Enterprise Geographic Information Servers

GEOSPATIAL INFORMATION & TECHNOLOGY ASSOCIATION®

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Director of Products
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ESRI

Outline

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

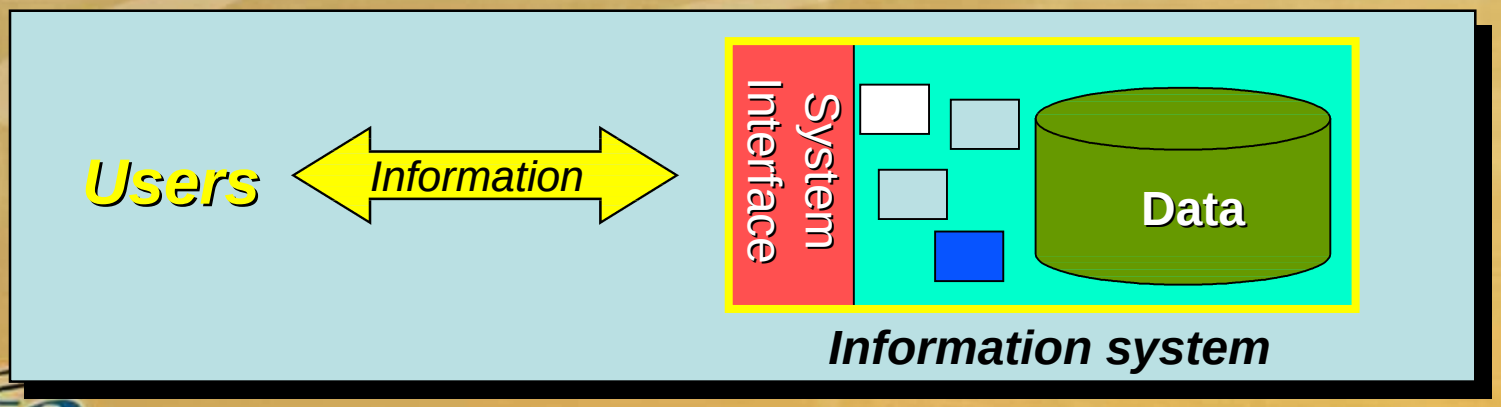
Introduction

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

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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

Two Enterprise Information System Approaches

Enterprise GIS (noun)	Spatially-enable IS (verb)
Core technology	Applications of spatial reference
Geo-centric workflows	Line of business-centric workflows
Advanced applications § Data creation and maintenance, analysis and modeling	Simple applications § Data exploitation, routing, geocoding
IT-based	IT-based
Examples § Network maintenance, asset management, facility siting, corridor analysis	Examples § 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

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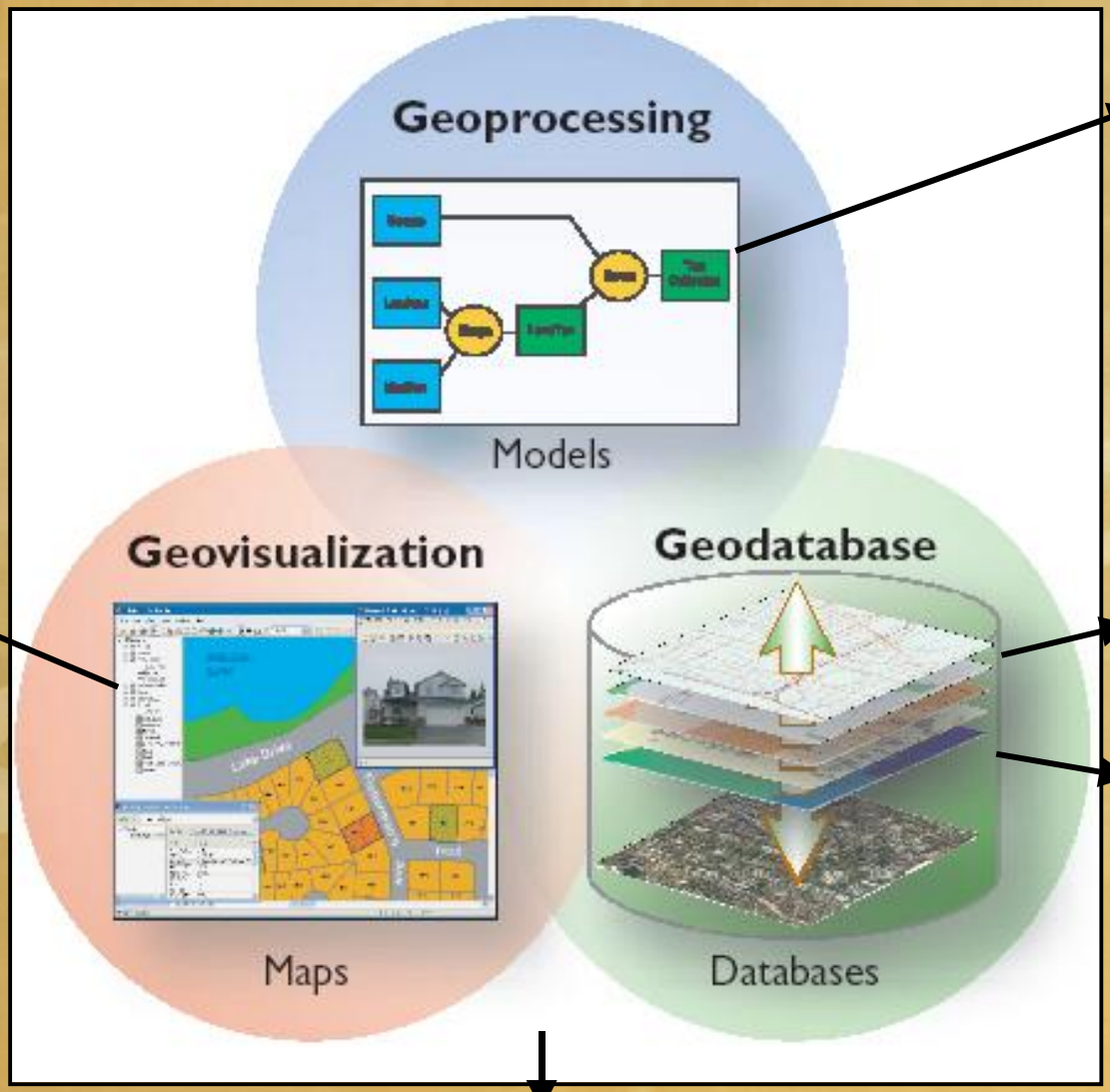
Three Components of GIS



