



GIS

The Geographic Approach for the Nation



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Web 2.0 Development with ArcGIS Server and Java

Gary Sheppard and Frank Xia
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Agenda

- ArcGIS Server and the Web ADF
- ArcGIS Server and Web 2.0
- You Could Use a REST
- Server Object Extensions (SOEs) in Java
- Playing Nice with Frameworks
- Consider the Future: New in ArcGIS 10
- `session.close();`

ArcGIS Server

- Enterprise access to core GIS functions:
 - Visualization (maps/globes)
 - Data management
 - Analysis
- Service-oriented architecture
 - SOAP
 - REST
 - OGC (WMS, WFS, WCS)



Developing with ArcGIS Server

- ArcObjects
- ADF = Application Development Framework
 - Java Web ADF
 - .NET Web ADF
- Web APIs
 - JavaScript
 - Flex
 - Silverlight
 - SharePoint

ArcGIS Server Java Web ADF

- Component-based Web GIS development
- Based on JavaServer Faces (JSF)
- Out-of-the-box applications
- API for common GIS functionality

Benefits of the Web ADF

- **MVC—separation of presentation and logic**
- **Built-in user interface elements**
 - Tasks (widgets)
 - Tools/commands
- **Pre-built applications**
- **Works with ArcGIS Server, ArcIMS, and WMS**

Tradeoffs of Using the Web ADF

- Performance issues
- JSF not widely used
- Tricky to customize user interface
- User interface focuses on GIS users

ArcGIS Server and Web 2.0

- Can ArcGIS Server do Web 2.0?
- Better question: **what is Web 2.0?**

Web 2.0

No single definition, but in general:

1.Efficient, pleasant user interfaces

2.User-generated content

– VGI = volunteered geographic information

Web 2.0

No single definition, but in general:

1. Efficient, pleasant user interfaces

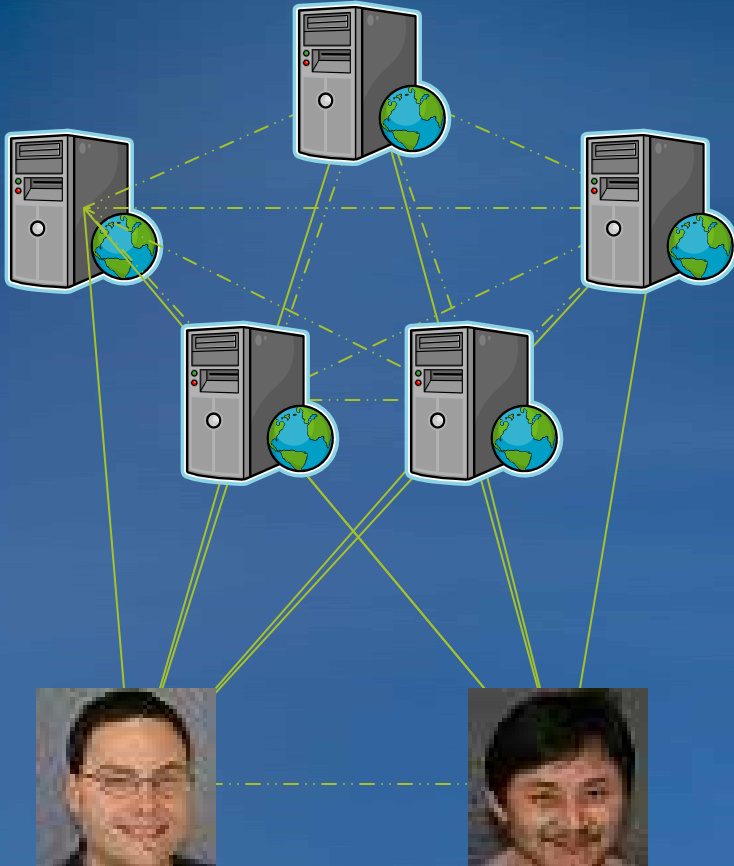
2. User-generated content

– VGI = volunteered geographic information

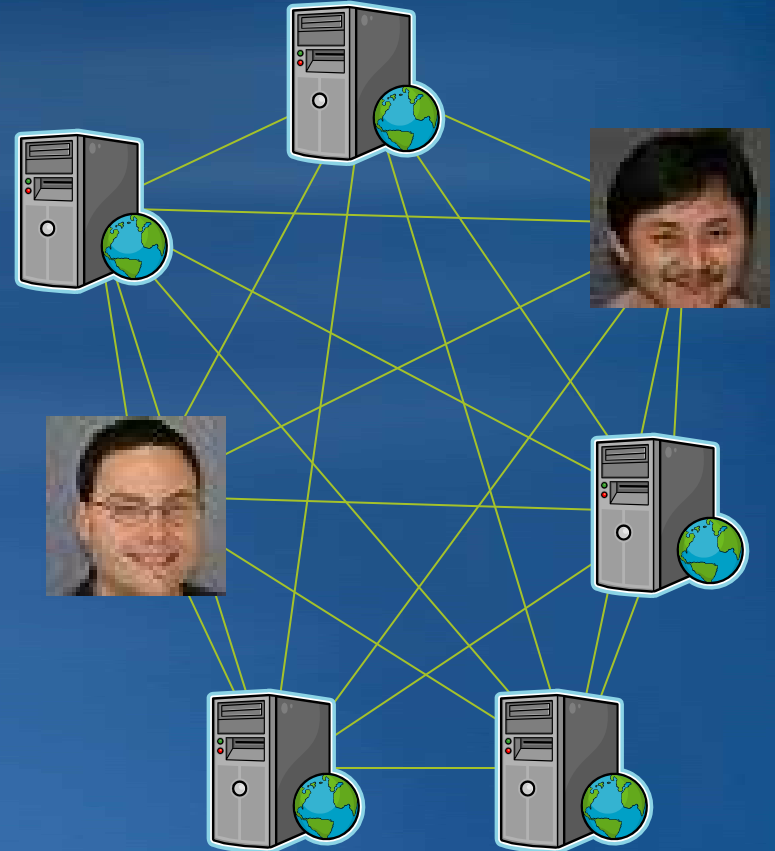


Web 1.0 vs. Web 2.0

Web 1.0: Client-Server



Web 2.0: Web



ArcGIS Server and Web 2.0

Well, can ArcGIS Server do Web 2.0?

a. Yes

b. Heck yes!

