Innovative Technology Serving Cadastre

New Developments at ESRI

Kevin Daugherty
FIG Commission 7
Annual Meeting
Seoul, Korea 2007

Contents

- GIS has many applications
- Technology for Cadastre and Land Administration
- Integration Technology
- Modeling
- New Technology Results in Innovative GIS Architecture
- Server Based
- Services

Applications Provide The Evidence

. . . . Of The Increasing Value of GIS

Map Books

Damage Assessment

Data Management

(Transactions Editing)

Ad Hoc Mapping

Spatial Analysis

Consistency

Integration

With CAMA

Citizen Inquiry

Workflow Efficiency

Visualization

Accountability

Fair & Equitable Valuation

Automated Appraisals

Legal Notification

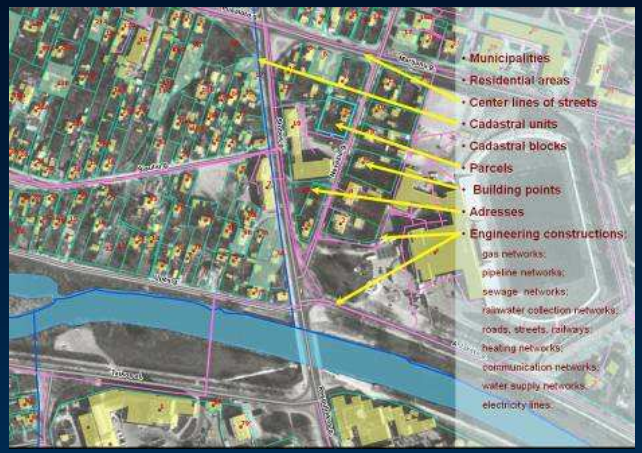
