Extending ArcGIS Enterprise with SOEs and SOIs

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Agenda

• Introduction
• Server object extensions
• Server object interceptors
• Esri consulting services projects
• Best practices & tips
• Q&A

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Introduction
ArcGIS Platform

- Powerful GIS toolset
- Building blocks
- Configurable and extensible
Why?

• Default is not adequate
• Custom business logic
• Security considerations
• Integrate disparate systems

“Because no two burrito bowls are the same”
Options

- Custom applications
- Geoprocessing services
- Server object extensions
- Server object interceptors

Image Services

Map Services
Options

Custom applications

Business logic coded in your application

- Performance
- Reusability
- Scalability
Geoprocessing services

- Full GIS library
- Asynchronous
- Python

“Bread, butter for a GIS analyst”
Server Object Extensions
Server-side code
Attached to Map or Image services in GIS Server
Access to full suite of arcobjects
Custom API (REST | SOAP)
Performance

Managed lifecycle
No additional hardware
Authentication and authorization

*Allows you to focus on your business logic!*
Use cases

- Editing
- Data Processing
- Image Functions
- Network Analysis

When performance is key!
Architecture

Out-of-box applications
- Well-defined API
- Custom API

Custom applications

GIS Server
- Map Services
- Image Services
- SOE

Custom applications
Process

1. Install SDK
2. Samples/templates
3. Add logic
4. Build & deploy via Manager
5. Configure
Demo
Server Object Extensions
Server Object Interceptors
Server-side code
Map or Image services
Filter requests and responses
Chains

API cannot be changed
Must handle all map/image API
Managed lifecycle
Use cases

- Security & Access Control
- Data Enrichment
- Notifications
- Auditing & Metering
Architecture

Out-of-box applications

Well-defined API

GIS Server

SOI

Map Services

Image Services
Inner workings

Out-of-box applications

GIS Server

ArcSOC

Web Handler

SOI 1

SOI 2

Map Services
Demo
Server Object Interceptors
Esri Consulting Services
Projects
Carsten Piepel
Mobile sales mapping app

- Responsive app for the mobile sales force
- Workflow:
  1. Find customers and prospects within territory
  2. Show customer info
  3. Create a trip
- JavaScript

Identify relevant customers and generate route plans
Hexagon binning

- Aggregate insurance policies into hexagonal bins
- Apply spatial and non-spatial filters
- Asynchronous
- Python and procedural SQL

Highlight concentrations of insurance risk
Caching Aspect

- Part of a bigger security SOI project
- Maintain in-memory cache of *query* operation results
- Speeds up frequently repeated queries
- For read-only data
- Java
- Ehcache (Redis, Memached would be better)

Improve query performance by maintaining a cache of frequently accessed query results
Mapping lots of points

• Problem: Visualize tens of thousands or hundreds of thousands of point features on a web map

• Client-side: Feature layer with out statistics | Cluster layer | Heat map layer | Coming: WebGL-based feature layer

• Server-side: Image layer | Geoprocessing | Clustering
Clustering concepts

1. Query features
2. Assign features to clusters based on regular grid using seed locations
3. Fix clusters:
   - Remove overlap
   - Collapse small neighboring clusters

- Clustering is sensitive to order of features
- Similar to JS API point clustering example
- Thanks to Kerry Coffin

https://github.com/Esri/sever-extension-java

cellSize = mapUnitsPerPixel * clusterDistanceInPixels

bbox (extent)

geometry: spatial filter

clusterFieldName: Valuation ($7K)
SUM: $35K
Samples & IDE integration
Automate development workflows using Admin API
Use GP services for long running tasks
Don’t change the API in an SOI

Implement security carefully
No SOIs for hosted feature or tile requests
May need to increase ArcSOC heap size
Enable remote debugging for Java from Manager
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Questions?