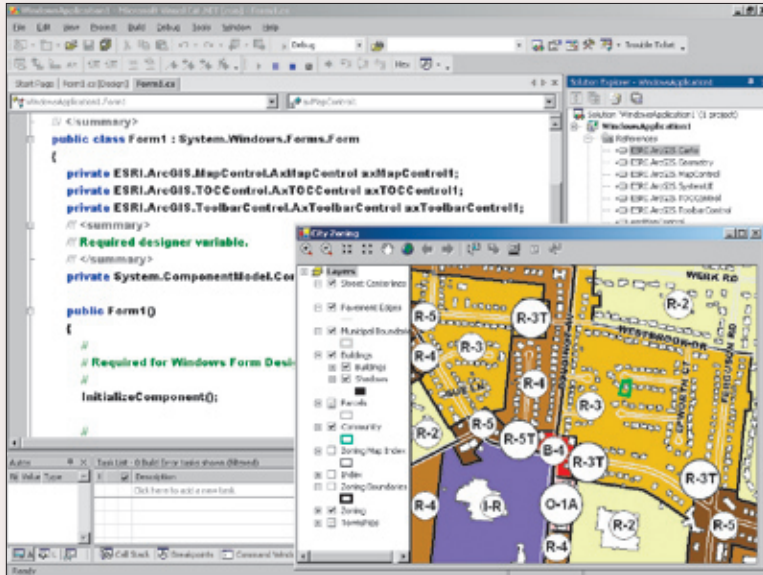# GIS and Mapping Solutions for Developers

Technology for desktop, client, Web, and server application architectures

ESRI

GIS and Mapping Solutions for Developers

If you are a software developer looking for an effective way to bring geography and mapping capabilities into your applications, ESRI has geographic information system (GIS) development and deployment tools designed to meet your specific needs.

- Develop applications using the language of your choice.
- Deploy applications on a variety of platforms.
- Access and manipulate GIS data in multiple formats.
- Focus on solving business problems, not on coding GIS functionality from scratch.

Why Would You Want to Build GIS Applications?

Geographic analysis and spatial visualization tools give organizations the ability to improve operational efficiency and decision making. These tools provide the information that decision makers need to quickly and accurately assess a situation and act accordingly.

Many potential users of GIS-enhanced applications are not GIS professionals and are not equipped to take advantage of the comprehensive tools available on the market without a steep learning curve. In these cases, developers need to provide custom-made, easy-to-use spatial solutions.

"Think of GIS as more than a technological tool. Think of it as a method for strategic planning."

Don Cortez
Vice President of Distribution Support
CenterPoint Energy

Continuing Commitment to GIS and IT Standards and Interoperability

ESRI has made major investments in the development and implementation of open GIS standards not only to serve our own customers but also to promote sharing geographic data across all GIS platforms.

ESRI has developed products based on open computing standards to ensure a high level of interoperability across platforms, databases, development languages, and applications. We are committed to supporting and actively leading industry efforts that set these standards.

Handheld Devices	ESRI® software supports platforms such as Windows CE, Palm OS, and Java 2 Platform Micro Edition (J2ME) as well as the 802.11 standard for wireless networks.
Desktop Computers	ESRI desktop software runs on Windows®, UNIX®, and Linux® platforms.
Servers	ESRI provides a range of server software that is supported on UNIX, Linux, Windows, and Java™.
DBMS	Commercial DBMSs supported by ESRI software include IBM® DB2®, Informix®, Oracle®, and SQL Server™ as well as support for all spatial types.
Networks	Protocols, such as TCP/IP and HTTP, allow the transfer of data and HTML documents.
Developer Environments	Developers have a choice of development environments when using ESRI software including VB, C++, .NET, and Java (J2ME, J2SE, J2EE, ASP/JSP).
Spatial Data Formats	ESRI supports more than 40 formats including Spatial Data Transfer Standard (SDTS), Vector Product Format (VPF), imagery, CAD, digital line graph (DLG), and GML.
Web Services	ESRI employs many Web standards such as XML, SOAP, UDDI, and WSDL. Web APIs, such as WFS, WMS, XML, and GML, are also supported.

Visit **www.esri.com/standards** for more information.

