eENVplus

eENVplus - eEnvironmental services for advanced applications within INSPIRE

CIP – Pilot Actions
Grant agreement no: 325232
Starting date: 01 January 2013

EnviroInfo 2013 – Hamburg, 4 September 2013

Summary

- **Project overview**
- **eENVplus infrastruture**
  - ☐ Data harmonisation services
  - ☐ Thesaurus services
  - ☐ Processing services
- **Application scenarios and use cases**
- **Trining framework**
- **Conclusion**

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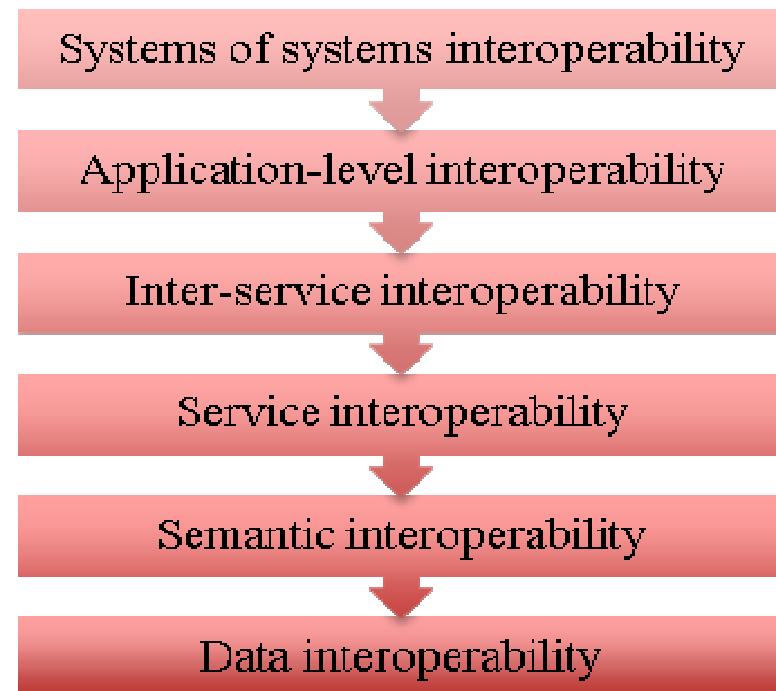- Conclusion

![eENVplus logo]
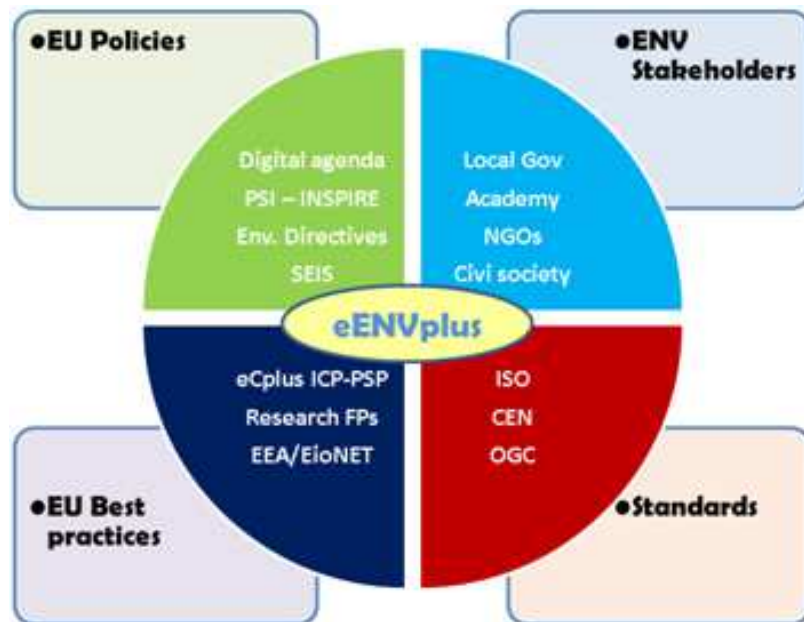
eENVplus (www.eenvplus.eu)

ICT-PSP CIP-Pilot A project

Time period: 1 January 2013 – 1 January 2016

Partners involved: 19 partners from 12 EU countries

Key objective

- to support INSPIRE and SEIS implementation
- through deployment and integration of value-added eEnvironment services
- available at national level and through past/on-going key EC-funded projects
- eENVplus provides Members State and the GI Communities, with tools addressing a **multi-level interoperability stack:**

Initiatives   Policy   Environmantal Directives

Digital Agenda for Europe

INSPIRE · Infrastructure for Spatial Information in Europe

SEIS — Shared environmental information system

EIS

PSI

isa

ICELAND

SWEDEN

DENMARK

IRISH REPUBLIC

NETHERLANDS

UNITED KINGDOM

BELGIUM

LUXEMBOURG

POLAND

SLOVAKIA

FRANCE

AUSTRIA   HUNGARY

SLOVENIA

ITALY

GREECE

MALTA

CYPRUS

Partnership

CISIC

imati

Vmm

SINERGIS

Epsilon

disy

GraphiTech

PLANETEK ITALIA

Epsilon ITALIA

ISPRA — Istituto Superiore per la Protezione e la Ricerca Ambientale

GISt

cenia

GeoZS

SAZP

L'ATELIER technique des espaces naturels

LANDMÆLINGAR ÍSLANDS ...vísa þér veginn

dgTerritório

GEO

eENVplus

Air

Water

Nature Conservation

ENV Risks

LandUse Planing

Everyday Life

nesis

NatureSDIplus

BRISEIDE

ONE

HUMBOLDT

VESTA GIS

CAFÉ

- ■ **National Agencies:**
  - ☐ Environmental Agencies: VMM (BE), ISPRA (IT), CENIA (CZ), SAZP (SK), MRD (HU) with support of GEO (HU); moreover, EPSILON in close cooperation with GR EA
  - ☐ Mapping Agencies: DGT (PT), NLSI (IC, in close cooperation with IC EA)
  - ☐ Thematic Agencies: Geological (GeoZS, SLO), Nature (ATEN, FR)
- ■ **Technical partners:** CNR-IMATI, Epsilon, Sinergis, Graphitech, disy, EPSIT, PKH
- ■ **University:** GEO
- ■ **Standardization Body:** GISt (Secretary of CEN TC/287 Geographical Information)
- ■ **European Association:** GISIG (eENVplus Coordinator)

**19 partners from 12 countries**

European projects background

- **NESIS** - A Network to enhance a European Environmental Shared and Interoperable Information System (ICT PSP project)

- **NATURE-SDIplus -** Best Practice Network for SDI in Nature Conservation (eContentplus project)

- **BRISEIDE** – Bridging services, information and data for Europe (ICT PSP project)

- **OneGeology Europe -** Making digital geological spatial data more easily discoverable, accessible and useable

- **HUMBOLDT** - Towards the Harmonisation of Spatial Information in Europe (FP6 GMES project)

- **CAFE** – Development and demonstration of technical IT solutions for data exchange and reporting under the CAFE Directive using INSPIRE services"

