SeaDataNet 2 Kick-Off Meeting

Athens, October 19-20th, 2011

CNR Activities and links

IIA ESSI-Lab
ISAC, ISMAR, IAMC (on behalf)

Stefano Nativi, Lorenzo Bigagli

CNR-IIA

Who we are

- National Research Council of Italy
  - 109 Institutes, among which
    - IIA – Institute of Atmospheric Pollution Research
    - ISAC – Institute of Sciences of Atmosphere and Climate
    - ISMAR – Institute of Marine Sciences
    - IAMC – Institute for coastal marine environment
- IIA ESSI-Lab – Earth and Space Science Informatics – Laboratory
  - Started in 2008

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Research Activity

- Multi-disciplinary Interoperability
- Cyber(e)-Infrastructure / SDI
- Brokering Service approach
- Standardization activity for Geospatial data and information
- Models access and interoperability (Model Web)

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Synergetic actions

- OGC
- EGU (ESSI division)
- AGU (ESSI Focus Group)
- CEN TC 287
- INSPIRE DTs
- GEOSS STC, ADC, SIF

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Active Projects

- FP7 **GEOWOW** (GEOSS interoperability for Weather, Ocean and Water)
  - ESSI-lab leads WP3: "*Multi-disciplinary interoperability*"
- FP7 **MEDINA** (Marine coastal Ecosystem monitoring Dynamics and Indicators for North Africa)
  - ESSI-lab leads the interaction with GEO/GEOSS
- FP7 **EarthServer** (European Scalable Earth Science Service Environment)
  - ESSI-lab leads the networking activities
- FP7 **EnviroFI** (The Environmental Observation Web and its Service Applications within the Future Internet)
  - ESSI-lab leads the System Architecture design

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Active Projects

- FP7 **EGIDA** (Coordinating Earth and Environmental cross-disciplinary projects to promote GEOSS)
  - ESSI-lab leads the Project and coordinates the WP4: "EGIDA Methodology"
- FP7 **GeoViQua** (QUAlity aware VIsualisation for the Global Earth Observation system of systems)
  - ESSI-lab leads WP2: "*Quality-enabled discovery service*"
- FP7 **EuroGEOSS** (Euro-GEOSS: A European approach to GEOSS)
  - ESSI-lab leads WP2: "*Multidisciplinary interoperability*"
- FP7 **UncertWeb** (The Uncertainty Enabled Model Web)
  - ESSI-lab leads WP2: "Chaining and discovery services under uncertainty"
- FP7 **ISTIMES** (Integrated System for Transport Infrastructures surveillance and Monitoring by Electromagnetic Sensing)
  - ESSI-lab coordinates the system architecture design for TeRN

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Active Projects

- FP7 **SAFER** (Services and Applications for Emergency Response)
  - ESSI-lab contributes to WP 20200: "Gateway and service network development"
- FP7 **G-MOSAIC** (GMES services for Management of Operations, Situation Awareness and Intelligence for regional Crises)
  - ESSI-lab contributes to the identification of standards, namely the definition of a ISO 19115 metadata profile

- CNR Inter-departmental project **GIIDA** (Gestione Integrata ed Interoperativa dei Dati Ambientali del CNR)
  - ESSI-lab coordinates the project
- CNR **PolarNet**
  - ESSI-lab coordinates the Data Sharing WG

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Links with SeaDataNet 2

- Main ESSI-Lab activities
  - Definition of SeaDataNet metadata (based on ISO 19139 XML Schema) compliant with EDMED, EDMERP, EDIOS, CSR and CDI, including INSPIRE
    - To develop the compliance with ISO metadata encoding and INSPIRE
  - Specification and governance of additional and improved data formats (e.g. CF-netCDF)
  - Developing interoperability with global portals, such as GEOSS and IOC/IODE Ocean Data Portal

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CNR Marine data to SeaDataNet-2

Two main activities:

1) **WP4-WP5:** Connecting the CNR Marine data Information System to SDN-2 Infrastructure

   The CNR Marine Information System (http://mare.giida.cnr.it) has federated the CNR Marine Institutes (ISAC, ISMAR, IAMC) database providing access to CNR marine data (satellite products, in situ physical, biological, hydrological and geological measurements)

2) **WP10:** As follow up of SDN-1, CNR will continue to contribute to the development and regular updating of standard data products for the Mediterranean Region

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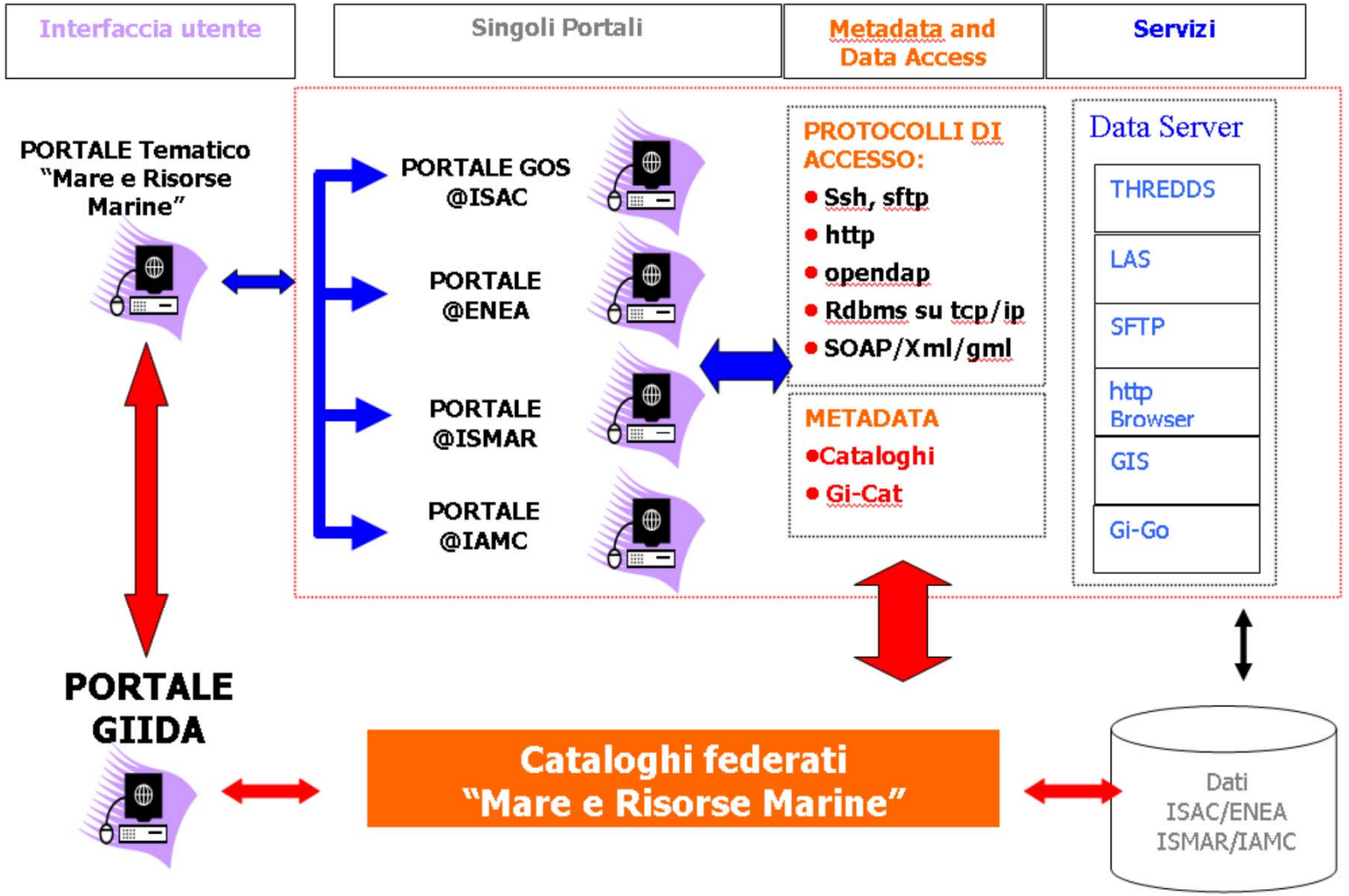
The CNR Marine IS: main architecture



