2009 NSDI Cooperative Agreement Program
Category 2: Behind the Portal - Use of GOS Map and Data Services

Final Report

GOS Dashboard –

Enterprise GIS Dashboards for the Geospatial One-Stop (GOS) Portal

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Executive Summary

Currently, the National Spatial Data Infrastructure (NSDI) community does not have a way to integrate GOS Portal search functions into the desktop environment. Our project, the *GOS Dashboard – an Enterprise GIS Desktop Dashboard for the Geospatial One-Stop (GOS) Portal*, developed enterprise applications to enable at-a-glance visualization of geospatial assets and monitoring of key GOS Portal search functions (Figure 1) to fill this gap. This effort was supported by a 2009 NSDI CAP grant and focused on designing, developing, documenting and deploying open source enterprise applications to enable "at-a-glance" visualization of geospatial assets and monitoring of GOS Portal search functions.

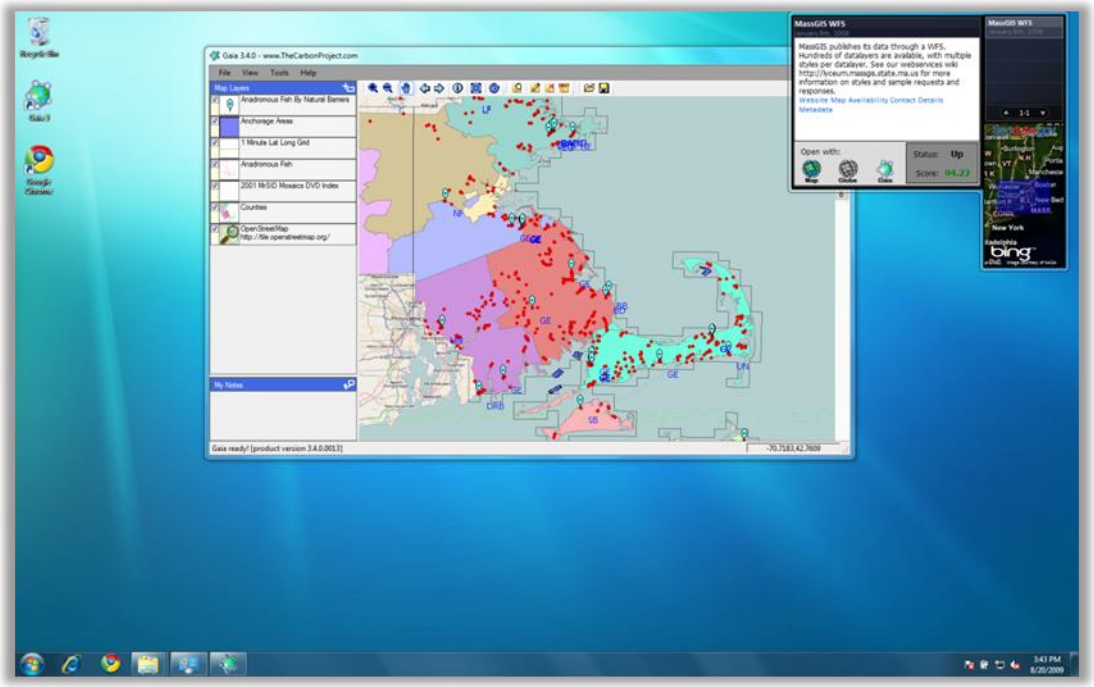

Figure 1 – The GOS Dashboard as deployed in September 2009 on a Windows 7 Desktop. The Dashboard features the capability to discover WMS and WFS, such as MassGIS services above, from GeoRSS feeds and launch applications like Gaia directly from the desktop.

During this effort The Carbon Project developed and released multiple versions of the open source dashboard for Geodata.gov, the federal government's information service for maps and data. Releases were followed by testing with Geodata.gov and a variety of NSDI services, including Web Map Services (WMS) and Web Feature Services (WFS) from MassGIS, Pacific Disaster Center, USGS, CubeWerx, ESRI and others. Testing showed the GOS Portal yielded near-instant instant access to the NSDI services. In addition, The Carbon Project established an online forum for collaborative discussion of GOS Dashboard functions and conducted workshops for the open-

source GOS Dashboard - the beginning a community dialog on the functions of geospatial dashboards with NSDI users and developers. Based on feedback from these workshops, The Carbon Project developed a second web-based version of the tool. This tool consisted of an open source web widget able to access Geodata.gov search functions and deploy open geospatial applications such as Gaia from any web page (Figure 2). Simple to understand and high in ROI, the GOS Dashboard and Widget have the potential to fill a vital gap in the use of open-geospatial web services and become a "must-have" for all federal enterprises.

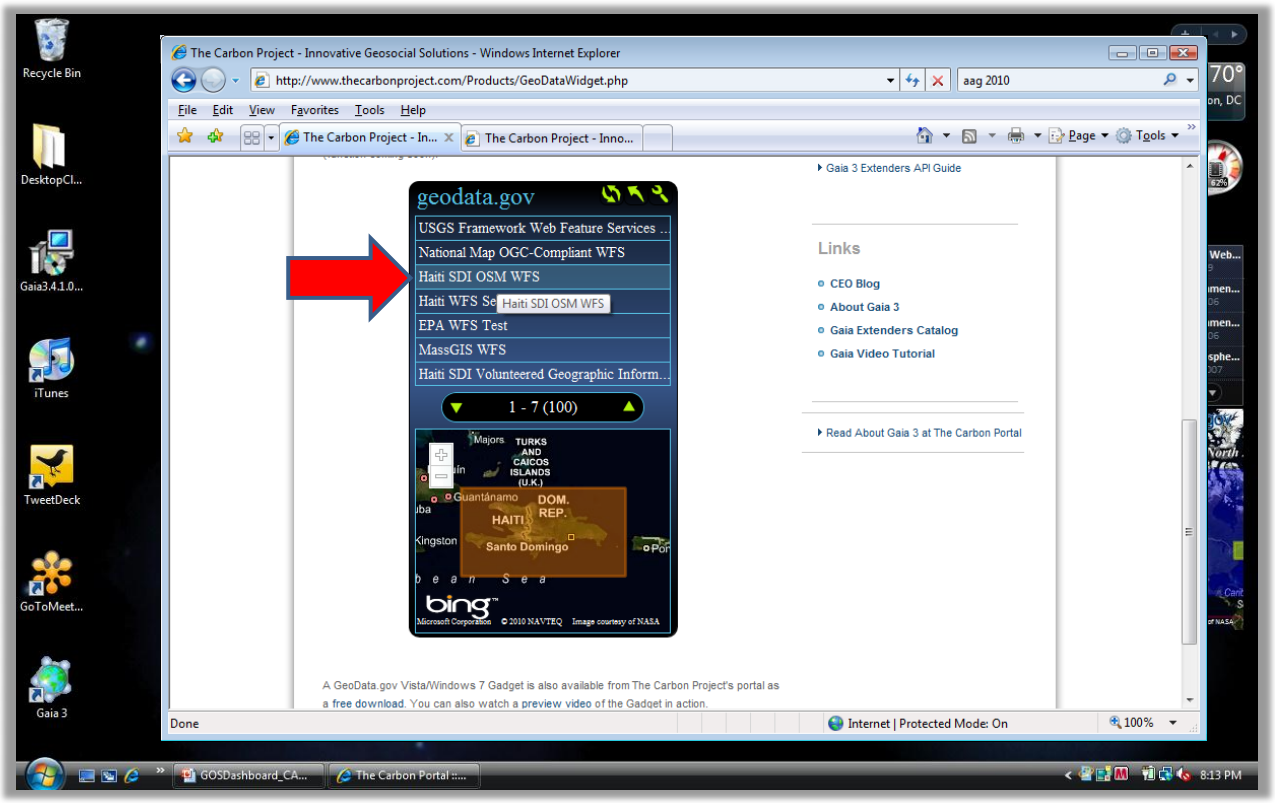

Figure 2 –The GOS Widget operating in a web page and used to discover OpenStreetMap WFS for Haiti

