rmAgro/drmAgro/drmCrop

Standardisation of electronic data exchange and architecture

Live webinar on Wednesday 15 February

Daan Goense. ( daan@pragmaas.com )
Daan Goense

- Retired from Wageningen University & Research (WUR)
- Hired by WUR for the Farm Digital Project of AgroConnect
- Member of 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.
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 whole 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
All classes have definitions, evt. remarks and examples

**Definition.**

*CropField* describes the continuous surface of land which is used during a period of time by a certain *CropProductionUnit*.

**Remark.**

The surface of the *CropField* is always within the borders of a Field.

As a *CropProductionUnit* applies to only one *CropType*, a *CropField* is grown by one *CropType*.

It is the farmer who decides when to split up to different *CropFields*. That can be a different *Variety*, a different purpose for which the crop is grown, a different class in seed production, the need to keep it separate for tracking and tracing purposes etc.
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