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YOUR WORLD SMARTER

LADM

A blueprint for enterprise level land administration systems
Séamus Gilroy, Country Manager, Ireland

Our vision……

The number 1 choice

for spatial big data management.

Enabling the capture, maintenance and integration of multi-petabyte spatial databases.

We share with Oracle a vision of delivery innovative spatial solutions built on an enterprise architecture.

Our History

- **Founded in 1969**
- **Headquarters in Cambridge, UK**
- **International offices in Australia & Ireland**
- **Recently acquired the STAR-APIC group with offices in France and Belgium.**

Our Business

A specialist solutions and services provider to data providers, government and utilities

Our track record in spatial data standards…..

- 1Spatial is a Technical Member of OGC and has been involved in a number of key projects.
  - Contributor to original WMS and WFS specifications
  - Dr Paul Watson (1Spatial CTO): Contributor to the GML specifications (topology in GML 3.0 and WG for GML 3.2.1).
  - Founder and Chair or Co-Chair of the OGC Data Quality Working Group

- Oracle has extensive involvement in both OGC and ISO and supports these standards in many products reflecting the importance of standards compliance to the company.
  - OGC Founding Members and active on Board of Directors
  - WG Chair (Simple Features SWG, GeoSPARQL SWG, Geometry DWG, ...)
  - John Herring is involved in OGC and is chair of ISO TC211 IMWG helping ensure that industry and de jure standards are in line.

Good standards improve things….

ISO Standards for dimensions and materials for nuts and bolts

Delivers maximum flexibility and freedom with predictable result for consumer.

But sometimes standards fail to deliver real benefit….

Industry standards focused on market dominance

Winner takes all approach …..
Costly obsolescence for consumers.

Where does LADM fit in?

Important to engage at the right level:

- **Conceptual Data Model (CDM)**
  A map of the concepts of interest in a domain and the relationships of significance between them.

- **Logical Data Model (LDM)**
  A technology neutral representation of an organisation's data, organised in terms of entities and relationships.

- **Physical Data Model (PDM)**
  A physical implementation of an LDM subject to the constraints of a specific DBMS technology.

Ideal result is adoption of a single universal **LADM** CDM, leading to multiple compliant regional LDMs, which are then deployed as organisation or application technology specific PDMs .
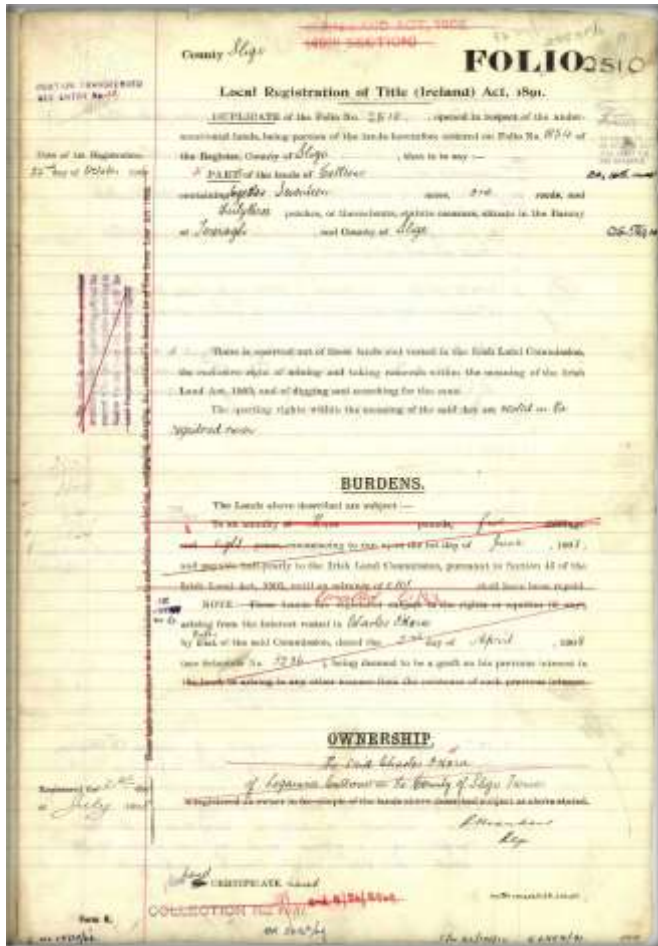
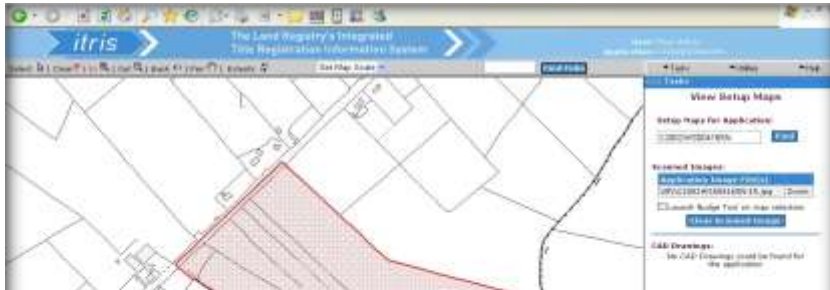# PRAI Land Register
Land Administration Example

