



Where's Waldo

The experience with development of geo-spatial services

By Olga Esipova SAP Development Architect

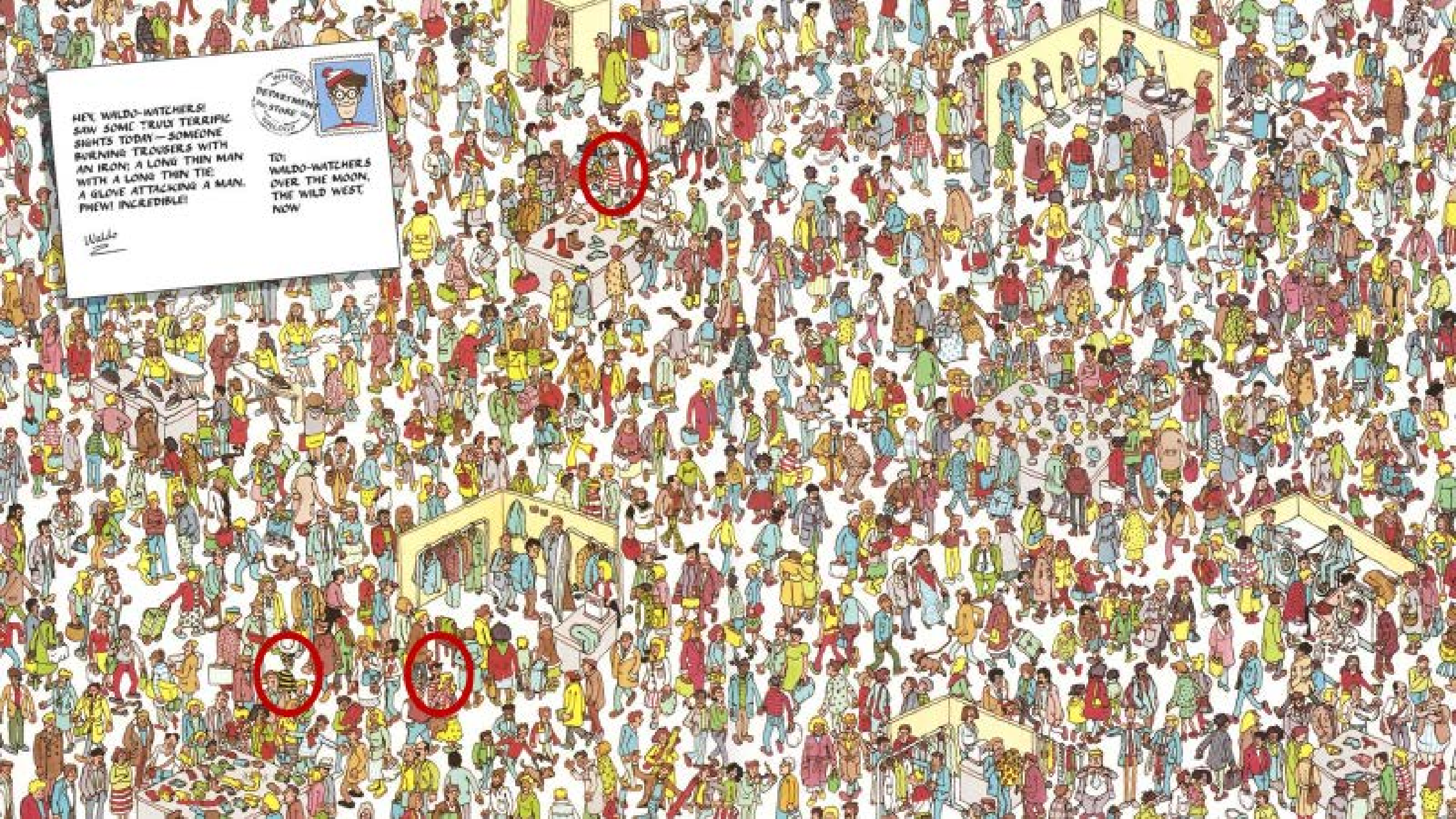


HEY, WALDO-WATCHERS!
SAY SOME TRULY TERRIFIC
SIGHTS TODAY — SOMEONE
BURNING TROUSERS WITH
AN IRON, A LONG THIN MAN
WITH A LONG THIN TIE,
A GLOVE ATTACKING A MAN.
PHEW! INCREDIBLE!

Waldo



TO:
WALDO-WATCHERS
OVER THE MOON,
THE WILD WEST
NOW





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?



Many, but it is still hard to find him.



