

## 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....



County Sligo **FOLIO 2510**

Local Registration of Title (Ireland) Act, 1891.

DECLARATION of the Folio No. 2510... opened in respect of the additional lands, being portions of the lands heretofore entered on Folio No. 1934 of the Register, County of Sligo...

DATE of the Folio No. 2510... 24th July 1914

There is a general assent of these lands and tenements to the Irish Land Commission, the executive agent of selling and taking interests within the meaning of the Irish Land Act, 1903, and of buying and mortgaging the same.

The selling rights within the meaning of the said Act are vested in the Special Com.

**BURDENS.**

The lands above described are subject —

To an easement of way... for... 1907...

NOTE: — From time to time... of the rights or equities... arising from the interest vested in Charles Mack...

by Act of the said Commission, dated the 2nd day of April 1909...

**OWNERSHIP.**

The said lands have been... of Joseph Mackinnon & Co. County of Sligo Town...

Witnessed as above in duplicate of the lands above named and subject as above stated.

1914

COLLECTION No. 1111

all existing roads and footpaths etc

August 1912 / Michael O'Sullivan of... full owner in tenant - in favour of... undivided moiety of the property etc

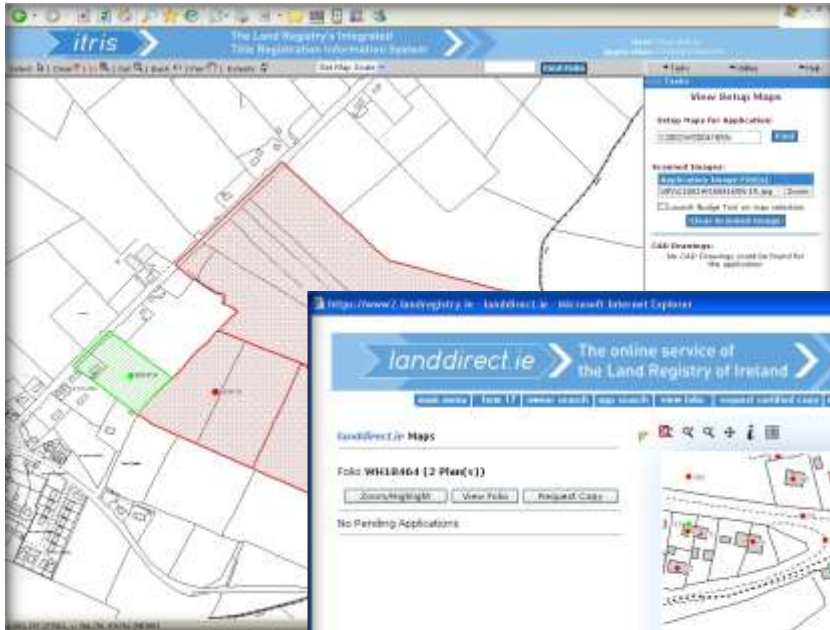
August 1912 / Gerard Mallon of... full owner in tenant - in favour of an undivided moiety of the property etc

August 1912 / The registration under any... duplication for value by... registered since affecting the part of the... specified in Instrument No. 2741/12... by J. O. Mackinnon is to be made... the life of J. O. Mackinnon except with... consent etc

August 1912 / The title to 3-3-4... at 2252(12) has been transferred to... No. 22154 (plan 165).



