

# ESRI's Geodatabase Data Models

Topic Presentation  
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PSU Geography 575  
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## REFERENCES:

- Introduction to Geographic Information Systems, Chang
- Designing Geodatabases, Arctur, Zeiler
- <http://support.ESRI.com/datamodels>

## Presentation Outline

- ESRI Vector Model History
- Geodatabase Structure
- Topology
- Geodatabase Advantages
- Examples of Geodatabase Models
- Conclusions

# VECTOR MODEL HISTORY

- Coverage with ArcInfo
- Shapefile with ArcView
- Geodatabase with ArcGIS

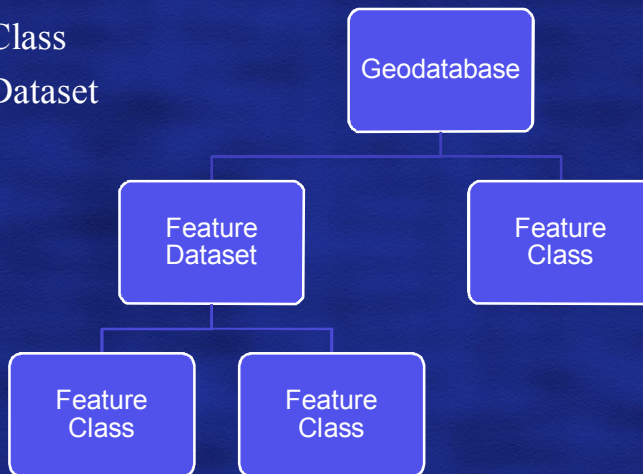
## Geometries Compared

GEODATABASE	SHAPEFILE
Point	Point
Multipoints	Multipoints
Polyline	Polyline
Polygon	Polygon
Polyline with Measure	Polyline with Measure
Feature Class	Shapefile
Feature Dataset	N/A



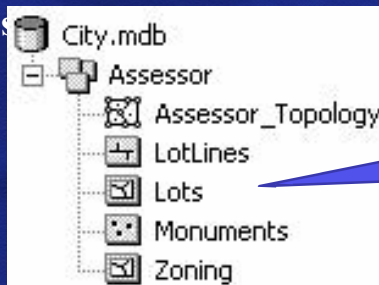
# GEODATABASE STRUCTURE

- Feature Class
- Feature Dataset



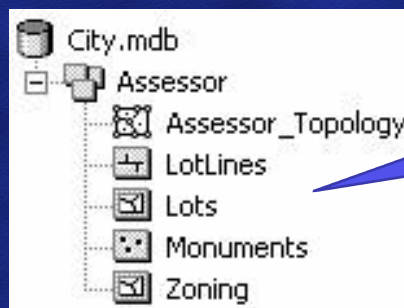
## Feature Class

- A collection of features of the same geographic elements (lots, survey monuments and zoning)
- Each Feature Class has the same spatial representation (polygons)



# Feature Dataset

- **Organized collections of spatially or thematically related feature classes**
- **Required for topology and geometric networks**



Thematically  
related  
Feature Classes

# TOPOLOGY

- Controls feature integrity through rules/editing
- Define how features share geometry  
Example: Counties must not overlap
- Geodatabases have on-the-fly topology  
Offers the user choices to decide which rules are needed