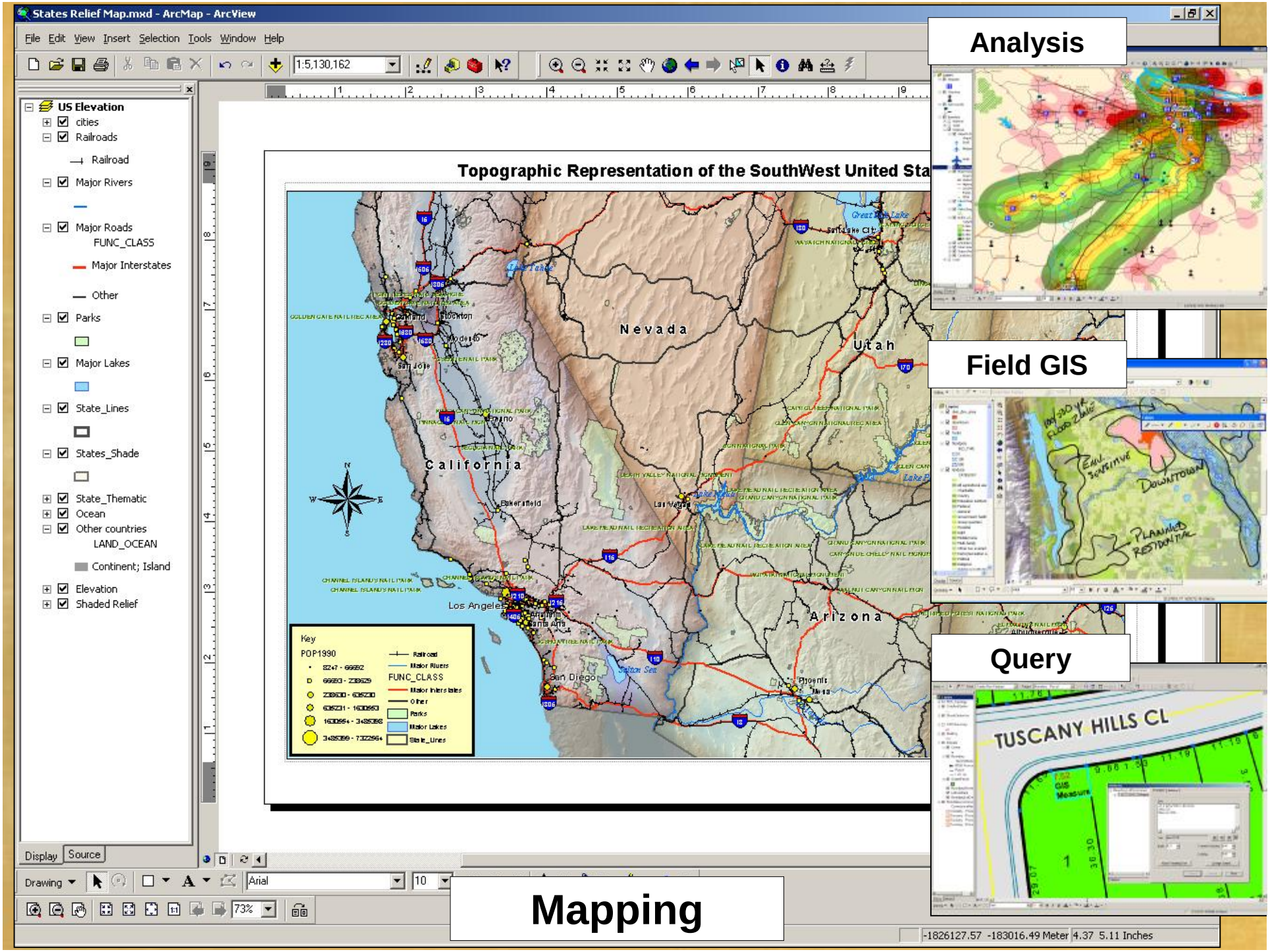
Geoprocessing Models

Maps and Globes

Datasets

Data Models

Metadata Documents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US Elevation
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Railroad
Major Rivers
Major Roads
FUNC_CLASS
Major Interstates
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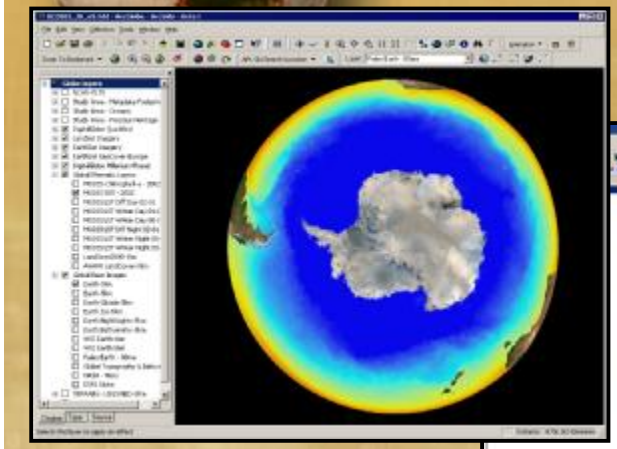
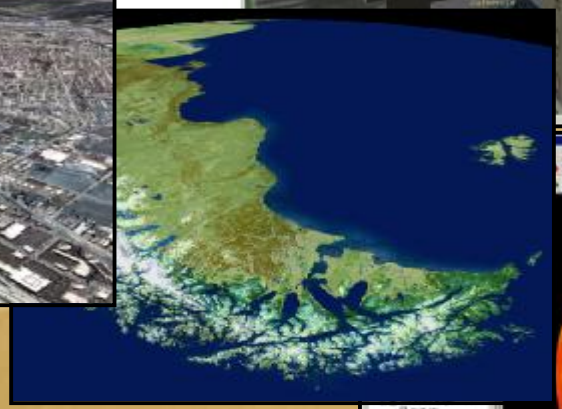
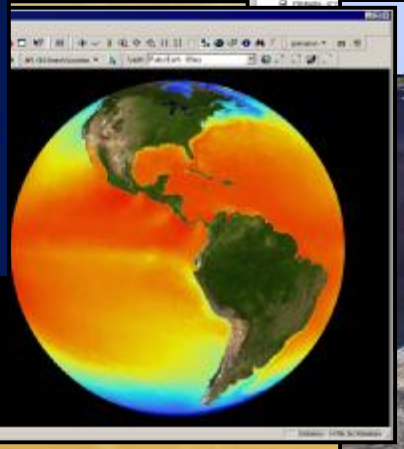
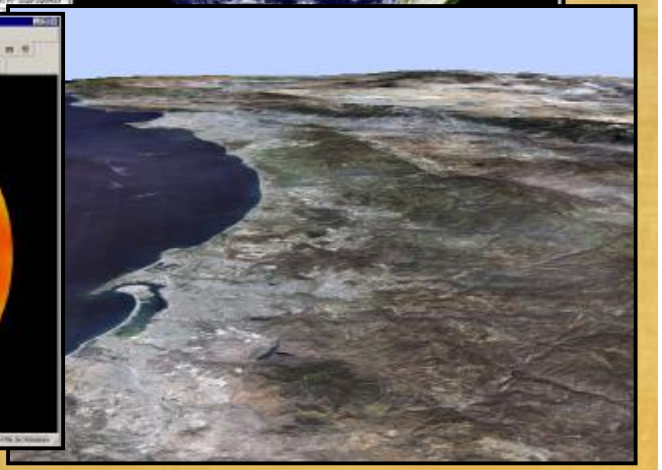
Mapping