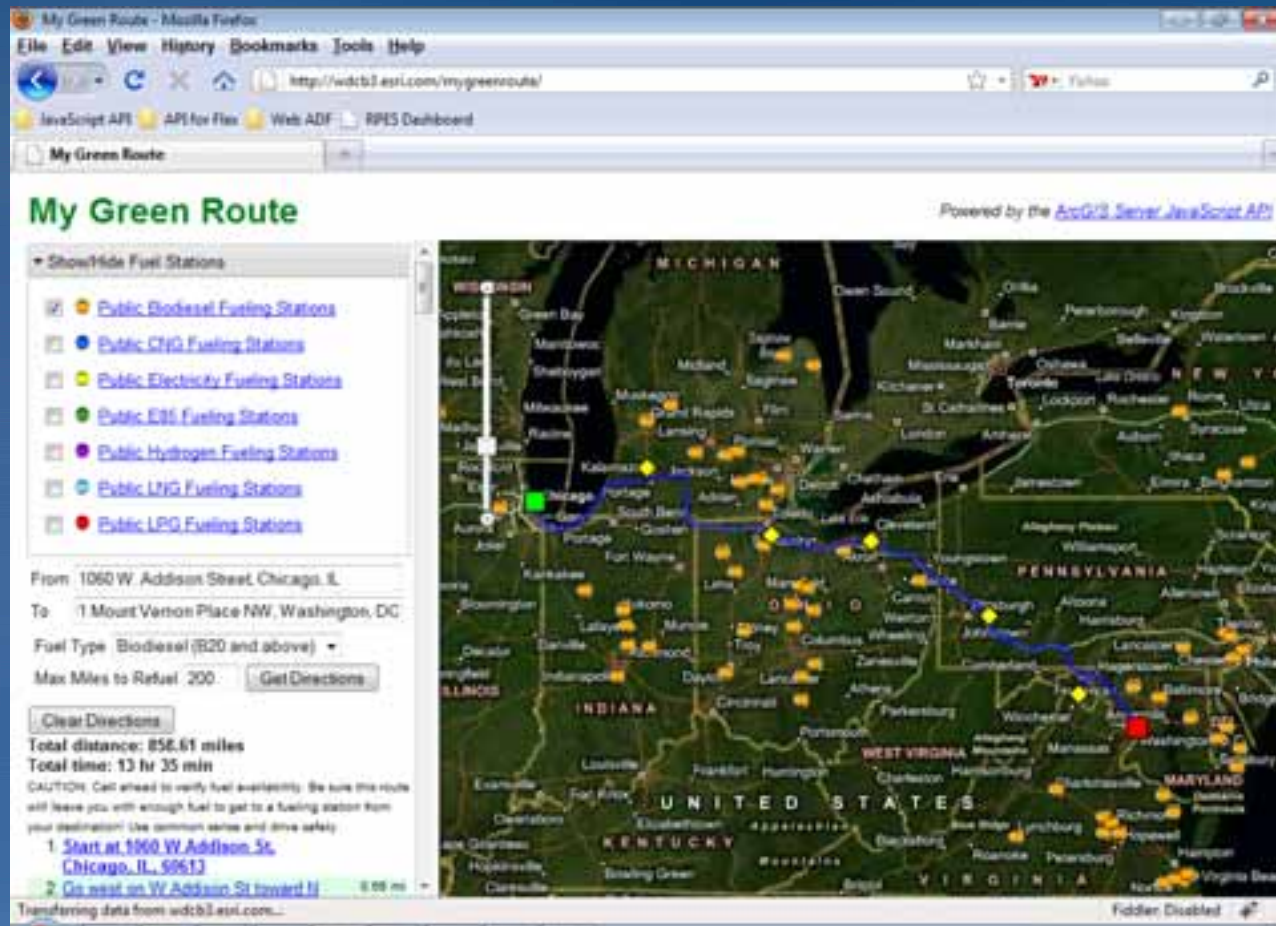
c. Indubitably

d. All of the above

Let us elaborate...

