



Adopting the Appropriate GIS Web Service Technologies

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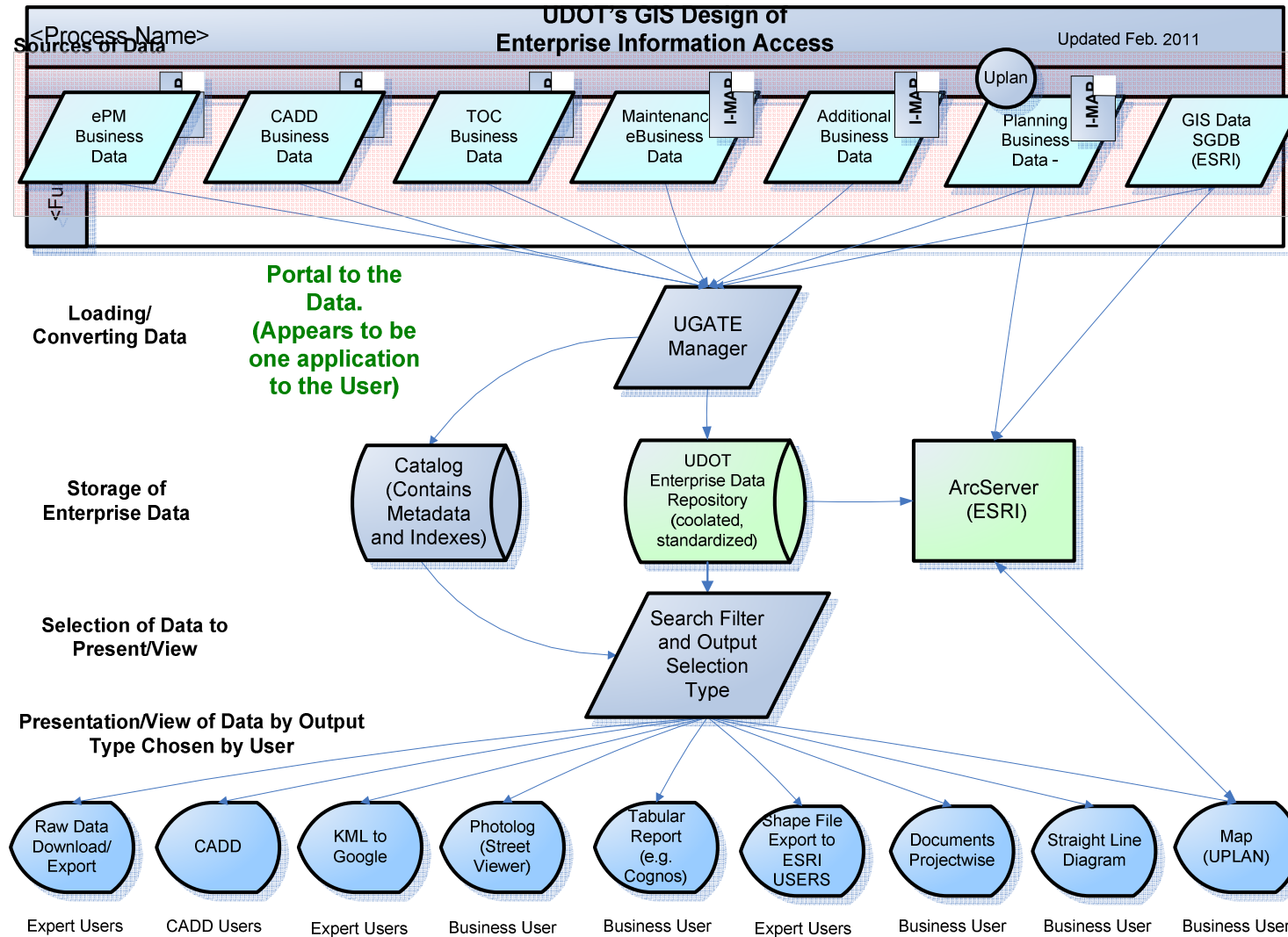
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Topics

