FIG Seminar on
e-Land Administration
Innsbruck/Austria

2-4 June 2004

"ESRI's Experiences and Directions in National Portals"

Kevin Daugherty
Cadastral/Land Records Manager

ESRI

Topic Points

- Technology
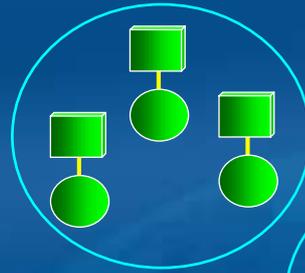 - GIS
  - Portal
- Process
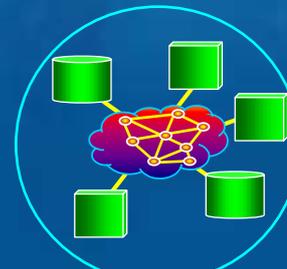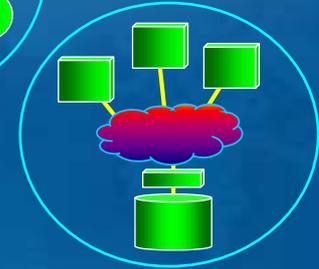- Results

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GIS Technology

GIS Configurations

Common Architectures
- GIS Desktops
- Departmental Systems

Emerging Enterprise Technologies
- Shared Database Servers
- Centralized Application Servers
- Distributed Servers Integrated With Web Services

Evolving GIS Technologies
# Will Improve Implementations

- Intelligent GIS
- Web Services
  - GIS Services
  - Networks
  - GIS Portals
- Distributed GIS
  - Server
  - Embedded
  - Desktop
  - Mobile

- Component Software
- New GIS Functionality
  - Geoprocessing Models
  - Global Visualization
  - Cartography & Labeling
  - Image Integration
  - Real Time
  - Mobile GIS/LBS
- Interoperability

GIS Is Becoming More Intelligent
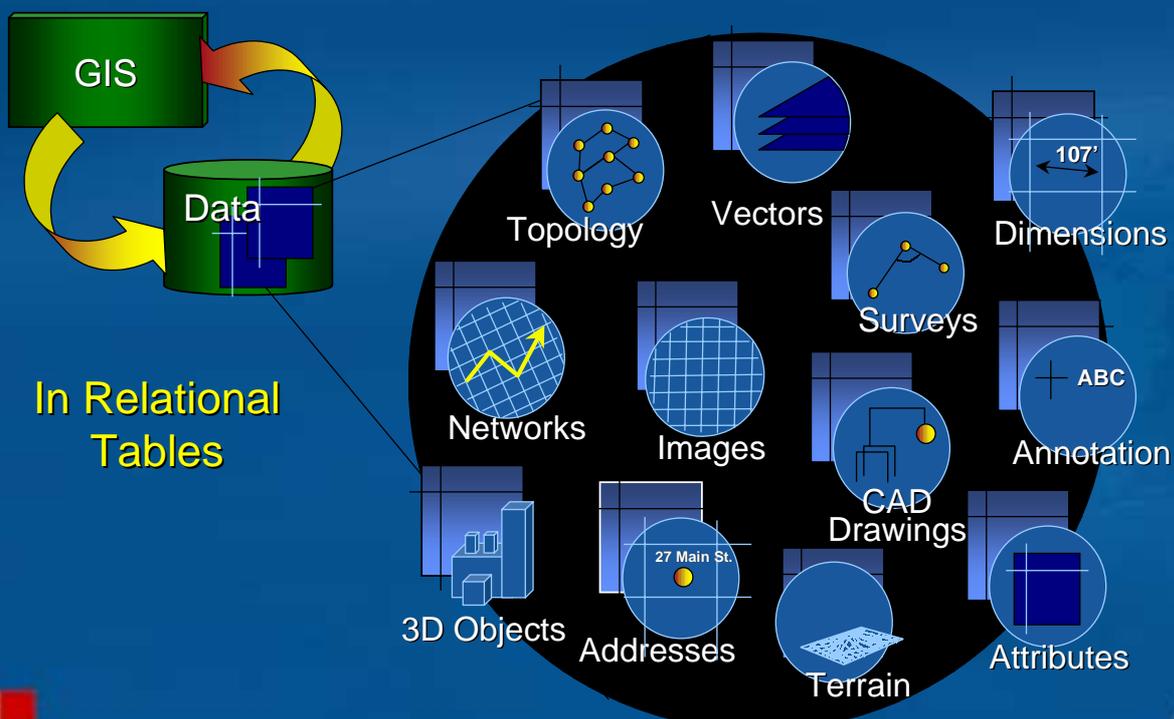
Managing Datasets, Workflows …
… In a Common Environment

…Encapsulating
Five Basic
Elements

GIS Software

Maps &
Globes

Models

Data
Models

Geodata

Metadata
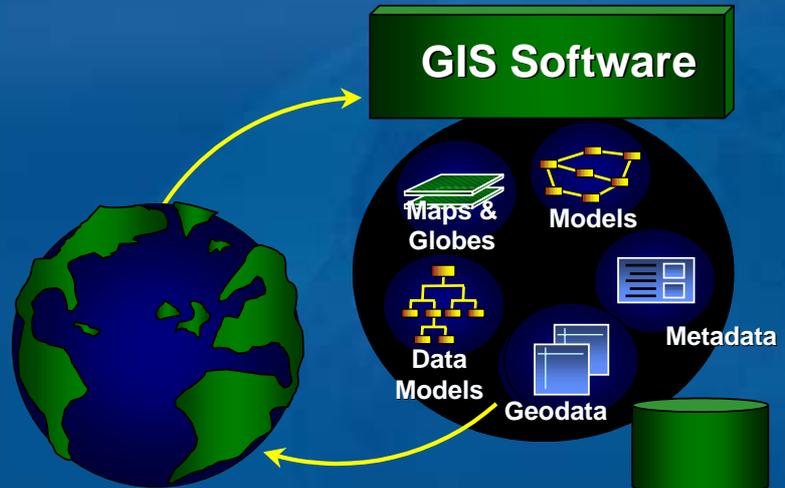
…Abstracting Geographic Knowledge

The Modern Geodatabase Supports All
The Generic Spatial Data Types

GIS

Data

In Relational
Tables

Topology

Vectors

107'

