



Integrating GIS within the Enterprise – Options, Considerations and Experiences

Enterprise GIS Track

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Agenda

- Business Drivers and Requirements
- Key Enterprise Systems
- Leading Vendors
- Integration Approaches
 - Options
 - Considerations
- Customer Experiences / Examples

Background

- ERP, CRM and SCM
 - belong to category of enterprise wide operational systems
 - systems that support the day to day business operations of a company
- Business Intelligence (BI)
 - Includes data warehousing, data mining and analytics
 - Operational systems feed historical data into Data Warehouses (DW)
 - DW provide a wealth of information for analyzing and improving the business
- Enterprise Content Management (ECM)
 - Document/content management, versioning, collaboration, workflow

ERP/CRM/SCM Integration

- Many of the business processes or transactions can be enhanced by integrating geo-spatial components or services
- Many processes and transactions or the underlying business services can be initiated from within geocentric workflow applications
- Composite applications that make use of pre-existing services

ERP/CRM/SCM Integration Work Management

The screenshot displays the SAP Service Request interface. At the top, the menu bar includes 'Service notification', 'Edit', 'Goto', 'Extras', 'Environment', 'System', and 'Help'. The title bar shows 'Change Service Notification: Service Request'. Below the title bar, there are several icons and buttons, including 'Partner', 'Status', '+ Determine tasks', 'Organization...', and 'Contract selection'. The main area contains a notification form with the following details:

- Notification: 300000070
- Status: OSNO
- Description: The roof is leaking. Clean up required.

Below the notification form, there are tabs for 'Notification', 'GIS Map Sys.', 'System availability', 'Malfunction, breakdown', 'Location data', and 'Items'. The 'GIS Map Sys.' tab is active, showing a map of a building layout. The map is a grid of rooms, with several rooms highlighted in red and yellow. The highlighted rooms are labeled with IDs: 9999-999-AA-19, 9999-999-AA-16, 9999-999-AA-13, 9999-999-AA-12, 9999-999-AA-08, and 9999-999-AA-11. The map also shows a compass rose with 'N', 'S', 'E', and 'W' directions. Below the map, there are coordinates: X: 365142.75, Y: 4477104.0001, and a legend icon. At the bottom of the map area, there are buttons for 'Zoom In' and 'Re-center'. On the right side of the interface, there is an 'Action box' with the following options:

- Repair Order
- Send Final Notice
- Solution Database
- Create Internal Note
- Log Telephone Call
- Send Confirmation of Receipt
- Create Quality Notification

At the bottom right of the interface, there is a status bar showing 'LT1 (1) (050) SAPR3 INS'.

ERP/CRM/SCM Integration Real Estate

The screenshot displays the SAP LUM Tools interface integrated with ArcMap. The main window shows a map of land parcels with a red parcel highlighted. The SAP LUM Tools menu is open, listing the following options:

- Add new Parcel of Land
- Modify existing Parcel of Land
- Delete existing Parcel of Land
- Add new Business Entity
- Modify existing Business Entity
- Delete existing Business Entity

The ArcMap interface includes a Layers panel with the following layers:

- Wirtschaftseinheiten
- flurstuecke
- 5614_01.tif (Value: High : 1, Low : 0)

The SAP LUM Tools interface also displays a data table with the following information:

Allgemeine Daten		Katastr	
BLand/Gemark.	05 1081	No	
Flur/Flurst	7		1
Allgemein			
Regierungsbezirk			
Kreis	954		
Gemeinde	036		
Stadtbezirk			
Stadtteil			
Geschäftsbereich			
Geschäftsbereich	0001		
Eröffnet am			
Eröffnet am	01.0		
Berechtigungsgruppe			
Adressen Flurstück			
Adresse			
46195 Witten, Hauptstr. 1			

ERP/CRM/SCM Integration Utilities

The image shows two overlapping software windows. The background window is ArcMap, displaying a map titled 'strom1.mxd'. The foreground window is the SAP 'Instandhaltungsauftrag' (Maintenance Order) interface for order 4012204.

ArcMap Window:

- Title: strom1.mxd - ArcMap
- Menu: File, Edit, View, Insert, Selection, Tools, Window, Help
- Network: Strom
- Layers Panel:
 - BrokenDownArea
 - Großtransformator
 - Objektart
 - Großtransformator
 - Ortsnetztransformator
 - Objektart
 - Netztrafo
 - 1-Phasen OH
 - 1-Phasen UG
 - 2-Phasen OH
 - 3-Phasen OH
 - 3-Phasen UG
 - Stufentrafo
 - Schaltanlage
 - Leistungsschalter
 - Objektart, Zustand
 - Leistungsschalter, offen
 - Leistungsschalter, geschlossen
 - Trennschalter
 - Objektart, Schaltzustand
 - Lasttrennschalter Kabel, offen
 - Lasttrennschalter Kabel, geschlossen
 - Trennschalter Kabel, offen
 - Trennschalter Kabel, geschlossen
 - Lasttrennschalter FL, offen

SAP Instandhaltungsauftrag 4012204 ändern: Kopf zentral

Buttons: FS-Anforderung, Arbeitsfreigabe

Auftrag: PM01 4012204 Generalüberholung Station LUTT

SysSt: EROF FSAB KKMP NMVP VOKL

Navigation: Kopfdaten, Vorgänge, Komponent., Kosten, Partner, Objekte, Zusatzdat., Standort, Planung

Zuständige

Planergrp.	/ 0001	Meldung	10001169
VerArbPI.	SERVTECH / 0001 Service Techniker	Kosten	DEM
Verantwortli...		IHLstArt	001 Inspektion
		AnlZust.	
		Adresse	

Termine

Eckstart	04.04.2001 18:05	Priorität	
Eckende	04.04.2001 18:05	Revision	

Bezugsobjekt

TechnPlatz	LUTT	Trafostation LUTT
Equipment		
Baugrp.		

