

21/05/2007

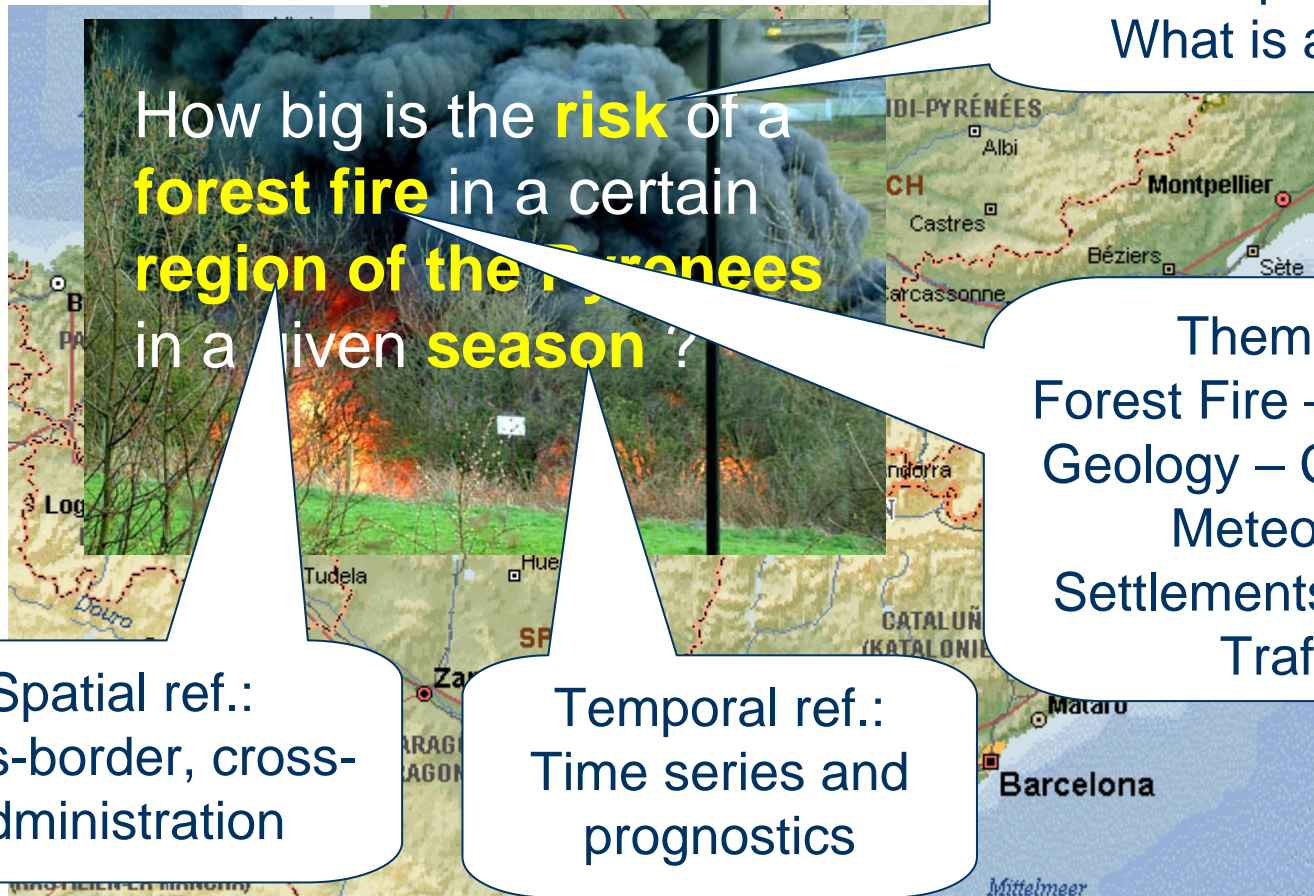
ORCHESTRA – Aktueller Stand und Entwicklungen

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Fraunhofer IITB

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orchestra

Problem statement of a Civil Protection or Environmental Agency



Conceptual ref.:
What is a risk ?

How big is the **risk** of a **forest fire** in a certain **region of the Pyrenees** in a given **season** ?

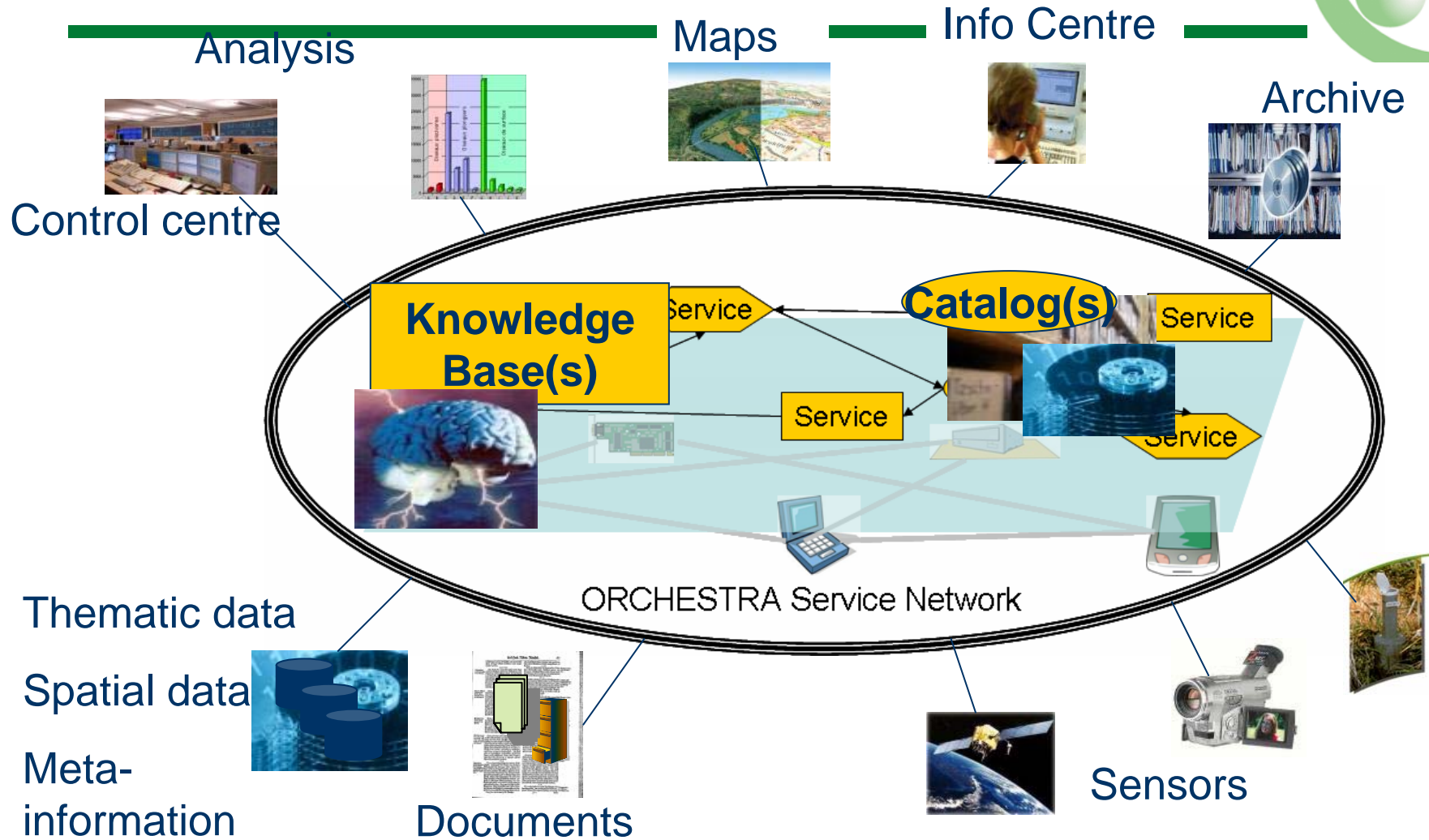
Thematic ref.:
Forest Fire – Vegetation –
Geology – Cartography –
Meteorology –
Settlements – Industry –
Traffic - ...

