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Introducing ArcGIS Server

ESRI® ArcGIS® Server is a platform for building enterprise geographic information system (GIS) applications that are centrally managed, support multiple users, include advanced GIS functionality, and are built using industry standards. ArcGIS Server manages geographic resources, such as maps, locators, and software objects, for use by applications.

This chapter will introduce you to ArcGIS Server, how you use it, and its different components. Topics covered in this chapter include:

- an overview of ArcGIS 9 development • the ArcGIS Server product • what you can do with ArcGIS Server • the ArcGIS Server Developer Kits • a description of this book*

WHO SHOULD READ THIS BOOK?

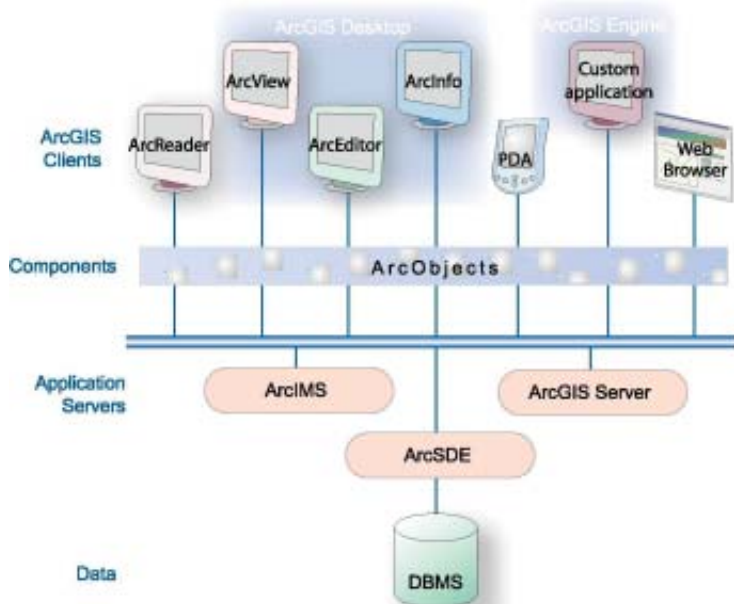
This book will be of greatest use to programmers who want to use ESRI® ArcGIS Server to build server applications, such as Web services and Web applications, that do simple mapping or that include advanced GIS functionality. However, this book provides a general explanation of the use of ArcGIS Server and the possibilities when building and deploying custom applications and solutions. Several scenarios will illustrate, with code examples, some of the different types of applications that can be developed with the ArcGIS Server and the Application Developer Framework (ADF) developer kits.

This book will also be of use to ArcGIS Server administrators who need to administrate aspects of an ArcGIS Server, such as its set of server objects and its output directories.

ARC GIS 9 OVERVIEW

ArcGIS 9 is an integrated family of GIS software products for building a complete GIS. It is based on a common library of shared GIS software components called ArcObjects™. ArcGIS 9 consists of four key parts:

- ArcGIS Desktop—an integrated suite of advanced GIS applications.
- ArcGIS Engine—embeddable GIS component libraries for building custom applications using multiple application programming interfaces (APIs).
- ArcGIS Server—a platform for building server-side GIS applications in enterprise and Web computing frameworks. Used for building both Web services and Web applications.
- ArcIMS®—GIS Web server to publish maps, data, and metadata through open Internet protocols.



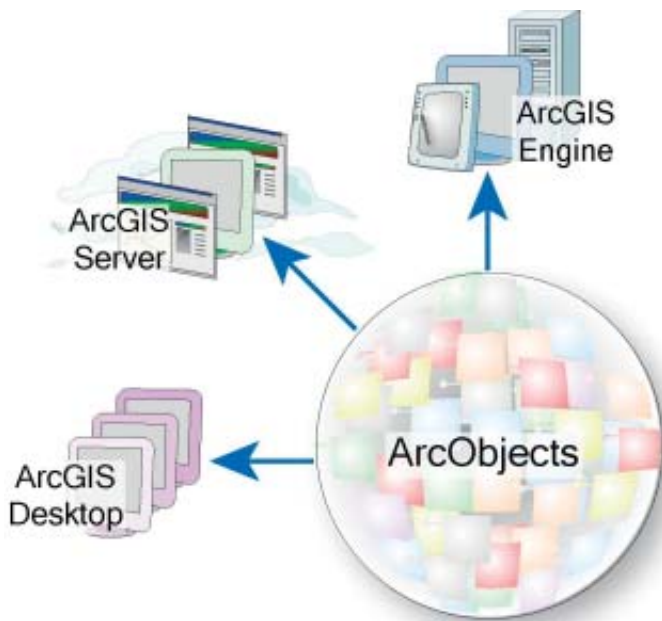
Each of the GIS frameworks also includes the ArcSDE® gateway, an interface for managing geodatabases in numerous relational database management systems (RDBMSs).

ArcGIS 9 extends the system with major new capabilities in the areas of geoprocessing, 3D visualization, and developer tools. ArcGIS Engine and ArcGIS Server, developer-centric products, make ArcGIS a complete system for application and server development.

There is a wide range of possibilities when developing with ArcGIS. Developers can:

- Configure/Customize ArcGIS applications such as ArcMap™ and ArcCatalog™
- Extend the ArcGIS architecture and data model
- Embed maps and GIS functionality in other applications with ArcGIS Engine
- Build and deploy custom desktop applications with ArcGIS Engine
- Build Web services and applications with ArcGIS Server

ArcGIS 9 has a common developer experience across all ArcGIS products (Engine, Server, and Desktop). This book focuses on building and deploying server applications using the ArcGIS Server. Developers wanting to customize the ArcGIS Desktop applications or work with the ArcGIS Engine should refer to the *ArcGIS Desktop Developer Guide* and *ArcGIS Engine Developer Guide*.

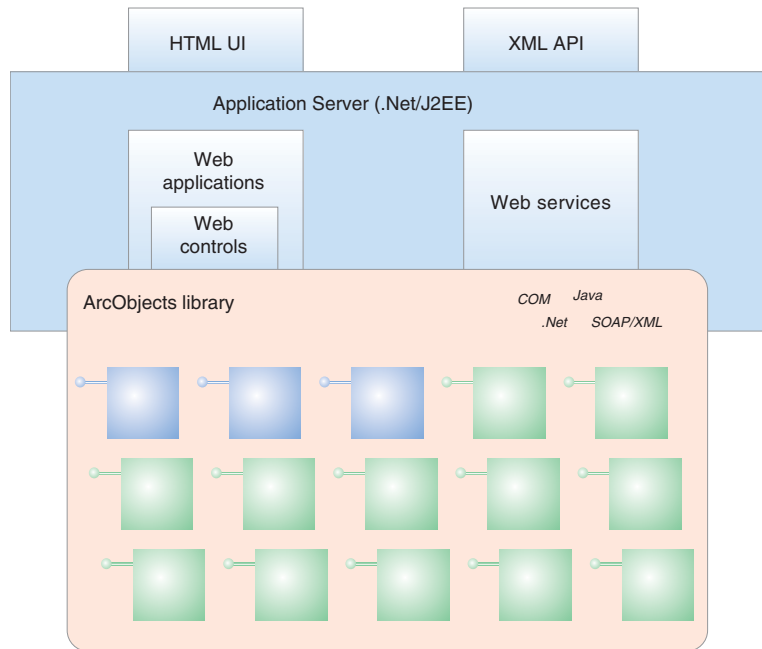


The ArcGIS system is built and extended using software components called ArcObjects. ArcObjects components are software objects that have multiple developer APIs. These include Component Object Model (COM), .NET, Java™, and C++. Developers can use these APIs to build applications that make use of ArcObjects functionality. ArcObjects is at the core of all the ArcGIS products: ArcGIS Desktop, ArcGIS Engine, and ArcGIS Server.