Organization Information

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FGDC-endorsed standards selected for the project:

OGC Catalog Service for the Web (CSW) FGDC Profile, ebRIM Profile, and Version 2.0.2 'baseline'
OGC Catalog Service Version 2.0.2, Z39.50 Profile
FGDC Content Standard for Digital Geospatial Metadata, Version 2.0
North American Profile (Draft), ISO 19115 Metadata

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Project Narrative

The scope of the project supported by this NSDI-CAP grant was to design, develop, document and deploy an open source enterprise application to enable "at-a-glance" visualization of geospatial assets and monitoring of GOS Portal search functions. Currently, the NSDI community does not have a way to integrate GOS Portal search functions into the desktop environment. Simple to understand and high in ROI, this Enterprise GIS dashboard has the potential to fill this gap and become a "must-have" for all federal enterprises.

This effort is important because the GOS Portal (www.geodata.gov) has matured to a point where broad uptake and use is now dependent on the capacity to make data discovery, access and use easy for enterprise GIS users. Organizations that use the GOS Portal must also consider how they can monitor key GOS Portal search functions and link data and services into enterprise GIS applications like ArcGlobe, ArcExplorer, the Gaia SDI Platform and other applications. These requirements will continue to increase as data access transitions from a file-based environment to the web services environment.

To meet this challenge, this project is developed and deployed an open source enterprise applications, the GOS Dashboard and Widget, as key components of NSDI Business Process requirements. This project leveraged The Carbon Project's four-year investment in developing NSDI applications and solutions. Specifically, The Carbon Project provided unique experience in all

facets of NSDI application development including CS-W, WMS, WFS, GML, GMLsf, GeoRSS, ESRI technology and enterprise SOA.

The project was based in part on The Carbon Project's experience developing GeoRSS applications in the Canadian Geospatial Data Infrastructure (CGDI), including interoperability projects in Canada where government organizations highlighted a solution for collaborative data maintenance and integration partnerships based on standards-based web services combined with a GeoRSS 'GeoSynchronization' mechanism[1].

This effort built on this foundation and developed open source enterprise applications, the GOS Dashboard, and Widget as key components of the NSDI and The National Map.

Development and Integration Summary

Geodata.gov contains a vast amount of geospatial data. With the help of a robust filtering and searching mechanism, the site allows for retrieval of that data. With the GOS Dashboard, we attempted to make things easier for the casual desktop user. Instead of having to open a web browser to retrieve that data, users are now able to view changes in a feed form and access data of interest with a few button clicks - straight from the desktop. Key design elements include:

- GeoRSS data retrieval based on user filtering.
- Extensive filtering mechanism, built to mimic geodata.gov website both in style and functionality.
- Bounding box display in Bing Maps w/current RSS feed items.
- Integrated FGDC Status Checker
- External application launching from the gadget (ex. Gaia)

The GOS Dashboard enhances the common RSS reader functionality in both Windows Vista and Window 7 with tools suited for the GOS users. Among the features are the ability to easily configure the feed's search criteria, view the data's polygonal footprint on a mini-map, and accessing GIS products directly with the data published.

To create the GOS Dashboard we used the GOS Portal flexible GeoRSS feed generator. Based on the options specified by the user, a query is generated and the results are returned in a GeoRSS format. As discussed, in the GOS Dashboard options we try to mimic the website's look and feel for search & filtering as much as possible in both style and functionality, making some improvements when necessary. However, there is a GeoRSS server limitation of only 100 results, and those results are displayed 4 at a time, much like the default RSS gadget that comes with Windows Vista. We also emulated the default RSS styling when displaying the current feed items

[1] Results of the CGDI project are highlighted in an online video http://www.youtube.com/watch?v=YIZLc_qHYZc

as well as the paging capabilities. The desktop Gadget was been tested in both Windows Vista and Window 7 and works well in both environments.

Installation

To install the GOS Dashboard, all users need to do is download and double-click on the GOSGadget.gadget file, and the following security dialog will appear (Figure 3).

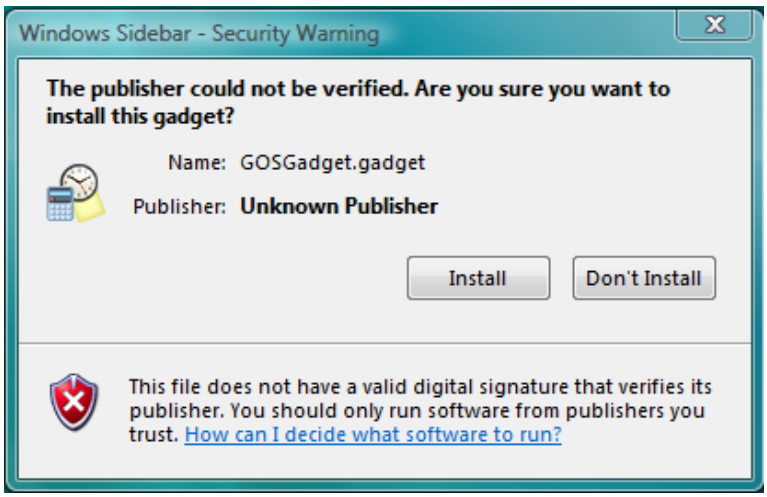


Figure 3 – GOS Dashboard Installation

Users just need to click on install and the gadget will appear in the Vista or Windows 7 sidebar

Main Viewable Area

The main viewable area of the GOS Dashboard displays GeoRSS feed items in a list (Figure 4). Users can navigate the list by pressing the up and down arrows in the navigator. The results are limited to 100 by the server, as discussed. On the Bing map below the 4 GeoRSS feed items, the bounding boxes of each feed item are displayed (each in a different color).

When a feed item is selected (by clicking on the title), the map will display only the current feed item bounding box. Double-clicking the feed title will open up the metadata in a browser window.

