

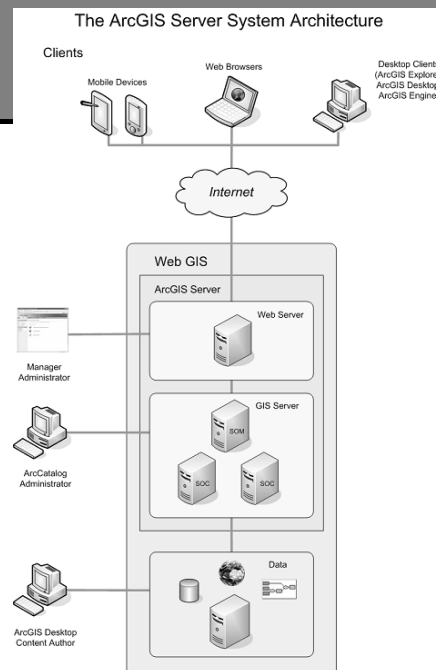
* ArcGIS Server Architecture beyond the desktop

GEOG 4/590: GIS Programming

Why GIS Server?

- Share GIS resources throughout a company or across the Web
- Resources are “hosted” on a GIS server and accessed by clients
- Advantages:
 - Centrally managed data
 - Multiple users
 - Up-to-date data
 - Web client = less expensive than ArcMap for all

Architecture



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What is a service?

- "A method of communication between two electronic devices"
http://en.wikipedia.org/wiki/Web_service
- "...a representation of a GIS resource that a server is making available to other computers on a network. " ESRI
- Services are "published" using ArcGIS Server Manager
- Computers accessing the service are called clients

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ArcGIS services

- Map: makes maps, features, and attribute data available
- Geocode: find/display addresses on a map and see how they relate to surrounding features
- Geodata: access a geodatabase
- Geometry: geometric calculations such as buffering, simplifying, calculating areas and lengths, and projecting

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More ArcGIS services

- Geoprocessing: contains tasks accessible by clients; These tasks are executed on the server; Appear as toolboxes
- Image: provides access to raster (and image) data
- Search: a searchable index of an organization's GIS content

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OGC services

- Open Geospatial Consortium, Inc. (OGC), has published specifications for sharing GIS information on the web
- Open Standards !!!
- Web Map Service (WMS) : is a spec for serving collections of layers as map images
- Web Feature Service (WFS) : is a spec for serving geographic features (vector)
- Web Coverage Service (WCS): provides a spec for sharing raster datasets

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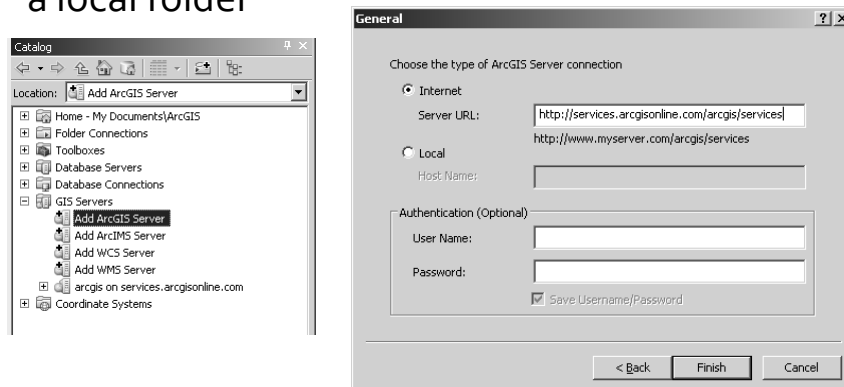
ArcGIS server and OGC services

- OGC capabilities may be enabled when configuring the service through ArcGIS Server Manager
- http://help.arcgis.com/en/arcgisserver/10.0/help/arcgis_server_dotnet_help/index.html#/OGC_support_in_ArcGIS_Server/009300000056000000/
- <http://www.opengeospatial.org/>

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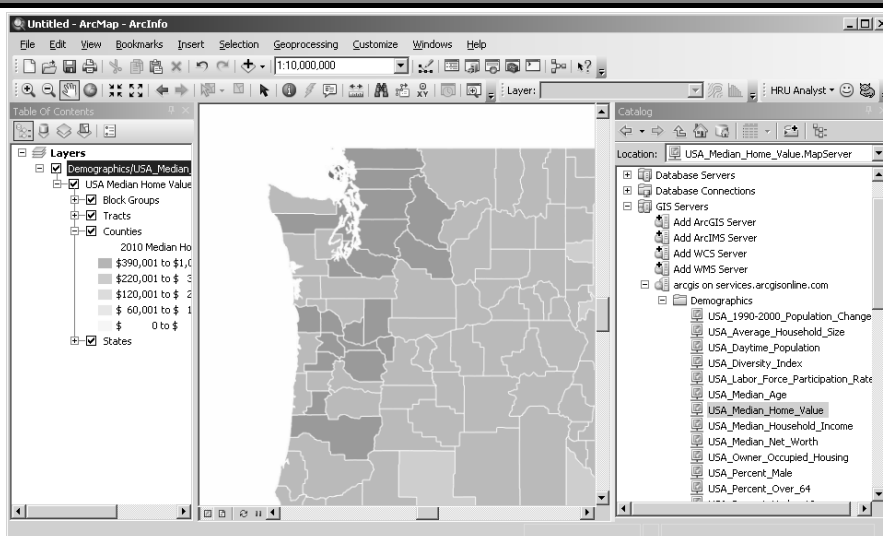
ArcGIS Desktop as a client

