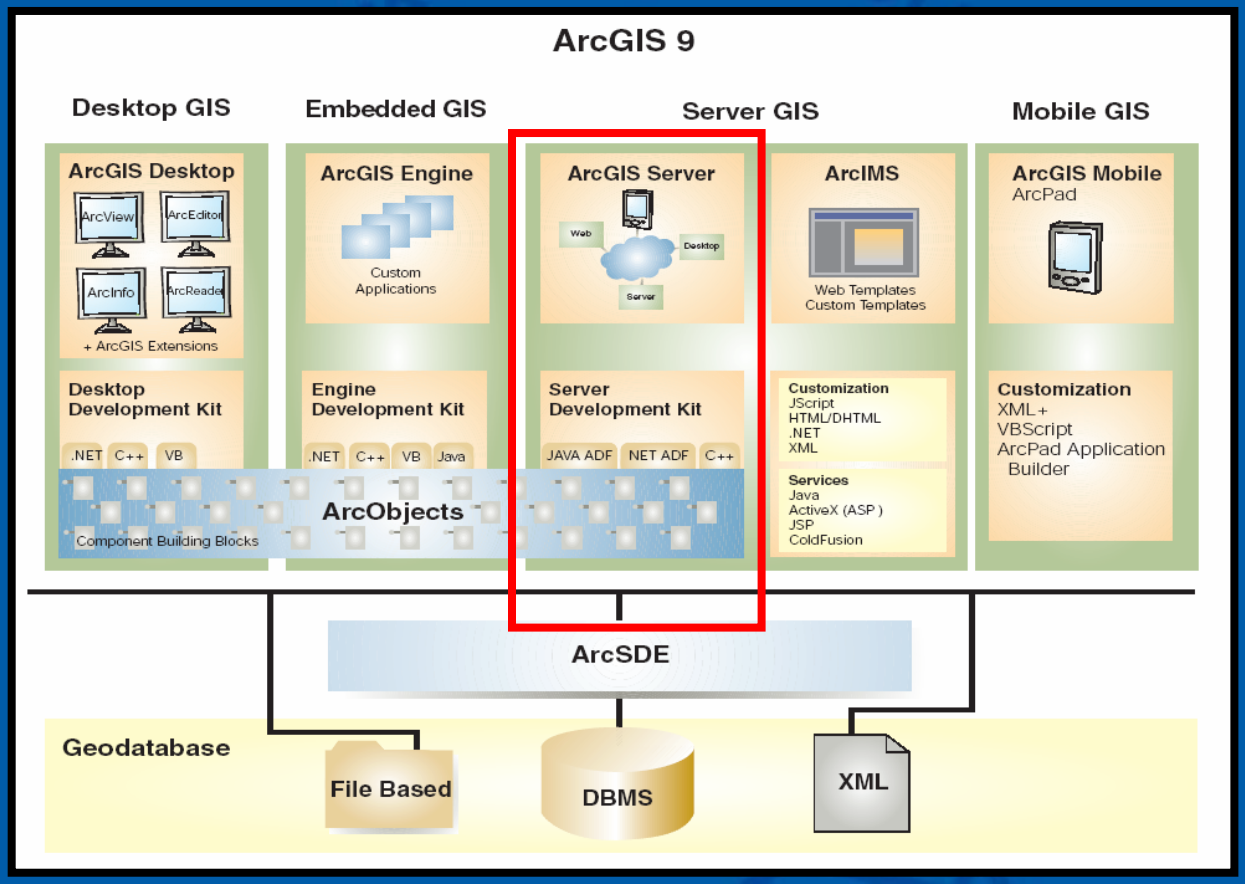
ArcGIS Server 9.1

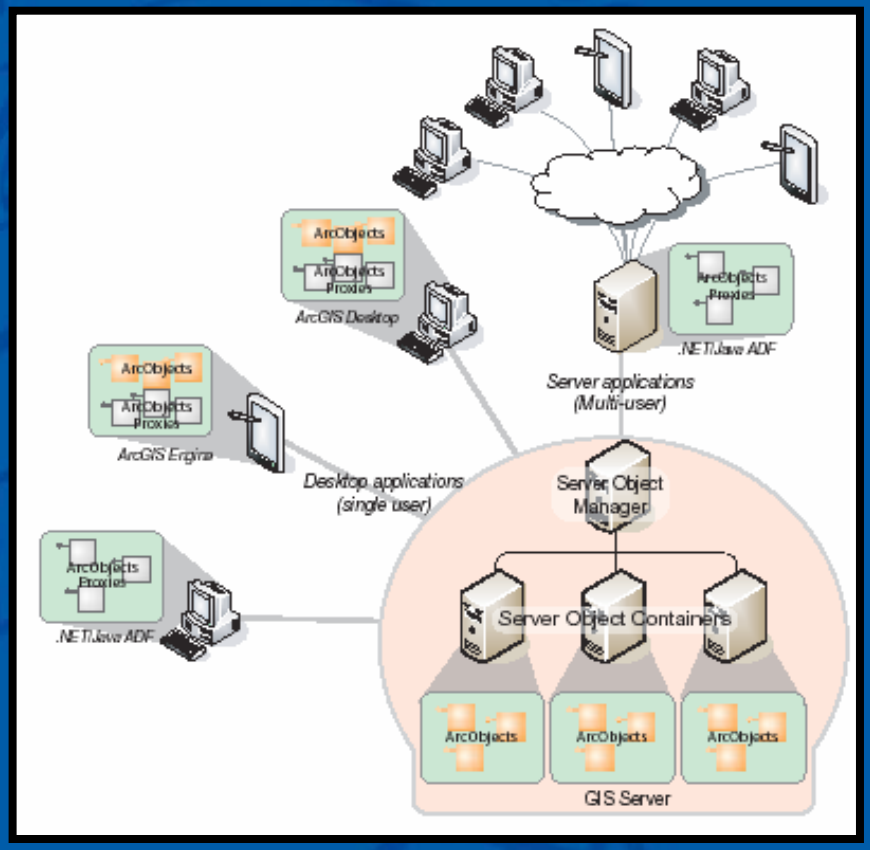
What is ArcGIS Comprised Of?

- **ArcGIS Desktop**
  - Integrated suite of GIS applications
- **ArcGIS Engine**
  - Embeddable developer components
- **Server GIS**
  - ArcSDE, ArcIMS, ArcGIS Server
- **Mobile GIS**
  - ArcPad



What is ArcGIS Server?

- Set of software components that developers can use to build server-side GIS applications
- Designed for