The ArcGIS Server provides a new set of deployment options and resources for developers as well as new and improved tools for developers to work with. ArcGIS Server is a set of the core ArcObjects and a framework for running ArcObjects in a server. The ArcGIS Server ADF is a set of components and Web controls that allow developers to build and deploy Web services and Web applications that make use of ArcObjects running within a server.

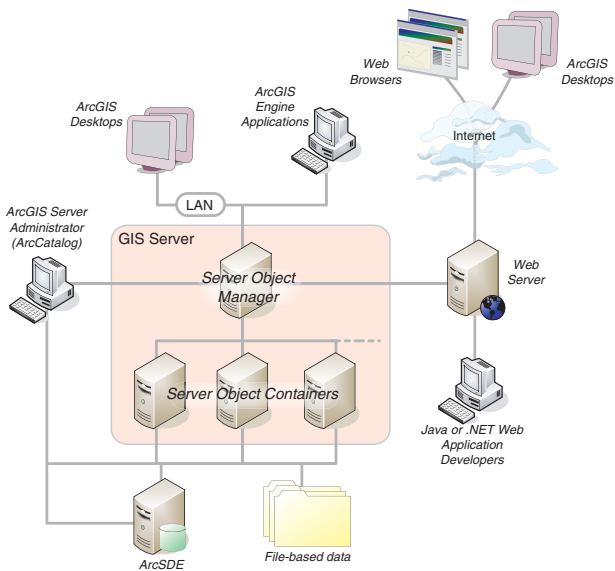
ArcGIS Server is a platform for building enterprise GIS applications that are centrally managed, support multiple users, include advanced GIS functionality and are built using industry standards. ArcGIS Server manages geographic resources, such as maps, locators, and software objects, for use by applications.

Developers can use ArcGIS Server to build Web applications, Web services, and other enterprise applications, such as those based on Enterprise JavaBeans™ (EJBs). Developers can use ArcGIS Server to build desktop applications that interact with the server in client/server mode. ArcGIS Server also supports out-of-the-box use by ArcGIS Desktop applications for server administration, simple mapping, and geocoding over a local area network (LAN) or over the Internet.



The ArcGIS Server consists of two components: a GIS server and an ADF for .NET and Java. The GIS server hosts ArcObjects for use by Web and desktop applications. It includes the core ArcObjects library and provides a scalable environment for running ArcObjects in the server. The ADF allows you to build and deploy .NET or Java desktop and Web applications that use ArcObjects running within the GIS server.

The ADF includes a software developer kit (SDK) with software objects, Web controls, Web application templates, developer help, and code samples. It also includes a Web application runtime, which allows you to deploy Web applications without having to install ArcObjects on your Web server.



The ArcGIS Server is a distributed system that provides ArcObjects functionality to both Web applications and client/server desktop applications.

KEY FEATURES OF ARC GIS SERVER

Standard GIS framework

ArcGIS Server provides a standard framework for developing GIS server applications. The world's most popular GIS software (ArcView®, ArcEditor™, and ArcInfo®) is built from this same set of software objects. ArcGIS Server is both robust and extensible, and its rich functionality allows developers to concentrate on solving organizational problems, not building GIS functionality from scratch.

Cost-effective deployment

ArcGIS Server supports enterprise applications, such as Web applications, running on servers, and supporting many users. The ADF runtime is not licensed. This allows multiple server applications to run on multiple Web servers, incurring the cost of licensing the GIS server to support the number of users of those applications.

Web controls

ArcGIS Server provides a set of Web controls. These Web controls simplify the programming model for including mapping functionality in your Web application, and allow developers to focus on more advanced GIS functionality aspects of their applications.

Web application templates

ArcGIS Server provides a set of Web application templates as a starting point for developers who want to build Web applications using the Web controls, and as an example of how to use the Web controls to build Web applications.

Cross-platform functionality

The ArcGIS Server ADF for Java runs on a variety of UNIX® platforms and supports numerous Web servers. Your Java Web applications and Web services will fit within your standard Web server environments.

The GIS server itself is supported on Windows®, Sun Solaris, and Red Hat Linux. The ADF for .NET is available on a number of Windows platforms. For detailed information on the supported platforms, refer to the ESRI support site at <http://support.esri.com>.

Cross-developer languages

ArcGIS Server supports a variety of developer languages for its use including .NET and Java for building Web applications and Web services; COM and .NET for extending the GIS server with custom components; and COM, .NET, Java, and C++ for building desktop client applications. This allows the objects to be programmed using a wide range of tools and should not require your programming staff to learn a new or proprietary language.

ArcGIS Server extensions

The ArcGIS Server Developer Kits include the extended functionality of ArcGIS 3D Analyst™, ArcGIS Spatial Analyst, and ArcGIS Network Analyst.

Developer resources

The ArcGIS Server Developer Kits provide a help system along with object model diagrams (OMDs), Web application templates, and sample code to help developers get started.

WHY ARC GIS SERVER?