Buttons: Störungsdaten, Schadensbild, Meldungstermine

ERP/CRM/SCM Integration Customer Service Calls

Telephony Edit Goto Incoming calls Agent System Help

SAP

Gwinnett Service Interaction Center

End Contact

Business Partner

Name
Phone
Partner (Main)
Name
Partner (Main)

Interaction Info

Find: 1 Service
By: 1 Period
Valid From: 08/20/2004
Valid To: 09/09/2004

Start

No tree ID 00000001 exists

Gwinnett County Government

75 Langley Dr
Lawrenceville, GA
30045-8935
770.822.8000

home services departments calendar news & events careers a-z index contact us

Zoom In Zoom Out Pan Identify Full Extent Overview Get SR Zoom All SR

Report Search

Service Request

- Completed
- Follow up Completed
- Follow up - Email
- Follow up - Tel
- In Process
- Wrk Cmpltd- Begin Follow up(E)
- Rejected

School Zone

Zoning

Subdivision

Parcel

Lakes

Fire Station

Fire District

Precinct

County Properties

Senate District

House District

Congress District

Cities

- AUBURN
- BERKELEY LAKE
- BRASELTON
- BUFORD
- DACULA
- DULUTH
- GRAYSON
- LAWRENCEVILLE
- LILBURN
- LOGANVILLE
- NORCROSS
- REST HAVEN
- SNELLVILLE
- SUGAR HILL
- SUWANEE

Commission District

- 1
- 2
- 3
- 4

SAP CRM GIS © Gwinnett County

Done

Local intranet

ERP/CRM/SCM Integration Asset Management

http://donkey.esri.com - IBM WebSphere Portal - Microsoft Internet Explorer

File Edit View Favorites Tools Help

ArcWeb Showcase Public Works Portal

My Portal Edit my profile Log out

New Page Edit Page Search:

Notifications Equipment Details Dispatching My Favorites

SAP Equipment Details

Display Equipment :

Menu Back Cancel Tools Display-> Change Object info... More

Equipment: 60121869 Category: X Transformer
Description: TRANSFORMER
Status: INST
Valid from: 11/04/1999 Valid to: 12/31/9999

General Location Organization Structure

General data

Class			
Object type	XFMR 02 PADMOUNT XMFR		
AuthorizGroup		Maint. date	
Weight	0.000	Size/dimension	3 KVA
Inventory no.	457623	Start-up date	

Reference data

AcquisValue	54.22	USD	Acquistn. date	09/20/1948
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Equipment Location

An aerial map view showing the geographic location of the equipment. The map features a street labeled 'DODSON WY'. Various colored lines (blue, orange, purple) represent different types of infrastructure or equipment paths. Several red circular markers with white centers and green circular markers with white centers are placed on the map, indicating specific equipment locations. Yellow square markers are also visible on the map.

ERP/CRM/SCM Integration Layers of Integration

Integrated Mobile Applications	ArcPad, ArcGIS Server
Integrated Web Applications / Portal	ArcIMS, ArcGIS Server
Desktop Integration	ArcIMS, ArcGIS Server, ArcGIS Engine, ArcGIS Desktop
Process Integration	ArcIMS, ArcGIS Server
Master Data Synchronization	ArcGIS Server

ERP/CRM/SCM Integration

- Technical connectivity or technology is *not* the issue
- The crux is defining the *business process* and the corresponding *business requirements*
 - Define the use cases and business processes
 - Define the user interface requirements
 - Define the data model requirements
 - Select technical connector approach based on business processes and requirements
 - Design business logic in conjunction with the requirements and technical connector approach
- In some areas like Utilities and Public Sector, many ESRI customers have done it
 - Learn from their experience
 - Partners are packaging the know-how

ERP/CRM/SCM Integration

- Vendors in this space include but not limited to
 - SAP
 - Oracle/PeopleSoft
 - Microsoft
 - Siebel
 - Pivotal
- We will use SAP as an example
 - SAP is part of a handful of ESRI's strategic partners
 - Partnership extends since 1995
 - ESRI is also a SAP customer
- Concepts learned are also applicable to other vendor solutions

ERP/CRM/SCM Integration

- Packaged Solutions
 - ESRI is a GIS software/platform provider
 - We do not have Packaged Solutions
 - Packaged Solutions still require configuration and software add-ons
 - Packaged Solutions are highly focused

ERP/CRM/SCM Integration (SAP example)

- Packaged Solutions
 - ESRI relies on Business Partners e.g.
 - Cybertech with Map on SAP
 - Web based map integrated in SAPGUI
 - Address verification and routing integrated with SAP transactions
 - AED SICAD with ArcFM UT
 - The integration is part of the their GIS product -- ArcFM based GIS
 - Packaged process for integration with SAP PM and SAP UT
 - Data mapping and synchronization support for SAP PM
 - IMPRESS with Geo IApp
 - Packaged processes for integrating ArcGIS and SAP AM/PM including Facility Management
 - Uses ArcGIS Server -- supports ArcGIS and ArcFM based GIS from ArcGIS versions 8.3 to 9x
 - Data mapping and synchronization support for SAP AM/PM
 - Dedicated application server for executing business logic for the integrated processes

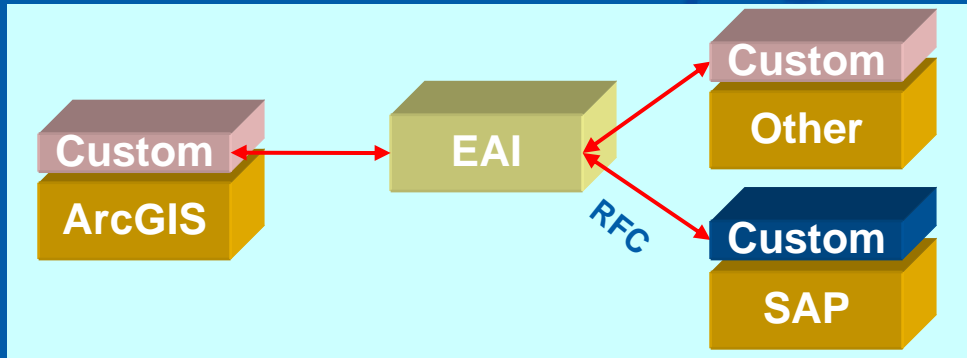
ERP/CRM/SCM Integration (SAP example)

