

Web Services, Mashups & KML

Exploring and Using the GeoWeb & Web 2.0 Technologies



AJ Wortley – UW State Cartographer's Office



– Overview –

- Introduction to Web 2.0
- Web services & web service clients
- KML -> 3D client publishing
- KML Clients & Tools
- Mashups explained -> web services applied
- Mashup Tools
- Mashup Frameworks
- Local & other examples



The Context

- Globalization
- Shrinking resources
- Information society
- Moving from *Maps* as art and output ...
to geospatial as an organizing principle in
support of efficiency, economy, knowledge
communication and measuring well-being

The GeoWeb

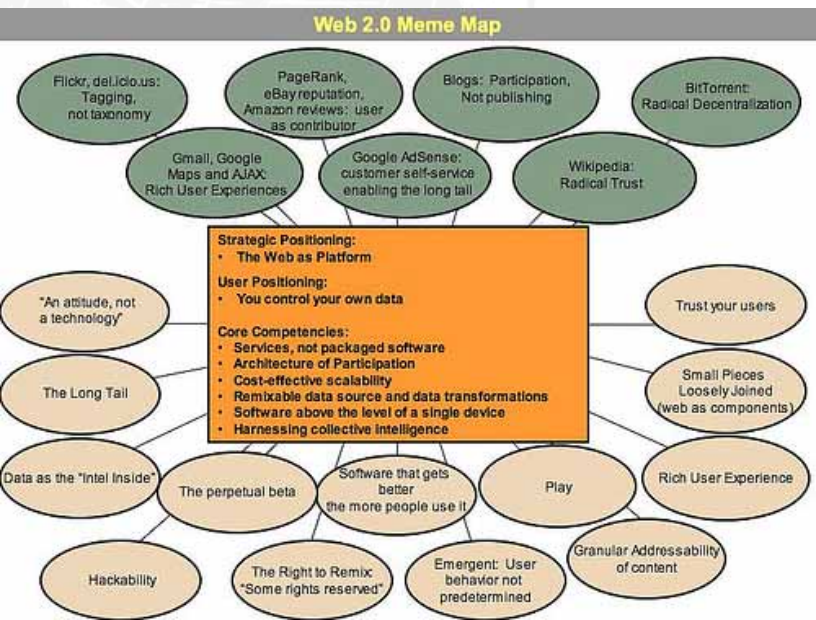


The Geospatial Web or **Geoweb** is a relatively new term that implies the **merging** of geographical (location-based) information with the abstract information that currently dominates the Internet. This would create an environment where one could search for things based on location instead of by keyword only – i.e. “**What is Here?**”.

The interest in a Geoweb has been advanced by new technologies, concepts and products. **Virtual globes** such as Google Earth and NASA World Wind as well as **mapping websites** such as Google Maps, Windows Live Local and Yahoo Maps have been major factors in raising awareness towards the importance of geography and location as a means to index information. The increase in advanced web development methods such as Ajax are providing *inspiration to move GIS (Geographical Information Systems) into the web.*

The concept of a Geospatial Web may have first been introduced by Dr. Charles Herring in his US DoD paper, An Architecture of Cyberspace: Spatialization of the Internet, 1994, U.S. Army Construction Engineering Research Laboratory ([show location on an interactive map] 40°8'58.9"N 88°16'22.7"W / 40.149694, -88.272972 (U.S. Army Construction Engineering Research Laboratory)). Dr. Herring proposed that the problem of defining the physical domain in a computer or cyber-infrastructure, providing real time and appropriate fidelity, required a cyber-spatial reference or index combining both Internet Addressing and Hierarchical Spatial Addressing. As such, the Geoweb would be characterized by the self synchronization of network addressing, time and location. The Geoweb would allow location to be used to self organize all geospatially referenced data available through the Internet

What is Web 2.0



Author: Tim O'Reilly

URL: <http://www.oreillynet.com/oreilly/tim/news/2005/09/30/graphics/figure1.jpg>



Author: Ludwig Gatke

URL: <http://www.railsonwave.it/2007/1/2/web-2-0-map/>

Licensed under CC Attribution-NonCommercial-ShareAlike 2.0 Germany | Ludwig Gatke | <http://flickr.com/photos/stalio-boss/>

What is Web 2.0



Author: Luca Cremonini Source: <http://www.railsonwave.it/railsonwave/2007/1/2/web-2-0-map>

URL: http://www.railsonwave.com/assets/2006/12/25/Web_2.0_Map.svg

Web 2.0



*Wikipedia, the free
encyclopedia*

According to Tim O'Reilly:

"Web 2.0 is the business revolution in the computer industry caused by the move to the Internet as platform, and an attempt to understand the rules for success on that new platform."

An IBM social-networking analyst, Dario de Judicibus, has proposed a different definition which focuses more on social interactions and on architectural implementation:

"Web 2.0 is a knowledge-oriented environment where human interactions generate content that is published, managed and used through network applications in a service-oriented architecture."

Web 2.0 can be defined as **"the philosophy of mutually maximizing collective intelligence and added value for each participant by formalized and dynamic information sharing and creation."**



Web 2.0

... and whether the technologies came first or the words to describe them, they often adhere to said principles like *reusability*, *interactivity*, *user-generated content*

Which fits very well in the world of GIS and web publishing of Geographic Information – as if it's where we were headed all along.

Web 2.0 – in other words

- Internet = platform → connected devices
- Government and corporate data combined with ***user-created data*** (*UGC, VGI, crowd-sourced*)
- 2-way interaction encouraging interactive participation and collaboration
- Authoring of data as **(re)usable** web services
- Data as a service | s/w as a service (SAAS)

Web 2.0 Content Services

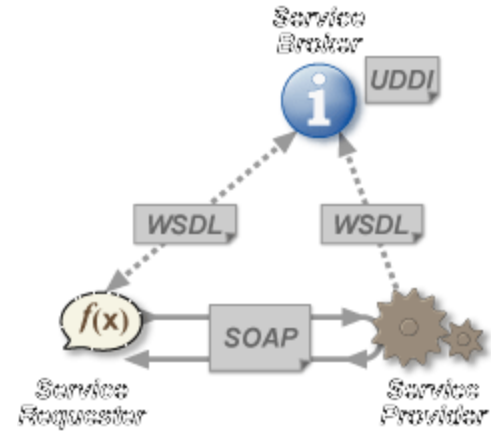
- Blog content
 - Web surveys, polls, feedback
 - Photo sharing, Video sharing
 - Searching, shopping
 - Social networking sites
 - Location, maps and mappable things
- ... Enter Web services & Mashups

SOA and Web 2.0: The Top-Level Organizing Principles in Software Continue to Converge and Evolve



Source: <http://web2.wsj2.com> 

Web services



A Web service (also Web Service) is defined by the W3C as **"a software system designed to support interoperable Machine to Machine interaction over a network."** Web services are frequently just Web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services.

{Note: API = Application Programming Interface }

“Open” Web services

- Differentiate ... (all location examples)
 - Proprietary services (e.g. ArcWeb Services)
 - Commercial *APIs* (e.g. Yahoo/Google Maps)
 - Standards-based web services (OGC)
 - Open Geospatial Consortium
 - + ISO, XML ...
 - KML, WMS, WFS, WCS
 - Defining *Open* ... not always 100% clear

OGC Web service standards

Of primary interest...

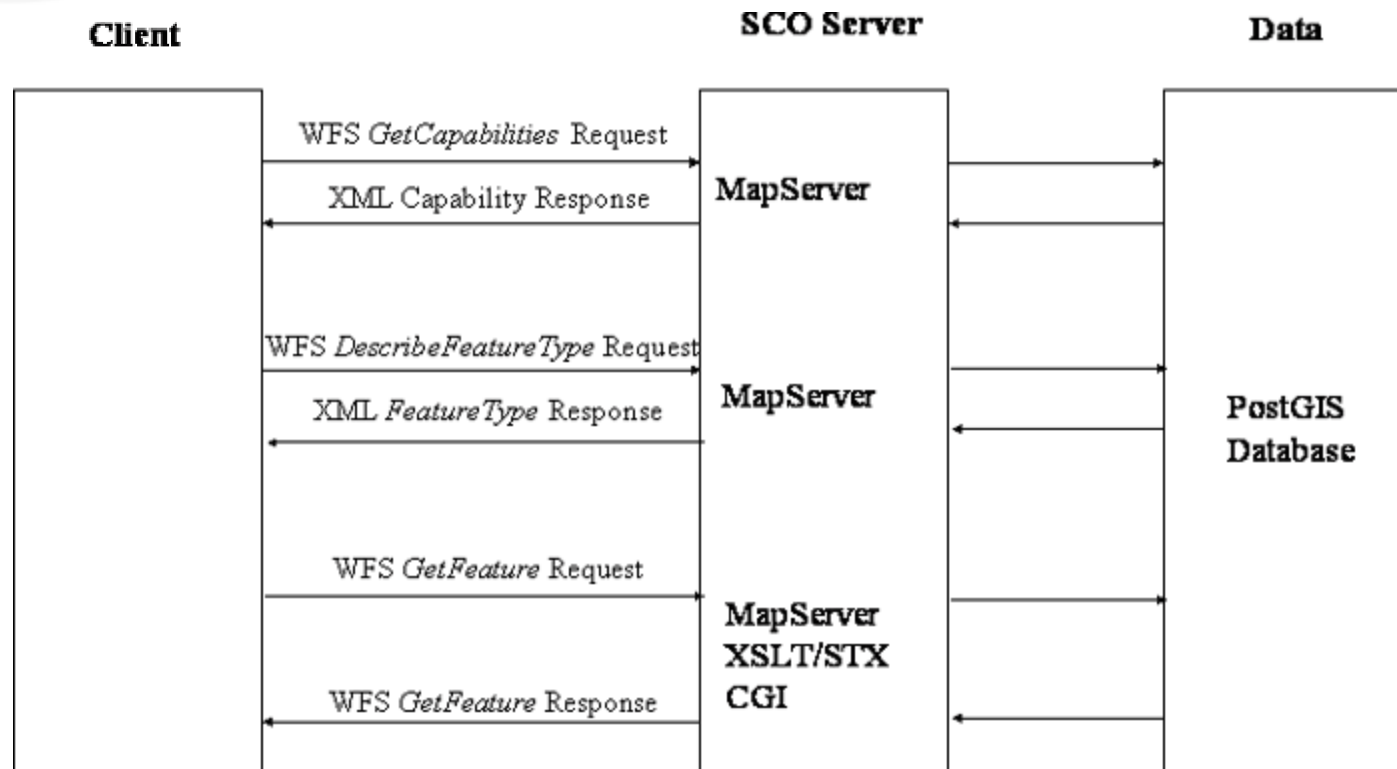
- Web Map Service (WMS) Image
- Web Feature Service (WFS) Feature
- GeoRSS Event
- KML (not really a service, but we'll come back.)

Of secondary interest ...

