The National Integrated Land System (NILS)

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June 24, 2005

Topics

- Purpose/Goal
- Functional Components
- Design
- Data
- Question

BLM's Responsibilities (OMB A-16)

- Public Land Records
  - Public land conveyance data

- Federal Land Ownership Status
  - Real and mineral property

- Cadastral
  - Public Land Survey System

NILS Facts and Figures

- BLM manages:
  - 262 million surface acres
  - 700 Million subsurface acres
- 130 million parcels/ 28,000 PLSS Townships
- ~ 250 survey and measurement users
- ~ 900 parcel management users
- USDA Forest Service manages 8.5 percent of U.S. land

Problem to Solve

- Poor spatial accuracy of base GIS features is a problem compounded by the fact that many other layers are constructed from these base features

- Multiple programs in the PLSS Maintenance process

Goal

- A simple system to create and manage survey geometry in ArcGIS
- The system must be extensible, follow survey methods, improve existing datasets, and maintain spatial relationships between the survey networks and associated GIS data
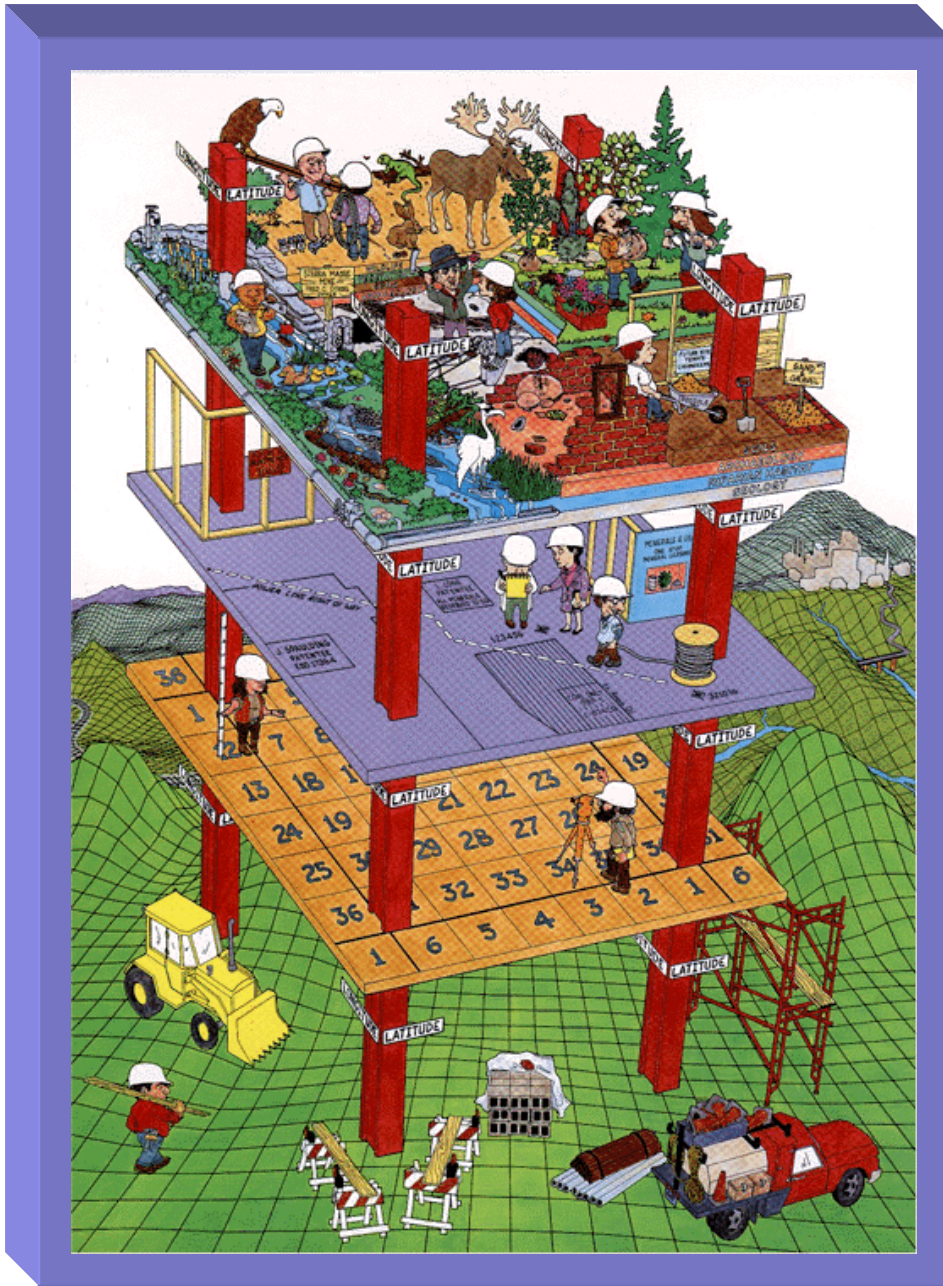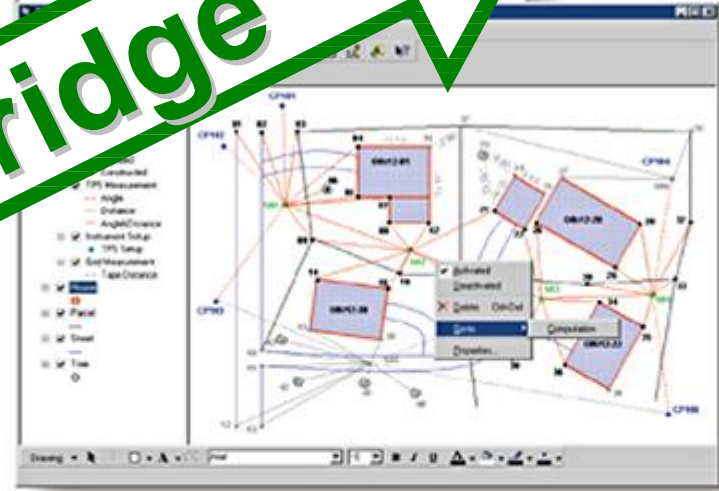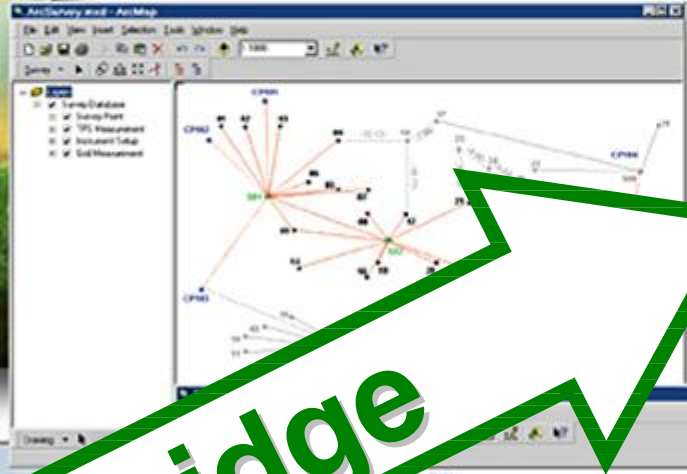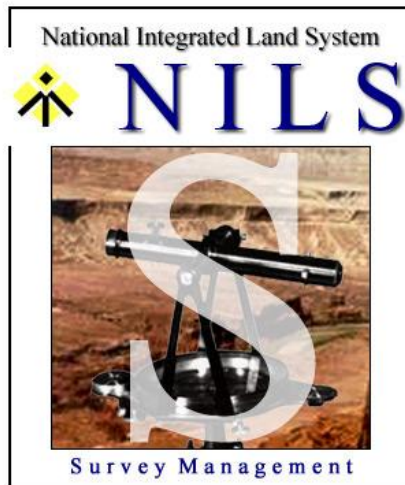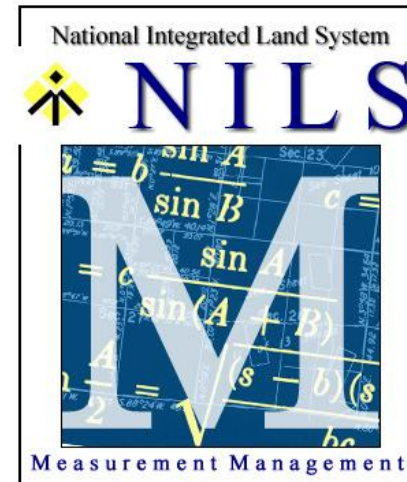
1990's
Vision

GIS

Bridge

Survey

Geodata.gov

- Part of the [Geospatial One-Stop E-Gov initiative](#) providing access to Federal, State, and Local geospatial data and information.
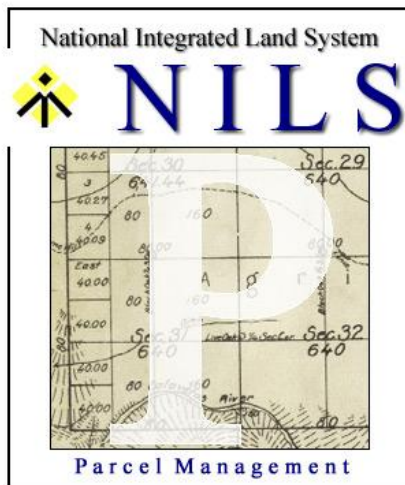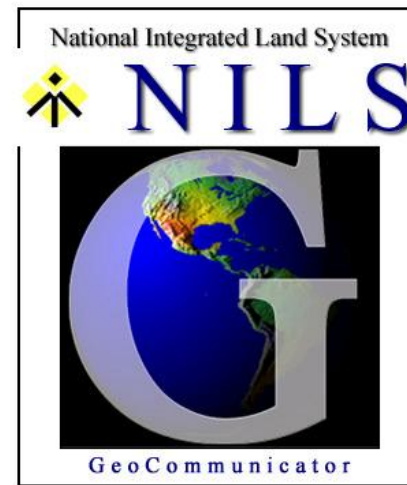
NILS Functional Components