Visualization









- Very Fast
- Seamless
- Continuous Pan & Zoom

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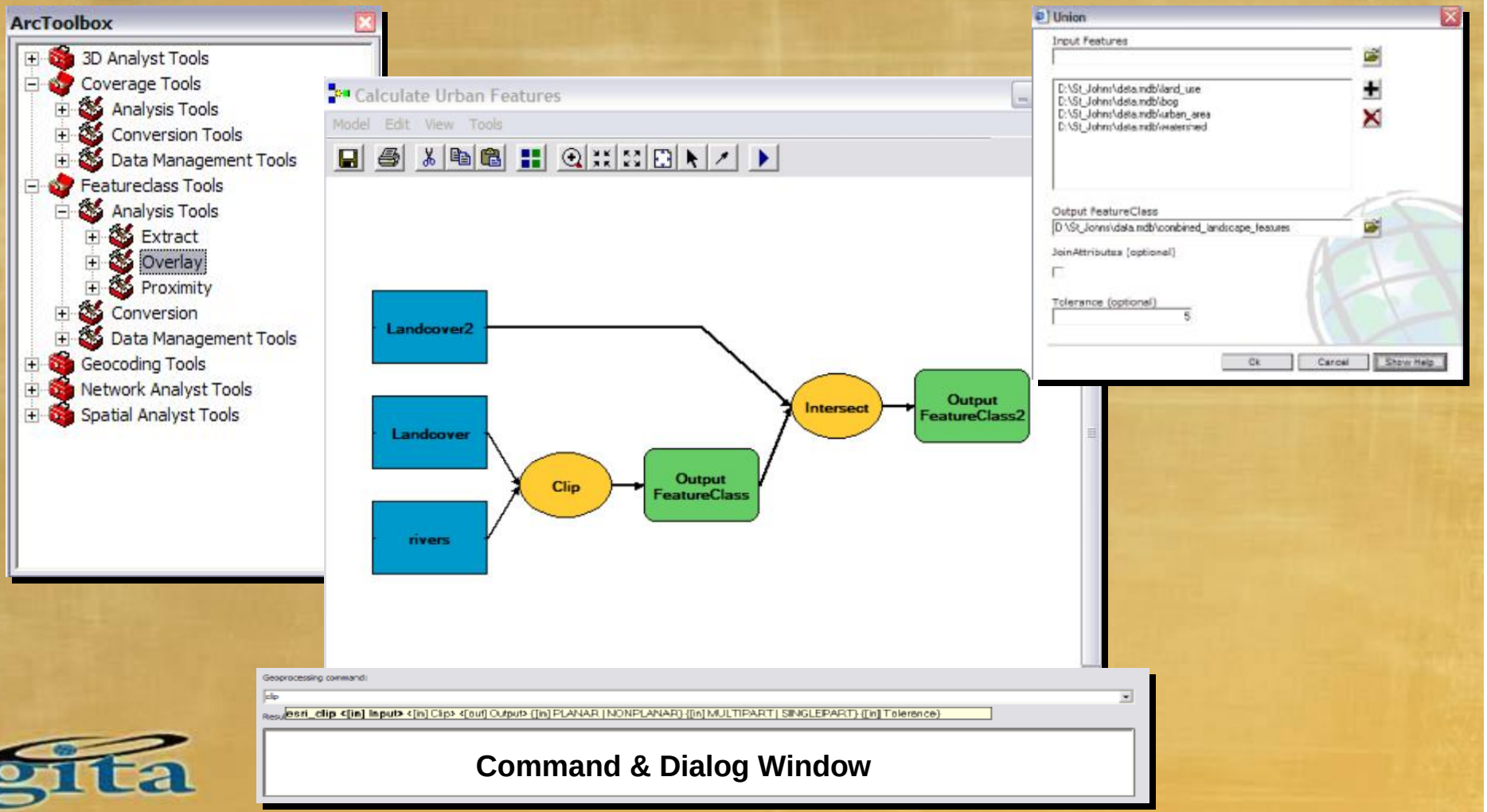
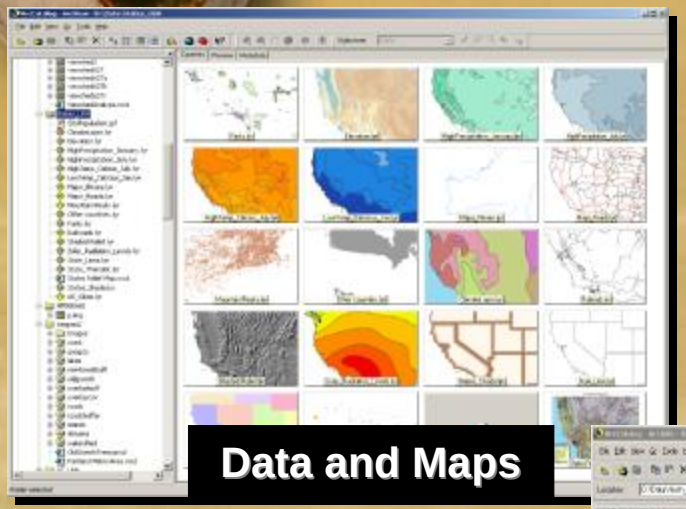
. . . Images, Terrain, and Vectors