- Web Coverage Service (WCS) Grid
- Catalog Service for Web (CSW) Catalog

Open Web services

- Open Web Service (WFS) graphic with diagram of Capabilities -> Query

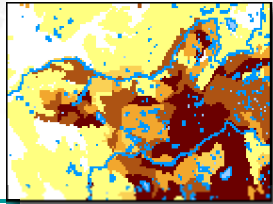


On-line Mapping Applications and [Open Geospatial Web Services](#)

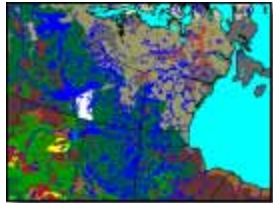
Interactive Applications

Web Browser Requirements for Interactive Maps:

Soil Landscapes of Canada



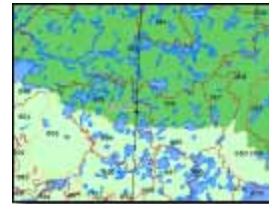
Version 3.0
[Interactive Map](#)



Version 2.2
[Interactive Map](#)

[Soil Landscapes of Canada](#) (SLCs) describe the major characteristics of soil and land for the whole country. SLCs were compiled at a scale of 1:1 million, and information is organized according to a uniform national set of soil and landscape criteria based on permanent natural attributes. [More Info](#)

Ecosystem Framework



[Interactive Map](#)

Open Web Services:
[WMS GetCapabilities](#)
[WFS GetCapabilities](#)
[Ecozones Context Document](#)

The [National Ecological Framework](#) provides a consistent, national spatial context within which ecosystems at various levels of generalization can be described, monitored, and reported on. The use of such a framework of standard ecological units provides for common communication and reporting between different jurisdictions and disciplines, and provides a common ground to report on the state of the environment and the sustainability of ecos

http://sis.agr.gc.ca/cansis/systems/online_maps.html



Map Web Service Authoring Tools

- MapServer
- simpleWMS
- GeoServer
- Featureserver

- Autodesk MapGuide & MapGuide Enterprise

- ArcGIS Server (*ArcIMS, ArcObjects*)

Web Service Clients

- Web clients (Site, application, mashup)
 - E.g. Targeted ads, Coastal Circle Tour, weather)
 - Microsoft Virtual Earth = fuzzy line ...
- Thin clients (software-lite, service-heavy)
 - E.g. 2D: QGIS, gvSIG, UDig, Gaia
 - E.g. 3D: Worldwind, Google Earth, ArcGIS Explorer
- Thick clients (often traditional software)
 - E.g. ArcGIS, AutoDesk Map, Intergraph

Explore Our Planet

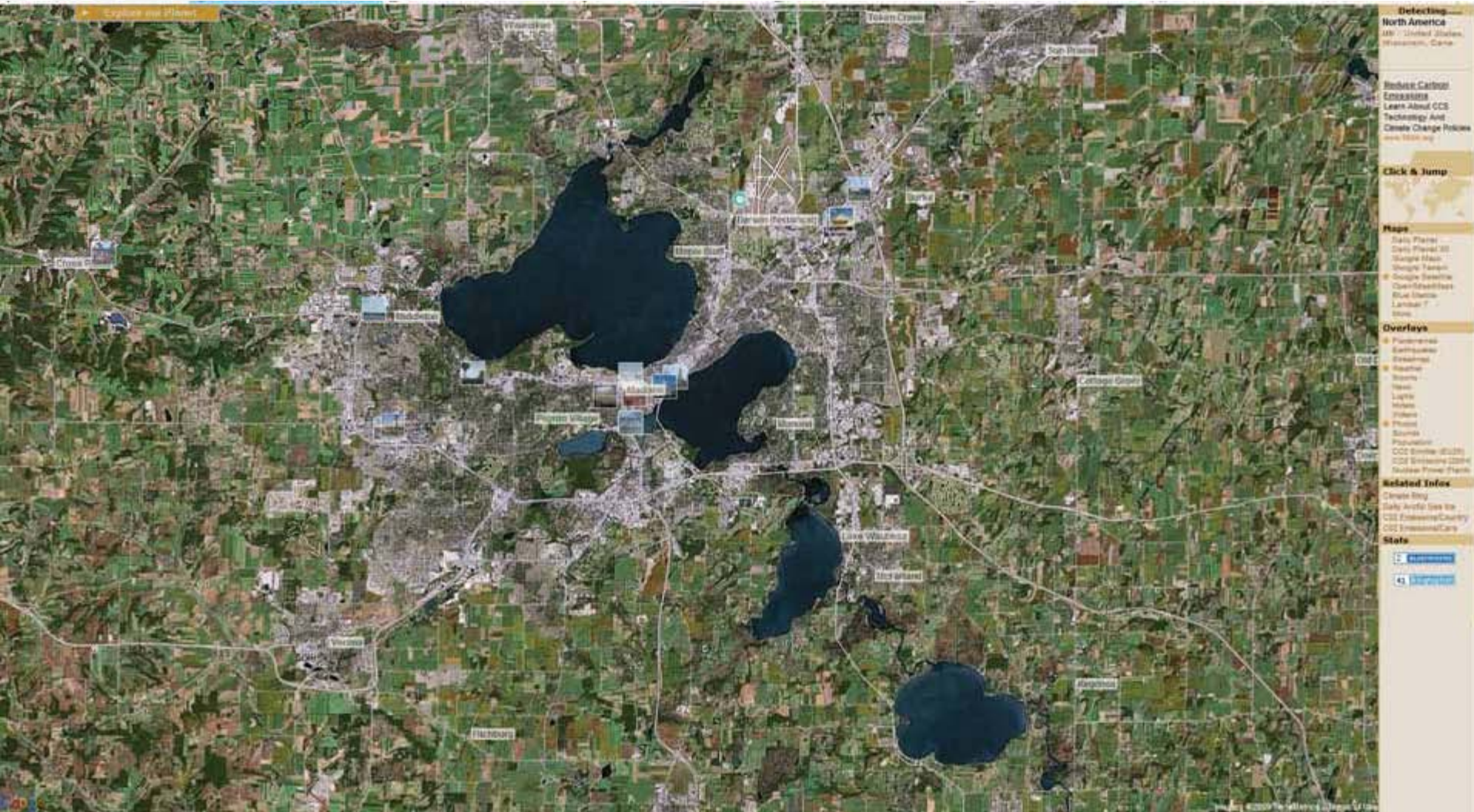
ExploreOurPla.net has a OGC WMS database with +200 [public servers](#) and more than [30,000 layers](#). Most of them are viewable as base map and overlay with Google Maps as framework. You may combine them with transparency to visualize more information.

An OGC Web Map Service (WMS) produces maps of spatially referenced data dynamically from geographic information. Combining different layers and extensions gives you a unique control and you will reach faster what you want to achieve.

In any case you can generate a handy geoLink or copy the URL as [permalink](#) to come back later or use the information about latitude, longitude, maps, overlays, etc in mails.



The picture above is only a preview of common used layers:





Exchange

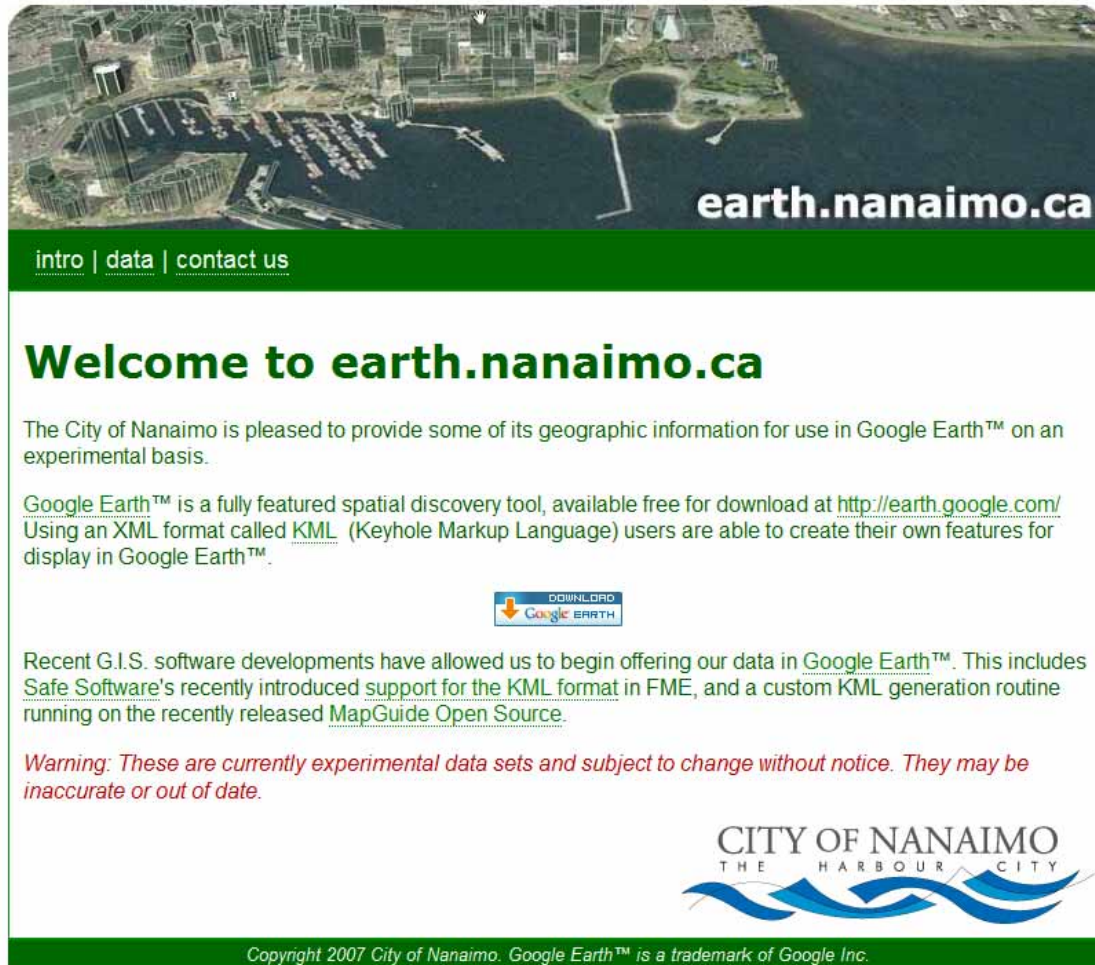
- First there was XML ...
- Then there was GML ...
- Now there is KML ...



KML Tools

- MapExcel2KML
- KML2SHP, SHP2KML
- Gdal2tiles, GeoServer,
- ESRI-related:
 - Export to KML 2.4.4
<http://arcscripts.esri.com/details.asp?dbid=14273>
 - Arc2Earth
- KML Clients (Google Earth, ArcGIS Explorer, NASA Worldwind)

“How Google Earth Ate Our Town” - Nanaimo, BC <http://earth.nanaimo.ca/>



earth.nanaimo.ca

intro | data | contact us

Welcome to earth.nanaimo.ca

The City of Nanaimo is pleased to provide some of its geographic information for use in Google Earth™ on an experimental basis.

Google Earth™ is a fully featured spatial discovery tool, available free for download at <http://earth.google.com/>. Using an XML format called [KML](#) (Keyhole Markup Language) users are able to create their own features for display in Google Earth™.

[DOWNLOAD](#)
GOOGLE EARTH

Recent G.I.S. software developments have allowed us to begin offering our data in Google Earth™. This includes [Safe Software's](#) recently introduced [support for the KML format in FME](#), and a custom KML generation routine running on the recently released [MapGuide Open Source](#).

Warning: These are currently experimental data sets and subject to change without notice. They may be inaccurate or out of date.

CITY OF NANAIMO
THE HARBOUR CITY

Copyright 2007 City of Nanaimo. Google Earth™ is a trademark of Google Inc.

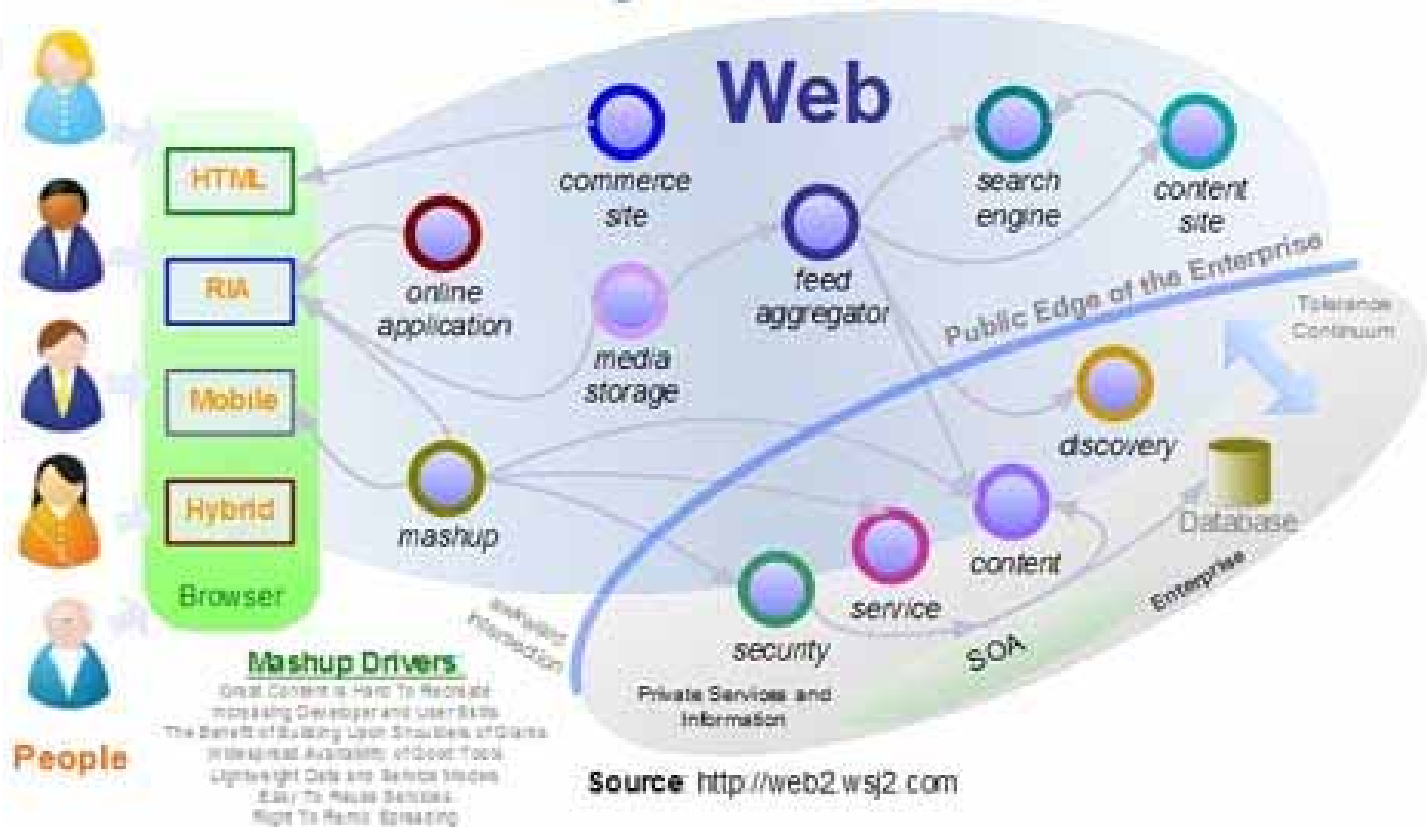
Mashup Concepts

- Mashups – The merging of services and content from multiple web sites in an integrated, coherent way is called a *mashup*.
- Most mashups do more than simply integrate services and content. Sites that do mashups typically add value. They benefit users in a way that's different and better than the individual services they leverage.