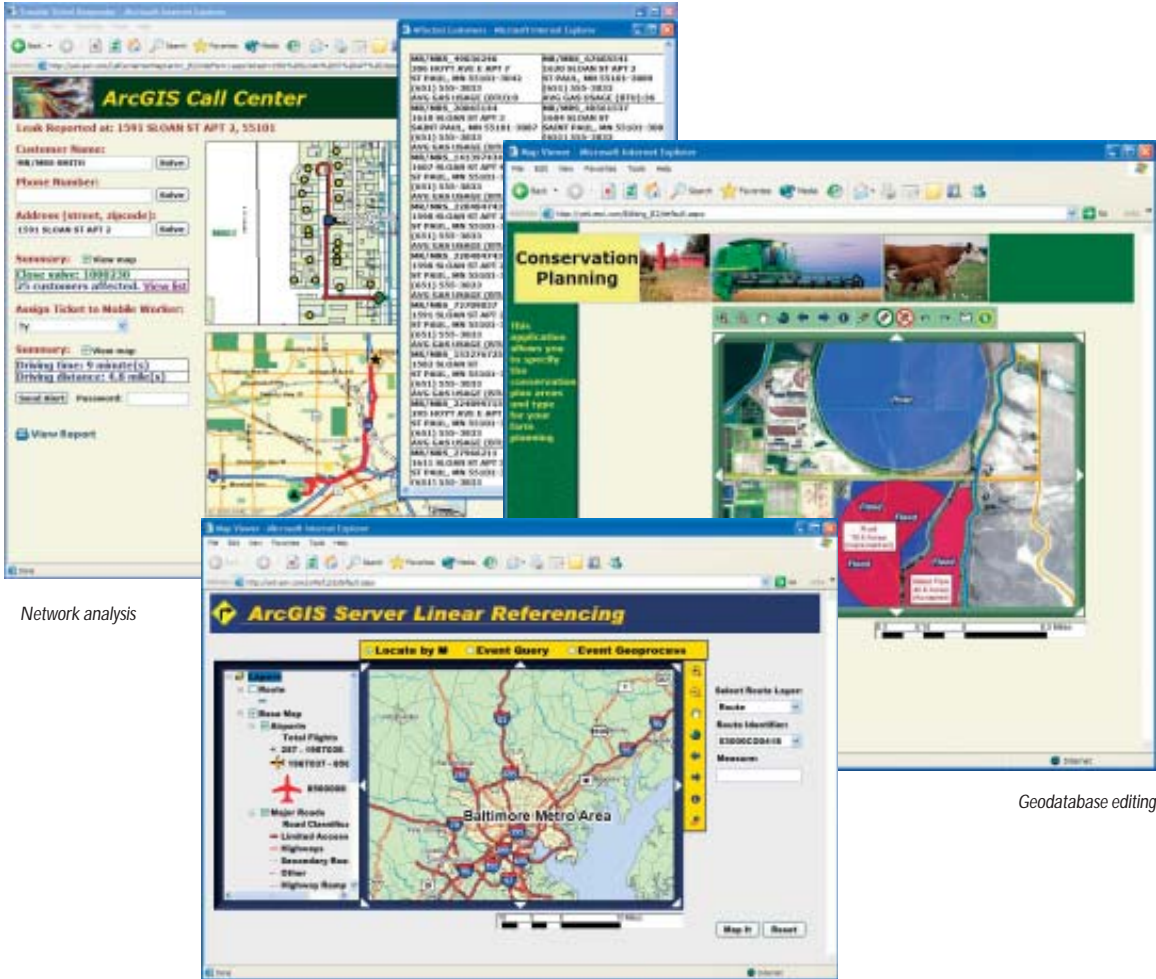
ArcGIS Server allows developers and system designers to implement a centrally managed GIS. This gives the advantage of lower cost of ownership through single GIS applications (such as a Web application) that can scale to support multiple users and saves the cost of installing desktop applications on each user's machine. This, along with the ability of ArcGIS Server to leverage Web services, makes it ideal for integration with other critical information technology (IT) systems, such as relational databases, Web servers, and enterprise application servers.

ArcGIS Server complements the ESRI family of server products: ArcIMS, ArcSDE, and ArcGIS Server. ArcIMS provides high-performance Web geopublishing of maps and metadata, ArcGIS Server is a centrally managed GIS for advanced GIS applications, and ArcSDE manages data access for ArcGIS Server and ArcIMS.

There are a number of different roles that a user of ArcGIS Server may take:

WEB APPLICATION USERS

This is the largest group of users of ArcGIS Server. A Web application user uses an Internet browser to connect to a Web application written and deployed by a Web application developer. That user interacts with the Web application to make use of the GIS and other functionality it presents. Web application users themselves may have little or no knowledge that they are using GIS functionality provided by a GIS server.



Network analysis

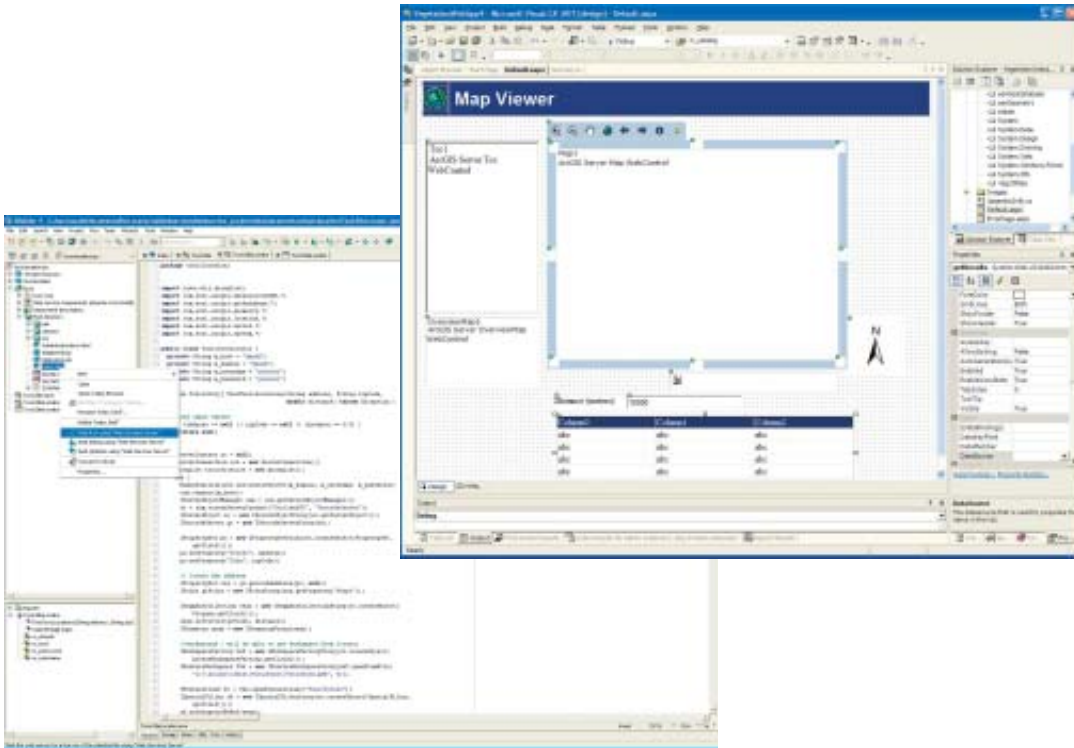
Geodatabase editing

Web application users will use their browsers to connect to GISWeb applications built and deployed by a developer.

Linear referencing and map composition

WEB APPLICATION AND WEB SERVICE DEVELOPERS

Web application and Web services developers will use the ADF to build and deploy .NET and Java Web applications and Web services. These Web applications and Web services include advanced functionality by connecting to a GIS server and make use of ArcObjects running within the server. Developers can build Web services to expose maps and address locators for use by ArcGIS Desktop users over the Internet. Developers can also build application Web services that encapsulate GIS functionality and are consumable by other programs.

