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

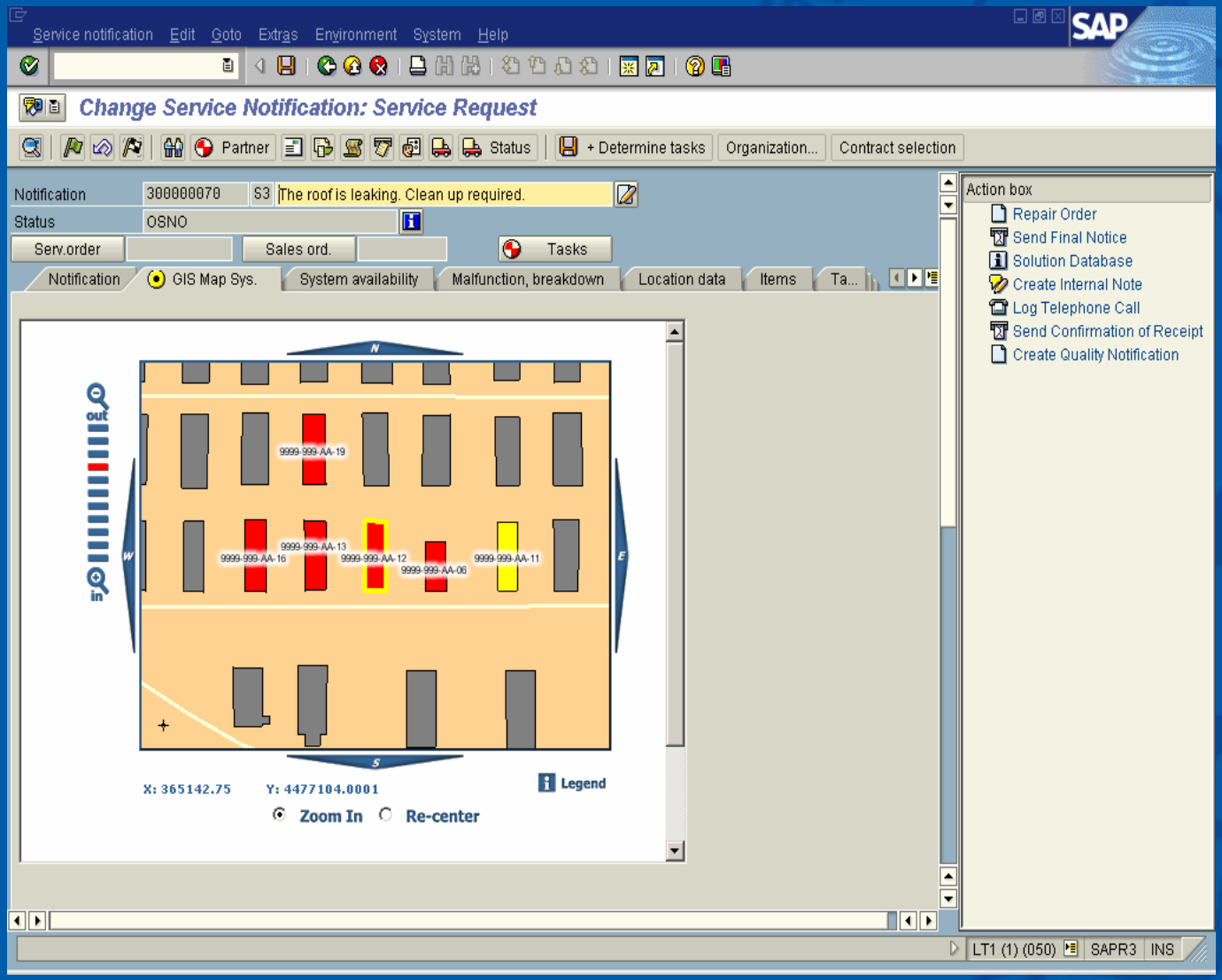
Background

- 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

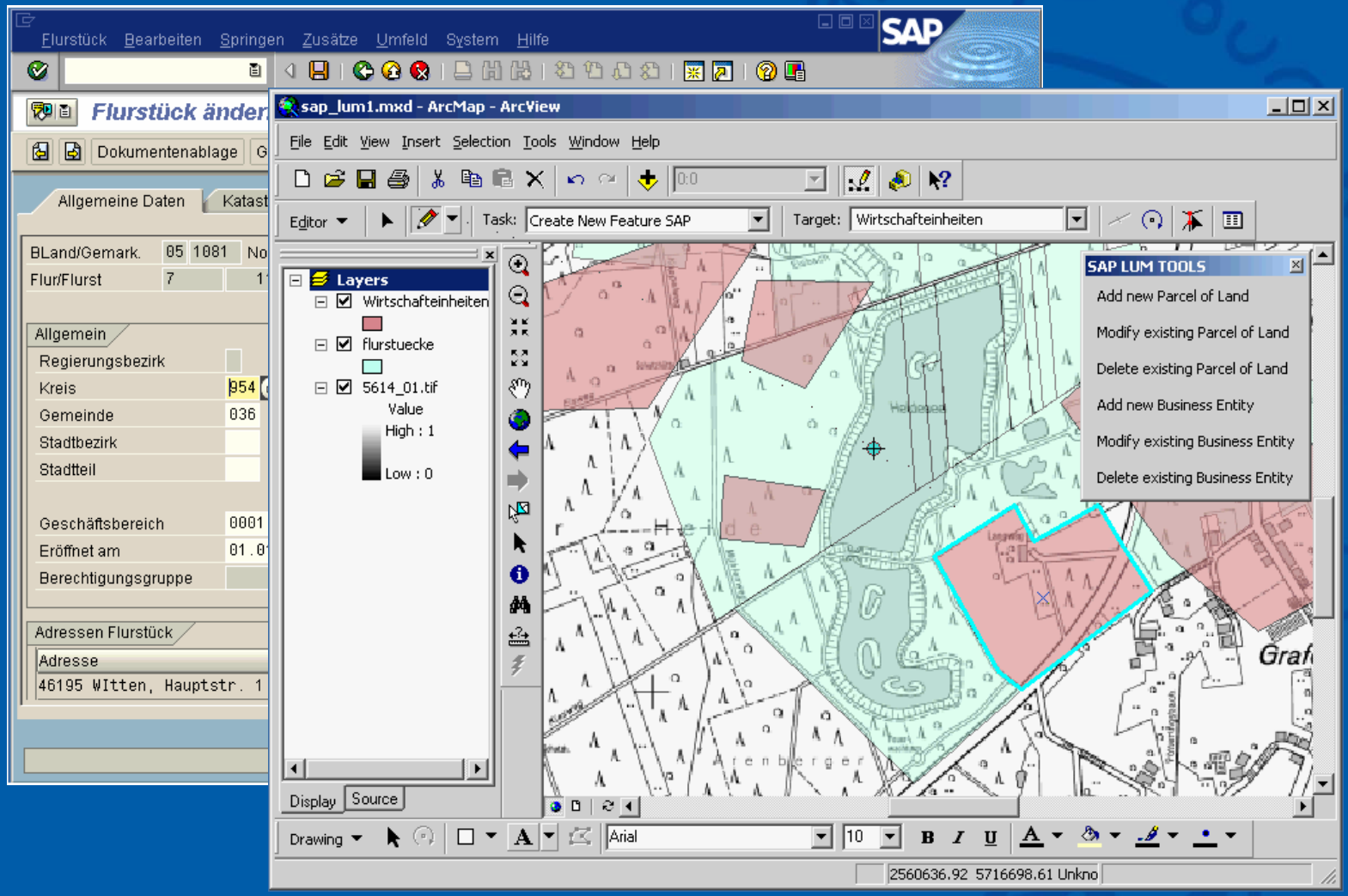
ERP/CRM/SCM Integration

- 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

