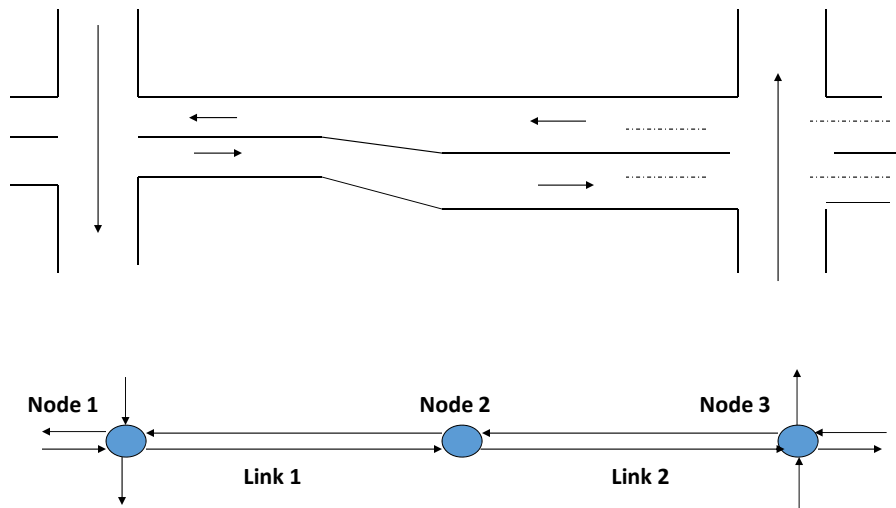


Network Representation

- In Normal Practice, the network is modeled in the form of **A DIRECT GRAPH**
 - Nodes: Junctions (Intersections)/ point of road element characteristics change
 - Links: homogenous stretches of road segment between junctions
- speed – number of lanes – existence of special lanes - etc



Example of Links Data Table

UpStream	DownStream	Type	Capacity	Density	SpeedLimit	Lanes	StreetName	Facility Name	City	Organization	AirLineLength	ActualLength
20	4482	freeway	2000	200	65	4	US 75 S Park Blv	US 75 Southbound	Plano	TxDOT Dallas	0.6141899	0.67697024
53	5732	freeway	2000	200	65	4	US 75 N Park Blv	US 75 Northbound	Plano	TxDOT Dallas	0.7044467	0.6982535
82	300004	freeway	2000	200	65	4	US 75 N 15th St	US 75 Northbound	Plano	TxDOT Dallas	0.60602725	0.57024604
83	53	freeway	2000	200	65	4	US 75 N Park Blv	US 75 Northbound	Plano	TxDOT Dallas	0.7044467	0.6982535
180	187	freeway	2000	200	65	4	US 75 S Arapahc	US 75 Southbound	Richardson	TxDOT Dallas	0.85759985	0.8782425
187	3279	freeway	2000	200	65	5	US 75 S Belt Line	US 75 Southbound	Richardson	TxDOT Dallas	1.0519568	1.0355183
188	189	freeway	2000	200	65	4	US 75 N Belt Lin	US 75 Northbound	Richardson	TxDOT Dallas	0.86643445	0.85114324
189	190	freeway	2000	200	65	4	US 75 N Belt Lin	US 75 Northbound	Richardson	TxDOT Dallas	0.86643445	0.85114324
190	4078	freeway	2000	200	65	5	US 75 N Arapahc	US 75 Northbound	Richardson	TxDOT Dallas	0.67194855	0.6938248
579	21220	freeway	2000	200	65	4	US 75 N Royal Lr	US 75 Northbound	Dallas	TxDOT Dallas	0.37607816	0.37314996
581	3161	freeway	2000	200	65	5	US 75 N Royal Lr	US 75 Northbound	Dallas	TxDOT Dallas	0.37607816	0.37314996
586	21224	freeway	2000	200	65	4	US 75 S Park Cer	US 75 Southbound	Dallas	TxDOT Dallas	0.3979873	0.39661512
588	2139	freeway	2000	200	65	5	US 75 S Meadow	US 75 Southbound	Dallas	TxDOT Dallas	0.5284897	0.53891176
733	734	freeway	2000	200	65	4	US 75 S Mocking	US 75 Southbound	Dallas	TxDOT Dallas	0.5071484	0.5167583