Spatial ref.:
cross-border, cross-
administration

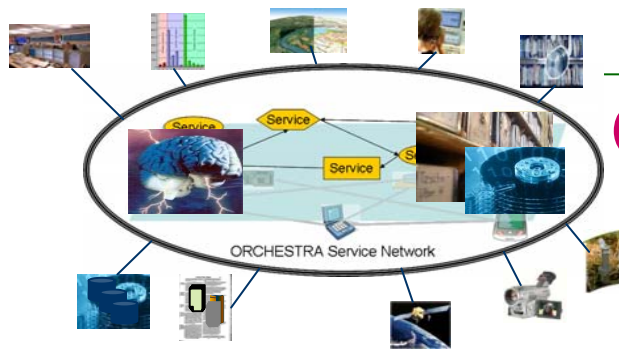
Temporal ref.:
Time series and
prognostics

Quelle: <http://iapf.physik.tu-berlin.de/DZ/dickow/Pyrenaeen/Karte.html>

ORCHESTRA Architectural Approach



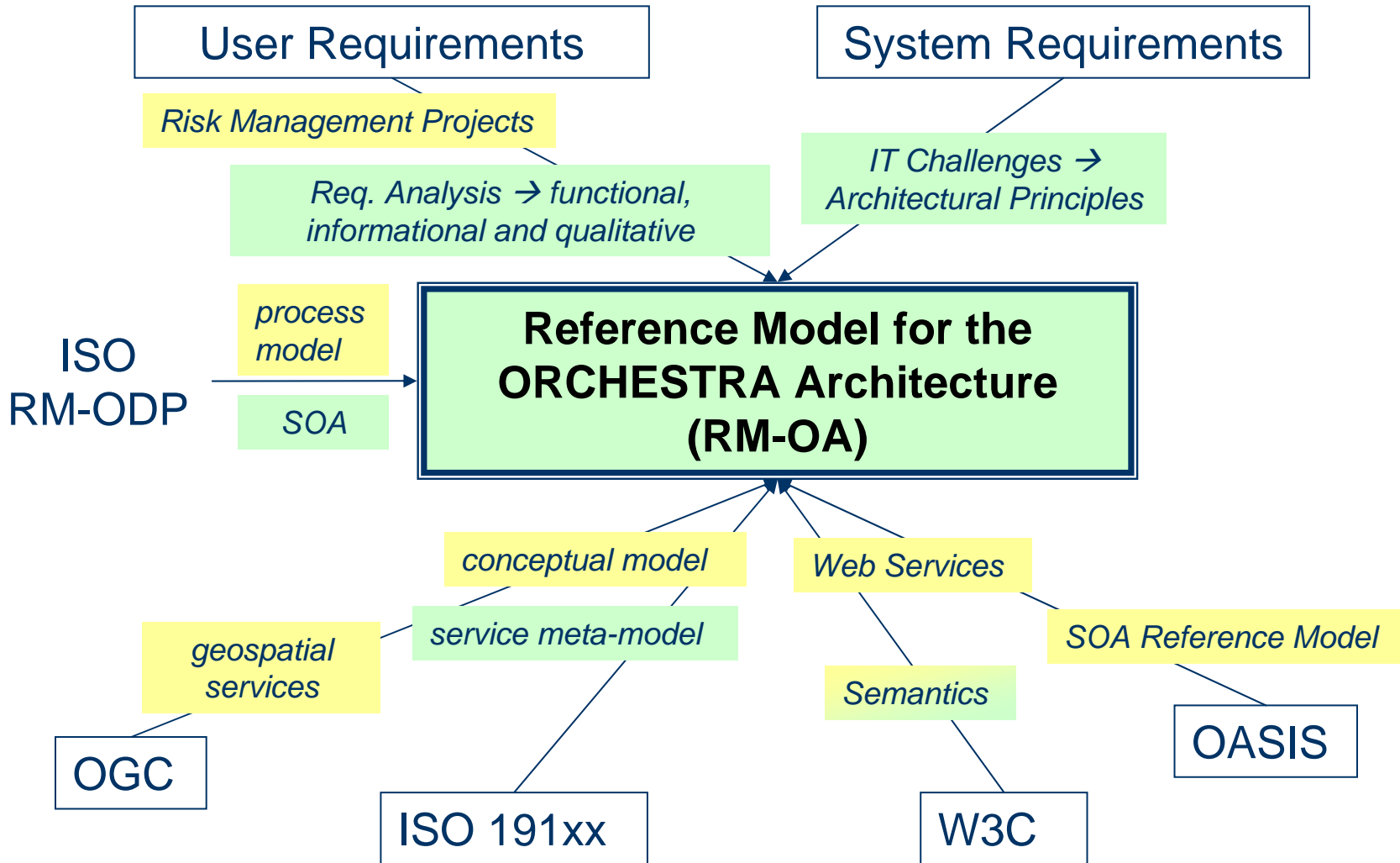
Claim of the ORCHESTRA Reference Model



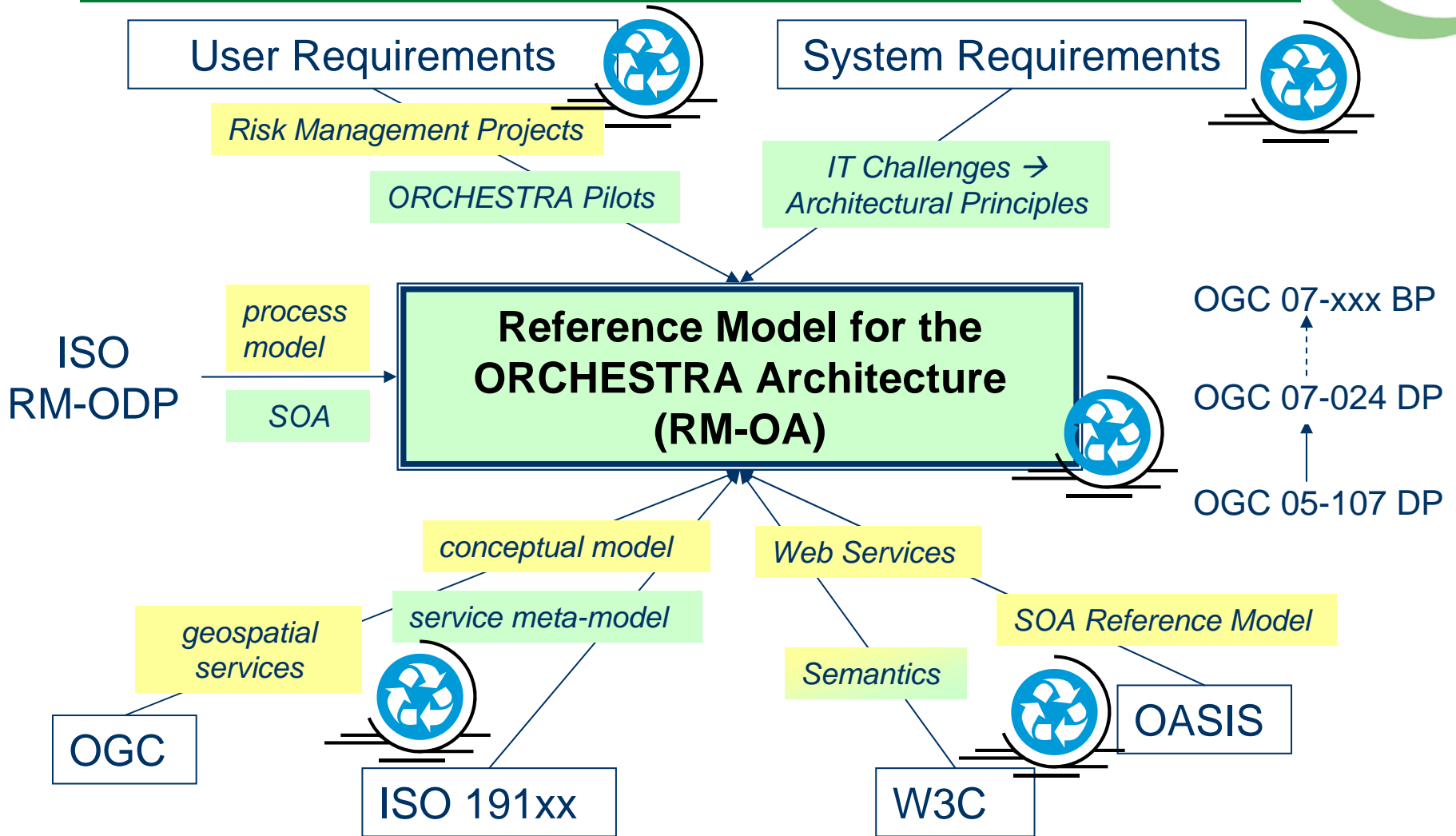
Open Service-oriented Architecture
improving Interoperability