Geoprocessing

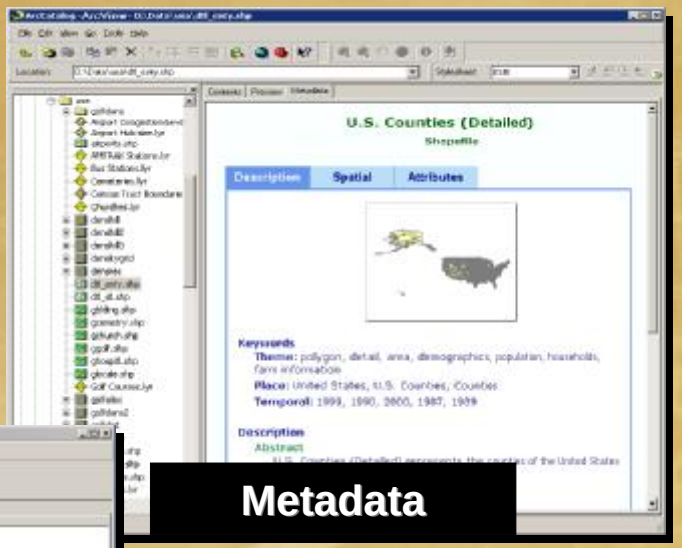
Data + Function = Data



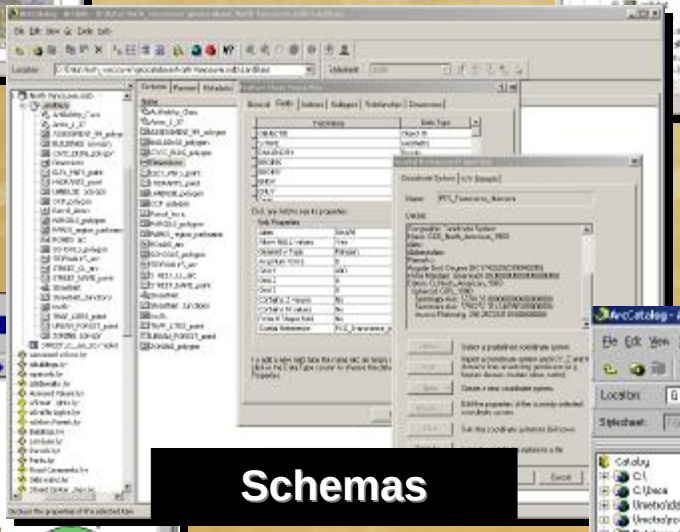
Data Management



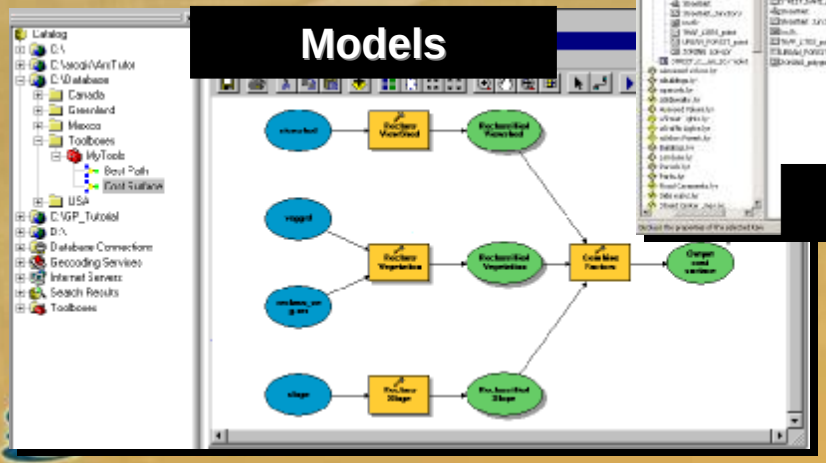
Data and Maps



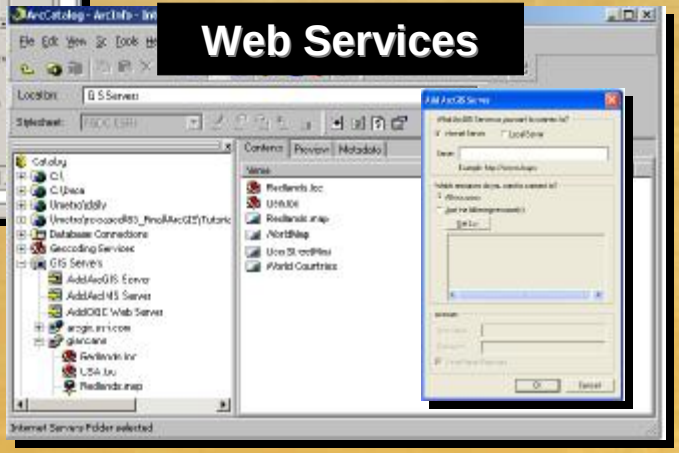
Metadata



Schemas

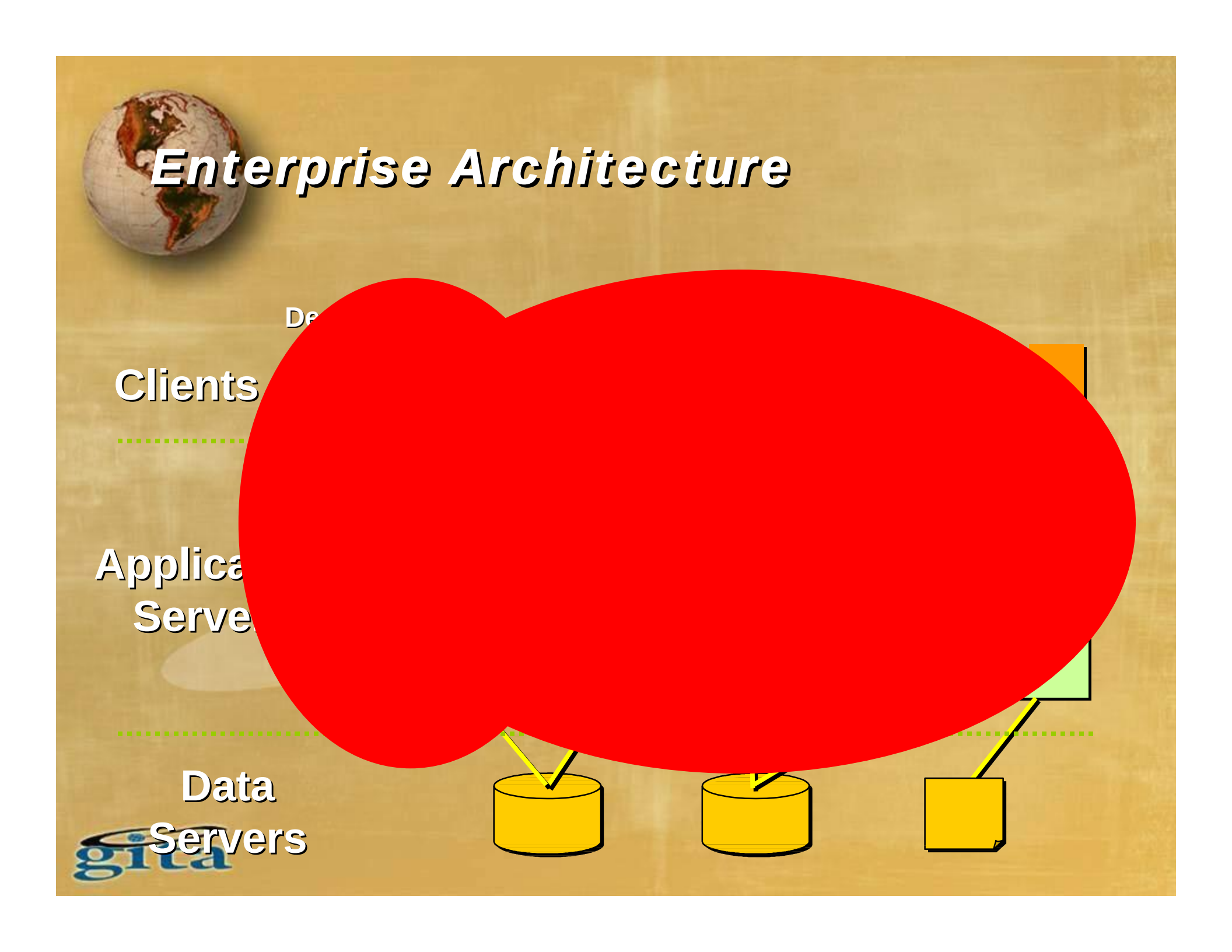


Models



Web Services

Enterprise Architecture



City and County of San Francisco Enterprise GIS

Mayor's Office

Public Works
City Planning
Building Inspection

SF Public Utilities Commission

Real Estate
Assessor/Recorder
Treasurer/Tax Collector

Economic & Community Development

Recreation & Parks
Dept. of Environment
Zoo

Human Services
Children, Youth, Families
Dept. of Public Health

SF Police/Fire
Emergency Services

Enterprise Service Bus

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City and County of San Francisco
Board of Supervisors

