Using Open and Interoperable Ways to Publish and Access LANCE AIRS Near-Real Time Data

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**Introduction**

The Atmospheric Infrared Sounder (AIRS) Near-Real Time (NRT) data from the Land Atmosphere Near-real-time Capability for EOS (LANCE) element at the Goddard Earth Sciences Data and Information Services Center (GEOSS DISC) provides information on the global and regional atmospheric state, with very low temporal latency, to support climate research and improve weather forecasting. An open and interoperable platform is useful to facilitate access to, and integration of, LANCE AIRS NRT data.

As Web services technology has matured in recent years, a new scalable Service-Oriented Architecture (SOA) is emerging as the basic platform for distributed computing and large networks of interoperable applications. Following the provide-register-discover-consume SOA paradigm, this presentation discusses how to use open-source geospatial software components to build Web services for publishing and accessing AIRS NRT data, and discover data services in the catalogue systems, and implement a Web portal to facilitate users’ consumption of the data and services.

**AIRS NRT Data Services**

OGC Web Coverage Service (WCS) ([http://docs.oasis-open.org/wcs/1.1/wcs-v1.1.pdf](http://docs.oasis-open.org/wcs/1.1/wcs-v1.1.pdf)) provides common interfaces to access customized multi-dimensional and multi-temporal geospatial data as “coverage.” It supports the following operations:

- GetCapabilities: returns an XML document with the service metadata and brief description of the data collection.
- DescribeCoverage: returns a full description of one or more coverages.
- GetCoverage: allows retrieval of coverages with customized domain and range subsets, formats, and projections.

OGC Web Map Service (WMS) ([http://docs.oasis-open.org/wms/1.3.0/wms-v1.3.0.pdf](http://docs.oasis-open.org/wms/1.3.0/wms-v1.3.0.pdf)) provides geospatial data as a “map,” which is generally rendered dynamically from real geographical data in a spatially referenced pictorial image format such as PNG, GIF, or JPEG. It supports the following operations:

- GetCapabilities: returns an XML document with the service-level metadata and specific information about the available maps.
- GetTile: returns a map of a region based on the user’s requests.
- GetLegendGraphic: returns a legend image for the requested layer.

OPeNDAP

OPeNDAP allows several open-source netCDF-based tools, such as Integrated Data Viewer, Ferret server, and Panoply, to directly transfer the level 2 data over the network. To enable users to locate swath data files in the OPeNDAP server that are within a certain geographic area, graphical “grace maps” are being added to show the outline of each file on a map of the Earth.

**AIRS NRT Data**

**Service Registration and Discovery**

NASA’s Global Change Master Directory (GCMD) ([http://gcMD.nasa.gov](http://gcMD.nasa.gov)) is a prominent catalogue system that enables users to publish, discover, access, and use Earth science data and data-related services relevant to global-change and Earth science research. It uses a Service Entry Resource Format (SERF) to record service directory entries related to the acquisition, processing, retrieval, viewing, analysis, interpretation, and archival of Earth science data services. The SERF focuses on scientific descriptions of the data related to the registered service, rather than on how to access the service programmatically.

**Data Portal**

AIRS Near-Real-Time Data Portal ([http://disc.gsfc.nasa.gov/services/wxs_ogc.shtml](http://disc.gsfc.nasa.gov/services/wxs_ogc.shtml)) is a rich Web-based geographic application designed for access to, and visualization of, AIRS NRT data through AIRS NRT WMS and WCS.