- When Packaged Solutions do not fit then technical connectors need to be evaluated
 - SAP Connectors
 - RFC SDK (NET and Java)
 - GIS Business Connector
 - Business Connector (based on WebMethods technology)
 - 3rd Party Connectors to SAP
 - iWay Aactional Control Broker, etc
 - EAI/ESB based Connectivity e.g.
 - SAP XI
 - WebMethods Fabric
 - Microsoft BizTalk
 - BEA WebLogic, etc
- Web Services and SOA is supported by both ESRI and SAP technology stacks

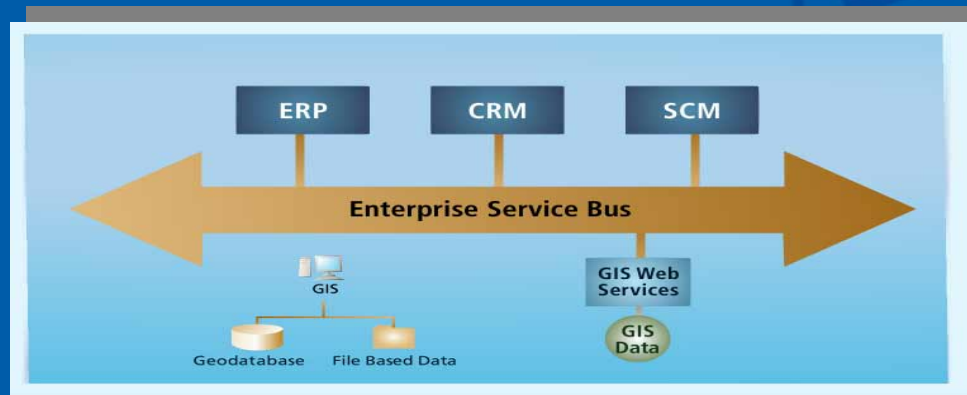
ERP/CRM/SCM Integration



Point-to-Point Interface



Integration Middleware



Service Oriented Architecture

ERP/CRM/SCM Integration

GIS-SAP Integration Experience - Utility Customer

Background

- GIS implementation was part of the project
- SAP Plant Maintenance (PM) module being integrated with GIS was partially implemented
- Systems Integrators were not used
- Customer provided SAP programmers and analysts
- Local ESRI Distributor provided GIS programmers and analysts
- Customer defined fixed budget and implementation schedule were heavily based on high level estimates

ERP/CRM/SCM Integration

GIS-SAP Integration Experience - Utility Customer

Implementation Approach

- Use Case / Business Process definition
- Technical Connector discussion and selection
- Initial System Design
- Template Prototype Approach
 - Group 'like' processes
 - Prototype each group and use that as a template
 - Proof of Concept of system design including the choice of technical connector
- Final System Design
- Implementation
- Data Migration and Initial Synchronization

ERP/CRM/SCM Integration

GIS-SAP Integration Experience - Utility Customer

Recommendations

- Ensure Business Stakeholders are fully engaged
- Engage support from GIS and SAP functional analysts
- Promote good technical understanding of available connectors and associated APIs
- Avoid minimizing the importance of integration implementation
 - Give priority to business and functional requirements definition
 - Apply appropriate level of effort and associated budget
 - Consider total cost of ownership ... on-going support

Questions?

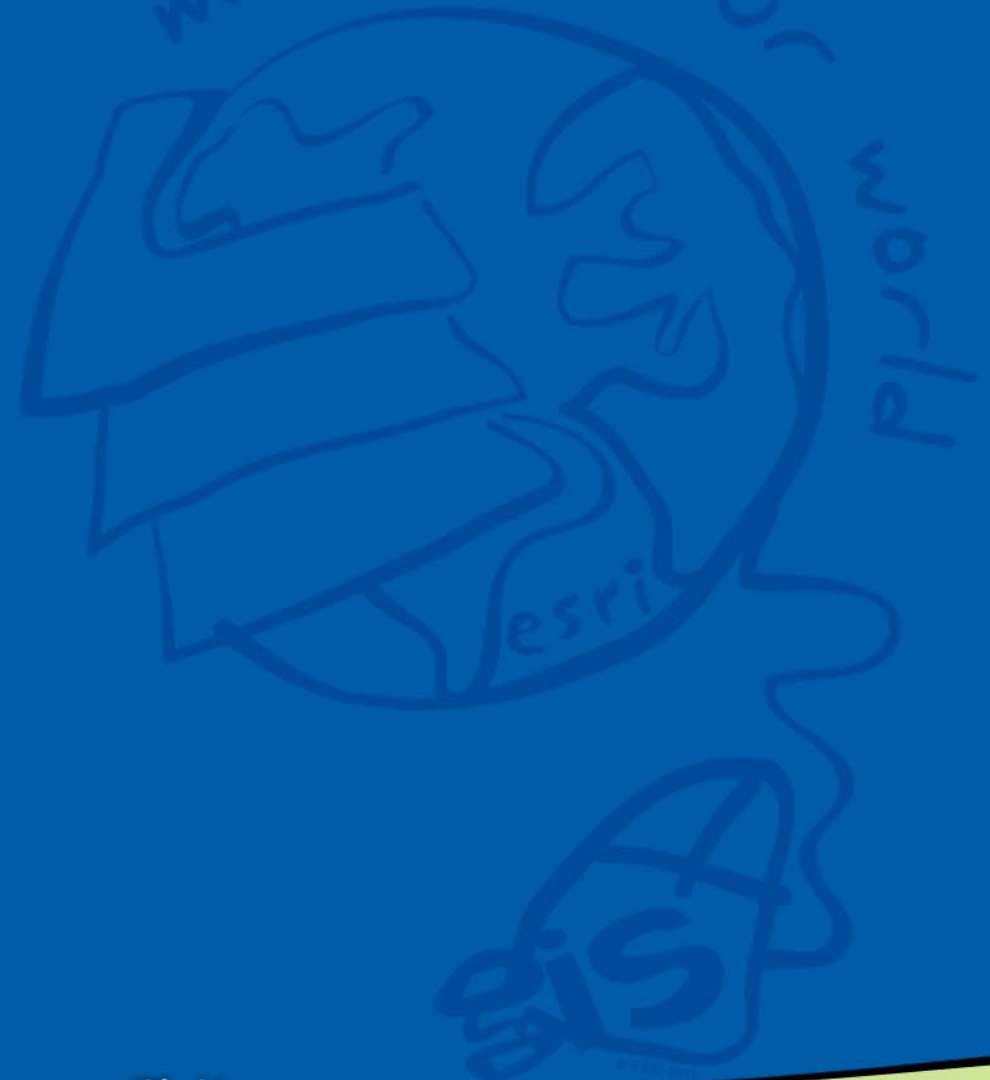


Business Intelligence (BI)

