

GEOSS

Architecture Implementation Pilot, AIP- 2 Results

AIP-3 Initial concepts

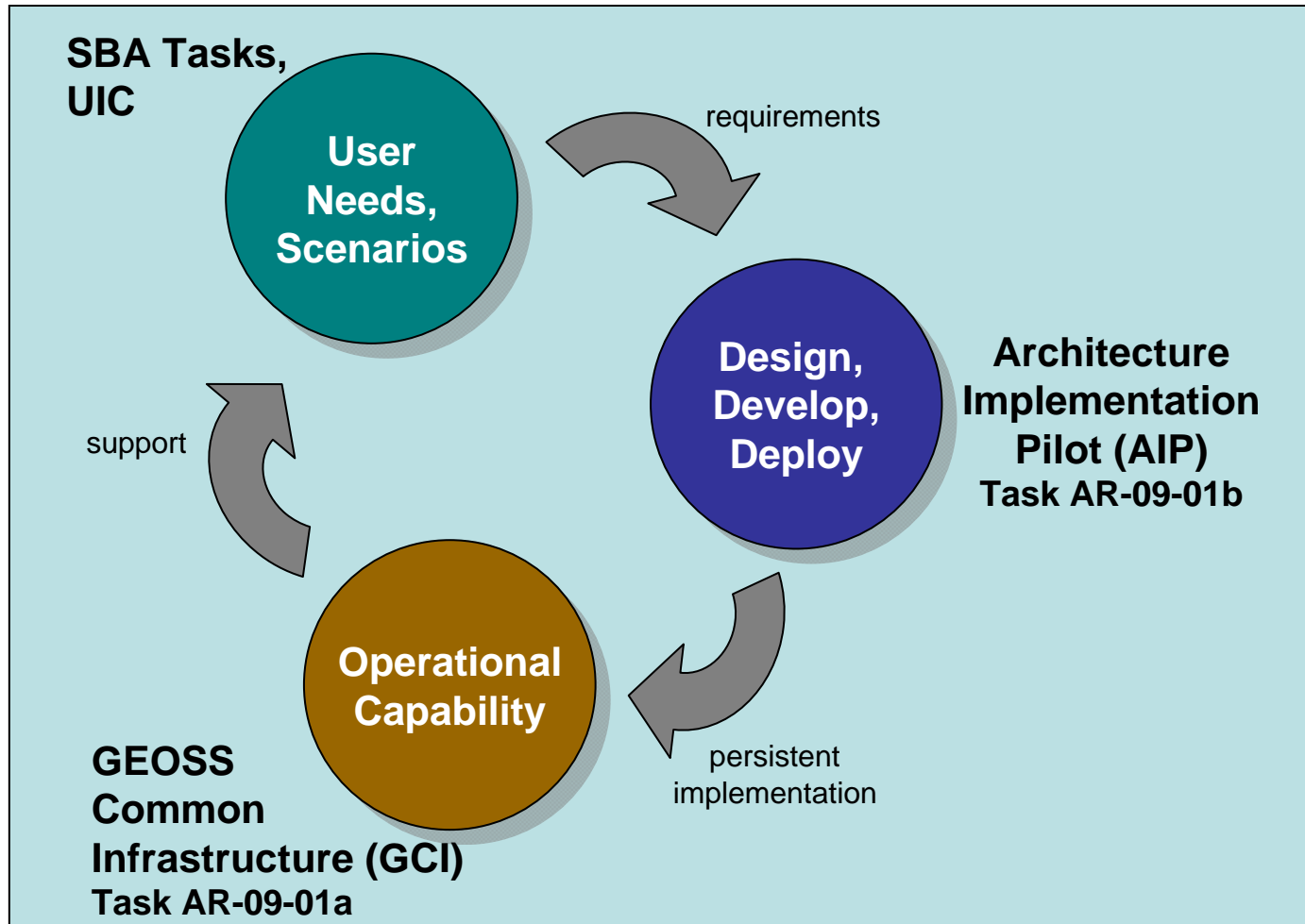
George Percivall,
Open Geospatial Consortium
GEO Task AR-09-01b Task POC

ADC-12 Melbourne Australia
15 September 2009





Elaboration of GEOSS Architecture





GEO Task AR-09-01b

Architecture Implementation Pilot

- Develop and pilot new process and infrastructure components for the GCI and the broader GEOSS architecture
- Continuation of existing efforts and new activities solicited through AIP Calls for Participation (CFPs) and other means;
 - Including continuation of IP3



Acknowledgments

- AIP-2 Summary provides an overview of efforts of scores of GEOSS Members and Participating Organizations.
- Hundreds of individuals from those organizations have contributed to the development of AIP
- Our collective contributions are making it possible to create GEOSS.



AIP-2 Themes

- Augment the GEOSS Common Infrastructure
- Emphasize SBAs identified by UIC/ADC collaboration
- Promote "persistent exemplars"
- Elaborate GEOSS Architecture
 - Scenarios and Use Cases
 - Service and Component types
 - Interoperability Arrangements