- A system of registration of title to land carrying a State Guarantee

- A Public Register established in 1892

- 1.8 million titles covering 2.5 million registered land parcels

- Over €400 billion worth of housing indemnified in Land Registry

- 625 staff dealing with 450,000 register changes per annum

- *Mission: 'Safeguarding the Legal, Social and Economic Fabric of Property Ownership'*

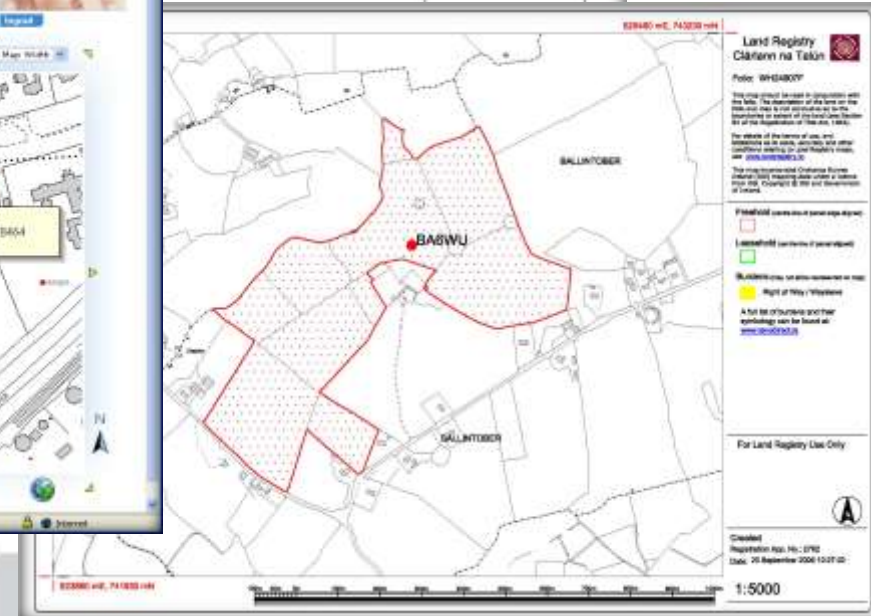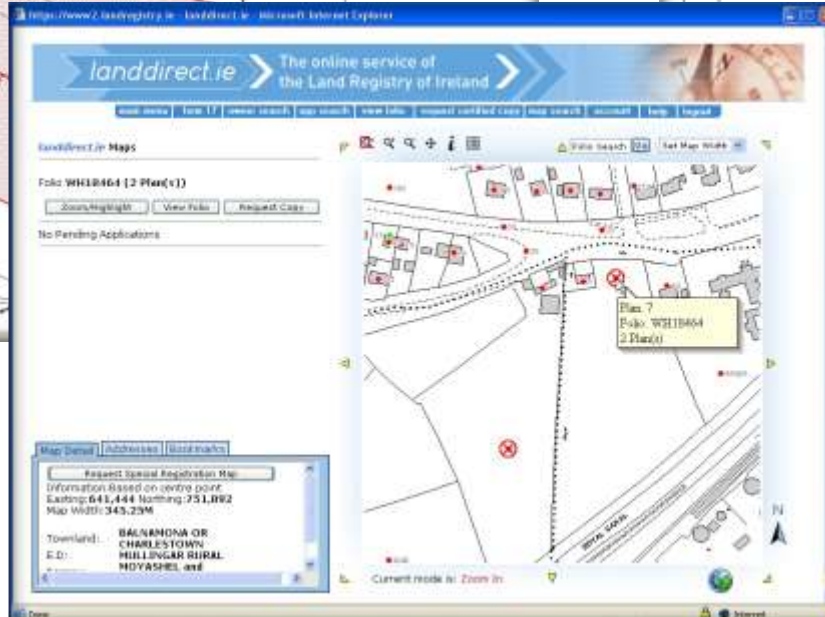# Transition from manual document editing and map production….