Sprint Business Mobility Framework

The Real-Time Enterprise

Combining enterprise applications with embedded network intelligence and access

Over-the-Air Delivery

- WAP
- WEA
- IM
- Etc.

Standard Developer Toolsets

- WebSphere Studio
- JBuilder
- Visual Studio

Application Runtime Environments

- SFA App
- CRM App
- FFA App
- ERP App
- Mobile Simple Apps (email)
- Common Enterprise Middleware Application Environment
- Enterprise / SI

Web Services

Sprint Business Mobility Framework Services

Web Services Gateway

- Configuration Management
- Device Management
- Administrator Portal
- Intelligent Notification
- Location Services
- Network Availability
- Call Control Services
- Messaging Services
- Supply Chain Connectors

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

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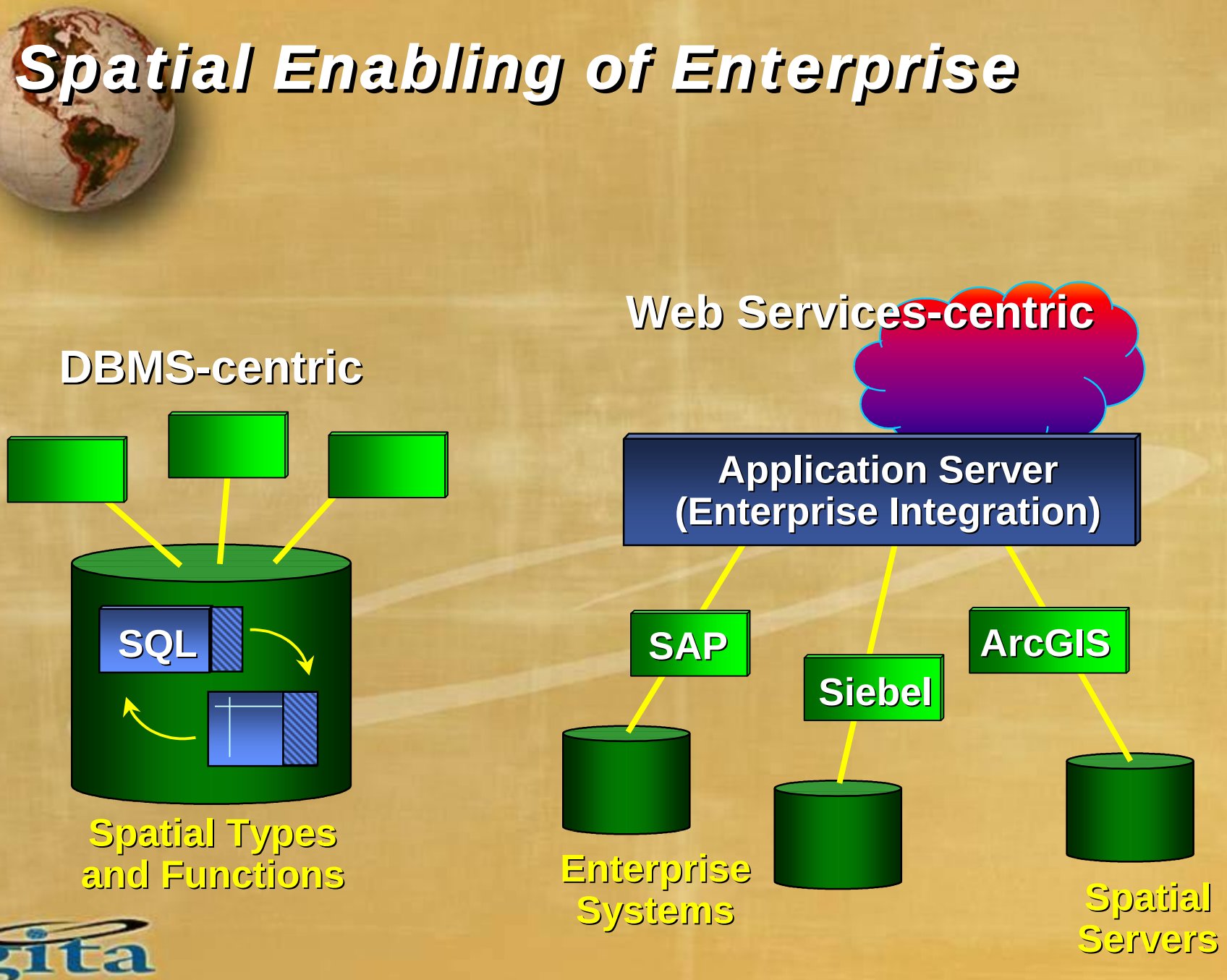
Spatial Enabling of Enterprise



Oracle Launches Product Information Management Data Hub

May 24, 2005

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WRITE TO AN EDITOR

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
nformationWeek

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

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IBM Ships Product Data-Management Tool

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-How business process

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 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 to 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.

Ahead

IBM Ships Product Data-Management Tool

Big Names Keep An Eye On Small Start-Ups

Salary Study 2005

The Keys to Continuous Improvement
-How business process frameworks impact management of people, processes and technologies.

RFID -- Wisdom Of Pilots

Week of April 11: Stephanie Stahl On The Global 50
Week of April 25: The 2005 Salary Survey
Week of May 9: H-1B Visa Programs

3M Ships Product Data-Management Tools

uly 19, 2004

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y TechWeb News
nformationWeek

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

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

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3M plans to deploy Product Center as the central repository underpinning the lectronic product code information services component of IBM's RFID

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By TechWeb News
InformationWeek

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

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.

