Florida Statewide Model (FLSWM) in PTV Visum

presented by

Name

Steve Perone

Date

May 6th, 2015

Agenda

- Who is PTV Group and who is using Visum?
- Florida State-wide Model (FLSWM) in Visum

PTV Group

PTV Headquarters, Karlsruhe, Germany

Founded in 1979

12 Subsidiaries

650 Employees

$90M Turnover

FLORIDA MODEL TASK FORCE

PTV Group

FLORIDA MODEL TASK FORCE

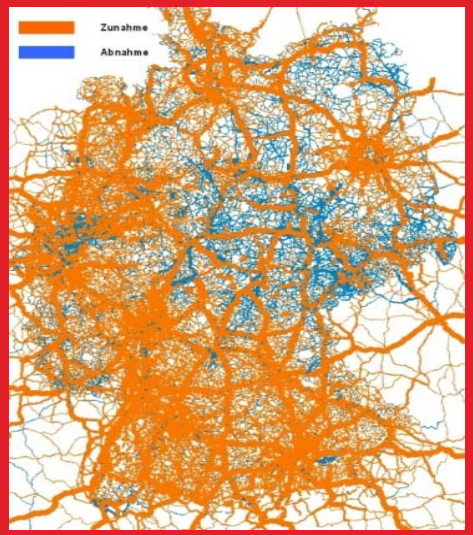
PTV Group – North America

Portland, OR

Arlington, VA

PTV Group

STRATEGIC PLANNING



OPERATIONAL PLANNING

REAL-TIME TRAFFIC MANAGEMENT & ITS

FLORIDA MODEL TASK FORCE

PTV Vision Suite

PTV OPTIMA
Real-time Simulation

PTV VISUM
Strategic Planning

PTV VISSIM
Microsimulation

PTV BALANCE
Adaptive Signal Control

PTV VISTRO
Traffic Analysis

PTV VISWALK
Pedestrian Modeling

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PTV User Community - Visum

ARC
ATLANTA REGIONAL COMMISSIOI

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Metro

Oregon Department of Transportation

Pikes Peak Area Council of Governments
Communities Working Together

Winnipeg

COLORADO SPRINGS

YVCOG

ourmap

FAUQUIER COUNTY VIRGINIA

SRTC Spokane Regional Transportation Council

Saskatchewan
Real Growth. Real Opportunity.

Capital District Transportation Committee
One Park Place Albany NY 12205 518-458-2161

HALIFAX REGIONAL MUNICIPALITY

CITY OF FARMINGTON NM

Region of Waterloo

ARLINGTON VIRGINIA

ORANGE COUNTY NEW YORK

vicroads

رخص الحفريات

RTA

NJTRANSIT The Way To Go.

SEOUL METROPOLITAN GOVERNMENT

Transport for London

هيئة الطرق والمواصلات
ROADS & TRANSPORT AUTHORITY

HPA Hamburg Port Authority

ISTANBUL BÜYÜKŞEHİR BELEDİYESİ

DB BAHN

qatar 2022

Queensland Government
Department of Main Roads

SHANGHAI

بلدية الكويت
Kuwait Municipality

Provincia di Milano

State Of Qatar

Ministerio de Transporte y Obras Públicas

Ministry of Transportation Republic of Indonesia

SHARJAH MUNICIPALITY

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PTV User Community - Partnership

ECONOLITE Group, Inc.

INRIX

here Maps for Life

McCain

PTV GROUP

TOMTOM

RHYTHM ENGINEERING

IBM

Microsoft

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PTV Visum

2015. 7 — **V15**

More to come this summer….

2014. 7 — **V14**

Distributed computation of procedures, Scenario Management (Multi-User Access), Matrix Editor Improvement, Rubberbanding for tour-based model, PuT skim matrices for time intervals, Distance Measurement in Network editor, OSM Import for geographic area, Spatial PuT Analysis, Evaluation of Transfers, etc.

2013. 6 — **V13**

Distributed Computing for Scenarios, ICA Assignment Improvement, PrT Calibration Reports, Faster Computation for PuT, Reporting tool for Count data, Live stream Bing Map, Flexible matrix definition with formula, Multi-threading of trip distribution of the 4-step model, Visum Safety, etc.

2012. 9 — **V12.5**

User Interface update, Time table based capacity restrained PuT assignment, Headway based PuT Assignment using the fare model, Improvement of bush-based assignment, Bing Aerial Photo as a Background image, Schematic Line Diagram (PuT), Nested Demand Model, Multi-threading for Tour Based model, Open Street Map import, etc.

2011. 10 — **V12**

Scenario Management Phase 2, Formula attributes, Check Network, Open street map as a background Image, Matrix editor improvement, Ring barrier controller (RBC), Signal time space diagram, Multi-thread execution expansion, Duality Gap, Headway based PuT Assignment, TFlowFuzzy Improvement, more COM access, etc.

2010. 8 — **V11.5**

Multi-threading expansion, ICA Assignment with blocking back, TRIBUT (Highway assignment with Toll), TFlowFuzzy Matrix Extension, Scenario Management Phase 1, Reimplementation of Matrix editor, Google Transit Import, HCM 2010, Open street map import, etc.

2009. 5 — **V11**

New Origin based assignment (LUCE), Built-in Tour based model (VISEM), ICA node impedance Calculation, signal optimization, Main Zone, Aliases for Attributes, New Junction editor, Smart map, Node flow diagram,

2007. 9 — **V10**

Dynamic User Equilibrium Implementation (9.5) & Improvement, Equilibrium / Stochastic Assignment Improvement, Custom Volume Delay Function (VDF), Full implementation of HCM 2000, Main nodes & Turns, COM improvements, Integration with Vissim (ANM), 64-bit version support, Multi-threading parallelization of all computationally intense algorithms, etc.

