PROPOSAL PENGABDIAN KEPADA MASYARAKAT

WORKSHOP RENCANA INDUK

PROGRAM STUDI TEKNIK SIPIL
FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
INSTITUT TEKNOLOGI NASIONAL
BANDUNG
2019

HALAMAN PENGESAHAN

1. Judul : Workshop Rencana Induk Transportasi Nasional
2. Pelaksana : Andrean Maulana, S.T., M.T.

   NIP : 120160802

   Pangkat/Golongan : Asisten Ahli/III B

   Jurusan : Teknik Sipil

   Bidang Keahlian : Transportasi
3. Bentuk Kegiatan : Workshop
4. Waktu Kegiatan : 22 Januari 2020
5. Sumber Dana : Kementerian Perhubungan
6. Jumlah Dana : Rp. 2.000.000

Bandung, 9 Januari 2020

Pelaksana	Ketua Jurusan Teknik Sipil
(Andrean Maulana, S.T., M.T.)	(Dr. tech. Indra Noer Hamdan, ST., MT.)

Mengetahui

Kepala LP2M Itenas

(Dr. Tarsisius Kristyadi, ST., MT.)

Latar Belakang

Penyusunan Rencana Induk Transportasi Nasional (RITN) membutuhkan model transportasi sebagai alat bantu uji scenario pengembangan kawasan dan jaringan transportasi. Dengan lingkup wilayah skala nasional, komputasi yang dilakukan cukup rumit sehingga membutuhkan alat bantu, dalam hal ini menggunakan software PTV Visum.

Tujuan

Tujuan pelaksanaan workshop ini adalah alih teknologi software PTV Visum sebagai alat bantu perencanaan sistem transportasi untuk menunjang Rencana Induk Transportasi Nasional (RITN).

Mekanisme Pelaksanaan Kegiatan

Kegiatan dilaksanakan pada 22 Januari 2020 di Hotel Santika, Bekasi.

No	Waktu	Nama Kegiatan
1	9:00-12:00	Pengolahan data survey sebagai input model transportasi.
2	12:00-13:00	Isoma
3	13:00-15:00	Penggunaan software PTV Visum sebagai alat bantuk model transportasi.

Target Luaran

Luaran dari kegiatan ini adalah panduan penggunaan software PTV Visum sebagai alat bantuk model transportasi.

LAPORAN PENGABDIAN KEPADA MASYARAKAT

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Bandung, 10 Februari 2020

Pelaksana	Ketua Jurusan Teknik Sipil
(Andrean Maulana, S.T., M.T.)	(Dr. techn. Indra Noer Hamdhan, ST., MT.)

Mengetahui

Kepala LP2M Itenas

itenas
LPPM

(Dr. Tarsisius Kristyadi, ST., MT.)

CV. CIPTA SOLUSI PERKASA

SESI 4 : PENGGUNAAN SOFTWARE DALAM PEMODELAN PERGERAKAN DAN JARINGAN TRANSPORTASI MULTIMODA MULTIKOMODITAS

JAKARTA, 22 JANUARI 2020

PELATIHAN PEMODELAN TRANSPORTASI DALAM MENDUKUNG PENYUSUNAN RENCANA INDUK TRANSPORTASI NASIONAL

Kementerian Perhubungan
Sekretariat Jenderal
Biro Perencanaan

I. MODUL SOFTWARE VISUM

THE TRANSPORTATION CHALLENGES OF TODAY AND TOMORROW

PTV GROUP www.ptvgroup.com

Page 3

THE TRANSPORTATION CHALLENGES OF TODAY AND TOMORROW

TRANSPORTATION MODELLING – ANSWERING QUESTIONS!

- of new road infrastructure

- of Public Transport changes

- of new developments

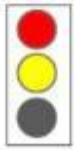
- of demographical changes

- of mobilty pricing

- Of changing fuel costs

- of regulative actions

- of new signal programs

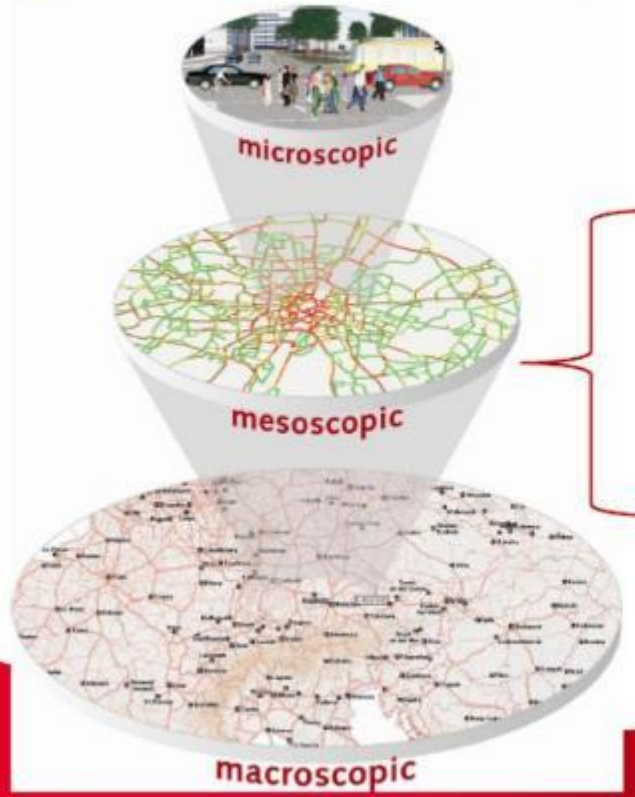


Program 1		Program 2	
t_C =	60s	t_C =	90s
t_{g1} =	20s	t_{g1} =	30s
t_{g2} =	28s	t_{g2} =	48s

PTV GROUP www.ptvgroup.com

PTV GROUP
the mind of movement

Transportation Modeling Approaches



Modeling of individual vehicles and their interactions (PTV Vissim)

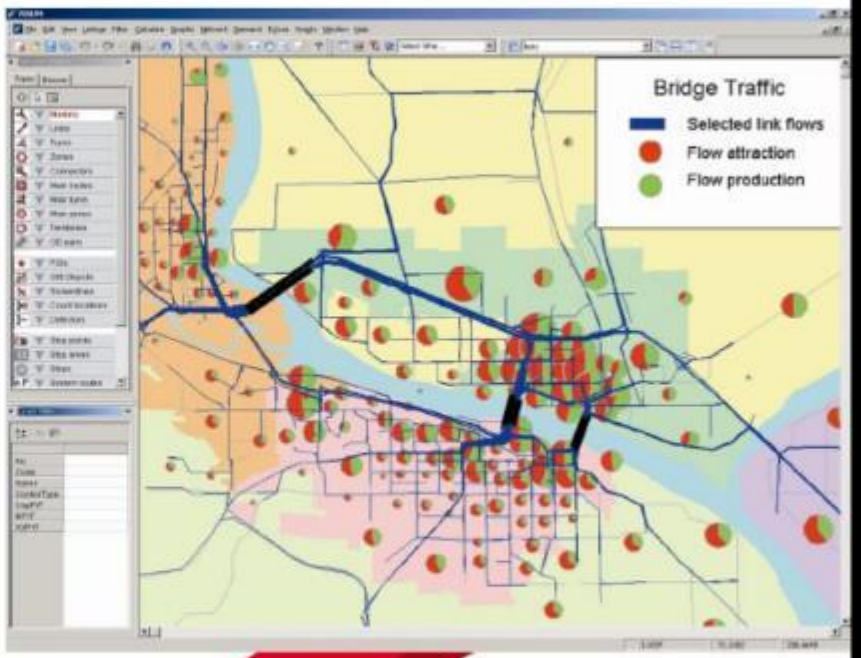
Modeling of individual vehicles which move through the network based on macroscopic properties	Modeling of individual vehicles but based on simplified assumptions regarding their behaviors
Vehicles move through the network as packages of vehicles	Cell based approaches

Modeling of traffic using the relationship between aggregated quantities like flow, speed, density (PTV Visum)

www.ptvgroup.com

What is VISUM?

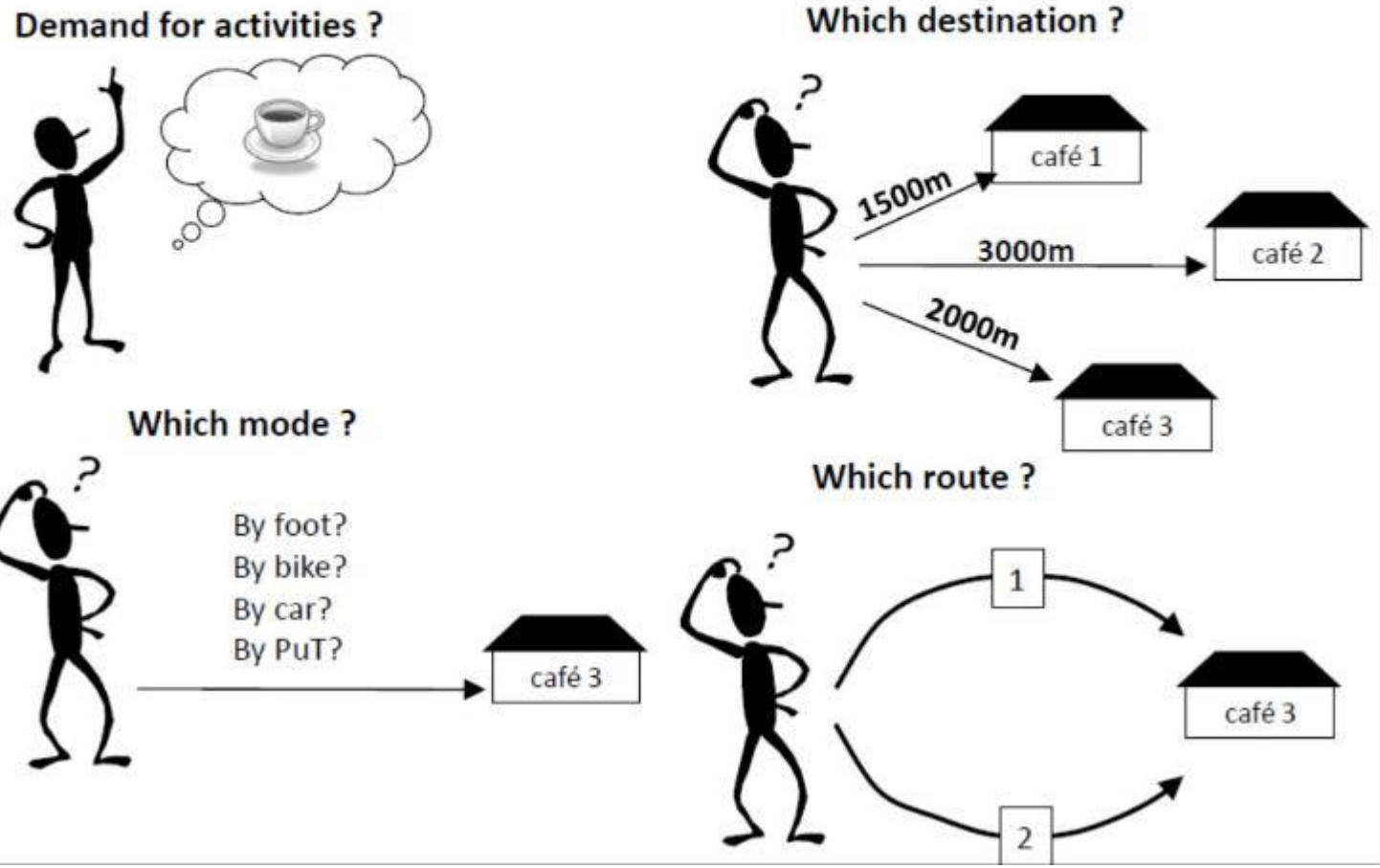
1. Transportation Planning Platform
2. Integrated Multimodal Network Model
3. Windows Interface
4. Extensive GIS Functionalities
5. Advanced Environment for Assignment
6. Analysis and Optimisation of Networks
7. Transportation Intelligence for public and private transport



Short Introduction to Transportation Modelling

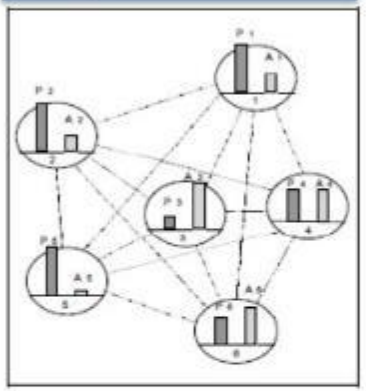
- Travel Demand modelling
- Assignment

How do we model travel demand?

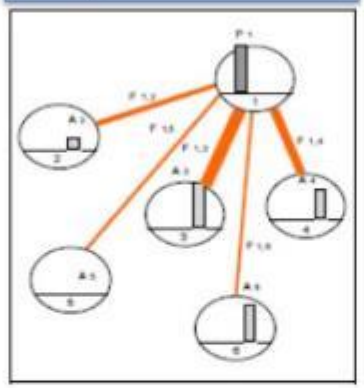


Traffic demand models – the famous 4 steps

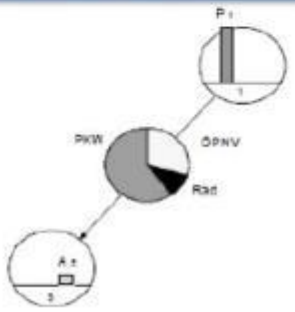
1. Trip Generation



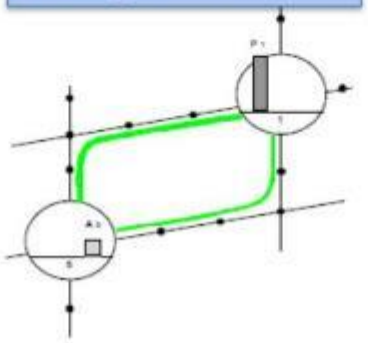
2. Trip Distribution

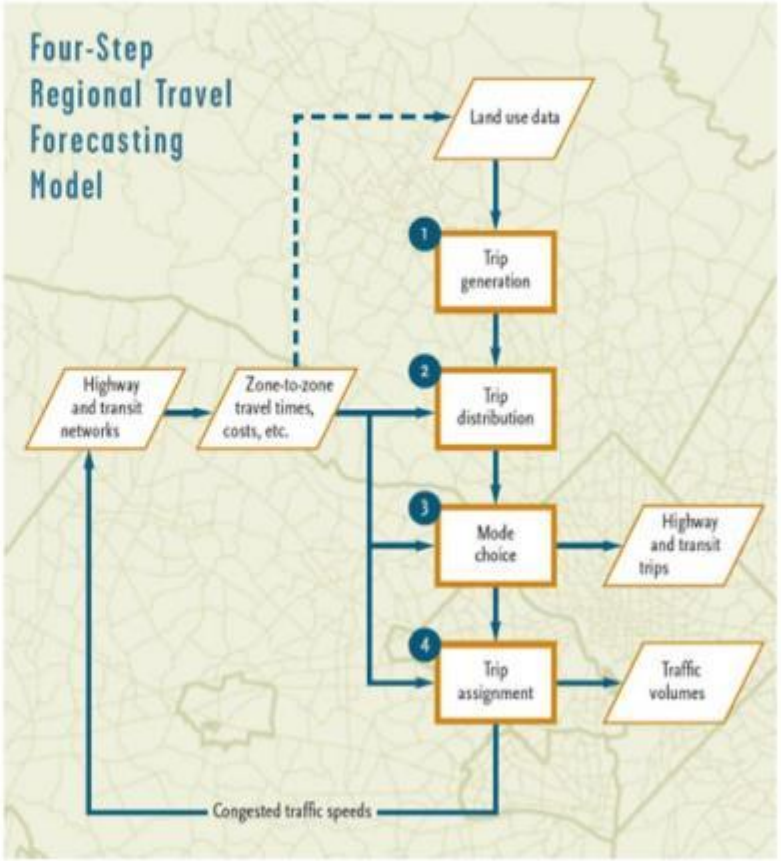


3. Mode Choice

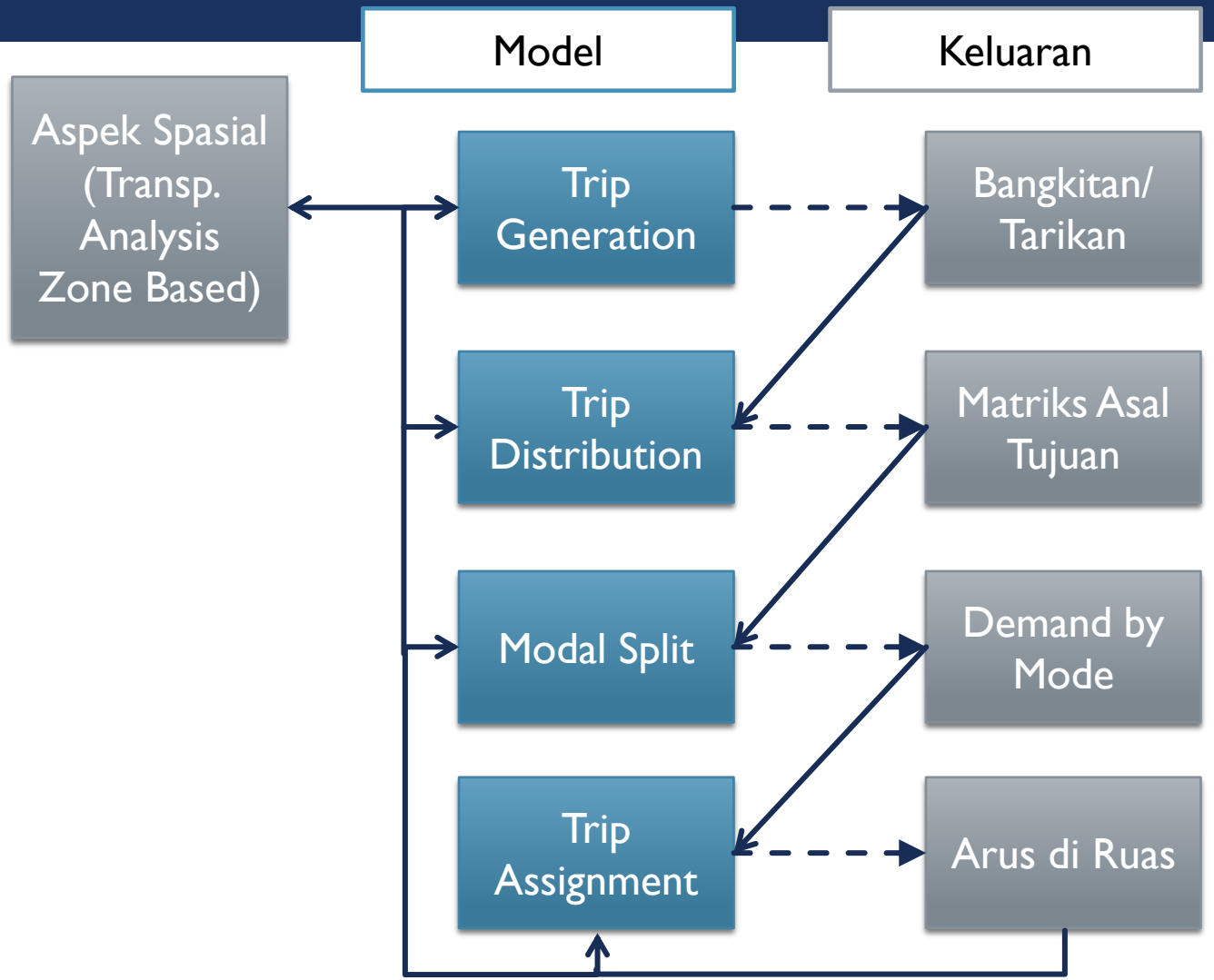


4. Assignment

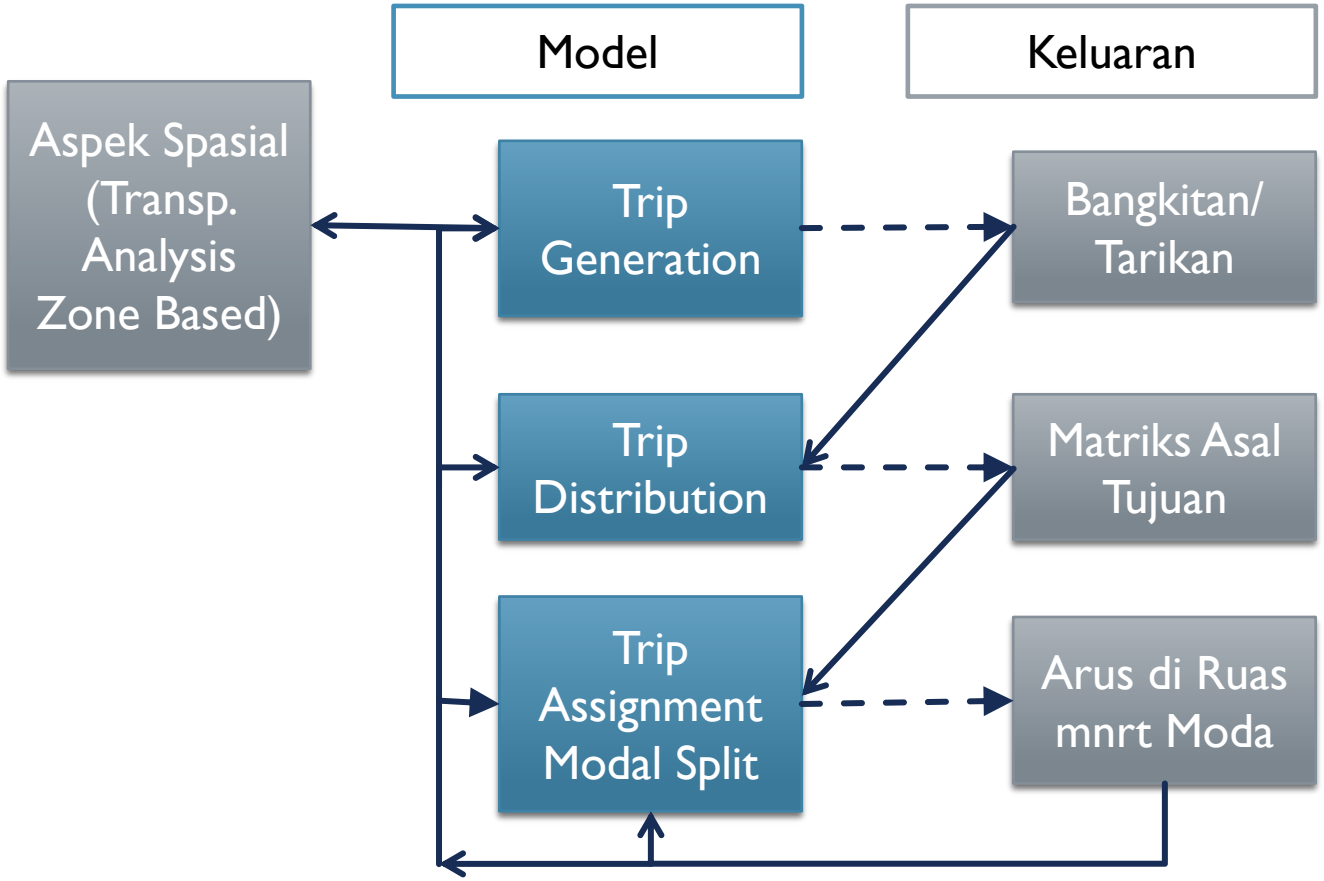




MODEL 4 TAHAP



MODAL SPLIT DALAM MODEL 4 TAHAP



INPUT MODEL JARINGAN MULTIMODA:
FUNGSI BIAYA DI LINK

$$c(x_i) = \left(\frac{l_i}{s_i} \left(1 + 0.5 \left(\frac{\frac{x_i e_i}{o_i * 10 * 30}}{k_i} \right)^{1.5} \right) \right) * w + \frac{b}{o_i} * l_i + \frac{t_i}{o_i} * l_i \qquad (1)$$

