GEOSS Common Infrastructure (GCI) and the Discovery and Access Broker (DAB)

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launched in response to calls for action by the 2002 World Summit on Sustainable Development, Earth Observation Summits, and by the G8 (Group of Eight) leading industrialized countries.

- voluntary partnership of 99 governments and 87 international organizations
- provides a framework within which these partners can develop new projects and coordinate their strategies and investments
- charged with developing GEOSS

THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS
INFORMATION FOR THE BENEFIT OF SOCIETY

Disasters, Health, Energy, Climate, Agriculture, Ecosystems, Weather, Water, Biodiversity
GEOSS Discovery and Access Infrastructure

Many possible User Targets

Unified, Simplified, Flexible Discovery and Access services interface

Vast Supply System

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About 50 Supply Systems

GEOSS Information System

GEOOSS Apps

GEO Home Page

GEOOSS Portal

Brokering Framework

Registry (CSR)

Semantic engines

Providers Brokered (capacities, systems, networks, etc.)

Private sector (tested interoperability)
Ongoing Brokering tests:

- IGN
- DigitalGlobe
- GBIF
- Geoscience Australia
- FP7 GeoCarbon DBs
- UK.gov
- FAO
- RapidEye
- EO MAP
- Arctic Data archive System (ADS)
<table>
<thead>
<tr>
<th>Dataset/Network</th>
<th>Description</th>
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<tbody>
<tr>
<td>ArcGIS Online ESRI</td>
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<td>Arctic Data Archive System</td>
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<td>Australia AODN Collections</td>
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<td>BYU World Water Data catalog</td>
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<td>CEOS WGISS Integrated Catalog (CWIC)</td>
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<td>Chile Geoportal</td>
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<td>Data Integration and Analysis System (DIA)</td>
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<td>Digital Globe</td>
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<td>EEA SDI Catalog</td>
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<td>GBIF</td>
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<td>GMOS Database</td>
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<td>Geoscience Australia</td>
<td>Global River Discharge Datasets (GRDC/GEOWOW) - Kisters AG</td>
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<td>HIS Central US</td>
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<td>IGN GeoPortal</td>
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<td>INPE CDSR</td>
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<td>IRIS Event</td>
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<td>IRIS Station</td>
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<td>ISPRA Monitoring network</td>
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<td>Limitses (Administrative Boundaries from Ministry of Public Works)</td>
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<td>MEDINA SDI</td>
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<td>NASA Global Change Master Directory</td>
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<td>NIWA data catalog</td>
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<td>NOAA Unified Access Framework Catalog</td>
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<td>New Zealand Monitoring Network</td>
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<td>New Zealand government geodata catalog</td>
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<td>One Geology</td>
<td>PANGAEA</td>
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<td>RASAQM</td>
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<td>Red Vial (Road Network, from Ministry of Public Works) -- from Chile</td>
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<td>Registered Data</td>
<td>Research Data Archive (RDA)</td>
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<td>SeaDataNet</td>
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<td>South African Environmental Observation Network</td>
<td>UK Data Gov</td>
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<td>US Data Gov</td>
<td>US NODC Collections</td>
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<td>US NODC</td>
<td>WIS GISC DWD</td>
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<td>Webservice Energy Catalog</td>
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<td>[Graph showing data access over time]</td>
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Time (2011 - 2016):
- 0 for 2010
- 13 for 2012 Jul
- 21 for 2013 Oct
- 34 for 2014 May
- 2015 Sep
- 2015 Nov
Big Data challenges for the GCI

Cloud-based Software Ecosystem

Volume:
- Millions of discoverable (small & medium) products;
- Long time/space series, … .

Variety:
- Different product types (data, services, models, documents);
- Data models;
- Protocols;
- Semantics;
- Granularity levels;
- Organizations;
- Maturity level, … .

Veracity/Validity/Value:
- Evaluation support,
- Essential Variables;
- Discovery Ranking, User Feedbacks, … .

Velocity:
- Serve countries with limited Internet access,
- Fast Discovery & Access,
- Data Transformation and Analytics

Visualization:
- Preview,
- Tiling services,
- visual exploration, … .
Applications, Mobile Apps, Community Portals, Clients

- WIS (KMA node)
- CEOS Water Portal
- OGC (Open GIS Consortium, Inc.)
- OpenSearch
- GEOSS Portal
- Javascript
- My-GEOSS
- ArcGIS online
- GEONETCast
- Brokering Services
- APIs
- Software
- Discovery, Evaluation, Access, Processing (simple), Visualization, Monitoring, Tagging, Workflow management, QoS control
- .. and more ...
- Infrastructure
- Object storage, Database, Monitoring
- Platform
- OpenSearch
- OGC (Open GIS Consortium, Inc.)
- OPeNDAP
- RDF
- ISO
- International Organization for Standardization
- THREDDS
- W3C
- Semantic Web
- netCDF
- Vast Data Supply System
- and more ...
GEO DAB in the Cloud

Scalable and reliable platform

More than 30 (autoscaling) virtual machines on a public cloud
GCI (GEO DAB) Usage Statistics

Daily Count of Discovery Queries

- 2014: more than 410 thousands
- First 4 months 2015: more than 150 thousands
- Last two weeks: around 12 thousand per day

• Temperature
• River Discharge
• Precipitation
• Land Cover
• ...

1. Keyword
2. GEOSS Data-CORE
3. BBOX
4. ...

http://statistics.geodab.eu/gi-stat/stats
GCI APIs

High level open APIs to develop GEOSS applications

APIs = Application Program Interfaces

JavaScript APIs for GEOSS resources
- Discovery
- Semantic enriched discovery
- Access
- Visualization

http://api.eurogeoss-broker.eu/docs/index.html
THE NEXT FUTURE

Personal Vision
The Architectural Evolutions

1st Evolution
[Service driven]

2nd Evolution
[Brokering pattern]

3rd Evolution
[Big Data]

4th Evolution
[VRE]

...
From Data to Knowledge

Observation Data → Essential Variables → Indicators → Indexes → Strategic Targets

What if...

GEOSS Users

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Software Ecosystem

2015

next decade

Social Ecosystem

2025
Thank you!

Questions?

Useful links

http://api.eurogeoss-broker.eu/docs/index.html
http://statistics.geodab.eu/gi-stat/stats