- **VESTA-GIS** – Development of a training infrastructure (LdV)
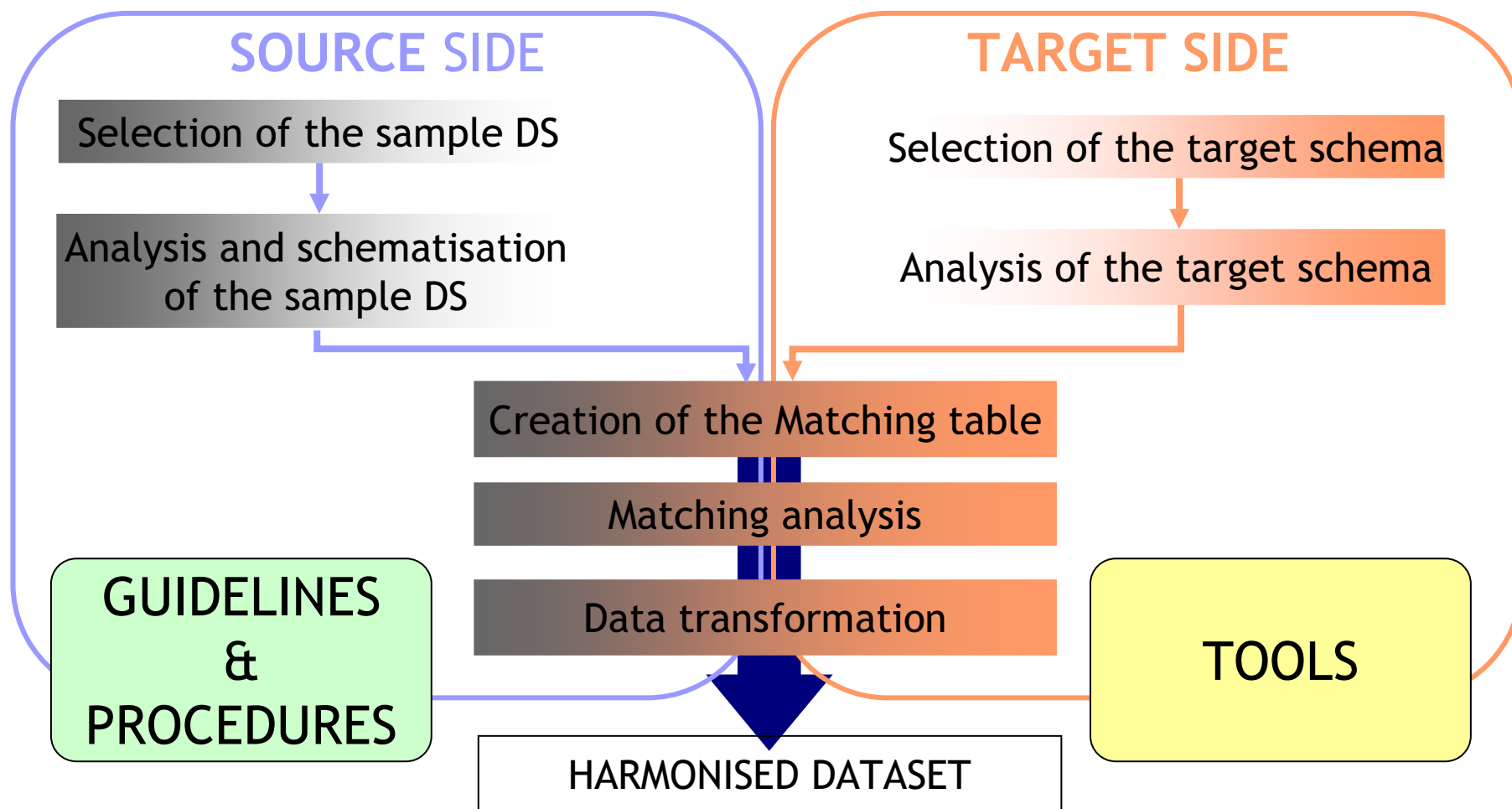
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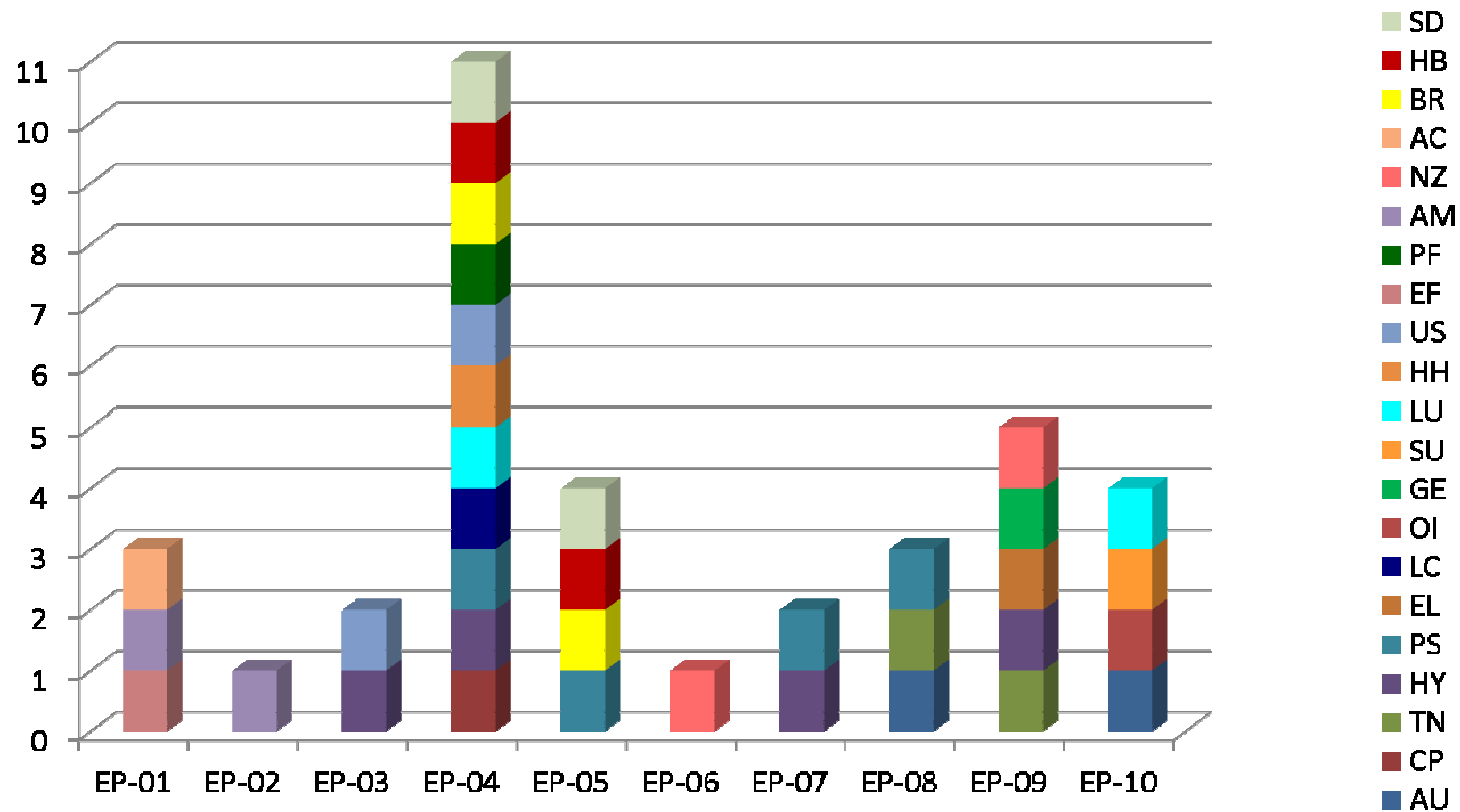- **Conclusion**