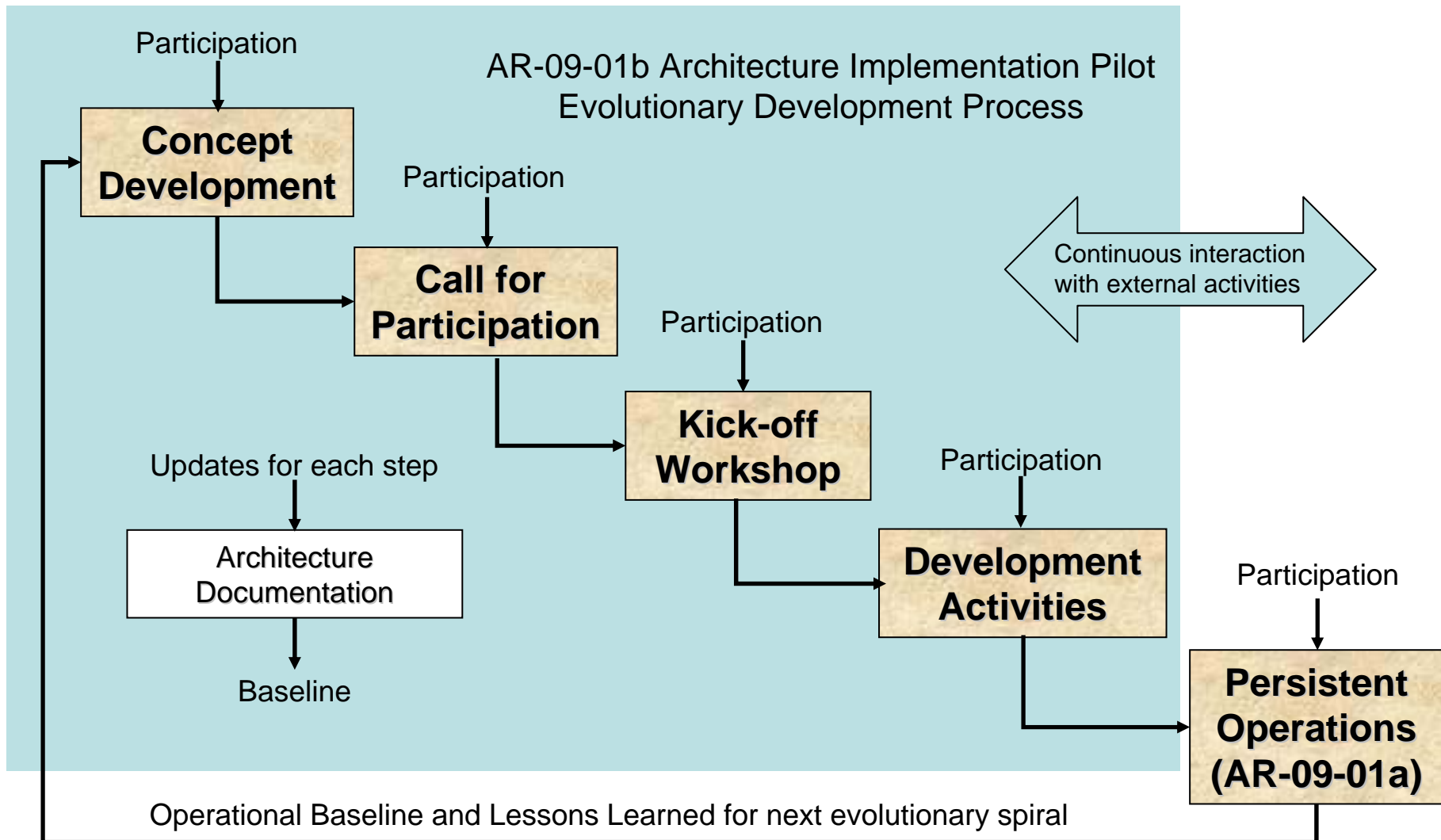


Main achievements of AIP-2

- Developed and demonstrated six SBA scenarios in close collaboration with other GEO Tasks.
 - Scenarios identified through UIC/ADC collaboration
- Established reusable process to implement SBA scenarios in Service oriented Architecture (SoA) for GEOSS
 - Defined 10 transverse use cases for SoA
 - With SIF, further advanced GEOSS Interoperability Arrangements
- Piloted Augmentations to the GCI
 - identification of Engineering view Components
 - Contributed to increased in CSR registered resource
 - Promoted “persistent exemplar services”
 - Service testing facilities to test contributed components during the registration process and operations



AI Pilot Development Approach





AIP Phase 2 Master Schedule

AIP-2 CFP Announced	June 2008
Kickoff Workshop at NCAR	September 2008
Scenarios and Use Cases defined	January 2009
Demo Capture Workshop	4-5 May 2009
Finalize AIP-2 deliverables	8 September 2009
AIP-2 results transition to operations	2 nd Half of 2009



SBAs for **AIP-2** Scenarios

- **Disaster Management:**
 - Editors: NASA, Spot Image, ERDAS, Northrop Grumman
- **AQ & Health – Smoke Event:**
 - Editors: EPA, Washington Univ St. Louis, NAS
- **Biodiversity: Pika Distribution:**
 - Editors: CNR
- **Biodiversity: Arctic Food Chain:**
 - Editors: CNR
- **Biodiversity: Polar Ecosystems:**
 - Editors: USGS, George Mason Univ
- **Renewable Energy - Facility Planner:**
 - Editors: Mines Paris



- ▼ AIP-2 Introduction
 - Instructions
 - Sections Overview**
 - GCI for Publishing Services
- ▼ SBA Scenarios
 - Disaster Management
 - Pika Biodiversity
 - Arctic Food Chain
 - Polar Ecosystems
 - Air Quality
 - Renewable Energy
- ▼ GEO Web Portals
 - Compsult GEO Portal
 - ESA/FAO GEO Portal
 - ESRI Geoportal
- Geoprocessing Services