Solutions for Efficient GIS Development

Because building GIS applications from scratch takes more time and resources than might be readily available, ESRI offers a suite of component-based development frameworks that help you rapidly build industry specific GIS applications. These applications can be delivered on the desktop, client, Web, or server tier and embedded into both new and existing applications.

ArcIMS®—Geopublishing on the Internet

ArcWeb™ for Developers—GIS Web services that can be integrated into applications

ArcGIS Server—Enterprise GIS application server for centrally managed GIS

ArcGIS® Engine—Components for creating custom desktop GIS applications

MapObjects®—Embeddable mapping components

Applications

That Benefit From Integrated GIS Technology

- Community Redevelopment
- Decision Support
- Demographic Analysis
- Emergency Management
- Energy Distribution
- Event Analysis
- Facilities Management
- Field Inspection
- Location Services
- Logistics
- Monitoring and Control
- Planning
- Public Information
- Resource Management
- Retail Operations
- Site Remediation
- Site Selection
- Surveillance
- Threat Analysis
- Vehicle Routing

Industries

The application of GIS is limited only by the imagination of those who use it.

- Business
- Communications
- Defense
- Education
- Engineering
- Government
- Criminal Justice
- Natural Resources
- Transportation
- Utilities

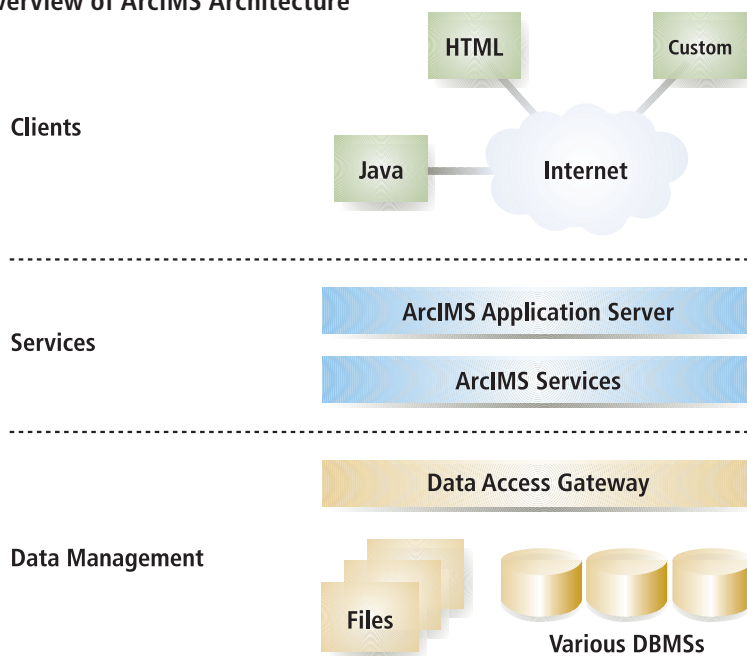Visit **www.esri.com/industries** for more information.

ArcIMS
Geopublishing on the Internet

ArcIMS software is the foundation for distributing high-end GIS and mapping services via the Internet. By providing a common platform for exchanging and sharing GIS resources, ArcIMS provides unique opportunities to leverage data from within the organization and to integrate information from other agencies. ArcIMS supports Windows, UNIX, and Linux platforms.

ArcIMS can be used by

- Developers interested in building Web-based location services and geographic applications
- Organizations needing to build geographic applications for their Intranets
- Diverse applications such as e-commerce, enterprise resource planning, data warehousing, customer care and support, location services, and field data integration

Overview of ArcIMS Architecture

With ArcIMS you can

- Provide high-performance, high-throughput mapping.
- Combine data from multiple sources.
- Perform a wide range of GIS capabilities.
- Serve geographic information to a variety of clients.
- Integrate services with ESRI's ArcGIS Desktop products.
- Provide secure access to map services.
- Create a central repository for publishing and browsing metadata.
- Offer routing and point-to-point driving directions.

Visit **www.esri.com/arcims** for detailed information on ArcIMS.

ArcWeb for Developers

Easily Integrate Spatial Data and GIS Services Into Your Application Via the Internet

ArcWeb for Developers provides a suite of SOAP-based ArcWeb Services that can be integrated easily into any Web or desktop application. With ArcWeb for Developers you can include GIS content and capabilities in your applications without hosting the data or developing any GIS applications yourself, resulting in significant savings of development time, expense, and computer resources.

