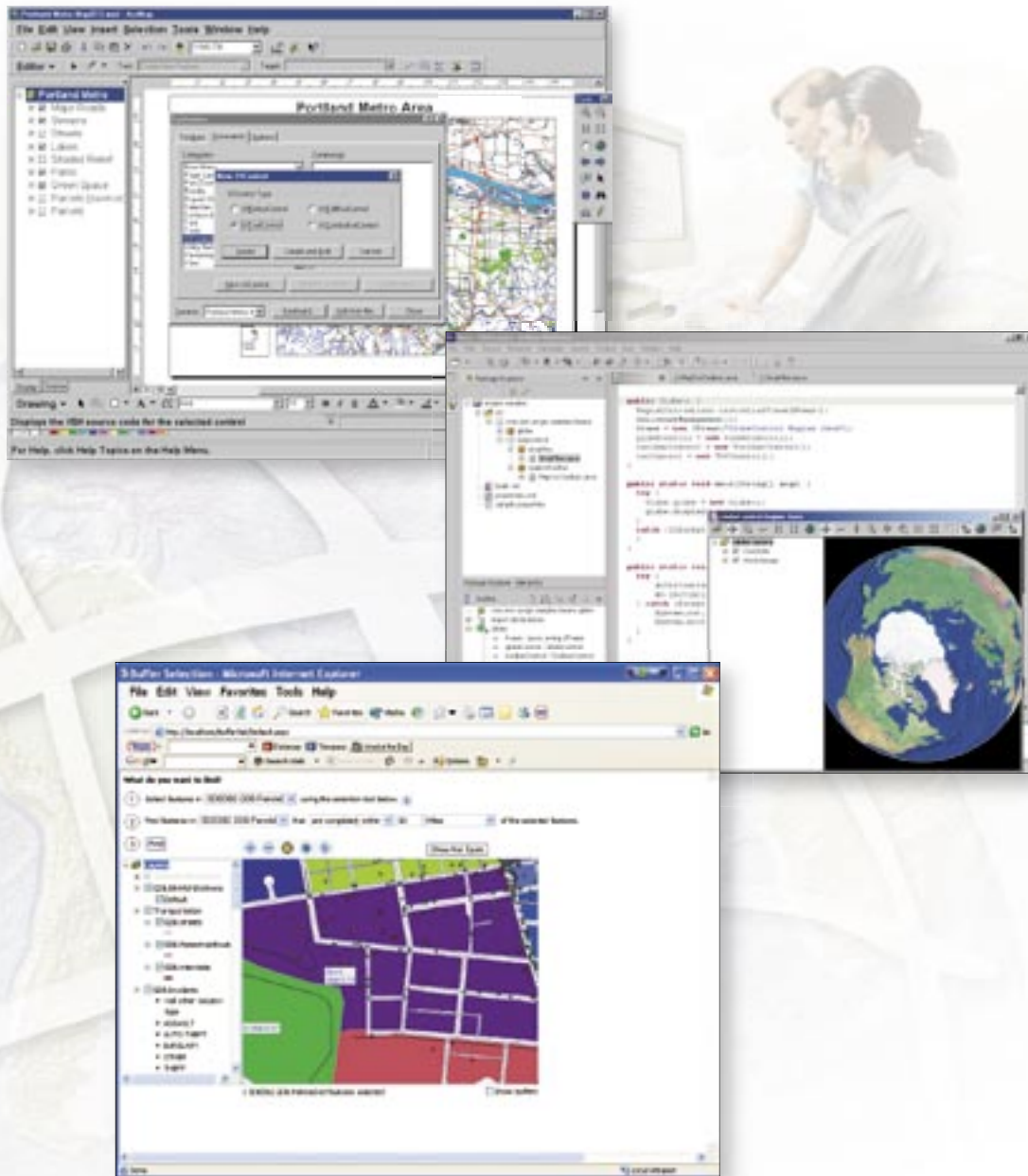


ArcGIS® for Developers

A Complete System for Deploying ArcObjects™ Anywhere



Arc
ESRI GIS™



ArcGIS® for Developers

A Complete System for Deploying ArcObjects™ Anywhere

ESRI® ArcGIS® provides a complete system for developing desktop and server applications that allows developers to

