Serving High-Resolution Imagery With OnEarth Open Source Software

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About OnEarth

- A software component of the Global Imagery Browse Services (GIBS) along with The Imagery Exchange (TIE)
- Image processing and serving software
- Conceived at the Jet Propulsion Laboratory (JPL)
- Utilizes MRF image format for very fast access
- Leverages Geospatial Data Abstraction Library (GDAL)
- Time extension facilitates historical image requests
- Support for displaying granule imagery soon to come!
- More information: https://earthdata.nasa.gov/gibs

Meta Raster Format

- Georeferenced tile pyramid at discrete resolutions
- Composed of data, index, and metadata files
- Extension to GDAL

How to Serve Imagery Using OnEarth

Configure the OnEarth Server

1) Download and install the OnEarth sofware
https://github.com/nasa-gibs/onearth/releases
RPMs are available for CentOS and RedHat

2) Enable the mod_onearth Apache module in the Apache configuration

3) Create service endpoints for WMTS and/or TWMS for each projection
These are locations on the server (e.g., /wmts-geo/ for Geographic)

GIBS uses the following projections:

- Lat-Lon / Geographic / WGS 84 (EPSG:4326)
- Web Mercator / Spherical Mercator / "Google Projection" (EPSG:3857)
- NSIDC Sea Ice Polar Stereographic North (EPSG:3413)
- Antarctic Polar Stereographic / WGS 84 (EPSG:3031)

Configure Product Layers

1) Modify the configuration files for the OnEarth Layer Configurator to match the system environment

- Environment Details
- Projection Info
- GetCapabilities Info
- Tile Matrix Sets

2) Run the OnEarth Layer Configurator to create the MRF metadata cache for mod_onearth and GetCapabilities files (WMTS/TWMS)

Legend graphics can also be generated from GIBS color maps

Prepare Imagery

- Full spatial resolution imagery is supported
- Imagery must be PNG, JPEG, or GeoTIFF
- PNG or JPEG must be associated with an ESRI world file for geo-referencing
- Bit depth must be 24-bit true color or 8-bit indexed color + alpha channel
- May be a set of tiles or a single global image
- Should be in a projection supported by clients (see top-right for GIBS supported projections)

Generate MRF

1) The MRF Plugin for GDAL is required.
The MRF source code and specification are available here:
https://github.com/nasa-gibs/mrf/

2) Run the OnEarth MRF Generator using the prepared imagery as input.
GDAL commands as well as custom Java or Python code may be used alternatively.

MRF Data Archive

The Imagery Exchange

GIBS uses an image management and workflow software, TIE, to automate and manage MRF generation and metadata.

Serve Imagery

- The imagery is now ready to be accessed at an endpoint via:
WMTS, TWMS, or KML
- GetCapabilities request will return the metadata needed for clients to interpret available layers
- TWMS also uses a GetTileService request that returns metadata for available cached tiles

WorldView | SOTO 2D | SOTO 3D

Example Client Applications

National Aeronautics and Space Administration. Jet Propulsion Laboratory, California Institute of Technology
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