- Public and free specifications
- Use of existing standards
- Contribute to the evolution of standards
 - Syntactic → encodings
 - Structural → schemas, interfaces
 - Semantic → meaning

RM-OA: Basis and Extensions/Adaptions



RM-OA Design Process: Iterations



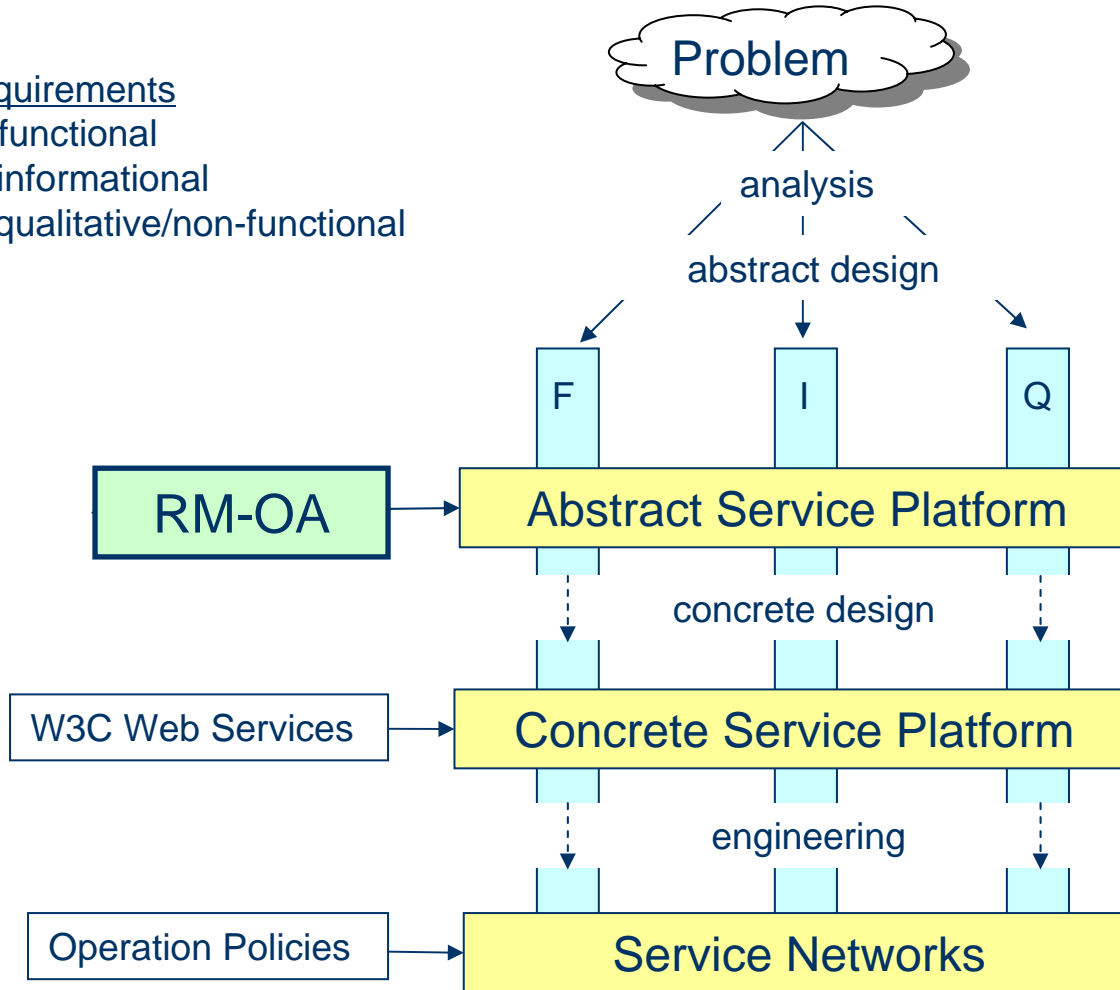
Position of the RM-OA in the Engineering Process