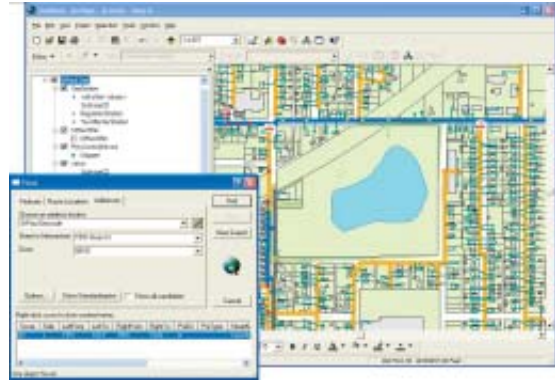
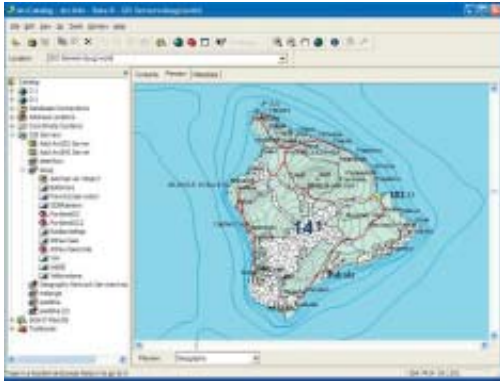


ARC GIS DESKTOP USERS

Web application and Web service developers will use standard development environments, such as Microsoft Visual Studio .NET and JBuilder™, to build ArcGIS Server applications.

ArcGIS Desktop users can use ArcMap and ArcCatalog to connect to a GIS server on their local network over the LAN or to a Web service catalog over the Internet. In both cases, users can use the maps and address locators published as map and geocode server objects to do basic mapping and geocoding.

ArcGIS Desktop is also the software that you use to create the data that is used by ArcGIS Server applications. ArcGIS Desktop provides the tools to build the databases, map documents, and address locators that are served by ArcGIS Server.

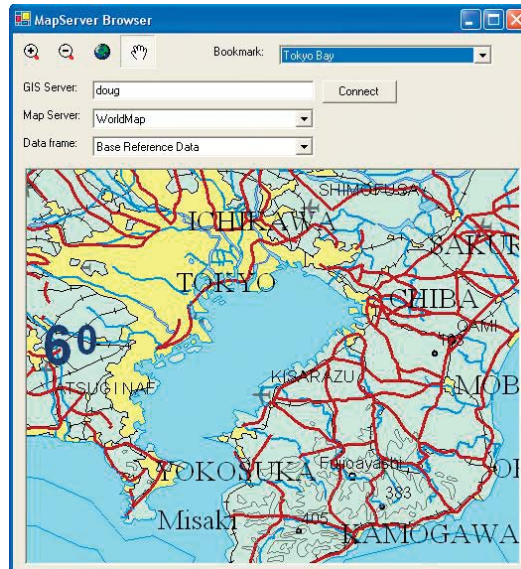


ArcGIS Desktop users can connect to a GIS server directly over a LAN or over the Internet and make use of the map and geocode server objects running in the GIS server.

ARC GIS DESKTOP, ARC GIS ENGINE DEVELOPERS

ArcGIS Engine and ArcGIS Desktop developers can also develop applications that connect to a GIS server and make use of ArcObjects running within the server. This allows the integration of desktop functionality with server functionality.

Developers can also build desktop applications that work with the GIS server in a client/server mode. These desktop applications can be built using the ArcGIS Server ADFs or with the ArcGIS Engine Developer Kit.



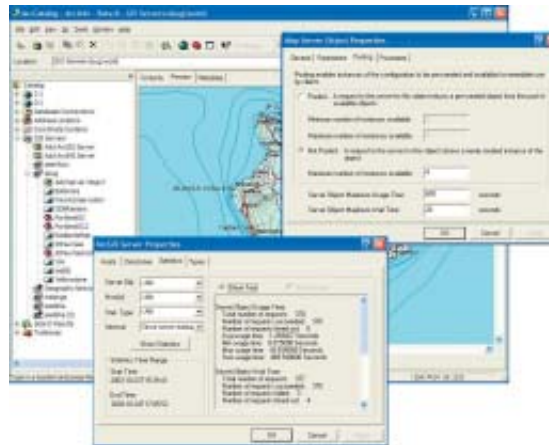
GIS SERVER ADMINISTRATORS

The GIS server administrator uses ArcCatalog to connect to a GIS server on the local network and administer aspects of the server itself and the set of server objects running in the server. The GIS server administrator will add machines to and remove them from the system to perform the server's GIS processing, manage the server's output directories, and monitor statistics and output logs to troubleshoot any errors or performance problems.

The GIS administrator will also use ArcCatalog to manage and configure the server objects running in the server that are used by desktop and Web applications. In each case, the administrator will work with the application developer to understand the nature of the application and the number of users it needs to support to make decisions about its configuration.

The GIS administrator must make use of operating system tools to provide appropriate privileges to the ArcGIS Server accounts on data and output directories needed to run server objects and support any applications. The GIS administrator must also make use of operating system tools to control user access to the GIS server.

The GIS server administrator uses ArcCatalog to connect to a GIS server on the local network and administer aspects of the server itself and the set of server objects running in the server.



As an ArcGIS Desktop user, you can perform the following functions using ArcGIS Server:

- Connect to a GIS server on your local network over the LAN.
- Connect to an ArcGIS Server Web services catalog.

Through your LAN or Internet connection you can:

- Use ArcCatalog to preview, pan, zoom throughout a map server, and identify features on a map server.
- Use ArcCatalog to batch geocode addresses using a geocode server.
- Use ArcMap to add a map server as a layer to your local map document.
- Use ArcMap to pan and zoom throughout a map server.
- Use ArcMap to identify, search for, and find features on a map server.
- Use ArcMap to interactively toggle layers on and off.
- Use ArcMap to find addresses with a geocode server.

As a developer, you can implement these and many other functions in Web applications and Web services built with the ADF developer kit:

- Display a map with multiple map layers such as roads, streams, and boundaries.
- Pan and zoom throughout a map.
- Identify features on a map by pointing at them.
- Search for and find features on a map.
- Display labels with text from field values.
- Draw images from aerial photography or satellite imagery.
- Draw graphic features such as points, lines, circles, and polygons.
- Draw descriptive text.
- Select features along lines and inside boxes, areas, polygons, and circles.
- Select features within a specified distance of other features.
- Find and select features with a Structured Query Language (SQL) expression.
- Render features with thematic methods such as value map, class breaks, and dot density.
- Dynamically display real-time or time series data.
- Find locations on a map from a street address or intersection you provide.
- Transform the coordinate system of your map data.
- Perform geometric operations on shapes to create buffers; calculate differences; or find intersections, unions, or inverse intersections of shapes.
- Perform advanced spatial and attribute queries.
- Perform network analysis.
- Manipulate the shape or rotation of a map.

- Create and update geographic features and their attributes.
- Perform geodatabase management tasks such as reconciling versions and validating topology.

