Goals

- Give you an overview of development with ArcGIS Server
- Give you a roadmap to other sessions
- Cover the breadth of the software
  - Not a deep dive session
Presentation Outline

• Brief Product Overview

• Overview of Development with ArcGIS Server
  – Developing Web Applications
  – Developing Web Services
  – Developing Enterprise Components
  – Developing Mobile Applications
What is ArcGIS Server 9.2

• A complete, out of the box Web based GIS with ready to use applications and GIS services for spatial data management, visualization, and analysis

• A platform for developing web and enterprise applications and services
  – Full Software Developer Kit
  – Available for the .Net and Java platforms
Complete Out of the Box Web based GIS

• Allows GIS Analysts to easily configure Web Applications
  – No programming required

• Includes out of the box Desktop Clients
  – ArcGIS Explorer
  – ArcGIS Desktop

• Allows analysts to publish rich GIS Services
  – 2D and 3D Mapping services
  – Geocoding, Geodata, Network Analysis and Geoprocessing services
  – SOAP, WMS, and KML based services
Development Platform for Server Applications

• Support for multiple platforms
  – .Net
  – Java

• Cross-platform development
  – Available on Windows, Linux, and Solaris

• Comprehensive SDKs for Application Development
  – *Web ADF* – for Web Applications and Web Services
  – *Mobile ADF* – for Mobile Applications (.Net only)
  – *Enterprise ADF* - for Enterprise JavaBeans (EJB) (Java only)
ArcGIS Server 9.2

- Complete & Integrated server-based GIS
- Out-of-the-box applications and services
- Rich developer opportunities
Product Platforms

• ArcGIS Server for the Microsoft .Net Framework
  – Windows

• ArcGIS Server for the Java Platform
  – Windows, Linux, Solaris

• Platform specific install, documentation, SDK and IDE integration

• Both platforms have the same GIS functionality
  – Rich GIS Services
  – Management Applications
  – Web Mapping Applications
  – ArcGIS Explorer and Desktop clients

• ArcGIS Server product purchase includes both platforms
ArcGIS Server for the Microsoft .Net Framework

Engineered for .Net and Windows
ArcGIS Server for the Java Platform

Certified Application Servers:

![Bea](image1)
![IBM WebSphere](image2)
![Jboss](image3)

Certified Operating Systems:

![Red Hat](image4)
![SUSE](image5)
![Sun Microsystems](image6)
![Windows](image7)

IDE Plugins:

![Eclipse](image8)
![Java Studio Creator](image9)
Developing with ArcGIS Server
What can developers do with ArcGIS Server?

- You can build the following kinds of applications and services with ArcGIS Server:
  - Web Applications
  - Mobile Applications
  - Desktop Applications
  - (Application) Web Services
  - (Application) EJBs
How do you build your application?

- You build your applications using Application Development Frameworks
  - Web ADF [.Net, Java]
    - for Web Apps and Web Services
  - Mobile ADF [.Net]
    - for Mobile Apps
  - Enterprise ADF [Java]
    - for EJBs
  - ArcGIS Engine, ArcGIS Desktop SDK, ArcGIS Explorer SDK [.Net, Java]
    - for Desktop Apps
- Your applications work against GIS Services running in ArcGIS Server
  - via the ADFs or Directly or in Combination
GIS Services – The Application Developers View

- GIS Services represent *network accessible* resources that your application works with:
  - Map Service, Geocode Service, Network Analysis Service, Geoprocessing Service, ...

- A GIS Service supports multiple network accessible programming interfaces
  - SOAP
  - ArcObjects

- GIS Services can be accessed via
  - Internet Connections
    - Applications use SOAP / HTTP
    - "GIS Web Service"
  - Local Connections
    - Applications use SOAP / LAN or ArcObjects / LAN
    - "GIS Server Object"

- The ADFs expose GIS Services as Resources or Tasks to your application
Building Web Applications
Building Web Applications

• Use the Web ADF
  – ArcGIS Server for .Net - Web ADF
  – ArcGIS Server for Java – Web ADF

• Leverage AJAX Enabled ASP.Net or JSF Web Controls

• Work with GIS Web Services using the SOAP API

• Work with GIS Server Objects using either
  – The SOAP API
  – Finer Grained ArcObjects API
Web ADF Development Paths