  - Building centrally managed applications
  - Expose advanced GIS functionality
  - Supporting multiple users



ArcGIS Server is:

A Platform for building :

- Spatially Enabled Enterprise Applications
- Enterprise GIS Applications
  - Web Applications
  - Web Services
  - Applications built using industry standards
    - .Net, J2EE
- Centralized GIS implementation with advanced GIS functions

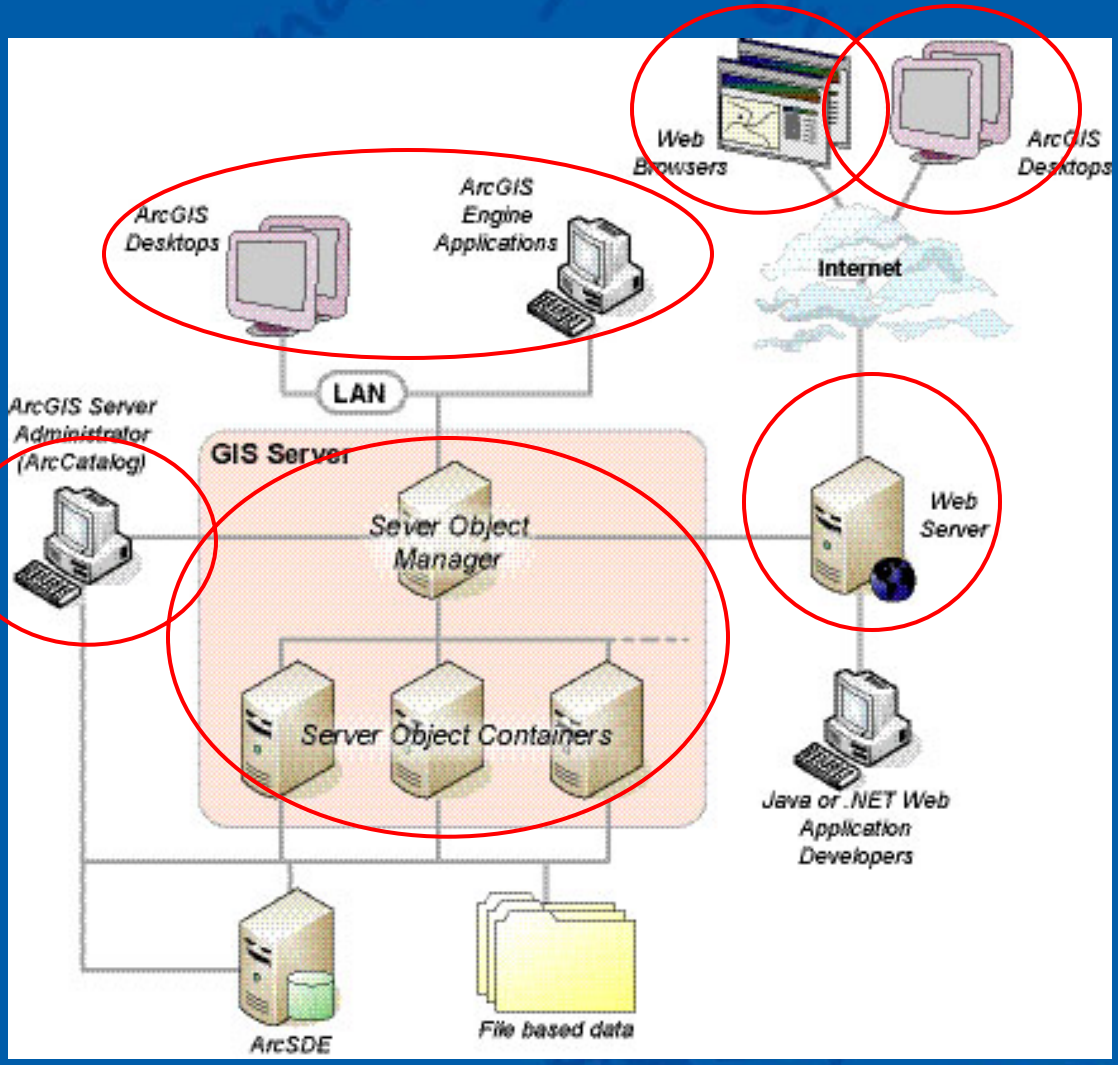
Platforms:

- GIS Server, .NET ADF on Windows
- Java ADF on Windows, Linux, Unix
- GIS Server on Red Hat Linux, Sun Solaris at 9.0.1

Strong developer APIs - Java, .Net, SOAP/XML

ArcGIS Server System

- GIS Server
  - Serves up GIS resources like maps and locators.
- Web Server
  - Hosts Web Applications and Web Services that use the GIS Server
- Browsers
  - Connect to Web Applications running in the Web Server
- Desktop Apps
  - Connect indirectly to GIS Servers via Web Services running in the Web Server
  - Connect directly to GIS Servers over the LAN
  - Administer the GIS server (ArcCatalog)

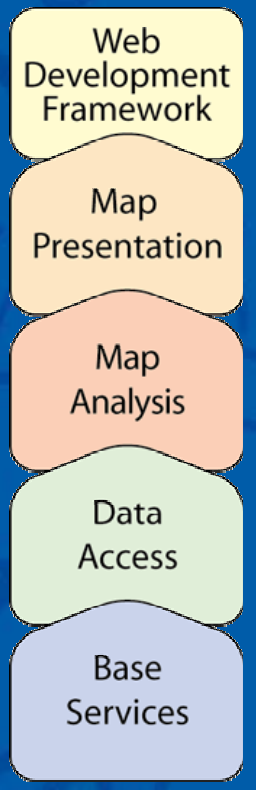


Product components

- GIS Software Components
  - ArcObjects : A rich set of GIS Software Components that can be used to build Web and Enterprise Applications.
- GIS Server
  - A scalable environment for hosting and running ArcObjects on server platforms.
- Application Developer Framework
  - An easy to use Web Developer framework for developing spatially enabled .Net or Java Web Applications.
  - Web Application Templates and Web Controls
  - Works with ArcObjects

ArcGIS Server ArcObjects

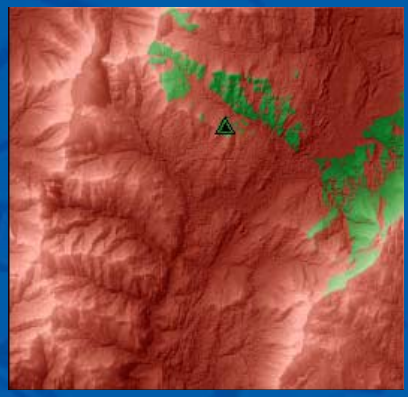
- A rich set of server ready GIS software components
- 23 core component libraries
- Both coarse grained and fine grained GIS components for:
  - Data Access
  - Query
  - Display
  - Editing
  - Data Management
- Acts as a window into the Geodatabase
- Describes and Displays Map Layouts
- Supports high res export of maps to a large number of raster and vector formats



ArcGIS Server

ArcGIS Server Extensions

- **Spatial Extension**
  - provides a powerful set of functions that allow you to create, query and analyze cell based raster data.



- **3D Extension**
  - provides a powerful set of functions that allow your applications to create and analyze surfaces.

