Architecture Implementation Pilot, Phase 2 (AIP-2) presentation to ADC-10 meeting, Stresa, Italy

AIP Phase 2 Progress including demonstration of Transverse Technology Use cases

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GEO Task AR-09-01b Task POC
7 May 2009
Agenda

• Background
• AIP-2
  – Schedule
  – Themes
  – Working Groups
  – Deliverables
• Video Demonstrations
• Wrap-up
  – AIP-2 discussion topics
  – Topics after AIP-2
Elaboration of GEOSS Architecture

SBA Tasks, UIC

User Needs, Scenarios

Design, Develop, Deploy

Architecture Implementation Pilot (AIP) Task AR-09-01b

GEOSS Common Infrastructure (GCI) Task AR-09-01a

Operational Capability

requirements

support

persistent implementation
GEO Task AR-09-01b
Architecture Implementation Pilot

• Lead incorporation of contributed components consistent with the GEOSS Architecture…
• …using a GEO Web Portal and a GEOSS Clearinghouse search facility
• …to access services through GEOSS Interoperability Arrangements
• …in support of GEOSS Societal Benefit Areas
AI Pilot Development Approach

AR-09-01b Architecture Implementation Pilot
Evolutionary Development Process

Continuous interaction with external activities

Participation

Concept Development

Updates for each step

Architectural Documentation

Baseline

Call for Participation

Participation

Kick-off Workshop

Participation

Development Activities

Participation

Persistent Operations (AR-09-01a)

Operational Baseline and Lessons Learned for next evolutionary spiral
AIP Phase 1 Results – Early 2008

- Elements of the GEOSS Common Infrastructure (GCI) – Initial Operating Capability established
- Effective development process for GEO
  - CFP, Kickoff, Execution, etc.
  - Approximately 120 organizations participated
  - Methods for international coordination
- Prepared “Architecture Implementation Report”
- **10 Demonstrations** of Initial Operating Capability

**AI Pilot has broad international participation that could only have occurred with GEO.**
**High interest & momentum to support GEOSS.**
<table>
<thead>
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<th>Event</th>
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<tr>
<td>AIP-2 CFP Announced</td>
<td>June 2008</td>
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<td>Kickoff Workshop at NCAR</td>
<td>September 2008</td>
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<tr>
<td>Scenarios and Use Cases defined</td>
<td>January 2009</td>
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<tr>
<td>Demo Capture Workshop</td>
<td>4-5 May 2009</td>
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<tr>
<td>Finalize AIP-2 deliverables</td>
<td>1st Half of 2009</td>
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AIP-2 CFP Responses (37 to date)

- ACRF
- BKG
- Caribbean Flood Team
- CIESIN
- CNES and ERDAS
- Compusult
- EPA AirNow
- ERDAS Titan
- ESA
- ESIP AQ Cluster
- ESRI
- ESRI Canada
- EuroCryoClim
- GEONETCast
- GEO Grid
- GEO-Ukraine
- Giovanni
- ICAN
- ICT4EO
- INCOSE
- IP3
- ISPRA
- JAXA
- KDDI
- Mines Paris Tech
- NASA World Wind
- NOAA/NASA GOES-R and GMU CSISS
- NOAA IOOS
- NOAA NCDC
- NOAA SNAAP
- Noblis
- Northrop Grumman
- Spot Image
- SURA/NIMSAT/GoMO OS
- USGS
- VIEWS
- Washington University in St. Louis
AIP-2 Kickoff Workshop, September 2008

• At NCAR Mesa Laboratory, Boulder, Colorado, USA
• 85 Participants
• 3 Plenary Sessions
• 12 Parallel Sessions based on CFP Responses
• Established Working Groups; and Development Plan
AIP Phase 2 Themes

• Augment the GEOSS Common Infrastructure
AIP Phase 2 Themes

• Augment the GEOSS Common Infrastructure
• Emphasize SBAs identified by UIC/ADC collaboration
• Develop "persistent exemplars”
• Elaborate GEOSS Architecture
  – Scenarios and Use Cases
  – Service and Component types
  – Interoperability Arrangements
AIP-2 Working Groups (WGs)

- **Community WGs**
  - Disaster Response
    - Flood disaster management scenario
  - Climate Change and Biodiversity
    - Pika Distribution scenario
    - Polar ecosystems scenario
    - Arctic food chain scenario
  - Renewable Energy
    - Site selection process for solar and wind energy scenario
  - Air Quality and Health
    - Smoke events and AQ scenario
Community WG Leaders