- Operational systems help to better manage the enterprise business processes
- Business Intelligence (BI) systems improve business critical decision making process
- Definition:
Business Intelligence (BI) strives to eliminate guessing and ignorance in enterprises by leveraging the mountains of quantitative data that enterprises collect as part of the day-to-day operations

Business Intelligence (BI)

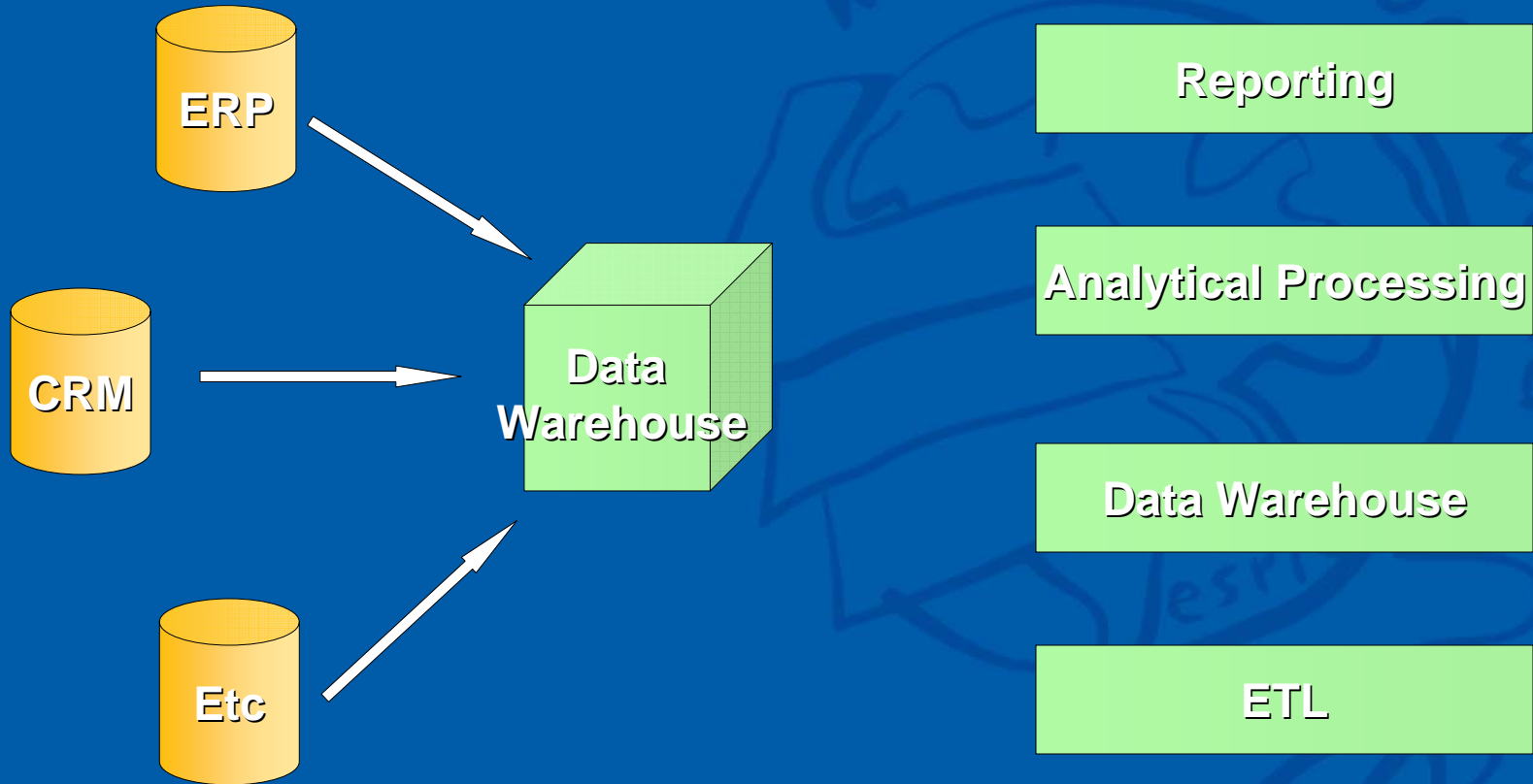
- Vendors
 - Business Objects
 - Microsoft
 - MicroStrategy
 - SAP
 - SAS



Motivation and Benefits

- BI strives to reduce cost and increase profitability
 - Secure competitive advantage
 - Quickly adapt to changes in markets and customer demands
 - Improve planning processes
 - Reduce risk
 - Improve customer satisfaction
 - Personalized services
- Typical Scenarios
 - Executive dashboard
 - Analyst workbench

Business Intelligence Landscape



Business Intelligence Principles

- Data warehouses are organized as multidimensional cubes
 - Measurable performance variables such as profit, items sold, cost are called *metrics* (facts, measures)
 - Metrics are organized along *dimensions*, such as product category or time.
 - Hierarchical members
 - Data is aggregated by member levels
- Analytical systems (OLAP systems) operate on data warehouse
 - “Slicing and dicing”
 - Functions
- Visualization means typically reports and charts