Survey Management

Measurement Management

Parcel Management

GeoCommunicator

Survey Management

This will support the capture of measurement features and metadata directly into **a GIS database format**.
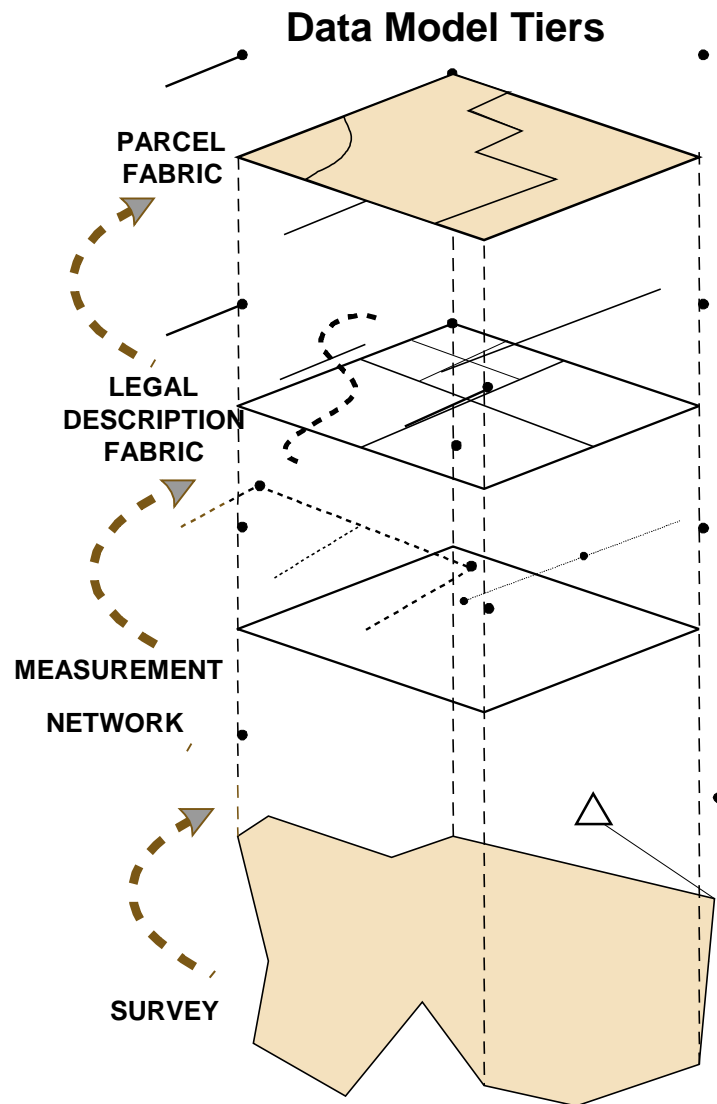
The goal is to minimize the need for data conversion and re-construction as measured features are incorporated into the land records management system.

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Measurement Management

Data Model Tiers

PARCEL
FABRIC

LEGAL
DESCRIPTION
FABRIC

MEASUREMENT

NETWORK

SURVEY

Provides the foundation for the legal description and parcel fabric tiers.

Integrated maintenance of cadastral data is made much more efficient when **geometry** can be **shared**.

Interpretation of (1) the **reliability** of each point position and (2) where data editing is needed.

New **data** can be **added**, and data elements that do not contribute to the optimal solution can be **removed**.

Any **area** can be selected and **readjusted**, e.g. to update point positions affected by newly-added data.

Parcel Management
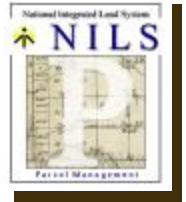
Provides a process for managing land records and cadastral feature data stored in the database model.

Provides custom feature classes, tools, and procedures for editing land records in a transactional, history-tracking environment.

Support will be provided to allow users to construct and edit legal description fabrics and to create required parcel fabrics from them. Parcel fabrics may include ownership, land use rights, tax assessment, and others.

Measurement Network

Legal Description Fabric

Parcel Fabric
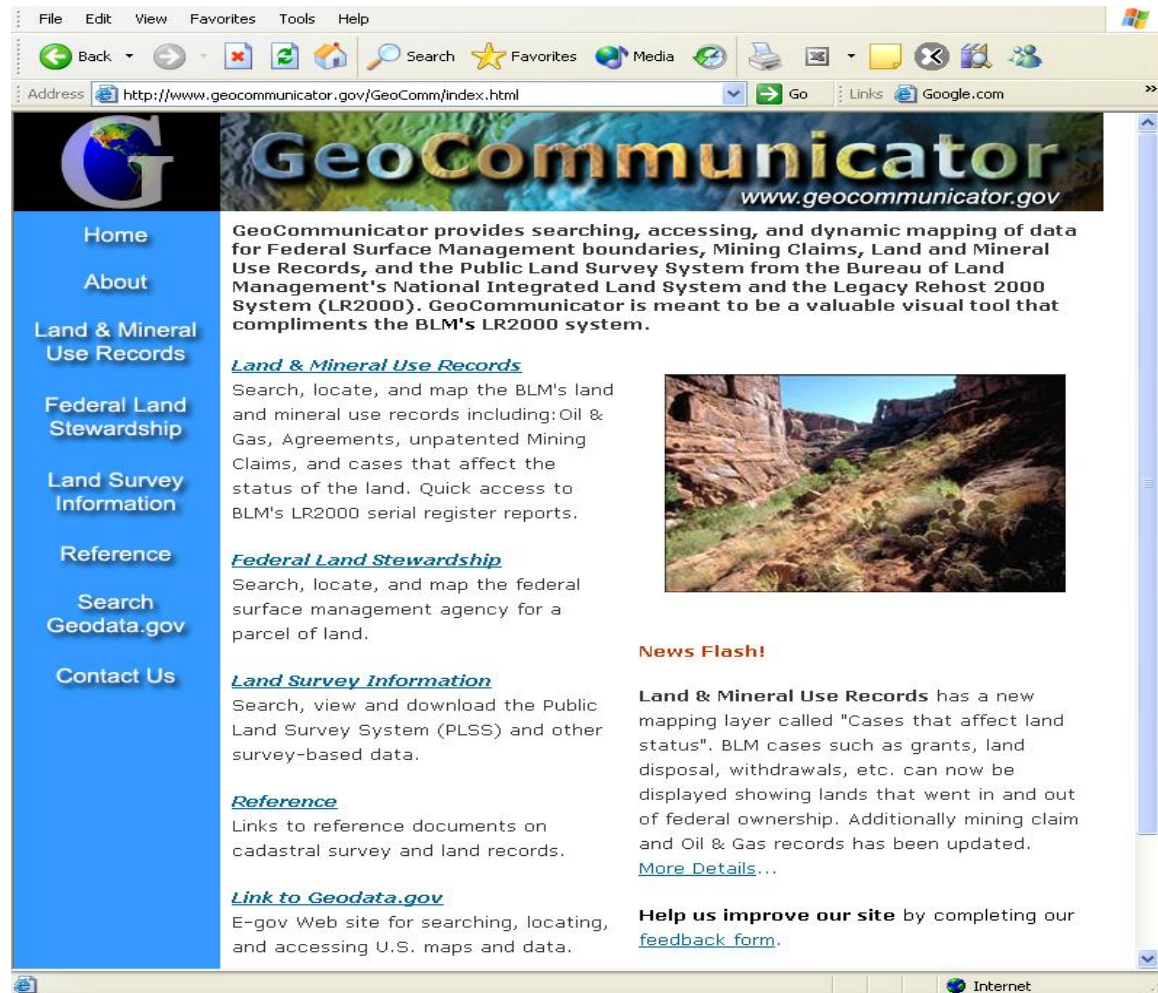
PARCEL FABRIC

LEGAL DESCRIPTION FABRIC
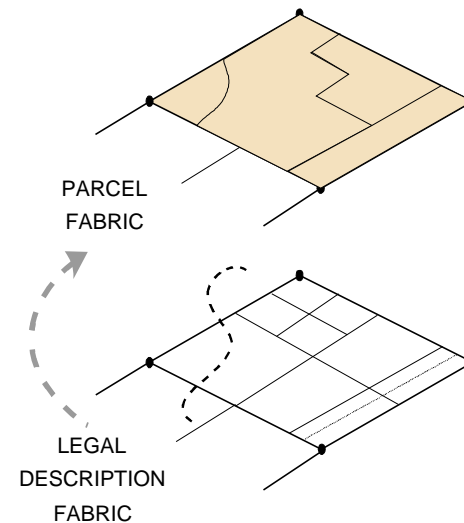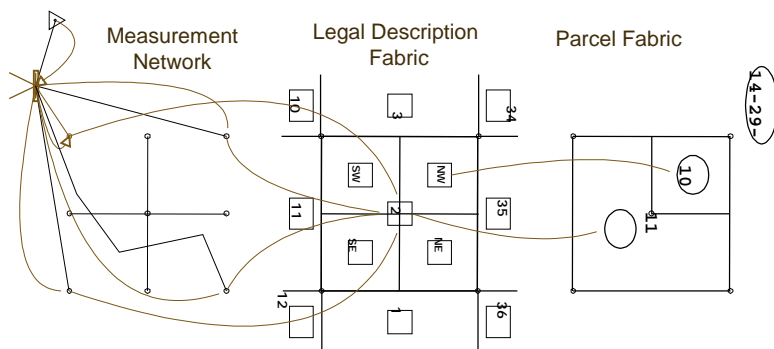
GeoCommunicator
ww.geocommunicator.gov