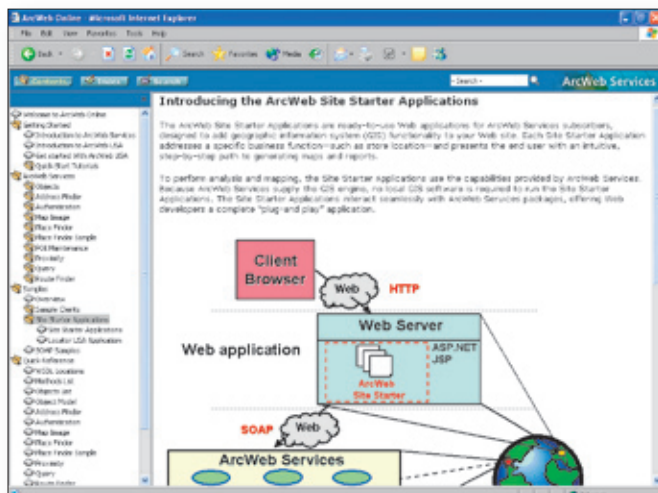ArcWeb for Developers can be used by

- Web developers who wish to integrate GIS functions into their Web pages but lack GIS capabilities
- Companies that want current data without having to spend time and resources to keep it updated
- GIS users who want to be able to perform GIS processing at their desktop without doing the programming themselves

ArcWeb for Developers provides a robust package of GIS Web services coupled with spatial data sets. The services include

- Place, address, and route finders
- Map image
- Proximity search
- Query
- POI (point of interest) Manager
- Utility services
- Data offered from leading data providers such as Tele Atlas, GDT, National Geographic, Meteorlogix, TrafficCast, GlobeXplorer, Pixxures, and many more. New data sources are being added continually.
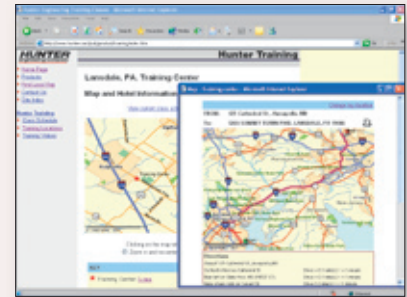
ArcWeb for Developers also comes with extensive online documentation that includes samples, site starters, and tutorials.

Visit **www.esri.com/arcwebdev** for a free evaluation and detailed information on ArcWeb for Developers.

Documentation for the ArcWeb for Developers Starter Application

ArcWeb for Developers Success Story

ArcWeb for Developers Locator/Routing Application

Hunter Engineering

Hunter Engineering designs, manufactures, and sells an array of passenger car and truck service equipment. Hunter offers training classes throughout the United States and wanted to provide maps locating its training centers and its regional offices on its Web site. Using ArcWeb for Developers, Hunter's Web site now offers the ability to find a route to Hunter's regional offices and training centers, as well as the location of nearby hotels, from any location in the United States.

"ESRI's ArcWeb Services were exactly what I needed. The services plugged right into my Web application, and I'm very happy with the results."

Sheryl Daugherty
Hunter's Web site administrator

Overview of the ArcGIS Server Architecture

Gas Utility Company Call Center

A gas utility call center could use ArcGIS Server in the following way:

Customers telephone the call center and report a strong smell of gas in the neighborhood. The call center uses a browser to enter the customer's name and address and sends a request to ArcGIS Server. ArcGIS Server then performs a trace on the gas pipe network to find the upstream gas main to the customer's address and determines which valve needs to be shut down. ArcGIS Server instantly sends back to the browser client a map of the network trace; the location of the valve that needs to be turned off; and a listing with names, addresses, and phone numbers of all the customers who would be affected by shutting off the valve.

This entire process is accomplished without having to install any special software on the client and without any GIS expertise required of the end user.