- **Network Extension**
  - provides transportation network analysis functionality

GIS Server

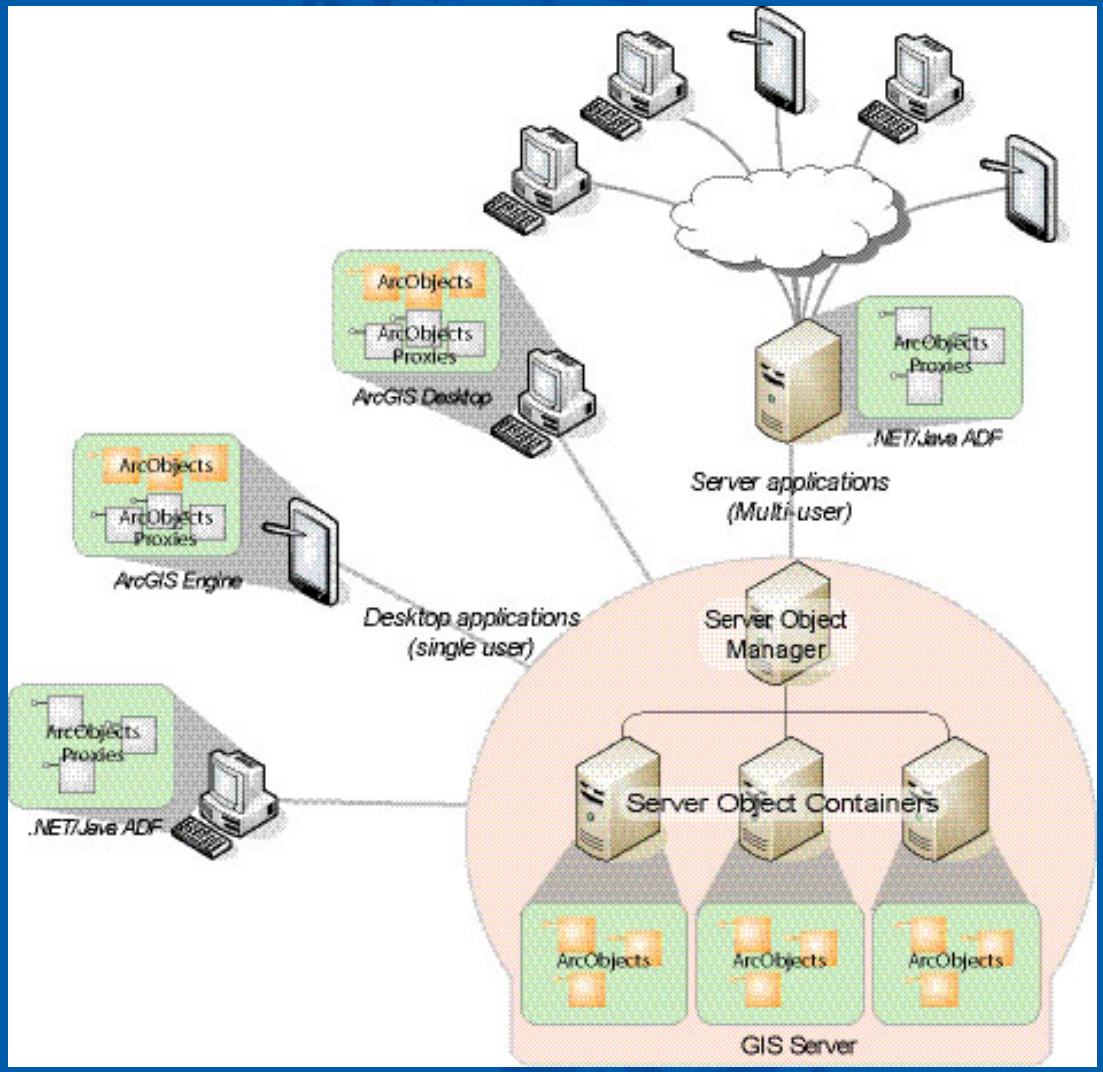
- The Server hosts and runs Server Objects
- A Server Object is a software object that serves a GIS resource such as a map or a locator
  - esriCarto.MapServer – exposes a Map Document
  - esriLocation.GeocodeServer – exposes a Locator
- Server Objects are managed by and run within the Server

GIS Server

- Server = Server Object Manager (SOM) + Server Object Containers (SOCs)
- Server Object Manager
  - Manages server objects that are distributed across a set of server containers
  - A Windows service/ Unix daemon
- Server Container
  - A process started by the Server Object Manager
  - Hosts one or more server objects

ArcObjects Remoting

- All ArcObjects are created within processes / contexts managed by the GIS Server.
- Your application works with object proxies



Application Developer Framework (ADF)

- A framework for building ArcGIS Web Applications and Web Services
- Developer APIs for .NET and Java