Internet Site

- Land Survey Information System

- Federal Land Stewardship

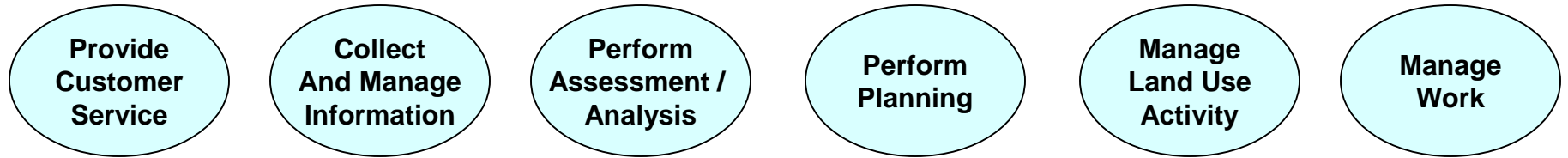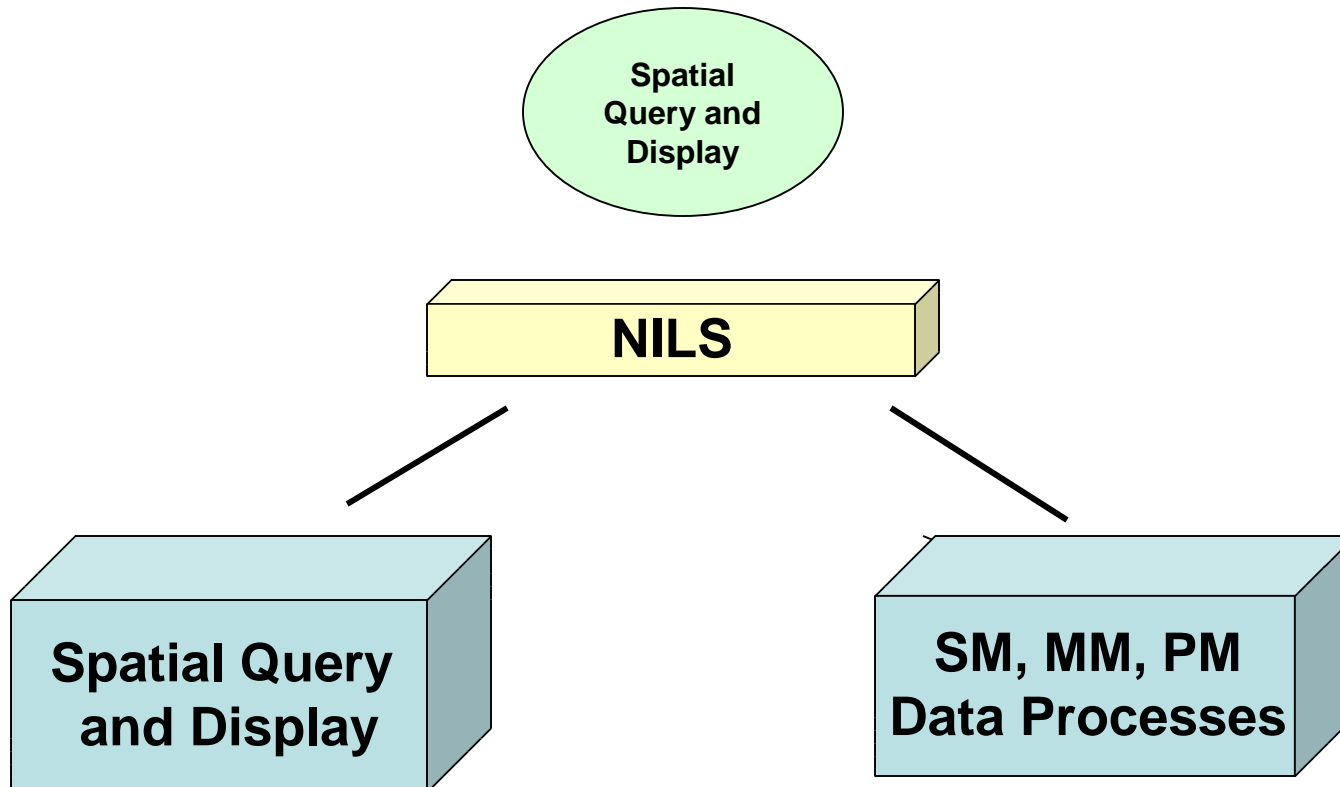- Land & Mineral Use Records

- Reference Data

NILS

- NILS comprises transactional and publication components:

    – The ArcGIS implementation for creating and maintaining Survey, LD, and Parcel data is the *transactional* component

    – The ArcIMS implementation for viewing, querying, and downloading data is the *publication* component

Design

Higher Level BLM Business Processes

- Provide Customer Service
- Collect And Manage Information
- Perform Assessment / Analysis
- Perform Planning
- Manage Land Use Activity
- Manage Work

Business Process Components

- Spatial Query and Display

NILS

Spatial Query and Display

SM, MM, PM Data Processes

New Survey Data

GCDB

Data Prep

Input Data

GCDB files
Coverages
(LD)

Flat files
(Surveys)

LD importer

SFF
Importer

**LD
Fabric**

**Survey
Fabric**

SM/MM

Parcel Management
Business Rules &
Custom Applications

PM

**Parcel
Fabric**

**Custom
Applications**

Business Rules
Section Subdivision
Geodetic Calculations

**COTS Applications
ArcGIS**

Least Squares Analysis
Topology Analysis
COGO

**Land
Records**

LR2000

ArcSDE

**GeoData -
base**

Transaction Database

Publication Database

ArcIMS

LSIS

Internet

Customer

Business Processes

NILS Analysis & Design

FGDC Cadastral Standard

Legal Description Fabric

LegalAreaDescription

LADBase

ParcelLegalArea

LegalAreaRecordBoundary

LegalAreaCorner

Parcel Fabric

Parcel

RecordBoundary

Corner (Legal)

ParcelRecordBoundary

RecordBoundaryReference

RecordBoundaryCornerPoint

ParcelArea

Line

CornerPoint (Monument)

Measurement Network

StraightLine

CircularCurve

OtherCurve

CornerPointMeasuredCoordinate

Restriction

Agent

ParcelTransaction

TransactionAgent

PublicAgency

Organization

External Parcel Data

TransferredRight

Address

Individual

ParcelAddress

AgentAddress

NILS Software Architecture

Survey Management

Measurement Management

Parcel Management

Survey Analyst

Arc Catalog   Arc Map   Arc ToolBox

GeoData Objects

Parcels   Corner   Point

Files

Spatial Data Engine
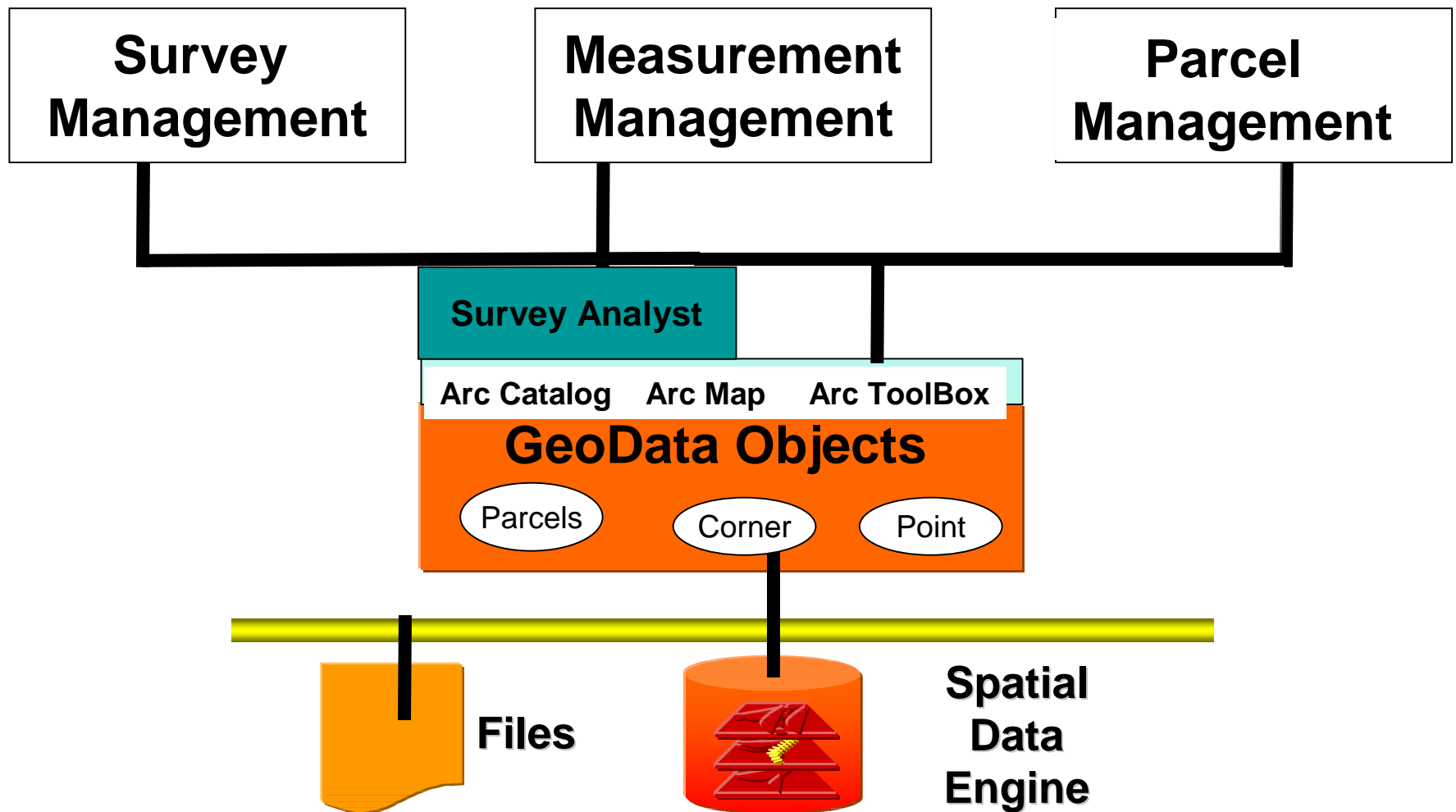
Technology

- Primary components:

Arc SDE 9.0, Arc GIS 9.0. Arc IMS 4.0

Informix 9.4

Apache Tomcat 4.1

IIS

Java SDK/JRE 1.4

FME/Spatial Direct

BASS2

Citrix XPe
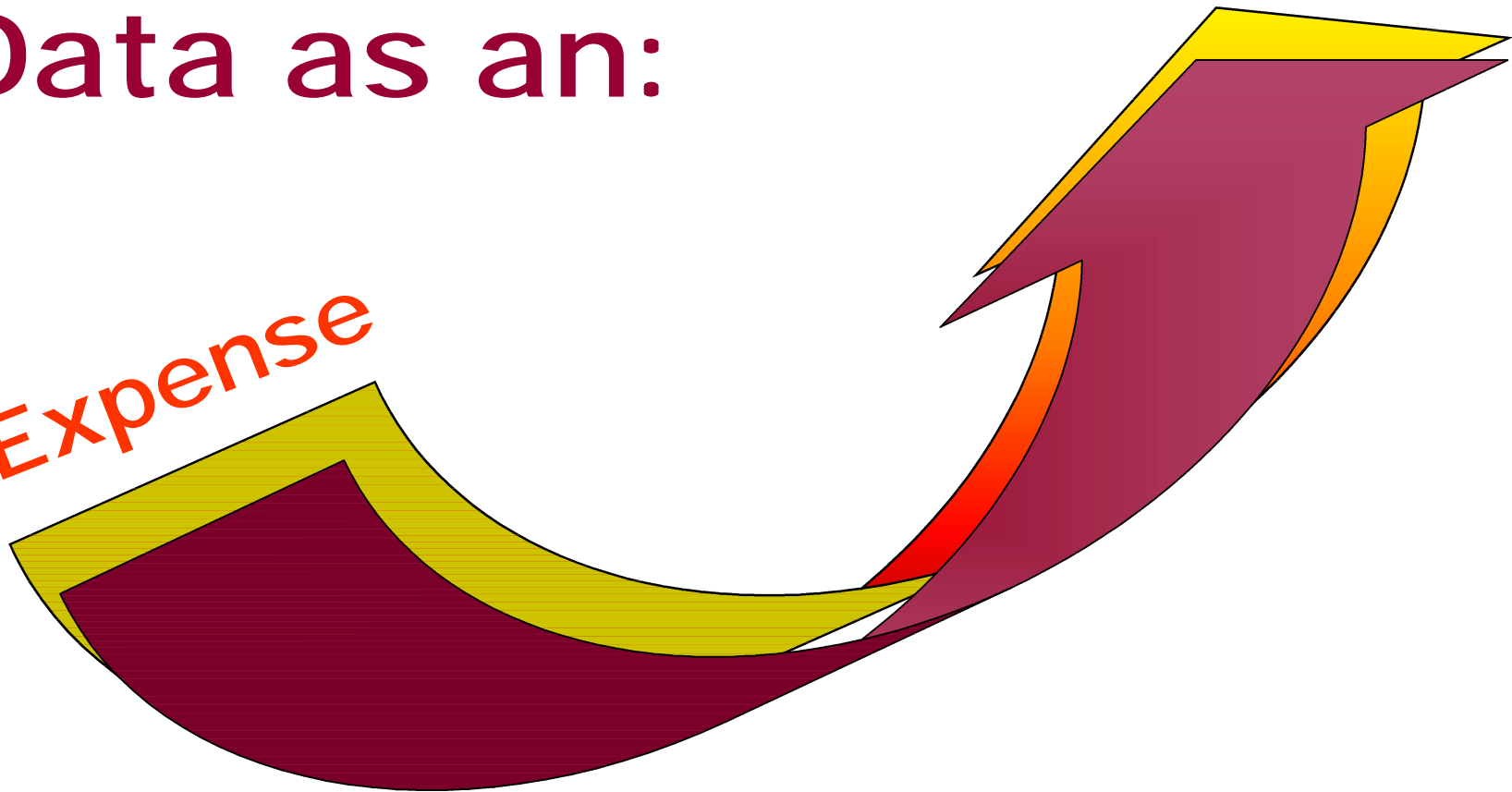
Storage over 1 Terabyte

2 Large database tables over 20 million records each

Data Management

Change In Paradigm

Data as an:

Asset

Expense
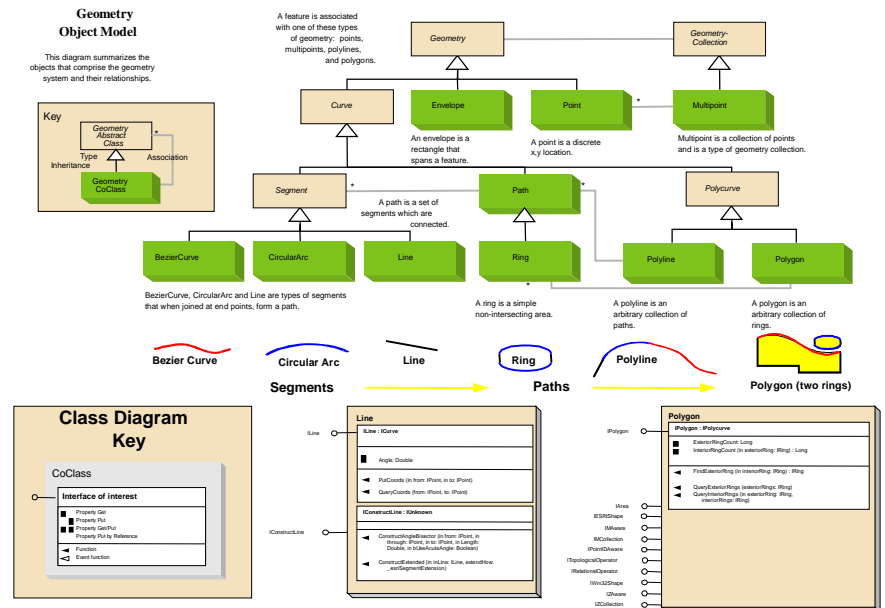
Moving from an EXPENSE to an ASSET