$$c(x_i) = \left(\frac{l_i}{s_i} \right) * w + t_i * l_i \qquad (2)$$

$$c(x_i) = g_i * w + m_i \qquad (3)$$

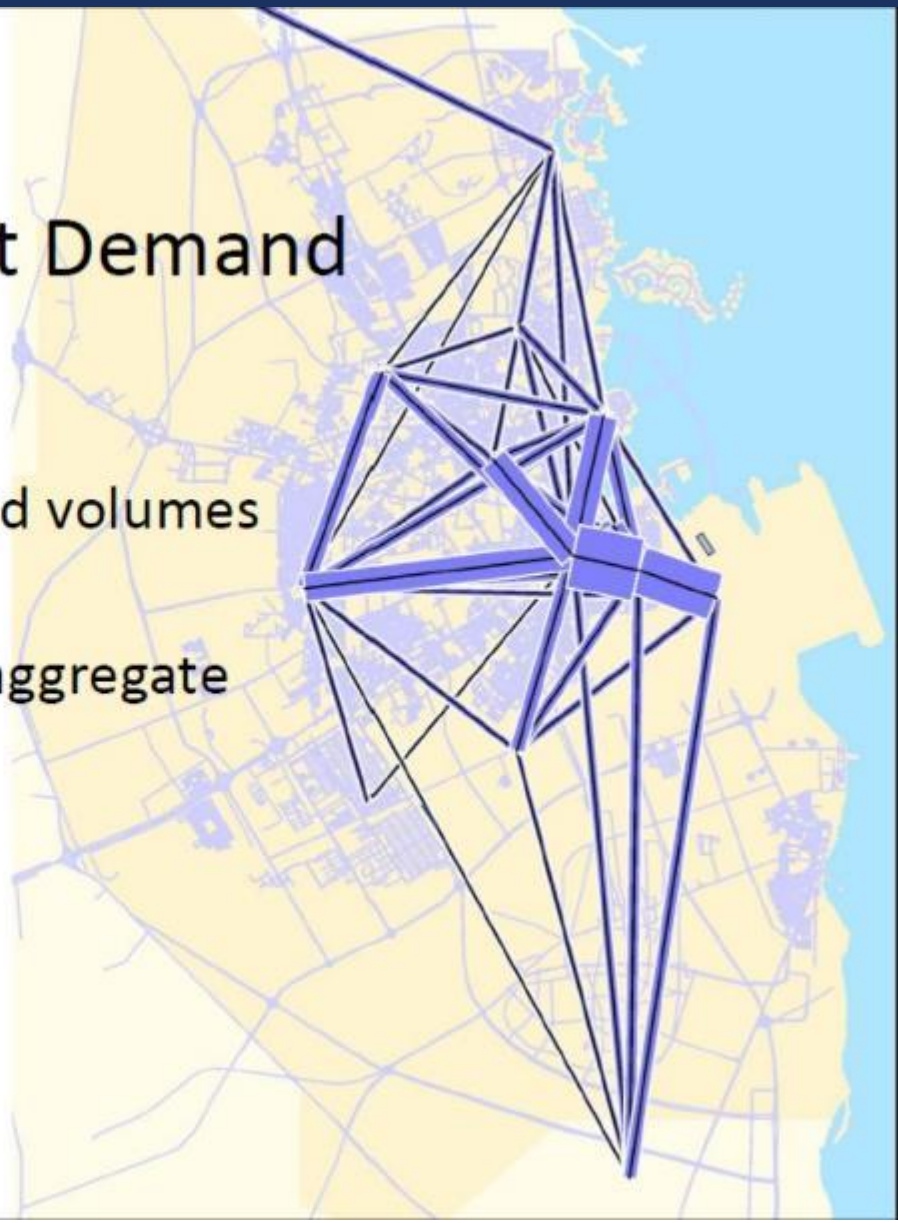
Dimana:

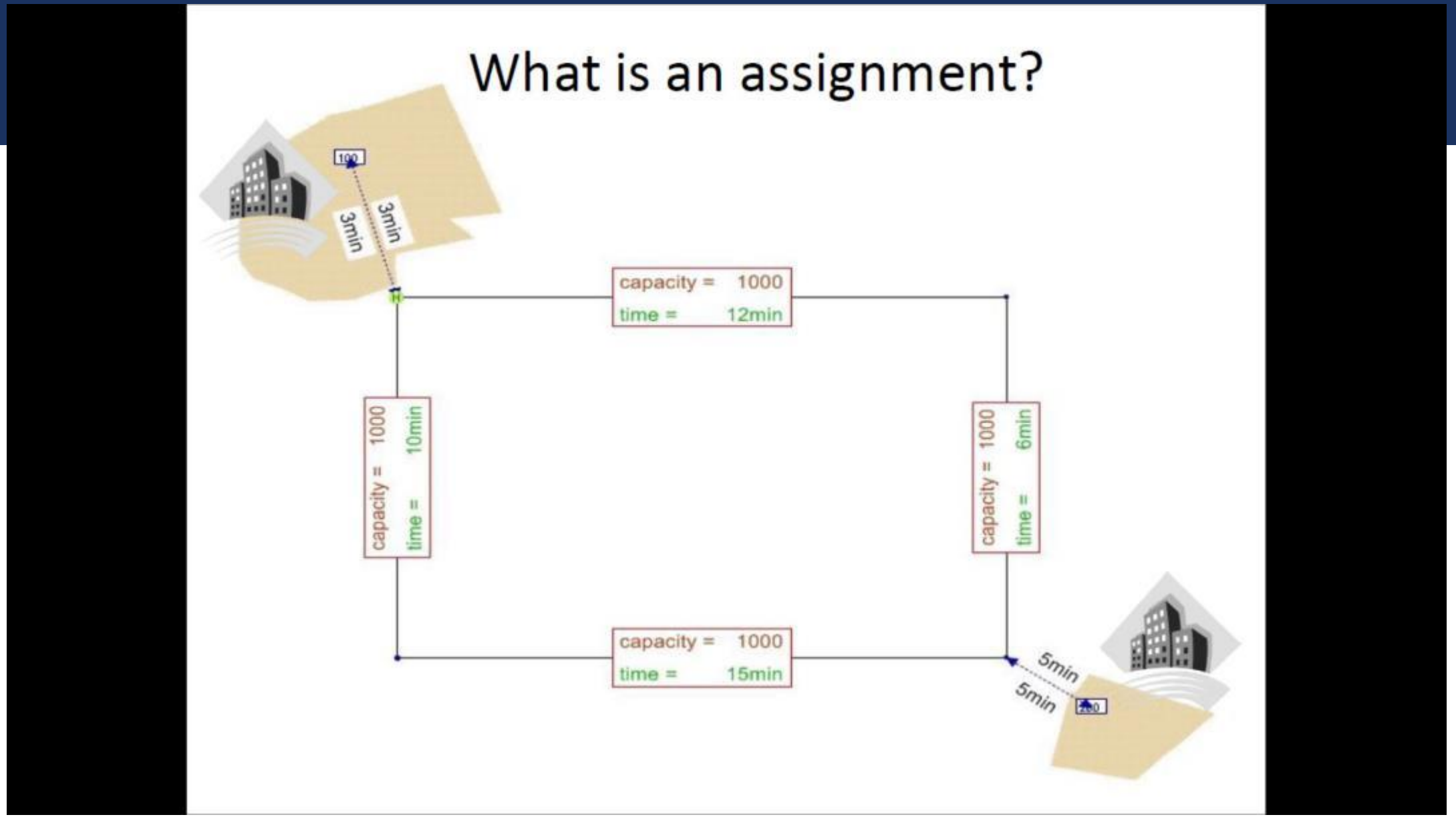
Persamaan (1) untuk link jalan, (2) untuk link udara, laut dan KA, (3) untuk link akses naik/turun terminal/stasiun/bandara/pelabuhan

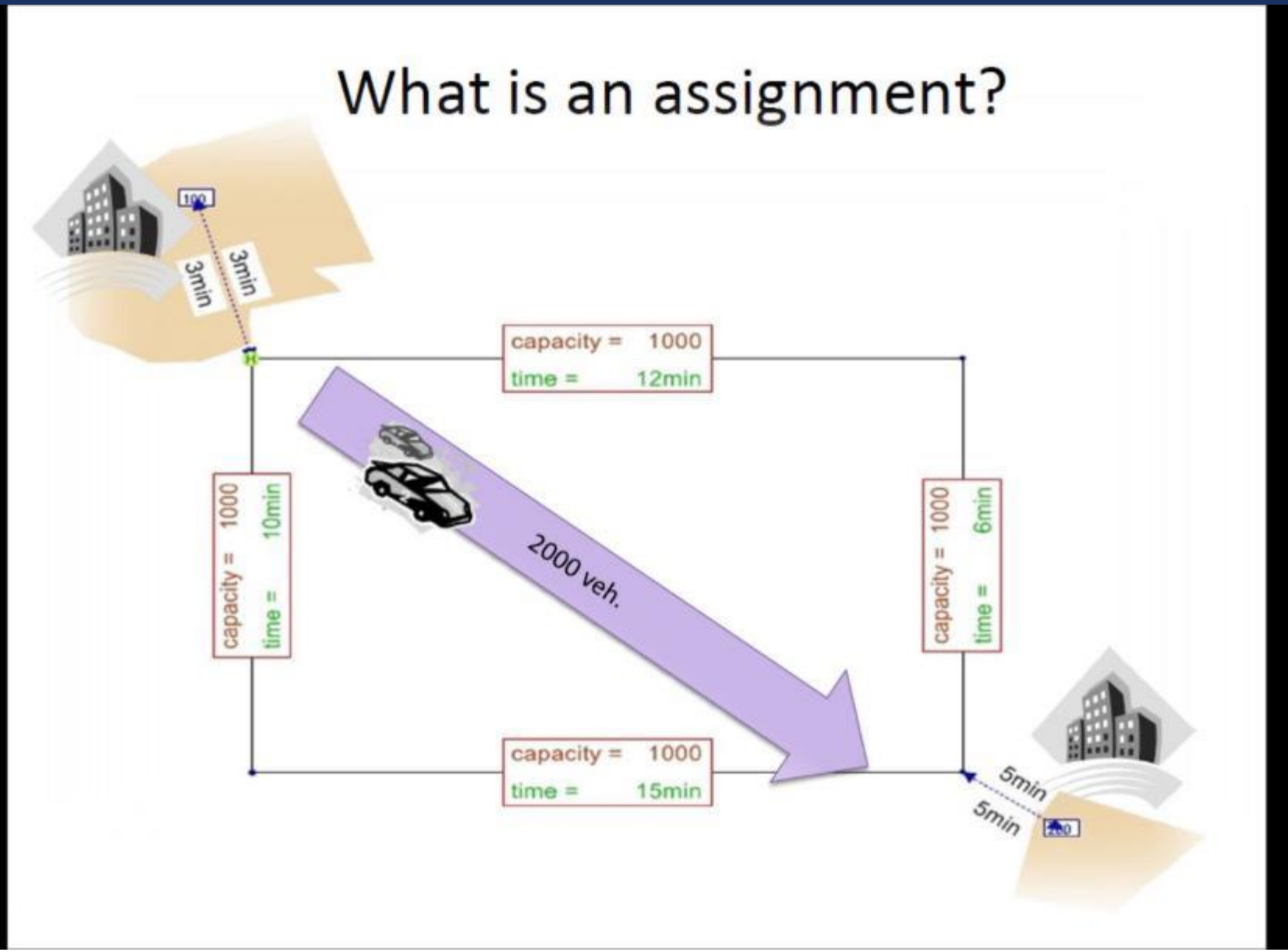
x_i	:	arus di link (orang/bulan)	k_i	:	kapasitas jalan (smp/jam)
$c(x_i)$	:	biaya di link (Rp.)	w	:	nilai waktu rata-rata (Rp./orang)
l_i	:	panjang link (km)	b	:	biaya operasi kendaraan (Rp./km)
s_i	:	kecepatan di link (km/jam)	t_i	:	tarif tol rata-rata perkendaraan (Rp./km), untuk link jalan tol
e_i	:	faktor konversi ke smp	g_i	:	waktu kedatangan sampai meninggalkan stasiun rata-rata (jam)
o_i	:	okupansi (orang/smp)	m_i	:	biaya akses dan biaya tambahan lain dari--stasiun atau sebaliknya (Rp.)

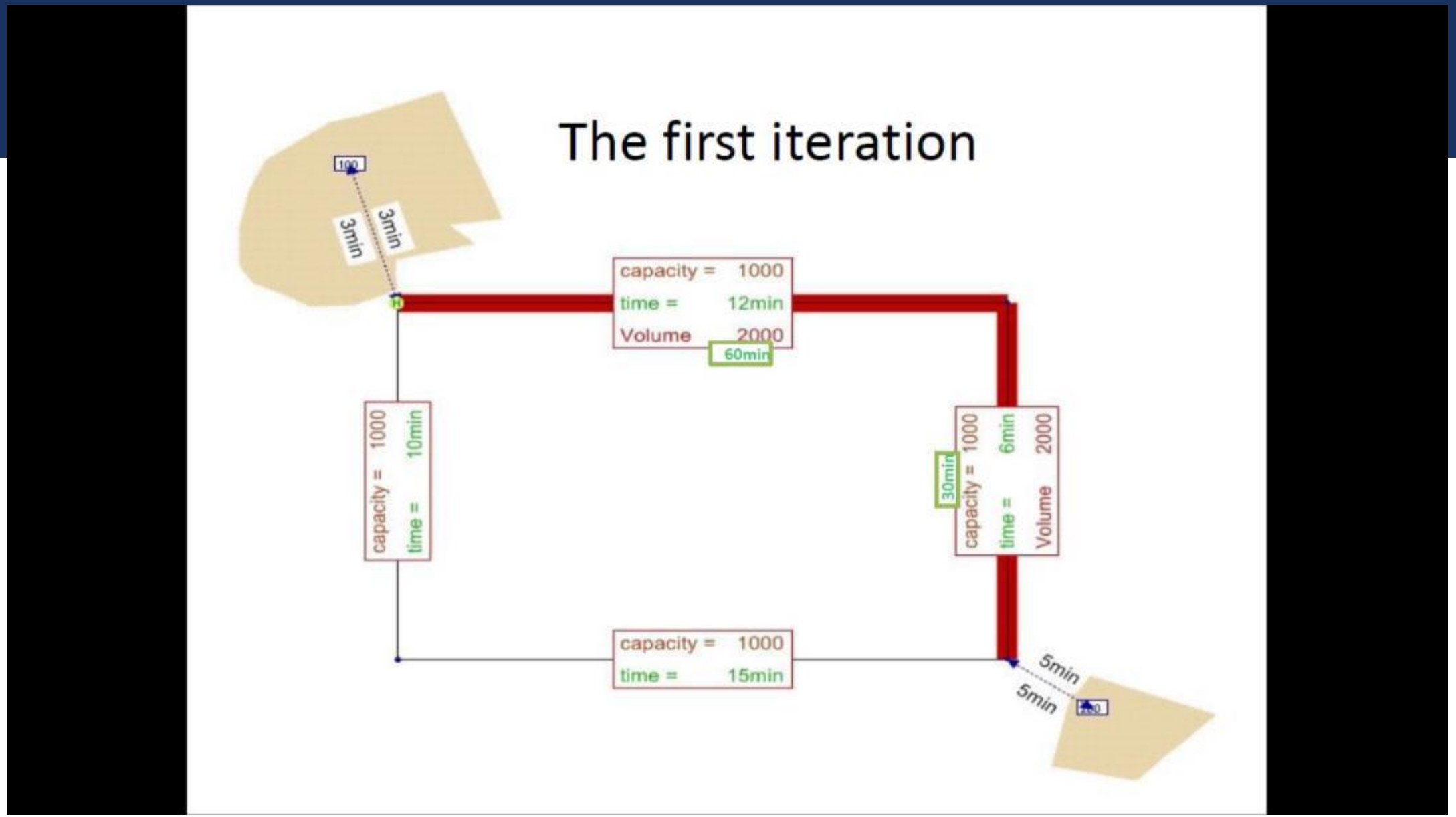
Analysing Transport Demand

- Desire Lines
  - to display structure and volumes of O-D relations,
  - typically based on an aggregate matrix (main zones)

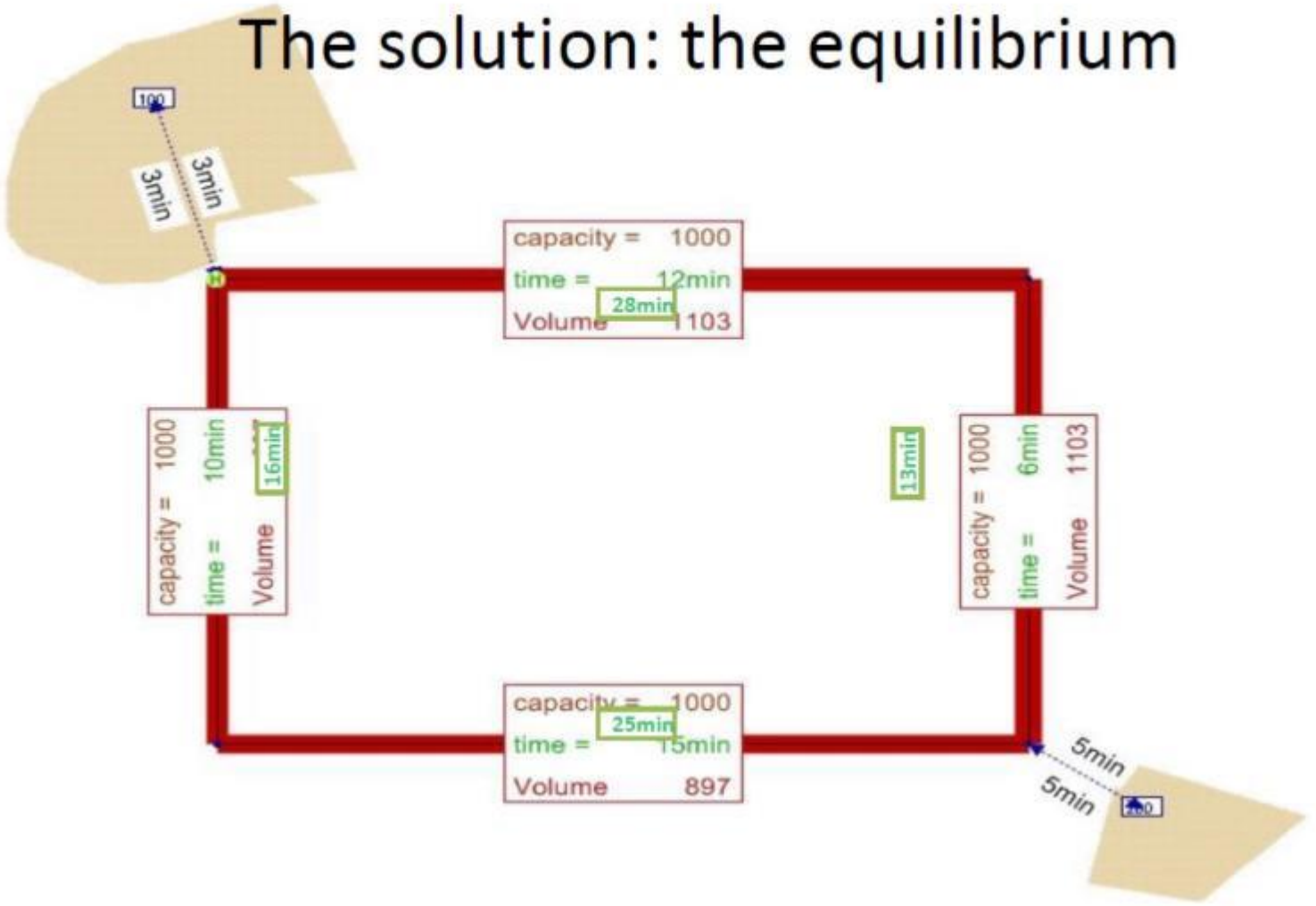



What is an assignment?
100
3min
3min
capacity = 1000
time = 12min
capacity = 1000
time = 10min
capacity = 1000
time = 6min
capacity = 1000
time = 15min
5min
5min