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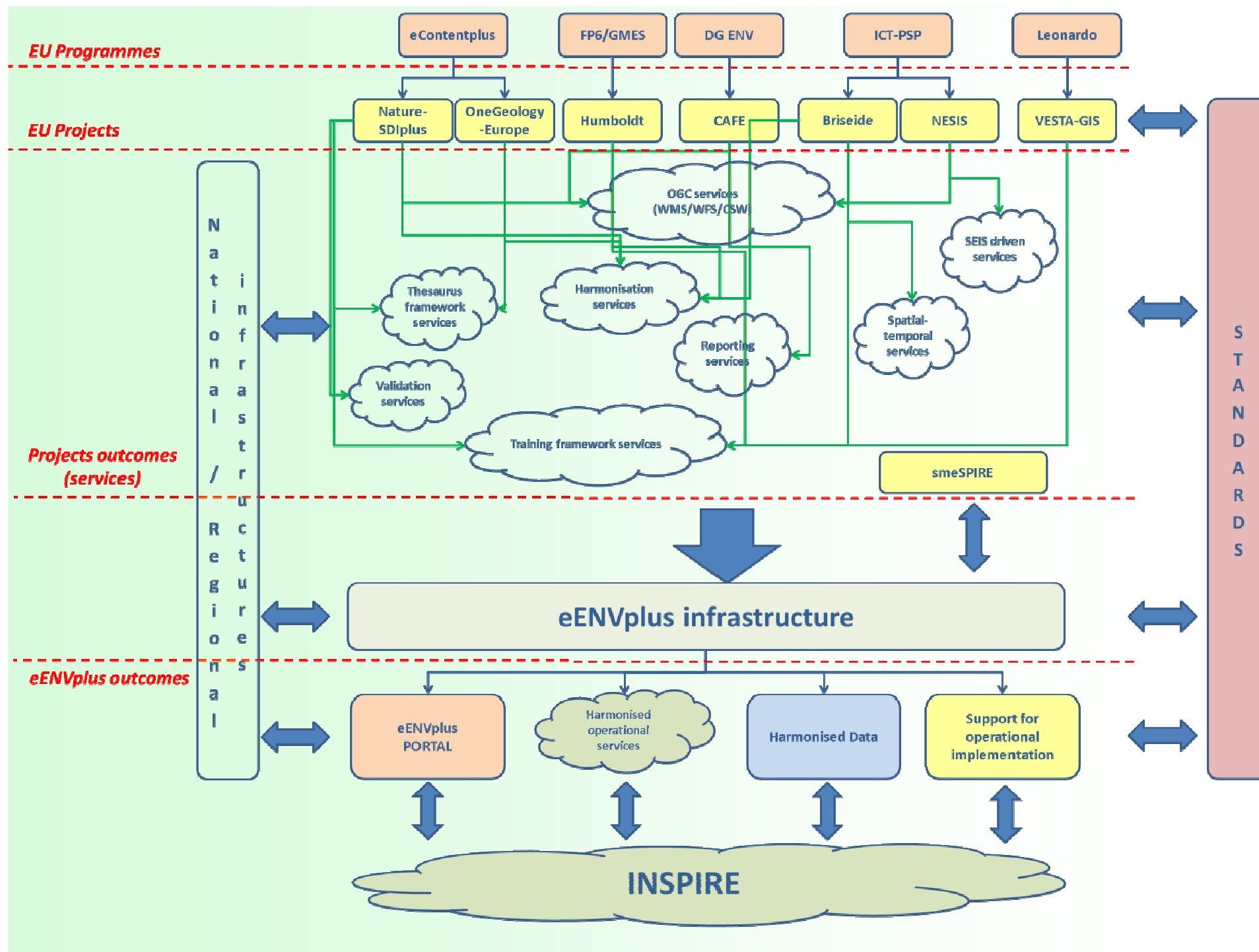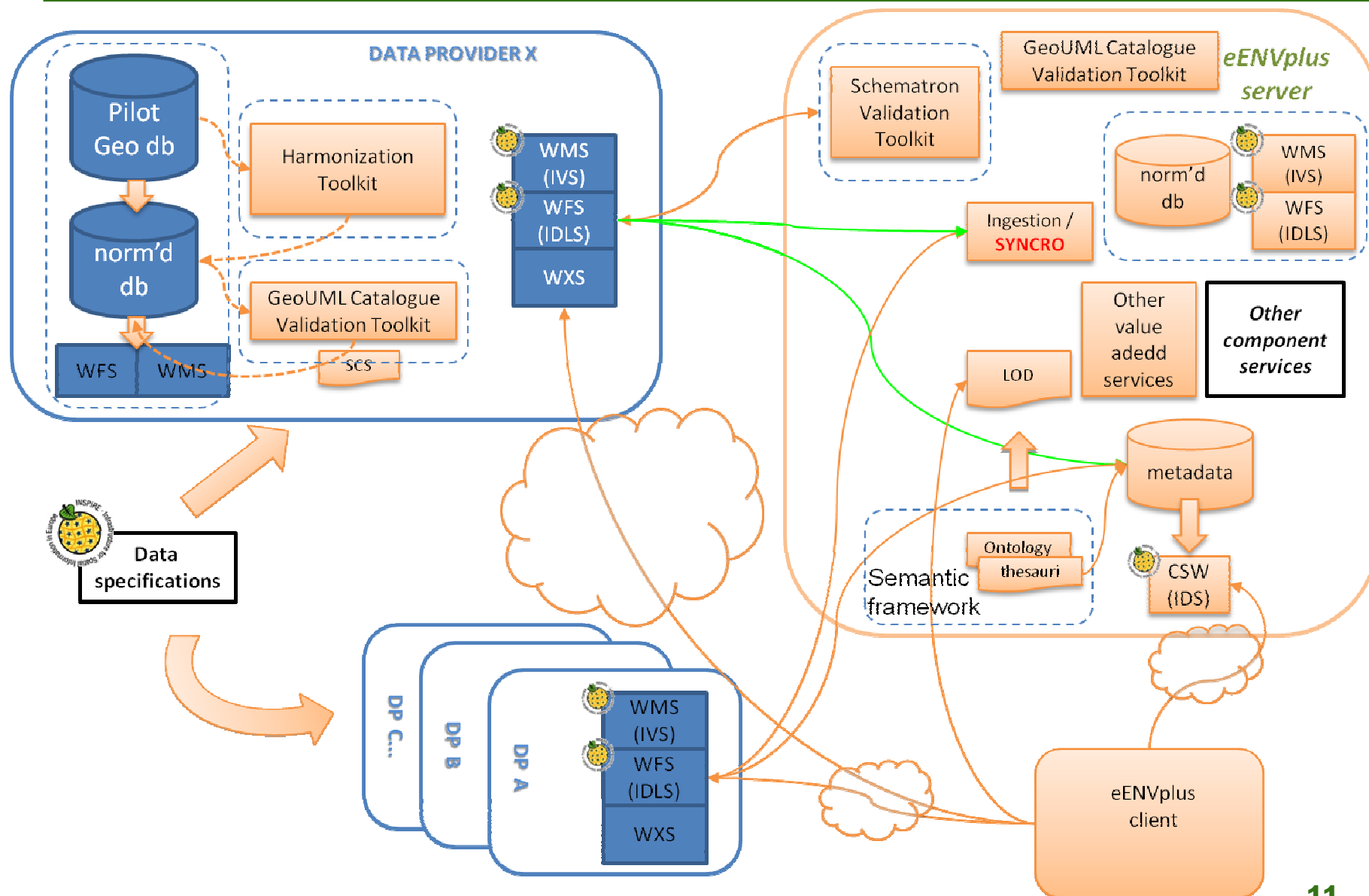
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The overall DH methodology

