rmAgro/drmAgro/drmCrop

Standardisation of electronic data exchange and architecture

Live webinar on Wednesday 15 February

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Daan Goense

- Retired from Wageningen University & Research (WUR)
- Hired by WUR for the Farm Digital Project of AgroConnect
- Member of the the Ad Hoc Arbeitsgruppe Bus Schitstelle, LBS, 1987- 1993)
- Member of ISO/TC23/SC19/WG1 & WG5 (1993 - ……)
- Research in Farm Machinery Management, Precision Agriculture and ICT in Agriculture.

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What triggered rmAgro?

- Changes in technologies over time. (ADIS, EDIFACT, XML, JSON, API)
  - ➔ Domain reference model should be independent from implementations.
- Recent additional scope's.
  - Precision Agriculture, Tracking and tracing, Guidance, etc.

- **➔ One common basis that defines the <u>whole</u> Agricultural Production Domain.**
  - First focus on crop production

Why one model for whole Agriculture

- Different branches of agriculture share objects.
  - Organisations, people, etc.
- There is a significant percentage of mixed farms.

- Branches in rmAgro
  - Crop production
  - Greenhouse production,
  - Animal husbandry
  - Aqua culture

rmAgro; a model suite

- Business Process Model (**BPMN**), mainly for FIspace
- **Use case** model, mainly for ISO/TC23/SC19WG5
- Domain Reference Model (**drmAgro**)
- Dynamic view (**sequence diagrams** for FIspace)
- ***DDL model*** *(transformed from drmAgro)*
- External models (ISO19107, Fertilizer, Crop Protection)
- External XSD's (ISO11783, GML)
- Mapping (drmAgro/drmCrop to other models)
- **Java Model** (interface model *& implementation model* transformed from drmAgro)
- **WSDL** (defines messages for FISpace)
- **XSD model** (transformed from drmAgro)

Modelling conventions for the domain model

- It is a **platform independent** model !

- No id's or keys, except for a Global Unique IDentifier (GUID) as an attribute.
- No foreign keys.
- Limited set of generic datatypes (*no language specific datatypes*)
- Many to many relations stay as they are, no association class (*except when it has attributes*)

Some starting points

- Use existing standards when appropriate
  - **ISO191xx** and **GML** for geometry
  - **SensorML** for sensor data

Structure of the domain model (1)

