



# **An Overview of the Geography Network<sup>SM</sup>**

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# An Overview of the Geography Network

## An ESRI White Paper

<b>Contents</b>	<b>Page</b>
Introduction .....	1
The Origin of the Geography Network.....	1
What Is the Geography Network?.....	2
What Is GeographyNetwork.com? .....	2
How to Become a Participant .....	2
How the Geography Network Supports the NSDI and GSDI .....	3
What Are GeoServices? .....	3
The Future of the Geography Network .....	4
Conclusion.....	4

# An Overview of the Geography Network

## Introduction

The proliferation of spatial data on the Internet is beginning to allow a much larger audience to share in the rich databases that are currently maintained and principally used by geographic information system (GIS) specialists. This will result in many benefits: better coordination, more integrated thinking, a richer learning environment and, ultimately, a society that better understands how the world works. The demand for quick and easy access to accurate spatial data continues to rise as more organizations realize the value of using geographic information to solve their problems.

This demand for more timely geographic information has surpassed our ability to supply it as files on CDs and other digital media. The Internet is becoming a more feasible way to meet accelerating demand. The Internet has advanced quickly during the past few years and has provided the information required to develop a collaborative system to share and access geographic information.

Open to all GIS users and Web communities, the Geography Network<sup>SM</sup> is a way to dramatically improve the interorganizational sharing of geographic knowledge. It enables the public and private sectors to collaborate in new ways by spatially integrating and fusing their data and knowledge, leading to new understanding and innovation. As public and private organizations, such as local governments and utility companies, work together to better serve their communities, the sharing of spatial data facilitates technological advances in many fields.

## The Origin of the Geography Network

The development of the Geography Network resulted from three key endeavors. The first of these was the development of the ESRI<sup>®</sup> ArcData<sup>SM</sup> Online program in June 1997. The ArcData Online Web site, an online marketplace and network of public and private data providers, enabled users to search, view, and download specific sets of spatial data. The second endeavor was the development and subsequent launch of ArcIMS<sup>®</sup> software in May 2000. ArcIMS gave data providers an infrastructure that enabled them to publish their data on the Internet, while also allowing users to access the data remotely with multiple clients. The final endeavor was to combine the concepts and technologies of the first two to create a search-and-access infrastructure for the GeographyNetwork.com Web portal, launched in June 2000. These endeavors—combined with the vision of an OpenGIS Consortium (OGC) standards-compliant system, the Global Spatial Data Infrastructure (GSDI), the National Spatial Data Infrastructure (NSDI), and the Digital Earth Initiative—gave ESRI the tools and vision to develop the Geography Network.

**What Is the Geography Network?**

The Geography Network is a collaborative, multiparticipant system that provides the infrastructure needed for publishing, sharing, and using geographic information on the Internet. Through the Geography Network, users can publish their own data, search for data, use GeoServices, create new GeoServices and applications, or even build services upon services to reach new communities. It is available to private, public, and commercial users, data publishers, and service providers around the world. Content may be provided in the form of raw data, maps, or more advanced services dealing with, for example, lifestyle mapping, population demographics, crime mapping, climate modeling, real-time weather reports, flood risk mapping, address geocoding, and network routing—the possibilities are endless.

**What Is GeographyNetwork.com?**

GeographyNetwork.com is a portal that connects users with data and GeoServices and contains the metadata catalog, Geography Network Explorer, and a digital marketplace. The metadata catalog is a searchable index of all geographic information and services available to the user. By querying the metadata catalog users can discover the map services, data services, GeoServices, and solutions that meet their needs. The Geography Network Explorer is a browser that enables users to visualize, query, and analyze data found on the Geography Network. GIS software can also be used to connect to one or more sites to simultaneously overlay and analyze many types of data from different sources. Also on the portal will be a digital marketplace with a vast array of commercial imagery, value-added services, and customizable solutions provided by Geography Network participants.

The software used to operate GeographyNetwork.com includes ESRI's ArcIMS and ArcSDE™ software. ArcIMS is used to create, publish, and administer the map services. ArcSDE is used to store and deliver the geographic data used to support the map services. The system hardware is provided by Sun Microsystems and includes several server-class machines that house the Web servers, mapping servers, and data servers. The ESRI system currently can serve more than one million maps per day.

