

An Internet Safari Through the Geography Network

Jonathan W. Lowe

My father is a legendary list-maker. Everything he intends to do, for business or pleasure, he meticulously lists on long scraps of paper. As children, my sister and I used to tease him that he even made lists of his lists, just to keep track of them all. That was 20 years ago. If only we'd known then what a great idea Dad had.

Today, Jerry Yang of Yahoo! (number 38 in the Forbes 400 ranking of the richest Americans) is estimated to have a net worth of more than \$6.4 billion at the ripe old age of 31. Jerry is a billionaire because he owns a list of lists, otherwise known as an Internet portal. And he's not the only person making money with Dad's idea — industry-specific vertical portals (also known as vortals) now number in the thousands, including a few for the spatial data industry.

A jungle of lists of lists

The goal of most portals, like Yahoo!, is to provide a single point of organized access to the otherwise sprawling chaos of the Internet. Vortals do the same, but for a specific audience and profession. Vortals often include news updates, auctions, e-commerce, discussion groups, and, almost always, listings of links to other sites organized by subgroup. The theory is that vortals support collaboration among users, hence their alternate name of Net communities.

In the ever-growing hodgepodge of the Internet, searches within the confines of a vortal rather than across the Web's entire breadth have become a valuable time-saver. Consequently, businesses in numerous markets are launching vortals. At the beginning of this year, according to the Gartner-

Group (www.gartnergroup.com), there were approximately 300 Internet-based vertical industry portals already launched and another 10,000 anticipated within the next two years. There are even vortal space owner/operator companies, the largest of which is currently VerticalNet (www.verticalnet.com) of Horsham, Pennsylvania, with 57 Net communities on its list of lists of lists.

The rare spatial vortal

Anyone who's searched the Internet for spatial data without the assistance of a vortal knows how many false leads are out there waiting to slow down the search for paydirt. Yes, countless sites offer spatial data, but the real challenge is finding them.

Many individual companies are launching e-commerce sites or virtual marketplaces to sell their imagery and data — Kodak (www.kodak.com/go/earthimaging), GlobeExplorer (www.globexplorer.com), Pixxures (www.pixxures.com), and Spot Image (hosted by GeoData Systems, www.geodatasystems.com) are a few that come to mind. As yet, though, centralized vortals for the geospatial community, where we can browse an array of available data from several organizations and competing companies, are a very rare species.

An exception is the Geography Network (www.geographynetwork.com), ESRI's (www.esri.com) spatial vortal inaugurated last summer. That site, like any real vortal, exists to foster a sense of Net community among geospatial professionals. As stated on the introductory page, "The Geography Network is a global network of geographic information users and providers. . . . Through the

Geography Network, you can access many types of geographic content including live maps, downloadable data, and more advanced services." These three pieces — downloadable data, live maps, and services — are what make the Geography Network unique, exciting, and, initially, a little confusing. Is it the spatial vortal we've been searching for?

Data hunting

Like all vortals, the Geography Network has lists of lists. The core items in this list are metadata and links to data providers' Web sites. Anybody can be a data provider by adding their metadata and link to the Geography Network's collection. Figure 1 is an example of summary metadata for TeleAtlas's European street data that illustrates the format and content of a typical entry.

Unlike most vortals, users can employ the site's search engine — called the Geography Network Explorer — to, of course, search spatially as well as by keyword. The end result of either keyword or spatial

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FIGURE 1 This example of metadata linking to TeleAtlas's European street data is typical of the summary information users will find at the Geography Network.

searches is a list of matches from the metadata and links list. Figure 2 shows the Geography Network Explorer with the search criteria in the left frame and search results on the right, with choices for viewing the results as metadata or, when available, in a map. The spatial part of the search in Figure 2 is the extent of Florida, without limits on the type of content, data theme, or keywords. Note that the search engine is asking, "Which datasets in my collection intersect the extent of the user's search area?" not "Which datasets are completely contained by the user's search area?" This means that, in our example, datasets with worldwide coverage will be part of the search results, but datasets exclusive to France will not. 84 datasets match the search criteria.

