

# GIS and SDI

Vision and Enabling Technology



... Emerging Solutions

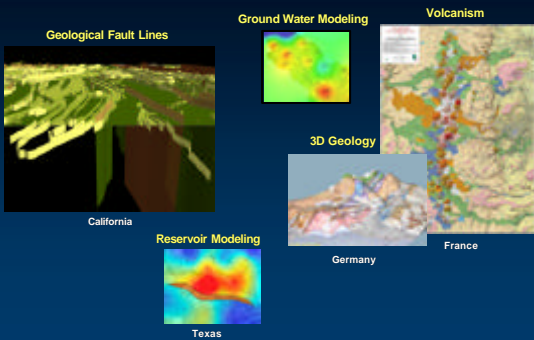
# Geographic Information Is Being Applied To All the World's Problems

Providing A New Framework For Human Activities...



... Applications Demonstrate The Evidence Of Its Value

# Earth Science



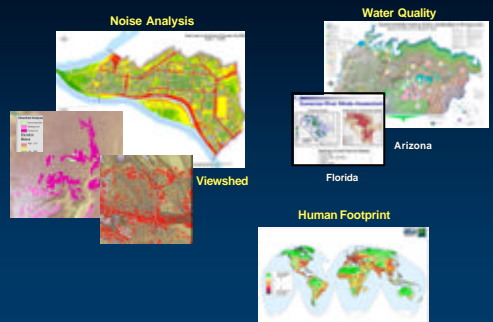
# Geographic Visualization



# Planning

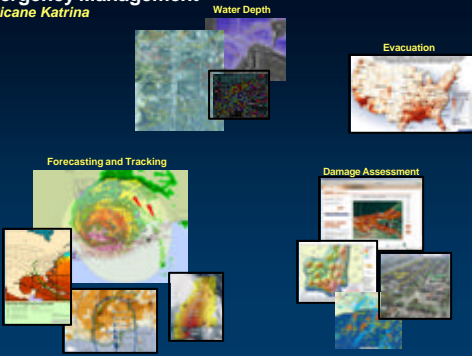


# Human Impacts On the Environment



# Emergency Management

Hurricane Katrina



# Public Safety



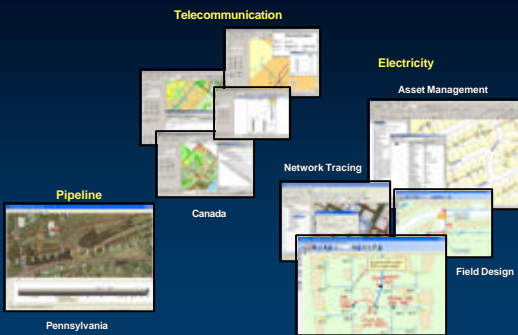
# Homeland Security



# Business



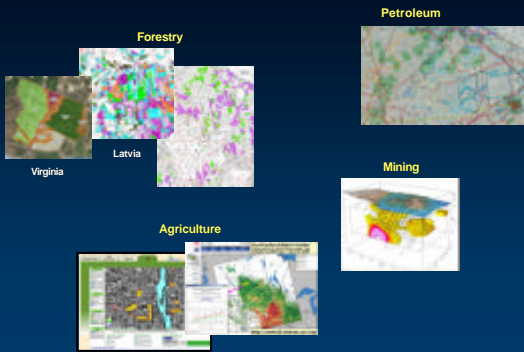
# Managing Infrastructure



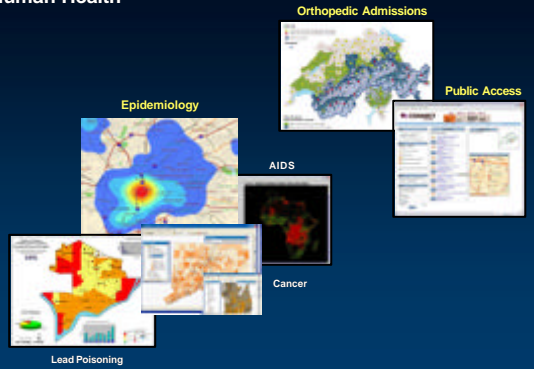
# Land Information Systems



## Natural Resource Management



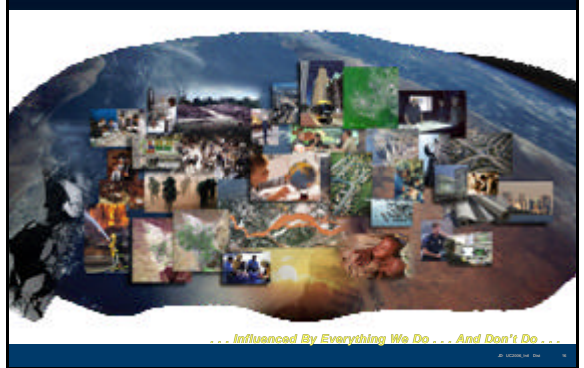
## Human Health



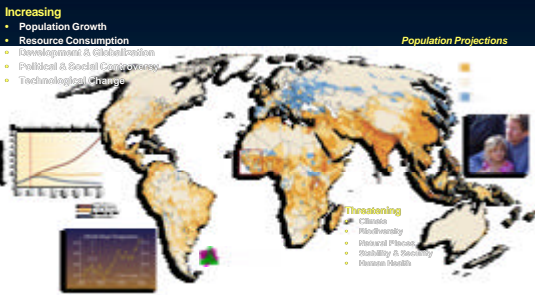
## Education



## Our World is Changing Rapidly And Increasingly Challenged



## Driven By the Dynamics of



... The Sustainability of Our Environment and Civilization Itself

## To Meet These Challenges

Each of Us Needs to Participate



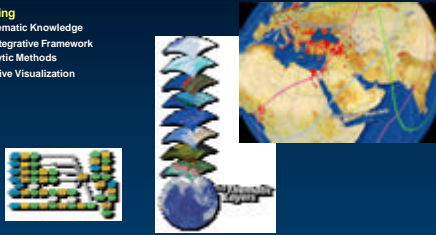
... GIS Provides the Framework ... Personally, in Organizations and in Society

