Integrating GIS within the Enterprise – Options, Considerations and Experiences

Enterprise GIS Track

Enrique Yaptenco
Carsten Piepel
Bruce Rowland
Mark Causley
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
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
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
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
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 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?
“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)

Magic Quadrant for Enterprise Content Management, 2004

Challengers

Leaders

Ability to Execute

Hyland Software

Moebius

SAP

Oracle

eiStream

Cimagine

NovoSoft

Spescom

Meridio

Hypenwave

RedDot

Day

Hummingbird

FileNet

IBM

Open Text

Vignette

Stellent

Interwoven

Xerox

As of October 2004

Source: Gartner Research (October 2004)
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)

Spatial User ➔ GIS ➔ Integration ➔ ECM ➔ Document User

Business Requirements ➔ RDBMS ➔ Tabular User

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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 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