Powering an Efficient Geospatial Data Sharing Framework with Spatial ETL

February 2010

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Overview

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- **Introduction**
- **Case Study #1: Data clearing house**
  - Arkansas- GeoSTOR
- **Case Study #2: Data Harmonization**
  - North Central Region Data Repository
- **Case Study #3: Emergency Response**
  - Indiana Department of Homeland Security
- **Case Study #4: CAD ⇔ GIS Integration**
  - Ohio Department of Transportation
- **Summary**

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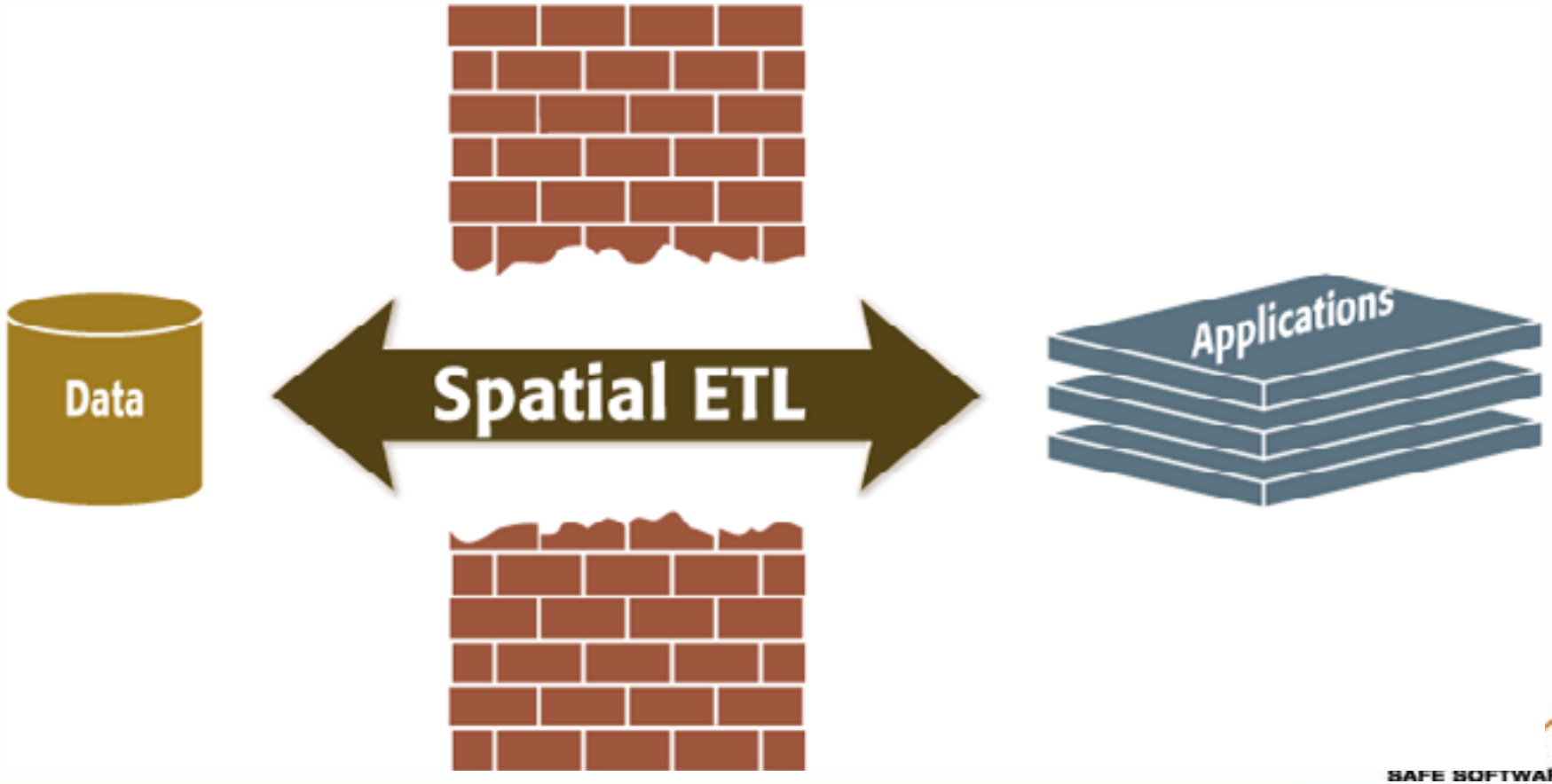
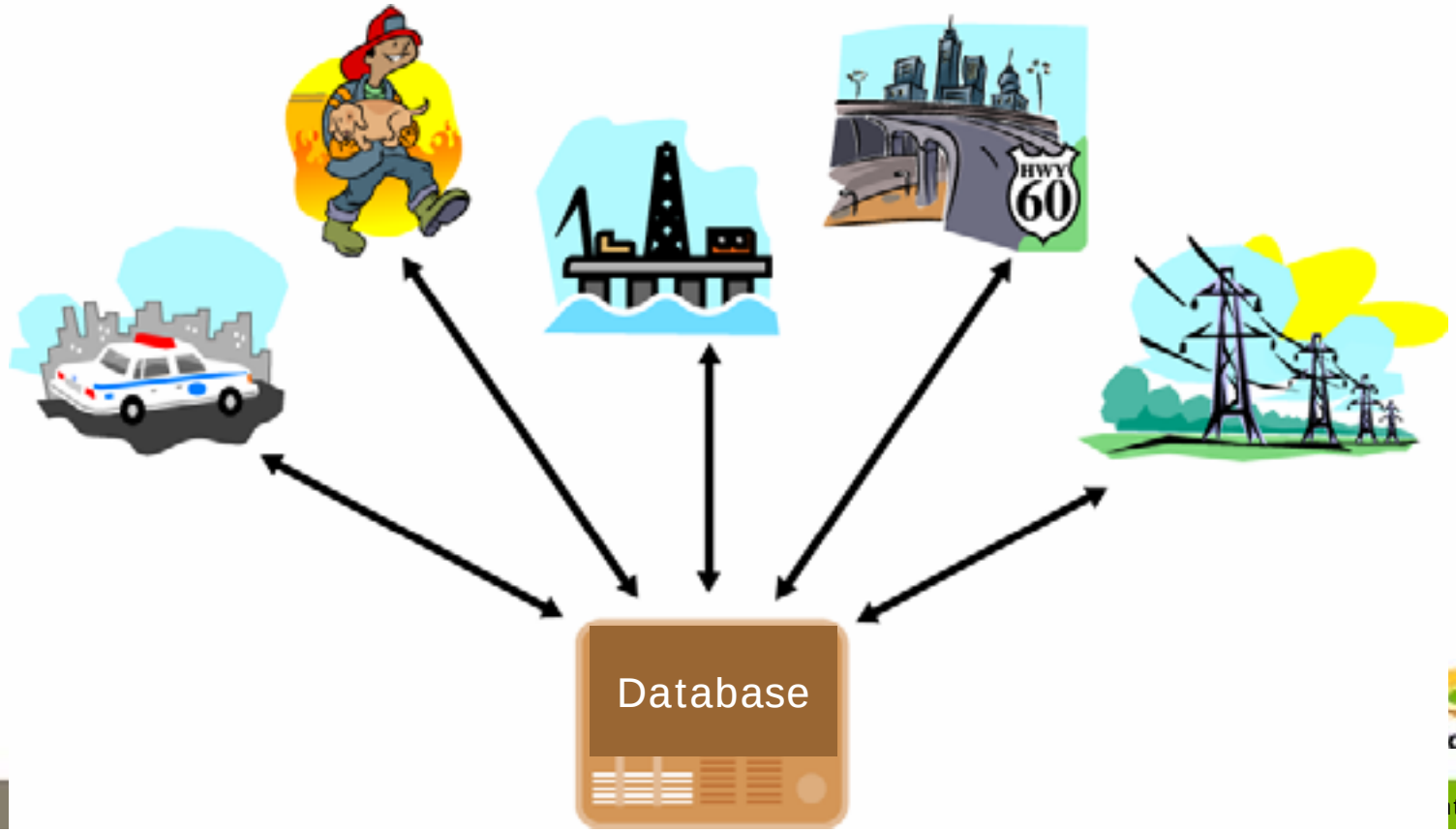
Common Theme

- **Spatial ETL used to break barrier between data, applications, and users**



Common Theme

- **Different users have and want different things!**



Common Theme

- Different Systems = different data model
- Different organizations = different data model
- Different problem focus = different data model