Requirements

F: functional

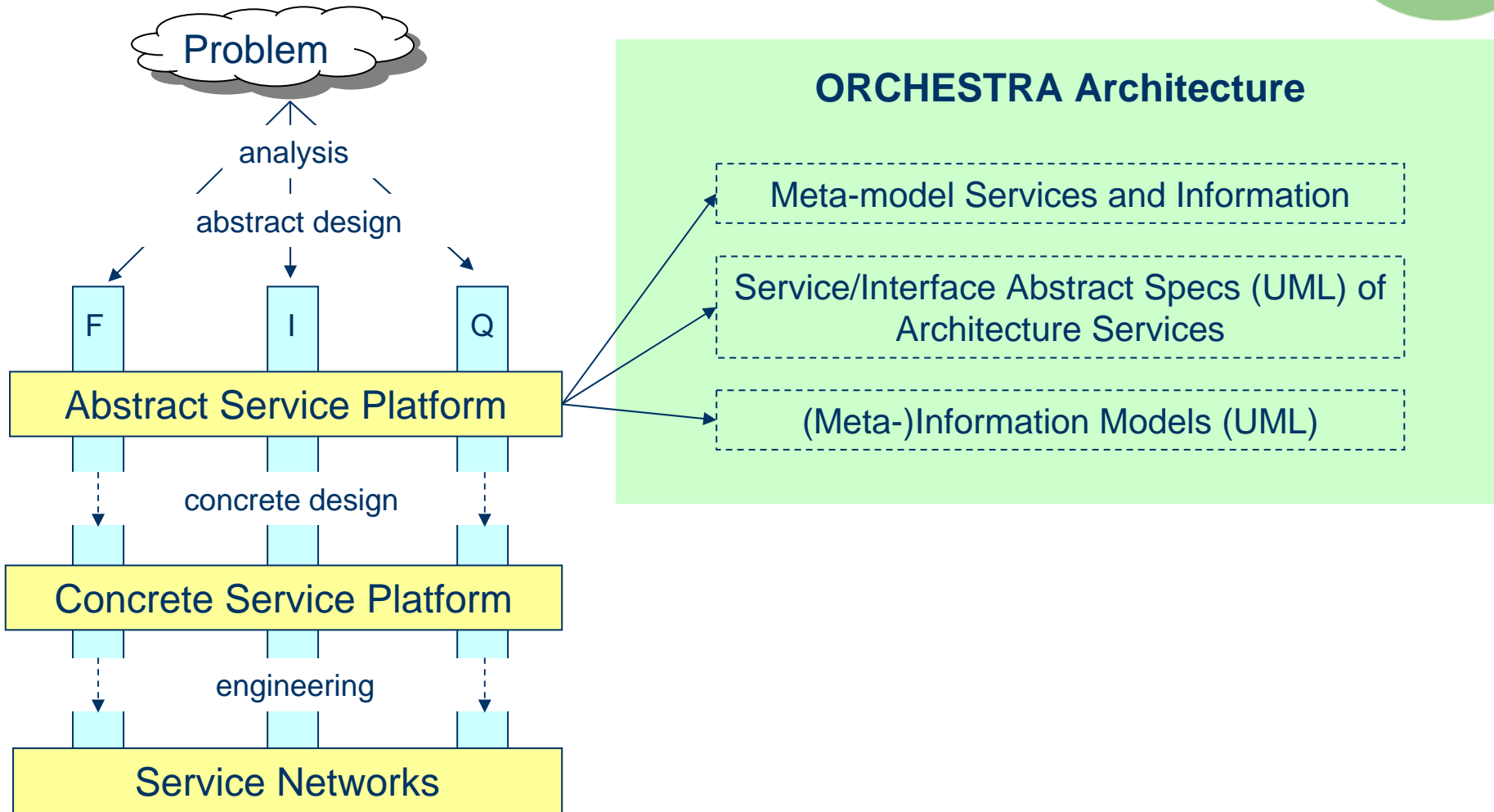
I: informational

Q: qualitative/non-functional

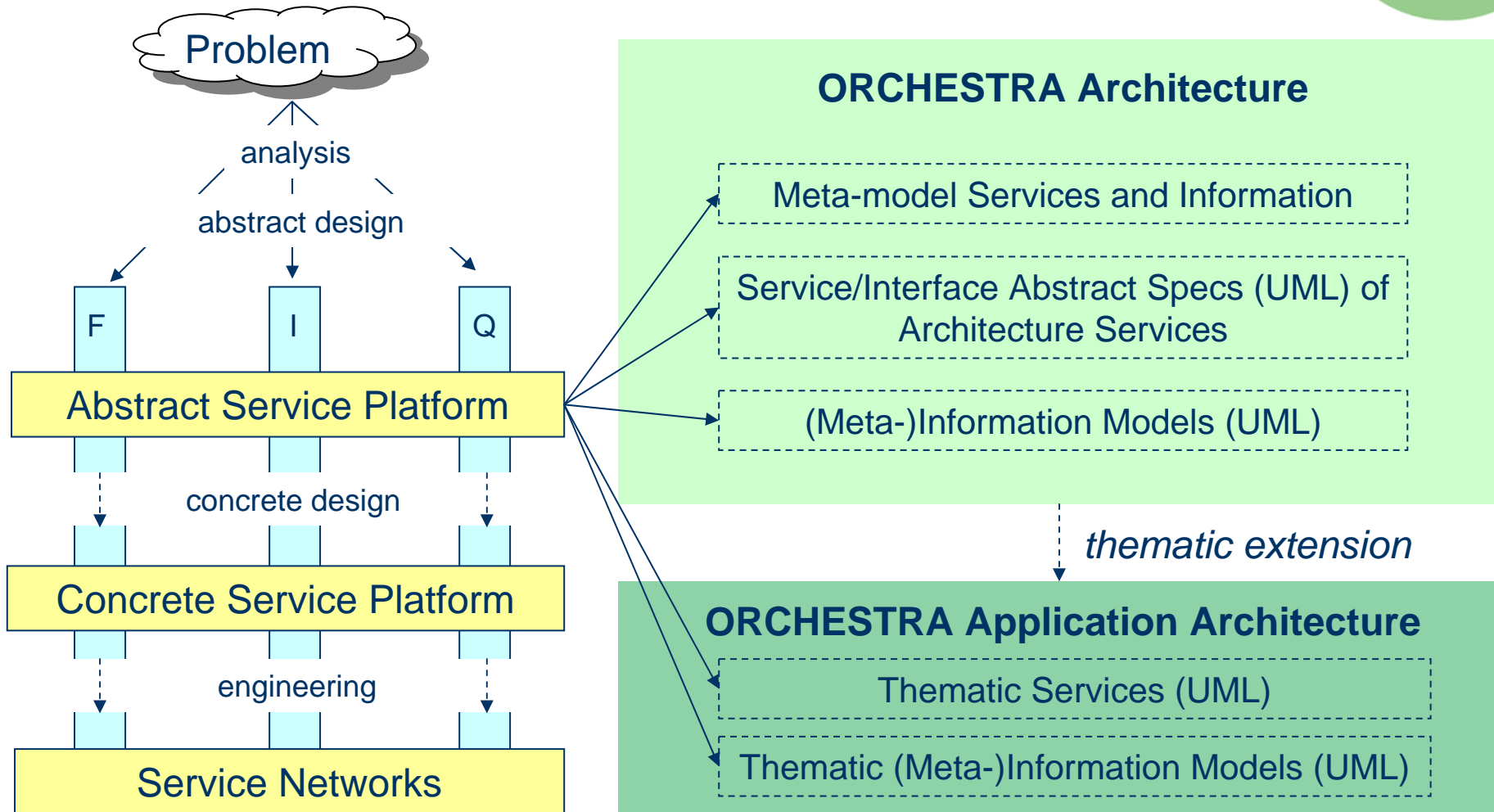


Platform-neutral
generic specification
in UML

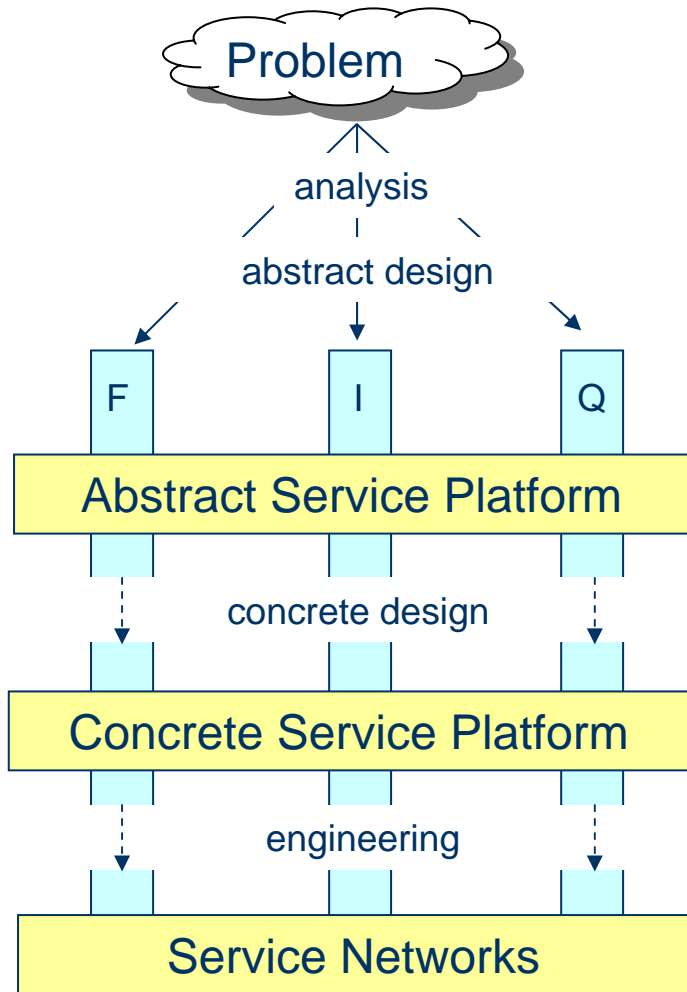
ORCHESTRA Result (1): Abstract Architecture



ORCHESTRA Result (2): Application Architecture



ORCHESTRA Result (3): Implementation (Specs)



ORCHESTRA Implementation Support

Specification of Web Service Platform
(WSDL, SOAP, GML Profile)

