

Introduction to EBA and EIOPA Data Point Model





What is the EBA&EIOPA ISO 5116 - DPM?

The Data Point Modelling (DPM) is a data centric method for organising business terms and concepts in a hierarchical order. It is used to present data in various reporting scenarios which derive from the underlying legal requirements in a business-friendly and non-technical manner.

The DPM method provides a precise, complete, and unambiguous definition of terms and concepts that enables the definition of logical structures of information requirements (such as messages, tables, data sets or cubes) based on underlying business dictionaries that can be understood by both business and technical users.

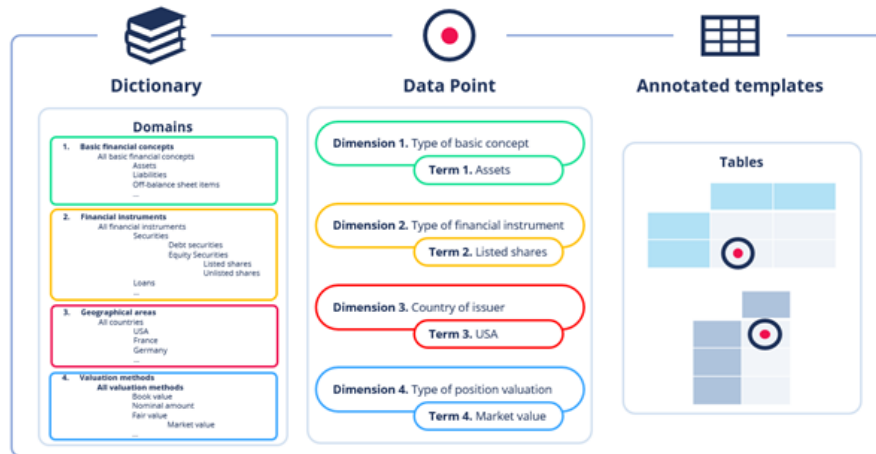


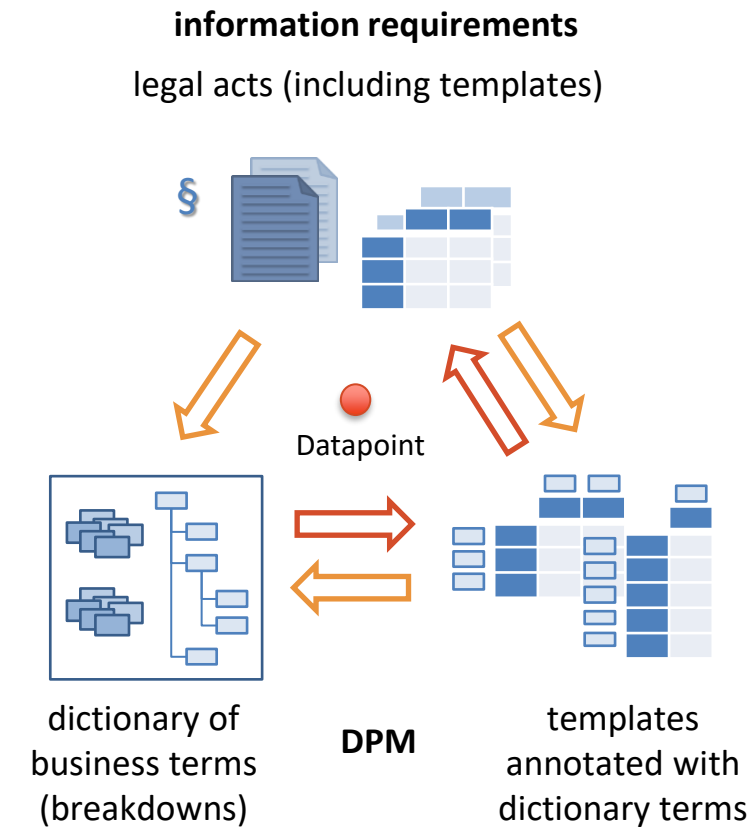
Figure 1: Decomposition of a business term (data point) with DPM method

A richer methodology

- Which includes several non ISO features: like templates convention codification, module and framework management, keys of open tables keys, a semiformal validation language, etc.
- Enables the supports the whole reporting chain, from data definition on regulatory processes until the data dissemination