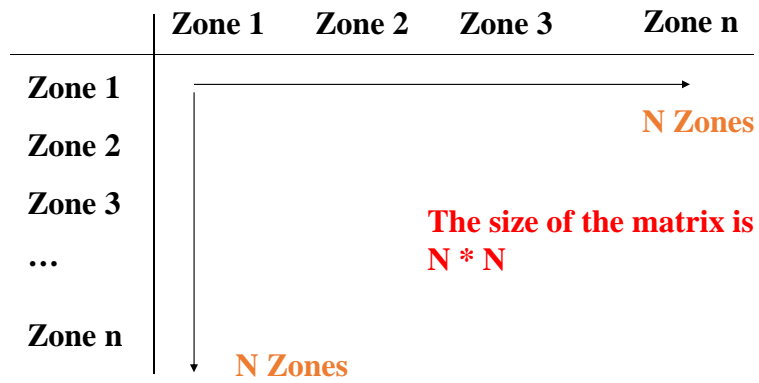
Example of Nodes Data Table

ID	X	Y	Z	Zone
1	10007	-6686.8	2267.8	0
2	10013	-6684.621207	2274.099742	0
3	137	-6681.602218	2281.349313	0
4	138	-6681.596829	2281.908804	0
5	139	-6681.397504	2282.25377	0
6	140	-6681.635726	2282.119321	0
7	142	-6681.713936	2281.377294	0
8	145	-6683.325668	2281.318015	0
9	147	-6682.733843	2281.318637	0
10	148	-6683.329813	2281.00787	0
11	15	-6681.46	2282.35	0
12	150	-6682.732668	2281.045939	0
13	151	-6683.338864	2280.481888	0
14	152	-6682.80998	2280.477121	0
15	153	-6682.627513	2280.277243	0
16	157	-6682.75609	2280.277589	0
17	158	-6683.238545	2280.266051	0
18	159	-6682.268522	2280.254167	0
19	16	-6681.612581	2282.045464	0
20	160	-6682.788217	2280.248985	0
21	161	-6683.158263	2280.248847	0
22	162	-6683.324562	2280.227982	0
23				

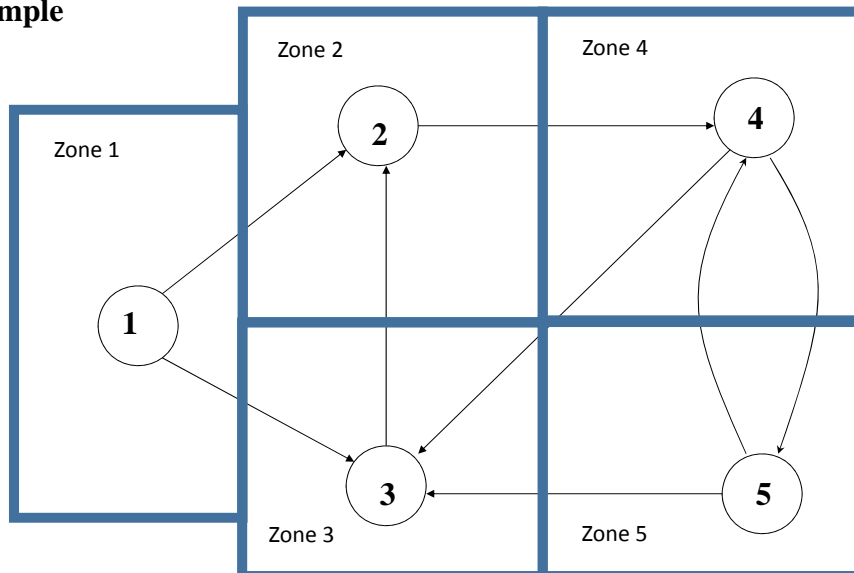
Example of Zones Data Table

ID	Centroid
126	2093
126	2093
126	2093
129	2089
129	2089
129	2089
134	2044
134	2044
134	2044
135	2003
135	2003
135	2003
136	2041
136	2041
136	2041
140	2011
140	2011
140	2011
141	2183