SOURCE SIDE

- Selection of the sample DS
- Analysis and schematisation of the sample DS

TARGET SIDE

- Selection of the target schema
- Analysis of the target schema

- Creation of the Matching table
- Matching analysis
- Data transformation

GUIDELINES & PROCEDURES

TOOLS

HARMONISED DATASET

Data harmonisation services

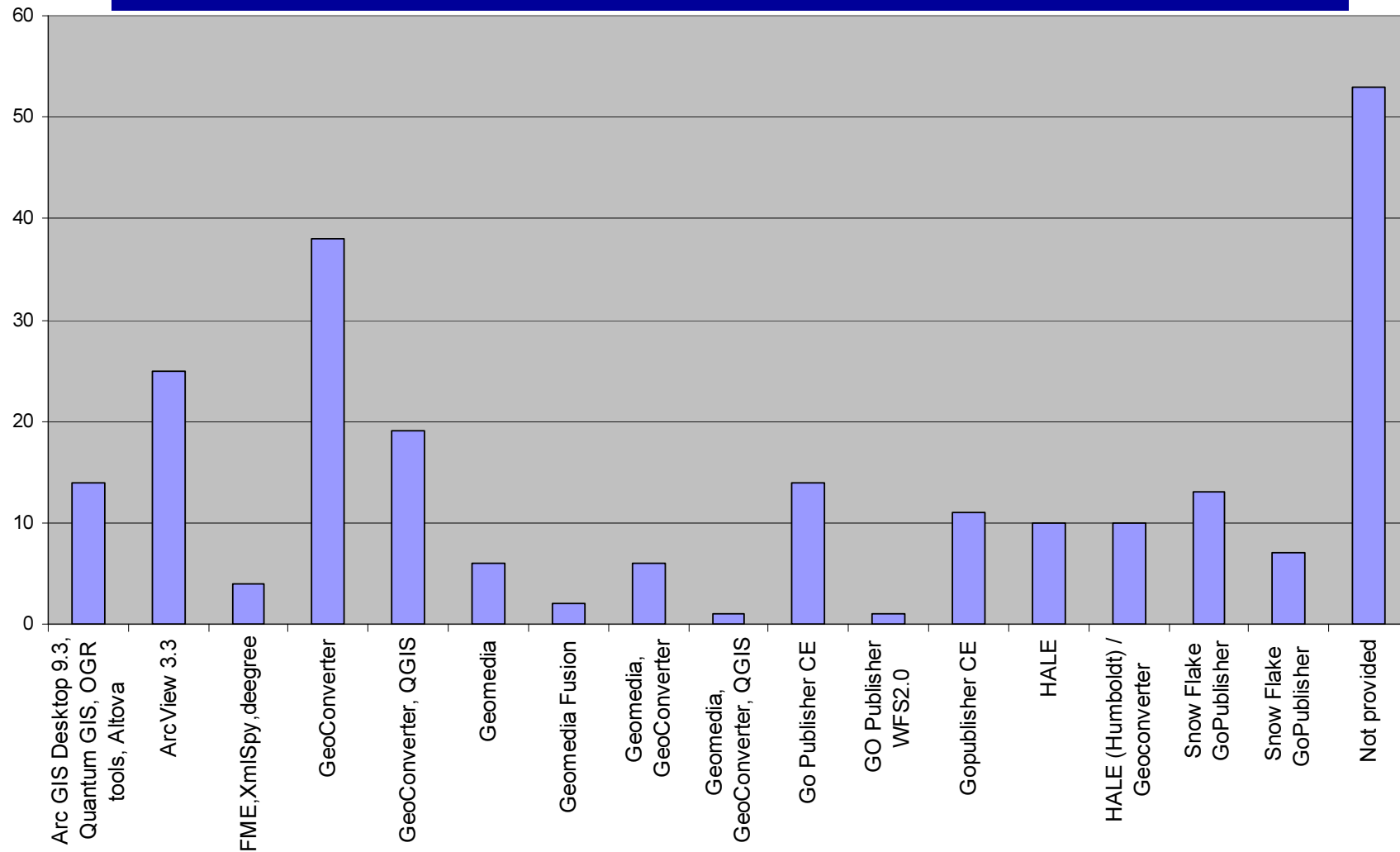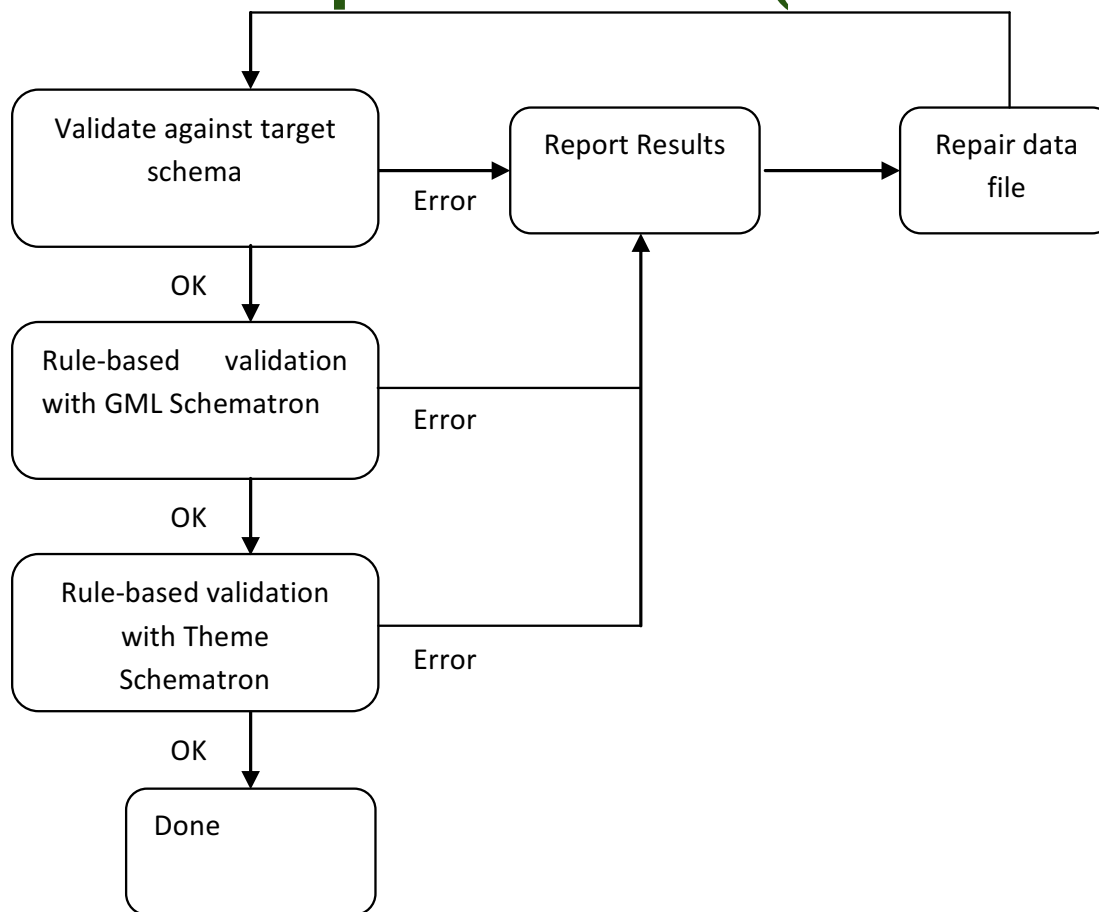## Distribution of the 21 INSPIRE data-themes per Pilot
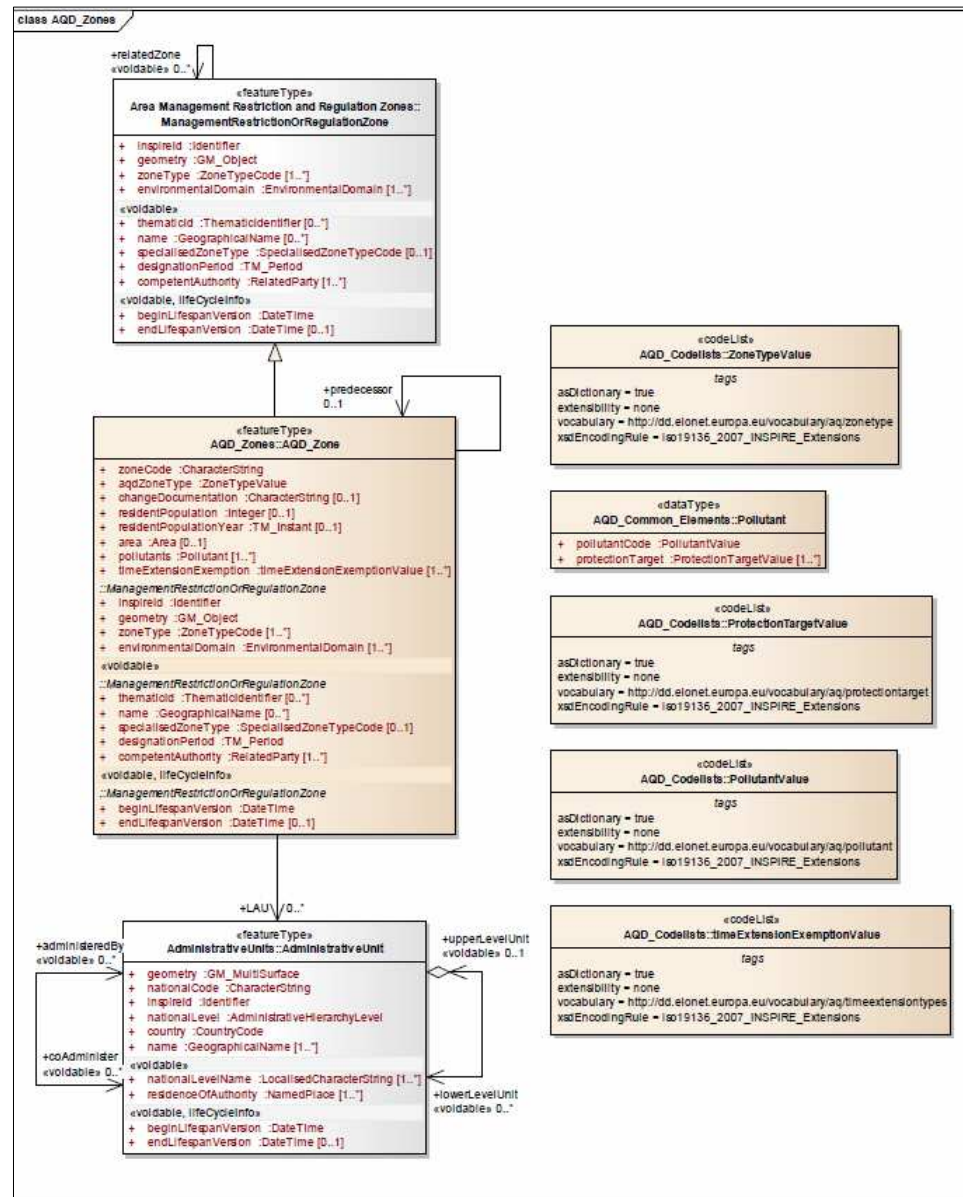
Example of other relevant Data Models:

the AQD DM of EEA for Air Quality Reporting

■The relationships between AQD_Zones class and AU and AM INSPIRE DS

Data harmonisation services

16 different "tool configurations" used by Data Providers in the Datasets Harmonisation Process

Validation process (datasets)

```
                    ┌─────────────────┐   Error   ┌──────────────┐       ┌──────────────┐
                    │ Validate against │─────────→ │ Report Results│──────→│ Repair data  │
                    │  target schema   │           │              │       │    file      │
                    └─────────────────┘           └──────────────┘       └──────────────┘
                           │ OK
                           ↓
                    ┌─────────────────┐   Error
                    │ Rule-based       │─────────→
                    │ validation with  │
                    │ GML Schematron   │
                    └─────────────────┘
                           │ OK
                           ↓
                    ┌─────────────────┐   Error
                    │ Rule-based       │─────────→
                    │ validation with  │
                    │ Theme Schematron │
                    └─────────────────┘
                           │ OK
                           ↓
                    ┌─────────────────┐
                    │      Done        │
                    └─────────────────┘
```

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eENVplus   Thesaurus services

- **General Objective**

To make effective sharing and reuse of data overcoming the language and cultural barriers in the use of data.

- **Specific Objectives**
  - **A common thesaurus for the Environment**
    - based on existing multilingual thesauri
    - covering different data themes related to the environmental domains
  - **Exploitation of the thesaurus framework**
   - to compile metadata describing resources more effectively, with more widely shared concepts and limiting the language barriers,
    - to improve resource discovery across applications and platforms

Thesaurus services

☐ Different communities with different competencies are involved in the management of Environmental information

☐ Different Thesauri have been already developed covering most of these competencies

☐ More that one terminology is available for a given competency

☐ Terminologies have often a national origin. They are not uniform in all the EU countries and often even stakeholders from the same country can adopt different terminologies in everyday practice

✓ **Picking up just one of the available thesauri does not cover all**

✓ **Exploitation of existing thesauri (general purpose and target thesauri)**

✓ **Thesaurus interoperability to shift from on thesaurus to another**

Thesaurus services
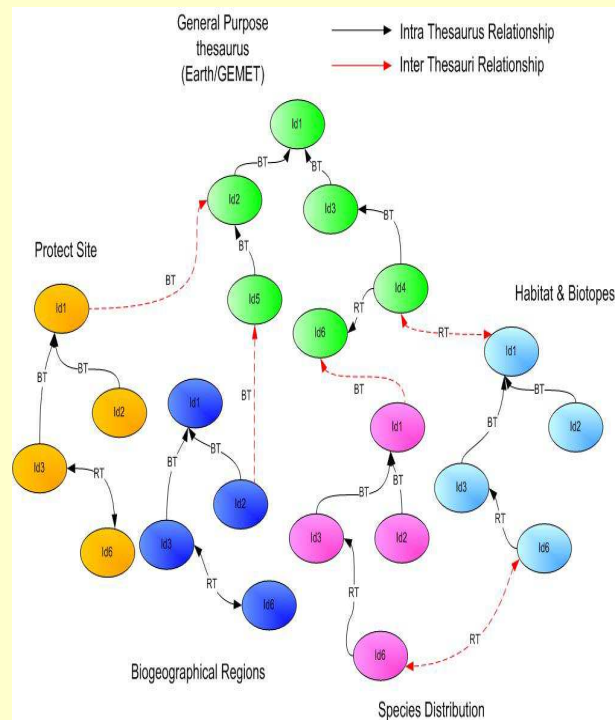
KOS/Thesauri

Interlinking

Linksets

Linkset Quality

TF exploitation Services

Metadata Compilation

Data Discovery

Semantic Search

CROSS-WALKING

Thesaurus services

Content Enlargement

- New thesauri (Thesaurus Survey & literature)
- Interlinking between thesauri
- Interlinking Quality Assessment

TF Exploitation services

- metadata compilation
- data retrieval (query formulation/refinement)
- semantic search (semantic similarity, semantic visualization ...)

Server deployment

- Framework re-engineer
  (VIRTUOSO and Pubby data server setting)

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Objectives

■ To create the eENVplus platform consisting of state-of-the-art, efficient, robust and standard-based services:

☐ INSPIRE OWS (where available)

☐ Ingestion

☐ Service Validation (CSW, WMS)

☐ Data Validation (schema & constraints)

☐ LOD (if any ontology available) & Theasuri

☐ processing

☐ eReporting

☐ Crowdsourcing

☐ 3D visualization

Services (1/4)

- **Basic INSPIRE OWS from national pilots (where available)**

  Existing services to discover, view and download data
  - ❑ CSW
  - ❑ WMS
  - ❑ Atom/WFS
  - ❑ WCS

- **Ingestion services**

  Ingestion services to automatically load <u>not conformant</u> data and facilitate schema transformation ("bulk&cache") at database level

Services (2/4)

■ **Service Validation services**

❑ Using **INSPIRE Geoportal** Validator (web service) for:

Existing metadata, CSW and WMS

http://inspire-geoportal.ec.europa.eu/validator2/

■ **Data Validation services**

❑ Using **Geonovum** tool for GML data validation for:

XML schema, schematron businessrules, 2d geometry

http://validatie-dataspecificaties.geostandaarden.nl/
genericvalidator/helpResource/download/305?lang=en

❑ Using **GeoUML** validation tool for:

OCL constraints, topological constraints

http://spatialdbgroup.polimi.it/en/home/

Services (3/4)

■ **LOD services**

Using and extending GetLOD implementation (Regione Emilia-Romagna - IT) to publish RDF triples from WFS sourced data and CSW metadata

■ **Thesaurus services**

Expose EARTh thesaurus that extend and is interlinked to GEMET to explore the use in the context of INSPIRE environmental themes.