• Disaster Response
  – Stuart Frye, NASA;
  – Didier Giacobbo, Spot Image
• Health SBA: Air Quality
  – David McCabe, EPA
  – Frank Lindsay, NASA;
  – Stefan Falke & Rudy Husar, Washington Univ.
• Biodiversity and Climate Change
  – Stefano Nativi, CNR;
  – Gary Geller, NASA/JPL
• Energy SBA
  – Thierry Ranchin & Lionel Menard, Mines Paris Tech;
  – Ellsworth LeDrew, Univ Waterloo;
AIP-2 Working Groups (WGs)

• Transverse Technology WGs:
  – Portals and Application Clients
  – Clearinghouse, Catalogues, Registries and Metadata
  – Access Services: products, sensors, models
  – Workflow and Processing
  – Test Facility for Service Registration
Transverse Technology WG Leaders

- Catalogues, Clearinghouse, Registries and Metadata
  - Doug Nebert, USGS;
  - Josh Lieberman OGC/Traverse;
  - Ted Haberman, NOAA
- Workflow and Alerts
  - Greg Yetman, CIESIN
  - Eugene Yu, GMU;
  - Satoshi Sekiguchi, AIST;
- Test Facility for service registration
  - Gianni Sotis, Mauro Semerano, ESA
- Portals and application clients
  - Nadine Alameh, OGC/Mobilaps;
  - Herve' Caumont, OGC/ERDAS
- Access Services: products, sensors, models
  - Herve' Caumont, OGC/ERDAS;
  - Glenn Rutledge NOAA,
  - Hans Peter Plag, UNR;
  - Anwar Vahed, ICT4EO;
  - Luis Bermudez SURA;
AIP-2 Use Case Diagram

GEOSS Service Consumer

01 Register Resources

02 - Deploy Components & Services

03 - Publish, Harvest, & Query Metadata via Clearinghouse

04 - Client Search of Metadata

05 Presentation of Services & Alerts

06 Interact with Services

07 - Exploit Data Visually and Analytically

08 - Construct and Deploy Workflow

09 Test services

10 Register Interoperability Arrangements

GEOSS Service Provider

Notes:
- Summary list of AIP-2 Use Case Diagram
- Hyperlinks from Use Cases ellipses to AIP Google Site pages are to be added.
- Relationships between use cases may be one of four types – association, extends, includes, and inheritance
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
Reusable Practice for Implementing SBAs in the GEOSS Architecture

1. SBA experts develop end-to-end **Scenario** for decision makers use of Earth Observations

2. SBA scenario is structured in **Enterprise Models**

3. GEOSS architects map enterprise model to **Transverse Technology Use Cases**

4. **Specialized Use Cases** are developed for the SBA including services and interoperability arrangements

5. **Services** are deployed, registered and tested as **components** with emphasis on persistent exemplars

6. SBA Scenarios are tested and refined
AIP-2 Deliverables (GEO Task AR-09-01b)

- **Demonstration**
  - 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**
  
  To be considered for GEOSS Best Practice Registry
  - Community Scenarios
  - Transverse Technology Use Cases
  - AIP-2 Summary Report
GEOSS Reference Model of Open Distributed Processing Model – ISO/IEC 19793 Standard

- Set of UML models organized using the 5 RM-ODP viewpoints
- Developed by INCOSE group led by Larry McGovern, NGC
- Working with the Scenario working groups
- Will be published as an AIP-2 Engineering Report

- Status by RM-ODP Architecture Viewpoints:
  - Enterprise – 100% of Enterprise for all SBAs
  - Information – 100% of Enterprise for all SBAs
  - Computational – 100% of Enterprise for all SBAs
  - Engineering – Scheduled for next AIP
  - Technology – Scheduled for next AIP
AIP-2 Scenario Demonstrations

• AQ & Health – Smoke Event: Rudy Husar, David McCabe

• Biodiversity: Pika Distribution: Stefano Nativi

• Biodiversity: Arctic Food Chain: Stefano Nativi

• Biodiversity: Polar Ecosystems: Doug Nebert

• Disaster Management: Stuart Frye, Didier Giacobbo

• Renewable Energy - Facility Planner: Lionel Menard
AIP-2 Technology Demonstrations

• GEO Web Portal to Clearinghouses
  – Compusult - Robert Thomas
  – ESA/FAO – Gianni Sotis, Jolyon Martin
  – ESRI – Marten Hogeweg

