

# Improving information management and interoperability for national roads authorities

**Aonghus O'Keeffe**  
CitA BIM Gathering  
23<sup>rd</sup> November 2017



# Overview

- ROD and INTERLINK
- Typical current condition of road asset information management
- Research objectives
- European Road Object-Type Library
- The technical solution
- The vision

# ROD & INTERLINK

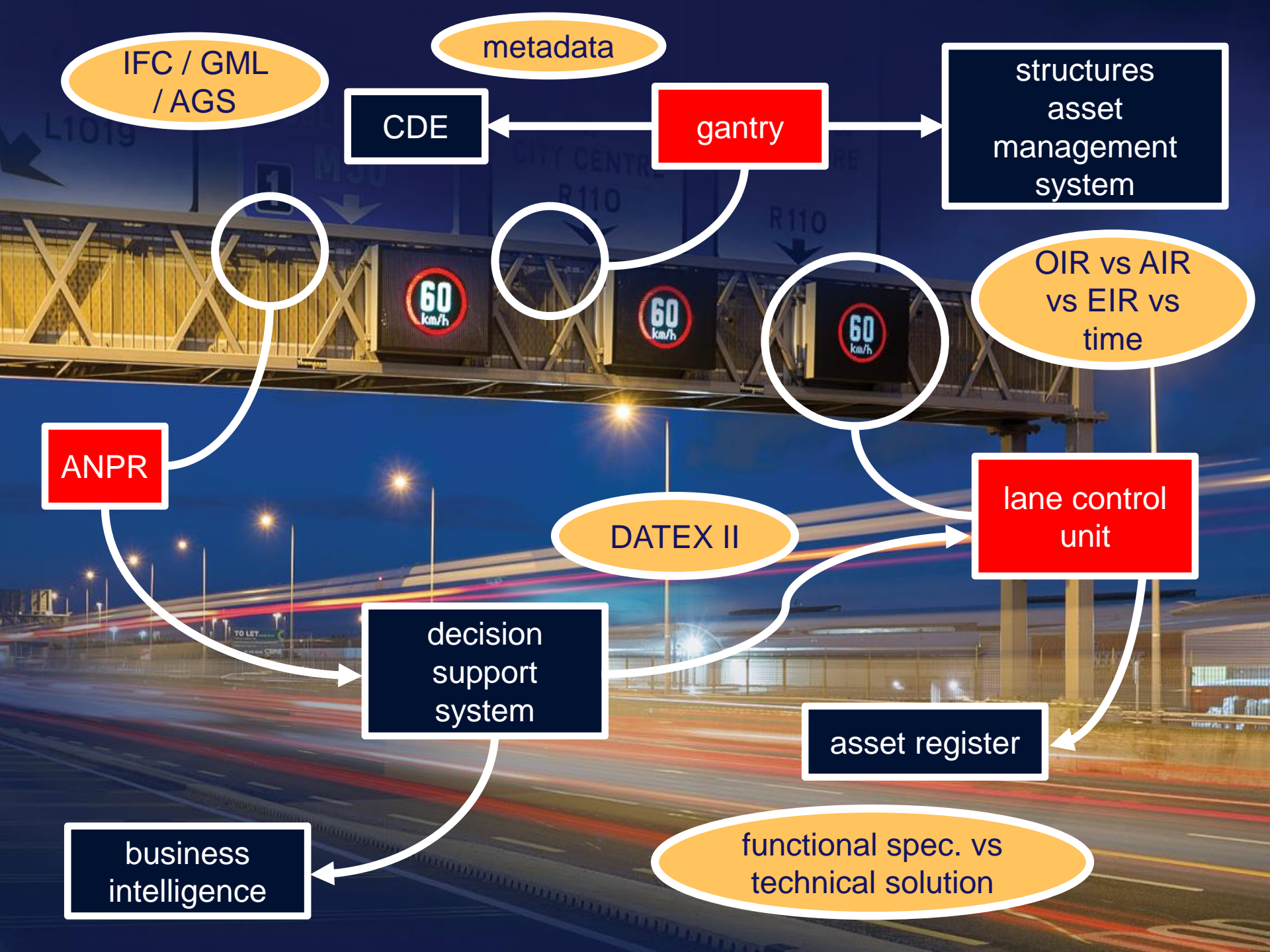
---

- Roughan & O'Donovan Consulting Engineers
  - Design, construction, asset management
  - Roads, bridges, ports, buildings
- INTERLINK research consortium
  - Engineering consultants, software developers, information management specialists