Dimensions

Surveys

Networks

Images

ABC

Annotation
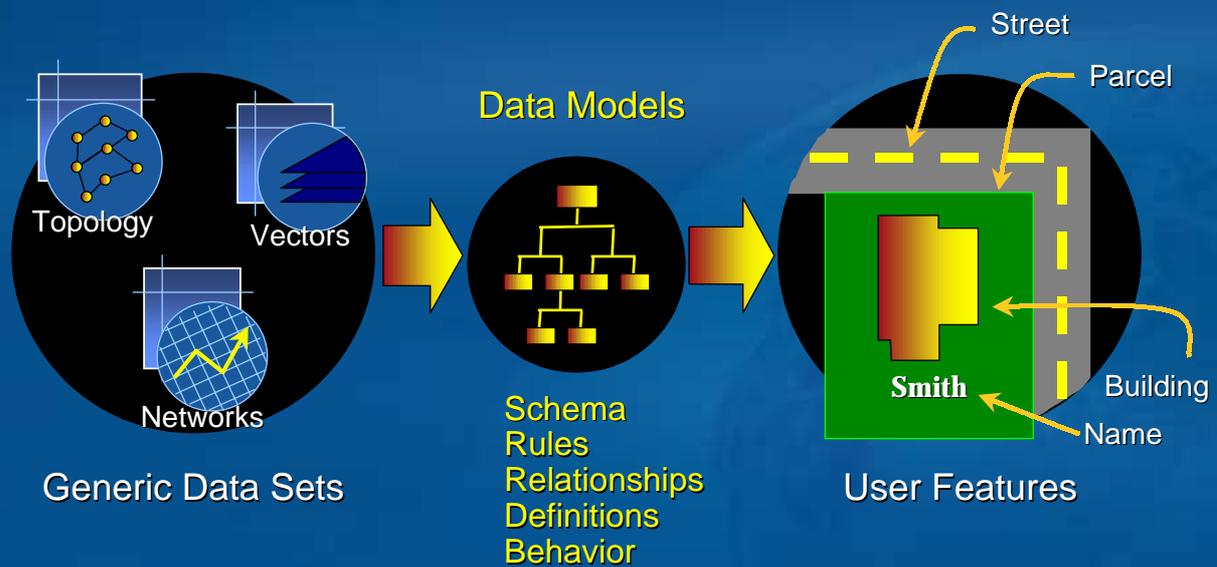
CAD
Drawings

3D Objects

27 Main St.

Addresses

Terrain

Attributes

With Rules That Define Relationships and Behavior

"Intelligent" Features Are Maintained
Using Data Models . . .

Data Models

Topology

Vectors

Networks

Generic Data Sets

Schema
Rules
Relationships
Definitions
Behavior

Street

Parcel

Smith
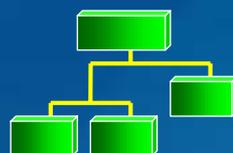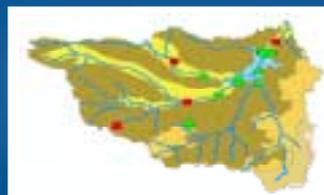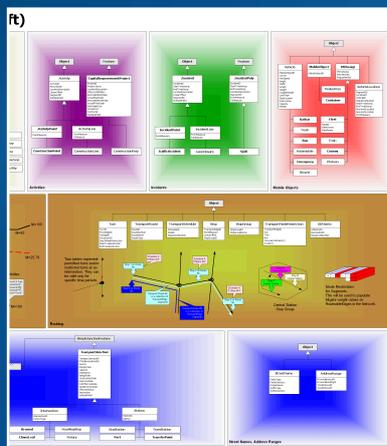
Building

Name

User Features

. . . Creating More Usable Information

Thematic Data Models Extend
# Generic Data Models

Implementation Templates

- Petroleum
- Pipeline
- Marine

- Administrative Boundaries
- Hydrology
- Water/Wastewater
- Land Parcels
- Utilities
- Transportation
- Environmental Facilities
- Biodiversity
- Forestry
- Defense
- Base Map
- Addresses
- Geology

. . . Built In Collaboration With User Community. . .
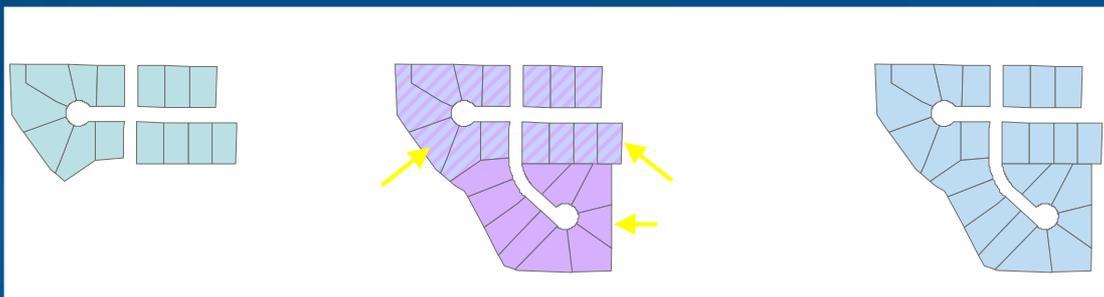## Encapsulating Expert Knowledge. . . Jump Starting Projects
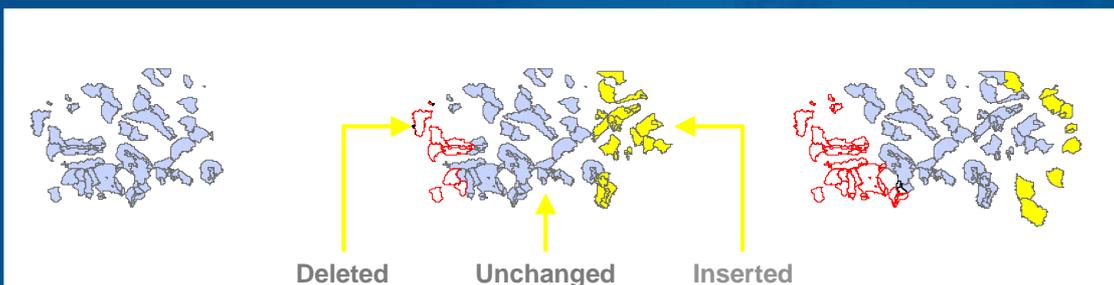
Geodatabase Manages Change

Long Transactions
History
T1 → T2 → T3
Base
Changes
Multi User Editing
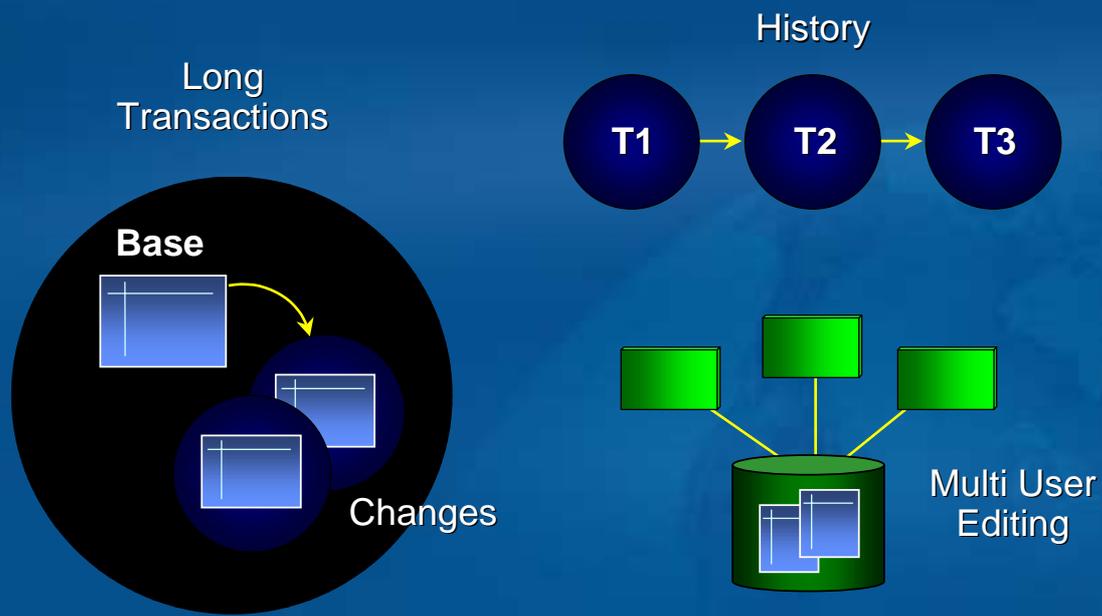
. . . With Versioning

