US Army Europe Sustainable Range Program

Challenges of Maintaining an Internet Mapping Service in a Military Environment

USAREUR SRP Army Range Mapper (ARM)

Kolade Ayorinde & Jimmy Batcheller
USAREUR SRP GIS Regional Support Centre
Grafenwoehr, Germany
Agenda

- Introduction
  - Who we are
  - Who we work for
  - What we work on
- The evolution of a web mapping application
- Current application architecture
- The vagaries of a military environment
- Issues, solutions and workarounds
- Future development
• The USAREUR SRP GIS RSC mission is to create, manage, and distribute authoritative standardized spatial information, products, and services for the execution of training on U.S. Army Europe ranges and training lands.

• The Army Range Mapper has been developed as an integrated platform for supporting the USAREUR SRP GIS mission online

• ARM currently disseminates geospatial information for training areas, ranges, Forward Operating Sites/Cooperative Security Locations (FOS/CSL) spread throughout EUCOM, CENTCOM and AFRICOM

• ARM aims to provide a one-stop-shop for all USAREUR SRP customers, including the training war fighter community, range safety personnel and environmental GIS analysts
Overview of ARM

- Unclassified (NIPR) solution
- Delivers FOUO (For Official Use Only) data
  - Over 200 training locations
  - 29 countries
  - 3 commands
- Vector data
  - DA SRP QAP (Quality Assurance Plan) & non-QAP compliant
- Raster data
  - Aerial & Satellite imagery
  - Military topographic maps
- Accreditation
  - Army Portfolio Management System (APMS)
  - DIACAP (DoD Information Assurance Certification and Accreditation Process)
  - Service Certificate of Networthiness (CoN)
A Brief Evolution of ARM

- Out-of-the-box web-based image viewer. No customization, limited functionality, no vector visualization

- ITAM Mapper – USAREUR’s pioneering application, tailored, based upon ArcIMS. Vector and raster data visualization, core GIS toolset. Performed well but little scope for future growth

- Subsequently redeployed using WebADF as an ArcGIS Server 9.2 application – improved service publication workflow, improved functional scalability

- Advances in functionality tempered by performance degradation. Optimization of application yielded minimal gains. A different approach was required

- Current application represents a move from server-side approach to one that places more of the workload on the client browser

- Significant performance gains, clearing the way for better integration of USAREUR SRP GIS products and services
System Environment

• Application: ArcGIS Server 9.3.1 SP2, ArcGIS API for JavaScript 2.x

• Webserver: Microsoft Information Services (IIS) 6.0

• Geospatial middleware:
  – ArcSDE Direct Connect + Oracle 11g client (application)
  – ArcSDE Application Server (administration)
  – ArcGIS Server Image Extension

• Database: Oracle 11g Release 2

• Operating system: Microsoft Windows 2003 + 2008 Server

• Client – Server authentication: DoD PKI/SSL

• User authentication – AKO SSO
Product and Service Delivery

- Dynamic data

- Static Products
  - Image Maps
  - Military Installation Maps
  - Topographic Maps
  - Soldier Field Cards

- Physical Product Requests
  - ITAM Viewer
  - Installation Specials
  - Raised Relief Maps
  - Demand-driven Maps
Some of the Vagaries

• **Security Baseline Issues (Database, OS)**
  – STIGs, AGM lockdowns, AD Group Policy Object (GPO) pushes

• **Web Tier (SOM\IIS) Issues**
  – ArcGIS Server Manager
  – Services timeout

• **SOC Issues**
  – Invalid server container error
  – Image services fail to publish images

• **Client & Network Issues**
  – Internet Explorer (IE7, IE8)
  – Network Firewall policy
Security Baseline Issues

- Application downtime due to STIGs, AGM lockdowns, AD GPO pushes
  - After IAVA patch 401 error was received ArcGISWebservices, ASP.Net, IUSR, IWAM accounts were locked
  - AD GPO pushes - ArcGIS Server received: The RPC server is unavailable
  - STIGs requires Oracle connection timeout of 60 minutes
  - Solutions: Check and unlock accounts

STIG: Security Technical Implementation Guide
AGM: Army Gold Master (approved and locked-down OS edition)
AD GPO: Active Directory Group Policy Object
IAVA: Information Assurance Vulnerability Alert
SOM\IIS Issues

• ArcGIS Server Manager
  - It is an error to use a section registered as allowDefinition="\'MachineToApplication\'" beyond application level. This error can be caused by a virtual directory not being configured as an application in IIS arcgis\security\web.config line 10
  - Possible cause: Corruption of application pool (due to security push?)
  - Solution: Post install for ArcGIS Server. Create a new app pool in IIS.

• Services timeout
  - First user of the day and when there is a long period of inactivity
  - Possible cause: ???
  - Solution: Implement pinger script on the web server to “wakeup” the services at intervals
SOC Issues

• Invalid server container Error
  - "Access Denied: Either the SOM service on machine is not started or the user attempting this connection is not a member of the agsuser or agsadmin group and cannot be granted access to the SOM."
  - Possible cause: DCOM uninstalled during security push
  - Solution: Re-install and Enable Distributed COM on server

• Image Server fails to publish to the SOC
  - Possible cause: Install profiles corrupted following security update
  - Solution: Remove Image Server profiles, reinstall IS and re-start Image Server Manager
Client & Network Issues

- **Internet Explorer (IE7, IE8) mixed content warning**
  - No data is displayed on the map frame if the wrong button is clicked
  - **Cause:** Secure and non-secure content being rendered on page
  - **Solution:** Reconfigure all content to https://
  - Problem temporarily solved until change in firewall policy (see below)
  - **Workaround:** inform users to select Yes for IE7 and No for IE8

- **Network Firewall policy**
  - ArcGIS JS API configured for https:// does work within USAREUR firewall (but works with VPN)
  - Map frame is blank, no data comes through
  - **Solution:** Reconfigure API for http://
Future development
Questions
Contact Information

Kolade Ayorinde
USAREUR SRP GIS System Specialist
Attn: AETT-STS-TS; Unit 28130
APO, AE 09114

Phone: +49 9641 83 8385
DSN: 475-8385
Fax: 475-8344
Email: kolade.ayorinde@us.army.mil

Jimmy Batcheller
USAREUR SRP GIS Architect
Attn: AETT-STS-TS; Unit 28130
APO, AE 09114

Phone: +49 9641 83 8622
DSN: 475-8622
Fax: 475-8344
Email: james.k.batcheller@us.army.mil

https://srp.usareur.army.mil
srp@eur.army.mil
ARM Map Data

• Vector data
  – Aggregated into a single Web Mercator (Auxiliary Sphere) geodatabase
  – FY11 DA SRP Quality Assurance Plan (QAP) profile

• Raster data
  – Image Services
  – Imagery + Military Topographic Maps
  – Web Mercator (AS) services

• Basemap
  – Bing Maps