Enterprise Geographic Information Servers

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Outline

- Introduction
- Enterprise GIS vs. Spatially-enabled IS
- Architectures for building Enterprise GIS
- Enterprise Geographic Information Servers
- Examples
- Conclusions
Introduction
GIS is Evolving

From Projects and Workgroups to Enterprises Information Systems
Information System

- Set of resources
  - useful information
  - through management and analysis of data
  - in accordance with defined procedures

- Support the missions of an organization
Enterprise GIS Characteristics

- GIS is key to business operations
  - Mission-critical
  - Decision support
- More planning, integration, testing and support than traditional GIS
- Mainstream IT
  - Deploy and manage like other IT
  - Customer IT clients select and deliver
Enterprise GIS Characteristics

- Integration with other enterprise systems
  - Middleware, Enterprise Service Buses, etc.
- Central management and serving
- Embed within other business solutions
- May be complex to deploy and support
- Business driven service level agreements
Enterprise Success Factors

- Solid workflow, architecture and application designs
- Well defined infrastructure requirements
- Knowledgeable, highly-skilled teams
- Enterprise-wide standards and governance processes
- Qualified business partners skilled in developing enterprise GIS solutions
- Good tuning tools and methods
- Robust services and support capabilities

- ...and the best GIS technology available
Enterprise GIS vs. Spatially-enabled IS
## Applications of spatial reference core technology

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### Examples

- **Network maintenance, asset management, facility siting, corridor analysis**
- **Field-force automation, executive information system, customer care, store locators**

Run by GIS and IT professionals: Run by IT professionals.
Geographic Information System (GIS)

- Generic platform for working with geographic information
  - Schema-driven information model
  - Tools for editing, mapping, analysis
  - End-user interface with scripting
  - Application programming interface
- This supports…
  - Ad-hoc integration of information from different sources
  - Transactions against a shared database
  - End-user system configuration and programming
  - High-level platform for the development of geo-spatial applications
Visualization

• Very Fast
• Seamless
• Continuous Pan & Zoom

...Images, Terrain, and Vectors
Geoprocessing

Data + Function = Data

Command & Dialog Window
Data Management

- Data and Maps
- Metadata
- Models
- Schemas
- Web Services
City and County of San Francisco Enterprise GIS

- Mayor’s Office
- Economic & Community Development
- Recreation & Parks
- Dept. of Environment
- Zoo
- Human Services
- Children, Youth, Families
- Dept. of Public Health
- SF Police/Fire
- Emergency Services
- Public Works
- City Planning
- Building Inspection
- SF Public Utilities Commission
- Real Estate
- Assessor/Recorder
- Treasurer/Tax Collector
- Board of Supervisors
The Real-Time Enterprise
Combining enterprise applications with embedded network intelligence and access
Role of DBMS

- Centralized data repository
- Avoid redundancy and duplication
- Facilitate data sharing
- Multi-user editing of large databases
- DBMS backup and recovery
- Security
- Availability

- Support for advanced geographic data types
- Limitations of SQL
- Performance and scalability (esp. complex operations / information models)
- Support for poorly structured / distributed data types
- Integration of heterogeneous data
Oracle Launches Product Information Management Data Hub May 24, 2005

The repository for both structured and unstructured information is designed to hold a consolidated view of all data on a company's products.

By Charles Babcock

Oracle introduced a Product Information Management Data Hub on Monday that's designed to act as a repository for both structured and unstructured information on a company's products.

The data hub is designed to pull together information on a product, regardless of where it resides and keep one "true" version of the information stored in its own repository. A product-data hub can then serve a variety of applications and Web
The data hub is designed to pull together information on a product, regardless of where it resides and keep one "true" version of the information stored in its own repository. A product data hub can then serve a variety of applications and Web services as a reference point.

The firms Master Lock, Pella Windows, and 7-Eleven are current users of Oracle PIM data hub, says John Webb, VP of applications. Oracle already offers a customer-information data hub, which competes with customer-data hubs from CRM vendor Siebel Systems and ERP applications vendor SAP AG. Two more Oracle data hubs are scheduled to follow over the next 12 months, but Oracle spokesmen declined to specify what they will be.

The product data hub is useful in situations where product information "is dispersed over a number of legacy and best-of-breed applications," making it hard to assemble without a lot of data retrievals, Webb says. Another case where it acts as a needed centralizing force is in a company that has grown through mergers and acquisitions, and has key data scattered across different systems, he says.

The data hub isn't focused on any particular set of industries and could be used where it's needed, Webb says. It includes support for UCCnet and Global Data Synchronization Network to help companies that are suppliers to large retailers such as Lowes Home Improvement or Home Depot exchange product information with them.

The data model for Oracle PIM data hub, the core of such an offering, is part of the Oracle E-Business Suite of applications. For E-Business Suite users who wish to customize the data model, there will be a $9,995 charge for Oracle PIM Data Librarian, a product used to customized PIM data hub.

A non-E-Business Suite customer will pay $100,000 per processor for the product.
3M Ships Product Data-Management Tools
July 19, 2004

Version 5 of WebSphere Product Center is designed to help businesses track, manage, and control product data.

TechWeb News
informationWeek

3M on Monday unveiled software to help businesses track, manage, and control product data shared with customers and partners or gathered internally from different information technology systems.

rigo’s software can draw product information, such as price, location and description, from multiple IT systems and store it in a central repository. From here, the data can be shared with a company’s customers, partners, or suppliers through a portal. The software also can deliver product data to a point-of-sale device for price checking, for example, or a customer call center.