Geodatabases Manage Change
Transaction Models

Multi-user editing

Deleted   Unchanged   Inserted
Historical Archive

Geodatabase Manages Distributed Data

Disconnected Editing

Multiple Replication

Editor

National

State
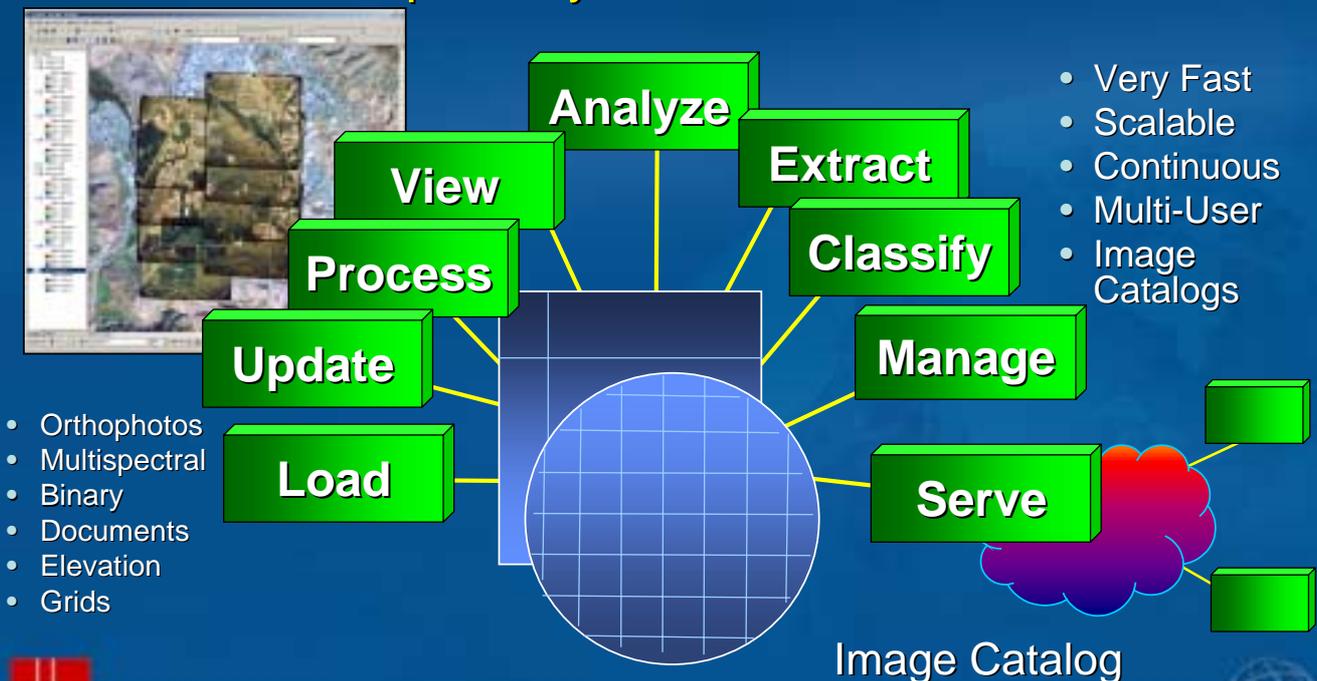
Local
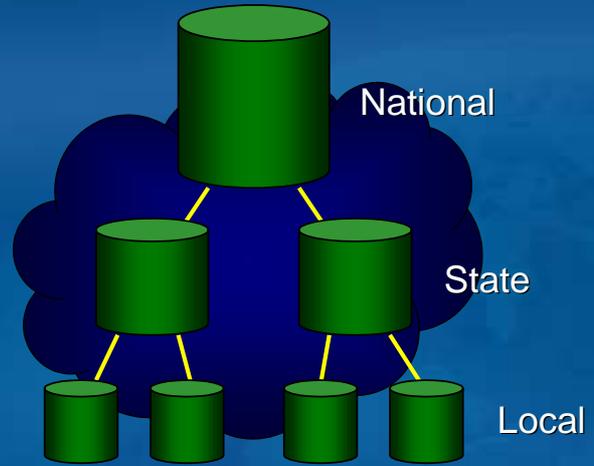
. . . Using a Multi-State Database

The Geodatabase Provides The Base For an Image Information System

A Complete System for Raster Data

Analyze

View

Extract

Process

Classify

Update

Manage

Load

Serve

- Very Fast
- Scalable
- Continuous
- Multi-User
- Image Catalogs

- Orthophotos
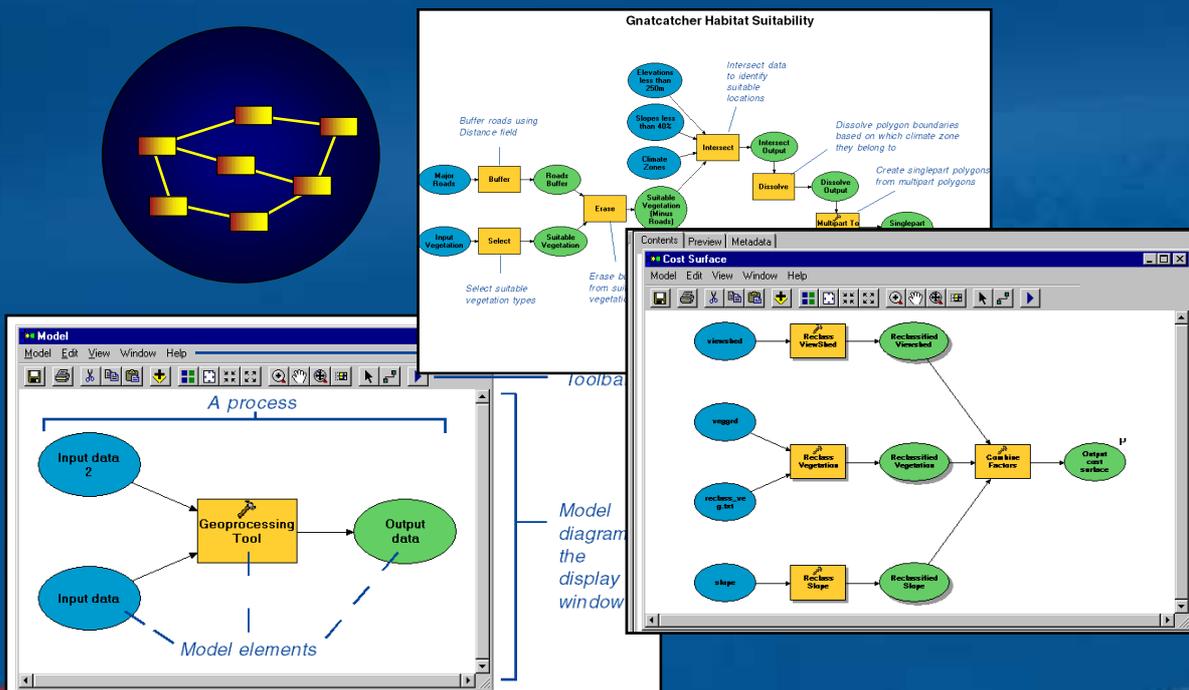- Multispectral
- Binary
- Documents
- Elevation
- Grids

