ESRI Coverage Model

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IS a: Georelational Topological Vector Data model

Stores geometry and attributes separately
Spatial relationships between connecting and adjacent features
Uses points and X,Y coordinates
Features are represented as points, lines, polygons

When: Introduced by ESRI, inc. in the 80's to differentiate ArcGIS from AutoCAD

AutoCAD uses .DXF which does not contain topology

Geometry

Coverage Models are Stored as a directory,
a collection of feature classes

View of coverage contents in ArcCatalog

Feature class	Application and use	Examples
Point	Point locations	Well sites, mountain peaks
Arc	Linear features	Street sections, contours, streams, sewers, power lines, gas lines
Node	Connecting points and endpoints of linear features	Valves on pipelines, intersections of streets, power poles, manhole covers
Polygon	Area features	Soil units, land use, parcels, building footprints, forest stands, ownership
Region	Area features, multiple polygons	Census geography, state of Hawaii overlapping wildlife habitat
Annotation	Feature labels	Street names, place-names on road maps
Tic	Geographic registration and control	Registration for digitizing
Coverage extent	Defines map extent	Rectangle describing outer boundary of coverage

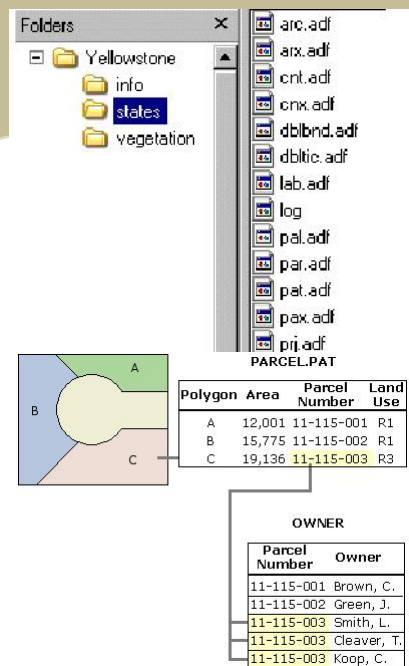*webhselp.eri.com.arcgis.9.3.coverage*

Attributes

Stored in a Feature Attribute Table
INFO folder, .adf

Features exist in a 1: 1 relationship with corresponding records in feature attribute table.

Unique ID assigned to each feature links the feature and the attribute record (called a sequence number)

Sequence numbers are stored both in the geometry, and with corresponding record in the attribute table and ArcGIS maintains the connection
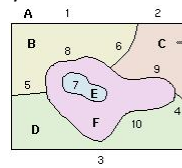
Relate tables based on common item

webhselp.eri.com.arcgis.9.3.coverage

Topology

Defines spatial relationships between connecting or adjacent features
AKA we understand our surroundings based on location data (Cramer Hall is North of the Smith Memorial Student Union)
3 Topological Relationships

Area Definition
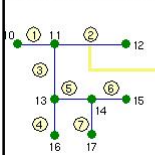An area is defined by a series of connecting arcs

Polygon-Arc Topology

Polygon	Arc List
B	1, 6, 8, 5
C	2, 4, 9, 6
D	3, 5, 10, 4
E	7
F	8, 9, 10, 0, 7

Connectivity
Arcs connect to each other at nodes
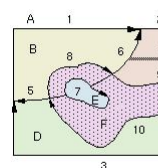Network tracing/ pathfinding

Arc-Node Topology

Arc-Node List

Arc	From Node	To Node
1	10	11
2	11	12
3	11	13
4	13	16
5	13	14
6	14	15
7	14	17

Contiguity
Arcs have adjacency (L/R)

Left-Right Topology

Arc	Left Polygon	Right Polygon
1	A	B
2	A	C
3	A	D
4	C	D
5	D	B
6	B	C
7	F	E
8	B	F
9	C	F
10	D	F

WHY Coverage Data Structure

Arc- Coordinate list (x,y coordinates, can be multiple sets)
Arc-Node list (connectivity)
Polygon-Arc list (area definition)

Reduce data redundancy!

Advantages;
User ability to customize feature tables
Spatial data stored in binary files, attribute data in tables

Limitations;
Features aggregated into points, lines, polygons with generic behavior

Arc #	L-Poly	R-Poly
1	100	101
2	100	102
3	100	103
4	102	101
5	103	102
6	103	101
7	102	104

Polygon #	Arc #
101	1,4,6
102	4,2,5,0,7
103	6,5,3
104	7

Arc #	x, y Coordinates
1	(1,3)(1,9)(4,9)
2	(4,9)(9,9)(9,6)
3	(9,6)(9,1)(1,1)(1,3)
4	(4,9)(4,7)(5,5)(5,3)
5	(9,6)(7,3)(5,3)
6	(5,3)(1,3)
7	(5,7)(6,8)(7,7)(7,6)(5,6)(5,7)

Questions;

1. ESRI created the Coverage Model as a response and to distinguish itself from_____?

2. The common extension for an attribute table is _____ , and it is stored in a _____ folder which cannot be seen in ArcCatelog.

3. Match each topological relationship with its corresponding topology table.

   Contiguity   Polygon- Arc
   Area Definition   Arc-Node
   Connectivity   Left/ Right

4. A Coverage data model is a georelational topological vector model because_____
_____?

Cheers!

References;

http://webhelp.esri.com/arcgisdesktop/9.3/iopicName=Coverage

Introduction to GIS 5th Edition, Chang 2009 McGraw Hill