• Geo-Processing with WPS: Brian Falk

• Publish, test, register, and monitor: Hervé Caumont
ESRI GEO Portal
http://geoss.esri.com

1 May 2009
Marten Hogeweg (mhogeweg@esri.com)
ESRI Inc © 2009
Redlands, CA, USA
ESRI GEO Portal Demonstration

• Purpose: Enable Discovery and Use of Earth Observation and other Geospatial Resources

• Provides complete GEO Portal and Clearinghouse capabilities:
  – Register Resources
  – Finding Resources
  – Preview Resources
  – Manage the Clearinghouse
  – Harvesting from other Clearinghouses
  – Search other Clearinghouses
ESRI GEO Portal Demonstration

Quick Access to Community Portals and GEO resources

Intuitive Interface, Powerful Search

Reusable Search Widget in Air Quality and Health Community Portal
AIP-2 ESA-FAO GEOportal
Demo Capture Workshop

4/5 May 2009
The Palazzo dei Congressi di Stresa
Stresa, Italy
Guidelines for demo capture

• The ESA-FAO GEOportal provides an entry point to the GEO System of Systems to access Earth Observation information and services.

• It is part of the GEOSS Common Infrastructure (GCI) and addresses the needs of the nine GEO Societal Benefit Areas.
ESA-FAO GEOportal Demo

Demo presenting:
- the main GEOportal functionalities
  - Search alerts on the rotating globe
  - Navigating related information provided by GEOportal
  - Display of WMS images
  - Alternative ways to search information on GEOportal:
    - Searching through SBAs
    - Searching by Country/Continent
    - Simple search
    - Advanced search
- AIP-2 transverse technology use cases testing.
Compusult Geo Portal Demo Summary

4/5 May 2009
The Palazzo dei Congressi di Stresa
Stresa, Italy
Compusult Geo Portal - Transverse Demonstration

• Goals:
  – Demonstrate Searching across more then one catalogue/clearinghouse through more then one interface.
  – Demonstrate searching directly through SBAs
  – Demonstrate portrayal and management of resources from disparate resource providers

• Storyboard
  – Introduce the portal
  – Show brief portal highlights
  – Wiring diagram of what will happen
  – Perform search across multiple catalogues
  – Perform search through alternative Interface
  – Perform typical search related to a SBA working group
  – Bind to discovered services and demonstrate managing resources
Using the GEOSS Common Infrastructure
Publish, Test, Register and Monitor a Data Access Service

GEOSS Architecture Implementation Pilot-2
Transverse Technology Working Group
GCI End-to-End scenario

• 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
GEOSS Service Oriented Architecture
Organizations team-up to deliver service to the user
GEOSS Service Oriented Architecture

Then user sees the tip of the iceberg...

Updating data sources & Monitoring Quality of Service, then supporting operational constraints
Geoprocessing Demo

GEOSS AIP-2
Workflow and Processing WG
Overview

- This demonstration illustrates the use of SEDAC’s WPS to perform a Geo-processing task on features obtained from a WFS operated by UNEP.
- A plugin for uDig that implements WPS client functionality is used to connect to our service (available from 52north).
- The scenario represented involves a GIS analyst wishing to obtain an estimate of the number of residents in Nile Basin states.
uDig interface with 52north plugin

Feature service (WFS)

Population Estimation (WPS)
AIP-2 Discussion Topics (1 of 2)

• Clearinghouses
  – Multiplicity: should they all return the same results?
  – Sample Queries, Queryables, Query Interface

• Who is the user?
  – Need better understanding of the users
  – Aid in defining expected behavior of GCI

• End-to-End: Discovery, Access, Fusion, Decision
  – Clear consistent registrations are needed for discovery of components/services
  – Provide standardized way for easy visualization and browsing
AIP-2 Discussion Topics (2 of 2)

• Mix of operations and research
  – From pilot to persistent exemplars to sustained operations

• Variations on approach to Interoperability
  – GEOSS interoperability “based on non-proprietary standards, with preference to formal international standards.”
  – Alternative: Client/server interaction by reuse of portlets, i.e., code sharing
  – Alternative: Brokers for Data Providers
Brokers Provide GEOSS Interoperability

Broker provides access when institutional policies and firewalls currently don’t use GEOSS Interoperability Arrangements.
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
References

• GEO
  – earthobservations.org

• GEO Architecture Implementation Pilot
  – www.ogcnetwork.net/Alpilot

• GEOSS registries and SIF
  – geossregistries.info

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