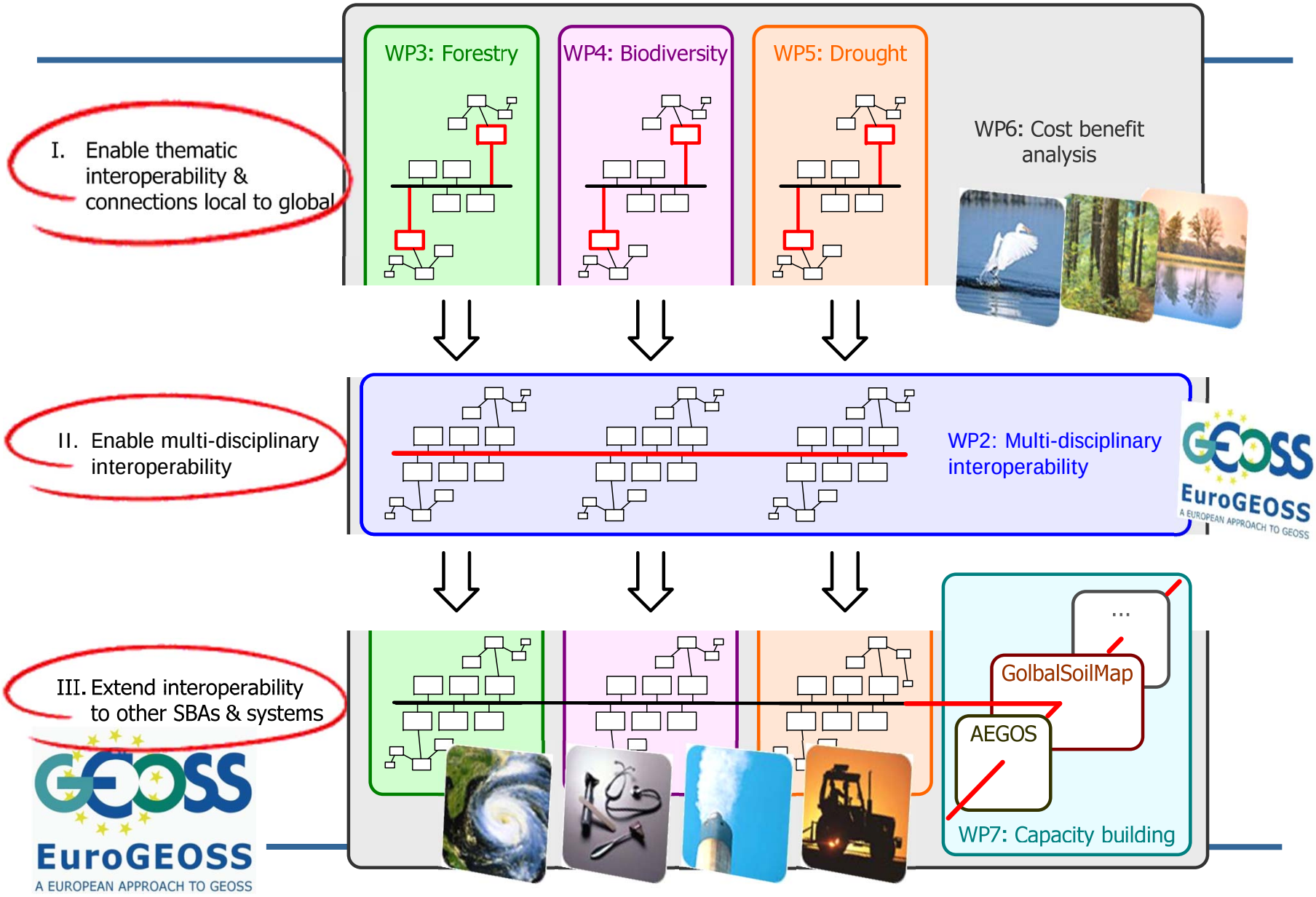
The CNR Marine MIS is part of the CNR Environmental data MIS and it is under development. Access and download capabilities are implemented: **THREDDS**, **GEONETWORK 2.4** (CSW/ISO 2.0.2.), **Anonymous FTP access, Gi-cat/ Gi-go:** http://ce01.artov.rm.cnr.it:8090/GI-cat

EuroGEOSS

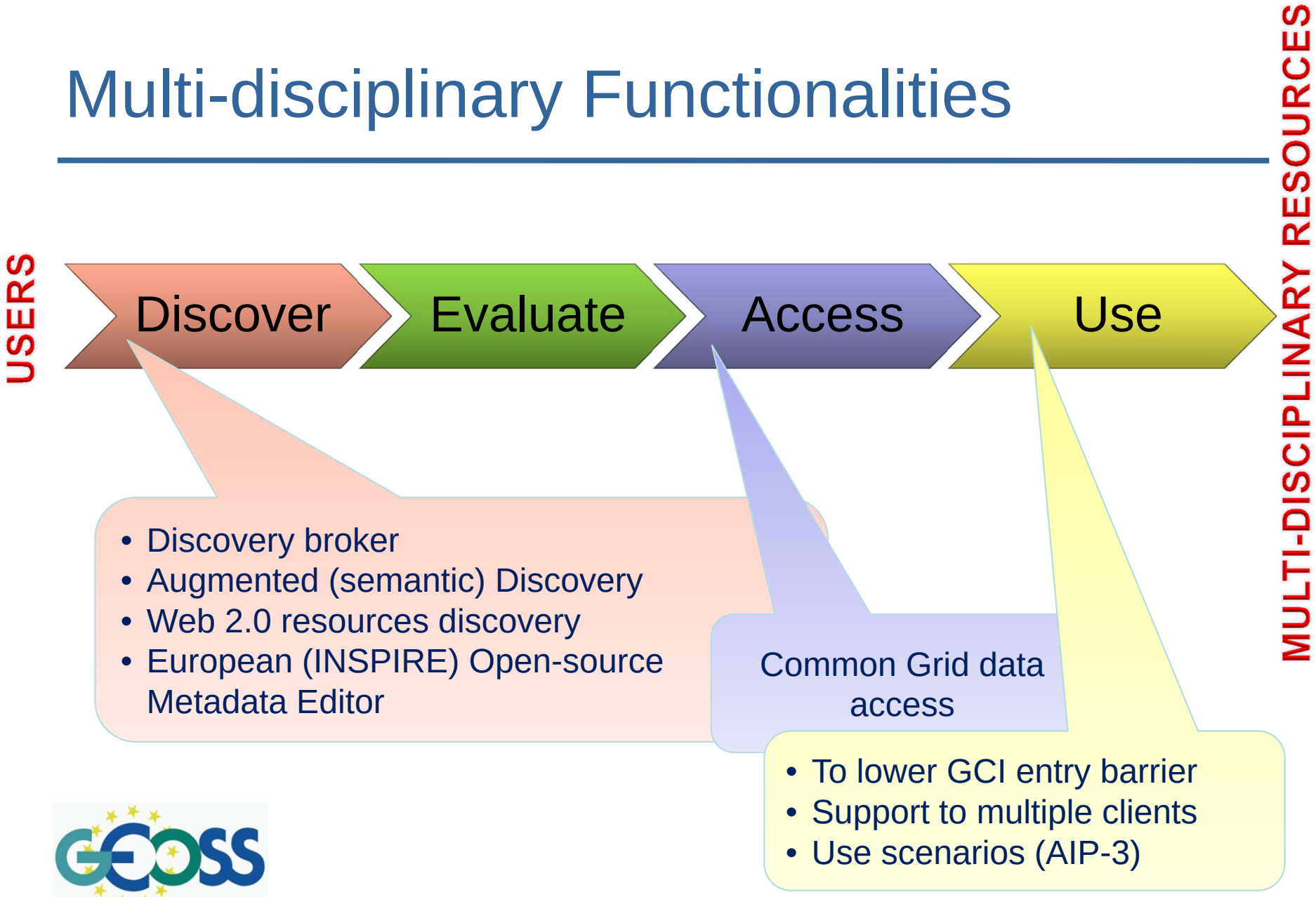
EuroGEOSS project

Proposal full title	EuroGEOSS: a European approach to GEOSS
Proposal acronym	EuroGEOSS
Type of funding scheme	Collaborative project (large-scale integrating project)
Work programme topics addressed	FP7-ENV-2008-1: Environment (including climate change) ENV.2008.4.1.1.1: European Environment Earth Observation system supporting INSPIRE and compatible with GEOSS
Start date	01 May 2009
End date	01 May 2012

Three **Interoperability** phases



Multi-disciplinary Functionalities



EuroGEOSS
A EUROPEAN APPROACH TO GEOSS

Step 1: Discovery

Implement **Discovery Interoperability** Arrangements

«Service Providers»
Geospatial Resources

. . .

CSW

«Broker»
Catalog Discovery Broker

«CatalogInterface»
Published Interfaces

+ CSW2.0.2-ebRIM/CIM0.1.9
+ CSW2.0.2-ebRIM/EO0.2.5
+ CSW2.0.2-ISO1.0
+ GI-cat Extended interface 7.x
+ OAI-PMH2.0
+ OpenSearch-GENESI-DR
+ OpenSearch1.1

Implement Multi-disciplinary Interoperability Arrangements

Service Providers (Resource Servers)

+ CSW2.0.2-Core
+ CSW2.0.2-ebRIM/CIM0.1.9
+ CSW2.0.2-ebRIM/EO0.2.5
+ CSW2.0.2-ISO1.0
+ Deegree2.2
+ GBIF
+ GDACS
+ GeoNetwork2.2.0
+ GeoNetwork2.4.1
+ GeoRSS2.0
+ GI-cat6.x
+ GI-cat7.x
+ NetCDF-CF1.4
+ OAI-PMH2.0
+ OpenSearch1.1
+ THREDDS1.01-1.0.2
+ WCS1.0
+ WCS1.1.2
+ WFS1.0.0
+ WFS1.1.0
+ WMS1.1.1
+ WMS1.3.0
+ WPS1.0.0
+ CDI

EuroGEOSS
A EUROPEAN APPROACH TO GEOSS

Step 2: Access

Implement **Subsetting & Transformation** services

CSW

«Service Providers»
Geospatial Resources

«Broker»
Catalog Discovery Broker

«CatalogInterface»
Published Interfaces

- + CSW2.0.2-ebRIM/CIM0.1.9
- + CSW2.0.2-ebRIM/EO0.2.5
- + CSW2.0.2-ISO1.0
- + GI-cat Extended interface 7.x
- + OAI-PMH2.0
- + OpenSearch-GENESI-DR
- + OpenSearch1.1

Service Providers (Resource Servers)