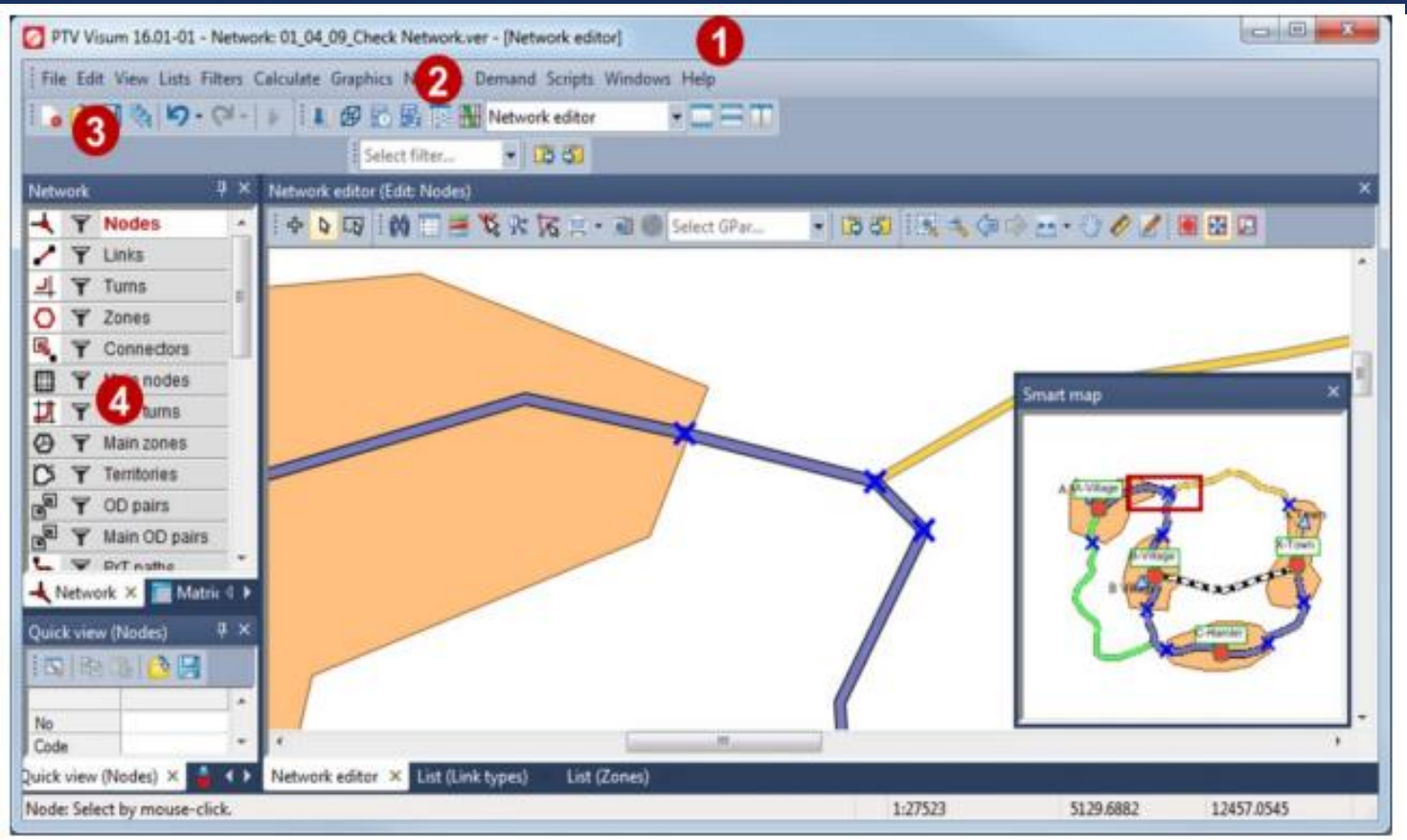

What is an assignment?
100
3min
3min
capacity = 1000
time = 12min
capacity = 1000
time = 10min
2000 veh.
capacity = 1000
time = 6min
capacity = 1000
time = 15min
5min
5min
200


The first iteration
100
3min
3min
capacity = 1000
time = 12min
Volume 2000
60min
capacity = 1000
time = 10min
capacity = 1000
time = 6min
Volume 2000
30min
capacity = 1000
time = 15min
5min
5min

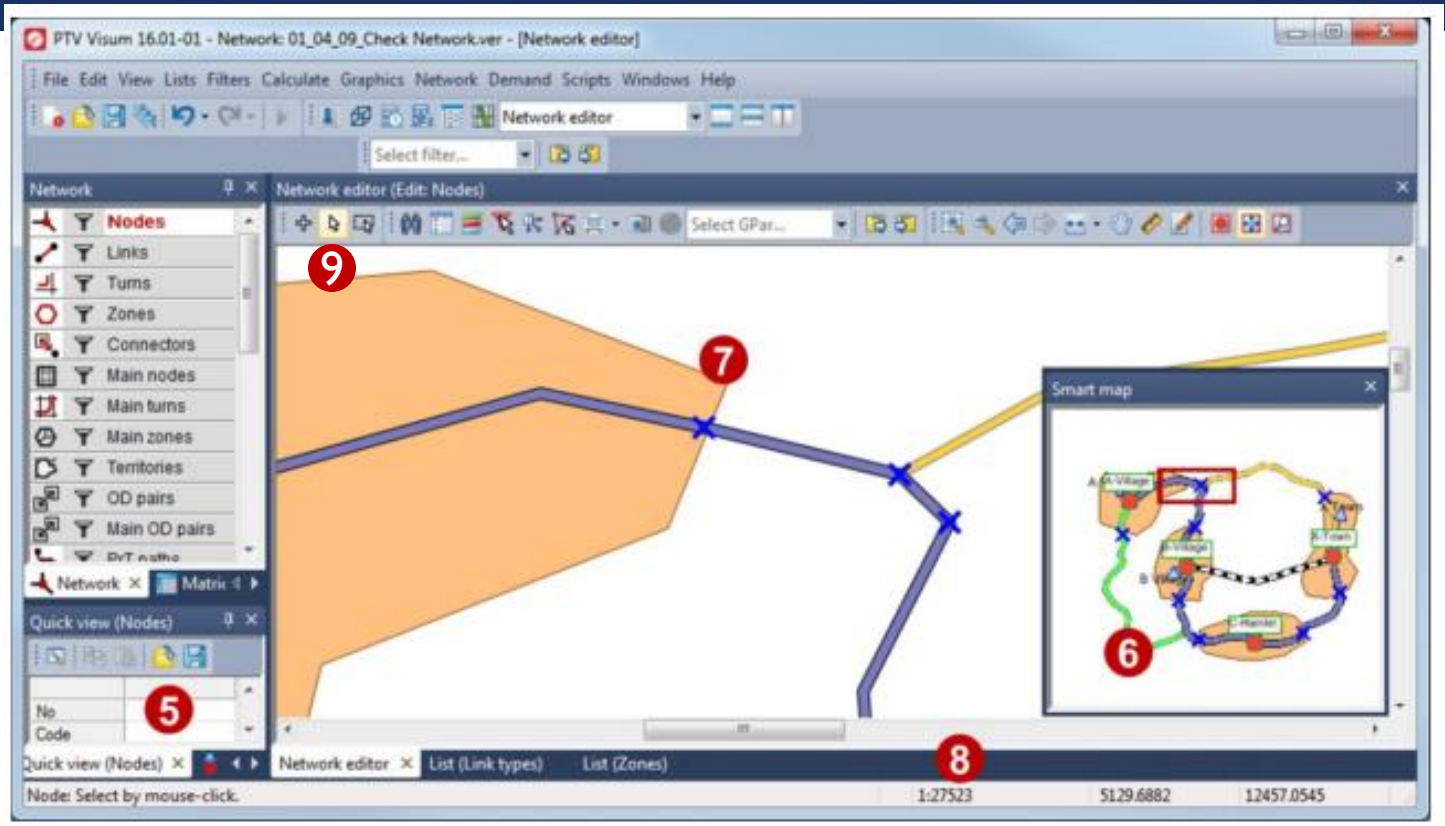
The solution: the equilibrium



2. FITUR ALAT BANTU VISUM



1. TitleBar
2. Menu Bar
3. Tool Bar
4. Windows Network



(5) Quick View Window

(6) Smart Map Windows

(7) Windows Network

(8) Status Bar

- Rincian pada objek jaringan yang disorot, jika hanya objek jaringan tunggal yang disorot
- Jumlah objek jaringan yang disorot, jika beberapa objek jaringan telah disorot
- Perintah untuk langkah-langkah pemrosesan jaringan
- Skala jaringan
- Koordinasikan penunjuk mouse dalam jaringan

(9) Insert and Edit Mode

NETWORK OBJECTS

Network object	Description
Transport system (TSys)	The transport supply consists of several transport systems. Transport systems are used for example, to allocate attributes for network objects dependent on transport systems. This is how links can be opened for a transport system bike, for the transport systems car and HGV blocked, however.
Mode	In PrT a mode comprises exactly one transport system. In PuT, however, a mode can comprise several transport systems. This is how you can define a mode PuT for example, which comprises the PuT transport systems tram, bus and train.
Demand segment (DSeg)	A demand segment makes the connection between transport supply and traffic demand. A demand segment is assigned exactly one mode and each demand segment exactly one demand matrix. A mode can comprise several demand segments. This is how you can create a demand segment for the mode PuT, for transporting students and one for the remaining PuT.
Node	Nodes are point objects, which specify the location of intersections, merging links or points in road and rail network. They are start and end points of links. Nodes connect zones with the network (connected nodes).
Turn	Turns specify which movements are permitted at a node, that is, whether turning at a node from one link to another link is permitted. For PrT transport systems, turning time penalties and capacities can be specified which describe the influence of the intersection on the performance of the network. Turning prohibitions are taken into consideration as follows: » For public transport systems in the construction of a line route » For private transport systems in a route search
Turn standard	Turn standards are templates used to create new turns with default values for the attributes **Time penalty** and **Capacity PrT**. Which turn standard is used for the allocation of turn attributes, depends on the node type, the turn type and the flow hierarchy.
Link	Links connect nodes and thus describe the structure of the road and rail network. A link is a directed edge, i.e. both directions of a link are independent network objects and thus, can have different attributes.
Link type	Link types are used as a template when inserting new links. When inserting a link, a link type has to be specified. The link then takes over the attributes permitted transport systems (**TSysSet**), **Capacity PrT**, velocities (**v0-PrT**, **vMin-PrT**, **vMax-PrT** and **vDef-PuT**), **Number of lanes** and the link rank as default values.
Zone	Zones (traffic cells) describe the positions of utilities in the network (for example, residential areas, commercial areas, shopping centers, schools). They are origins and destinations of movements within the transport network, which means of traffic. Zones and the transport network are connected through connectors.
Connector	Connectors connect zones to the link network. They represent the distance to be covered between a zone's center of gravity and the connector nodes. For public transport demand, the zone has to be connected via a stop area with stop(s) allocated to a node.

TYPES OF TRAFFIC IN VISUM

PrT

PuT

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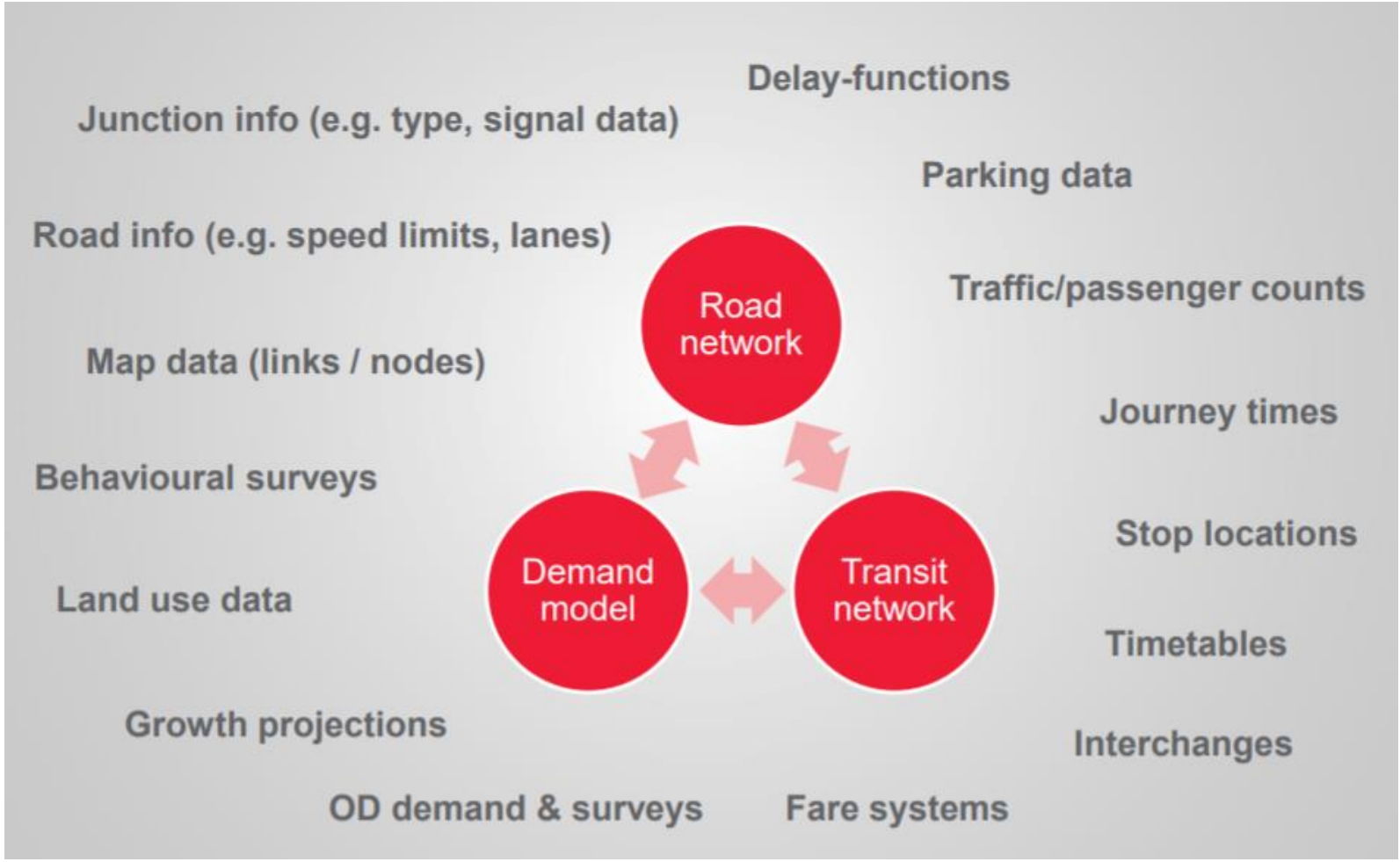
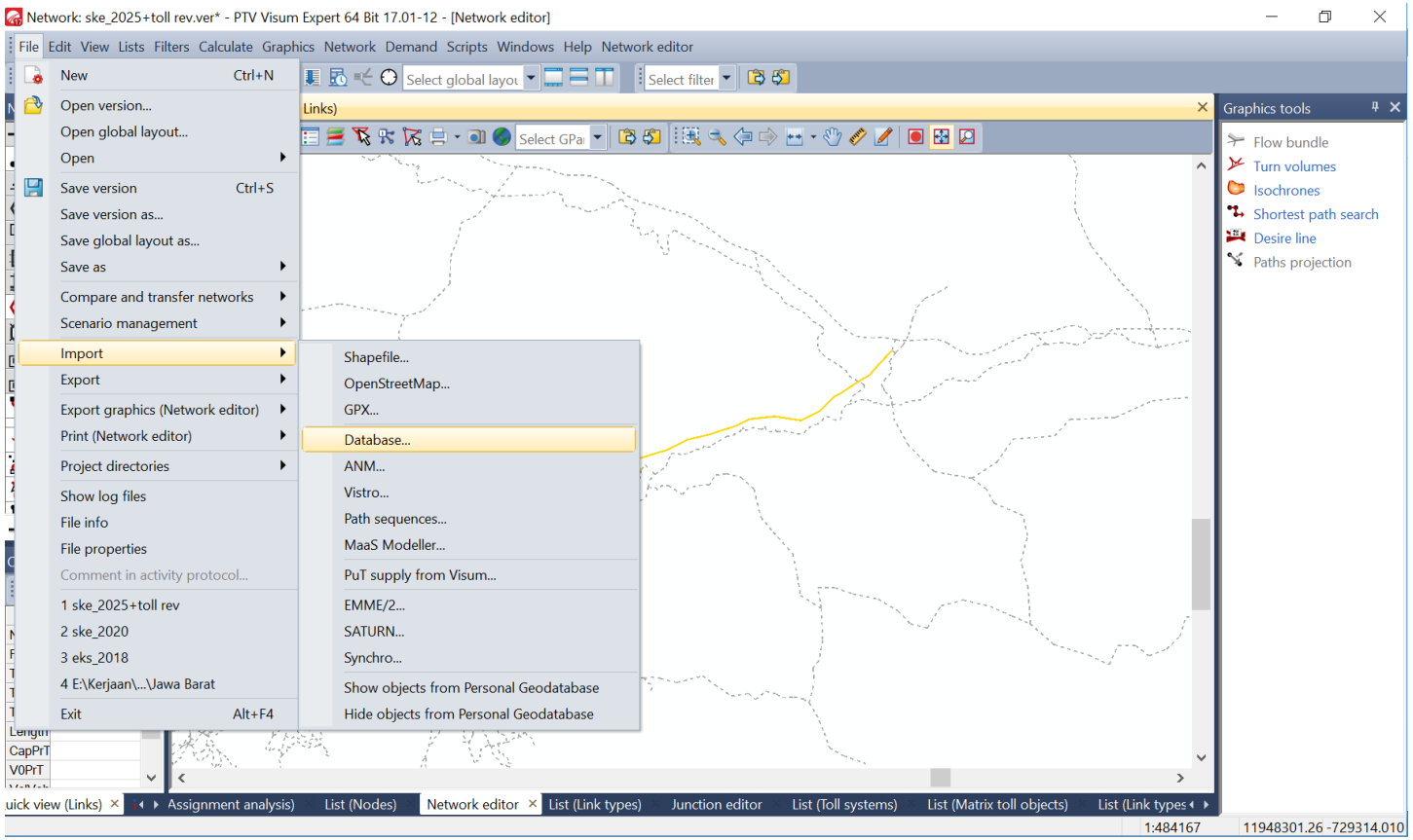
FITUR ALAT BANTU VISUM



IMPORTING FILE

- Dapat dikoordinasikan dengan format file lain, seperti .shp dan .osm .