Source:

http://java.sun.com/developer/technicalArticles/J2EE/mashup_1/

The Mashup Ecosystem: Flourishing In An Increasingly Nurturing Environment



(Location) Map Mashups

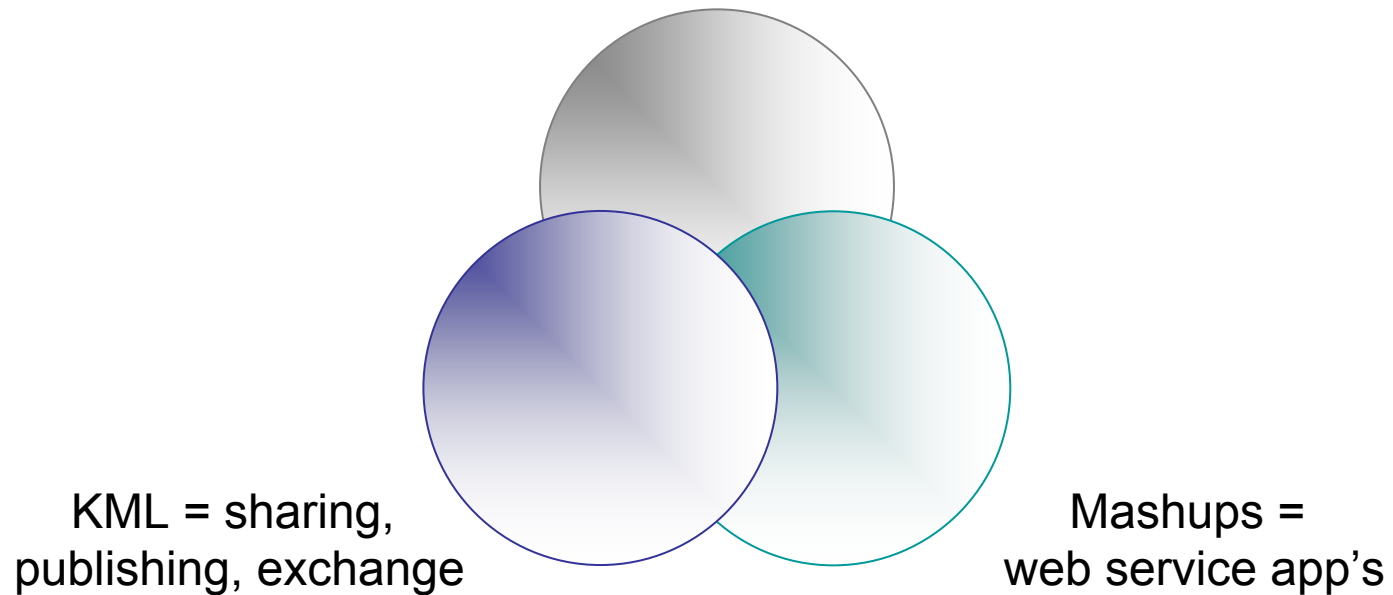
Mashups are appearing on the web at an extremely fast rate. Three new mashups typically appear on the web each day. You can see some of the newest ones on the [ProgrammableWeb](#) site. The bulk of the mashups on the web involve the use of maps. Many of these sites use mapping services such as those provided by [Yahoo Maps](#) and [Google Maps](#).

Source:

http://java.sun.com/developer/technicalArticles/J2EE/mashup_1/

GeoWeb Relationships

(Geo)Web services = content/process





open your api channel today

mashery on-demand api platform



- Home
- News
- Mashups
- APIs
- Verticals
- How-To
- Contests
- Members

- Blog Home
- Recent Popular
- All Time Popular
- Featured Articles
- Best Mashups

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Subscribe

View News by Category

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- AOL (10)
- APIs (175)
- BestMashups (107)
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- CaseStudies (5)
- Code (3)
- Contests (44)
- ebay (5)
- Enterprise (36)
- Events (48)
- Examples (151)

March 27th, 2007

400 Web APIs

The rate of new web APIs continues apace with [our API directory](#) now hitting an even 400 entries. If you [View by Category](#) you can see there are just over 50 categories of APIs now listed. Top 3 categories? [Mapping](#), [Reference](#) and [Internet](#).



The 400th entry is the [Multimap API](#). The latest version of this JavaScript API for European and global mapping [was just announced](#) and includes new features like a geocoding API, search by radius, routing with 'travelling salesman' optimization and route animation, and local points of interest, POI, like schools, transportation, restaurants and bars, ATMs, and car parks.

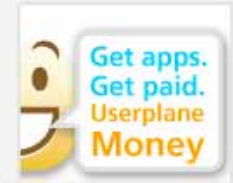
[Share This](#)

Posted by John Musser as [APIs](#), [Site News](#) at 12:51 AM | [2 Comments](#) »

February 18th, 2007

Thanks to Our Sponsors

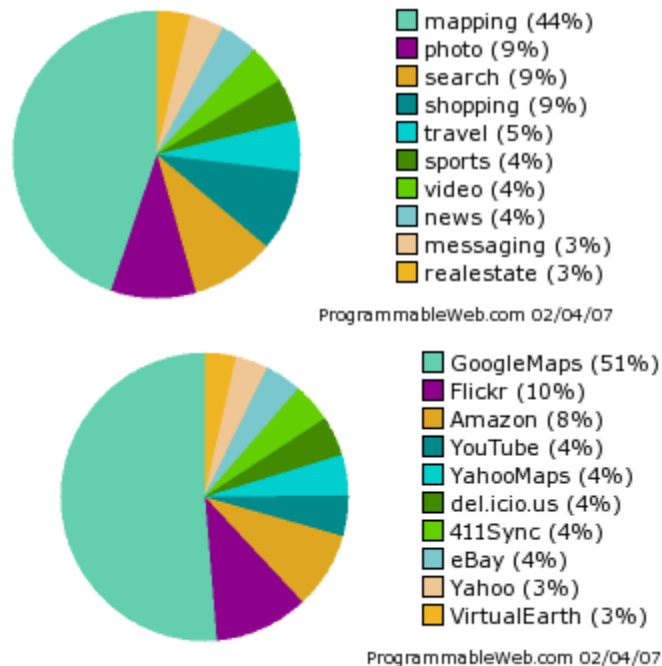
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February 5th, 2007

1,500 Mashups

Last week the ProgrammableWeb database of mashups crossed the 1,500 mashups threshold. That's an average of just over 100 a month with a fairly steady climb (and as always, this is a sample of all the thousands of mashups out there). Beyond the base numbers it's generally more interesting to look at any trends or differences over time. If you compare the distribution by tag to back at the 1001 mashup level you can see that, with one exception, not a lot has changed. Mapping then was at 46% versus now at 44%, essentially the same. As are most of the other common mashup subjects: photo 9%, search 9%, and shopping 9%.



Probably the biggest change of note is that you can see video is now in the top 10, with 90 video mashups listed.

On the API side there are now 374 APIs listed. 11 more added in the past 7 days. Google Maps is still king here, with Flickr, Amazon and YouTube next. Again, due to the rise of video mashups, YouTube's gained a bigger slice of the mashup pie.

Subscribe
 All New Mashups

Mashup Directory
 Total Mashups Listed: **3725**

Past 7 Days: 17
 Past 30 Days: 54
 Mashups/Day

3.0

7 Days Avg.: 2.4
 30 Days Avg.: 1.9

Mashup Dashboard
 Thousands of web mashups with new updates daily.

Mashup of

★★★★★

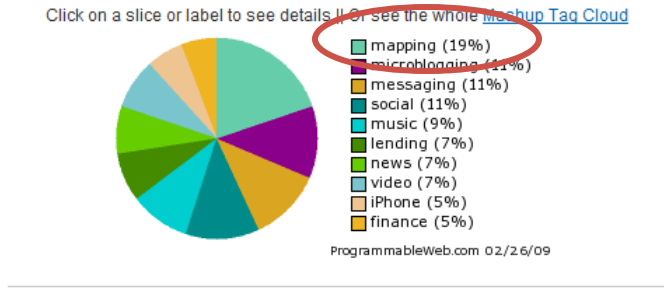
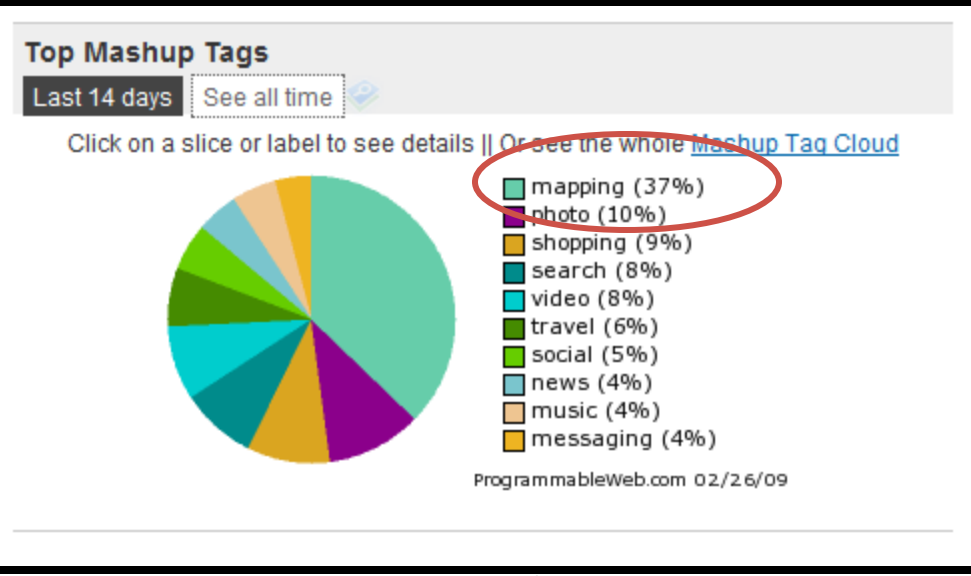
- Browse our**
- All Mashups
 - Popular Mashups
 - By the Matrix

Random Mashups
 94 mashups are

Top Mashups
 Last 14 days

- Newest Mashups** [more >](#)
- Favtape
 - Flickr Map
 - Tubegotchi Movies
 - Singapore Shopping Tour
 - BanzaApp
 - Headup
 - More new mashups >>

- Popular New Mashups** [more >](#)
- CoolFlick
 - TrackThis
 - OMOM - Online Members On Map
 - Flickr Flip Book
 - idiomag
 - ConnectorLocal



IBM Mashup Center
 Unlock. Remix. Unleash.

Learn more.

PW Sponsor

- Popular Directory Searches**
- Celebrity Mashups
 - Video Mashups
 - Popular New Mashups
 - All Popular Mashups
 - Maps Mashups
 - Photo Mashups
 - Shopping Mashups
 - Sports Mashups
 - Government Mashups
 - Dating Mashups
 - Games Mashups
 - Crime Mashups
 - Animals Mashups
 - News Mashups
 - Enterprise Mashups
 - APIs by Date
 - APIs by Mashups
 - APIs by Category



Map-based Web Services

- Map image
- 3D image, photo image
- Geocoding, reverse geo-coding
- Gazetteer, place name search
- Analytical processing services
- Geo-tagged content services
- Geosocial networks

API Directory

Total APIs

1163

Past 7 Days: 12

Past 30 Days: 42

IBM Mashup Center

Unlock.
Remix.
Unleash.