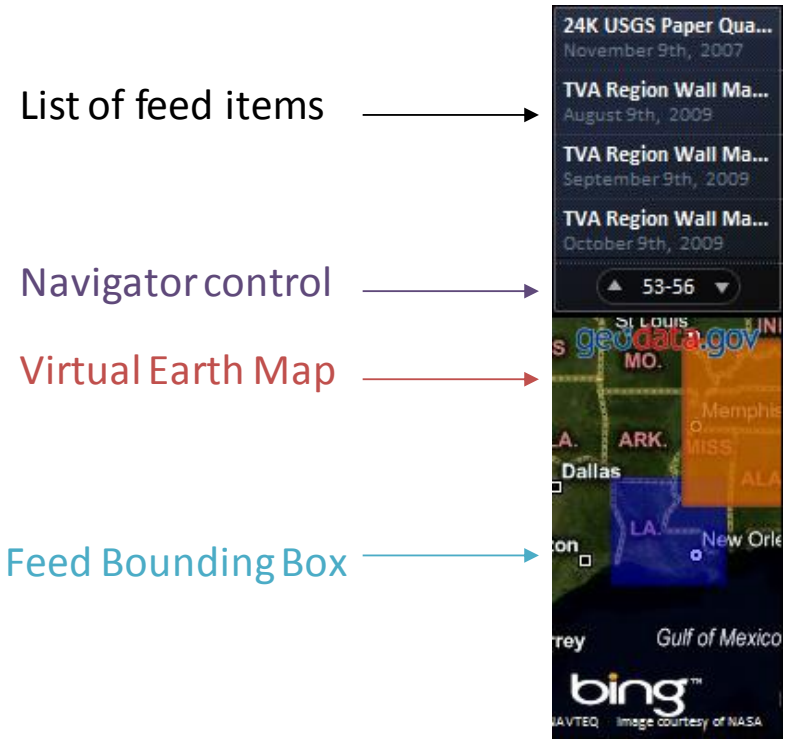


Figure 4 – The Main Viewable Area of the GOS Dashboard

The Item "Flyout" Window

The Flyout window appears when users click on a feed link. This form displays the feed description (as sent from the server). The description usually contains a few links that users can follow for additional information about the item. This view is similar to the common RSS reader view, with an added toolbar at the bottom. This unique bar shows various GIS applications that can be triggered by the associated data (Figure 5). The icons in this bar allow easy navigation to external services/applications that display the feed geospatial data, and a status of the GOS resources. When not applicable the icons are grayed out. Currently, Arc Explorer, ArcGlobe and Gaia, and "Status" are supported:

- **Map** shows the data or service on a Geodata.Gov online ArcExplorer.
- **Globe** shows the data or service on ArcGlobe.
- **Gaia** adds capabilities of the OGC service (if available) to the Gaia application.
- **Status** shows a reliability Score from the FGDC Status Checker[2] (via REST API).

[2] http://registry.fgdc.gov/statuschecker/index.php

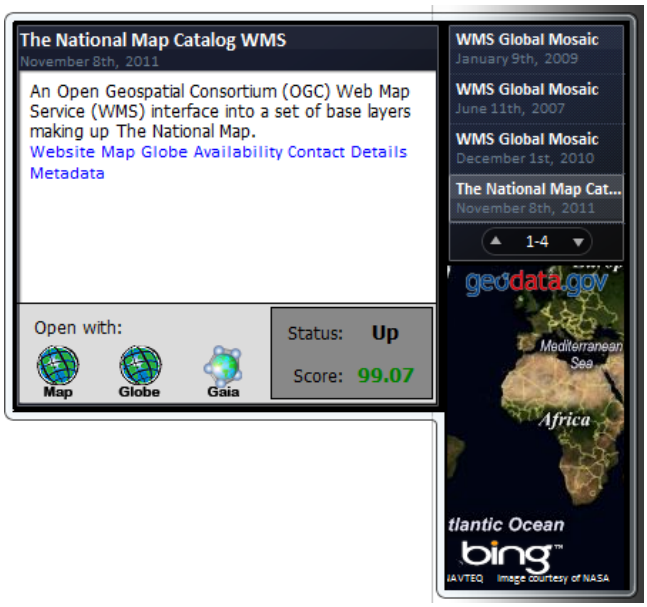


Figure 5 - The Flyout window appears when users click on a feed link

Setting GOS Dashboard Configuration

Most Vista gadgets have a configuration option (Figure 6). The existing RSS reader gadget from Microsoft only allows the user to select the feed from existing subscriptions and adjust the maximum number of aggregated items. This is not adequate for a GOS user, for example changing the feed search properties is not possible and requires manual re-subscribing to the feed (using a new URL) and reloading of the gadget. The GOS Dashboard gadget offers a Settings configuration window that is much more suited for the task.

The Settings window is where feeds search parameters are set. The top of the dialog allows keywords to be set. The keyword defaults to “map” if nothing is specified. The other filtering options correspond very closely to those that appear on the *geodata.gov* website. To expand a filtering section, users just click on the blue header bar. The GOS Dashboard configurable search elements include:

- Search keywords
- Content type (e.g. live data, geographic services)
- Data categories (e.g. Transportation)
- RSS update interval (e.g. once a day, every hour etc.)

Once configured the GOS Dashboard will construct the required query and update the feed items accordingly. There is no need to restart the gadget or re-subscribe the feed.

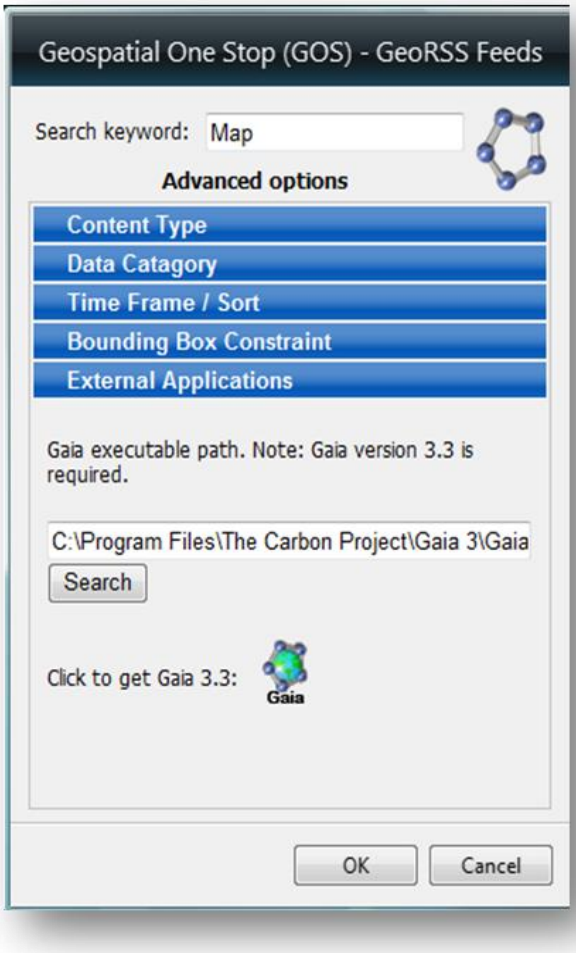


Figure 6 - The Settings window allows GOS users to set feed search parameters.

The external applications section of the Setting window allows feed items to be opened up with *Gaia*. If users don't have *Gaia* installed, a link to the free download site is provided. The path settings is by default the application default installation path. The *Search* button allows automatic detection of the Gaia path.

Basic Desktop GIS Workflow

A basic desktop workflow where a user selects an NSDI Service of interest from the GOS Dashboard, reviews its information and launches a desktop application (Gaia) is depicted below in Figure 7.