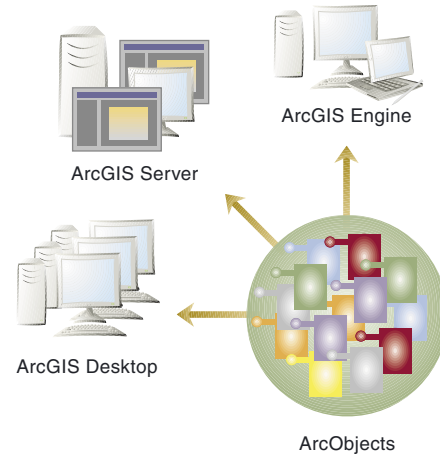
- Embed geographic information system (GIS) and mapping functionality in other applications.
- Build and deploy custom desktop applications.
- Configure/Customize ArcGIS products such as ArcView®, ArcEditor™, and ArcInfo™.
- Extend the ArcGIS architecture and data model.
- Build Web services and server-based applications.

ArcObjects Technology

Through a carefully planned evolution, ArcGIS has come to be based on a modular, scalable, cross platform architecture comprising libraries of software components called ArcObjects™.

ArcObjects products are platform-independent software components, written in C++, that provide services to support GIS applications, either on the desktop in the form of thick and thin clients or on a server for Web and traditional client/server deployments. Because this architecture supports a number of unique ArcGIS products with specialized requirements, all ArcObjects components are designed and built to support a multiuse scenario.

Libraries of appropriate ArcObjects are packaged into Developer Kits for ArcGIS, providing a common developer experience across ArcGIS Desktop, ArcGIS Engine, and ArcGIS Server products. ArcGIS also provides a number of deployment options and resources as well as extensive tools for developers. These tools include industry specific data models, an integrated help system, object library diagrams, sample code, utilities, and documentation.

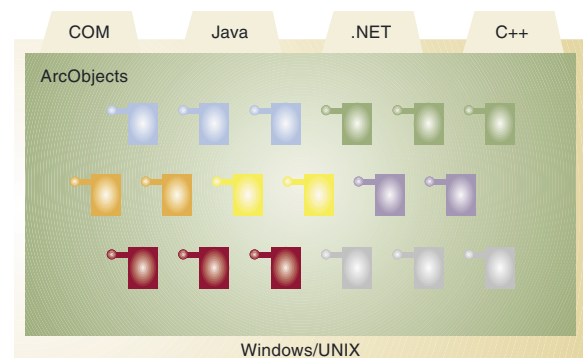


ArcGIS Development and Deployment Options

Developers can customize ArcGIS Desktop with COM-compliant languages such as Visual Basic®. The extensive Windows®-based user interfaces for ArcGIS Desktop limit development to COM and .NET environments.

With ArcGIS Engine and ArcGIS Server, developers also have the ability to deploy ArcGIS solutions as independent applications on the desktop or as Web services across the Intranet or Internet.

ESRI offers developers flexibility in selecting a development platform for ArcGIS. ArcObjects is at the core of these choices, offering an integrated collection of GIS software objects written in C++. Developers can choose from three deployment platforms (ArcGIS Desktop, ArcGIS Engine, and ArcGIS Server) and four development environments (Java™, .NET, C++, and COM) and deploy applications on a variety of Windows and UNIX® operating systems.