….to digital register maintenance, online query and automated document/map production.

Delivering Public Access to all Land Register Data

Key DMapS System Requirements

- Integrate with existing ITRIS (Titles) and DIMS (Documents) systems

- Build on OSi national reference large scale vector map base.

- Implement Business and Topology Rules for Plans
  - No overlap by Level of Title
    - Freehold, Leasehold, Sub-Leasehold, etc
  - Shared Boundaries
  - Relationship between Title Levels
    - E.g. Leasehold is a Burden on the Freehold

- Mappable Burdens and Appurtenant Rights
  - Capture and manage relationships for Right of Way, Pipeline, Well, Turbary, etc

- Allow for:
  - Commonage (Undivided Shares)
  - Development Schemes
  - Multi-Storey Developments

- Deliver a Future-Proof framework

Mapping of ITRIS DMapS to LADM

class LADM_ITRIS-DMapS

Registration Input Map:
Ordnance Survey Map:
Historical Cadastral Index:
Aerial Photo:
Court Defined:

Plan Boundary Lines with source references.

LA_Point

LA_SpatialSource

LA_BoundaryFaceString

Topology: Primary Interest Area
Polygon: Secondary Interest Area
Point/Line: Secondary Interest Point or Line
Point: Primary Interest Multi-Storey

Appurtenant Right on one Folio is a Burden on another Folio

LA_Source

Instrument: Lodged legal documents

LA_Party

LA_SpatialUnitGroup

LA_SpatialUnit

LA_Level

LA_PartyMember

LA_AdministrativeSource

Folio:
Property:

Plan (Parcel):
Appurtenant Right:
Burden:

Commonage: Undivided Shares

LA_GroupParty

LA_LegalSpaceBuildingUnit

Multi-Storey Registration:

LA_RRR

LA_BAUnit

LA_RequiredRelationshipBAUnit

LA_Responsibility

LA_Restriction

LA_Right

Folio/Property/Plan:
Multi-Storey:
Appurtenant Rights:
Burdens:

Managed Burdens:

Mapped Burdens:
Mortgage:
Etc:

Primary Interest: Freehold/Leasehold
Secondary Interest: Appurtenant Rights
Etc.

Ordnance Survey Ireland
Enterprise Solution Example

History

- Established in 1824 as military unit with first civilians only in 1970s.

- Ireland was first country in the world mapped at 6" to 1 mile in 1846.

- Became a separate state body in 2002.

- Approx. 320 staff in original Dublin HQ in Phoenix Park and in 6 regional offices.

