

Data Modeling Basics

John Auel

GIS Technician II

United Services Group

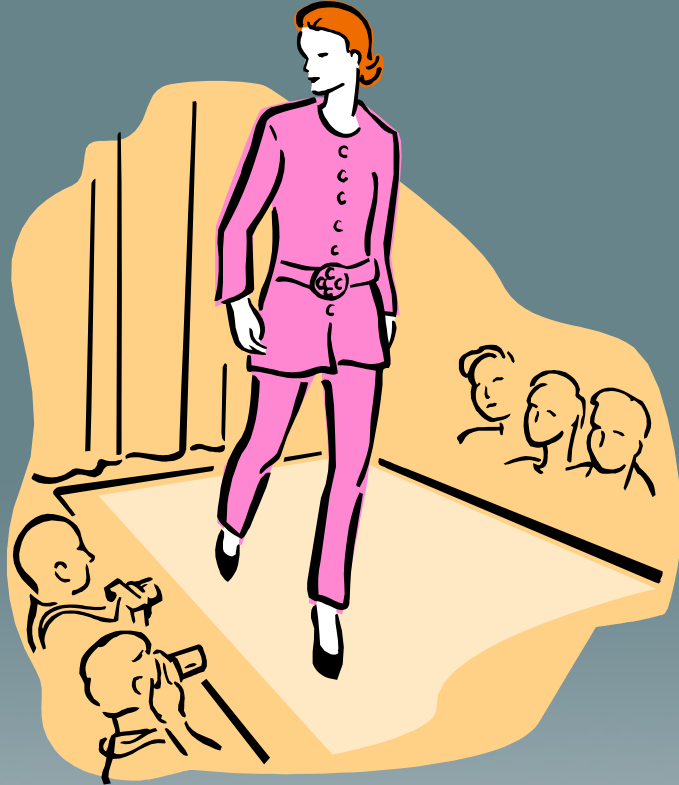


Background

- Bachelor of Science at University of Wisconsin, Steven's Point
 - Area of Emphasis -- Cartography
- Been at United Services Group Since 2001
 - GIS Technician II



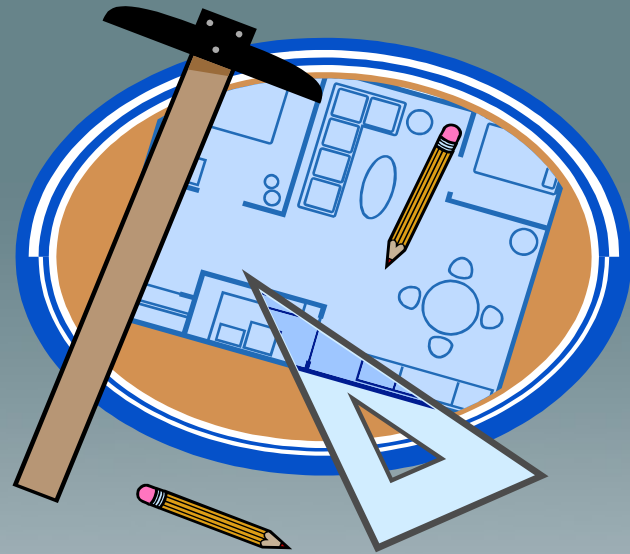
Data Modeling



Dressing up your GIS data and sending it
down the runway

Data Model

- The foundation to a database
- Your blue prints
- Building plans for storing your data.
- Instructions for building a database



Looking Ahead

- Things to consider before constructing or updating a data model
- Selecting a data model that best fits your situation.
- Already have a Data Model
- Basic steps to help create and maintain your data model
- Questions

Plan, Plan and Plan Some More!



Design Guidelines

- Involve users
- Build a team
- Educate users in what a GIS can do
- Plan from your model
- Take it one step at a time
- Be creative
- Keep goals and objectives in focus
- Do not add details prematurely
- Document carefully
- Be flexible

Data Model #1 Goal

- Identifying your data objects
 - Services
 - Primary lines
 - Transformers
 - Reclosers
 - Fuses
 - Faults

Data Modeling

- Match Data to Spatial Elements
 - Determine geometry type of discrete features
 - Specify relationships between features
 - Implement attribute types for objects

Data Modeling

- Select Geographic Representation
 - Represent data with discreet features
 - Points, Lines and Polygons
- Characterize continuous phenomena with rasters



Data Modeling

- Model the Users View of Data
 - Identify organizational functions
 - Determine data needed to support functions
 - Organize data into local groups
- Define Objects and Relationships
 - Identify and describe objects
 - Specify relationships between objects
 - Document model in diagram