Zone-Zone Incidence Matrix



Example



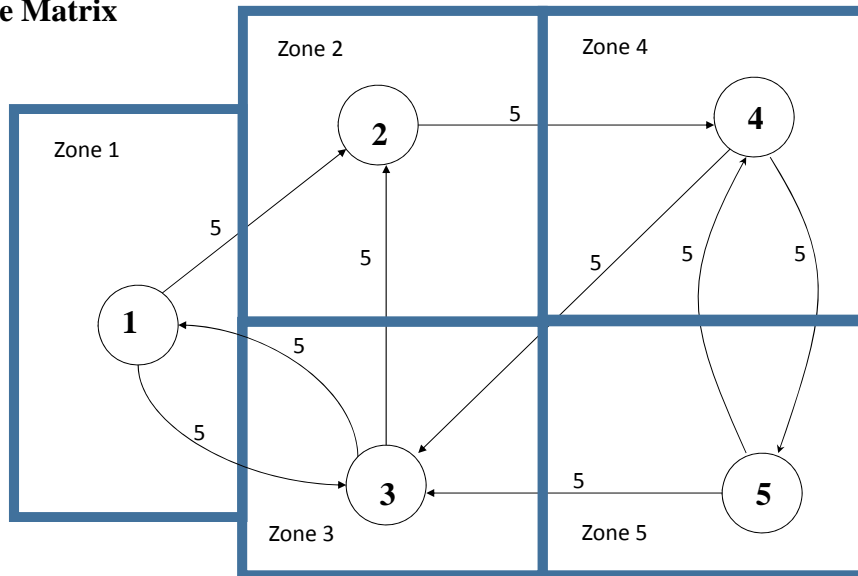
	1	2	3	4	5	Sum
1	0	1	1	0	0	2
2	0	0	0	1	0	1
3	0	1	0	0	0	1
4	0	0	1	0	1	2
5	0	0	1	1	0	2

Could the Incident Matrix be Symmetric? When?
 Which zone(s) is the least accessible? Most
 accessible?

Travel Resistance

- It is defined as the traveling resistance between the origin and destination points. It could be measured by:
 - Travel Time
 - Travel Distance
 - Travel Cost
 - Travel Generalized Time

Time Matrix



	1	2	3	4	5	Sum
1	0	5	5	10	15	35
2	15	0	10	5	10	40
3	5	5	0	10	15	35
4	10	10	5	0	5	30
5	10	10	5	5	0	30

Could the Time Matrix be Symmetric? When?
 Which zone(s) is the least accessible? Most accessible?

- Travel Distance Matrix
- Could the Travel Distance Matrix be Symmetric? When?
- Which zone(s) is the least accessible? Most accessible?
- Does Travel Distance Matrix provide same results (Accessibility) as Travel Time Matrix? Why?

	1	2	3	4	5	Sum
1	0	5	5	10	15	35
2	15	0	10	5	10	40
3	5	5	0	10	15	35
4	10	10	5	0	5	30
5	10	10	5	5	0	30

- Generalized Cost function
 - $GC_{ij} = a_1 \cdot T_{ij} + C_{ij} + a_2 \cdot D_{ij} + P_j + \sum \delta_n$
 - Where:
 - GC_{ij} : Generalized Cost for traveling between i and j
 - C_{ij} : Travel Cost for traveling between i and j (e.g. Transit fare)
 - a_1 : Value of Time
 - a_2 : Distance Cost for traveling between i and j (e.g. Car Cost)
 - P_j : Parking Cost at destination
 - δ_n : Turning movement penalty at intersection n
- Generalized Cost function does not include factors as:
 - Comfort
 - Convenience
 - Security
 - Safety

- Travel Generalized Cost Matrix
 - Could the Generalized Cost Matrix be Symmetric?
When?
 - Which zone(s) is the least accessible? Most accessible?
 - Does Travel Distance Matrix provide same results (Accessibility) as Travel Time Matrix? Why?

Roadways

Roadway systems provides two main functionalities:

- **Accessibility**
Access to land uses
- **Mobility**
Through Movement from point to another in the system

Highway Classification

Limited-access (freeway) facilities

100% mobility – 0% accessibility

Arterials

60-80% mobility – 20-40% accessibility

Collectors

40-60% mobility – 60-80% accessibility

Local Streets

0-40% mobility – 100% accessibility