Image Catalog

. . . For Large Multi-User Environments

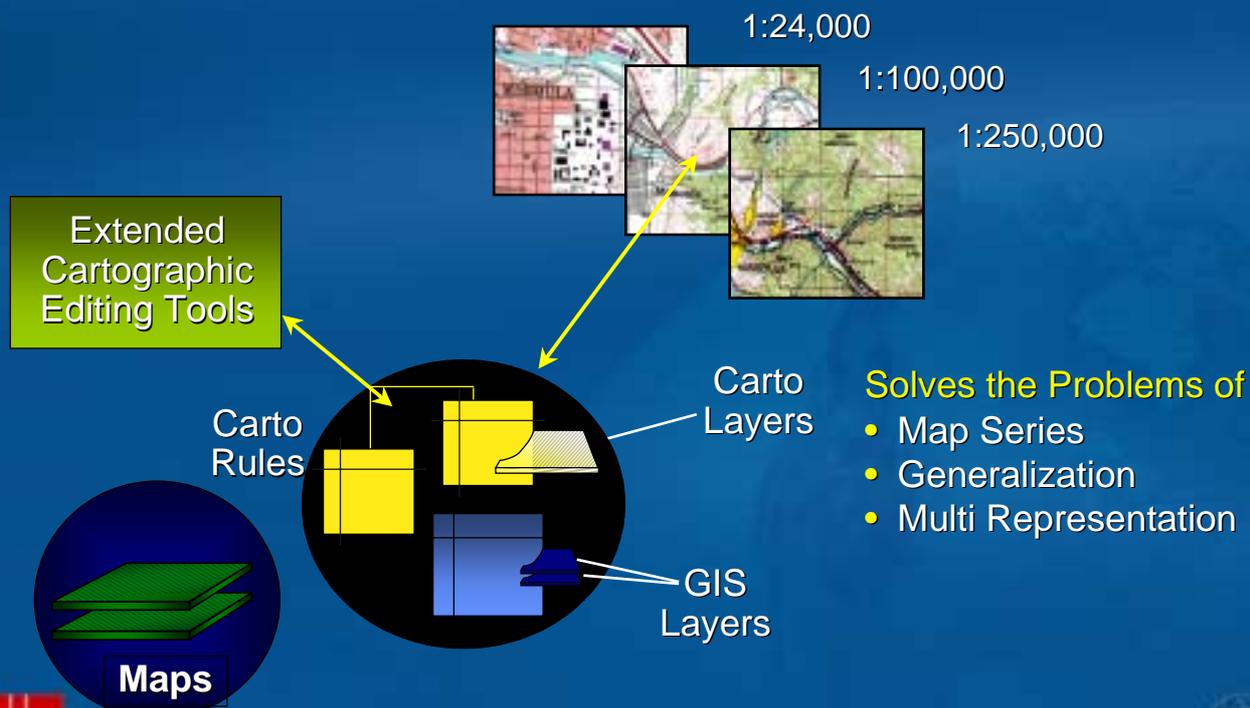# Geodatabase Encapsulates Models
– Best Practices and Applications

. . . Sharing Geographic Knowledge

Geodatabases Will Manage Maps
Database Cartography

1:24,000

1:100,000

1:250,000

Extended Cartographic Editing Tools

Carto Rules

Carto Layers

GIS Layers

Maps

Solves the Problems of
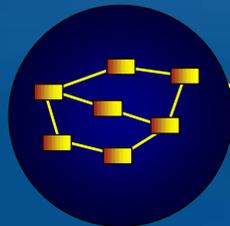- Map Series
- Generalization
- Multi Representation

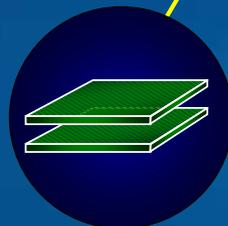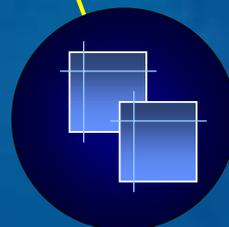**A New Approach for Production Cartography**

Geodatabase Manages Metadata

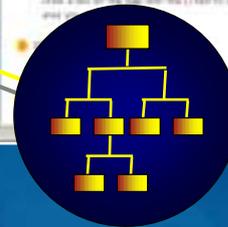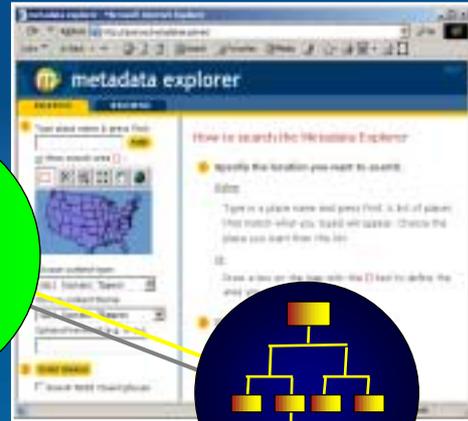**Documenting and Describing**

Workflow Models

Maps (Services)

Data Sets

Data Models

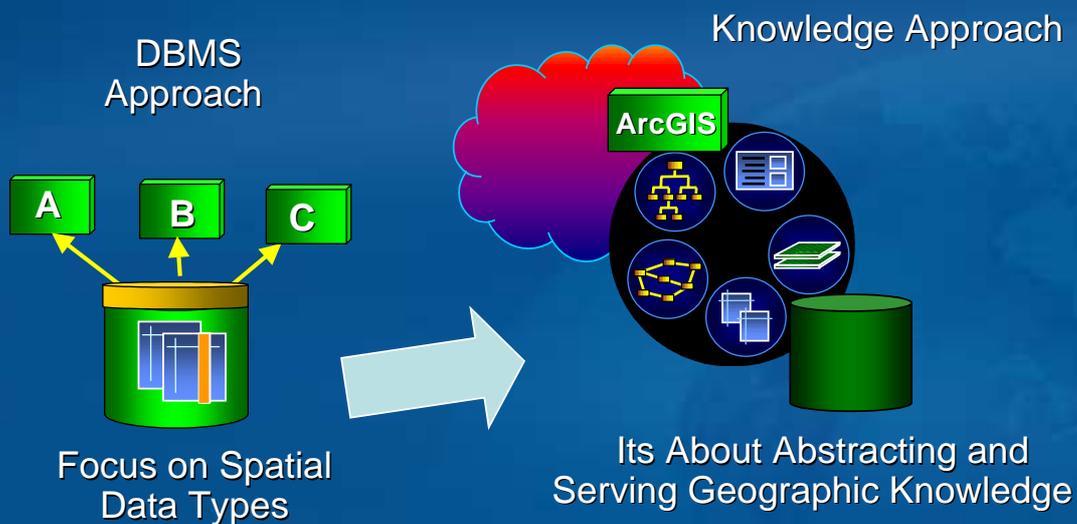. . . Geographic Knowledge

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Intelligent GIS (Geodatabase) Is A New Approach

It's More Than Just Data And Tools….