## GIS is Providing a New Medium For Understanding

*Modeling the Physical and Cultural Knowledge of our World  
Breaking Down the Earth into Components and Systems . . .*

### Providing

- Systematic Knowledge
- An Integrative Framework
- Analytic Methods
- Intuitive Visualization



*. . . Creating Order and Meaning  
. . . Defining Interconnections and Interdependence  
. . . Providing a Broad Understanding of Natural and Human Ecology*

## GIS Is Influencing How We See and Do Things

*Building a Common Understanding*

### Creating a Sense of Engagement

- ### Providing More
- Science
  - Accuracy/Detail
  - Realism
  - Logic & Analysis
  - Immediacy

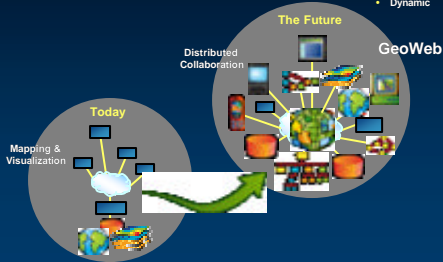


*. . . Changing How We Communicate*

## The Web is Becoming Geographically Enabled

*Many Services and Lots of Communities*

- Many Authors & Publishers
- Interconnected
- Interoperable
- Integrative
- Dynamic

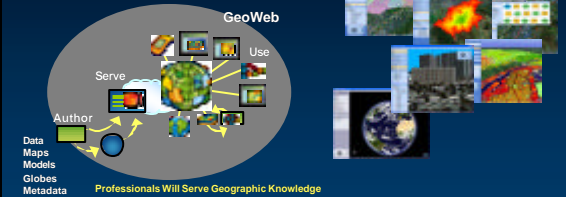


*. . . Creating New Opportunities for Collaboration*

## The Web Will Provide Many Possibilities

*For Sharing, Integrating and Leveraging Geographic Knowledge*

### Providing A New Way To Connect Professionals And Users



*. . . Creating A New Kind of Synergistic GIS  
. . . In an Open and Interoperable Environment*