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



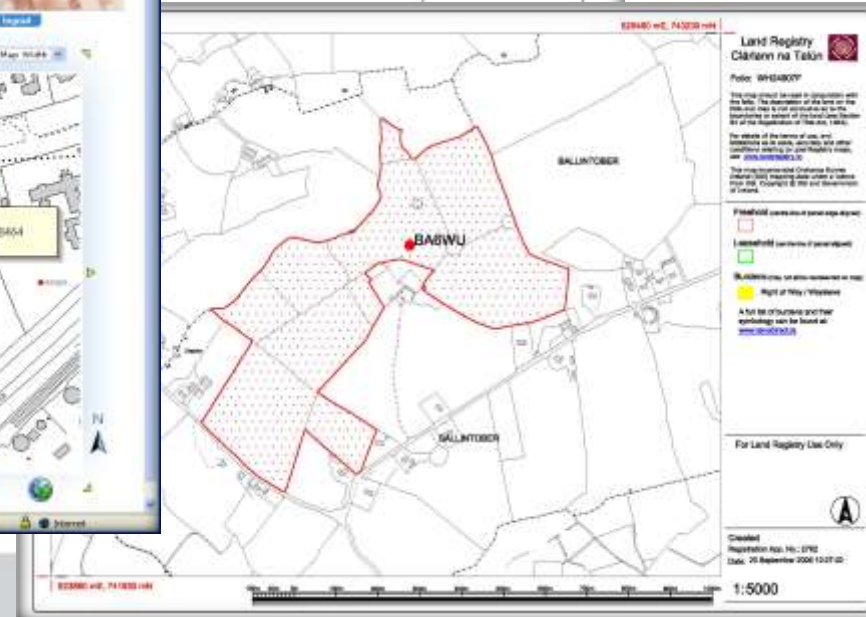
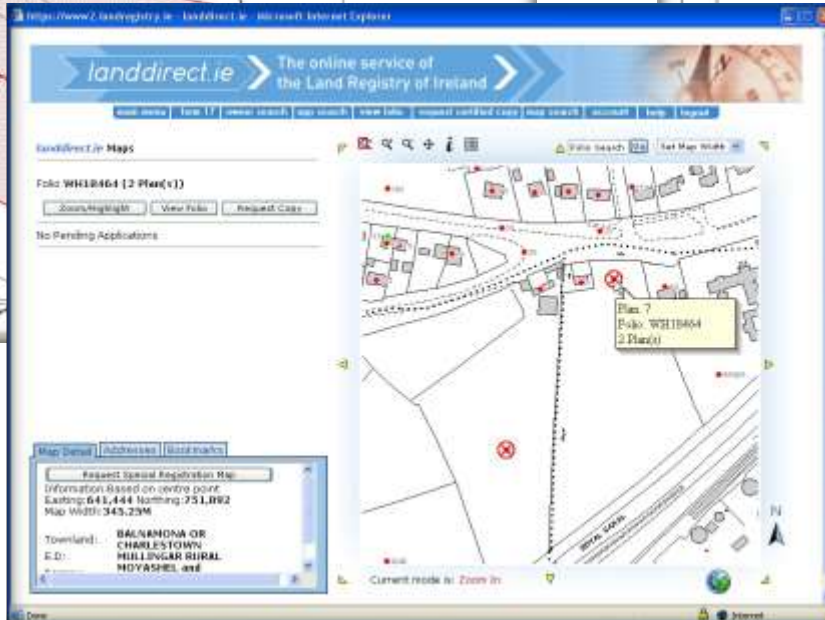
**Land Registry**

County **Sligo** Folio 999999F

Register of Ownership of Freehold Land

Part 1(A) - The Property  
 For parts transferred see Part 1(B)

No.	Description	Official Notes
1	A plot of ground being part of the fowland of ASBRYCHTIN NORTH and BARRY of CARRIGY shown as Plot (a) 8899, 8899 edged RED on the Registry Map (OZ HD Ref (a) 23/12). The Registration does not extend to the stones and MINERALS	From folio 888888





# Delivering Public Access to all Land Register Data



Getting Started Search Print View Basket

Base Layer

- Osi Map
- Osi Orthophotography
- Osi Hybrid

Land Registry Overlays

- Burdens
- Subsidiary Interest

Property Details

Folio Number	WH722F
Title Level	Freehold
Area of selected plans	0.10 hectares
Number of Plans on this folio:	1

[Add to Basket](#)

\*PRA Boundaries and Plan Area are not conclusive. See Section 6(2)(i) of Registration of Title Act 2008 and Rule 9(1) of the Land Registration Rules 1972 as substituted by Land Registration Rules 2009.