Services (4/4)

■ **Processing**

Using and extending WPS services implemented in BRISEIDE project (GeoServer, R2WPS) according to pilots' requirements:

❑ Topological

❑ Statistical

❑ Raster algebra

❑ …

to build added value services ie: cross border landslide risk maps, cross border flood hazard maps…

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Scenarios and use case

Pilots / Scenarios / Use Cases

- In 10 pilots, 9 Scenarios, 3 cross-border
- Pilots: the actual implementation of the scenarios in a geographical area
- Scenarios: the different use cases considered by eENVplus, which the applications correspond to
- Use Case: a methodology used in system analysis to identify, clarify, and organize system and user requirements

	Scenario Title	ENV Aspect	Pilots
EP01	Implementation of a SEIS for air quality data	Air Quality	BELGIUM
EP02			
EP03			BELGIUM
EP04			CZECH REPUBLIC / SLOV...
EP05		Nature Conservation	FRANCE
EP06			
EP07			
EP08			
EP09	Geological Map Harmonization	Environmental Risk (Geohazard)	ITALY / SLOVENIA
EP10	Urban Landuse Planning: INSPIRE'd land use planning Indicators to monitor good urban planning practices	Ecological Landuse Planning	PORTUGAL

- Offering examples on how the eENVplus outcomes can be utilized in a variety of different situations (ENV aspects) and users' needs
- Providing streamline of the tools available to the project into the main flow of INSPIRE compliance
- Proposing interoperability among the applications (existing or planned)
- to create a more complete thematic (integration among complementary issues) or regional example (integration among cross-border cases)

Scenarios & Pilots

eENVplus

- **3 Cross-border Pilots:**
  - ☐ **Czech Republic/Slovakia** for everyday life issues connected to Environmental aspects
  - ☐ **Hungary/Slovakia** for Nature Conservation
  - ☐ **Italy/Slovenia** for Environmental Risk (Geohazard)

- **1 Scenario in two Pilots**
  - ☐ Belgium and Italy for Air Quality

- **Portugal**
  - ☐ three municipalities (PT) from transboundary catchment – the Tagus River, Scenario on Ecological landuse Planning
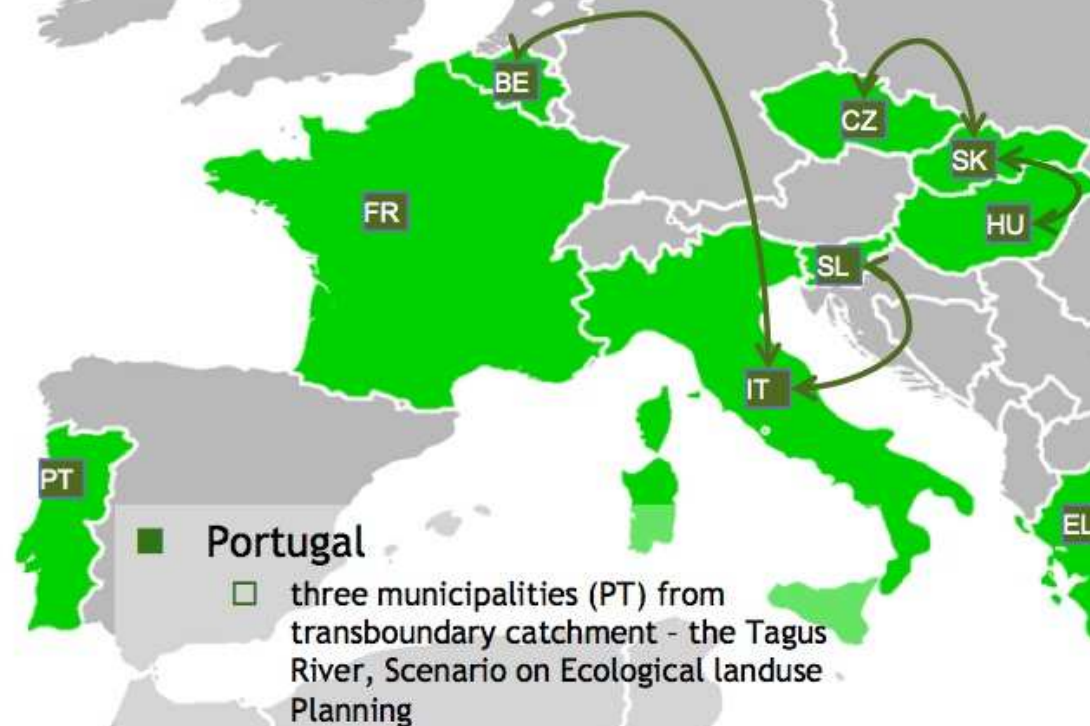
Underlying content, INSPIRE data Themes

- various National datasets related to many INSPRE Annex I-II-III Data Themes, datasets are made available for eENVplus (some are under IPR, many are Open Data)

Pilot Applications:	EP01	EP02	EP03	EP04	EP05	EP06	EP07	EP08	EP09	EP10
ANNEX I										
1. RS: Coordinate reference systems								☐		
4. AU: Administrative units								☐		☐
6. CP: Cadastral parcels				☐						
8. HY: Hydrography			☐	☐			☐			
9. PS: Protected sites				☐	☐		☐	☐		
ANNEX II										
2. LC: Land cover				☐		☐				☐
3. OI: Orthoimagery										☐
4. GE: Geology									☐	
ANNEX III										
1. SU: Statistical units										☐
4. LU: Land use				☐						☐
5. HH: Human health and safety				☐						
6. US: Utility and governmental services			☐	☐						
7. EF: Environmental monitoring facilities	☐	☐				☐				
8. PF: Production and industrial facilities				☐						
11. AM: Area mng/rest/reg zones & rep. units	☐	☐							☐	
12. NZ: Natural risk zones									☐	
13. AC: Atmospheric conditions	☐			☐						
14. MF: Meteorological geographical features							☐			
17. BR: Bio-geographical regions				☐	☐					
18. HB: Habitats and biotopes				☐	☐					
19. SD: Species distribution				☐	☐					