Using the GCI for publishing services

Societal Benefit Area Scenarios

The GEO Web Portals

Geoprocessing Services

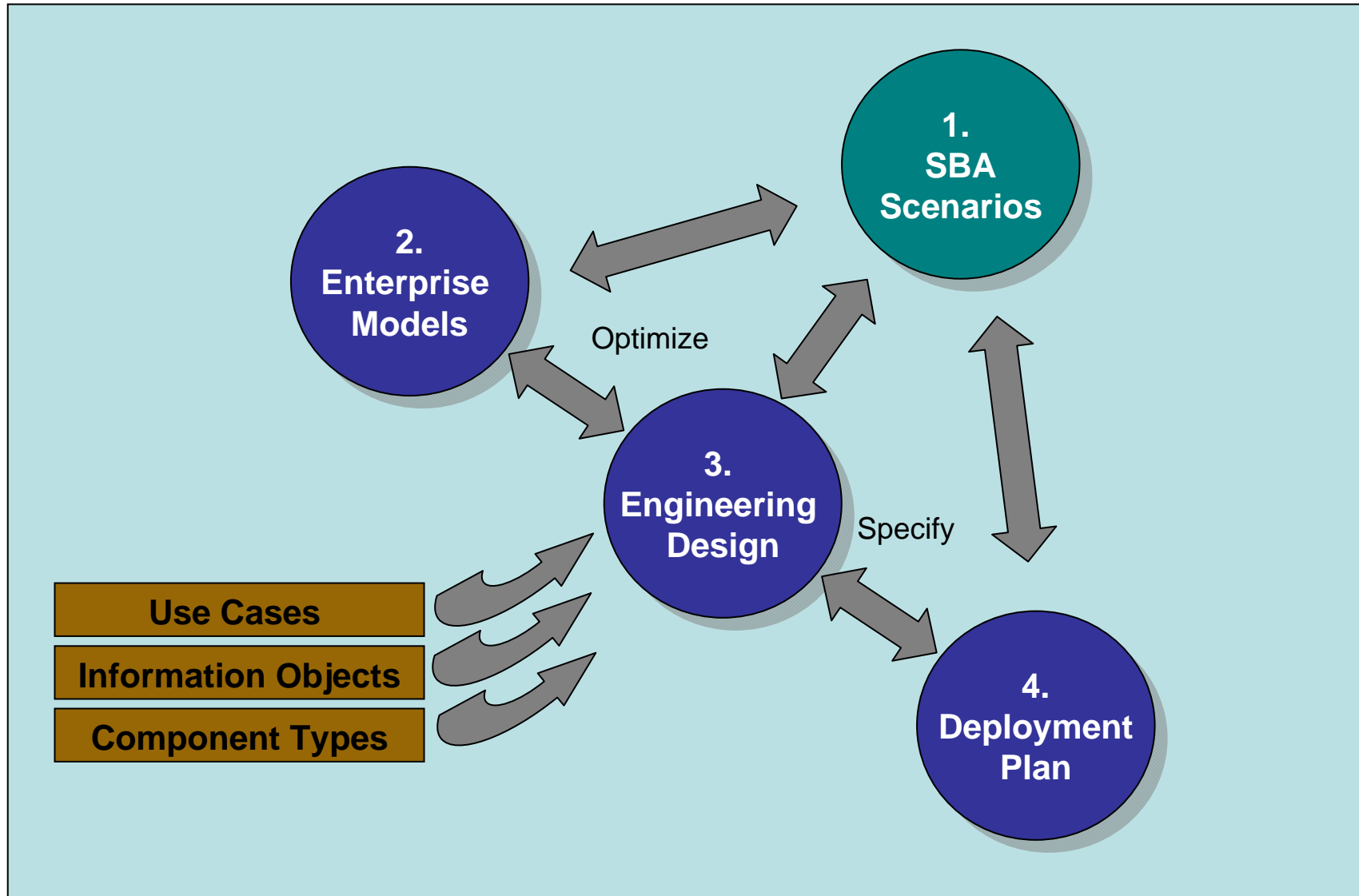


Scenarios and Use Cases

- Transverse Use Cases support Community Scenarios
- Scenarios: end user view of the value of GEOSS
 - Focused on topics of interest to a community
 - Occur in a geographic Area of Interest (AOI)
 - Steps in a scenario are Use Cases
 - Scenarios developed by Community WGs
- Use Cases: reusable service oriented architecture
 - Use cases for discovery, data access, etc
 - Utilize Interoperability Arrangements
 - Use Cases developed by Transverse Technology WGs



SBA-to-SoA Process



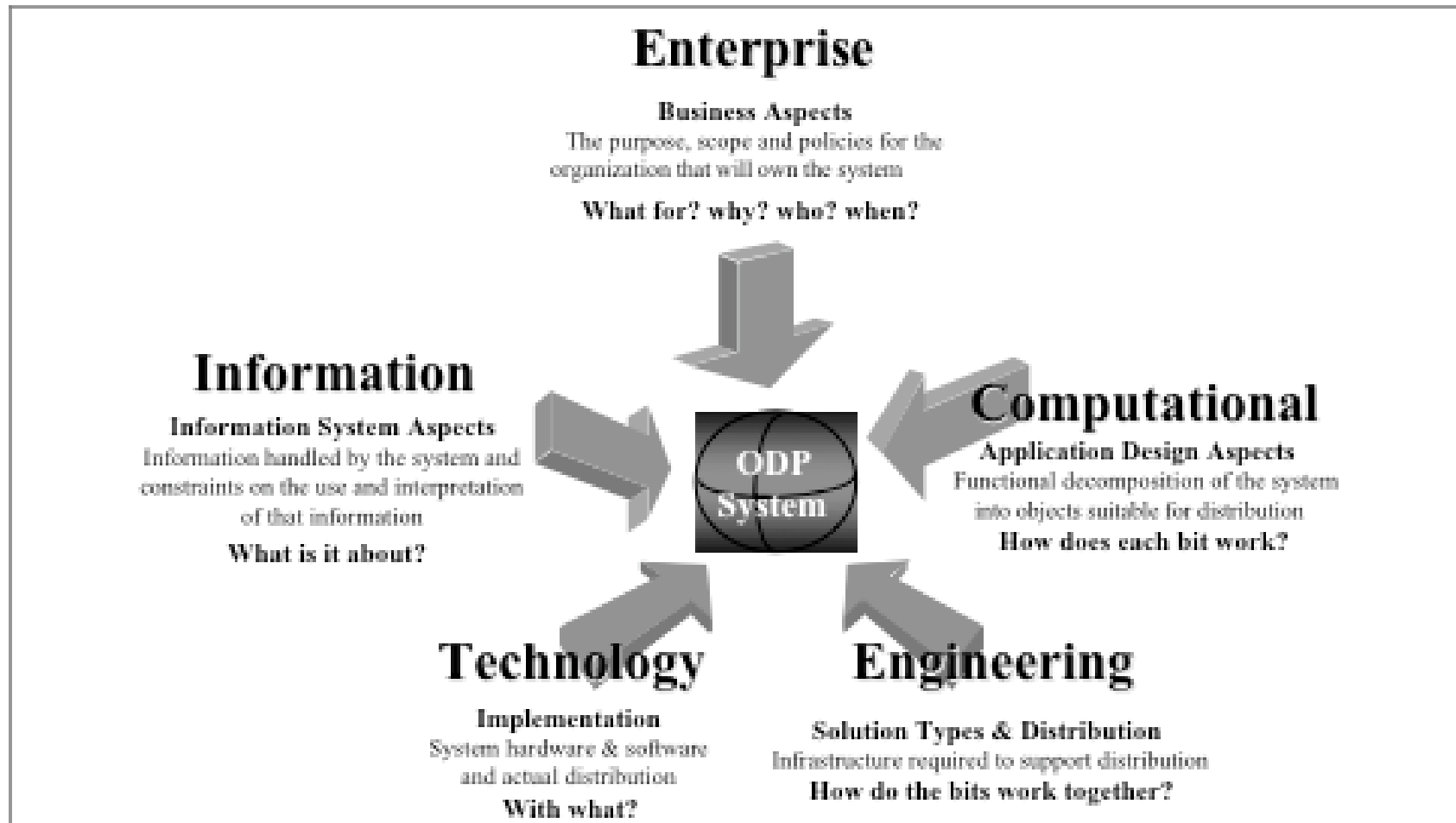


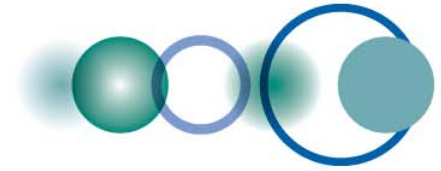
SBA-to-SoA Process Artifacts

Activity Step	Artifacts
1. Scenarios	<ul style="list-style-type: none">• Objectives• Scenarios• Processes
2. Enterprise Models	<ul style="list-style-type: none">• Activity diagram- Use Cases• Enterprise objects• Context diagram
3. Engineering Design	<ul style="list-style-type: none">• Generalized use cases• Specialized use cases• Information objects• Component Types• Interoperability Arrangements
4. Deployment Plan	<ul style="list-style-type: none">• Component Instances• Persistent Exemplars