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PTV Visum

More than 60 software developers

develop ~ 300 new features per year

24-hour technical support concept

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FLSWM in PTV Visum

- Network Import
- Network Compression
- Assignment Performance Test

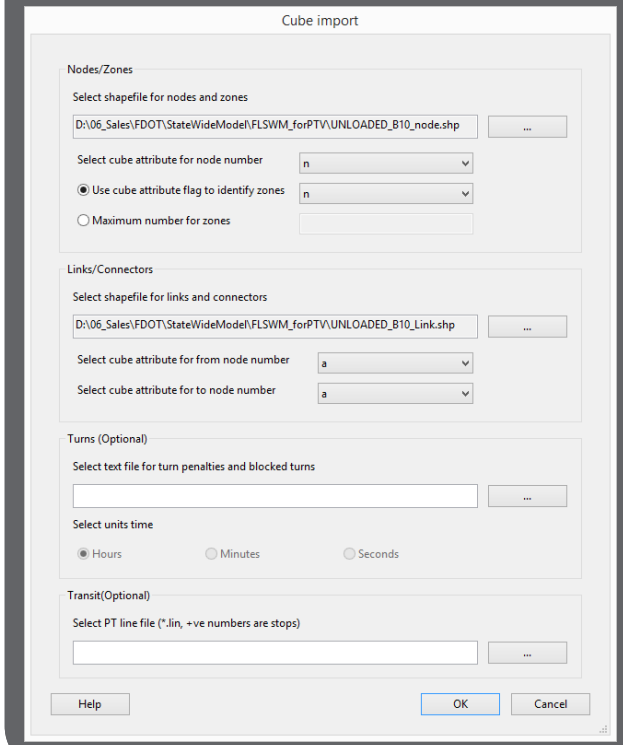
FLORIDA MODEL TASK FORCE

Network Import


Shape File

Trip Table

Cube Importer



Visum Network File

FLORIDA MODEL TASK FORCE

Network Import

PTV Visum 64 Bit 14.00-08 - Network: FDOT_StateWide_v003_Lohse_Original.ver* - [Network editor]

File Edit View Lists Filters Calculate Graphics Network Demand Scripts Window Help

Network editor

Network

- Nodes
- Links
- Turns
- Zones
- Connectors
- Main nodes
- Main turns
- Main zones
- Territories
- OD pairs
- Main OD pairs
- PrT paths
- POIs
- GIS objects
- Screenlines
- Count locations
- Detectors
- Toll systems
- Stop points
- Stop areas
- Stops
- System routes

Network | Matrices

Quick view (Nodes)

No	
Code	
Name	
ControlType	
CapPrT	
t0PrT	
VolPrT	
IMPT_N	
IMPT__TOLL_ACC	
IMPT__TOLL_DEC	
IMPT__PLAZAID	
IMPT_X	
IMPT_Y	
IMPT_TIMESUSED	

Quick view (Nodes) | Marking

Network editor (Edit: Nodes)

Select GPar...