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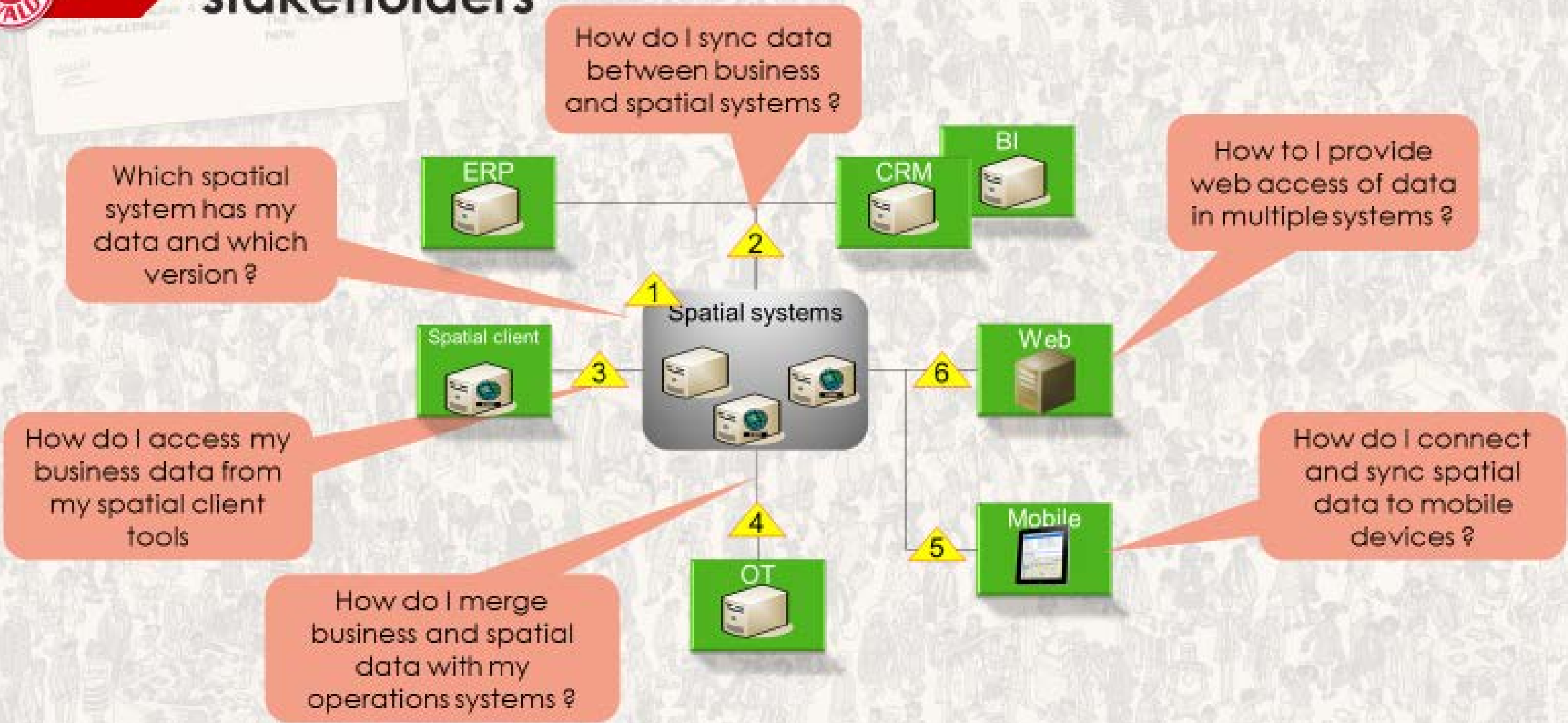
How many application an average company might have?

Duplicates

- ▶ GIS 
- ▶ Finance 
- ▶ Accounting/Billing 
- ▶ Enterprise Resource Planning (ERP) 
- ▶ Warehouse Management 
- ▶ Sales & Distribution 
- ▶ Customer Relationship Management (CRM) 
- ▶ Supplier chain management 
- ▶ Supplier Relationship Management (SRM) 
- ▶ Human Resource (HR) 
- ▶ and more ... 



The system "architecture" for the various stakeholders





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

↳ 3,795 ★ 2,175

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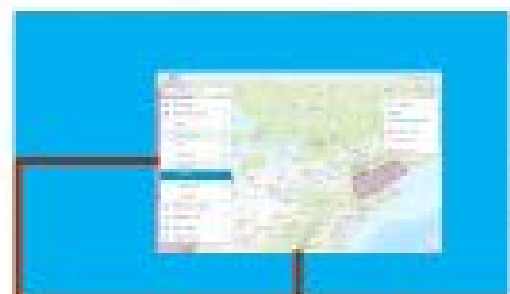