Ordnance Survey Ireland
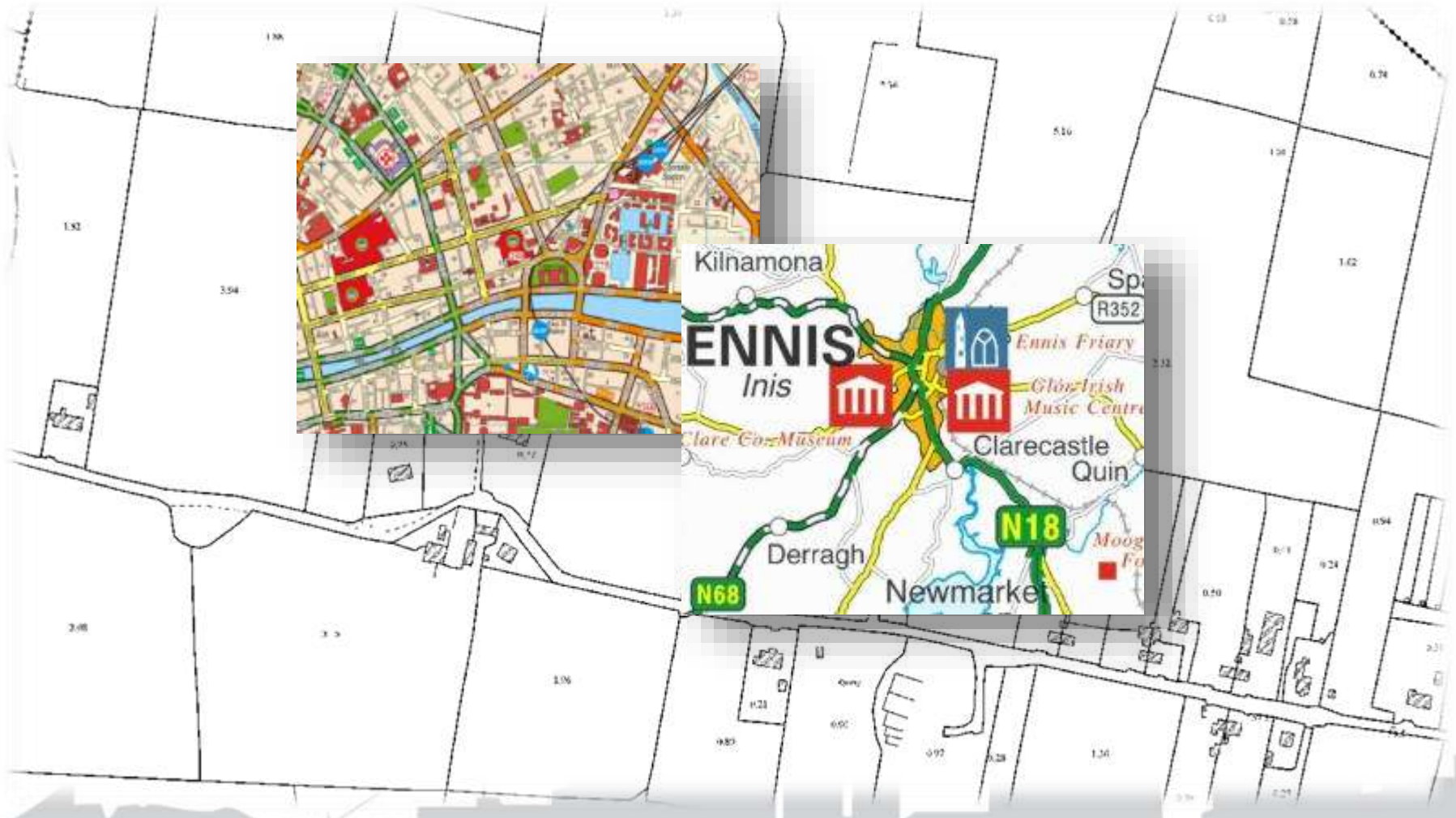## 1st Generation Mapping

Lithographic Stone

Copperplate Printing

Ordnance Survey Ireland
2nd Generation Mapping

Cartographic Tiles of Vector Data at Multiple Scales

Ordnance Survey Ireland
Next Generation Mapping

Multiple Data Sources, Capture Methods and Outputs

Ordnance Survey Ireland
Next Generation Mapping

- The most significant revision to OSi's data creation and management practices in over 30 years.

- Next generation national core reference data.

- Foundation for National Spatial Data Infrastructure

- Seamless real-world feature data model.