Change Monitoring

Complex modeling

Integration is Becoming Understood and Easier

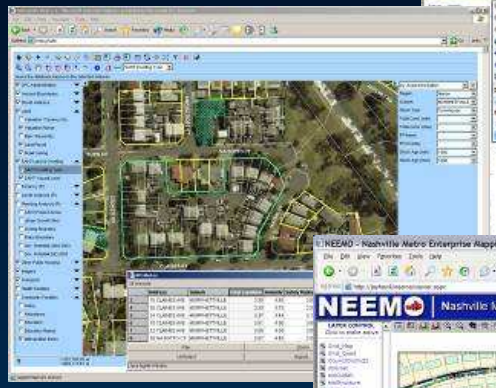
Land Information Systems

Comprehensive Land Registry



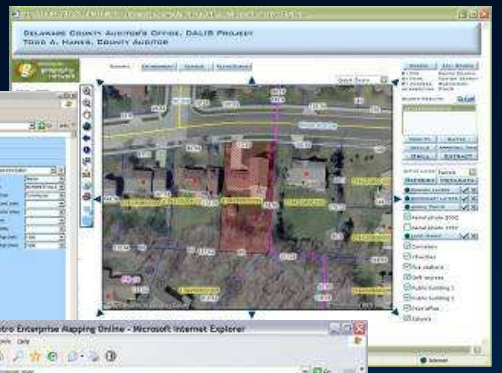
Lithuania

Cadastral Records

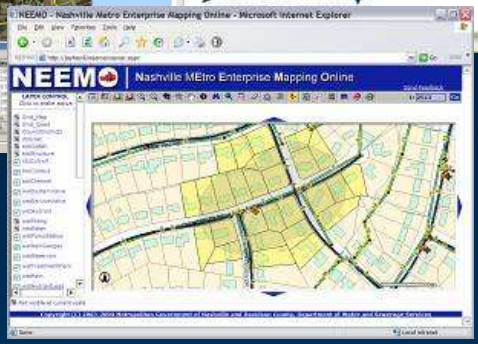


Adelaide

Public Access



Ohio

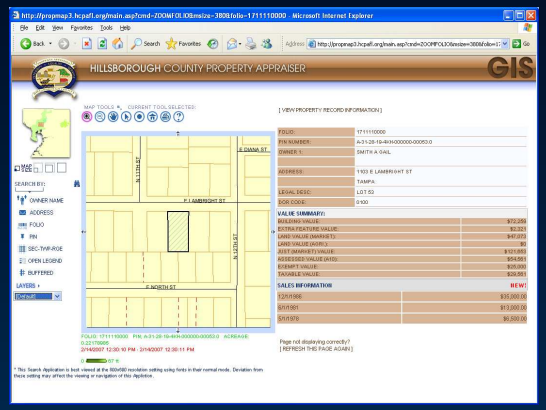


Nashville, TN

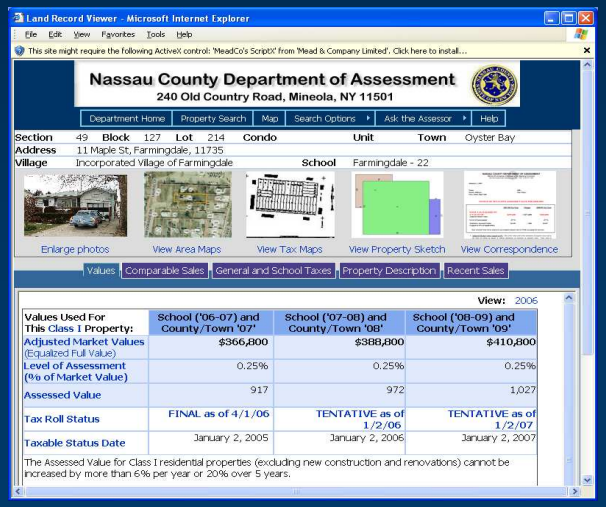
Government Lease Management

USA

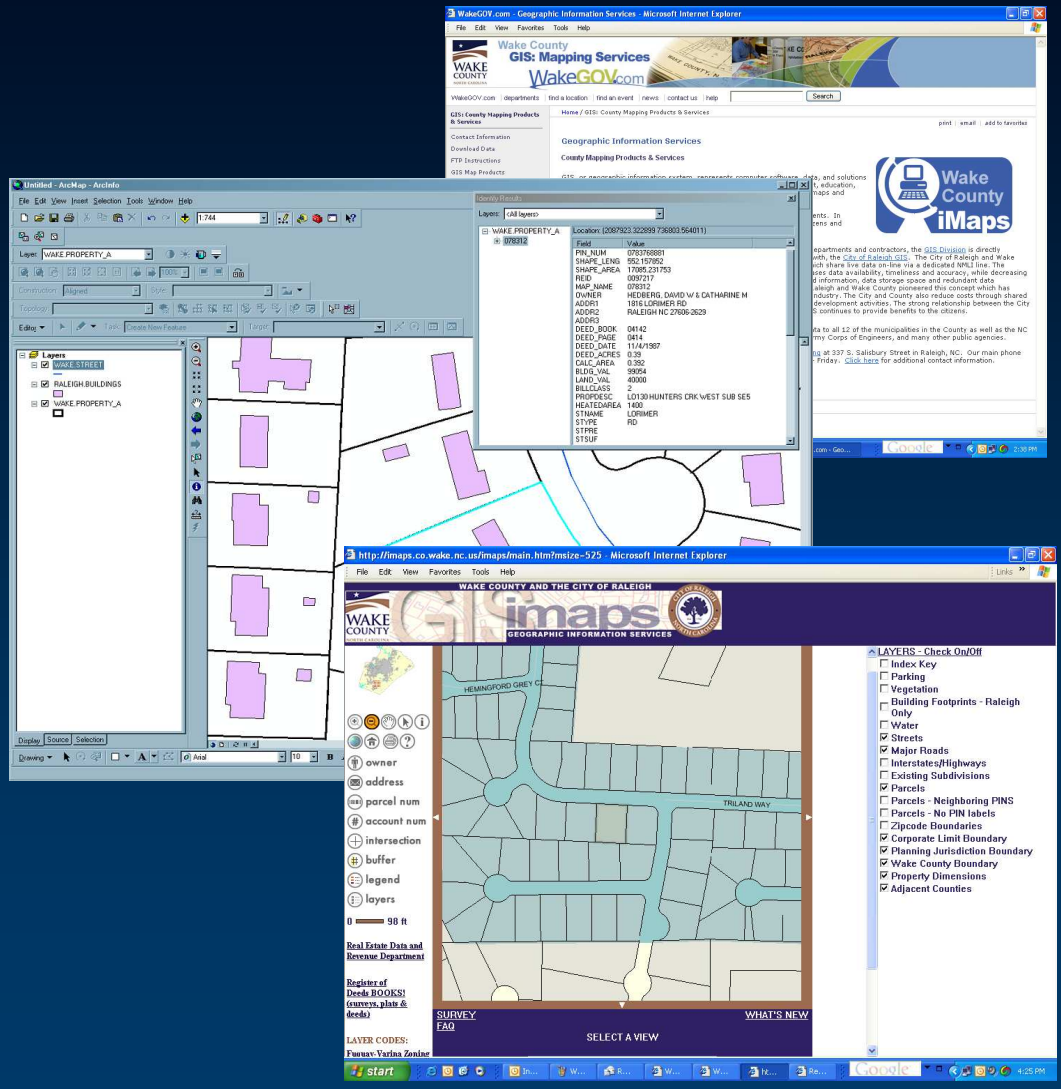
Citizen Access – Via Web



Hillsborough County



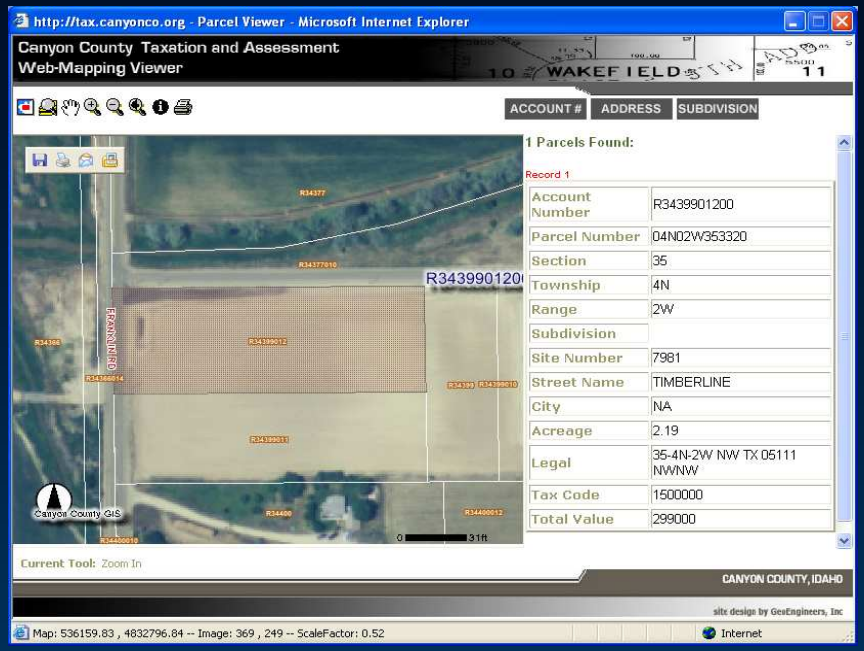
Nassau County

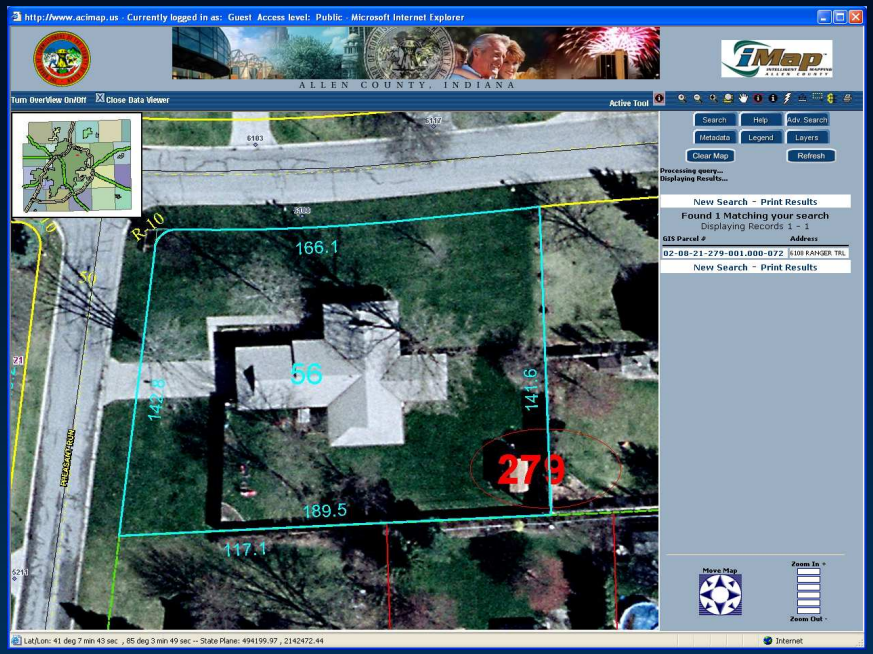


Wake County

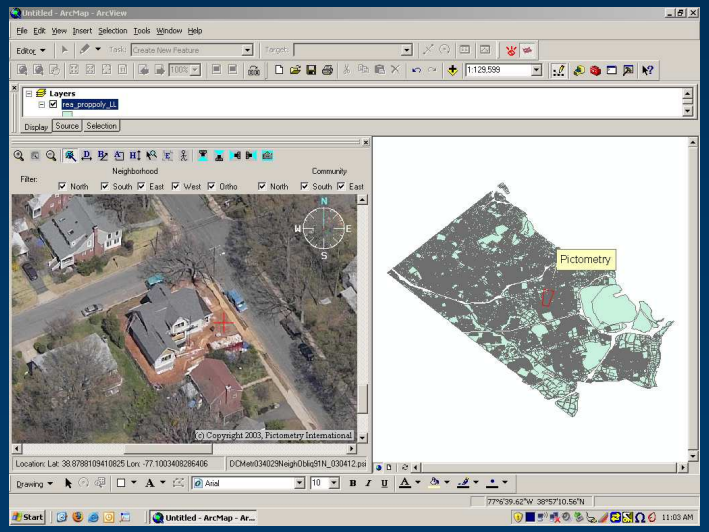
Online Search, Reporting and Map Generation