## Individual Systems and Communities

*Will Use Each Other's Services*

*Breaking Down the Earth Into Components and Geographic Areas . . .*



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

*. . . Distributing Management*

*. . . Dynamically Integrating Our Common Geospatial Knowledge*

## Implementing This Vision Requires -

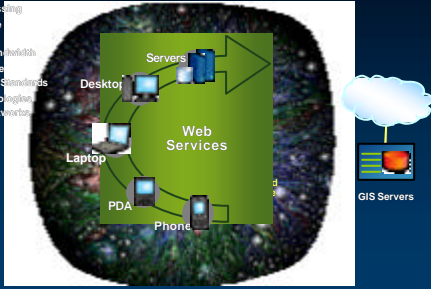


*. . . And Enabling Technology*



## 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
- Charting
- Geo-Schematics
- Multi Dimension Data
- Real Time
- History & Archiving
- Modeling
- Spatial Analysis
- Data Management
- Collaboration
- Portals
- Metadata
- Standards
- Interoperability



Deployed On All Platforms - Desktop, Server, Mobile . . .

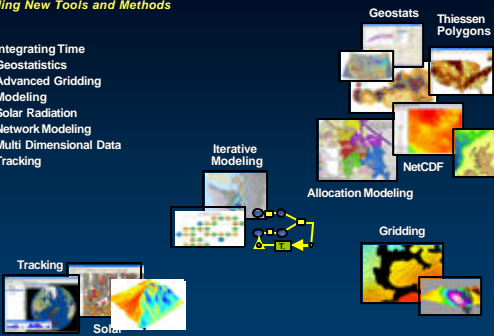
. . . Increasingly On The Web

. . . As Services

## Improving the Science of Geography

### Providing New Tools and Methods

- Integrating Time
- Geostatistics
- Advanced Gridding
- Modeling
- Solar Radiation
- Network Modeling
- Multi Dimensional Data
- Tracking

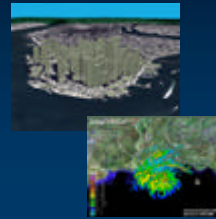


Evolving How We Model and Analyze Our World

## Modeling, Tracking And Visualizing Geographic Change

### Understanding Dynamic Geography

- New York
- Katrina
- Sea Ice



. . . Creating Process Knowledge

## Modeling, Tracking And Visualizing Geographic Change

### Understanding Dynamic Geography

- Cropland
- Oil Production
- Medicaid



. . . Creating Process Knowledge

## GIS Servers Are a New Platform

### Comprehensive Server Based GIS

- Many Application Clients
- Out-of-the-Box GIS Services
- Easy to Install & Manage
- Scalable
- High Performance
- Interoperable
- Affordable



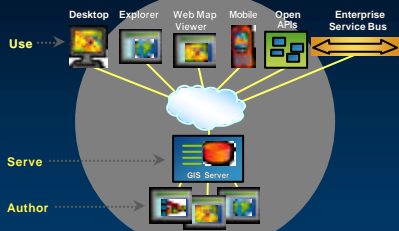
. . . Enabling Enterprise GIS

## The GIS Server Works as a Complete System

A New Way to Manage and Disseminate Geographic Knowledge

### Author/Serve/Use

- Maps
- Data
- Models
- Globes
- Metadata



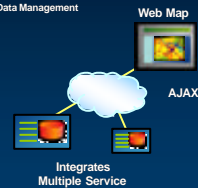
Making GIS Knowledge Available To Anyone . . .  
 . . . Integrating With Other Systems Via Standards

## Web Client

Browser Based GIS Application

### Supporting

- Mapping
- Editing
- Geoprocessing
- Routing
- Geocoding
- Data Management



- High Quality
- Fast
- Dynamic Navigation

. . . Easy Access to GIS Services

## Mobile "Smart" Client

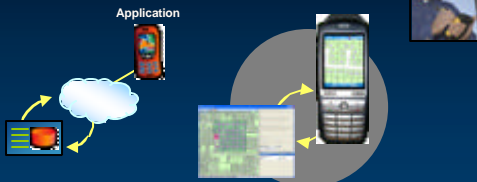
A Small Lightweight Client for Focused Application