- IT/GIS Integration Vision at UDOT
- Advantages of Web Services
- Integration Architecture
- Adoption Decision Points
- Research Project
- Conclusions

Integrated GIS/IT Architecture



Principles Behind the Architecture

- Database-Centric
 - GIS is part of IT
 - Spatially-enable IT
 - Oracle Spatial
- Open Architecture
 - Standard-based
 - Web services
- AGRC Base Map
- Leverage Existing Investment
 - ESRI & Oracle

Advantages of Web Services

- Standard-based – W3C
 - Described by WSDL
 - Discovered by UDDI
 - Constructed by SOAP or REST architecture
 - Transported by HTTP
- Platform independent, interoperability among systems
- Data sharing and integration opportunities

Adoption Decision Points

- Data consumption by technologies
- Data serving/output by technologies
- Control of data
- Projection
- Need for spatial data editing
- Performance and tile caching
- Security
- Cost

Data Consumption by Map APIs

Data Sources	ArcGIS API	Google Map API	Open Layers API	Oracle Maps
ArcGIS Rest	X	X*	X	
Google Map	X	X	X	
Bing Map	X		X	
GeoJSON		X	X	
KML		X	X	
GeoRSS			X	X
GML			X	X
WKT			X	
OpenStreet	X		X	
WFS			X	
WMS	X	X	X	
Shapefile	X		X	
SDE	X		X**	
Oracle Spatial	X***		X**	X****
MS SQL Geo Type	X***			

- * API or extension required
- ** Via Service
- *** Via ArcSDE
- **** Via MapViewer

Vector Data Production by Map Servers

Service or Format	ArcGIS Server	Google	GeoServer	Oracle MapViewer
ArcGIS Rest Feature Service	X			
KML	X	X	X	X* (modPLSQL)
Google Map		X		
WMS	X		X	X
WFS			X	X
WCS	X		X	
Shapefiles			X	
GML			X	
GeoRSS			X	
GeoJSON			X	
PDF			X	

Adoption Decision Points

- Base Map
 - Using Google, Microsoft or ArcGIS.com
 - AGRC Map
- Projections
 - WGS 84 lat/long (EPSG 4326) vs Spherical/Web Mercator (EPSG 3857/102113)
 - What projection are your base maps in?
 - On-the-fly projection is expensive

Adoption Decision Points

- GIS Data Editing
 - Most services to disseminate information
 - Simple red-lining vs full-blown geometry editing
 - Joint research on web editing capabilities
- Performance & Caching
 - Caching strategy
 - Projection