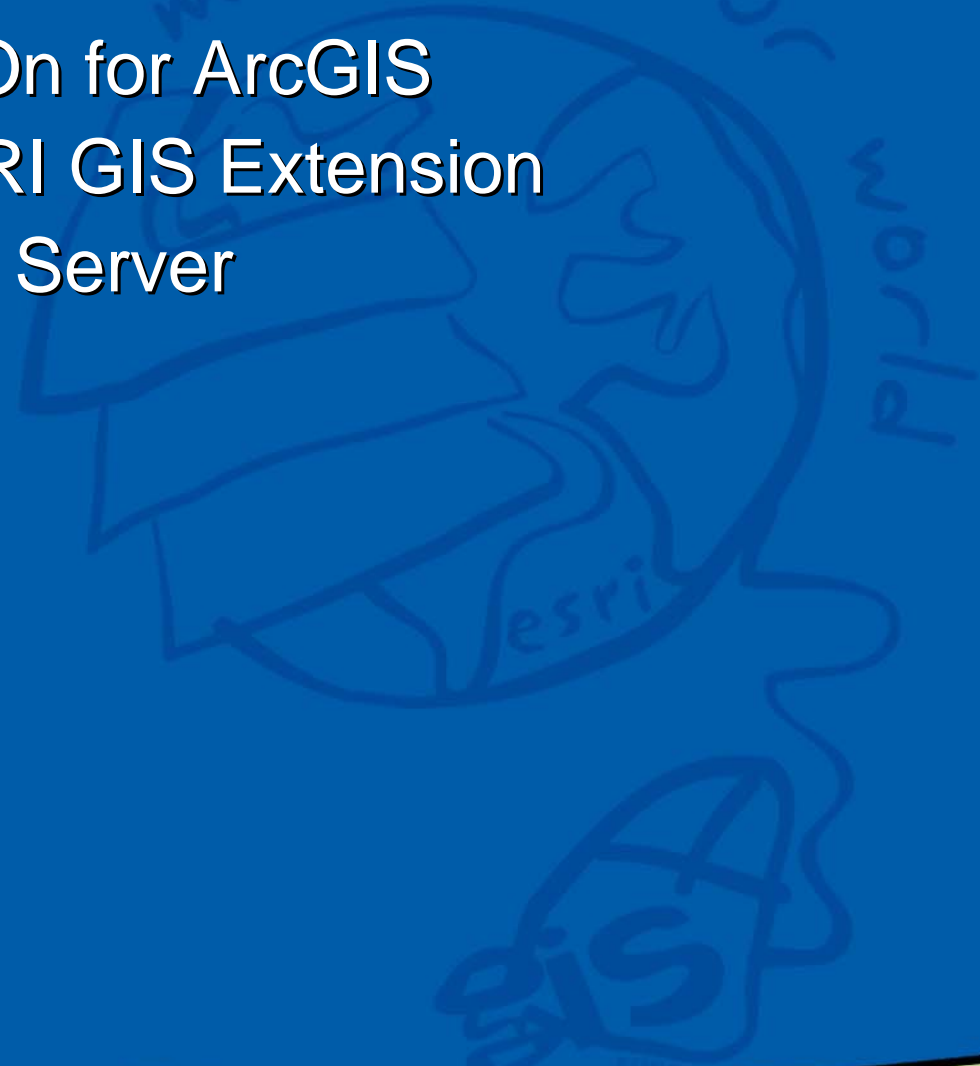
Geospatial Business Intelligence

- Dimensions in a data warehouse can have indirect spatial reference
 - Customers
 - Stores
 - Sales territories
- Options for enabling spatial intelligence
 - Spatial data types in data warehouse
 - Include geometric functions in analysis systems
 - Spatial aggregation
 - Visualization as maps

Business Intelligence

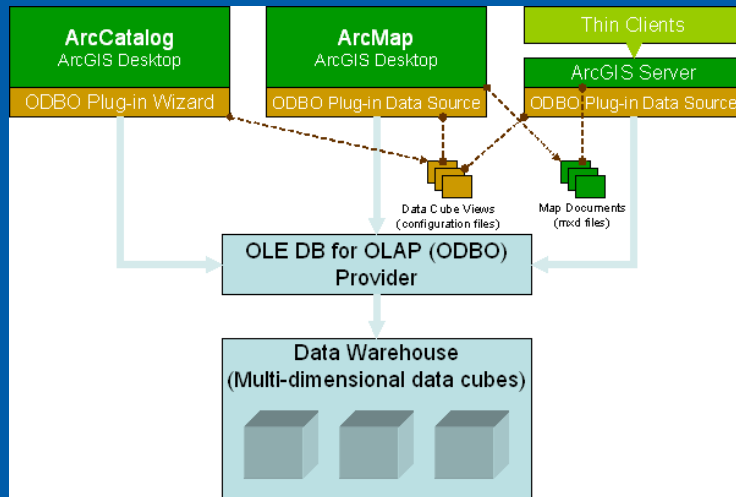
Example Integration Approaches

- ESRI OLAP Add-On for ArcGIS
- MicroStrategy/ESRI GIS Extension
- SAS Enterprise BI Server



ESRI OLAP Add-On for ArcGIS

- Fully integrated Add-on for ArcGIS
 - ArcMap, ArcCatalog, ArcGIS Engine
 - ArcIMS ArcMap Server
 - ArcGIS Server
- Support for all major BI vendors



- Dynamically link to reports from any OLAP-compliant data source
- Enhance thematic maps with business intelligence data
- Improve traditional reports and charts by adding sophisticated maps from ArcGIS

ESRI OLAP Add-On for ArcGIS

The screenshot displays the ESRI OLAP Add-On for ArcGIS interface. On the left, the 'ODBO Table Wizard' window shows a Microsoft Office PivotTable 11.0 with the following data:

Store Country	Store State	Store Sales	Store Count
USA	CA	4011.37	160
	OR	3460.32	137
	WA	6557.39	260
	Total	14029.08	557
Grand Total		14029.08	557