New technologies - Monoliths are broken

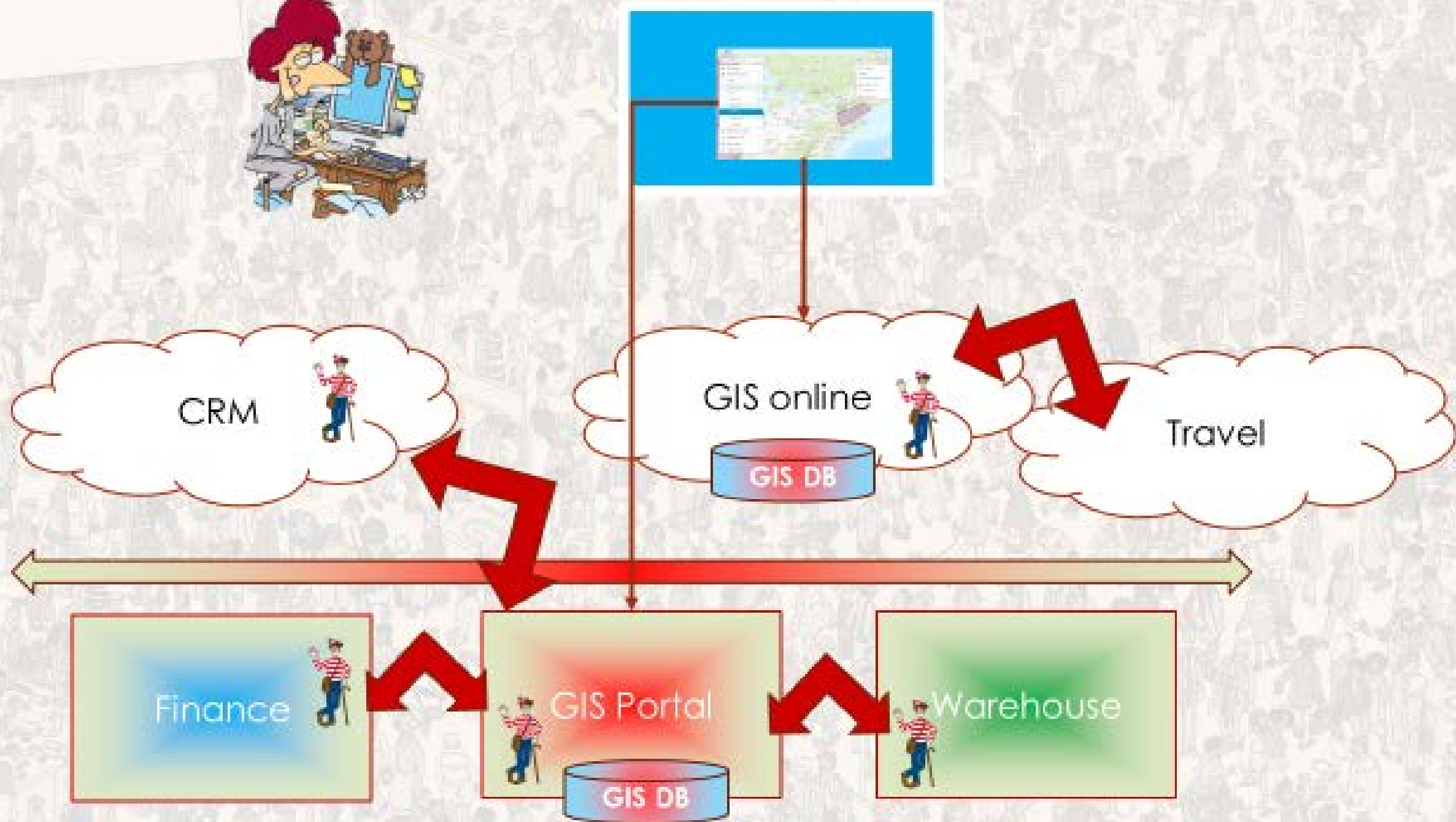
Duplicates

- ▶ 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

HOW ? Replicate / Synchronize



Replicate



Synchronization, replication

Replicate

Cons

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

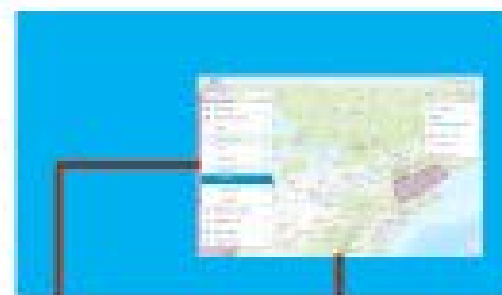