You'll find ArcGIS Server suitable for building basic mapping to advanced GIS applications. In addition to the above core functionality, ArcGIS server can be enhanced to include support for specialized extensions. The available extensions for ArcGIS Server are:

SPATIAL EXTENSION

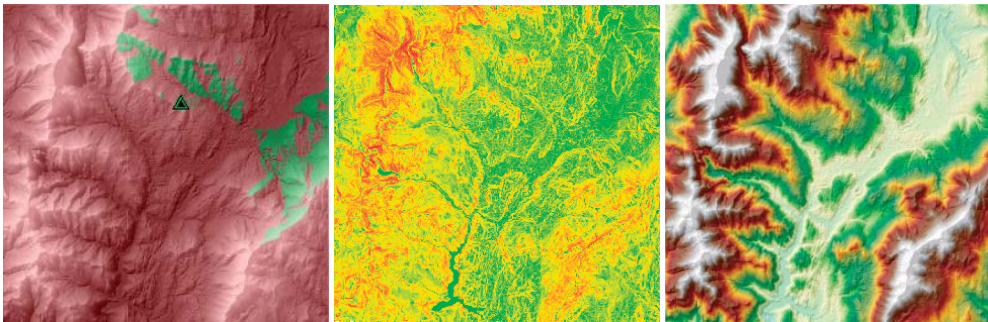
The ArcGIS Server Spatial extension provides a powerful set of functions that allows you to create, query, and analyze cell-based raster data. Using the spatial extension to the GIS server, your applications can derive information about your data, identify spatial relationships, find suitable locations, and calculate the cost of traveling from one point to another.

The Spatial extension for ArcGIS Server provides a powerful set of tools that allows you to create, query, and analyze cell-based raster data.



3D EXTENSION

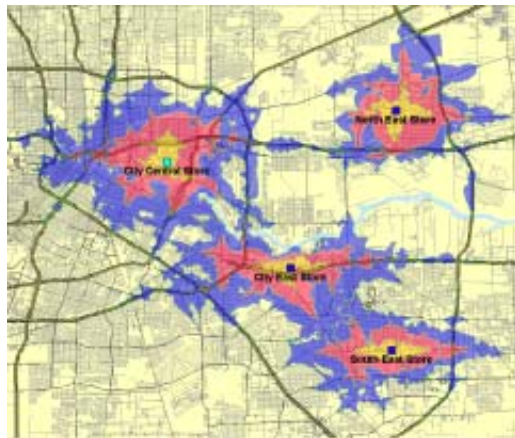
The ArcGIS Server 3D extension provides a powerful set of functions that allows your applications to create and analyze surfaces.



The 3D extension for ArcGIS Server allows you to create and analyze surfaces. These functions include viewshed, slope, aspect, hillshade analysis, and more.

NETWORK ANALYST EXTENSION

The ArcGIS Server Network extension enables developers to build Web applications and Web services that solve a variety of problems on network datasets. Tasks, such as finding the most efficient travel route, generating travel directions, finding the closest facility, and defining service areas based on travel time, are some examples of the capabilities of the Network Analyst extension.

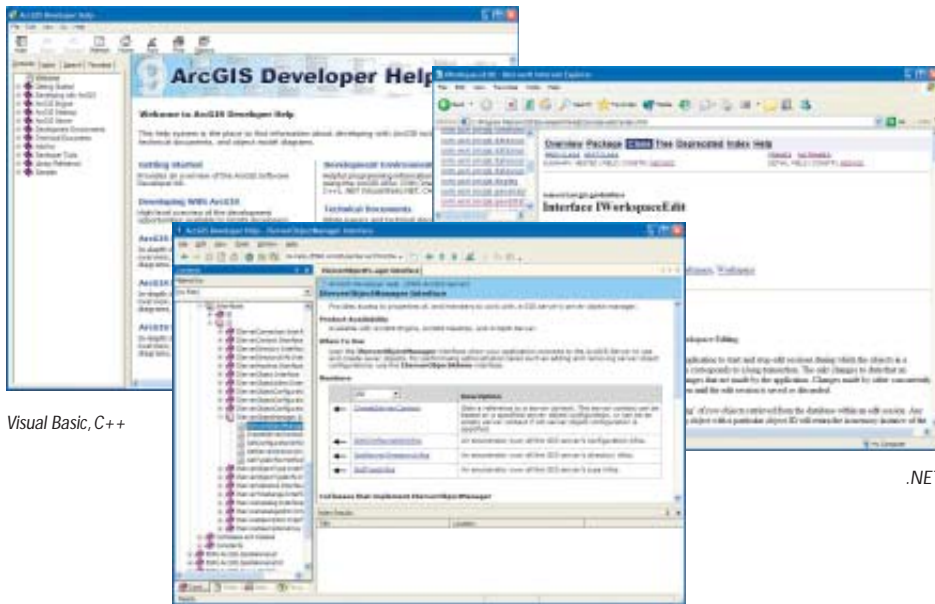


The Network Analyst extension for ArcGIS Server enables you to find the most efficient travel route, generate travel directions, find the closest facility, and define service areas based on travel time.

Each component of ArcGIS Server includes a developer kit: the GIS server developer kit for developers who want to extend the GIS server, the Java ADF developer kit for developers who want to build Java applications, and the .NET ADF developer kit for developers who want to build .NET applications.

Each developer kit contains common developer resources to support your development task. An integrated help system is provided for several APIs (COM, Java, .NET, and C++) along with object model diagrams and samples for each part of the core ArcObjects components. Each developer kit provides access to a large collection of ArcObjects for you to exploit to include any range of GIS functionality in your application.

The GIS server developer kit lets you, the programmer, develop custom COM components to extend the GIS server using COM development languages, such as Visual Basic® (VB), C++, and .NET. To help facilitate this, the GIS server developer kit also contains a collection of integrated development environment (IDE)



Visual Basic, C++

.NET

Java

Each developer kit contains an integrated help system for several APIs.

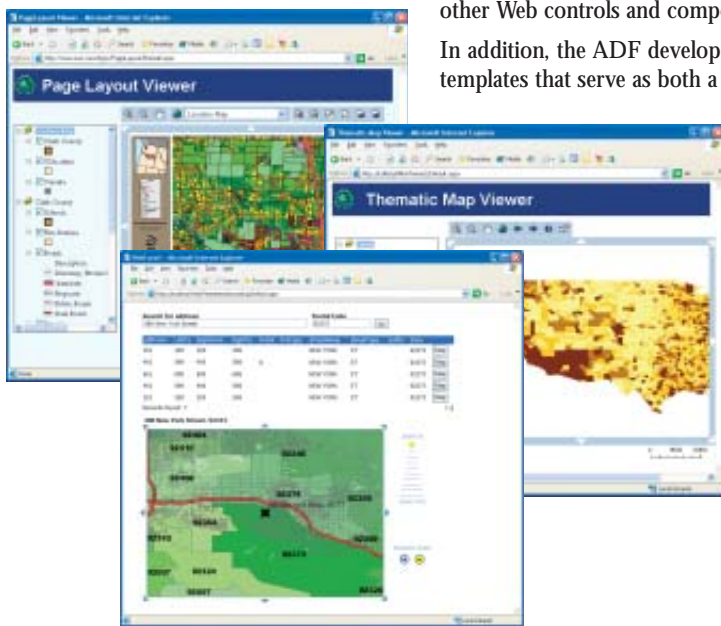
plug-ins and utilities to make developing COM objects with ArcObjects easier. The .NET and Java ADF developer kits are a set of Web controls and helper objects that let you add dynamic mapping and GIS capabilities into new or existing Web applications. The ADFs include the following Web controls to assist with Web application development:

- Map
- Overview map (.NET) or Overview (Java)
- Table of contents (Toc)
- Page layout
- North arrow
- Toolbar
- Scale bar
- GeocodeConnection (.NET) or Geocode (Java)
- Impersonation

These controls are available as .NET Web controls and Java Web controls exposed as JavaServer Pages™ (JSP) tags. These controls can be combined with other Web controls and components to create customized Web applications.