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- Week of April 11: Stephanie Stahl On The Global 50
- Week of April 25: The 2005 Salary Survey
- Week of May 9: H-1B Visa Programs

Geographic Information Systems (GIS)

- 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

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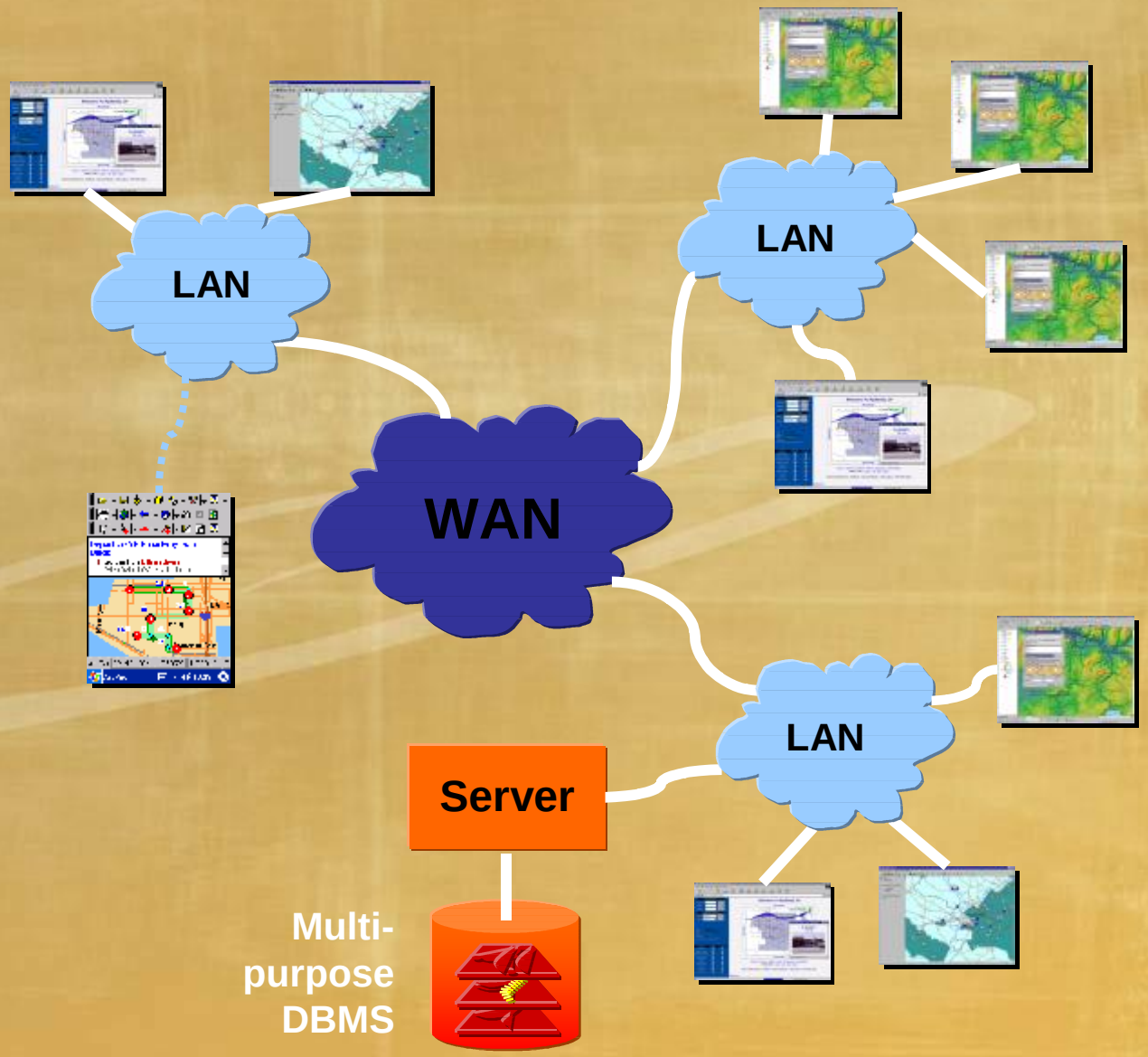
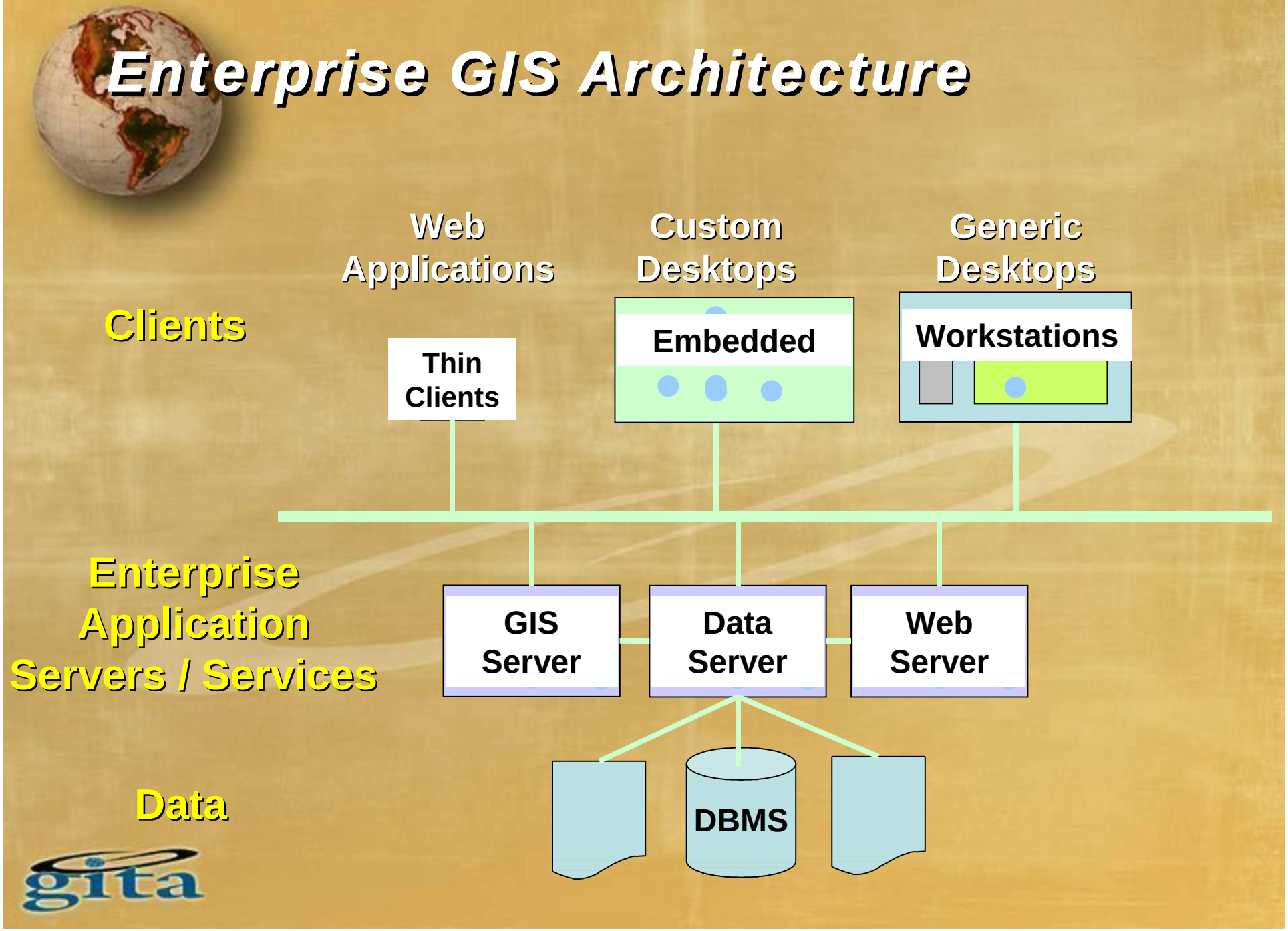
Enterprise GIS Architecture