RM-ODP viewpoints from ISO/IEC 19793





GEOSS

Melbourne Full ADC meetings

- UML Architecture

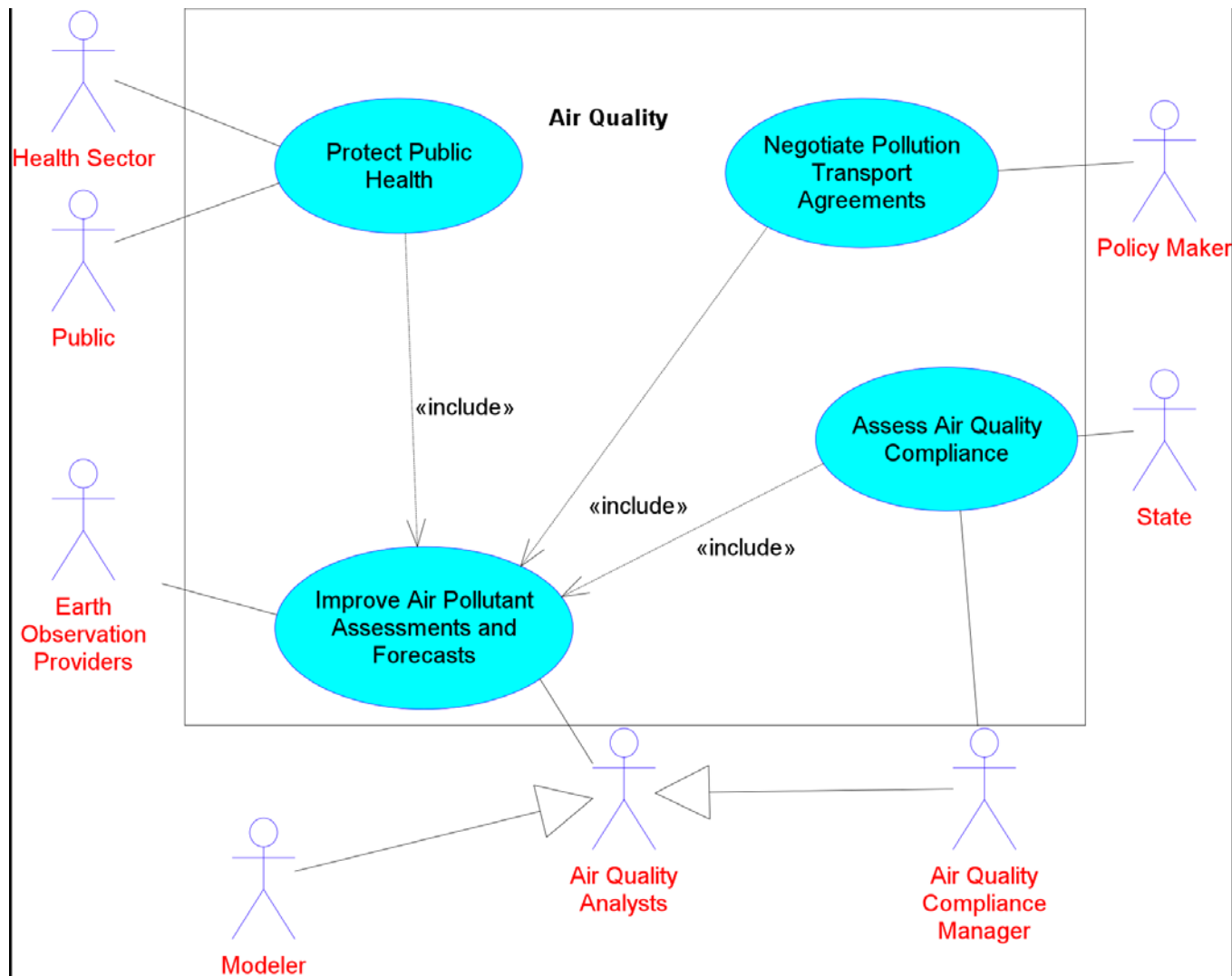
Recommendations

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Enterprise Use Case Diagram for Air Quality





Use Cases

- Use cases are not part of the current ISO/IEC 193793:2007 standard Enterprise View.
- It is recommended they be added to the Enterprise view and that they replace processes package and
- Use them in conjunction with Use Case Diagrams, Activity and Sequence Diagrams and become part of new package called Use Cases in the ISO/IEC193793:2007 standard Enterprise View



Use Cases

- In this way the horizontal data flow can be captured at the highest level.
- Then if necessary GEOSS System Functions and Services can be allocated by mapping one or more of these activities to a system function and/ or service. This is called use case realization.
- Individual use cases can then be further allocated to activity and sequence diagrams to capture data flow at next level. This provides firm evidence on how system functions and services were arrived during analysis of the architecture.