DBMS Approach

Knowledge Approach

ArcGIS

A B C

Focus on Spatial Data Types

Its About Abstracting and Serving Geographic Knowledge

. . . Focus Is On Managing Geographic Knowledge

Interoperability is Important

But there are many standards . . .

XML/SOAP

GIS Server

DBMS Integration

Web Services

Direct Read (API)
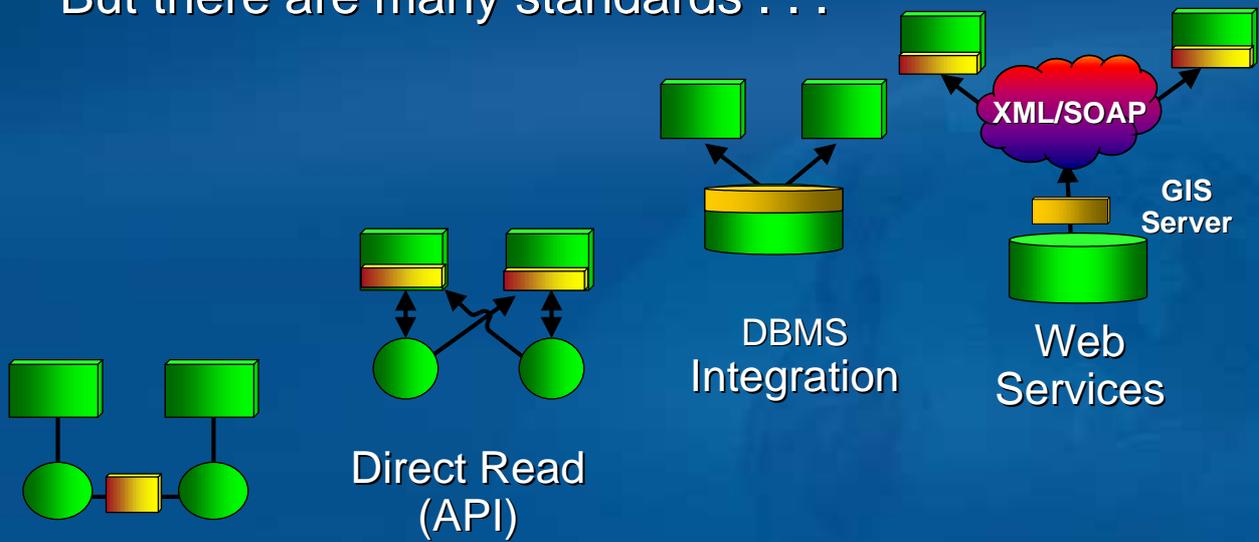
Conversion

. . . So focus on simple and practical approaches that work

Two Design Options

Web Services Centric

DBMS Centric

Application Server (Enterprise Integrity)

ERP

CRM

GIS

SQL

Spatial Types and Functions

Enterprise Systems

GIS Services

Add Spatial Servers
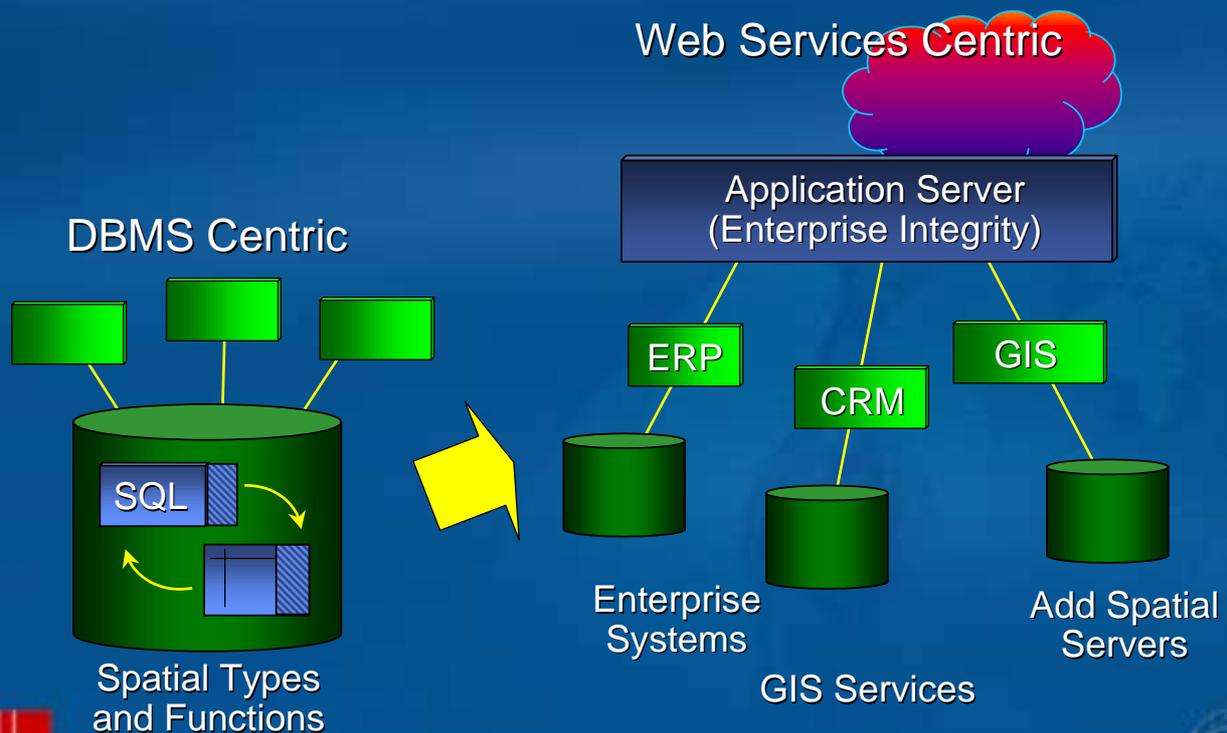
Technology Transforms GIS