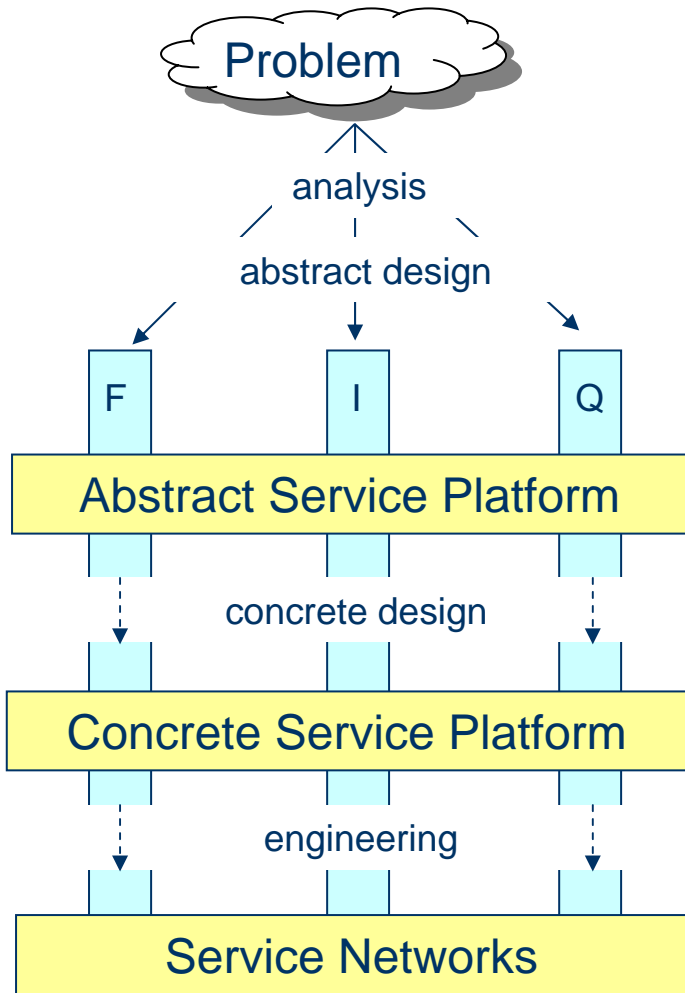
Development Tools (UML → platform)