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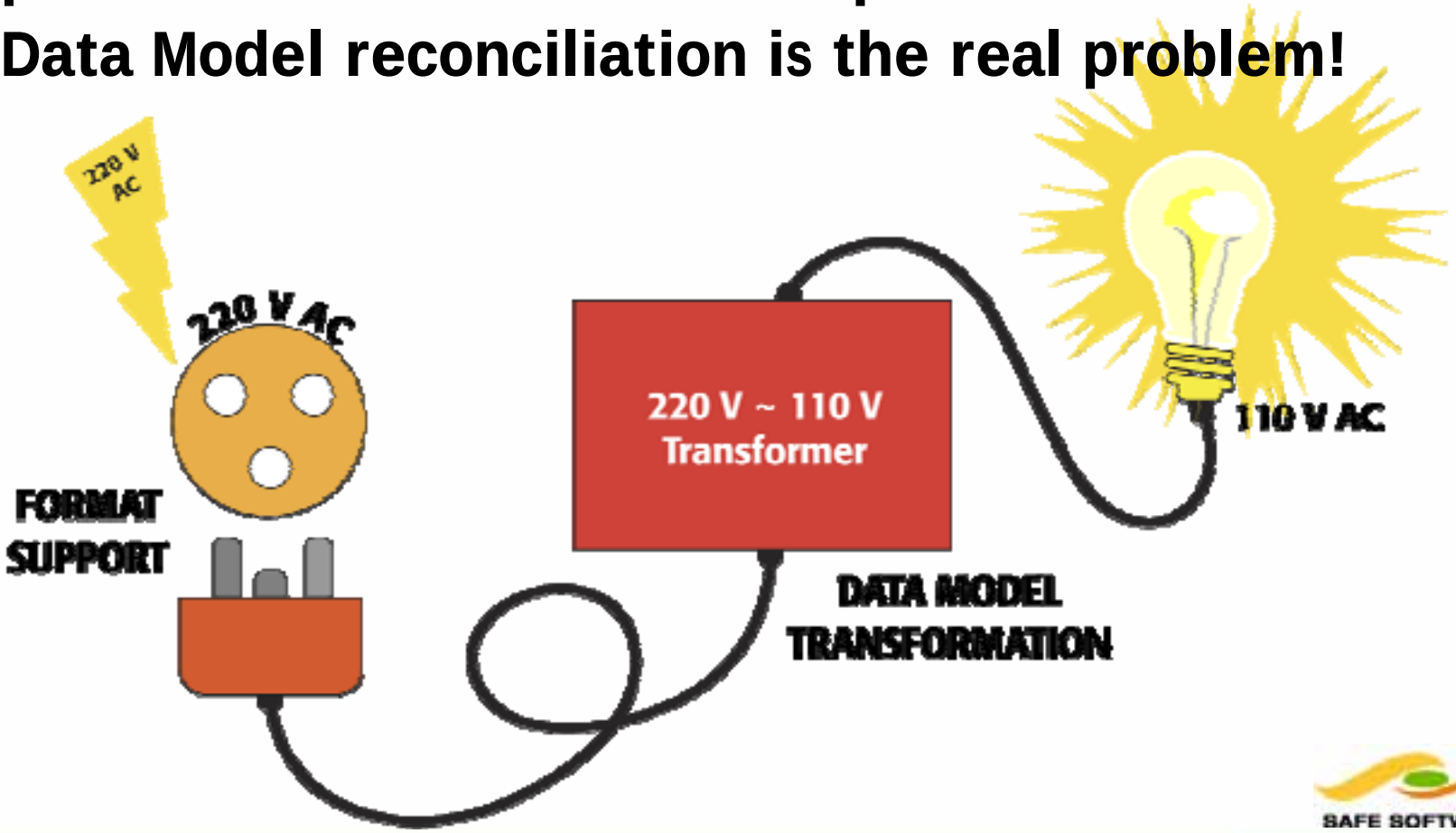
Data Model is King

- Data sharing requires solving *both* the format problem and the data model problem
- Data Model reconciliation is the real problem!



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Challenge

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- Automate distribution of GIS data
- Vector and Raster Data in Multiple Formats
- Data in different coordinate systems
- FGDC Metadata required
- Over 250 searchable layers

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GeoSTOR

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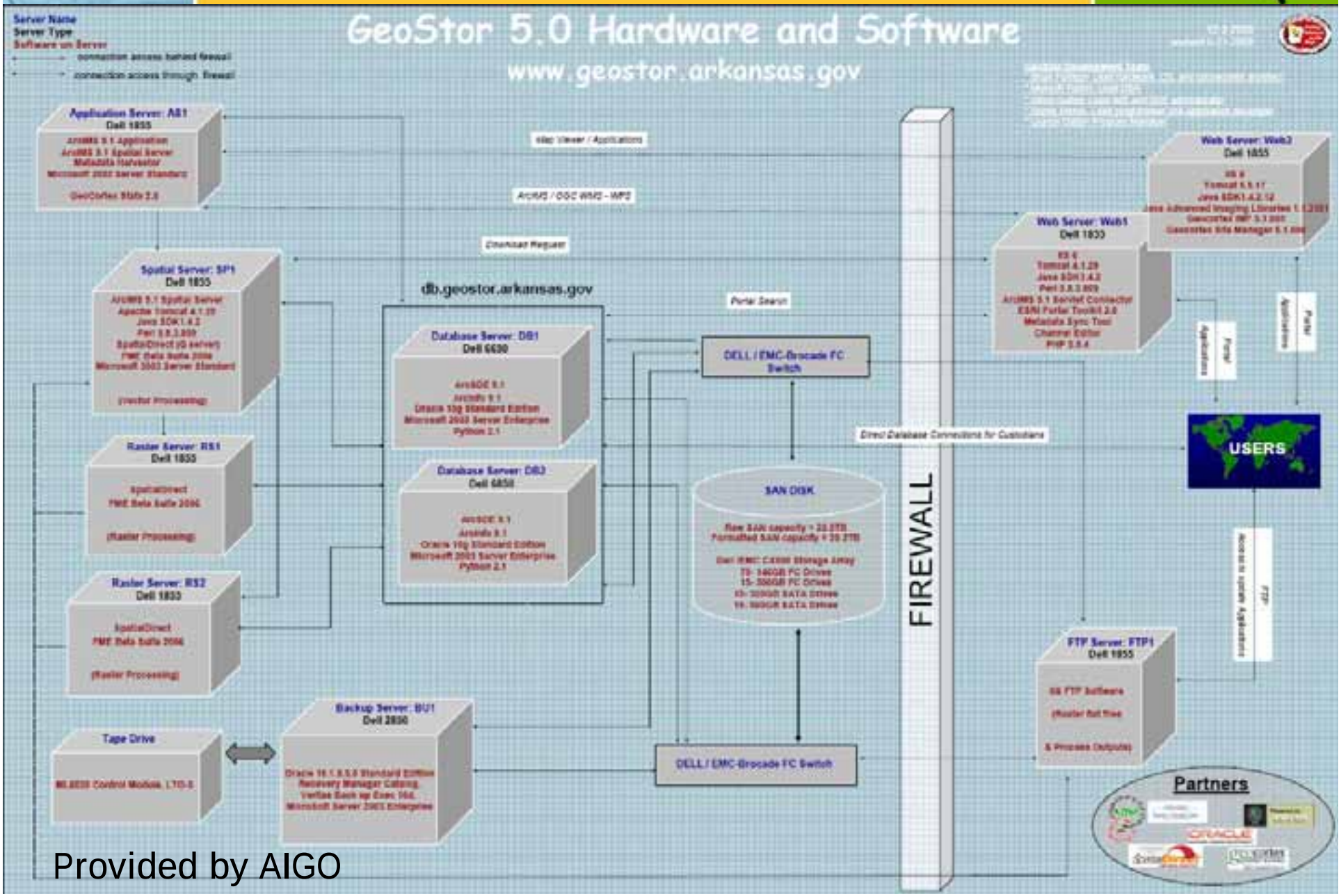
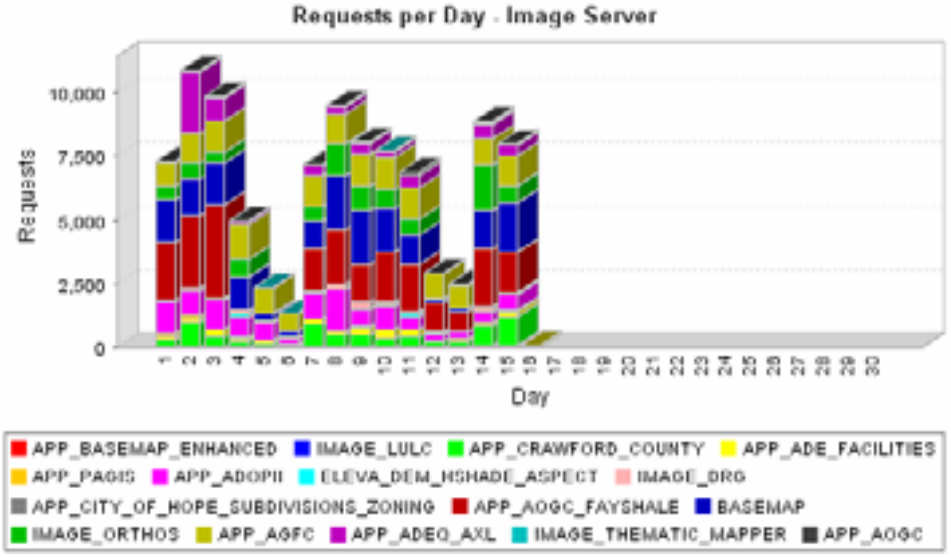


Provided by AIGO


GeoStor - Arkansas' Official GeoData Clearinghouse - Internet Explorer provided by Dell
http://www.geostor.arkansas.gov/Portal/index.jsp
Google
GeoStor - Arkansas' Official GeoData Clearinghou...
GeoStor 5.0
Arkansas' Official GeoData Clearinghouse
Login
Username:
Password:
LOGIN
Click here to create a new account!
Forget your log in?
Find Data
Map Viewer
Applications
FTP - Rasters
GeoStor At the Core!
How To
Disable pop-ups in your browser
Connect to Map Services
Save a Map or Email a Link to a Map
Contact AGIO about loading your data into GeoStor
Work with the XML metadata delivered with GeoStor downloads
Information
About This Site
Quick Start Guide
Free GIS Data Viewers
Contact Us
GeoStor Statistics
Internet | Protected Mode: On
100%
Done
Internet | Protected Mode: On
100%

Benefits

- Reduced costs for state
- Reduced wait times for end users
- Metrics on layers and areas interest
- Increased number of formats for data