- Increasing complexity and functionality
Web ADF – Key Features

- Ability to work with multiple data sources
- Ability to overlay multiple map services within the web application
- Web Mapping Controls
  - Rich Web User Experience – AJAX enabled
  - Enhanced Design Time Experience
- Web Graphics Layers for results and selections
- Task framework
- Web Mapping Application Template
- Integrated into the key IDEs
Web ADF – Support for multiple data sources

- ArcGIS Server Local (over LAN)
  - using the SOAP API
  - using the ArcObjects Server API

- ArcGIS Server Internet (over HTTP)
  - using the SOAP / Web Services API

- ArcIMS Server (over HTTP or LAN)

- ArcWeb Services (over HTTP)

- WMS Servers (over HTTP)

- Custom Data Sources that you can develop
Web ADF – Tasks

• Allow the end user to perform useful work
• Visual components designed to perform a set of related actions and generate a result

• Configurable from Manager
• Product ships with out of the box tasks
  – Search by attributes
  – Query Attributes
  – Find Place
  – Find Address
  – Editing
  – Geoprocessing

• Developers can extend the system with Custom tasks
Web Graphics

• Allow developers to add simple graphics to the map

• Supported symbols
  – Line
  – Marker
  – Polygon
  – True type marker

• Supported renderers
  – Unique value
  – Class break
  – Simple

• Integrated into Web and Browser tiers
ArcGIS Server for .Net – Developing Web Applications

• You work with
  – ASP.Net Pages, ASP.Net Web Controls, WebParts,
  – JavaScript, AJAX, HTML, XML, XSLT

• ESRI provides you with
  – ASP.Net Web Controls
  – Web ADF GIS Business Objects
  – SOAP API to GIS Services
  – ArcObjects API to GIS Components
ArcGIS Server for .Net - Web ADF

- Designed for ASP.Net
- Integrated with VS 2005
- Rich design-time experience
- Drag and drop web controls
- Configure tools, resources and tasks
- Start with Web Project templates
- Integrated samples and documentation
ArcGIS Server for .Net - Web ADF architecture

- AJAX enabled GIS Web controls
- Extend, distribute custom functionality
- Web-tier graphics, geometry, rendering
- Multi-source support

Diagram showing the integration of Web ADF with various data sources and controls:
- Data Sources: ArcGIS Server, ArcIMS, ArcWeb, OGC WMS
- Web ADF consolidation classes
- Common Data Source API
- Tasks
- Task Framework
- Web Server
- Web ADF JavaScript
- Web Controls

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ArcGIS Server for .Net - Web ADF Controls

- AJAX enabled

- Map control supports multi source blending
ArcGIS Server for .Net - Web ADF Controls

- Volcanoes and Faults
  - VOLCANO
    - Less than -3503
    - -3503 - -906
    - -906 - 1691
    - 1691 - 4288
    - 4288 - 6886
- Faults
- Background
  - Populated Places
  - Railroads
  - Highways

Controls:
- Zoom In
- Zoom Out
- Pan
- Full Extent
- Magnifier
- Zoom Level

Tasks:
- SearchAttributesTask
- FindAddressTask
- FindPlaceTask
- QueryAttributesTask
- GeoprocessingTask
- EditorTask
- TaskManager
- TaskResults

Extensible framework to support creating and deploying custom tasks
Demo – Developing Web Applications

ArcGIS Server for .Net
Sessions - .Net Web ADF

• Building AJAX Based Web Applications with ArcGIS Server and .Net
  – Art Haddad and Rex Hansen
  – Tue 2:45 – 4 PM
  – Thu 8:30 AM – 9:45 AM

• Developing Custom Web Tasks using the .Net Web ADF
  – Sentha Sivabalan and Rex Hansen
  – Wed 2:45 – 4:00 PM
ArcGIS Server for Java – Developing Web Applications

- You work with
  - Java Server Pages (JSP), Java Server Faces (JSF), Portlets
  - AJAX, JavaScript, HTML, XML, XSLT
- ESRI provides you with
  - JSF-based Web Controls (Web ADF)
  - Web ADF GIS Business Objects
  - SOAP API to GIS Services
  - ArcObjects API to GIS Components
ArcGIS Server for Java - Web ADF

• Java Server Faces (JSF) based web controls for rapid application development

• Integrated into Eclipse and Sun Creator IDEs

• Runs on standard J2EE Application Servers

• Allows you to work with
  – Java Server Pages (JSP), Java Server Faces (JSF), Portlets
  – Javascript, HTML, XML and XSLT
IDE integration - Eclipse

- Eclipse plug-in
  - Template applications
  - Reusable code available as snippets
  - Integrated documentation
  - Samples are integrated to run from within the IDE
Creator IDE Integration