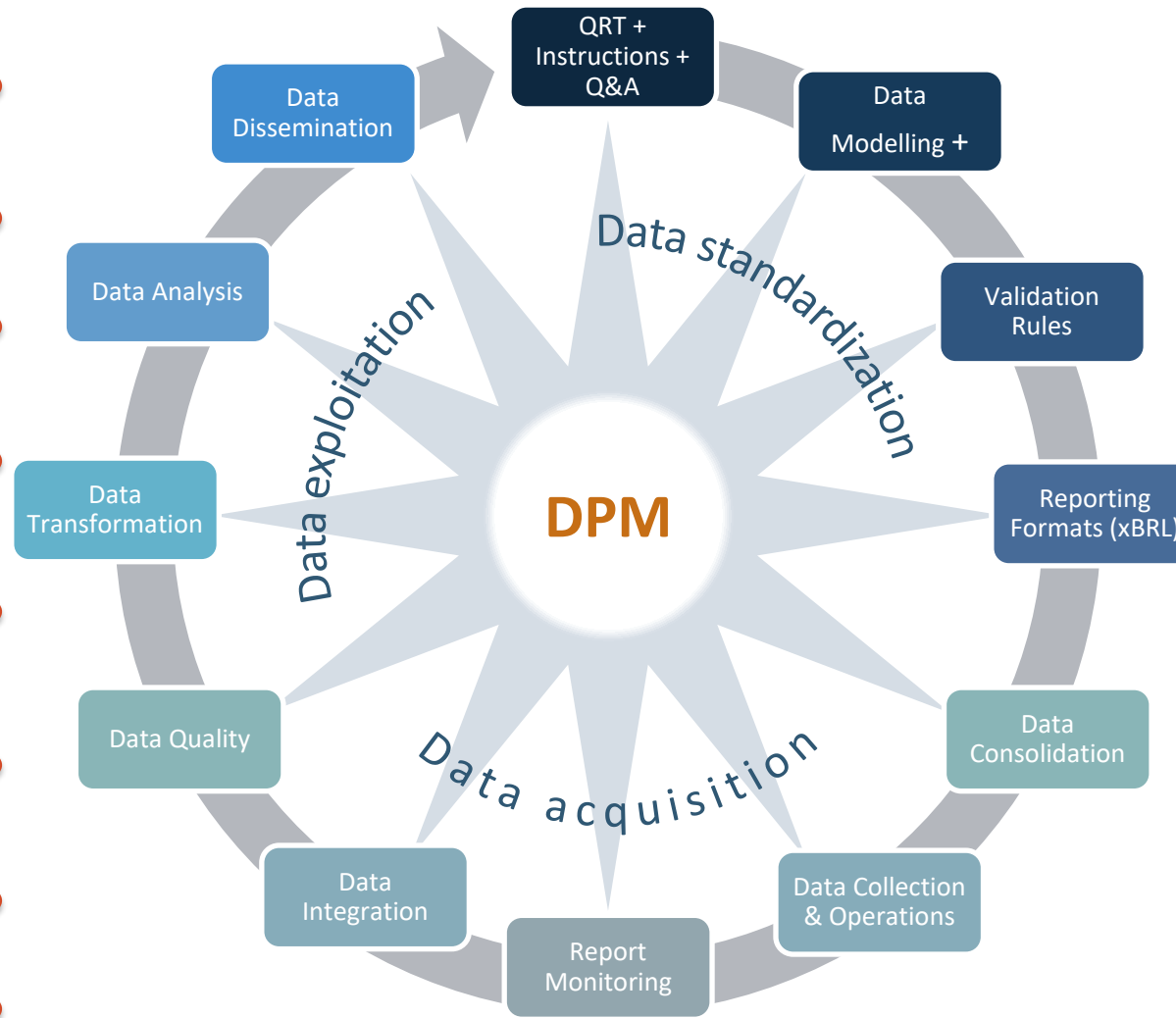
A bigger set of artefacts and tools

- Annotated templates
- Glossaries (dictionaries)
- Validations
- Database based representation
- Derivation of other products: xBRL taxonomies, log of changes



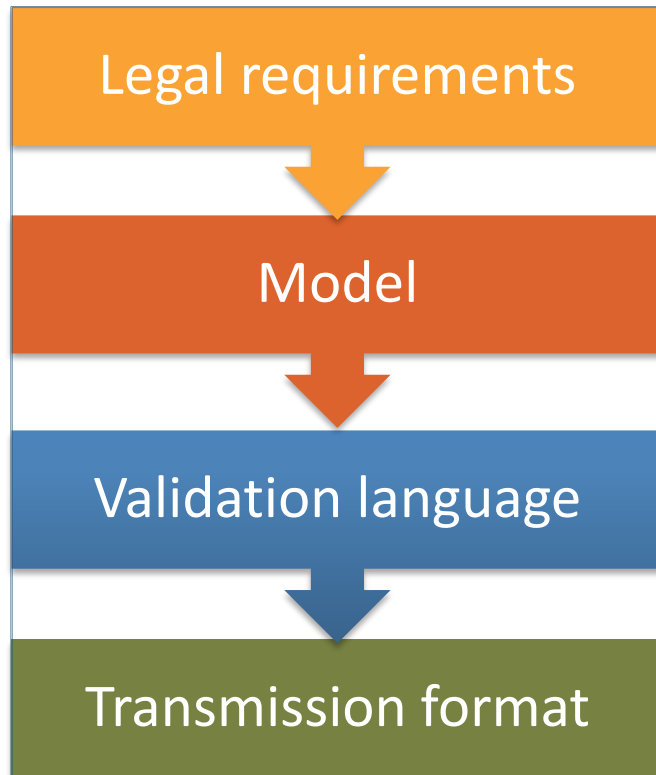
Why the DPM is so important for regulators

- Defining better regulation ●
- Basis of semantic layer for data analytics ●
- Integration with data catalogue ●
- Support data preparation ●
- Definition and management data access policies ●
- Definition and management of calculation and derivation rules ●
- Definition and management of plausibility checks ●
- Organisation of data storage model ●
- Integrity checks of incoming data ●