- + CSW2.0.2-Core
- + CSW2.0.2-ebRIM/CIM0.1.9
- + CSW2.0.2-ebRIM/EO0.2.5
- + CSW2.0.2-ISO1.0
- + Deegree2.2
- + GBIF
- + GDACS
- + GeoNetwork2.2.0
- + GeoNetwork2.4.1
- + GeoRSS2.0
- + GI-cat6.x
- + GI-cat7.x
- + NetCDF-CF1.4
- + OAI-PMH2.0
- + OpenSearch1.1
- + THREDDS1.01-1.0.2
- + WCS1.0
- + WCS1.1.2
- + WFS1.0.0
- + WFS1.1.0
- + WMS1.1.1
- + WMS1.3.0
- + WPS1.0.0
- + CDI

EuroGEOSS
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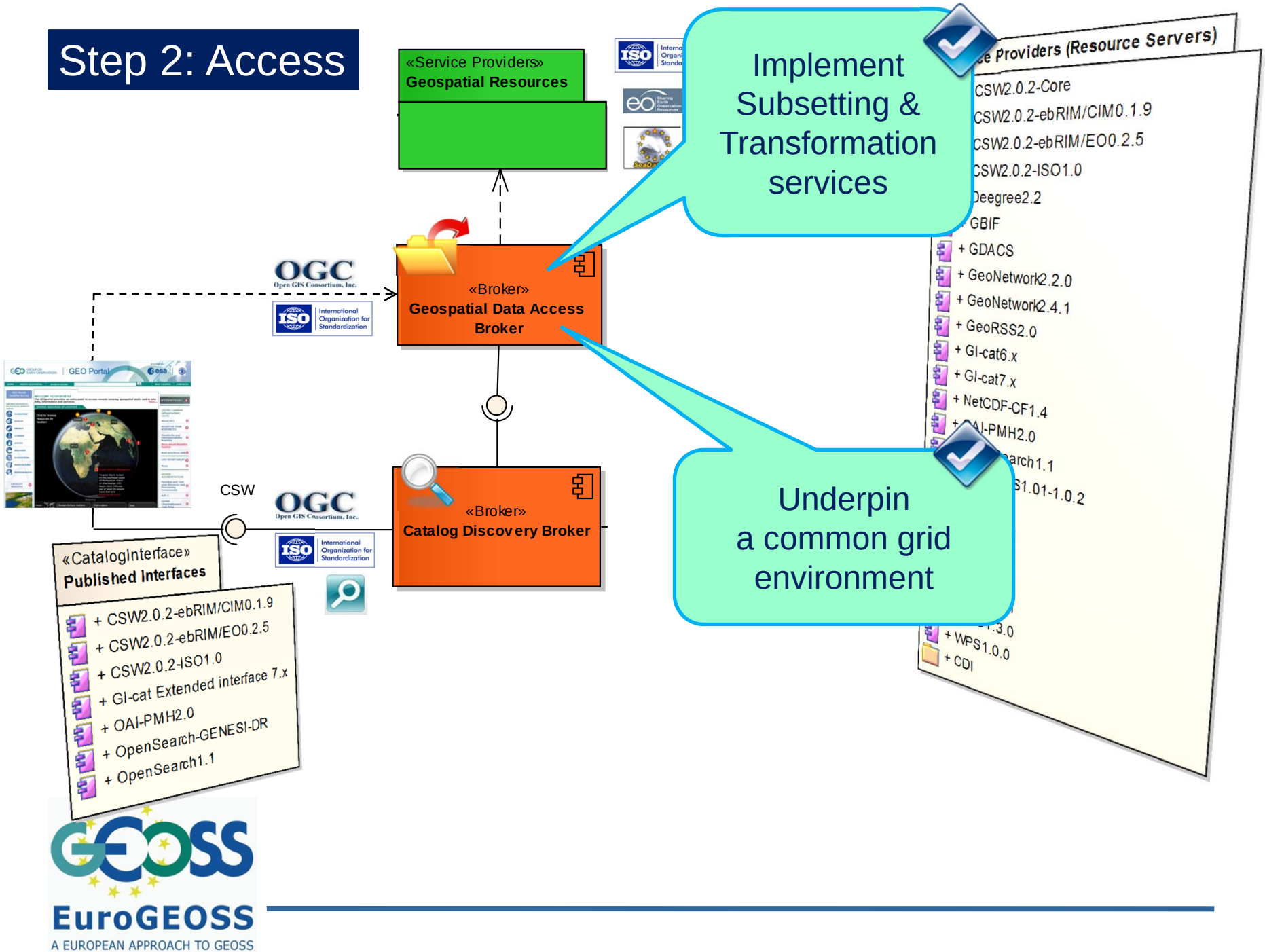
Step 2: Access



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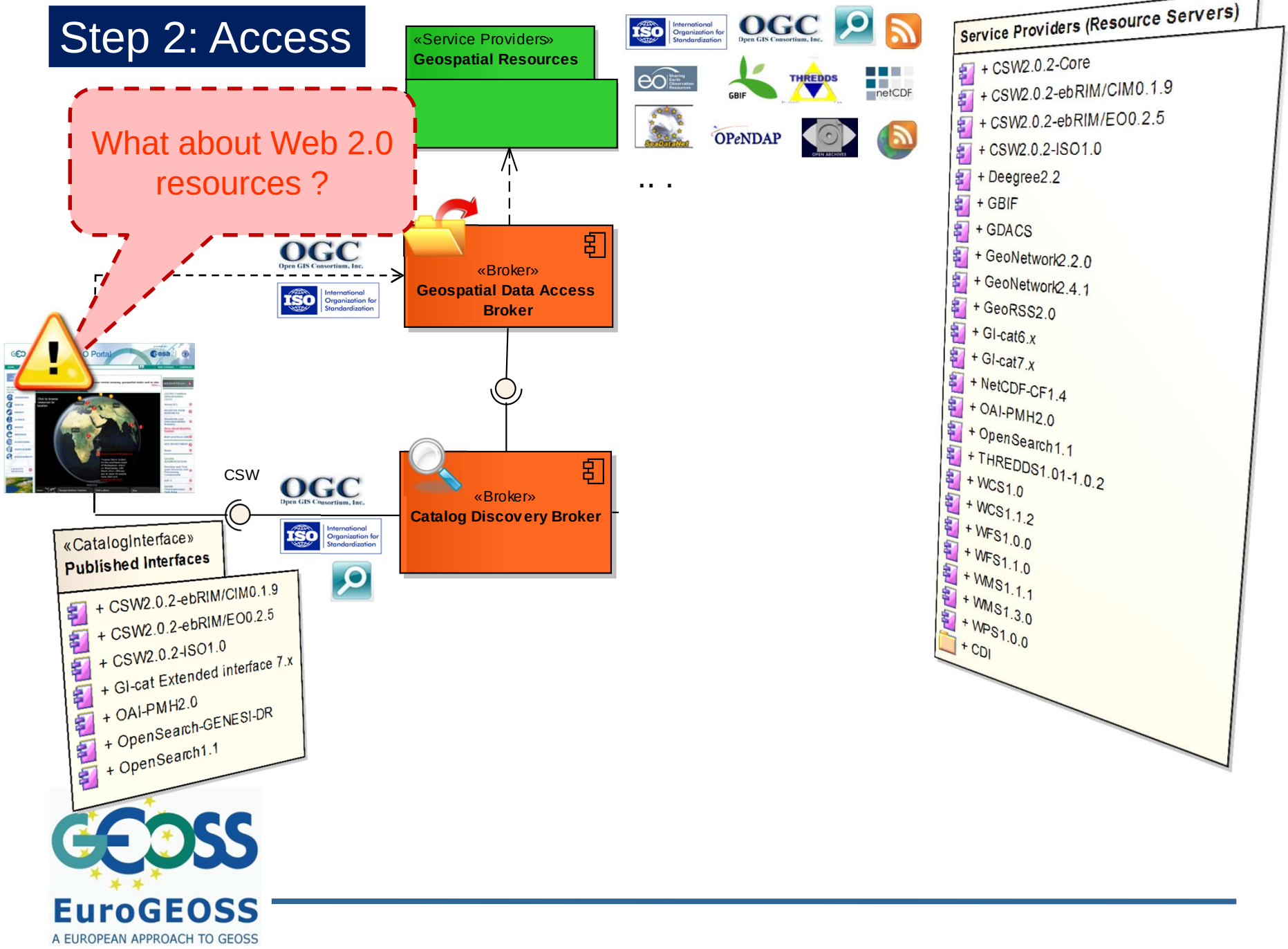
Step 2: Access