Earthstar Geographics SIO
Image courtesy of NASA
© 2014 Microsoft Corporation

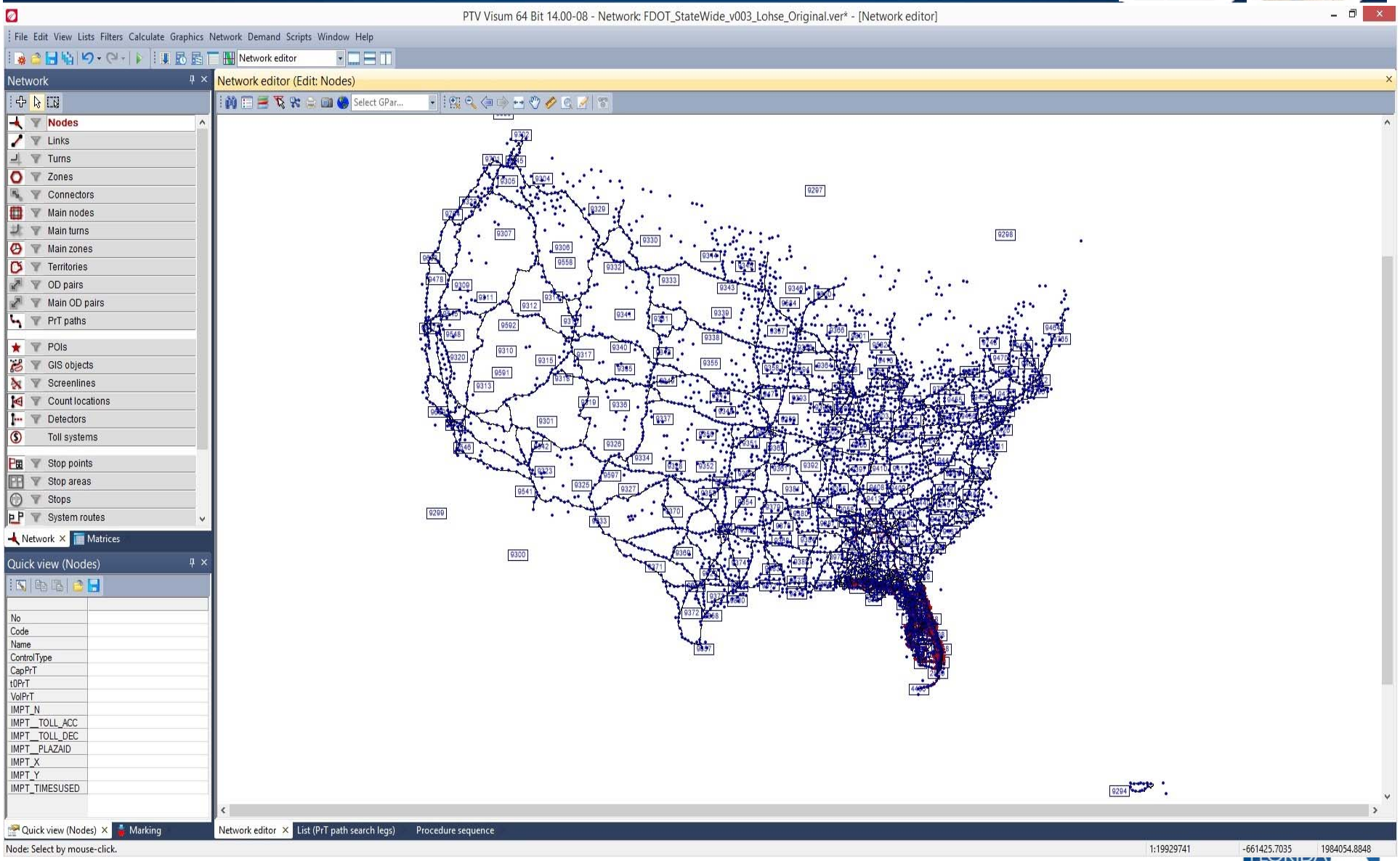
bing

Network editor | List (PrT path search legs) | Procedure sequence

Node: Select by mouse-click. 1:19929741 580648.6470 2175963.3681

FLORIDA MODEL TASK FORCE

Network Import



FLORIDA MODEL TASK FORCE

Network Import

ESRI Attribute Table

Attributes of rdline

FID	Shape	FNODE_	TNODE_	LPOLY_	RPOLY_
0	Polyline	539	532	0	0
1	Polyline	533	539	0	0
2	Polyline	534	540	0	0
3	Polyline	523	541	0	0
4	Polyline	542	519	0	0
5	Polyline	541	524	0	0
6	Polyline	543	531	0	0
7	Polyline	530	543	0	0
8	Polyline	544	518	0	0
9	Polyline	545	544	0	0
10	Polyline	520	521	0	0
11	Polyline	546	545	0	0
12	Polyline	532	547	0	0
13	Polyline	548	529	0	0

Record: 1 Show: All Selected Records (0 out of 1494 Selected.) 0

Visum Inbuilt & User-Defined Attributes

List (Links)

Count: 4152	No	FromNodeNo	ToNodeNo	TypeNo	TSysSet	Length	NumLanes	CapPrT	V0PrT	ADAS	BACKRD
1	370817	200853943	200854241	2	C	0.139mi	1	99999	15mph	0	6
2	370817	200854241	200853943	2	C	0.139mi	1	99999	15mph	0	6
3	370827	200845679	200850441	0	C	0.209mi	1	99999	15mph	0	0
4	370827	200850441	200845679	0	C	0.209mi	1	99999	15mph	0	0
5	370828	200845679	200852782	0	C	0.048mi	1	99999	15mph	0	0
6	370828	200852782	200845679	0	C	0.048mi	1	99999	15mph	0	0
7	370835	200844708	200845507	0	C	0.028mi	1	99999	15mph	0	3
8	370835	200845507	200844708	0	C	0.028mi	1	99999	15mph	0	3
9	370837	200850259	200853806	0	C	0.077mi	1	99999	15mph	0	3
10	370837	200853806	200850259	0	C	0.077mi	1	99999	15mph	0	3
11	370838	200852604	200853806	0	C	0.181mi	1	99999	15mph	0	3
12	370838	200853806	200852604	0	C	0.181mi	1	99999	15mph	0	3
13	370846	200840332	200859428	0	C	0.196mi	1	99999	15mph	0	0
14	370846	200859428	200840332	0	C	0.196mi	1	99999	15mph	0	0
15	370847	200836054	200859428	0	C	0.265mi	1	99999	15mph	0	3
16	370847	200859428	200836054	0	C	0.265mi	1	99999	15mph	0	3
17	370848	200838415	200859428	0	C	0.106mi	1	99999	15mph	0	3
18	370848	200859428	200838415	0	C	0.106mi	1	99999	15mph	0	3
19	370849	200835322	200837685	0	C	0.043mi	1	99999	15mph	0	3
20	370849	200837685	200835322	0	C	0.043mi	1	99999	15mph	0	3