Pros

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

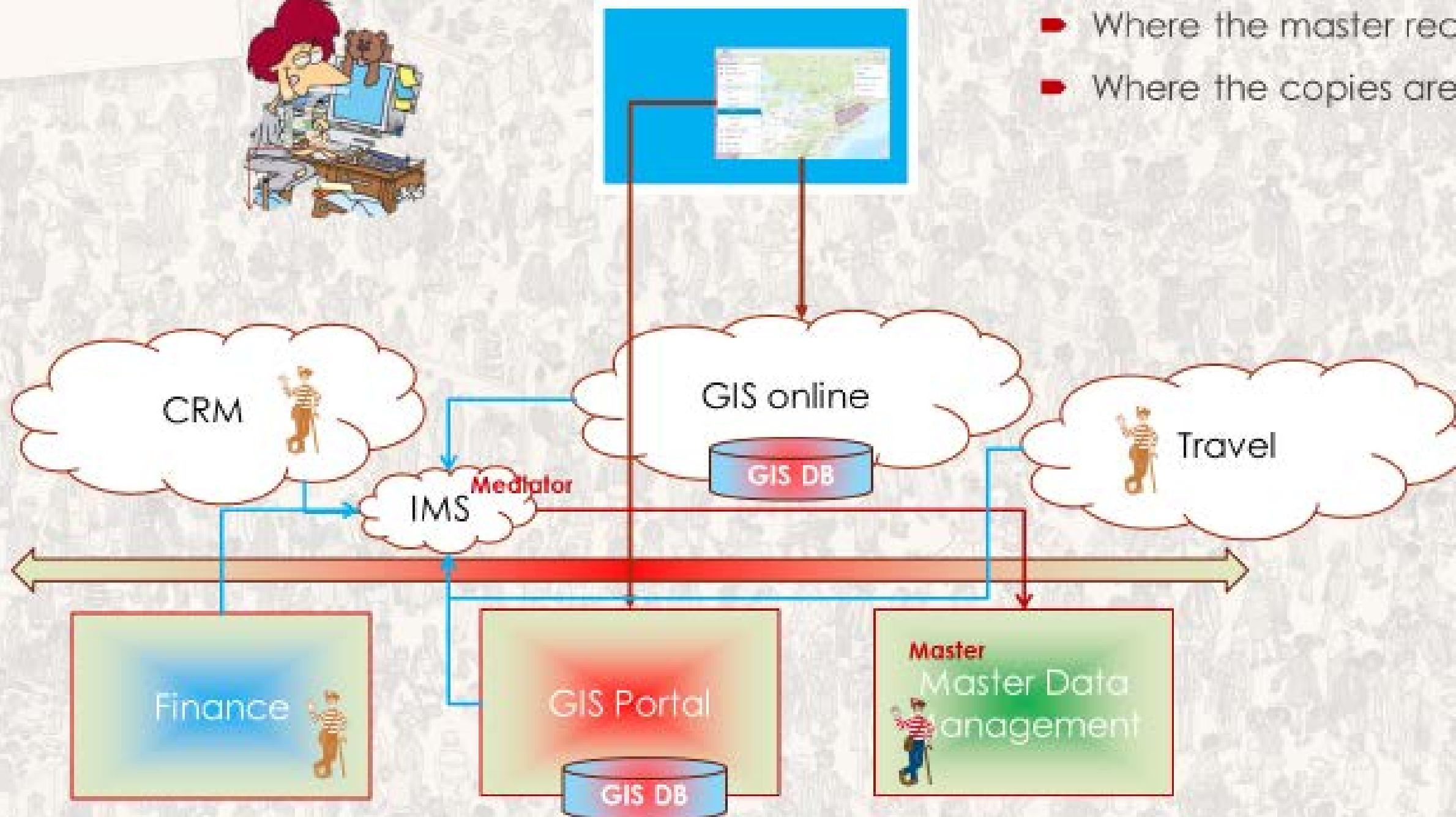


HOW ? Reuse / Redirect / Delegate



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

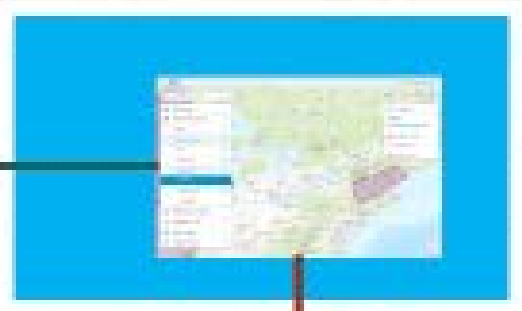
Reuse



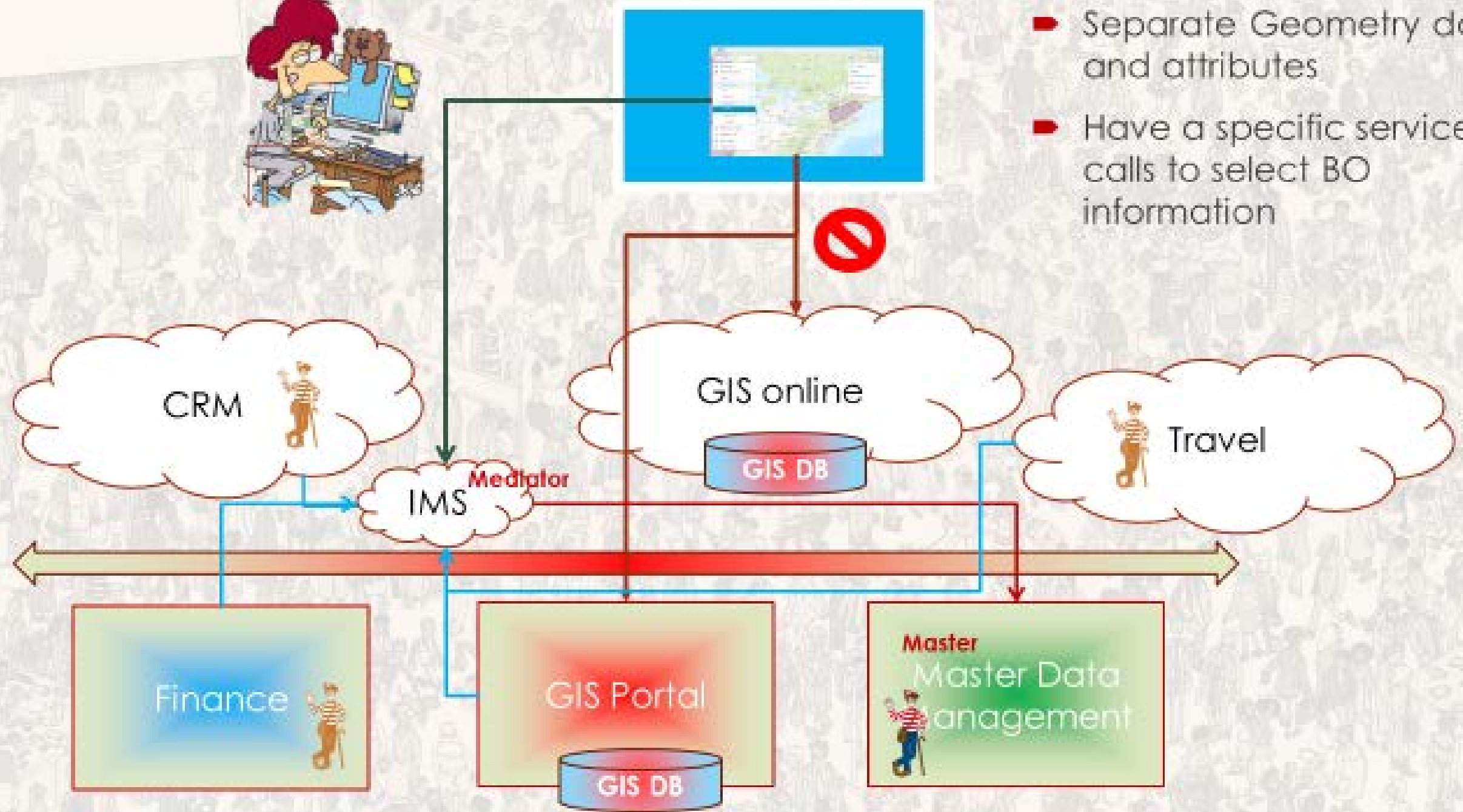


HOW ? Reuse / Redirect / Delegate

Reuse