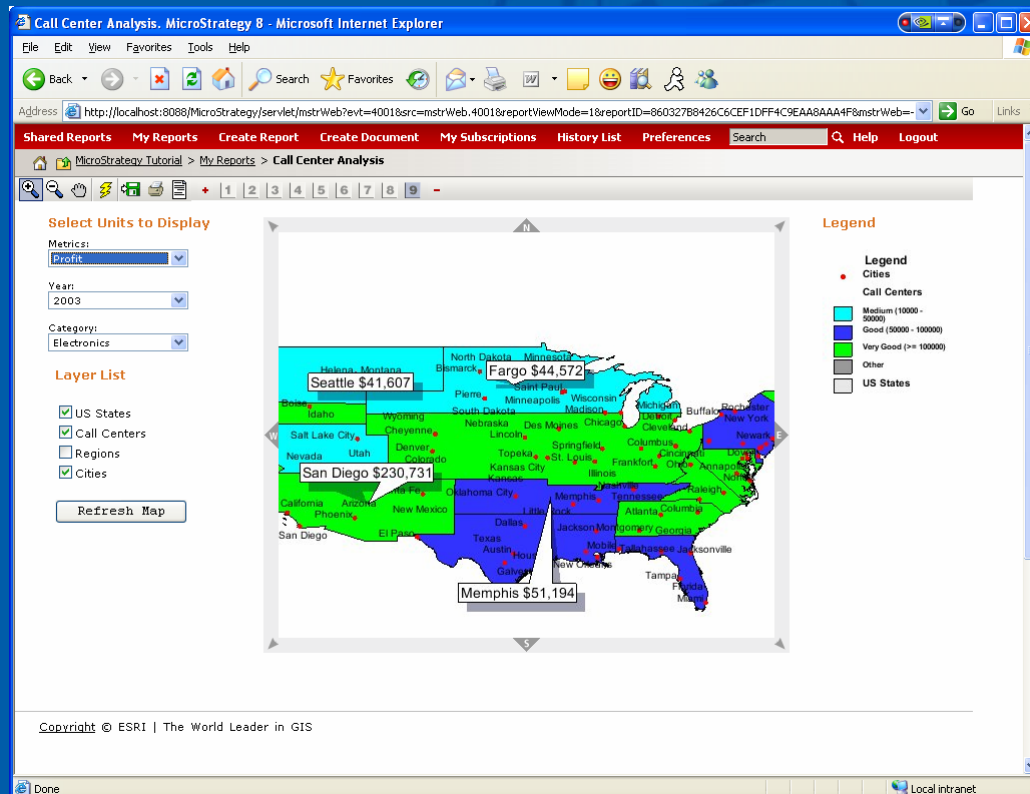
The main window, 'Test.mxd - ArcMap - ArcInfo', shows a map of the United States with bar charts overlaid on the states of California, Oregon, and Washington. The 'Layers' panel on the left lists various product categories, with a total count of 920 for the 'states' layer. The categories listed are:

- Beer and Wine
- Carbonated Beverages
- Drinks
- Hot Beverages
- Pure Juice Beverages
- Dairy
- Bread
- Baking Goods
- Jams and Jellies
- Breakfast Foods
- Canned Anchovies
- Canned Sardines
- Canned Shrimp
- Canned Soup
- Canned Tuna
- Vegetables
- Fruit

The status bar at the bottom indicates the current map location: 129°10'41.59"W 39°59'27.97"N.

MicroStrategy/ESRI GIS Extension

- Prototype for large Federal Agency
 - Performance evaluation of regional offices based on standard metrics
- Web-based, utilizes ArcIMS mapping functionality
- Potential release as product



SAS Enterprise BI Server

- Integration of ArcGIS Server's geo-analytic capabilities with SAS Enterprise BI Server
- Developed by SAS in cooperation with ESRI
- Tightly integrated
- Rich set of functionality
 - Drill up/drill down
 - Expand/collapse

Questions?



Enterprise Content Management (ECM)

- *“By 2008, 75 percent of Global 2000 companies will have a desktop-focused and a process-focused content management implementation”*

(Gartner)

Enterprise Content Management (ECM)

- **Definition** – evolving
 - IDM – Integrated Document Management
 - WCM – Web Content Management
 - CMS – Content Management Systems
 - EDMS – Electronic Document Management System

Enterprise Content Management (ECM)

- **ECM Components (Gartner)**
 - **Document management** - for check-in/checkout, version control, security and library services for business documents
 - **Web content management** - for managing dynamic content and content authoring
 - **Records management** - for legal or regulatory purposes, long term archiving, and automation of retention and compliance policies

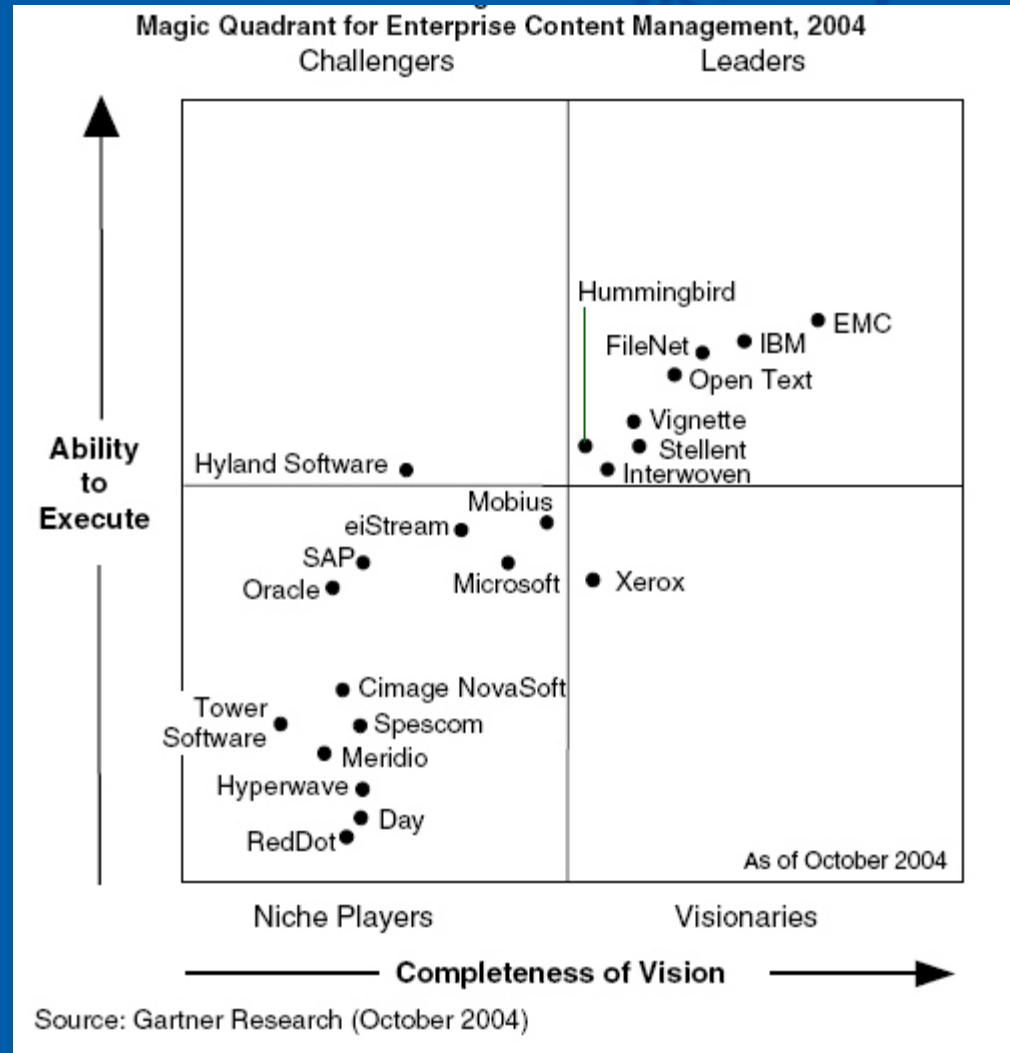
Enterprise Content Management (ECM)