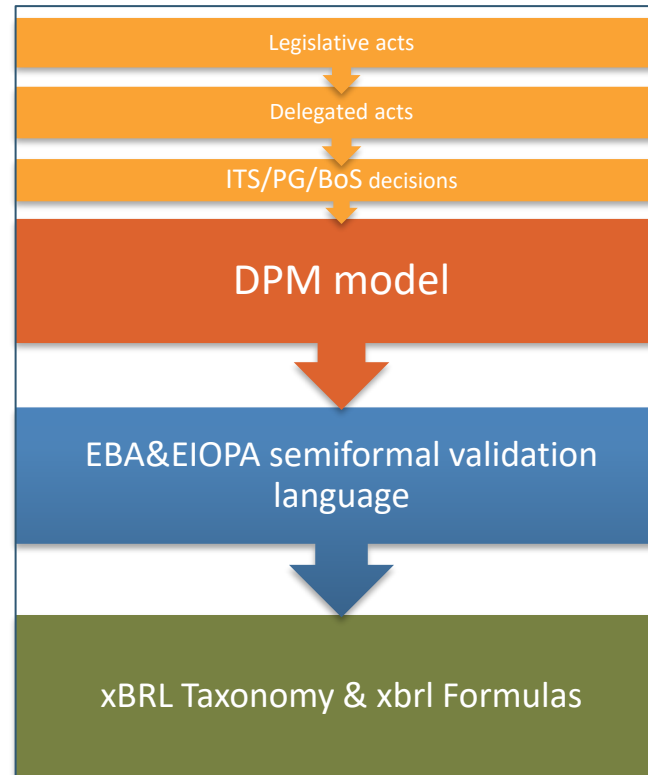


- Better understanding of regulation
- Definition and management of data requirements
- Definition and management of validation rules
- Basis for automatic generation of data exchange formats
- Reference for defining the report compliance rules
- Dynamic generation of data entry forms
- Definition of the reporting calendar
- Reference for checking report compliance
- Reuse/extension of existing templates across different reporting obligations

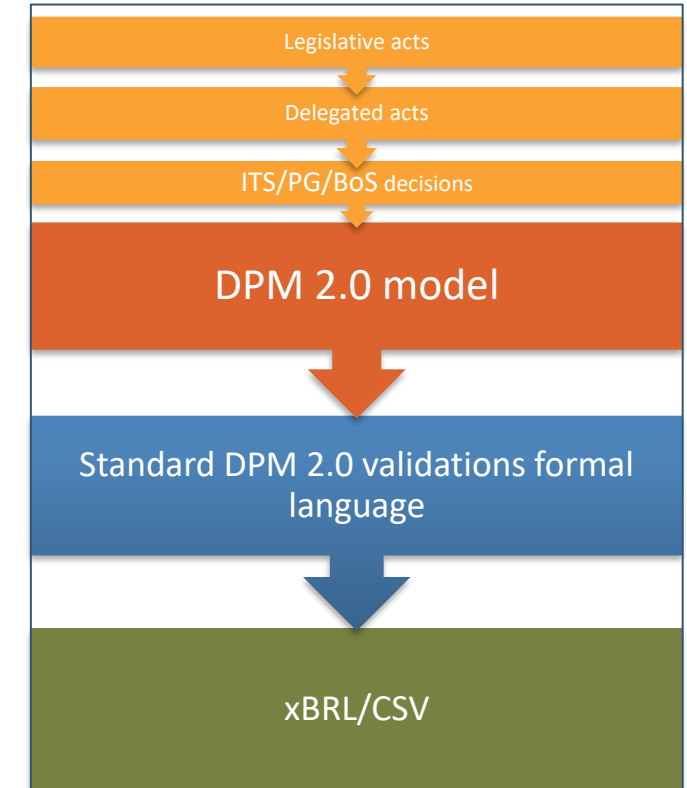
Conceptual



Current

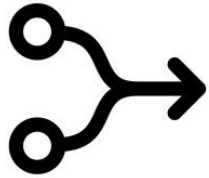


DPM 2.0 upgrades

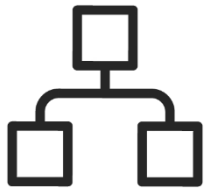


Data dictionary features

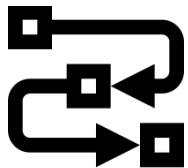
	XBRL	DPM
▪ Formal definition of data requirements	✓	✓
▪ Glossary of business terms	✓	✓
▪ Dimensional data definitions	✓	✓
▪ Templates rendering	✓	✓
▪ Explicit metamodel	✗	✓
▪ Invariant data point identifiers	✗	✓
▪ Historisation of concepts and relationships	✗	✓
▪ Metadata exploration with standard query languages	✗	✓
▪ Verifiable global model consistency	✗	✓
▪ Support frameworks integration	✗	✓



Total convergence of EBA and EIOPA methods, models, processes, and tools used for the development of data dictionaries and related regulatory products



Unified and versatile metamodel applicable to all regulatory data exchanges, from highly aggregated data points to very granular data sets of prudential, statistical or transactional information



Content extensible and interoperable for defining, reusing and exchanging metadata for regulatory data requirements



Enabling the possibility of subsequent **semantic integration** of data dictionaries across different regulatory domains



