ArcGIS® Engine

## Create Custom GIS Desktop Applications

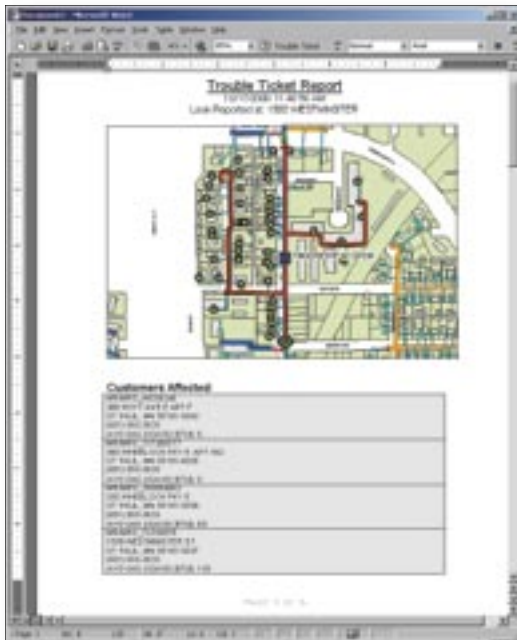

Arc GIS™
ESRI

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ArcGIS® Engine

Create Custom GIS Desktop Applications

Geographic analysis and spatial visualization improve operational efficiency, decision making, and problem solving. Software developers need the ability to build domain specific, easy-to-use applications that incorporate the power of geographic information system (GIS) technology into a focused, user-friendly experience.

ArcGIS® Engine is a new component framework in the ESRI® ArcGIS product family, created to embed spatial functionality in new or existing applications.
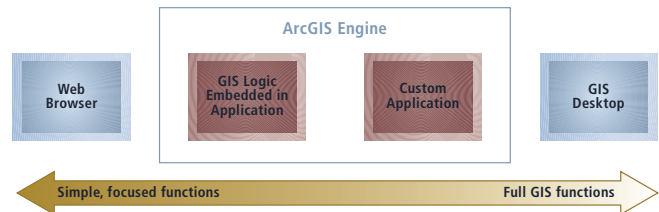
GIS clients can range from simple browser access to professional GIS desktops such as ArcView and ArcInfo.

A Utility Trouble Ticket Report With ArcGIS Engine Functionality Embedded in Microsoft Word

Introducing ArcGIS Engine

ArcGIS Engine is a comprehensive set of core software components, tools, and resources packaged together for developers to build custom GIS and mapping applications. Developers can extend the object libraries and have complete control over the look and feel of their applications' user interfaces. ArcGIS Engine functionality can be either incidental to or central within an application. Applications can be deployed within the ArcGIS Engine framework, or developers can embed GIS functionality in other custom or commercial applications such as Microsoft® Word or Excel.

ArcObjects: ArcGIS Software's Common Component Architecture

ArcGIS is an integrated family of GIS software products from ESRI that delivers complete, scalable GIS at the project, work group, and enterprise levels. It is based on a common library of shared software components called ArcObjects™. ArcObjects is composed of platform neutral C++ software objects that can run on Windows®, Linux®, and UNIX® platforms and have multiple developer application programming interfaces (APIs) including COM, .NET, Java™, and C++.

"As a provider of software solutions for local government organizations and a current MapObjects® user, we were interested in trying out ArcGIS Engine. We believe there is a real need for comprehensive, embeddable GIS development platforms that allow for considerable flexibility in both form and function. ESRI is headed in the right direction with products, such as ArcGIS Engine, that will enable us to provide spatially enhanced applications that meet specific business processes."

Brian Flood, President
Spatial Data Logic

Core ArcGIS Engine Functionality

Map Creation

Data display, multilayer data transparency, on-the-fly projections

Data classification

Symbology

Labeling

Layout and printing

Map Interaction

Panning and zooming

Identifying

Hyperlink to external applications or URL

Interactive selection

Spatial bookmarks

Map Analysis

Selection operations: interactive selection, select by attribute or location

Analysis operations: buffer, clip, merge, intersect, union, spatial join

Data Creation (shapefile and personal geodatabase)

Editing shapefiles and personal geodatabase

Rectification of images

Geocoding and events

Dynamic segmentation

Read and write MXD files

Developer Controls

Map

Page layout

Reader

Toolbar with tools and commands

Table of contents

Scene and globe (requires 3D extension)

Use ArcGIS Engine To

- Embed GIS logic in custom industry applications.
- Efficiently build and deploy GIS applications.
- Provide access to advanced GIS logic from simplified applications.
- Embed GIS logic and maps in commercial applications such as Microsoft Word and Excel.
- Build cross platform applications with C++ or Java.