In addition, the ADF developer kits include a collection of Web application templates that serve as both a starting point for your Web application and an example of how to use the Web controls and the ArcGIS Server API to build Web applications. The Web application templates include:

- Map Viewer template, which provides basic map display capabilities.
- Search template, which provides a search-centric interface for finding features on a map.
- Page Layout template, which displays the entire page layout for a map.
- Thematic template, which adds thematic mapping capabilities on top of the Map Viewer template.
- Geocode template, which provides an interface for finding map locations using an address.
- Buffer selection template, which allows you to find features in one layer of the map based on their location relative to features in another layer.



Both the Java and .NET ADFs include a collection of Web application templates that developers can extend to include their own functionality.

The Java ADF also consists of a J2EE Connector Architecture (JCA) compliant resource adapter that allows Enterprise JavaBeans (EJB) to call and work with

ArcGIS Server objects. For more information on the JCA resource adapter and EJBs, see Appendix C, 'Developing applications with EJBs'.

Developers building Web services or desktop applications, rather than Web applications, will also benefit from the ADF developer kits' documentation and code samples.

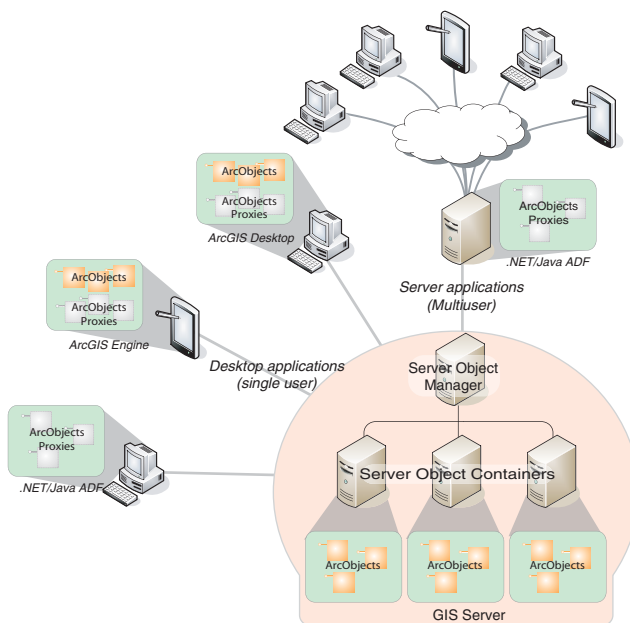
The ArcGIS Server Developer Kits are not for end users. They are for people who are developing server applications or extending the server to support server applications. As a developer, you can build applications based on ArcGIS Server and deploy those applications either to end users or on application servers. An important feature of ArcGIS Server is that the application you create can treat a map as a central or incidental element of the application. In the case of some applications (especially Web services) there may be no mapping component at all.

ADF RUNTIMES

To deploy a Web application or Web service on an application server or deploy a server desktop application written with the ADF, you need the ADF runtime. Because server applications use ArcObjects that are running within the server, the application server or desktop machine running a server application does not need ArcObjects installed on it. The ADF runtime includes only those components necessary for applications to connect to the GIS server and make use of ArcObjects running in the server.

The .NET ADF runtime installs a collection of .NET assemblies and corresponding COM object libraries. The Java ADF runtime installs a set of Java Archive (JAR) files for working with ArcObjects. These runtimes do not require a license;

The ArcGIS Server is a distributed system that supports both desktop and server (e.g., Web) applications. The ADF runtimes provide the necessary components for applications to connect to the GIS server and make use of ArcObjects running within the server.



however, the applications deployed with the runtimes require a GIS server to connect to, which must be licensed to run the ArcObjects components required by the application.

For more information on configuring and administering your GIS server, see Chapter 3, 'Administering an ArcGIS Server'.

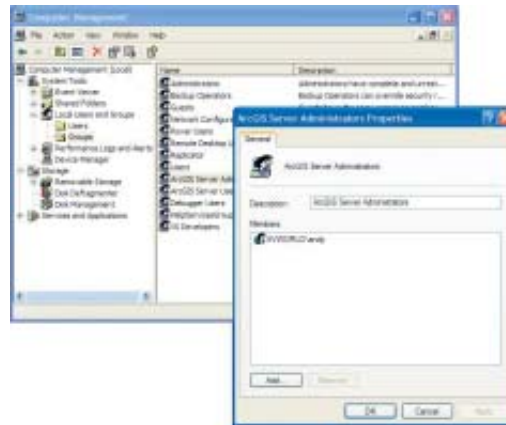
Once you have installed the various components of ArcGIS Server and the server is up and running, the next steps are to configure the GIS server, add server objects, and start developing applications.

CONFIGURING THE GIS SERVER

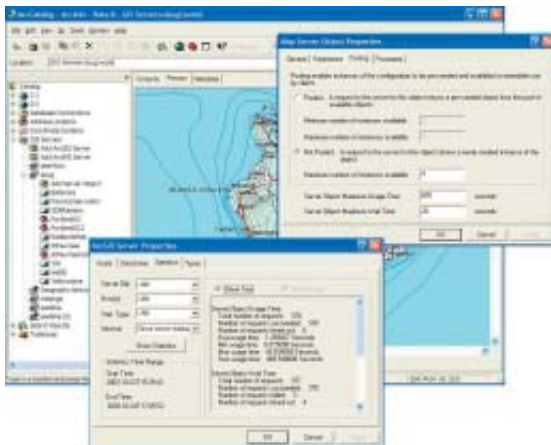
Configuring the GIS server is the job of the GIS server administrator. The following administration tasks must be completed before you can start adding server objects to your GIS server:



The ArcGIS Server administrator will use operating system tools to manage access to the GIS server and manage privileges on both data and output directories.



- Use operating system tools to grant access to the GIS server to users and administrators.
- Use operating system tools to grant privileges on the server's output directories to the GIS server account.
- Use operating system tools to grant privileges on the server's data to the GIS server account.
- Use ArcCatalog to add server object container machines to the GIS server.
- Use ArcCatalog to add server directories to the GIS server.



