The Geography Network℠ and the NSDI

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John Moeller, director of the United States Federal Geographic Data Committee (FGDC), said, "I believe the Geography Network has the potential to be a great asset in the implementation of the NSDI in the United States, in spatial data infrastructures in other nations, and in the access and use of geographic information as encouraged by the Global Spatial Data Infrastructure. Your stated commitment to the use of the NSDI-compliant metadata standard for documentation of data and the incorporation of the Geography Network in the NSDI Geospatial Data Clearinghouse is an important example of how a spatial data infrastructure can benefit all sectors and communities."

Summary

The Geography Network℠ complements and supports the construction of global and national spatial data infrastructures.

Purpose of This Document

The Geography Network and the National Spatial Data Infrastructure (NSDI) are both concepts. The Geography Network is a concept that envisions a collaborative and multiparticipant system for publishing, sharing, and using digital geographic information. The NSDI is a concept that encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. This document clarifies the Geography Network's role in making the National Spatial Data Infrastructure, and ultimately the Global Spatial Data Infrastructure (GSDI), a productive resource with the widest possible participation through providing an implementation mechanism.

Background

Much activity has taken place in the area of promoting the sharing of geospatial data. This is happening at a global level and has strong support to ensure a long-term vision of creating networks that support many levels of society. This document will discuss three: the NSDI, GSDI, and Geography Network.

NSDI

In 1994, United States Federal Executive Order 12906 was signed. The Executive Order directs federal agencies to cooperate with state, local, and tribal governments, as well as the private sector, to develop the NSDI to support public and private sector of geospatial data. The NSDI concept is defined as the technologies, policies, and people necessary to promote sharing of geospatial data throughout all levels of government, the private and nonprofit sectors, and the academic community.

In 1997, the FGDC published *A Strategy for the National Spatial Data Infrastructure*. In this strategic document, four goals were outlined for the development of the NSDI. These goals are defined later in this document.

GSDI

In 1997, the definition of the GSDI concept was adopted at the second GSDI conference as "…the policies, organizational remits, data, technologies, standards, delivery mechanisms, and financial and human resources necessary to ensure that those working at the global and regional scale are not impeded in meeting their objectives…."

Geography Network

In June 2000, ESRI announced the Geography Network and the GeographyNetwork.com Web site. The Geography Network is a concept that promotes the sharing and distribution of geospatial information via the Web, allowing consumers to have access to information that will allow them to understand their geography and apply this to their everyday and business use. GeographyNetwork.com is a Web implementation of this concept—an online library of information that connects GIS users with geospatial data, maps, services, and solutions via the Internet.

How the Geography Network Currently Supports the NSDI

The Geography Network supports the four goals of the FGDC's NSDI strategies.

Goal 1

Increase the awareness and understanding of the vision, concepts, and benefits of the NSDI through outreach and education.

GeographyNetwork.com was built as a result of demand from geographic information system (GIS) users and Web communities looking for dynamic access to geographic data and services. GeographyNetwork.com supports the NSDI vision by promoting data sharing through a virtual marketplace environment for geographic products.

To encourage a wide diversity of participants in the NSDI, Geography Network user-specific interfaces can be written to increase the awareness and understanding of geographic information to many diverse communities. Just as the GeographyNetwork.com site connects GIS users with geospatial data, maps, services, and solutions in additional disciplines, such as newscasting/reporting and real estate, people are beginning to be educated about geospatial data and the enrichment this data brings to their professions.

ESRI has proposed and implemented the initial infrastructure for GeographyNetwork.com and will continue to look for opportunities to improve the user experience on GeographyNetwork.com, increasing exposure to new audiences of the NSDI. It will be the publishers and consumers that will form and evolve the Geography Network with their content, solutions, partnerships, and feedback, in the same way that it will ultimately be the data providers and consumers' enhanced participation that will result in continued support and development of the NSDI.

Goal 2

Develop common solutions for discovery, access, and use of geospatial data in response to the needs of diverse communities.

Through standard Web browsers, GIS users as well as general consumers can access an online library of geospatial products. Using metadata, consumers are able to search for data, compare their user requirements with producers' metadata, and decide whether to pursue the data.