Service Development Frameworks

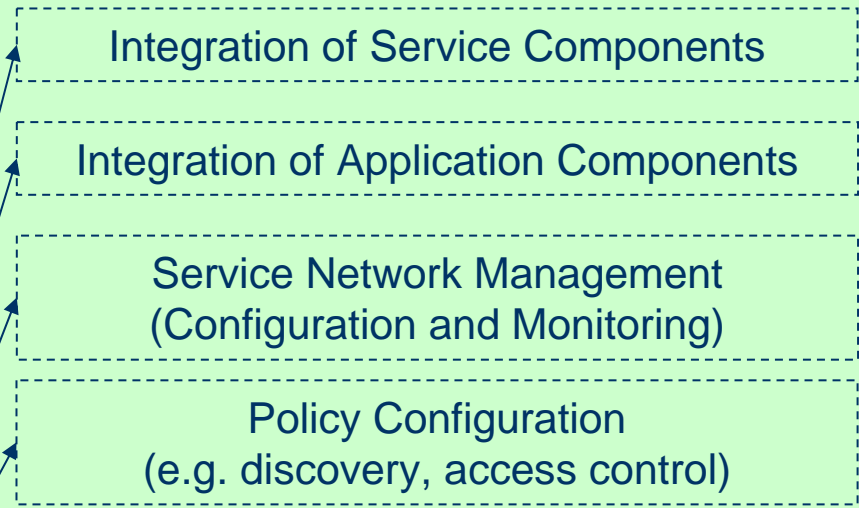
Service/Interface Impl. Specs

Service Implementation Components

ORCHESTRA Result (4): Service Networks



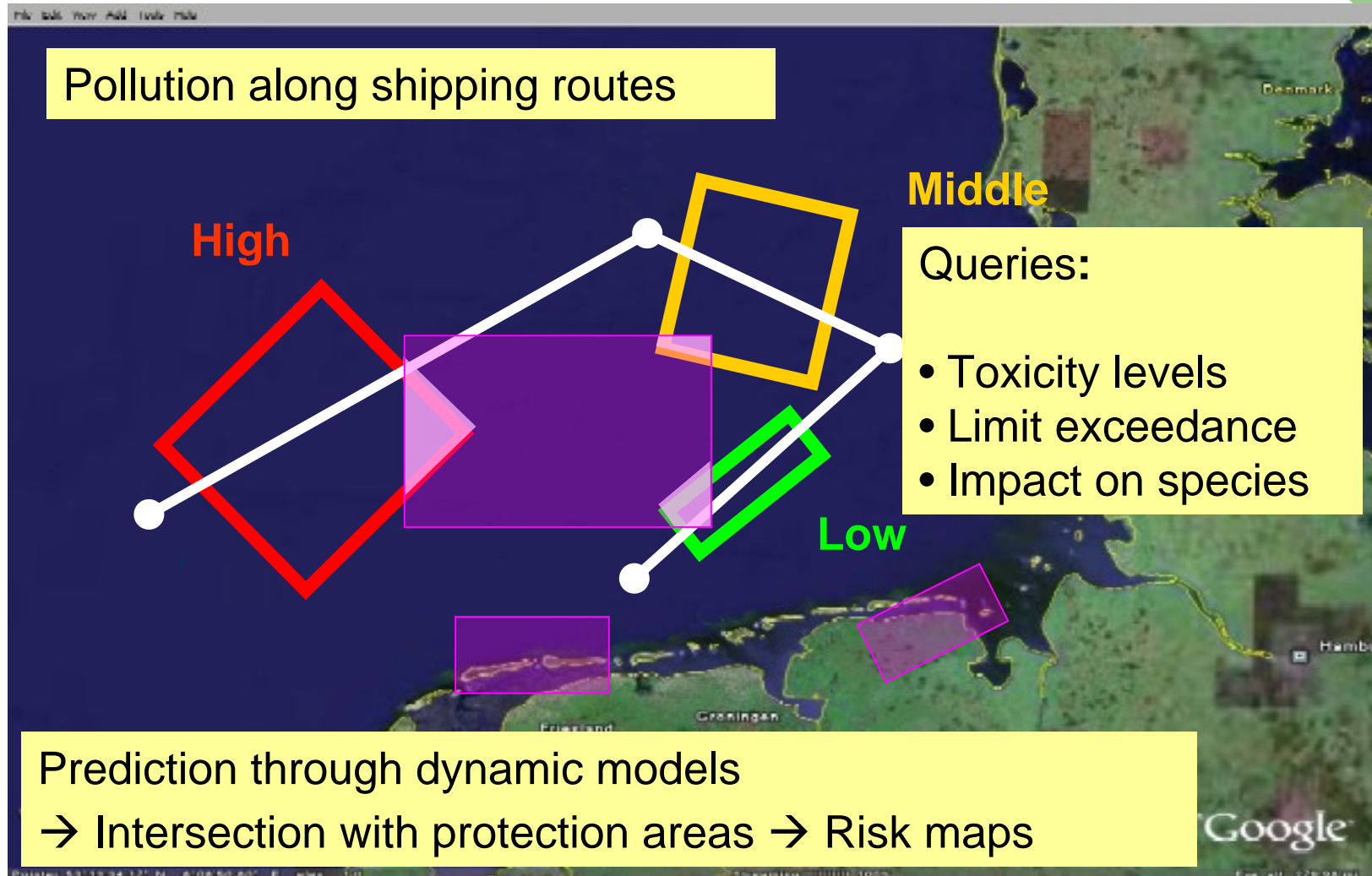
ORCHESTRA Implementation Architecture



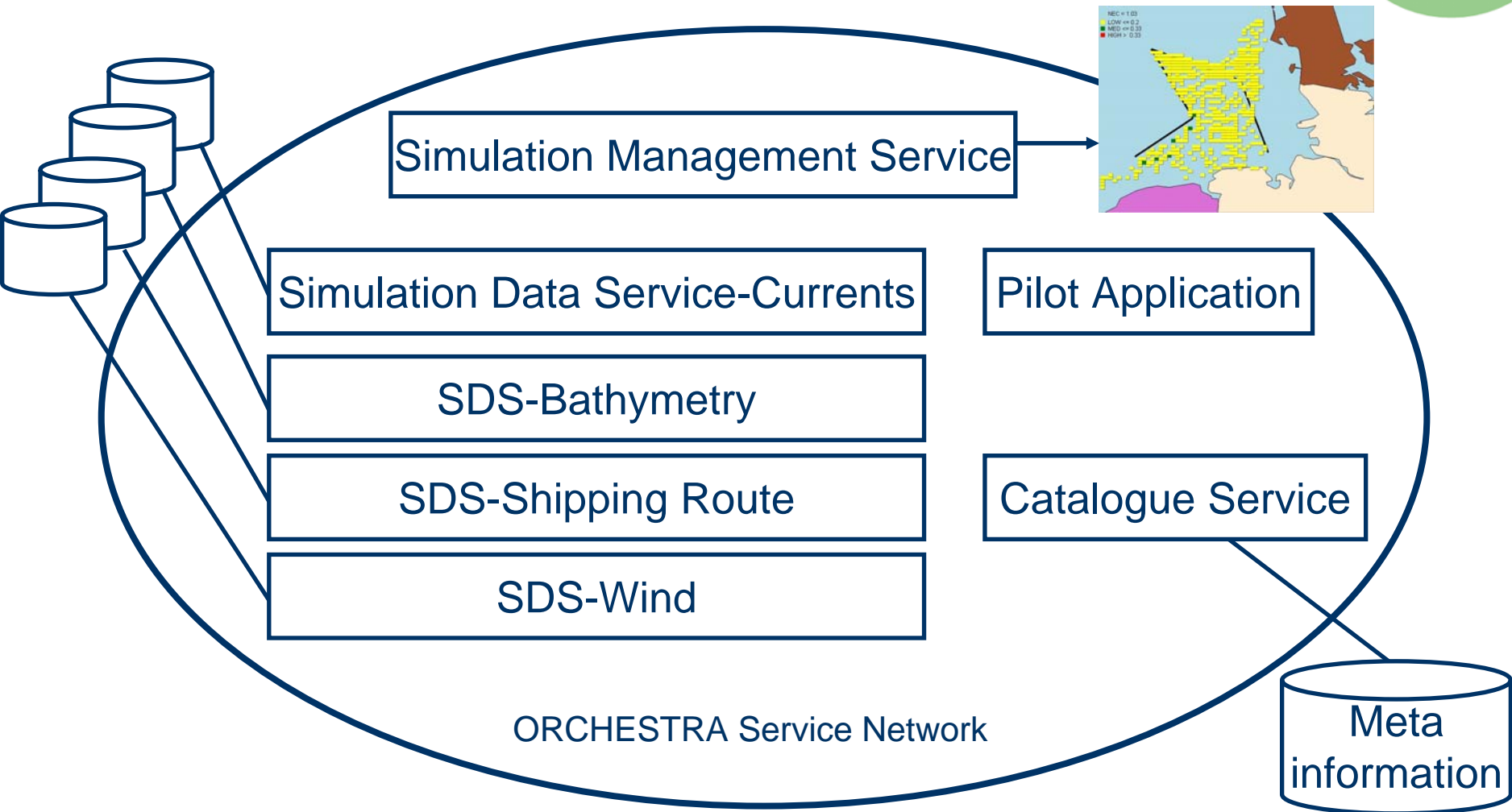
ORCHESTRA Pilot Applications

- Forest Fire
- Marine
- Flooding
- Geo-hazards

ORCHESTRA Pilot: German Bight „Antifoulants“



German Bight Pilot / Services



Integration in Earth Observation Portals

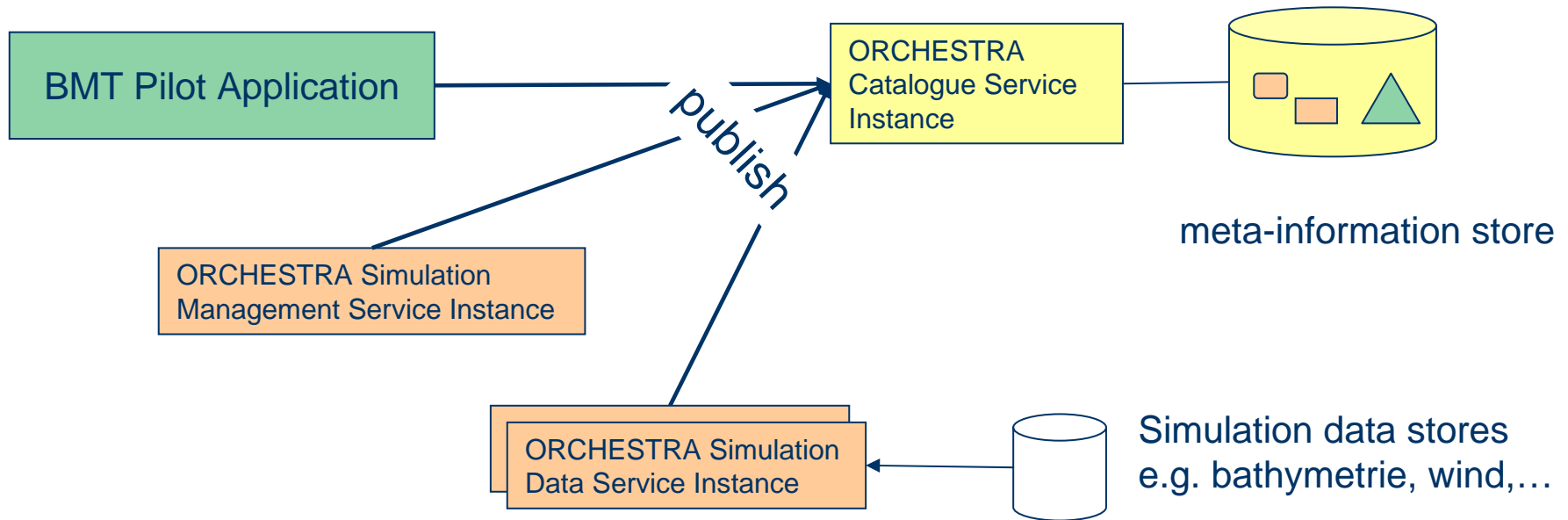
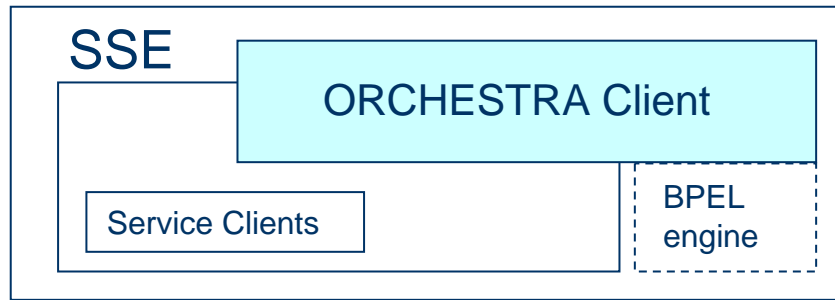


Application of the basic
SOA pattern **publish – find – bind** to
Risk Management Services

