

Basic GIS Feature Types

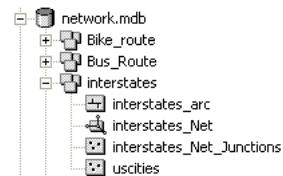
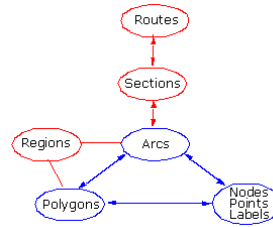
- Point
 - Cities, control points (BM), weather stations
 - Location, distance (buffer), point pattern, interpolation
- Polygon
 - States, land-use (zoning), land-cover, eco-region
 - Location (area coverage), distance, shape metrics, overlay
- Line
 - Roads, streams, utility lines, path
 - Location (linear referencing), distance, shape metrics (e.g., sinuosity), connectivity

Linear Feature Analysis

- Linear referencing
 - Geocoding (e.g., address matching)
 - Dynamic segmentation
- Network connectivity
 - Path analysis (e.g., shortest path)
 - Location allocation
 - Tracing (e.g., up stream area)

Geocoding & Dynamic Segmentation

- Dynamic segmentation
 - Sections and routes (for linear referencing)
 - Events
- Network
 - Line (coverage)
 - Edge + junctions (geodatabase)



Types of Geocoding

- Address matching
- Corner (intersection) matching
- ZIP code geocoding
- Reverse geocoding

Geocoding Applications

- Location-based services (GPS, e911)
- Geodemographic analysis
- Public health
- Crime analysis

Geocoding

- Input: street addresses in text format
- Reference database: street map (e.g., TIGER)
 - Street name, prefix/suffix, and type
 - Beginning and end address numbers (left, right)
 - ZIP code (left, right)
- Process: Geocoding engine (linear interpolation)
 - Side offset, end offset
- Output: address points in GIS format

Causes of Geocoding Errors

- Misspelling of address
- Incorrect address number
- Incorrect street prefix/suffix
- Incorrect street type
- Abbreviations
- Matching scoring system

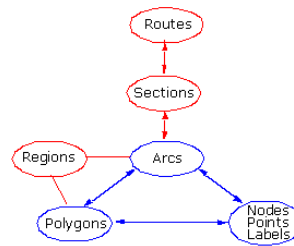
Dynamic Segmentation

- DS is the process of computing the location of events along a route.
- Routes ((multipart) polylines – M-Aware)
- Sections (polylines)
- Events

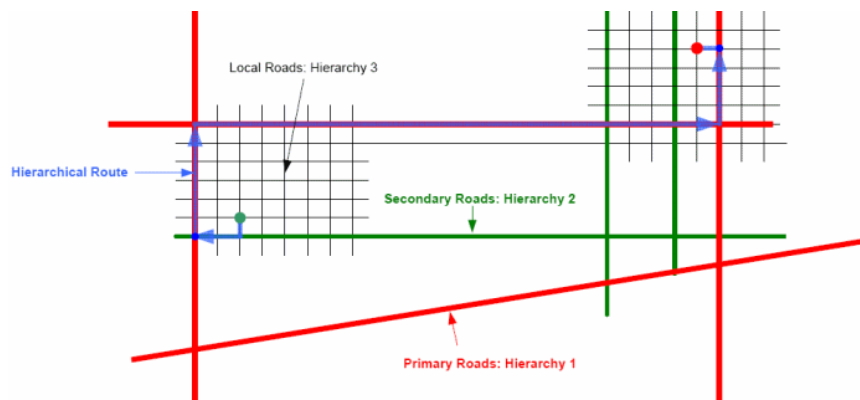
Creating Routes

- Create route geometric objects
 - Polylines or multipart polylines
- Linear Referencing Tools (ArcToolBox)
 - Create Routes: enable route measures on routes (i.e., create measured polylines)
 - Calibrate Routes: recalculate route measures using points.

- Types of routes
 - Simple
 - Combined
 - Split route
 - Looping route
 - Hierarchical route



Example of Hierarchical Route



Event Tables

- Types of events
 - Point events: mileposts, traffic accidents, dams
 - Linear events: speed limits, stream reaches
- Event tables creation and analysis (linear referencing tools in ArcToolBox)
 - Locate events along routes: create route event tables by intersection overlay
 - Overlay route events: union or intersect route event tables.
 - Transform route reference: transforms the measures of events from one route reference to another.

usstations#	bus#	measure
1	1	899.930
2	1	2359.145
3	1	2476.239
4	1	2849.655
5	1	3163.485
6	1	4173.557
7	1	5446.844
8	1	6451.580
9	1	9368.944
10	1	8509.497
11	1	10002.686
12	1	10412.696
13	1	11728.987

Table 16.5 A point event table showing bus stops along the bus route

inter-id	from	to	year
1	44700	90000	1995
1	123648	180000	1989
1	239375	270000	1992
2	74024	78000	1988
2	154873	180000	1993
2	356992	400000	1987
3	78065	90000	1988
4	40000	72033	1986

Table 16.7 A linear event table showing year of pavement re-surfacing on the interstate highway route system

Dynamic Segmentation

- Make route event layer tool
- Overlay/dissolve event layers