Soil Erosion Prediction Application Built With ArcGIS Engine

ArcGIS Engine Developer Resources Include

- ESRI Developer Network (EDN) Program
- Developer help system
- Developer guide online book series
- ESRI support center
- Training classes

ArcGIS Engine Tablet PC Application for Field Service Workers

For more information on ArcGIS Engine, visit **www.esri.com/arcgisengine**.

ArcGIS Engine Developer Kit and Runtime

ArcGIS Engine consists of two products: a software development kit to build applications and a redistributable runtime to enable execution of the completed applications. The ArcGIS Engine Developer Kit is a components-based software development product for building custom GIS and mapping applications. The ArcGIS Engine Developer Kit is not an end user product but rather a toolkit for application developers, suitable for building basic mapping and comprehensive, dynamic GIS applications for Windows, UNIX, or Linux users.

ArcGIS Engine Runtime contains the core ArcObjects components to enable the execution of the end user application and needs to be installed on each computer that is running an ArcGIS Engine application.
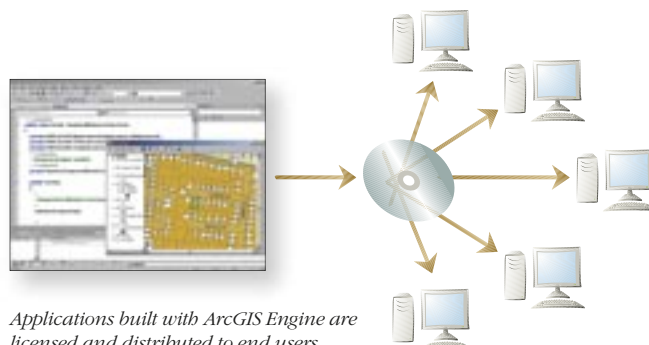
Building Applications With ArcGIS Engine

Developers build ArcGIS Engine applications in their chosen integrated development environment (IDE) such as

- Microsoft Visual Basic® (VB) and Visual Studio .NET
- Eclipse, Sun™ ONE Studio, and Borland® JBuilder® for Java developers

Developers register the ArcGIS Engine Developer Kit components with their IDE, as illustrated here in JBuilder, then create form-based applications, adding ArcGIS Engine components and writing code to build their applications.

For example, a VB developer can build a focused GIS mapping application by adding a map control, a table of contents control, and selected toolbars to the application. The finished application can then be installed on any ArcGIS Engine Runtime seat (including ArcGIS Desktop seats) for deployment.

Applications built with ArcGIS Engine are licensed and distributed to end users.

Developing an ArcGIS Engine Application in JBuilder
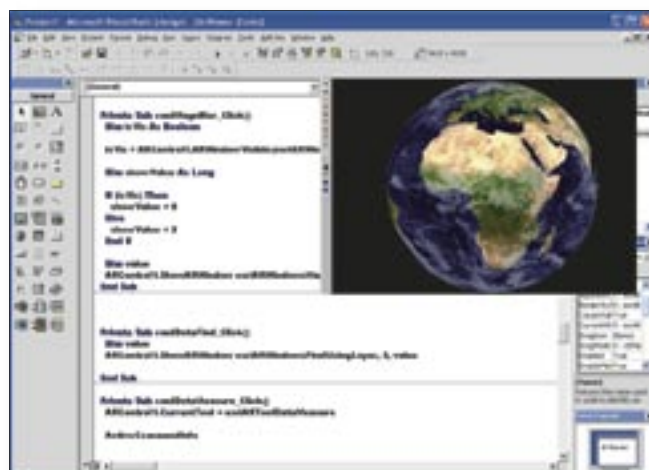
VB Development With ArcGIS Engine