- Connect to ArcGIS server just like connecting to a local folder



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Connected to arcgisonline



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Authoring server content

- Generate documents in ArcMap to be hosted on the server
- Create raster and mosaic datasets
- Build GIS models using ModelBuilder or Geoprocessing menu to share as geoprocessing services
- Resources are managed via ArcCatalog with permissions or the Server Manager client

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Creating web applications

- Use ArcGIS Server Manager wizard to create a Web mapping application that uses your services.
 - Map layers
 - Theme and appearance
 - Tasks to simplify workflow
- Use Web ADF for more complicated tasks. But please don't (unofficially)

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RIA clients

- Choose one of these instead to build **Rich Internet Applications**
- JavaScript API
<http://help.arcgis.com/en/webapi/javascript/arcgis/>
- Flex API
<http://help.arcgis.com/en/webapi/flex/help/index.html>
- Silverlight API
<http://help.arcgis.com/en/webapi/silverlight/help/index.html>

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JavaScript API

- Powered by a back-end REST API
- REpresentational State Transfer
- Built using Dojo JavaScript toolkit, so it works on all browsers
- Scripts can be written with any text editor
- Copy and paste your script into an HTML document
- "You can use the JavaScript API even if you have little or no coding experience." - ESRI

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JavaScript sample

```
function init() {
    map = new esri.Map("map");

    layer = new
    esri.layers.ArcGISDynamicMapServiceLayer("http://sampleserver1.arcgisonline.com/ArcGIS/rest/services/Specialty/ESRI_StatesCitiesRivers_USA/MapServer");

    if (layer.loaded) {
        buildLayerList(layer);
    }
    else {
        dojo.connect(layer, "onLoad",
        buildLayerList);
    }
}
```

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Flex API

- Powered by a back-end REST API
- Coded with MXML (Macromedia XML)
- Use Adobe FlashBuilder to create your project
- When you compile your application a .SWF file is created
- Embed the .SWF file in an html page, deploy to the server, and access via a web browser

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Flex sample

```
<?xml version="1.0" encoding="utf-8"?> <s:Application
  xmlns:fx="http://ns.adobe.com/mxml/2009"
  xmlns:s="library://ns.adobe.com/flex/spark"
  xmlns:mx="library://ns.adobe.com/flex/halo"
  xmlns:esri="http://www.esri.com/2008/ags" pageTitle="A
  tiled map service"
>
  <esri:Map>
    <esri:extent>
      <esri:Extent xmin="-1788000" ymin="-4177000"
        xmax="10044000" ymax="4511000">
        <esri:SpatialReference wkid="102100"/>
      </esri:Extent>
    </esri:extent>
    <esri:ArcGISTiledMapServiceLayer
      url="http://server.arcgisonline.com/ArcGIS/rest/se
      rvices/World_Street_Map/MapServer"/>
    </esri:Map>
  </s:Application>
```

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ArcGIS viewer for Flex

- Configurable Web application built on the ArcGIS API for Flex
- No programming required => use XML configuration files
- Consumes services from your GIS server and ArcGIS.com
- Supports data display, interactive querying, Web editing, data extraction, geocoding, printing, and ...

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More on ArcGIS viewer for Flex

- Built upon widgets. Use built-in widgets or extend functionality by writing your own. See [video](#)
- Only works if you have permissions on the client computer and can install the viewer
- Download the flex viewer here:
<http://resources.arcgis.com/content/arcgis-flex-viewer-download>
- Demo from Chris shortly...

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Microsoft Silverlight API

- Cross-browser, cross-platform development environment for building and delivering RIA
- Enables you to integrate ArcGIS Server, ESRI MapIt, and Bing Maps services
- Build your project in VS Web Developer Express 2010 and generate an .xap file
- Silverlight application are hosted in an html or .aspx page by the Server and accessed in a web browser

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Silverlight sample

```
<UserControl x:Class="SilverlightApplication.MainPage"
  xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
  xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
  xmlns:esri="clr-namespace:ESRI.ArcGIS.Client;assembly=ESRI.ArcGIS.Client">
  <Grid x:Name="LayoutRoot" Background="White">
    <esri:Map x:Name="MyMap" Extent="-120, 20, -100, 40" >
      <esri:Map.Layers>
        <esri:ArcGISTiledMapServiceLayer ID="StreetMapLayer"
          Url="http://server.arcgisonline.com/ArcGIS/rest
            /services/ESRI_StreetMap_World_2D/MapServer" />
      </esri:Map.Layers>
    </esri:Map>
  </Grid>
</UserControl>
```

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