Learn more.

PW Sponsor

What's your preferred mashup language?

- Flash
- Java
- .NET
- PHP
- Python
- Ruby

Vote

[View Results](#)

Popular Directory Searches

- [Celebrity Mashups](#)
- [Video Mashups](#)
- [Popular New Mashups](#)
- [All Popular Mashups](#)
- [Maps Mashups](#)
- [Photo Mashups](#)
- [Shopping Mashups](#)
- [Sports Mashups](#)
- [Government Mashups](#)
- [Dating Mashups](#)
- [Games Mashups](#)
- [Crime Mashups](#)
- [Animals Mashups](#)
- [News Mashups](#)
- [Enterprise Mashups](#)
- [APIs by Date](#)

API Dashboard

APIs news, how-to, contests and comprehensive database of API resources

Featured API »

[Green Thing](#)

green thing

★★★★★

Newest APIs »

- ▶ [Green Thing](#)
- ▶ [Vindicia](#)
- ▶ [Jigsaw](#)
- ▶ [Zuora](#)
- ▶ [Billboard](#)
- ▶ [More new APIs »»](#)

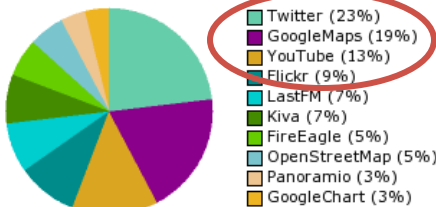
Browse our API DB

- ▶ [View all APIs](#)
- ▶ [By Category](#)
- ▶ [By Mashups](#)
- ▶ [Add an API](#)
- ▶ [How-To Guide](#)

Top APIs for Mashups

Last 14 days **See all time**

Click on a slice or label to see details



ProgrammableWeb.com 02/26/09

New: Advanced API Search

You can now search by protocol, category, tags and more. [Try it now »](#)

Want ideas? See [all REST APIs](#), or [all SOAP APIs](#), or [APIs tagged "mapping"](#), or [Google JavaScript APIs](#), or [APIs in category Enterprise](#).

API Contests »

Want to win money and prizes for coding? There have been over 40 mashup contests. See the ongoing competitions on our [contests](#) page.

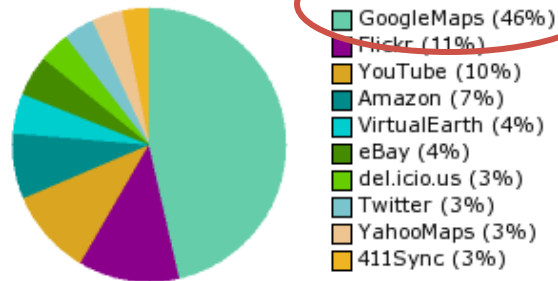
Browse APIs by Category

Advertising (14)	Government (26)	Reference (59)
Answers (5)	Internet (69)	Search (36)
Blog Search (7)	Job Search (8)	Security (22)
Blogging (18)	Mapping (77)	Shipping (8)
Bookmarks (15)	Media Management (7)	Shopping (46)
Calendar (4)	Medical (13)	Social (61)
Chat (12)	Messaging (42)	Sports (9)
Database (9)	Music (41)	Storage (15)
Email (29)	News (17)	Tagging (8)

Top APIs for Mashups

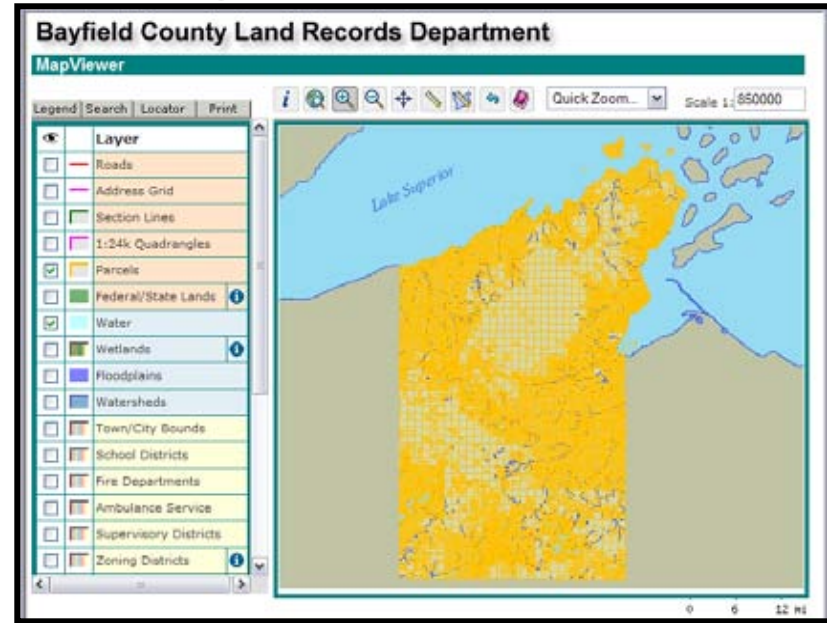
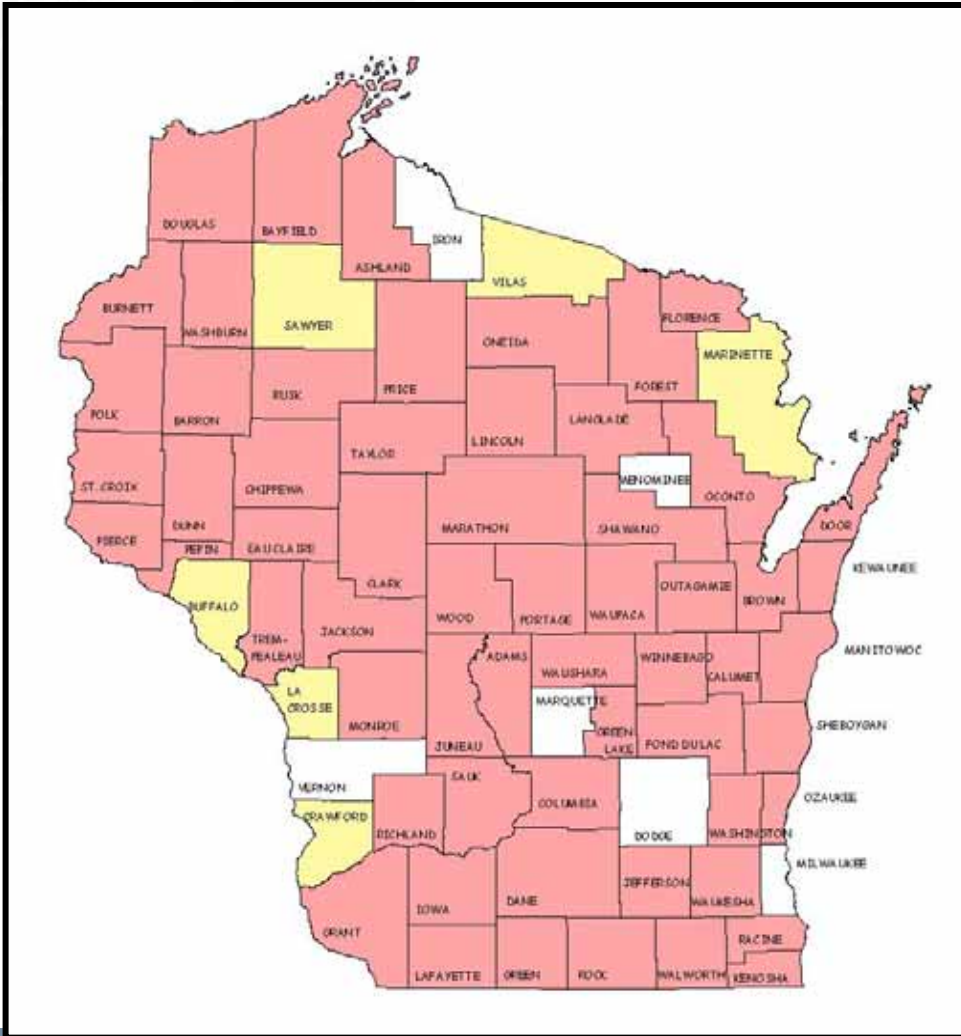
Last 14 days **See all time**

Click on a slice or label to see details



ProgrammableWeb.com 02/26/09

Wisconsin County Web Mapping Sites



<http://coastal.lic.wisc.edu/>

Putting it all together- Case Study

- GIS Cert. Student Project – S. Johnson
- WI Land Economic Inventory Maps
~ *Bordner Survey*
 - Scan historical raster maps & process
 - Gdal2tiles – w/ mashup and/or kml output
 - Develop associated metadata (and in this case web presence.)
 - http://sco.wisc.edu/maps/bordner_main.php

You Are Here: Home > Maps

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Wisconsin Land Economic Inventory / Bordner Survey

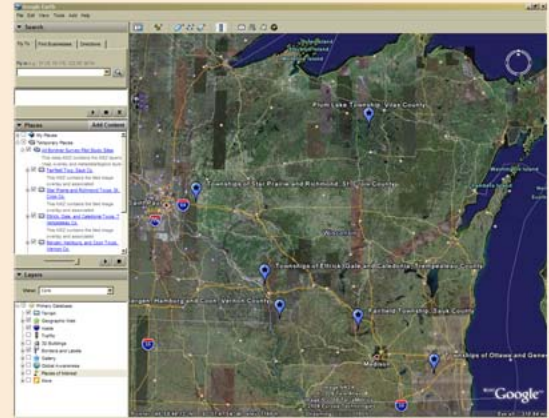
A Pilot Study by Samuel F.B. Johnson (SCO Intern, UW GIS Certificate Program)



John Bordner in hayfield, Rusk County, 1927

The Wisconsin Land Economic Inventory, commonly named the Bordner Survey, was a major effort carried out statewide under the aegis of the Department of Conservation (then the State Planning Board) between 1937 to 1941. Its mission was to assess the state's land resources in all parts of the state so that exhausted lands could be restored to productive use.

Small areas of the Inventory data have been vectorized and automated for use in specific GIS project analyses. However, the Bordner Survey maps have only been available in static form and only at the above-named centralized repositories until their relatively recent addition to the UW Digital Collections. They nonetheless remain flat files in archived analog or digital form, having never been georeferenced and systematically manipulated and made available and distributable via a modern web interface.



With the advent of popular, free Web 2.0 web mapping and visualization offerings like Google Earth, NASA World Wind, and ESRI's ArcExplorer, and the example of renowned map collectors such as David Rumsey, the Bordner Survey maps the potential for giving them a new life. This effort, through the State Cartographer's Office, in the State Cartography Center and with the cooperation of the Wisconsin Historical Society, provides a georeferenced, seamless display of these historical maps in Google Earth.



Downloads

With Google Earth (any version) installed on your computer, click the links to download and view KML layers for the sites in the following counties:

- | | |
|-----------------------------|---------------------------|
| Sauk | St. Croix |
| Trempealeau | Vernon |
| Vilas | Waukesha |

Great Lakes Circle Tour

Tourism: The Great Lakes Circle Tour on GLIN! - Microsoft Internet Explorer provided by A...

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://www.glc.org/tourism/index.html

HOME ABOUT US ANNOUNCEMENTS CALENDAR PROGRAMS PUBLICATIONS

Great Lakes Commission des Grands Lacs

Featured Issues Policy and Advocacy Communications and Education Air / Water Quality Water Use Economy and Transportation Land and Soil Management Data and Monitoring

Home | Economy and Transportation | Great Lakes Circle Tour

Search: Go

Great Lakes Circle Tour

Overview
Circle Tour Background

Publications

More "Tourism and Recreation" publications...

Great Lakes Information Network

Great Lakes Circle Tour

Transportation
Tourism
Lighthouses
Museums
Historic Sites

Great Lakes Circle Tour




@ www.great-lakes.net/tourism/circletour/



The 6,500-mile [Great Lakes Circle Tour](http://www.great-lakes.net/tourism/circletour/) -- a scenic, international road system connecting the five Great Lakes and the St. Lawrence River -- now has its own section on the Great Lakes Information Network.

The Circle Tour signage system was established in the late 1980s as a cooperative, regional effort between the Great Lakes Commission and the eight U.S. states and two Canadian provinces that comprise the Great Lakes-St. Lawrence system.

Image Window - Microsoft Internet Explorer...