**How to Become a Participant**

Becoming a participant on the Geography Network is a two-step process. First, author a map service using ArcIMS, OGC's Web Mapping Server, or standard Extensible Markup Language (XML) protocols. Second, register the map service in the GeographyNetwork.com metadata catalog. Organizations or individuals with spatial data can join the Geography Network as publishers or contributors.

**Publishers**

Publishers offer map services using ArcIMS technology that lets users view a map online as a dynamic image or feature stream. In feature streaming, the data is not downloaded, only temporarily cached in memory. Users can interact with the data held in a local cache to perform such tasks as thematic mapping and feature identification. A publisher may choose to offer commercial services via the Geography Network. Through a paid subscription, users can license access to these map services and add them to an online or desktop GIS project using streaming technology.

**Contributors**

Contributors publish links to their geographic data and maps that users can access or download from the Web. As with data from publishers, data linked to the Geography Network in this way can be distributed free or for a fee.

Publishers and contributors must prepare their maps differently. Publishers must publish their map services using an Internet Map Server that communicates using the XML protocol. ESRI's ArcIMS software is designed for this. However, the Geography Network will also accept data from other software, as long as it complies with the OGC Web Mapping Server standard. Data services can be authored and published as a single data layer or a collection of layers. In contrast to publishers, contributors need not publish their data with an online viewing capability; they can simply link to data that is available for FTP download, if they choose.

### **How the Geography Network Supports the NSDI and GSDI**

The Geography Network clearly complements and supports the construction of the NSDI and the GSDI with all the features that make it easy to access public spatial data. The Geography Network supports the four goals of the Federal Geographic Data Committee (FGDC) NSDI strategy by

- Increasing awareness and understanding of the vision, concepts, and benefits of the NSDI through outreach and education
- Developing common solutions for discovery, access, and use of geospatial data in response to the needs of diverse communities
- Using community-based approaches to develop and maintain common collections of geospatial data for sound decision making
- Building relationships among organizations to support the continuing development of the NSDI

More information is available about the Geography Network and NSDI in an ESRI white paper entitled, "The Geography Network and the NSDI."

### **What Are GeoServices?**

A GeoService is a tool that performs basic geoprocessing functions such as geocoding, routing, and buffering or a gazetteer service. A Geography Network GeoService is published using the standard Geography Network XML communication protocol so that all requests for like services are handled the same. Developers and applications service providers (ASPs) can access this set of online tools for building online solutions.

Several publishers offer GeoServices for developers to add Geography Network functionality to their sites. For example, ESRI and Sagent offer geocoding services that allow users of the client Web site to input an address and see the location on a map. ESRI's gazetteer returns a list of candidate place names when part of a place name is entered. Coming soon is a point-in-polygon service, which will determine which polygons a point is in. This would enable an application to show information about, for example, the school district an address is in.

Developers who pay the necessary fees can write calls to these GeoServices into their programs just as they link to data. Application service providers can use the GeoServices to serve maps into their applications. These services can add spatial functionality to many applications in addition to wireless devices that lack the processor power and memory to perform geocoding by themselves. The demand for GeoServices, high-

quality data, and value-added applications, such as MapShop, REALTOR.com, and Money Mailer, will continue to increase as the Geography Network continues to grow.

## **The Future of the Geography Network**

Over time, the Geography Network will grow and evolve as users discover and apply the concepts of this system for their own work. To facilitate this growth, tools have been placed in the next generation of ESRI's ArcGIS™ system, enabling users to access and use geographic information on the Geography Network. Users will be able to access an enormous amount of data directly through their desktop applications or Web browsers and integrate it with local data. The ability to incorporate multiple data sets in ArcGIS and access it by way of the Geography Network will facilitate more participation and collaboration in the decision making that affects industries and communities around the world.

*"The Geography Network is as important as any accomplishment we have ever achieved. ESRI is committed to continuing to research and build technology that will facilitate the convergence of the Internet and GIS tools, allowing geographic information to be shared by everyone."*

—Jack Dangermond  
President, ESRI

## **Conclusion**

The Geography Network is the future of geospatial analysis.