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07/07/2015
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European Commission

EULF – European Union Location Framework: ISA Integration

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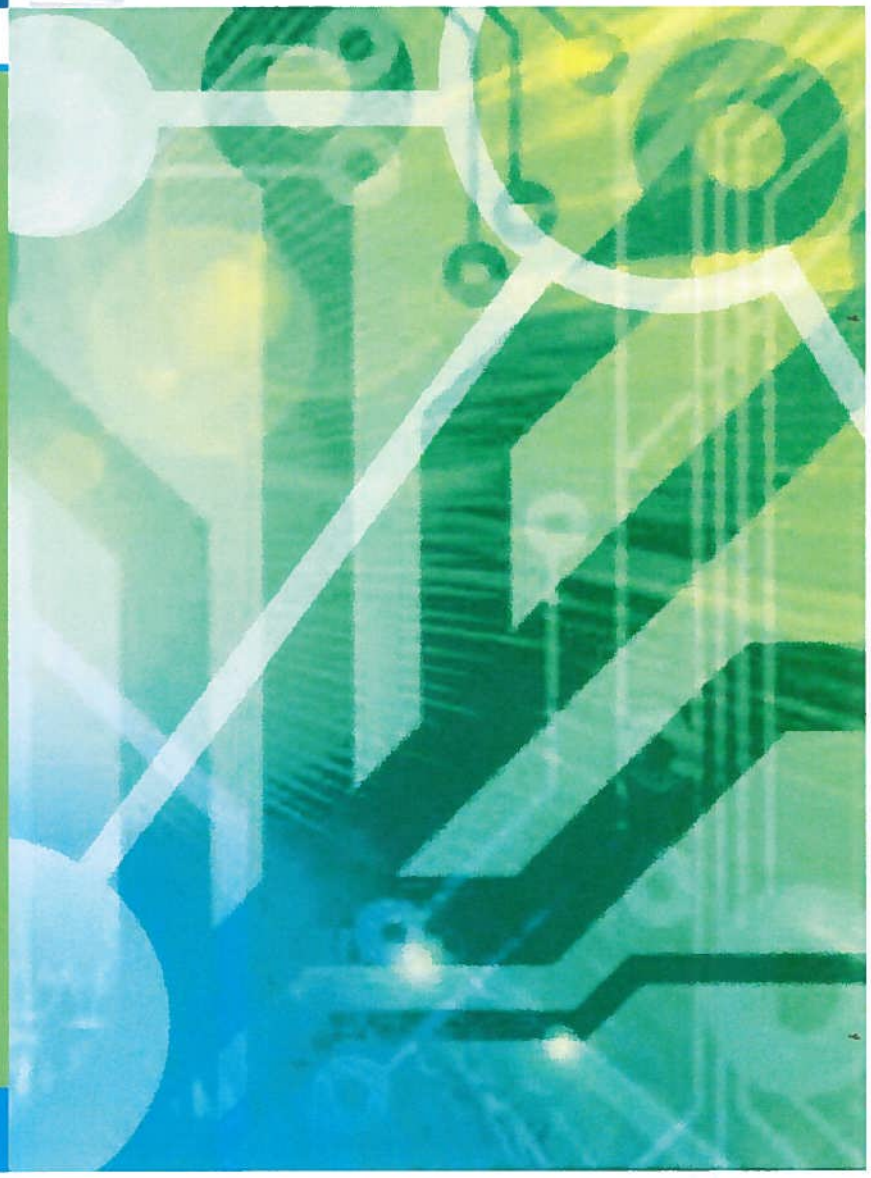