The ArcGIS Server administrator will use ArcCatalog to configure the server and manage its server objects.

whether your server object is configured properly by drawing your map servers and finding addresses with your geocode servers.

ADDING SERVER OBJECTS

Once the GIS server is configured, you can use ArcCatalog to add, configure, and start map and geocode server objects. Once you have added server objects to your GIS server, you can start using them with the ArcGIS Desktop applications. You can use ArcMap and ArcCatalog to help you determine

BUILDING APPLICATIONS

The real power of ArcGIS server can be exploited by developers building server-based applications. Use the server objects running in the GIS server to build applications with mapping and advanced GIS functionality. Developers can take advantage of the software objects, Web controls, and template applications in the ADF to get started building applications that make use of ArcObjects running in the GIS server.

The best way to get started once your server is configured is to implement one of the applications outlined in the developer scenarios in Chapter 7, 'Developer scenarios'. These scenarios are step-by-step walk-throughs of the entire process from creating the necessary server objects to programming and deploying the application.

The *ArcGIS Server Administrator and Developer Guide* is an introduction for anyone who wants to configure ArcGIS Server and create desktop and Web applications using COM, .NET, or Java.

This guide will help you become a server developer by stepping through numerous code samples and developer scenarios. Although the samples documented in this guide may not solve your immediate problem, they will serve as a framework or template on which you can build a more specific or complex solution.

To serve the widest base of developers, most of the code samples in this guide are written in VB. As necessary, some code samples are written in Microsoft® C#, VB.NET, or Java.

The first three chapters of this book provide an overview of the ArcGIS Server product and its capabilities and an overview of the ArcGIS Server architecture and its administration. The remaining chapters focus on developing applications that make use of objects running in the GIS server, including using ArcObjects in the server, using the ADFs to build applications, developer scenarios, and methods for deploying those applications.

CHAPTER GUIDE

Chapter 1, 'Introducing ArcGIS Server', gives you an overview of the ArcGIS Server product, its developer kits, and additional resources.

Chapter 2, 'The ArcGIS Server architecture', describes the various aspects of ArcGIS Server and how they interact, including how the GIS server manages ArcObjects, how applications interact with the objects in the GIS server, and GIS server security.

Chapter 3, 'Administering an ArcGIS Server', describes the various responsibilities of the GIS server administrator. It provides descriptions of how to use ArcCatalog and various operating system tools to administer, monitor, and troubleshoot your GIS server.

After reading this chapter you should have enough information to configure your GIS server, add server objects, and troubleshoot any problems. Once this is complete, developers can use the server objects in your GIS server to build GIS functionality into their applications.

Chapter 4, 'Developing ArcGIS Server applications', describes how to use the server API to access and work with ArcObjects in the GIS server. This chapter includes important programming rules and best practices for developing applications with ArcGIS Server.

Chapter 5, 'Developing Web applications with .NET', describes how to use the Web controls, application templates, and other objects in the .NET ADF to build Web applications that use functionality available through ArcGIS Server.

Chapter 6, 'Developing Web applications with Java', describes how to use the Web controls, application templates, and other objects in the Java ADF to build Web applications that use functionality available through ArcGIS Server.

Chapter 7, 'Developer scenarios', guides you through the creation and deployment of the several types of Web applications and Web services you can build with both .NET and Java.

This book also contains a number of appendixes that provide detailed information about the GIS server API's object model and information on how to use and understand the GIS server's log and configuration files. Additional appendixes

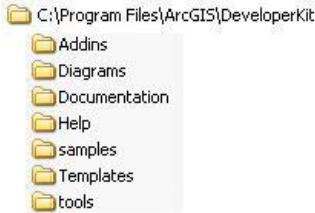
provide background information for all ArcObjects developers, including language-specific notes and a how-to guide to reading OMDs.

In addition, Appendix C, 'Developing applications with EJBs', describes how a developer would build EJBs that consume services from the ArcGIS Server. EJBs can call and work with ArcGIS Server objects through a connection to a Java Connector Architecture (JCA)-compliant resource adapter, which is provided in the Java ADF. Recommended usage and programming models for JCA and ArcGIS Server are given in this section. Appendix F, 'Converting personal geodatabases', explains how to convert a personal geodatabase to an ArcSDE geodatabase or a supported file-based format so that data can be used to serve a map on UNIX.

The following topics describe some of the additional resources available to you as a developer. These include books, guides, and various help systems.

ARC GIS SOFTWARE DEVELOPER KIT

The ArcGIS SDK is the collection of diagrams, utilities, add-ins, samples, and documentation geared to help developers implement custom ArcGIS functionality.



A typical SDK installation

ArcGIS Developer Help system

The ArcGIS Developer Help system is the gateway to all the SDK documentation including help for the add-ins, developer tools, and samples; in addition, it serves as the complete syntactical reference for all object libraries.

Each supported API has a version of the help system that works in concert with it. Regardless of the API you choose to use, you will see the appropriate library reference syntax and have a help system that is integrated with your development environment. For example, if you are a Visual Basic 6 developer, you will use ArcGISDevHelp.chm, which has the VB6 syntax and integrates with the VB6 IDE, thereby providing F1 help support in the code window.

The help systems reside in the DeveloperKit\Help folder but are typically launched from the start menu or F1 help in Visual Basic 6 and Visual Studio® .NET 2003. The graphic below shows the start menu options for opening the help systems.

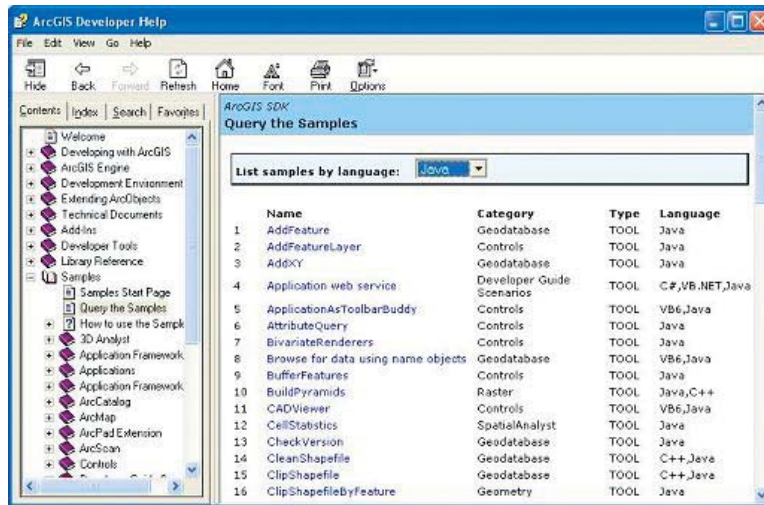


Samples

The ArcGIS developer kit contains more than 600 samples, many of which are written in several languages. The samples are described in the help system and the source code and project files are installed in the DeveloperKit\samples folder. The help system's table of contents for the samples section mirrors the samples directory structure.