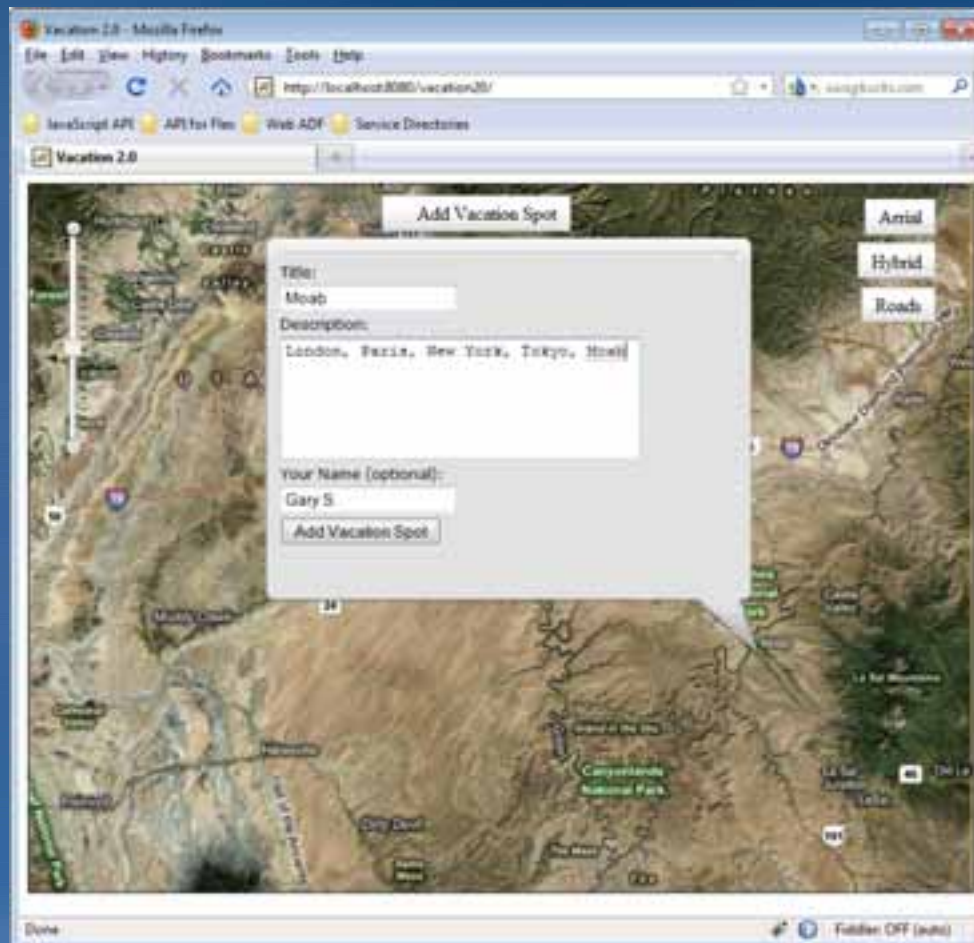
ArcGIS Server and Web 2.0

1. Efficient, pleasant user interfaces



ArcGIS Server and Web 2.0

2. User-generated content



You Could Use a REST

- **REST = Representational State Transfer**
- **REST is an architectural style**
 - Not a technology
 - Not a standard
 - Not a specification
 - Not an API
 - Try as people might!
- **Most commonly used for Web services**

REST Key Ideas

- Client-Server
- Stateless
- Outputs are cacheable or non-cacheable
- Client and server are decoupled
- Layered system
 - REST services using REST services
 - Encapsulation

REST Services Demystified

- There's not much to demystify!
- Resources as URLs
- Operations as HTTP methods
 - GET (like SQL SELECT)
 - DELETE (like SQL DELETE)
 - POST (like SQL INSERT)
 - PUT (like SQL UPDATE or INSERT)
- See [http://ajaxpatterns.org/RESTful Service](http://ajaxpatterns.org/RESTful_Service)

REST Responses

- Again, REST is not a specification
- Common response format: JSON
 - JavaScript Object Notation
 - Simple object structure
 - Java library available at <http://json.org/java>

REST Service Example (non-GIS)

- Sports database at <http://www.gnfsports.com> (fictional)
- Request:
HTTP GET <http://www.gnfsports.com/scores/NBA/2010/02/06/UTH>
- Response:

```
{  
  "gameId": 300206026  
  "home": "UTH",  
  "visitor": "DEN",  
  "homeScore": 116,  
  "visitorScore": 106,  
  "attendance": 19911  
  "highScorerId": 4000  
}
```
- Note: <http://www.gnfsports.com/scores/NBA/2010/02/06/DEN> should return the same thing

REST Service Example (GIS)

- ArcGIS Services Directory
 - Installed with ArcGIS Server 9.3 and higher
 - .NET: <http://servername/arcgis/rest>
 - Java: <http://servername:8399/arcgis/rest>
- Demo: ArcGIS Online Services Directory
 - <http://server.arcgisonline.com/arcgis/rest>