Integration with Aerial Photos

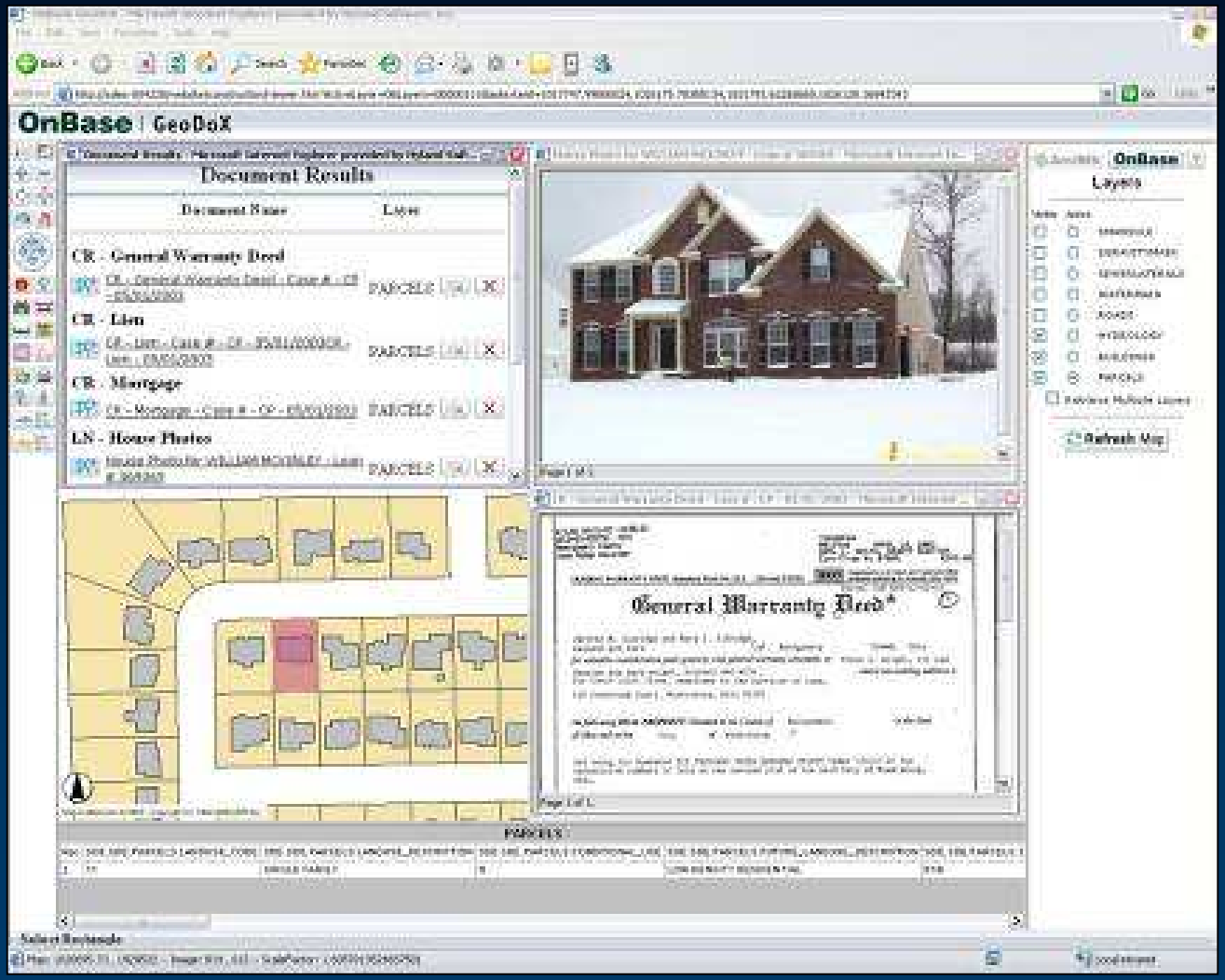




Oblique Imagery



Integration With Document Management



Updating Using Mobile GIS

Automated Notice of Valuation

Cindy Domenico
Boulder County Assessor
Mailing Address
P.O. Box 471
Boulder, CO 80306-0471
www.boulderassessor.org

2005 NOTICE OF VALUATION

Residential Property

May 1, 2005

Office Location
1325 Pearl Street, 2nd Floor
Boulder, CO 80302
Phone: 303-441-4830
Fax: 303-441-4996
Office Hours: 8:00 - 5:00, Mon-Fri

**********AUTO**5-DIGIT 80303

OWNER NAME
MAILING ADDRESS
CITY STATE ZIP

Location & Legal Description

STREET ADDRESS

LOT 54 BLOCK XX KEEWAYDIN MEADOWS

STR: 04 1S 70 **Tax Area**: 0010 **Nbhd**: 148

PROPERTY DESCRIPTION

Land: 1 Lot(s)

1972 1 STORY - RANCH
Bathrooms: 1-**F**ull 2-**T**hree Quarter 0-**H**alf
Main living area: 1648 SF
Upper living area: 0 SF
Basement area: 1430 SF of which 1264 SF are finished

Copyrighted photos courtesy of IRES ®

Account Number _____ **Access PIN** _____

PROPERTY VALUE

	Current Actual Value as of: 6/30/2004	Prior Actual Value as of: 6/30/2002	+ or - Change
Residential	$416,200	$391,100	$25,100

PROPERTY TAX *ESTIMATE*

- The Assessor estimates the value of property. The property value is multiplied by the assessment percentage (set by law) to arrive at your assessed value. Your taxes are set when that assessed value is multiplied by a mill levy set this fall by school boards, county commissioners, city councils, and special district directors.

Your tax bill last year (2004 payable 2005) was	If no special levies or bonds are added and no exemptions are in place, we *estimate* your total taxes for this year (2005 payable 2006) will be approximately
$2,186.36	$2,302.80

Go to www.boulderassessor.org for a more detailed description of your property and a complete listing of all the sales in your area. Use your Account Number and Access PIN to obtain information on your property. Refer to the attached Appeal Form for definitions of property characteristics.

MARKET COMPARISON GRID

- Your property has been valued using mass appraisal techniques. These three comparable properties support your 2005 actual value.
- Listed below are the most significant attributes that contribute to the value of your property.



	Your Property	Comparable 1	Comparable 2	Comparable 3
Property Address	_____ PUEBLO PL	_____ OMAHA PL	_____ OMAHA PL	_____ BLACK HAWK RD
Account Number	R_____	R_____	R_____	R_____
Sale Date		25-Sep-2003	08-Aug-2003	11-Apr-2003
Sale Price		$387,000	$410,000	$426,900
Time-Adjusted Sale Price		$391,567	$415,412	$434,798
Total Above Grade Living Area	1,648 SQ FT	1,412 SQ FT	1,479 SQ FT	1,466 SQ FT
Year Built	1972	1972	1972	1973
Quality	AVERAGE	AVERAGE	AVERAGE	AVERAGE
Bathrooms	1-F 2-T	1-F 2-T	1-F 2-T	1-F 2-T
Finished Basement Area	1264 SQ FT	736 SQ FT	882 SQ FT	682 SQ FT

MARKET COMPARISON MAP

- The map at right shows the location of your property and the comparable sold properties listed above.
- Residential property, by law, must be valued solely by the ***market approach***. Market value is based on sales prices of homes with similar location, size, age, and other amenities. Your property has been compared to similar single-family homes that sold during an 18-month period from January 1, 2003 through June 30, 2004. By law, if there were not enough sales during that time period, a 5-year period may be used.
- Sales prices within this study period were ***time adjusted*** to the end of the period, June 30, 2004, as if they were sold on that date. The ***time adjusted sales price*** reflects market conditions on that date.

GIS Provides A Systematic Framework

Modeling The Property Records Environment
Supporting Complex Workflows

Providing

- **An Integrative (Geospatial) Framework**
- **Analytic Methods**
- **Intuitive Visualization**

. . . Providing Many Tools and Methods
. . . And Comprehensive Information Management

GIS Is Evolving

Web Services is Becoming A New Platform

GeoWeb

- Many Authors & Publishers
- Lots of Communities
  - Interconnected
  - Interoperable
  - Integrative
  - Dynamic

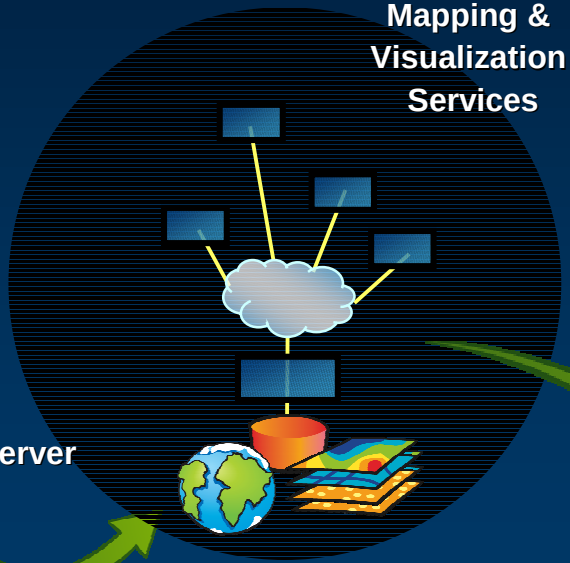
Emerging

Distributed Collaboration

GIS Services

Today

Mapping & Visualization Services



Legacy

Client / Server

Supporting

- **Distributed Data Management**
- **Collaborative Computing**
- **Application Integration**

. . . Creating New Opportunities for Collaboration And Integration Of Systems

Web Services Enables Shared Data With Other Organizations

Making Cadastral Mapping Usable as a Service . . .