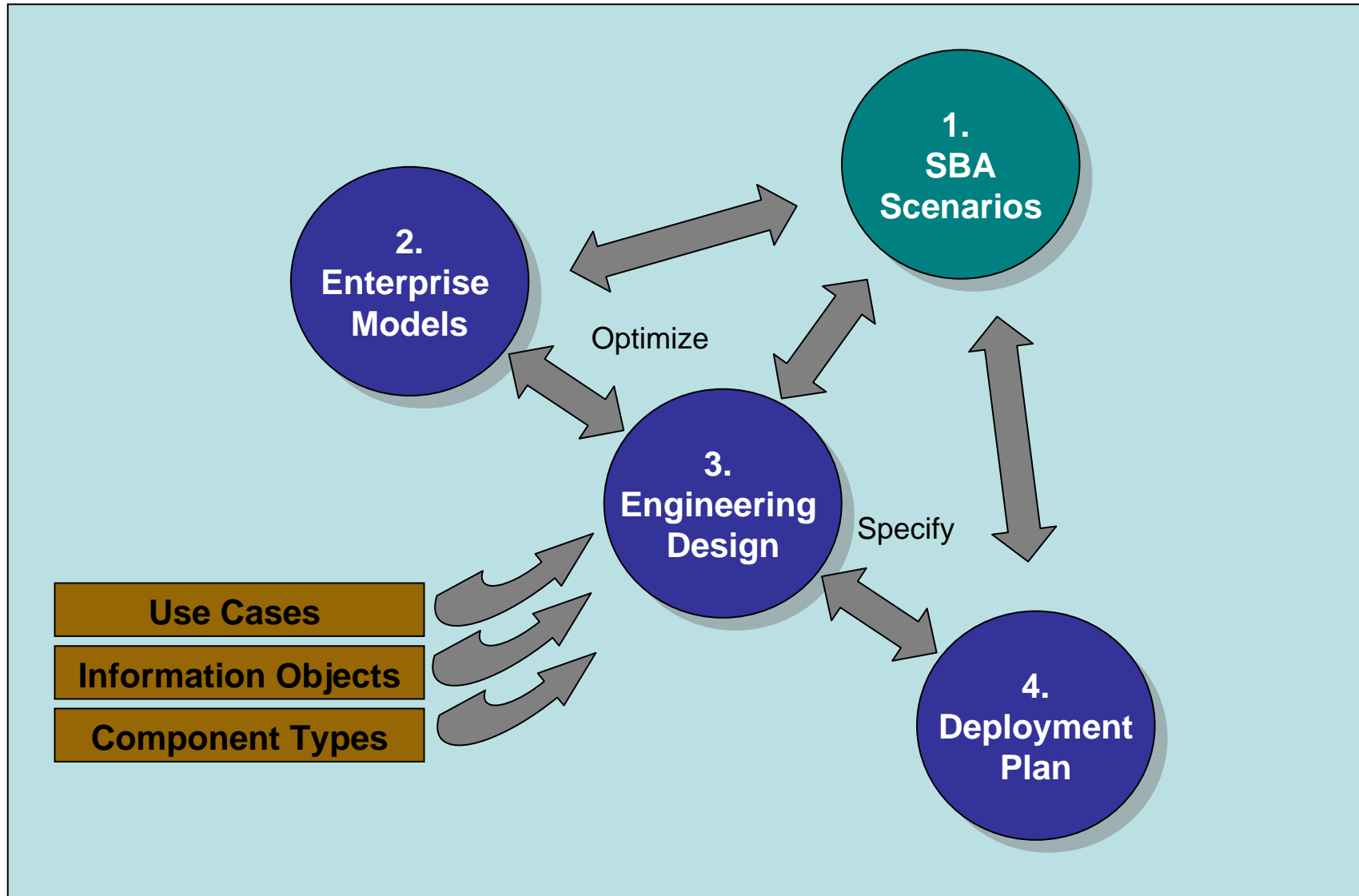


References

- IAW ISO/IEC 193793 UML Standard
- IAW ISO/IEC RM-ODP 10746 for OMG Domain Specifications

