

Indiana High & Local-Resolution NHD Update Geo-Synchronization Grant

2010 Category 2: Framework Data Exchange through Automated Geo-Synchronization

Interim Report

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Project title: Indiana High & Local-Resolution NHD Update Geo-Synchronization

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Executive Summary

Indiana's NHD Geo-Synchronization project will result in the development of a streamlined and productive workflow to easily communicate (transmit, review, and reject/approve) updates to our existing High-Resolution and new Local-Resolution National Hydrography Data (NHD) data through a suite of web services.

The Indiana Geo-Synchronization Suite (IGSS) will provide updating and publishing functionality for NHD data within the current operating environment of Indiana's Geographic Information Office (NHD steward), Indiana Office of Technology, State and Local NHD data users, maintainers, and the USGS.

At this point our project design phase is complete and development of the Indiana Geo-Synchronization Suite (IGSS) by Image Matters LLC is in full force. We expect to be entering our first round of application testing before the end of this year, with all IGSS development completed and in production testing with real-world NHD updates before the end of Q1 2011.

Project Narrative

The Indiana Geo-Synchronization Suite (IGSS) is intended to facilitate the work flow process in which NHD geographic information is updated and distributed through the network of the Indiana geospatial community and the USGS. A graphical user interface will be provided to allow authenticated users to perform authorized processes for submitting and approving database updates. The suite will also provide a series of Atom/PUB feeds for quickly identifying and distributing updates within a publish-subscribe-notify framework. The updating and geo-synchronization of the NHD will serve as a pilot for the IGSS.

The IGSS Suite is comprised of two major components. The Web 2.0 rich IGSS Web Console and the OGC Geo-synchronization Service (GSS) web service. The IGSS Web Console will provide an interactive web interface to the underlying GSS web service. The web console will allow users to interactively manage Change Requests, user-defined feeds (Topics), and Subscriptions. The console will also provide visual analysis of Change Request. Authorized users will be allowed to review and accept/reject Change Requests within the system.

The GSS web service component will be responsible for managing and synchronizing the life cycle of feature Change Requests within a distributed system for databases such as the NHD. The IGSS Web Console will be communicating through the standardized OGC web operations specified within the GSS specification. The GSS component will also be responsible for distributing and applying approved changes through the synchronization protocol to other GSS instances (See Figure 1).