Requires

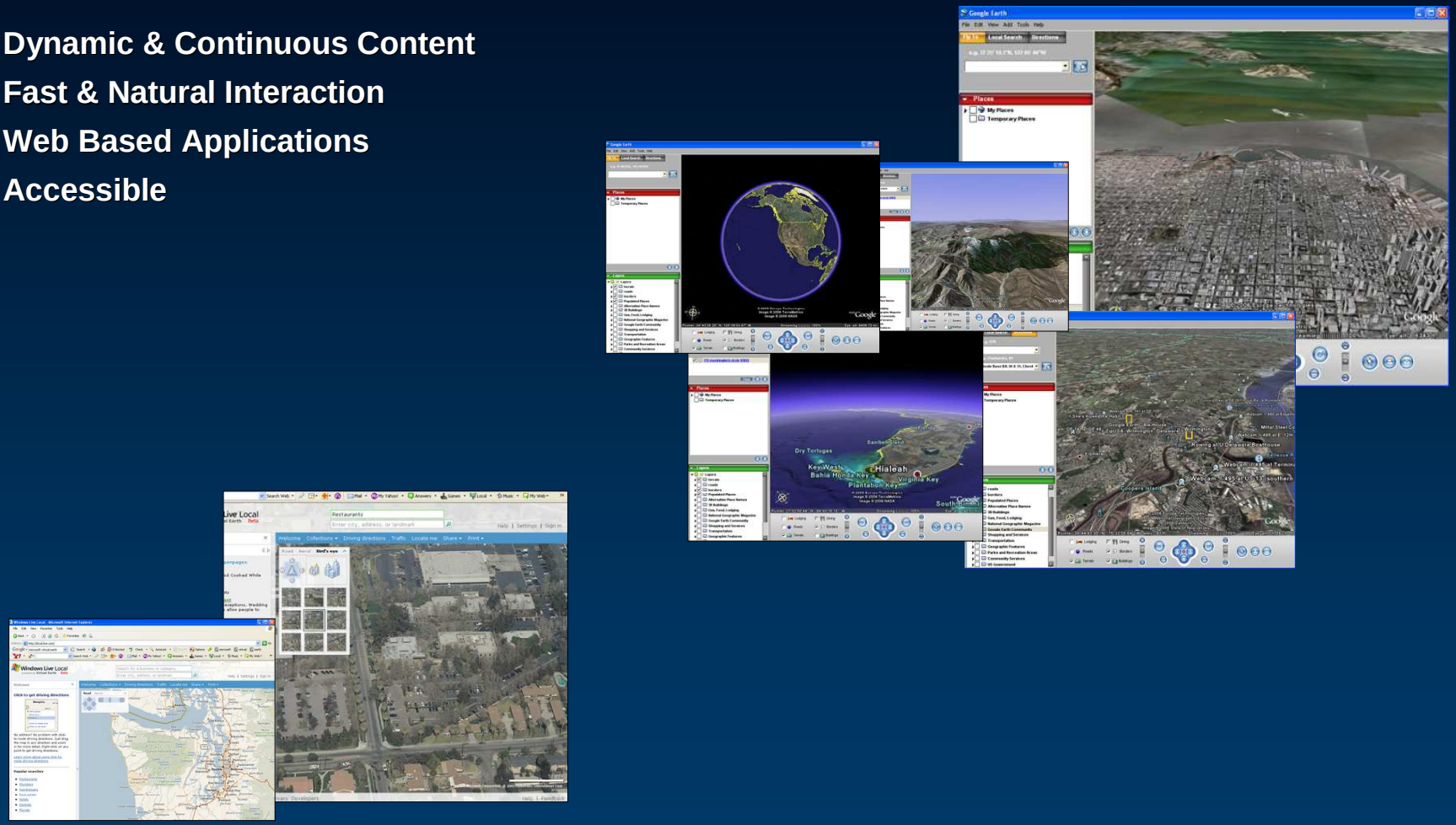
- Geographic Framework
- Collaboration
- Sharing Content
- Interoperability
- Enabling Technology

. . . Dynamically Integrating Property Data with Other Information

Google and Microsoft Are Already Changing Things

Introducing a New Way of Interacting with Geographic Information on the Web

- **Dynamic & Continuous Content**
- **Fast & Natural Interaction**
- **Web Based Applications**
- **Accessible**

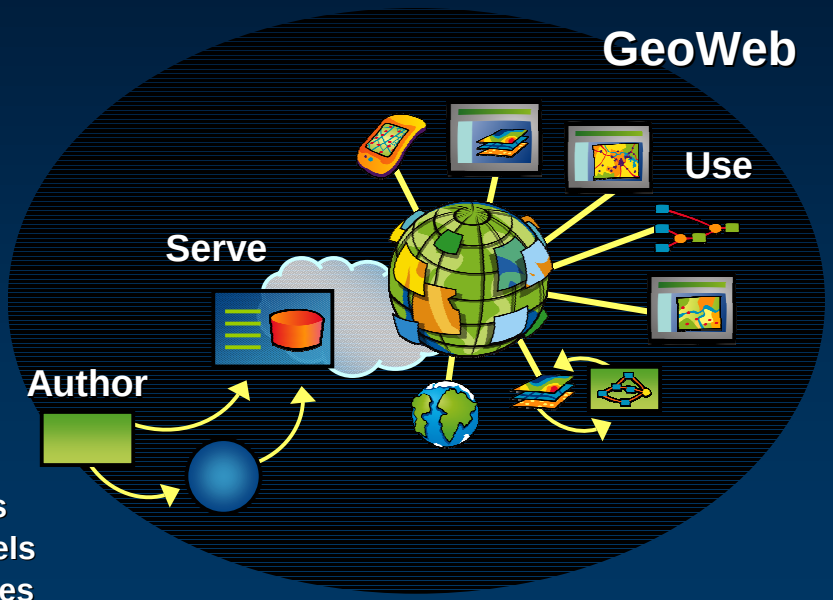


. . . Opening the World's Eyes To a Whole New Way of Seeing

GIS on The Web Provides Many Additional Possibilities

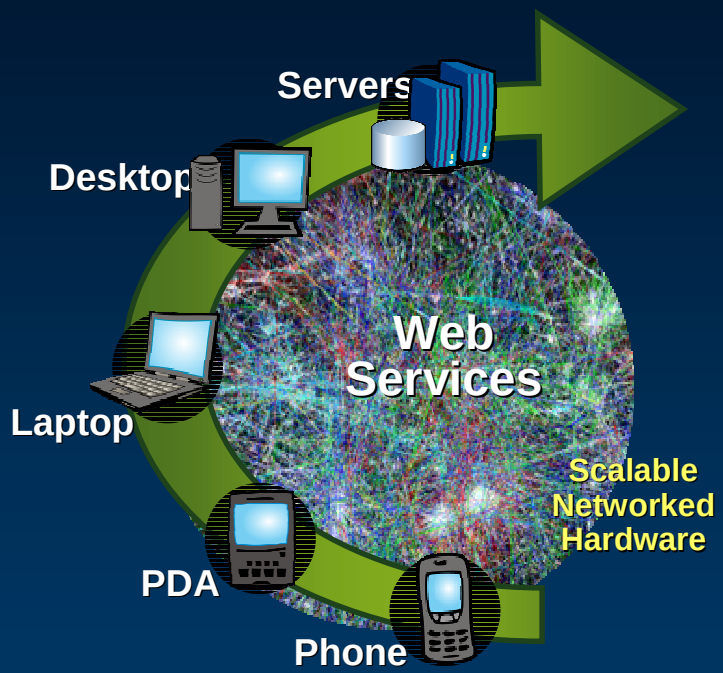
For Sharing, Integrating and Analyzing Geographic Knowledge

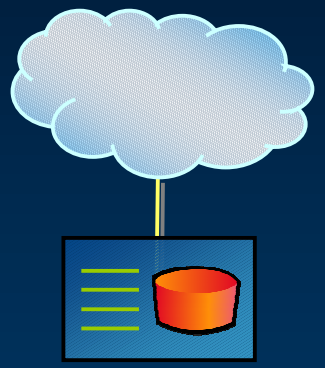
Connecting Professionals And Users



Enabling Technology

- Faster Processing
  - Multi-core
  - Blades
- Increased Bandwidth
- Larger Storage
- Web Services Standards
- Mobile Technologies
- Real Time Networks
- GIS Software





. . . Improving Our Ability To Share and Distribute

GIS Technology Is Advancing -

Many New Capabilities & Innovations

- Mapping
- Visualization
- Modeling
- Query & Reporting
- Spatial Analysis
- Data Management

Deployed On Desktop, Server, Mobile . . .