Transfer & Map

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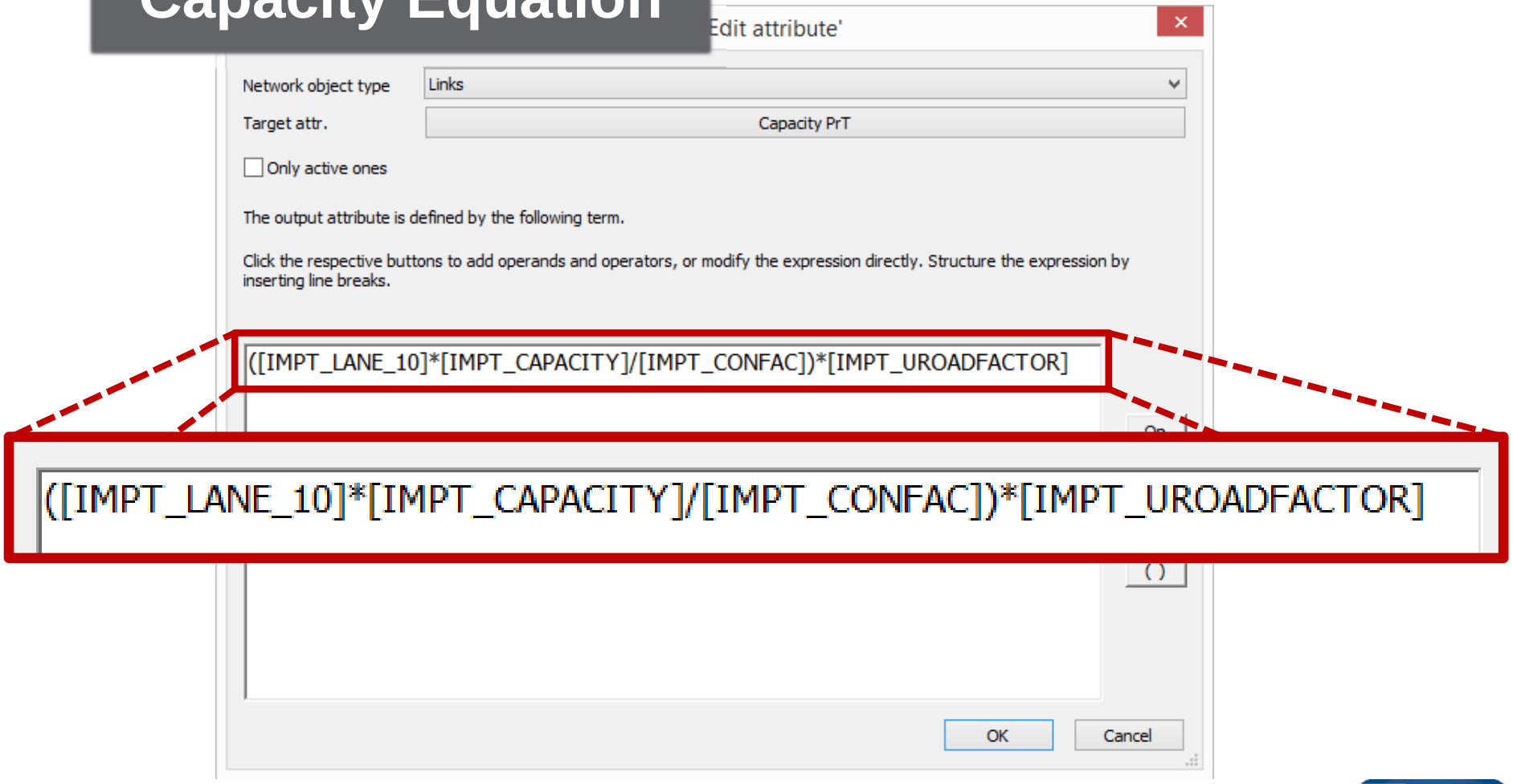
Network Import

Capacity Equation



([IMPT_LANE_10]*[IMPT_CAPACITY]/[IMPT_CONFAC])*[IMPT_UROADFACTOR]

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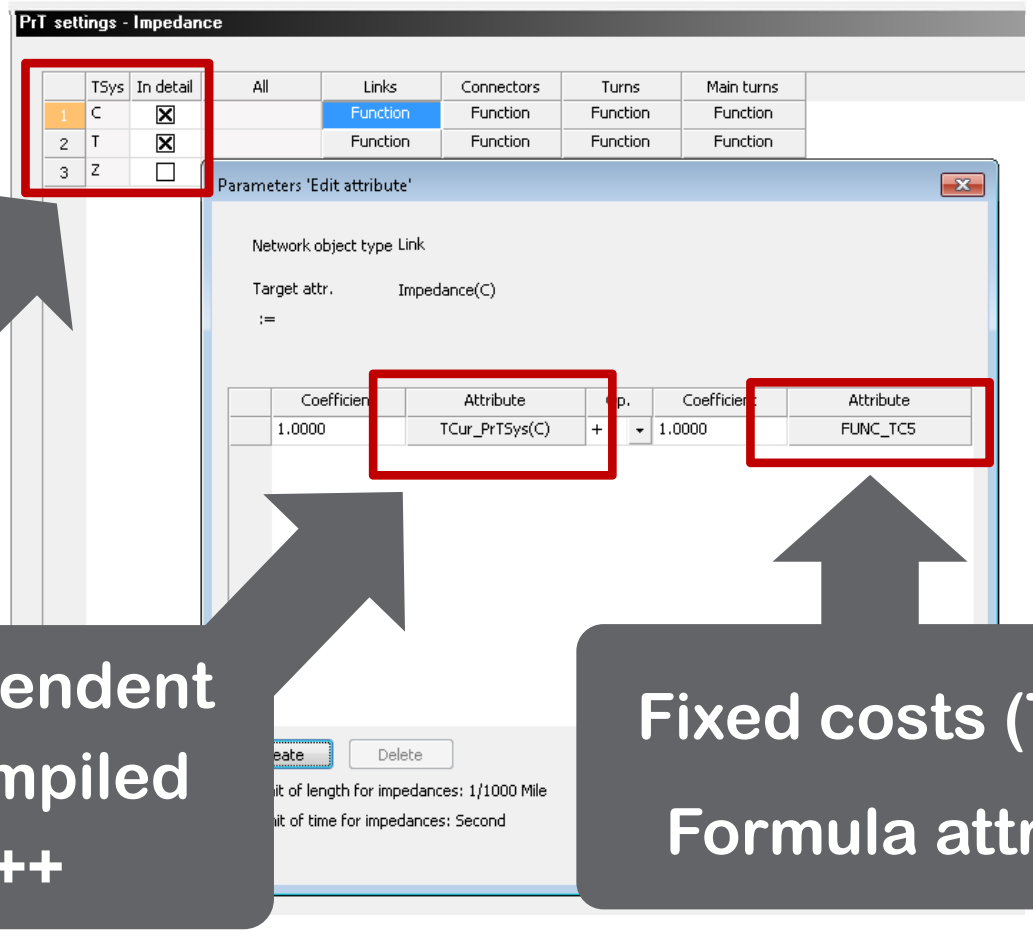
Network Import