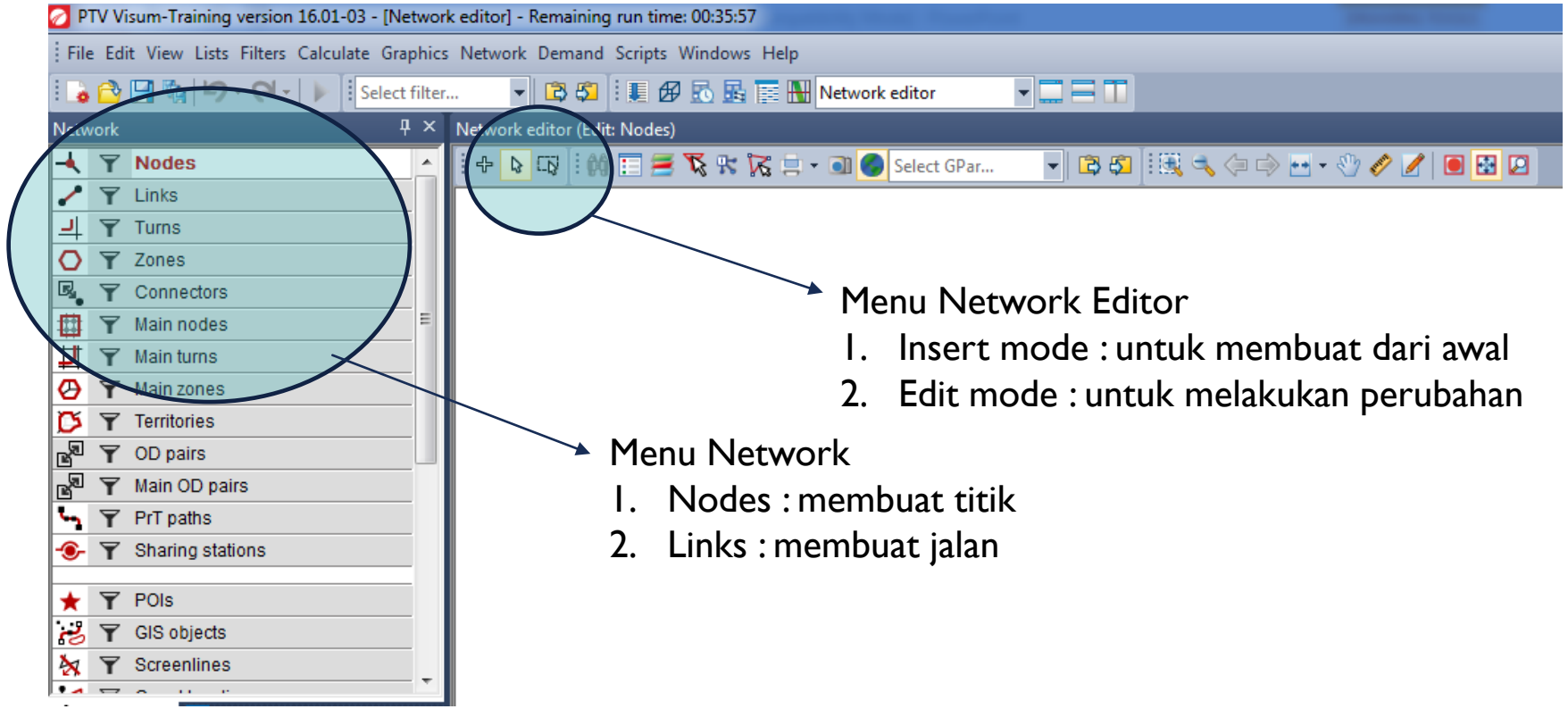
3. SISTEM INPUT

MASUKAN UTAMA

1. Data jaringan
2. Data matriks asal tujuan
3. Proses Assignment

I. DATA JARINGAN

A. Penggambaran link dan node.



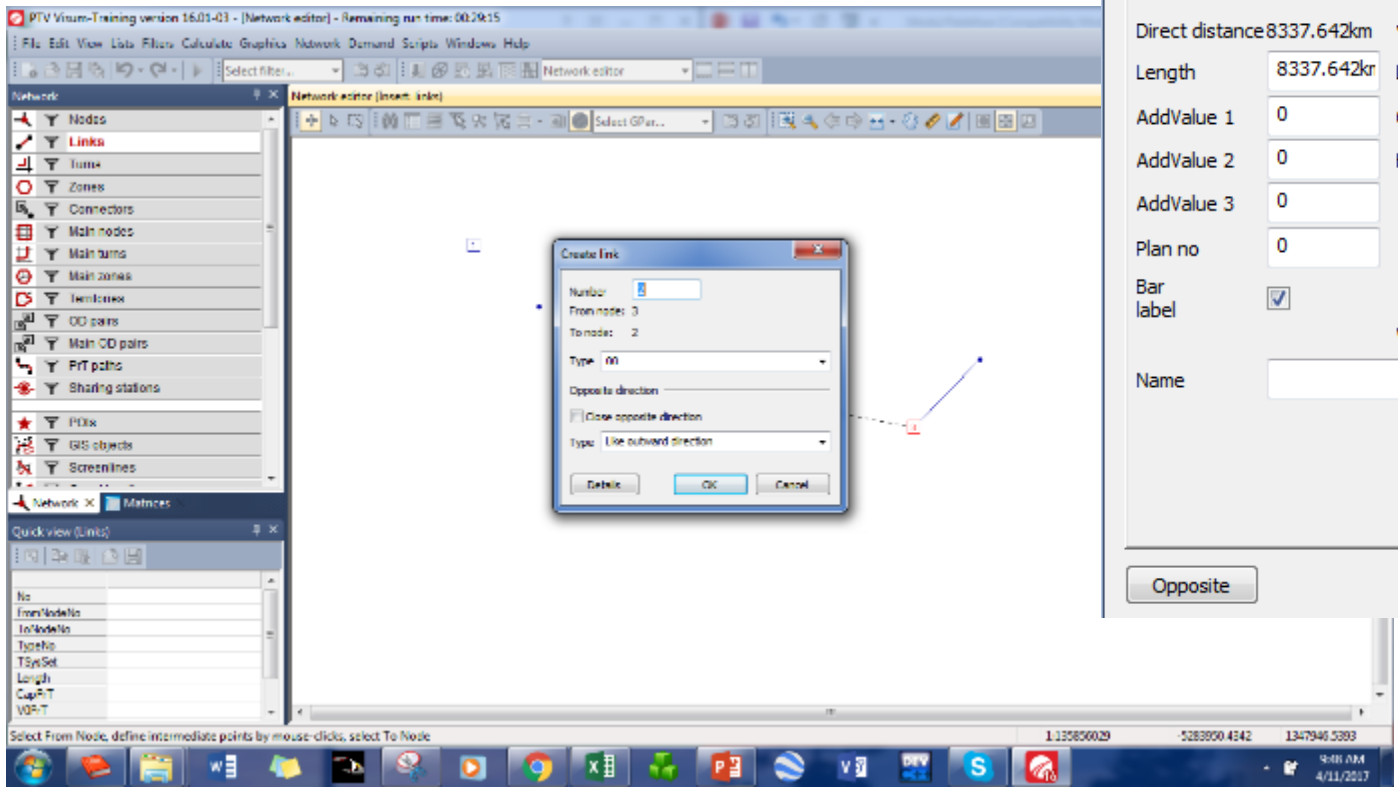
Menu Network Editor

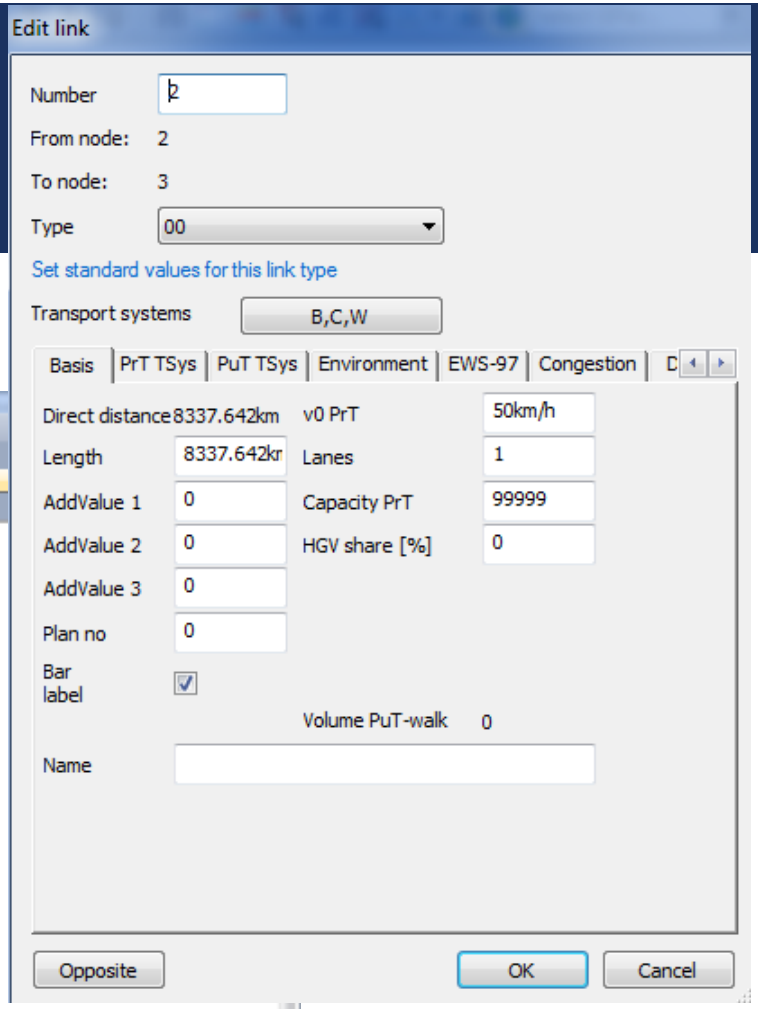
1. Insert mode : untuk membuat dari awal
2. Edit mode : untuk melakukan perubahan

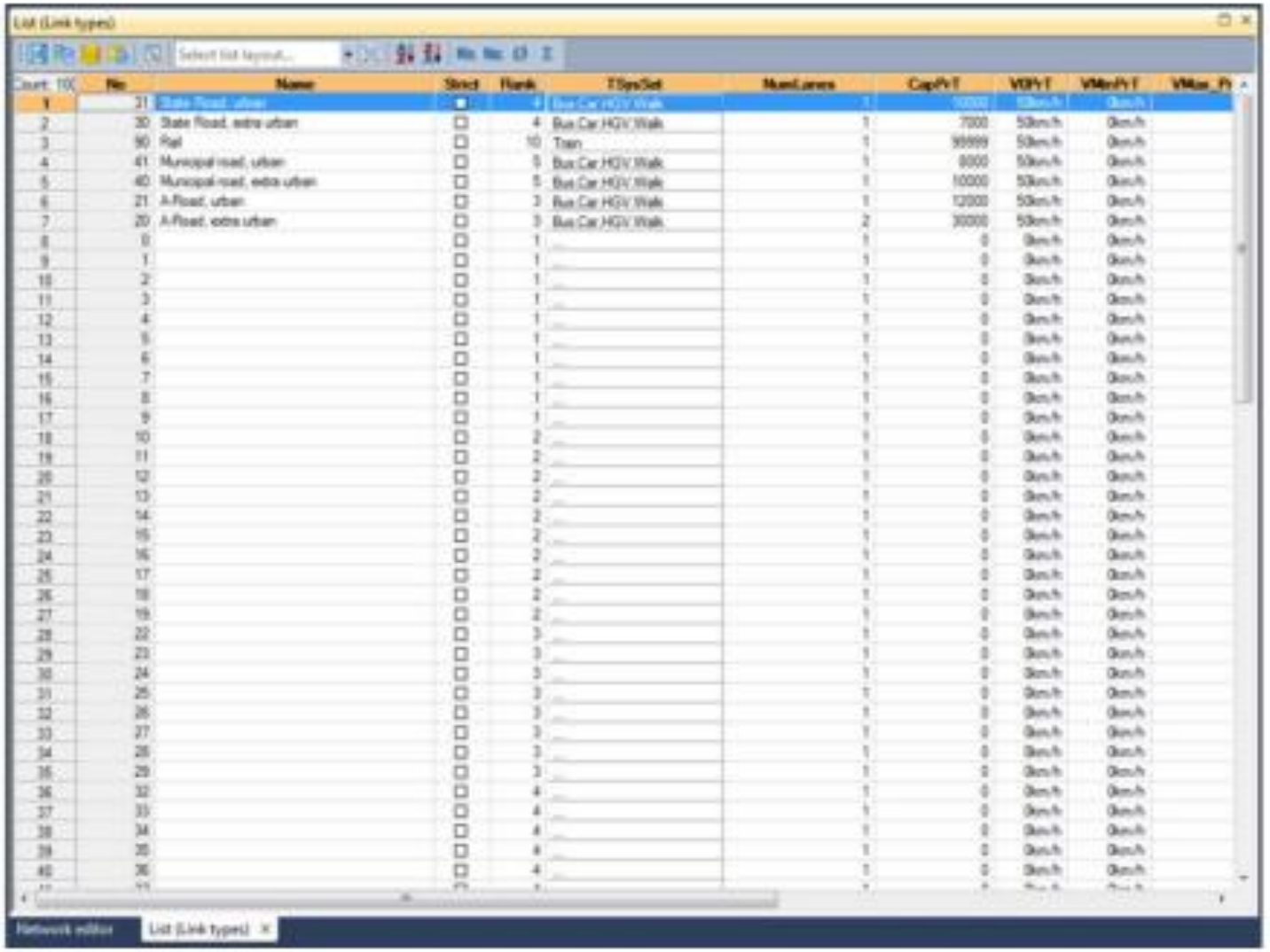
Menu Network

1. Nodes : membuat titik
2. Links : membuat jalan

PROPERTIES LINK

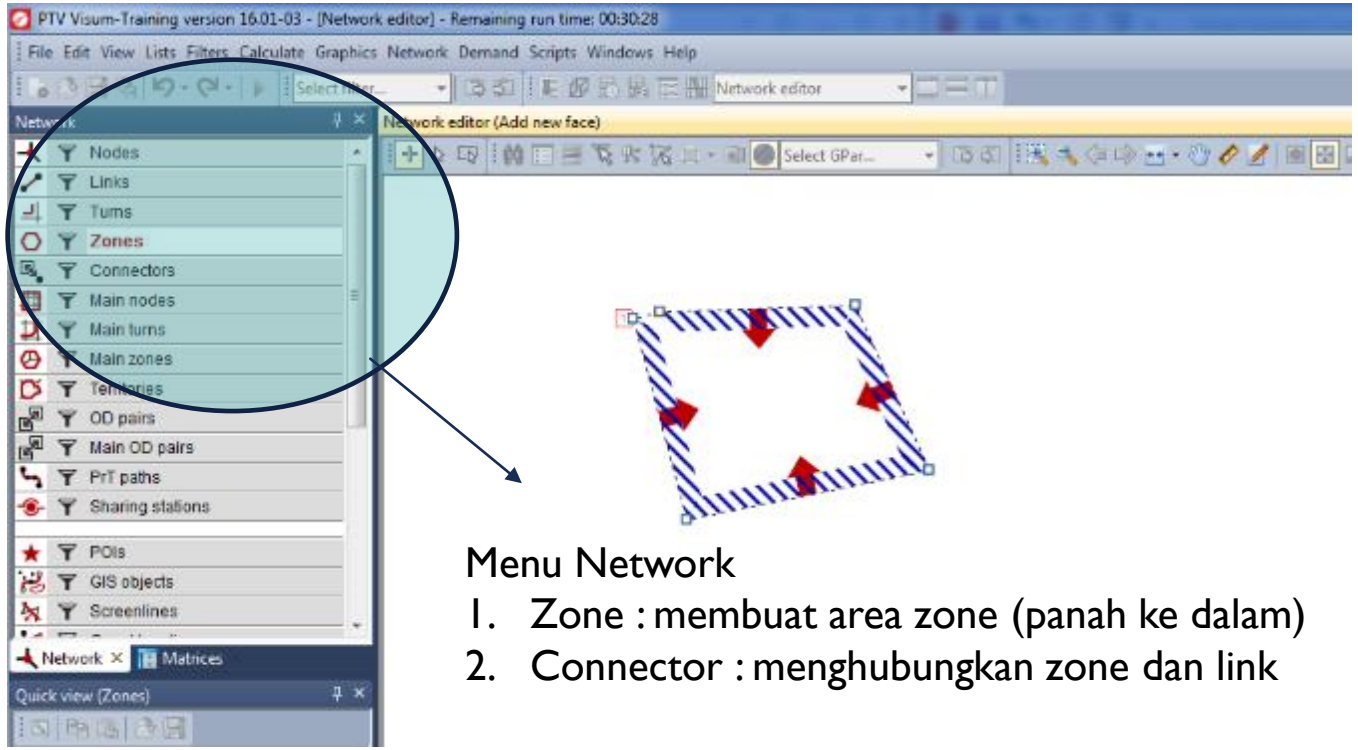





List (Link types)
Select list layout...
Count: 10
No
Name
Strict
Rank
TSysSet
NumLanes
CapPrT
VDPrT
VMinPrT
VMax_Pr
1 31 State Road, urban 4 Bus,Car,HGV,Walk 1 10000 50km/h 0km/h
2 30 State Road, extra urban 4 Bus,Car,HGV,Walk 1 7000 50km/h 0km/h
3 90 Rail 10 Train 1 99999 50km/h 0km/h
4 41 Municipal road, urban 5 Bus,Car,HGV,Walk 1 8000 50km/h 0km/h
5 40 Municipal road, extra urban 5 Bus,Car,HGV,Walk 1 10000 50km/h 0km/h
6 21 A-Road, urban 3 Bus,Car,HGV,Walk 1 12000 50km/h 0km/h
7 20 A-Road, extra urban 3 Bus,Car,HGV,Walk 2 30000 50km/h 0km/h
Network editor
List (Link types)

I. DATA JARINGAN

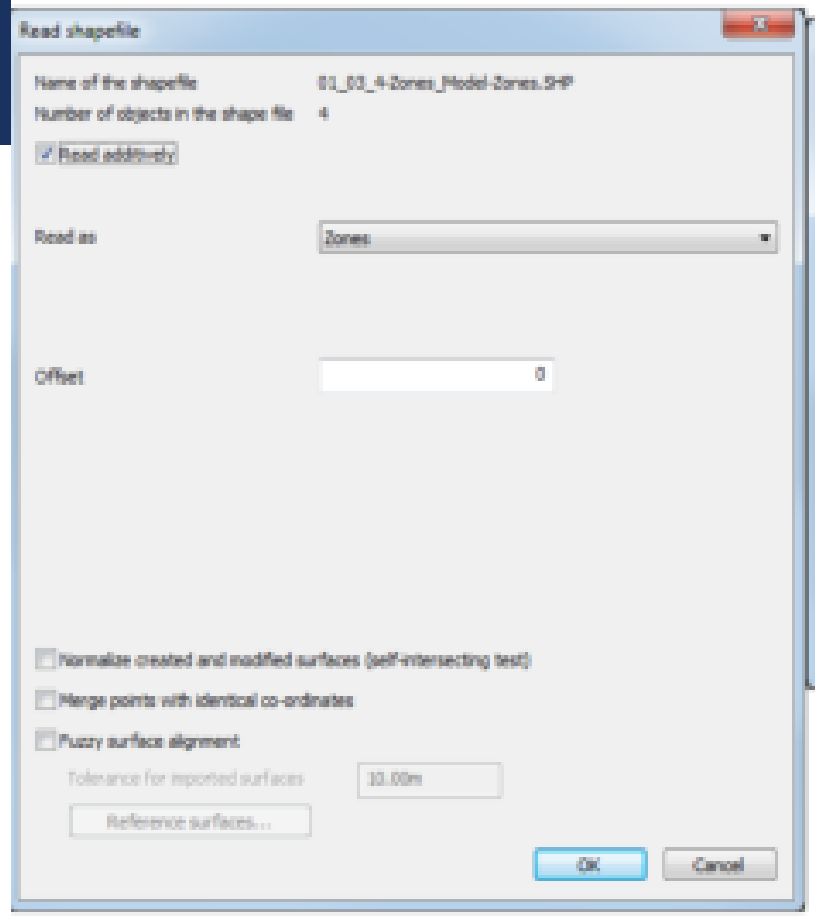
B. Penggambaran zone dan connector.

