Where’s Waldo

The experience with development of geo-spatial services

By Olga Esipova SAP Development Architect
Why Waldo? Relevance?

- Object is located somewhere, on the earth or in space. It can be put on the map -> same as with Waldo

- Objects need to be found -> same as with Waldo
  - Waldo is a business partner, agent, employee, lost child?
  - Asset (pipe, transformer, tractor, crane, drone)?
  - Transport (car, taxi, train, bus, plane)?
  - Place: Square, Memorial, building, palace.

- Objects need to have a correct information about them -> same as with Waldo.
  - Is it a gas or water pipe underground? – Do I dig ??
  - Is that correct metro line which will bring me to the Red Square?
What attributes Waldo has?

- Oversized, thick-rimmed glasses
- Beanie
- Side-swept bangs
- Messenger bag
- Striped sweater
- Skinny jeans
- Superfluous cane
- Pointy boots

Waldo: THE ORIGINAL HIPSTER

CorruptCamel.com
How many application an average company might have?

- GIS
- Finance
- Accounting/Billing
- Enterprise Recourse Planning (ERP)
- Warehouse Management
- Sales & Distribution
- Customer Relationship Management (CRM)
- Supplier chain management
- Supplier Relationship Management (SRM)
- Human Recourse (HR)
- .... and more ...
The system “architecture” for the various stakeholders

1. Spatial client
2. ERP
3. CRM
4. OT
5. Mobile
6. Web

- How do I sync data between business and spatial systems?
- Which spatial system has my data and which version?
- How do I access my business data from my spatial client tools?
- How do I merge business and spatial data with my operations systems?
- How do I provide web access of data in multiple systems?
- How do I connect and sync spatial data to mobile devices?
Monoliths are broken

Architect Clippy
@architectclippy
I see you have a poorly structured monolith. Would you like me to convert it into a poorly structured set of microservices?

6:59 PM - 23 Feb 2015
3,798 Retweets
2,175 Likes
New technologies - Monoliths are broken

- With more usage of cloud applications, picture is changing dramatically, even more applications are in this waist landscape.
- Those applications need to be integrated with each other
- More information need to be synchronized
- We can have several instances/representations of the same object in different applications/systems -> information is distributed
- With IoT in mind even more things need to manages/ located/maintained
Replicate

HOW? Replicate / Synchronize
Synchronization, replication

**Cons**
- Complex
- Susceptible to errors
  - Duplicates
  - Incorrect keys
  - As created data are not verified, inconsistencies are possible
- Require resources to maintain
- Expensive ??

**Pros**
- Straight forward
- Allows offline processing
- Proven that will work
- Cheap ???

Replicate
HOW? Reuse / Redirect / Delegate

- Where the master record?
- Where the copies are?

Reuse

CRM

GIS online

Travel

Mediator

Finance

GIS Portal

Master Data Management
HOW? Reuse / Redirect / Delegate

- Separate Geometry data and attributes
- Have a specific service calls to select BO information

Reuse

CRM

GIS online

Travel

Mediator

Finance

GIS Portal

Master Data Management

GIS DB
Delegation - Is it a valid approach?

**Cons**
- Need to extensively enhance UI
- Current GIS solutions does not support this approach yet
- Sometime new interface management component is needed
- Not clear if performance will be affected
- What about offline processing?

**Pros**
- True data – correct/validated
- All the systems have the same source
- No replication necessary
- No synchronization necessary
- Whole software Industry goes this direction
HOW? Remake / Rejoin

- Where the master record?
- Where the copies are?
HOW? Remake/ Rejoin

Remake

CRM

GIS online

Travel

Finance

ArcGIS Portal

MDM

SAP Geo Framework
Join services - Is it a valid approach?

**Cons**
- Did we really get rid of synchronization
- Need an additional development on our master system
- Not clear if performance will be affected
- Not suitable for everyone

**Pros**
- True data – corrected / validated
- All the systems have the same source of information
- No replication necessary
- No synchronization necessary
- Good fit for SAP Business Suite customers
- High flexibility level
Development challenges

What problems did we face when we develop the services
TASK: Make a Geo service in the business system!

Does it make sense?
Yes it does ...
Start: What kind service to choose?
Where is a specification for this service?

RISKS: Service is proprietary

MITIGATION: Develop a flexible design to allow fast service development
### Request parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
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<tr>
<td><strong>f</strong></td>
<td>Description: The response format. The default response format is html. Values: html</td>
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</table>
| **Where** | Description: A where clause for the query filter. Any legal SQL where clause operating on relevant fields. Examples: where=POP2000 > 500000 where=CITY_NAME = 'Barrington' If you are working with ArcGIS Server 10.4 or a subsequent version, the dateFieldsTime needs to be specific.

Although you issue local time in your where clause, query always returns date values in 'UTC' time. |
| **objectIds** | Description: The object IDs of this layer or table to be queried. |

### Start: What kind service to choose?

**Where is a specification for this service?**

**RISKS:** Service is proprietary

**MITIGATION:** Develop a flexible design to allow fast service development
Version 1.0 SP03 is planned to be released on July 26th.*
For Business suite and S4/HANA

* Subject to change
Challenge - services

- Integrated with ESRI tools and portals
- RESTful service architecture.
- Smaller / better. Microservice is the best.
- Allow to select geometries for the specific object and spatial extend
- Allow to create/update/delete geometry and object as well

ESRI Feature Service -> was the only available service which fit our requirements at a time
Challenge - services

- Need to have a capability to create/ update/ delete / query spatial data
- Correctly utilize HANA spatial capabilities.
Challenge - services

- Develop a way to define / customize service.
  - It should fit not just an Esri Feature Service BUT can be suitable for other specifications in the future
Challenge - services

- Develop a way to define / customize service.
  - We should be able to define a Business Layer
  - We should be able to specify different geometry types
  - We should be to determine a symbols for our geometries
  - We should be able to expose a set of attributes with the service
Challenge - services

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Challenge - services

- Figure out how should it look like:
  - What is must, what is optional?
  - What can be postponed in the development?
  - Where are the latest specs?

- Founds
  - Layer Info
    - Renderer?
  - Service path
  - Service structure
Challenge – UI functionality

➤ Develop UI which would integrate ArcGIS JavaScript API with a Web Application Framework SAPUI5 (Fiori).

➤ The application must be built with SAPUI5

➤ SAPUI5 is a SPA web application framework supporting a MVC architecture

➤ SAPUI5 handles the model, the view, and the controller

➤ SAPUI5 is not compatible with dojo
Final architecture overview
Standard spatially enabled applications

SAP Business Suite
SAP S/4HANA

GIS Platform
(e.g. Esri ArcGIS)

SAP Geographical Enablement Framework* (e.g. Esri REST services)

Geometry Explorer
Geometry Editor

SAP HANA***

* Framework available on SAP ERP 6.0 EHP 6/7/8 and SAP S/4HANA 1610.
Finally, I would like to emphasize my Waldo. In reality I would like to find my “Waldo” on the map. Waldo should have a white hat with a red stripe, round glasses, and a red-and-white stripe shirt. It has to be the “true” Waldo.

The same goes for the object I want to find; it should have the correct business attributes coming from the system where this information originated from.

WHERE'S WALDO?
He is nice and hard to find but SAP Geo Framework can help

THANK YOU
Additional Info


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