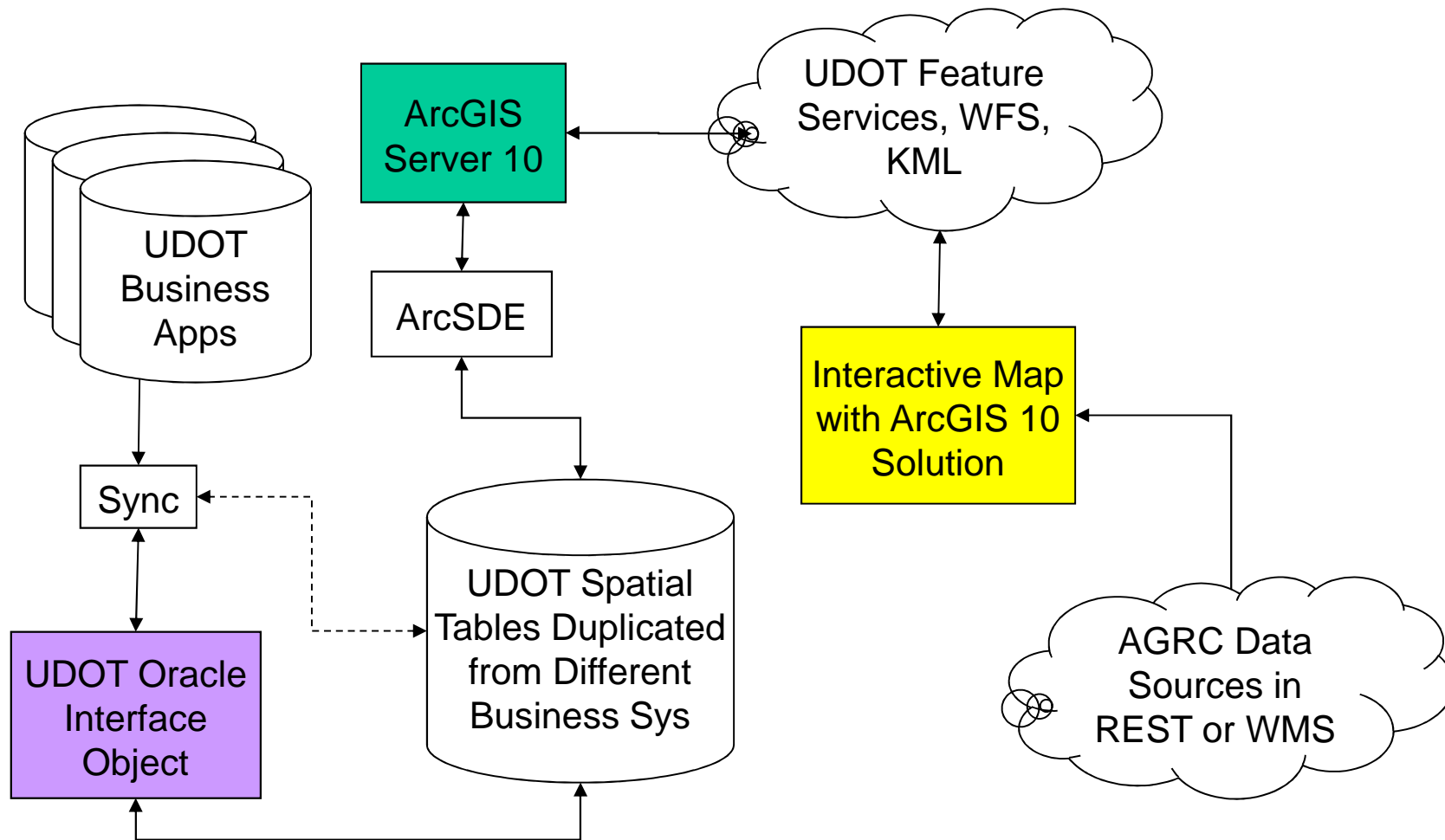
Adoption Decision Points

- Security
 - Securing web services vs securing web application
- Software Cost
 - Is Google free?
 - Is FOSS free?
 - Ever-changing license schemes
 - Server hardware
 - Staffing