- Rich visual design-time experience for web application development
- Drag and drop web controls
- Configure tools, resources and tasks
- Start with Web Project templates
- Integrated samples and documentation
IDE integration – SUN Java Studio Creator

Controls
ArcGIS Server for Java – Web Mapping Application and Controls

- Tasks
- Navigation Task
- TOC Control
- Map Control
- Overview Control
ArcGIS Server for Java: Web ADF Architecture – follows the MVC pattern
ArcGIS Server for Java - Web ADF Objects

Context Control

WebContext

GISResource

GISFunctionality

Attributes
(WebMap, WebGraphics, ...)

Resource
(ArcGIS Server, ArcIMS, ...)

Functionality
(Mapping, overview, ...)
Demo – Developing Web Applications

ArcGIS Server for Java
Sessions - Java Web ADF

• Building AJAX Based Web Applications with ArcGIS Server and Java (Deep Dive)
  – Jayant Sai and Antony Jayaprakash
  – Tue 4:30 – 5:45 PM

• Developing Custom Web Tasks using the Java Web ADF
  – Keyur Shah and David Cardella
  – Wed 1:00 – 2:15 PM
Working with GIS Web Services
Service Oriented Architectures

- A method of building business applications that utilize common services to support business functions

- Resources on a Network are made available as Services that can be accessed without awareness of their underlying implementation

- Services have a well defined contract and are interoperable

- GIS Web Services are available for integration into your SOA

- You can build spatially enabled business web services
SOAs helps integrate Diverse Enterprise Systems

- Enterprise GIS System Integration
  - Improves Geo-Centric Workflow
  - Utilize GIS data from all GIS Systems

- Enterprise Application Integration
  - Improves GeoSpatially Enabled Workflows
  - Utilize GIS data within CRM & ERM Systems

- Service Oriented Architecture
  - Facilitates GIS System and Enterprise Application Integration
GIS Web Services

• ArcGIS Server includes a rich set of out of the box GIS Web Services

• SOAP
  – 2D Map Service
  – 3D Map / Globe Service
  – Geocoding Service
  – Network Analysis Service
  – Geoprocessing Service
  – Geodata Service
  – Mobile Data Service

• OGC
  – WMS Service

• KML
  – KML Service

• Publish and Deploy using Manager
  – no programming required

• .Net and Java ArcGIS Servers have identical web service capabilities
Consuming GIS Web Services

• ArcGIS Explorer and ArcGIS Desktop are out of the box Clients.

• You can build Web Mapping Applications that consume GIS Services using Manager.

• The Web ADFs have built in support for working with GIS Web Services via the ArcGIS Server Internet Data Source.

• Application Developers can also consume GIS Web Services using the standard SOAP/WSDL interfaces.
  – No need to install any ESRI software on client machine.
  – Can be consumed from both .Net and Java.
Building Spatially Enabled Business Web Services

• You Implement your business Web Service using a standard framework
  – ASP.Net asmx, WCF
  – Java Axis
  – ...

• You Implement your geo-spatial logic using:
  – The Business Objects in the Web ADF
    • Eg IQueryFunctionality
  – The ArcGIS Server SOAP API
  – The ArcObjects fine grained APIs
Sessions – GIS Web Services

• Working with the ArcGIS Server Web Services API (Deep Dive)
  – Sud Menon and Julio Andrade
  – Wed 2:45 – 4:00 PM
ArcGIS Server for Java - Enterprise Development

• You work with
  – Enterprise Java Beans (EJB), Servlets
  – Enterprise Service Bus (ESB), Java Business Integration (JBI), BPEL
  – Java Message Service (JMS)
  – Enterprise Information Systems (EIS) integration

• ESRI provides you with
  – Geospatial Enterprise Java Bean (EJB) components (Enterprise ADF)
  – SOAP API to the Server
  – ArcObjects API to the Server [optionally, via J2EE Connector Architecture (JCA)]
Java 2 Platform, Enterprise Edition

Client Tier
- SOAP, UDDI, WSDL
- IIOP
- Firewall

J2EE Server
- Servlets
- JSPs
- EJBs
- Connectors
  - JMS
  - SQL

Back-End Systems
- Databases
- Legacy EIS
- Other Systems

Other Systems
- Applets, Applications
- Web Browser
- Wireless Devices

Wireless Browsers
- HTTP

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ArcGIS Server for Java – Geospatial EJBs

