Web services for spatial data transformation and exchanges in SDI: a prototypical implementation of the LPIS Quality Assurance Test Bed Services

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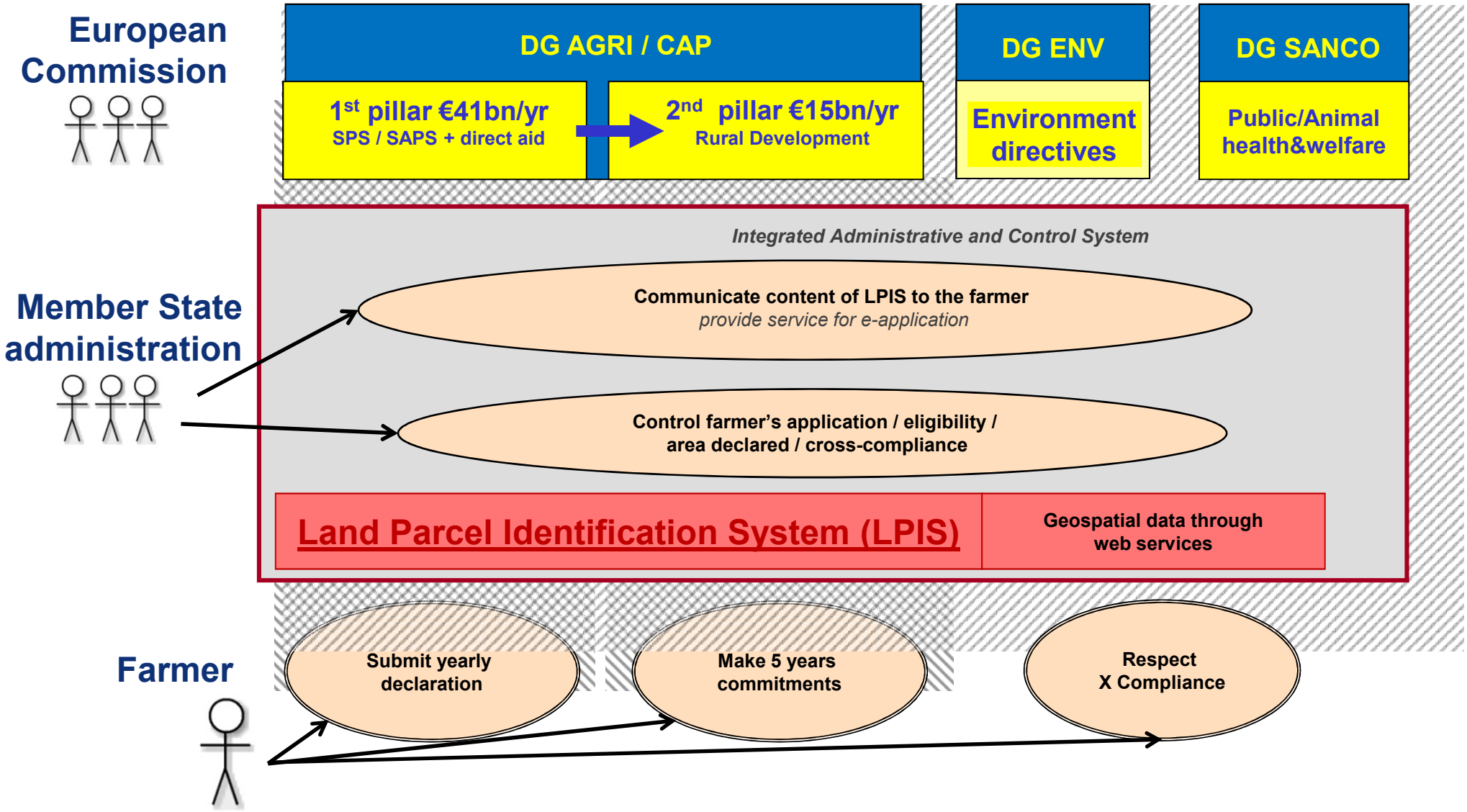
Outline