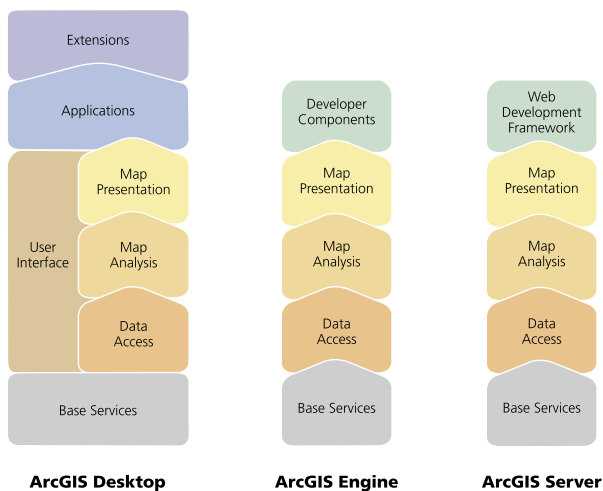


“As we move into enterprise GIS at an organizational level, more users will have access to GIS centric applications without realizing they are using GIS. With ArcGIS, at last, it is possible to exploit the benefits of centralized technology for GIS applications that traditionally required out-of-the-box desktop software. This is an exciting time for this type of GIS development.”

Andrew Cox
Senior Scientist—GIS Development
Environment Agency (UK)

Build on Common Foundations

Many of the ArcObjects that make up ArcGIS are used within all of the ArcGIS products. The diagram below shows that the objects within the broad categories (Base Services, Data Access, Map Analysis, and Map Presentation) are contained in all three products. These four categories contain the majority of the GIS functionality exposed to developers and users in ArcGIS.



This commonality of function between ArcGIS products is important for developers to understand, since it means that when working in a particular category much of the development effort can be transferred among the ArcGIS products with little change to the software.

The ArcGIS architecture provides rich functionality to the developer, but it is not a closed system. The ArcGIS architecture is extendable by developers external to ESRI. ArcGIS provides many possibilities for the sharing and reuse of ArcObjects created by ESRI, you, and others in the GIS community.



An ArcGIS Field Application on a Tablet PC Using Ink Technology for Annotation

ArcGIS Architecture Focuses On

- **Modularity**—The ArcGIS architecture is divided into a number of logical libraries so that users can use and deliver only those libraries they need for an application.
- **Extensibility**—You can add geospatial functionality specific to an organization’s specific needs.
- **Scalability**—ArcObjects components perform effectively in all intended operating environments, from single user desktop applications to multiuser/multithreaded server applications.
- **Standards and Interoperability**—ArcGIS Server and ArcGIS Engine support multiple operating systems, database management systems, and development environments in addition to numerous GIS and data standards.
- **Compatibility**—ArcObjects remains equivalent, both functionally and programmatically, to ArcObjects in previous releases of ArcGIS.
- **Flexibility**—You can deploy GIS functionality on the server (ArcGIS Server), in custom applications (ArcGIS Engine), or in commercial off-the-shelf products (ArcView, ArcEditor, ArcInfo).

For more information on ArcObjects, visit www.esri.com/arcgisdeveloper.

Customizing and Extending ArcGIS Desktop

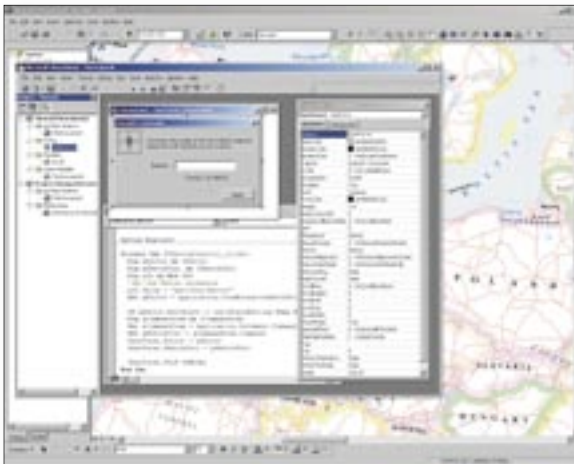
ArcGIS Desktop is a suite of GIS software products: ArcView, ArcEditor, and ArcInfo. These products serve GIS and vertical industry professionals with a broad range of geographic data management, spatial editing, and cartographic visualization functionality. ArcGIS Desktop products can host a variety of extension products such as ArcGIS Spatial Analyst, ArcGIS Geostatistical Analyst, ArcGIS 3D Analyst™, and others. As is the case with other ArcGIS products, ArcObjects is the development platform and underlying technology for ArcGIS Desktop.