Circle Tour Road Route

Chicago, Ill. to New Buffalo, Mich.:
ROUTE: Follow I-94E; in Gary, Ind., follow US-12 to I-94E
MILEAGE: Approximately 80 mi/120 km

New Buffalo, Mich. to Mackinaw City, Mich.
ROUTE: Follow I-96E to Holland; US-31N to Manistee; MI-22 to Traverse City; US-31 to Petoskey; MI-119 to the town of Cross Bridge; C66 to US-31; cross the Mackinaw Bridge (toll) into the Upper Peninsula
MILEAGE: Approximately 450 mi/730 km

Mackinaw City, Mich. to Menominee, Mich./Marinette, Wis.:
ROUTE: Follow US-2 W to Escanaba; MI-35 to Menominee/Marinette
MILEAGE: Approximately 205 mi/325 km
SPUR ROUTE: At Garden Corners, take MI-103 to Fairport (PL Detour)



Follow the Circle Tour signs!

28 (Door
Ludington, Mich.

The Circle Tour site on GLIN has lots of info, but only schematic maps.

Wisconsin Coastal Guide – Map Features

- Land
 - Circle Tour route
 - Parks
- Shore
 - Beaches
 - Lighthouses
- Water
 - Shipwrecks
- Viewing
 - Panorama photos
 - Webcams



Use the map as a means to link to existing web content

Wisconsin's Maritime Trails

Welcome to Wisconsin's Maritime Trails

Taking you back to the days when schooners and steamers sailed the Great Lakes.

Centuries of exploration, travel, commerce, and recreation on the Great Lakes have left an impressive trail of maritime cultural resources along Wisconsin's Great Lakes shorelines and bottomlands.

To foster wider public appreciation of the state's rich maritime past and encourage preservation of unique historic sites such as shipwrecks, lighthouses and historic waterfronts, the Wisconsin Historical Society established the Maritime Trails program.

[Learn More »](#)

Visit
Research
Participate
Discover

Explore Wisconsin's rich marine history, spectacular shipwrecks and hundreds of fascinating maritime venues.

Shipwrecks on Video

Explore Wisconsin's historic shipwrecks without getting wet!

Kids and Teachers!

Read a chapter from the new WHS publication "Working with Water"

Wisconsin's Great Lakes Shipwrecks

Explore some of Wisconsin's most fascinating shipwrecks!




A Partnership of the Wisconsin Historical Society

Wisconsin Coastal Guide

university of wisconsin sea grant

GREAT LAKES CIRCLE TOUR



Wisconsin coastal guide


[Home](#) [Maps](#) [Links](#) [About](#) [Contact Us](#)

Maps **Get Down to the Water!**

[360° Panoramas](#) The Great Lakes Circle Tour leads you around the largest freshwater system on the planet – but the main route often takes you far from the water's edge. This site shows you where to pull off the highway for a quiet [beach](#), a hidden [lighthouse](#), or a secluded [park](#).

[Beaches](#)

[Lighthouses](#)


[Parks](#)  360° Panoramas

Have a look around. More than two hundred 360° photo panoramas show you what things look like at many public places where you can drive or walk down to the water. The links below share the views from beaches, parks, and boat ramps – even lonely fire lanes where there's nothing to do but admire the view. Accompanying maps show what direction you are looking as you "turn around."

[Shipwrecks](#)

[Webcams](#)

[Boat Ramps](#)



Wisconsin Coastal Guide



Other Map Tools

Google Earth

Google Earth is a free program from Google that puts a planet's worth of imagery and other geographic information right on your desktop. View exotic locales as well as points of interest such as local restaurants, hospitals, schools, and more.

[Download Google Earth \(for both Mac and PC\)](#)

Download the Google Earth Version of the Maps on this Website

After you've downloaded and installed Google Earth, you can take advantage of some of its advanced features to view the maps on this site.

[360° Panoramas](#)

[Beaches](#)

[Lighthouses](#)

[Parks \(State\)](#)

[Parks \(County\)](#)

[Parks \(Local\)](#)

[Shipwrecks](#)

[Webcams](#)

[Circle Tour Route](#)

[Oblique Photos](#)

[All maps in one file](#)

(These links will launch Google Earth. If Google Earth does not launch automatically, try downloading the file to your computer then double-click on it to launch Google Earth. The files contain the links and information for the 360° panoramas, beaches, lighthouses, shipwrecks and parks displayed on this site.)

OpenLayers

[OpenLayers](#) is an open-source web mapping software. It is a project that includes the participation of software developers from around the world.

OpenLayers [web mapping application](#) including panoramas, parks, lighthouses, shipwrecks, beaches, parks, webcams, and NEXRAD radar (works in Mozilla Firefox).

ERSC MODIS Imageserver v. 1.0

[Home](#)

[This Month](#)

[Gallery](#)

[LakeSat](#)

[SLOI](#)

[About](#)

Wisconsin Aqua scene: October 09, 2005 at 2:05 pm CDT

Click on a point in the image to: zoom in zoom out center



<http://www.ersc.wisc.edu/modis/>

Home > Community Maps > Crash > Search

[Login](#) | [Contact](#) | [Help](#)

Folder: **Community Maps Test Site**

Legend: ● Fatality ● Injury ● Property Damage

685 Records(s) Found

[Select All](#) | [Clear All](#) | [Pan To Selected](#)

Sort By: | Display Type:

- 35** AT Budworth School Rd
 BEETOWN (T), GRANT COUNTY
 11/04/07
 INJURY 1

- 35** AT Five Points Rd
 BEETOWN (T), GRANT COUNTY
 02/27/97
 FATALITY 2

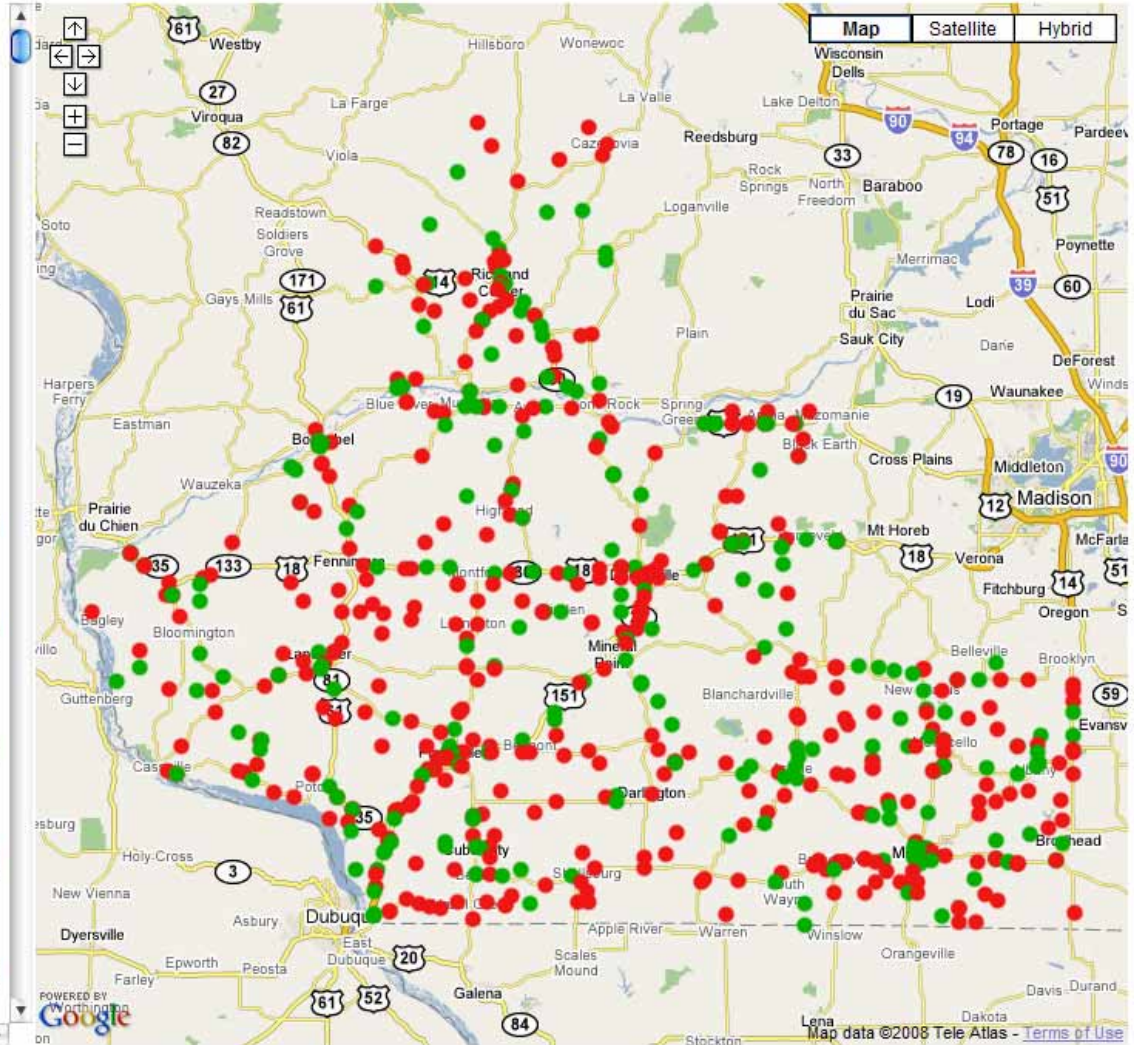
- 81** AT Tin Can Ln
 BEETOWN (T), GRANT COUNTY
 11/15/97
 FATALITY 3

- U** AT Short Cut Rd
 BEETOWN (T), GRANT COUNTY
 08/04/01
 FATALITY 4

- V** AT Diamond Grove Rd
 BEETOWN (T), GRANT COUNTY
 04/17/06
 INJURY 5

- 35** AT Cemetery Rd
 BLOOMINGTON (T), GRANT COUNTY
 08/05/06
 INJURY 6

- A** AT VV



Mashups in Planning

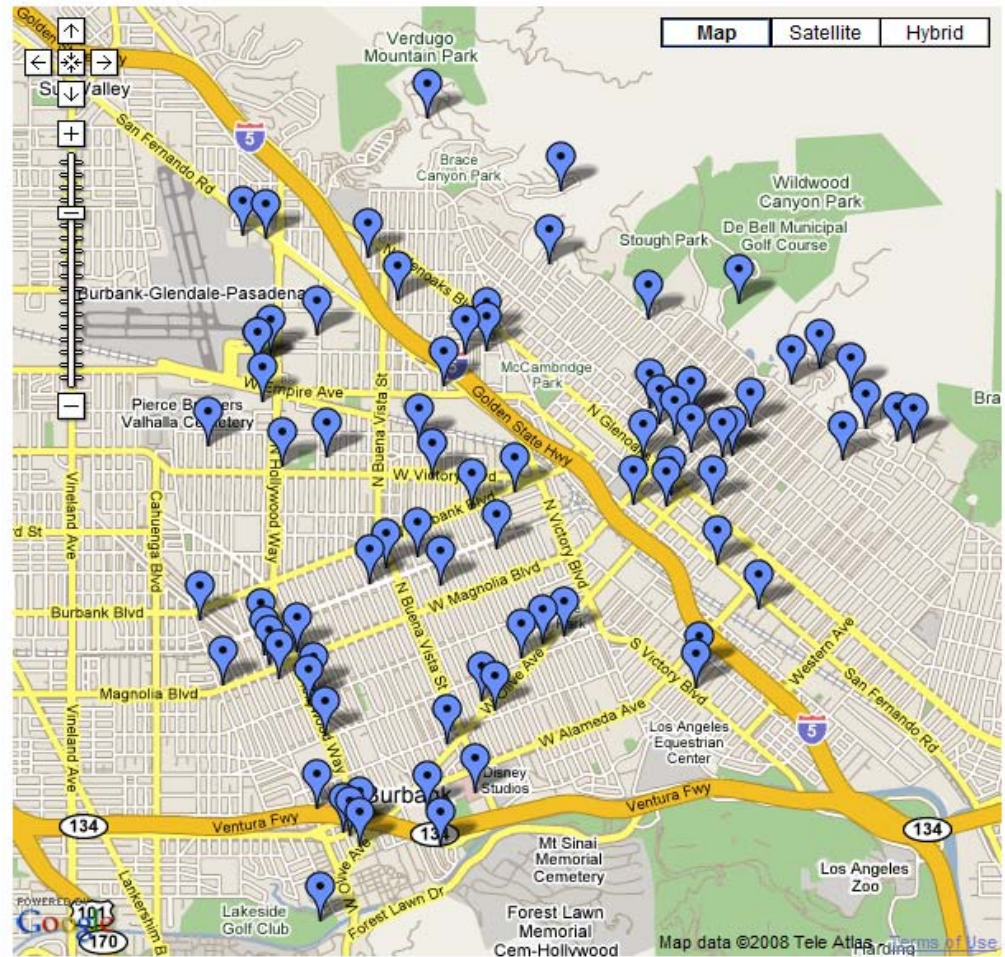
- Project communication
- Relevant regulations
- Participatory mapping
- Combining multiple map services for visual interpretation

City of Burbank Planning Projects Map

Click on a project icon to display information about the project and link to its current status.
All project locations are approximate.