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



Delegation - Is it a valid approach?

Reuse

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?



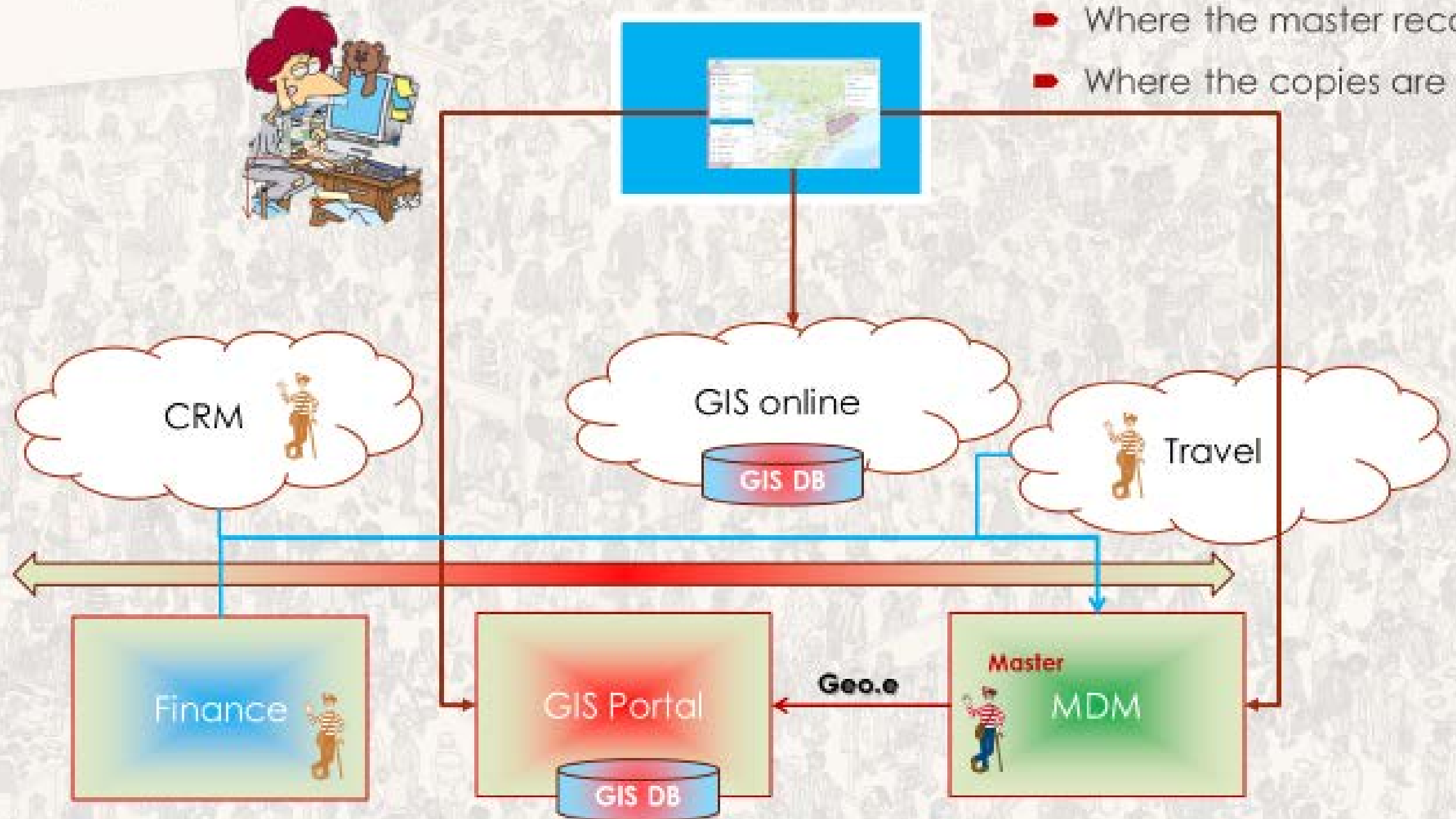
Pros

- 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

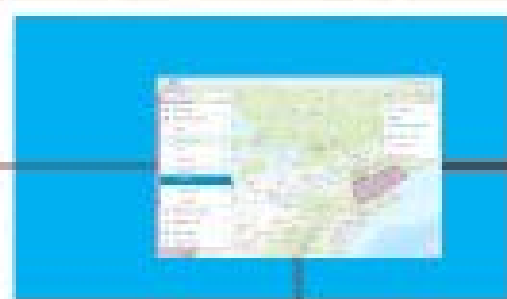
- ▶ Where the master record?
- ▶ Where the copies are ?