Current Location

Townland Petitswood

Barony Moyashe And Magherademon

County Westmeath

Scale = 1 : 1500

XY: 644878, 753325

An iDentis Clientship Machine  
The Property Registration Authority

# Key DMapS System Requirements 1spatial YOUR WORLD SMARTER

- 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



# 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 1<sup>st</sup> Generation Mapping

## Lithographic Stone



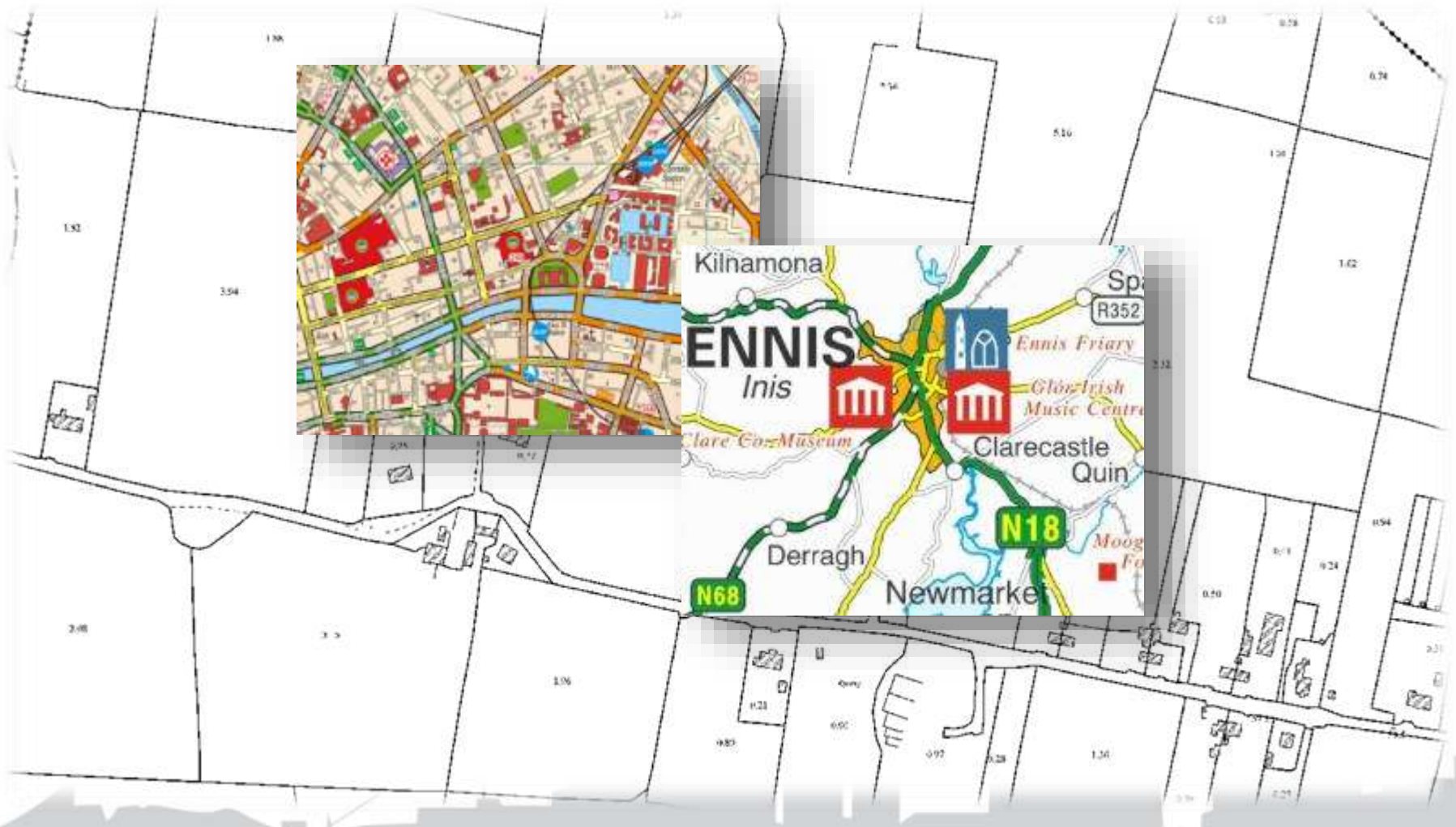