- Introduction
  - CAP, IACS and LPIS
  - LPIS QA: Abstract Test Suite & Executive Test Suite
- Schema transformation service for LPIS
  - Architecture
  - Implementation
- Content validation service for LPIS
- Linkage to INSPIRE
- Conclusions and further research

CAP, IACS, LPIS



- **A well functioning LPIS (= single GIS for IACS)**
  - good localisation
  - correct quantification of eligible area
  - greatly facilitates operations by farmer, inspector and paying agency,

→ **a better performance, a higher efficiency**

  - a reduction of inspections (for both eligibility and cross-compliance)
  - lower IACS operating costs for the member states

→ **substantially reduced risks for the EU Funds**

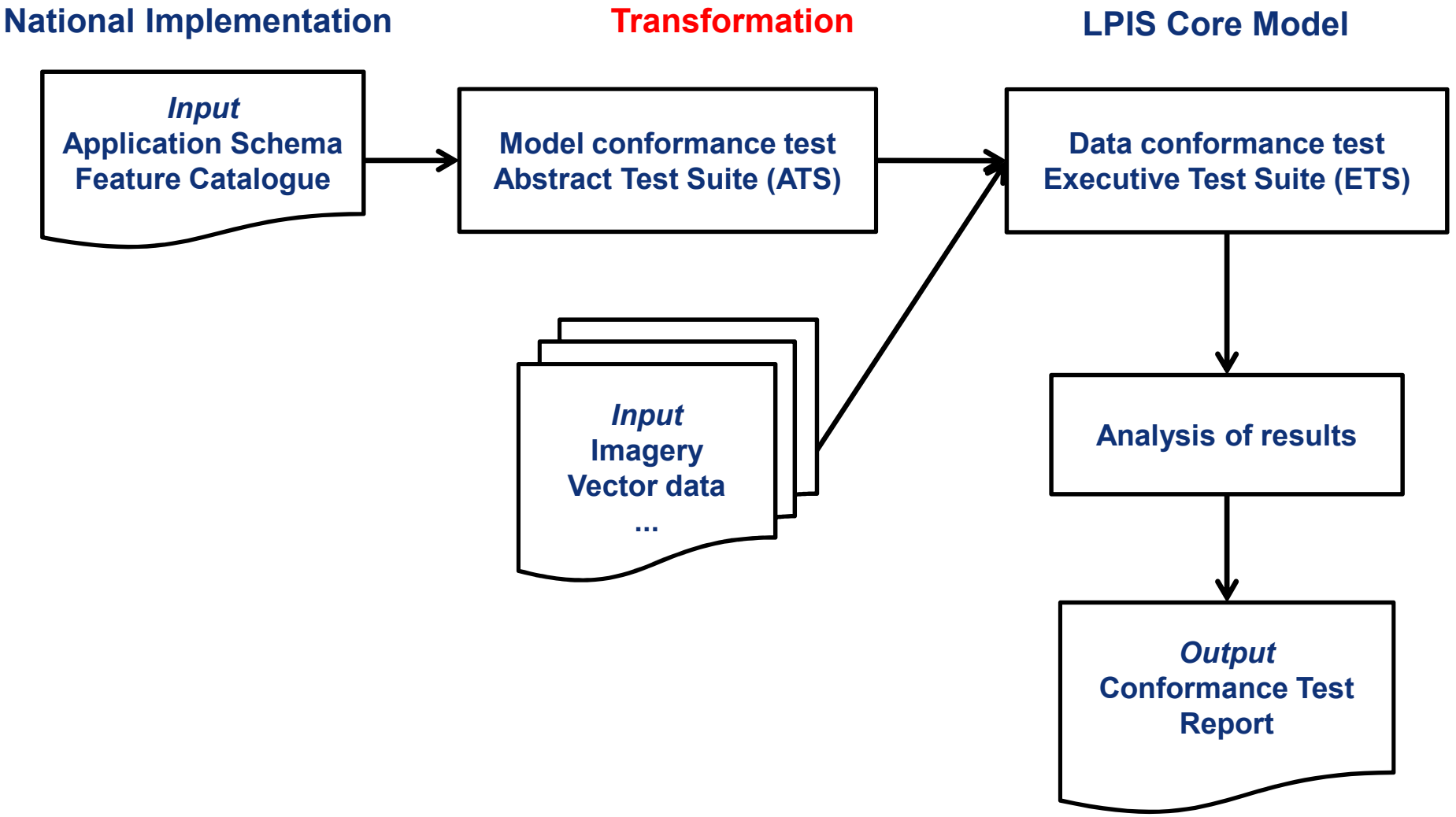
→ **good information to the farmer**

Comm. Reg. EC (no) 1122R2009 art. 6.2: annual assessment by MS, based on ISO 19105: Conformance and testing

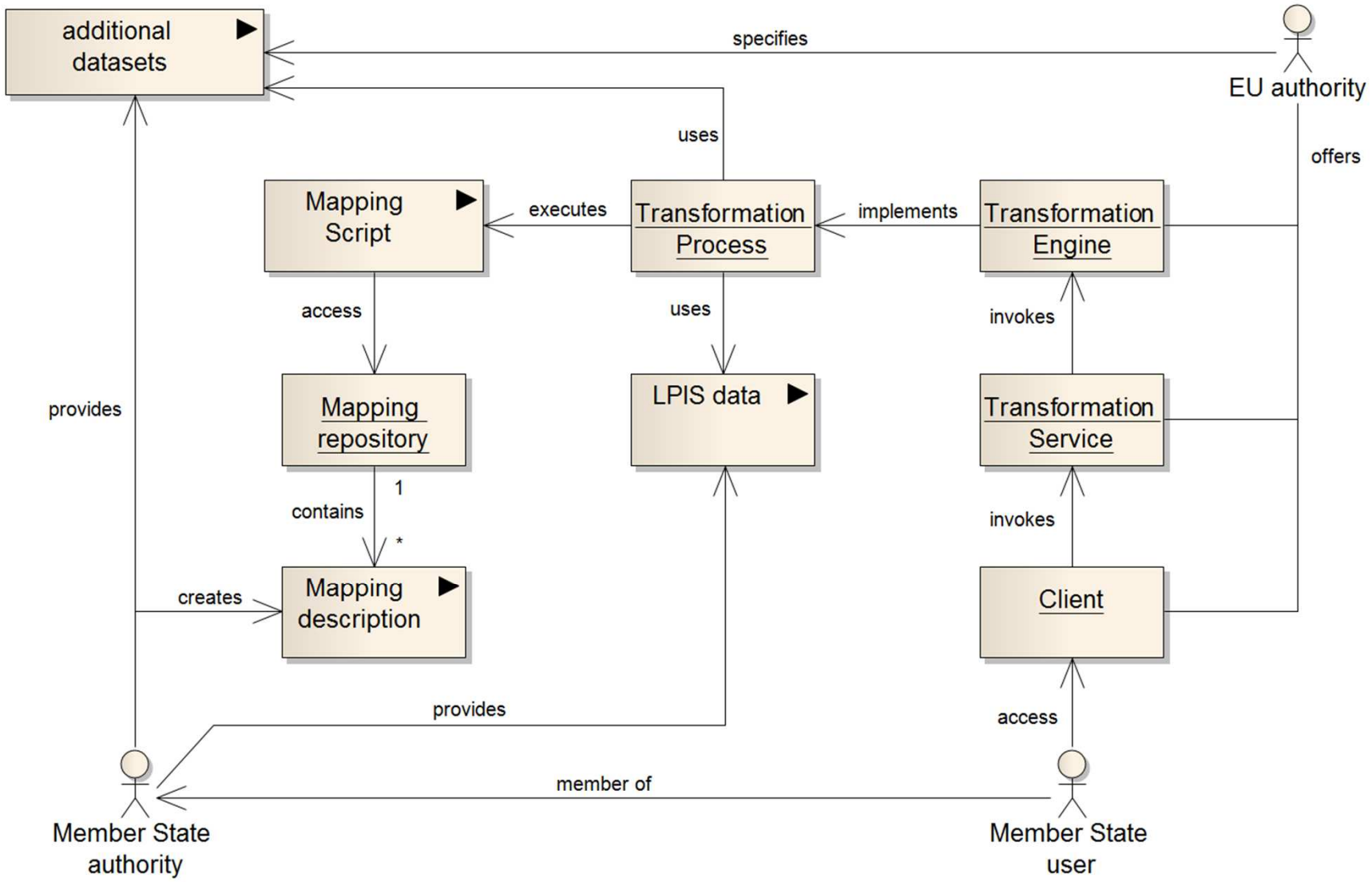
- CAP Regulation sets up the requirements but does not provide instructions on conception and implementation of the LPIS by Member states
  - Many different solutions and designs emerged
  - Every Memeber State has its own implementation of the LPIS database