Remake

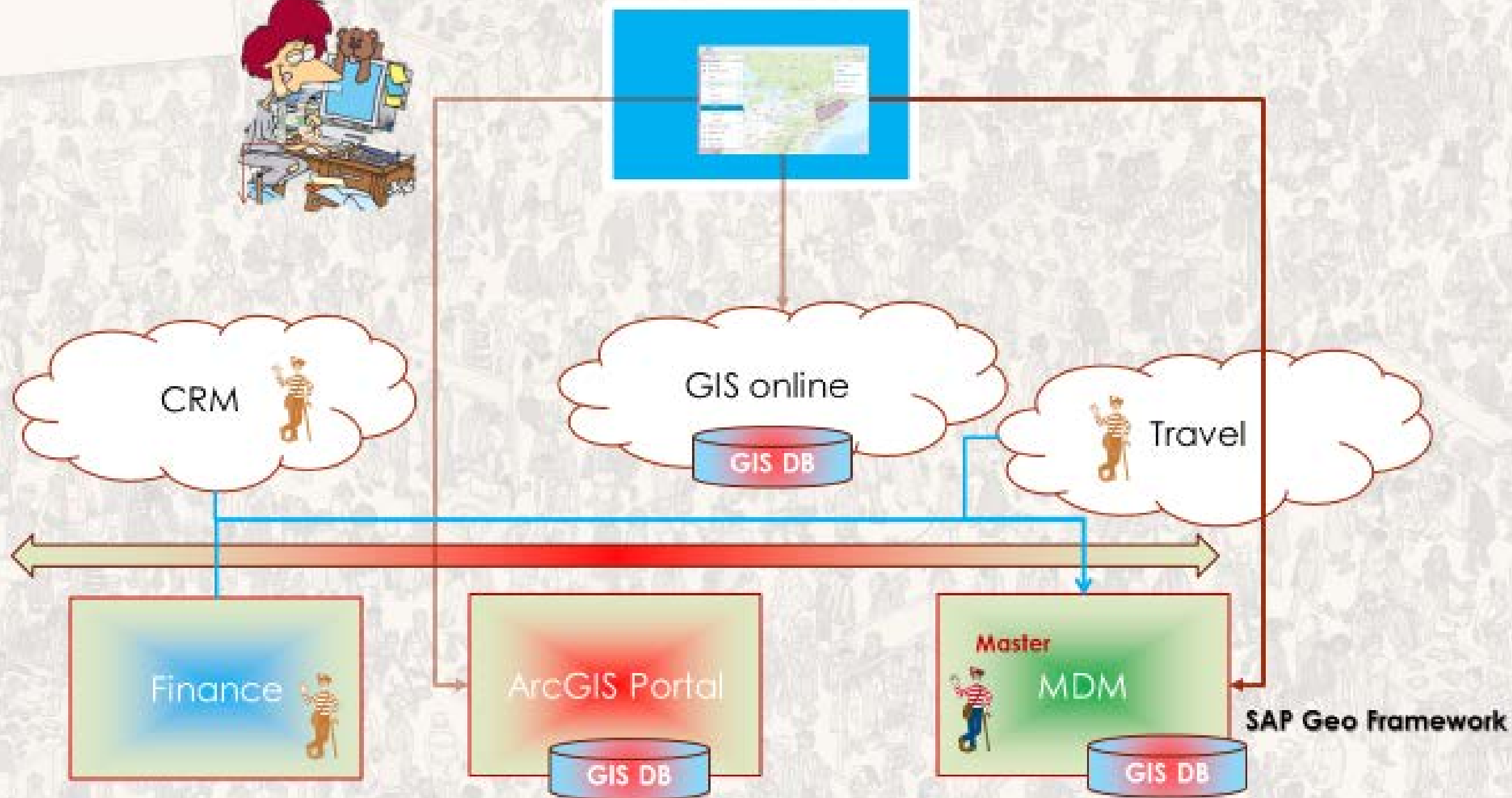




HOW ? Remake/ Rejoin



Remake



Join services - Is it a valid approach?

Remake

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

A vintage postcard with a map of the United States in the background. The text on the postcard is partially obscured by a large red text overlay. The text on the postcard includes "HEY, WALLY! WATCHES ARE SOME TRICKY THINGS RIGHT TODAY - SOMEONE BOUGHT TRUNKS WITH AN IRON A LONG TIME AGO WITH A LONG TRIP TO A PLACE ATTENDING A BANK FROM INDIANAPOLIS" and "TO: WALLY-WATCHES OVER THE MOON THE WILD WEST NOW".

TASK: Make a Geo service in the business system!

Does it make sense?

Yes it does ...