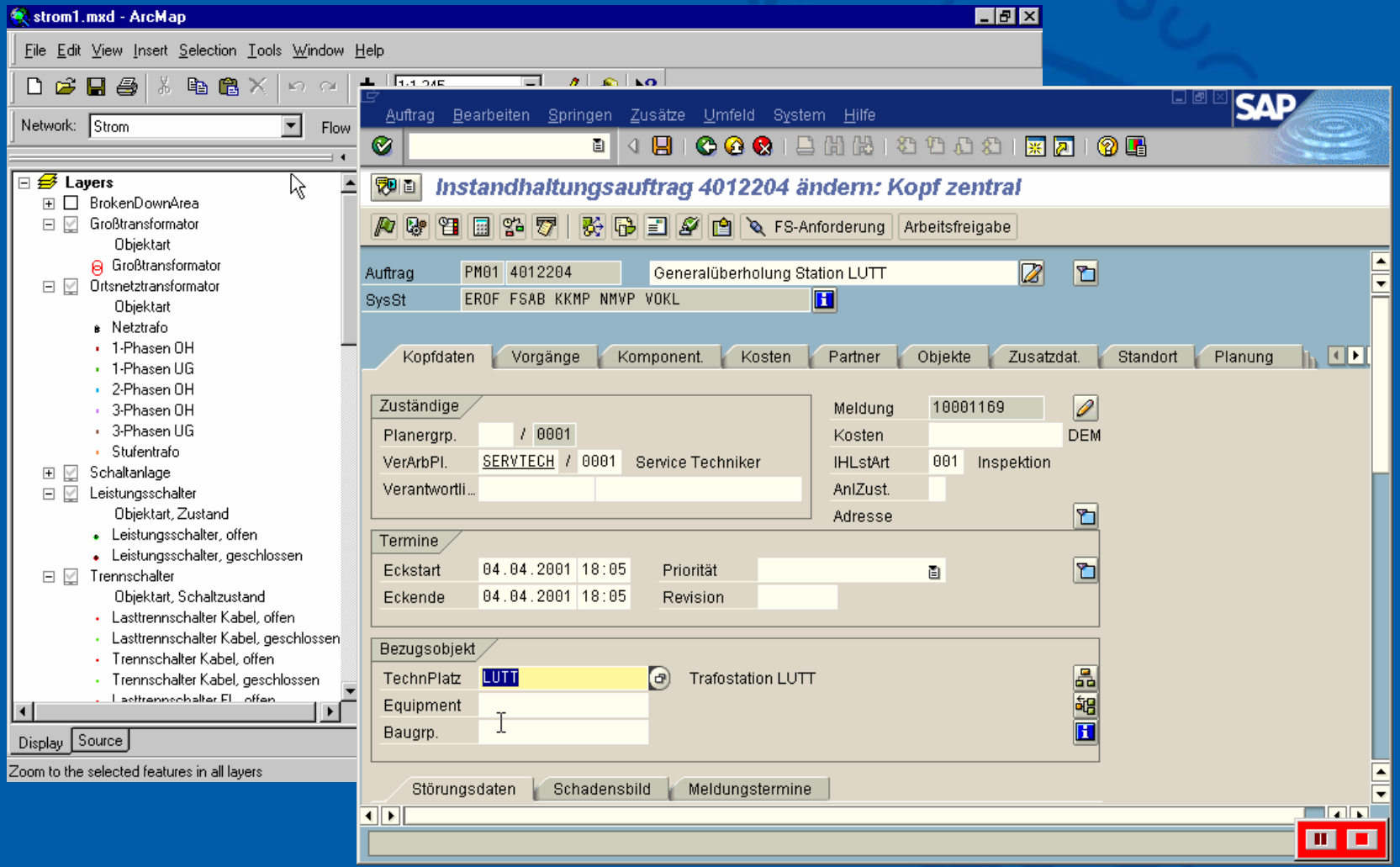
ERP/CRM/SCM Integration
Work Management



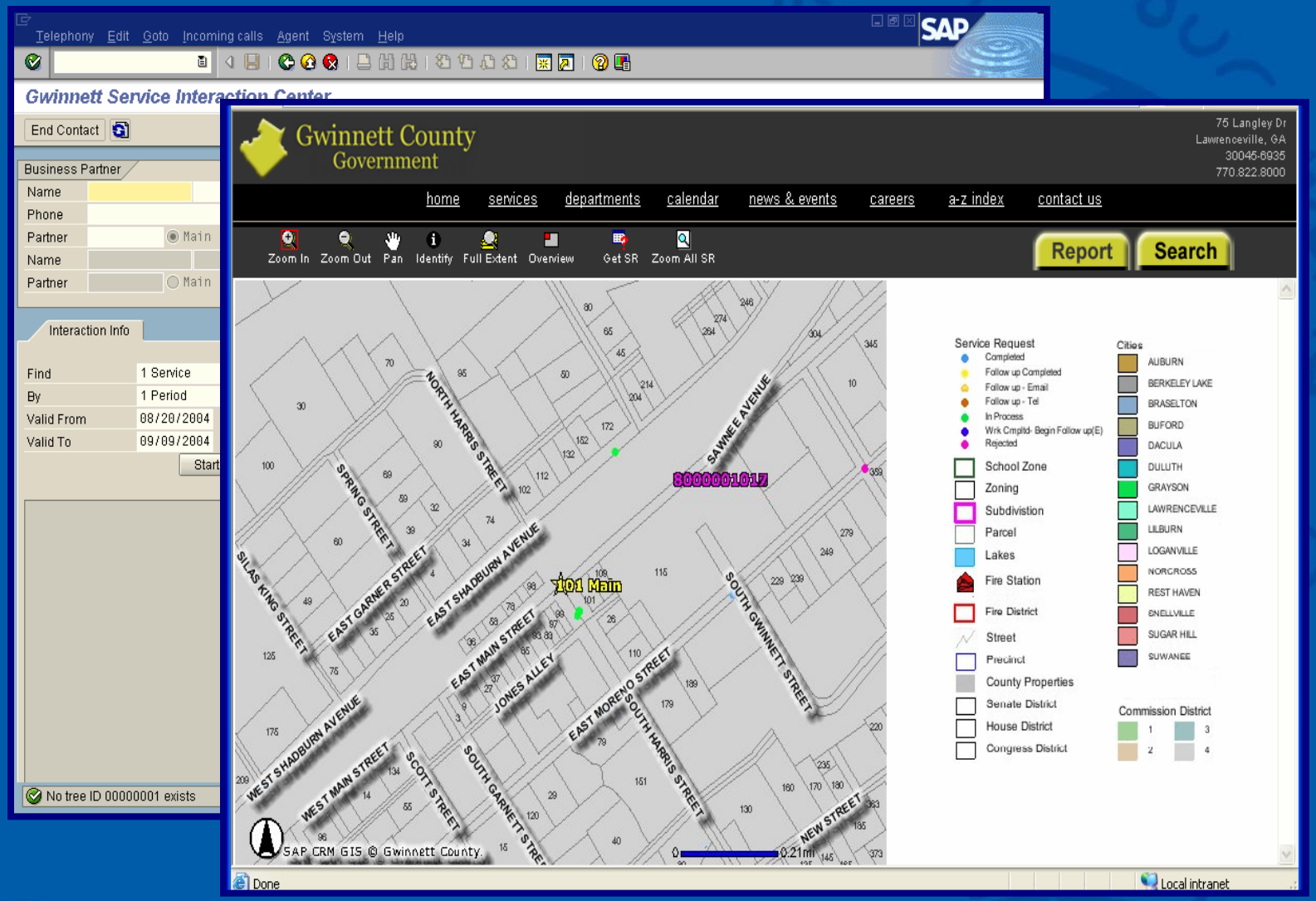
ERP/CRM/SCM Integration
Real Estate



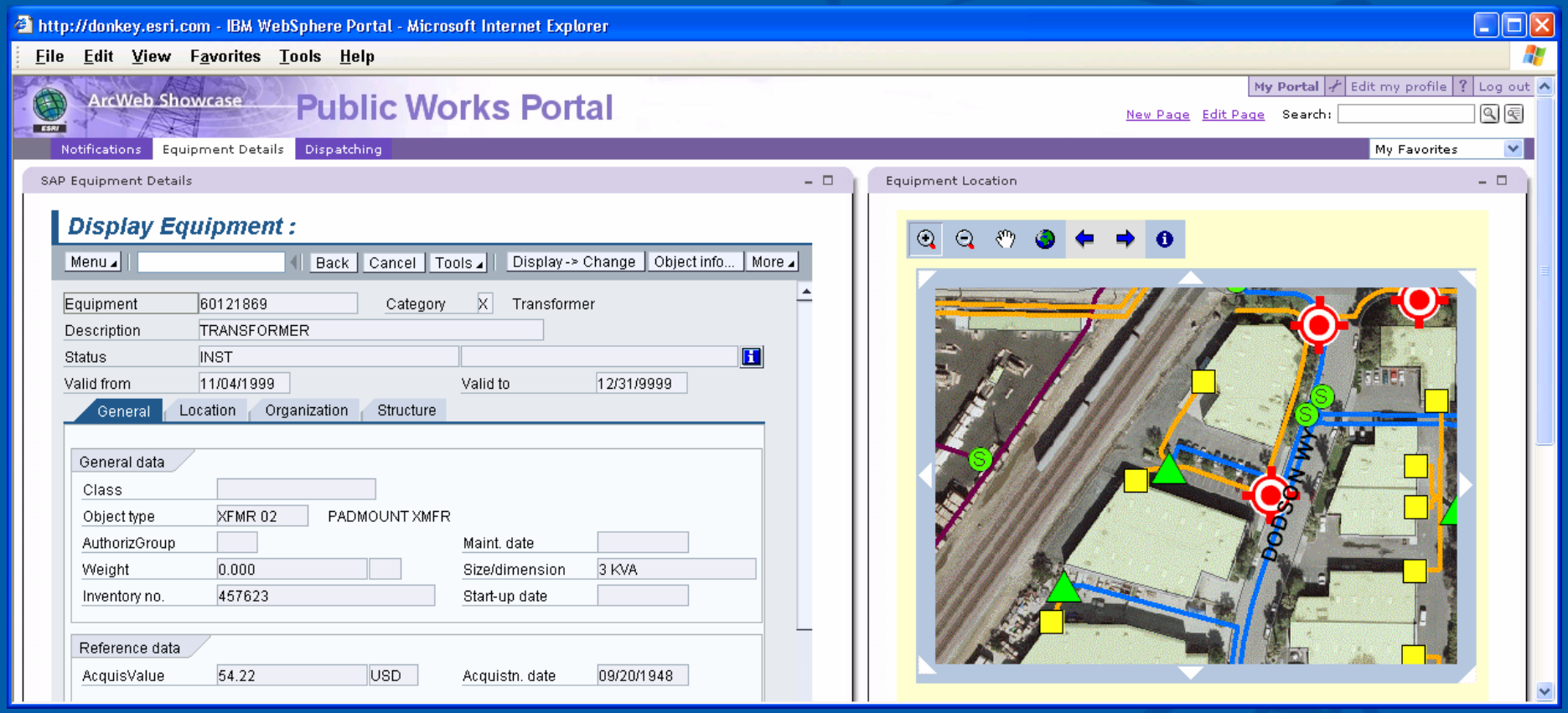
ERP/CRM/SCM Integration
Utilities



ERP/CRM/SCM Integration
Customer Service Calls