Live data

At vortals like Yahoo!, the usual process of reviewing lists leads you to a link, which leads to a Web site with reading material. With spatial data, it's not always so direct. Realizing that not everyone has the appropriate software to read spatial data, the Geogra-

Content Citation:	
Title of Content:	European StreetMap
Type of Content:	Image Service
Content Publisher:	Tele Atlas
Publication Place:	Rotterdam, The Netherlands
Publication Date:	2000-06-19
Content Description:	
Content Summary: The Tele Atlas street map service contains highways, streets, railroads, postal areas, parks, and water bodies, and points of interest for Europe. The initial coverage area includes Belgium, France, Germany, Luxembourg, and the Netherlands. The map service is hosted by ESRI-Nederland based in Rotterdam.	
Content Purpose: The street map service can be used as a basemap for GIS, transportation, marketing, and other applications.	
Content Status:	
Progress:	Complete
Update Frequency:	Annually
Spatial Domain:	
West Coordinate:	-5
East Coordinate:	15
North Coordinate:	55
South Coordinate:	42
Coverage Area:	Belgium, France, Germany, Luxembourg, Netherlands
Content Keywords:	
Theme Keywords:	highways, streets, parks, points of interest
Place Keywords:	Belgium, France, Germany, Luxembourg, Netherlands
Spatial Data Information:	
Data Type:	Vector
Data Format:	GIF
Data Projection:	Geographic
Data Scale:	1:10000
Access and Usage Information:	
Access Constraints: License fee is required for use of map service in GIS tool.	
Use Constraints: Defined in License Agreement.	
<input type="checkbox"/> View Coverage Area	

phy Network makes a distinction between live data and static downloadable data. Live data allows any user to view the data online. It may also be possible to establish an extent of interest and then efficiently download only the data within that extent. Figure 3 continues the search process begun in Figure 2. By scrolling down

the list of 84 datasets to the ESRI World Vegetation dataset and clicking the "View Map" button, a user gets to view the data (conveniently displayed in his search extent) before downloading it. Clicking the download button would clip only the features in the current view extent before submitting them as a shapefile.

Some live data are not just downloadable; users can also add them as a theme in

their GIS viewers, either as an image or as a stream of vectors. This process isn't traditional downloading because the data for the current view is only temporarily cached in memory, not saved to disk. Plus, the cached data may be an image rather than actual vectors, so even saving the contents of a cache often wouldn't capture anything but a picture. Nonetheless, using live data guarantees the most current version of that data because it comes straight from the data provider every time. Conversely, it also forces reliance on the network connection.

The Geography Network also makes a distinction between two types of live data. In its list of lists, the vortal refers to data that users can view live in their own GIS viewer, (such as the free ArcExplorer or most other ESRI ArcGIS products) as a "map service" and classifies data that can only be browsed through the data provider's own spatial Web site a "solution." Figure 4 shows the use of ESRI's free ArcExplorer to display local airport point data on top of the live ESRI World Vegetation Map Service data.

A Net-community expedition

Many interactive spatial Web sites offer inventory, but not analysis, of spatial data. As the public gets comfortable with spatial data, though, they will more frequently request specific analysis. In addition to organizing the online offering of data into an easily searched list, the Geography Network hopes to become a destination for people seeking spatial functionality. So far, this boils down to three functions, called "GeoServices." One is geocoding — accepting a textual address and returning its latitude and longitude. About five street network providers currently offer free geocoding services and charge for bulk geocodes. Another is called the Gazetteer Service, which "enables users to input a place name and receive a ranked candidate list of place names and associated coordinates." The third map service (though not yet available) is point-in-polygon functionality — which takes a point loca-

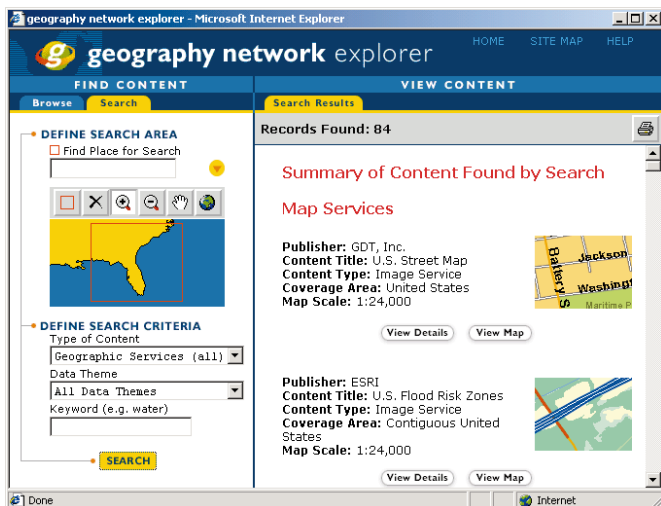


FIGURE 2 ESRI's Geography Network Explorer with search criteria and results displayed in the same viewer.

tion and returns a list of all regions that contain it. When available, the point-in-polygon service will be helpful for answering questions like, “If I live here, what is my voting district? police beat? school district? census tract?”

