Spatial Infrastructure at Iowa DOT

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Agenda

- Iowa DOT Spatial Infrastructure
- What is GeoNexus
GIS Philosophy

- Federated Model
  - Rely on offices to have GIS analyst
  - IT supports geospatial infrastructure and coordination
  - Offices produce data for DOT and public consumption
GIS Philosophy

Database central and software neutral

- Rely on central spatial data repositories in Oracle (G)
- Rely on data repositories in an enterprise database (IS)
- Business data and spatial data may or may not reside in the same database
- As long as software can read Oracle Spatial objects (SDO_GEOMETRY)
Why Database Central Philosophy

- Multiple business systems; too expensive to redesign for spatial objects, better to retrofit
- New systems should take spatial objects into account
- Look for ways to leverage existing spatial objects across systems
  - Building footprints, bridges, roads, towers, heliports, etc.
  - Linear Referencing System
Geospatial Tools

- Over $13 million invested in hardware, staffing and software.
- 3 FTEs in IT Division coordinate, implement, maintain and educate
- 2 Part Time staff (ISU Students)
Geospatial Tools

- **Database**
  - **Spatial Data**
    - Oracle Spatial (6 copies; 3 test 3 production)
    - 2 Production and 1 LRS Production
    - 2 Test and 2 LRS Test
    - LRS Production and Test in 64 bit Windows environment
  - **Business Data**
    - Oracle
    - SQL Server
    - IDMS
    - Access
    - Excel
Geospatial Tools

- Imagery
  - Statewide from 2002 and collect imagery from over 30 counties through agreements
  - 1930’s photos
  - Project flights
  - Spatial footprints of images stored in Oracle spatial
  - Use TerraShare from Intergraph
  - Leverage ISU image server
  - Expose to Service Layer - GeoNexus

- LiDAR
  - Collection is going on now
  - DOT will store 12+ TB of LiDAR, contours, DEM for continuation of government and portal failover
  - Partnership with DOT, UNI and DNR to create and maintain LiDAR portal
Geospatial Tools

Software

- 50 GeoMedia
- 30 GeoMedia Pro
- 20 GeoMedia Transaction Manager
- 2 GeoMedia Transportation
- 2 GeoMedia Transportation Analyst
- 18 copies ArcView
- 2 copies ArcInfo
- 15 Google Earth Pro
- Google Earth Basic deployed to all computers
- TerraShare Client
- 5 copies Quick Terrain Modeler (future)
- 2 LDMx
- TransCADD
- 2 ArcGIS Server
- 1 ArcGIS Image Server
Geospatial Tools

- Web Based
  - Software
    - GeoMedia Web Map
    - Google Maps
    - ArcGIS Server
  - Implemented internal GIS service layer called GeoNexus
Linear Referencing System

A set of procedures and methods for specifying a location as a distance, or offset, along a linear feature, from a point with a known location.
How Does LRS Support Iowa DOT

- Ability to locate roadway features along a linear network
- Examples of transformations between Linear Referencing Methods (LRMs)
  - Reference Post to Coordinate Route
  - Mile Point to Reference Post
  - Literal Description to Coordinate Route
- Accurate Centerline
- One of a few states that have all public roads at DOT level
114,000 Miles of Public Road
GeoNexus
The Problem

- How does the DOT integrate data to benefit the maximum number of people?
- Is critical transportation information shared and integrated in a common way?
- GeoNexus can allow Iowa DOT to work smarter not harder.
Need Geospatial Data Interoperable Standards

- Common IT infrastructure and technology
  - Databases that can relate data
  - System design that takes into account other data
  - Storage of geometry or location
  - GeoNexus
- Common way to exchange geospatial data with centralized technology
  - Web services
    - WMS, WFS, WCS
  - Maps, graphs, PDF
- Location Referencing Methods (LRM)
- Standard projection(s)
- CADD/GIS Integration
By fall 2008 the GIS IT group had spent two years looking at web services for the Iowa DOT.

- It had become clear that more systems would benefit from web services.
- Some of these systems are I-80 portal, WeatherView and Truck Routing and can all benefit from a WMS/WFS

Fall 2008 after a presentation to IP Steering on the importance of using WMS/WFS as a standard

- Steve Gast approved and championed the initial costs.
- Jim Rost is supporting the service layer project via funding.
Web Map Service (WMS) produces maps of spatially referenced data dynamically from geographic information for display as an image.

Web Feature Service (WFS) provides an interface allowing requests for geographical features across the web using platform-independent calls. For example, one could query primary road centerline data and return only roads that have asphalt and paved shoulders.

As more DOT systems require real-time and interactive maps, the Iowa DOT is providing a standard way through Open Geospatial Consortium (OGC) Web Map Service (WMS) and Web Feature Service (WFS) to disseminate geospatial information.
The Iowa DOT has a wealth of business data that has or can have a geographic component to it.

- This geographic component allows individuals the ability to see their business data on a map and allows their data to interact spatially with other data.
- Geographic component also allows spatial analysis to take place.
Data Available

- Aviation
- Basemap
- Boundaries
- Facilities
- Imagery
- Imagery Statewide
- Trails
Questions