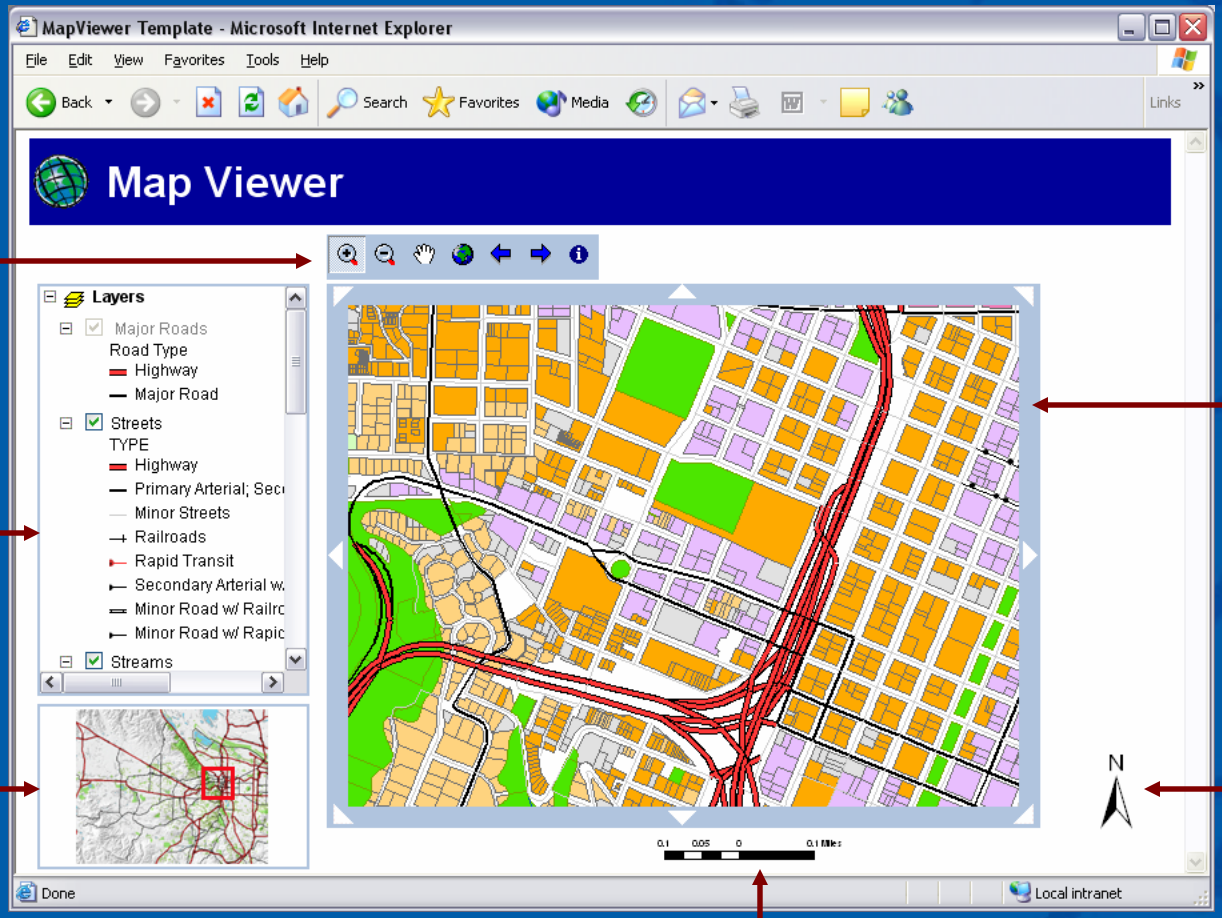
Why use the ADF ?

- Easy to build web apps with GIS in them
- Faster development and deployment with Web templates
- Access to all ArcObjects functionality
- Helps manage access to GIS server and server objects
- Provides user interface for common map components

What's in the ADF?

- Web Controls
- Web Templates
- Class Library
- Runtime
- Samples
- J2EE Connector Architecture (JCA) for Enterprise Java Beans (EJB)