- Need for harmonisation of LPIS
  - LPIS Core Model: CAP Regulation translated into the geoinformation realm

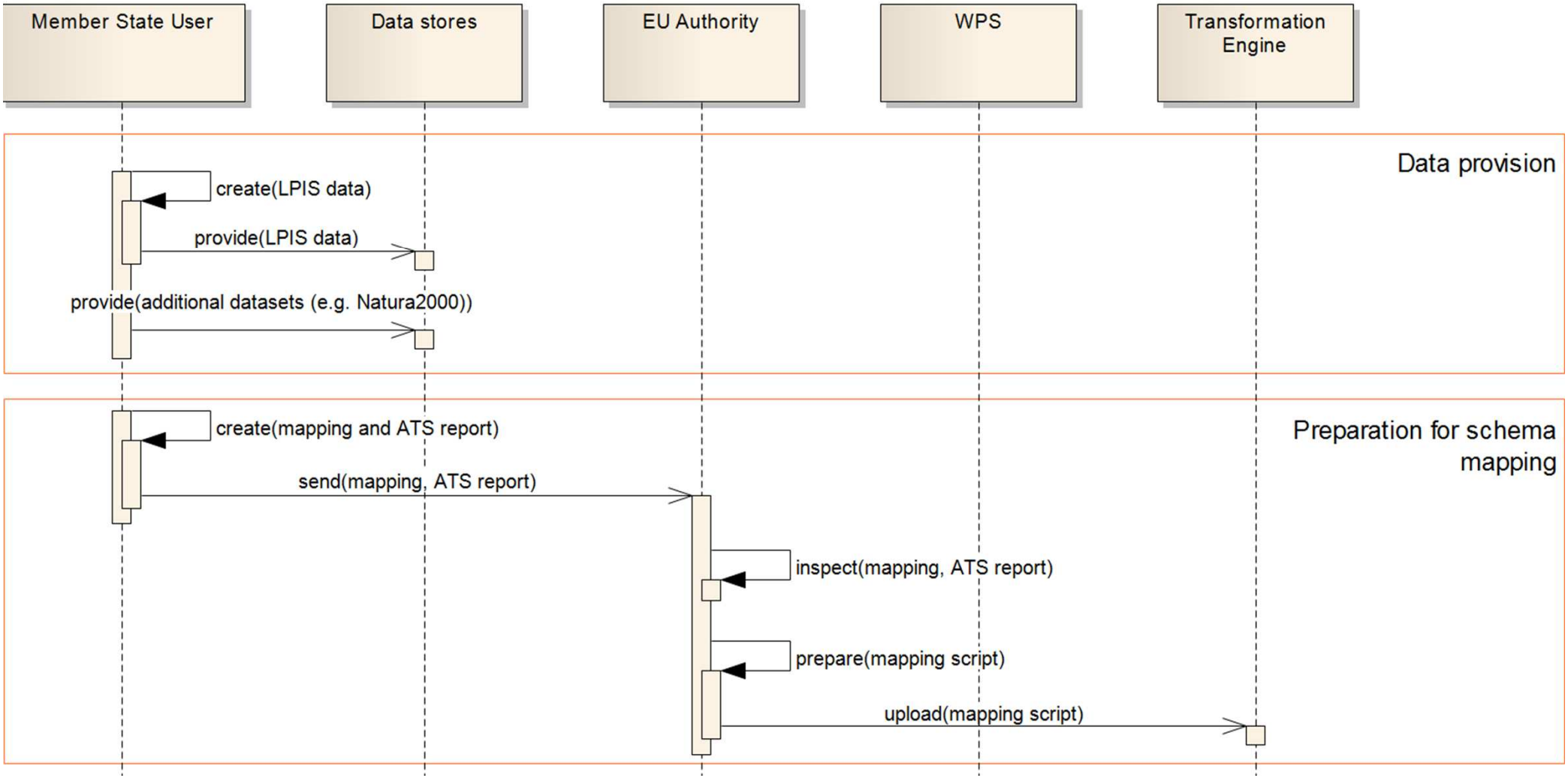
LPIS QA: ATS & ETS



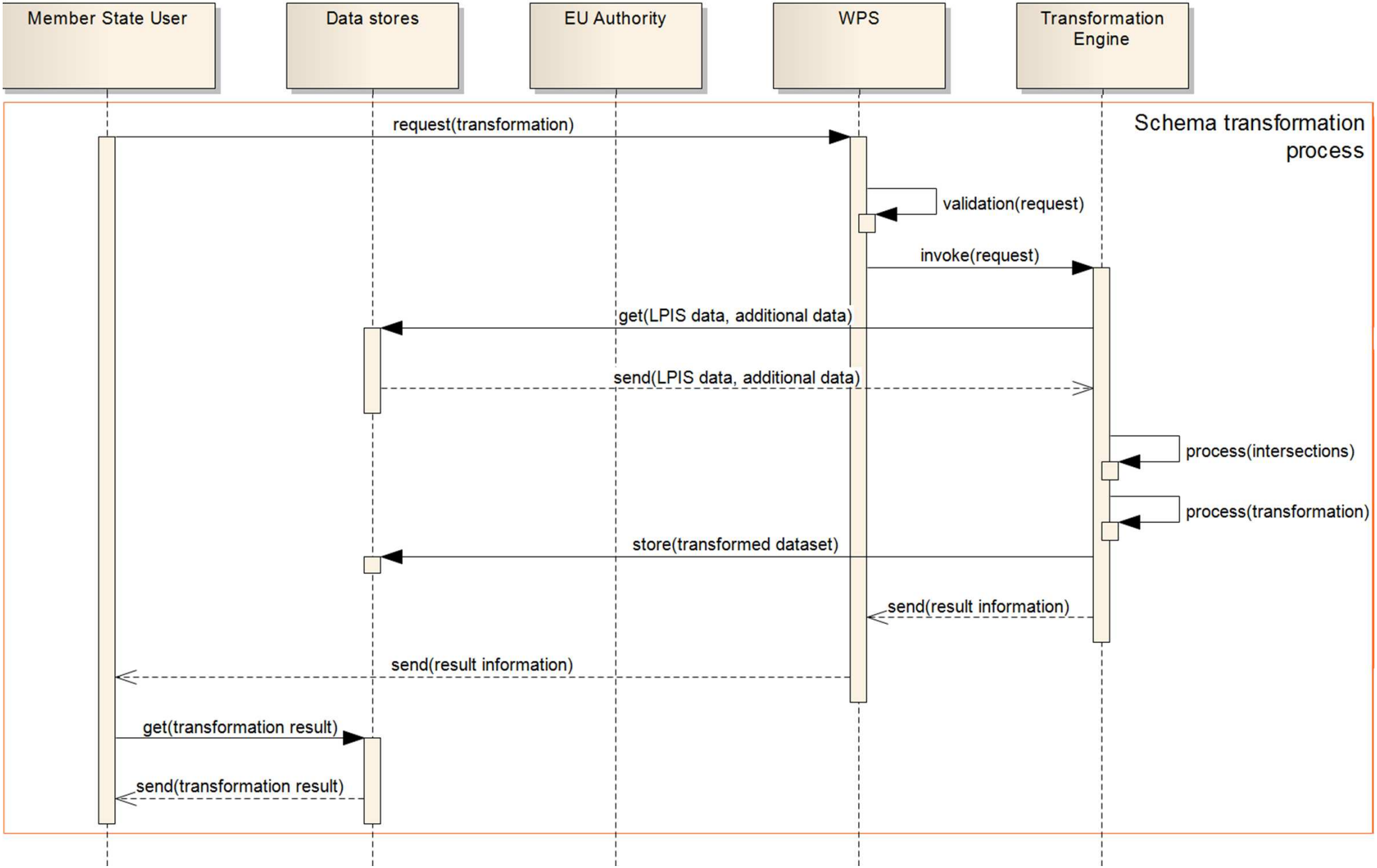
- Aim of schema mapping and transformation:
  - Ensure the exchange of LPIS data in a standardized way
  - Simplify communication to the responsible EU authority
  - Ensure that appropriate data will be submitted for inspection
- Starting point for a prototypical implementation:
  - LPIS data is provided via OGC WFS interface following an arbitrary LPIS GML application schema
  - Target schema defined by the LPIS Core Model