For more information on ArcGIS Engine, visit **www.esri.com/arcgisengine**.
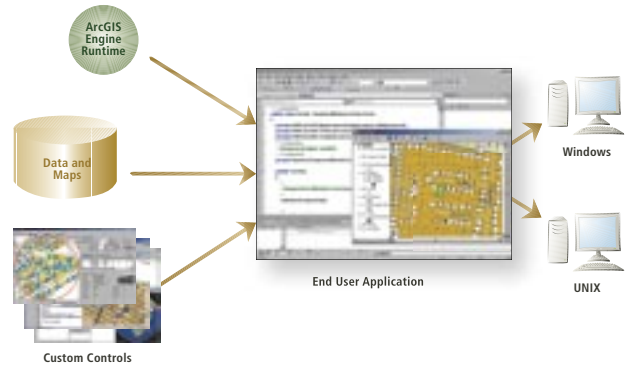
Deploying ArcGIS Engine Applications

All applications built with the ArcGIS Engine Developer Kit will need ArcGIS Engine Runtime or an ArcGIS Desktop product (ArcView®, ArcEditor™, or ArcInfo®) to execute successfully. The creator of an application can deliver ArcGIS Engine Runtime software integrated with the executable code or request the end user to license the ArcGIS Engine Runtime software directly from ESRI.

The standard ArcGIS Engine Runtime provides the core functionality of all ArcGIS products and can be enhanced with

- Geodatabase Update extension for full read–write access to a multiuser geodatabase
- 3D extension for advanced 3D visualization
- Spatial extension for complex spatial analysis
- Network extension for routing and network-based analysis

The details of ArcGIS Engine Runtime licensing will vary with the functionality used in a deployed application. For example, if the completed application performs 3D analysis, ArcGIS Engine Runtime needs to include the 3D extension. If there is already an ArcGIS Desktop product on the target computer, it needs an ArcGIS 3D Analyst™ extension license.

Components That Make Up an ArcGIS Engine Application's Deliverables
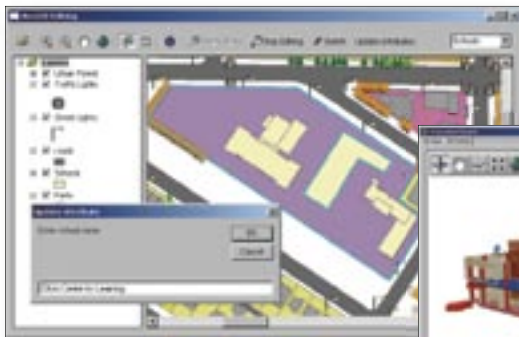
Build multiuser geodatabase editing into an ArcGIS Engine application.
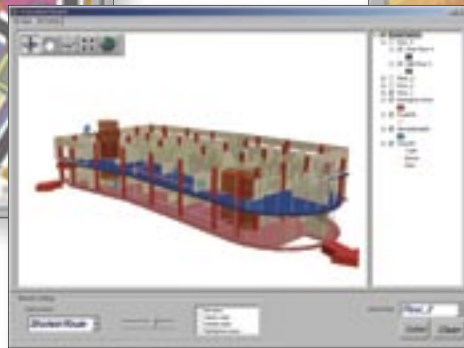
This evacuation routes simulation uses the 3D Analyst and Network Analyst extensions to ArcGIS Engine.
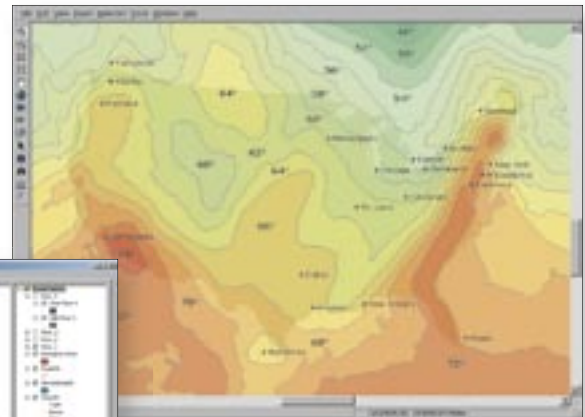
Spatial Analysis Functionality for Weather Imagery and Isobars in an ArcGIS Engine Application

"We are using ArcGIS Engine to build field-based applications providing disconnected geodatabase editing. Woolpert and our clients must produce high-quality data, and using these kinds of applications on tablet PCs with ink technology will help achieve our goals in a cost-effective manner. The user interface for these applications is simple, user-friendly, and targeted to the job. ArcGIS Engine allows us to do that. I have used ArcObjects since version 8.0 and am pleased with its evolution and the fact that my 8.x custom code is working in ArcGIS Engine."