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ISA

Outline

- Integration methodology
- Detailed analysis + Integration plan
- Conclusions

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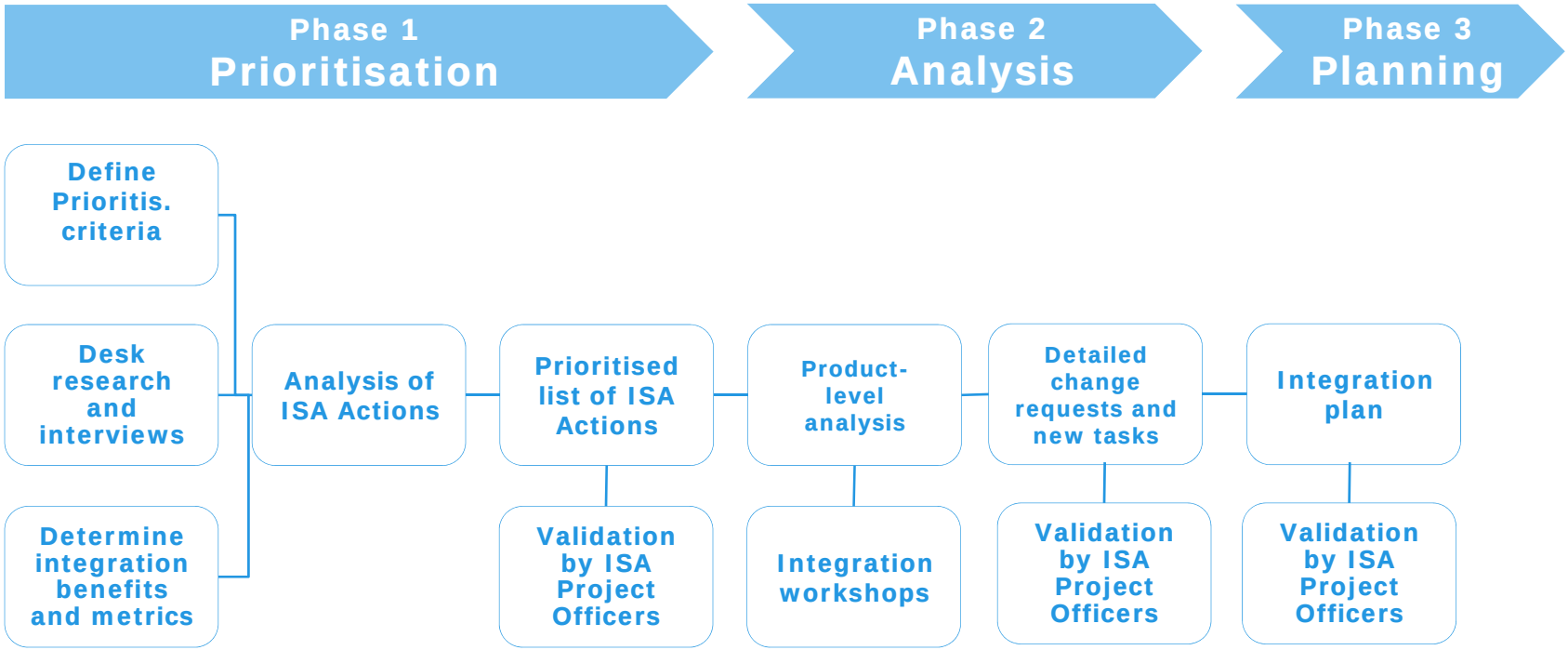
EULF-ISA Integration: methodology



EULF-ISA Integration

- **Integration** entails adapting the *products* of on Action of the ISA Programme to the products of another Action
  - **Product referral**: e.g. the EULF Blueprint refers to the 'Core Vocabulary Handbook' as a good practice for data modelling.
  - **Product use**: e.g. CISE is using the modelling conventions and syntax (GML) of the INSPIRE data specifications.
  - **Product alignment**: e.g. the EULF Blueprint is changed to align the views and architectural building blocks of the European Interoperability Reference Architecture (EIRA).

- **Prioritisation criteria** (granularity: ISA Action):
  - Relevance
  - Expected use
  - Timing
  - Integration cost

ISA Actions to integrate with

- Action 1.1 SEMIC;
- Action 1.2 Base Registries;
- Action 1.3 Catalogue of Services
- Action 1.16 CISE;
- Action 1.17 ARE3NA;
- Action 2.1 EIA;
- Action 2.2 CAMSS;
- Action 2.14 TES;
- Action 3.1 ICT implications of EU legislation;
- Action 4.2.3 NIFO;
- Action 4.2.4 EFIR;
- Action 4.2.5 Sharing and Reuse; and
- Action 5.2 EIS Governance support.

Outline

- Integration methodology
- Detailed analysis + Integration plan
- Conclusions

7 Integration opportunities were analysed in detail

1. Align the EULF with the EIF interoperability levels, principles, and recommendations
2. Align with the EIRA
3. Contribute to the EFIR and EIC
4. Refer to and provide input to the ICT implications of EU legislation impact assessment
5. Elaborate recommendations on access to base registries
6. Elaborate guidelines on spatial data standards
7. Share expertise and ensure cross-referencing

Integration plan

Task	Type of task	2015		2016		2017	
EULF to refer to the EIF principles	Change request						
EULF to refer to the EIF recommendations	Change request						
EULF to refer to the EIF interoperability levels	Change request						
EULF to participate in the EIF revision	New task						
EULF to participate in the EC Communication	New task						

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Example: EULF to refer to the EIF interoperability levels

- Standardisation and interoperability
- Policy and strategy alignment
- Return on investment
- E-Government integration
- Effective governance and partnerships

EIF Interoperability levels

European Interoperability Framework

Political context

- Legal View
- Organisational View
- Semantic View
- Technical View – Application
- Technical View – Infrastructure

Integration plan

Task	Type of task	2015		2016		2017	
EULF to participate in the review of the EIRA	New task						
EULF to define a Location Information Reference Architecture that extends the EIRA	New task						
EULF to identify patterns of public service design / process design involving spatial data	New task						

2. Align with the EIRA

Example: An INSPIRE Spatial Data Infrastructure

Example: documenting INSPIRE with EIRA.