## Copperplate Printing



# Ordnance Survey Ireland 2<sup>nd</sup> 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



# Drivers for enterprise solutions

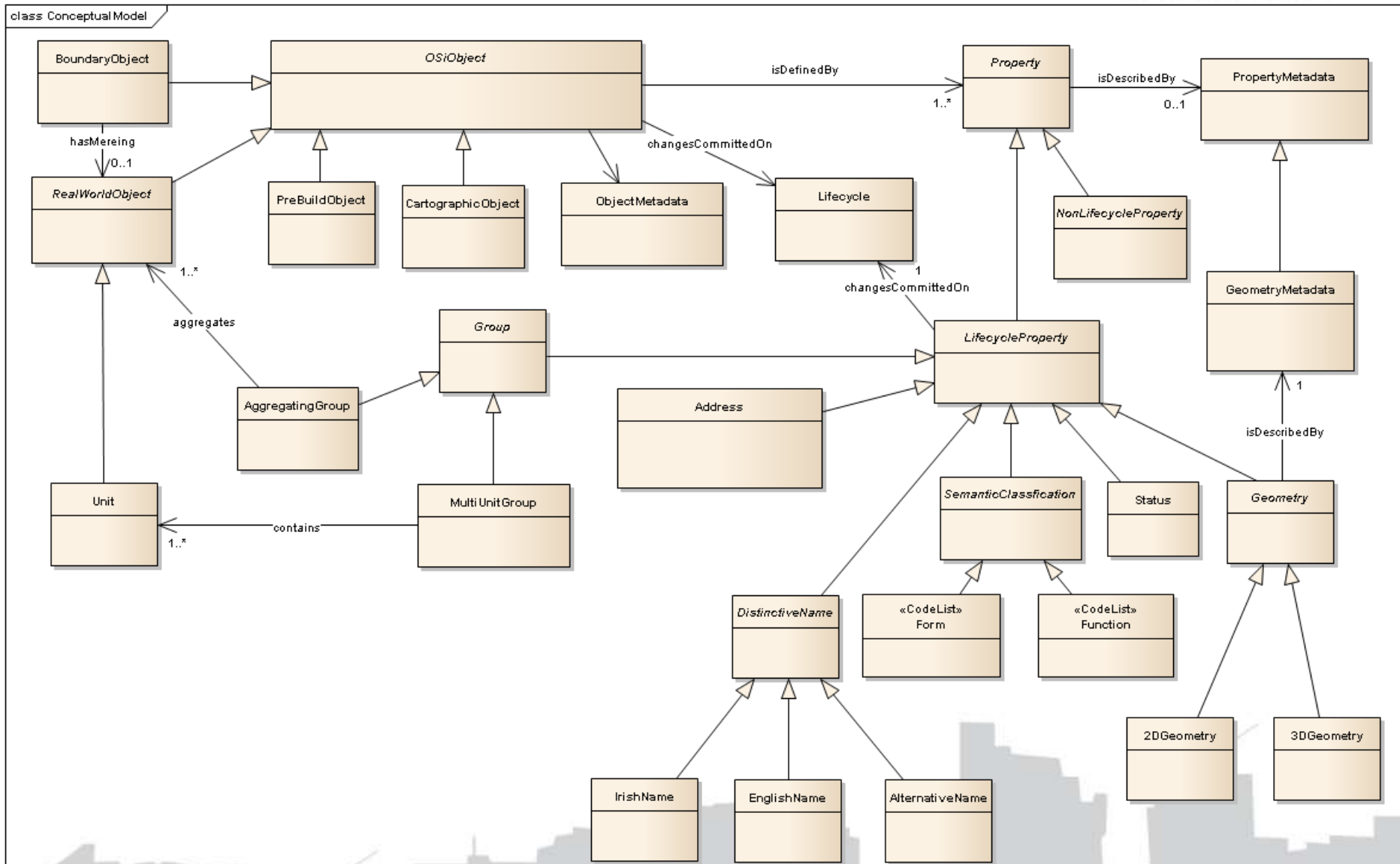


- National level implementations.
  - Very large spatial databases.
  - Distributed operations.
- Rich and complex data models.
  - Representing real world objects and their relationships.
  - Extensible to support concepts not yet defined/identified.
- Demand for “Fit for Purpose” data.
  - Data must 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

