ENVI and IDL are compatible with hundreds of different data types including scientific formats like NetCDF and HDF5. Both applications provide a rich set of capabilities ranging from data preprocessing, calibration, math and statistical functions, and spectral and feature-based analysis tools.

The Engine can operate with any middleware, meaning users can implement this capability in their current enterprise architecture such as ENVI's ArcGIS® for Server or Geoserver. This Engine enables the remote user to access the same compiled ENVI and IDL functions and procedures that scientists have used for decades at the desktop level from any client device, other apps, or services running in the enterprise.

One example of how the ENVI and IDL Services Engine can be used is Exelis VIS has also developed a solution for ESRI's ArcGIS® for Server, which embeds ENVI image analysis tools into the ArcGIS® environment to mitigate growing data volumetrics, bandwidth usage, and end user requirements. Web based applications (or ‘apps’) are intended to apply analytic methods, procedures, and routines to image datasets stored within centralized server repositories.

For any enterprise developing web-based applications, Exelis VIS developed an enterprise-enabled processing engine that provides remote users access to the power of ENVI image analysis and IDL applications from a web or mobile client interface. The working name for this capability is the ENVI and IDL Services Engine.

The ENVI and IDL Services Engine is written in the IDL programming language, which allows remote sensing tasks to be automated or custom algorithms and workflows implemented. IDL has been used by the earth and planetary science community for 35 years for scientific data visualization and analysis. It can be used as a standalone programming language or to enhance ENVI’s capabilities.

ENVI and IDL are compatible with hundreds of different data types including scientific formats like NetCDF and HDF5. Both applications contain a wide range of analysis functions ranging from data preprocessing, calibration, math and statistical functions, and spectral and feature-based analysis tools.

The ENVI and IDL Services Engine displays data across, analysis, and visualization capabilities at an enterprise level. An enterprise is a cloud computing environment leveraging a number of vetted services to allow for middleware interoperability (e.g. ArcGIS® Server or GeoServer) with any enterprise IT infrastructure.

Once an ENVI or IDL routine is developed, it is quite simple to wrap it as a service and display it in the engine for consumption by remote end users, other apps, or services running in the enterprise.

The Engine makes processing requests via HTTP REST calls. HTTP REST requests made to the Engine from a middleware component will subsequently call and run ENVI and IDL routines, with the results being pushed back through the middleware components to the requesting application. See Figure 3. Results are delivered back from the Engine and can be saved, utilized in further analysis, or displayed in a variety of web, desktop, or mobile clients.

Exelis VIS has also developed a solution for ESRI’s ArcGIS® for Server, which embeds ENVI image analysis tools into the ArcGIS® environment. See Figure 4. An App Server can also be used to deploy apps back to desktop users so vetted or approved apps can be run on the desktop version of ENVI and IDL or server side.

A Reference Implementation

In an effort to provide examples of how the ENVI and IDL Services Engine can be used, Exelis VIS created a reference implementation that repurposes several pieces of existing ENVI code as ‘apps’. These include:

- Anomaly Detection for detection of suspicious materials in a large image
- Pan Sharpening for enhancing multispectral data with high resolution panchromatic imagery
- Vegetation Delimitation for identifying vegetation presence and level of vigor
- Use of the Engine to perform a viewshed using terrain data

The implementation leverages a web client or mobile app calling the ENVI and IDL Services Engine via a middleware component such as MapServer, GeoServer, or some other development environment and employs a web based GIS and/or for a mobile app for Android or iPhone as an access mechanism.

Thin and mobile clients are used to discover data using a cataloguing specification such as Web Catalog Service (CS) and to make Open Geospatial Consortium (OGC) compliant analysis requests via Web Processing Service (WPS) calls to The ENVI and IDL Services Engine via the middleware.

One use case example could be looking at the latest archival data with the vegetation delineation tool. For a region or a specific scene, this ENVI and IDL Service Engine implementation would facilitate in discovering imagery, analyzing change over time, or specific points correlated to ground truth measurements. These results could be delivered to web, mobile or a desktop client.

Summary

- The geospatial imagery analysis community has a growing need for online analytic capabilities.
- Work previously done on desktop workstations must migrate to a web-accessible environment to mitigate growing data volumetrics, bandwidth usage, and end user requirements.
- Web-based applications (or ‘apps’) are intended to apply analytic methods, procedures, and routines to image datasets stored within centralized server repositories.
- Earth and Planetary Image Processing for the Cloud
- Anomaly Detection for detection of spurious material in a large image
- An ‘App Store’ can also be used to deploy apps back to desktop users so vetted or approved apps can be run on the desktop version of ENVI and IDL or server side.
- Much data means more discoveries, more collaboration, and more progress toward big geophysical problems.

ENVI and IDL Services Engine: Earth and Planetary Image Processing for the Cloud

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Introduction

The geospatial imagery analysis community has a growing need for online analytic capabilities.

Work previously done on desktop workstations must migrate to a web-accessible environment to mitigate growing data volumetrics, bandwidth usage, and end user requirements.

Web-based applications (or ‘apps’) are intended to apply analytic methods, procedures, and routines to image datasets stored within centralized server repositories.

The geospatial imagery analysis community has a growing need for online analytic capabilities.

Exelis VIS has also developed a solution for ESRI’s ArcGIS® for Server, which embeds ENVI image analysis tools into the ArcGIS® environment.

The ENVI and IDL Services Engine represents bringing long term earth science monitoring analysis capabilities to the cloud, harnessing existing ENVI and IDL tools, deploying them to the enterprise, and improving access to earth and planetary science data.