Bryan Dickerson, Senior Developer
Woolpert LLP

ESRI

For more than 35 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
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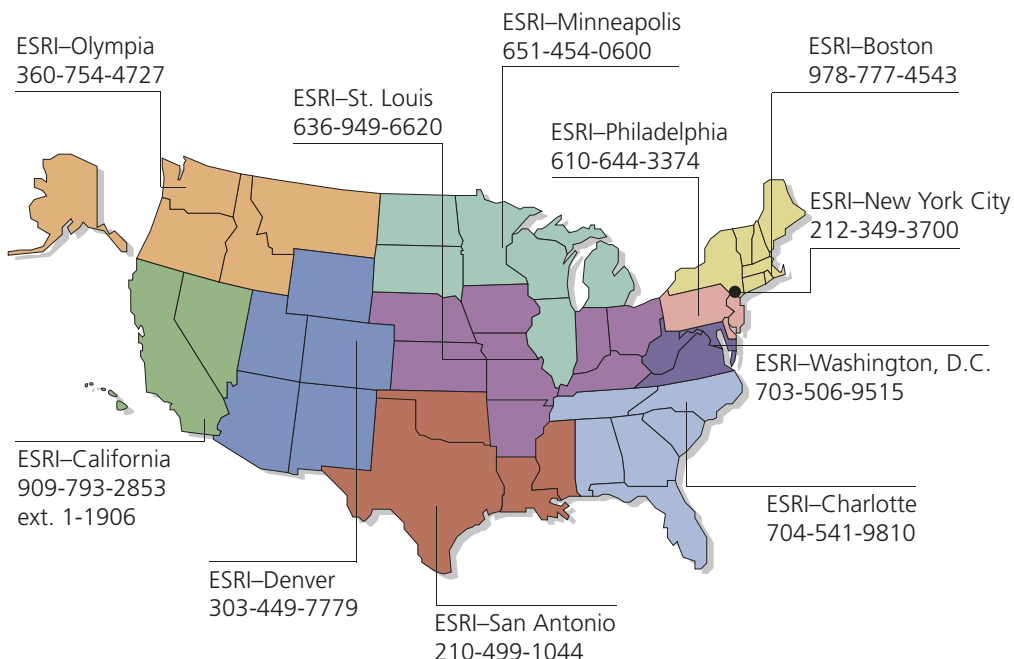or contact an ESRI value-added

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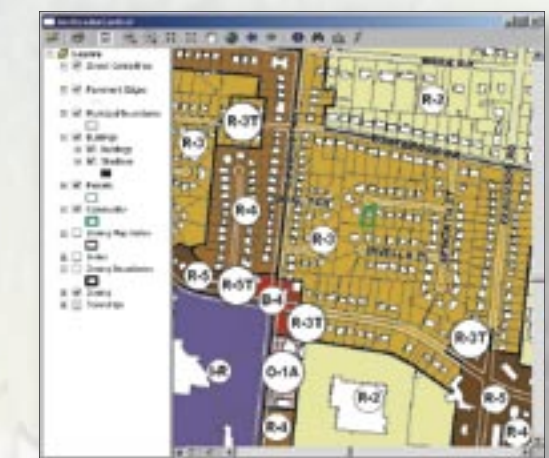
GSA
Federal Supply Schedule

No. GS-35F-5086H

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Create Custom GIS Desktop Applications With ArcGIS® Engine

ArcGIS Engine Libraries

Visual Controls and Toolbars

21 Spatial-Analyst
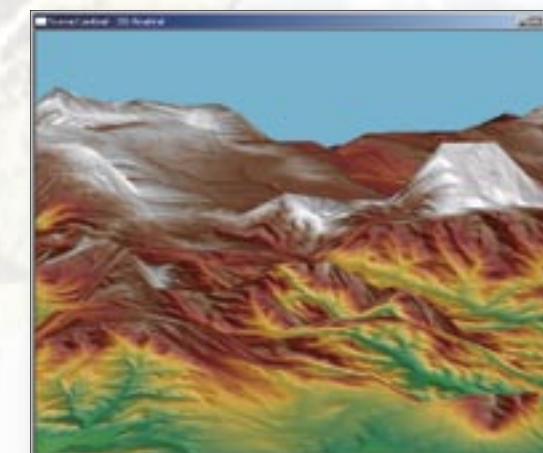Provides user interfaces to support objects contained in the Spatial Analyst library.