ArcGIS Server
Enterprise GIS Application Server

ArcGIS Server takes a centralized approach to GIS data management and application support, allowing focused GIS capabilities to be leveraged to distributed users who may not have any GIS expertise. Developers can use ArcGIS Server to build Web applications that meet specific GIS needs and deliver these applications to end users throughout the organization using a variety of clients ranging from browser to desktop to custom applications. ArcGIS Server supports all common development environments (Java, .NET, C++, and COM).
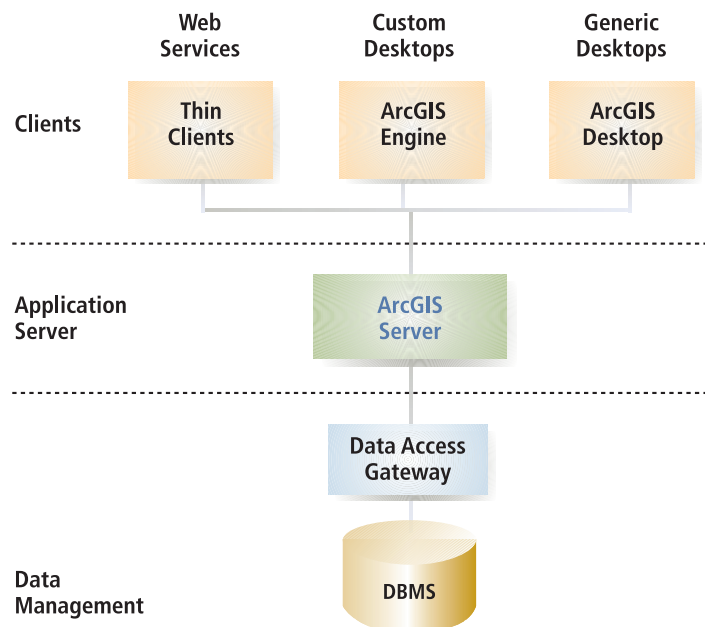
ArcGIS Server is used by

- Web application users
- Web application developers
- Desktop GIS users
- GIS developers
- GIS server administrators

Key features of ArcGIS Server include the following:

- Developers can use ArcGIS Server to create multiuser applications that provide advanced GIS functions and leverage Web services.
- ArcGIS Server supports multiple APIs (e.g., Java, .NET, C++, COM).
- Developers can build highly focused GIS applications as thin clients. These clients require no installation and can be used with a Web browser.
- ArcGIS Server adheres to key IT standards, providing maximum interoperability and compatibility with enterprise architectures using any of a variety of popular programming languages, development environments, commercial application servers, and database management systems (DBMSs).

Visit **www.esri.com/arcgisserver** for detailed information on ArcGIS Server.

ArcGIS Server System

ArcGIS Engine

Create Custom Desktop GIS Applications

ArcGIS Engine is a set of cross platform ArcObjects™, ArcGIS software's underlying components, used to build custom GIS and mapping desktop applications or add new functionality to existing applications. ArcGIS Engine applications can vary from simple map viewers to custom GIS editing and analysis programs. ArcGIS Engine is supported on Windows, Linux, and Solaris and provides programming interfaces for .NET, COM, Java, and C++.
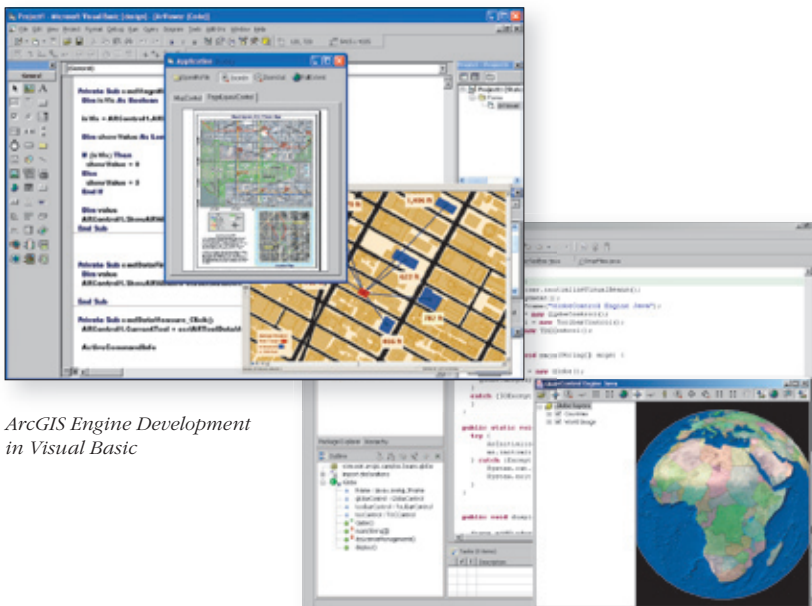
ArcGIS Engine can be used by