additional datasets
specifies
EU authority
uses
offers
Mapping Script
executes
Transformation Process
implements
Transformation Engine
access
uses
invokes
provides
Mapping repository
LPIS data
Transformation Service
1
contains
*
invokes
creates
Mapping description
Client
provides
access
member of
Member State authority
Member State user

Transformation Service Workflow



Transformation Service

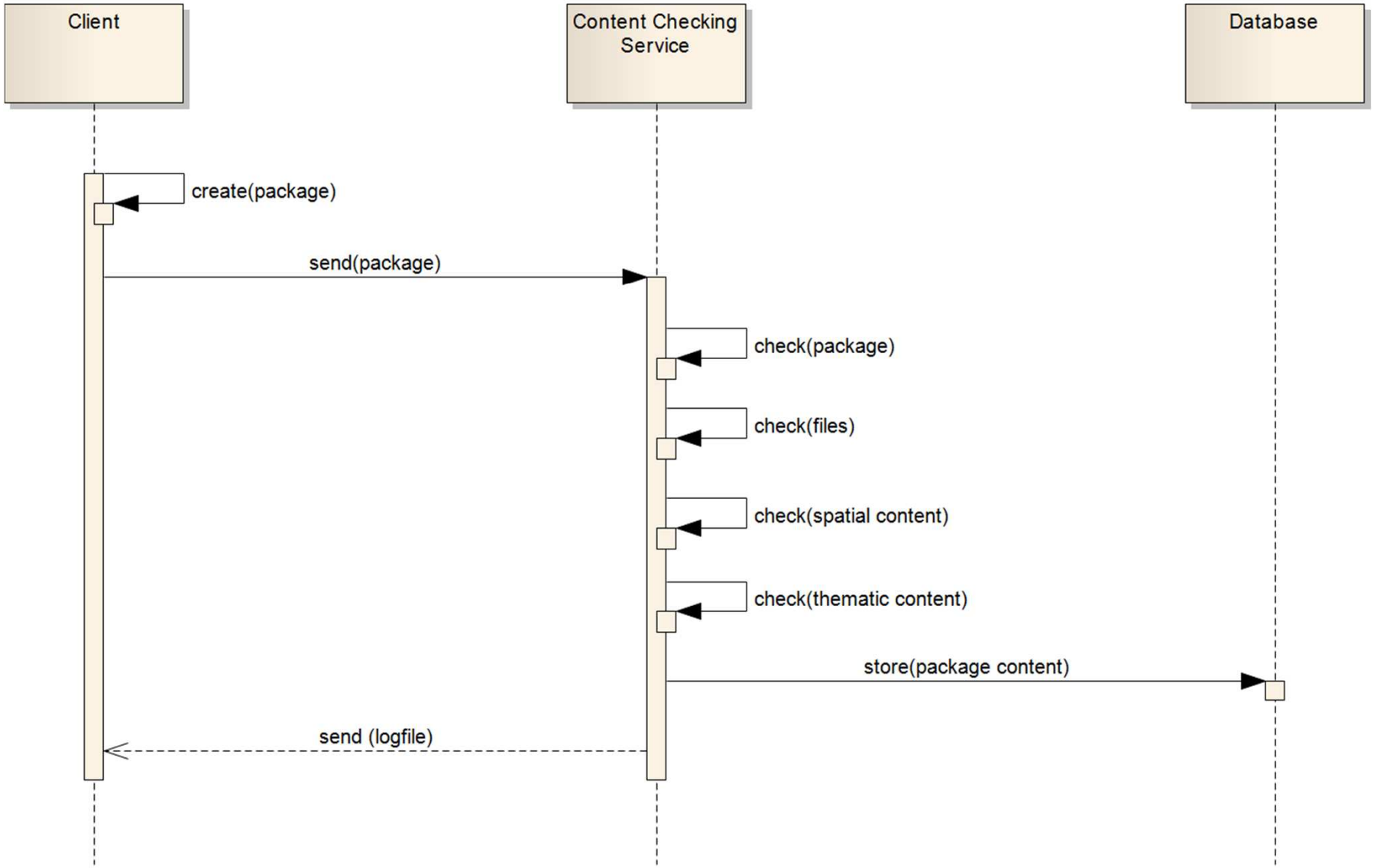


- Software components:
  - FME Desktop – to interactively model complex schema and format mapping processes
  - Python – to describe the transformation rules (script is invoked by the FME transformation process)
  - FME Server – to access and run previously created FME mapping scripts (Java API allows for wrapping by the standardized OGC WPS interface)
  - 52°North WPS – to implement the mediator WPS instance between the web client and the FME Server
  - GeoServer WFS – to provide LPIS datasets for schema transformation as well as additional datasets for intersections via the OGC WFS interface.

Content Validation

- Aim is to ensure completeness and validity of ETS observations
- Check against previously defined constraints (e.g. defined in XML schemas)
  - Data structure
  - Mandatory elements and attributes
  - Attribute values
  - Consistency of spatial data
- Result stored in a spatially enabled database
- Service functionality wrapped by the OGC WPS interface

Content Validation Workflow



Linkage to INSPIRE

- Setup follows the general idea of the INSPIRE network service architecture
- Most of the requirements for INSPIRE Transformation Network Services fulfilled:
  - Use of GML application schemas
  - Mapping descriptions stored separately from the process in a mapping repository
  - Compliance with architectural constraints (open interface, statelessness, parameter by reference, schema agnostic interface, automated process, mapping flexibility)

Conclusion & Further Research

- Demonstrated feasibility of the chosen SDI-approach for LPIS Quality Assurance
- Aim: integration of the proposed services in a prospective geoportal implementation for LPIS
- Further development:
  - Consider the propagated technical solutions for INSPIRE (e.g. WSDL/SOAP, RIF)
  - Generic service profiles for schema transformation and content validation (facilitate interoperability)
  - Improve service security, robustness and usability

Thank you for your attention!