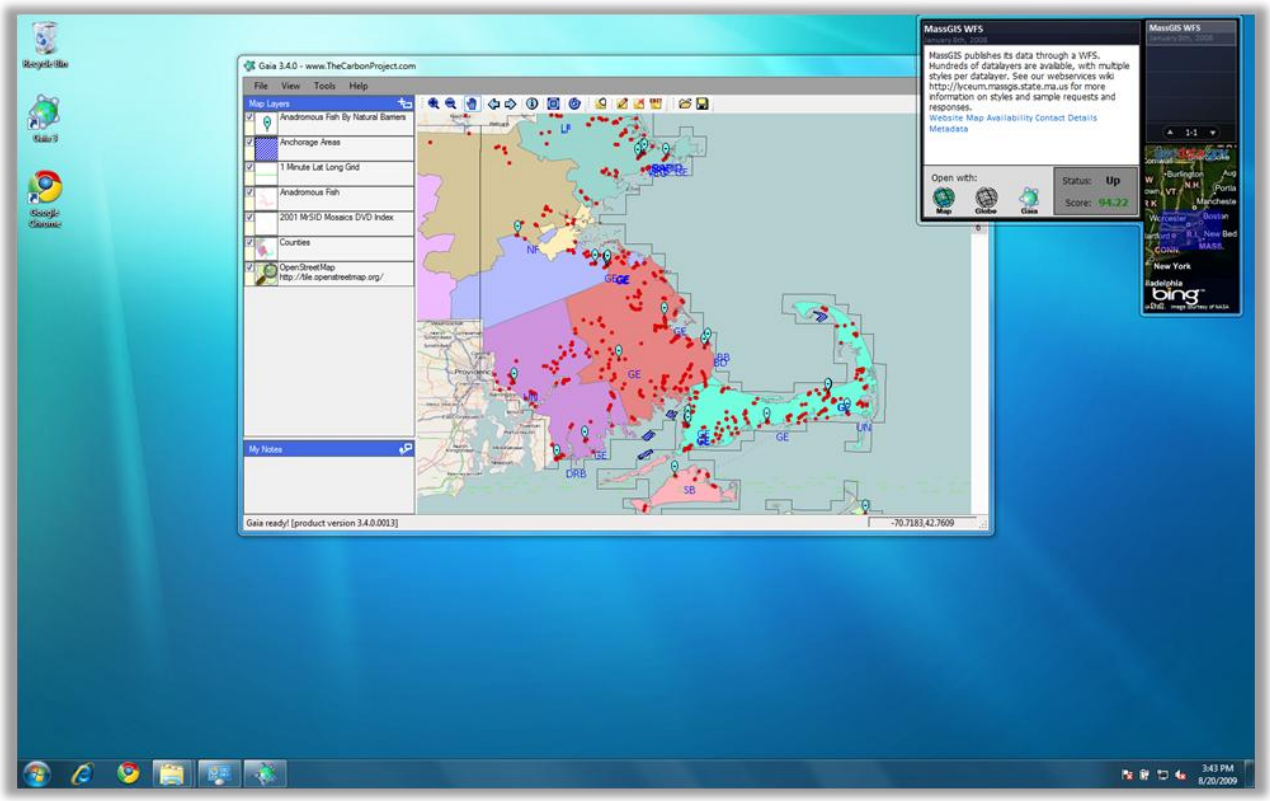


Figure 7 – A GOS Dashboard in use on the desktop

Community Outreach and the Need for "GOS Widget"

Early in the effort The Carbon Project delivered a Dashboard application that can be widely used for discovering data and services through geodata.gov. As part of this project, we also engaged in a consistent community outreach program that has reached users across the NSDI. A significant component of this community engagement has been efficient use of collaborative engagement tools on the Internet, including YouTube, Blogs, online meetings and an interactive Forum.

Specifically, The Carbon Project released the first version of its open source dashboard for Geodata.gov, the federal government's information service for maps and data. This release was followed by initial testing with Geodata.gov and a variety of NSDI services, including WFS and WFS from MassGIS and other sources. Testing showed the GOS Portal yielded near-instant instant access to the NSDI services. In addition, The Carbon Project established an online Forum for collaborative discussion of GOS Dashboard functions. Finally, The Carbon Project conducted the

first online workshop for the open-source GOS Dashboard - the beginning a community dialog on the functions of the dashboard with NSDI users and developers.

Key GOS Dashboard information and Community Outreach Links include:

- **GOS Dashboard Download Site** - http://thecarbonportal.net/modules.php?op=modload&name=Downloads&file=index&req=viewdownload&cid=6
- **GOS Dashboard Announcement** – http://www.thecarbonproject.com/news_geodatadash.php
- **GOS Dashboard on YouTube** – http://www.youtube.com/watch?v=NwzEsCftonk
- **GOS Dashboard Video Preview** – http://thecarbonproject.com/Videos/GOSGadget1/GOSGadget1.htm
- **GOS Dashboard Slideshare Presentation** – http://www.slideshare.net/CarbonProject/gos-dashboard-enterprise-gis-dashboard-for-geodatagov
- **MassGIS Testing Quick Look** - http://carboncloud.blogspot.com/2009/08/gaia-and-gos-dashboard.html
- **Summary of First GOS Dashboard Workshop** - http://carboncloud.blogspot.com/2009/09/success-at-gos-dashboard-workshop.html

Figure 8 – A key element of this project was the use of collaborative engagement tools on the Internet, including YouTube, Blogs, online meetings and an interactive Forum

Based on our community engagement process it was determined that additional utility could be gained from creating a web-based version of the GeoRSS feed reading capabilities of the GOS Dashboard. Specifically, users commented that although Windows 7 is a target desktop environment for the Federal enterprise not all users (especially in State and Local organizations) have reached this upgrade point yet. To meet this challenge a web-based version of the GOS Gadget, called the GOS Widget, was developed, tested and released (Figure 9).

Figure 9 – Community workshops indicated that a GOS Widget, focused on web environments, would also be useful to enterprise users

The final architecture of both the GOS Dashboard and GOS Widget is presented below in Figure 10.

