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Real World Data and Service Integration: Demonstrations and Lessons Learnt from the GEOSS Architecture Implementation Pilot Phase Four

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The GEOSS Architecture Implementation Pilots (AIP) develop and pilot new process and infrastructure components for the GEOSS Common Infrastructure (GCI) and the broader GEOSS architecture through an evolutionary development process consisting of a set of phases. Each phase addresses a set of Societal Benefit Areas (SBA) and geoinformatic topics. The first three phases consisted of architecture refinements based on interactions with users; component interoperability testing; and SBA-driven demonstrations. The fourth phase (AIP-4) documented here focused on fostering interoperability arrangements and common practices for GEOSS by facilitating access to priority earth observation data sources and by developing and testing specific clients and mediation components to enable such access. Additionally, AIP-4 supported the development of a thesaurus for earth observation parameters and tutorials to guide data providers to make their data available through GEOSS. The results of AIP-4 are documented in two engineering reports and captured in a series of videos posted online.

Led by the Open Geospatial Consortium (OGC), AIP-4 built on contributions from over 60 organizations. This wide portfolio helped testing interoperability arrangements in a highly heterogeneous environment. AIP-4 participants cooperated closely to test available data sets, access services, and client applications in multiple workflows and set ups. Eventually, AIP-4 improved the accessibility of GEOSS datasets identified as supporting Critical Earth Observation Priorities by the GEO User Interface Committee (UIC), and increased the use of the data through promoting availability of new data services, clients, and applications. During AIP-4, A number of key earth observation data sources have been made available online at standard service interfaces, discovered using brokered search approaches, and processed and visualized in generalized client applications.

AIP-4 demonstrated the level of interoperability that can be achieved using currently available standards and corresponding products and implementations. The AIP-4 integration testing process proved that the integration of heterogeneous data resources available via interoperability arrangements such as WMS, WFS, WCS and WPS indeed works. However, the integration often required various levels of customizations on the client side to accommodate for variations in the service implementations. Those variations seem to be based on both malfunctioning service implementations as well as varying interpretations of or inconsistencies in existing standards. Other interoperability issues identified revolve around missing metadata or using unrecognized identifiers in the description of GEOSS resources. Once such issues are resolved, continuous compliance testing is necessary to ensure minimizing variability of implementations. Once data providers can choose from a set of enhanced implementations for offering their data using consistent interoperability arrangements, the barrier to client and decision support implementation developers will be lowered, leading to true leveraging of earth observation data through GEOSS.

AIP-4 results, lessons learnt from previous AIPs 1-3 and close coordination with the Infrastructure Implementation Board (IIB), the successor of the Architecture and Data Committee (ADC), form the basis in the current preparation phase for the next Architecture Implementation Pilot, AIP-5. The Call For Participation will be launched in February and the pilot will be conducted from May to November 2012. The current planning foresees a scenario- oriented approach, with possible scenarios coming from the domains of disaster management, health (including air quality and waterborne diseases), water resource observations, energy, biodiversity and climate change, and agriculture.