Generalized Cost (Impedance) Calculation



Multiple Classes

Volume dependent via DLL compiled from C++

Fixed costs (Toll) via Formula attributes

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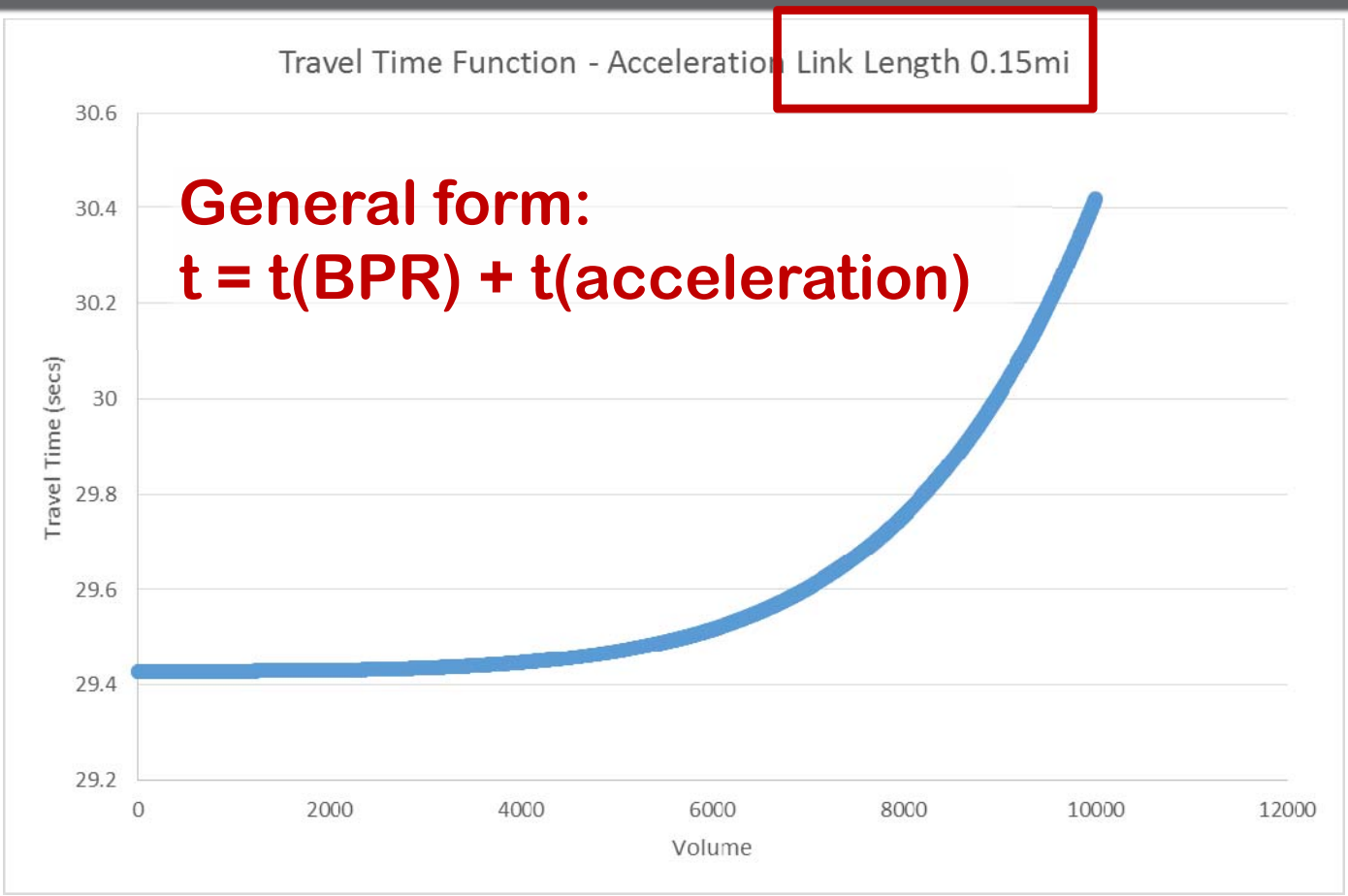
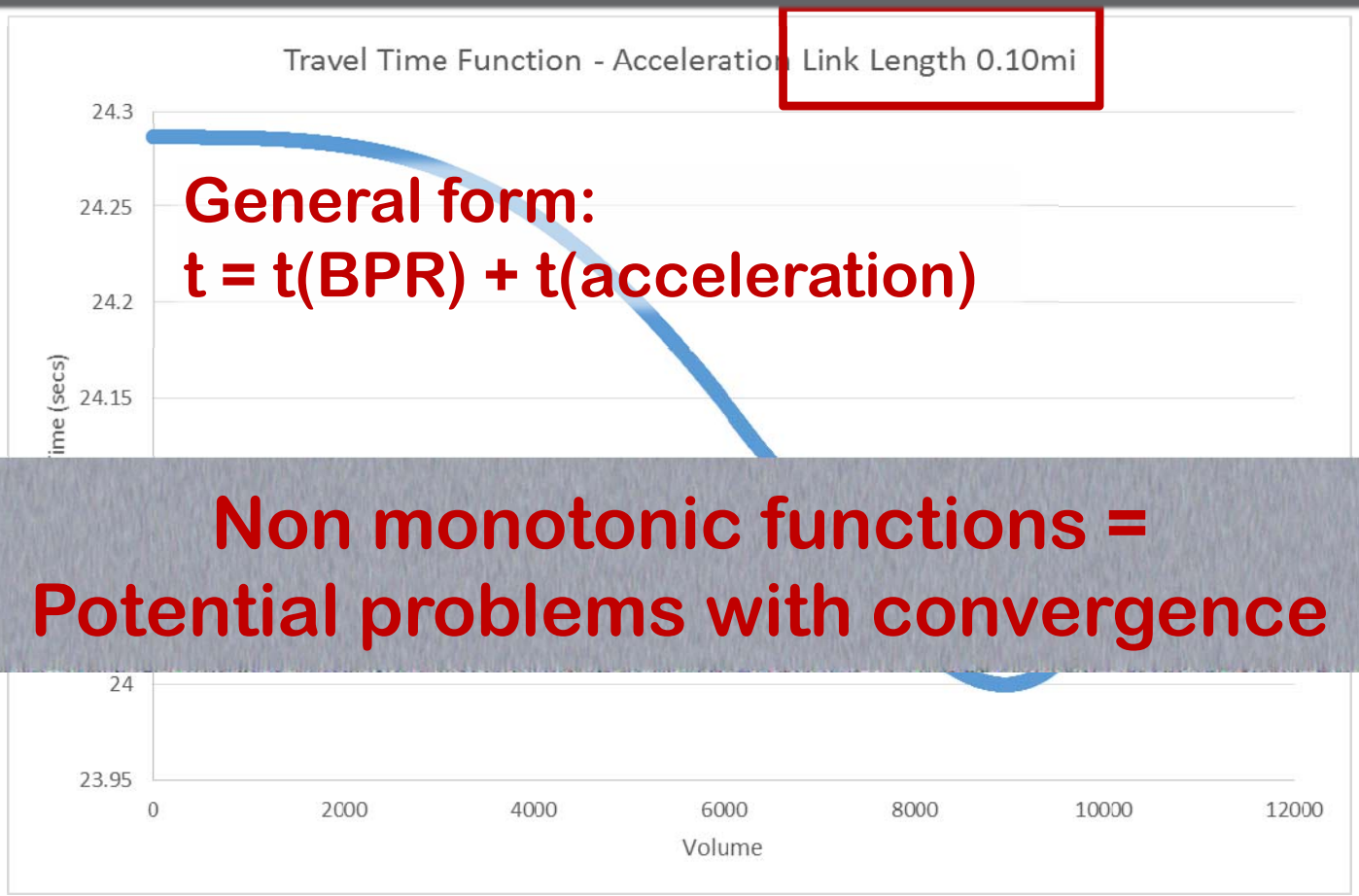
Network Import