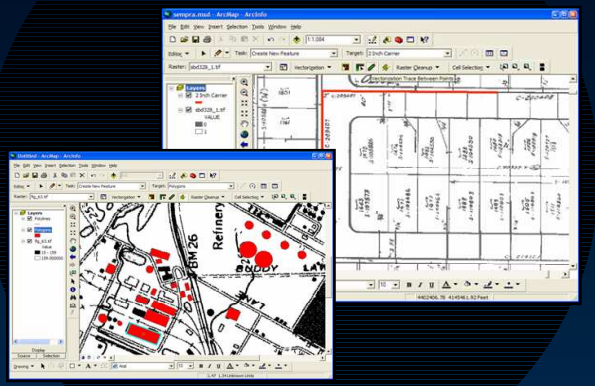
. . . Increasingly On The Web

Improved Data Compilation and Editing

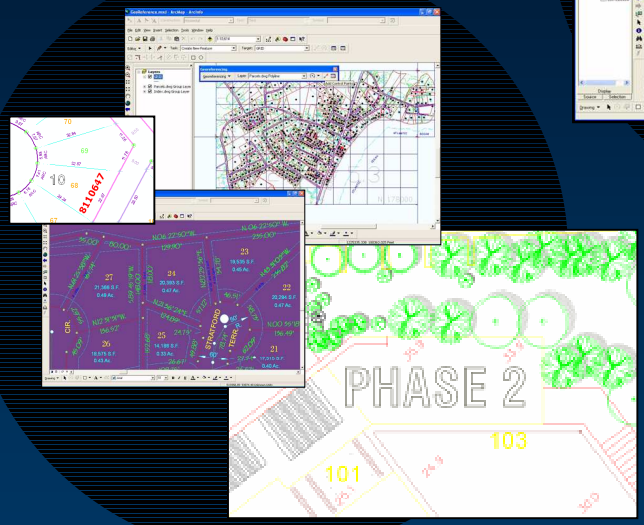
Adding New Techniques and Methods

-

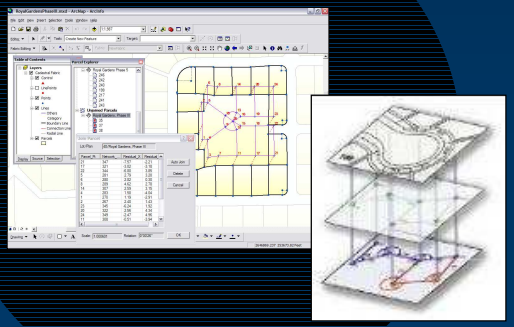
Automated Scanning



CAD Integration



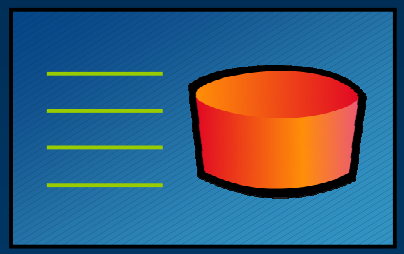
Integrating Survey Measurements



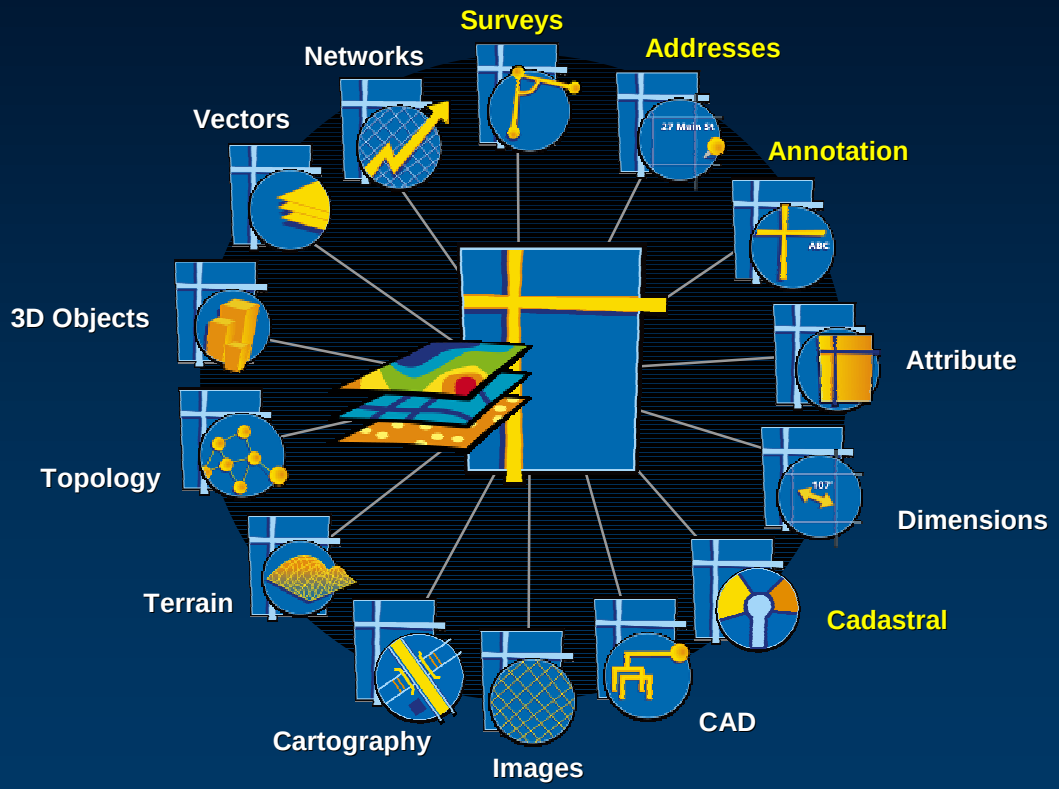
Enhanced Interoperability

Extended Data Modeling

Abstracting Various Sciences, Technology and Methods for Spatial Measurement



Geodatabase

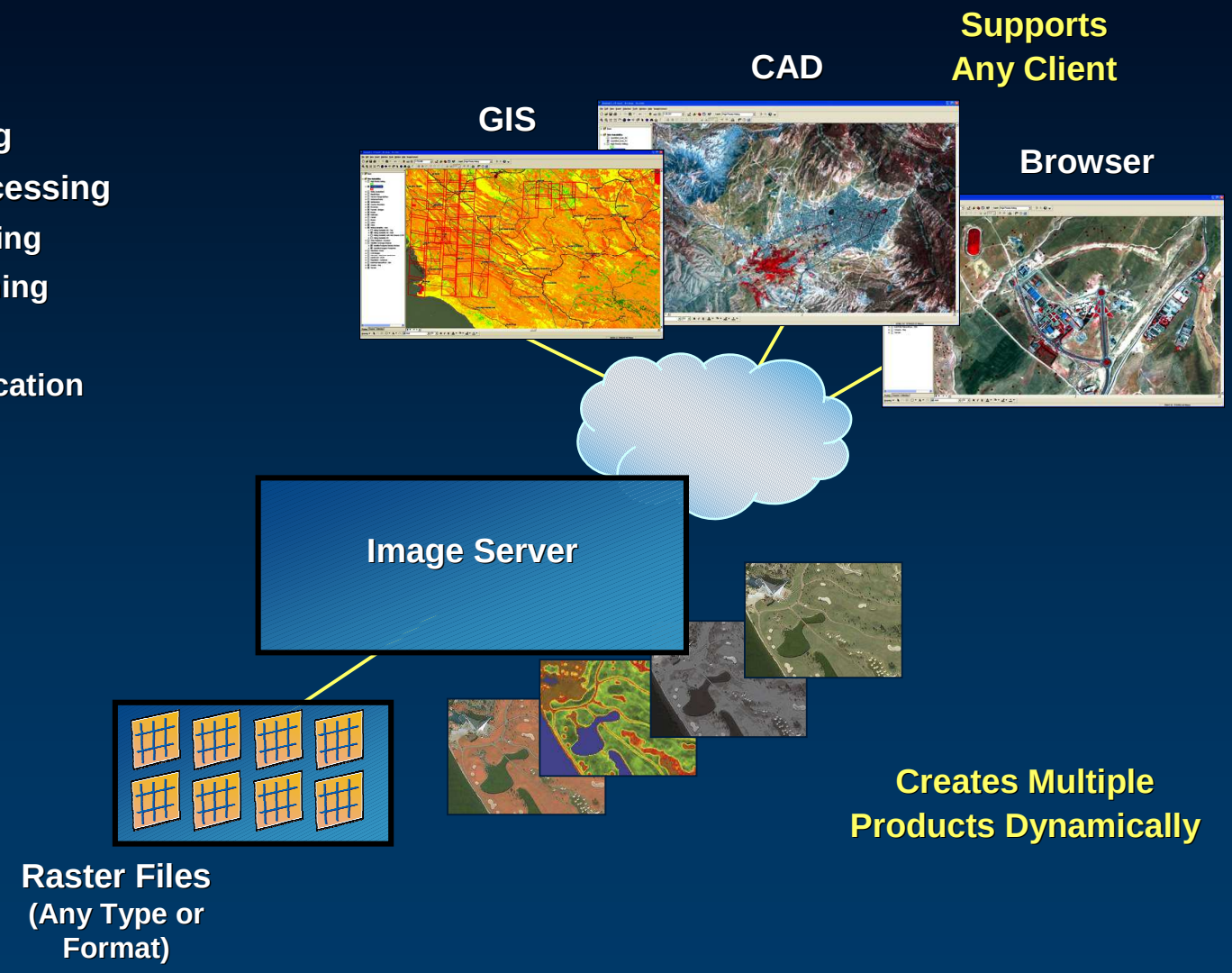


Managing all Types of Geospatial Data

Image Serving

A New Way to Rapidly Access to Large Imagery Collections

- Fast
- Easy Publishing
- On-the-Fly Processing
  - Georeferencing
  - Pan Sharpening
  - Mosaicing
  - Ortho-rectification
  - . . .