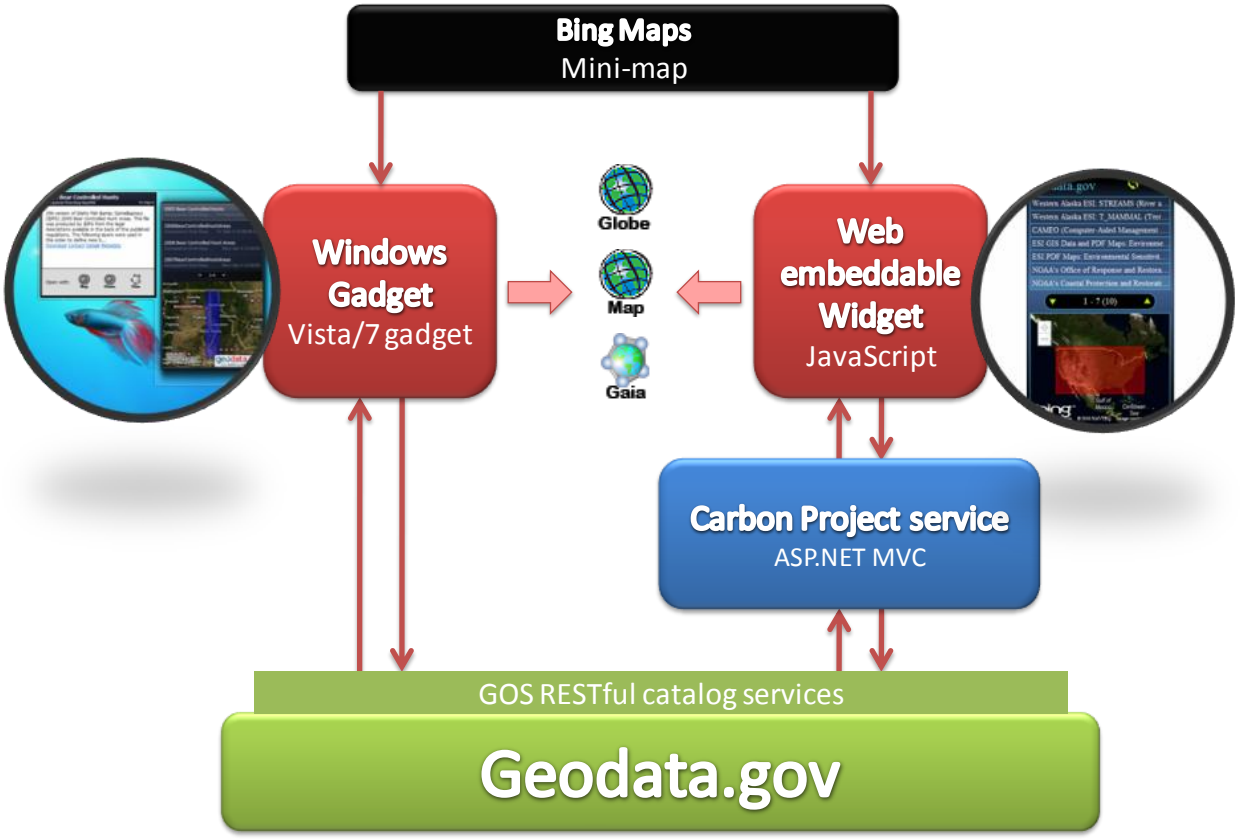


Figure 10 - Architecture of the GOS Dashboard and GOS Widget

Our community engagement process also included presenting the project results at the American Association of Geographers (AAG) 2010 Conference - Geospatial Web Services in the Government session. This presentation is available online at http://carboncloud.blogspot.com/2010/04/10-minutes-with-nsdi-web-services-using.html.

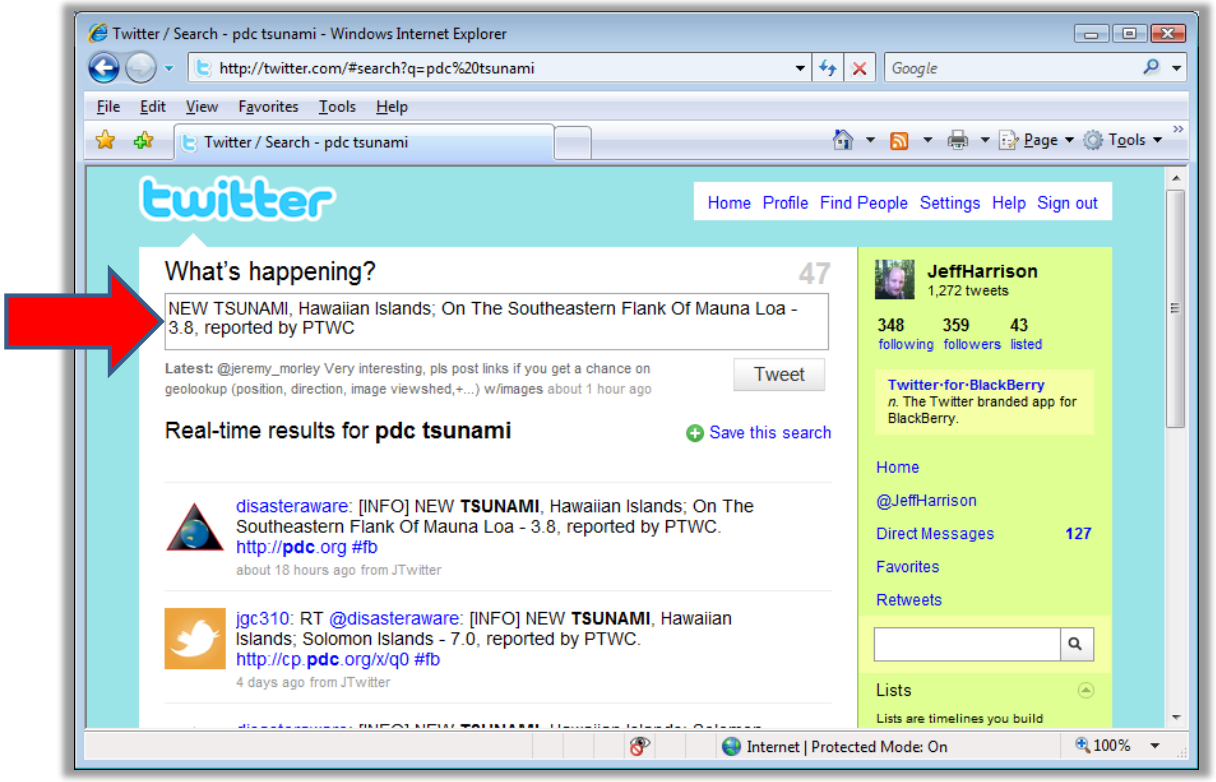
NSDI Community Use Cases

As part of the capstone testing for this project two Community Use Cases were developed and tested. These Use Cases were designed to highlight access easy for casual user – where users just view changes in the GeoRSS feed and access NSDI Web Services in a few clicks from desktop or Web. Specifically, the following Use Cases were developed –