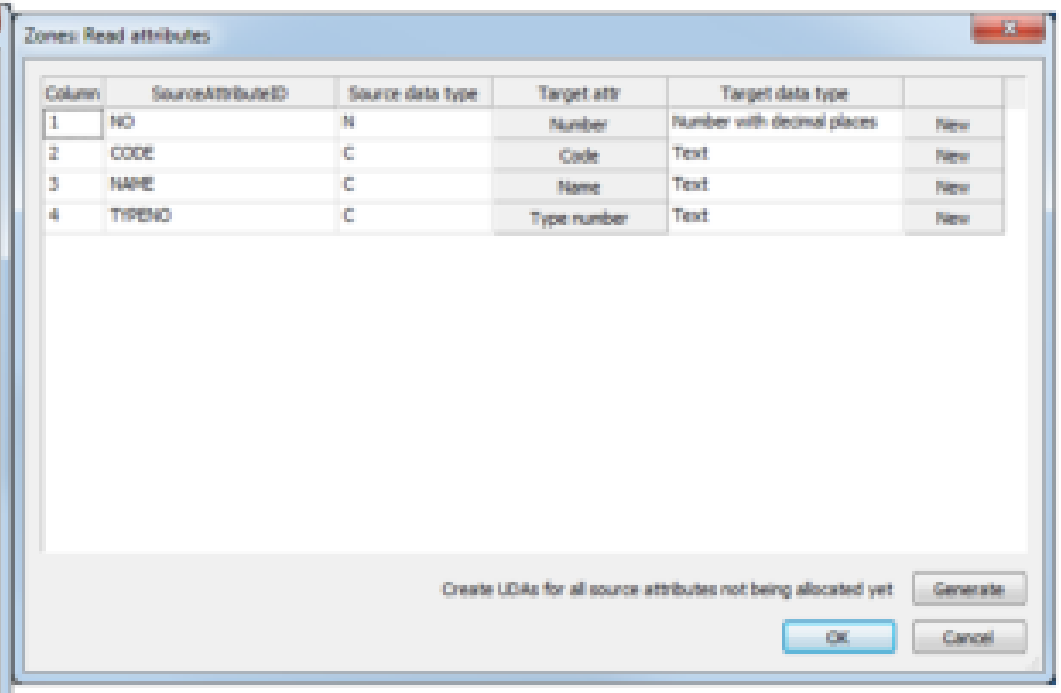


Menu Network

1. Zone : membuat area zone (panah ke dalam)
2. Connector : menghubungkan zone dan link

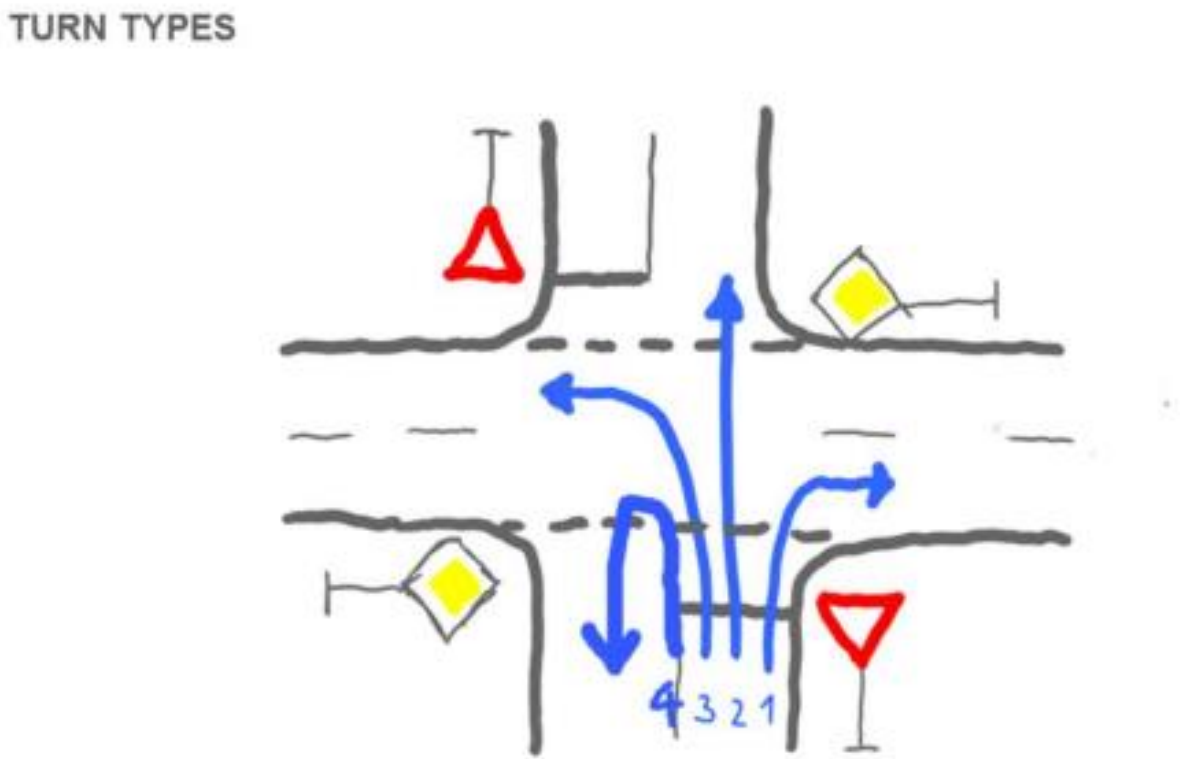
INSERT ZONES AS SHAPE-FILE



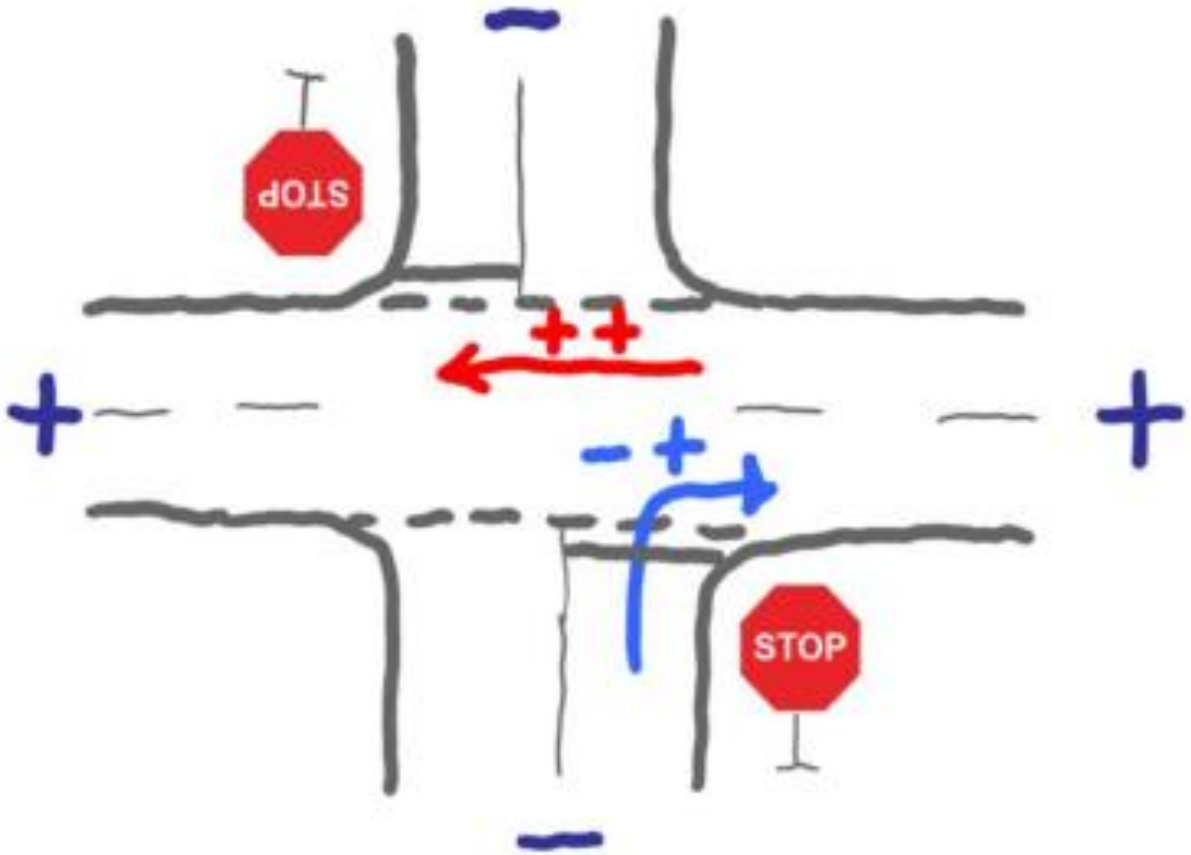


I. DATA JARINGAN

C. Pengaturan turning movement.

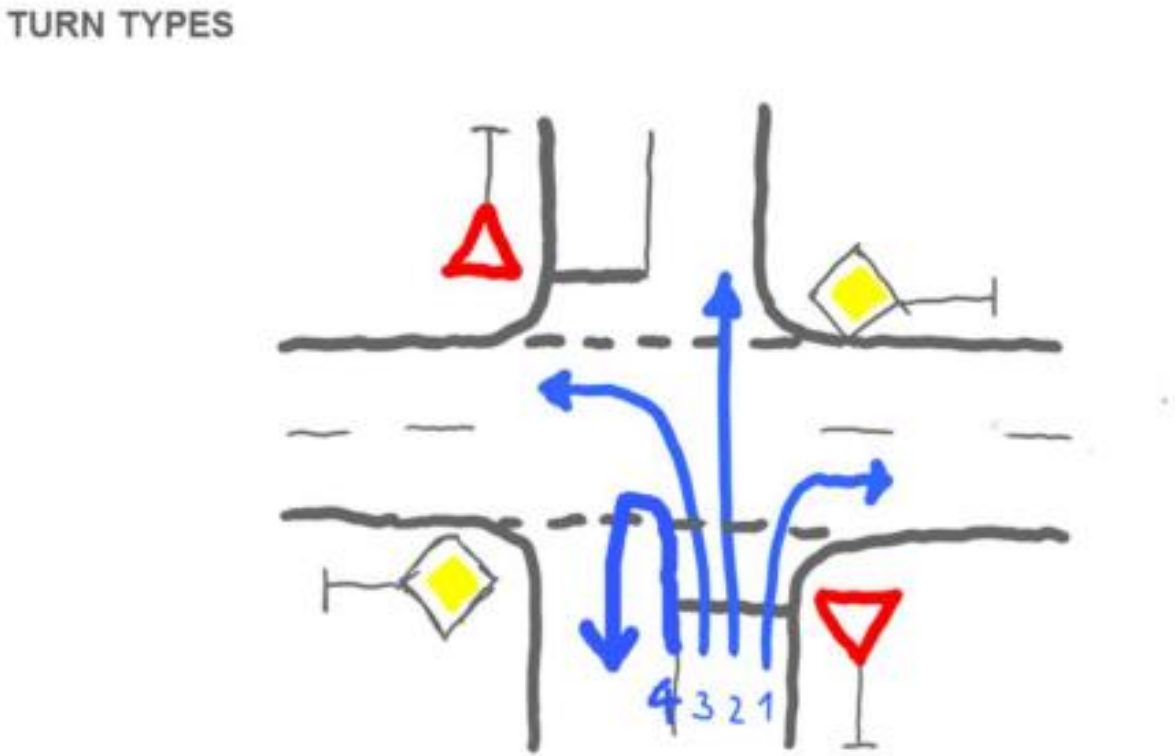


TURN TYPES AND FLOW HIERACHY



I. DATA JARINGAN

C. Penggambaran turning movement.



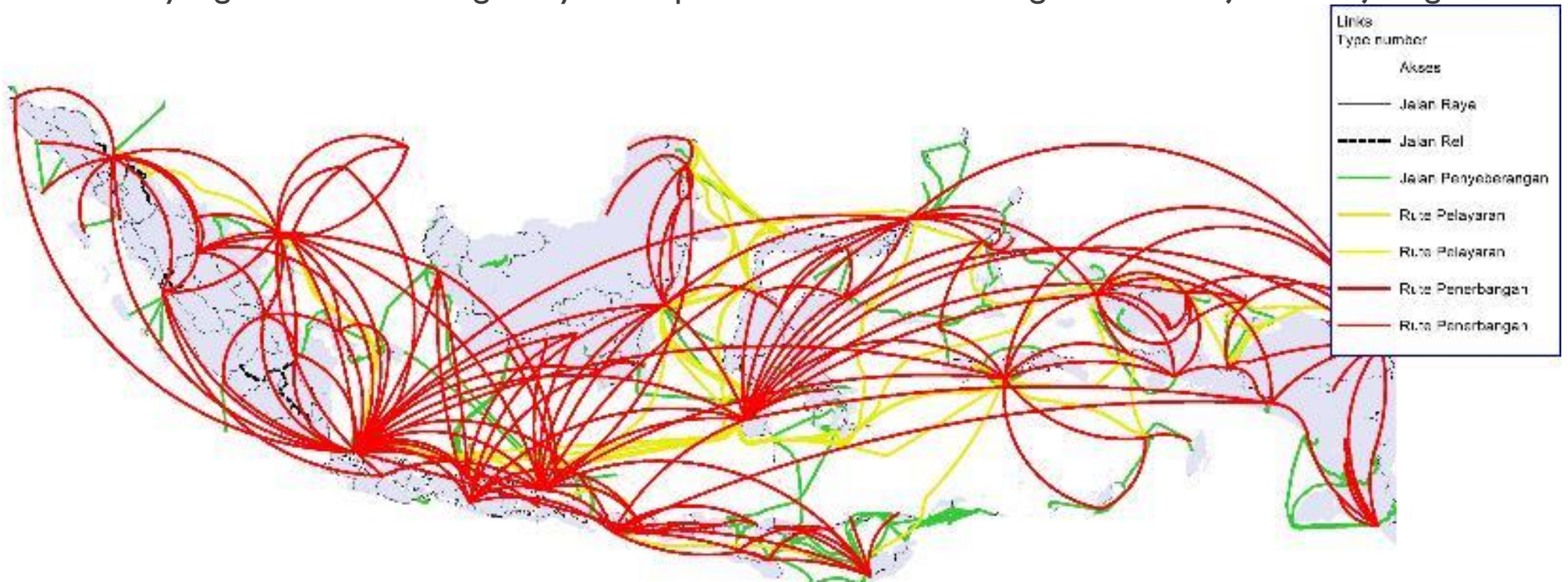
I. DATA JARINGAN

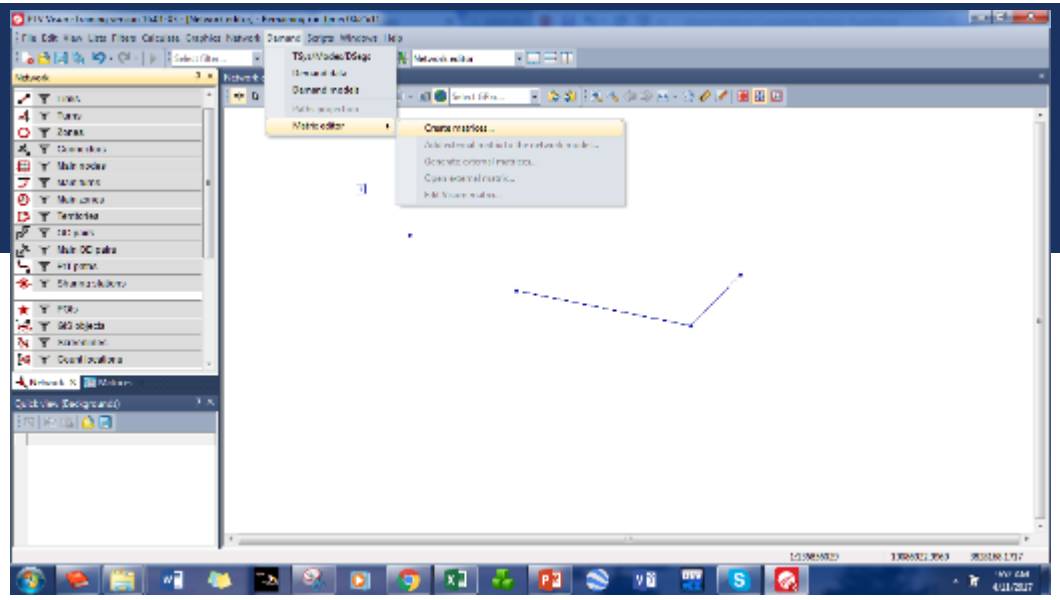
D. Penggambaran Connector zone.

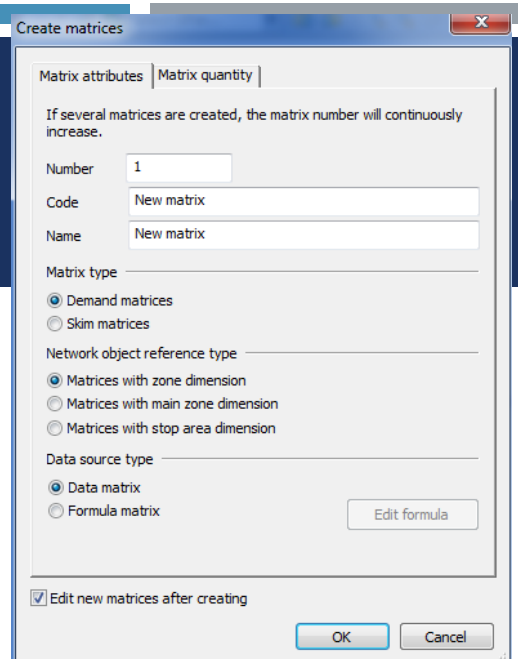
CONNECTORS

JARINGAN TRANSPORTASI MULTIMODA MULTIKOMODITAS

- Link jaringan transportasi dibuat ke dalam jenis jalan raya, jalan kereta api, penyeberangan, laut dan udara sesuai dengan komoditas yang dibawa.
- Parameter yang ada di dalam fungsi biaya transportasi diatur sesuai dengan keunikan jenis link jaringan

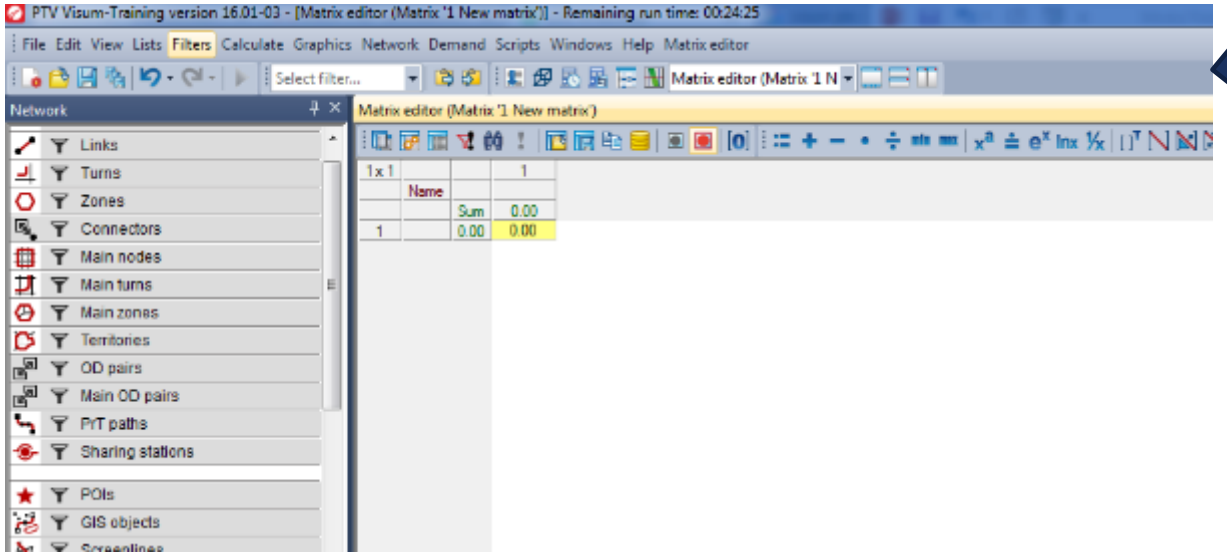






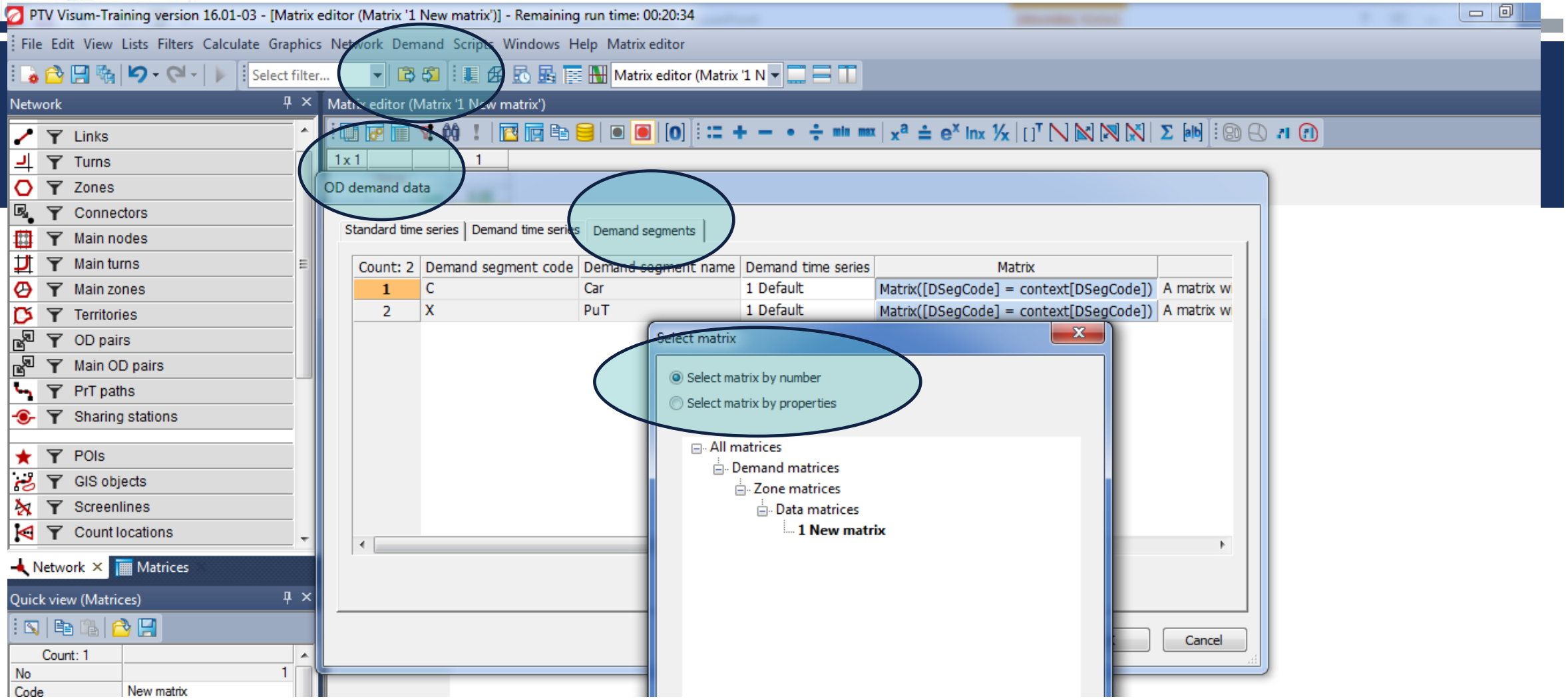
2. Data Matriks Asal Tujuan (MAT)

- Data MAT didapatkan dari hasil perhitungan trip generation dan distribution, dan dilakukan di luar *software* Visum;
- Satuan bisa berupa kendaraan ataupun smp



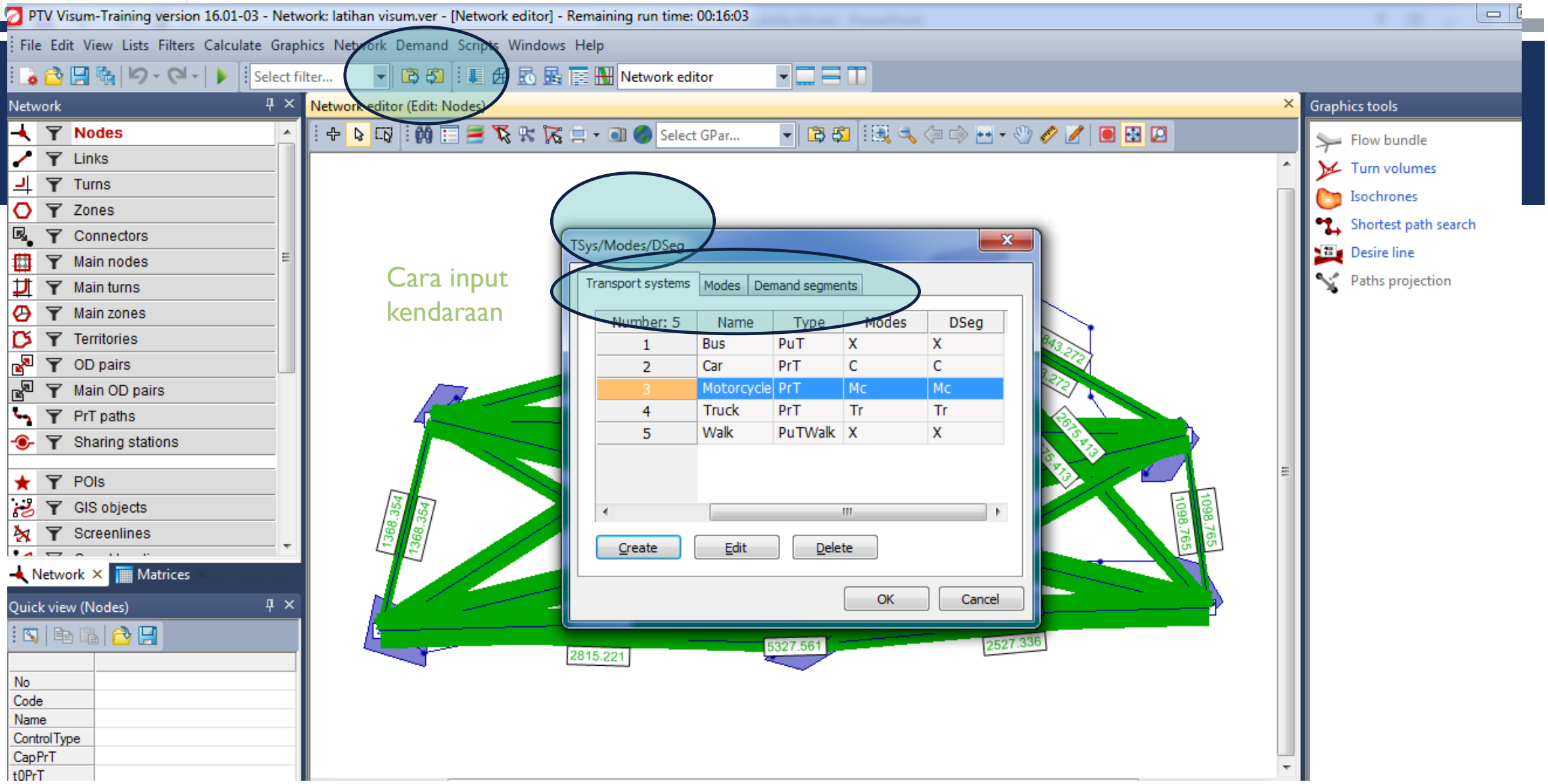
PEMBUATAN DATA MAT

1. Input data MAT
2. Input jenis kendaraan



Cara input MAT

Menu Demand → Demand Data → Demand Segments → Select matrix by number


PTV Visum-Training version 16.01-03 - Network: latihan visum.ver - [Network editor] - Remaining run time: 00:16:03
File Edit View Lists Filters Calculate Graphics Network Demand Scripts Windows Help
Select filter...
Network editor
Network
Nodes
Links
Turns
Zones
Connectors
Main nodes
Main turns
Main zones
Territories
OD pairs
Main OD pairs
PrT paths
Sharing stations
POIs
GIS objects
Screenlines
Network editor (Edit: Nodes)
Select GPar...
Graphics tools
Flow bundle
Turn volumes
Isochrones
Shortest path search
Desire line
Paths projection
Cara input kendaraan
TSys/Modes/DSeg
Transport systems
Modes
Demand segments
Number: 5
Name
Type
Modes
DSeg
1 Bus PuT X X
2 Car PrT C C
3 Motorcycle PrT Mc Mc
4 Truck PrT Tr Tr
5 Walk PuTWalk X X
Create
Edit
Delete
OK
Cancel
1368.354
1368.354
2815.221
5327.561
2527.336
1098.765
1098.765
2675.413
Network
Matrices
Quick view (Nodes)
No
Code
Name
ControlType
CapPrT
t0PrT