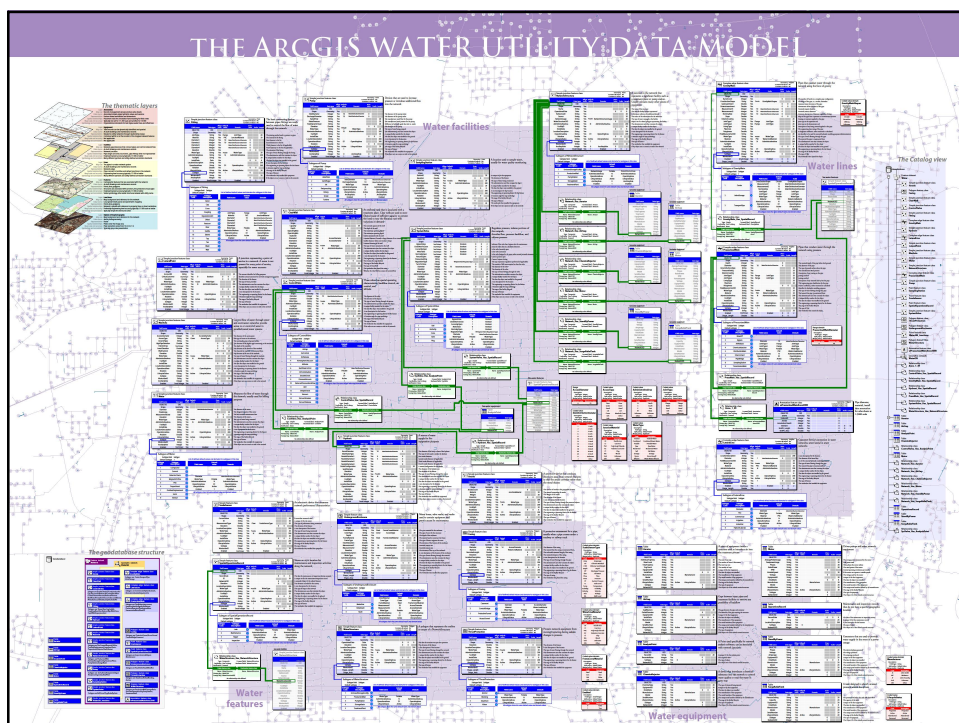


# GEODATABASE ADVANTAGES

- The hierarchy structure makes data organization and management easier
- Geodatabases can take advantage of object-oriented technology
- Thousands of objects, properties, and methods are available to develop customized applications
- On-the-fly topology

# EXAMPLES OF GEODATABASE MODELS

Examples of ESRI Geodatabase Models	
Addresses	Agriculture
Atmospheric	Basemap
Biodiversity	Building Interior Space
Carbon Footprint	Census-Admin. Boundaries
Defense-Intel	Energy Utilities
Environmental Facilities	Fire Service
Forestry	Geology
GIS for the Nation	Groundwater
Health	Archaeology - Preservation
Homeland Security	Hydro
Land Parcels	Local Government
Marine	National Cadastre
Petroleum	Pipeline
Raster	Telecommunications
Transportation	Water Utilities



ArcGIS Water Utility Data Model.pdf - Adobe Reader

Complex edge feature class  
**LateralLine**

Geometry *Polyline*  
Contains M values *No*  
Contains Z values *No*

Field name	Data type	Allow nulls	Default value	Domain	Precision	Scale	Length
OBJECTID	OID						
Shape	Geometry	Yes					
LocationDescription	String	Yes					200
Diameter	Integer	Yes	1	MainDistributionDiameter	0		
FlowMeasurementID	String	Yes					20
WaterType	String	Yes	Potable	WaterType			20
Material	String	Yes	PVC	WaterLineMaterial			20
AdministrativeArea	String	Yes	N	AdministrativeArea			200
FacilityID	String	Yes					20
InstallDate	Date	Yes			0	0	8
OperationalArea	String	Yes	D1	OperatingArea			200
LifecycleStatus	String	Yes	Active	LifecycleStatus			20
Subtype	Integer	Yes	1		0		
WorkorderID	String	Yes					20
Enabled	Small Integer	Yes	1	Enabled	0	0	2
Shape_Length	Double	Yes			0	0	

Untitled - ArcMap - ArcInfo

Geodatabase (.gdb extension)

Feature Dataset

Feature Class

Attributes of wLateralLine

WaterType	Material	LocationDescription	Diameter	Shape_Length
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# CONCLUSION

- Geodatabases are the most recent vector models
- Geodatabases have Feature Classes and Datasets
- They organize and manage data effectively
- They take advantage of object-oriented technology with many objects, properties, & methods
- Many pre-designed models are available from ESRI

Questions/Comments





# Master background slide

- History
- Structure

## Questions for Class

The hierarchical structure of the geodatabase makes data organization and management easier. True/False (True)

A geodatabase stores (geometries) and (attributes) in a single system. (fill in the blanks)

A geodatabase is a vector data model and it can not accept raster datasets. True/False. (False)

A geodatabase is an object-based data model. True/False (True)