20 GlobeCore
Contains objects for performing analysis and supports the display of globe data.

22 ArcReader-Control
Supports the ArcReader™ object model providing the ability to create custom ArcReader-based applications. Only available in ArcGIS® Engine.

19 3DAnalyst
Performs 3D analysis of data and supports 3D data display.

18 GeoAnalyst
Contains core spatial analysis operations that are used by the SpatialAnalyst and 3DAnalyst extensions.

Contains objects related to working with location data, either route events or geocoding locations.

17 Controls
Contains controls for application development including commands and tools for use with the controls. Only available in ArcGIS Engine.

16 Network-Analysis

15 Location

ReaderControl

14 Carto
Contains the objects for displaying data. The PageLayout and Map objects are in this library along with map layers and renderers for all the supported data types.

Supports the creation and analysis of utility networks.

Developer Components

Map Analysis

Map Presentation

Data Access

Base Services

13 GeoDatabase-Distributed
Contains the objects required to support a distributed geodatabase.

12 DataSource-Raster
Contains the workspace factories and workspaces for file-based raster data formats.

Provides workspaces for working with OleDB-based data sources.

MapControl

PageLayoutControl

11 DataSource-OleDB

10 DataSource-GDB
Contains the workspace factories and workspaces for vector and raster data formats supported by the geodatabase that are stored within an RDBMS.

8 GISClient
Contains objects for working with remote GIS Services provided by either ArcIMS® or the ArcGIS Server.

9 DataSources-File

Contains the workspace factories and workspaces for vector data formats supported by the GeoDatabase API.

7 GeoDatabase
Contains types for all the definitions relating to data access. Features, tables, networks, TINs are all defined in this library.

6 Output
Contains the objects required to generate output to both printers and plotters or exporting to files.

SceneControl

GlobeControl

Contains the objects used to obtain a connection to the ArcGIS Server.

5 Server

4 Display
Contains components that support drawing symbology to an output device.

Defined types used by user interface components in the ArcGIS system such as ICommand and ITool.

2 SystemUI

3 Geometry
Contains the core geometry objects and defines and implements the spatial reference objects for coordinate systems.

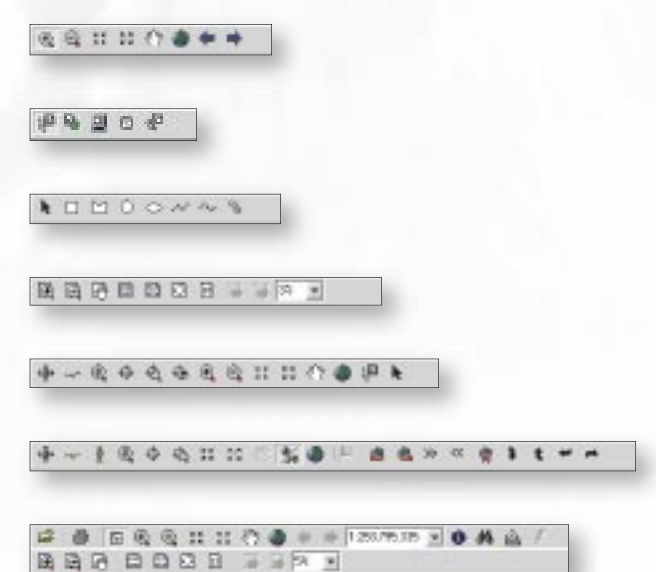Contains components that expose services used by the other libraries composing ArcGIS.

1 System

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Customizable Toolbars

ArcGIS Engine Library Reference Diagram

www.esri.com/arcgisengine