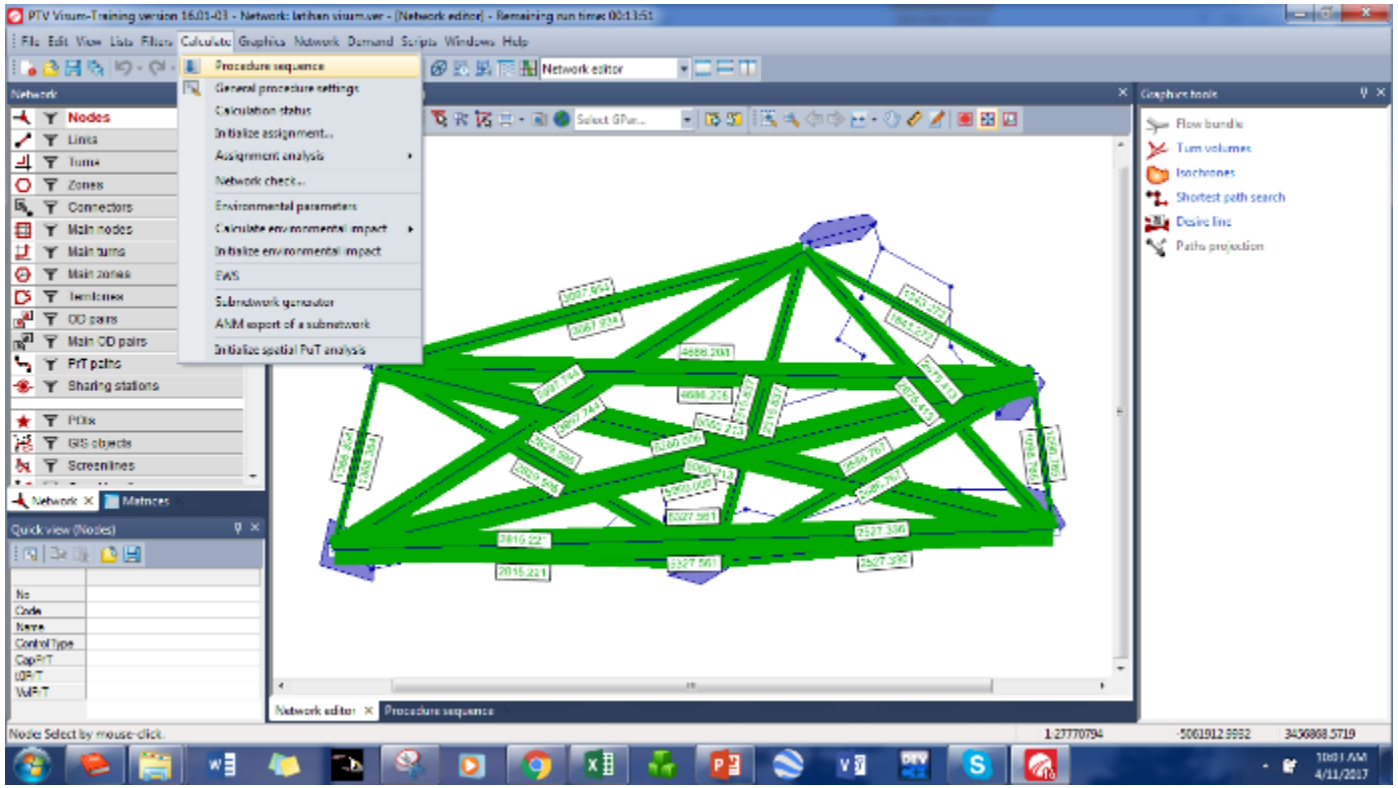
MATRIKS ASAL TUJUAN (MAT) MULTIKOMODITAS

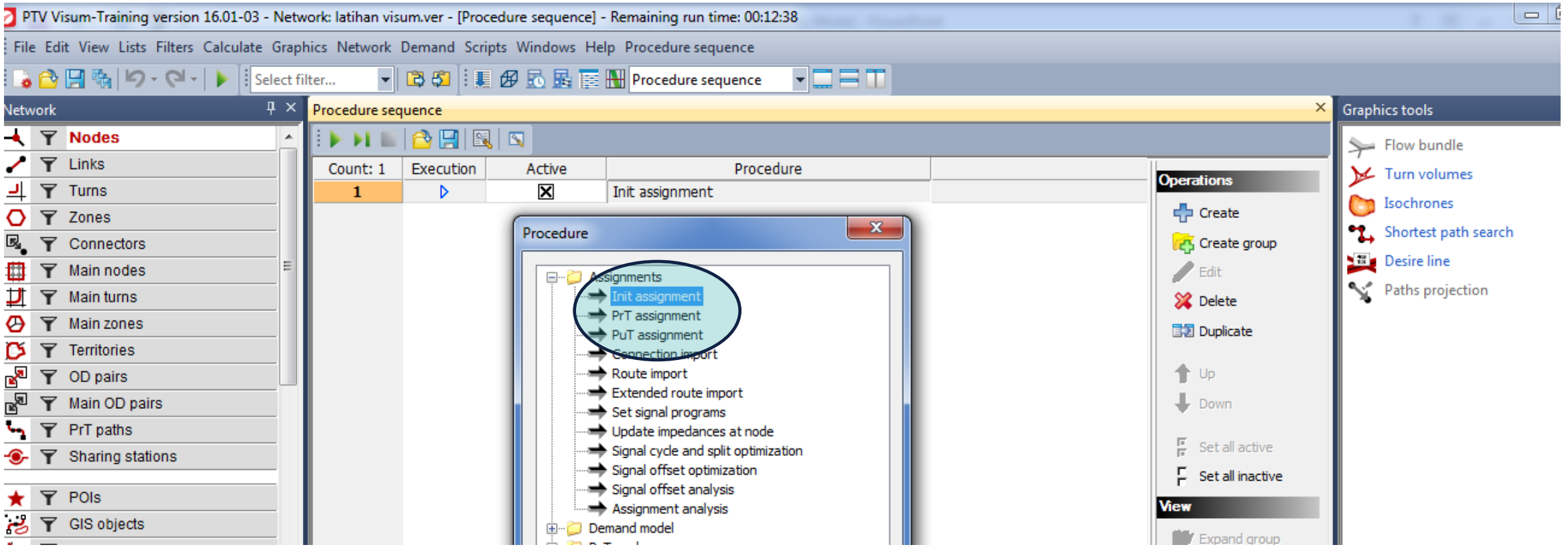
- Terdapat dua komoditas yang digunakan dalam pemodelan RITN ini yaitu orang dan barang.
- Satuan MAT yang digunakan adalah orang/hari dan ton/hari.

Matrix editor (Matrix '14 HasilKalibrasiMATPnp')

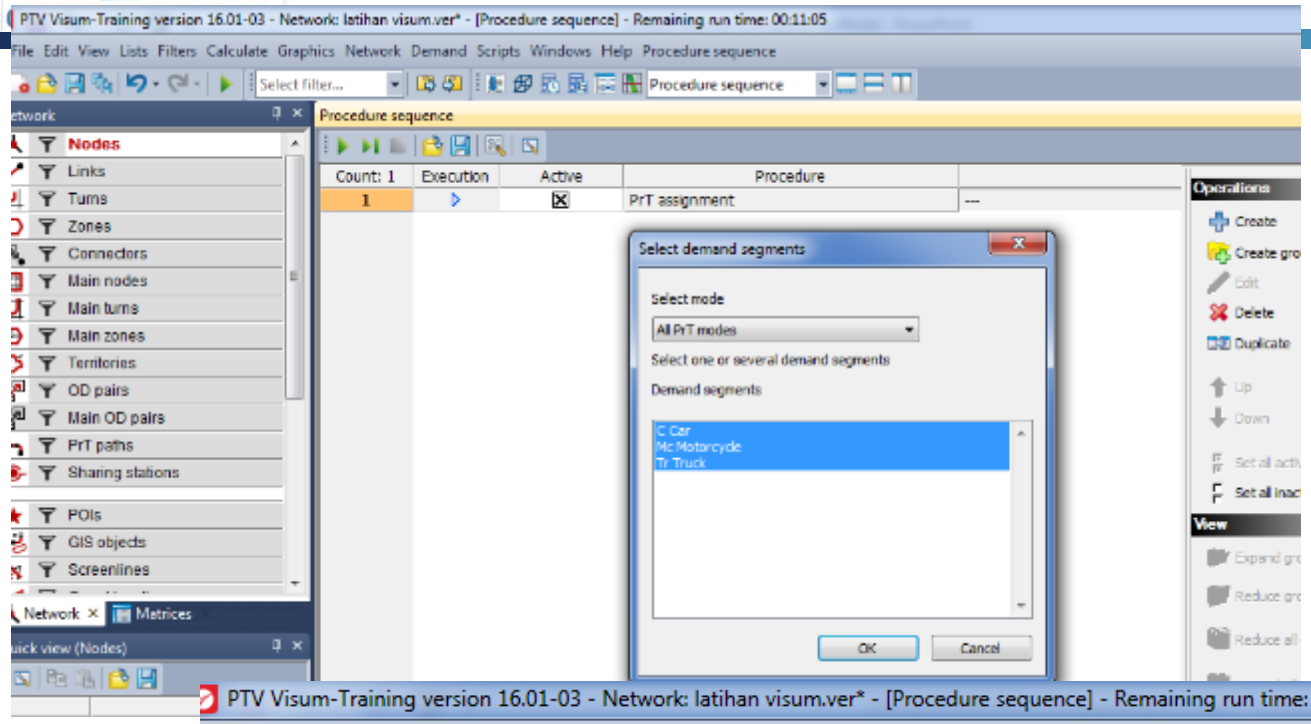
514 x 514			1	2	4	5	6	7	8	9	10	11	
	Name		SIMEULUE	CEH SINGKI	CEH SELATA	EH TENGGA	ACEH TIMUF	CEH TENGA	ACEH BARA	ACEH BESAF	PIDIE	BIREUEN	ACEH
		Sum	5824.31	967.00	1737.69	1623.24	2512.78	2319.60	2073.05	503.81	2936.09	2757.25	4
1	SIMEULUE	4284.80	0.00	2.62	9.05	4.88	6.90	8.40	10.79	5.65	7.53	8.09	
2	ACEH SINGKIL	944.97	3.34	0.00	1.04	0.97	0.77	0.77	0.71	0.50	0.66	0.78	
4	ACEH SELATAN	1412.12	9.39	0.85	0.00	2.98	2.46	3.15	2.92	1.47	2.12	2.67	
5	ACEH TENGGARA	1370.36	5.06	0.79	2.97	0.00	1.82	1.76	1.37	0.91	1.27	1.67	
6	ACEH TIMUR	2245.54	8.14	0.71	2.81	2.07	0.00	10.21	4.73	4.50	6.73	14.62	
7	ACEH TENGAH	1896.80	9.09	0.65	3.29	1.84	9.37	0.00	7.46	4.86	7.12	13.81	
8	ACEH BARAT	1746.32	12.32	0.64	3.21	1.51	4.57	7.87	0.00	5.21	6.99	7.28	
9	ACEH BESAR	2009.99	40.73	2.83	10.24	6.35	27.47	32.34	32.88	0.00	56.23	10.23	
10	PIDIE	2144.17	8.10	0.56	2.20	1.32	6.14	7.08	6.59	8.40	0.00	13.37	
11	BIREUEN	2302.98	9.00	0.68	2.86	1.79	13.77	14.19	7.09	1.58	13.81	0.00	
12	ACEH UTARA	363.80	1.12	0.10	0.41	0.31	3.66	1.13	0.62	0.10	0.77	1.48	
13	ACEH BARAT DAYA	883.11	6.70	0.40	3.07	1.11	2.13	3.35	3.70	0.27	1.96	2.68	
14	GAYO LUES	4938.72	26.06	2.31	14.62	9.09	15.75	19.14	13.30	1.36	10.25	15.65	
15	ACEH TAMIANG	2381.75	7.88	0.88	3.25	3.67	6.95	5.13	3.51	0.47	3.60	5.57	
16	NAGAN RAYA	766.45	5.08	0.28	1.36	0.70	2.17	4.24	15.07	0.40	2.90	3.49	
17	ACEH JAYA	592.94	3.22	0.18	0.74	0.42	1.46	2.06	3.50	0.60	3.77	2.66	
18	BENER MERIAH	4920.51	24.78	1.77	7.90	4.86	27.92	103.93	22.27	3.05	24.71	56.82	
19	PIDIE JAYA	745.54	2.78	0.19	0.76	0.45	2.11	2.43	2.27	2.89	1.67	4.59	
20	KOTA BANDA ACEH	12254.69	49.35	3.32	11.83	7.36	28.92	34.69	33.38	17.74	144.16	61.54	
21	KOTA SABANG	1612.91	5.06	0.35	1.26	0.78	3.07	3.15	3.25	1.45	8.94	5.25	
22	KOTA LANGSA	9975.78	35.45	3.67	14.09	14.24	37.97	26.09	16.81	2.27	69.57	28.08	
23	KOTA LHOKSEUMAWE	8543.84	34.91	2.84	11.36	7.93	121.46	51.56	23.91	4.45	36.58	110.25	
24	KOTA SUBULUSSALAM	4535.90	19.91	0.97	6.20	5.77	4.58	4.59	4.25	2.98	3.94	4.66	
25	NIAS	4158.82	27.81	4.30	4.63	4.07	5.24	5.26	5.57	0.73	5.25	5.95	
26	MANDAILING NATAL	14791.47	50.75	7.66	11.44	10.82	15.94	14.75	14.40	2.07	15.14	17.53	
27	TAPANULI SELATAN	9687.95	33.50	5.50	7.72	7.57	10.40	9.65	9.39	1.33	9.75	11.38	
28	TAPANULI TENGAH	14105.40	63.28	13.09	14.59	15.34	18.42	17.20	16.85	2.30	16.90	19.95	
29	TAPANULI UTARA	11072.73	48.92	10.08	12.02	13.40	15.56	14.36	13.73	1.89	13.95	16.57	
30	TOBA SAMOSIR	6959.45	29.26	5.71	7.69	8.91	10.19	9.31	8.67	1.20	8.92	10.75	

3. PROSES ASSIGNMENT

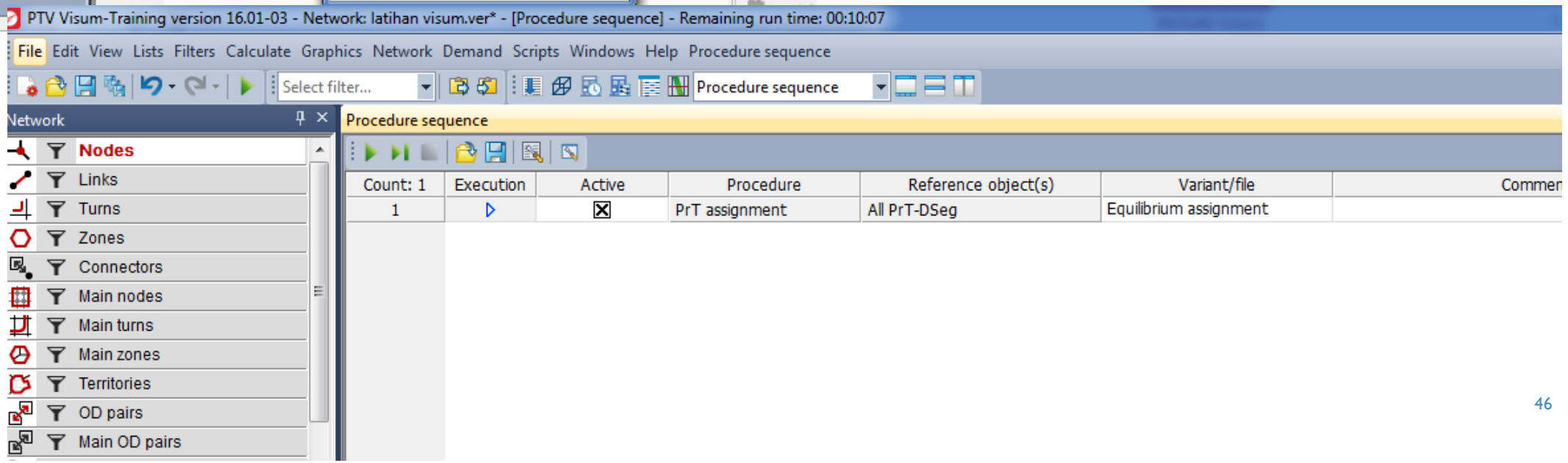




1. Initial Assignment : menghilangkan hasil assignment
2. Private assignment : membebankan kendaraan pribadi

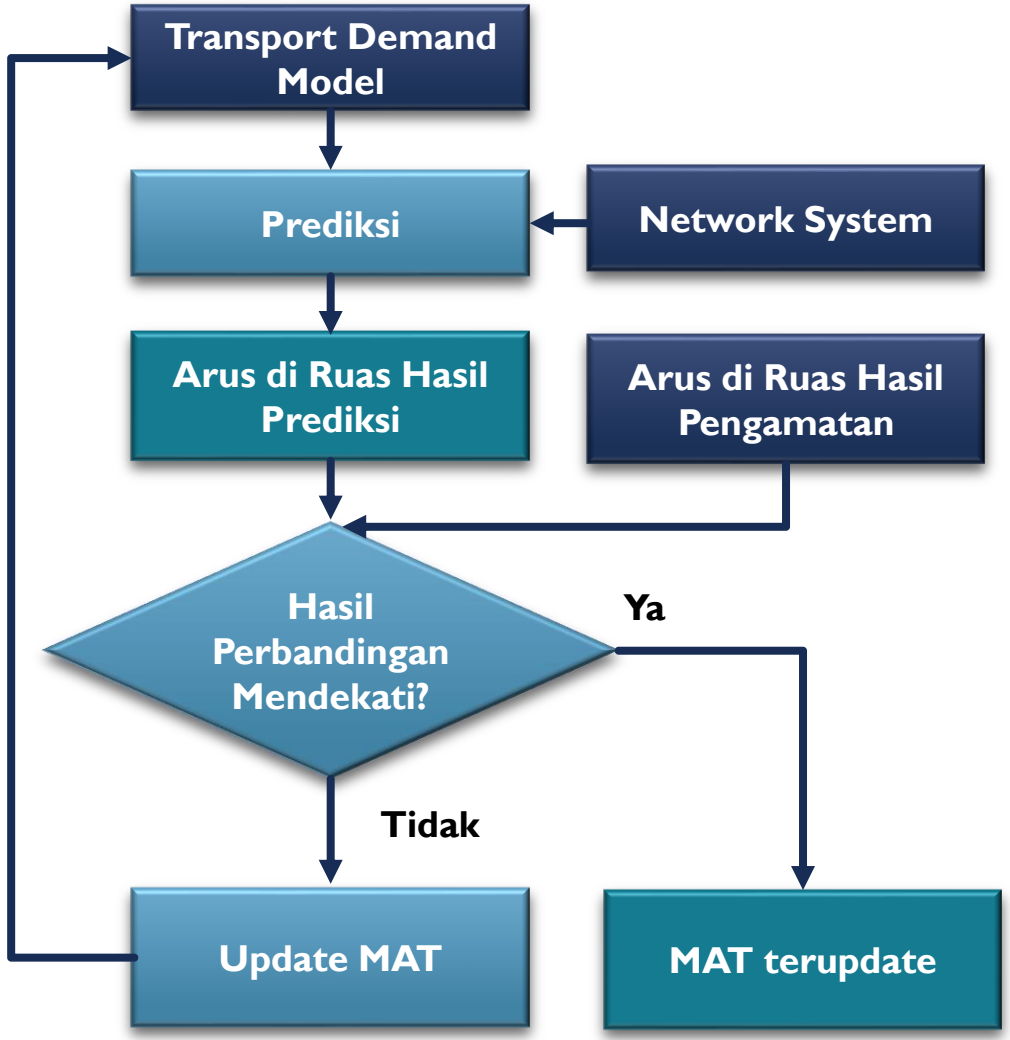


Assignment dilakukan untuk semua jenis kendaraan private, dengan metode equilibrium assignment



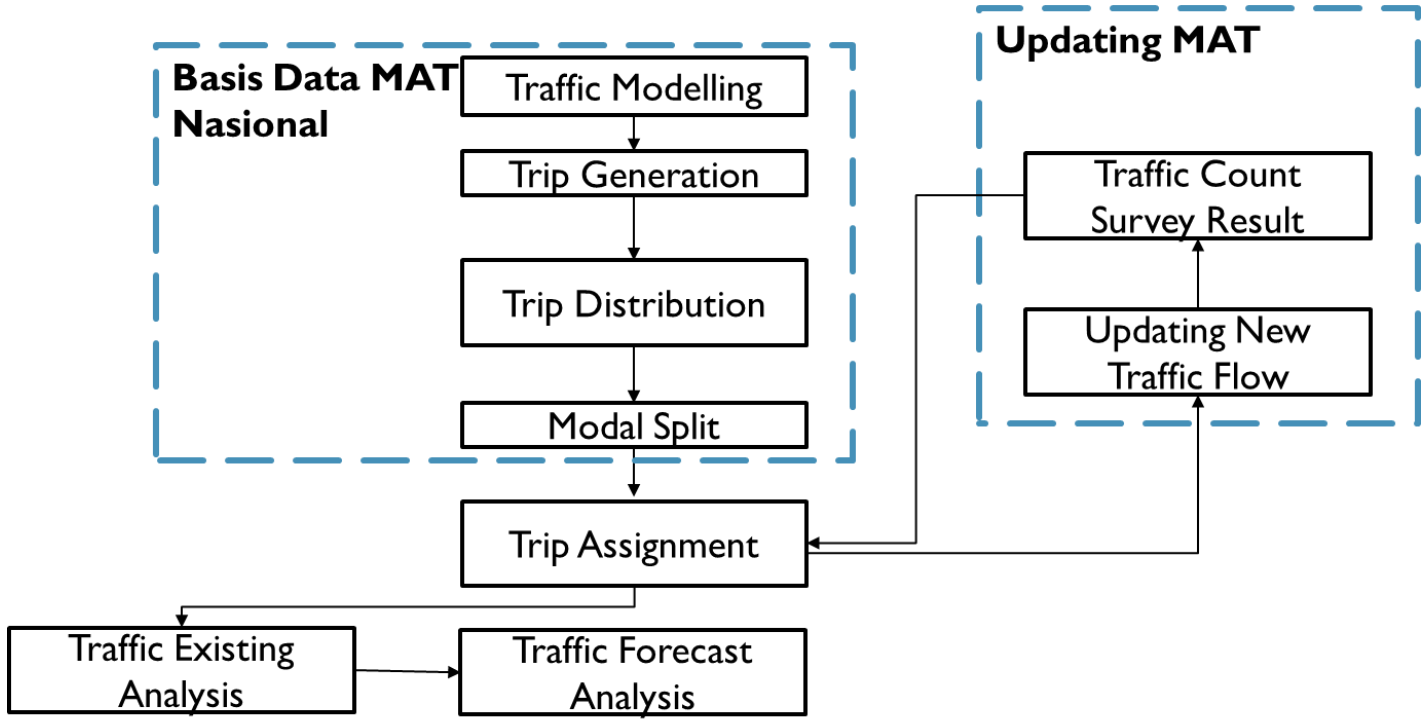
UPDATE KEBUTUHAN PERJALANAN (MATRIKS ASAL TUJUAN)