ERP/CRM/SCM Integration
Asset Management



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

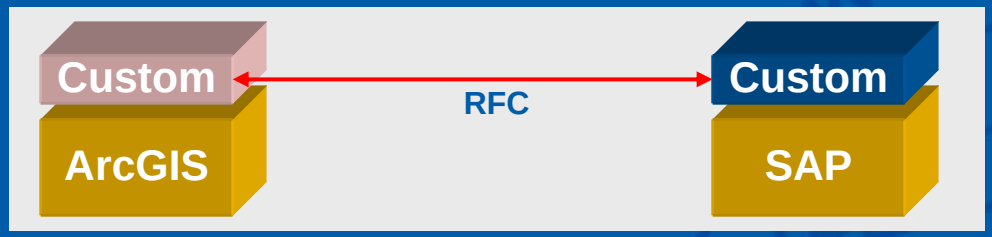
ERP/CRM/SCM Integration
(SAP example)

- 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 83 to 9x
      - Data mapping and synchronization support for SAP AM/PM
      - Dedicated application server for executing business logic for the integrated processes

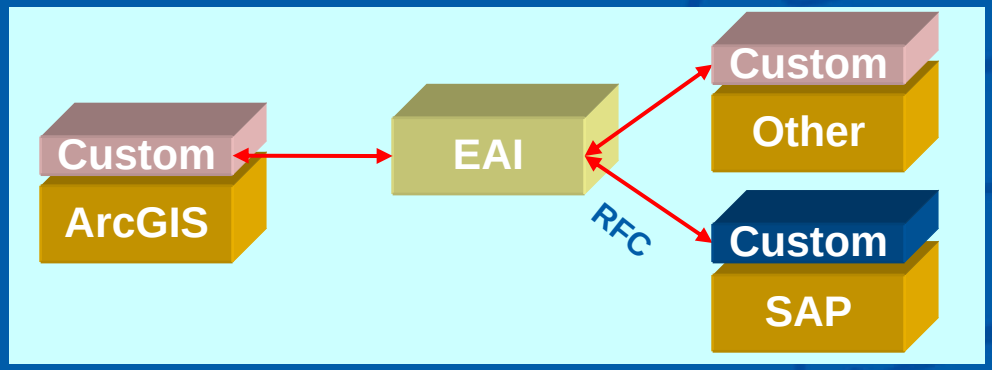
ERP/CRM/SCM Integration
(SAP example)

- 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 Actional 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