The GeographyNetwork.com infrastructure was built to support the full range of GIS users of the NSDI by allowing the customization of the GeographyNetwork.com user interface. The customization allows clearer communication for data sharing in languages appropriate to differing communities. Examples of customized user interfaces include the National Geographic Society's award winning Map Machine (www.nationalgeographic.com); the Texas Geography Network (www.tnris.state.tx.us/explorer); and The Associated Press MapShop, whose site is available via subscription service.

The GIS professional can access the Geography Network using GIS tools such as ArcExplorer™, ArcView®, and ArcInfo™ software or simple standard Internet browsers. While the Geography Network experience will be readily available to ESRI® software users with the release of the ArcGIS™ system, ESRI is dedicated to ensure that all users of geographic information will find GeographyNetwork.com a useful tool.

Why reinvent the wheel when there are existing standards and tools for searching and discovering geospatial information? With this in mind, the Geography Network utilizes and supports metadata that adheres to the FGDC's endorsed Metadata Content Standard version 2. ESRI has been an FGDC clearinghouse node for some time now. Planned enhancements to the Geography Network registration site include allowing users to directly publish their existing structured metadata on their own Geography Network nodes (a.k.a. clearinghouse nodes) and to use metadata stored in existing clearinghouse nodes as if it was native to the Geography Network, eliminating the duplication of metadata entry. In addition, when the International Standards Organization (ISO) reaches approval of its international metadata standard, ESRI will work to ensure harmonization with this version of the standard, as well, to better align with GSDI goals.

The Geography Network infrastructure supports the development of tools that will allow for easy exchange of applications, information, and results. Application software providers and software developers are encouraged to publish geoservices and GIS solutions on the Geography Network. Examples of geoservices include geocoding, gazetteering, and point-in-polygon functionality. Geocoding accepts textual addresses and returns latitude and longitude. Gazetteering enables users to submit a place name and receive a ranked candidate list of place names. And point in polygon takes a point location and returns a list of all regions that contain it.

Map services and geoservices may be provided using the Geography Network XML protocol (derivative of ArcXML) or the OpenGIS Consortium (OGC) Web Mapping Server (WMS) protocol. A methodology for registry of online services will be cooperatively developed between the FGDC and ESRI using OGC services metadata to support discovery of these two protocol families. Access to the data, map services, geoservices, and GIS solutions are what the Geography Network and the NSDI are about—making the user experience the most pleasant and informative possible.

Goal 3

Use community-based approaches to develop and maintain common collections of geospatial data for sound decision making.

GeographyNetwork.com is already being used for sharing information within and among divisions and agencies, as well as the GIS community. Government agencies can retain control over their own data while making it available through the Geography Network, enabling access to this data by many. Any number of agencies can then integrate these sources with their local data and undertake further analysis for projects. The possibilities are endless.

The Geography Network supports locally distributed and maintained databases such as clearinghouses. The Geography Network currently allows users to select and search many FGDC clearinghouse sites; however, not all the clearinghouse sites have been registered on the Geography Network. It is the intention of the Geography Network to utilize the existing efforts of FGDC registered clearinghouse sites, both nationally and internationally, to provide GIS users with the vast wealth of the information contained therein. Planned enhancements include allowing all FGDC clearinghouse sites to be registered and searchable when using the Geography Network Explorer.

As part of the United States Office of Management and Budget Circular of 1990, seven framework themes of data were identified that provide a foundation layer of basic mapping elements that may require mapping applications. These framework layers include orthoimagery, elevation, geodetic control, government boundaries (census geographies), transportation, hydrography, and cadastral. The appropriate federal agencies responsible for each of these layers were tasked to coordinate their themes as part of the NSDI.

These government framework layers are a key element in the Geography Network infrastructure, and the Geography Network team plans to ensure a focused, long-term approach to enabling access to this data rather than have the data reside in an isolated database whose content is unknown to most. Dialog will be maintained with agencies and organizations, such as the FGDC, to maximize efforts when providing users access to key government data sets.

Goal 4

Build relationships among organizations to support the continuing development of the NSDI.

GeographyNetwork.com can allow access into isolated databases hosted on remote servers whose content can be integrated with local data. This sharing of data takes place throughout different industries, government and commercial, as a way of distributing geospatial information to customers across the Internet. The Geography Network provides the infrastructure to build and support these relationships.