» [Disclaimer and Terms of Use](#)

» [Return to Planning Home](#)



<http://www.burbankca.org/planning/projectsmap.html>

Please type an address
Address: **United States**

Walk Score: 86 out of 100 Worst  Best [What it means](#)

- [Expand all](#)
- Grocery Stores**
Williamson Street G 0.19 Mi
 - Restaurants**
Weary Traveler Inc 0.19 Mi
 - Coffee Shops**
Mother Fool's Coffe 0.23 Mi
 - Bars**
Crystal Corner Bar 0.23 Mi
 - Movie Theaters**
Broom Street Theate 0.21 Mi
 - Schools**
University of Wisco 0.3 Mi
 - Parks**
Orton Park 0.14 Mi
 - Libraries**
Trinity Lutheran Ch 0.7 Mi
 - Bookstores**
Apostle Andrew Book 0.28 Mi
 - Fitness**
Perfect Knot Yoga C 0.18 Mi
 - Drug Stores**
Shafer Pharmacy Inc 0.2 Mi
 - Hardware Stores**
Ace Hardware Center 0.31 Mi
 - Clothing & Music**
The Glitter Worksho 0.74 Mi

What's My House Worth?
 HouseValues' free service helps you determine the value of your home.

Short Sale Secrets
 Step-by-Step Guide To Getting Banks To Discount Properties by 40%!



What is Walk Score? We help homebuyers, renters, and real estate agents find houses and apartments in great neighborhoods. Walk Score shows you a map of what's nearby and calculates a Walk Score for any property. Buying a house in a walkable neighborhood is good for your health and good for the environment.

Celebrity Locations
 Check the walkability of these famous locations:

Apartments Walk
 Contact Us Today! Ask About Our 60+ Program for Seniors.
www.AvalonWalk.com/HamdenCT

Prepare to be Shocked
 Millions have already taken this amazing test. What's your RealAge?
RealAge.com

Get the Walk Score Tile



Closest Businesses: [View full map](#)

- Grocery: Durn Good Groc... - 0.28 Mi
- Restaurant: Rocking Wok ... - 0.23 Mi
- Coffee: Espresso Splendid... - 0.07 Mi
- Bar: Buckaroo Tavern - 0.38 Mi**
- Other: Guild 45th Theatre - 0.55 Mi

Delight your visitors by [adding](#) the Walk Score tile to your site.



Competitive Edge Explorer: Boston



Use the controls below to identify areas of high and low values. Turn several on to compare. Learn more by typing a town name or zip code in the Zip/Town Search.

select preset ...

Innovation

lower higher

Education Level

lower higher

Income

lower higher

Housing Cost

lower higher

Population Density

lower higher

Culture

lower higher

Accessibility

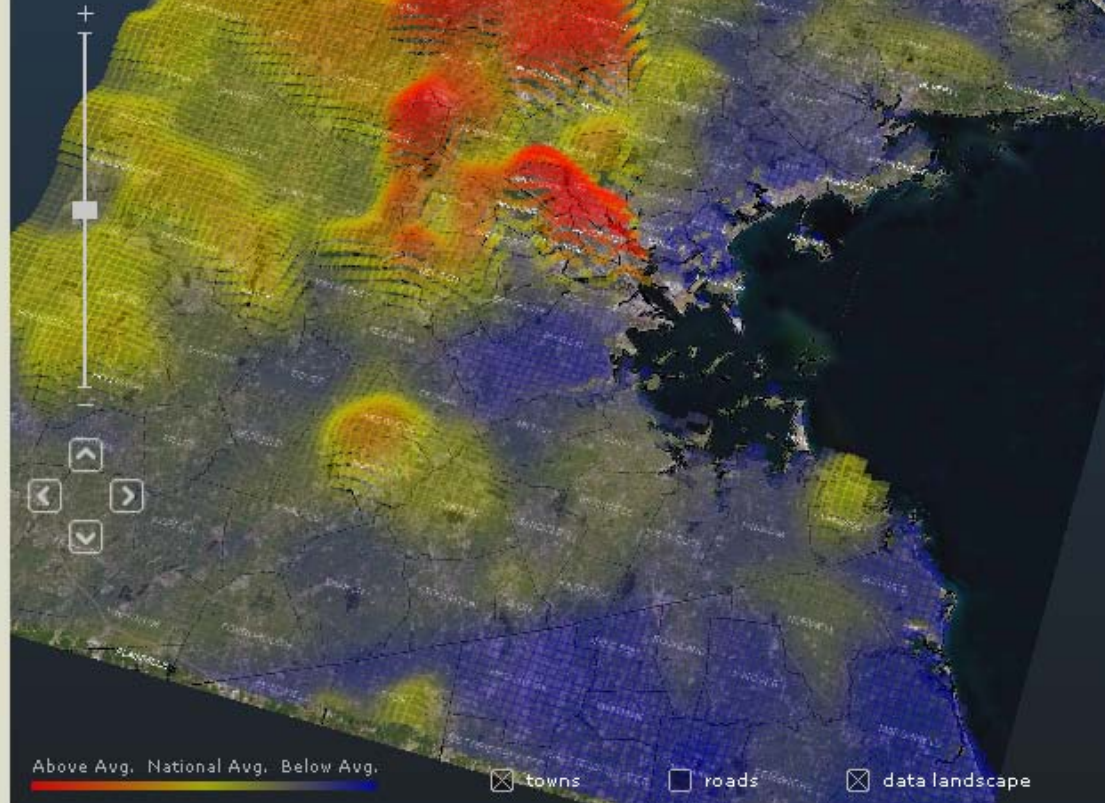
lower higher

Recent Job Growth

lower higher

ZIP/Town Search:

[About](#)




Data sources

Innovation: A composite score based on the amount of Federal R&D dollars and Small Business awards received during the years 2000 - 2006, the number of

Enterprise Support for Mashups

Virtual Earth for Public Sector




Send a message
Invite as friend

This "Virtual Earth for Public Sector" Space is set up by the Virtual Earth Public Sector team at Microsoft. It is a place to share information and ideas on the Virtual Earth platform as a tool that allows Governments to visualize their data within the context of location.

[View profile details](#)

Photos

Blog Images



Virtual Earth For Government

Search Discover Collaborate Visualize

Send a message Subscribe to RSS feed Tell a friend Add to My MSN
Add to Live.com Invite as friend Send to mobile Sign up for alerts

Blog

March 24


Flood Mapping Louisiana in Virtual Earth

Lafayette, Louisiana Consolidated Government, with a grant from Department of Homeland Security, and FEMA, has a public facing Louisiana Mapping Project web site showing citizens flood risk zones in particular regions.

Within only a couple of weeks, the initial phase of this public facing site has been upgraded to utilize Virtual Earth.

With this, they are seeing a considerable improvement in site performance.

Check it out for yourself. [Here is the site](#) not yet upgraded with Virtual Earth maps (have patience as the old maps load):



A smattering of Virtual Earth applications that are accessible to the general public.

[Experience Washington](#)
Official site of Washington State Tourism. Virtual Earth maps are provided for each of the topics (attractions, activities, etc.)

[US Air Force Advisor Locator](#)
Allows users to search for, locate and visualize nearest recruiting centers.

[NGA Earth](#)
Focused on the Hurricane Katrina disaster area, the NGA Earth viewer provides access to map information from Microsoft's Virtual Earth service combined with imagery from the NGA

Virtual Earth Link

Check out these links for more information on Virtual Earth

[Live Search Maps](#)
[Mapping 2006 with GPS Puck](#)
[Virtual Earth for Government Web Site](#)
[Virtual Earth Interactive SDK](#)


Archives

- March, 2008
- February, 2008
- January, 2008
- December, 2007
- November, 2007
- October, 2007
- September, 2007
- August, 2007
- July, 2007
- June, 2007
- May, 2007

Layers: Preliminary DFIRM Data Effective FIRM Data

Mouse Functions: Pan Add Place Marker Delete Place Marker

Find an address: (Street, City, State, zip code)



Legend

- Water Features
- ABFE Zone Boundary
- Base Flood Elevation
- Zone Break
- Floodway
- 1 Percent Annual Chance Flood Hazard
- 0.2 Percent Annual Chance Flood Hazard

Meetings

- Scoping Meeting: 7/14/2004
- Scoping Meeting Follow-Up: 8/27/2004
- Final Community Officials Meeting: 12/18/2007
- Flood Map Open House Meeting: 02/21/2008

Events and Documents

- Preliminary DFIRM and FIS delivery: 09/28/2007
- 90 Day Community Appeal Start Date: 02/07/2008
- 90 Day Community Appeal End Date: 05/06/2008
- Letter of Final Determination Date: To Be Determined
- Study Effective Date: To Be Determined



Property Search:

Enter an address

Welcome

Search Results

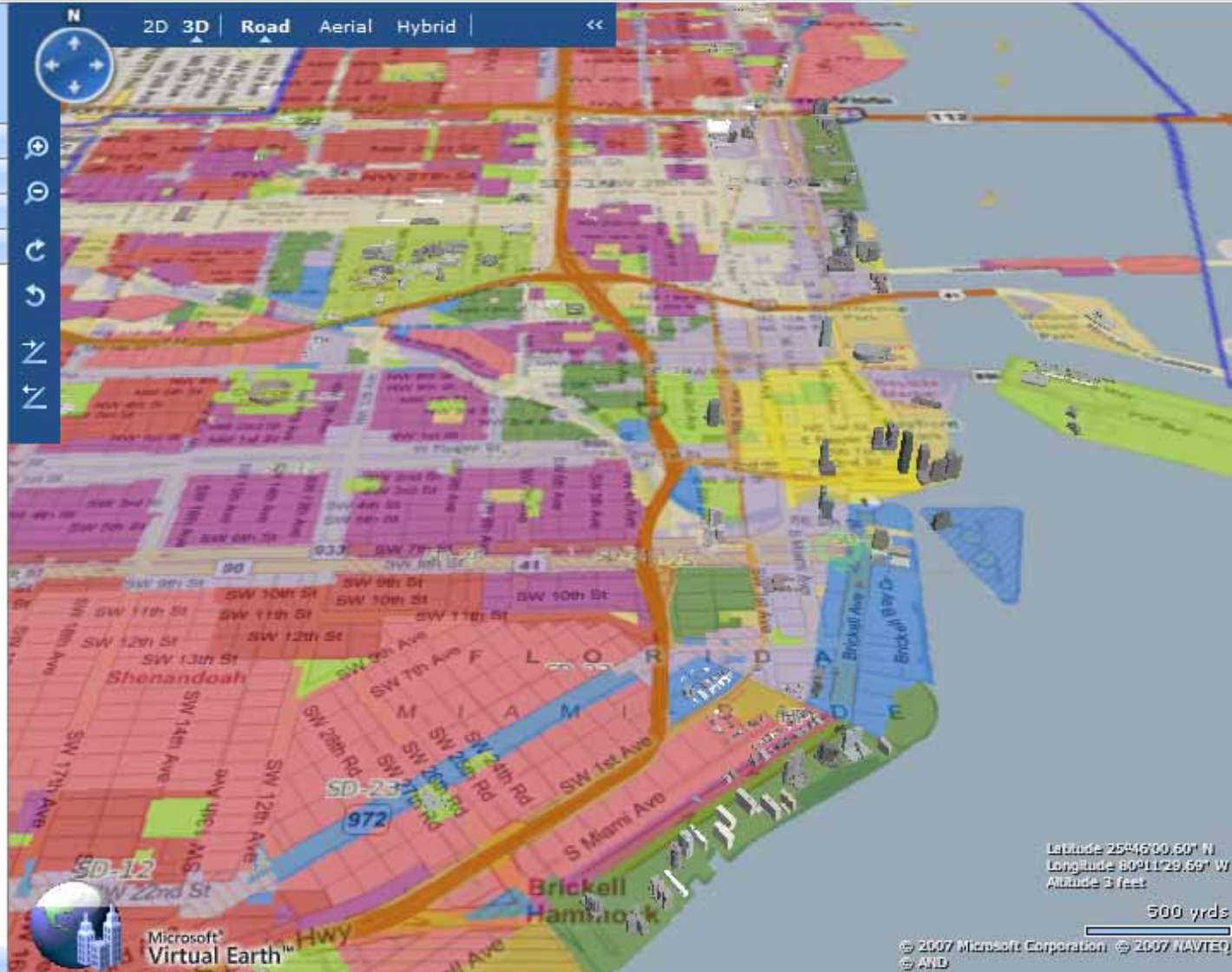
Property Details

Zones & Districts

Select from the following options to display additional map details.