- Clients
  - Desktop
  - Web
  - Mobile
- Servers
  - GIS
  - Web
  - Data
- Network
  - LAN / WAN
  - Internet



Enterprise GIS Architecture

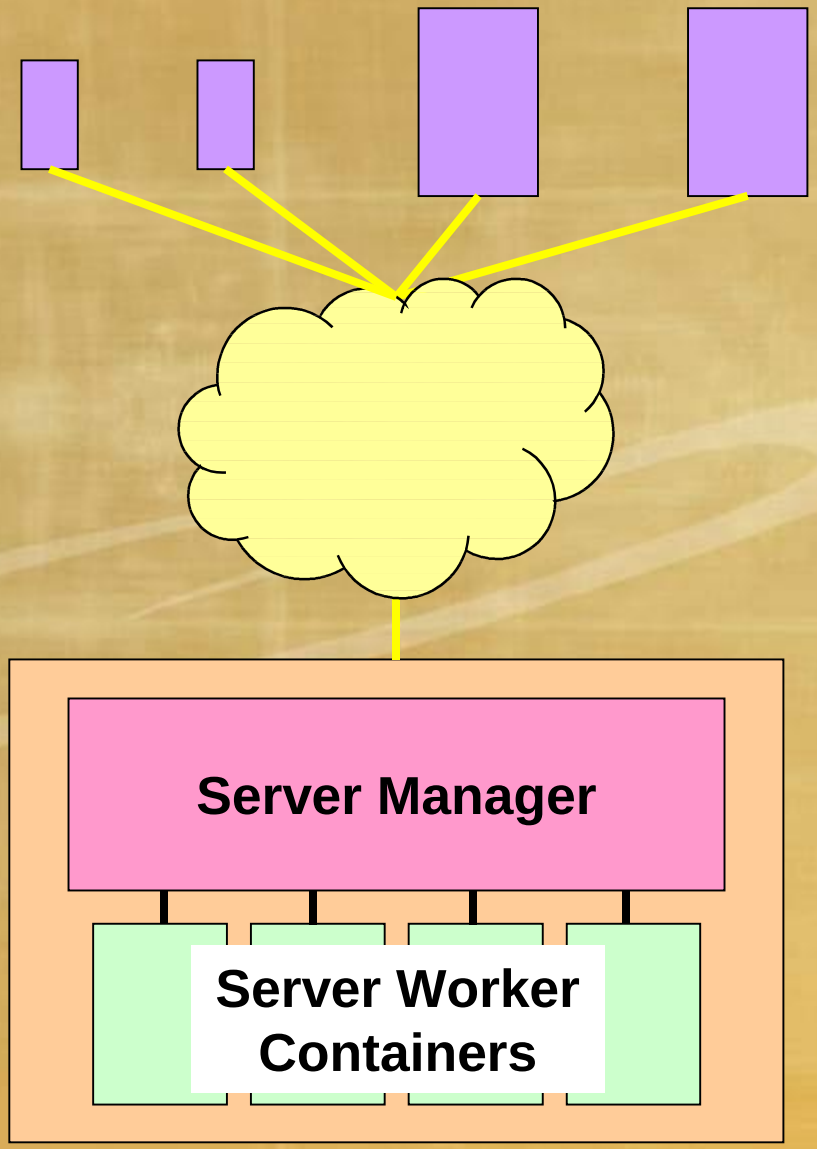


Enterprise Geographic Information Server

Thin and Thick Clients

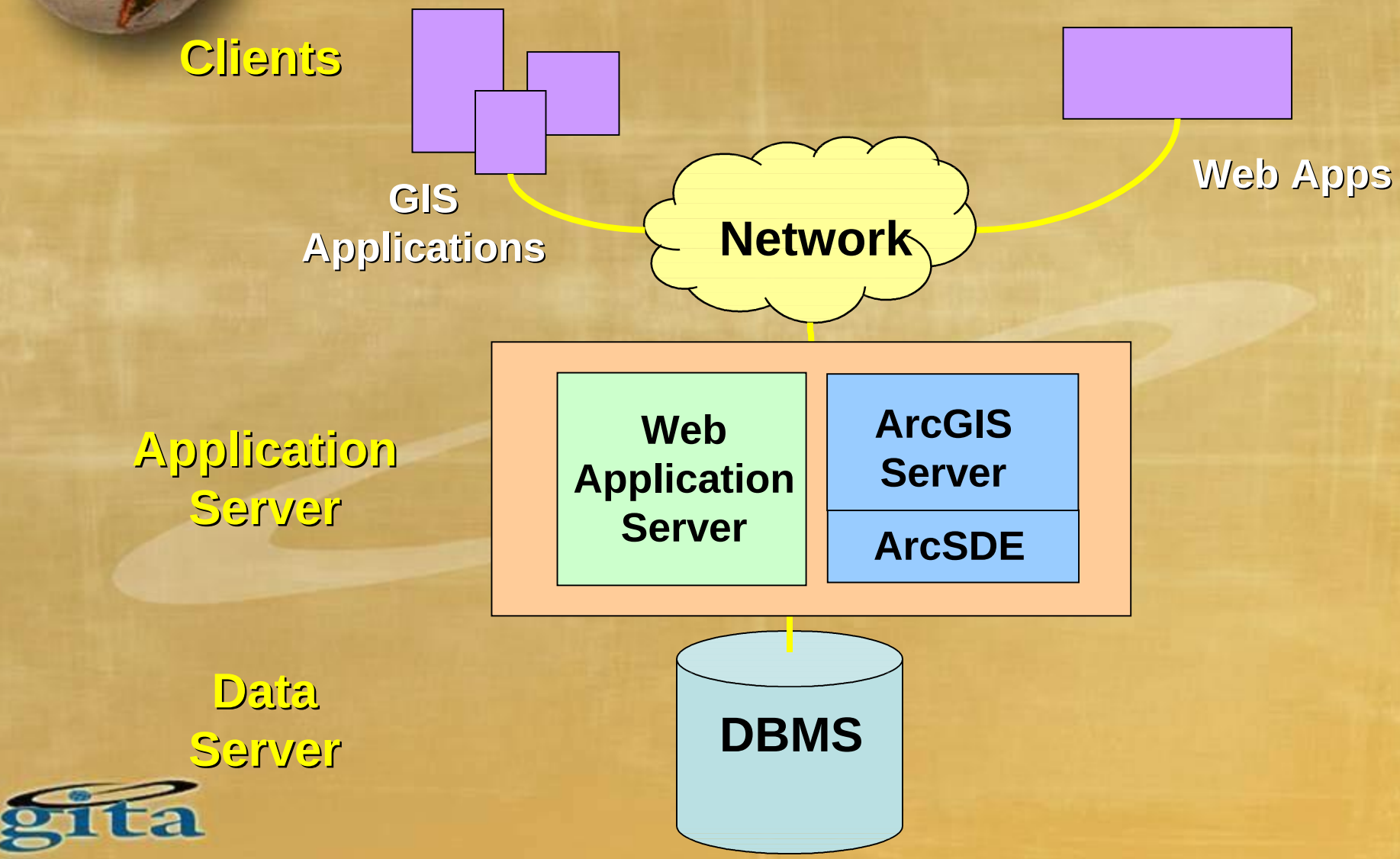
Network

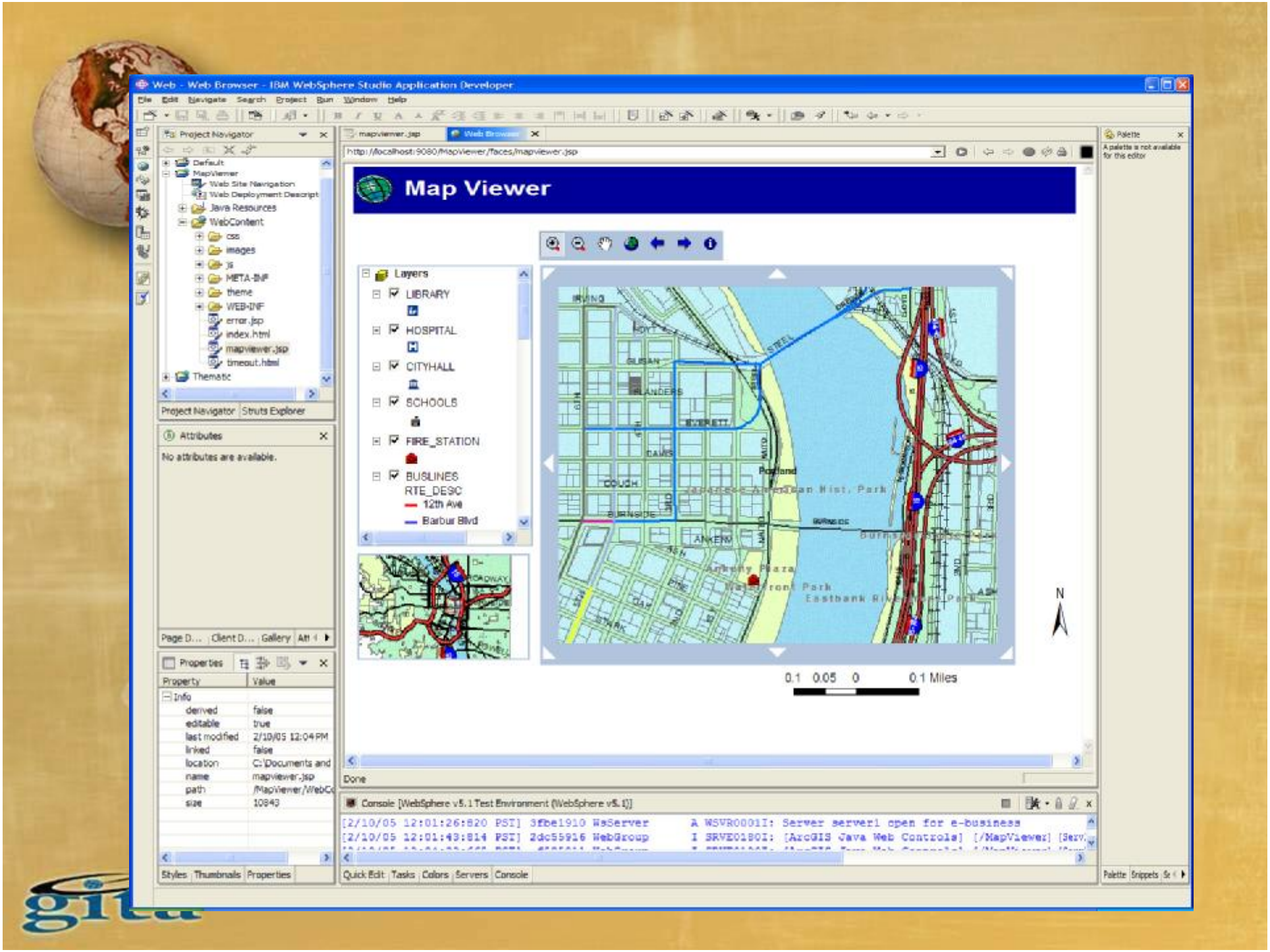
Enterprise Geographic Information Server



Enterprise GI Server

Technology Components




Web - Web Browser - IBM WebSphere Studio Application Developer
Map Viewer
Layers
LIBRARY
HOSPITAL
CITYHALL
SCHOOLS
FIRE_STATION
BUSLINES
RTE_DESC
12th Ave
Barbur Blvd
0.1 0.05 0 0.1 Miles
N
Done