HEY "WALDO" WITCHES!
SEE SOME TRICK TREATING
RIGHT TODAY - SOMEONE
EVENING TRICKS WITH
AN IRON A LONG TRIP WITH
WITH A LONG TRIP WITH
A BLIND ATTENDING A BARK
FROM INCEPTELLER



TO: WALDO
OVER THE 'N
NOW

- Apply Editor (Feature Service)
- Attachment (Feature Service)
- Attachment Info (Feature Service)
- Calculate (Feature Service/Layer)
- Create Replica
- Delete Attachments
- Delete Features
- Feature
- Generate Renderer (Feature Service)
- HTML Popup (Feature Service)
- Image
- Layer
- Query (Feature Service)
- Query (Feature Service/Layer)
- Query Attachments (Feature Service)
- Query Domains (Feature Service)
- Query Related Records
- Replicas (Feature Service)
- Replica Info
- Synchronize Replica
- Inspector/Details (Feature Service)

Submit as the object's name (for example, `city`). You must provide `objectId`'s value, unless you use `query` mode.

Request parameters

Parameter	Details
<code>f</code>	Description: The response format. The default response format is <code>html</code> . Values: <code>html</code> <code>json</code> <code>geojson</code> <code>and</code> (default when <code>returnIdsOnly=false</code> and <code>returnCountOnly=false</code>) Values: <code>html</code> <code>json</code> <code>geojson</code> (when <code>returnIdsOnly=true</code> or <code>returnCountOnly=true</code>)
<code>where</code>	Description: A where clause for the query filter. Any legal SQL where clause operating on the layer's fields. Examples: <code>where=POP2000 > 350000</code> <code>where=CITY_NAME = 'Barrington'</code> If you are working with ArcGIS Server 10.4 or a subsequent version, the <code>dateFieldsTime</code> parameter can be used to specify a time zone for the date field. <code>where=specific_time_date_field = DATE '2018-02-09 19:00:00'</code> Although you issue local time in your where clause, Query always returns date values in UTC.
<code>objectId</code>	Description: The object IDs of this layer or table to be queried.

Note: There might be a drop in performance if the layer/table data source resides in a different server than the service.

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



HEY "WALDO" WITCHES!
SEE SOME TRICK TREATING
RIGHT TODAY - SOMEONE
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The background of the slide is a collage of various vintage postcards. One prominent postcard in the top left corner features a circular postmark from 'WHEELING WYVA' and a rectangular stamp. The text on this postcard reads: 'HEY WALLY WATCHES AND SOME TRUMP TROUPE NIGHTS TODAY - SOMEONE EVENING TRAVELS WITH AN IRON A LONG TRIP WITH A LONG TRIP TO A BLIND ATTENDING A BANK FROM INGLEWOOD'. Below this, it says 'TO: WALLY-WATCHES OVER THE MOON THE WILD WEST NOW'.

SAP® Geographical Enablement Framework

Version 1.0 SP03 is planned to be released on July 26th *

For Business suite and S4/HANA

* Subject to change



Challenge - services

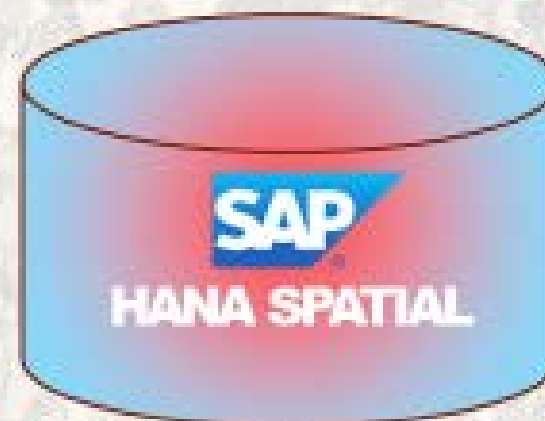
- ▶ Integrated with ESRI tools and portals
- ▶ RESTful service architecture.
- ▶ Smaller / better. Microservice is the best.
- ▶ Allow to select geometries for the specific object and spatial extend
- ▶ Allow to create/update/delete geometry and object as well
- ▶ *ESRI Feature Service -> was the only available service which fit our requirements at a time*



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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

Dialog Structure	Basemaps			
	Map Name	Group Description	Tooltip for Map Service	Map Type
• Servers for Map Services	ArcGISImag	ArcGIS Imagery	ArcGIS Online Imager	
• Basemaps	ArcGisCanv	ArcGIS Canvas	ArcGIS Canvas	An ArcGISTile
• Basemap Sets	ArcGisStrt	ArcGIS Street	ArcGIS(TM) Street	An ArcGISTile
• Basemap Sets and Basemaps	ArcGisTopo	ArcGIS Topography	ArcGIS Topography (TM)	An ArcGISTile
• Icons for Symbols	BINGAERIAL	Bing Aerial	Bing Maps - Imagery	A VETiledLaye
• Reference Layer Actions	BINGHYBRID	Bing Hybrid	Bing Maps - Hybrid	A VETiledLaye
• Action Parameters	BINGROAD	Bing Road	Bing Maps - Road	A VETiledLaye
• Reference Services or Layers	OpenStreet	OpenStreetMap	OpenStreetMap Basemap	An OpenStreet
• Action Assignments				
• Reference Layer Group Hierarchies				
• Level 1 Group and Layer Assignment				
• Business Layer Group Hierarchies				
• Level 1 Group and Layer Assignment				
• UI Configurations				
• UI Profiles for Geo Objects				
• Additional Map Services				