### Supports

- Mapping
- Editing
- Query
- GPS

### Runs On Many Devices

- Phones
- PDA's
- Laptops



. . . Data is Synchronized When Connected

## Explorer Client

Simple GeoBrowser for Working with Geographic Information

- Fast
- Intuitive



. . . Accesses Maps, Models and Globe Services

## Integrating Geographic Data Modeling And Management

Reflecting Various Sciences, Technology and Methods for Spatial Measurement



Modeling and Managing all Types of Geospatial Data

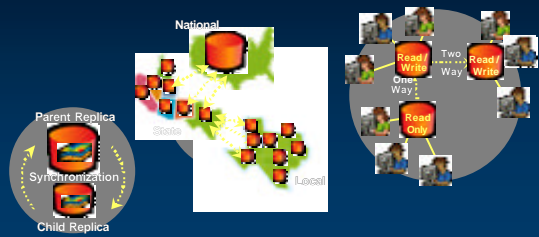
## GIS Servers Can Manage Distributed GeoSpatial Data

Using Replication Services

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

### Supports

- Collaboration
- Co-Data Production
- Mobile Users



## GIS Servers Are Open & Interoperable

Connecting and Integrating Any Application & Any DBMS

**Works with Anything**

- StandardsBased (OGC, ISO, W3C...)
- Open APIs

... Ensuring Geospatial Data Investments Can Be Leveraged  
... Providing a New Platform for Geospatial Integration

## Interoperability

Supporting Multiple Approaches

... Enabling Collaboration

## Geo-Portals Are Important For Interoperability

A Solution for Building SDI

**Supports**

- Metadata Management
- Search (Standards Based)
- View
- Use
- Share

**Many Deployments Worldwide**

Supporting Discovery and Integration of Geospatial Data

## Example - Conservation Commons

GeoWIKI For Conservation Collaboration

- Metadata Catalog
- Distributed Inventory
- Activity Notification
- Environmental Alerts

## GIS Servers Integrate Image Processing

Providing Fast Access to Large Imagery Collections

**Supports Any Client**

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

... Reducing Time Between Acquisition and Use

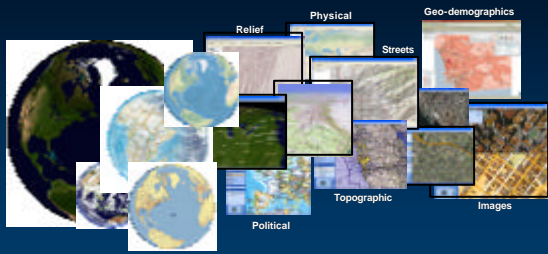
## Implementing SOA

Modernizing and Integrating Business Units ...

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

## Ready-to-Use Base Maps & Globes

Available as Data Products and Web Services

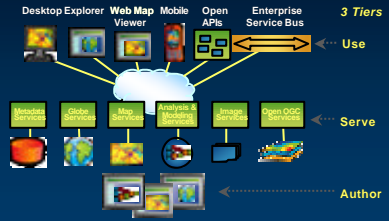


... Helping Users Be Immediately Productive

## GIS Provides A Complete Geospatial System

For Authoring, Serving and Using GIS Knowledge

- Open
- Interoperable
- StandardsBased



... And Integrating Other Geospatial Technology and Standard IT Infrastructure

## GIS Day: November 15, 2006



## Our World Needs Better Understanding

A Framework that Lets Us Chart a Better Future



... A New Medium That Allows Us Communicate the World

## Your Work With GIS is Already Helping

- Advancing Science
- Reconciling With Nature
- Making Communities Livable
- Supporting Economic Development
- Increasing Efficiency
- Improving Human Health
- Mitigating Conflicts



... Improving How We Manage Our World

## Our World is Changing Rapidly . . .

Presenting Many Challenges

GIS technology is evolving . . . Creating a new medium for communication  
Making geographic knowledge accessible to everyone . . . *Communicating Our World*

GIS professionals, working together . . . Will author and share their knowledge  
This collaboration will change our world . . . Bringing peace, prosperity and sustainability



Never doubt that a small group of thoughtful, committed citizens can change the world . . .  
. . . It is the only thing that ever has . . .  
- Margaret Mead