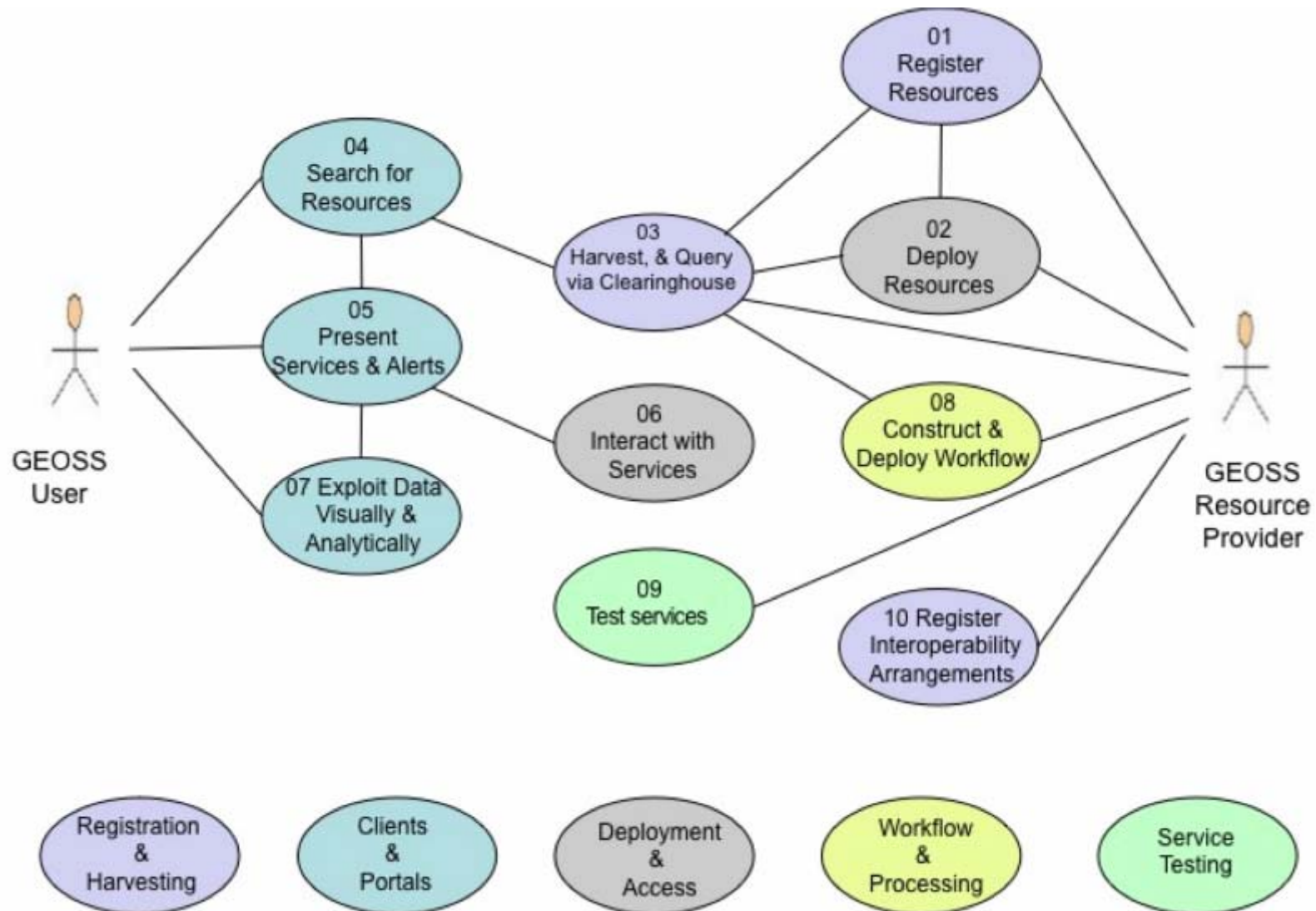


SBA-to-SoA Process



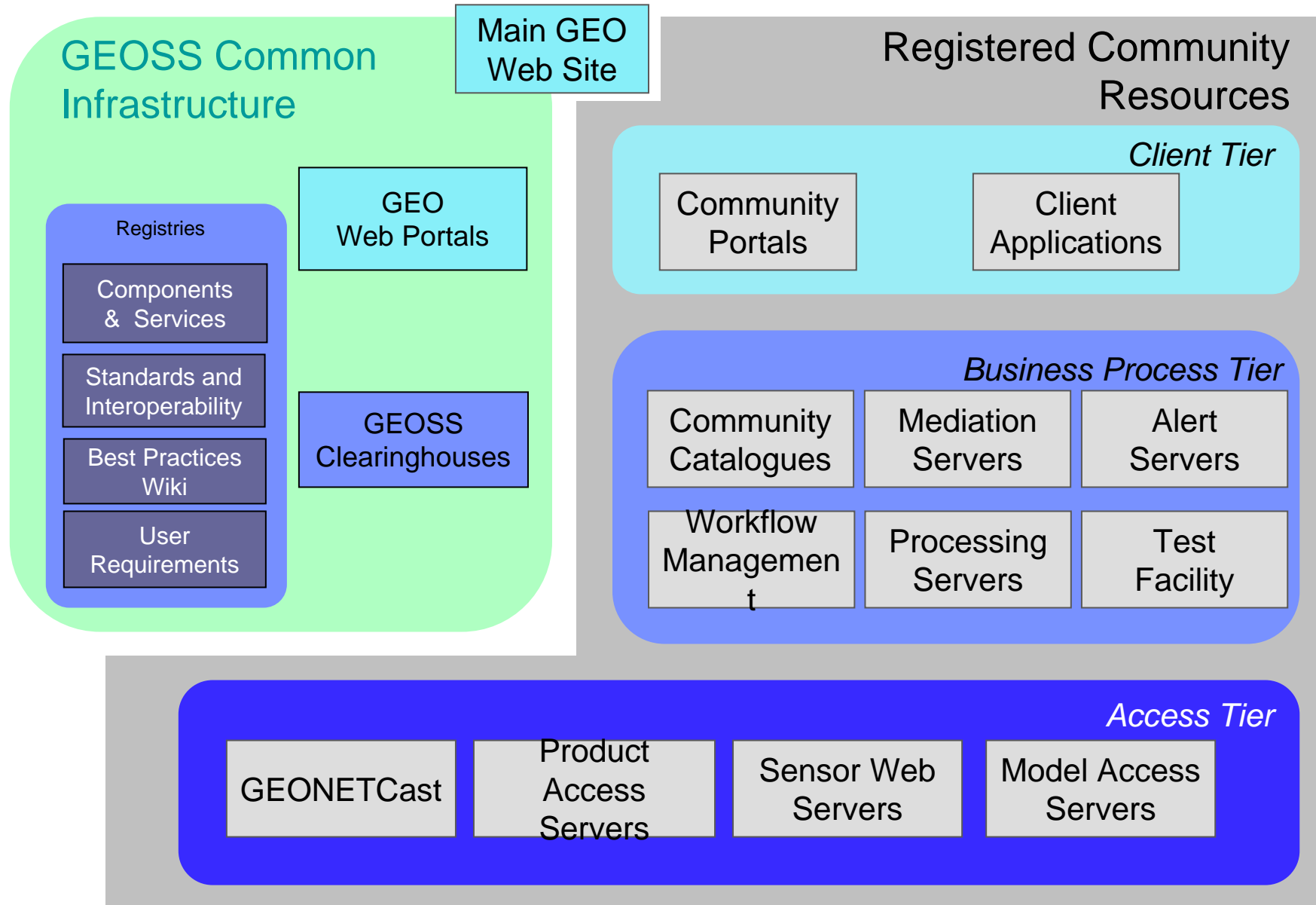


AIP-2 Transverse Use Cases





Use Case	Actors and Interfaces
Registration and Harvesting Use Cases	
1. Register Resources	# Service Provider # Components and Services Registry # Community Catalog Provider
10. Register New Interoperability Arrangements	# Service Provider # Components and Services Registry # Standards & Interoperability Registry # SIF Moderator
3. Harvest & Query via Clearinghouse	# Service Provider # GCI Registry # GEOSS Clearinghouse # Client Application
Clients and Portals Use Cases	
4. Search for Resources	# GEOSS User # Portals and Client Applications # GEOSS Clearinghouse # Community Catalog
5. Present Services and Alerts	# GEOSS User # Portals and Client Applications # GEOSS Service Providers
7. Exploit Data Visually and Analytically	# GEOSS User # Components and Services Registry # GEOSS Service Providers # Portals and Client Applications
Deployment and Access Use Cases	
2. Deploy Resources	# Service Provider # Components and Services Registry
6. Interact with Services	# Service Provider # Portals and Client Applications
Service Testing Use Cases	
9. Test Services	# Service Provider # Components and Services Registry # Test Facility/Tool # Relevant Standards Authority
Workflow Use Cases	
8. Construct and Deploy Workflow	# GEOSS Integrator # Client Application # Service Provider





GEOSS Interoperability Arrangements

- From the GEOSS 10 Year Plan Reference Document -

- Interoperability through open interfaces
 - Interoperability specifications agreed to among contributing systems
 - Access to data and information through service interfaces
- Open standards and intellectual property rights
 - GEOSS adopting standards; agreed upon by consensus, preference to formal international standards
 - GEOSS will not require commercial or proprietary standards
 - Multiple software implementations compliant with the open standards should exist
 - Goal is that at least one of the implementations should be available to all implementers "royalty-free"