- GIS solution developers, third party solution providers, system integrators, and corporate IT development groups
- Windows and Java developers
- Developers delivering cross platform applications
- Existing applications that can benefit from the addition of GIS processing, analysis, and visualization in an industry specific interface

ArcGIS Engine provides

- Standard GIS framework with access to ArcObjects, tools, and visual controls
- Developer kit and runtime products
- Cross platform application development and deployment
- Multiple developer language choices
- Extensive developer resources
- Optional ArcGIS extension functionality
- Cost-effective delivery of custom GIS applications
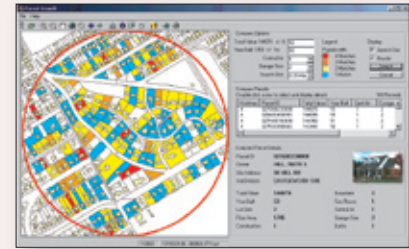- Access to ArcGIS Server for consumption of server-based data and logic

Visit **www.esri.com/arcgisengine** for detailed information on ArcGIS Engine.

ArcGIS Engine Development in Visual Basic

ArcGIS Engine Development in Java

ArcGIS Engine Usage Scenario

Land Management Application

A software development company or systems integrator may have the need to develop a custom, industry specific application that will be used by people having no familiarity with standard GIS software or methods. Developing a desktop application for assessment and land management, for example, will greatly benefit from the use of a cross platform component library, both by shortening the software development cycle and supplying essential GIS functionality.

The application developer had several requirements for the application that made ArcGIS Engine the GIS framework of choice.

- Delivery of a product with a custom, easy-to-learn and use GIS interface
- Did not need or want to deploy standard ArcGIS Desktop applications
- Access to a geodatabase
- Turnkey application delivery via automatically configured and installed runtime software

MapObjects—Windows and Java Editions

Embeddable Mapping Components for Developers

The MapObjects family of products consists of embeddable mapping components available as separate products for Windows and Java developers. MapObjects can be used to build powerful client, server, and Web applications or add GIS capabilities to existing applications. These capabilities include a wide range of map display, geographic query, and data retrieval activities.
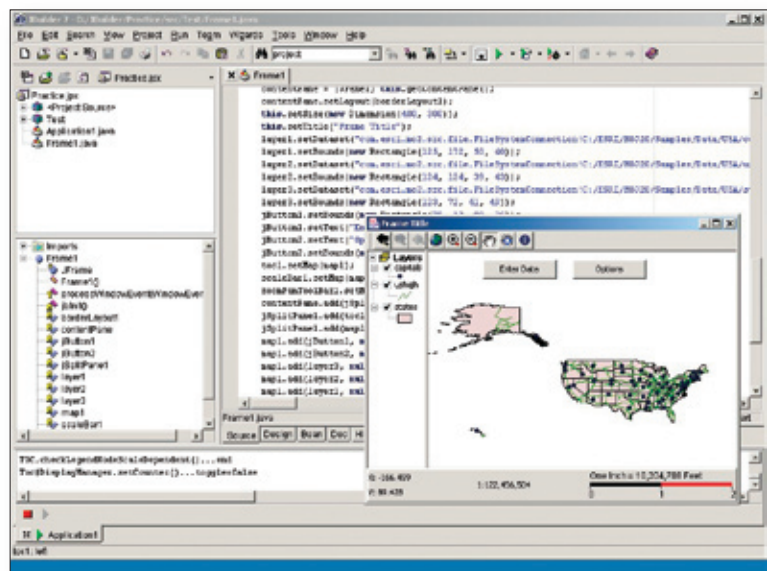
MapObjects can be used by

- Windows developers: MapObjects—Windows Edition is a programmable ActiveX® control that can be used in Visual Basic® for Applications (VBA), Visual C++, and Visual Studio® .NET.
- Java developers: MapObjects—Java Edition ships with a collection of visual JavaBeans that one can drag and drop into Java environments such as JBuilder or Sun ONE Studio.
- Developers building J2EE and .NET applications.
- Existing applications that can benefit from the addition of spatial analysis and visualization.

MapObjects products provide

- Basic mapping and spatial analysis
- Support for a wide variety of data sources and image formats
- On-the-fly map projections
- Geocoding capabilities
- Built-in compatibility with ESRI's ArcIMS Web connectivity middleware
- Lightweight application distribution, small deployment footprint
- Pure Java and COM-based versions to suit development needs
- Cost-effective mapping application delivery

Visit **www.esri.com/mapobjects** for detailed information on MapObjects products.