- Inter-Feature References

- Multiple Geometries per Feature

Ordnance Survey Ireland
Next Generation Mapping

Topologically seamless Skin of the Earth

Superimposed Features sit on top of Skin of the Earth

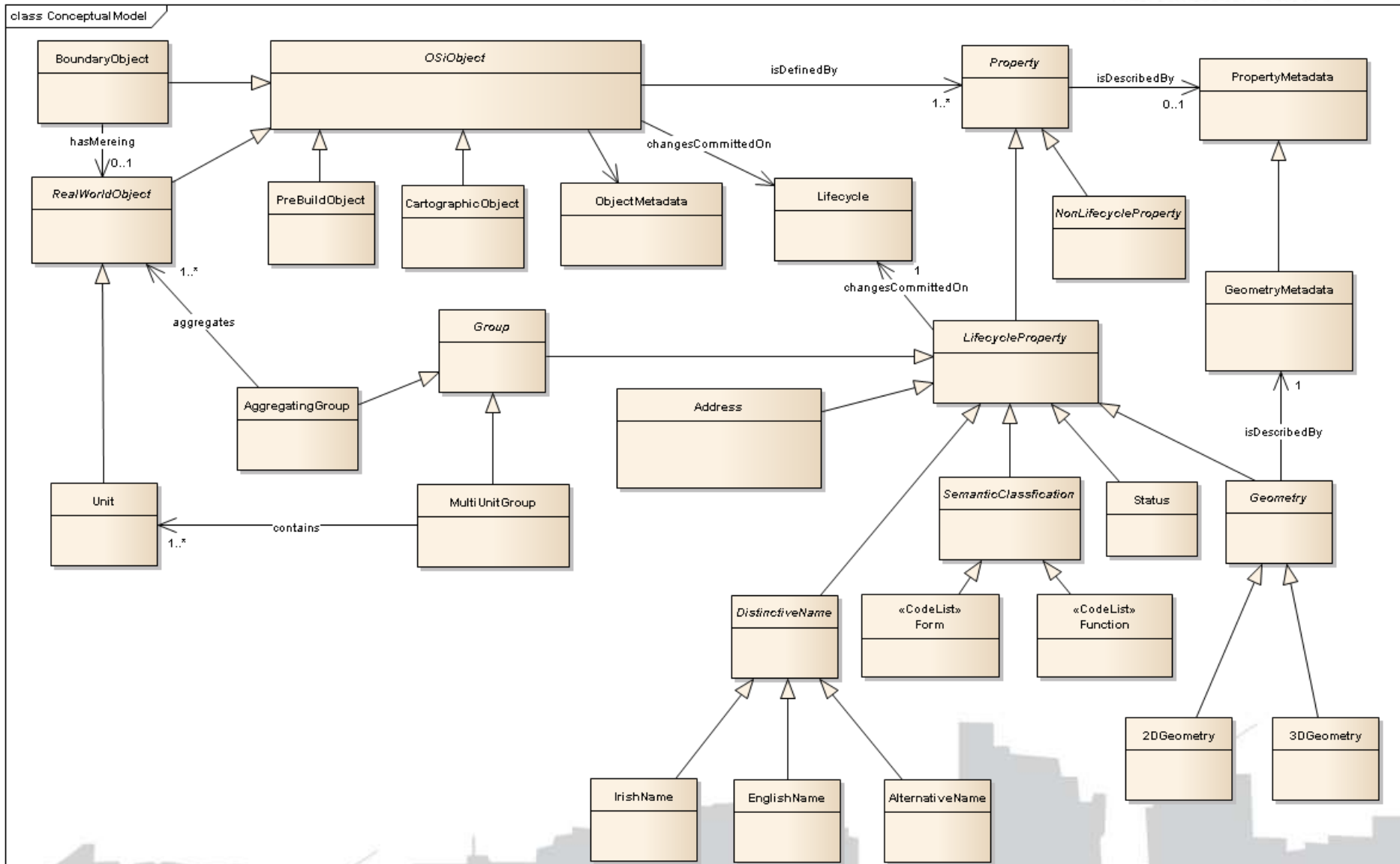Network Features including "Way", "Water" and "Rail"
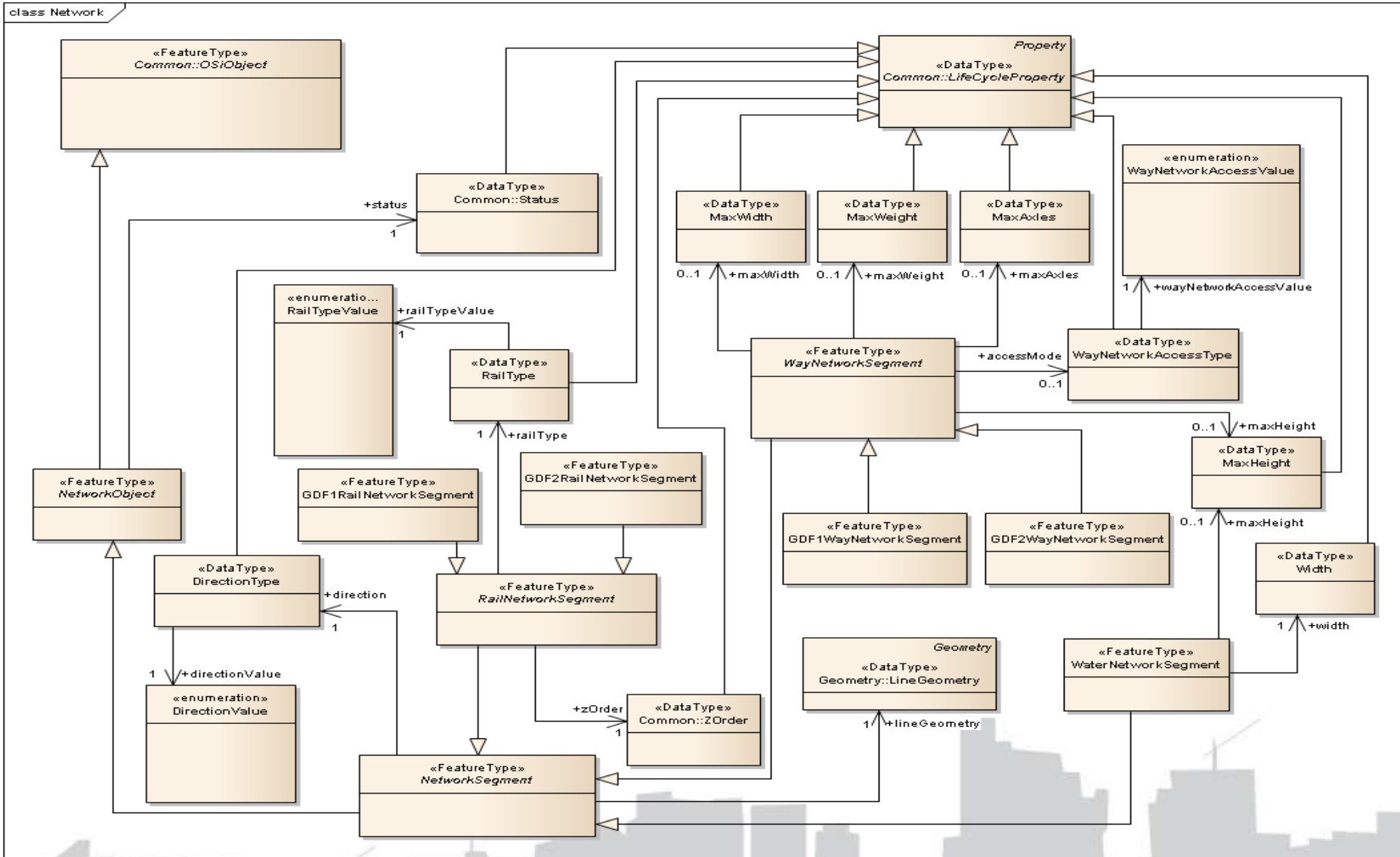
Drivers for enterprise solutions