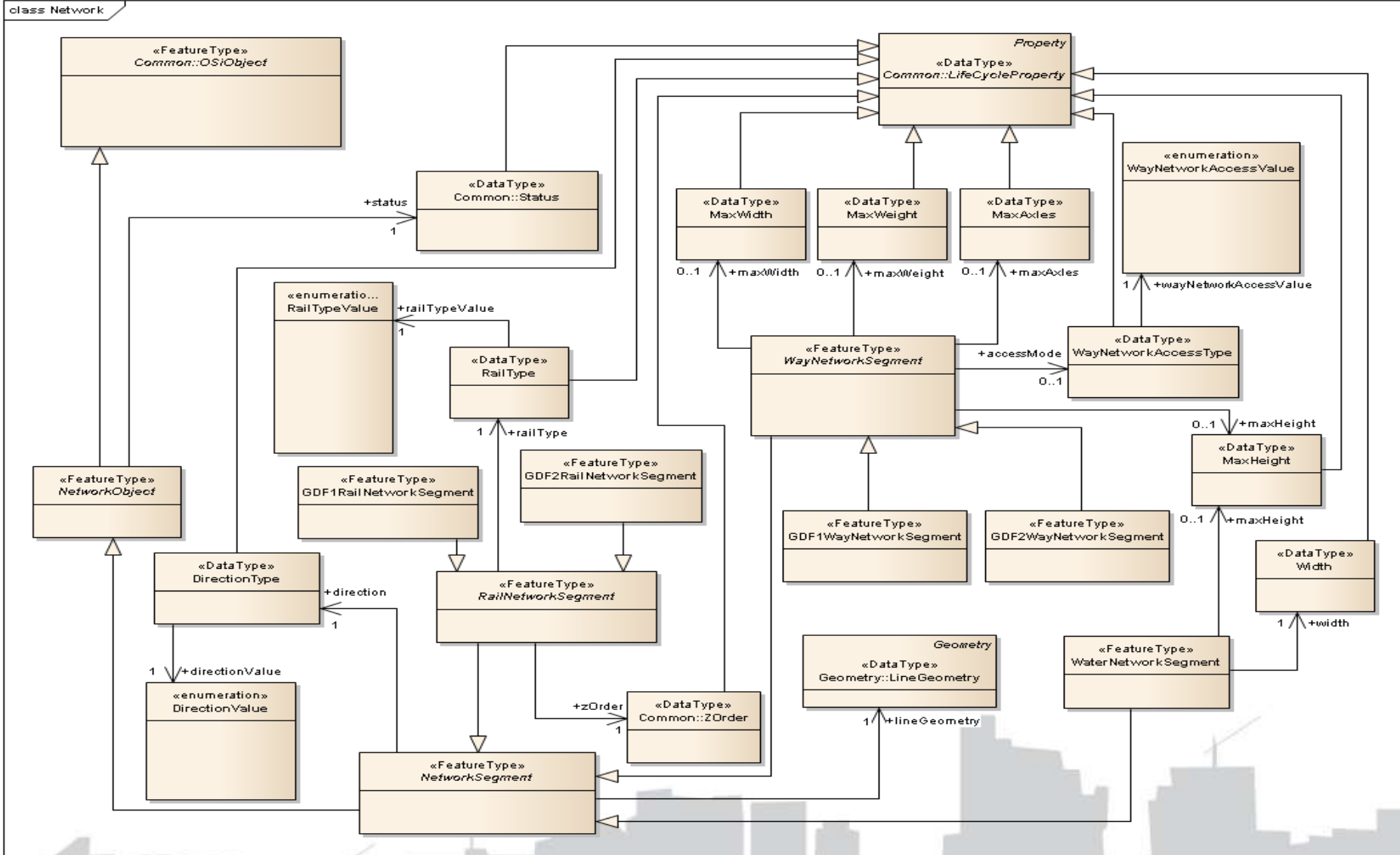




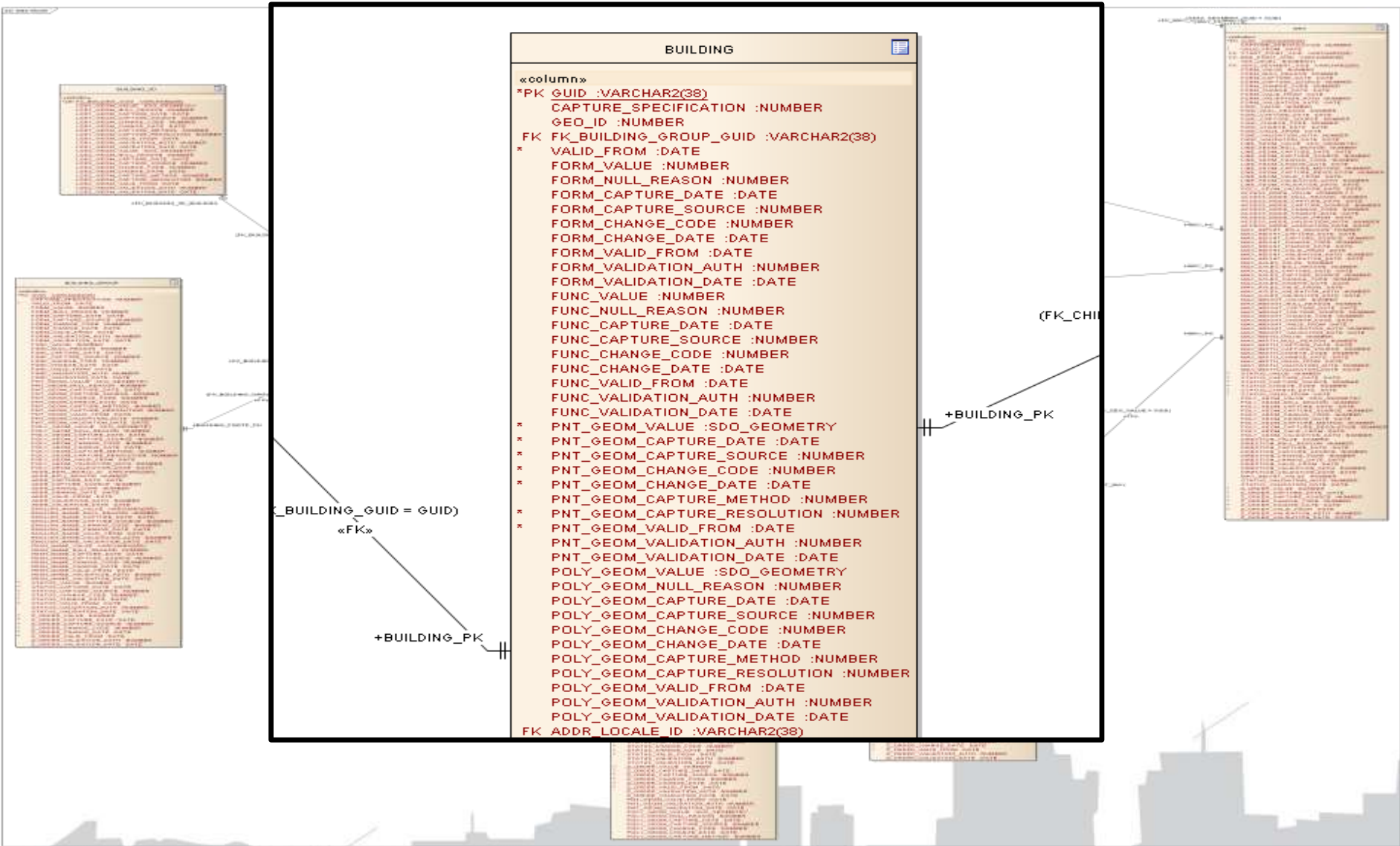
# Conceptual Data Model



# Logical Data Model



# Physical Data Model



# The Enterprise Data Management Challenge



PLAN