Acceleration delay function vs. Link length



Network Import

Acceleration delay function vs. Link length

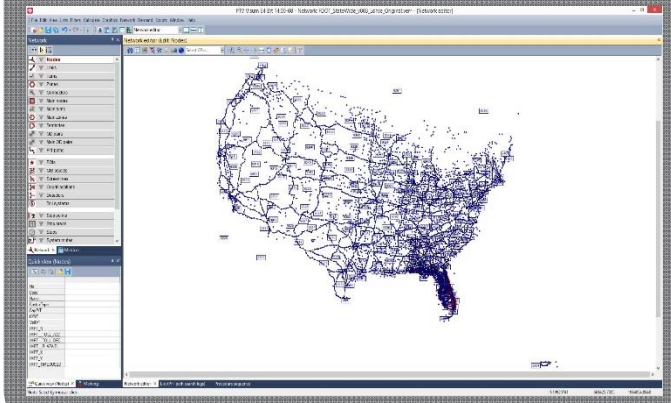


General form:
t = t(BPR) + t(acceleration)

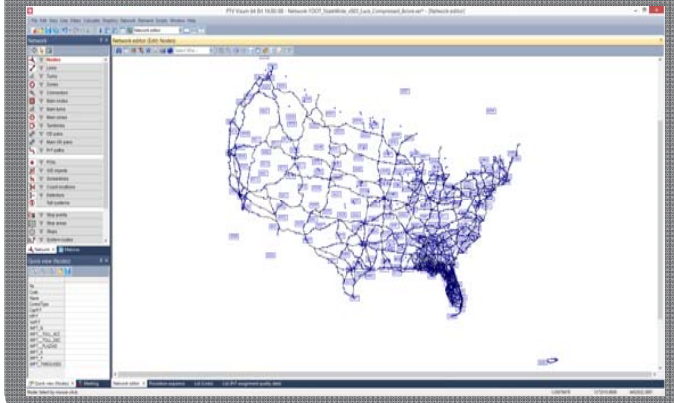
Non monotonic functions =
Potential problems with convergence