Providing REST Services

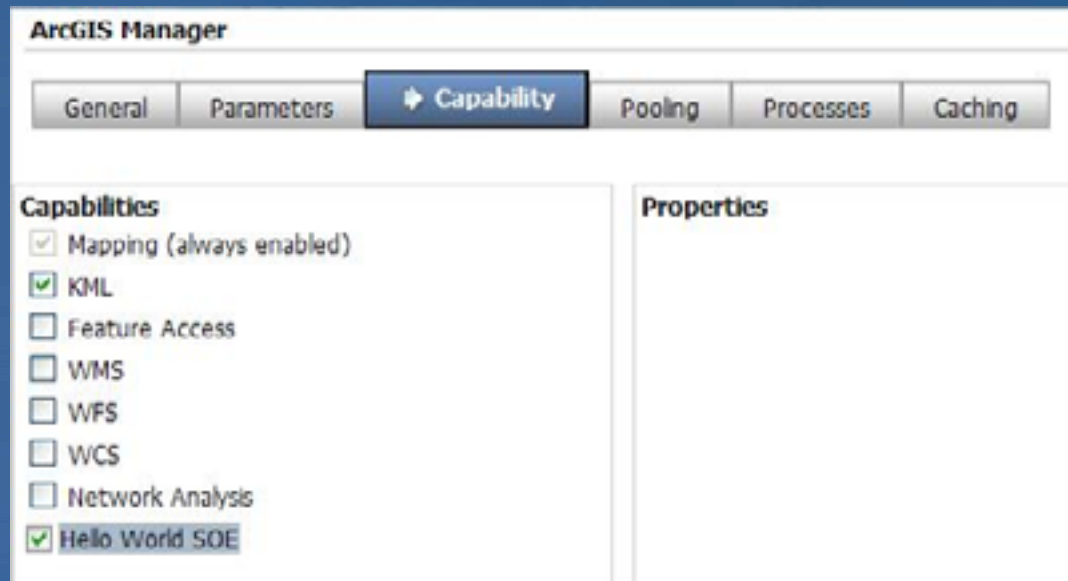
- **Publish GIS content in ArcGIS Server**
 - Map
 - Feature access and editing (new)
 - Globe
 - Geocode
 - Geodata
 - Geoprocessing
 - Geometry
 - Image
 - Search (new)
- **Build your own Java-based REST services**
 - Servlets/JSP
 - JSON libraries
 - IDE tools

Taking Advantage of REST Services

- Use ArcGIS Web APIs
 - JavaScript
 - Flex
 - Silverlight
- Use Ajax to call REST services
 - dojo.xhrGet
 - Built in to ArcGIS JavaScript API
 - XMLHttpRequest
 - All modern browsers
- Tools
 - Fiddler
 - Firebug

Server Object Extensions (SOEs) in Java

- Java code to add new capabilities to services
- Java interfaces and annotations



<http://servername/arcgis/services/Springfield/NuclearPowerPlants/MapServer/HelloWorldSOE>

ArcGIS Enterprise Integration With Java Open Source Frameworks

- ArcGIS Server becomes more widely used in enterprise
- Open Source Frameworks have been widely deployed in many enterprise applications