MAINTAIN

PUBLISH

**1 spatialmanagement**  
suite



**ORACLE®**  
DATABASE  
READY

**ORACLE®**  
EXADATA  
READY

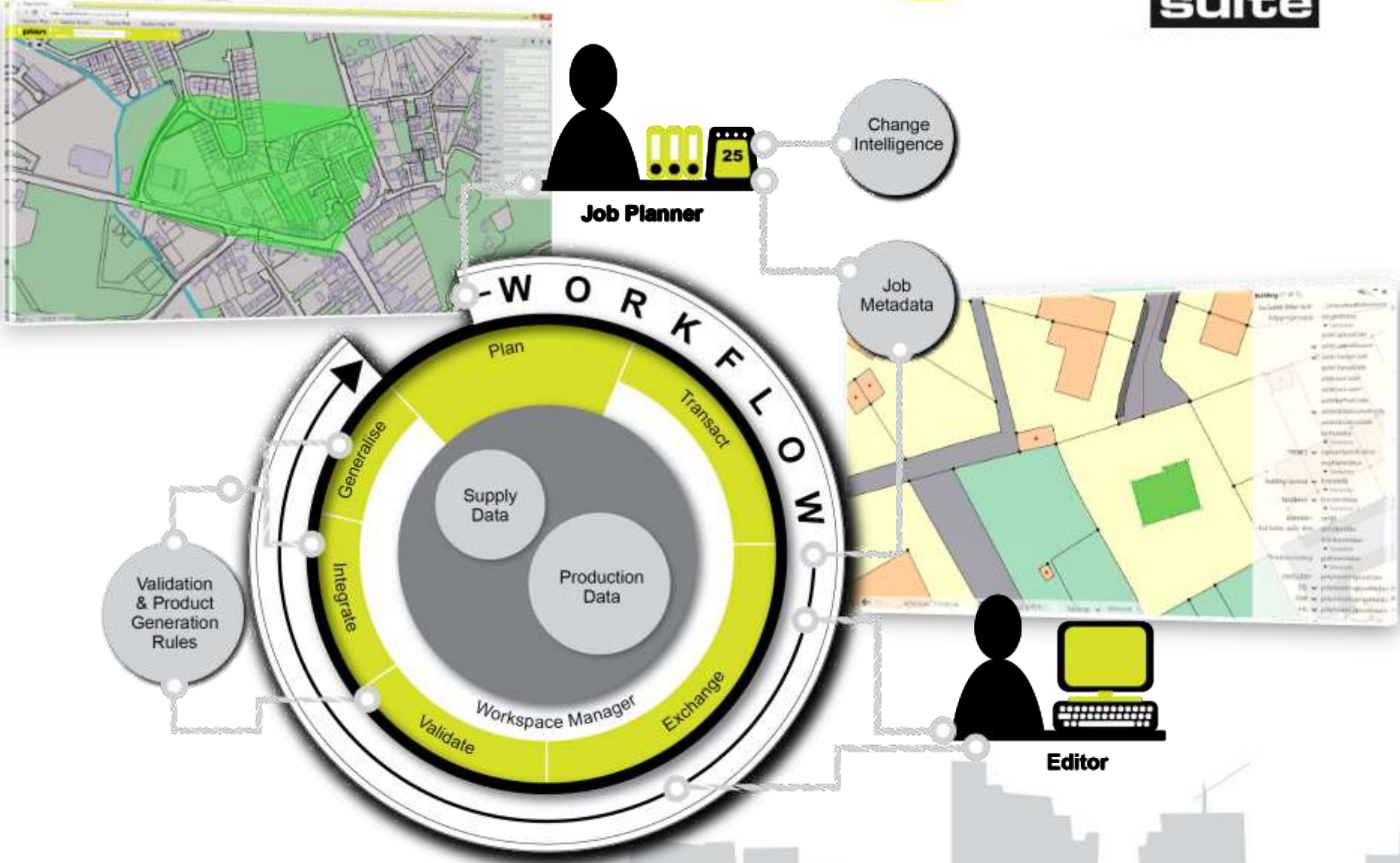
**ORACLE®**  
EXALOGIC  
READY

**ORACLE®**  
LINUX  
READY

**ORACLE®**  
WEBLOGIC  
READY



# 1 spatial management suite





# 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.



**Thank You**

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