Data Modeling

- Organize Database Structure
 - Organize system of features
 - Define topological associations
 - Assign coordinate systems
 - Define relationships, rules and domains

Objectives of Design

- Results in a Well-Constructed Database :
 - Satisfies objectives and supports organizational requirements
 - Contains all necessary data but no redundant data
 - Organizes data so that different users can access the same data
 - Accommodates different views of the data
 - Distinguishes which applications maintain the data from which applications access the data
 - Appropriately represents, codes and organizes graphical features

Benefits From Good Design

- Data retrieval and analysis are used more frequently
- Decrease time in attributing data
- Data that supports different users and uses
- Minimized data redundancy
- Increased likelihood of users developing applications



Selecting a Data Model

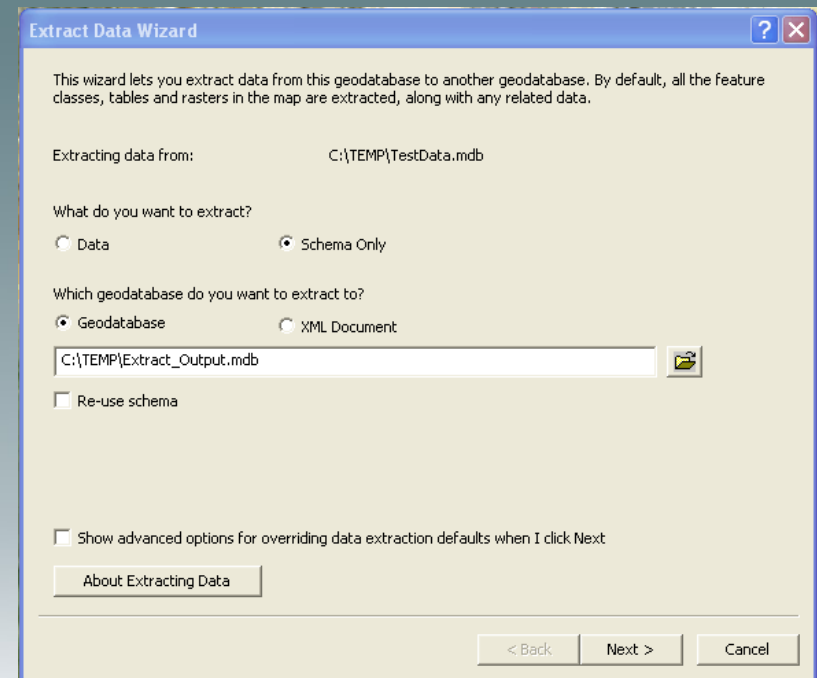
- Design and create a new geodatabase
- Copy and modify an existing geodatabase schema
- Create a copy of both the schema and contents from an existing geodatabase

Design and Create a New Geodatabase

- Cannot find one that matches your business objectives
- Labor intensive
- Create a new feature dataset
- Create a new feature class
- Create a new field
- Create a new domain
- Create a new subtype

Copy and Modify an Existing Geodatabase Schema

- Distributed Geodatabase Tool Bar
 - Inside of ArcMap
- Click Extract Data
 - Far symbol on the right
- Check Schema Only
 - It will only export feature datasets that are in ArcMap

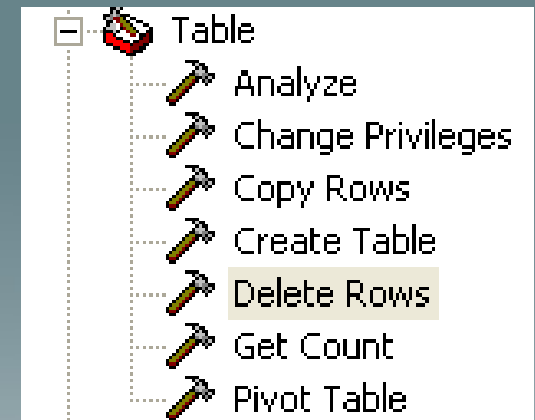


Copy and Modify an Existing Geodatabase Schema

- You may have to correct the Coordinate System of the new database.
- You will need to delete the Geometric Network if you are planning to load data to a feature in a Geometric Network.

Create a Copy of Both the Schema and Contents from an Existing Geodatabase

- You will need to delete any data that you will not want part of your database.
 - Delete Rows tool in ArcToolBox
- If feature class is a part of a Geometric Network you will need to delete the Network.