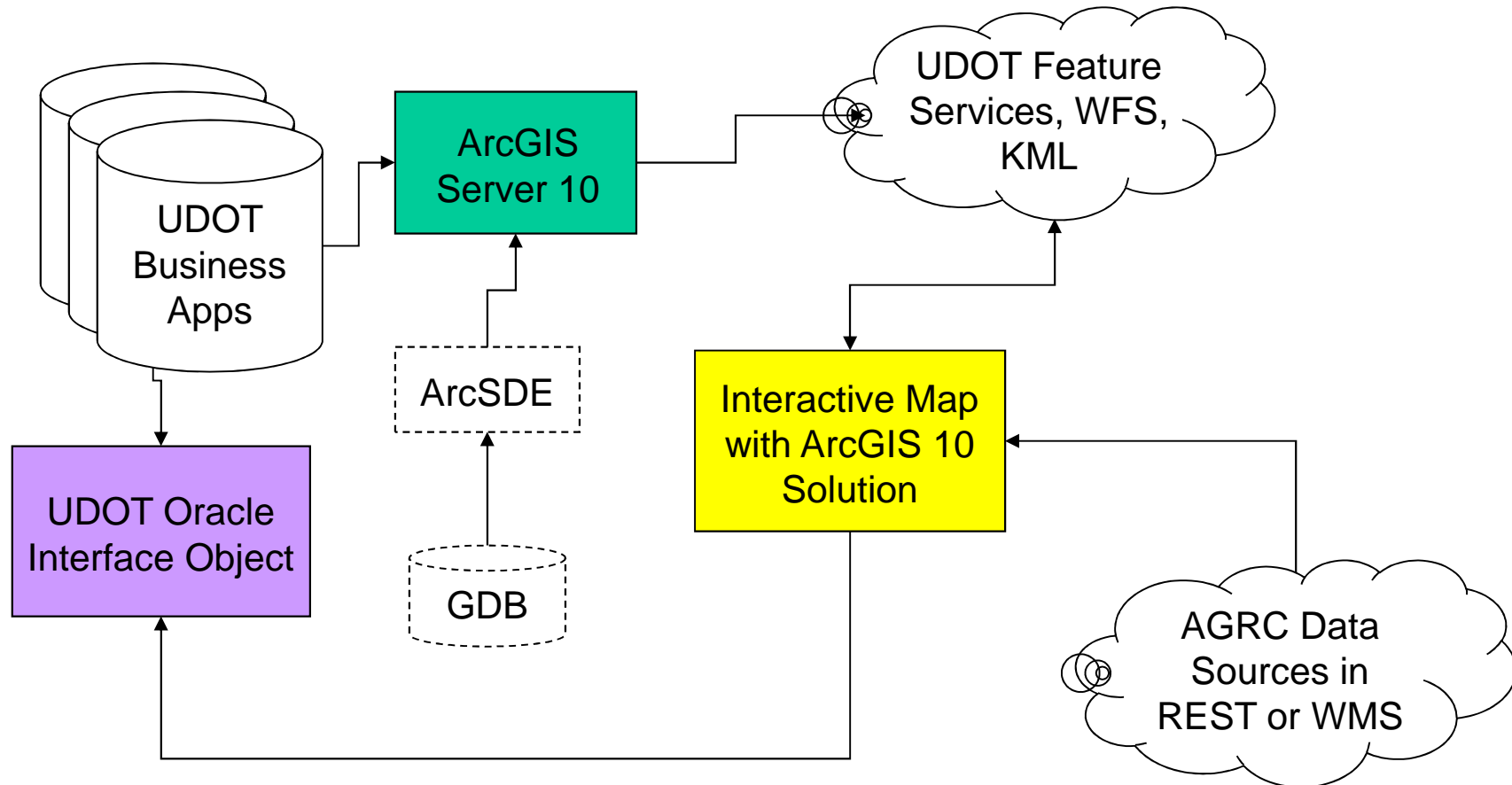
The Need for a Lightweight Mapping Tool

- Mapping capabilities reveal data quality issues, especially for LRS-based data
 - Completeness
 - Location accuracy
- Need a map-based interactive tool to add or modify event locations
- Can be used by many operational systems
 - Loosely coupled
- Meets LRS requirements