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Challenge

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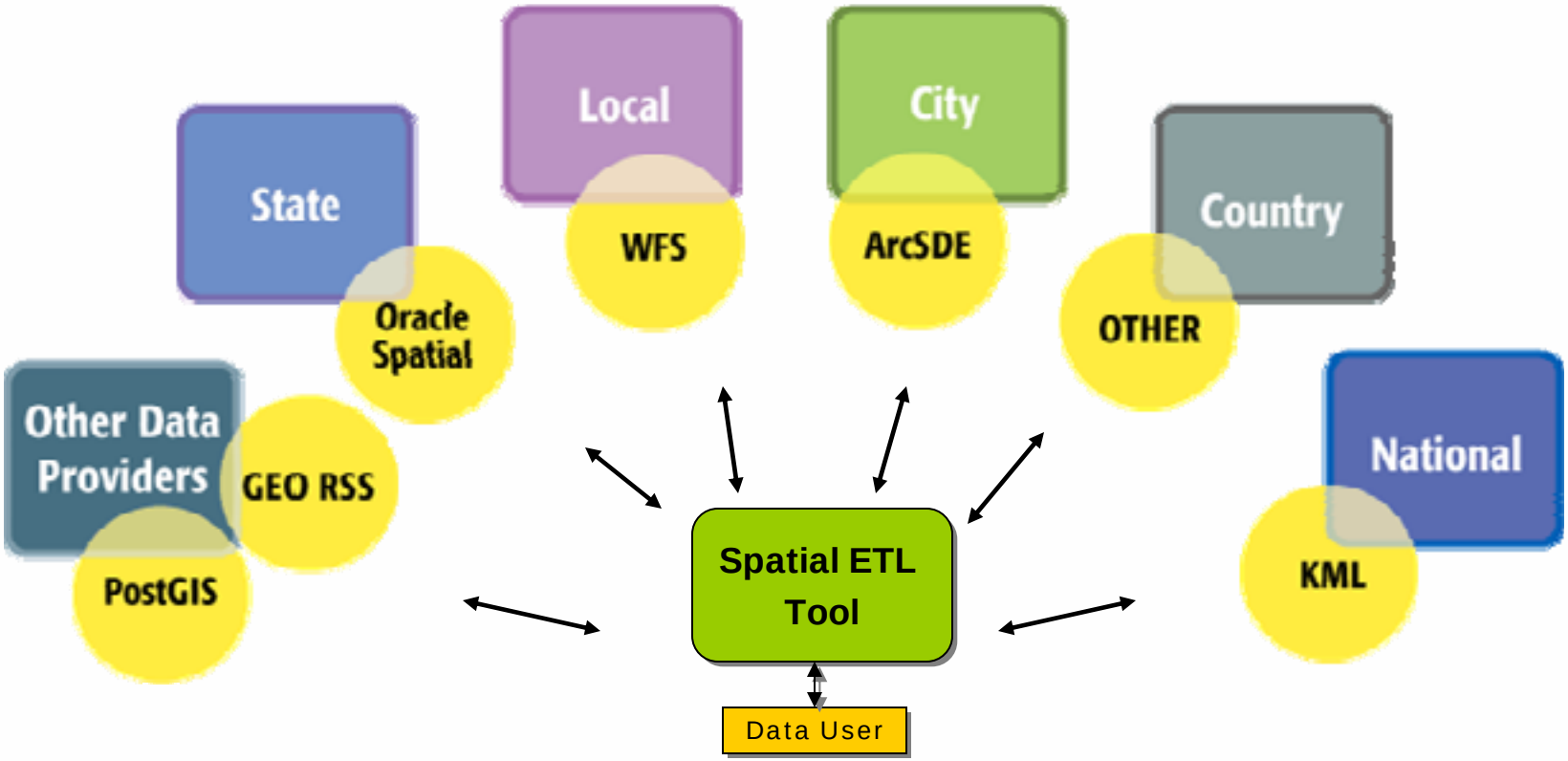

Different systems and data models

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Challenge
Data Harmonization

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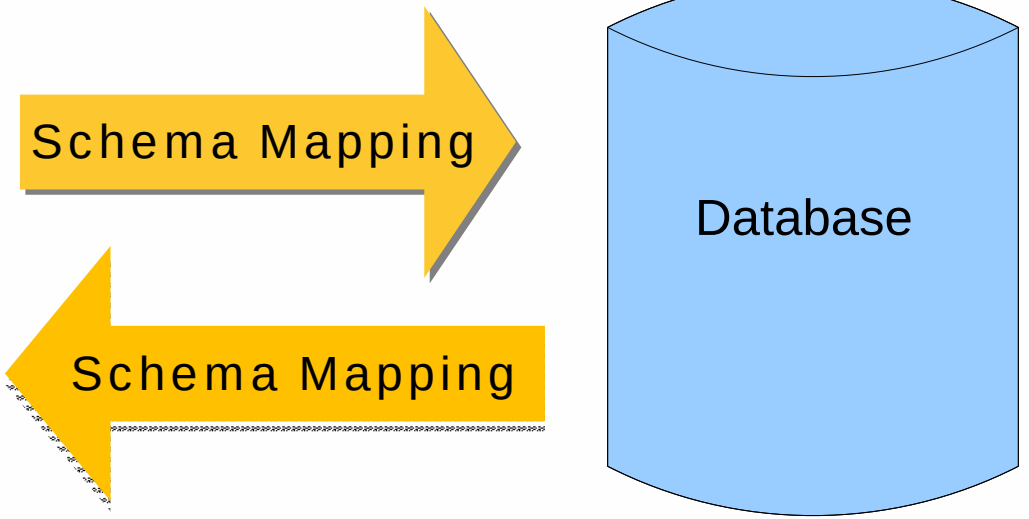

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Schema Mapping Concept

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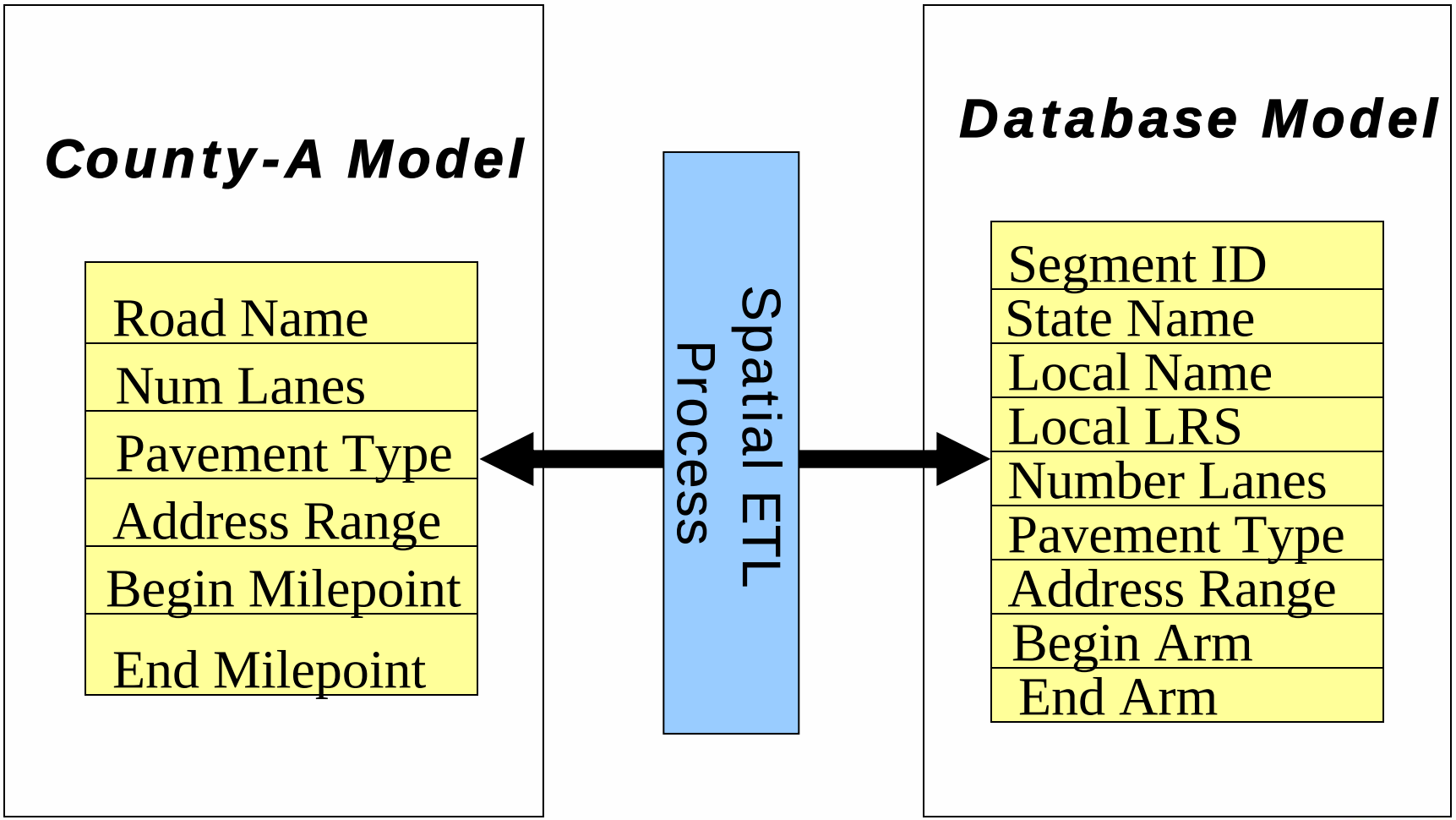