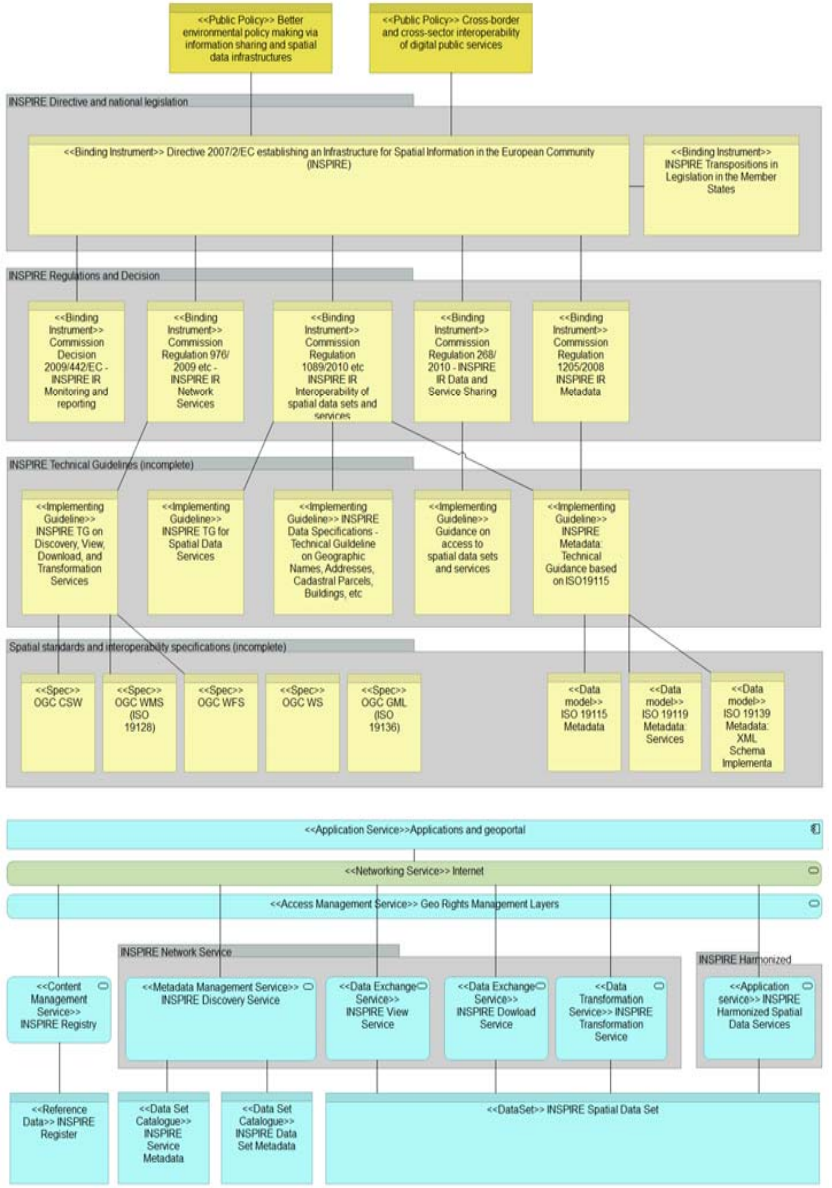
- **Legal view**:
  - Public policy
  - Binding legal instrument
  - Non-binding legal instrument

- **Organisational view (missing)**
  - Interoperability governance model
  - Organisational structure
  - Public Service
  - Business Information

- **Interoperability specs view**:
  - Interoperability specs
  - Data model

- **Semantic view**:
  - Data model
  - Reference data
  - Descriptive metadata
  - Datasets

- **Technical view**:
  - Content management service
  - Data exchange
  - Data transformation
  - Application services
  - Access management service
  - Metadata management service
  - …



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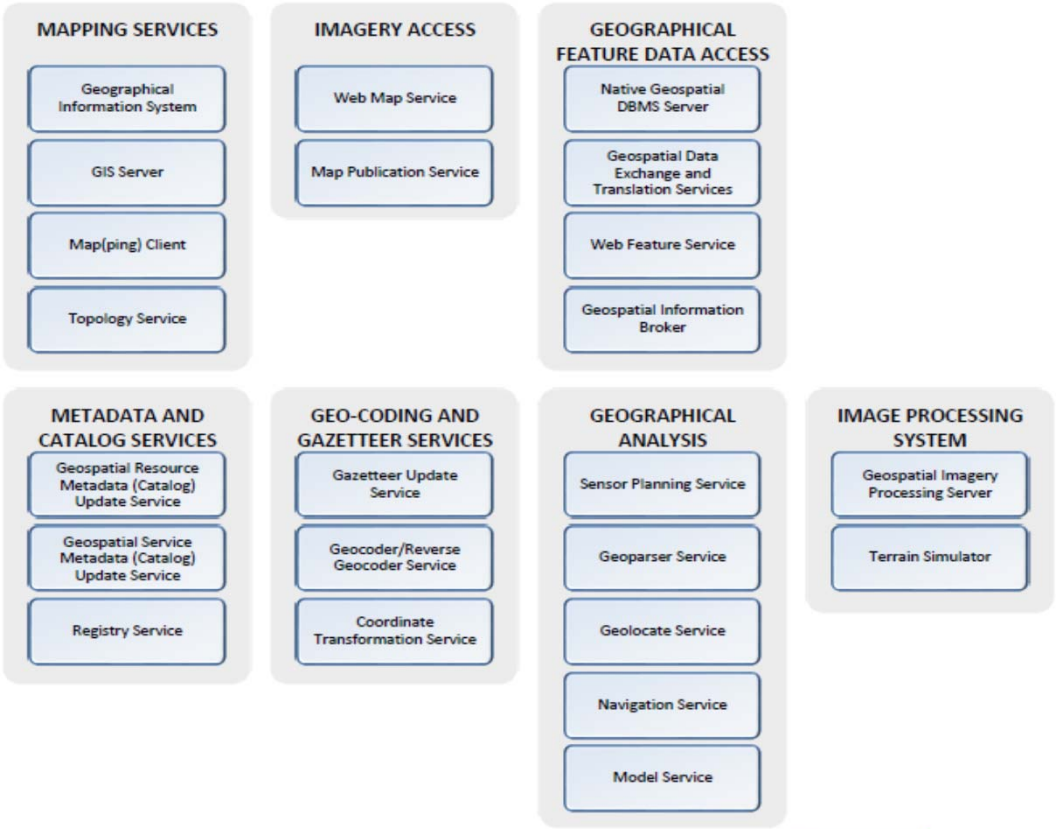
Example: Define a Location Information Reference Architecture that extends the EIRA



An analogy with the United States can be made, where a **Geospatial Interoperability Reference Architecture** (GIRA) was developed extending among others the United States Federal Enterprise Architecture Framework (**FEA**).