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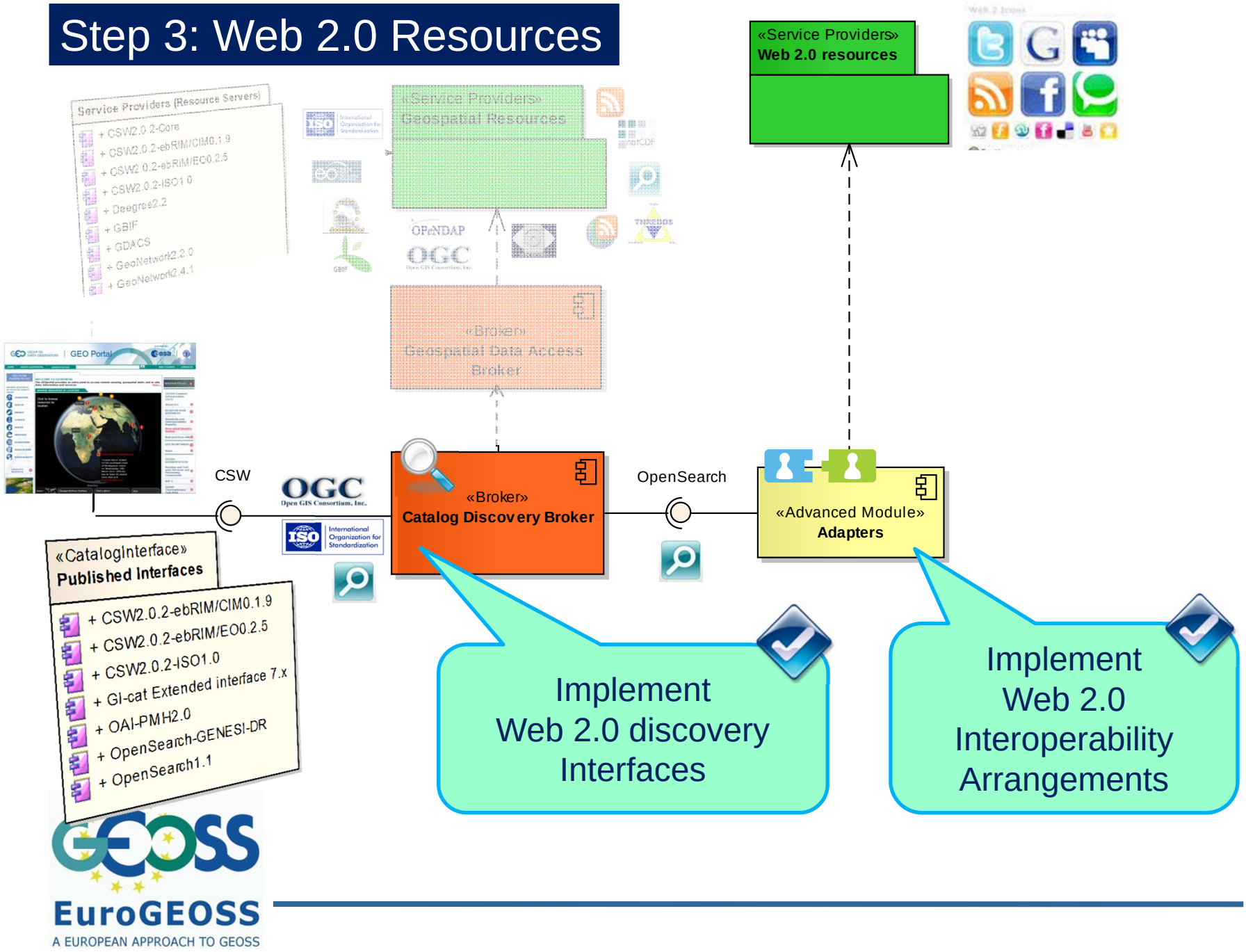
Step 3: Web 2.0 Resources



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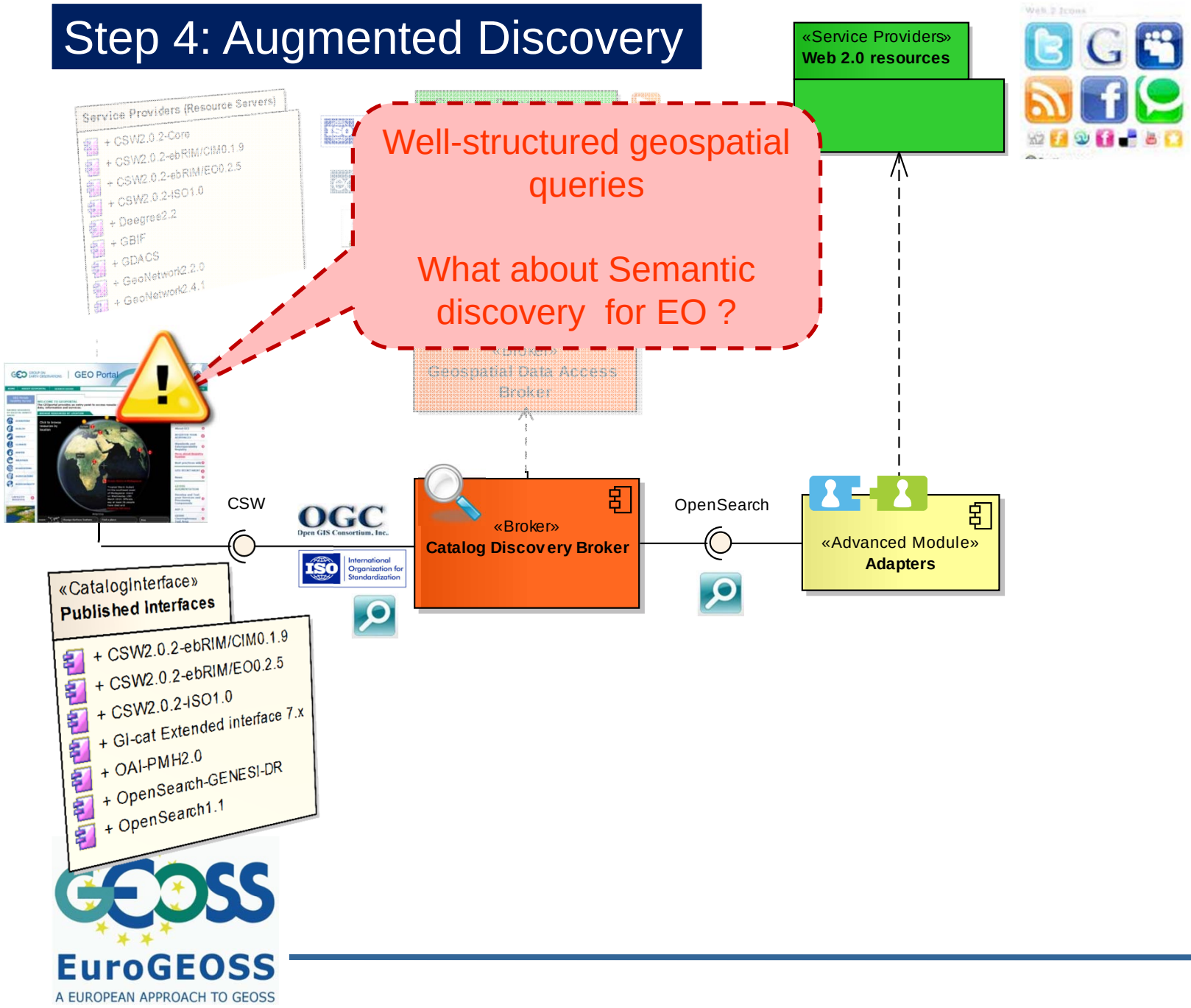
Step 4: Augmented Discovery