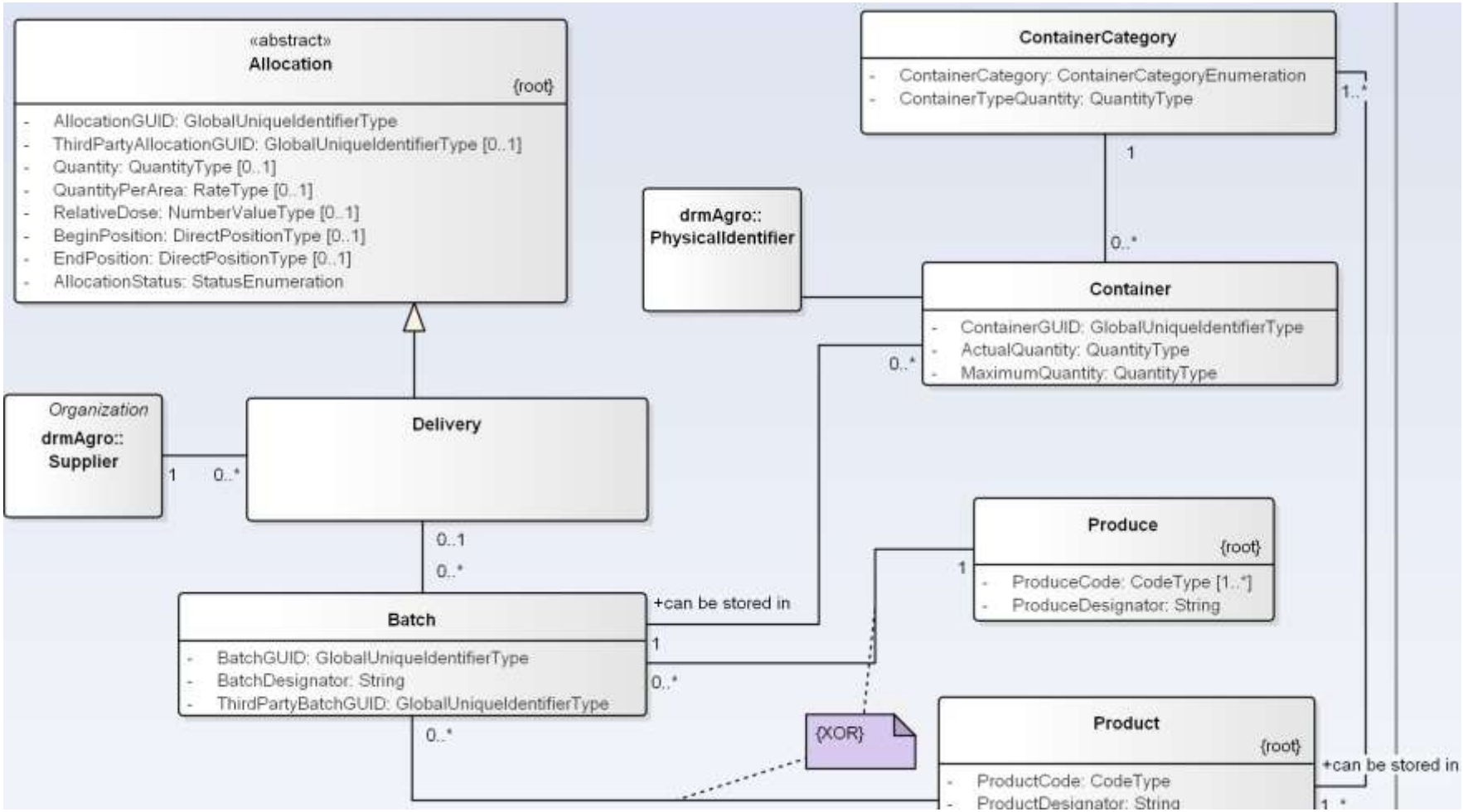
- drmAgro
  - DataTypes
  - Enumerations
  - Geometries (→ GML or → ISO19107)
  - SWE types (DataArrayType)
  - XSD types (token, ncName, anyURI)

Structure of the domain model (2)

- drmAgro
  - *All common classes* (i.e. Party, Organization, .)
  - ……
  - ……
  - drmCrop
  - drmAnimal
  - drmGreenHouse
  - drmInfrastructure (yards, trees, roads, etc)
  - drmPostharvest

Diagrams for different scopes of the model

Example for Batch



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All classes have definitions, evt. remarks and examples

Scopes covered by drmAgro

- Parties
  - Party, Organization, Person, Department, Farm, etc.
- Fields
  - Plot, Field, CropField, GreenhouseFloor, ActivityField, KadastralField
- Activities on the farm
  - Job, Task, Operation
- Data processing
  - DataSet, DataAggregation, Algorithm, DataProcess

Scopes covered by drmAgro (2)

- Handling of products and produce
  - ProductAllocation, Product, Batch, TreatmentZone
- Sampling and analyses
  - Sample, Analyses, PropertyValue, Laboratory, Container, VerticalLayer
- CropRecording
  - CropProductionUnit, CropField, Operation, AbsoluteTiming, CulturalPractise, OperationTechnique, ProductAllocation, TreatmentZone, Batch, etc.

Scopes covered by drmAgro (3)

- Farm machinery
  - Equipment, Implement, Tractor, ManMachineSystem
- Ordering
  - Order, OrderItem, Delivery, Invoice, Customer, Supplier
- Product composition
  - Product, ProductAllocation, Batch, ProductElement

Relevant Packages

- drmAgro/drmCrop
  - Allocation***
  - Auditing & Certification
  - Crop & CropRecording
  - Operation***
  - ProductApplicationOnCrops
  - PropertyValue
  - Site
  - Zone
- drmAgro/drmGreenhouse
  - Greenhouse

Availability of the model

- rmAgro snapshot: **ftp://pragmaas.com/rmCrop/rmAgro_SNAPSHOT**

- Enterprise Architect model: **rmAgro.eap**
- Description of background: **rmAgroGuideline.docx**