Integration plan

Task	Type of task	2015		2016		2017	
EULF to document reusable spatial data infrastructures to be included in the European Interoperability Cartography (EIC)	New task						
EULF to contribute standards and interoperability specifications to the European Interoperability Cartography (EICart)	New task						

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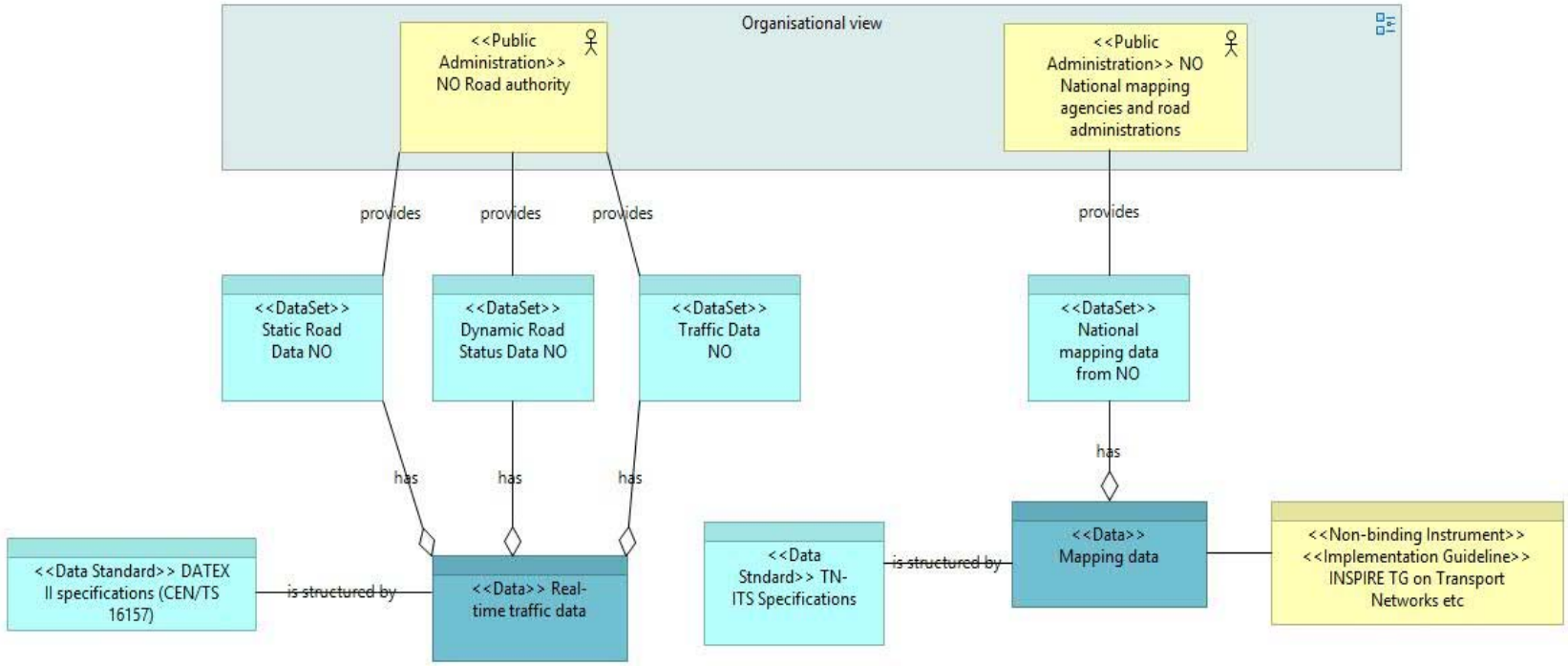
Example: EULF to document reusable spatial data infrastructures to be included in the European Interoperability Cartography(EIC)

EULF Transportation Pilot – Semantic view (data)