Though these three GeoService functions are what make the Geography Network unique, their novelty can be initially confusing. GeoServices aren't the traditional spatial data we're used to. Instead of being downloadable commodities, they are robust spatial applications built to accept a particular spatial question and answer with spatial data. For instance, the simple input and output of the geocoding services conceal a multi-gigabyte dataset of the entire USA's street network. Because these GIS functions are so popular, it makes sense to provide the public with access to them independent of any other GIS functions. Developers can weave calls to GeoServices into their programs and capture the results, thereby adding spatial functionality to any Web-connected device. As GPS-enabled wireless devices permeate our culture, GeoServices like geocoding and point-in-polygon will become increasingly useful for adding spatial functionality to them with almost no drain on their limited memory and storage space. Finding the right GeoService may one day become as important as finding the right data to analyze, so it's reasonable to list spatial-function Web sites with those offering pure data despite the potential confusion.

Trekking through the vortal

In general, the Geography Network offers a valuable tool to spatial data seekers around the globe. If you haven't gone data hunting in a while, you may be impressed by the volume of online data available at the Geography Network. At the site, I counted 13 free datasets, nine free live datasets, one live dataset for sale, and 292 spatial data clearinghouses, which can be free, live, or both. Each of the 292 clearinghouses typically offers numerous themes for down-

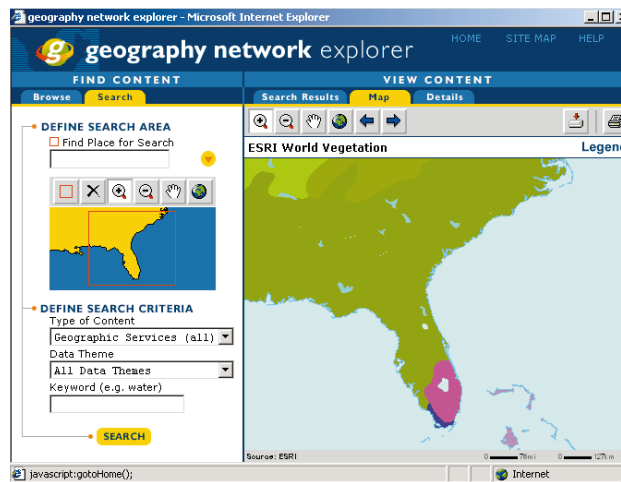


FIGURE 3 A map view of World Vegetation seen via the ESRI Geography Network Explorer.

load, making the clearinghouse list a resource not just for 292 datasets, but for thousands. (Clearinghouses offering lists of downloadable datasets are like vortals, but without the community focus — their main purpose is to sell or distribute data.)

The Geography Network Explorer's search tools are also easy to understand and control. I tested several of the downloads, all of which put the data that I wanted onto my local computer's hard drive, safe and sound

Metadata for each of the Geography Network's links are consistent, though not highly detailed — probably because the specifics are supplied by the data providers. Part of the metadata classification also includes keywords to help narrow searches — for instance, is the data free or for sale, live or static? In addition, some providers' sites had full metadata listings available with the data for download. My only frustration with the Geography Network was performance — during business hours it can be sluggish, even when accessed from a fast line. However, compared to the time saved by avoiding the standard text-based Internet-wide search, it is well worth the wait.

Forest for the trees

When a Web site's owners refer to it as a portal or vortal, what they often mean is that they want Web traffic to

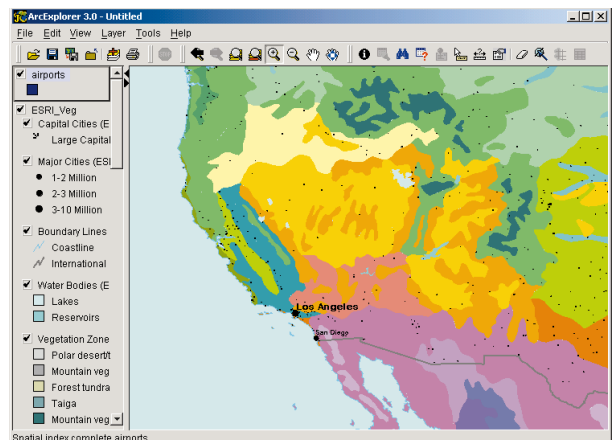


FIGURE 4 ESRI's ArcExplorer layers local airport point data over a Web-based Map Service of World Vegetation data.

flow through their site, resulting in opportunities for marketing and generation of advertising revenue. There's nothing wrong with wanting those perks, but to truly be a vortal, companies must remember to foster their industry's Net community. We'd all like to own a list of lists that everybody goes to first when they're looking for information in our industry. However, if you'd like to construct the world's best one-stop spatial data vortal, better hurry. Just as Jerry Yang built his world-famous list of lists before Dad and I could get around to it, industry leaders in the spatial world are already offering an eager geocommunity some exciting lists of their own. ESRI's Geography Network is an impressive offering that will only become richer as its list of data and geoservice providers grows longer. So if you can't beat 'em to the punch, consider joining them. We all benefit from shared spatial data. ☺