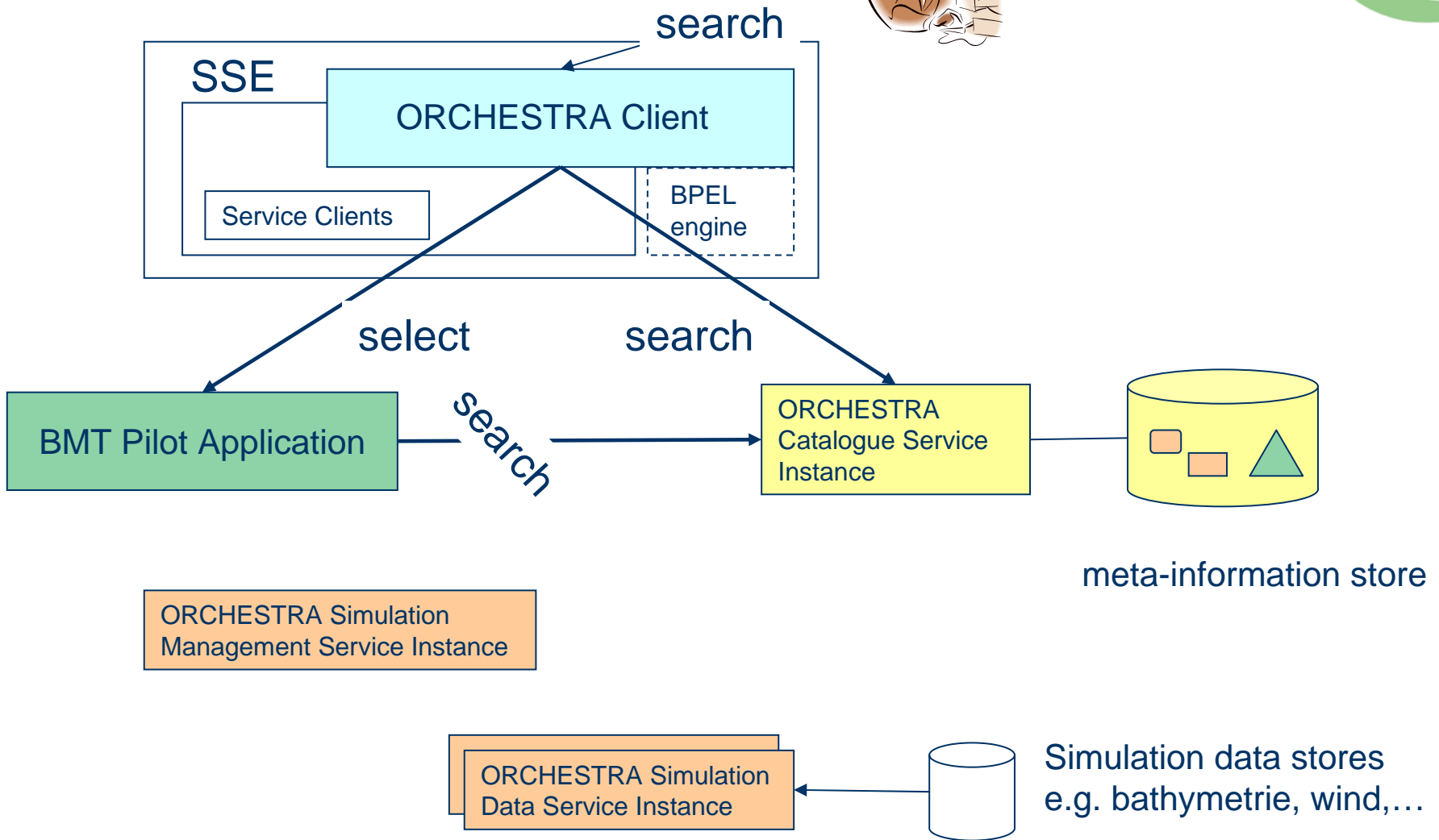
Components:

- Service Support Environment (SSE) = Service Consumer
- ORCHESTRA Catalogue = Registry
- BMT Pilot Application = Service Provider
- BMT Simulation Services = Service Consumer
- BMT Simulation Services = Service Provider