Current Data Model

- Data was placed into a data model because we saw something we liked at a conference or other cooperatives mention it to us.
 - Outage Management
 - AMR
 - Billing
 - Planning
- We updated our map book to a new software.

Reevaluated Your Data Model

- Double check your foundation of your database
- What works and what does not?
- Can we remove duplicated data?
- Can we standardize our data going in and going out?
- Is it working to create deliverables?
- Are our users getting the data they need?

Looking for Good Structure

- Group like objects into a Dataset
 - Geometric Network
 - Relationships
- Data uniformed
 - Using domains for data consistency
- Field Names
 - Unique
 - Have meaning to end user

Evaluating Your Database

- Using an ESRI Script to help go through your database.
 - Geodatabase Designer
- Going through all your features in the database.

Geodatabase Designer v2 (9.2)

- Download off of ESRI
 - <http://arcscripts.esri.com/>
- Gives you a full report of everything in your database.
 - Objects
 - Subtypes
 - Domains
 - Relationships

ArcCatalog - ArcInfo - I:\AmFm\UnitedServicesGroup\DataModels\2008ElectricDataModels

File Edit View Go Tools Window Help

Location: I:\AmFm\UnitedServicesGroup\DataModels\2008ElectricDataModels Convert Annotation Class to Feature Class Analyze...

Stylesheet: FGDC ESRI Export Schema Import Schema Utility

- [-] GreatRiverEnergy
- [-] ItascaMantrap
- [-] Kandiyohti
- [-] Keycodes
- [-] LakeCountryPower
- [-] LakefieldJunction
- [-] LakeRegion
- [-] LandbaseExtract
- [-] Mcleod
- [-] Meeker
- [-] MidwestESRIUtilityUsersGroup
- [-] Nebraska
- [-] NorthItasca
- [-] OakdaleElectricCooperative
- [-] PiercePepinCooperative
- [-] Polk_Burnett
- [-] PowerPlus
- [-] PowerSystemEng

- [-] ArcToolbox
 - [-] 3D Analyst Tools
 - [-] Analysis Tools
 - [-] Cartography Tools
 - [-] Conversion Tools
 - [-] Data Interoperability Tools
 - [-] Data Management Tools
 - [-] Geocoding Tools
 - [-] Geostatistical Analyst Tools
 - [-] Linear Referencing Tools
 - [-] Multidimension Tools
 - [-] Network Analyst Tools
 - [-] Reorder Fields
 - [-] Samples
 - [-] Server Tools
 - [-] Spatial Analyst Tools

Name	Type	Size	Modified
ArcFM_ElecDist.mdb	Personal Geodatabase	3.78 MB	5/6/2008 12:24:...
ArcFM_Multi.mdb	Personal Geodatabase	6.40 MB	1/8/2009 1:32:...
ArcFM_ElecDist.xml	XML Document	26.20 MB	5/6/2008 12:11:...
ArcFM_Multi.xml	XML Document	14.61 MB	5/6/2008 12:10:...
ArcFM_Multi_Domain.xml	XML Document	105.73 KB	1/8/2009 2:55:...
ArcFM_Multi_Object.xml	XML Document	253.29 KB	1/8/2009 2:55:...

Log HTML XML Options

ObjectClasses

ObjectClass Name	Type	Geometry	Subtype
ElectricDataset			
AbandonedConductor	FeatureClass	Polyline	Abandoned Conductor
CapacitorBank	FeatureClass	Point	Fixed Capacitor Bank Switched Capacitor Bank
CommunicationCable	FeatureClass	Polyline	Communication Cable
ConduitSystem	FeatureClass	Polyline	Duct Bank Trench
DownGuy	FeatureClass	Point	Down Guy
DynamicProtectiveDeviceBank	FeatureClass	Point	Circuit Breaker Recloser Sectionalizer
FuseBank	FeatureClass	Point	Overhead Fuse Underground Fuse
Generator	FeatureClass	Point	Steady State Subtransient Transient
Light	FeatureClass	Point	Security Light Street Light Aerial Marker Fault Indicator

Open... Save As... Clear Print... Save XML Help



Changes are Needed

- Feature classes are in the wrong datasets
- Feature class names don't describe feature
- Field names need to be rearranged
- Field Type is incorrect
- Field length is too short
- Subtypes
- Domains

Summary

- Take time to put a plan together
- Get other people involved
- Define Objects
- Select a Data Model that best fits your objectives
- Re-evaluate your Model after you have worked with it
- Correct your changes to help end users

Demo Time and Questions