Agnostic

Not bound to a particular data exchange standard



Unified

Single metamodel supporting different types of data sets



Rendering

Enabling data visualisation in the template layout



Versatile

Compatible with different approaches for data requirements definition



Historisation

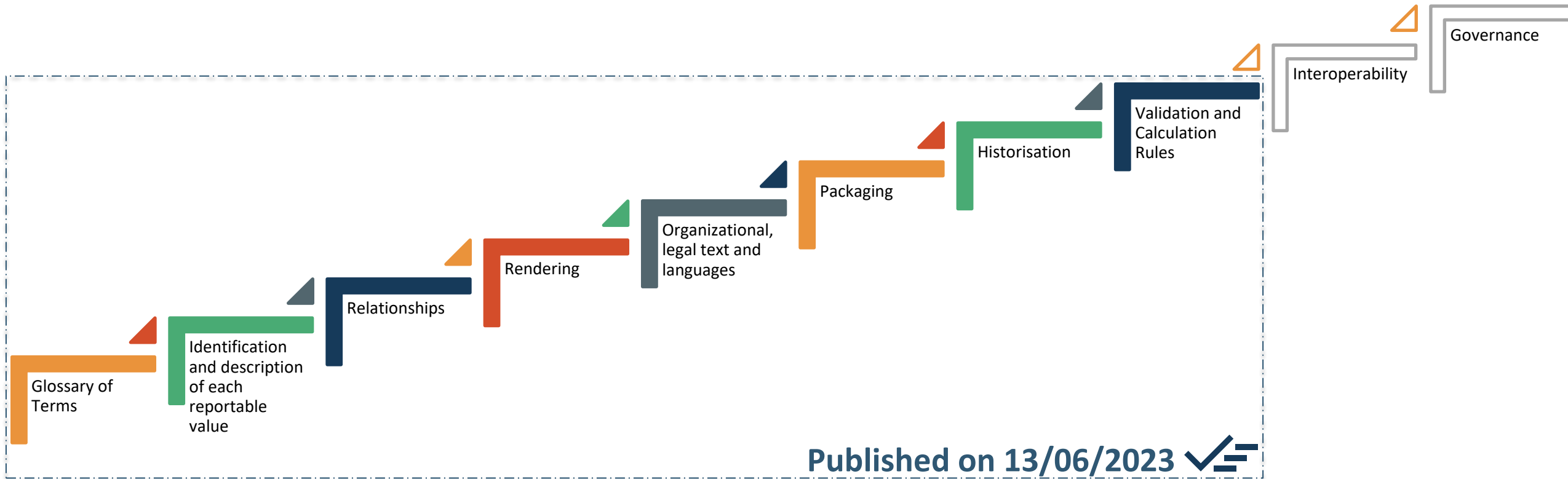
Keeping track of individual changes of data dictionary concepts across releases



Complete cycle

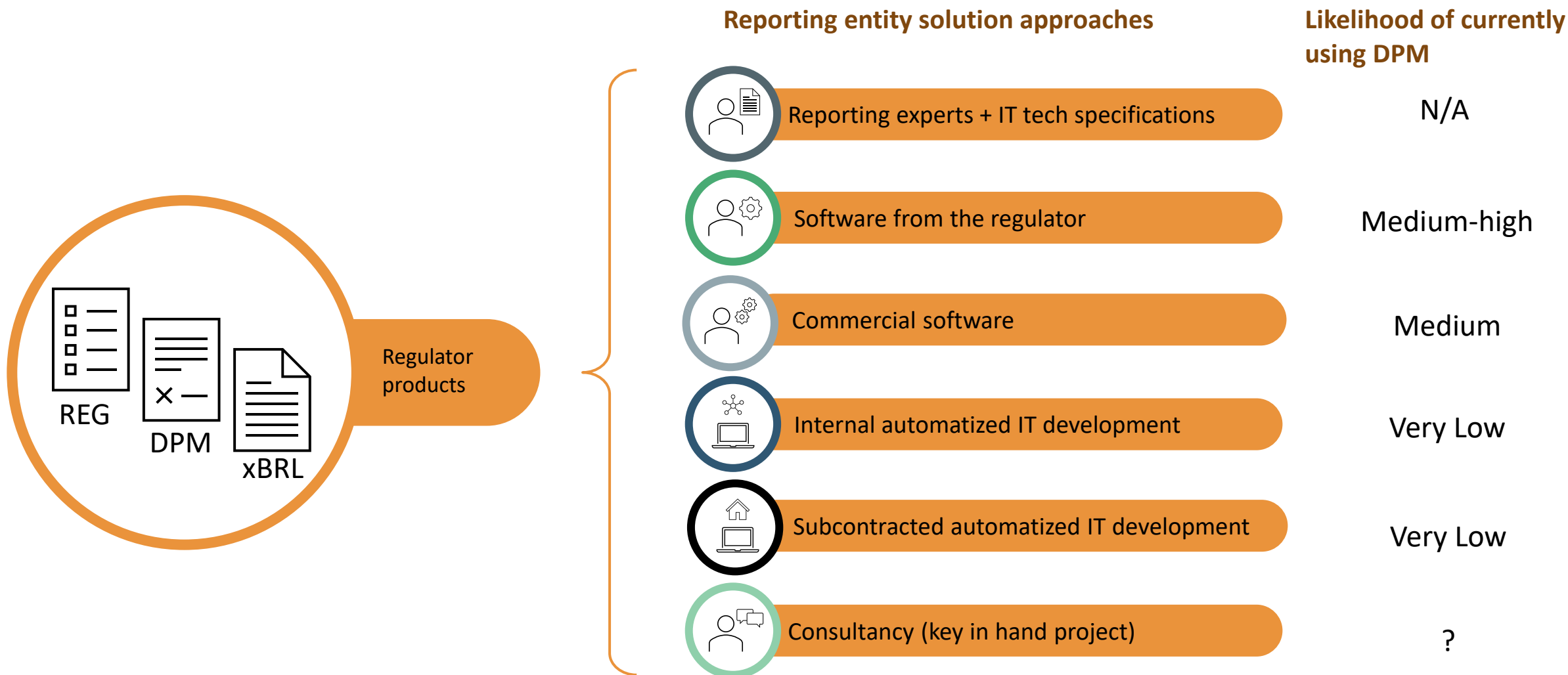
Supports the whole reporting lifecycle, from data definition to data exploration

The DPM Refit project building blocks



- ❖ Started on the fall of 2019 formed by a common team of EBA & EIOPA in cooperation with the ECB
- ❖ First draft package published, including technical documentation and a factsheet
- ❖ Some annexes and two building blocks still ahead to be developed: interoperability and governance

How much is used of DPM 1.0 on the reporting entities?



Qualities

Comprehensiveness



The DPM covers all data that Institutions are required to report to the Authorities for regulatory purposes.