Change In Paradigm

USFS Centric Application Development

COTS

BLM Centric Application Development

Partnership

Shared Costs

Shared Functionality

Shared Standards

Greater Efficiency

Less Redundancy

Greater Share-ability of Data
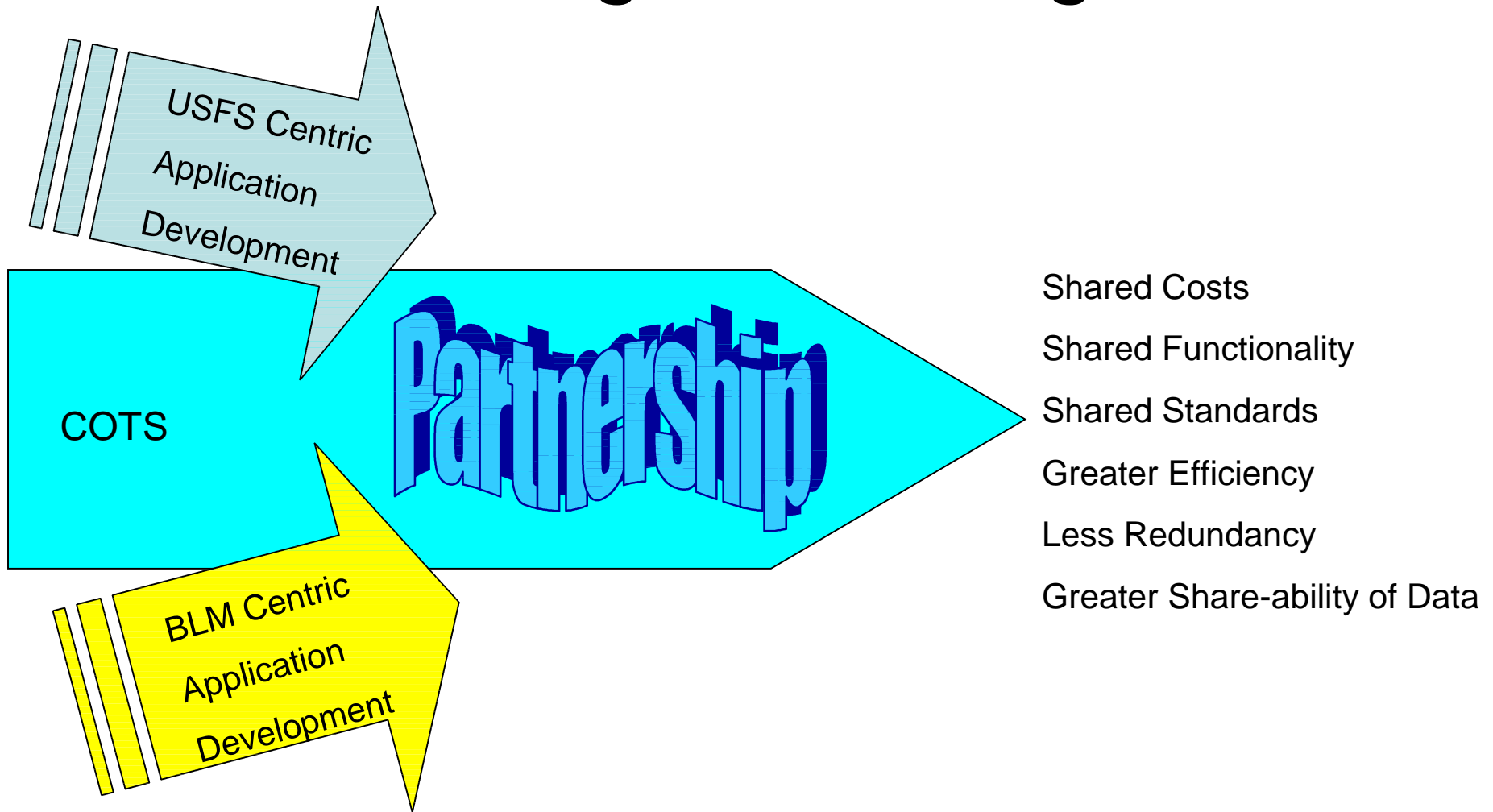
The Use of Standards

- Federal Geographic Data Committee (FGDC) Cadastral Data Content Standard

- American Land Titles Association (ALTA)

- Manual of Instructions for the Survey of the Public Lands of the United States, 1973

Geodatabase designed to reflect existing standards and to work in an object oriented technology environment.

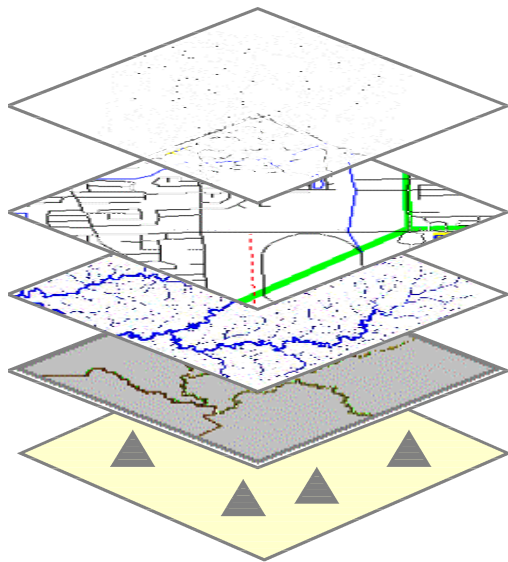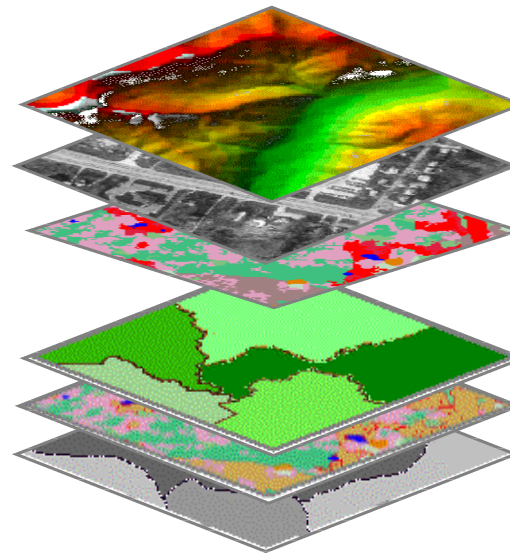# Meta Data Must Be Associated With All Data Sets

Data Sets

Coverages

Shapes

CAD Drawing

Images

Tables

Grids

Tins

ArcSDE

Any

ArcCatalog

View/Edit as Forms

Stored in XML (Structured Document)

Full FGDC Standard
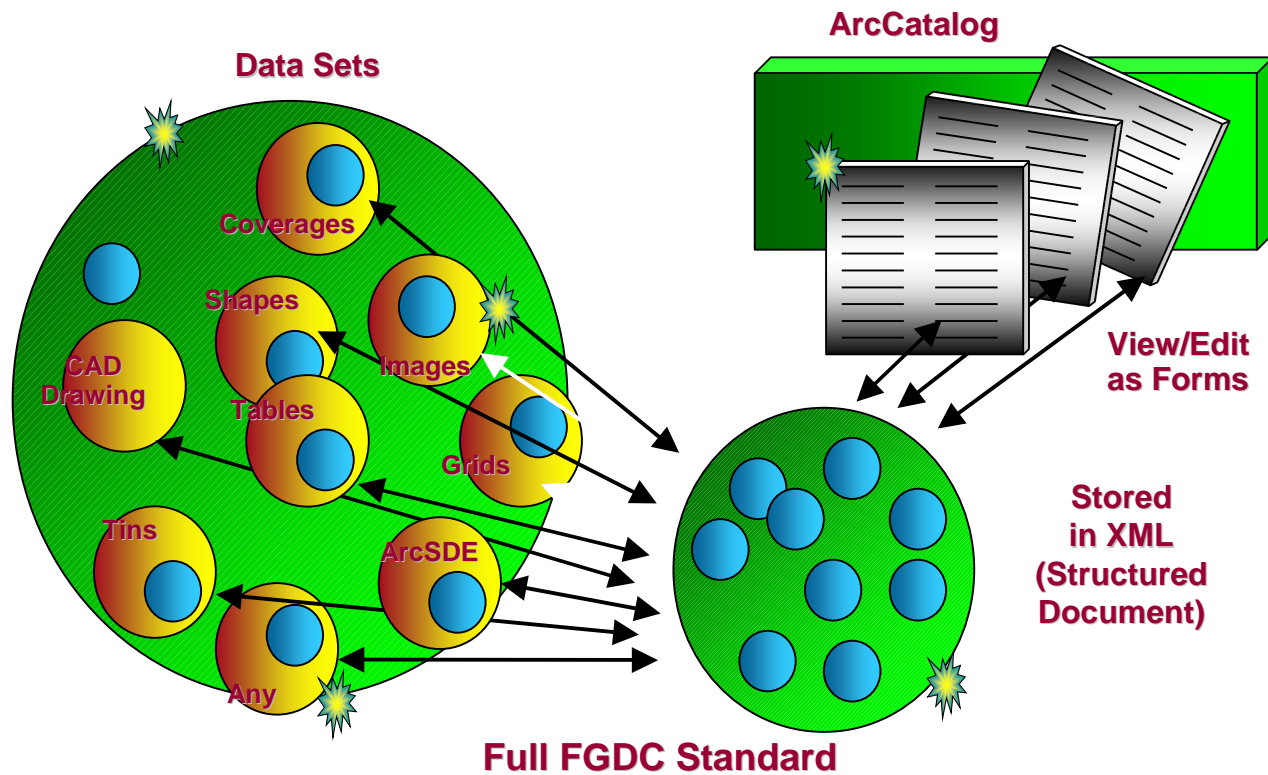
NILS Conceptual Data Model