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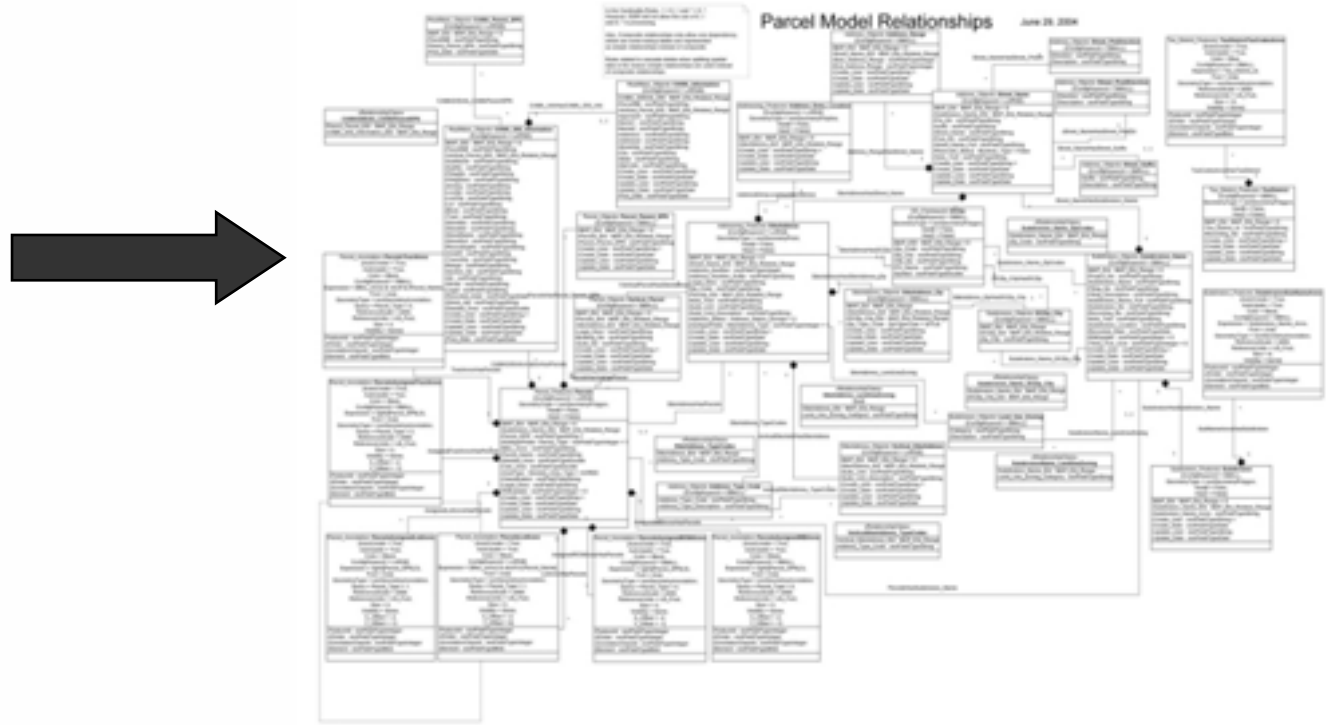
Collecting Information

- **10 very different data schemas, from the very simple to the very complex**

PGDB

Coverages

Shapefiles



Source: Arapahoe County

Collecting Information

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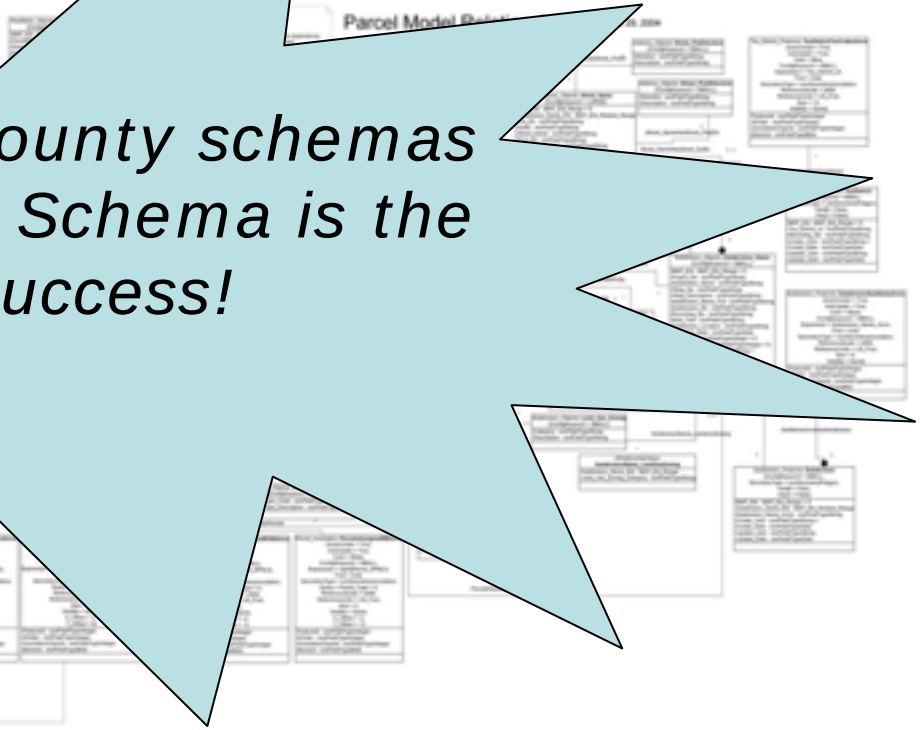
- **10 very different data schemas, from the very simple to the very complex**

Resolving the county schemas into the Master Schema is the key to success!



Source: Arapahoe County

Database Schema

- **Prototype application with 8 spatial data layers**
  - Roads
  - Parcels
  - Census Blocks
  - Municipalities
  - Lakes
  - Streams
  - Fire stations
  - Schools

Plus two non-spatial layers to support one-to-many relationships

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Collecting Information

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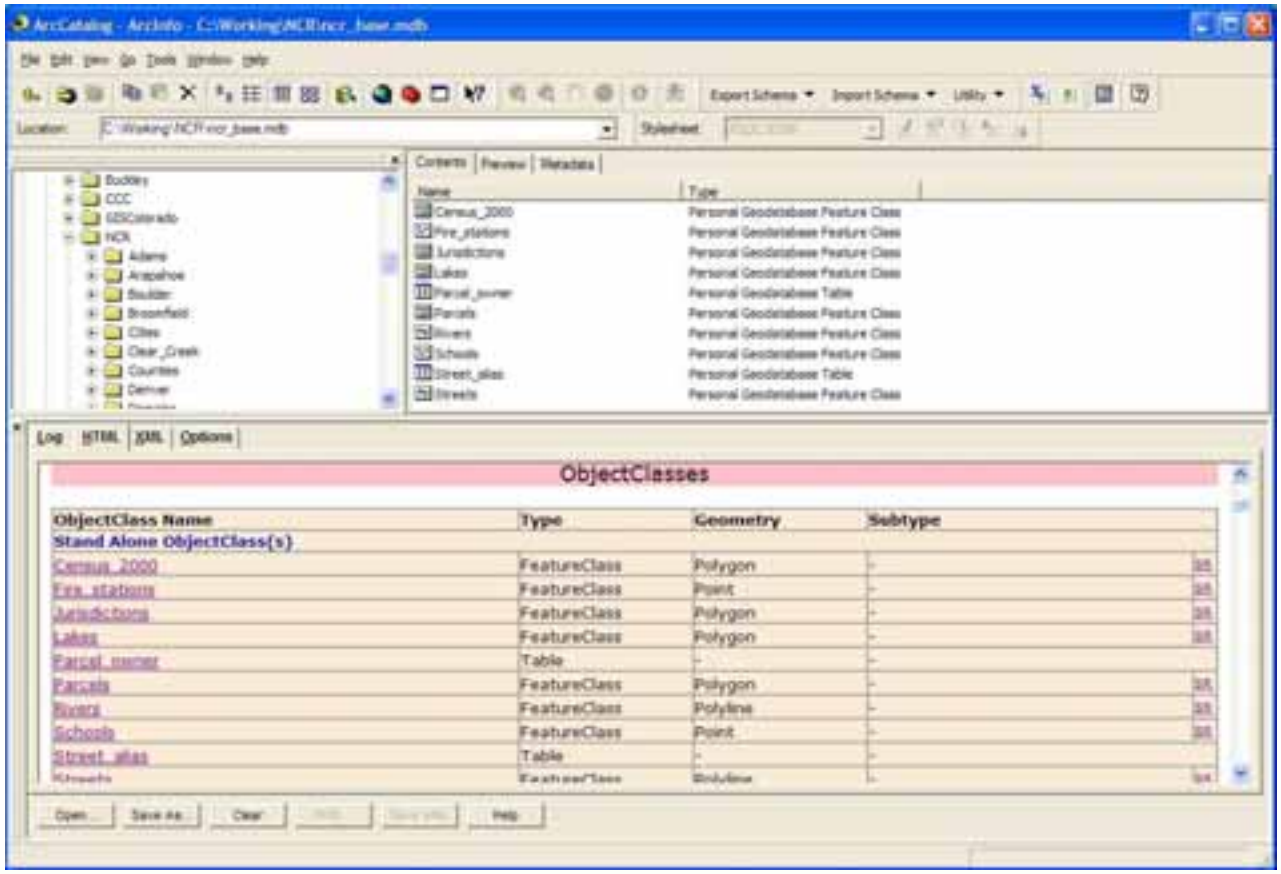
- **NCR data schema developed to house translated data sets**