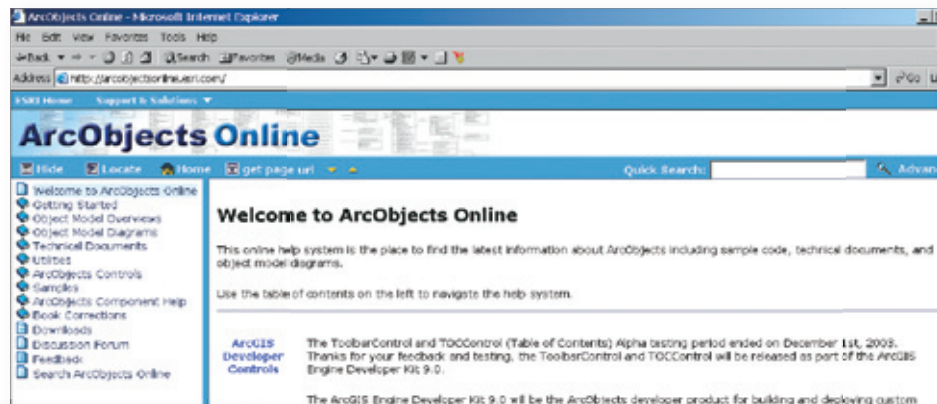*Developing With MapObjects—Java Edition in JBuilder*

ESRI Developer Resources

Integrating Geography With Information Technology

To help you succeed with your applications, ESRI offers a wealth of developer support tips and tricks and real-world scenarios of problem solving with GIS. Resources for developers include

- Online Support Center—Access documentation, samples, downloads, object models, and more.
- Developer Support Group—Obtain expert, personalized assistance.
- Discussion Forums—Benefit from the experience of other developers using ESRI software.
- *ArcUser Online*—Discover tips and tricks from the Developer's Corner.
- *ArcNews Online*—Learn how organizations worldwide are using GIS.
- ESRI in the News—Read what others are saying about ESRI and GIS.
- Instructor-Led and Virtual Campus Training—Receive training either online or at a location near you.

Visit **www.esri.com/support** for more information.

Which ESRI Products Are Best Suited to Your Development Efforts?

Use these tables as a guide to help you focus on which ESRI developer solutions you should investigate further.

Visit **www.esri.com/software** for comprehensive information on each product.

Deployment Scenarios	ArcIMS	ArcWeb for Developers	ArcGIS Server	ArcGIS Engine	MapObjects
Desktop Application				X	X
Mobile Client	X	X	X	X	X
Web Application	X	X	X		X
Server-Based	X	*	X		X

* Services hosted by ESRI

General Suitability	ArcIMS	ArcWeb for Developers	ArcGIS Server	ArcGIS Engine	MapObjects
GIS/Mapping Functionality	Moderate	Moderate	Very High	Very High	Moderate
Data Source Editing			X	X	Shapefiles
ArcGIS Extension Functionality			X	X	
Optimized Annotation and Labeling		X	X	X	
Support for a Variety of Spatial Data Types	High	‡	High	High	Moderate
Geoprocessing			X*	X*	
Geodatabase Aware	X		X	X	
ArcObjects Software-Based			X	X	
Project-Based GIS		X		X	X
Departmental GIS	X	X	X	†	X
Enterprise GIS			X	†	
Support for Server Deployments	X	‡	X	†	X
Available by Subscription		X			
GIS Expertise Needed to Implement Solutions	Low–Moderate	Low	Moderate	Moderate	Low–Moderate
J2EE and .NET Support		X	X	.NET	X
Suitability for Internet Geopublishing	High	High	Moderate	N/A	Moderate

* Post 9.0
† As client to ArcGIS Server
‡ Services hosted by ESRI

ESRI Business Partner Opportunities

Partner With the World Leader in GIS

The worldwide market for GIS technology is growing at an accelerated rate. Each year ESRI and its business partners continue to grow the success of GIS and solve business problems with new software applications, data, and value-added services. ESRI draws on the talents and skills of its business partners to expand end user knowledge of GIS while providing the partner with opportunities to expand its business and attain greater success.

Four primary program areas have been designed to meet partner goals and needs.