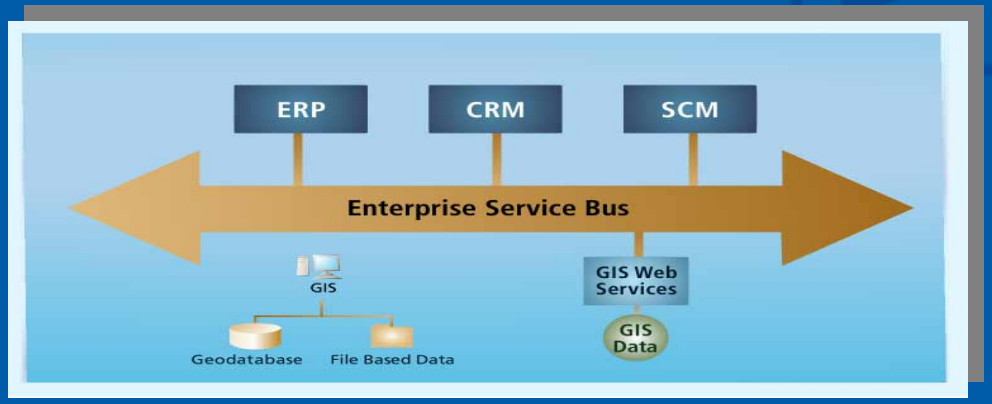
ERP/CRM/SCM Integration



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

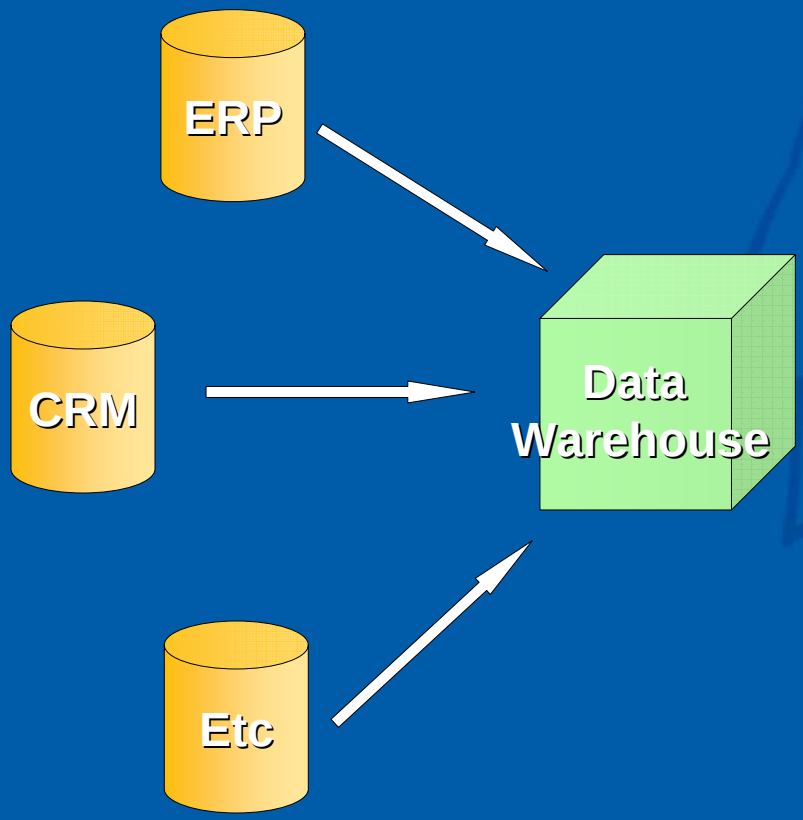
Business Intelligence (BI)

- 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



- Reporting
- Analytical Processing
- Data Warehouse
- ETL

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

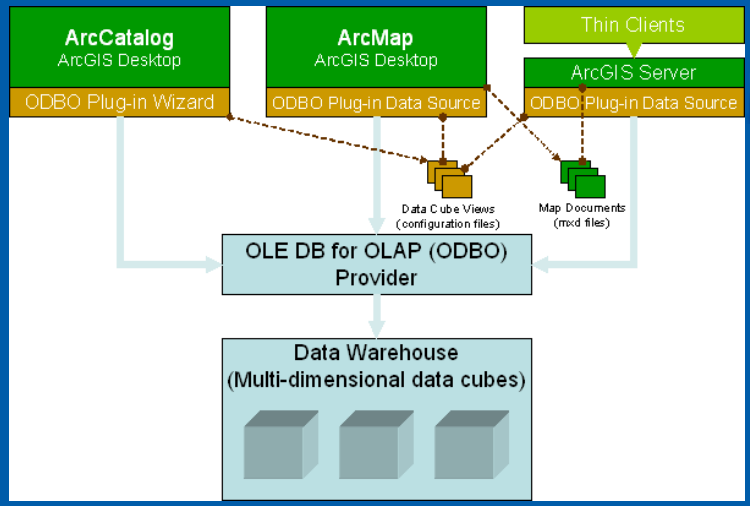
- Dimensions in a data warehouse can have indirect spatial reference
  - Customers
  - Stores
  - Sales territories
- Options for enabling spatial intelligence
  - Spatial data types in data warehouse
  - Include geometric functions in analysis systems
    - Spatial aggregation
  - Visualization as maps