- Matriks Asal Tujuan (MAT) yang digunakan berupa asal tujuan pergerakan orang dan barang.
- Updating M AT dilakukan dengan kalibrasi hasil Prediksi arus lalu lintas di jaringan transportasi yang diupdate sesuai dengan data di ruas yang terbaru



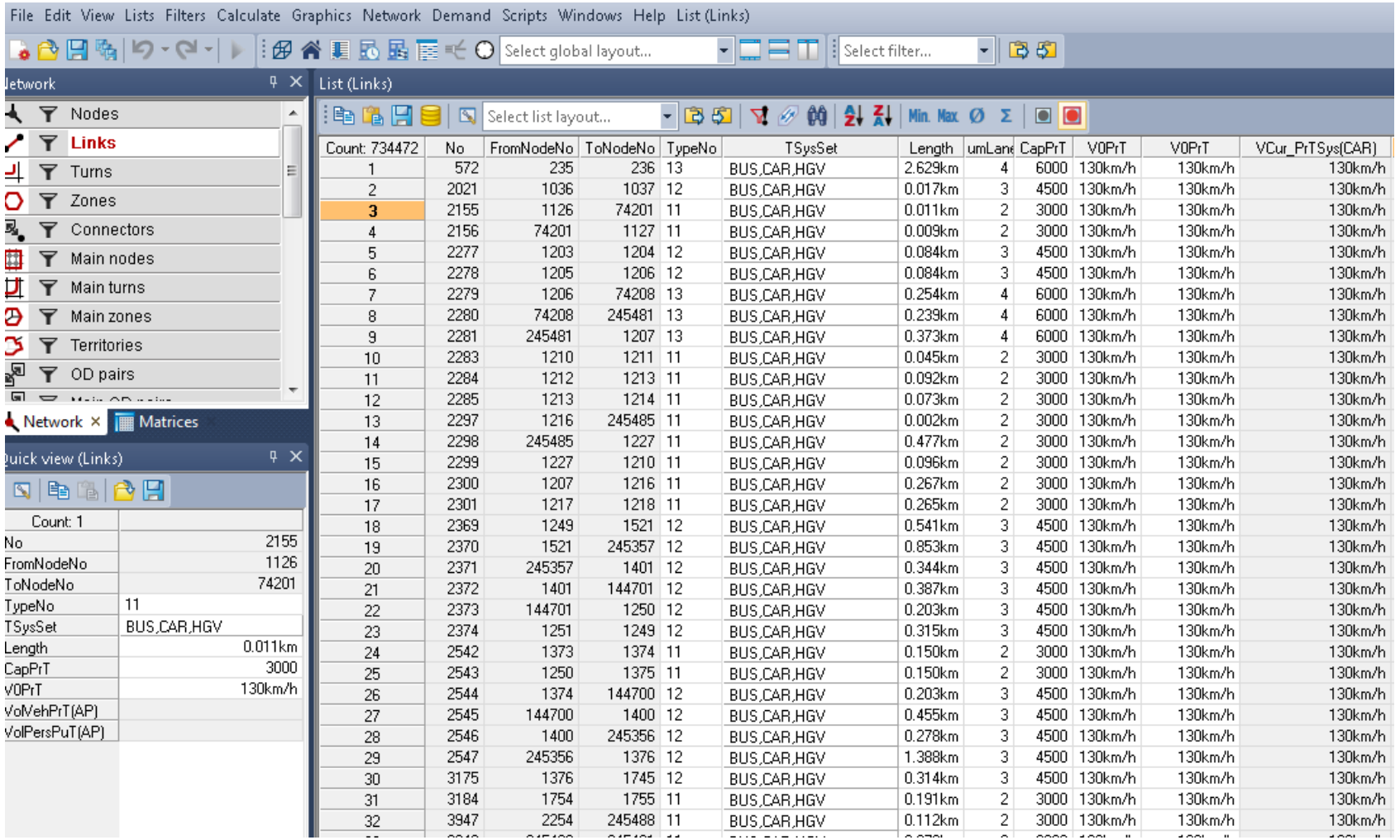
PROYEKSI KEBUTUHAN PERGERAKAN DAN UJI SKENARIO (PROGRAM/KOMBINASI PROGRAM)

- Selanjutnya MAT diproyeksikan sesuai dengan pentahapan analisis dan proyeksi faktor-faktor pengaruhnya.
- Skenario yang diuji terlebih dahulu ditetapkan sesuai dengan usulan dan identifikasi awal
- Hasil uji skenario adalah:
  - Perbandingan relatif antar skenario untuk fungsi tujuan tertentu
  - Kinerja jaringan dan setiap ruas/simpul transportasi
  - Identifikasi dampak skenario terhadap ruas/simpul transportasi dan kebutuhan pengembangan pendukungnya



4. SISTEM OUTPUT

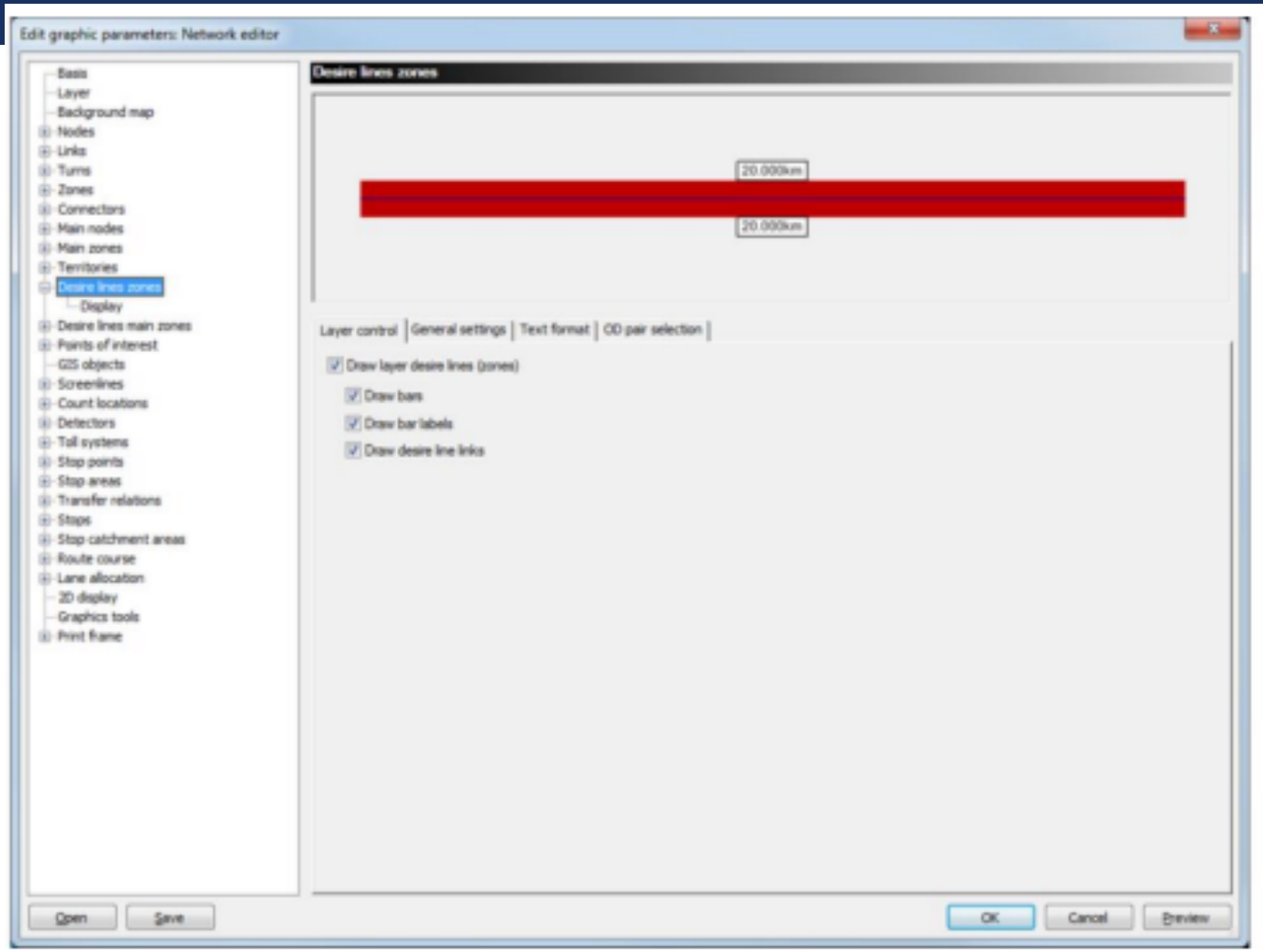
OUTPUT MODEL JARINGAN MULTIMODA:
DATABASE LINK/JARINGAN



Count: 734472	No	FromNodeNo	ToNodeNo	TypeNo	TSysSet	Length	umLane	CapPrT	V0PrT	V0PrT	VCur_PrTSys(CAR)
1	572	235	236	13	BUS,CAR,HGV	2.629km	4	6000	130km/h	130km/h	130km/h
2	2021	1036	1037	12	BUS,CAR,HGV	0.017km	3	4500	130km/h	130km/h	130km/h
3	2155	1126	74201	11	BUS,CAR,HGV	0.011km	2	3000	130km/h	130km/h	130km/h
4	2156	74201	1127	11	BUS,CAR,HGV	0.009km	2	3000	130km/h	130km/h	130km/h
5	2277	1203	1204	12	BUS,CAR,HGV	0.084km	3	4500	130km/h	130km/h	130km/h
6	2278	1205	1206	12	BUS,CAR,HGV	0.084km	3	4500	130km/h	130km/h	130km/h
7	2279	1206	74208	13	BUS,CAR,HGV	0.254km	4	6000	130km/h	130km/h	130km/h
8	2280	74208	245481	13	BUS,CAR,HGV	0.239km	4	6000	130km/h	130km/h	130km/h
9	2281	245481	1207	13	BUS,CAR,HGV	0.373km	4	6000	130km/h	130km/h	130km/h
10	2283	1210	1211	11	BUS,CAR,HGV	0.045km	2	3000	130km/h	130km/h	130km/h
11	2284	1212	1213	11	BUS,CAR,HGV	0.092km	2	3000	130km/h	130km/h	130km/h
12	2285	1213	1214	11	BUS,CAR,HGV	0.073km	2	3000	130km/h	130km/h	130km/h
13	2297	1216	245485	11	BUS,CAR,HGV	0.002km	2	3000	130km/h	130km/h	130km/h
14	2298	245485	1227	11	BUS,CAR,HGV	0.477km	2	3000	130km/h	130km/h	130km/h
15	2299	1227	1210	11	BUS,CAR,HGV	0.096km	2	3000	130km/h	130km/h	130km/h
16	2300	1207	1216	11	BUS,CAR,HGV	0.267km	2	3000	130km/h	130km/h	130km/h
17	2301	1217	1218	11	BUS,CAR,HGV	0.265km	2	3000	130km/h	130km/h	130km/h
18	2369	1249	1521	12	BUS,CAR,HGV	0.541km	3	4500	130km/h	130km/h	130km/h
19	2370	1521	245357	12	BUS,CAR,HGV	0.853km	3	4500	130km/h	130km/h	130km/h
20	2371	245357	1401	12	BUS,CAR,HGV	0.344km	3	4500	130km/h	130km/h	130km/h
21	2372	1401	144701	12	BUS,CAR,HGV	0.387km	3	4500	130km/h	130km/h	130km/h
22	2373	144701	1250	12	BUS,CAR,HGV	0.203km	3	4500	130km/h	130km/h	130km/h
23	2374	1251	1249	12	BUS,CAR,HGV	0.315km	3	4500	130km/h	130km/h	130km/h
24	2542	1373	1374	11	BUS,CAR,HGV	0.150km	2	3000	130km/h	130km/h	130km/h
25	2543	1250	1375	11	BUS,CAR,HGV	0.150km	2	3000	130km/h	130km/h	130km/h
26	2544	1374	144700	12	BUS,CAR,HGV	0.203km	3	4500	130km/h	130km/h	130km/h
27	2545	144700	1400	12	BUS,CAR,HGV	0.455km	3	4500	130km/h	130km/h	130km/h
28	2546	1400	245356	12	BUS,CAR,HGV	0.278km	3	4500	130km/h	130km/h	130km/h
29	2547	245356	1376	12	BUS,CAR,HGV	1.388km	3	4500	130km/h	130km/h	130km/h
30	3175	1376	1745	12	BUS,CAR,HGV	0.314km	3	4500	130km/h	130km/h	130km/h
31	3184	1754	1755	11	BUS,CAR,HGV	0.191km	2	3000	130km/h	130km/h	130km/h
32	3947	2254	245488	11	BUS,CAR,HGV	0.112km	2	3000	130km/h	130km/h	130km/h

Output model yang dihasilkan setelah dilakukan Prediksi lalu lintas adalah :

1. Aksesibilitas
   - Waktu tempuh antar simpul dan zona
2. Kinerja Lalu Lintas
   - Demand perjalanan
   - Kecepatan jaringan
   - Derajat kejenuhan di ruas jalan

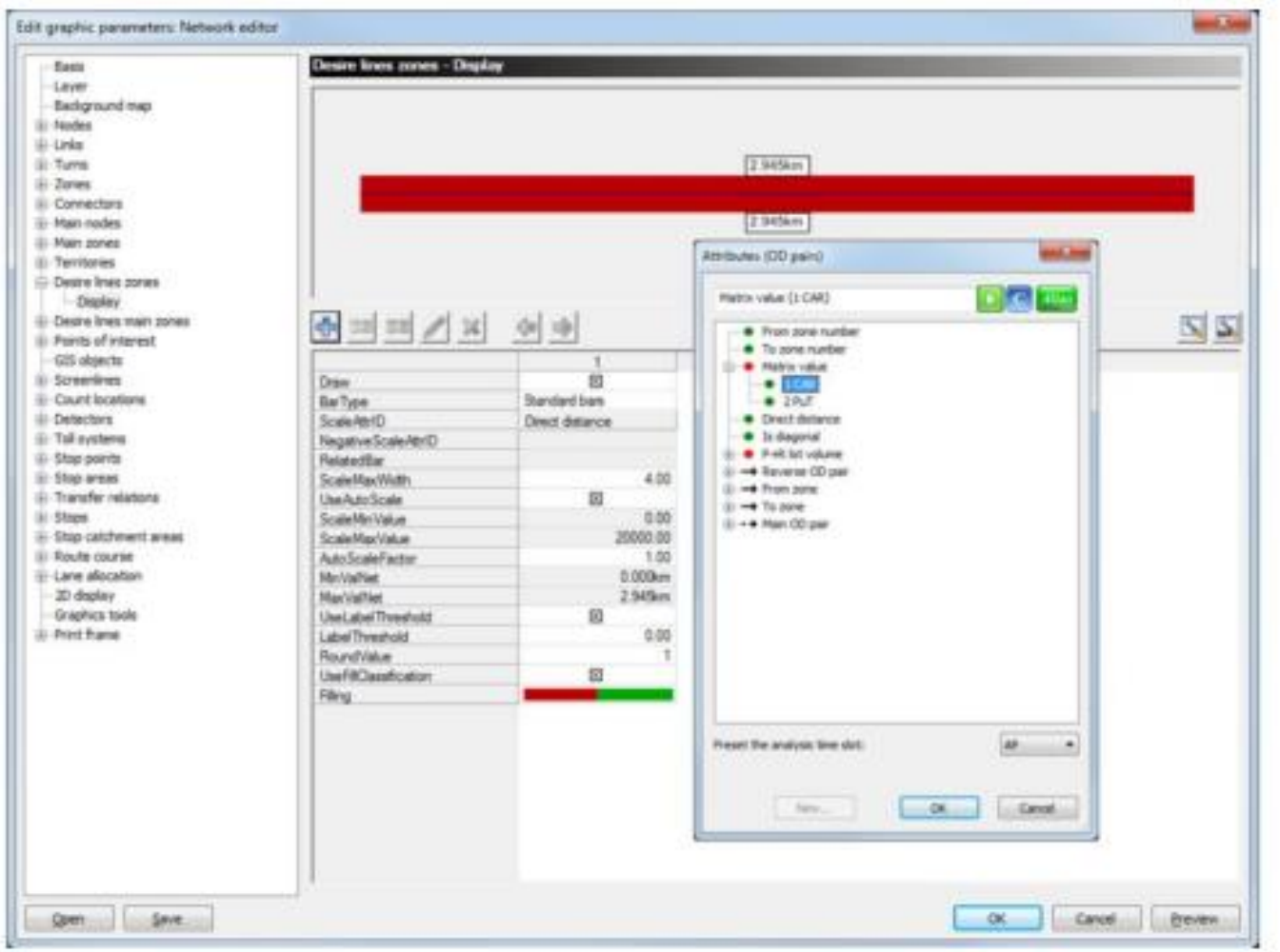


Langkah 4:

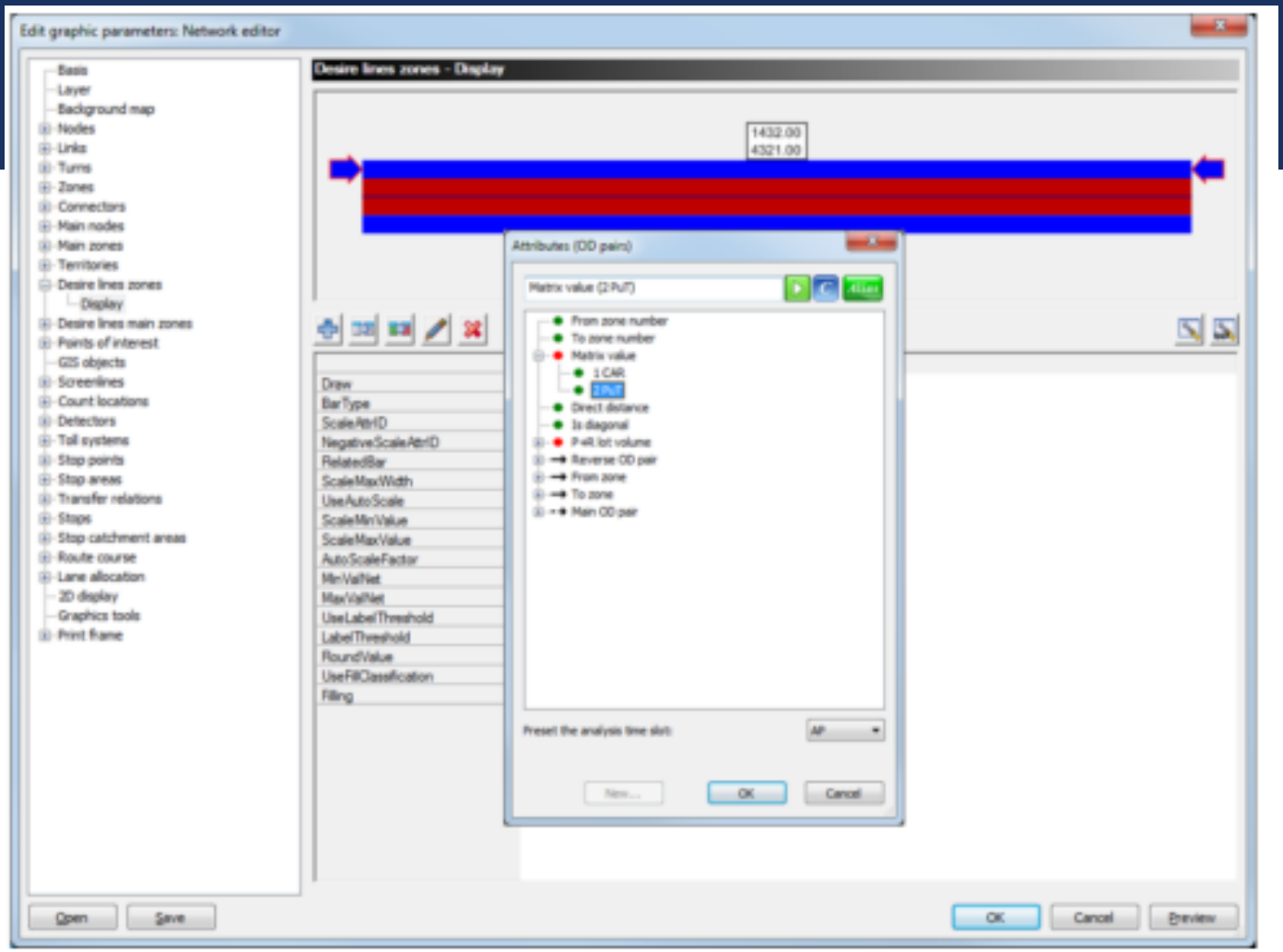
Dari menu *Graphics*, pilih *parameter Graphic*. Anda juga dapat menggunakan pintasan CTRL-G DARI EDITOR JARINGAN.

.

Di navigator, pilih *Desire lines Zones*.
Kemudian aktifkan *layer bar*. (semua pilihan gambarnya *Draw bar, Draw bar labels, Draw desire*
tautan baris sudah diaktifkan).