- Special Overlay and Neighborhood Conservation Districts
- Commission Districts
- Future Land Use
- Existing Land Use
- Flood Zones
- Primary Zoning

[Clear Selection](#)



Latitude 25°45'00.60" N
Longitude 80°11'29.69" W
Altitude 3 feet

500 yds

© 2007 Microsoft Corporation © 2007 NAVTEQ
© AND

[Export Mailing List](#)

What it all means ...

- Lower skills threshold and lower cost of ownership
- Faster development and rollout often soliciting iterative feedback
- Useful mid-project as well as for communication of results
- Map mashups are a good entry point



Mashup Tools

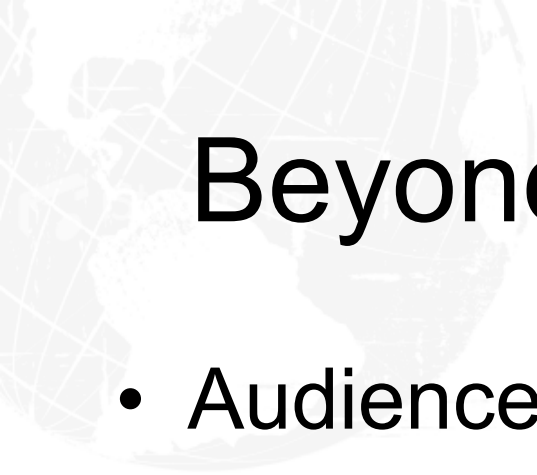
- Yahoo! *Pipes*, Yahoo! *GeoPlanet*
 - Google Maps, StreetView, GE APIs
 - Google & Yahoo! Geocoding services
 - .NET/Microsoft Virtual Earth
 - Custom coding
 - Mashup code “framework” (e.g. OpenLayers, MapFish)
 - Online mashup frameworks (ExploreOurPla.net, GeoCommons Maker/Finder)
- ... and the list is growing.

Mashup Frameworks

- OpenLayers/ MapFish (Javascript)
- Modest Maps (Flash)
- SpatialKey (Flex)
- SpatialWiki (.NET/Virtual Earth)
- GeoCommons – Finder! & Maker! (Online)
- MapChannels website (API Comparison)
<http://www.mapchannels.com/DualMaps.aspx>

... and the list is growing.

Virtual globe and open source GIS clients are a good staging/prototype environment for mashup development.



Beyond tools - considerations

- Audience/ Use Case Scenario
- Data access
- Resources and skills to get it done.

Who's Your Audience ?





Data Access

- Geospatial One Stop www.geodata.gov
- Regional and Local Clearinghouses
- Agency-specific Outlets
- Ad-hoc collections

Sources of Google Earth Files

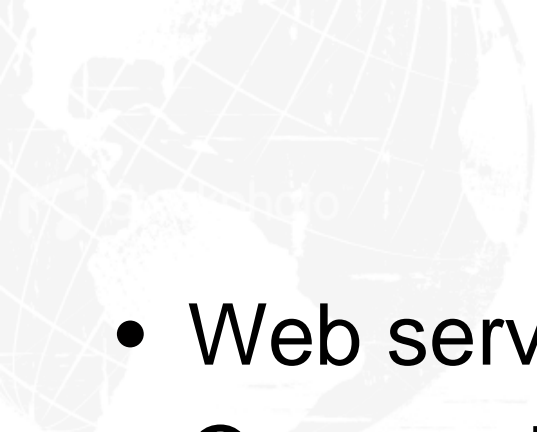
- “How Google Earth Ate Our Town” - Nanaimo, BC
 - <http://earth.nanaimo.ca/>
- Space Science and Engineering, UW-Madison
- Wisconsin Coastal Guide
- Great Lakes Environmental Research Lab
- Great Lakes GIS
- NOAA (NWS, NOHRSC), NASA, USGS
- Google gallery, ad-hoc compilations



Learning more:

- Blogs
- Books
- On-line Training
- Trial and error
- The Planning Report: **'Mash-Ups' Will Revolutionize How Planners and Citizens View City Planning**

http://www.planningreport.com/tpr/?module=displaystory&story_id=1190&format=html



Re-cap

- Web services as pipe feeds ...
- Open web services and web service standards
- Plethora of web service clients
- KML as exchange and web service output
- Mashup concepts & examples
- Message/Audience, Data access & resources

What it all means ...

- Lower skills threshold and lower cost of ownership
- Faster development and rollout often soliciting iterative feedback
- Useful mid-project as well as for communication of results
- Focus on user and value-added content
- Networked for connectivity to other tools

Case Study example

The screenshot shows the homepage of the Wisconsin State Cartographer's Office. The header includes the title "STATE CARTOGRAPHER'S OFFICE" and the tagline "Your online resource for mapping information and spatial data in the State of Wisconsin". Navigation links for "About SCO", "Contact", and "References" are present. The main content area is divided into several sections: "Features" with links for News, Calendar, Jobs, Publications, and Get Maps; "Recent Additions" listing various mapping tools and data sources; and "Related Links" with icons for SIAC, Wisconsin State Library, and Wisconsin.gov. A search bar is located in the top right corner.

The screenshot displays the "ControlFinder" web application. The title "ControlFinder" is prominently displayed at the top. Below the title, the "Wisconsin State Cartographer's Office" logo is visible. The main interface features a map of Wisconsin with county boundaries and names. A legend on the left side identifies symbols for County, NGS, WAMP, and USGS. Below the legend, there are "Tools" including "Zoom Box" and "Identify Box", with a "Zoom to County" dropdown menu. On the right side, there is a section titled "ControlFinder is designed as a central point of access for locating Wisconsin control data." Below this, a section titled "County Sites With Online Access:" lists counties that provide access to their Control data, with "Bayfield County" selected in a dropdown menu and a "Go!" button. At the bottom right, there are "Helpful Links" including "WI History Modernization Project", "WI CORS Networks", "WI County Surveys Directory", "Survey Station Condition Report Form", and "Help Page Data Dictionary".

– ControlFinder Overview –

- Audience – Wisconsin+ surveying community
- Data access – NGS, SCO/USGS, Counties
- Tools – Mapserver, PostGIS, PHP, Javascript
- Resources – Grants + office/student talent
- Mashup potential – Favorable
- Potential benefits – Reduced maintenance, focus on content, future enhancements
- Next step – Functional application analysis

What is Web 2.0



Author: Luca Cremonini Source: <http://www.railsonwave.it/railsonwave/2007/1/2/web-2-0-map>

URL: http://www.railsonwave.com/assets/2006/12/25/Web_2.0_Map.svg

Goals of ControlFinder Mashup

- Usability
- Remixability
- Standardization
- Convergence
- Flexible output
- Participation/
feedback from users



Use Case Scenario



Wisconsin State Cartographer's Office Small Medium Large

Legend:
 County
 NGS
 WHMP
 USGS

Tools:
 Zoom Box
 Identify Box

Brown

Full Extent
 Zoom +
 Zoom -
 Redraw Map

View Saved Results
 Clear Saved Results

Search By:
 Enter Point ID

Print

0 0.6 1.2 mi

Add all to saved results

USGS Control
 No USGS Results.

NGS Control
 Name: 4K60
 County: Brown
 WI-HMP: True
[View Record](#)
[Add To Saved Results](#)

County Control
 Name: ROCK
 County: Brown
 WI-HMP: False
[View Record](#)
[Add To S...](#)

County Control Attributes Show/Hide Full View

Print this page

Point Name	ROCK
Point ID	ROCK
County	Brown
WI-Height Modernization Point	False

Eastings Coordinates	96037.286 U.S. Survey Feet NAD 83 (1991)
Northing Coordinates	515171.476 U.S. Survey Feet NAD 83 (1991)
Horizontal Coordinate System	Brown County Coordinate System
Geographic Longitude Coordinates	88 1 45.135572 NAD 83 (1991)
Geographic Latitude Coordinates	44 22 18.667126 NAD 83 (1991)
Suitable for GPS	Yes

Comments

Point type = CP
[Report a disturbed or destroyed control station.](#)

Contacts

Organization	Brown County Property Listing
Dataset Metadata	not available
Dataset Inventory Date	2005-03-08
Name	Pat Ford
Title	Survey Coordinator
Email	Ford_PL@co.brown.wi.us
Phone	920-448-4493
Fax	920-448-4487
Address	305 East Walnut Street, Room 370 Green Bay, WI 54301
Website	County Land Information Office
Additional Information	County Homepage

NGS Control Attributes Show/Hide Full View

Print this page

Point Name	4K60
Point ID	DE7620
County	Brown
WI-Height Modernization Point	True
Geographic Longitude Coordinates	088 01 15. (W) NAD 83 (1991)
Geographic Latitude Coordinates	44 23 48. (N) NAD 83 (1991)
Orthometric Height	256.47 meters NAVD 88
Vertical Accuracy	Order 2 Class 1
Suitable for GPS	Yes
Online Tie Sheets	DE7620

Comments

Condition GOOD by WIDT
[Report a disturbed or destroyed control station.](#)

Contacts

Organization	National Geodetic Survey
Dataset Metadata	Metadata for NGS Geodetic Data
Dataset Inventory Date	2009-01-08
Name	John Ellingson
Title	Wisconsin State NGS Advisor
Email	john.ellingson@dot.state.wi.us
Phone	608-516-1382
Fax	608-246-4669
Address	3502 Kinsman Blvd. Madison, WI 53704
Website	NGS Geodetic Control Information
Additional Information	NGS Homepage

The NGS Data Sheet

See file [_dadata.txt](#) for more information about the datasheet.

```

DATABASE = ,PROGRAM = datasheet, VERSION = 7.65
1 National Geodetic Survey, Retrieval Date = JANUARY 17, 2009
DE7620 *****
DE7620 DESIGNATION - 4K60
DE7620 PID - DE7620
DE7620 STATE/COUNTY- WI/BROWN
DE7620 USGS QUAD - DE PERE (1992)
DE7620
DE7620 *CURRENT SURVEY CONTROL
DE7620
DE7620* NAD 83(1986)- 44 23 48. (N) 088 01 15. (W) SCALED
DE7620* NAVD 88 - 256.470 (meters) 841.44 (feet) ADJUSTED
DE7620
DE7620 GEOID HEIGHT- -36.13 (meters) GEOID03
DE7620 DYNAMIC HT - 256.434 (meters) 841.32 (feet) COMP
DE7620 MODELED GRAV- 980,472.3 (mgal) NAVD 88
DE7620
DE7620 VERT ORDER - SECOND CLASS I
DE7620
DE7620.The horizontal coordinates were scaled from a topographic map and have
DE7620.an estimated accuracy of +/- 6 seconds.
DE7620
DE7620.The orthometric height was determined by differential leveling
DE7620.and adjusted in April 2007.
DE7620
DE7620.Photographs are available for this station.
DE7620
DE7620.The geoid height was determined by GEOID03.
DE7620
DE7620.The dynamic height is computed by dividing the NAVD 88
DE7620.geopotential number by the normal gravity value computed on the
DE7620.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DE7620.degrees latitude (g = 980.6199 gals.).
DE7620
DE7620.The modeled gravity was interpolated from observed gravity values.
DE7620
  
```

Know your audience

Use Case Scenario & KML Opportunity

ControlFinder
Wisconsin State Cartographer's Office

Legend:
County
NGS
WIMP
USGS

Tools:
Zoom Box
Identify Box

USGS Control
Name: 961 ADJ 1903
Country Code: WI-IIMP: False
View Record
Add To Saved Results

NGS Control
Name: 924
Country Code: WI-IIMP: True
View Record

Save Results to Text Format

USGS Results

Point Name: US0843 - 961 ADJ 1903 [View Record](#)

NGS Results

[Retrieve NGS Data Sheets](#)

[Save Results to SDMS CTL Format](#)

Point Name: OM0384 - BM [View Record](#) [Remove Record](#)

Point Name: OM0385 - 924 [View Record](#) [Remove Record](#)