Consistency



The DPM provides a consistent set of definitions for all data points, which helps to ensure that data is reported in a uniform manner.

Structure



The DPM is highly structured, with each data point being defined by multiple dimensions (semantic categorisation) and mapped to template coordinates (positional definition).

Flexibility



The DPM is designed to be flexible and adaptable, so that it can meet the needs of various use cases, supporting many different data collections

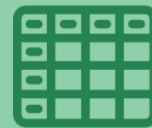
Building blocks

Business glossary



Metamodel entities that define and organise the business concepts (domains, dimensions, metrics, members, and hierarchies) that are used in the semantic categorisation of reporting data.

Report packaging



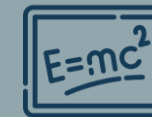
Metamodel entities used to represent the organisation of the reporting framework in modules (types of reports), template groups, and templates' structure.

Data points definition



Metamodel entities that hold the dimensional categorisation of table's axis (columns, rows, sheets) and of the resulting data points.

Validation rules



Metamodel entities used to describe the validation rules that apply to the report packages, and how they relate to the data points.

Capabilities

Support for different types of template structures

Good fit for the definition of data aggregates

Capable of representing granular data structures

Support for validation rules definition

Templates versioning

Full historization of data points

Shortcomings

Not able to represent table relationships

Lacking glossary historisation

No support for decomposition of complex members

Inheriting some of the XBRL limitations

No support for multiple ownership in cross-sectoral environment

Use cases

Supervisory data (CRR/CRD, Solvency)

Resolution data (BRRD)

Other regulatory data



DPM standard

Published on 13/06/2023



- ❑ Documentation of the **DPM 2.0 Refit metamodel**
- ❑ Documentation of the **validation and transformation language**
- ❑ **Supporting documentation** with presentations, diagrams and database models
- ❑ An updated EBA and EIOPA common **xBRL taxonomy architecture**

General metamodel



- The new metamodel is simpler, cleaner, and more fit for purpose.
- Names of model entities have been changed to avoid confusion with DPM 1.0 concepts.

Report packaging



- Fundamental redesign of this block, allowing for more flexibility and control of templates structure modelling.
- Modules versioning improved to facilitate understanding of changes in module composition.
- Templates versioning extended down to the level of individual headers and cells.

Business glossary



- Ability to define composite items by means of combination of several property-item pairs.
- Ability to group items of different categories in a more general Supercategory.
- Hierarchies redesigned as a particular case of Subcategory, which can also be used to define restrictions on allowed property values.
- Full historization of glossary concepts.

Data modelling



- New Variable concept extends from Data Point (fact variable) to key variable attribute variable .
- Categorisation (e.g. the metric property) applicable now to the whole template.
- Global variables (e.g. reporting period, entity, scope) can now be applied at module level.
- Ability to define table relationships via explicit primary and foreign keys, including generalisation/specialisation structures.

Operations



- Completely new model for validation rules and calculations that can be executed by machines.
- Ability to model rules as AST making it applicable to most data transformations.
- Operations metadata content populated automatically from the business validation expressions represented in the new DPM-XL syntax.

Other



- Generalisation of metamodel entities enabling extensible linkages of concepts, multi-language translations, mapping to legal references, and more.
- Ability to define ownership of individual elements of metadata.
- Detailed historisation of individual metadata records through DPM releases.

+ Capabilities

Supporting different types of data at any level of granularity

Supporting different data modelling approaches, including dimensional and relational models

Comprehensive versioning applied to individual concepts across the whole metamodel