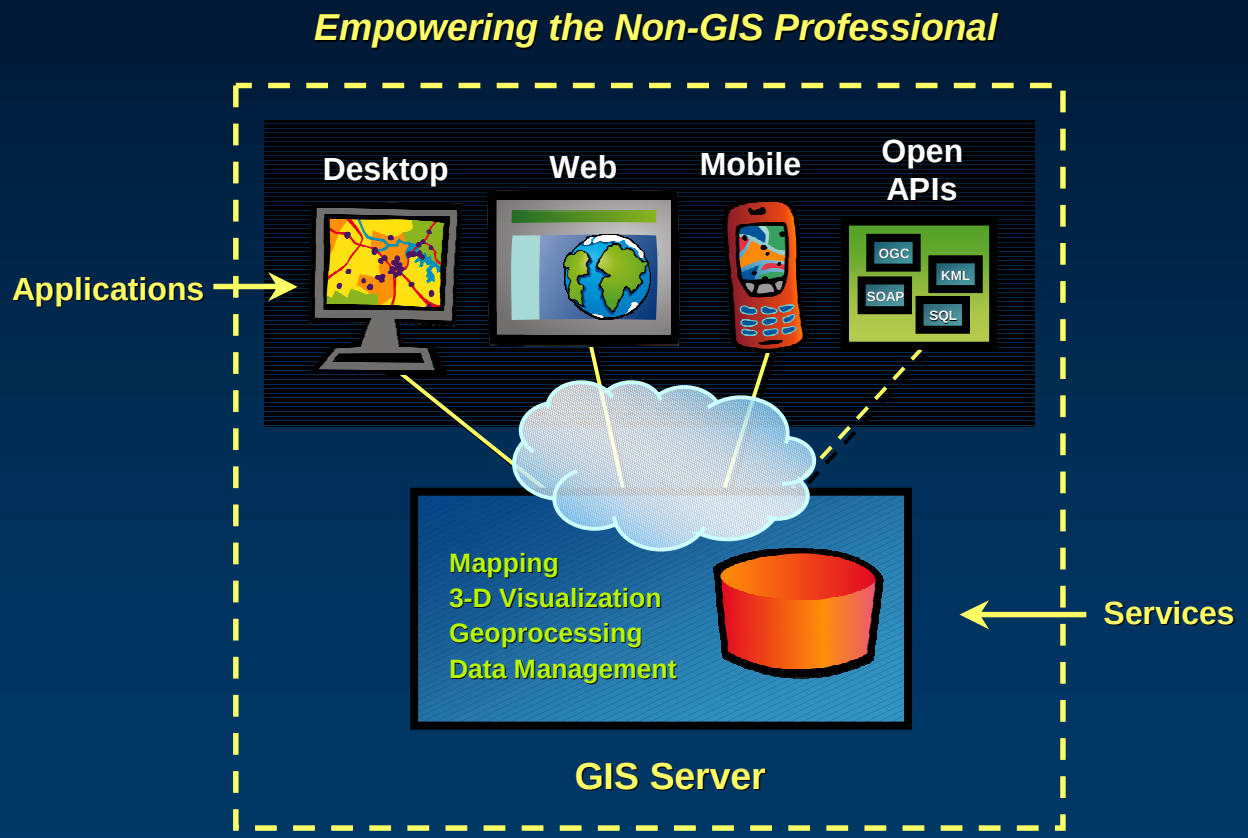


. . . Reducing Time Between Acquisition and Use

GIS Server Architecture Provides a New Platform

Comprehensive Functionality

- Centrally Managed
- Many Clients
- Easy to Install & Manage
- Scalable
- High Performance
- Interoperable
- Affordable



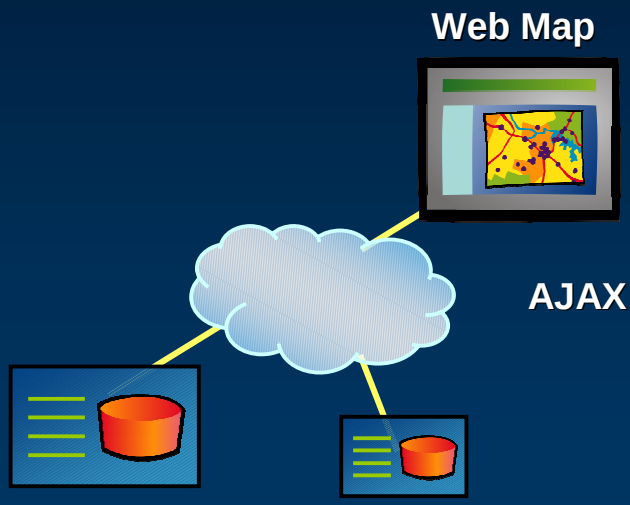
. . . Enabling Enterprise GIS

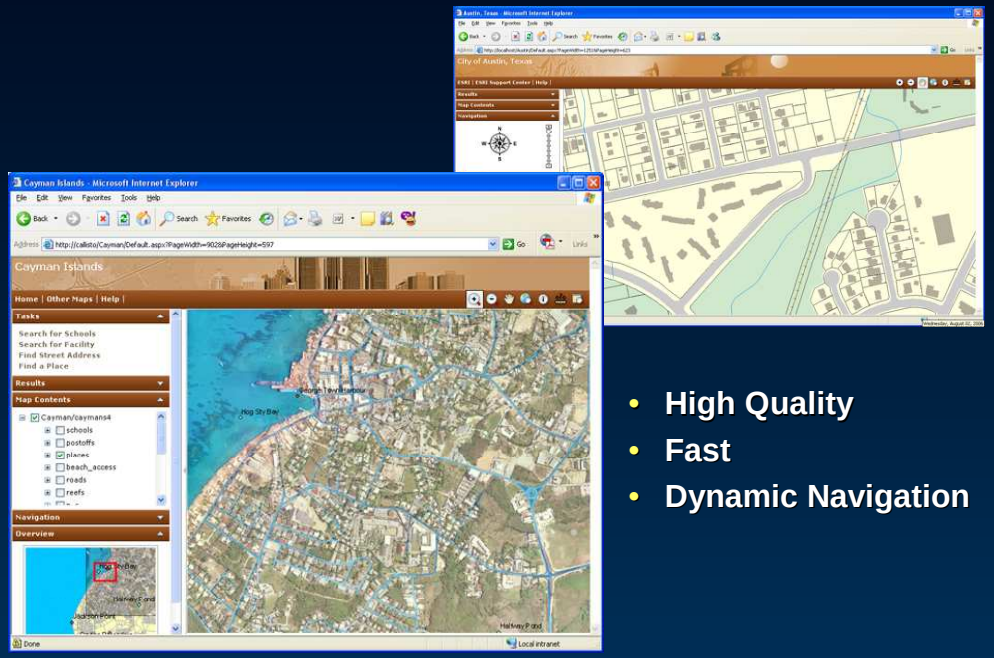
Web Clients

Browser Based GIS Application

Supporting

- Mapping
- Editing
- Geoprocessing
- Geocoding
- Data Management





- High Quality
- Fast
- Dynamic Navigation

. . . Easy Access to GIS Services

Browser-based Editing

- Add, modify, and remove features
- Update attribute data
- Useful for focused applications

