PODD Ontology Driven Database

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Background

- PODD was designed by Yuan-Fang Li and Gavin Kennedy
- Implemented between 2009 and 2011

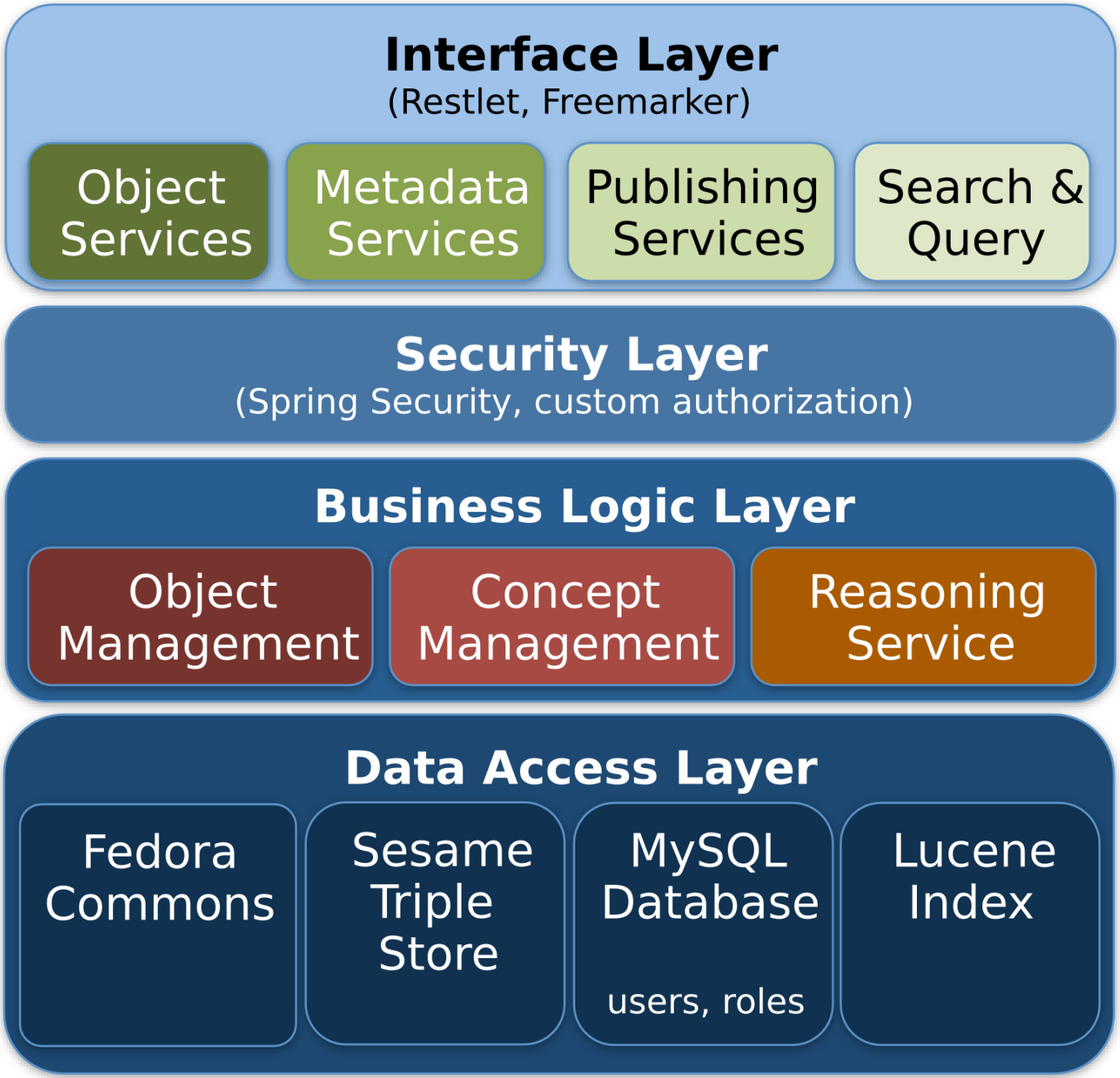
Motivation

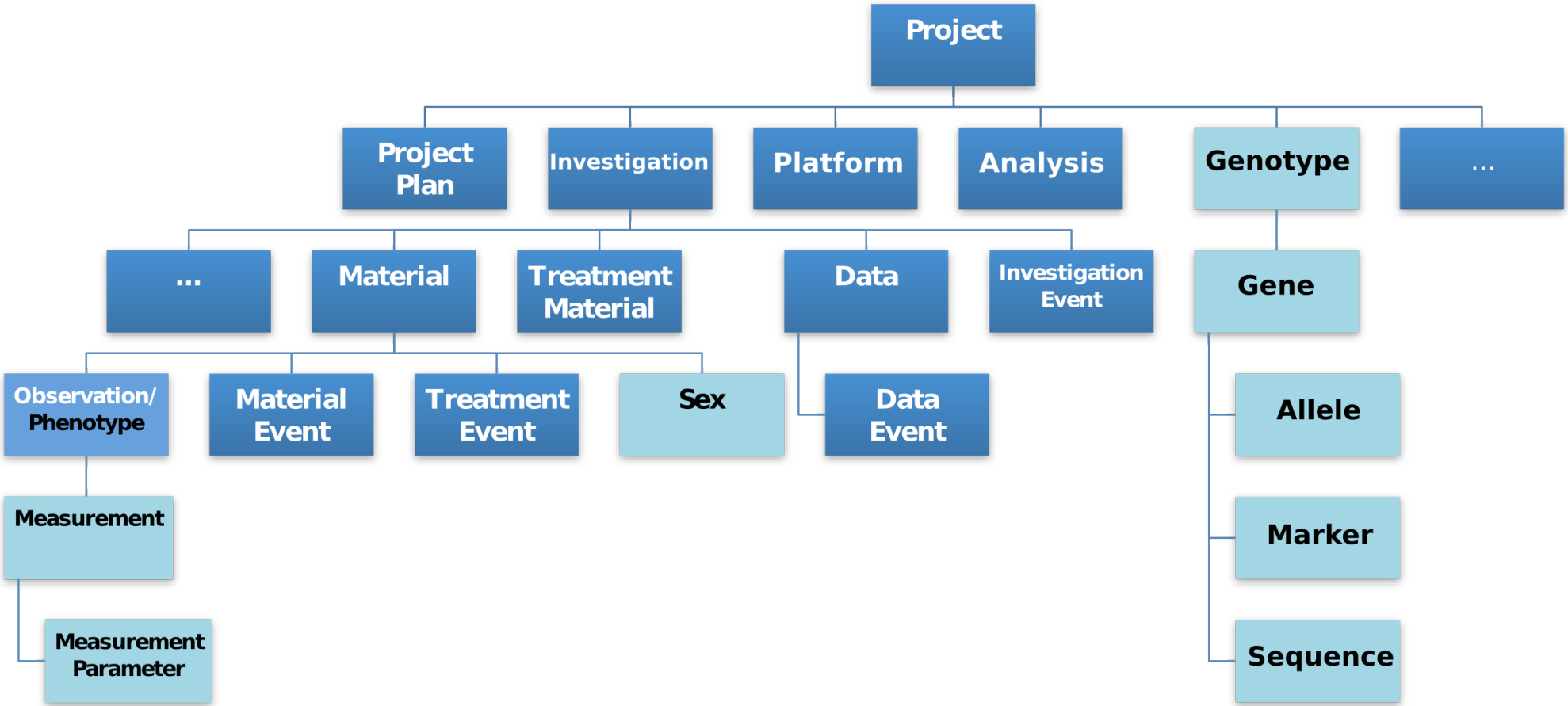
- Flexible scientific experiment management
- Use RDF and OWL technology to support science

Example

Simultaneous Phenotyping of Drought Stress Tolerance in Arabidopsis OST1-2 Mutant and Wild Type

Credit to Xueqin Wang for the example design : `http://podd.plantphenomics.org.au/podd/object/poddObject:838`


Interface Layer
(Restlet, Freemarker)
Object Services
Metadata Services
Publishing Services
Search & Query
Security Layer
(Spring Security, custom authorization)
Business Logic Layer
Object Management
Concept Management
Reasoning Service
Data Access Layer
Fedora Commons
Sesame Triple Store
MySQL Database
users, roles
Lucene Index


Project
Project Plan
Investigation
Platform
Analysis
Genotype
...
...
Material
Treatment Material
Data
Investigation Event
Gene
Observation/ Phenotype
Material Event
Treatment Event
Sex
Data Event
Allele
Measurement
Marker
Measurement Parameter
Sequence

Demo

http://podd.plantphenomics.org.au/podd

Evaluation

Pros:

1. Flexible : Simultaneously supports different experiments
2. Adaptable : Supports additions and changes to schema ontologies

Cons:

1. Current implementation does not scale with experiment size
2. Only supports OWL-1.1
3. Uses old versions of Fedora and Spring

Redesign

- Use upcoming SPARQL 1.1 Query and Update standards
- Support OWL-2
- Pure SPARQL access using a single database, including for management information to enable unified queries
- Support links between objects in PODD

Questions

Open source code can be found online at:
`https://github.com/podd`

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