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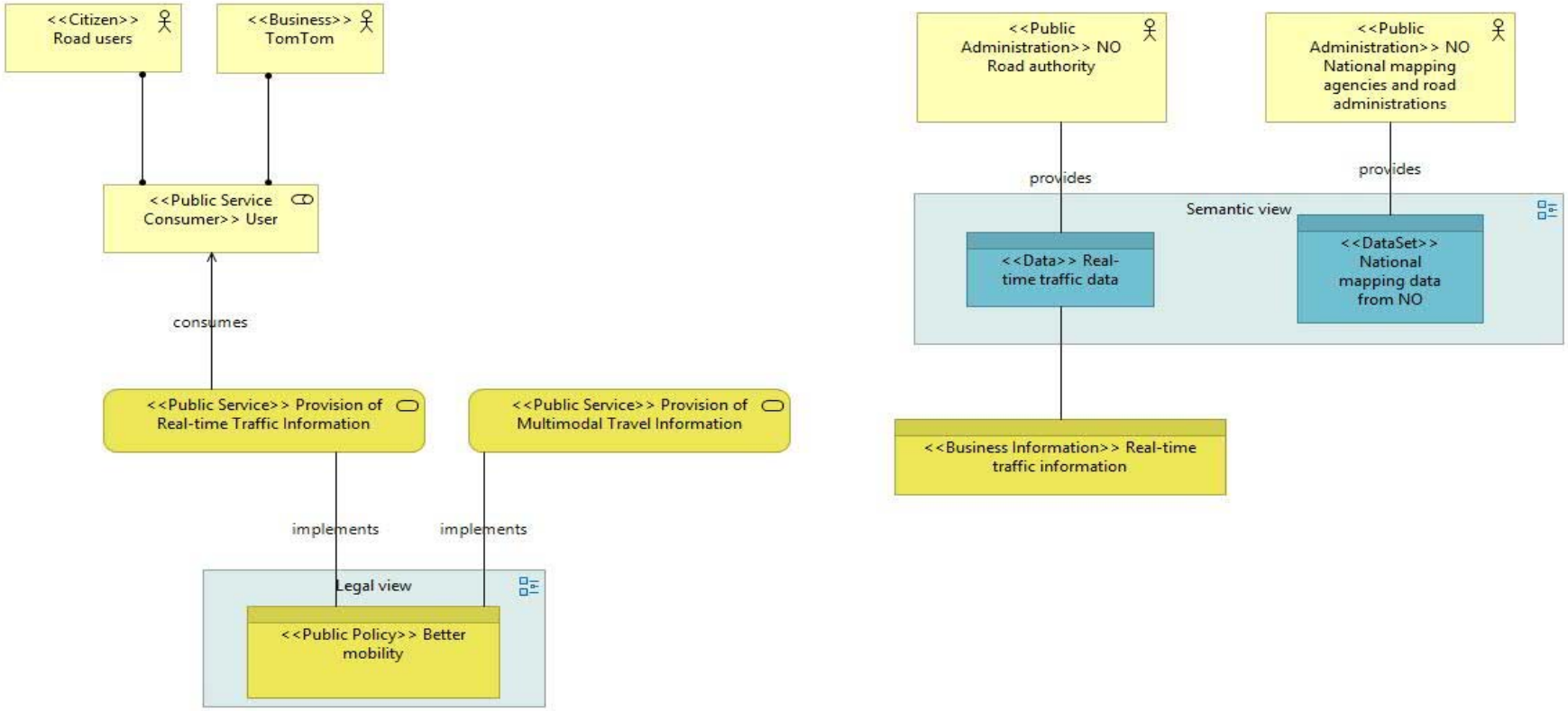
Example: EULF to document reusable spatial data infrastructures to be included in the European Interoperability Cartography(EIC)

EULF Transportation Pilot – Organisational view



Integration plan

Task	Type of task	2015		2016		2017	
EULF to refer to the ICT implications assessment method	Change request						
Action 3.1 to include a geo-spatial question to the ICT implications of EU legislation questionnaire	Change request						
EULF to support 'ICT implications of EU legislation' service on request	New task						

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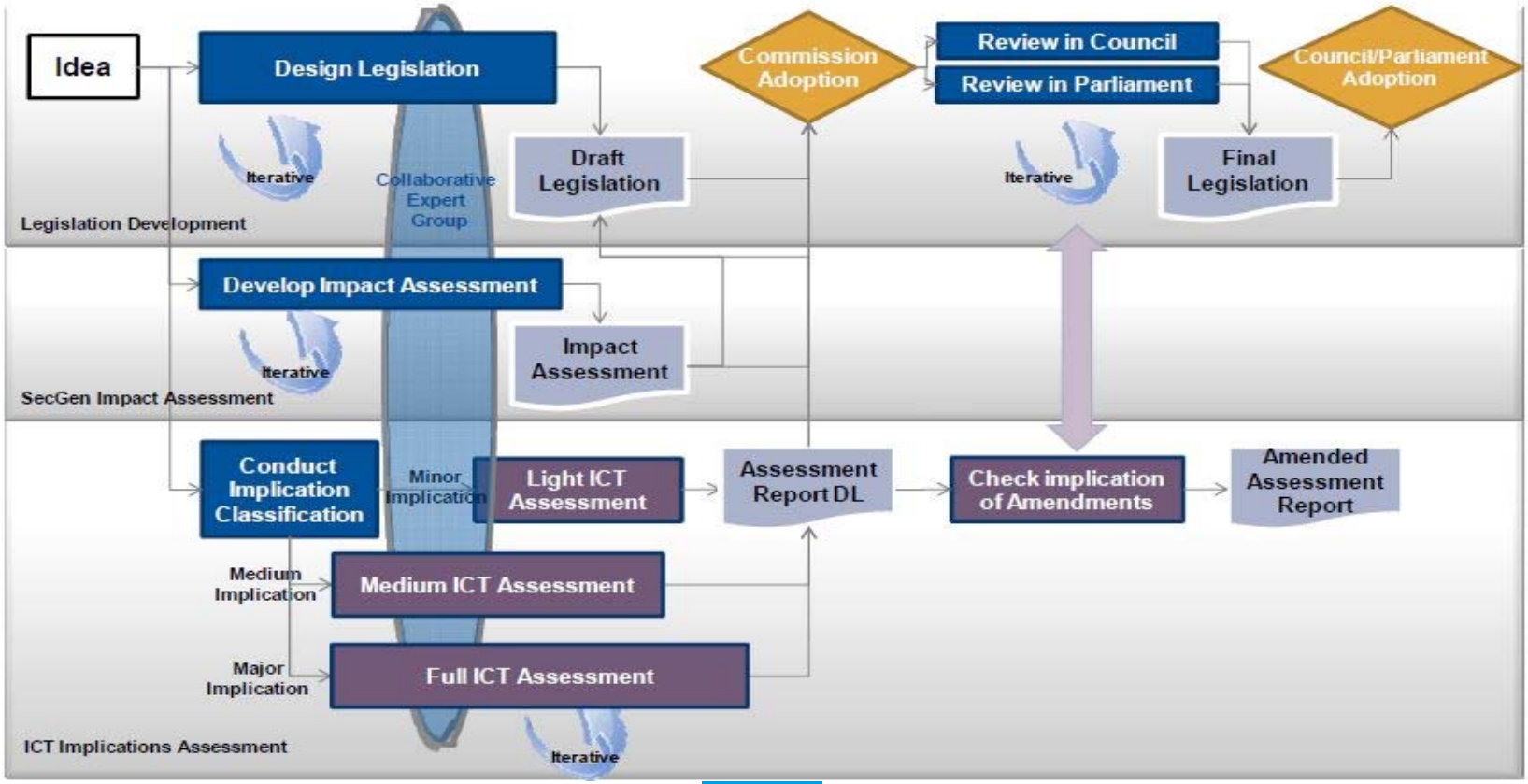
Example: EULF to refer to the ICT implications assessment method