- **Tsunami Response**
- **Haiti Response**

Tsunami Response Use Case

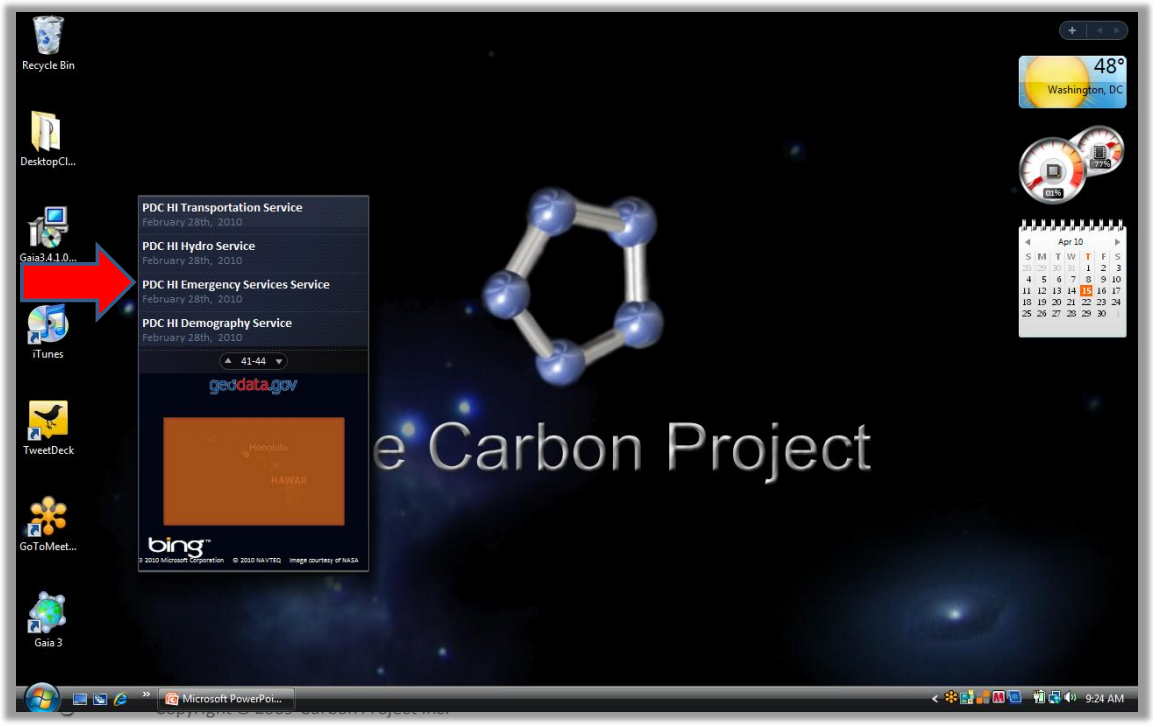
Step 1 - Tsunami Reported



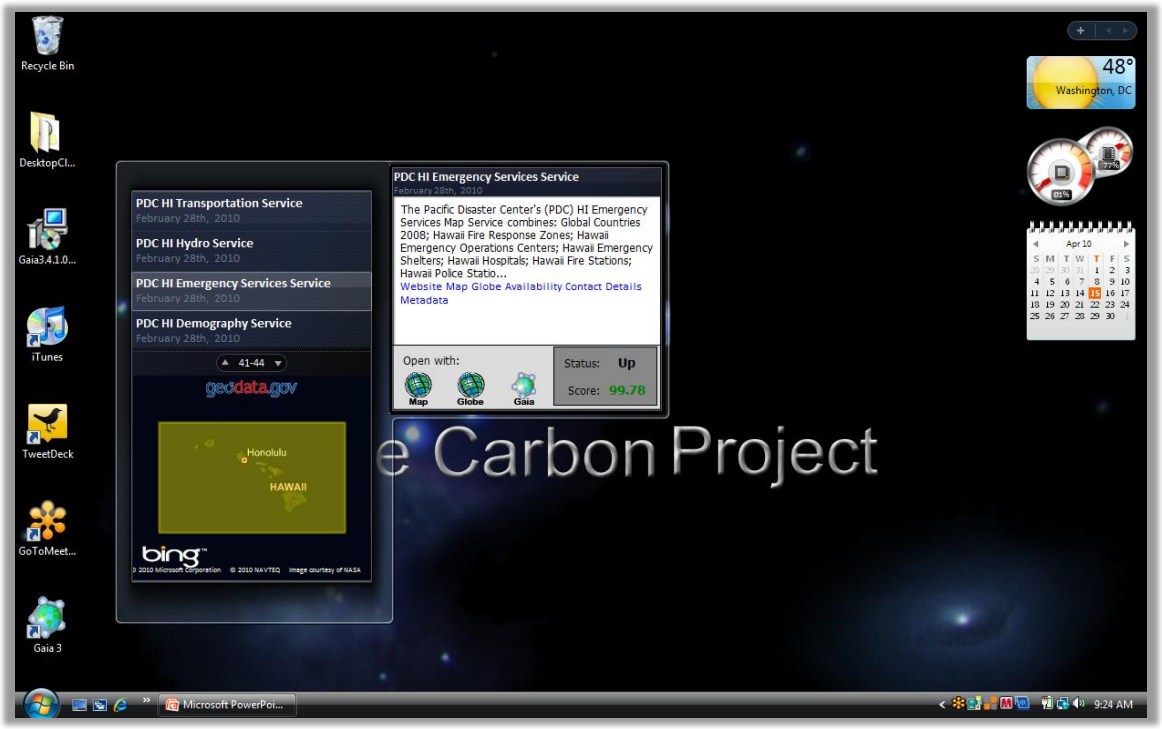
Step 2 - GOS Gadget on Desktop

Step 3 - Reading Geodata.gov Feeds

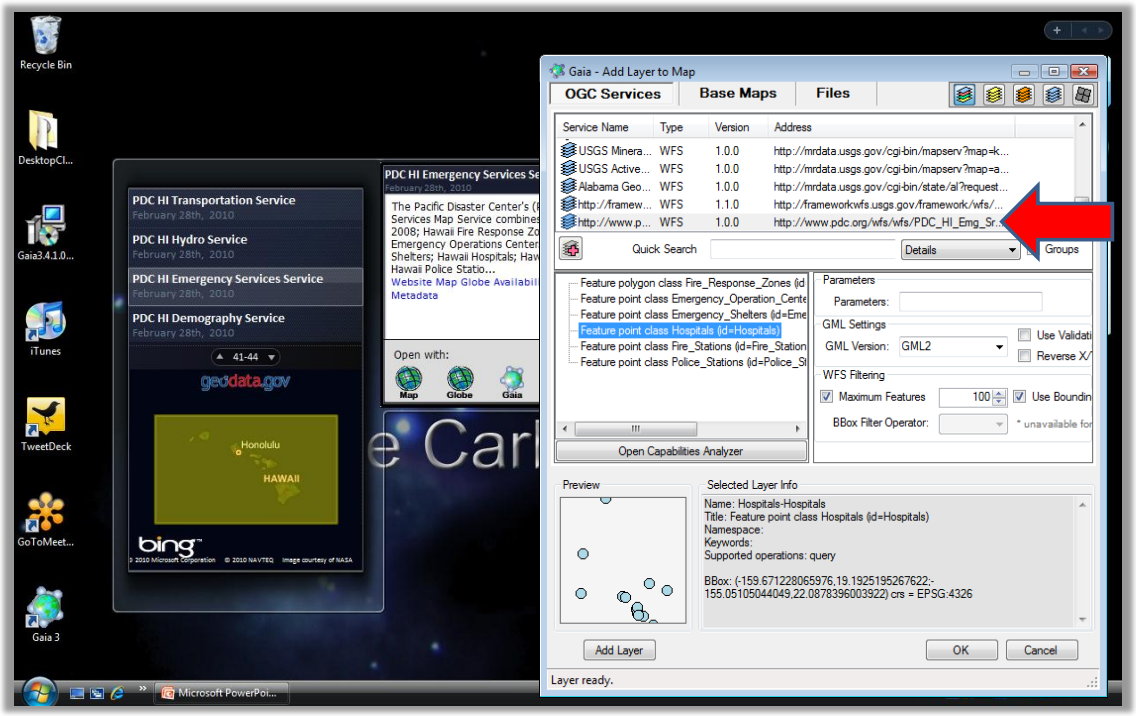
Step 4 - User notices Hawaii NSDI Web Services



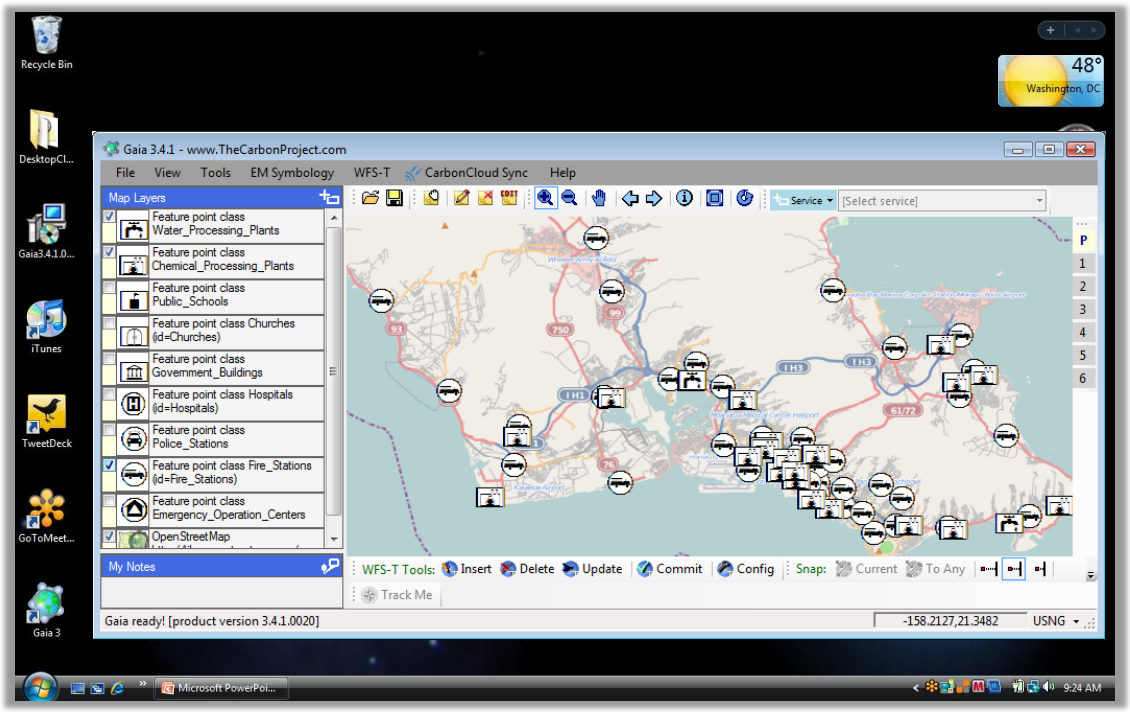
Step 5 - Clicks the 'Flyout' for more info on OGC WFS