# Understanding the Needs

---

- Two-year programme
- Understand as-is condition
  - 11 countries, >60 interviews
  - Survey to test needs statements
- Envision the to-be condition



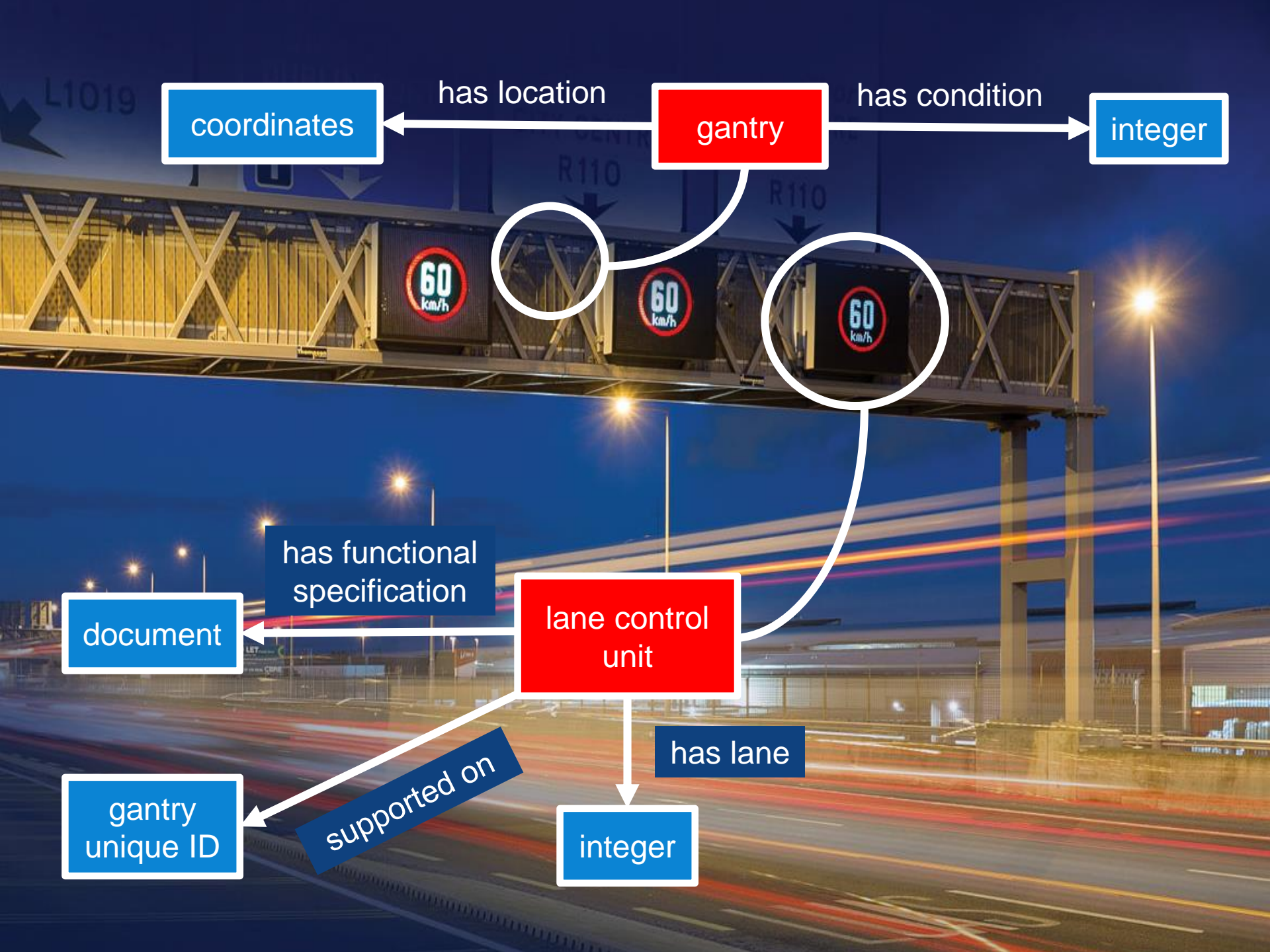
# As-Is

- Predominantly documents-based
- Silo databases and systems
- Duplicated, inconsistent or incomplete data
- Vendor lock-in with new enterprise-wide systems
- Data loss at end of term contracts
- NRA-led advances in some countries and organisations
  - BIM at design and construction (SE, NO, NL, FI)
  - Procurement of standardised data (NL, SE)