Feature classes, attributes, and domains need to be mapped and translated

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Application Design

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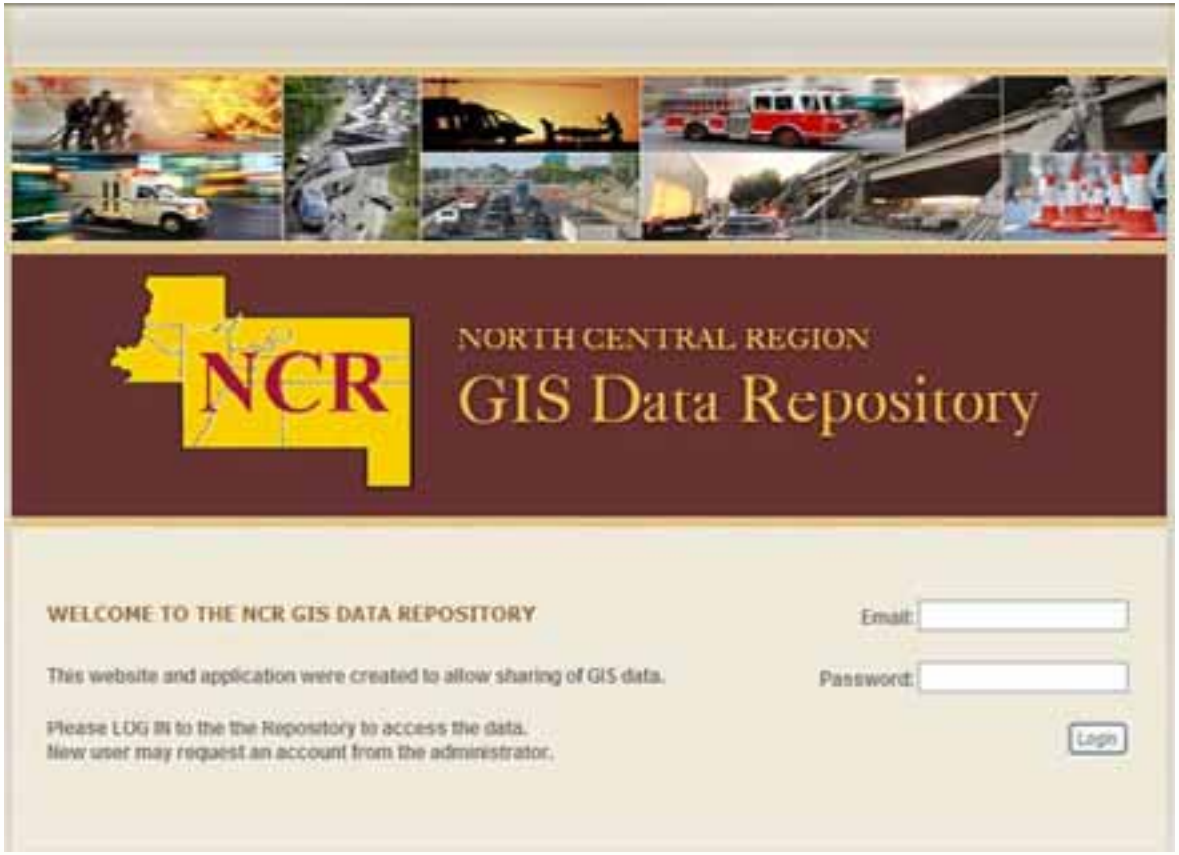
- **ArcSDE/Enterprise Geodatabase**
- **Password-protected web application**



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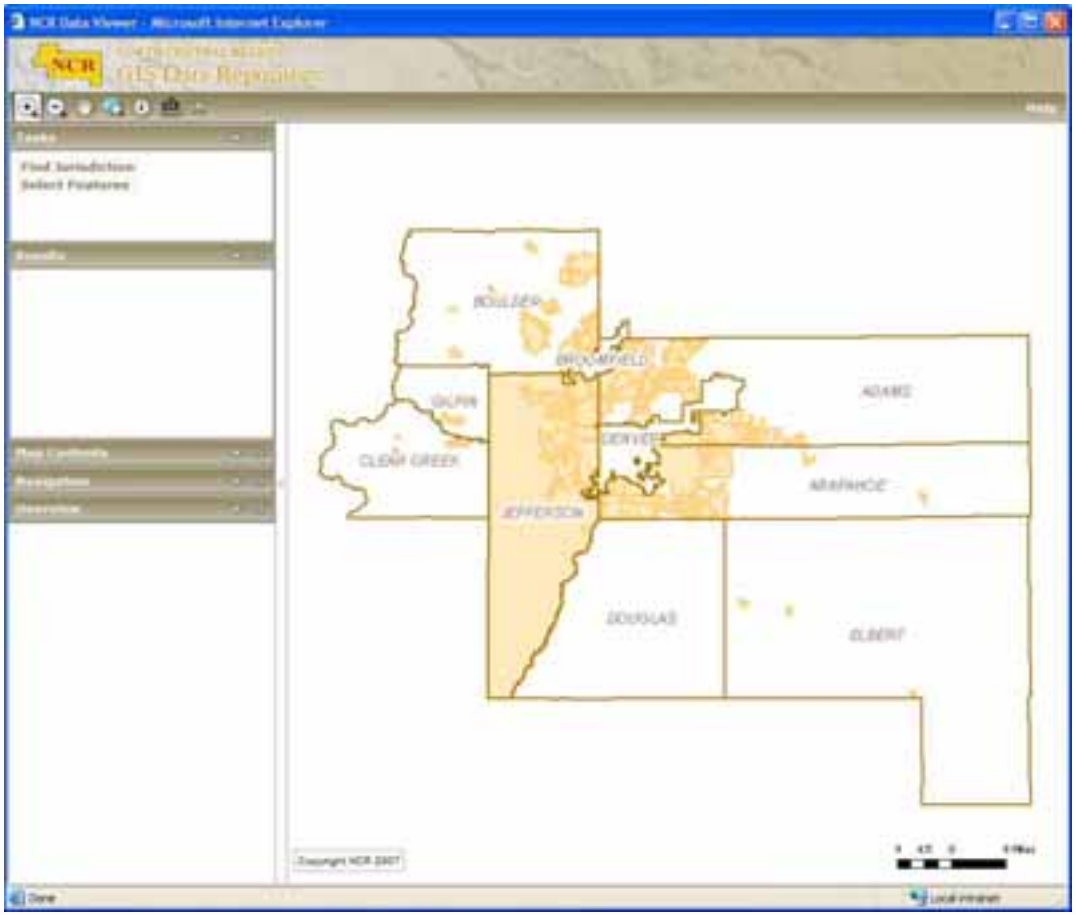
Application Design

- **ESRI ArcGIS Server web-based mapping application**



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Data Upload

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Data Upload

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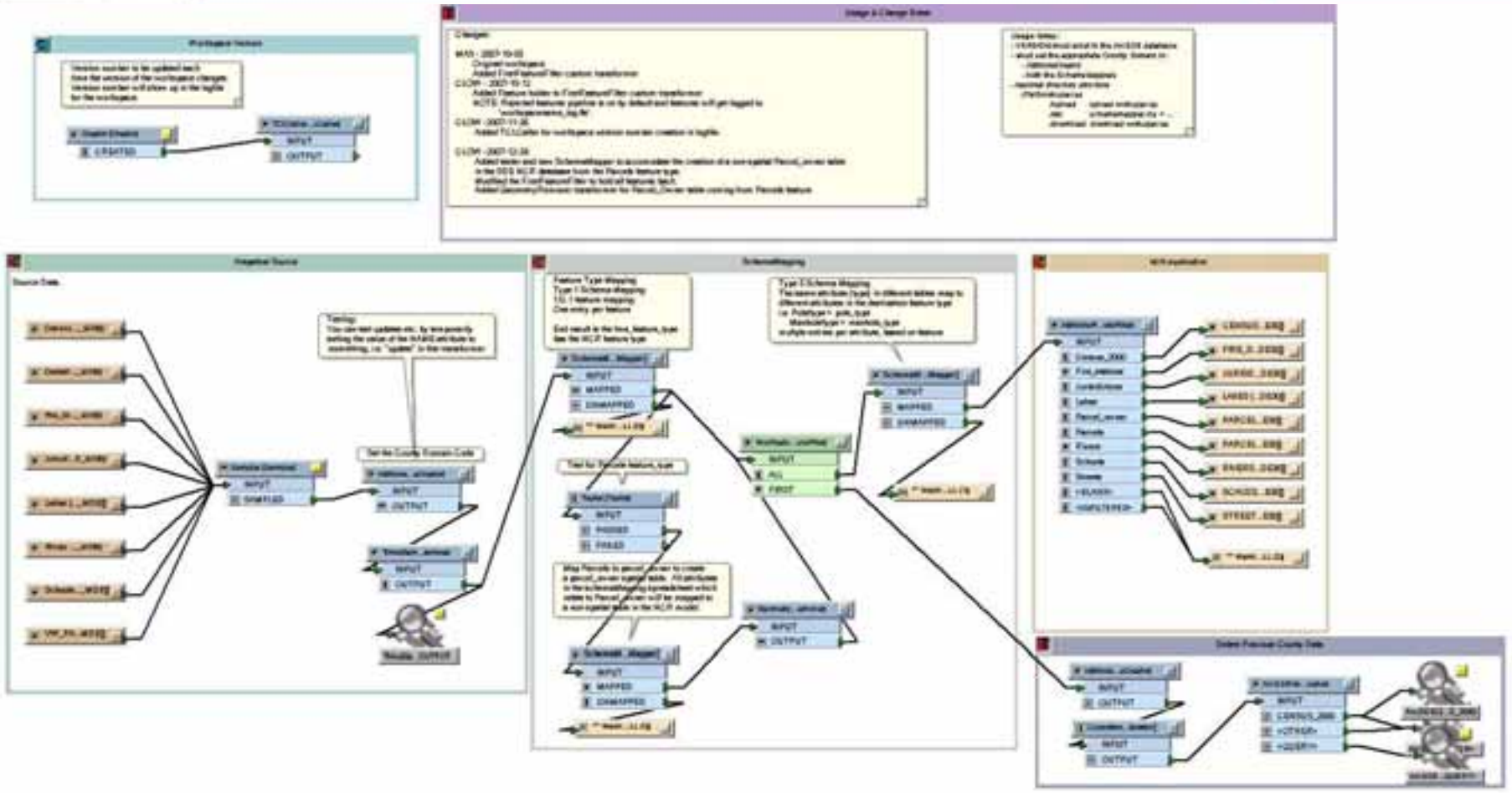

Data model changed as part of upload process.