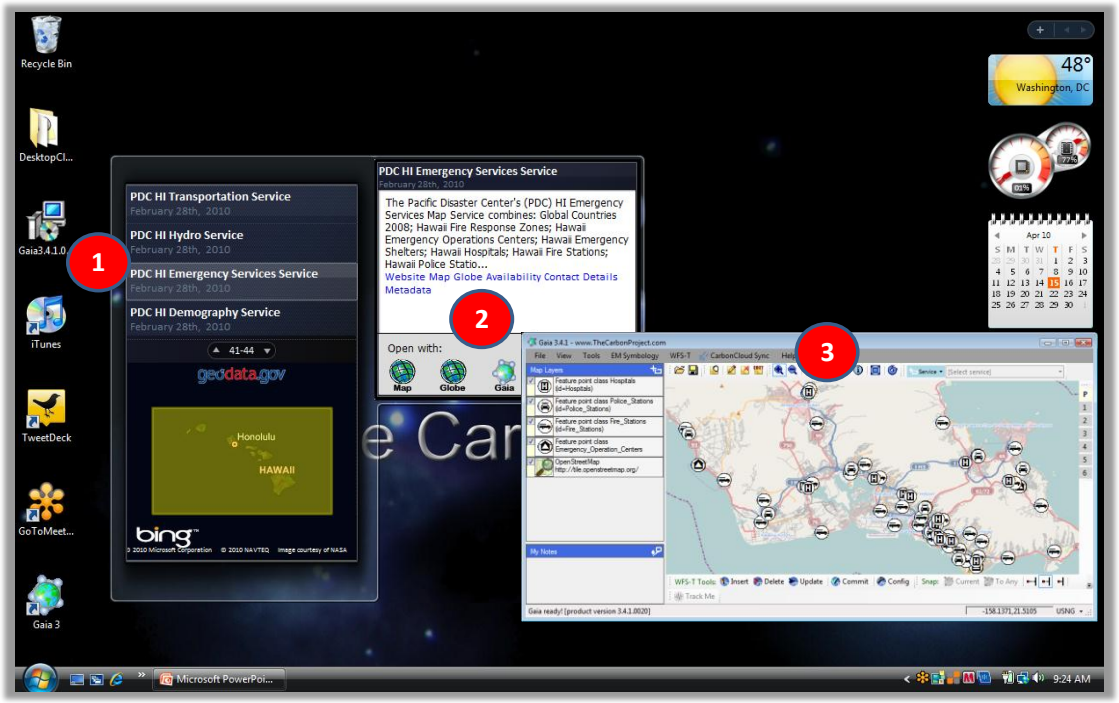
Step 6 - One click on Gaia icon adds OGC WFS to app