# CEDR Call 2015

---

- Conference of European Directors of Roads
- Asset information management using BIM
- Interoperability
- Demand-driven software development
- European Road OTL



coordinates

has location

gantry

has condition

integer

has functional specification

document

lane control unit

has lane

integer

supported on

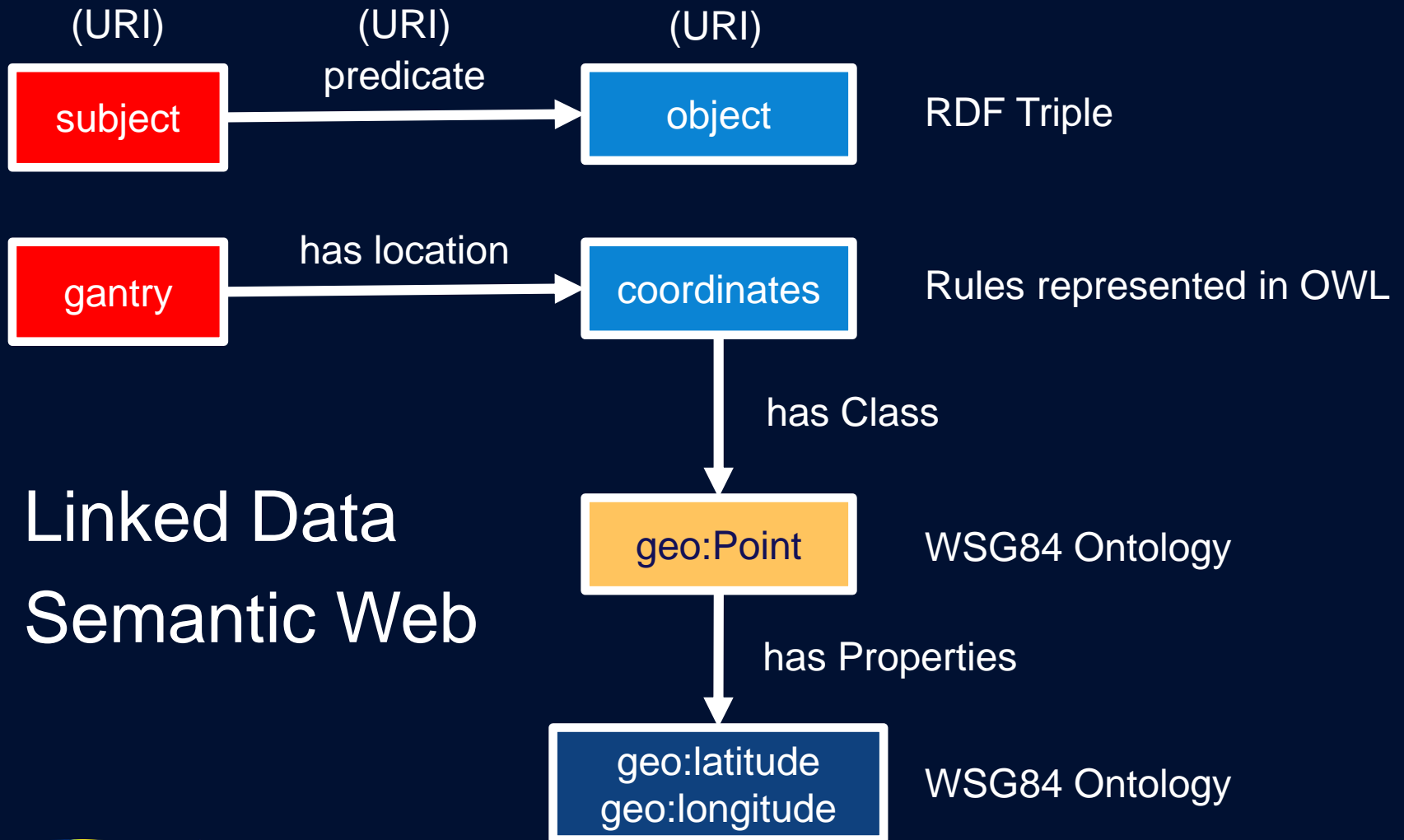
gantry unique ID



# Object-Type Library

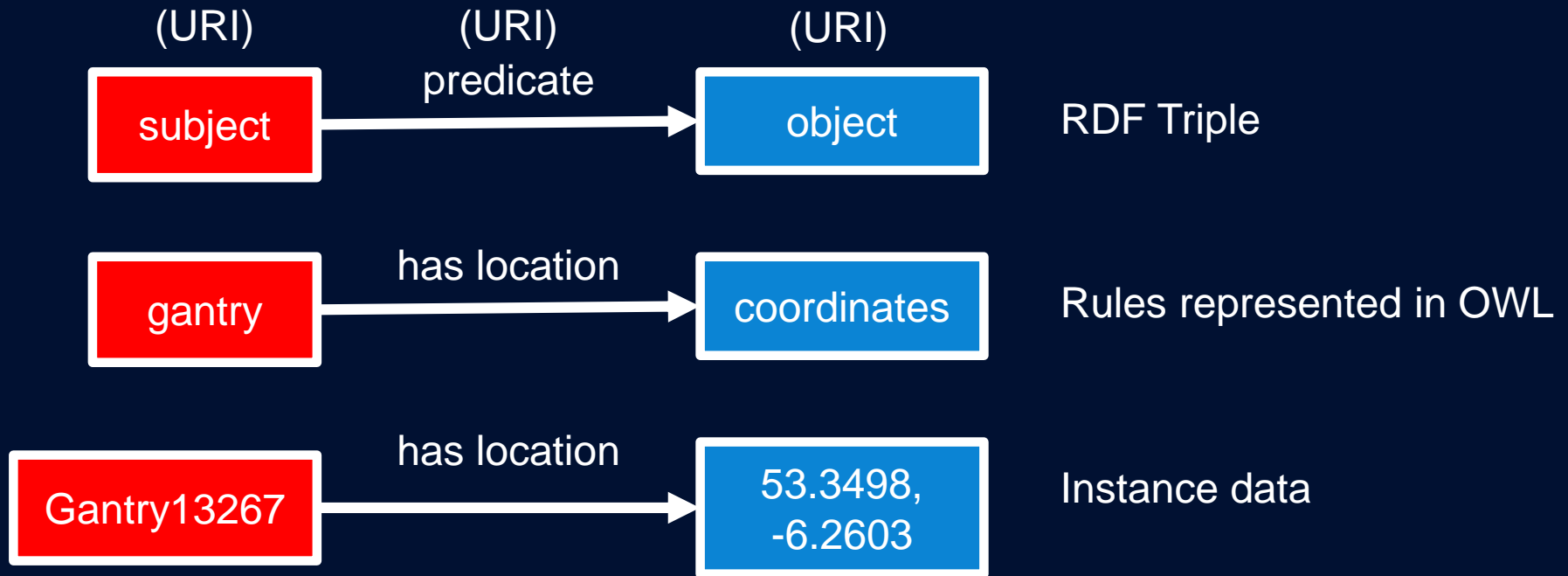
- ‘gantry’ and ‘lane control unit’ are examples of object types
- Collection of object types = object-type library
- OTL  $\cong$  data dictionary  $\cong$  ontology
- A set of human- and computer-interpretable rules for the structure of asset data and its relationship with other data
- Reuse the most suitable, develop otherwise
- CEDR procuring a basic European Road OTL
- Benefit from national developments at an international level