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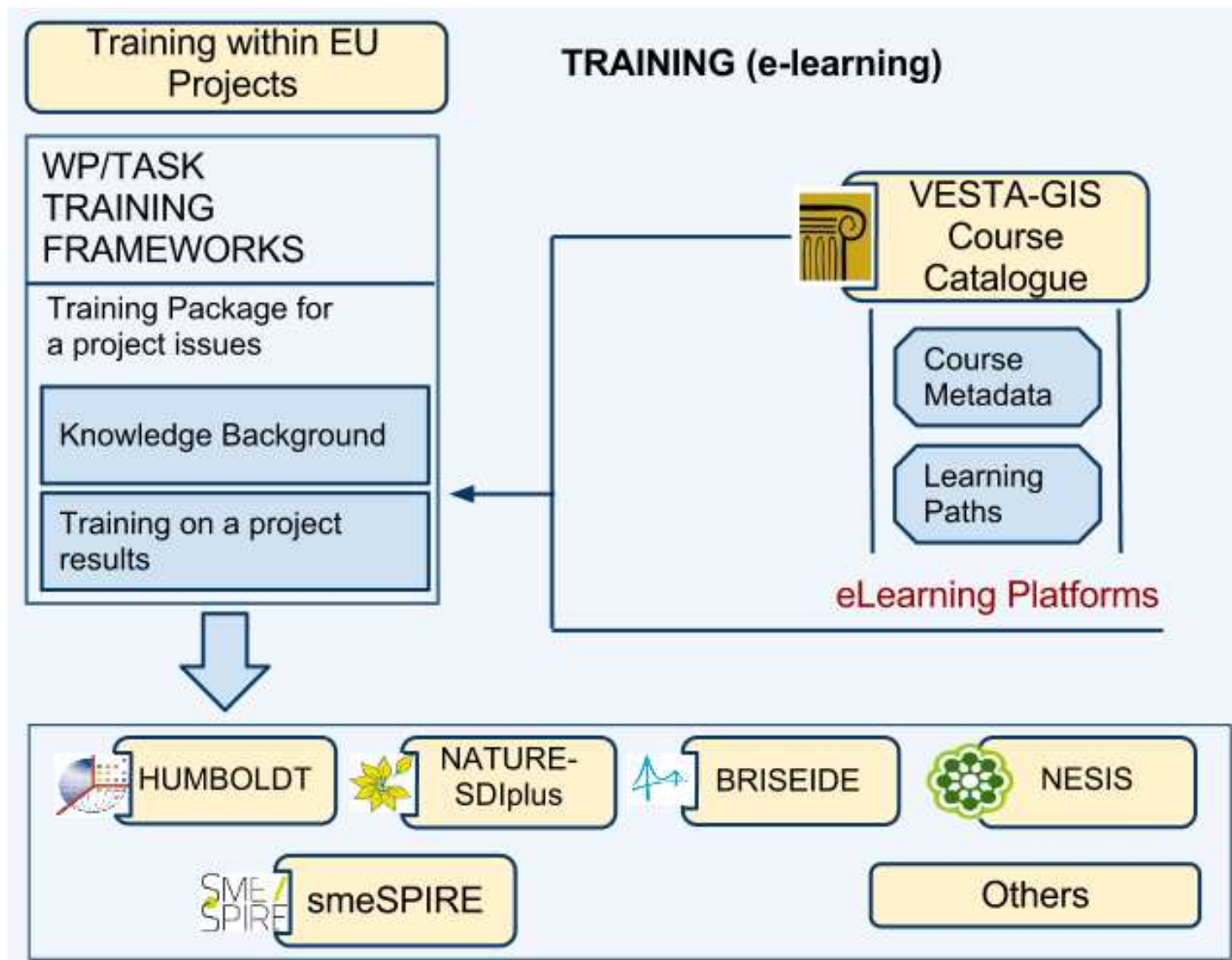
eENVplus Training Framework
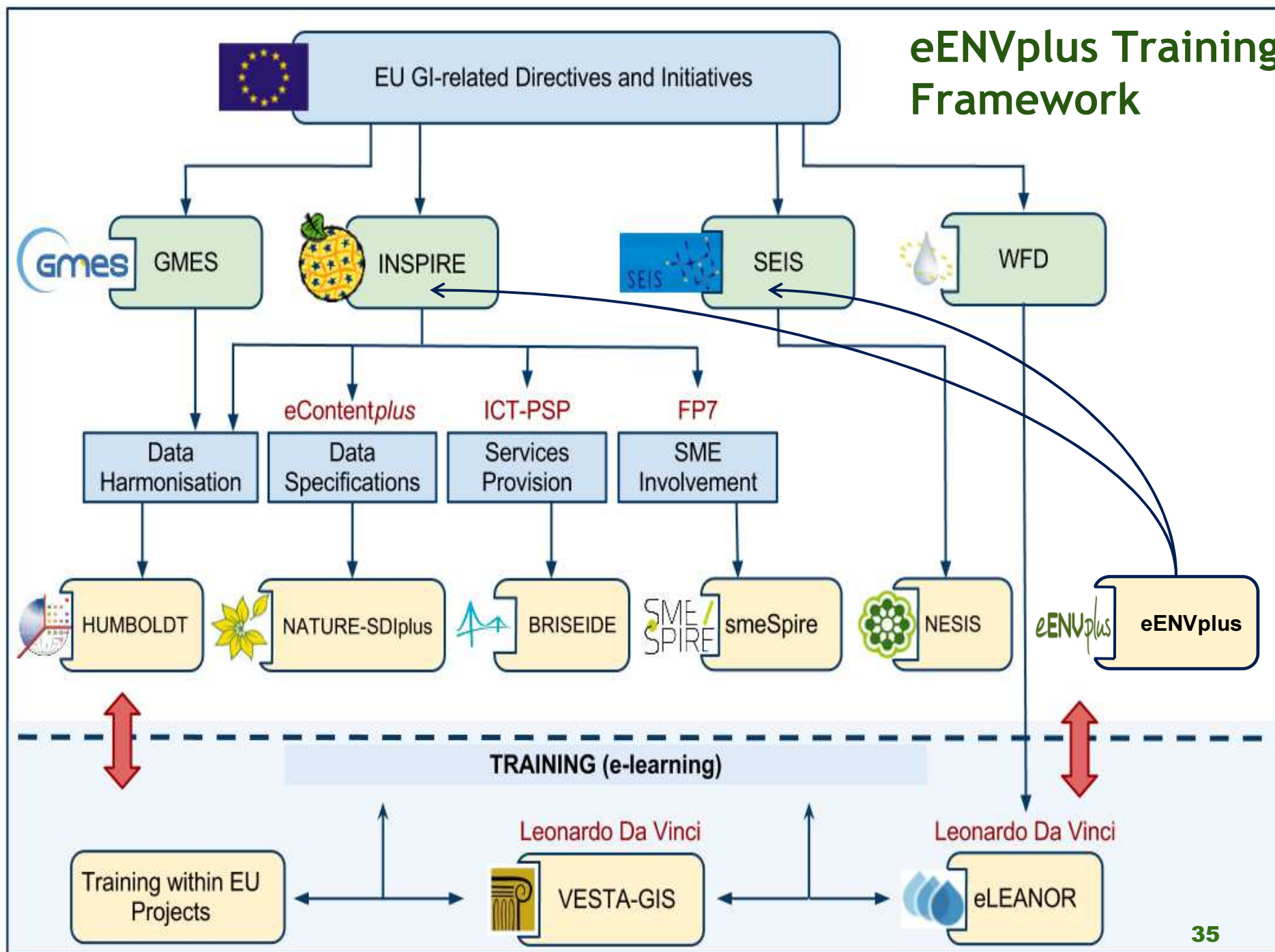
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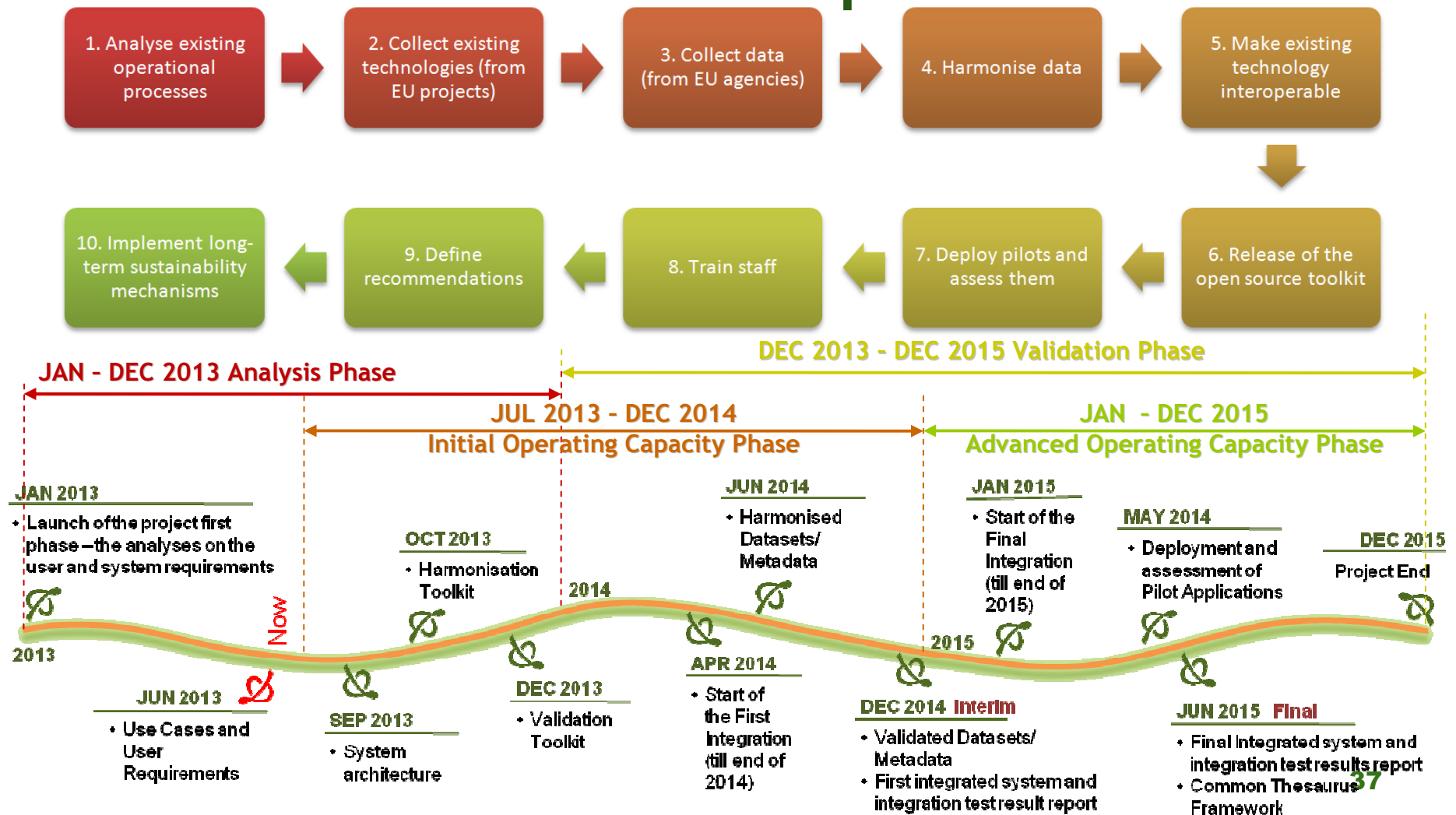- **Application scenarios and use cases**
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Macro-actions foreseen by eENVplus and Road Map