Distributed Networks

Client /Server Systems

Tools & Data

Professional Productivity

Information Management

Shared Services

. . . Web Services Provide A New Platform
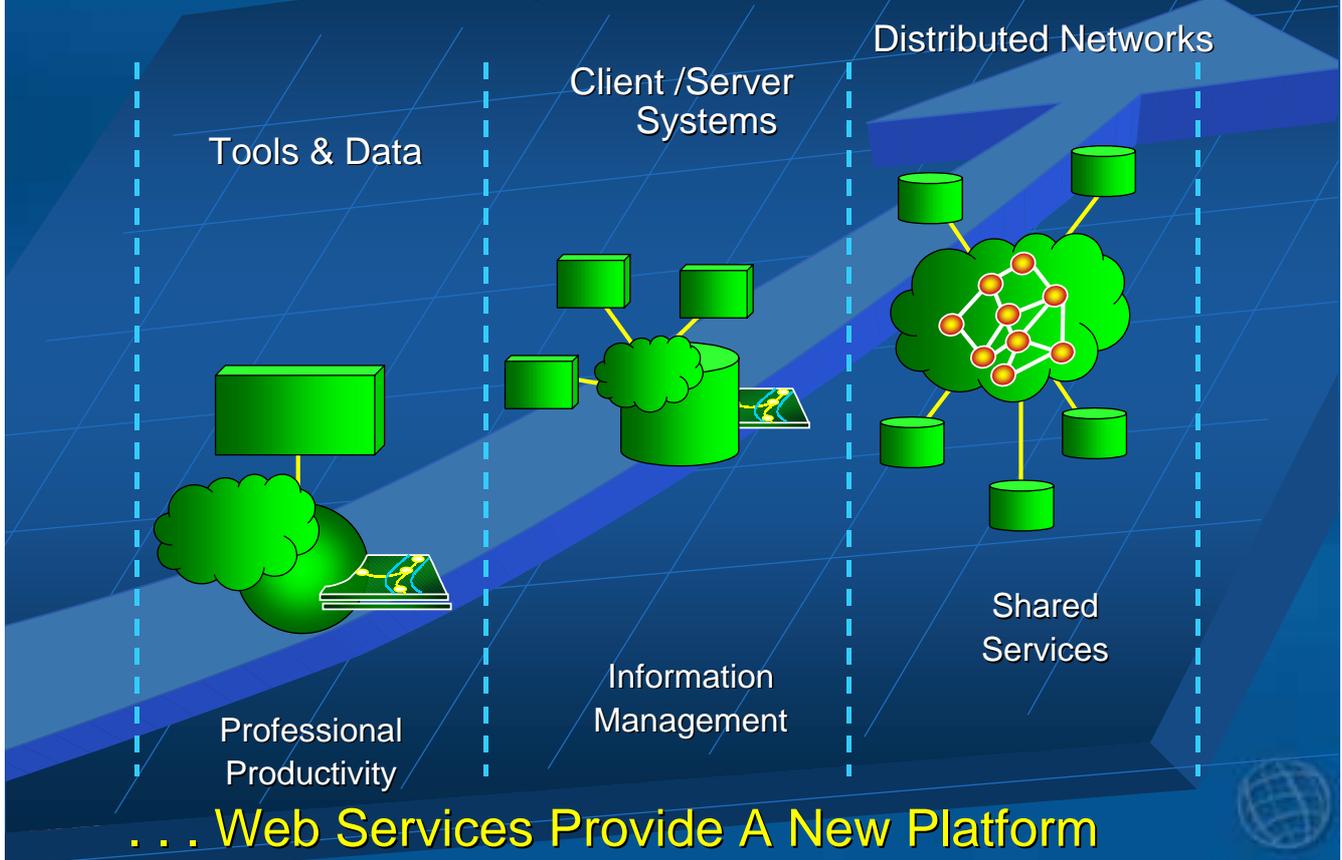
Web Services Provide

A System of Open and Interoperable Protocols
. . . XML, SOAP & UDDI

GIS Portal

Metadata

Web Services

Services

Users
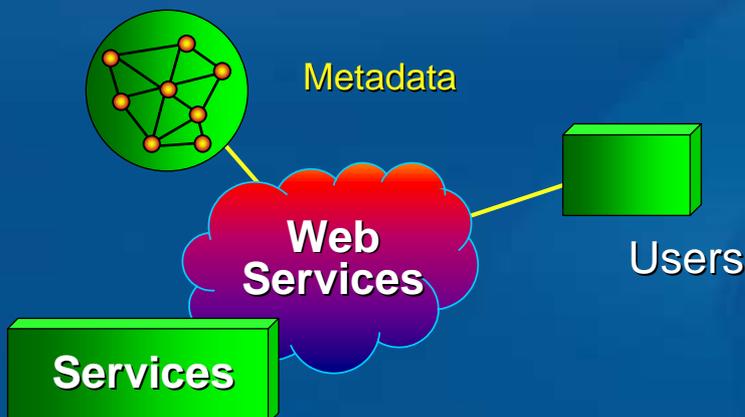
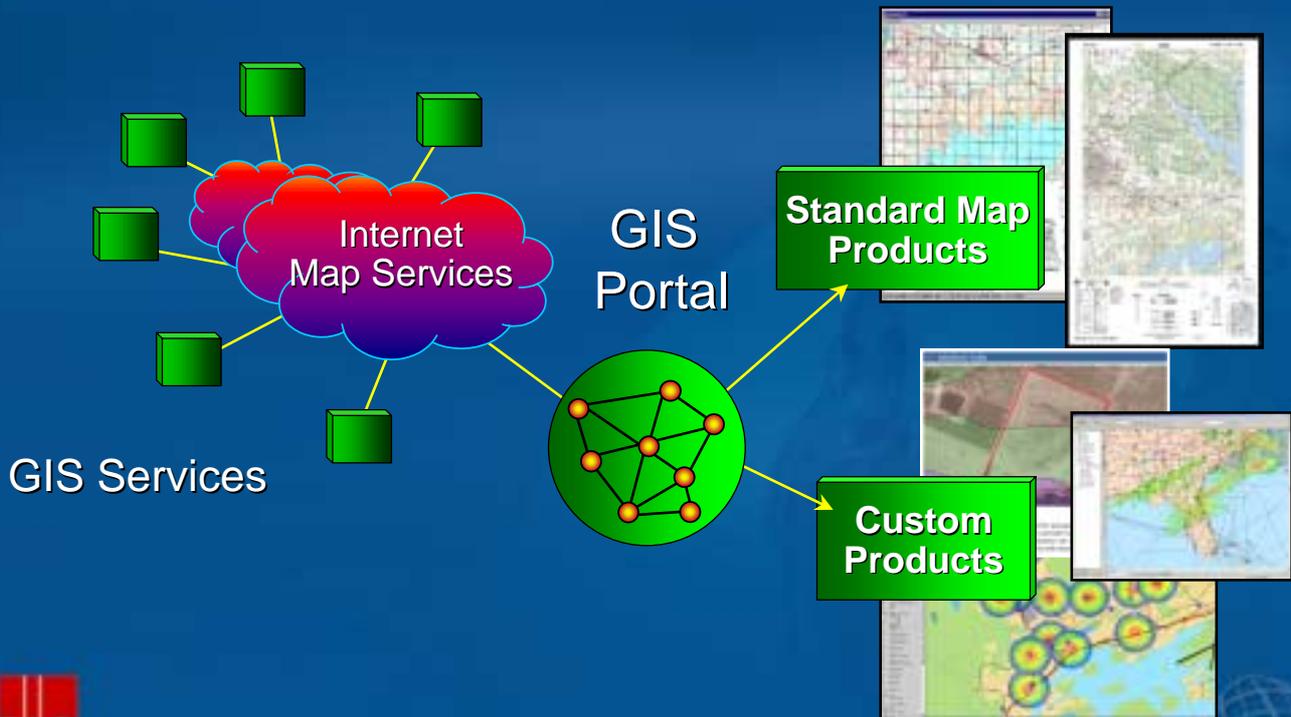- Many Clients
- Many Servers
- Meta Data Portal
- Loosely Coupled Network