ICT implications of EU legislation - The process



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Integration plan

Task	Type of task	2015		2016		2017	
EULF Blueprint to include a recommendation on base registries	Change request						
Action 1.2 to identify barriers to the adoption of INSPIRE	New task						
EULF to support the establishment of BRIS	New task						

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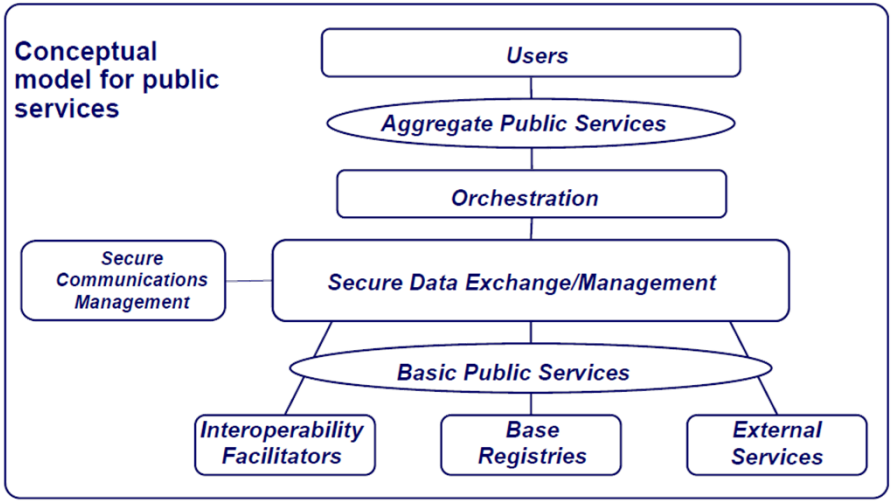
A base register is a trusted, authentic source of information

- A base register is a trusted, authentic source of information under the control of an appointed public administration or organisation appointed by government. (registry is the system…)
- Base registries provide basic information on items such as persons, companies, vehicles, licences, buildings, locations and roads.
- Base registers are the cornerstone of public services



Source: European Interoperability Framework

INSPIRE data can serve as spatial master data for e-Government

Examples:

- Czech Republic, COSMC/CÚZK – Base register of territorial identification, addresses, and real estates (RÚIAN) complies with INSPIRE
- Denmark, basic data for everyone, Danish Geodata Agency
- Netherlands, Buildings and Addresses (BAG) base register
- UK – publication of land registration data and use of INSPIRE
- Netherlands/Belgium, KLIC – cables and pipelines, IMKL specification
- INSPIRE National Implementation Webinars
- Norway/Sweden: TN-ITS specification: extension of INSPIRE TN for static road data exchange
- Core Location Pilot, http://location.testproject.eu

INSPIRE data can potentially be used in many public services

Examples:

- Law enforcement
- (Environmental) licensing
- Building permits
- Postal services
- Emergency services
- Property tax
- Cadastre
- Utilities
- Urban planning
- ...