Customize ArcGIS Desktop With Drag and Drop Ease and VBA

The most common ways that developers will customize ArcGIS Desktop is through the applications' "drag and drop" menu options and Visual Basic for Applications (VBA), which is included within the products. Through VBA, one can leverage the application framework that exists in ArcGIS Desktop applications for general data management and map presentation tasks and extend the applications with custom user interface commands, tools, menus, and modules. Using VBA within ArcGIS Desktop, one can accomplish the majority of customization needs with relatively little development effort writing VBA scripts and macros.



Drag and Drop ArcView Customization



Extending ArcInfo With Visual Basic

Extend ArcGIS Desktop With COM-Compliant Languages

More advanced developers can further extend ArcGIS Desktop with custom map layers, renderers, property pages, and data sources. These customizations require the use of a COM-compliant language and can be accomplished in a developer environment such as Visual Basic, Visual C++®, or Visual Studio .NET to create dynamic link libraries (DLLs), which plug in to a desktop application as a new control or component.

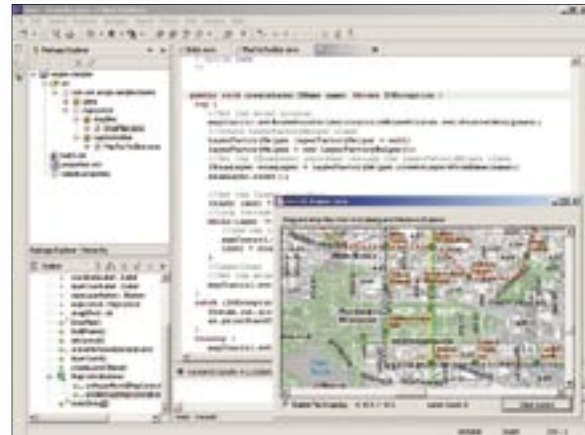
Creating Custom GIS Applications With ArcGIS Engine

ArcGIS Engine is a comprehensive set of cross platform ArcObjects used to deliver custom GIS and mapping desktop applications or add new geospatial functionality to existing applications. ArcGIS Engine applications can vary from simple map viewers to GIS editing and analysis programs, each with a custom user interface. In cases where users need specialized access to GIS, ArcGIS Engine applications provide an alternative solution to general software products.

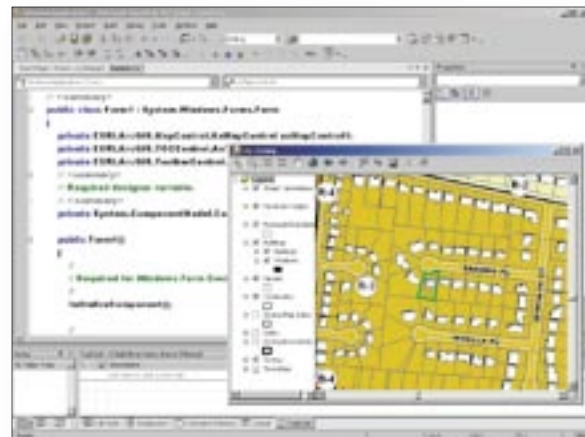
ArcGIS Engine consists of two products: a software development kit with which to build and a redistributable runtime to enable execution of the completed applications.

ArcGIS Engine Developer Kit

ArcGIS Engine Developer Kit is a component-based development product for building custom GIS and mapping applications. It is suitable for building basic mapping up through comprehensive, dynamic GIS applications. The developer kit provides access to large collections of ArcObjects and includes visual developer controls, available as ActiveX® controls, JavaBeans, .NET Windows controls, and Motif widgets, for creating mapping user interfaces. An integrated help system is provided for supported APIs (COM, Java, .NET, and C++) along with object model diagrams, utilities, and programming examples.



Building an ArcGIS Engine Application in Java



Developing With ArcGIS Engine in Visual Studio .NET



ArcGIS Engine Embedded in Microsoft Word

ArcGIS Engine Runtime

ArcGIS Engine Runtime is the product that contains the core ArcObjects that enable the execution of the end user application and will be installed on each computer that is running an ArcGIS Engine application. Standard Engine Runtime provides the core functionality of all ArcGIS applications. Standard Engine Runtime can be enhanced with full read–write access to a multiuser geodatabase along with advanced functionality for 3D visualization, spatial analysis, and detailed U.S. street data.