Top 10 Java Web Frameworks

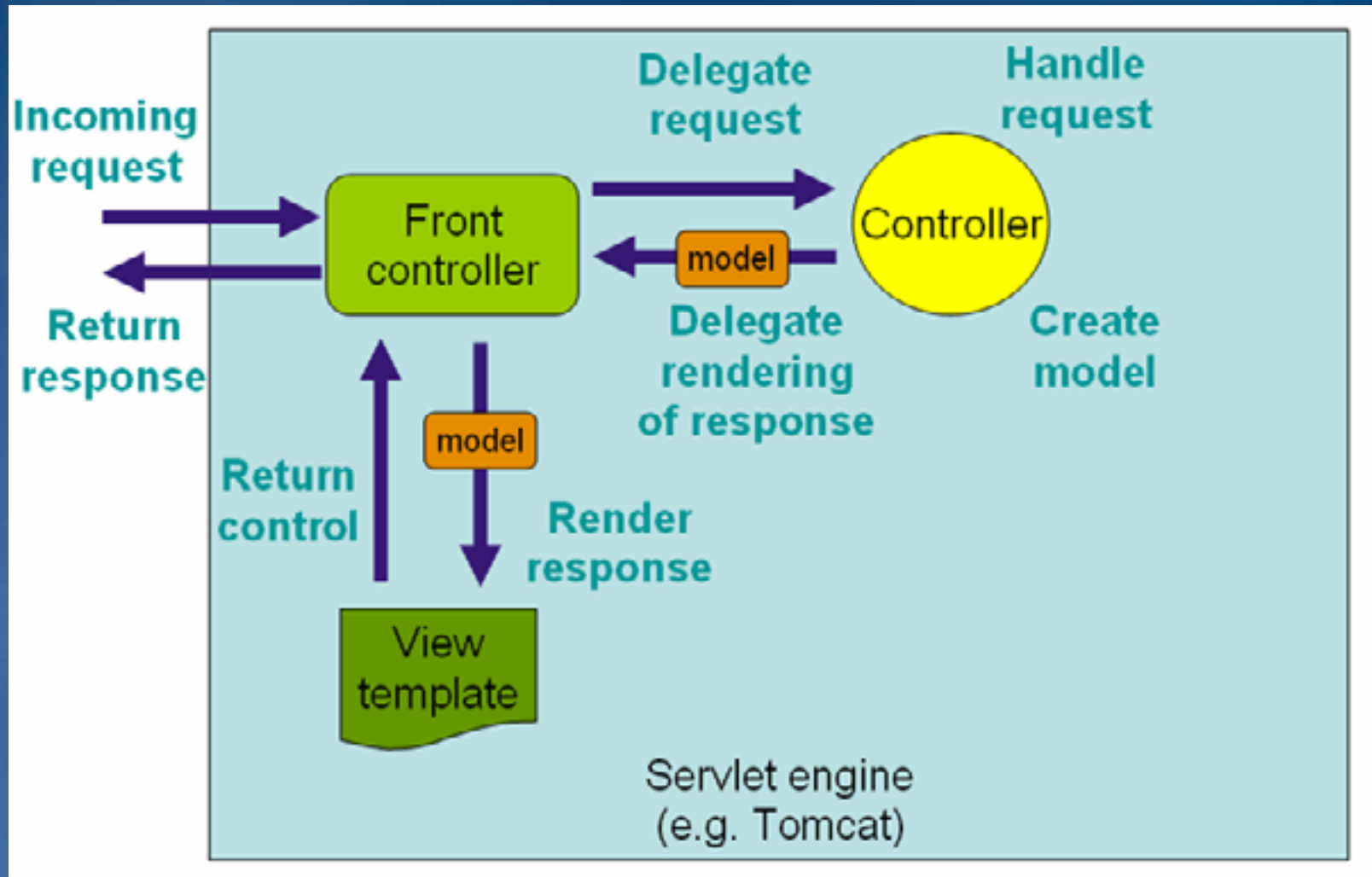
- Struts 2.0
- JSF
- Spring
- Wicket
- Stripes
- Tapestry
- RIFE
- SEAM
- GWT
- OpenXava

<http://blo.taragana.com/index.php/archive/10-best-java-web-development-framework/>