- 9.2 ships with out-of-the-box Geospatial EJBs that are ready to use and ready to deploy
  - Mapping, Geocoding, Network Analysis, Geodata Querying and Geoprocessing

- Integrated with the Web ADF
  - Use geospatial EJBs as data sources in web applications

- Integrated into Manager for simple point click ease
  - Package, configure and deploy
  - Configure logging, security and high availability for clustering

- Supports J2EE 1.4 compliant application servers

- Integrated with the Eclipse IDE

- You can also build your own business specific spatially enabled EJBs
Sessions – Java Enterprise ADF

- How to build Enterprise Applications using the Geospatial EJBs (Deep Dive)
  - Eric Bader and Divesh Goyal
  - Tue 2:45 – 4 PM
# ArcGIS 9.2: Mobile GIS Products

<table>
<thead>
<tr>
<th>Platform Support</th>
<th>Laptop PC</th>
<th>Tablet PC</th>
<th>Pocket PC</th>
<th>Smart Phone</th>
<th>J2ME Phone</th>
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<td>Developer Toolkits</td>
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<td>Applications</td>
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<td>Solutions</td>
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<td>GeoCollector</td>
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ArcGIS Server for .Net - Building Mobile Applications

• Use the ArcGIS Server Mobile ADF

• Leverage Mobile Map Controls

• Leverage the .Net Compact Framework

• Work with GIS Web Services using the SOAP API
ArcGIS Mobile SDK

• An ArcGIS Server developer solution for mobile applications

• An SDK that ships with ArcGIS Server for building Mobile applications.

• A Suite of .Net Components for developing custom server-centric lightweight mobile applications

• Supports field workflows
  – Data viewing
  – Feature inspection
  – Basic data collection

• Direct synchronization with ArcGIS Server

• Connected and disconnected environments

• Windows Mobile and Desktop platforms
ArcGIS Mobile SDK: Features Overview

- Suite of .Net Mobile GIS components
- Support multiple connectivity scenarios
- Long and Short Transactions, Versioned editing
- Leverage Visual Studio 2005
- Small footprint and high performance
- Comprehensive developer help
  - Visual Studio integration
  - Walkthrough, Samples
  - Online documentation
Mobile SDK: Target Platforms

- Microsoft .NET/.NET Compact Framework 2.0

- Windows Mobile 5.0
  - PocketPC
  - SmartPhone

- Windows Mobile for Pocket PC 2003, 2003 SE

- Windows CE 5.0

- Windows XP
Mobile SDK: Core components

ArcGIS Server

URL

Map

MapAction

Feature Layer

Annotation Layer

Raster Layer

ADO.Net

+ Many more components
Mobile SDK: Application and Data Deployment

Data Extraction
MapCache Extractor

Application Development
Visual Studio

ArcGIS Server
Web Service

Connection
Posts Edits
Refresh Data

Deployment

Mobile Applications

Day to Day synchronization from the Field

Editing Application

Viewing Application
Demo – Developing Mobile Applications

ArcGIS Server for .Net
Sessions – Mobile Development

• ArcGIS Mobile SDK – Best Practices
  – Jeff Shaner and Mike Shaw
  – Tue 2:45 – 4:00 PM
  – Wed 4:30 – 5:45 PM
Building Desktop Applications- using ArcGIS Engine

• Use ArcGIS Engine for .Net or Java
  – Leverage the Engine Map and Globe Controls
  – Work with GIS Services using ArcObjects
    • Use the GISClient ArcObjects library to create connections to the server to browse the server and to obtain proxies to gis services
• Program directly against wsdl proxies if needed
  – .Net or Java clients
• Use ArcGIS Explorer SDK to build custom tasks that work with ArcGIS Server

• Programming Custom Tasks for ArcGIS Explorer (Deep Dive)
  – Shelly Gill, Robert Dunfey and Euan Cameron
  – Wed 10:30 – 11:45 AM
  – Wed 4:30 – 5:45 PM
Presentation materials

• PowerPoint presentation and code will be posted on the conference web site

• EDN – downloads and videos
Further questions?

• TECH-TALK AREAS after the different detailed presentations

• ESRI Showcase

• Meet the teams
  – ArcGIS Server for Java – Tue 4 – 5 PM
  – ArcGIS Server for .Net – Tue 5 – 6 PM
  – ArcGIS Mobile – Wed 11:30 AM
  – ArcGIS Explorer – Thu 10:30 AM

• ESRI Developers Network (EDN) website
  – http://edn.esri.com