Step 7 - Hawaii Emergency Services NSDI mashup ready



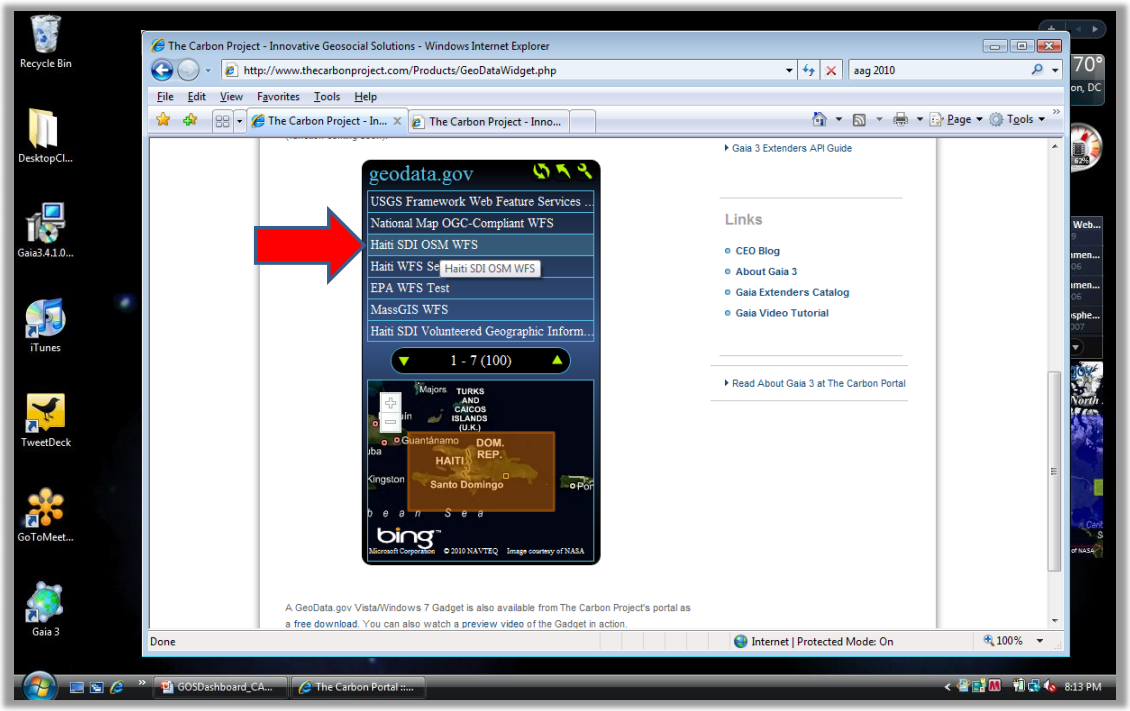
Step 8 - GOS Dashboard Use Case Review



Haiti Response Use Case

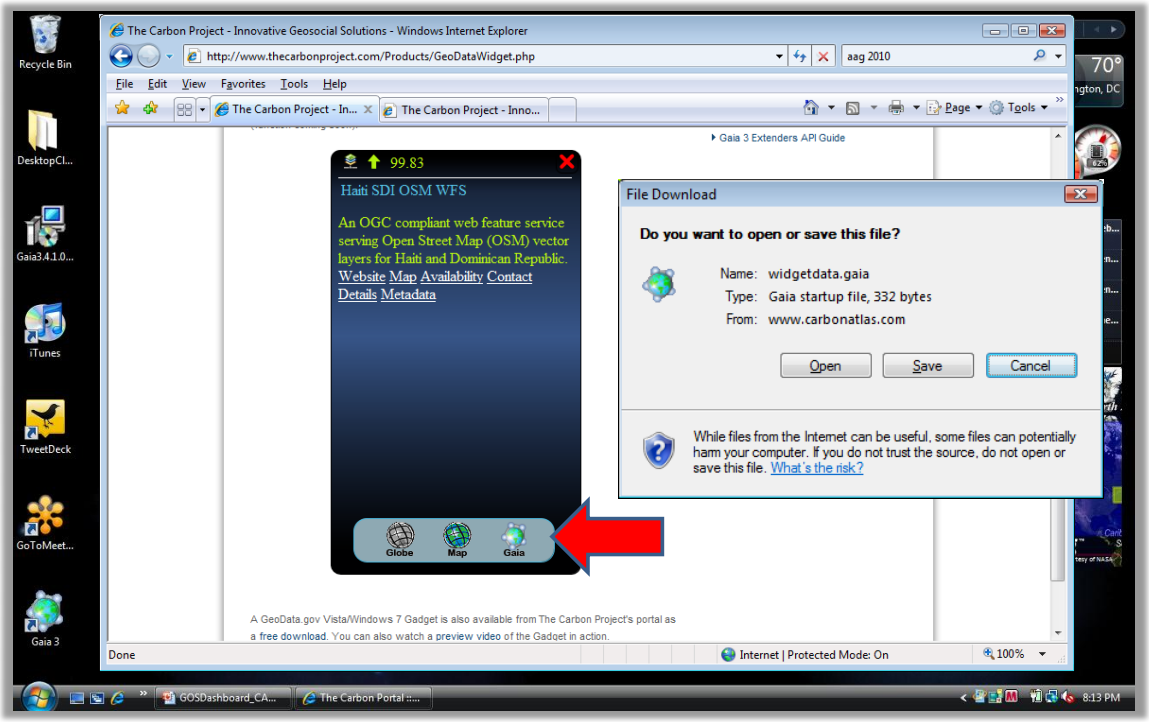
Step 1 - GOS Widget on Web Page – Reading Feeds

Step 2 - User notices Haiti SDI Web Services

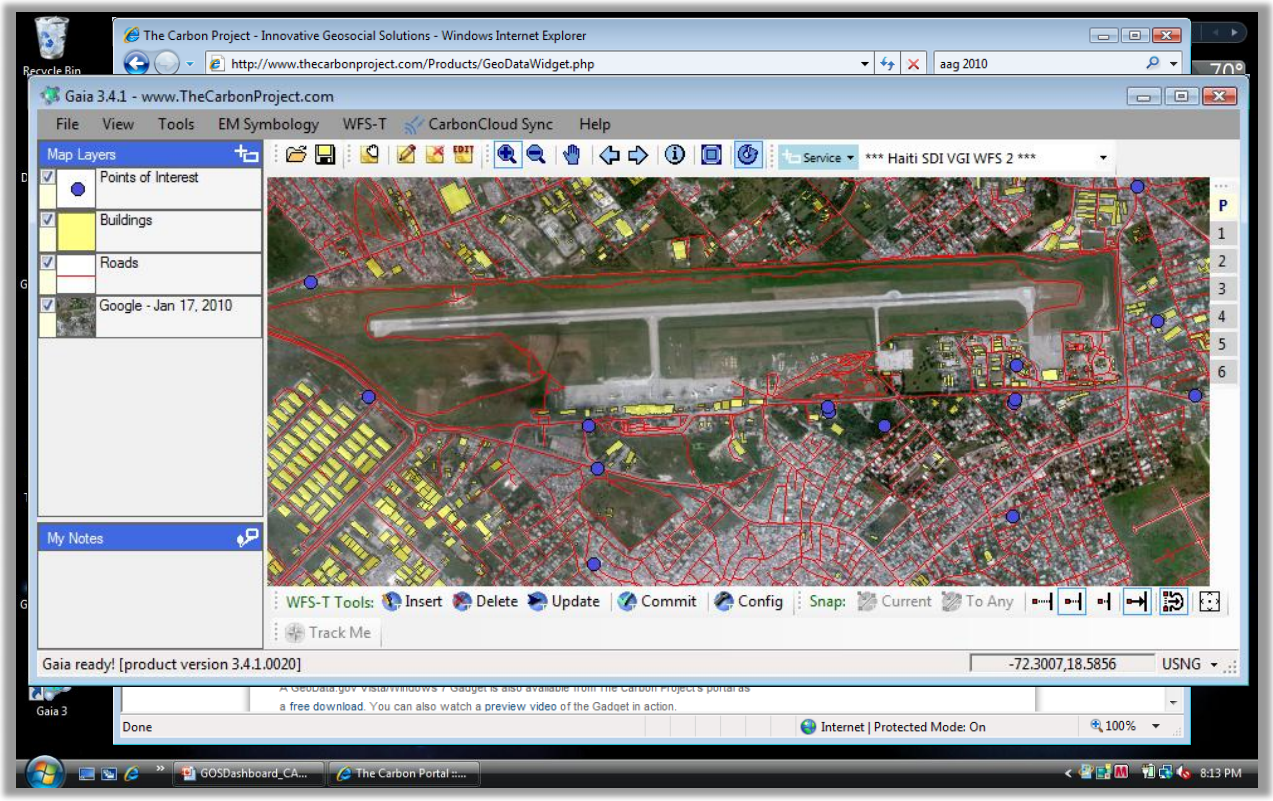


Step 3 - Clicks for more info on CubeWerx OSM WFS

Step 4 - Click on Gaia icon adds CubeWerx OSM WFS to app



Step 5 - OSM WFS ready



Quick References

Download GOS Gadget: http://www.TheCarbonPortal.net

Use GOS Widget: http://www.thecarbonproject.com/Products/GeoDataWidget.php

Download Free Gaia: http://www.thecarbonproject.com/gaia.php

View Samples on YouTube: www.YouTube.com/thecarbonproject

Feedback on the Cooperative Agreements Program

The NSDI Cooperative Agreements Program provided an opportunity for The Carbon Project to work with NSDI practitioners on an initiative that has real world implications in much of the U.S NSDI. The program provides for the injection of new technologies and approaches into the geospatial community. The grant provided both research challenges and important collaboration experiences.

Strengths: The program reviews and funding decisions were made very quickly. We were also pleased to have the opportunity to prototype applications and deployment scenarios, an effort that came out of discussions and regular teleconferences with NSDI participants and CAP government team. The program's mixture of NSDI participants from other projects was also very beneficial. Overall, the program is making very good progress towards promoting key aspects of realizing NSDI applications and services online. Continued emphasis needs to be placed on promoting easy-to-use applications that access an online infrastructure of standards-based location content across the nation, and can flexibly support operational requirements. With the progress on simplified access exemplified by efforts such as those outlined in this report we can identify no technical impediments to advancing such operational use. However, we suspect funding issues are continuing to hold back development of this online infrastructure. This issue needs to be addressed since investment in the NSDI will leave the country with a public resource, a modern spatial data infrastructure that will become a foundation for new business and technology investment. Most importantly, this framework can provide a sustainable, long-term infrastructure and innovation investment that will contribute to the economy for many years to come.

Weaknesses: Although not a weakness, additional external Federal engagement in project continuation and partnering efforts should continue to be encouraged. This is occurring but additional agencies can benefit from CAP solutions and should continue to engage more in the process. Specifically, the CAP and the NSDI needs to have continued strong liaison in operational aspects of these agencies and with other state, federal, and commercial interests.

The team had no program management concerns as the NSDI CAP is one of the best-managed federal programs this team has participated in. The team received prompt responses to questions. Additionally the program management team’s format for meetings and communications facilitated collaborations.