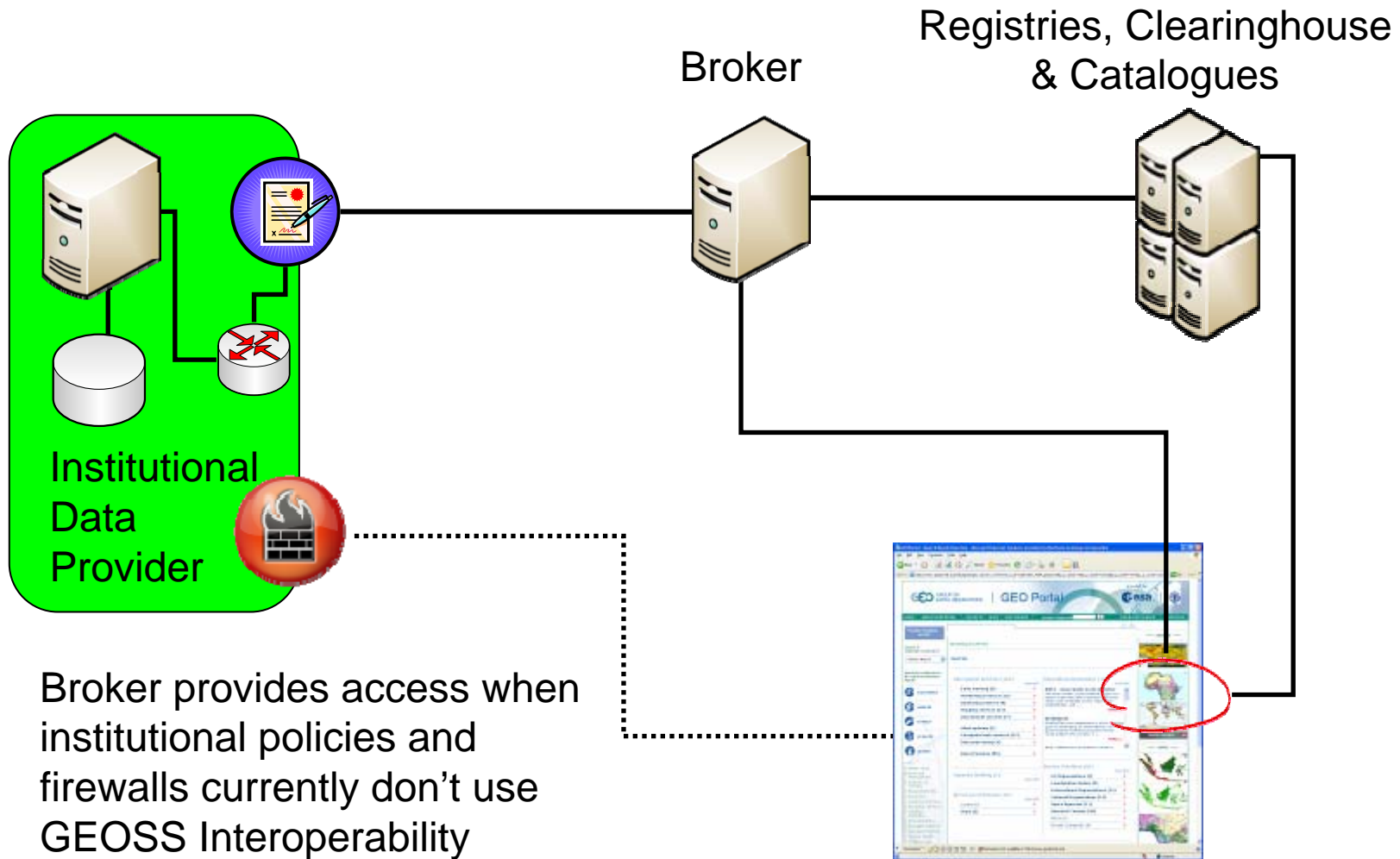


Engineering Components and Interoperability Arrangements

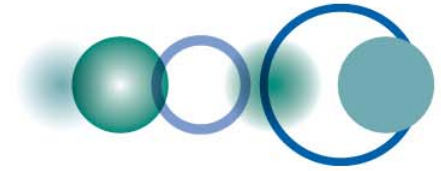
Component	Example Interoperability Arrangements
Main GEO Web Site	http
GEO Web Portals	http, CSW, WMS, KML
GEOSS Registries	
GEOSS Clearinghouse	CSW, ISO 23950
Community Portals	CSW, ISO23950, KML, WMS
Client Applications	CSW, ISO23950, WMS, WFS, WCS, SOS, SPS, WPS, CAP, KML, RSS, GeoRSS
Community Catalogues	CSW, ISO 23950
Mediation Servers	CSW, ISO 23950
Alert Servers	CAP, RSS, GeoRSS
Workflow Management	BPEL
Processing Servers	WPS
Test Facility	WMS, WFS, WCS, CSW
Product Access Servers	WMS, WFS, WCS, ftp, OpenDAP,
Sensor Web Servers	SOS, SPS, SAS
Model Access Servers	WMS, WCS, WFS, SOS
GEONETCast	DVB-S



Brokers Provide GEOS Interoperability



Broker provides access when institutional policies and firewalls currently don't use GEOS Interoperability Arrangements



Using the GEOSS Common Infrastructure: Publish, Test, Register and Monitor a Data Access Service

GEOSS Architecture Implementation Pilot-2
Transverse Technology Working Group

Hervé Caumont
ERDAS





Publish, Test, Register and Monitor a Data Access Service

- Behind the scenes, organisations like Data provider, Service provider, Catalog Provider, GeoPortal provider have to team-up to serve a category of users
 - Deploy a Data Access Web Service
 - Test the service interface
 - Register a web service in the CSR
 - Monitor a web service
- As a result, an update at one end (e.g. new dataset) must reflect at the other end (e.g. GeoPortal search) of the Service Oriented Architecture



Persistent Exemplar Services

- Criteria to be a persistent exemplar
 1. Registered in Component and Service Registry (CSR) as “Continuously Operational”
 2. Accessible through a GEOSS Interoperability Arrangement that is an international standard.
 3. Level of Service: Available >99% of the time (~7 hours downtime/month); Adequate network bandwidth and hardware for performance
- 192 services met criteria 1 & 2 as of 13 July 2009,
 - Methods to assess criterion #3 to be developed



Services meeting Persistent Exemplar Criteria 1 and 2

Service Type	Number of Services meeting criteria 1 and 2
Catalog/Registry Service	21 services
Data Access	36 services
Portrayal and Display Service	131 (102 are WMS)
(Processing Services)	2 (both are WPS)
(Alerting)	2 (one CAP, one RSS)
Total	192



Lessons Learned

- Continue to emphasize User involvement; working with UIC
- Need for stability of services beyond a phase
- Increase emphasis on Data and Information
- Refine distributed search and metadata for clearinghouse and CSRs
- Mature additional component types: Sensors, Models, Processing and Workflow
- Reusable SBA to SoA Process
- System Modeling - UML RM-ODP with prototypes
- Global Participation: monthly telecons at ~2400 UTC
- AIP Connection with other GEO Tasks, GIGAS, CEOSS, others