The virtual marketplace atmosphere of the Geography Network lends itself to building new innovative relationships that encourage citizen involvement and participation in the decision making process through the development of geoservices and GIS solutions. The Geography Network is a network of organizations linked through commitment to common interests within the context of the NSDI.

While ESRI's ArcIMS® software is one of the enabling technologies used to power GeographyNetwork.com, the Geography Network is committed to support other open technologies such as the OGC WMS protocols. The Geography Network is an "open environment," and the Geography Network development team is working with the FGDC and the OGC members to ensure that interfaces and specifications developed to improve interoperability are included in future enhancements to the Geography Network. These include the provision of gazetteer services within the Geography Network as both native and OGC-standardized interfaces.

Future Activities of the Geography Network in Support of the NSDI

Several enhancements are planned to improve the alignment of the Geography Network with the NSDI and GSDI.

- Eliminate the duplication of metadata entry for the data provider.
- Extend Geography Network Explorer searches to go beyond the ArcIMS Web server—for example, to allow browsing and viewing of data from one or more ArcIMS and WMS map servers simultaneously.
- Ensure all FGDC registered clearinghouse sites are accessible through the Geography Network and vice versa.
- Participate in the review of the relevant national and international documents being developed that define common terms or standards used in GIS.
- Help define what is meant by the term "services" metadata as used with regard to geospatial services, currently being discussed in the OGC arena.
- Develop a data strategy for GeographyNetwork.com that prioritizes the framework data as a key element in the infrastructure.

Conclusion

The Geography Network (www.geographynetwork.com) supports the NSDI and all government agencies on a local, regional, national, and international level in their efforts of data dissemination, sharing, adherence to standards, and partnership development.

For more than 30 years ESRI has been helping people manage and analyze geographic information. ESRI offers a framework for implementing GIS in any organization with a seamless link from personal GIS on the desktop to enterprisewide GIS client/server and data management systems. ESRI® GIS solutions are flexible and can be customized to meet the needs of our users. ESRI is a full-service GIS company, ready to help you begin, grow, and build success with GIS.

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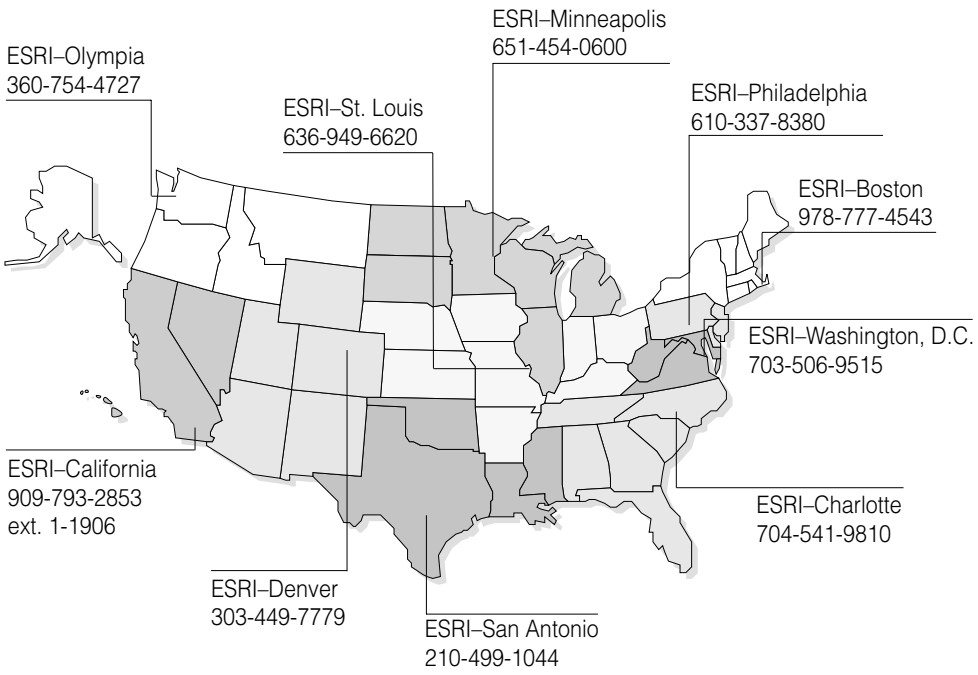

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