Network Import

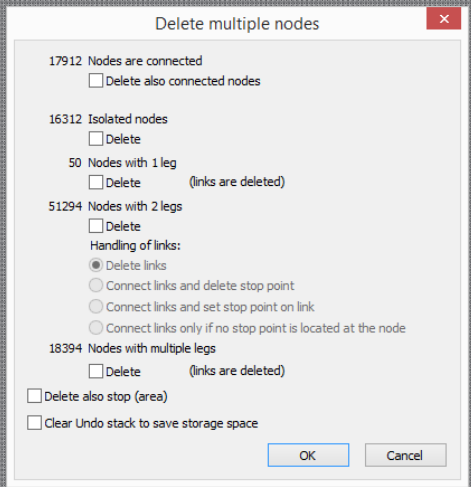
Original Network



Compressed Network



Multi-Delete



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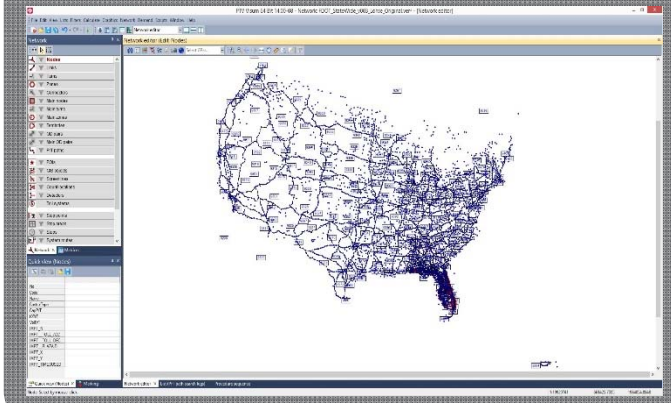
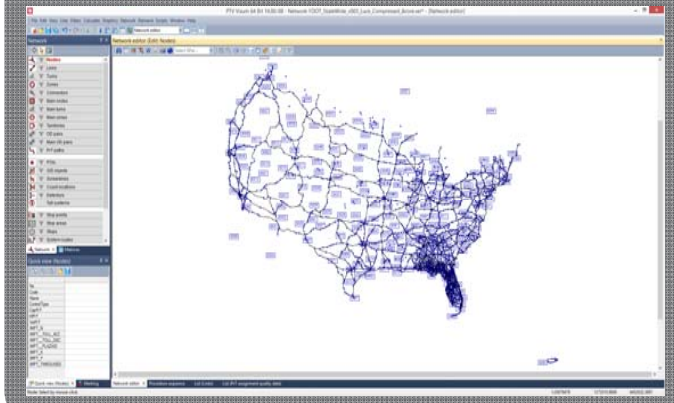
Network Import

Original Network



Compressed Network



103,962	Nodes	47,391
198,010	Links	117,492
9,535	Zones	9,535

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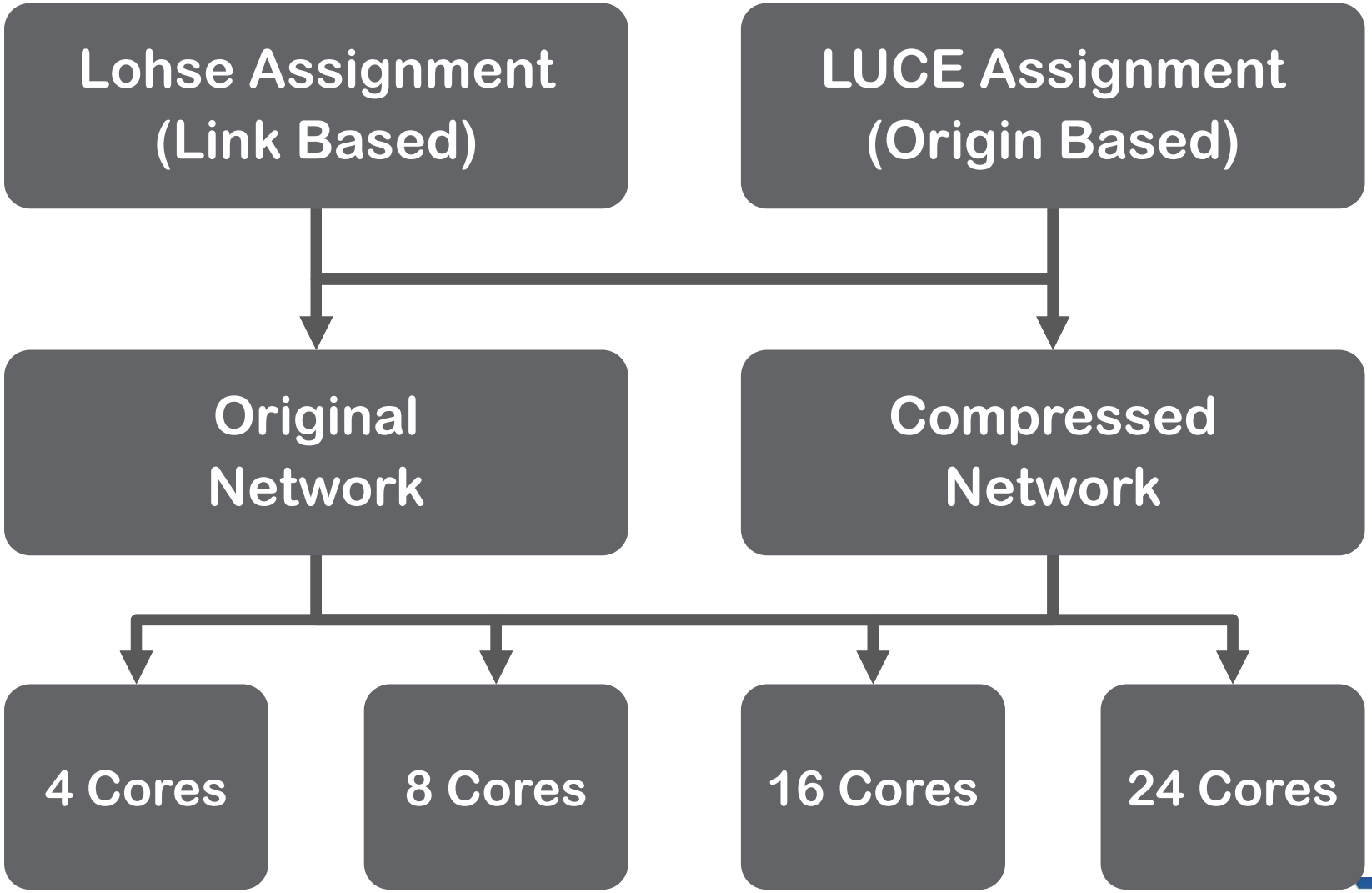
Assignment Performance