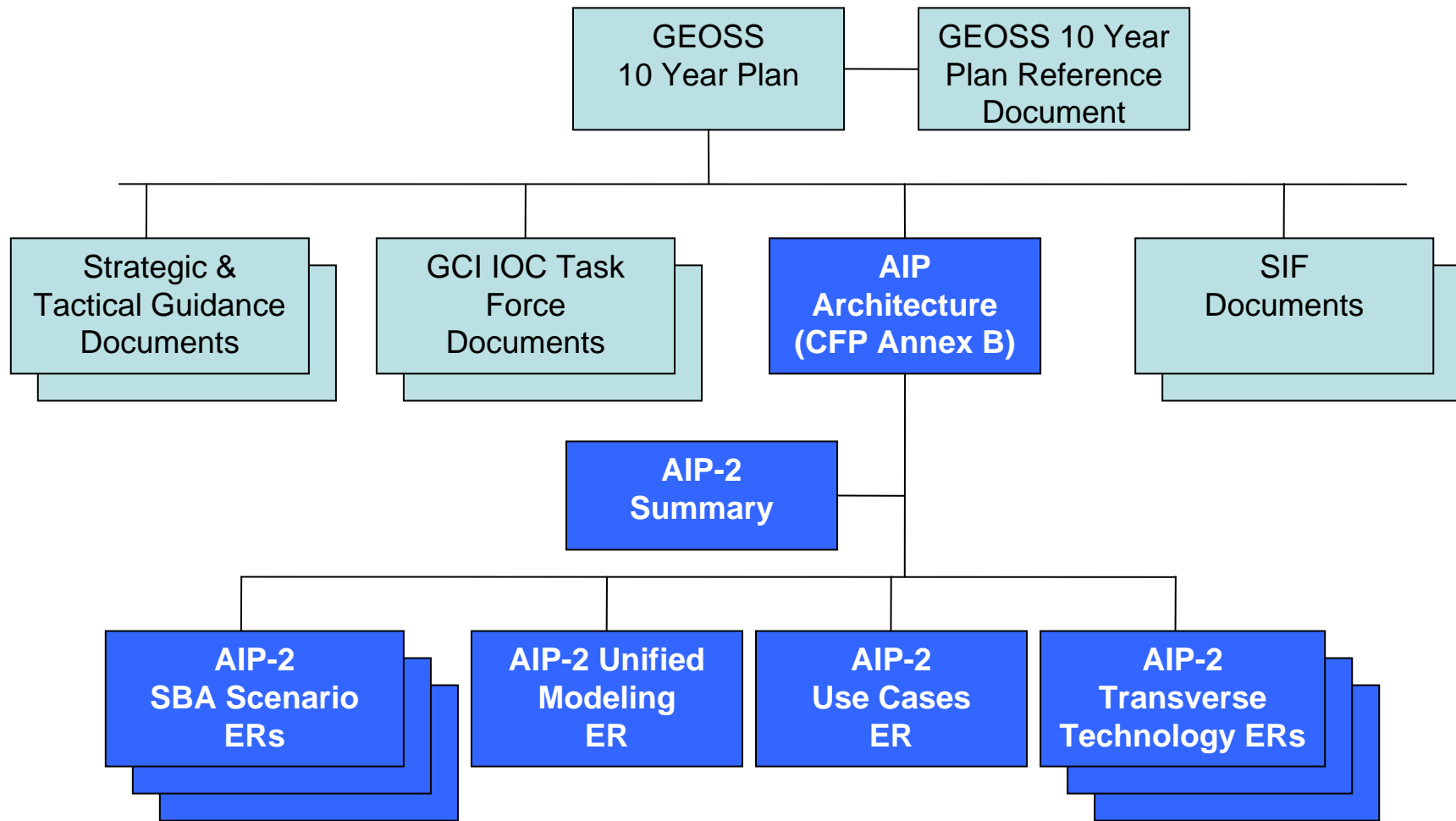


AIP-2 Deliverables (GEO Task AR-09-01b)

- Demonstrations
 - Demonstration of community Scenarios implemented through transverse Use Cases
 - Demonstrations to be recorded and made available via WWW
- Persistent Exemplars
 - Registered services ('continuous operation') with 99% availability (~7 hours down time a month); on a reliable network; plan for performance scaling
 - Nomination to operational task (AR-09-01a)
- Engineering Reports
 - Community Scenarios
 - Technology Reports
 - AIP-2 Summary Report



AIP-2 Document Tree





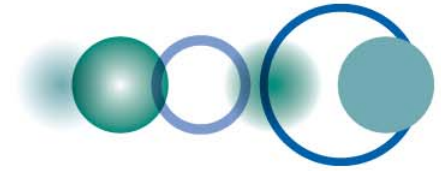
AIP-2 Conclusion

- All major activities are now complete
- Major Achievements
 - Six SBA Scenarios show use of GEOSS for communities of interest
 - Reusable process for applying Service Oriented Architecture to other SBAs
 - Augmentation of GCI: components, persistent exemplars, increase availability
- Presentation of results to GEO-VI Plenary and Exhibit



Topics after AIP-2

- GIGAS: EC FP7 Project – GEOSS, INSPIRE, GMES
 - AIP-2 Deliverables to GIGAS
 - INSPIRE and GMES inputs into AIP-3 planning
- Coordination with UIC
 - GEOSS User Typology
 - UIC/CBC Decision Support CFP
 - AIP-3 SBA Identification: Water, Climate, AQ
- Planning AIP-3
 - Coordination with ADC Data Tasks
 - CEOS Systems Engineering
 - GeoDRM and Security and data policy



GEOSS

Architecture Implementation Pilot, Phase 3

- AIP-3 Initial Concepts -

George Percivall,
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GEO Task AR-09-01b Task POC
September 2009





GEOS AIP-3 Potential Topics

- GCI with AIP-2 Augmentations for Sustained Operations
- SBAs to be identified working with the UIC. Potential communities of practice include:
 - AIP-2 SBAs to be considered
 - New SBAs: Environmental Monitoring, Oceans and coastal zones, Hydrology and drought management; Humanitarian response to disaster
- Focus on data: global datasets; data quality; licenses and user management; information architecture
 - Observables for EO, including discussion of registries and ontologies.
 - Coordination with the User Requirements Registry regarding observables and other topics relevant to AIP-3.



AIP-3 Master Schedule – Draft

– All dates are preliminary estimates

Architecture Workshop - TBC	November 2009
AIP-3 CFP Announced - TBC	January 2010
Kickoff Workshop in Europe - TBC	March 2010
Demo Capture Workshop	2 nd Half of 2010
Finalize AIP-3 deliverables	2 nd Half of 2010
AIP-3 results transition to operations	2 nd Half of 2010

Results in time for ministerial



References

- GEO
 - earthobservations.org
- GEO Architecture Implementation Pilot
 - www.ogcnetwork.net/Alpilot
- GEOSS registries and SIF
 - geossregistries.info

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