# The Technical Solution

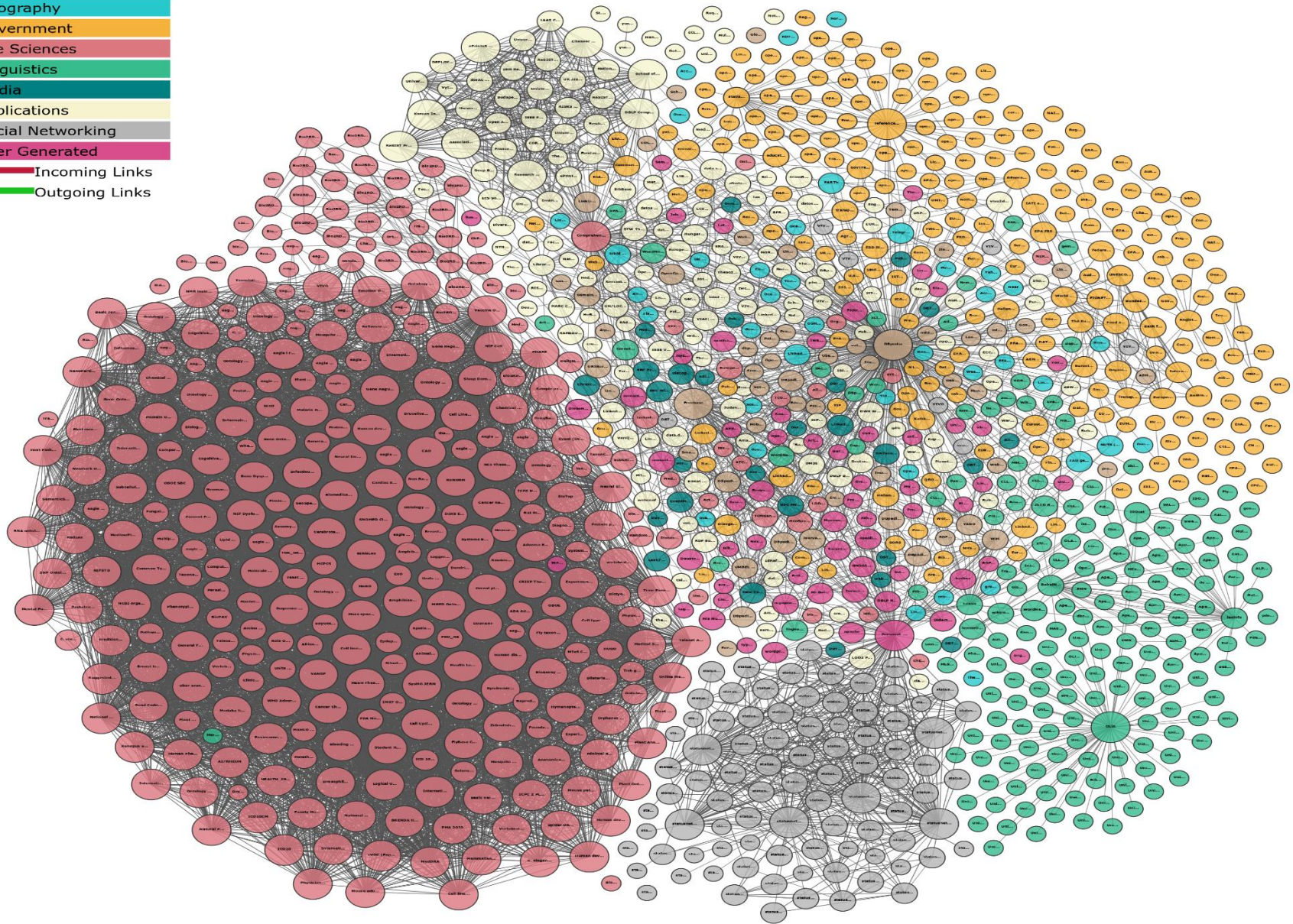


- Linked Data
- Semantic Web

# Linked Data / Semantic Web



- Data quality can be validated automatically
- Data gains semantic richness, leading to common understanding
- Data is easier to find (SPARQL)
- Data relationships can be inferred, e.g. coordinates and chainage



(Linking Open Data cloud diagram 2017, by Andrejs Abele, John P. McCrae, Paul Buitelaar, Anja Jentzsch and Richard Cyganiak. <http://lod-cloud.net/>)

# Examples of LD / SW Use

- Wikipedia, i.e. DBpedia
- Dutch NRA (RWS)
  - specify requirements
  - validate at handover
- Interrelate BIM, GIS and SE domains
- Add meaning to pre-existing data stored in relational databases
- Store once, reuse with multiple views
- Modularised, scalable, dynamic standardisation

# Development and Testing

- Iterative, scrum-based development and testing
- Prove viability using commercially-available software
- Sweden / Norway
  - Relating pavement condition to alignment
  - IFC, InfraGML, CoClass, SOSI
- Germany
  - Bridge design, construction and asset management
  - IFC, OKSTRA
- Netherlands
  - Pavement condition monitoring, reporting and repair
  - INSPIRE, GML, COINS, CB-NL, RWS-OTL

# Targeted Outcomes

- Provide confidence to CEDR
  - Viable, valuable approach
- Enable CEDR to promote use at NRA level
  - National and NRA OTLs supplemented by European Road OTL
  - Investment in supporting and scaling
- Vision = European Road OTL and INTERLINK approach are central to published NRA organisation information requirements
  - Interoperability
  - Trust
  - Reduced transaction costs
  - Improved decision-making
  - Reduced risk of vendor lock-in

# Summary

- High cost of handover
- Duplicated, inconsistent or incomplete data
- Encouraging advances
  - BIM for design and construction
  - Standardised approaches for asset data
- CEDR recognises value of interoperability
- Demand-driven capability development
- European Road OTL
- Linked Data / Semantic Web technologies



# Questions

Engage with us at  
[www.roadotl.eu](http://www.roadotl.eu)