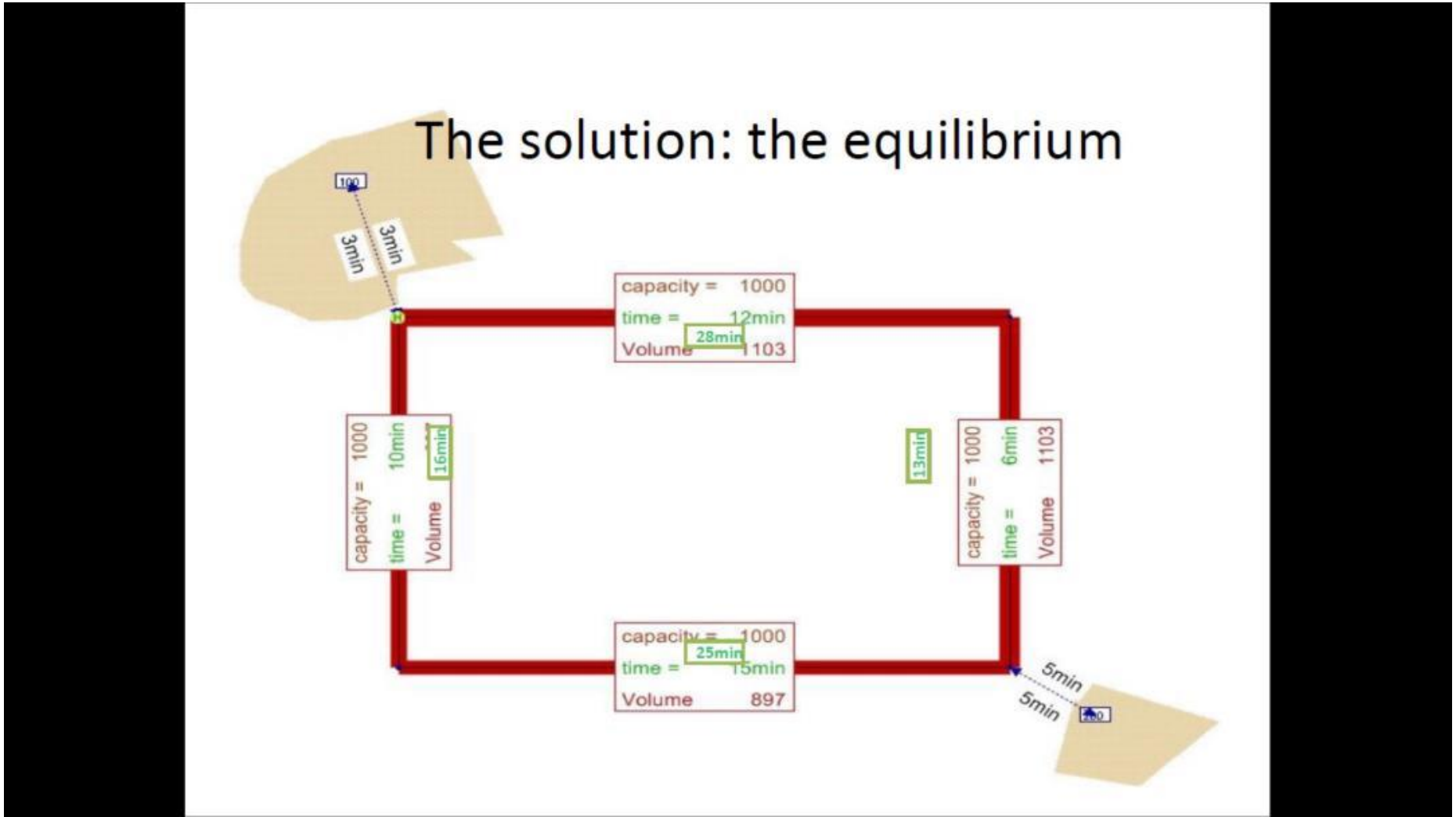


Di navigator, klik *Desire line zones*> *Display*.
Di kolom 1, pilih baris *ScaleAttrID*. Kemudian klik tombol *direct distance*.
Di bawah nilai Matrix, pilih 1Car sebagai atribut tampilan baru.
Klik OK untuk mengonfirmasi pemilihan atribut baru.



Sekarang klik kolom pertama. Kemudian klik simbol *classified duplicate* (yang ketiga dari kiri).
Di kolom 2, pilih baris *ScaleAttrID*. Kemudian klik tombol *matriks-value* (*1 car*).
Sebagai atribut tampilan baru Anda, pilih nilai *matriks-value-> 1 PuT*.
Klik OK untuk mengonfirmasi pilihan Anda.
Untuk memeriksa apakah tampilan dan organisasi memenuhi harapan Anda, tekan tombol *preview*
Klik OK untuk mengkonfirmasi pengaturan parameter grafis baru.

LATIHAN : BUAT JARINGAN SEDERHANA



CV. CIPTA SOLUSI PERKASA

SESI 5 : PENGGUNAAN SOFTWARE DALAM PEMODELAN PERGERAKAN DAN JARINGAN TRANSPORTASI MULTIMODA MULTIKOMODITAS (KALIBRASI DAN PROYEKSI)

JAKARTA, 23 JANUARI 2020

PELATIHAN PEMODELAN TRANSPORTASI DALAM MENDUKUNG PENYUSUNAN RENCANA INDUK TRANSPORTASI NASIONAL

Kementerian Perhubungan
Sekretariat Jenderal
Biro Perencanaan

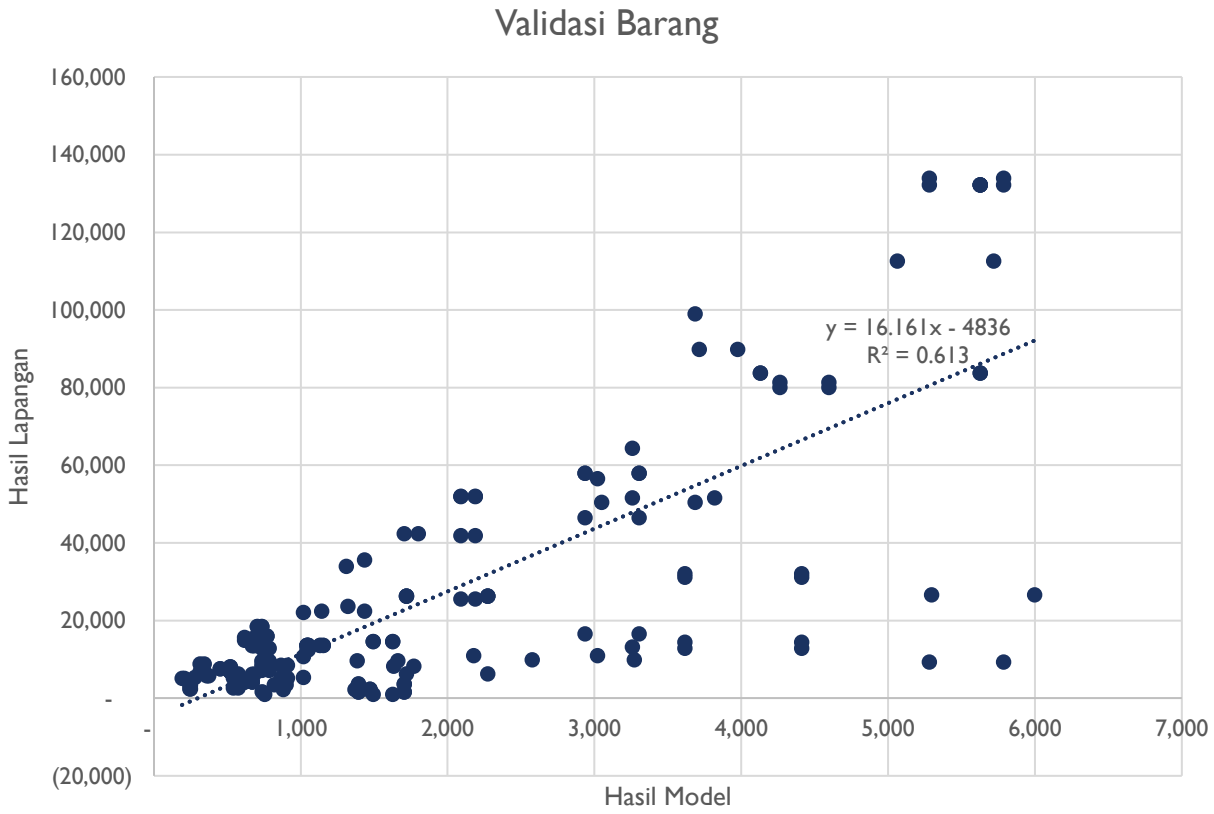
5. KALIBRASI DAN VALIDASI MODEL

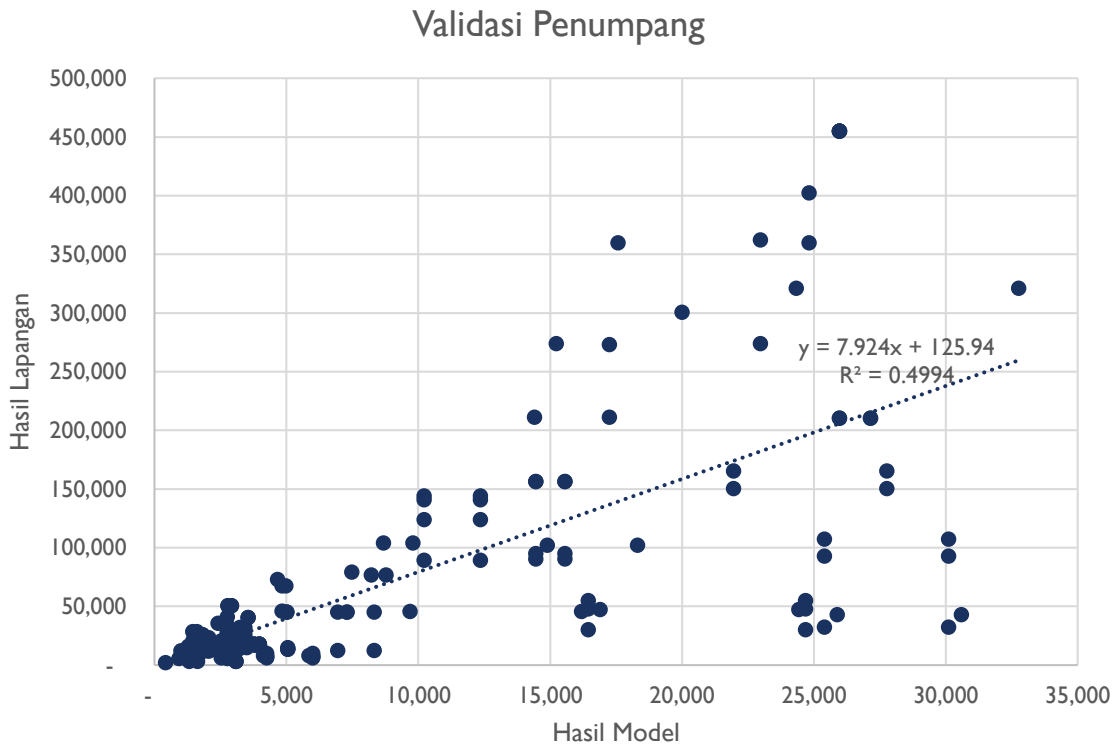
KALIBRASI MODEL

- Pengaturan parameter dalam fungsi biaya transportasi.
  - Kapasitas.
  - Free flow Speed.
  - Biaya Akses/Transportasi.
  - Kodefikasi Jaringan.
- Pengaturan keterhubungan node dan link.
- Keberadaan konektor yang menghubungkan zona dan node.

VALIDASI MODEL

- Perbandingan antara hasil model dengan data acuan (primer/sekunder) dengan menggunakan model regresi linier.





6. PROYEKSI MODEL

Regression models

$$Y = \sum_k \beta_k X_k$$ (linear regression)

Y Endogenous (explained) variable

e.g. number of trips produced by a zone or household

X_k Exogenous (explanatory) variables

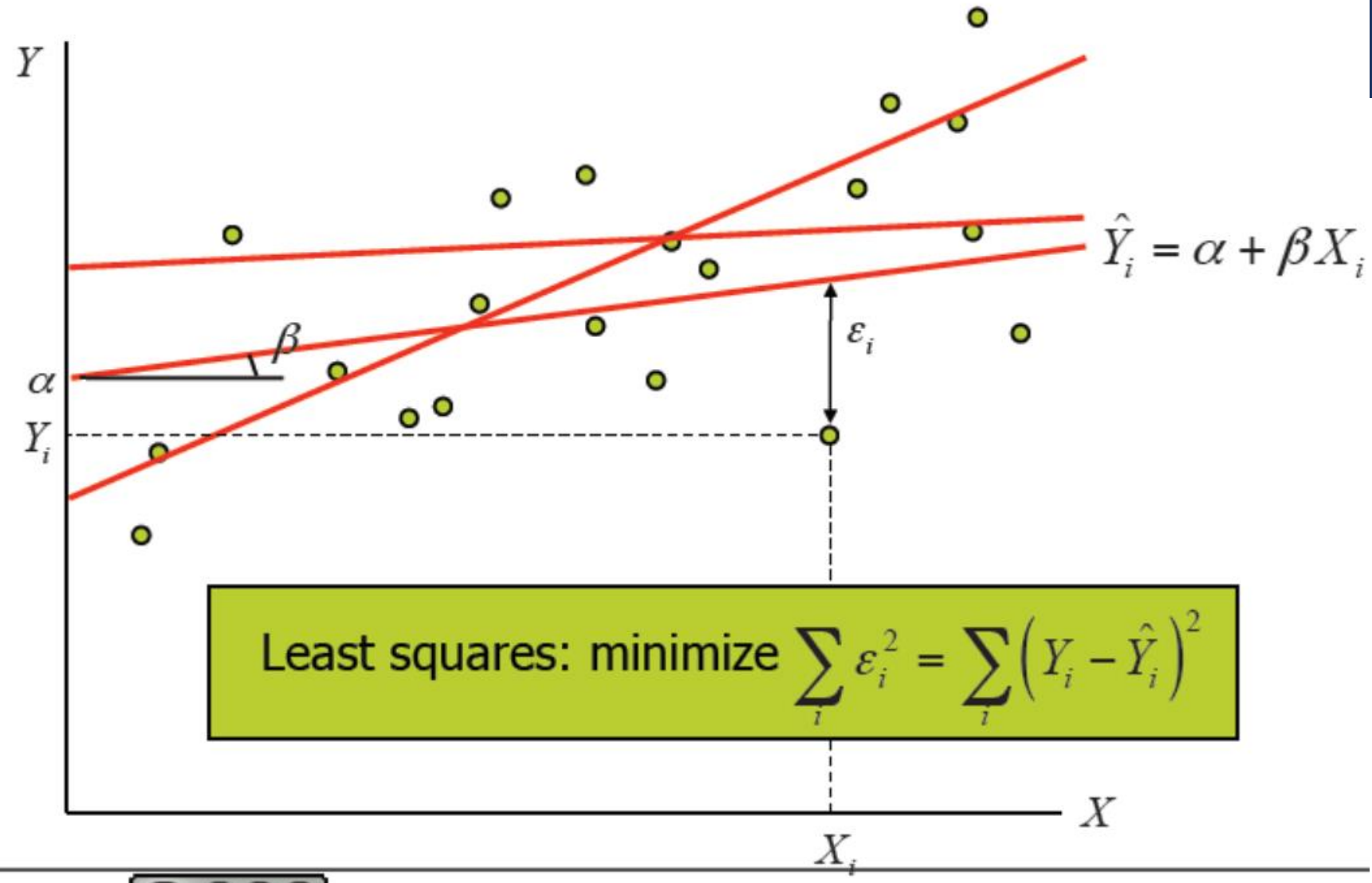
e.g. number of inhabitants, household size, education

β_k Parameters

$$Y = 0.91 + 1.44X_1 + 1.07X_2$$

Y: number of trips; X_1: number of workers; X_2: number of cars

Regression models



Regression models

Y = # trips per household
X_1 = # workers per household
X_2 = # cars per household

Linear regression:

$$Y = 0.91 + 1.41X_1 + 1.07X_2$$

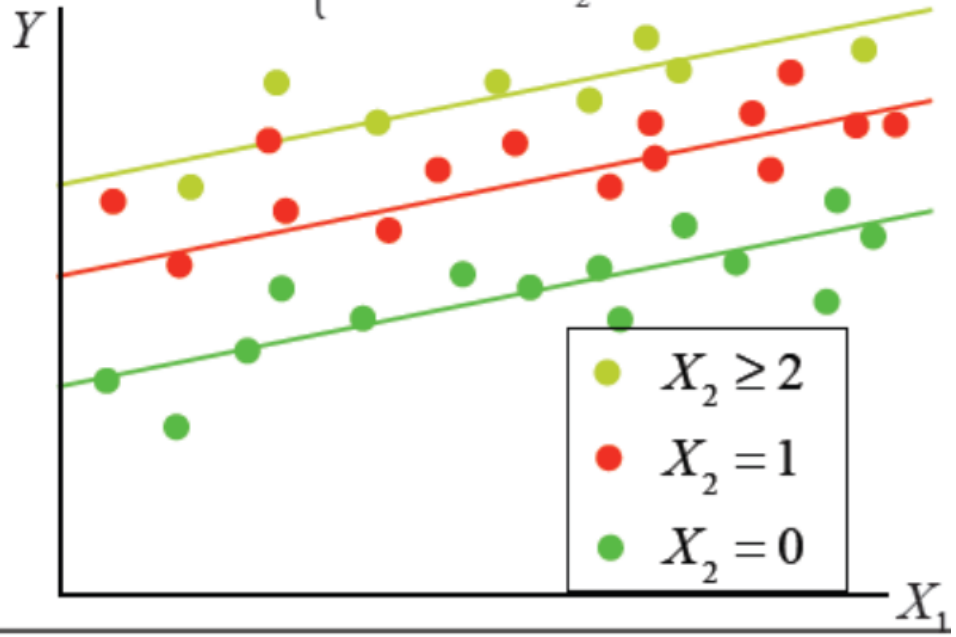
Nonlinearity problem:
The parameter for X_2 is not constant.

$$Y = 1.41X_1 + \begin{cases} 0.84 & \text{if } X_2 = 0 \\ 1.59 & \text{if } X_2 = 1 \\ 3.98 & \text{if } X_2 \geq 2 \end{cases}$$

Regression with dummy variables:

$$Y = 0.84 + 1.41X_1 + \\ + 0.75D_1 + 3.14D_2$$

$D_1 = 1$ if 1 car, 0 otherwise
$D_2 = 1$ if 2 or more cars, 0 otherwise



BANGKITAN-TARIKAN (PENUMPANG/HARI) HARI 2045

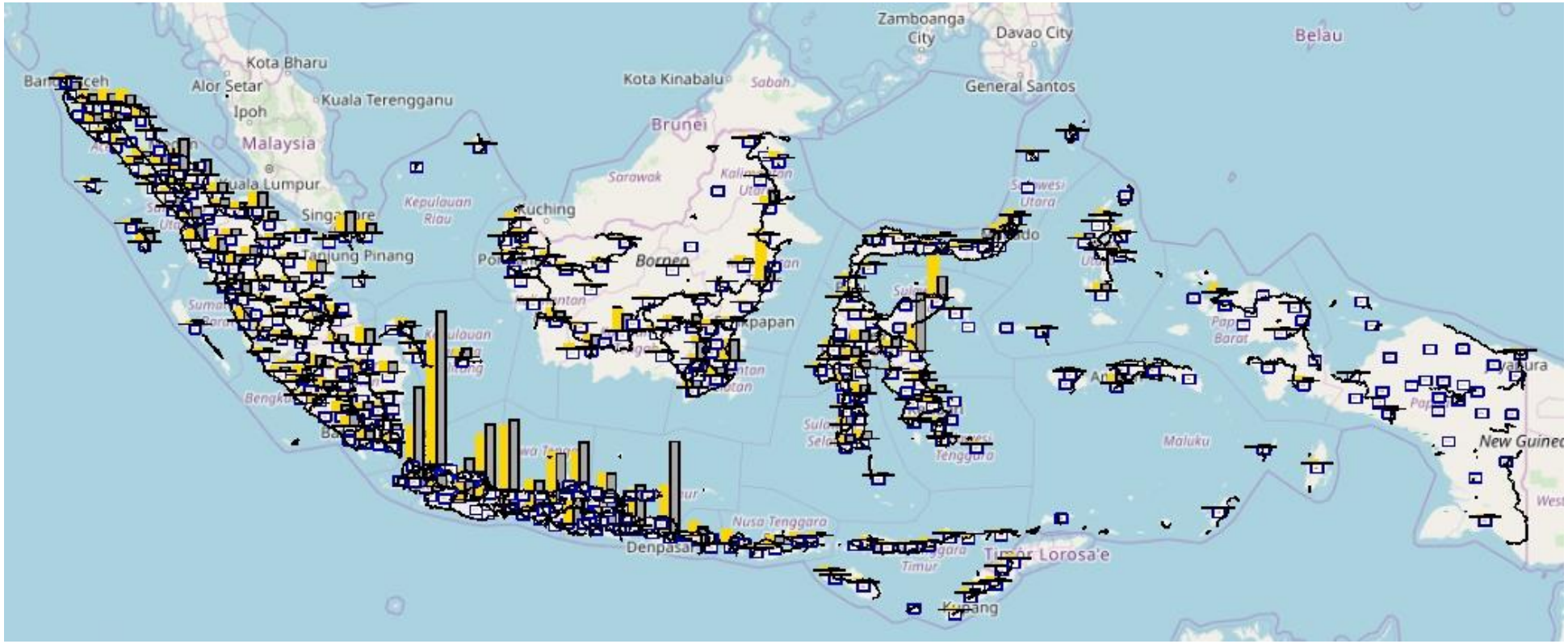
$$Y_3 = -41.740{,}729 + 0{,}001\,X_1 + 0{,}139\,X_2 \quad (R^2 = 0{,}767)$$

$$Y_4 = -41.830{,}715 + 0{,}001\,X_1 + 0{,}140\,X_2 \quad (R^2 = 0{,}779)$$

Keterangan

Y_3 : model bangkitan angkutan penumpang
Y_4 : model tarikan angkutan penumpang
X_1 : variabel PDRB
X_2 : variabel jumlah pendudukan

BANGKITAN-TARIKAN (TON/HARI) HARI 2045



$$Y_1 = -1.621{,}145 + 3{,}494\, X_1 + 0{,}023\, X_2 \quad (R^2 = 0{,}836)$$

$$Y_2 = -2.807{,}826 + 2{,}121\, X_1 + 0{,}026\, X_2 \quad (R^2 = 0{,}909)$$

Keterangan

Y_1 : model bangkitan angkutan barang
Y_2 : model tarikan angkutan barang
X_1 : variabel PDRB
X_2 : variabel jumlah pendudukan

PREDIKSI MAT PENUMPANG (PNP/HARI) HARI 2045

PREDIKSI MAT BARANG (TON/HARI) HARI 2045