- **ECM Components (continued)**
 - **Document capture and imaging** – for capturing and managing paper documents
 - **Document-centric collaboration** - for document sharing and supporting project teams
 - **Workflow** - for supporting business processes and routing content, assigning work tasks, and creating audit trails

Enterprise Content Management (ECM)

- **Leading Vendors (Gartner Magic Quadrant)**
 - Different characteristics and considerations
 - **FileNet**
 - **Documentum (EMC)**
 - **Hummingbird**
 - **IBM**
 - **Open Text**
 - **Vignette**
 - **Interwoven**
 - **Stellent**

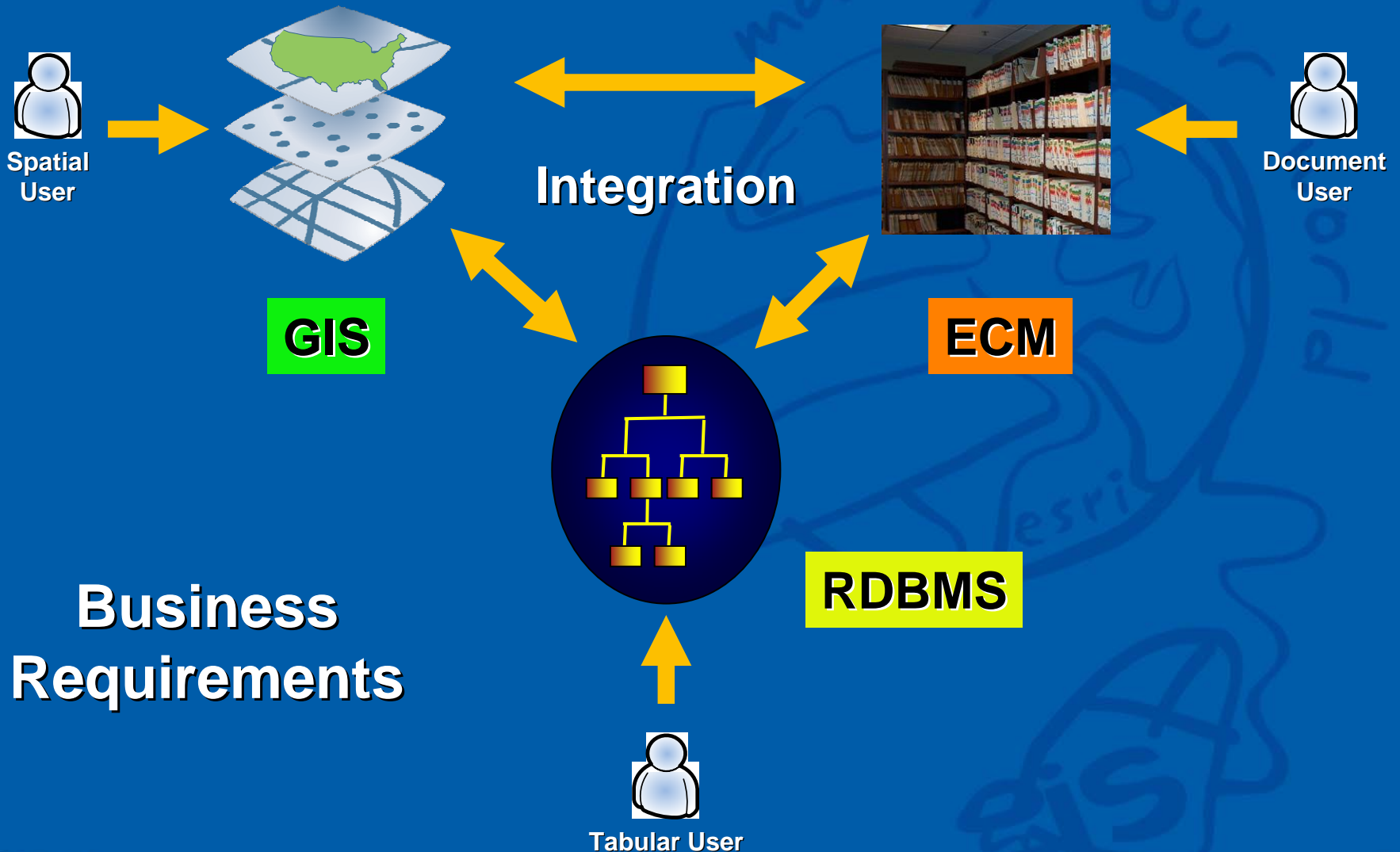
Enterprise Content Management (ECM)