Analysts have expected IBM to add its integration software to rigo’s applications, enabling customers to share product data with suppliers and partners for electronic commerce. rigo is strong in the retail industry, and its customers include Royal Philips Electronics, Sony, Staples and Unilever.

WebSphere Product Center includes the WebSphere Application Server, IBM B2 Information Integrator for accessing data types from repositories and WebSphere Business Integration MQSeries and Adapter for MQ to move data between disparate systems.

The roadmap for Product Center includes integration with IBM’s commerce and portal software and its radio-frequency-identification middleware.

3M plans to deploy Product Center as the central repository underpinning the electronic product code information services component of IBM’s RFID.
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IBM on Monday unveiled software to help businesses track, manage, and control product data shared with customers and partners or gathered internally from different information technology systems.

IBM's WebSphere Product Center Version 5 incorporates technology from Trigo Technologies Inc., which IBM acquired this year.

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IBM plans to deploy Product Center as the central repository underpinning the electronic product code information services component of IBM's RFID middleware. The new product will federate information from RFID, electronic data interchange, and Global Data Synchronization networks with enterprise data.
GIS is like other Enterprise Information Technology Systems…

- Architecture
- Interfaces
- Development tools
- Deployment strategies
- Standards
- Cost
Standards for GIS

Information Technology Standards
- DBMS: RDBMS & SQL
- Web Services: J2EE, .NET, XML/SOAP
- Computing Platforms: Windows, Unix
- Development Languages: C++, Java, Visual Basic, .NET (C#, etc.)

Domain Standards
- Industry, ISO, Military, OGC standards
- Data and Metadata formats
- Web Service APIs

User Community/Org. Standards
Architectures for Building Enterprise GIS
N-Tier Architecture

Single Tier

Presentation
Business Logic
Data Management

Three Tier

Client
Presentation

Application Server
Business Logic

Data Server
Data Management
Enterprise GIS Architecture

Clients
- Desktop
- Web
- Mobile

Servers
- GIS
- Web
- Data

Network
- LAN / WAN
- Internet

Multi-purpose DBMS
Enterprise GI Server

Standard Networks

EGIS
Technology Components

- Clients
- GIS Applications
- Network
- Web Application Server
- ArcGIS Server
- ArcSDE
- Data Server
- Web Apps
- DBMS
EGIS Characteristics

- Full GIS functionality
  - Information model
  - Geoprocessing
  - Data management
- Server-centric
- Distributed processing
  - Centralized
  - Federated / web services
  - Client-server
- IT standards-based
  - Development
  - Communications
  - Data management
  - Interoperability
- Low cost of maintenance/upgrade
- Easy scalability
Examples
Pierce County Increased GIS Capacity and Security, Reduced Costs

**Business Challenge:**
- Existing UNIX systems too costly to maintain
- Reduce database redundancy and consolidate data store
- Reduce points of failure to mitigate OS reliability and security issues
- Upgrade to latest GIS release and meet increased server demand
- Tight budgets

**Solution:**
- Server Consolidation
  - 4 IBM Bladecenters
- Software:
  - Upgrade to new GIS release
  - Streamlined licensing
- New HW Leasing
  - Lower TCO, $753K

**Business Benefits:**
- Projected $2.9M cost savings from hardware consolidation and new leasing agreement
- Significantly reduced administrative complexity, 27 servers reduced to 13, 98 CPU, added failover and more storage
- Better management of server software resources, better security of database and web services inside the firewall, and streamlined GIS software license management and cost.
Centerpoint Energy Drives Business and Achieves Greater Value with GIS

Business Challenge:
- Strategic direction in question
- Return to core business functions
- Focus on assets with immediate positive cash flow
- Tight budgets
- Demand cost efficiency with improved performance

Solution:
- GIS Software Deployment
  - Implement in all CP distribution companies (electric & gas)
  - Integrate with corporate systems, Filenet, SAP, etc
  - Spatially-enable mission-critical applications: SCADA, mobile operations, pole management

Business Benefits:
- Investment in GIS shifting from tactical (some ROI, specific business unit benefit, executive ‘support’) to strategic (substantial ROI, company-wide benefit, executive ownership)
- Strategic GIS use drives business modeling of asset management, business risk, product demand prediction; new distribution optimization tool, ‘Itron LD-Pro’
- IT discipline for ‘rapid strategic value’: don’t build in-house, buy proven solutions, must integrate
**Geospatial One-stop II**

**Moving into IT Mainstream**

**Business Challenge:**
- Continue momentum of e-gov initiatives
- Lack of data major constraint on GIS use in government
- Major duplication and redundancy
- Need to invest in secure IT-based platform infrastructure

**Solution:**
- Combined GIS and IT platform
  - ESRI GIS
  - IBM Websphere Portal
  - Google Search Engine

**Business Benefits:**
- Reduce redundant investments in geo-spatial data and facilitate data acquisition
- Greatly expand use of geo-spatial information into wider e-government community through easy, fast and familiar geoportal
- Move from geo-centric to IT-centric platform
Conclusions

- GIS is moving into Enterprises
  - Geo-centric
  - Business-centric
- GIS are Information Systems
- Enterprise Geographic Information Servers
  - New class of GIS server
  - Full GIS capabilities
  - Built on IT platforms and standards
- Several case studies already available
Questions