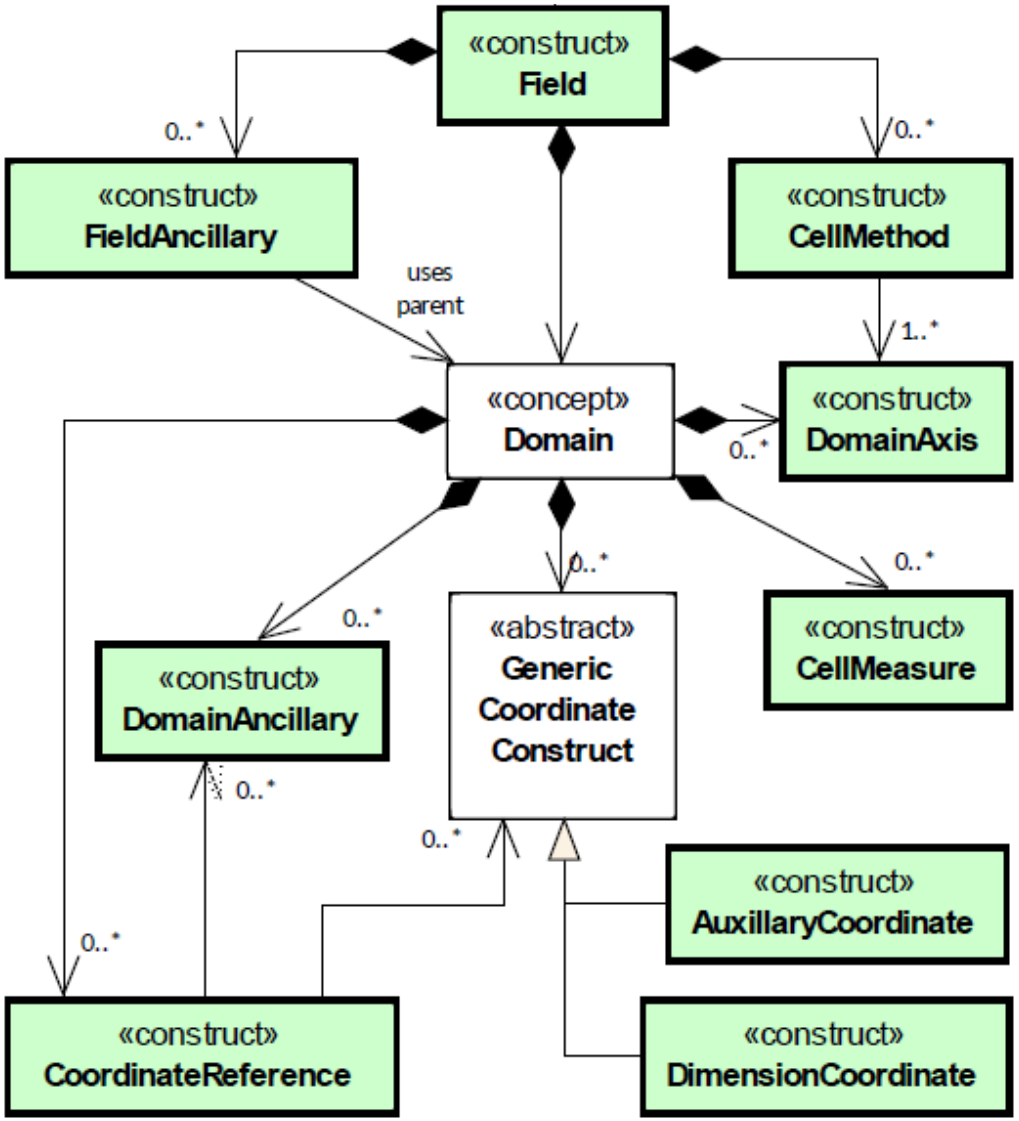

Making use of a CF data model

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- The CF data model can be used to ensure that an enhancement to CF fits in logically, as well as practically
  - The CF data model can guide the evolution of complicated enhancements
- Using the CF data model for software's internal data storage ought to encourage CF-compliance
- A reference implementation for Python:
  - https://pypi.org/project/cfdm
- Field construct aggregation rules
  - https://ncas-cms.github.io/cf-python/aggregation_rules.html

The future

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- It has been agreed that the CF data model shall become a formal part of the CF conventions
- This means that it will always be kept up to date with the latest version
- How to best represent it in the conventions document is currently a CF issue
  - https://github.com/cf-convention/cf-conventions/issues/159