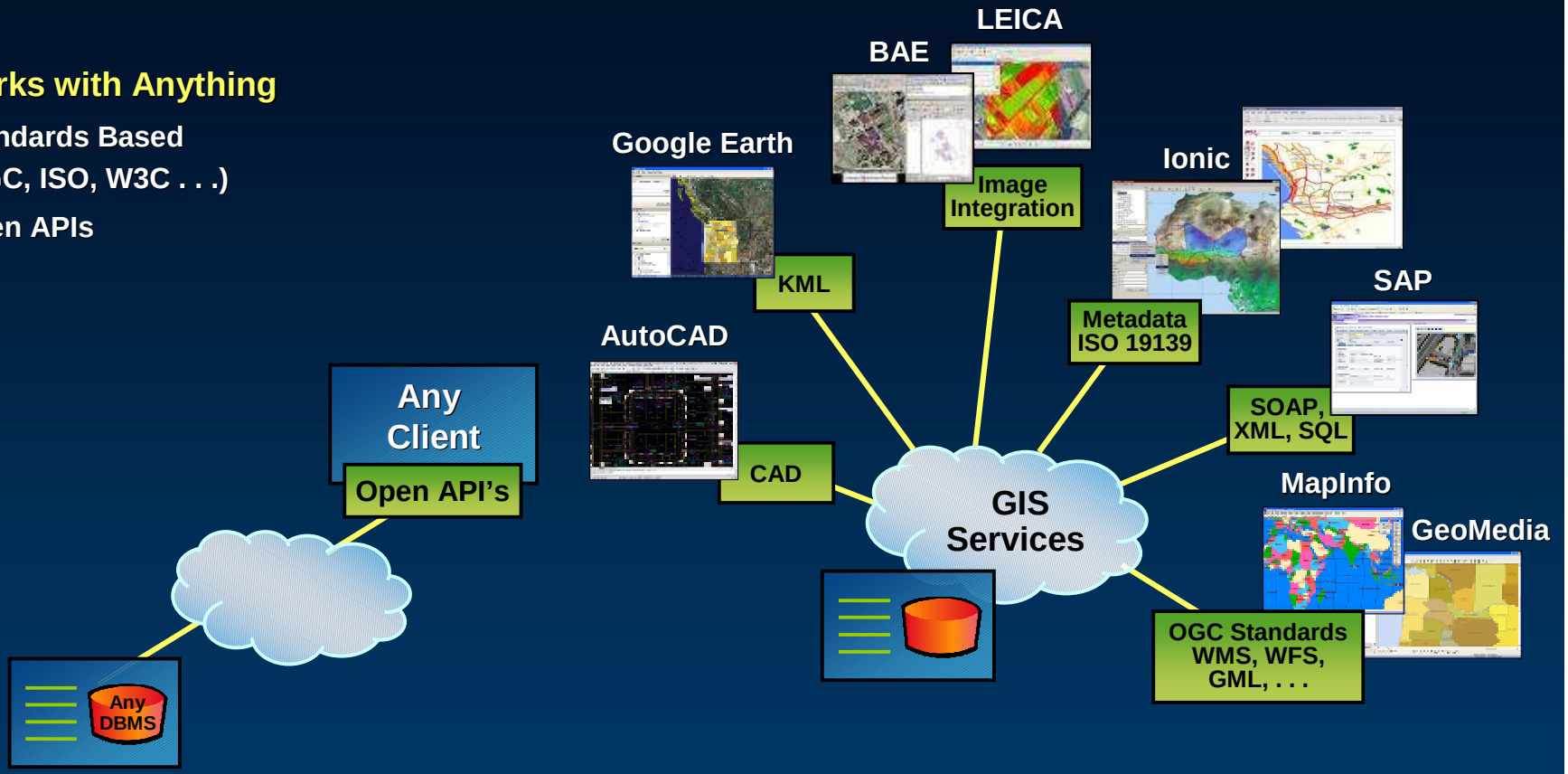
. . . Server Based Rules Insuring Integrity

GIS Servers Support Open And Interoperable Access

Supporting Many Clients and DBMS's

It Works with Anything

- Standards Based (OGC, ISO, W3C . . .)
- Open APIs



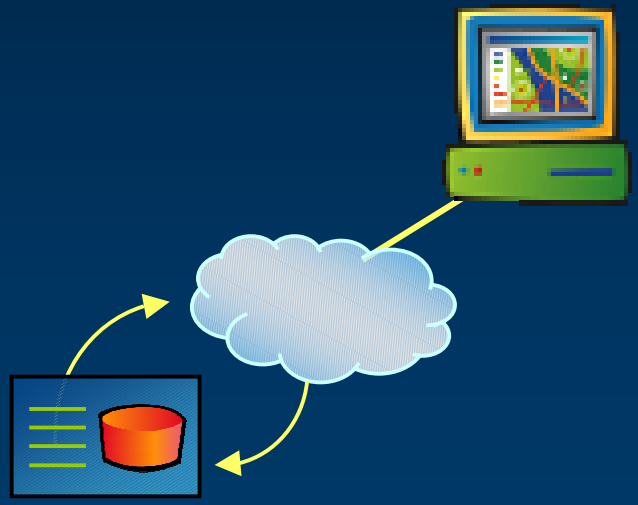
. . . Ensuring That Cadastral Data Investments Can Be Leveraged

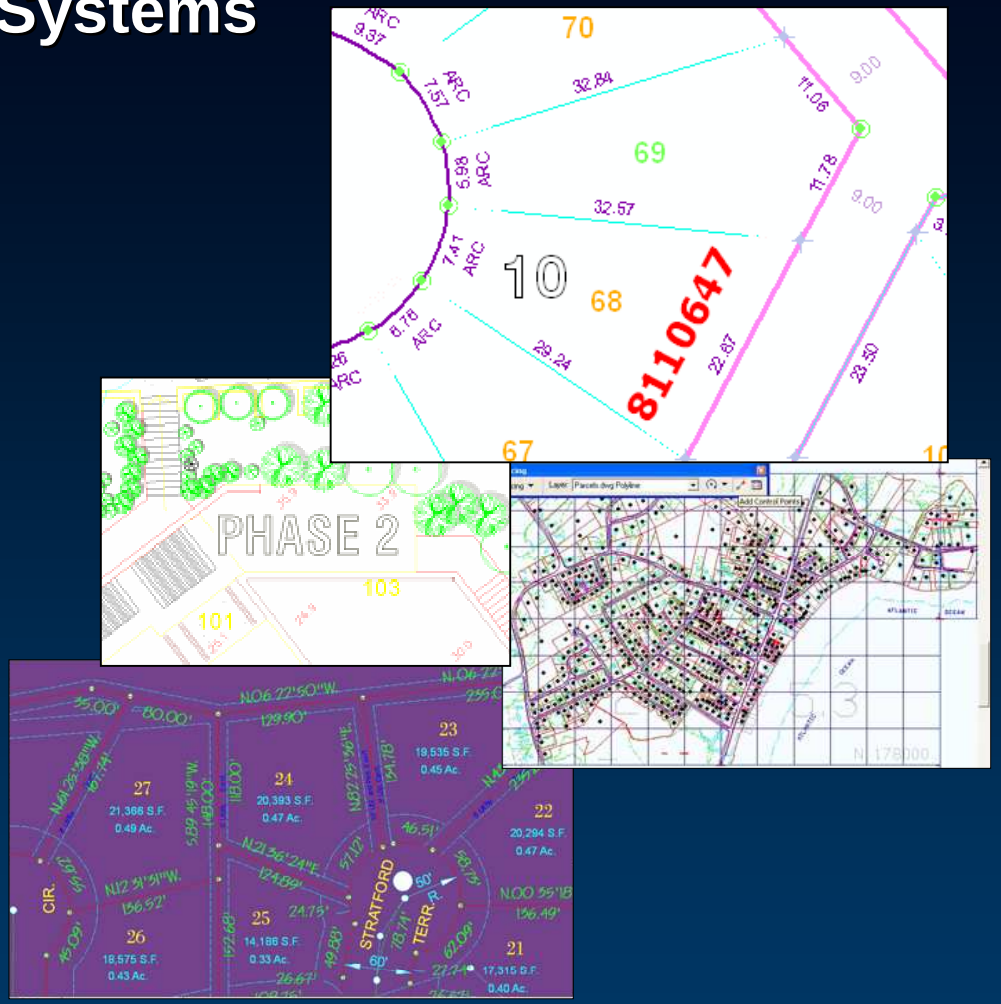
. . . Providing a New Platform for Geospatial Integration

GIS as a Service for CAD Systems

Complete CAD/GIS Integration

- Supporting
  - Data Management
  - Mapping
  - Editing
  - Spatial Analysis





Enhancing Interoperability

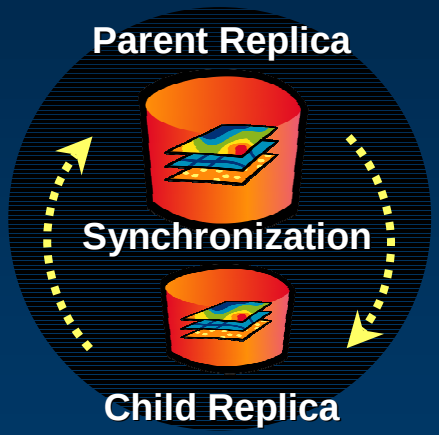
GIS Servers Can Manage Distributed Geospatial Data