EuroGEOSS
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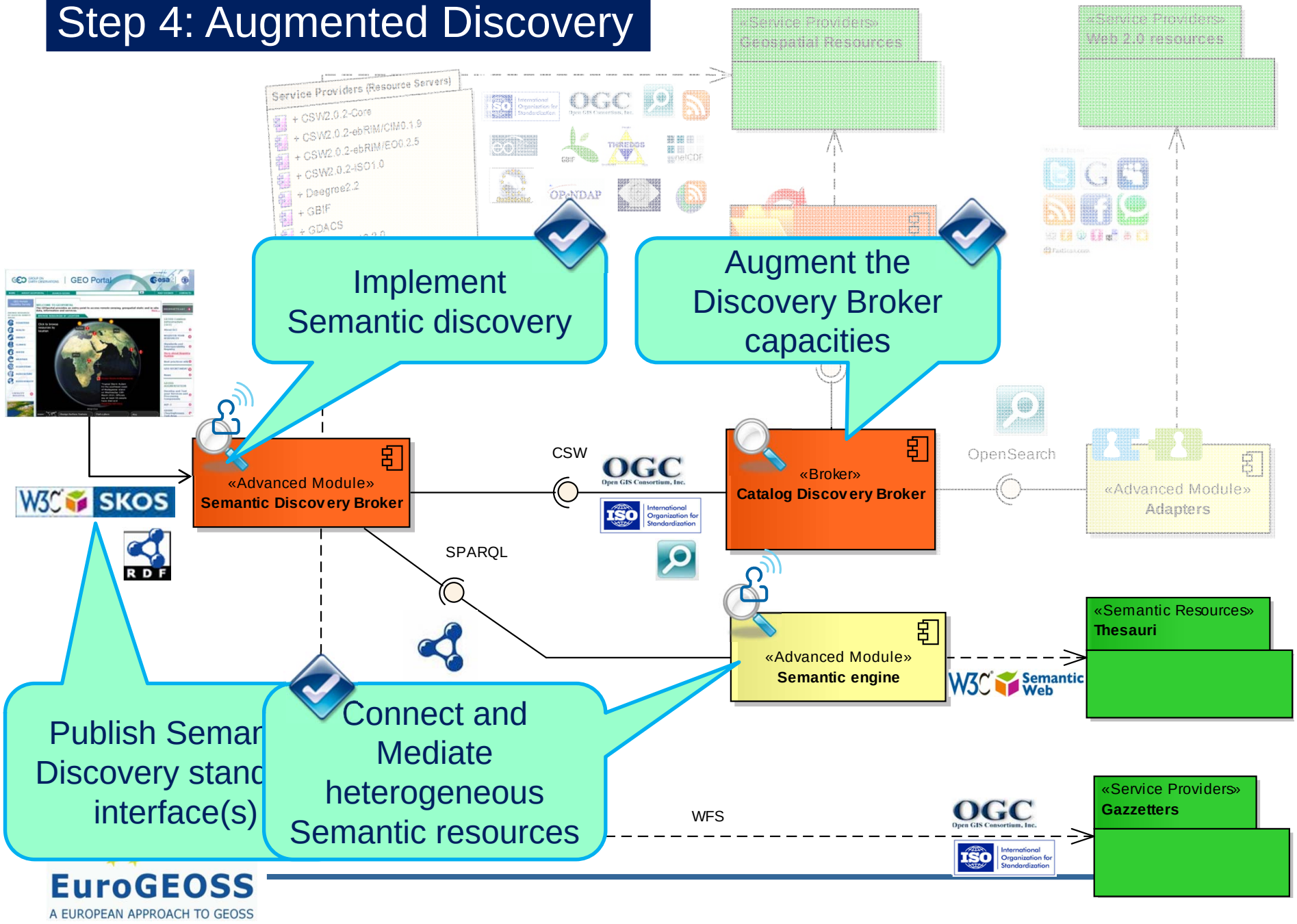
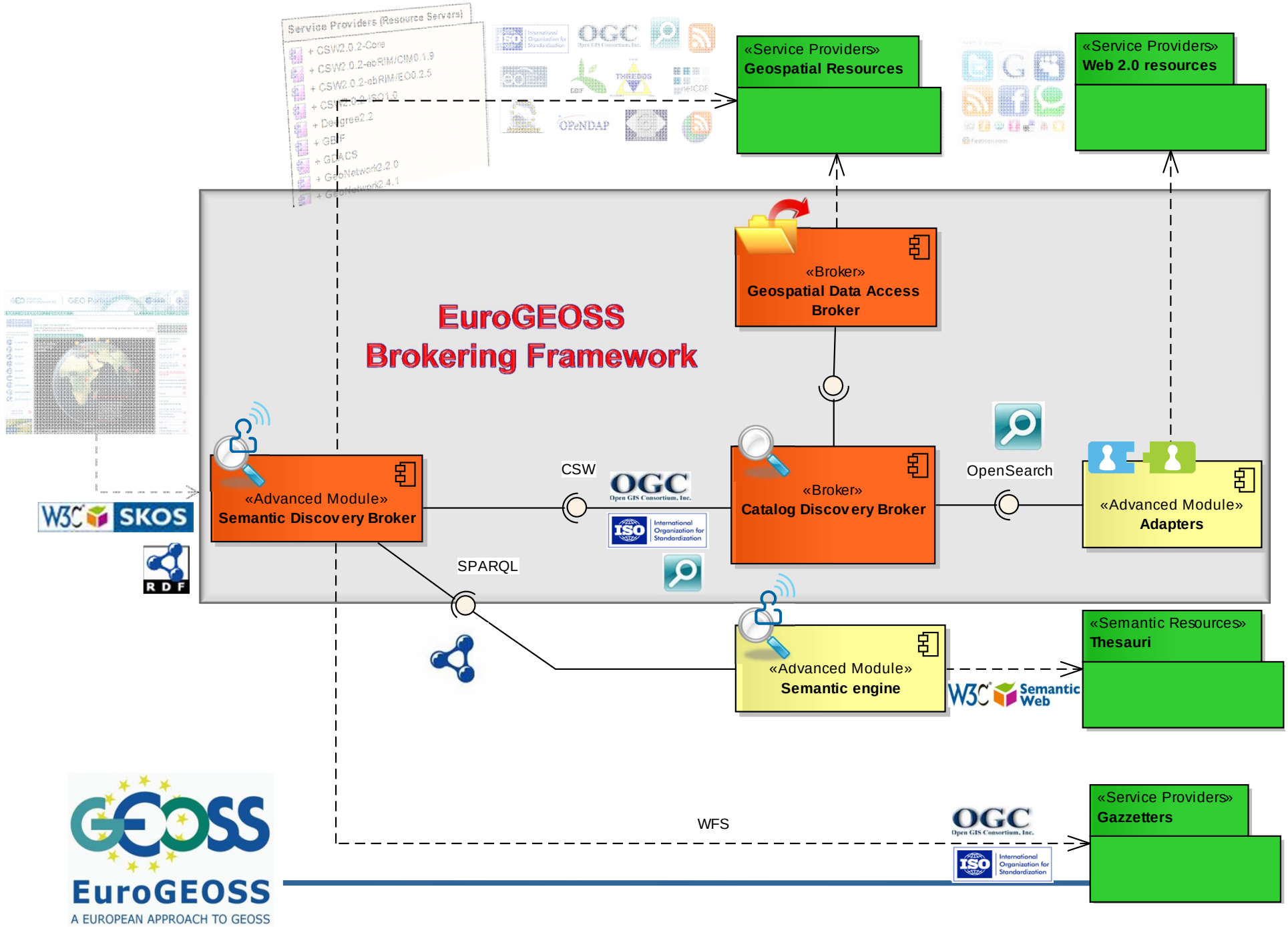
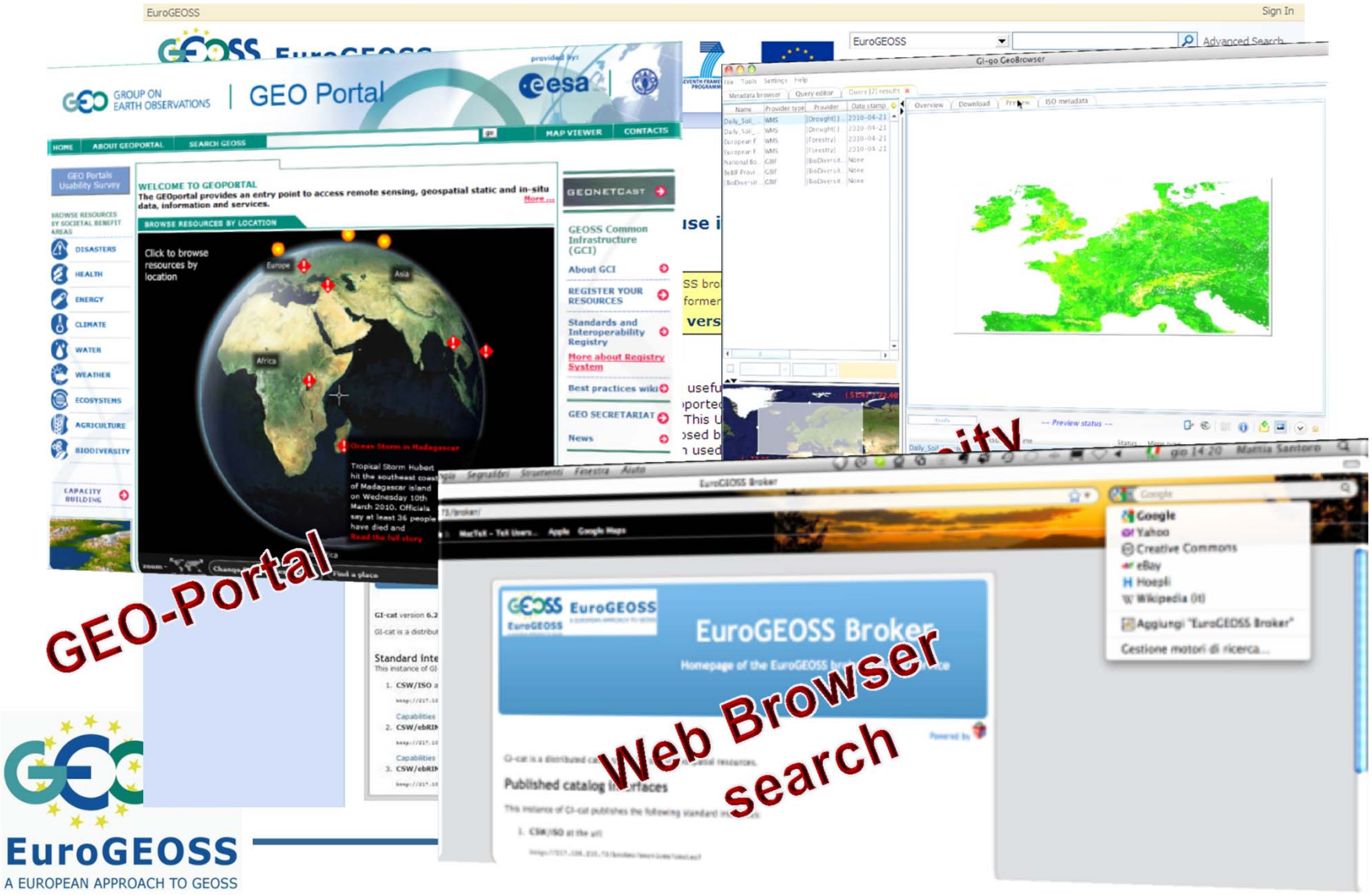
Step 4: Augmented Discovery




Service Providers (Resource Servers)
+ CSW2.0.2-Core
+ CSW2.0.2-ebRIM/CIM0.1.9
+ CSW2.0.2-ebRIM/EO0.2.5
+ CSW2.0.2-ISO1.0
+ Delgree2.2
+ GBIF
+ GEMACS
+ GeoNetwork2.2.0
+ GeoNetwork2.4.1
«Service Providers»
Geospatial Resources
«Service Providers»
Web 2.0 resources
EuroGEOSS
Brokering Framework
«Broker»
Geospatial Data Access
Broker
«Advanced Module»
Semantic Discovery Broker
CSW
«Broker»
Catalog Discovery Broker
OpenSearch
«Advanced Module»
Adapters
SPARQL
«Advanced Module»
Semantic engine
«Semantic Resources»
Thesauri
WFS
«Service Providers»
Gazzetters
SKOS
RDF
OGC
Open GIS Consortium, Inc.
ISO
International Organization for Standardization
W3C Semantic Web
GEOSS
EuroGEOSS
A EUROPEAN APPROACH TO GEOSS