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

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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

CenterPoint Energy

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

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Geospatial One-stop II
Moving into IT Mainstream

Business Challenge:

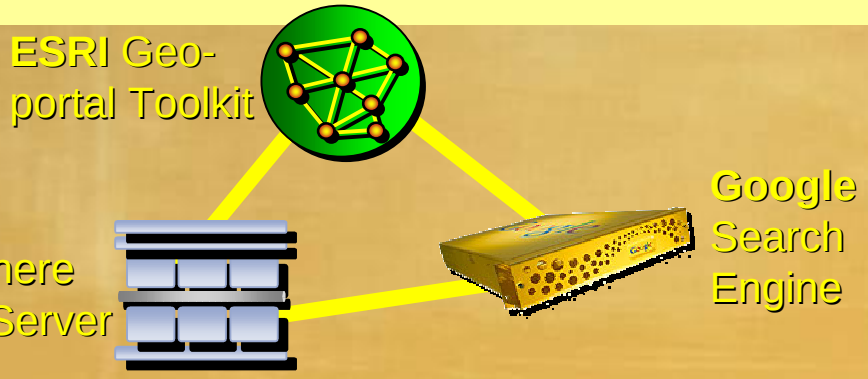
- Continue momentum of e-gov initiatives
- Lack of data major constraint on GIS use in government
- Major duplication and redundancy
- Need to invest in secure IT-based platform infrastructure

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