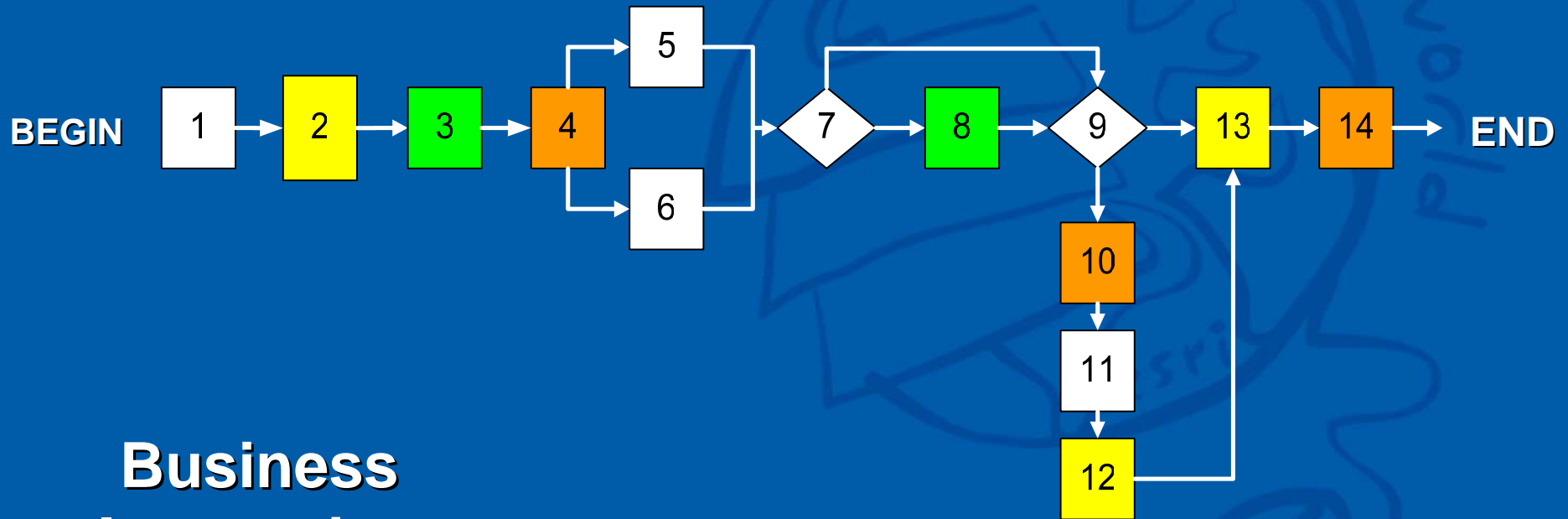
Enterprise Content Management (ECM)

- **Leading Vendors – Trends (Gartner)**
 - *“By midyear 2006, 50 percent of ECM vendors will merge or be acquired.”*
 - *“By year-end 2007, Microsoft, IBM, Oracle and SAP will share 50 percent of the new license revenue from ECM and closely related markets.”*

Enterprise Content Management (ECM)



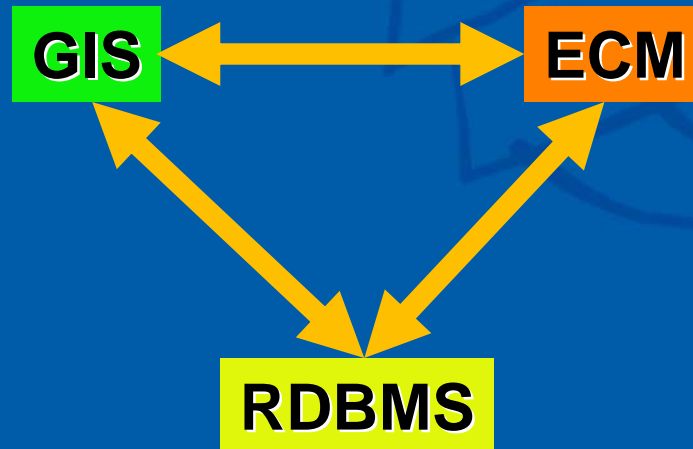
Enterprise Content Management (ECM)



**Business
Integration
Approach**

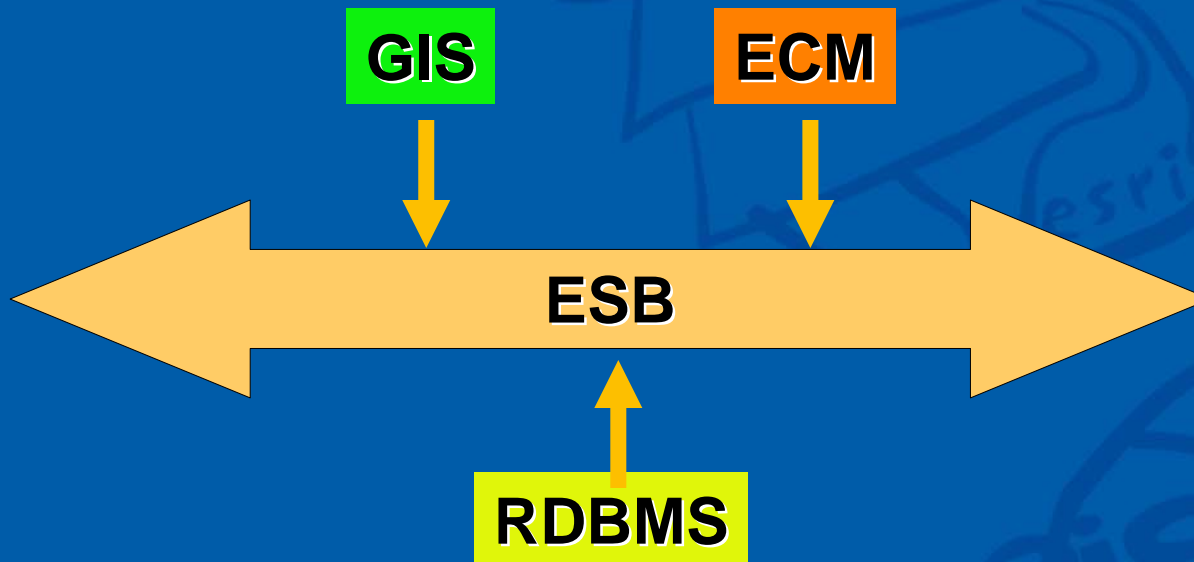
Enterprise Content Management (ECM)

- **Technical Approach**
 - **Application – Level Integration with Custom Connectors**



Enterprise Content Management (ECM)

- **Technical Approach**
 - **Services – Level Integration using a Services Oriented Architecture (SOA) – with or without Enterprise Service Bus (ESB)**



Enterprise Content Management (ECM)

- **Customer Experiences**

- Implementation is driven by customer business needs
- Evaluate overall ECM needs to ensure scalability
- Integration of COTS tools with customization to meet unique organizational workflows and IT environment
- Users demand seamless integration and ease of use

Questions?

For more information contact:

services@esri.com