. . . Network Centric

Web Services Provide A New Architecture For GIS

Internet Map Services

GIS Portal

GIS Services

Standard Map Products

Custom Products

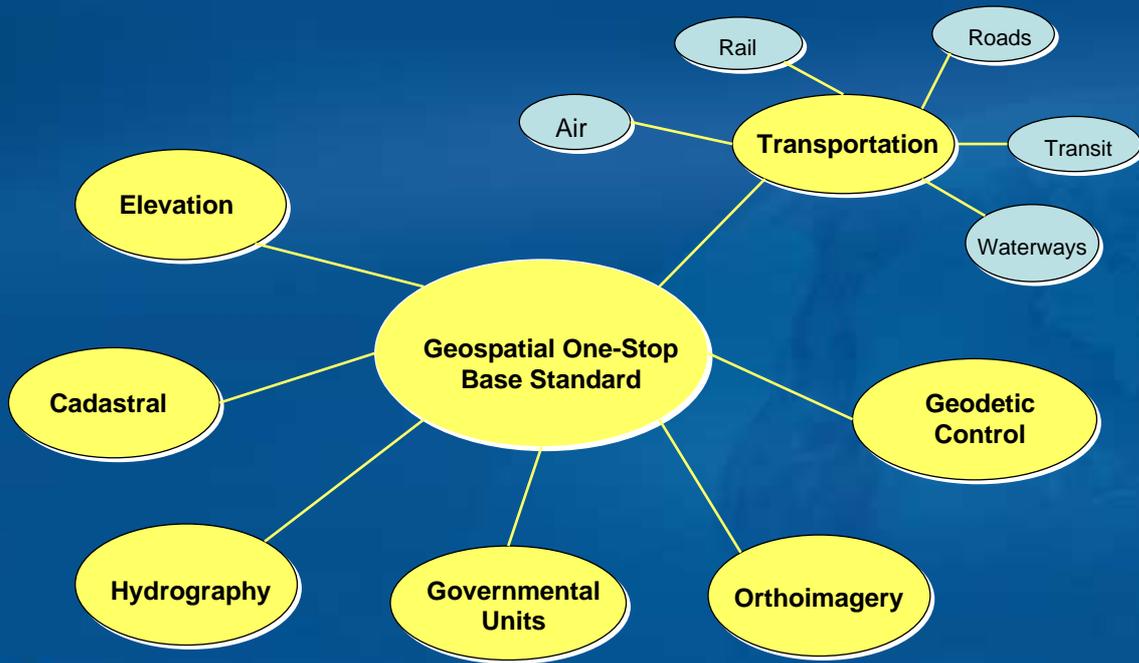**. . . They Dynamically Integrate Many Distributed Services**

Portal Configuration

- Distributed Data and Services
- Federated Model

National, State, Local, & Private Users

Search Catalog and Find

Connect and Use

Download and use

GIS Portal

Publish GIS data and services

Document in catalog

GIS Web Services Portals

Data Servers

FTP

GIS Data

GIS Data

GIS Data
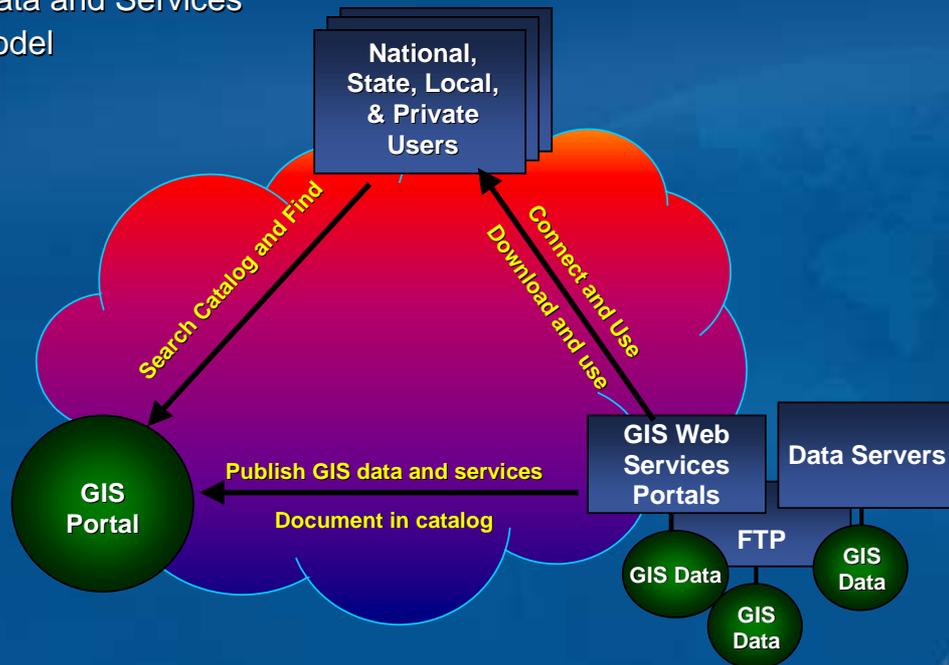
Framework Data

Building a Portal

Portals have a purpose

- Obvious compelling need
  - Leadership facing public pressure
- Based on perceived need
  - Government agencies share geography
  - All agencies impacted by an event
  - Need to coordinate planning and response

Key Steps

- Have a champion
- Identify stakeholders
- Work with key organizations – the rest will follow
- Build a data warehouse – "sharehouse"
- Make it objective driven
- Focus on framework – other geography layers will follow
- Utilize Standards – db design, normalize data, naming conventions, etc.

Getting it started

- Bring organizations together
  - Neutral party/facility
  - No jurisdictional conflict
  - All need to inform and respond public

Build Consensus

- Events, natural occurrences, people - don't always follow administrative boundaries
- Multiple jurisdictions - singular problem solving
- Common operational picture
- Portals based upon geography is the only way to address the issues

Portals Make Government
A Community – As Part of the Community

…coordinated, collaborative decision making, with Citizen access.