Parcel Fabric

Features
Case Parcels
Rights
Use Authorizations
Segregations
Land Status

Feature
Dataset

Shared Geometry

Legal Description Fabric

Features
Corners
Boundaries
Non-PLSS Classes
PLSS Classes

Survey Links

Survey Fabric

Survey Features
Survey Points
Measures
Computations
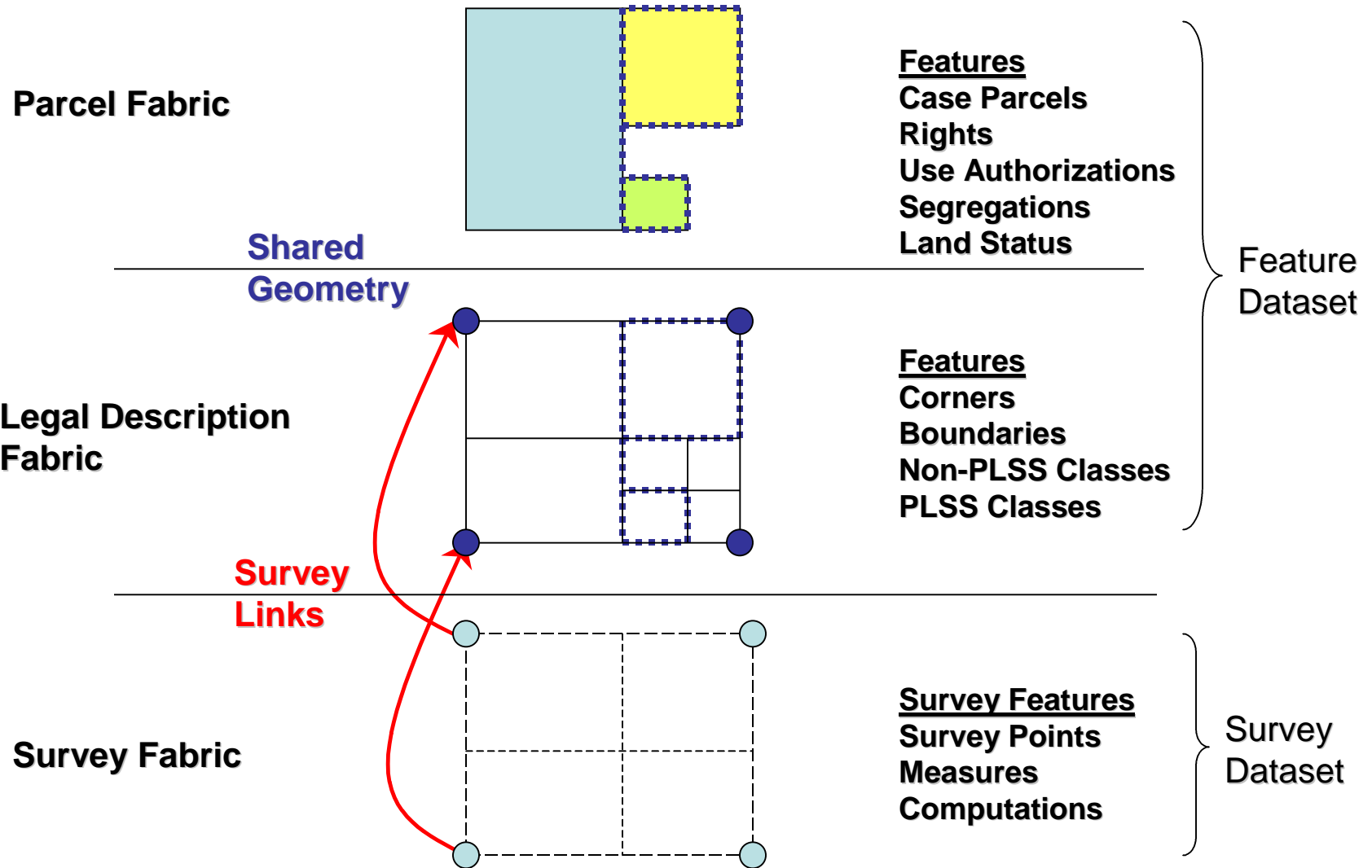
Survey
Dataset

GIS Data
(Before Survey Analyst)

Vector Data Layers

Raster Data Layers

Land Ownership

Transportation

Surface Waters

Boundaries

Geodetic Control

Elevation
Imagery
Land cover

Soils
Vegetation
Slope
Others …

GIS Data (After Survey Analyst)

Vector Data Layers

Land Ownership

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Surface Waters

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Raster Data Layers

Elevation
Imagery
Land cover
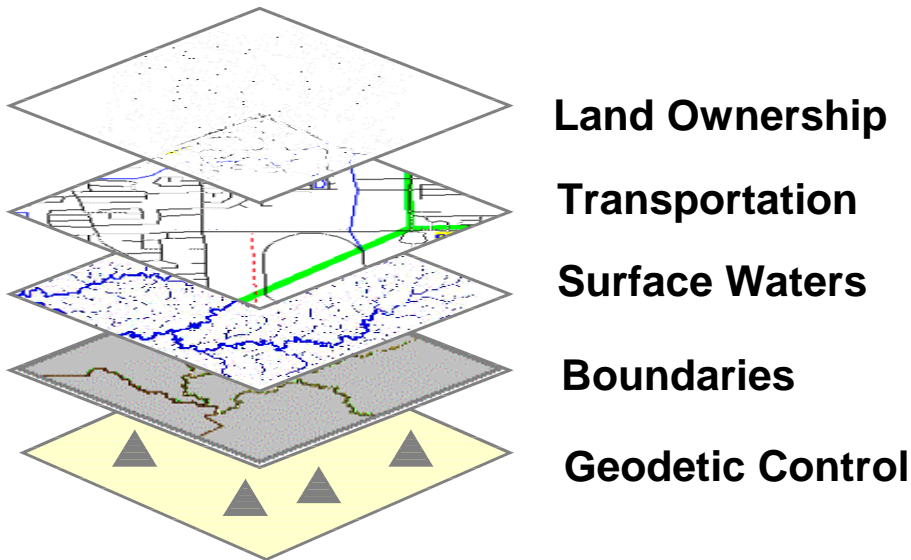
Soils
Vegetation
Slope
Others …
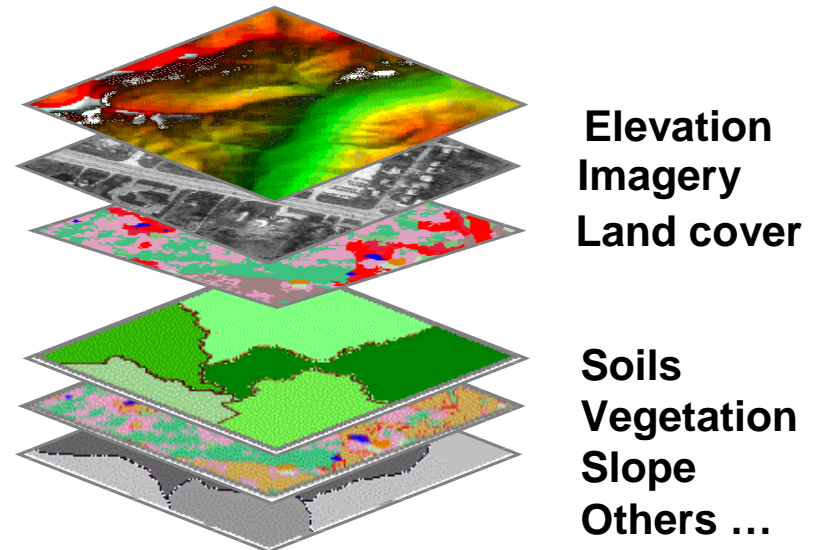
Survey Data Layers (Projects)

School Topo

Buildings 02.18.02

Total Station Survey 1
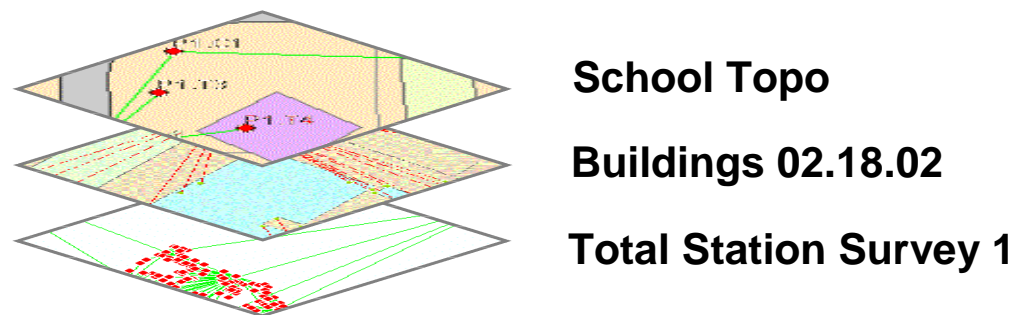
Data is delivered 3 ways…
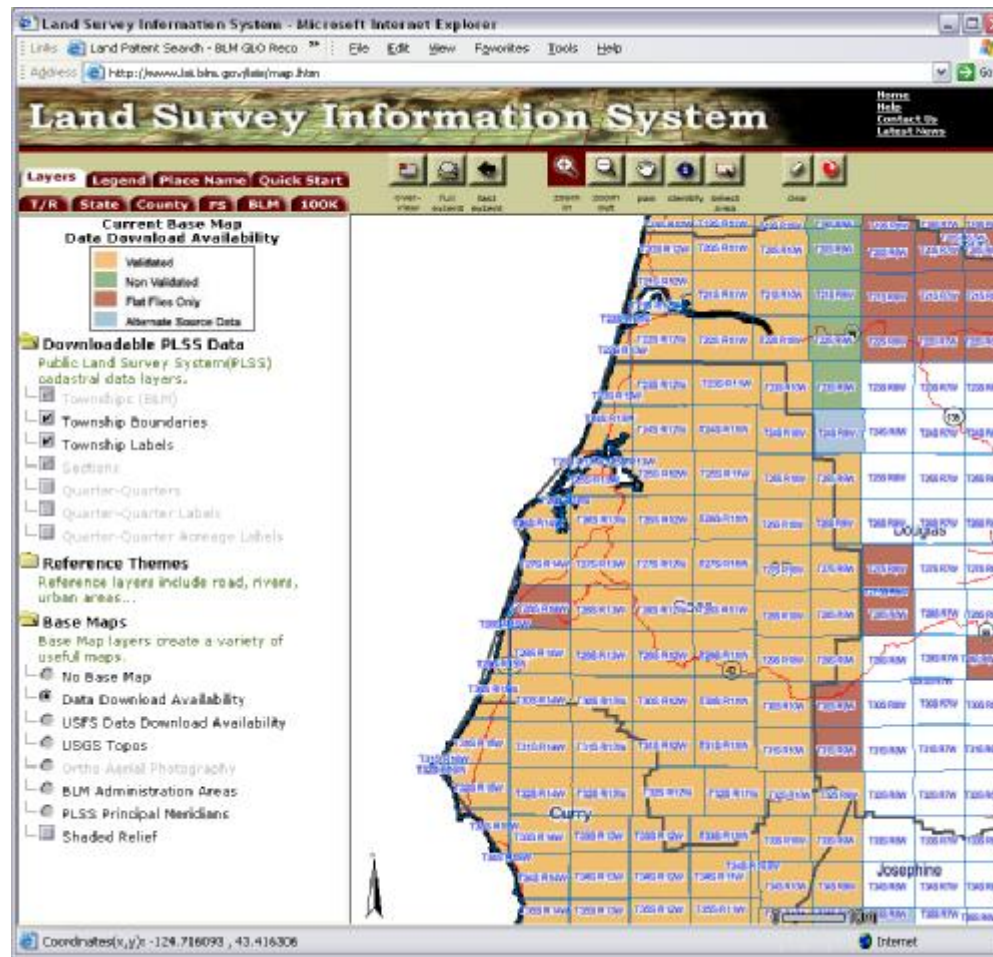
1