Business Intelligence
Example Integration Approaches

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

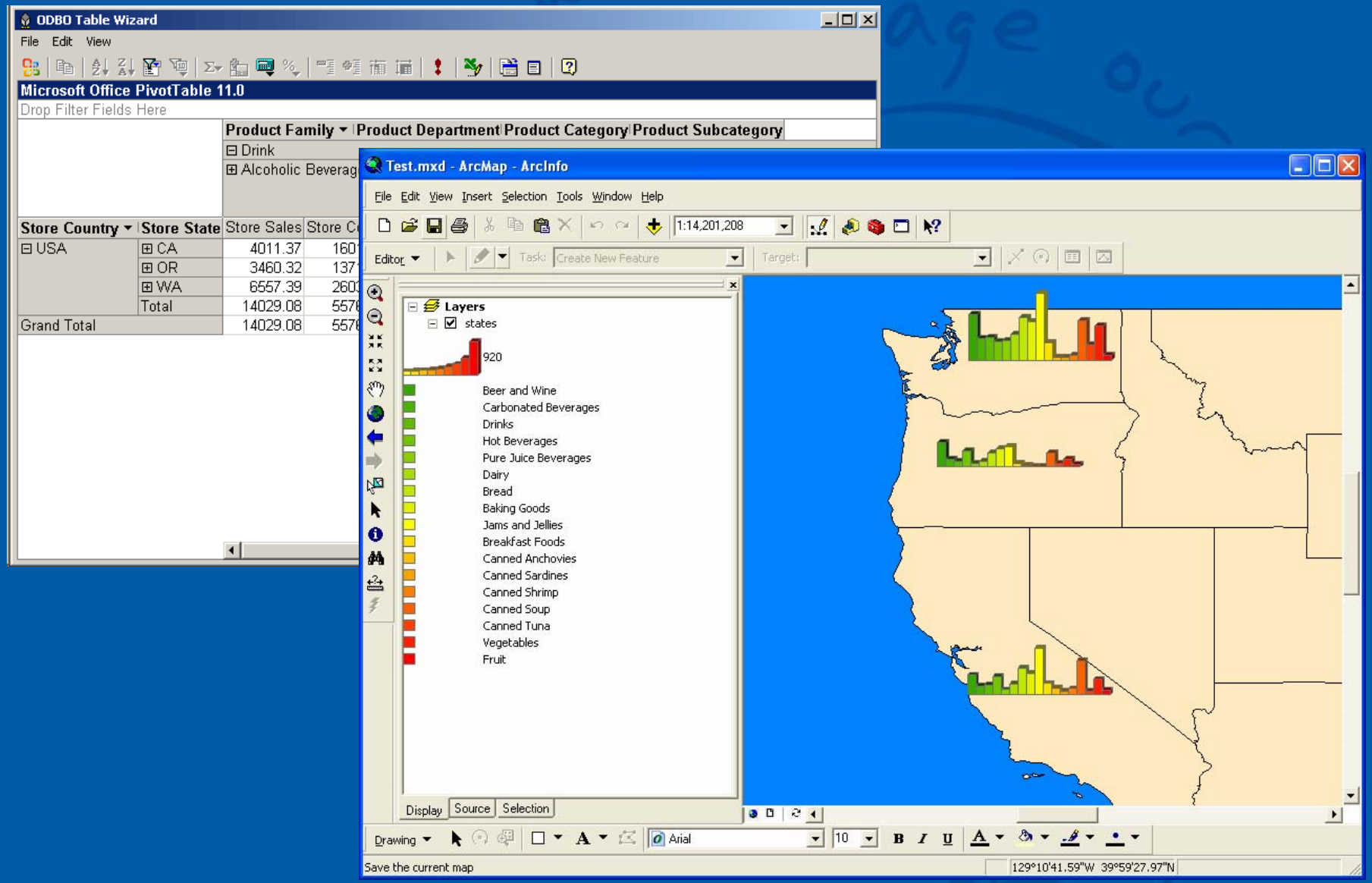
ESRI OLAP Add-On for ArcGIS

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



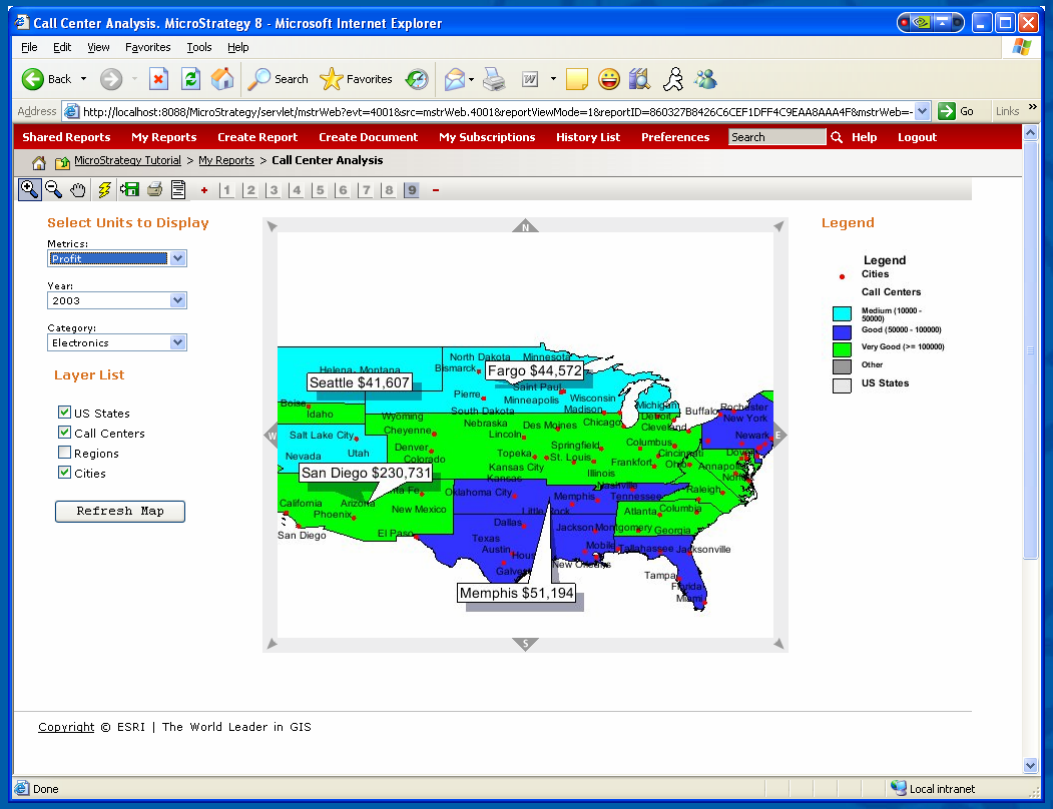
- Dynamically link to reports from any OLAP-compliant data source
- Enhance thematic maps with business intelligence data
- Improve traditional reports and charts by adding sophisticated maps from ArcGIS