F|G

Concerns? – Of Course

- Open Access to $\longleftrightarrow$ • Privacy/Security
  Public Domain Data
- World Wide Web $\longleftrightarrow$ • Hackers, Viruses,
  Worms, Spam
- Vendor versus Open $\longleftrightarrow$ • Vendor versus
  Vendor
- North America – $\longleftrightarrow$ • 100+ Standards
  Europe - Asia

F|G

Results are Successful

- India – http://gisserver.nic.in/nsdiportal
- Europe – http://eu-geoportal.jrc.it
- United States – http://www.geodata.gov
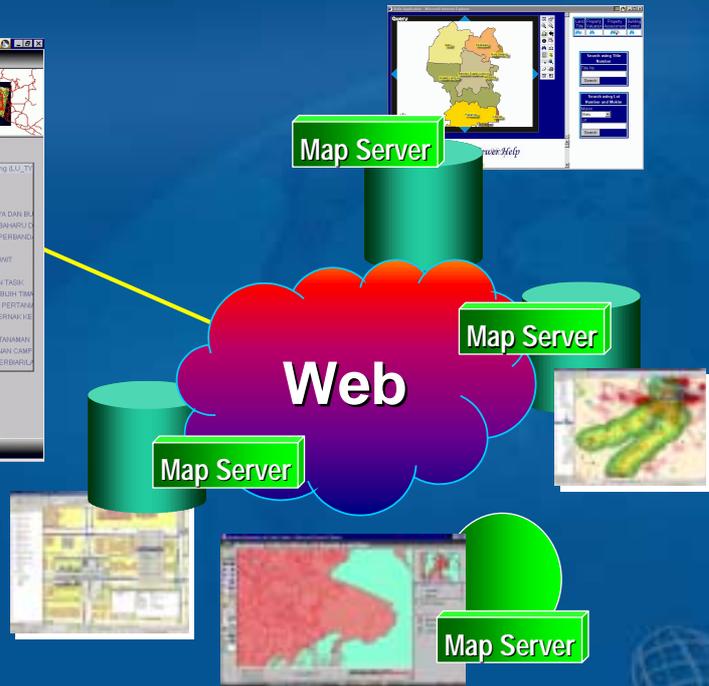- Nat'l Land Agency – www.nla.gov.jm

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National Land
Information System Malaysia
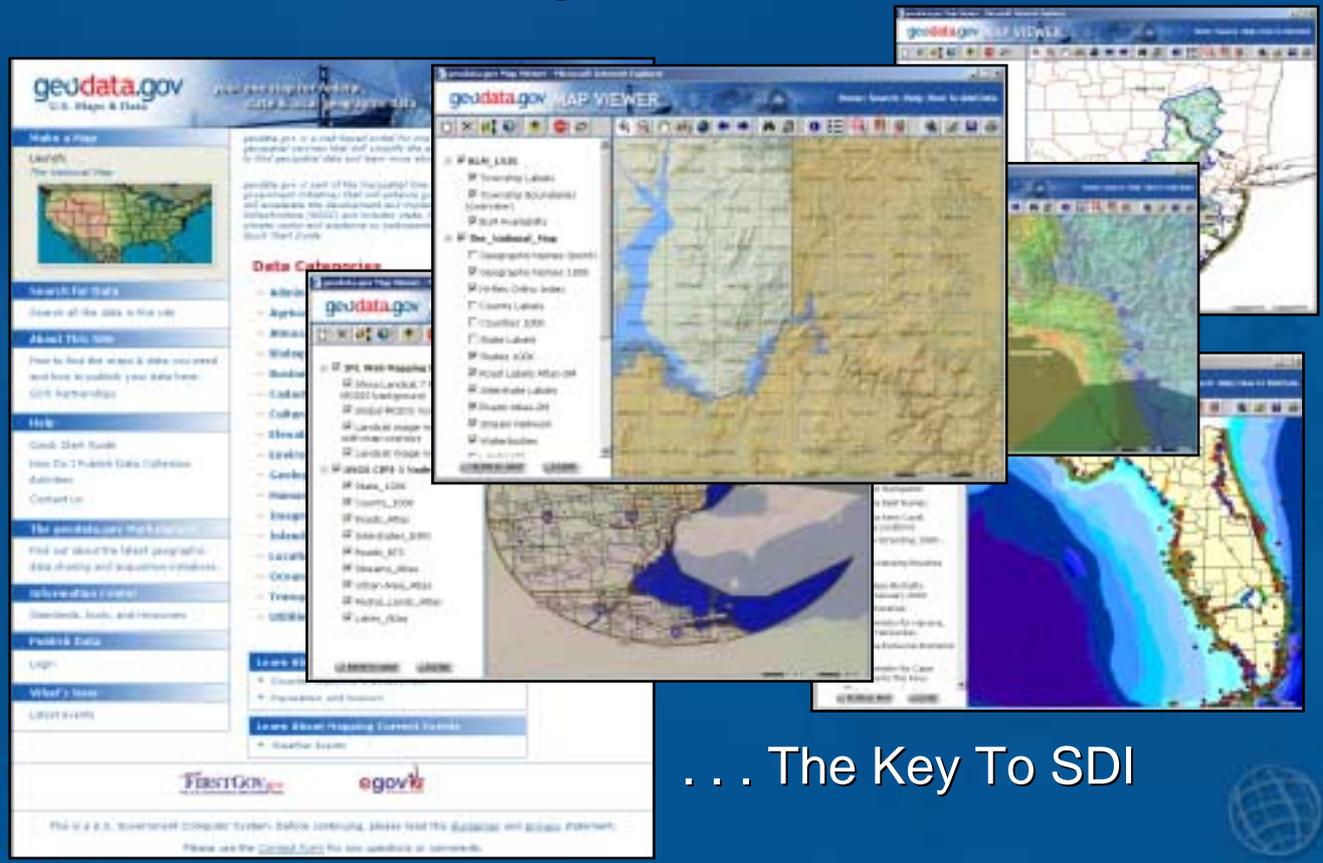
National Land Information System Distributed GIS
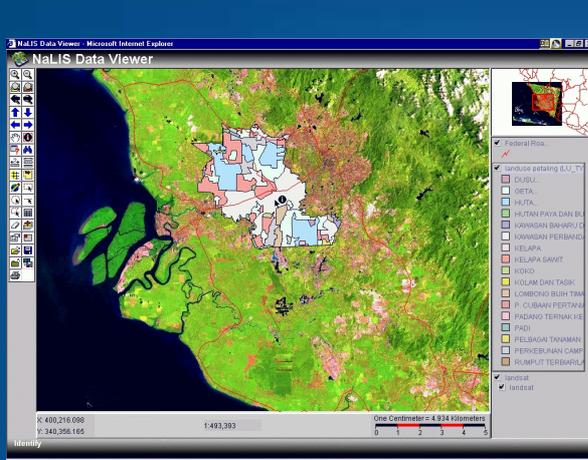
National Land Information System Europe

Portals Integrate Web Services

. . . The Key To SDI

National Land Agency

There are successes out there!

"A successful person is one who can lay a firm foundation with the bricks that others throw at him."
- *David Brinkley*

There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order to things.

N. Machiavelli

My play was a complete success. The audience was a failure.
-Anonomous