- Developer Program
  GIS user demand for ready-to-use applications is on the rise. The ESRI Developer Program is designed to support professional software developers who focus on meeting user needs by building commercial off-the-shelf solutions based on ESRI technologies. The program provides access to software, training, marketing opportunities, and other tools developers need to grow and be successful.

- Reseller Program
  Resellers remarket select ESRI software while providing value-added solutions for customers. ESRI provides the tools that partners require to be successfully positioned to remarket GIS solutions.

- Consultant Program
  Designed for companies that offer consulting services to GIS users, the ESRI consultant business partner typically specializes in a focused industry market. Services provided by these partners may include implementation planning, database development, and application development.

- ArcData℠ Publisher Program
  This is a global program designed for organizations wanting to license and market their data products in digital formats compatible with ESRI software.

For information on how to become an ESRI business partner, visit **www.esri.com/partners**.

"ESRI's innovative GIS software has provided the basis for our entire line of dynamic applications used by emergency management and law enforcement organizations throughout the country. The ESRI Business Partner Program has helped in every phase of our company's growth with continuing support of our marketing and sales efforts as well as the excellent training programs that enhance the technical expertise of our personnel."

Tony Bradshaw, President
Bradshaw Consulting Services

For more than 30 years ESRI has been helping people manage and analyze geographic information. ESRI offers a framework for implementing GIS technology 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.

Corporate

ESRI
380 New York Street
Redlands, California
92373-8100, USA
Telephone: 909-793-2853
Fax: 909-793-5953

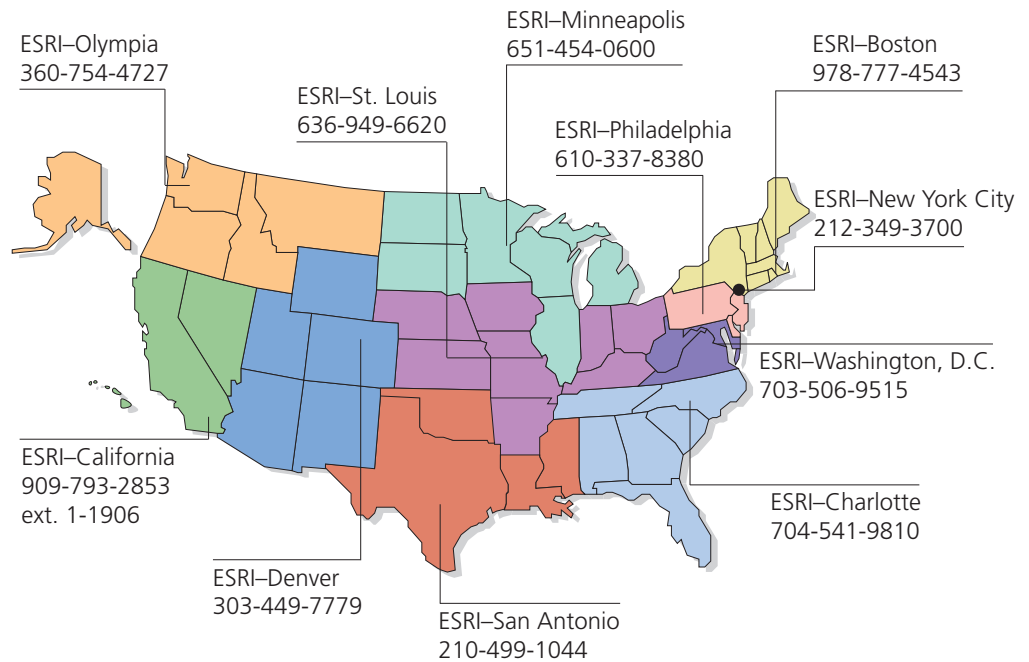For more information
on ESRI, call

1-800-447-9778

(1-800-GIS-XPRT)

or contact an ESRI reseller near you.

Send e-mail inquiries to

info@esri.com

Visit ESRI's Web page at

www.esri.com

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China (Hong Kong) www.esrichina-hk.com	Indonesia/Malaysia 62-21-527-1023 603-7874-9930	Portugal www.esri-portugal.pt	United Kingdom www.esriuk.com
			Venezuela www.esriven.com

Federal Supply Schedule
No. GS-35F-5086H

Place ESRI business partner or distributor address here.