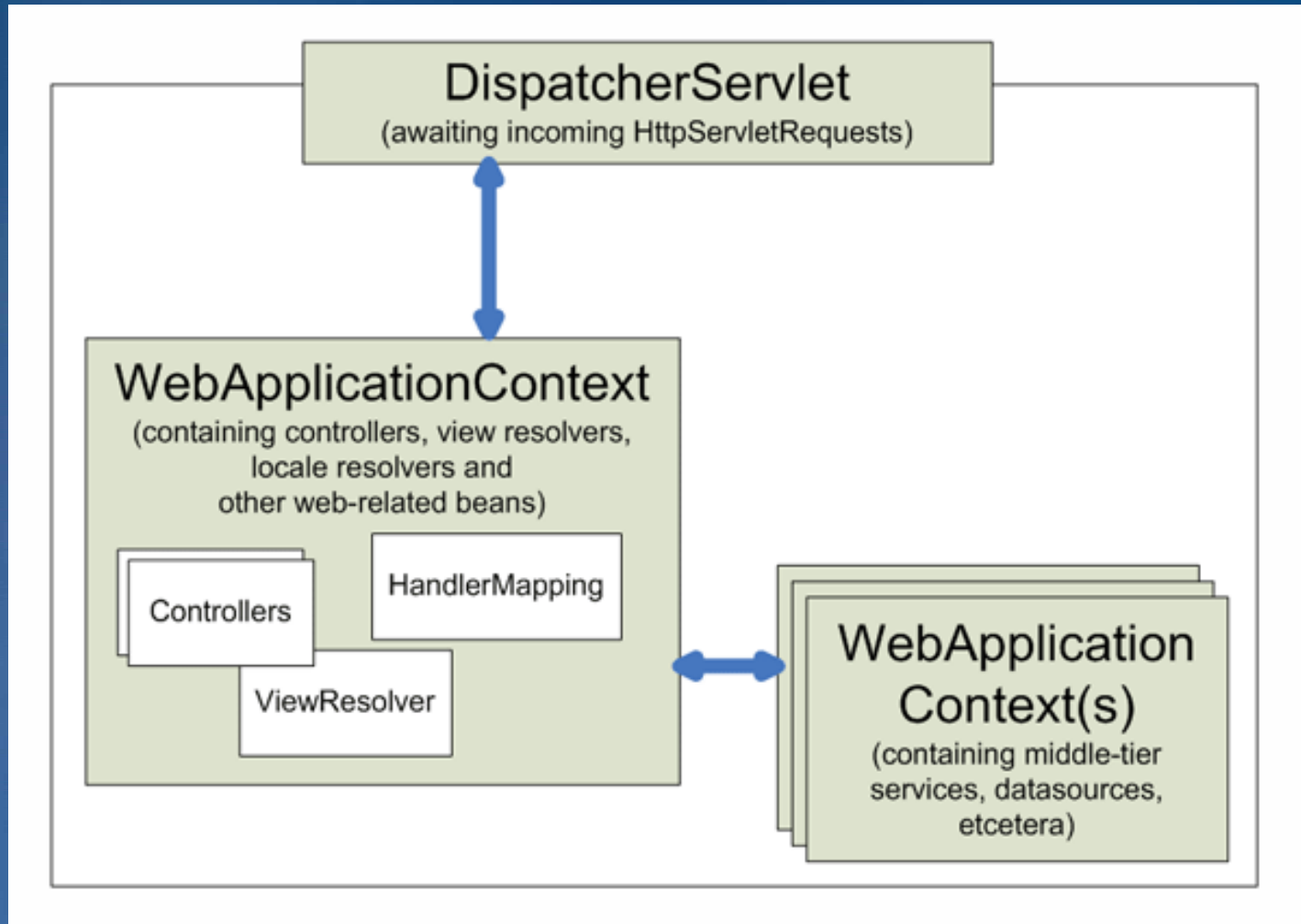
Spring Framework

- Lightweight
- Flexible, modular, pluggable
- Pioneer in POJO programming for enterprise and web apps
- Easy to integrate with other frameworks such as Tapestry and Struts for viewing, Hibernate for persistency
- <http://www.springframework.org/>

Request Processing Workflow



Spring Container (IoC)



Demo

- **Generate PDF with a map from ArcGIS Server via REST APIs**
 - Contents can be customized and personalized
 - PDF content can be saved to an archive database

Consider the Future: New in ArcGIS 10

- Better performance in Web ADF
- Caching
- New options in optimized map services
- REST endpoints for SOEs
- Search service
- Feature editing service
- Time
- iPhone

```
session.close();
```

- Our challenges to you:
 - Think about Web 2.0 (i.e. think about your users)
 - Submit great Web 2.0 code to Code Gallery
 - <http://resources.esri.com/arcgisserver>
 - Click “Communities”
 - Click an API or ADF
 - Click “Add An Entry”

Learn More

<http://www.esri.com/training>

- Instructor-Led Training
 - [Developing Applications with ArcGIS Server Using the Java Platform](#)
 - [Building Web Maps Using the ArcGIS API for JavaScript](#)
- Free Web Training Seminars
 - [Building Applications with ArcGIS Server Using the Java Platform](#)
 - [Implementing Security for ArcGIS Server 9.3 Java Solutions](#)
 - [Building Mashups using the ArcGIS JavaScript APIs](#)

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