Web Controls



Toolbar Control

Table of Contents

Overview Map Control

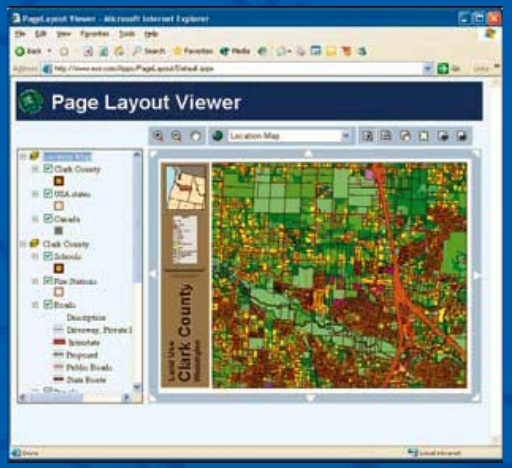
Map Control

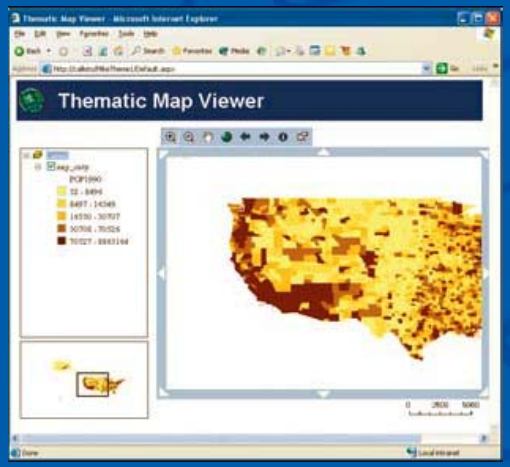
North Arrow

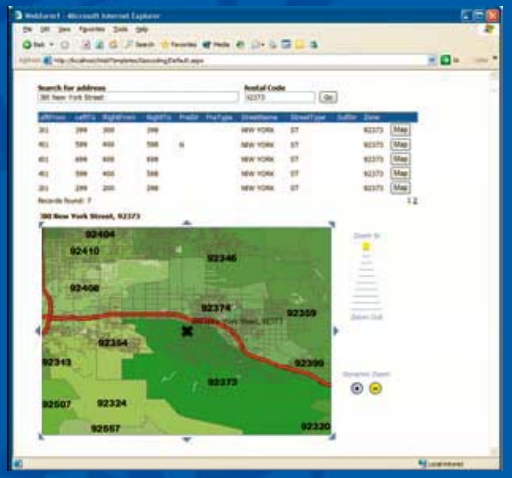
Scale Bar Control

Web Application Templates

- Map Viewer
- Search
- Page Layout
- Thematic
- Geocode
- Buffer selection

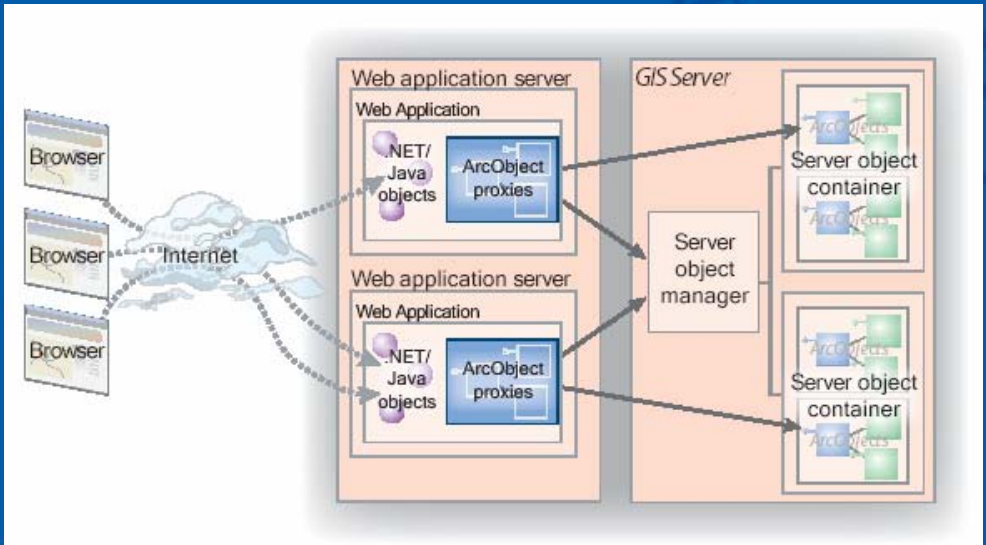


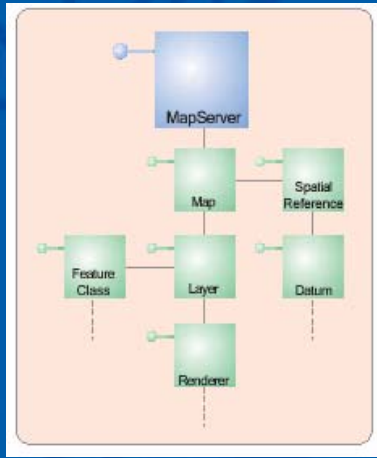




How it all works

- Client makes a request
- Web server and web application process the request
- GIS Server makes a request to a server object
- Server object calls ArcObjects