Delivering Enterprise GIS Applications With ArcGIS Server

ArcGIS Server is a platform for delivering enterprise GIS applications that are centrally managed, support multiple users, include advanced GIS functionality, and are built using industry standards. ArcGIS Server implements GIS business logic in an IT standards-based server environment. Previously, this business logic was available only in GIS desktop solutions. ArcGIS Server allows users throughout the enterprise—at the main office, at regional offices, at home, or in the field—to access GIS capabilities via a single shared system.

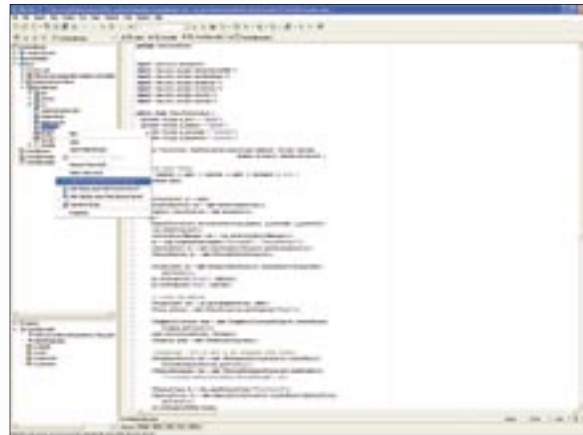
Support for IT Computing Standards

ArcGIS Server exposes the full depth of ESRI's geospatial functionality using open, standards-based application program interfaces to ArcObjects libraries. This standards-based (Windows, UNIX, Java, .NET, XML/SOAP, and HTTP) approach allows ArcGIS Server to provide GIS capabilities to a wide range of distributed users.

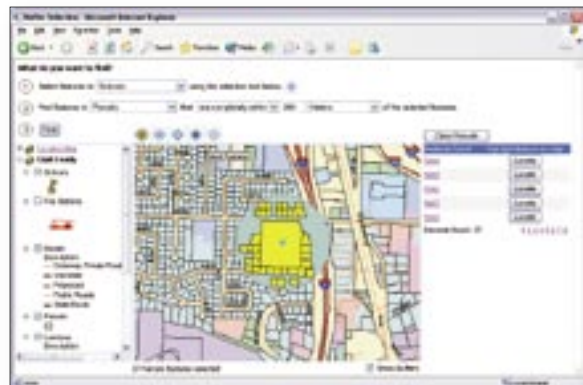
Developers can use ArcGIS Server to build Web applications, Web services, and other enterprise applications that run within standard .NET and J2EE application servers. ArcGIS Server can also be used to deliver desktop applications that interact with the server in a client/server mode.

A GIS Server and an Application Developer Framework

ArcGIS Server consists of two components: a GIS server and an Application Developer Framework (ADF) for .NET and Java. The GIS server hosts ArcObjects for use by Web and desktop applications and provides a scalable environment for running ArcObjects on the server. ADF supports building and deploying .NET or Java applications that use ArcObjects running within the GIS server. ADF includes a software developer kit with software objects, Web controls, Web application templates, developer help, and code samples.



Building an ArcGIS Server Java Application in JBuilder



A Browser-Based ArcGIS Server Application

Use ArcWeb™ Services With ArcGIS Server

ArcWeb Services provide a suite of SOAP-based Web services that can be integrated easily into any Web or desktop application. When used with ArcGIS Server, they can shorten development cycles by allowing developers to take advantage of ready-to-use GIS functionality and terabytes of data.

From simple mapping to more complex tasks, such as geocoding and multipoint routing, ArcWeb Services make developing lightweight, Web-enabled applications simpler and faster than ever before.

Which ArcGIS Products Are Best Suited for Your Development Efforts?

Visit www.esri.com/arcgisdeveloper for more information.