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Data Download

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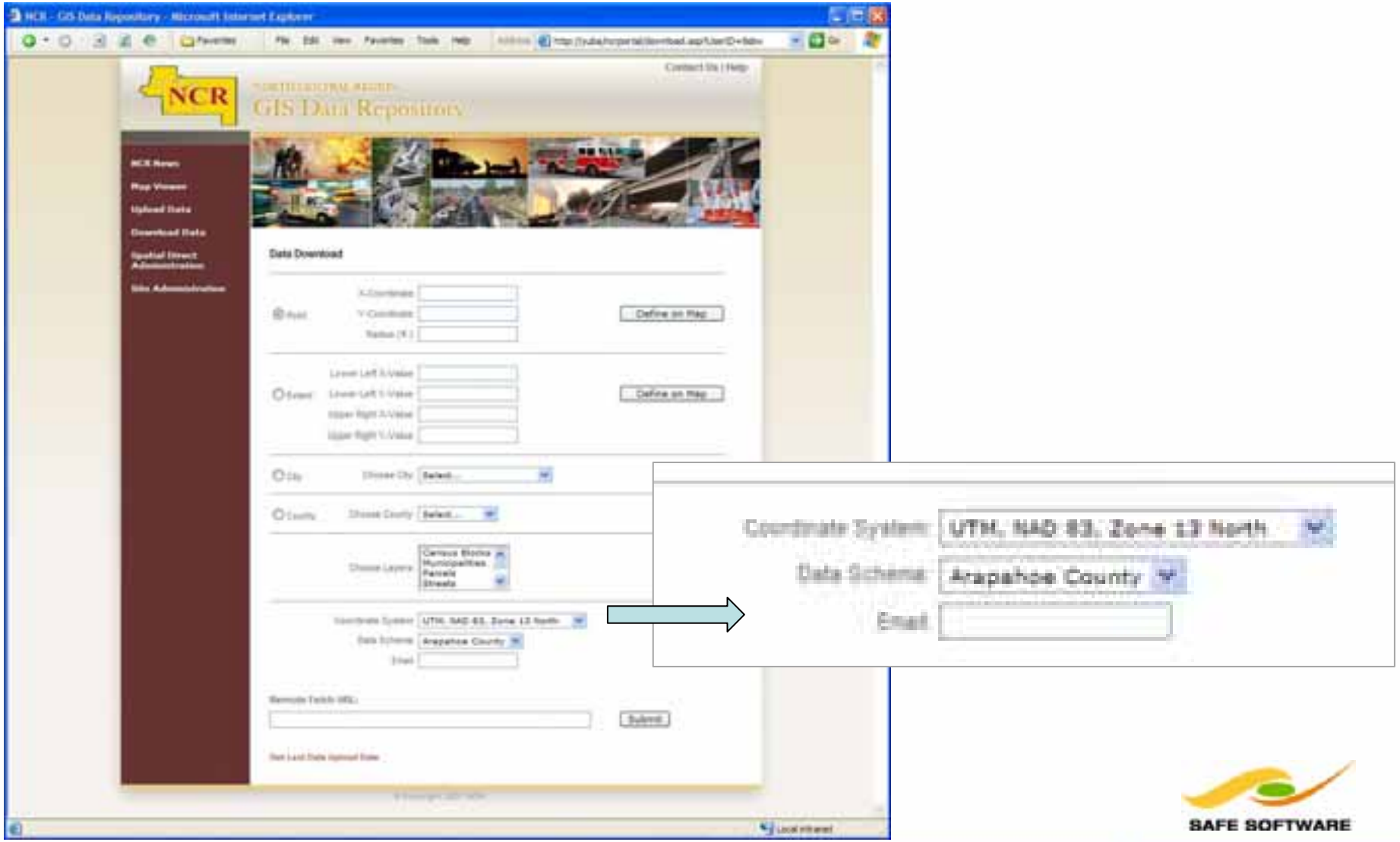

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Data Download

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- **Download Area Options**
  - By Area – Drag a rectangle, define on map
  - By Point and Buffer - Define on map
  - By Municipality – Clip polygon
  - By County – By County field in attribute table
- **Schema Options**
  - 10 different counties plus NCR master schema
- **Coordinate System Options**
  - UTM, 4 different state plane, LL NAD83
- **Layer Options**
  - Select any and all available data layers

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Benefits

- **Unique planning tool with seamless region-wide dataset**
- **Dialog between counties promotes better coordination**
  - Edge matching
  - Data schema harmonization

- **Serve as a model for inter-region and statewide coordination**

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Challenge

- Integrate multiple county's data
- Provide data to first responders for situational awareness
- Easily expandable architecture

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Solution Concept

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- **Each county produces a WFS feed**
- **W[illegible] data loade[illegible]to De[illegible]ent of Hom[illegible]Secu[illegible]odel**
- **[illegible] need[illegible]**

Resolving the county schemas into the Master Schema is the key to success!

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Architecture

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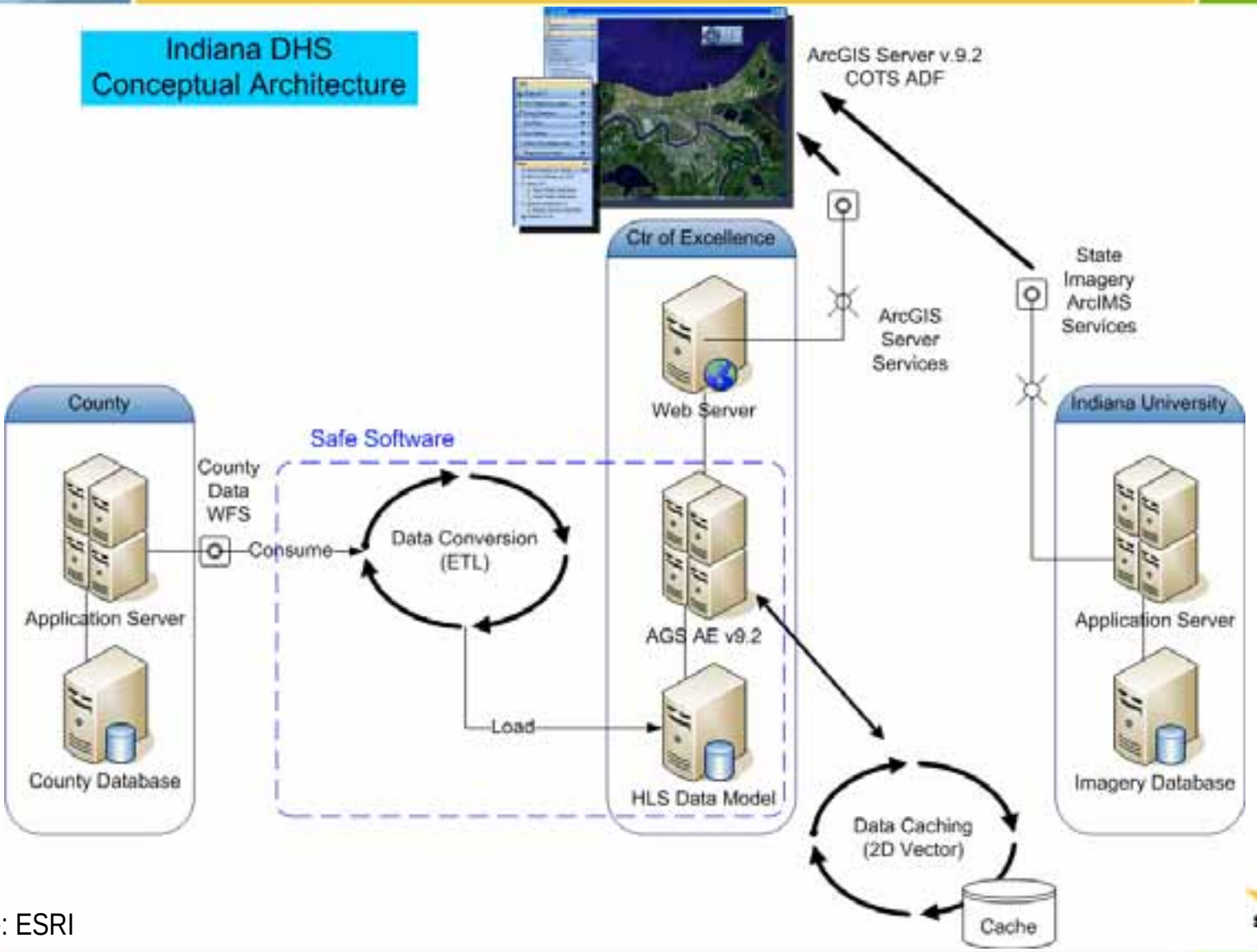

Source: ESRI

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Benefits

- The most current data in the state
- Centralized data available to all partners
- Simple, customizable user interface
- Enables high-level financial analysis of an impacted area

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Challenge

- Integrate CAD and GIS data from different counties
- Build data store which facilitates tool choices for future.
- Conflate data to build unified view.