Programming Model

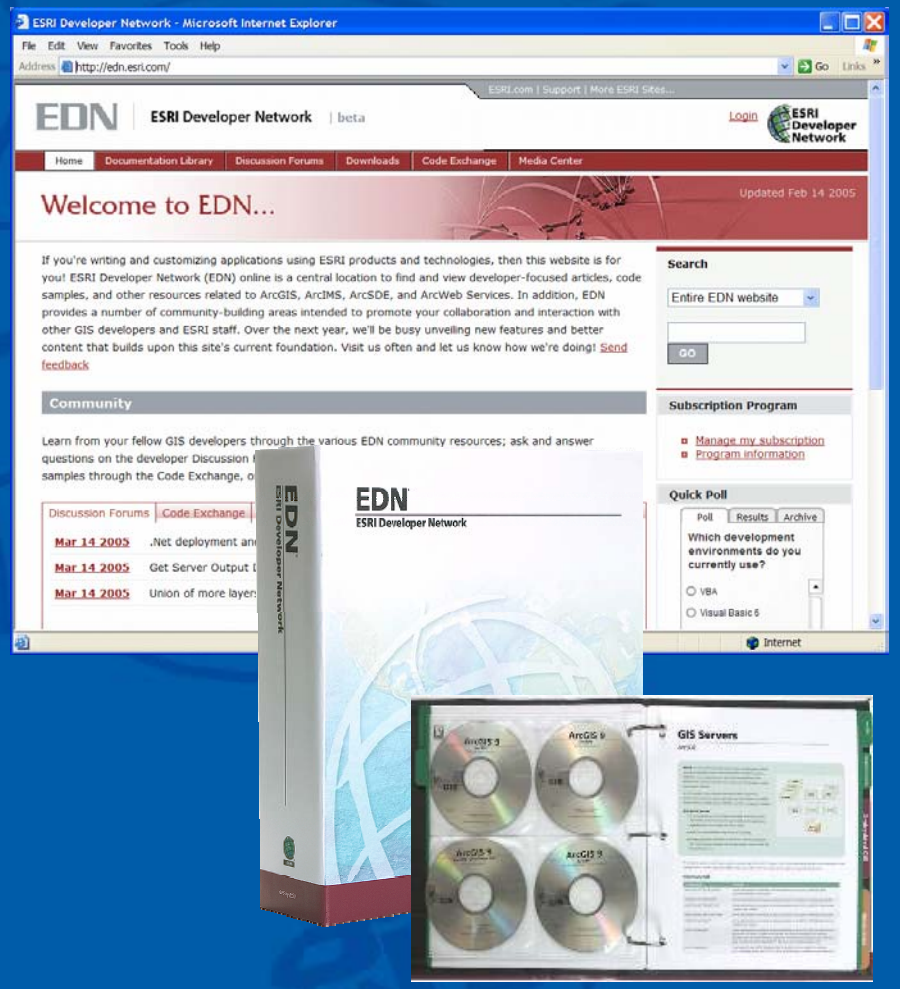
EDN – The ESRI Developer Network

This is where you start with ArcGIS Server

- $1500 Subscription
- Expandable for support contracts
- New paradigm for ESRI Developer Products
  - Develop first, then deploy
- Changes the preferred server licensing model
  - EDN is the new “developer seat”
- Prerequisites for server development
  - ArcGIS Desktop
    - Data Management
    - Data Creation
    - Server Administration

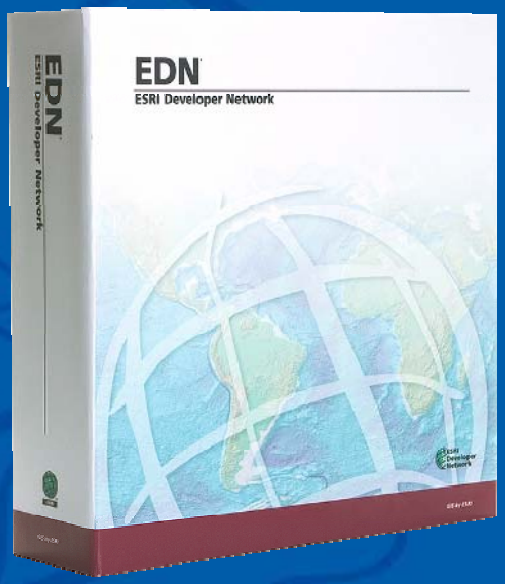
ESRI Developer Network

- Provides developers with tools and resources to build custom GIS solutions
  - Annual subscription-based program
  - Reduces cost and complexity
  - Development and testing only
- EDN Resources
  - Software Library
  - Web site
  - Documentation Library
  - Additional technical support and training



EDN Software Library

- **ArcGIS Server**
  - **Server extensions**
- **ArcGIS Engine Developer Kit**
  - **Engine Runtime and extensions**
- **ArcIMS**
- **ArcSDE**
- **ArcWeb Services**