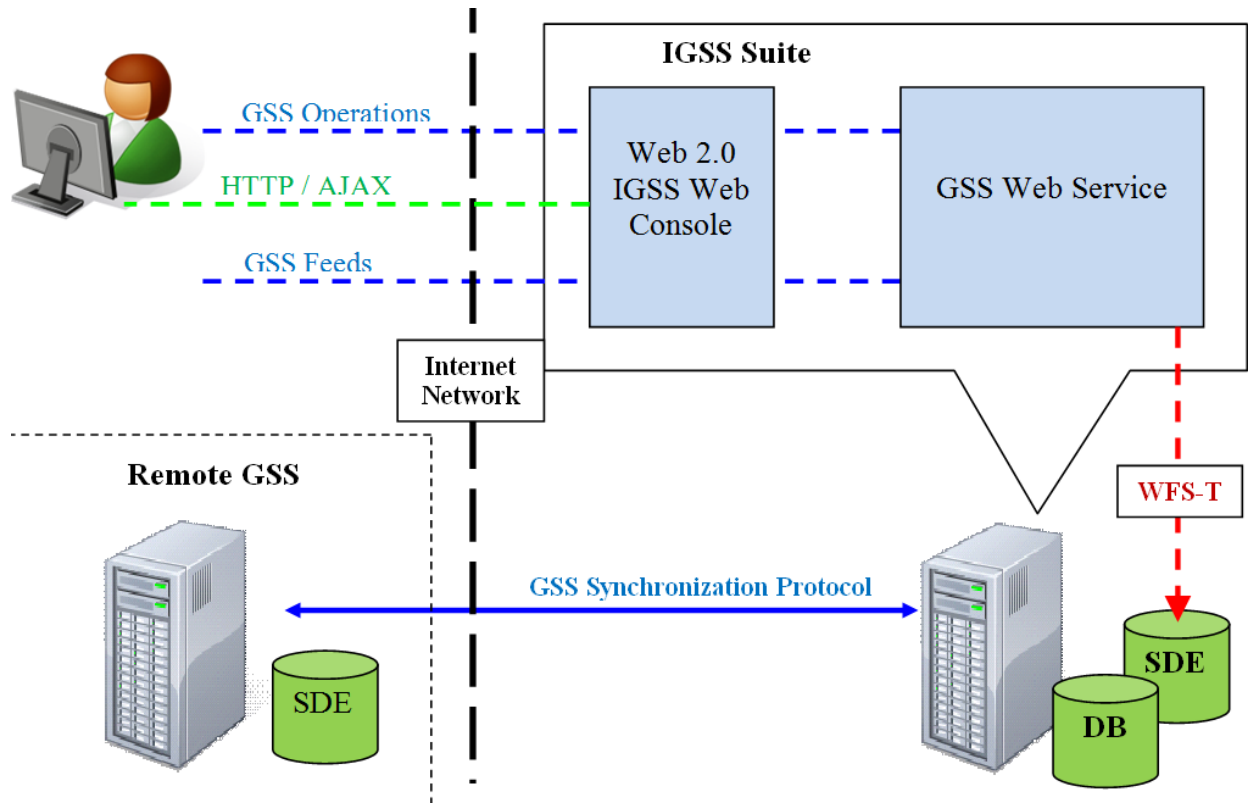


Figure 1

The IGSS Suite will rely on Image Matters userSmarts™ technology to drive both the GSS web service as well as the IGSS Web Console interface. userSmarts provides an OWS (Open Web Services) framework foundation for rapid and robust development and implementations of OGC web services.

Use Cases

The Indiana team has spent significant effort to learn, define and document both our current NHD maintenance workflow and a more streamlined automated process that can be achieved through this project. We see the following Actors participating in the use cases for Indiana's IGSS and the GSS:

- "Steward": Indiana NHD Steward (Jim Sparks, Indiana GIO; or proxy)
- "Editor": IGIC, DNR, IDEM, Contractors, and other Waters Workgroup Member (various personnel in Indiana)
- "Indiana Reviewer": Appointee of Steward that reviews the proposed NHD updates at some point in the process prior to submitting to USGS Reviewer. (This could be Dave Nail, Indiana USGS Liaison, or other personnel in Indiana).
- "USGS Reviewer": USGS NHD Reviewer (Elizabeth McCartney, Technical POC for NHD)
- "Data Follower": any party that wants to keep their Indiana NHD holdings current, including USGS Denver.

GSS Web Service Use Cases

- Data Publisher Posts Proposed Change(s) to GSS Service
- Proposed change(s) is/are read from the Change Feed direct from GSS
- Reviewer submits approval for proposed change(s) directly to GSS
- Reviewer submits rejection for proposed change(s) directly to GSS
- User creates a Topic directly through the GSS
- User deletes a Topic directly through the GSS
- User lists Topics directly through the GSS
- User subscribes to be notified of changes to a specific Topic directly through the GSS
- User lists Subscriptions directly through the GSS
- User pauses notification subscription of changes to a specific Topic directly
- User resumes notification subscription of changes to a specific Topic directly
- User cancels notification subscription of changes to a specific Topic directly
- Changes discovered by slave GSS are propagated to underlying WFS-T

IGSS Console Use Cases

- Editor posts proposed change
- Proposed change(s) is/are observed from the Change Request Browser
- Reviewer submits approval for multiple proposed change(s)
- Reviewer submits approval for proposed change(s)
- Reviewer submits rejection for multiple proposed change(s)
- Reviewer submits rejection for proposed change(s)
- User creates a Topic
- User deletes a Topic
- User lists Topics
- User subscribes to be notified of changes to a specific Topic
- User lists Subscriptions
- User pauses notification subscription of changes to a specific Topic
- User resumes notification subscription of changes to a specific Topic
- User cancels notification subscription of changes to a specific Topic

Summary

As soon as possible, Indiana plans to begin using the IGSS solution in partnership with the USGS as part of our ongoing NHD GNIS updates and Local-Resolution NHD data development projects. Indiana is fully committed to NHD Stewardship and we see this project as a unique opportunity that will allow us to leverage IGSS to significantly improve our existing NHD update workflow with the USGS.