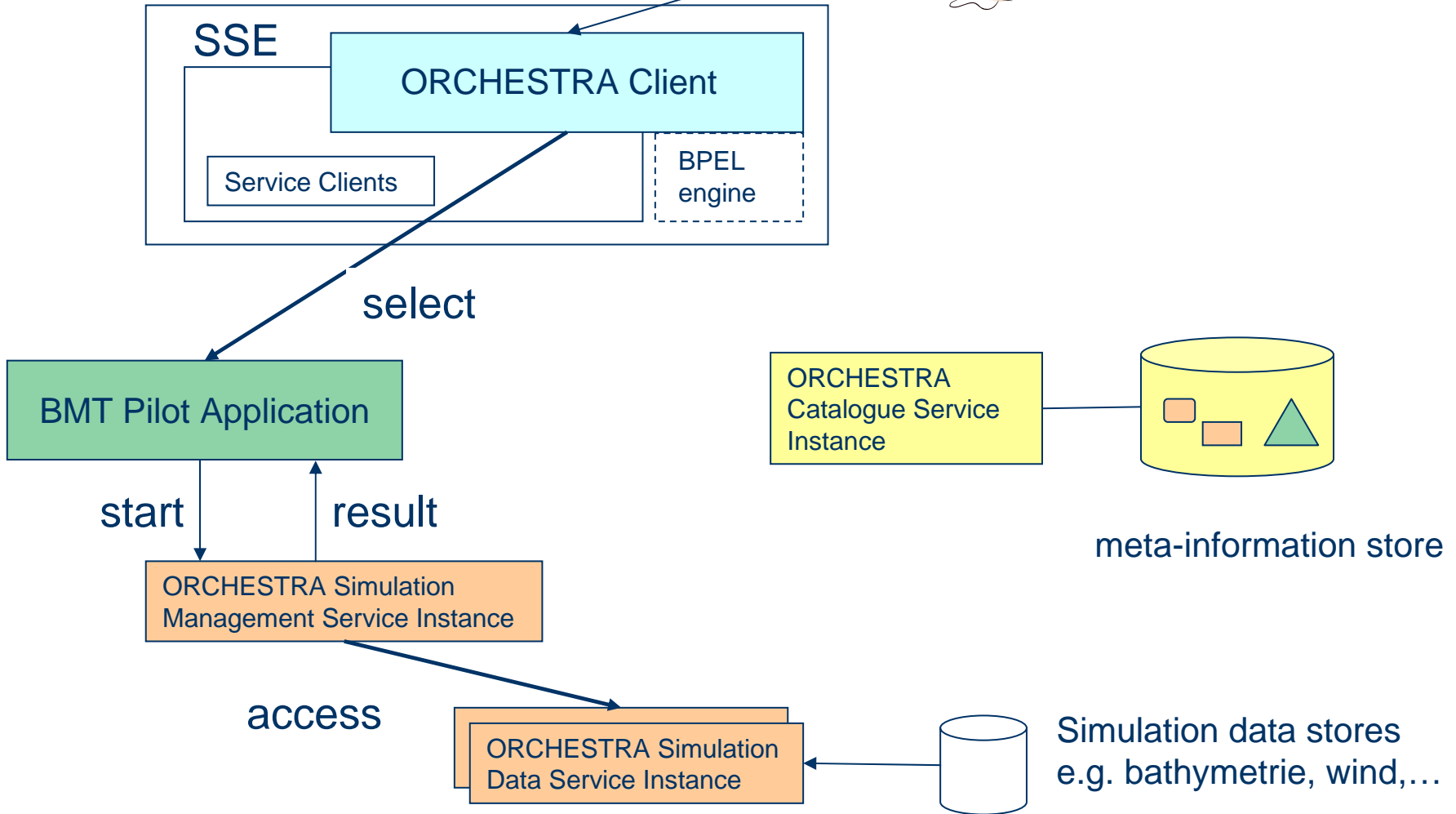
SSE/ORCHESTRA Service Network: Publish



SSE/ORCHESTRA Service Network: Search



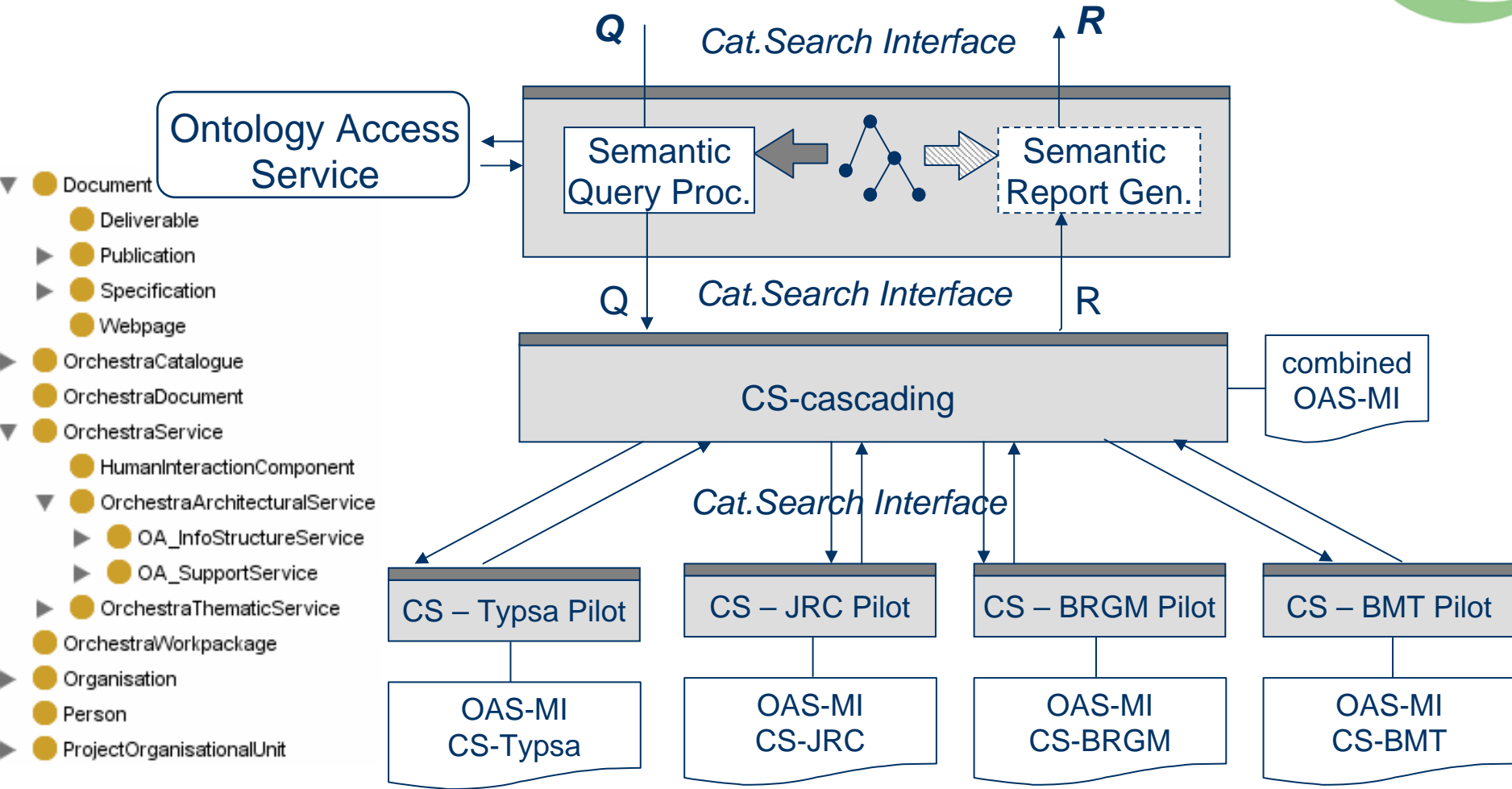
SSE/ORCHESTRA Service Network: Start



Demonstration



Metapilot / Semantic Catalogue

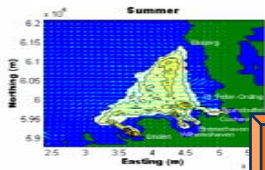


- Document
- Deliverable
- ▶ ● Publication
- ▶ ● Specification
- Webpage
- ▶ ● OrchestraCatalogue
- OrchestraDocument
- ▶ ● OrchestraService
- HumanInteractionComponent
- ▶ ● OrchestraArchitecturalService
- ▶ ● OA_InfoStructureService
- ▶ ● OA_SupportService
- ▶ ● OrchestraThematicService
- OrchestraWorkpackage
- ▶ ● Organisation
- Person
- ▶ ● ProjectOrganisationalUnit

German Bight Pilot / Semantic Catalogue



- ▼ ● ChemicalSubstance
 - Antifoulant
 - Biocide
- CoastalZone
- CostBenefit
- ▶ ● Environment
- ▼ ● Specie
 - MarineSpecie
 - ▼ ● Mollusc
 - ▶ ● Gastropod
 - ▶ ● Mussel



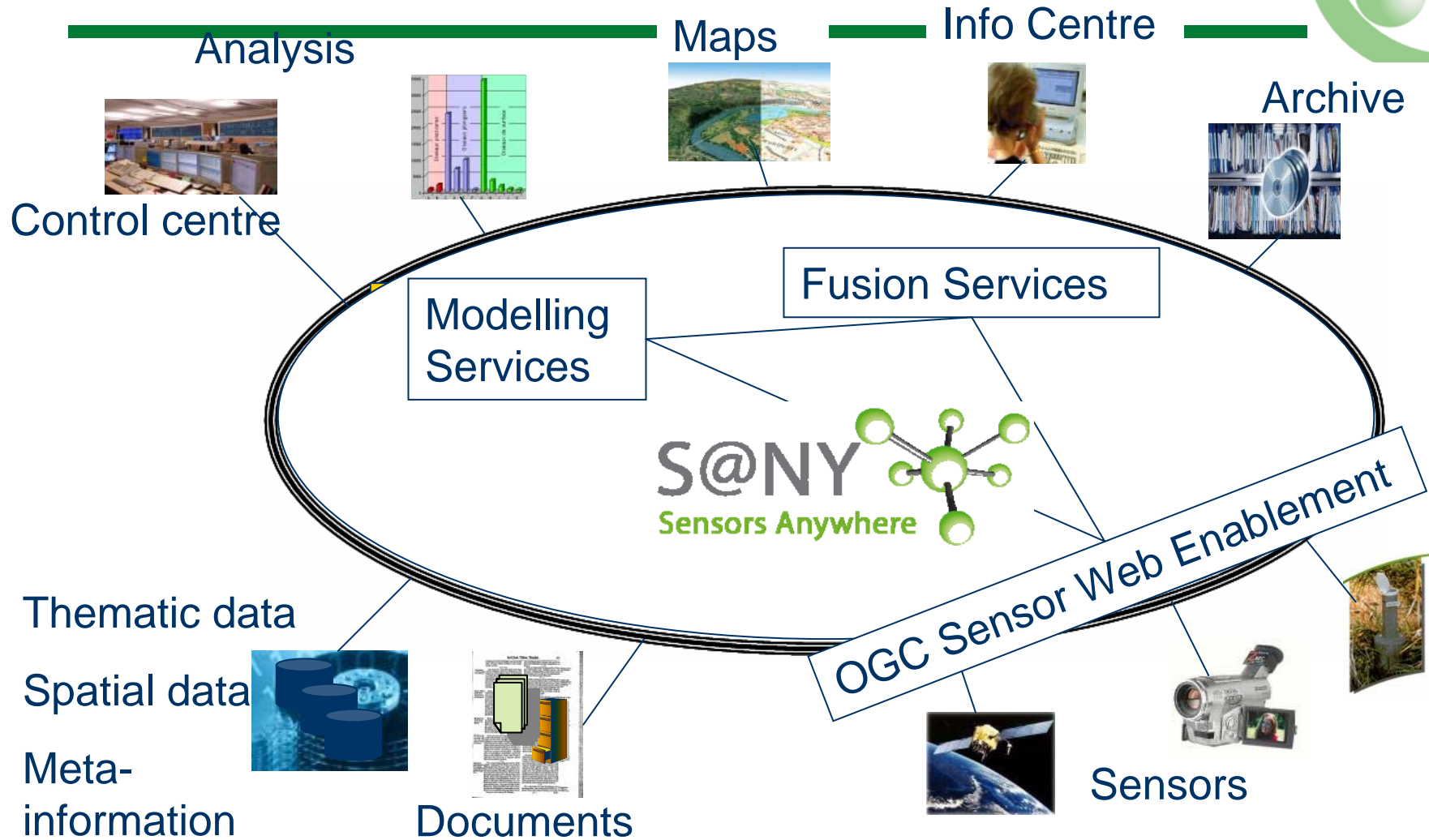
... Too high level ... TBT concentration caused by ... antifoulant paintings ... of ship hulls ... simulation has turned out ... areas ... imposex of gastropodes has been observed... To the biggest class of molluscs ...



Q

R

Application for Sensor Service Networks



Benefits of ORCHESTRA



- Reference Model will influence standards
- Public specifications, open-source software
- Contribution to EU initiatives
- Integration in Earth Observation Portals
- Architecture reused in other EU Projects (SANY, FP7)



THANK YOU
FOR YOUR
ATTENTION



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- Thematic Information Systems (Environment)
- Simulation Systems
- IT consulting

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