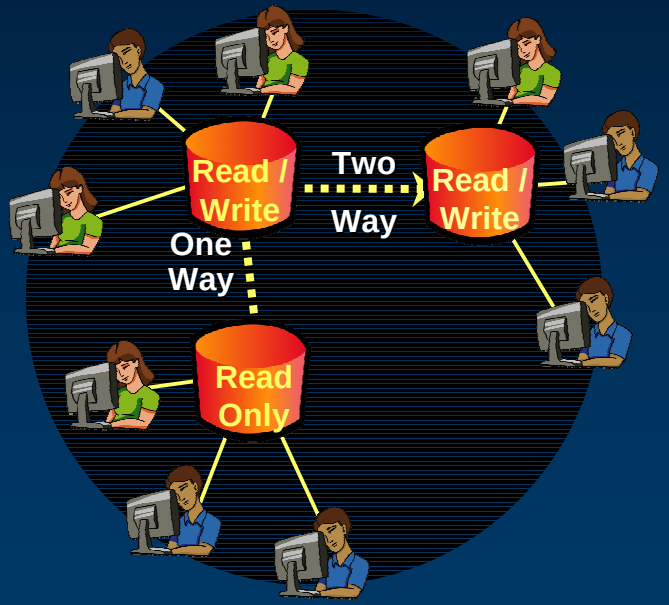
Using Replication Services

- Change Only Updates
- Periodically Synchronized
- Updates Over the Web or Courier

Supporting

- Collaboration
- Co-Data Production
- Mobile Users



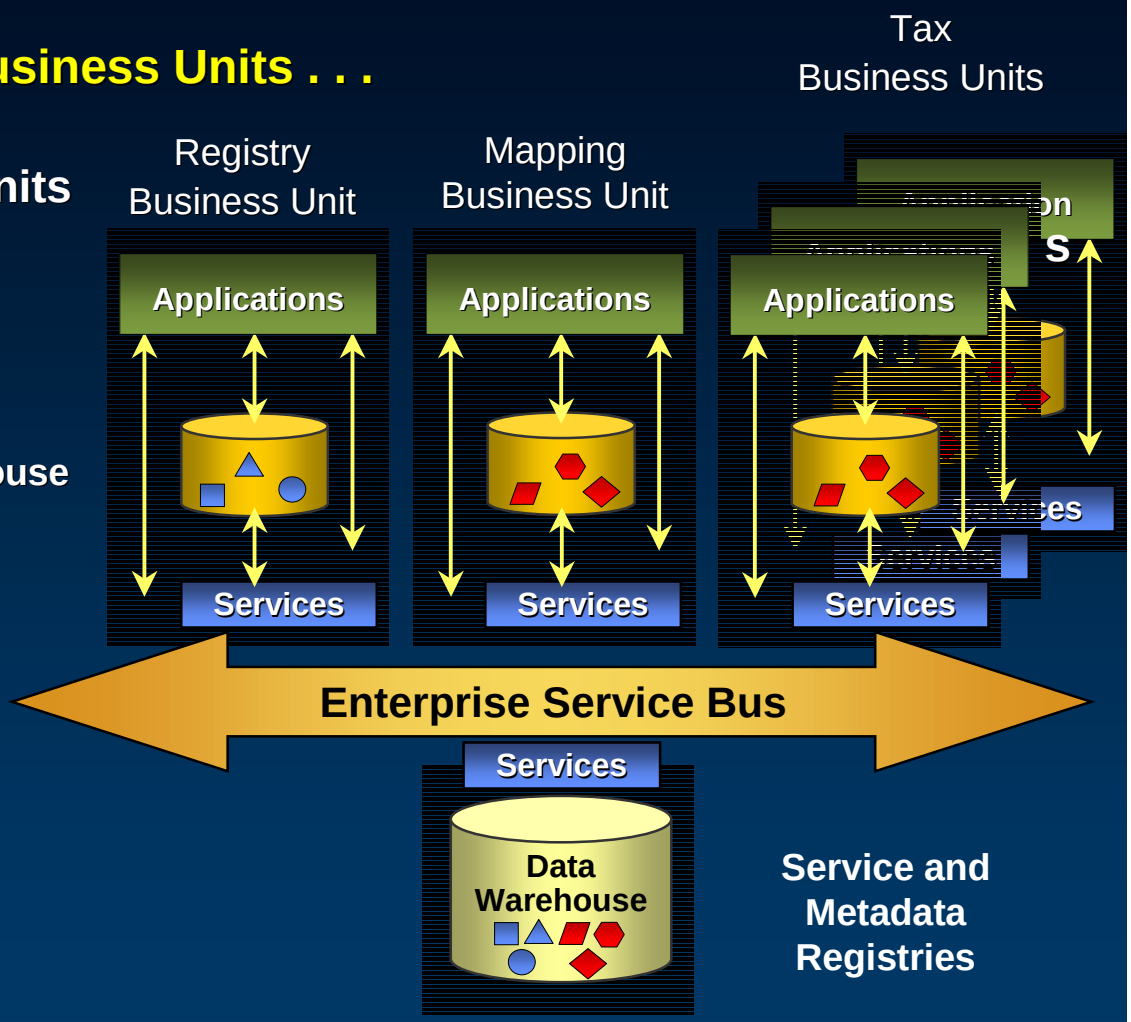


Supporting Collaborative Data Management

GIS Can Be Implemented Across the Enterprise Using A Service Oriented Architecture

Modernizing and Integrating Business Units . . .

- **Organized Around Business Units**
  - **Tailor Applications and Data to Mission Needs**
  - **Manage Operational Database**
  - **Share Data**
    - **Publishing to the Data Warehouse**
    - **Directly as Services**
- **Business Units Are Service Providers and Consumers**



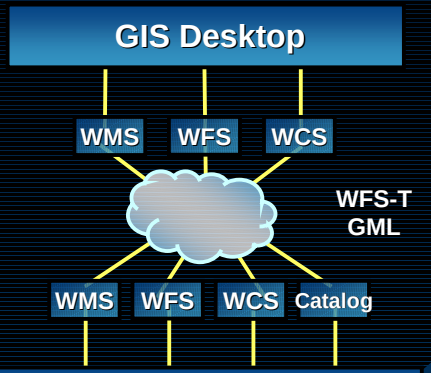
. . . A Framework For Incrementally Growing an Enterprise Services Architecture

Standards Based Interoperability Is Important

Multiple Approaches

Technology Standards

- Web Services
- OGC/ISO
- DXF, KML . . .



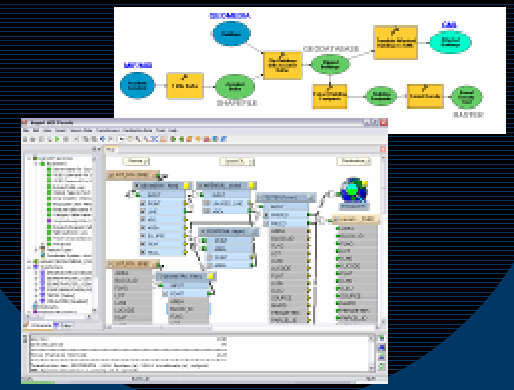
Content Standards

- Data Models
- Metadata (19139)

Transformation Procedures (ETL)

- Formats
- Schema
- Semantic

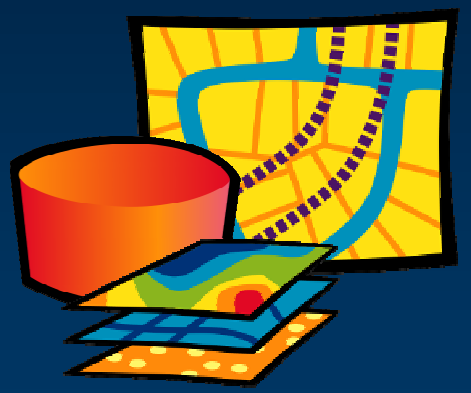
ETL = Extract, Transform & Load Data



. . . Providing An Open & Standards-based Environment
. . . And Enabling Successful Collaborative Systems

Implementing Enterprise GIS Requires More Than Technology

- Vision and Leadership
- Management Support
- Understanding of Business Processes
- Planning
  - Technical Architecture
  - Data Models
  - Organization
  - Implementation Work
- Good People



. . . And a Spirit Of Collaboration

Thank you for your attention!