- Viewable from the web interface
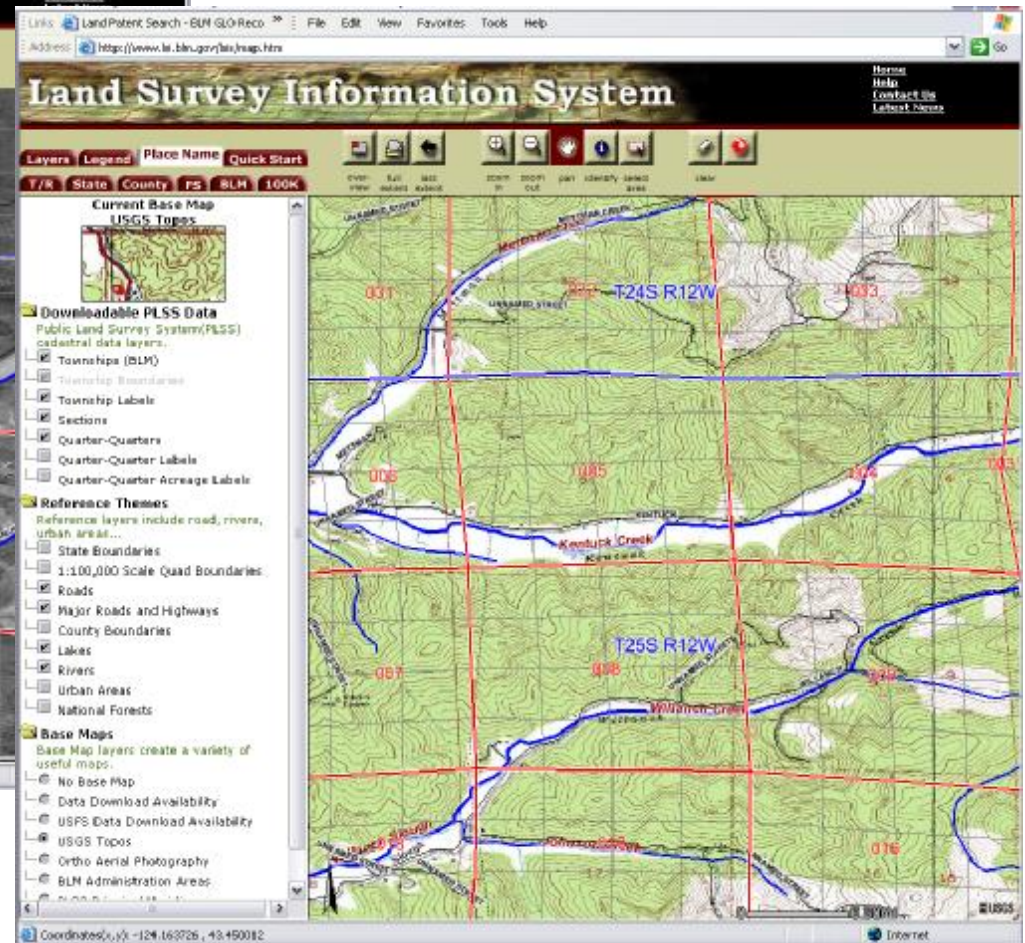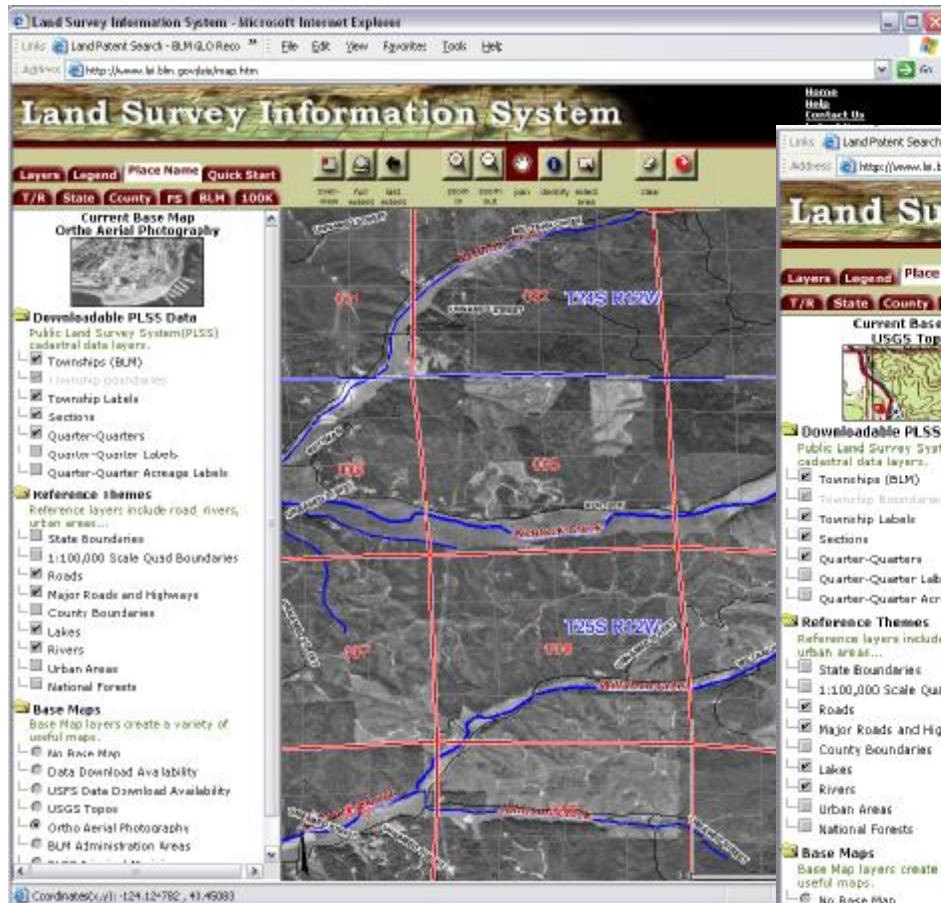
2

- Downloadable as Shapefiles

3

- Accessible as a streaming ArcIMS layer
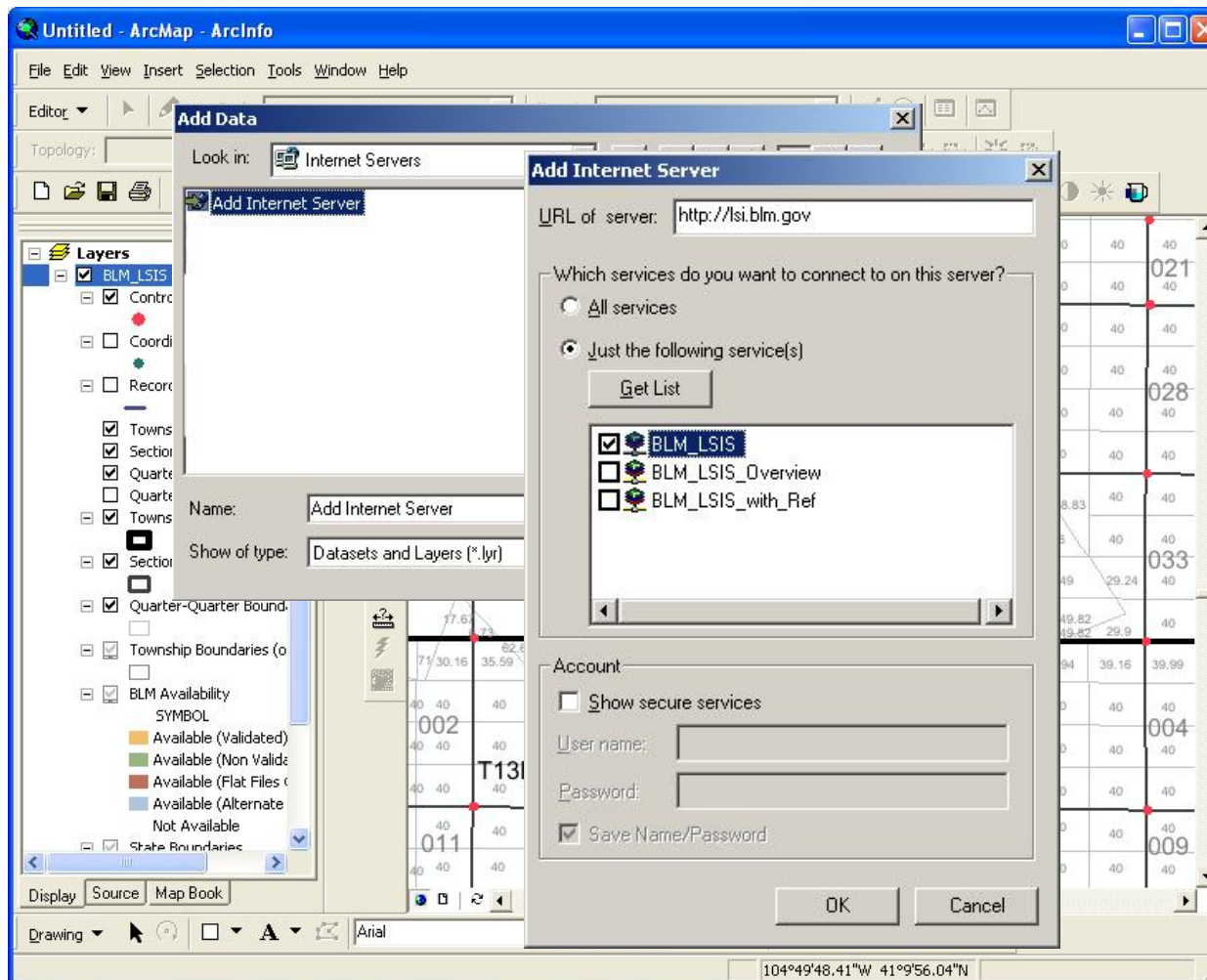
Integrate with other data layers through Desktop or Mobile GIS

- Add data from the internet with the URL:

http://lsi.blm.gov

Future Streaming Services...