Representation of complex relationships of data glossary elements

Supporting the definition of calculation expressions for data derivation

Powerful machine readable/executable operations metamodel

+ Use cases

Statistical data

Operational data

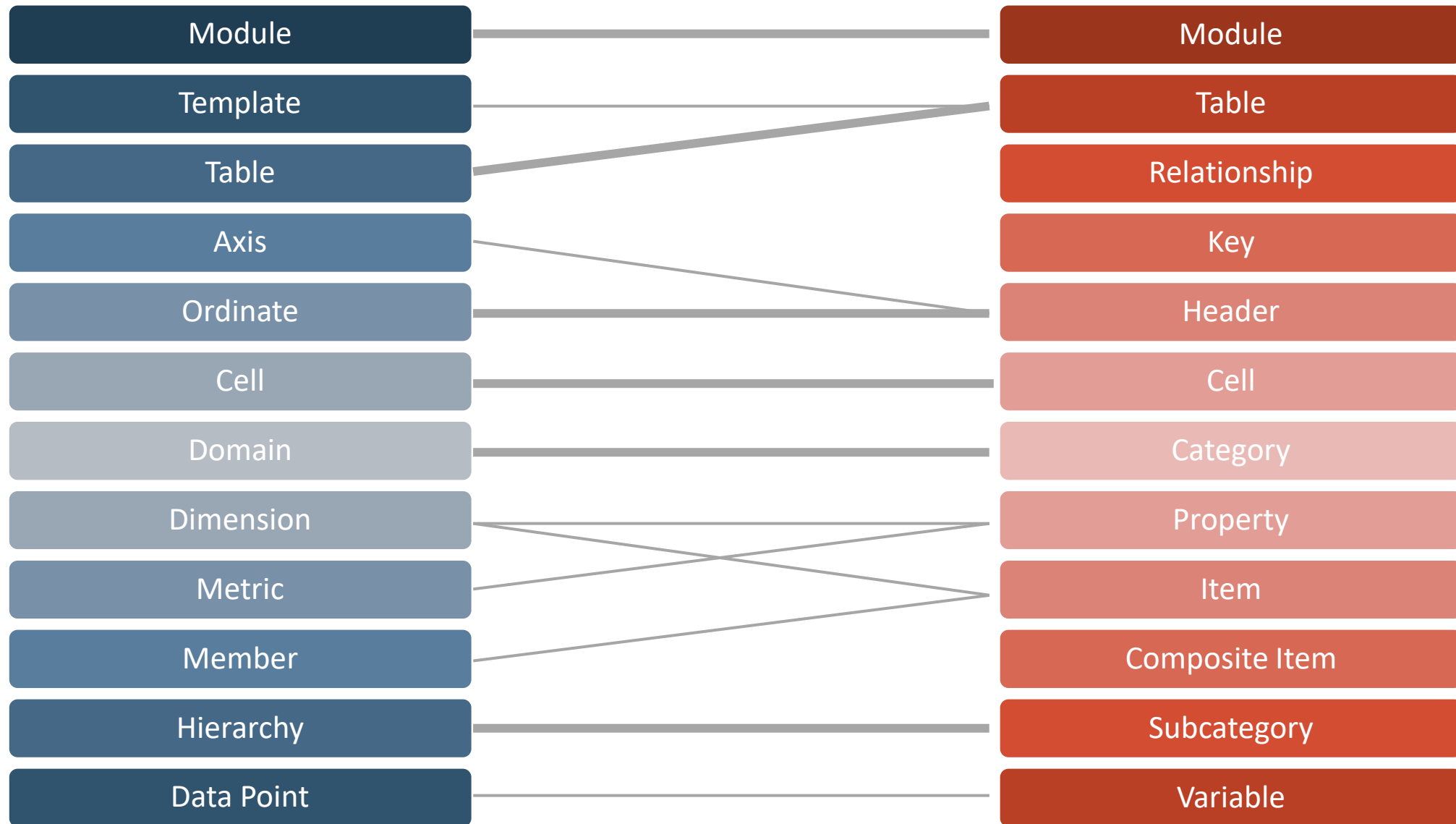
Master data

Registers

Notifications and incidents

...

Mapping 1.0 and 2.0 concepts



The current business rules language

has evolved over the years, but without a formal basis and proper documentation.

Main issues with the not fully formal language are:

- Difficult automation of translations to other languages (e.g. XBRL Formula).
- Differences in usage further complicate automation and common understanding.
- Extension of the language is difficult when there is no solid foundation (e.g. inconsistent operators).

The new expression language (DPM-XL)

is still based on the current language but uses an improved syntax for expressing operations.

Being a fully formal language, it now allows:

- Syntactical and semantical analysis to check correctness.
- Fully automated translations to other languages (e.g., XBRL Formula, VTL, SQL...).
- Building interpreters able to execute the rules as written.

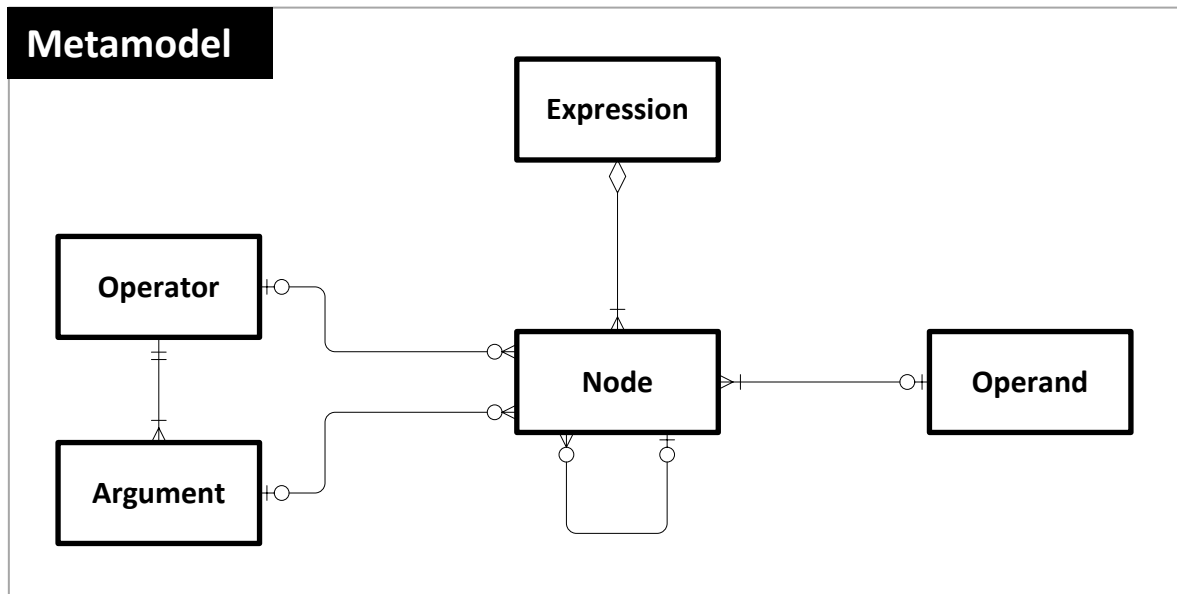
Validation rule		v0175_m
Scope	Table	C 01.00
	Column	0010
If value missing		treat as zero/empty string
Arithmetic approach		Interval
Formula		{r0130} = {r0140} + {r0150}
New DPM-XL expression		with {tC_01.00,c0010, default:0, interval:true}: {r0130} = {r0140} + {r0150}