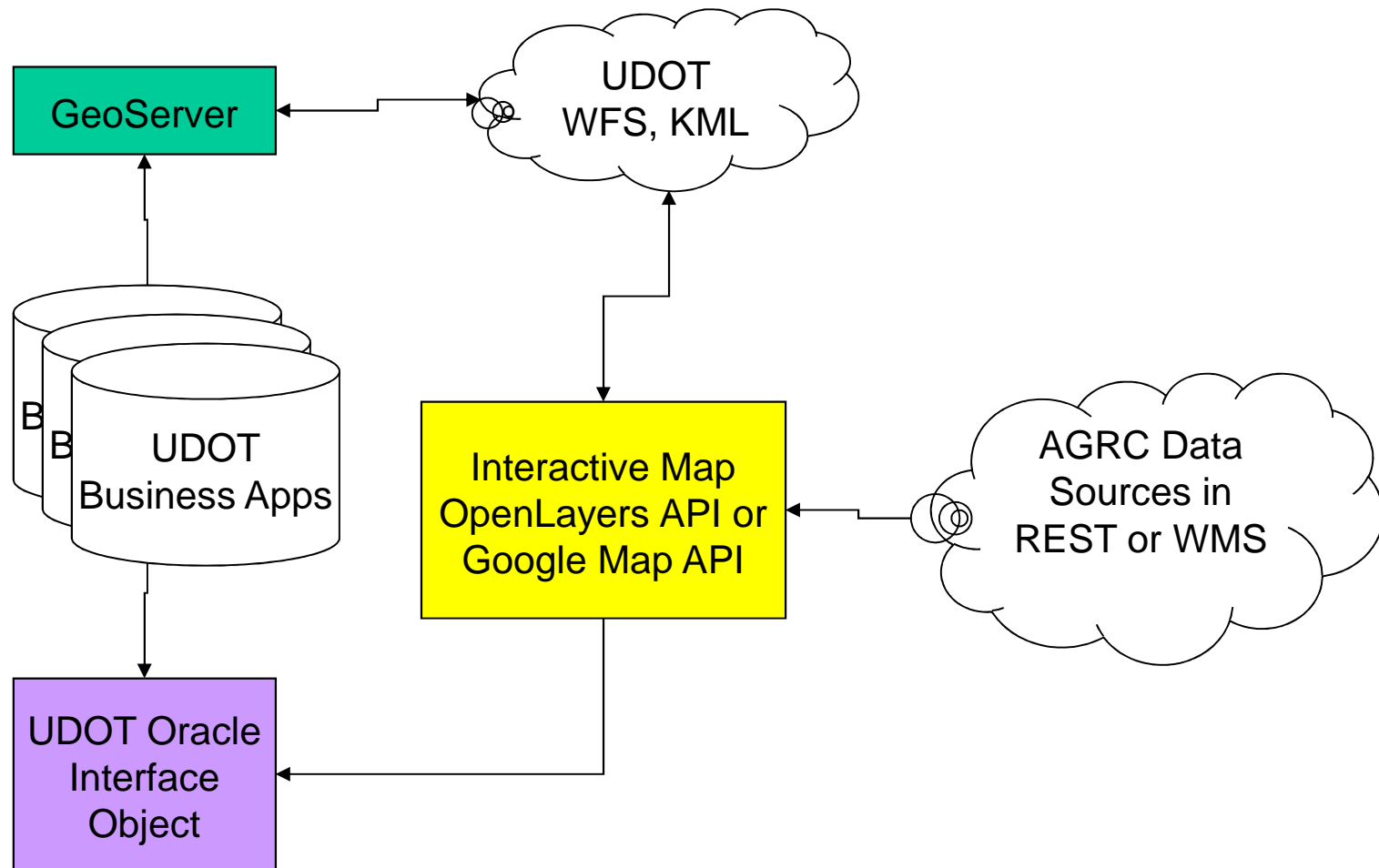
ArcGIS Architecture



Alternative ArcGIS Architecture



Open Source Based Architecture



Key Evaluation Criteria

Item	Comments
Performance	Critical
UI	Important
Programmability	Ease of coding and maintenance
Administration Overhead	Keeps the DBAs happy :)

Three Research Options

- ArcGIS Server JS API with Oracle Apex
- OpenLayers JS with Oracle Apex
 - <https://jdev.udot.utah.gov/apex/dev3/f?p=850:325>
 - <https://jdev.udot.utah.gov/apex/dev1/f?p=240:201>
- ArcGIS Server Web ADF for .NET Framework

Conclusions

- The complexity and abundance of technologies is overwhelming
- Big picture
- Chasing the best, coolest technologies may not be realistic
- Finding the appropriate technology stacks for your organization is the way to go
- Keep Open - Open mind, Open architecture, Open Source

Thank You!

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