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INSPIRE... does not provide the entire solution

- **eGovernment use cases** still have to be validated and proven
- INSPIRE is **not yet well known** by eGov units
- INSPIRE **data specifications** may need to be extended to fit e-Government requirements (but there are guidelines on how to do this)
- INSPIRE requires ***read-only*** network services, it formulates no specifications for ***data extraction, real-time processing***, ***data replication, change notification ...*** (but this can be added)

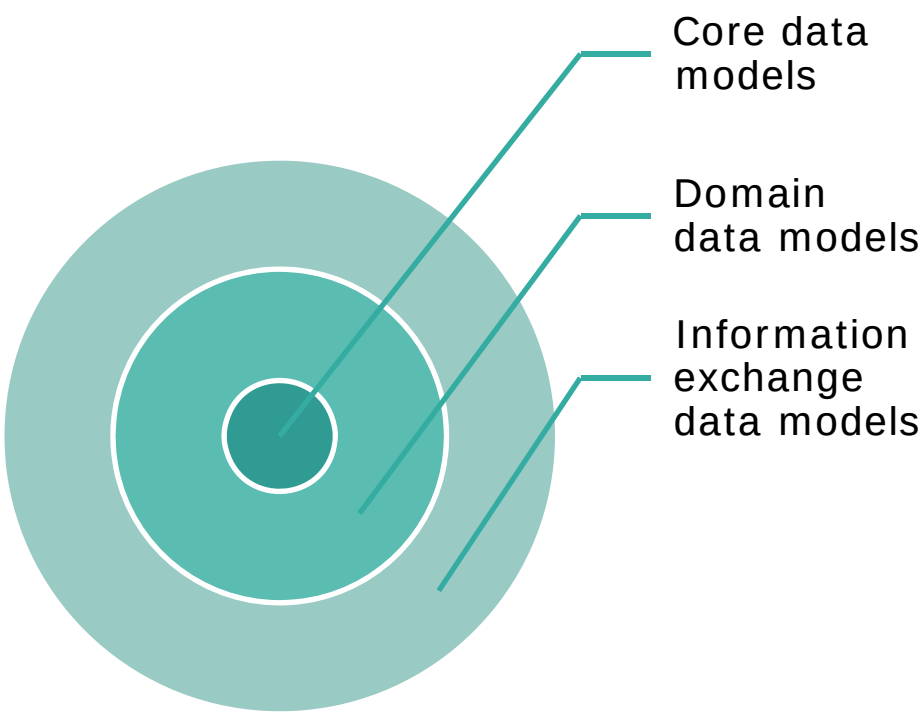
Proposed recommendation on location base registries

- When implementing EIF Recommendation 12 on harmonising interfaces to authentic sources of information, public administrations should consider using the INSPIRE Directive, INSPIRE Regulations, and INSPIRE technical guidelines documents with regard to the interoperability of spatial data, network services, and spatial data services. In particular the latter provide stable semantic and technical specifications for interfaces to base registries containing spatial information.
- The INSPIRE legal requirements regarding interoperability of spatial data, network services, and spatial data services must be implemented by public administrations having data sets that fit within the INSPIRE data themes in the period 2010 - 2020. When implementing these, it is a good practice for the public sector to leverage on it investments by making sure that the same spatial data can be used in the context many public services such as civil registration, company registration, cadastre, law enforcement, environmental permits, building permits, postal services, utilities, or urban planning. In this way, spatial data in base registers has the potential of becoming interoperable master data for the public sector, reinforcing adherence to the "Once Only" principle for e-Government.
- At the level of semantic interoperability, the INSPIRE data specifications provide harmonised data models for 34 spatial data themes, including geographical names, administrative units, addresses, cadastral parcels, transport networks, buildings, utility and governmental services etc. These INSPIRE data specifications are based on international standards and can be extended to fit additional requirements; there are guidelines on how to do this. For technical interoperability, the INSPIRE technical guidelines on network services (discovery, view, download, transformation services) and spatial data services, also based on international standards, can provide a stable machine-to-machine interface. A known limitation is that the INSPIRE specifications provide read-only solutions and may need to be complemented with technical interfaces for data extraction, transaction processing, data replication, change notification, etc.

Integration plan

Task	Type of task	2015		2016		2017	
EULF Blueprint to include a guideline on spatial data modelling	Change request						
Organisation of an EULF/SEMIC joint workshop on spatial data modelling	New task						
EULF to collaborate on guidelines on persistent identifiers and HTTP URIs	New task						
EULF to refer to guidelines on structural metadata management	Change request						
EULF to recommend and refer to guidelines on descriptive metadata management (dataset cataloguing)	Change request						

Example: guideline on spatial data modelling

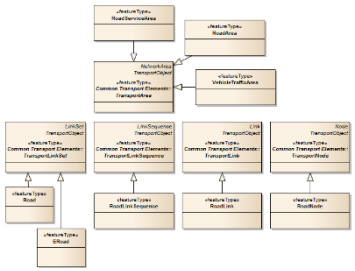


Data modelling concepts
Levels of abstraction

- **Core data model**: a context-neutral data model that captures the fundamental characteristics of an entity.
- **Domain data model**: a conceptual view of a domain that identifies the entities involved and their relationships
- **Information exchange data model**: a data model that defines and describes the structure and content of a specific information exchange context.

How to extend INSPIRE data models?