For Development and Testing Only

ArcGIS Server APIs

- ADF Web Controls (.NET and Java)
- Server API
- You'll work with both when developing ArcGIS Server applications

Developing with ArcGIS Server

- Most of you will develop web applications and web services
- It's also possible to build client/server desktop apps
- It's also possible to extend ArcGIS Desktop apps with custom server functionality

Developing with ArcGIS Server

- You'll use the ADF's web controls and templates
  - Customize
  - Extend with your own GIS functionality using ArcObjects
- ADFs include a number of classes that you'll use even when not using the controls (e.g. web services)
  - Converter, WebObject, Connection objects, etc
- The ADF's WebControls and application templates make it easy to build the user interface elements of your web applications
  - Pan/Zoom
  - Identify
  - Address matching
  - Data Frame and Layer display
  - …
- You'll add advanced GIS functionality using the server API and ArcObjects

Developing with ArcGIS Server

- Programming the server is about remotely programming ArcObjects
- To be successful at developing custom server applications you need to know how to:
  - connect to the server
  - work with server objects
  - work with ArcObjects in server contexts
  - understand server application performance tuning
  - understand application state
  - understand the relationship between the web controls and the server API
- The rest is all ArcObjects.

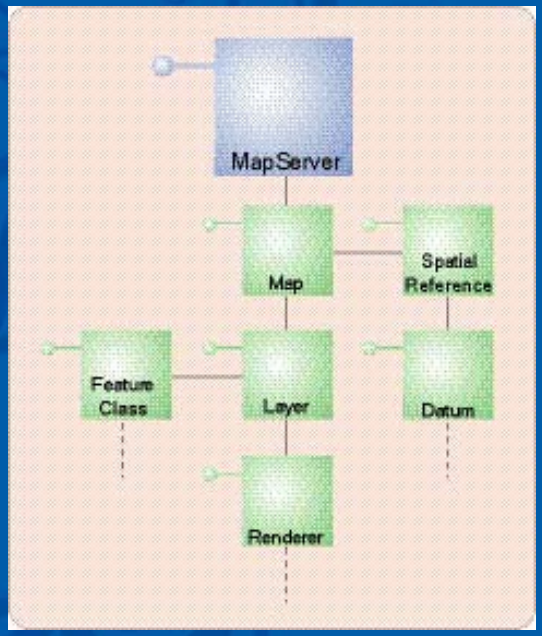
Developing with ArcGIS Server

- Because ArcGIS Server is built on ArcObjects, you'll be able to reuse a lot of your existing code either by:
  - Directly deploying your non-UI code in dlls on your server
  - Modifying parts of your code to work with remote ArcObjects

Server API
(remote ArcObjects)

Server Objects

- A Server Object is a coarse grained ArcObject
  - esriCarto.MapServer – exposes a Map Document
  - esriLocation.GeocodeServer – exposes a Locator
- A Server Object has other associated objects that you can get to :
  - MapServer -> Map -> Layer



Server Objects

- A Server Object exposes a coarse grained set of stateless methods that you can use :
  - mapServer.ExportMapImage
  - geocodeServer.GeocodeAddresses
- A Server Object can also process string requests in SOAP format
  - mapServer.HandleStringRequest
  - geocodeServer.HandleStringRequest

MapServer Object

- Describes and Displays Map and Map Layers
- Supports query, identification and analysis of features
- Acts as a window into the Geodatabase
- Describes and Displays Map Layouts
- Supports high resolution export of maps to a large number of raster and vector formats

GeocodeServer Object

Supports :

- Address Standardization
- Address Validation
- Single Address Geocoding
- Batch Address Geocoding

Web Services

- Developers can build **Application Web Services** using ArcGIS Server for eg :
  - FindHospital
  - CalculateTimberVolume
  - EstimateTravelTime
  - …
- Administrators can also expose map and geocoding server objects as generic **ArcGIS Server System Web Services** for access across the internet
  - Map service
  - Geocoding service

Application Web Services

- An Application Web Service solves a particular application problem, for Ex :
  - FindHospital
    - [in] double x, [in] double y
    - [out] Hospital
- Is implemented using the native web service framework
  - ASP.Net Web Service [WebMethod]
  - J2EE Web Service
- When using native frameworks developers need to use native types (cannot directly return ArcObjects).

ArcGIS Server Web Services

- GIS System Web Services are used to expose GIS resources / server objects for:
  - use across the Internet by ArcGIS Desktop
  - Any development environment that supports WSDL

- SOAP message handling for System Web Services is performed by the GIS Server
  - GIS Server includes a cross platform SOAP stack used for these generic GIS web services.