- National level implementations.
  - Very large spatial databases.
  - Distributed operations.

- Rich and complex data models.
  - Representing real world objects and their relationships.
  - Extensible to support concepts not yet defined/identified.

- Demand for "Fit for Purpose" data.
  - Data must be trusted.
  - Date must be correct.
  - Data must be up to date.

- The data does not exist in isolation.
  - Change driven by external processes.
  - Data consumed and/or referenced by others.
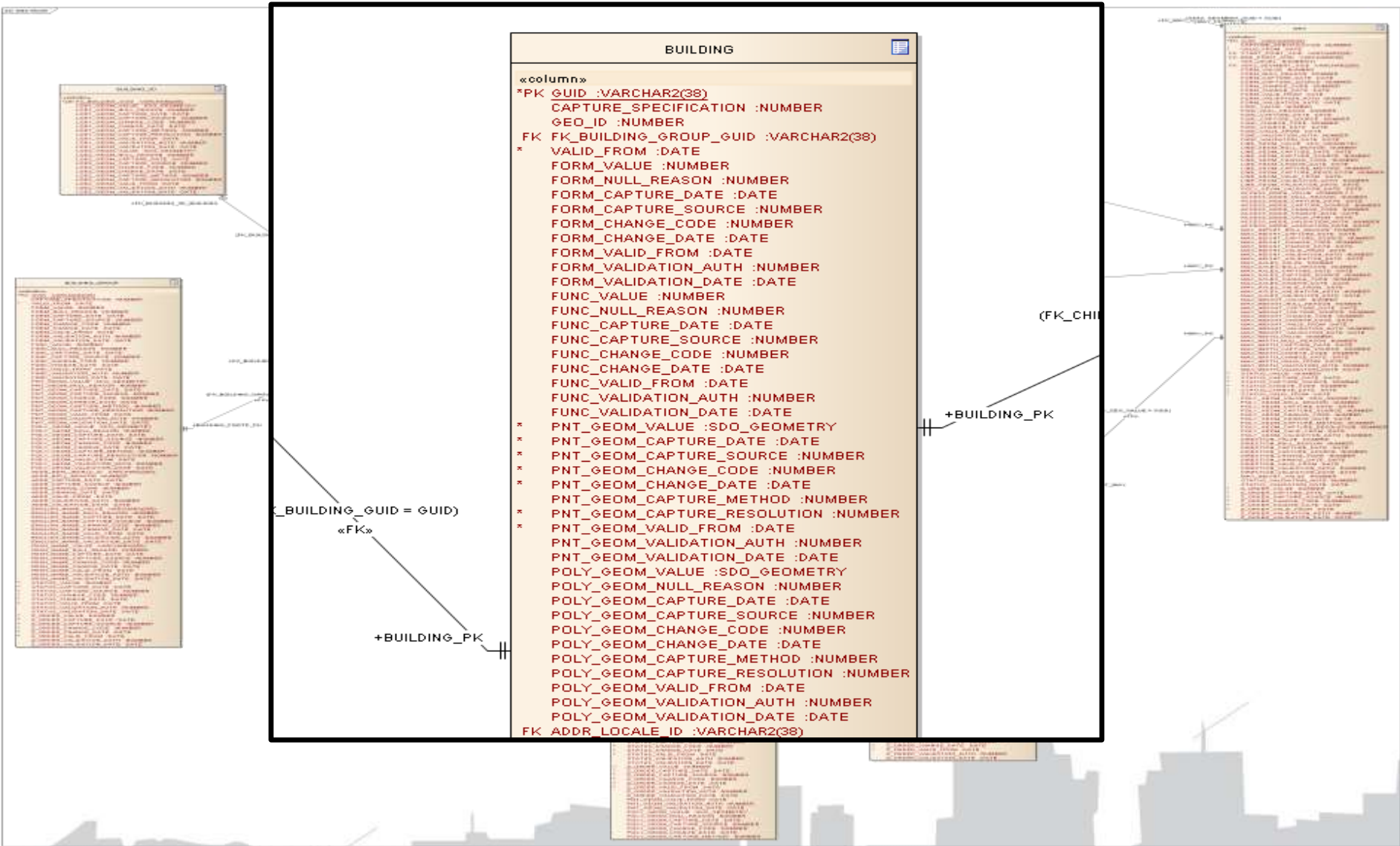 - Capture Once – Use Everywhere