EuroGEOSS Broker (www.eurogeoss.eu)



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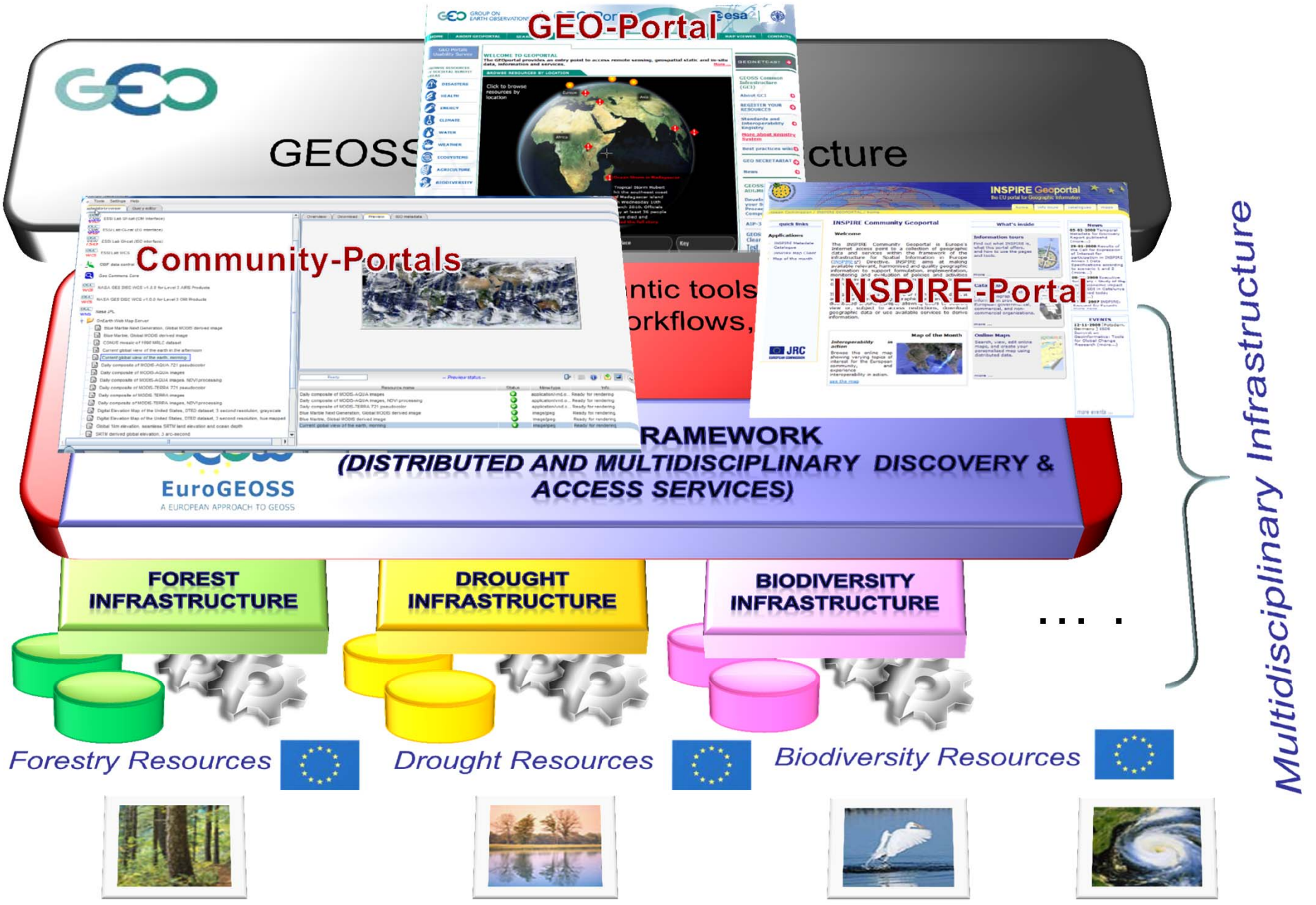
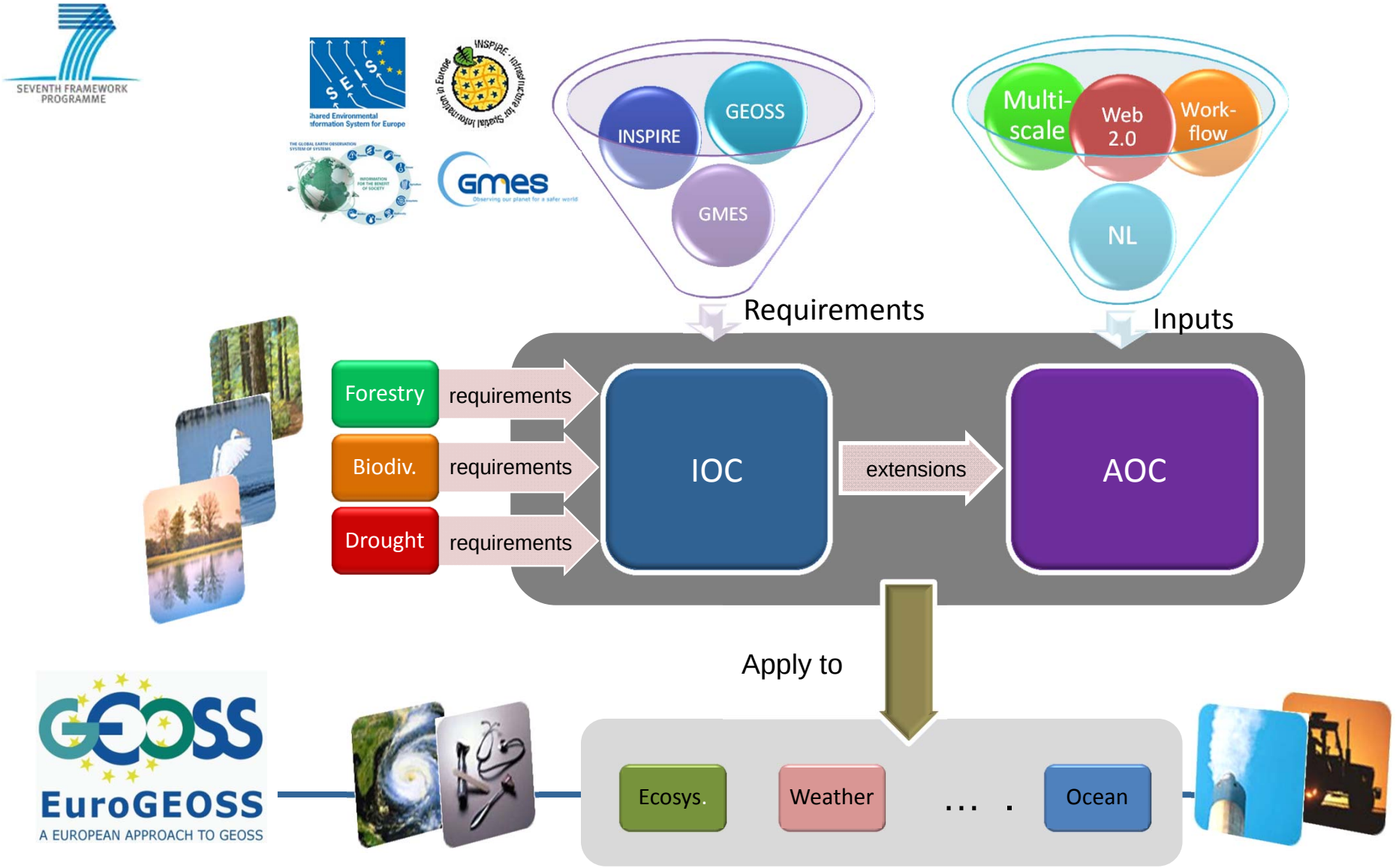
EXTRA SLIDES

EuroGEOSS


GEO-Portal
GEOSS
cture
Community-Portals
ntic tools
orkflows,
INSPIRE Geoportal
INSPIRE-Portal
RAMEWORK
(DISTRIBUTED AND MULTIDISCIPLINARY DISCOVERY & ACCESS SERVICES)
EuroGEOSS
A EUROPEAN APPROACH TO GEOSS
FOREST INFRASTRUCTURE
DROUGHT INFRASTRUCTURE
BIODIVERSITY INFRASTRUCTURE
. . . .
Forestry Resources
Drought Resources
Biodiversity Resources
Multidisciplinary Infrastructure

From IOC to AOC



Principles

- Build on existing (autonomous) capacities
  - *Implement a "system of systems"*
  - *Build on existing and future information systems*
  - *Supplementing but not supplanting systems mandates and governance arrangements*
- Assure a Low Entry Barrier for Users and Resource Providers
  - *Mediate (standard and non-standard capacities)*
  - *Interconnect (capacities) and Adapt existing capacities*
- Implement Semantic Interoperability
  - *Shift from technical interoperability towards conceptual composability*
  - *Avoid tight coupling or strong integrations*

