Joint WebCOP:
Framework for developing Distributed GIS capabilities in a Service Oriented Architecture (SOA)

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Joint WebCOP:
Using technologies such as ArcIMS, WMS, WFS and SLD to distribute GIS processing to multiple locations using a Service Oriented Architecture (SOA).
Agenda

- Overview
- Architecture
- Services Types
- Advantages & Disadvantages of SOA
- Existing Joint WebCOP (JWC) Services
- Summary
Overview: Distributed GIS using a Service Oriented Architecture

Joint WebCOP

- Framework for developing Distributed GIS capabilities
- Web Application built using Java and ESRI Map Objects Java Edition (MOJE).
  - provides a graphical user interface
  - handles map requests
  - gathers maps from Distributed Services
  - displays an aggregated map image

- GIS Services supported by Joint WebCOP:
  - ArcIMS
  - WMS
  - WFS
Distributed Providers

- Distributes processing to individual Mapping Services on separate machines.

- Distributed Services:
  - Data Retrieval & Filtering
  - Map Rendering
  - Parsing
  - Geographic Analysis

- Allow the integration of legacy GIS systems into the Joint WebCOP.
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Architecture
JWC Service Oriented Architecture

Services:

- C/JMTK and OGC-compliant Services generate Map layers.
- Deployed on multiple machines to distribute the processing.
- Accessed using HTTP/HTTPS.
- Request/responses made using Standard XML.
- Return PNG, JPG, or BMP images.
Service Types Supported:

**C/JMTK**
- ArcIMS 9.x

**OGC**
- WMS 1.0.0, 1.1.1, 1.3.0
- SLD 1.0.0, 1.0.20
- WFS 1.0.0
JWC Service Oriented Architecture

Joint WebCOP Web Application

• Thin client - uses only HTML, Javascript, and images – no ActiveX controls or Java applets.

• Combines/displays images from C/JMTK and OGC Services.
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Drawing the Map

Diagram:

1. Request
   - Web Browser
   - Web Server
   - Joint WebCOP Web Application
   - Internet Map Services
   - Web Map Services

2. Map Request
   - Web Server
   - Joint WebCOP Web Application
   - Web Map Services

3. Map Image
   - Web Server
   - Web Map Services

4. Composite Map
1. The User performs a Map operation such as Zoom In. A request is made to Joint WebCOP.

2. Joint WebCOP begins drawing a map by making so requests to the external services.

3. The external services generate and return an image representing their rendered layers.

4. Joint WebCOP combines each of the images returned from the external services and returns the composite map to the User.
Advantages

• Joint WebCOP displays maps from any ArcIMS and WMS Service.

• Processing to create maps is distributed to multiple servers (Services).
  – less map processing by Joint WebCOP
  – handles more user requests

• New data sources are easily integrated via open C/JMTK and OGC standards.
Disadvantages

• Memory overhead of combining images from ArcIMS or WMS services.
• Overhead increases with:
  – number of concurrent users/requests
  – number of Services displayed
  – size of the Map.
• Performance limited to weakest service.
Existing Services:

- Army Publish and Subscribe Service (PASS)
- Base Map Service
- Distributed Geospatial Intelligence Network (DGINet)
- Global Combat Support System (GCSS)
- Integrated Imagery and Intelligence (I3)
Army Publish and Subscribe Service (PASS)

- WMS/WFS Service
- Subscribes to PASS messages via HTTP Broadcast
- Stores Geo-Referenced PASS Messages In-Memory
- Draws PASS Friendly/Enemy units using MIL-STD-2525B Symbology
- Can be run on the PASS Server or stand-alone
Base Map Service

- ArcIMS Service
- Provider of static Base Map and Imagery Products
- Natural, Cultural and Political features
Distributed Geospatial Intelligence Network (DGINet)

- ArcIMS and WMS Service
- Provider of geospatial and intelligence data
- Multi-terabyte Database
- For background base maps or analysis functions
Global Combat Support System (GCSS)

- WMS/WFS Service
- WMS/WFS built on top of existing GCSS System
- Dynamically draws database result-sets from queries executed in GCSS System
- Drill-down on map by UIC, IRCS, Ship Name, or Mission Number
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Integrated Imagery and Intelligence (I³)

- WMS/WFS Service
- WMS/WFS built on top of existing I³ System
- View finished products created in I³ System as WMS Maps
  - Imagery
  - Order of Battle (OOB), Events, People
  - Threat Analysis
    - Course of Action (COA)
    - Situational Templates
    - Terrain Analysis
  - Weapon & Radar Analysis
  - Weather Analysis
- Provide drill-down to detailed report from plotted objects (WFS)
Summary

- Geographic data is complex – complicated retrieval, filtering and rendering.
- Service Oriented Architecture provides a means of distributing processing across the enterprise.
- OGC and C/JMTK Standards provide easy integration of services.
- JWC is a successful framework that facilitates SOA – being fielded with Global Command and Control System (GCCS) Family of Systems Release 4.1.