ESRI OLAP Add-On for ArcGIS



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)

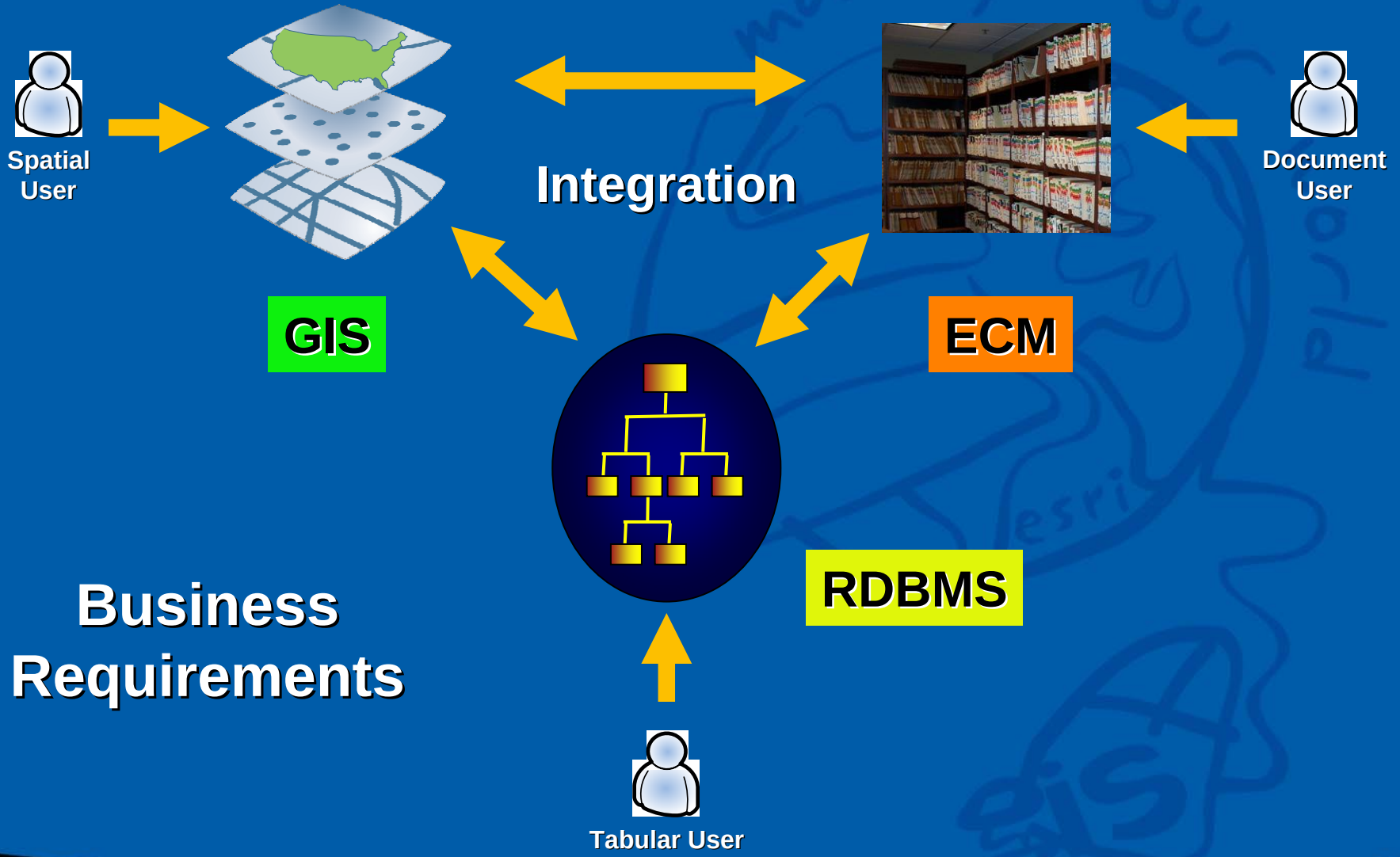
- **Leading Vendors** (Gartner Magic Quadrant)
  - Different characteristics and considerations
    - **FileNet**
    - **Documentum (EMC)**
    - **Hummingbird**
    - **IBM**
    - **Open Text**
    - **Vignette**
    - **Interwoven**
    - **Stellent**

Enterprise Content Management (ECM)