- BLM National Conservation Areas
  - National Wild and Scenic Rivers
  - National Scenic Trails
  - National Historic Trails
- BLM Wilderness Areas
- BLM Wilderness Study Areas
- BLM Areas of Environmental Concern

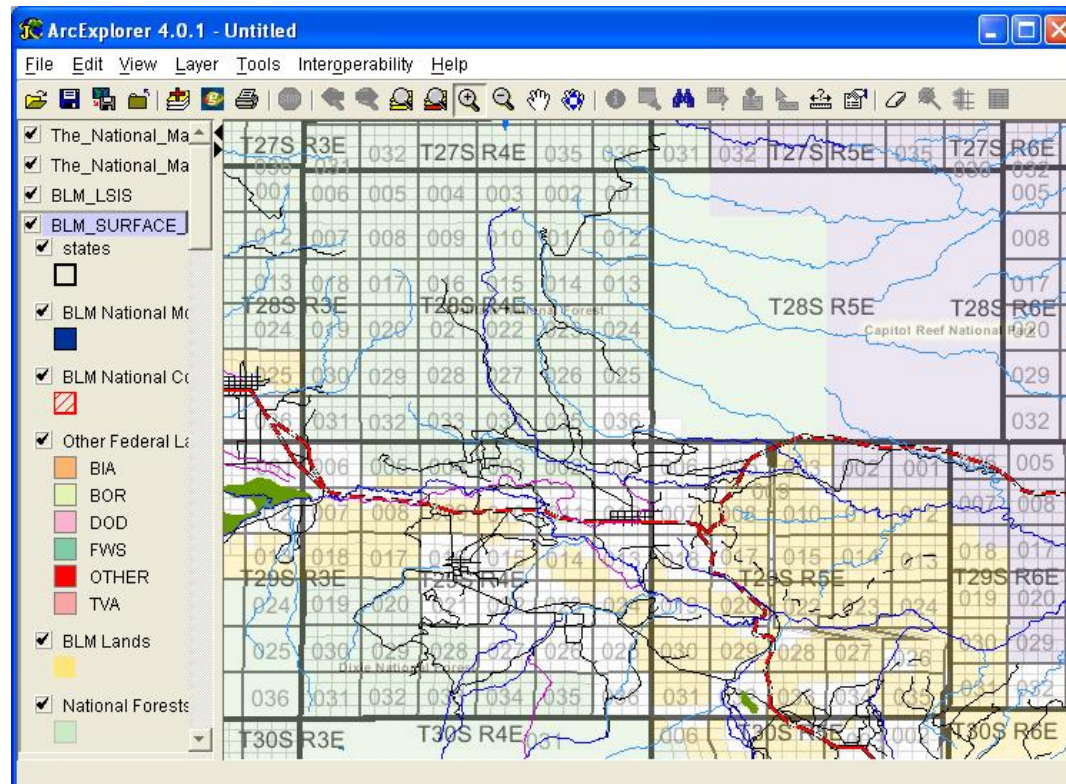File   Edit   View   Favorites   Tools   Help

Links »

Home
Help
Contact Us
Latest News

Land Survey Information System

Layers   Legend   Place Name   **Quick Start**

T/R   State   County   FS   BLM   100K

over-view   full extent   last extent   zoom in   zoom out   pan   identify   select area   clear

Quick Start

For detailed instructions, view Help.

Get information on site updates at our What's New Page.

Browsing

1. Zoom in to view Townships by using the navigation buttons

full extent   last extent   zoom in   zoom out   pan

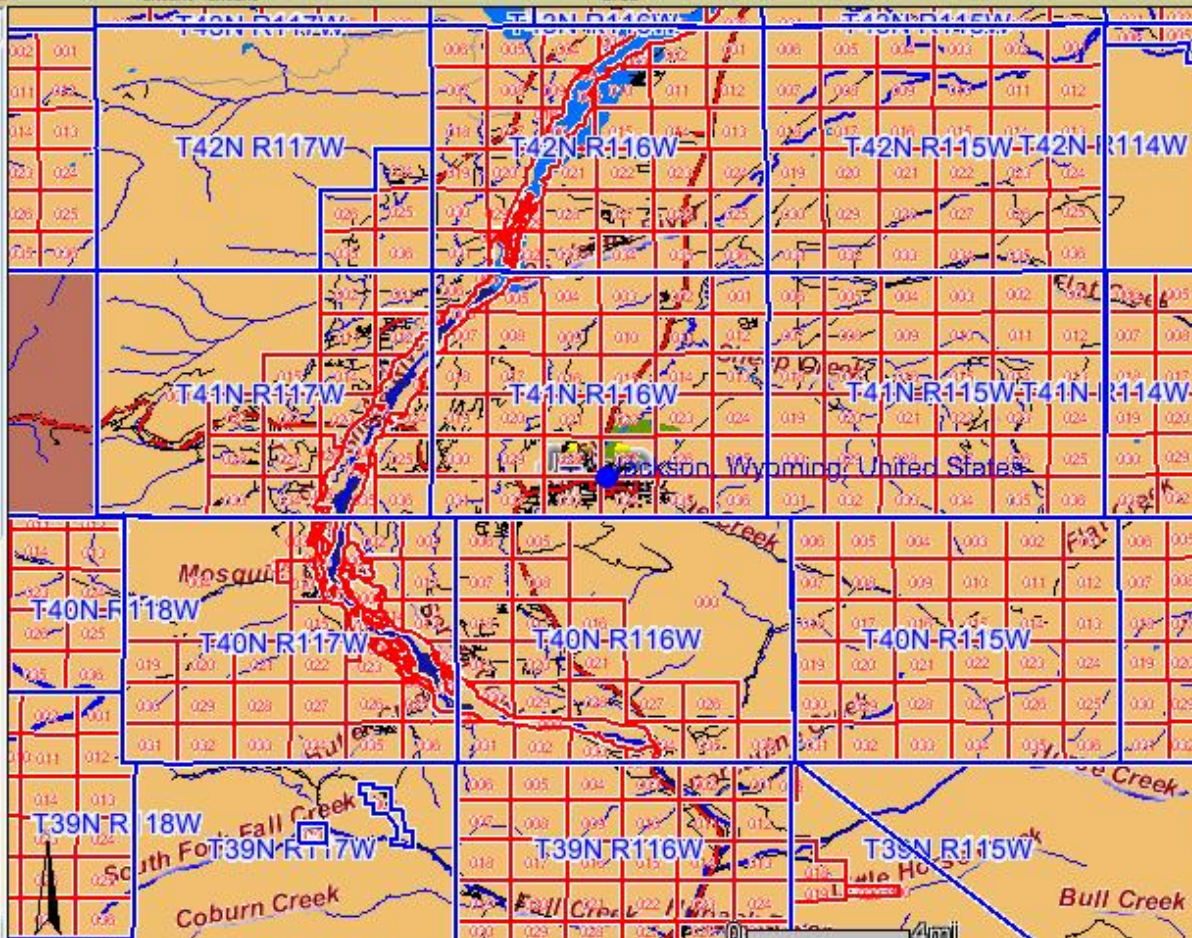2. Use Layer TreeView to toggle various base maps.

Base Maps
Base Map layers create a v useful maps.
- ○ No Base Map
- ◉ Data Download Availabil
- ○ USFS Data Download Av
- ○ USGS Topos

3. Use Navigation tools to refine map display: Zoom Back, Full Extent, Pan...

Selecting Townships

1a. Use one of the Query Tools to Select and Zoom to desired

T40N R117W   T42N R116W   T42N R115W T42N R114W

T41N R117W   T41N R116W   T41N R115W T41N R114W

Jackson, Wyoming, United States

Mosqui   T40N R118W   T40N R117W   T40N R116W   T40N R115W

Coburn Creek   T39N R 18W   T39N R117W   T39N R116W   T39N R115W

Bull Creek

DISCLAIMER   YOU ARE VISITOR: 46,501   PRIVACY

Coordinates(x,y): -110.92011 , 43.600571

Internet

QUESTIONS

For additional Information

www.blm.gov/nils

www.geocommunicator.gov

www.geocommunicator.gov/lsi

Streaming Service:

Map Service:http://www.lsi.blm.gov

Map Service: BLM_LSIS