Enabling Automated Access and Post-Processing of MODIS Science Data

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MODIS Web Services

Web Services are available for Moderate Resolution Imaging Spectroradiometer (MODIS) Level 1 and atmospheric data archived at NASA GSFC in the MODIS Adaptive Processing System (MODAPS). Since its release in early 2015, the Level 1 and Atmospheric Archive and Distribution System (LAADS) web services interface has provided the same capabilities for accessing MODIS data as the standard user-interactive GUI. This web service interface allows users to automatically retrieve MODIS data and search for data, as well as post-processing activities which include subsetting, reformatting and reprojecting. In addition, web clients customized to specific user needs can now include MODIS data in their list of products, MODAPS now supports both SOAP and REST-style web service calls, as well as standards such as OpenSearch.

MODAPS will deploy Open Geospatial Consortium (OGC) compliant Web Coverage and Map Services (WCS, WMS). These new web services allow for immediate delivery of products to meet users' needs, included in the upgrade of the current asynchronous "batch" post-processing architecture to a synchronous capability that returns data within the current browser session.

LAADS Web Service

The LAADS Web Service provides machine-to-machine access to MODIS Level 1 data and atmospheric data products. This web service provides similar features and functions as the LAADS web form, but through a programmatic interface which enables automation and retrieval of MODIS products and access to generated metadata. This new service supports Earth science data workflows as well as other derivative implementations and tools.

LAADS Web Service uses industry standard technology to provide a robust, system-independent interface to the MODIS data processing utilities. The web service provides standard SOAP and REST protocols as well as Earth science data access standards, such as OpenSearch and Federation/Findsearch.

Web Coverage

The MODAPS team is developing OGC compliant services to provide another mechanism to interrogate and obtain information and data.

Our implementation of the Web Coverage Service (WCS) adapts a standard interface and operations which enables interoperability of access to geospatial "coverage" data from MODAPS. A coverage is a "digital geographical information representing spatial phenomena". Our WCS will allow a client to select portions of the MODIS data holdings based on spatial, temporal and spectral constraints. The WCS provides access to data together with detailed metadata, allowing complex queries against these data and returning data with its original guarantees, which can be interpreted, extrapolated and rendered.

Each standard provides for interrogating the service capabilities through GetCapabilities, accessing metadata on a data item through DescribeCoverage and retrieving a data item (WMS Map Image or WCS Coverage data file) through GetMap or GetCoverage, respectively.

Web Map Services

The Web Map Service (WMS) allows to represent spatial data in a variety of "service" map images, such as EMF or JPEG, based on rendering custom maps and a standard format for dynamic data or custom styled maps.

Additionally, WMTS is an OGC standard, the "Web Map Tile Service" (WMTS). A WMTS-enabled server application can serve map tiles of Feature Access Protocol (WMS) and OpenGIS standards, which can be used to generate OGC and WMS-compliant cartographic and vectorial renderings for a variety of data sources.

WMS tiles the flexibility of custom map rendering for the possibility of serving static data (base maps) where the bounding boxes and scale can be constrained to display tiles. The fact that tiles are used for the implementation of a WMTS service using a web server that simply returns tile files, the fact that tiles can also enable the use of standard networking mechanisms for scalability such as distributed cache systems.

These OGC standards include both service (REST/URL) requests and procedural oriented architectures that are field-proven and SOAP-enabled, as well as a standard and versioned data source, in a variety of formats that are HSDS-enabled (Hypertext Transfer Protocol RESTful support) and OGC-compliant (ER精彩的, as well as SOAP-based).