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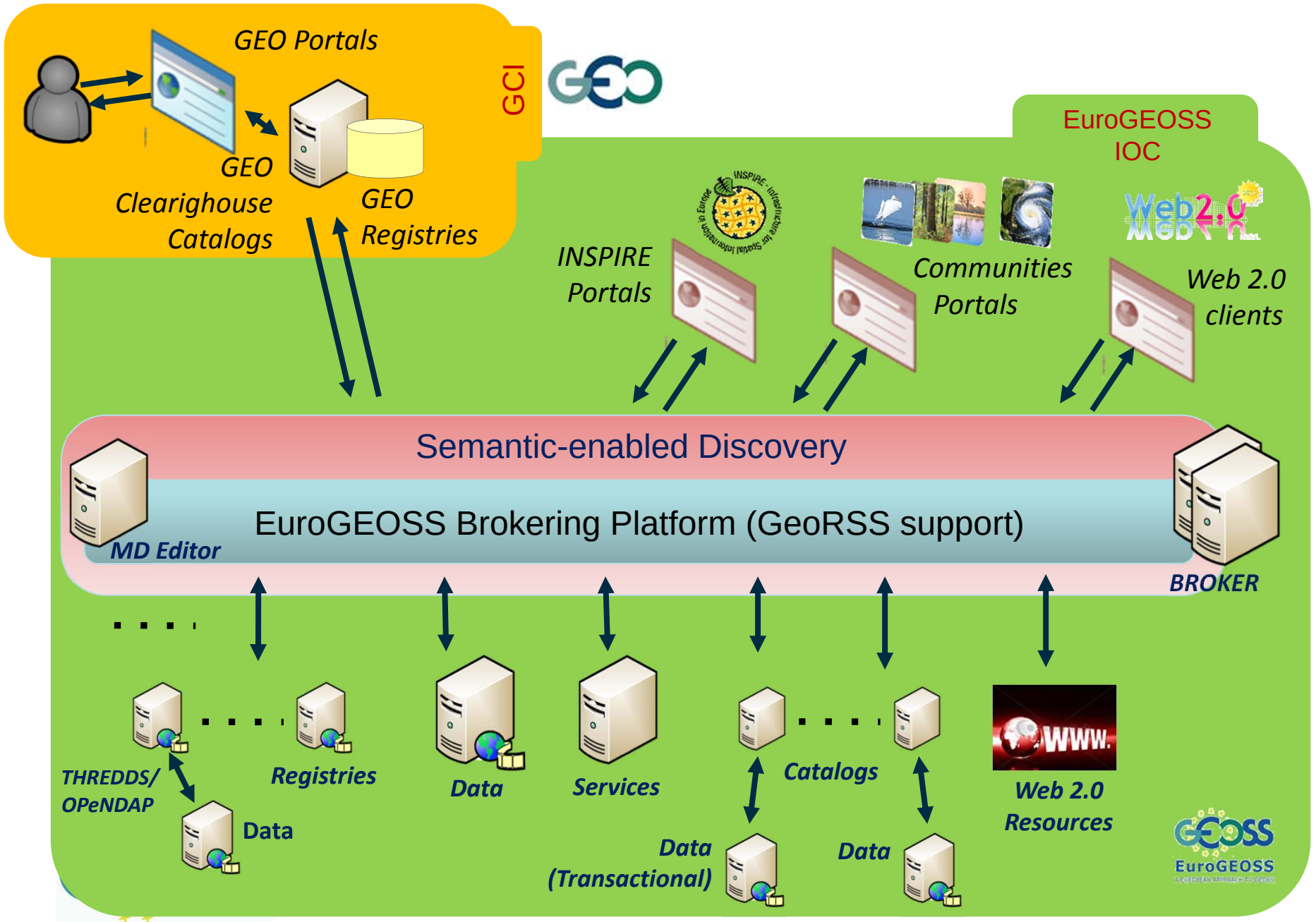
Multi-disciplinary Interoperability approach

EUROGEOSS INITIAL OPERATING CAPACITY (IOC)


GEO Portals
GCI
GEO
Clearighouse
Catalogs
GEO
Registries
EuroGEOSS
IOC
INSPIRE
Portals
Communities
Portals
Web 2.0
clients
Semantic-enabled Discovery
EuroGEOSS Brokering Platform (GeoRSS support)
MD Editor
BROKER
THREDDS/
OPeNDAP
Data
Registries
Data
Services
Catalogs
Data
(Transactional)
Data
Web 2.0
Resources
EuroGEOSS
EuroGEOSS
A EUROPEAN APPROACH TO GEOSS


Universität Hamburg
Géosciences pour une Terre durable
brgm
University of Ljubljana
Universidad de Zaragoza
IEEE
JRC
EUROPEAN COMMISSION
BirdLife INTERNATIONAL
OSE
OBSERVATORIO DE LA SOSTENIBILIDAD EN ESPAÑA (OSE)
RSPB
a million voices for nature
IIASA
BOKU
Thank you
for your attention !
GBIF
www.gbif.org
CSIC
UNIVERSITAT JAUME·I
The University of Nottingham
ALBERT-LUDWIGS-UNIVERSITÄT FREIBURG
UNEP
WCMC
CENTRO NACIONAL DE INFORMACIÓN GEOGRÁFICA
National Drought Mitigation Center
University of Nebraska–Lincoln
EDISOFT
www.eurogeoss.eu

Research Activities

Research Activity (1/5)

- Multi-disciplinary Interoperability
  - Atmosphere Science, Air Quality/Composition, Biodiversity/Ecosystems, Ocenography, Climate, Veterinary
  - Human Health (the next one?)
- Cyber(e)-Infrastructure
  - GCI
    - EGB (EuroGEOSS Broker)
    - GEOWOW, GeoViQua
  - INSPIRE
    - collaborazione con JRC
    - Collaborazione con MATTM & ISPRA?

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Research Activity (2/5)

- SEIS
  - Collaborazione con MATTM?
  - EEA adopt the Brokering approach?
- GIIDA
  - EioNet Workshop on in-situ data
  - Revamp the project: a National Initiative on Environmental Model Integration/Access
  - Use GI-portal as GIIDA portal
  - EGIDA
- GMES
  - SAFER, G-MOSAIC
  - Collaboration with who???

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Research Activity (3/5)

- NSF Earth Cube
  - White Paper on Brokering Approach
  - NSIDC (National Snow and Ice Data Center)
  - ICEO (IEEE Committee on Earth Observation)
  - UCAR/UNIDATA (University Corporation for Atmospheric Research)

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Research Activity (4/5)

- Standardization activity for Geospatial data and information
  - CF-netCDF, CSW, WCS, Pub-Sub, CITE
  - CEN SDI specification
- Environmental Model Interoperability
  - GEO Model Web
  - A National proposal?
- Science & Technology roadmap for GEO
  - EGIDA Methodology
  - GEO Italy
- Brokering Service approach
  - A new approach!
  - IEEE Webinar
  - Supported by the EC-JRC and GEO ADC

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Research Activity (4/5)

- Quality and Uncertainty
  - Uncertainty propagation for models chaining
  - GEO Model Web
  - Quality-based Discovery

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	GEOSS	INSPIRE	GMES	SEIS	Earth Cube	GIIDA	PolarNet
Brokering Approach	X	?		?	X	X	X
Models Access/interoperability	X				?	X	?
Uncertainty propagation	X			?		X	
S&T roadmap	X					X	
Multi-disciplinary Interoperability	X	?		?	X	X	X
Standardization activity	?	X	X		?		
….							

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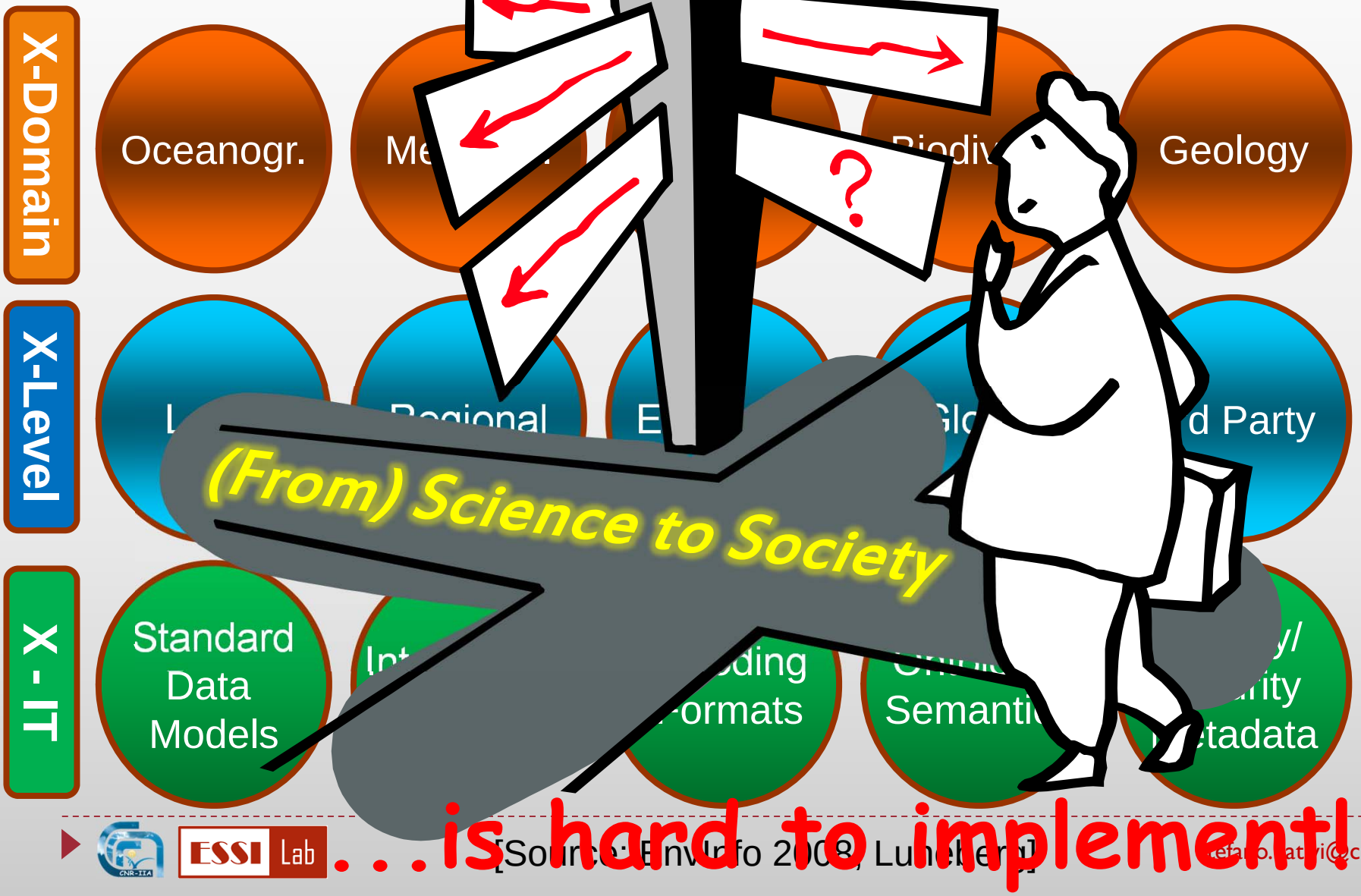
Rationale and perspectives