Deployment Scenarios	ArcGIS Desktop	ArcGIS Engine	ArcGIS Server	ArcWeb Services
Desktop Application	X	X		
Mobile Client	X	X	X	%
Web Application			X	%
Server-Based			X	%

Functionality Considerations	ArcGIS Desktop	ArcGIS Engine	ArcGIS Server	ArcWeb Services
GIS/Mapping Capabilities	High	High	High	Moderate
Data Source Editing: Personal Geodatabase, Shapefiles	X	X	X	
Data Source Editing: Multiuser Geodatabase	ArcEditor, ArcInfo	X	X	
ArcGIS Extension Functionality	All	Several	Several	
Internet Geopublishing			Moderate	High
Ad Hoc Query and Analysis	X	Can build	Can build	
Ready to Use Out of the Box	X			

Developer Considerations	ArcGIS Desktop	ArcGIS Engine	ArcGIS Server	ArcWeb Services
Development APIs				
COM	X	X	X	
.NET		X	X	
Java		X	X	
C++		X	X	
XML/SOAP			X	X
ArcObjects Based	X	X	X	
Support for Server Deployments		#	X	%
Platform Support				
Windows	X	X	X	X
UNIX		X ‡	X ‡	X
J2EE Support			X	X
.NET Support		X	X	X
Expertise Needed to Implement Solutions	Low–Moderate	Moderate	High	Low

% Services hosted by ESRI

As a front end to ArcGIS Server

‡ Post 9.0 release



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.

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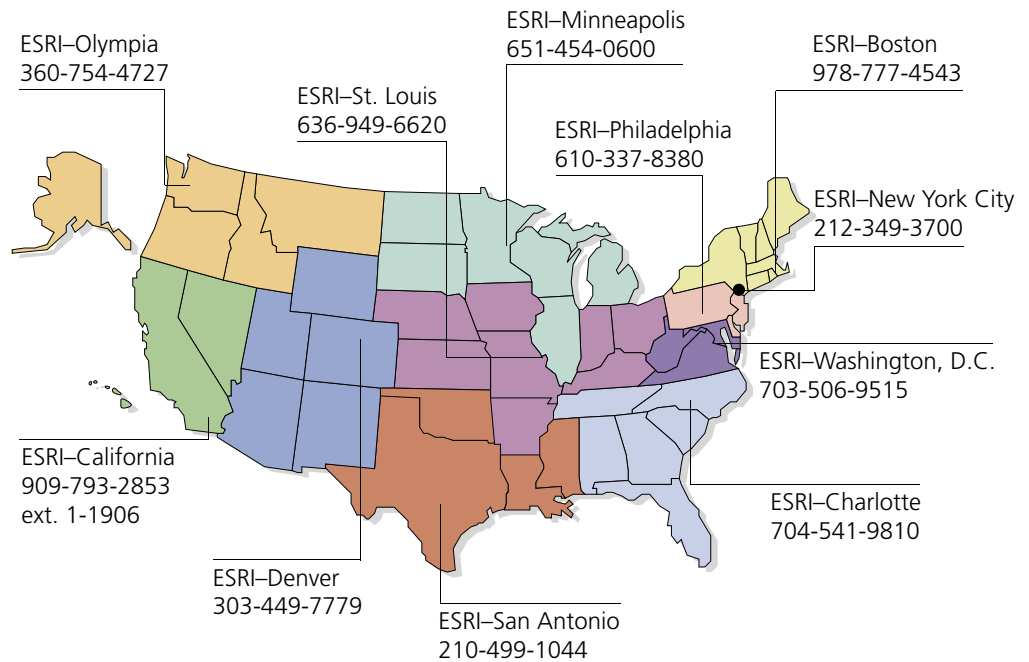
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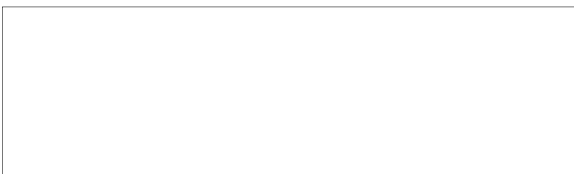
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