Validation rule		v0415_m
Formula		{C 09.02, r0010, c0010, [CEG=eba_GA:x1]} = sum({C 08.01.a, r0010, c0020, (s0003-0004)})
New DPM-XL expression		{tC_09.02, r0010, c0010} [where CEG = [eba_GA:x1]] = sum({tC_08.01.a, r0010, c0020, s0003-0004})

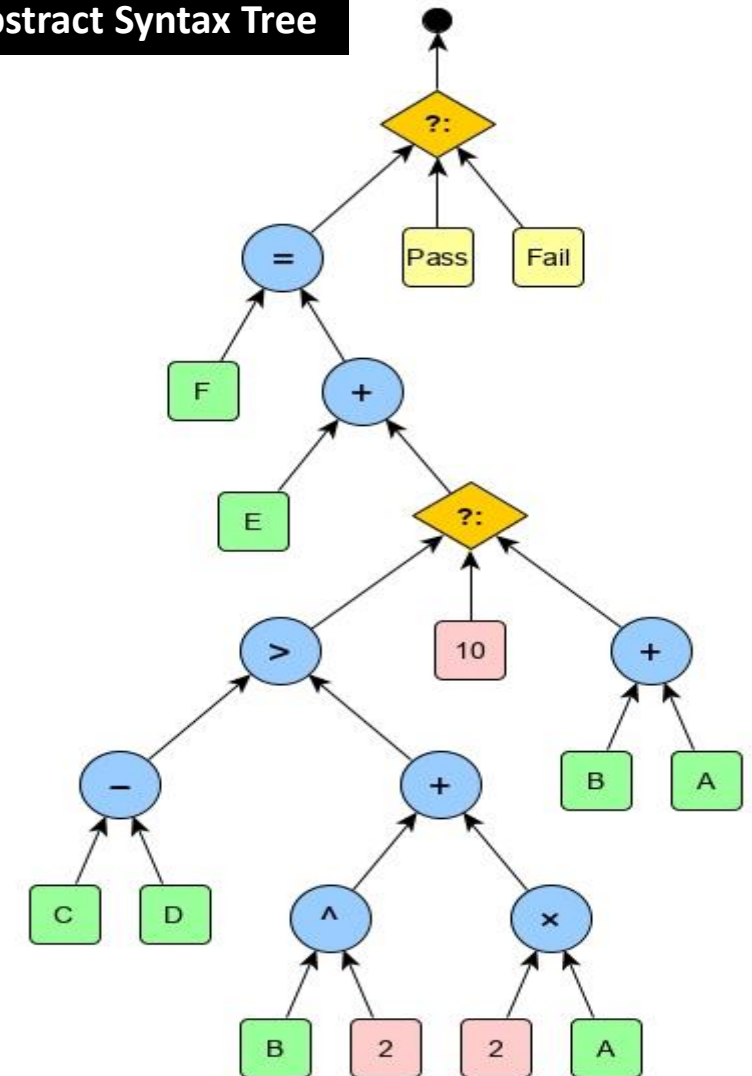
Logical expression

$F = E + \text{IF}((C-D) > (B^2 + 2A), 10, B+A)$

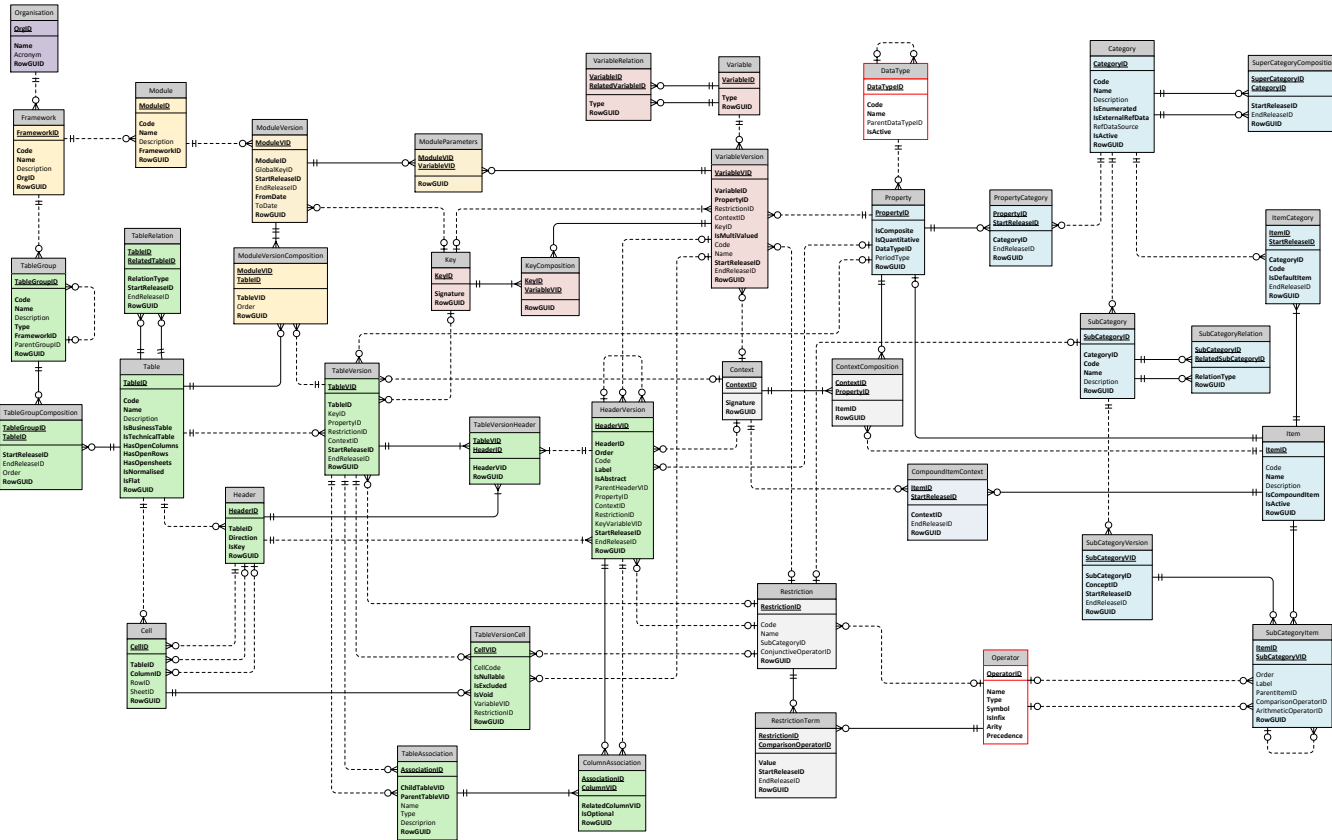
Metamodel



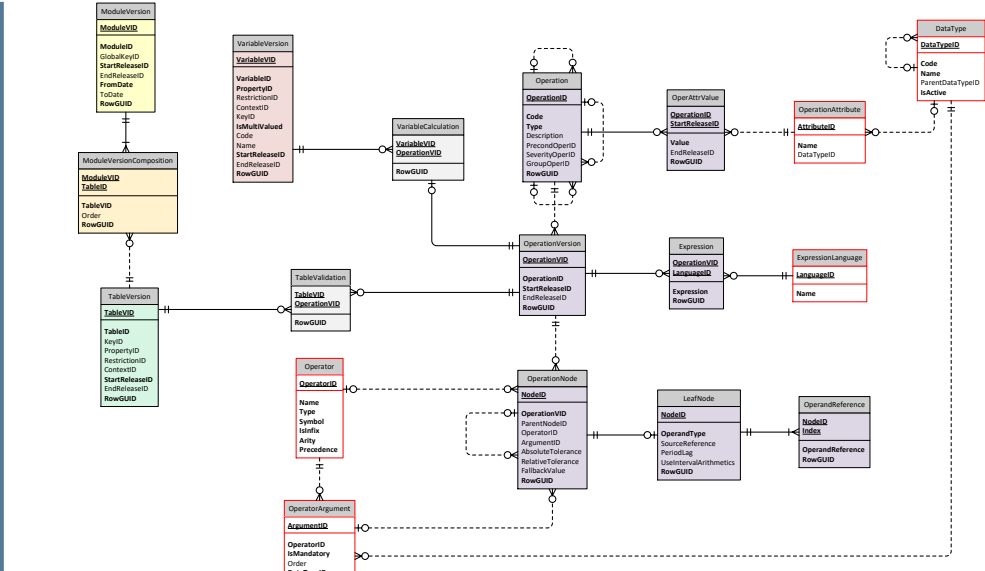
Abstract Syntax Tree



DPM 2.0 metamodel

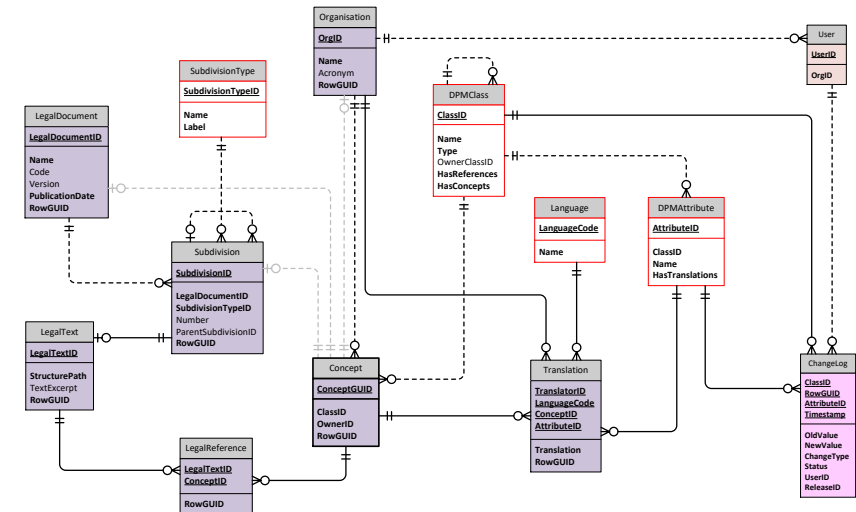


Packaging . Templates . Glossary . Variables definition



Validations . Transformations

Ownership . Legal references . Translations . Auditing



DPM use across the reporting lifecycle

The DPM provides the definition of the reporting requirements

The DPM can be used in the automation of data aggregation

The DPM can be used to generate instances in the required reporting format

The DPM is used by the data validation engine that checks the accuracy of reported data

The DPM is used by the data calculation engine that produces indicators and new data points from the reported data

The DPM provides the semantic layer that enables the exploration of analytic models



The DPM is the data dictionary that supports the data definition process

The DPM is used in the technical validation and integration of report instances

The DPM provides the necessary metadata that gives meaning to all the fact data stored in the data warehouse

The DPM is used in the automated preparation of subject-oriented data marts

The DPM is the source of metadata used in reports, dashboards, and APIs

DPM studio

- What** • Tool for defining data requirements and to create data dictionary releases
- Who** • Regulators and competent authorities
- When** • MVP to be delivered by end of 2023, development to continue in 2024

DPM explorer

- What** • Tool for navigating the data dictionary and to understand the data requirements
- Who** • Regulators, competent authorities, and reporting entities
- When** • Planned for 2024

Thank you!