Conceptual Data Model

Logical Data Model

Physical Data Model

The Enterprise
Data Management Challenge

1spatial management suite

WORKFLOW

Plan

Transact

Generalise

Integrate

Exchange

Validate

Supply Data

Production Data

Workspace Manager

Job Planner

Change Intelligence

Job Metadata

Editor

Validation & Product Generation Rules

25
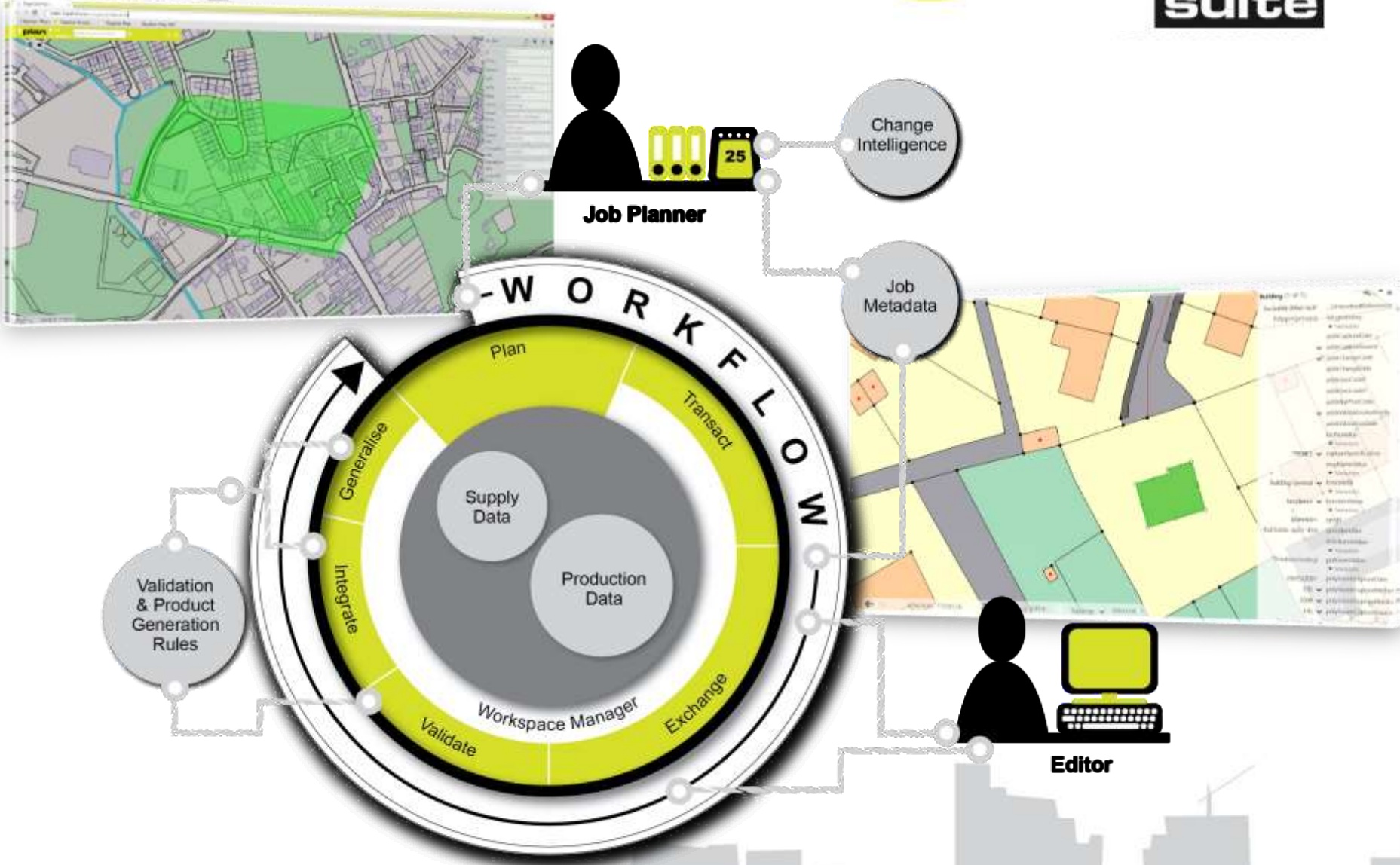
Potential Impact of LADM in Ireland

- **New national Property Agency for Ireland**
  PRA, OSi and VO are being merged to a single national agency.
  This will require a new unified CDM. LADM can be a key influence.

- **Key business drivers for next generation Land Administration**

  - **Digital by Default:** Move away from paper.
    Standards based approach will provide traditionally conservative legal profession with confidence to adopt.

  - **Make data freely available and usable:**
    Not about the cost of data.
    Consistent CDM is the key to reuse with confidence.
    Transformation of PDM not an issue if CDM is well understood but highly risky if not.

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Thank You
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