Conceptual data model (UML)



INSPIRE Generic Conceptual Model
+ INSPIRE TN Data Specification
+ TN-ITS extension

Methodology for the development of data specifications:
http://inspire.ec.europa.eu/index.cfm/pageid/2

Automatic transformation

Tool: e.g. ShapeChange
Guidelines for the encoding of spatial data:
http://inspire.ec.europa.eu/index.cfm/pageid/2

Syntax binding (XML Schema)

```
<?xml version="1.0" encoding="UTF-8"?>
<schema version="3.0" targetNamespace="urn:x-
inspire:specification:gmlas:RoadTransportNetwork:3.0" elementFormDefault="qualified"
xmlns:tn-ro="urn:x-inspire:specification:gmlas:RoadTransportNetwork:3.0"
xmlns:tn="urn:x-inspire:specification:gmlas:CommonTransportElements:3.0"
xmlns:net="urn:x-inspire:specification:gmlas:Network:3.2" xmlns:gn="urn:x-
inspire:specification:gmlas:GeographicalNames:3.0"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns="http://www.w3.org/2001/XMLSchema"><annotation><documentation>-- Definition --
This package defines the types that are used on the road
subtheme.</documentation></annotation><import
schemaLocation="http://inspire.ec.europa.eu/schemas/gn/3.0/GeographicalNames.xsd"
namespace="urn:x-inspire:specification:gmlas:GeographicalNames:3.0"/><import
schemaLocation="http://inspire.ec.europa.eu/schemas/tn/3.0/CommonTransportElements.
xsd" namespace="urn:x-
inspire:specification:gmlas:CommonTransportElements:3.0"/><import
schemaLocation="http://inspire.ec.europa.eu/schemas/net/3.2/Network.xsd"
namespace="urn:x-inspire:specification:gmlas:Network:3.2"/><import
schemaLocation="http://schemas.opengis.net/gml/3.2.1/gml.xsd"
namespace="http://www.opengis.net/gml/3.2"/><!--XML Schema document created by
ShapeChange-->
<element type="tn-ro:RoadType" substitutionGroup="tn:TransportLinkSet"
name="Road"><annotation><documentation>-- Definition -- A collection of road link sequences
and/or individual road links that are characterized by one or more thematic identifiers and/or
properties. -- Description -- EXAMPLE Examples are roads characterized by a specific
identification code, used by road management authorities or tourist routes, identified by a specific
name. </documentation></annotation></element><complexType
name="RoadType"><complexContent><extension
base="tn:TransportLinkSetType"><sequence><element name="localRoadCode"
nillable="true" minOccurs="0">
```


INSPIRE GML application schemas

ISO 19136 Geography Markup Language
ISO 19118 Geographic information - encoding

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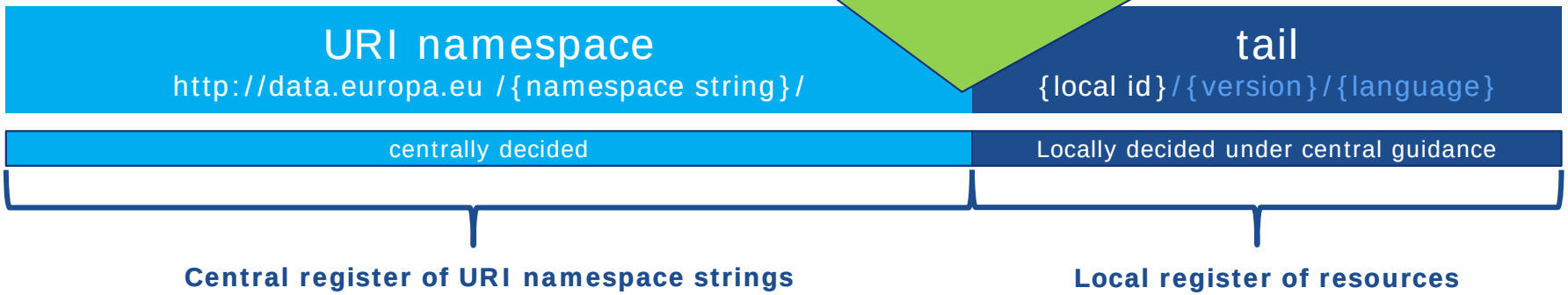
Example: guidelines on persistent identifiers and HTTP URIs

The combination {namespace string}/{local id} would also fit the INSPIRE object identifier, the INSPIRE recommendations on URIs , and support several governance models discussed in the ARE3NA PID study.



- **One central register of URI namespace strings:** the Persistent URI Service manages the URI namespace string and redirections .
- **Many local registers of resources (with PIDs):** the local registers contain the local identifier of resources for which information is kept in the register.

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Integration plan

Task	Type of task	2015		2016		2017	
EULF to share expertise with the CBA measurement activities	New task						
EULF to align procurement guidelines with the Sharing & Reuse Action	Change request						
EULF to collaborate with other EC initiatives on data licensing guidelines for spatial information	New task						
EULF to include recommendations on reusability	Change request						
EULF to contribute to the CISE handbook	New task						
EULF to refer to CAMSS in the 'Standards for SDI & e-Government' guideline	Change request						
EULF to define key life-events allowing to classify and manage location-enabled PSs	New task						

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Conclusion: EULF-ISA integration will have the following outcome

1. Better alignment with the EIF;
2. Contributions to the EIRA and possible creation of a Location Information Reference Architecture;
3. Contributions to a European cartography of location-related interoperability solutions;
4. Policy alignment included in the 'impact assessment' phase of the policy lifecycle;
5. Inclusion of a recommendation on base registries;
6. Increased focus on spatial data standards; and
7. Various other synergies via sharing expertise and cross-referencing.

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