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 able to determine a symbols for our geometries
 - ▶ We should be able to expose a set of attributes with the service

Dialog Structure	Business Objects	
• System Settings	BO ID	Description
• Geometry Contexts	BP	Business Partner
• Icons for Symbols	EAMEQUI	[EAMS] Equipment
• Mass Actions	EAMFLOC	[EAMS] Functional Location
• Business Objects	EAMNTF	[EAMS] Notification
• Geometry Context Assignments	EAMORD	[EAMS] Maintenance Order
• Geo Objects	FLOC	Functional location
• Field Definitions	ZBO_AJ_EQU	AJ EAM Equipment
• Field Map Provider Assignments	ZBO_AJ_FLO	AJ EAM Functional Location
• Filters	ZBO_AJ_NOT	AJ EAM Maintenance Notification
• Actions	ZBO_AJ_ORD	AJ EAM Maintenance Order
• Action Parameters		
• Mass Action Assignments		
• Business Layers		
• Fields		
• Geometry Layers		
• Legends		

Challenge - services

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• Action Parameters		
• Mass Action Assignments		
• Business Layers		
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• Geometry Layers		
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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



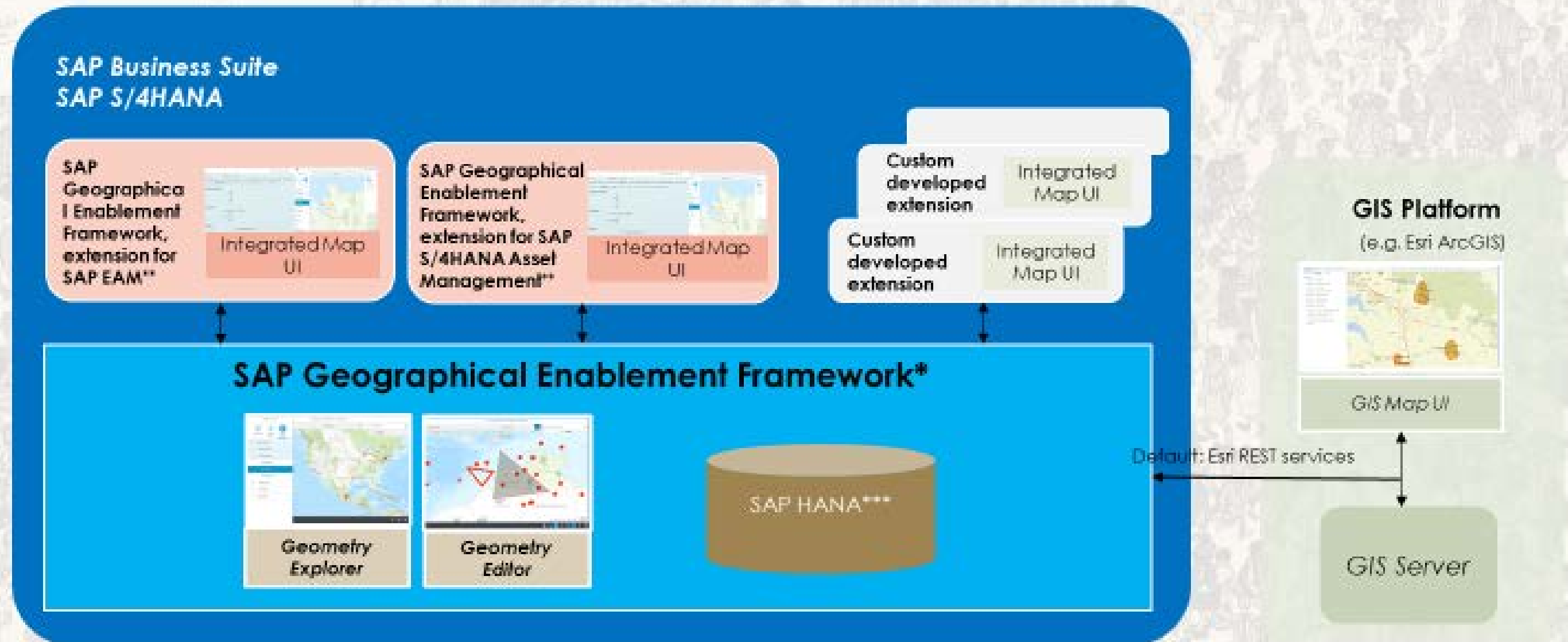
Challenge – UI functionality

- ▶ 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



* Framework available on SAP ERP 6.0 EHP 6/7/8 and SAP S/4HANA 1610.

** Extension for SAP EAM planned for SAP ERP 6.0 EHP 6/7/8; Extension for SAP S/4HANA Asset Management planned for S/4HANA 1610 (Q2/2017)

*** SAP HANA as a primary or secondary database is required for implementing SAP Geographical Enablement Framework; Deployment options: SAP Business Suite on HANA, S/4HANA, SAP Business Suite on anyDB with HANA secondary database using HANA spatial capabilities



“ 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

<https://blogs.sap.com/2016/11/10/what-is-sap-geographical-enablement-framework/>

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