The help system organizes samples by functionality. For example, all the Geodatabase samples are grouped under Samples\Geodatabase. Most first-tier groupings are further subdivided. You can also find samples in the SDK using the 'Query the Samples' topic in the help system, which lists all the samples alphabetically; in addition, you can sort the list by language. For example, you can elect to only list the available Java samples.

You can use the 'Query the Samples' topic in the help system to find specific samples you are interested in.



Installing the samples source code and project files is an option in the install. The samples are installed under the ArcGIS\DeveloperKit\samples folder. If you don't have this folder on your computer, you can rerun the install program and check Samples under Developer Kit.

Developer tools

The ArcGIS developer tools are executables that ESRI has provided to facilitate your ArcObjects development. You may find some of these tools essential. For example, if you are a Visual Basic 6 desktop developer, you will likely use the Categories.exe tool to register components in component categories.

The following developer tools are available with each product. Please refer to the help system for more developer tool details and instructions.

- *Component Categories Manager*—Registers components within a specific component category.
- *Fix Registry Utility*—Fixes corruptions in the Component Categories section of the registry.
- *GUID Tool*—Generates globally unique identifiers (GUIDs), in registry format for use within source code.
- *Library Locator*—Identifies an object library containing a specified interface, coclass, enumeration, or structure.

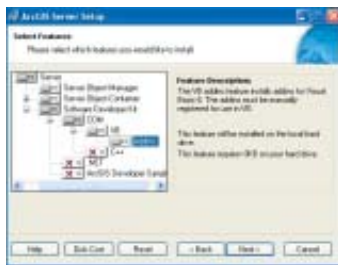
The developer tools are installed under the DeveloperKit\tools folder. There is one exception—the Component Category Manager is located in the ArcGIS\bin folder.

Add-ins

The ESRI add-ins automate some of the tasks performed by the software engineer when developing with ArcObjects, as well as provide tools that make debugging code easier. ESRI provides add-ins for the Visual Basic 6 IDE and the Visual Studio .NET IDE. The table below lists the add-ins available for these development environments.

Visual Basic 6

- *ESRI Align Controls with Tab Index*—Ensures control creation order matches tab index.
- *ESRI Automatic References*—Automatically adds ArcGIS library references.
- *ESRI Code Converter*—Converts projects from ArcGIS 8.x to ArcGIS 9.x.
- *ESRI Command Creation Wizard*—Facilitates the creation of commands and tools.
- *ESRI Compile and Register*—Aids in compiling components and registering these in desired component categories.
- *ESRI ErrorHandler Generator*—Automates the generation of error handling code.
- *ESRI ErrorHandler Remover*—Removes the error handlers from the source files.
- *ESRI Interface Implementer*—Automatically stubs out implemented interfaces.
- *ESRI Line Number Generator*—Adds line numbers to the appropriate lines within source files.
- *ESRI Line Number Remover*—Removes the line numbers from source files.
- *ESRI License Initializer*—Automatically generates and adds license initialization code to an ArcObjects project.



Visual Basic 6 add-ins are only installed if you select them on the install.

Visual Studio .NET

- *ESRI Component Category Registrar*—Stubs out registration functions to enable self component category registration.
- *ESRI GUID Generator*—Inserts a GUID attribute.
- *ESRI Automatic References*—Automatically adds ArcGIS library references.
- *ESRI License Initializer*—Automatically generates and adds license initialization code to an ArcObjects project.

The .NET add-ins are automatically installed during setup if a version of Visual Studio .NET 2003 is detected; the Visual Basic 6 add-ins are only installed if you select them on the install.

THE ARC GIS DEVELOPER SERIES

This book is one in a series of books for ArcGIS developers.

The *ArcGIS Engine Developer Guide* provides information for developers who want to create applications based on ArcGIS Engine. ArcGIS Engine allows you to embed GIS functionality within other applications and create desktop-like

applications using the supplied ArcGIS controls, such as the Map, Toolbar, and PageLayout controls. ArcGIS Engine is also based on ArcObjects components and may be programmed through a number of APIs.

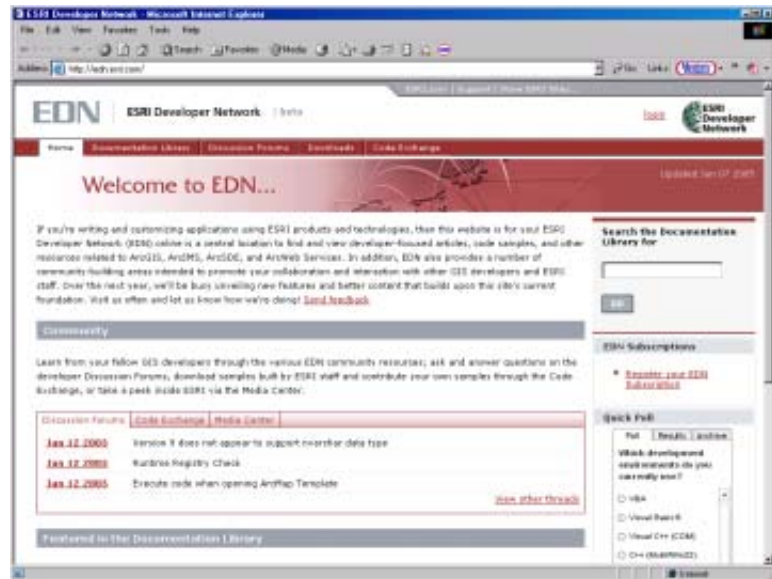
The *ArcGIS Desktop Developer Guide* is for developers who want to customize or extend the ArcGIS Desktop applications, such as ArcMap and ArcCatalog, using Visual Basic for Applications (VBA) and extend the applications using Visual Basic, .NET, or C++.

ESRI DEVELOPER NETWORK ONLINE

ESRI Developer Network (EDN) online is the place to find the most up-to-date ArcGIS 9 developer information including sample code, technical documents, object model diagrams, and the complete object library reference.

The Web site is a reflection of the ArcGIS Developer Help system except it is online and, therefore, more current. The Web site has some additional features including an advanced search utility that enables you to control the scope of your searches. For example, you can create a search that only scans the library reference portion of the help system.

Visit the site today (<http://edn.esri.com>).





The ESRI Support Center at <http://support.esri.com>

ESRI SUPPORT CENTER

The ESRI Support Center at <http://support.esri.com> contains software information, technical documents, samples, forums, and a knowledge base for all ArcGIS products.

ArcGIS developers can take advantage of the forums, knowledge base, and samples sections to aid in development of their ArcGIS applications.

TRAINING

ESRI offers a number of instructor-led and Web-based training courses for the ArcGIS Desktop developer. These courses range from the introductory level for VBA to the more advanced courses in component development with specific APIs.

For more information, visit <http://www.esri.com> and select the Training and Events tab.

The ESRI Virtual Campus can also be found directly at <http://campus.esri.com>.