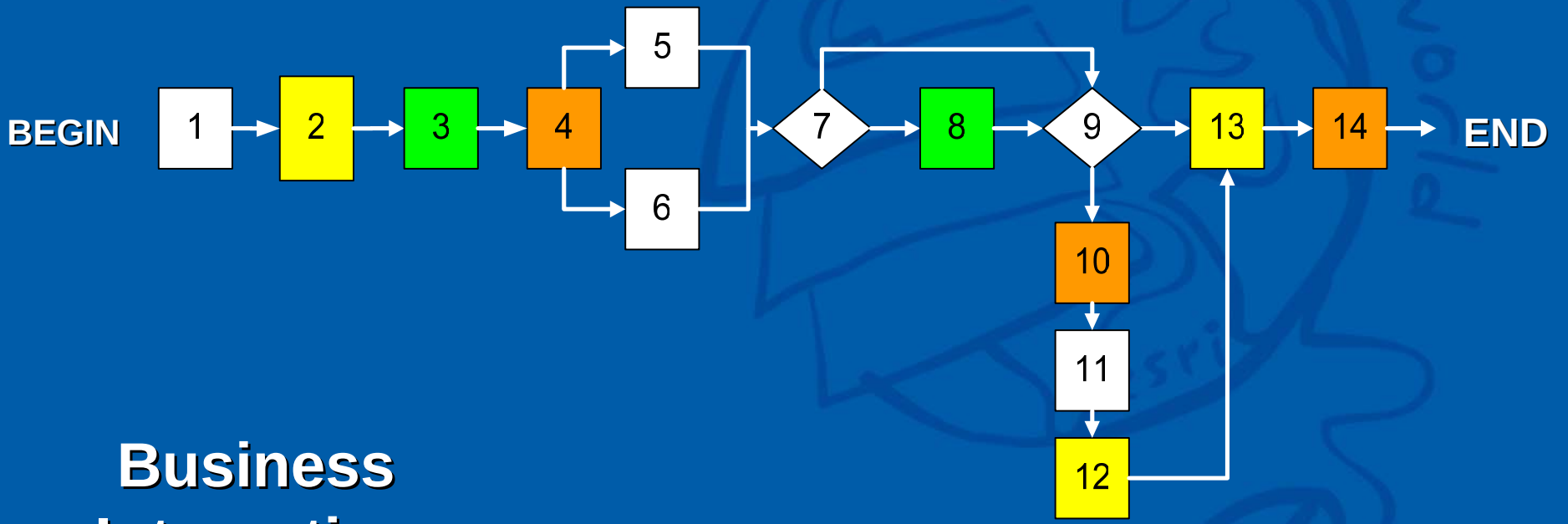
Enterprise Content Management (ECM)

- **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)



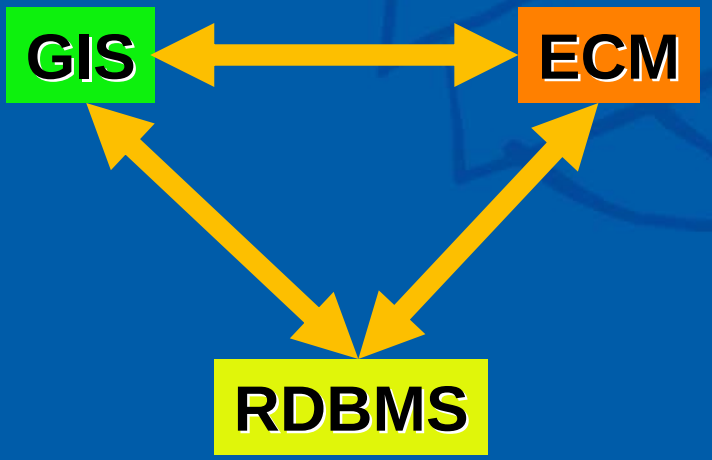
Enterprise Content Management (ECM)



Business Integration Approach

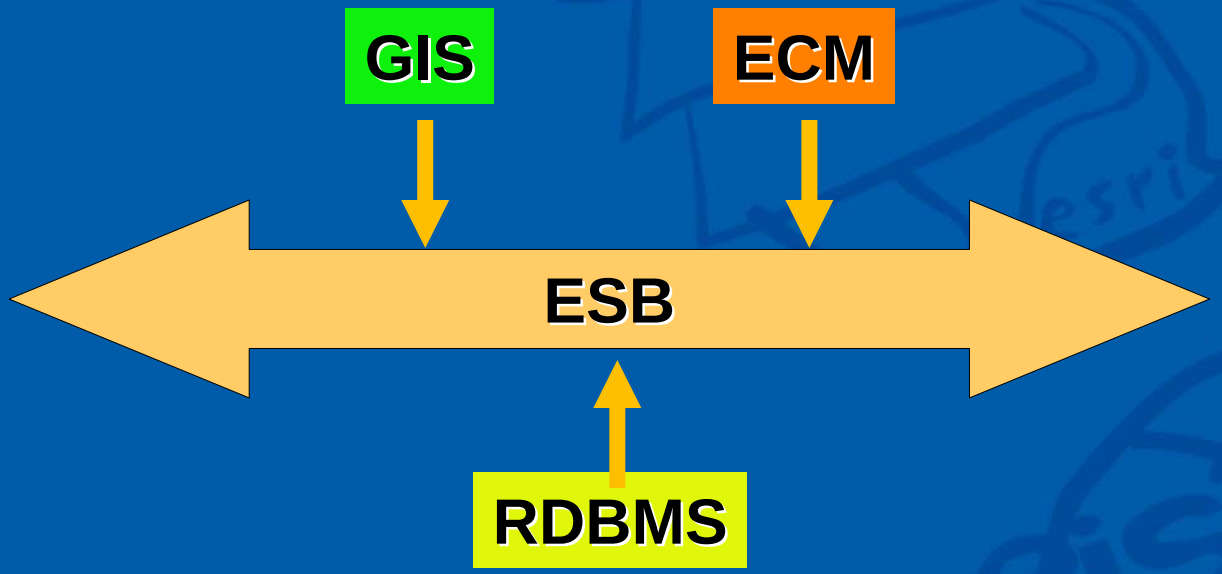
Enterprise Content Management (ECM)

- 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:

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