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Ohio District 2

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CAD Management

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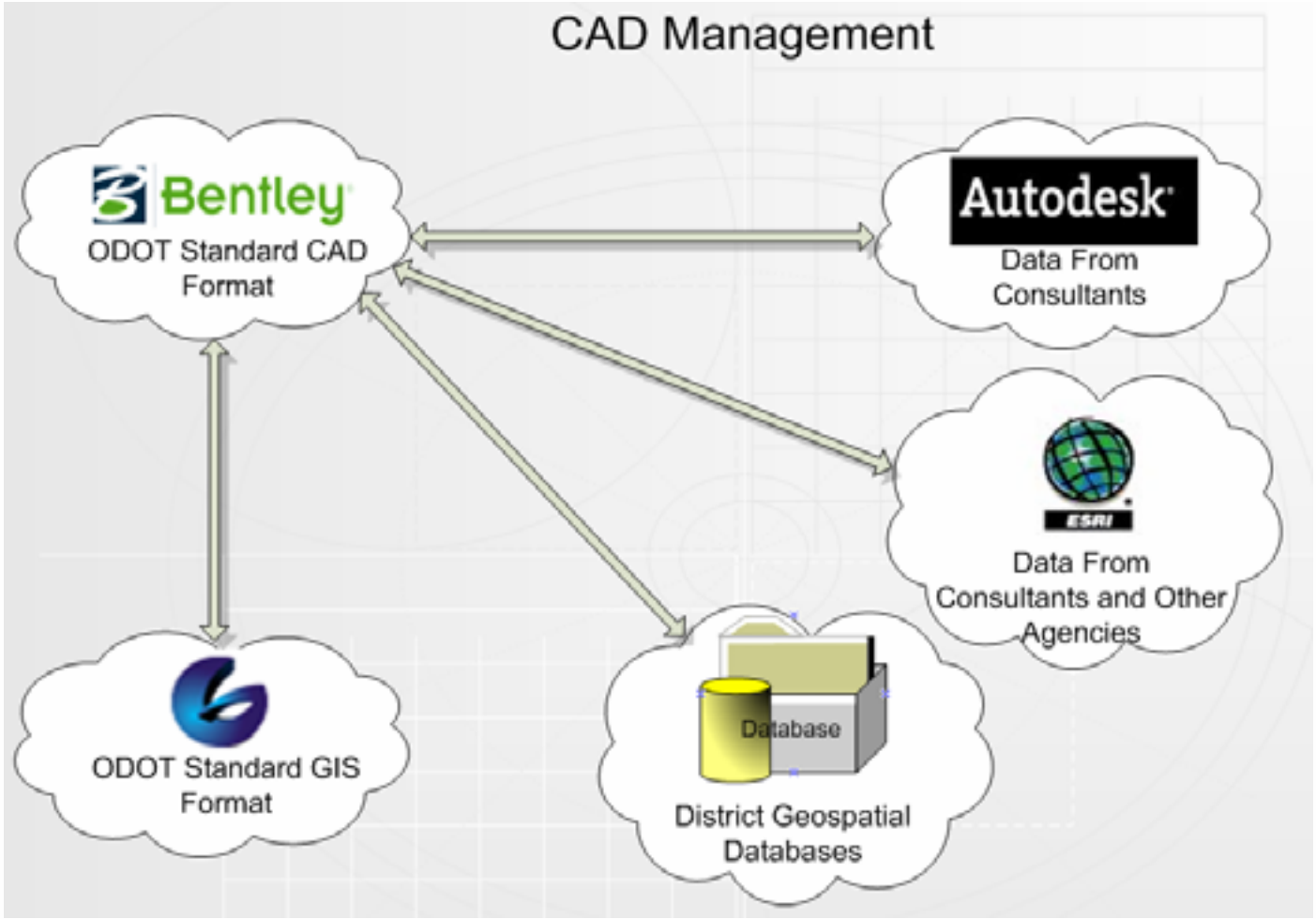

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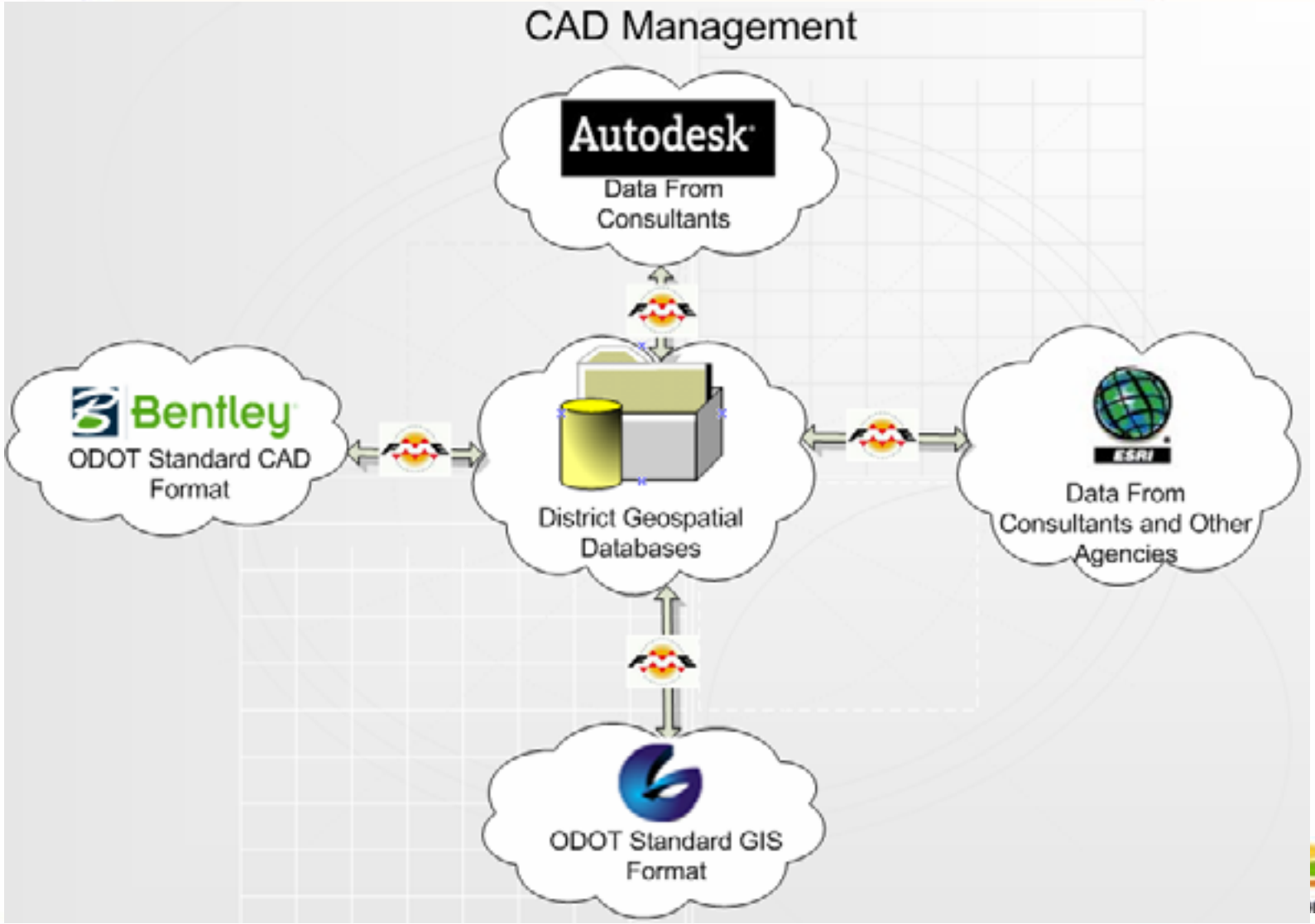
CAD Unification



Asset Management

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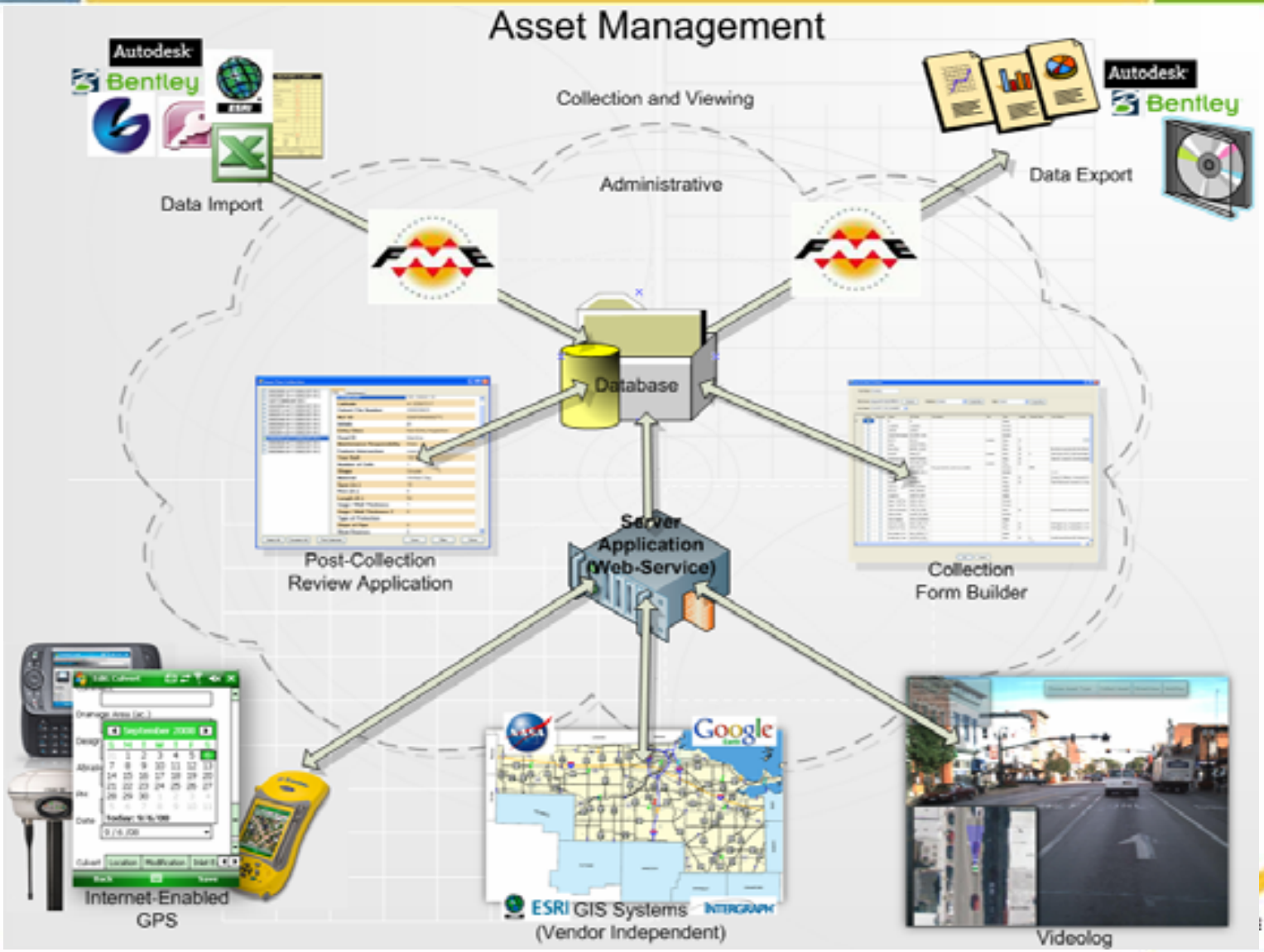