Good Environmental Information (Pick 2008)



Information Society's needs

- Growing demand of the Society to discover, access, evaluate and use Geospatial Information
  - Seamlessly
  - Effectively
  - Timely (Near Real Time)

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Shared Information

SEIS Communication, 200

February 1st, 2008:

- Commission Communication COM(2008) 46 final: "Towards a Shared Environmental Information System (SEIS)"
- Builds on INSPIRE and GMES
- To modernise the legal provisions relating to way in which information required by environmental legislation is made available
- Enable the e-Goverment

[Source: EnviInfo 2008, Luneberg]

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Challenge: Integrating information and Knowledge in Europe

- Based on existing Aarhus Conventions and EU Directives
- Guarantee PAs and citizen standardized access to information
  - public participation
  - access to justice
- Connected with e-Government and e-Participation

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INSPIRE/SEIS Principles (excerption)

- Common principles for timely, reliable and relevant information on the state of environment:
  - Info
  - Info
    purp
  - Info
    to e
  - Info
    auth
    geog
  - Info
    free

System of Systems

- Service Interoperability & Metadata sharing
  - Modeling Driven Approach
  - Geospatial Information standards
    - ISO TC211
    - OGC Web Services
  - (Web) Service Oriented Architecture

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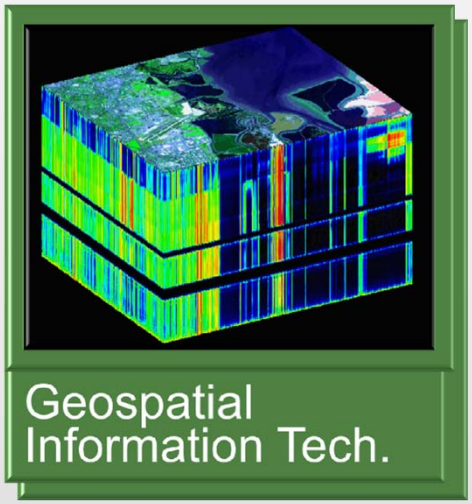
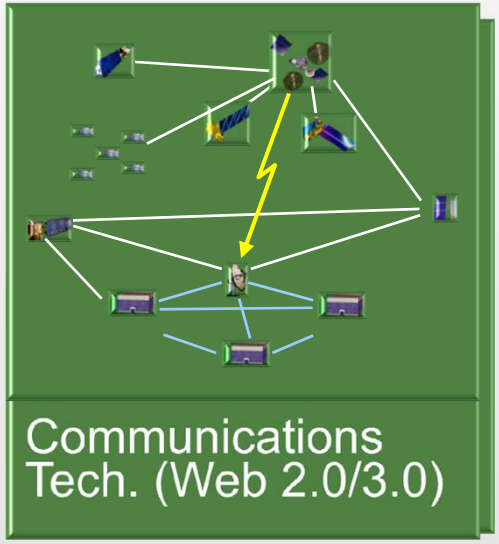
Technological drivers

- Future Earth System Science will leverage three ongoing technological (r)evolutions *[Science for Society (NASA, 2002)]*





- How will this knowledge be transferred to the Society?

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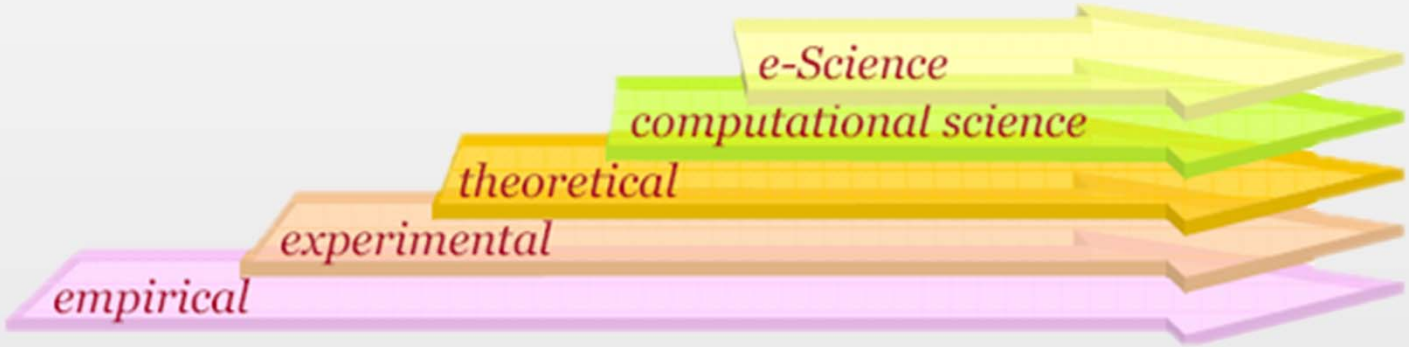
A new vision for Science

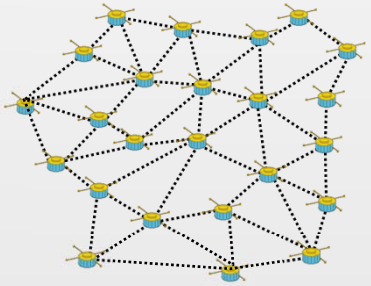
- The evolution to e-science
  - Global challenges, Big Science, digital revolution

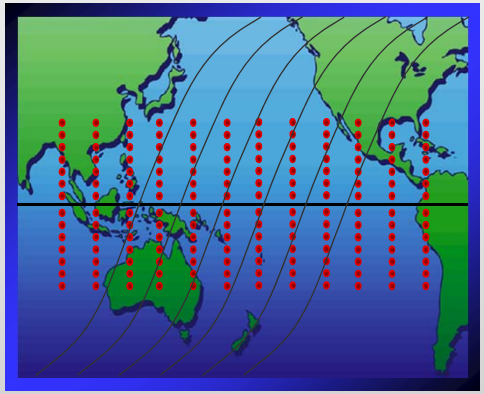


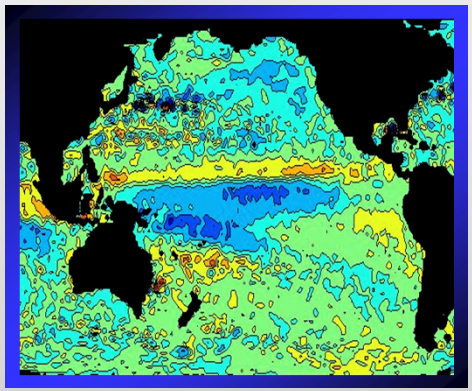
[Source: Mário Campolargo (Acting Director, Emerging Technologies and Infrastructures European Commission - DG INFSO), EGEE Conference, Barcelona 2008]

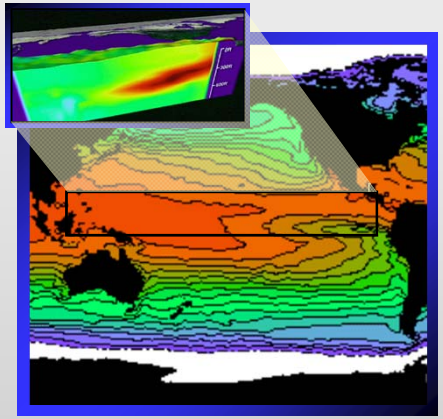
[From] Science to Society (NASA, 2002)

Advanced Sensors	Data Processing & Analysis	Information Synthesis	Access to Knowledge
Multi-platform, multi-parameter, high spatial and temporal resolution, remote & in-situ sensing (Petabytes 10^{15})	Calibration, Transformation To Characterized Geophysical Parameters (Terabytes 10^{12})	Interaction Between Modeling/Forecasting and Observation Systems (Gigabytes 10^{9})	Distribution, Dissemination (Megabytes 10^{6})









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