File Edit View History Bookmarks Tools Help

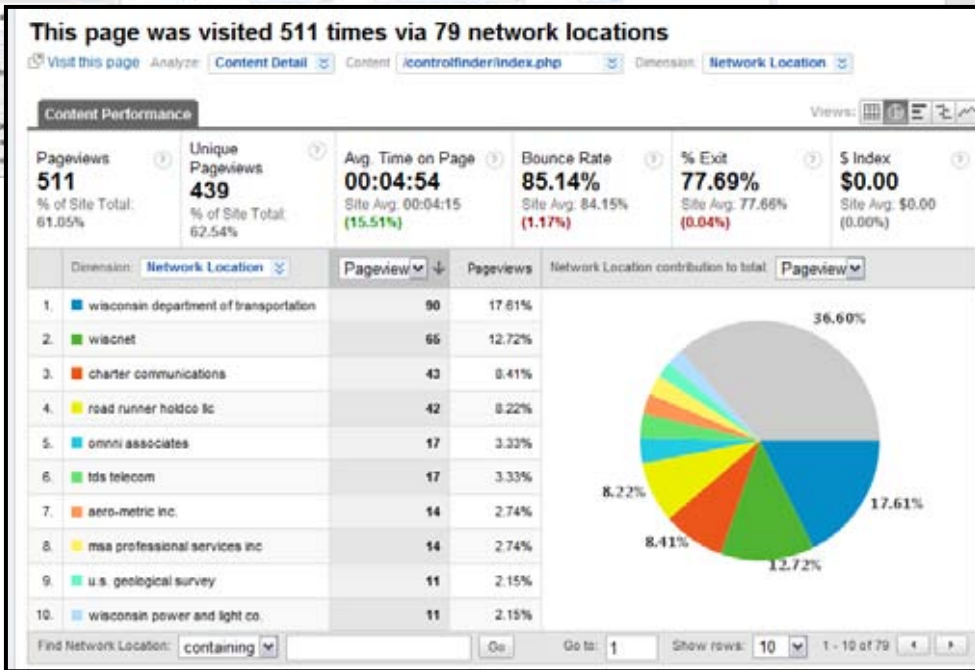
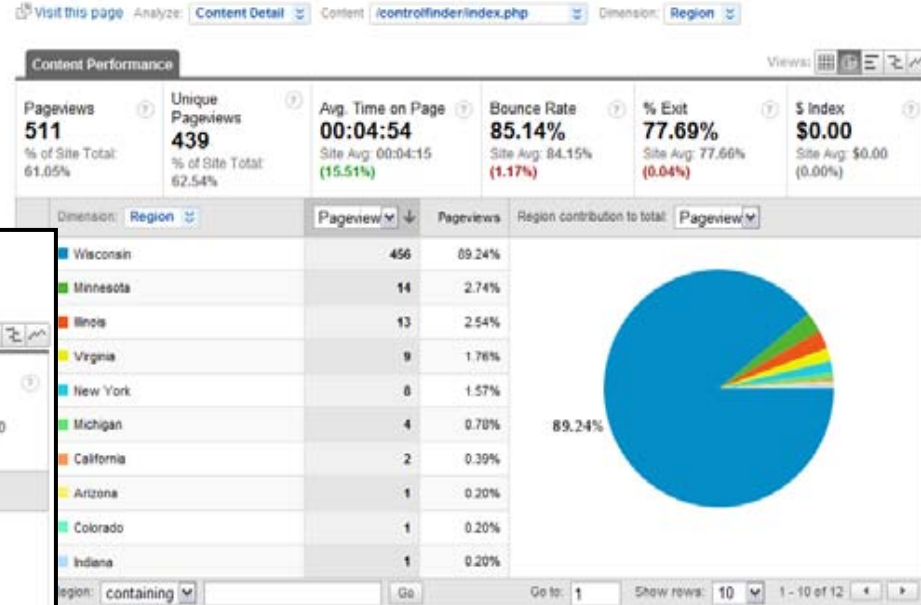
http://maps.sco.wisc.edu/controlfinder/pickup/control1967296188.txt

scopid	contributor	count	fips	contribpid	contribname	category	displaylat	displaylong	displaydatum	lat	long	l1dat		
173003317	173	3317	55025	OM0384	BM	NGS	43.07583	-89.40139	NAD 83 (1986)	43 04 33.	(N)	089 24 05.	(W)	NAD
173002429	173	2429	55025	OM0385	924	NGS	43.07528	-89.40222	NAD 83 (1986)	43 04 31.	(N)	089 24 08.	(W)	NAD
174000460	174	460	55025	US0843	961 ADJ 1903	USGS	43.07524471	-89.40378233	NAD 83 (1991)	43.07525	89.4036667	NAD 8		

Sometimes, knowing your audience is not by accident



This page was visited 511 times via 12 regions





Data Access

NGS – Bulk download, granular query...
aiming for web services and change alert.

The rest (via SCO)= Web Map Service (WMS)

Data Delivery - Clients

ControlFinder
Wisconsin State Cartographer's Office

Legend:

- County
- NGS
- WHMP
- USGS

Tools:

Zoom Box
Identify Box
Dane

Full Extent
Zoom +
Zoom -
Redraw Map
View Saved Results
Clear Saved Results
Search By
Enter Point ID
Search

ControlFinder is designed as a central point of access for locating Wisconsin control data.

County Sites With Online Access:
Counties that appear in the box below provide access to their Control data either on their county website or through a contractor.

Bayfield County

Helpful Links:

- WI Height Modernization Project
- WI CORS Networks
- WI County Surveyors Directory
- Survey Station Condition Report Form
- Hike Pass Data Dictionary

7N9E

Print

HELP PAGE

Google Earth interface showing a 3D satellite view of a city area. The map displays various control points (red and yellow dots) overlaid on the terrain. The interface includes navigation controls, a compass, and a legend.

Google

Potential Tools & choices

- PostGIS & flat files : data storage
- Mapserver - > GeoServer : web service authoring
- OpenLayers/MapFish : mapping framework
- GoogleMaps API ? : basemap
- Upgraded scripts : specific functions
 - E.g. Saved results
- New scripts : enhanced feedback reporting



KML Exchange

- KML is a transport format
- Can be discreetly published or...
- Can be output by a web service



KML Tools

- MapExcel2KML
- KML2SHP, SHP2KML
- Gdal2tiles, GeoServer,
- ESRI-related:
 - Export to KML 2.4.4
<http://arcscripts.esri.com/details.asp?dbid=14273>
 - Arc2Earth
- KML Clients (Google Earth, ArcGIS Explorer, NASA Worldwind)

KML Tool Compilations

Other posts in the **Google Earth Data Tools** series

1. [KML Editors](#)
2. [Diagramming In Google Maps And Google Earth With Smoot](#)
3. [Plotting Data In Google Earth Using GE-Graph](#)
4. [Drawing Grids, Paths And Polygons In Google Earth Using GE-Path](#)
5. [Online Google Earth Utilities For Buffering And Area Calculations](#)
6. [Easy Display Of Thematic Data In Google Maps And Google Earth](#)
7. [Using GIF/PNG Transparency In Displaying Raster Graphics In Google Earth](#)
8. [Adding Vector Graphic Objects To Google Earth](#)
9. [Animated GIFs In Google Earth](#)
10. [Creating A Network KML Link To A Google Spreadsheet](#)
11. [LIDAR Tools](#)
12. [EarthPlot Software Tools For Google Earth](#)
13. [Geographic Time Animations](#)
14. [Convert TIGER Polygons To KML Files](#)
15. [Putting Time Data Into A KML File](#)
16. [Using The KML Time Embedder To Stamp Time Data Into A Google Earth File](#)
17. [Using The KML Time Embedder, Concluded](#)
18. [KML Time Embedder Improved With Hour-Minute-Second Ability](#)
19. [Grid Creation And Path/Polygon Measurements: Two New Online KML Tools](#)
20. [Google Earth PhotoOverlay Tool](#)
21. [KML Random Placemark Generator](#)
22. [Update For Online Google Earth Utilities](#)
23. [KML Time Code Utility](#)
24. [Screen Overlays In Google Earth](#)
25. [The KML Screen Overlay Maker Utility](#)
26. [KML Screen Overlay Maker Utility, Concluded](#)
27. [KML Circle Generator](#)
28. [Creating Google Earth Screen Overlays With EarthPaint](#)
29. [Text Editor With KML Validation](#)
30. [Online Spreadsheet To KML Converter](#)
31. [Version 2.0 Of Google's Online KML Spreadsheet Mapper Tool Released](#)
32. [Creating Google Earth Ground Overlays From Georeferenced Images](#)
33. [Google Earth Ground Overlays With GIF Transparency](#)
34. [Creating "Transparent" Topo Map Overlays For Google Earth](#)
35. [Using Google Earth Ground Overlays To Display Shapefile Data](#)
36. [Converting 3D Objects Into Google Earth Format](#)
37. [Thematic Mapping In Google Earth](#)
38. [An Online KML Validator](#)

Most popular

- [Epoint2GE](#): Excel to Google Earth
- [Kml2shp 2](#): Google Earth to GIS
- [DigiPoint 2](#): Points export from Google Maps
- [Shp2kml 2](#): Shapefile to Google Earth
- [Epoint2CAD](#): Excel to AutoCAD
- [Ucons](#): Units Conversion Tool
- [Color-it](#): Color your Map
- [KMLToolbox](#): KML online tools



New

- [Epanet Z](#): Epanet 2.00.12 & Online Maps **New**
- [Shp2kml 2](#): Shapefiles to Google Earth
- [Terrain](#): Sample lat,lon,elev and reconstruct a terrain
- [KML-Toolbox](#): Online tools for KML
- [KML-Area & Length](#): Calculate area and length to GE objects
- [KML-GRID](#): Generate custom grids for Google Earth
- [GE-Census Explorer](#): Explore US Census within Google Earth
- [EpaSens](#): Epanet Sensitivity Analysis
- [MSX-GUI](#): MSX-Epanet Graphical User Interface



Online Tools

- [Cotrans 2](#): Single and Batch coordinate conversion
- [Net2Epa](#): Epanet and Google Maps
- [Kml2x](#): Google Earth Export
- [MapTool](#): Elevation, Distance, Area with Google Maps
- [DigiPoint 3](#): Points export from Google Maps **New**
- [Kml2shp Online](#): Google Earth to Shapefile **New**
- [E-Query](#): Elevation extraction
- [GPXViewer](#): Visualize GPX files with Google Maps
- [Gpx2epa](#): Epanet projects from a GPS
- [Color-It](#): Color your maps
- [EpaMove](#): Epanet coordinates shifting
- [EpaRotate](#): Epanet network rotation
- [KML Toolbox](#): KML online tools
- [Terrain](#): Sample lat,lon,elev values to reconstruct a terrain
- [KML-Circles](#): Generate circles and rings for Google Earth
- [xy2CAD](#): Create DXF files from xyz data
- [cad2XY](#): Extract CAD information
- [epaGeo](#): Epanet geographic transformations
- [epaElevations](#): Assign elevations to Epanet Nodes
- [Curve Number](#): SCS runoff curve number calculator **New**
- [Hazen-Williams Eq](#): Pressure drop to friction calculator **New**

- [Zucons](#): Units conversion
- [Colors](#): RGB, HTML, and KML
- [Calendar](#): Any year calendar



KML Generators

KML Interactive Sampler
Explore the samples below or enter your own KML to get started. You can then make changes and see them in action by clicking 'Update Earth!'
This sampler requires the [Google Earth Browser Plug-in](#).

- Balloons
- Extended Data
- Ground Overlays
- Lines and Paths
 - Absolute
 - Absolute Extruded
 - Relative
 - Relative Extruded
 - Tessellated
 - Untessellated
 - Linear Ring
- Models
- Multi-Geometries
 - Line Strings
 - Rollover
 - Simple
- Network Links
- Point Placemarks
- Polygons
- Regions
- Screen Overlays
- Sky
- Styles
- Views (Camera and LookAt)

Update Earth! (Ctrl + ↵)

```
<kml version="1.0" encoding="UTF-8" xmlns="http://www.opengis.net/kml/2.2">
  <name>Useful links and useful links will appear here if available</name>
</kml>
```




Image © 2009 DigitalGlobe
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© 2009 Tele Atlas
Google

More samples available at the [kml-samples](#) project

KML Generators



KML Clients

- Google Earth
- ESRI ArcGIS Explorer
- Microsoft Virtual Earth
- NASA WorldWind
- ERDAS Titan Client
- KML-consuming websites



Mashup Tools

- Google Maps, StreetView, GE APIs
- Yahoo! *Pipes*, Yahoo! *GeoPlanet*
- Google & Yahoo! Geocoding services
- .NET/Microsoft Virtual Earth, *GeoLife*
- Custom coding
- Mashup code “framework” (e.g. OpenLayers, MapFish)
- Online mashup frameworks (ExploreOurPla.net, GeoCommons Maker/Finder)

Mashup Frameworks

- OpenLayers/ MapFish (Javascript)
- Modest Maps (Flash)
- SpatialKey (Flex)
- SpatialWiki (.NET/Virtual Earth)
- GeoCommons – Finder! & Maker! (Online)
- MapChannels website (API Comparison)
<http://www.mapchannels.com/DualMaps.aspx>

... and the list is growing.

Virtual globe and open source GIS clients are a good staging/prototype environment for mashup development.