1. Analyse existing operational processes	→	2. Collect existing technologies (from EU projects)	→	3. Collect data (from EU agencies)	→	4. Harmonise data	→	5. Make existing technology interoperable

10. Implement long-term sustainability mechanisms	←	9. Define recommendations	←	8. Train staff	←	7. Deploy pilots and assess them	←	6. Release of the open source toolkit

JAN – DEC 2013 Analysis Phase

DEC 2013 – DEC 2015 Validation Phase

JUL 2013 – DEC 2014 Initial Operating Capacity Phase

JAN – DEC 2015 Advanced Operating Capacity Phase

JAN 2013
• Launch of the project first phase – the analyses on the user and system requirements

OCT 2013
• Harmonisation Toolkit

JUN 2014
• Harmonised Datasets/ Metadata

JAN 2015
• Start of the Final Integration (till end of 2015)

MAY 2014
• Deployment and assessment of Pilot Applications

DEC 2015
Project End

2014

2013

Now

2015

JUN 2013
• Use Cases and User Requirements

SEP 2013
• System architecture

DEC 2013
• Validation Toolkit

APR 2014
• Start of the First Integration (till end of 2014)

DEC 2014 Interim
• Validated Datasets/ Metadata
• First integrated system and integration test result report

JUN 2015 Final
• Final integrated system and integration test results report
• Common Thesaurus Framework

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Conclusion

eENVplus Infrastructure is the base for including new applications and new services also within future projects at a European and National level
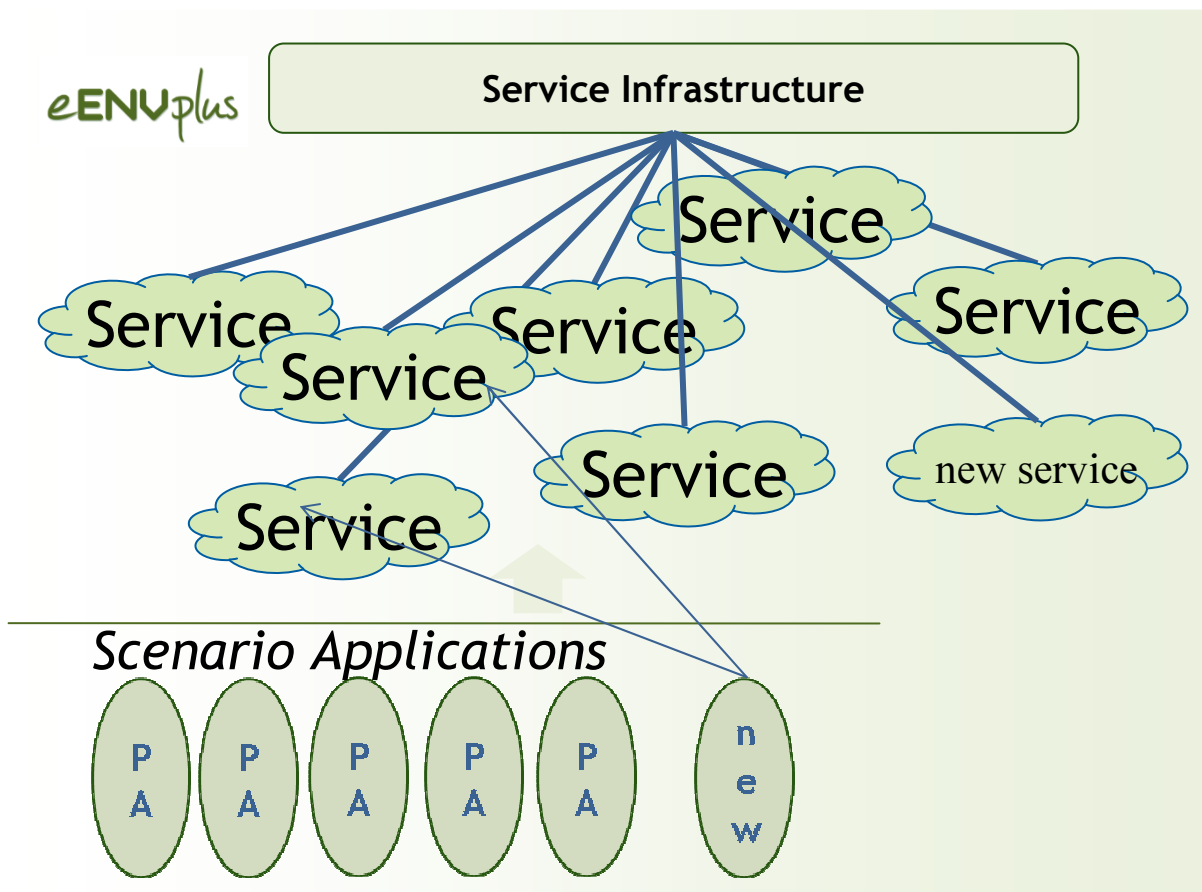
- eENVplus will be then the Framework for implementing/use/ sharing eEnvironmental services

- That will be part of the long term sustainability plan after the project conclusion