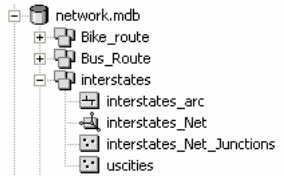
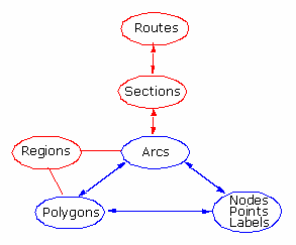
Network and Dynamic Segmentation 11/16/04

- Network
  - Line (coverage)
  - Edge + junctions (geodatabase)



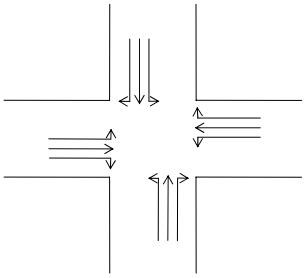
- Dynamic segmentation
  - Sections and routes (for linear referencing)
  - Events



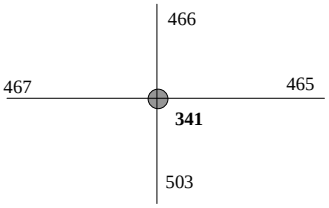
Network

- Topology-based features – connectivity
  - Links (edges)
    - Impedance (length, travel time, flow volume)
    - Directional impedance
  - Sources and sinks
  - Turns
    - Turn impedance
  - Directions
  - Intersections (Overpasses and underpasses)

Turns

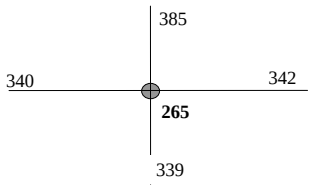


Possible turns at an intersection with four street segments. No U turns are allowed in this example.



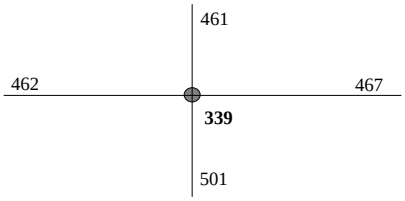
node#	arc1#	arc2#	angle	minutes
341	503	467	90	0.500
341	503	466	0	0.250
341	503	465	-90	0.250
341	467	503	-90	0.250
341	467	466	90	0.500
341	467	465	0	0.250
341	466	503	0	0.250
341	466	467	-90	0.250
341	466	465	90	0.500
341	465	503	90	0.500
341	465	467	0	0.250
341	465	466	-90	0.250

Possible turns at node 341



node#	arc1#	arc2#	angle	minutes
265	339	342	-87.412	0.000
265	339	340	92.065	0.000
265	339	385	7.899	0.000
265	342	339	87.412	0.500
265	342	340	-0.523	0.250
265	342	385	-84.689	0.250
265	340	339	-92.065	0.250
265	340	342	0.523	0.250
265	340	385	95.834	0.500
265	385	339	-7.899	0.000
265	385	342	84.689	0.000
265	385	340	-95.834	0.000

Node 265 has stop signs for the east-west traffic.



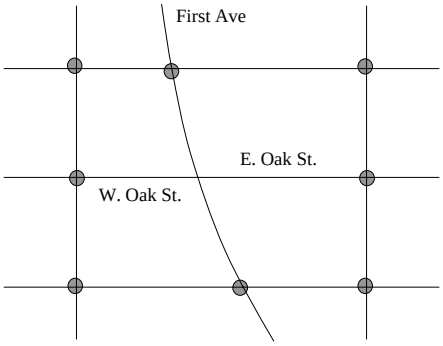
node#	arc1#	arc2#	angle	minutes
339	467	501	90.190	0.500
339	467	462	1.152	0.250
339	467	461	-92.197	-1.000
339	462	501	-90.962	0.250
339	462	467	-1.152	0.250
339	462	461	86.651	-1.000
339	461	501	2.386	0.250
339	461	467	92.197	0.500
339	461	462	-86.651	0.250

Node 339 is an intersection between a southbound one-way street and an east-west two-way street.

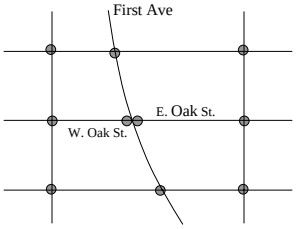
Link Directions

- Arc direction
- Attribute direction
  - FT (one-way)
  - TF (one-way)
  - N (closed street)

Overpasses & Underpasses



First Ave. crosses Oak St. with an overpass. A non-planar representation with no nodes is used at the intersection of Oak St. and First Ave.



Street Name	F-elev	T-elev
First Ave	0	1
First Ave	1	0
W. Oak St.	0	0
E. Oak St.	0	0

First Ave crosses Oak St with an overpass. A planar representation with two nodes is used at the intersection: one for First Ave, and the other for Oak St. The elevation value of 1 shows that the overpass is along First Ave.

Compiling a Street Network

1. Line features
2. Building a network
3. Assign link impedance
4. Assign link direction
5. Create a turn table

Network Applications

- Shortest-path analysis, closest facility
- Traveling salesman problem (TSP)
- Allocation (proximity)
- Location-allocation (proximity + supply + demand)
- Urban transportation planning

Dynamic Segmentation

- Routes ((multipart) polylines – M-Aware)
- Sections (polylines)
- Events

Creating Routes

- Create route geometric objects
  - Polylines or multipart polylines
- Create Route Tool (ArcToolBox)
  - Enable route measures on routes (i.e., create measured polylines)
- Types of routes
  - Simple
  - Combined
  - Split route
  - Looping route

Event Tables

- Types of events
  - Point events
  - Continuous events
  - Linear events
- Event tables creation and analysis (linear referencing tools in ArcToolBox)
  - Locate events along routes
  - Overlay route events
  - Transform route reference

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

inter-id	**to**	**unit**
1	80465	1
1	160930	2
1	241395	3
1	315194	4
2	80465	1
2	160930	2
2	241395	3
2	321860	4
2	402325	5
2	443570	6
3	80465	1
3	101155	2
4	80465	1
4	117974	2

Table 16.8 A continuous event table dividing each interstate highway into 50-mile segments