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GIS Management

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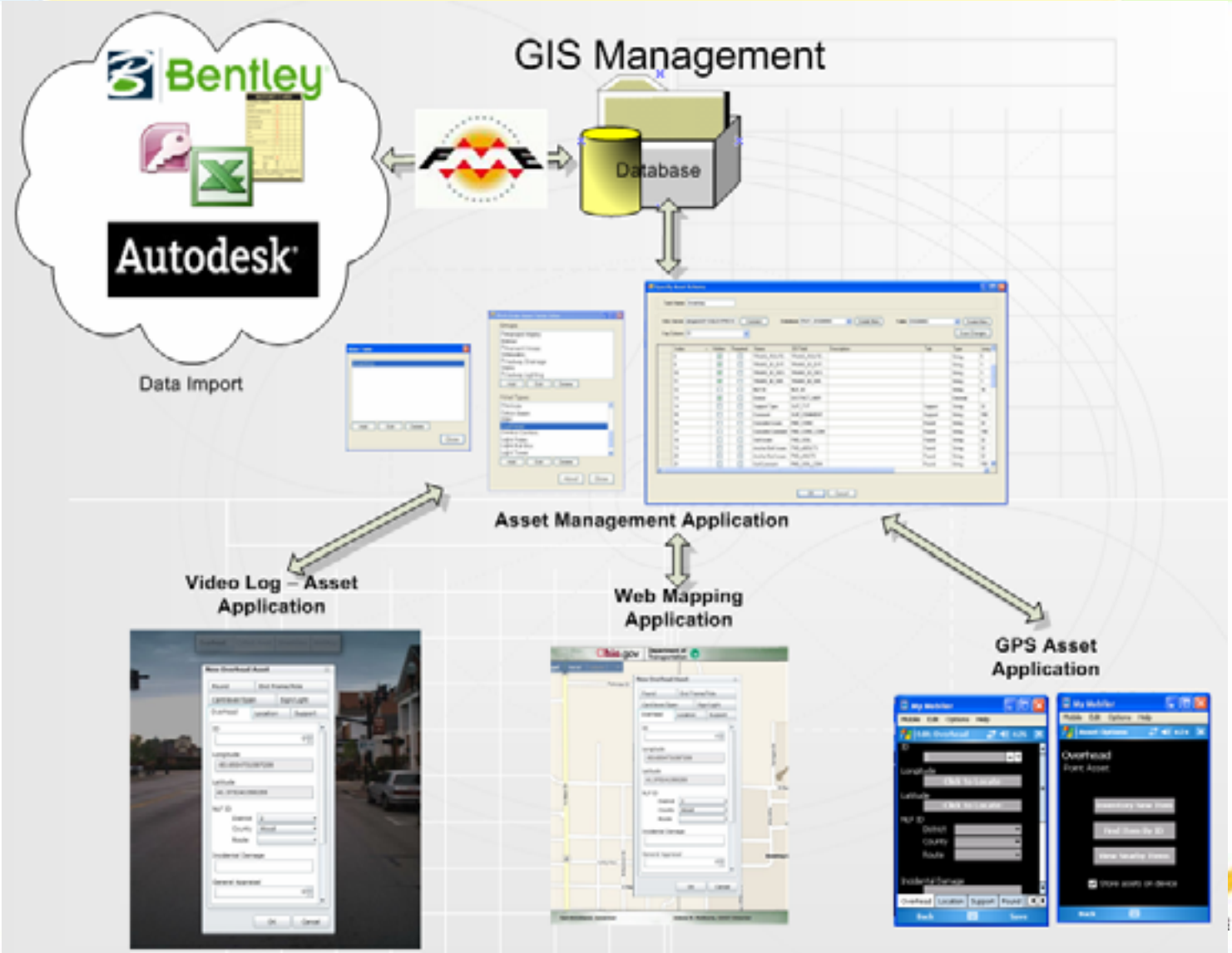

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Future Projects

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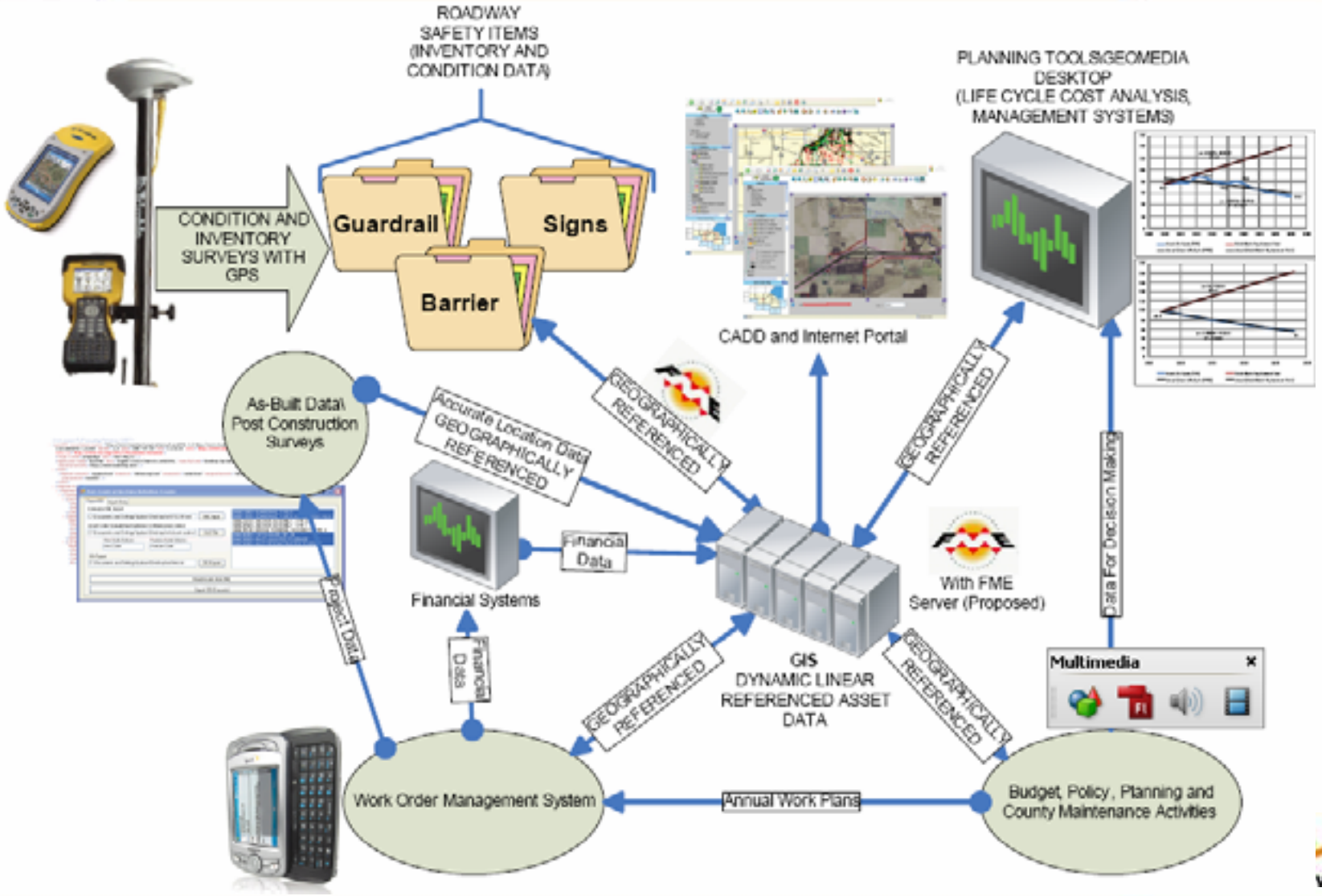

Benefits

- Reduced data Redundancy
- Increased Data availability thru web-based interface to all stakeholders
- Reduced cost thru more efficient operations
- Lives saved thru more current information.
- Architecture makes future growth much easier.

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Summary

- **There are many ways to share spatial data assets using Web Technology**
- **Data Harmonization is key to effective data sharing between groups**
  - Requires a common understanding of the data that is being shared.
- **Spatial ETL is technology focused on resolving data model differences**
  - Enabling users to get the data they need to the applications they use.

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Summary

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To learn more, please contact me at

Don.Murray@safe.com

Thank you!

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