ArcGIS Framework Plug-In
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Interim Report
Category 2: Framework Client Development
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Project Narrative

In collaboration with USDA FSA and ESRI, we have developed a powerful plug-in of
ESRI ArcGIS to enable a large amount of ArcGIS Desktop users to direct access to
Framework data served using Open Geospatial Consortium (OGC) Web Feature Service
(WFS), Web Coverage Service (WCS) and Web Map Service (WMS). By supporting
most of Framework data themes, it is promising for Framework data to be widely used by
a broad range of users including those in Agricultural efficiency, disaster management,
water management and national security.

Currently, we have achieved a successful integration of OGC data access on to ArcGIS
Desktop. This enables ArcGIS Desktop to support dynamic discovery of data using OGC
Catalog Service for Web (CSW), and interactive access and display of image data as
raster layers using WCS 1.0 protocol and Geography Markup Language (GML) 2 feature data as
standard ArcMap feature layers using WFS 1.1 protocol. To facilitate future efficient use of
these data, we provide a new ability to save all the required distributed Framework data
into geodatabases.

As of the date of this report, GML 3.1.1 reader is still in development. After we finalize
this component, most of Framework data can be accessed. Next, we will also implement
WMS component to make this plug-in to fully support OGC data access. Then, we will
devote on collaboration activities to do testing and documentations and collect user
feedbacks.

Status of your data access activities
What Framework data theme(s) will be accessed under this project?
This project is designed to allow ArcGIS Desktop users to manipulate all possible

Framework data themes as standard ArcMap layers.

What is the data volume of Framework data anticipated for access (geographic coverage, dataset size, feature count)?
Most of the testing have be done against nation wide datasets served by GMU CSISS, including state, county, road, rail, river and city. Currently, we are doing testing against NSDI Framework data served by GeoLeaders and CubeWerx, including government units and hydrography. Our plan is to access to all the NSDI Framework data containing millions of features and gigabytes of information which covers geodetic control, orthoimagery, elevation and bathymetry, hydrography, cadastral, governmental units and transportation.

Who are the primary organizations providing data for this project?
FGDC Framework data services will be the primary data providers in this project. In the interim, we have used our own WFS and WCS to serve some general nation wide datasets.

Status of Framework Client Development
What is the status of software development?
The software development is preceding well. Now the plug-in includes support for:
- CSW ebRIM – data discovery and service discovery
- WCS 1.0 – Manipulating WCS image data as standard ArcMap raster layer.
- WFS 1.1 -- Manipulating WFS GML 2 feature data as standard ArcMap feature layer.
- Geodatabase – Saving WCS and WFS data into geodatabases, including personal database, file and SDE.

We are currently developing GML 3.1.1 reader to parse feature data encoded in GML 3.1.1 that is more complex than GML 2.1.2.

How will the client software be evaluated and quality-assured?
At the same time of software development, GMU CSISS staffs are continuing to perform evaluation of the software by testing against GMU CSISS server and a variety of different Framework servers. The software will be released to USDA FSA and ESRI to perform evaluation and testing as general users and professional software developers.

Describe any internal or external users that are using this client.
This proposed project is undertaken by collaboration between GMU CSISS, USDA FSA and ESRI. This software will be used by USDA FSA to improve accuracy, promptness and broadness of decision makings.
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Identify plans for the promotion and distribution of this software.
In the next few weeks, we will set up a Web site to introduce the software and provide a link for its free downloading. We are tentatively planning to present the software at IGARSS 2008, AAG 2008 and AGU 2008.

Project management
Will this project's activities continue in the future?
After software development is finished, we will maintain a website for free downloading of the software. We will continue to promote the software based on users' feedbacks and release the new version of the software with the development of OGC specifications.
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Describe the next phase in your project.
In the next step, we will finalize the development of GML 3.1.1 reader and add the support for WMS 1.1. After that the software will be released to USDA FSA and ESRI to perform testing and evaluation.

What areas need work?
The structure of GML 3.1.1 is more complex than of GML 2.1.2. As we know, there is no open source software that can deal with GML 3.1.1 very well. It will take us more time to implement GML 3.1.1 reader.
Currently, the software only supports WFS service discovery. The user interface of CSW for WFS needs to be improved. We will investigate which parameter/constraint would be most appropriate for WFS data query and design a relevant new user interface to support WFS data discovery.
Because the software is still in development, the software documents have not been written yet. We will implement the relevant document soon, including quick start, user manual and website.

Feedback on Cooperative Agreements Program
What are the program strengths and weaknesses?
The program's strength is that it encourages using the cutting edge of computer technologies to implement geospatial data interoperability. It will have a great impact on the use of geospatial data in the future. But lots of people are not acquainted with this program. The data and software funded by this program are not widely used.

Where does the program make a difference?
The program focuses on the implementation of interoperable geospatial data and services which may be widely used.

Was the assistance you received sufficient or effective?
Yes.

What would you recommend doing differently?
The program is currently one year based. One year may be enough long for the software development. But we all know it always takes more efforts to maintain, promote and distribute the software. Is it possible to extend the program to support the software which is possible widely used?

Are there program management concerns that need to be addressed? Time frame?
No.

If you were to do this again, what would you do differently?
We would like to collect more user requirements from our collaborating organizations to guide our development. We also would like to take more testing against available Framework data services with the development of the software.