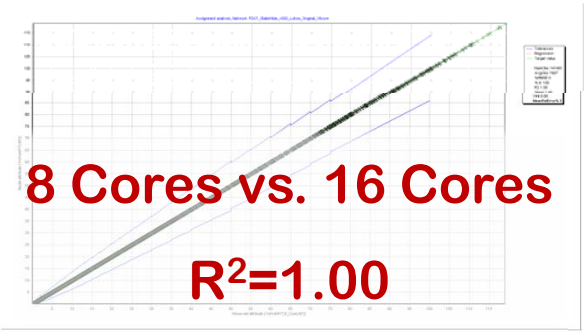


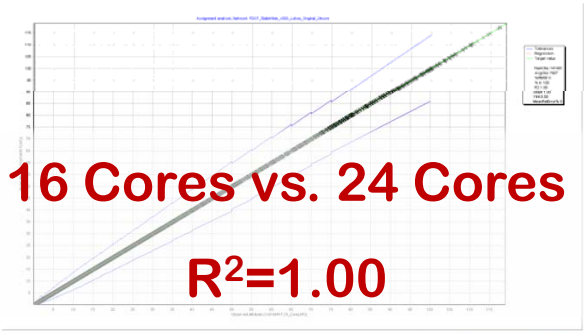
FLORIDA MODEL TASK FORCE

Assignment Performance

Numerical Integrity of Results

	Builds & Workstations	Number of Cores
Lohse	Identical	Identical
LUCE	Identical	Minor Deviation





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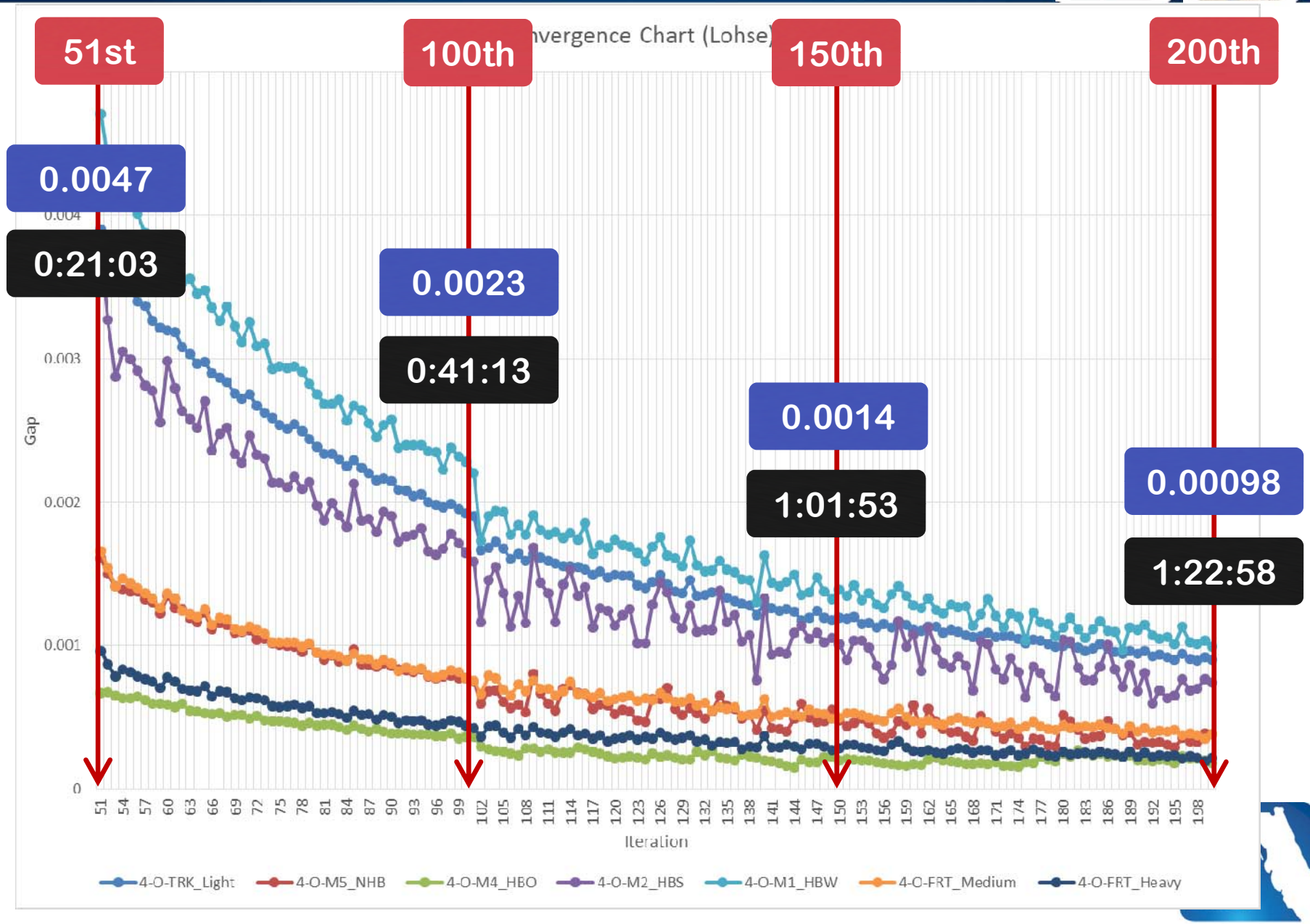
Assignment Performance


Lohse Assignment
(Link Based, 200 Iterations, Max. Gap : 0.00097891)

	Original Network	Compressed Network
4 Cores	3:07:05	2:34:18
8 Cores	2:05:01	1:45:44
16 Cores	1:28:20	1:13:05
24 Cores	1:22:58	1:05:57

FLORIDA MODEL TASK FORCE

Assignment Performance



Assignment Performance

	LUCE Assignment (Origin Based, 13 Iterations)	
	Original Network	Compressed Network
4 Cores	0:45:31	0:28:42
8 Cores	0:33:04	0:21:12

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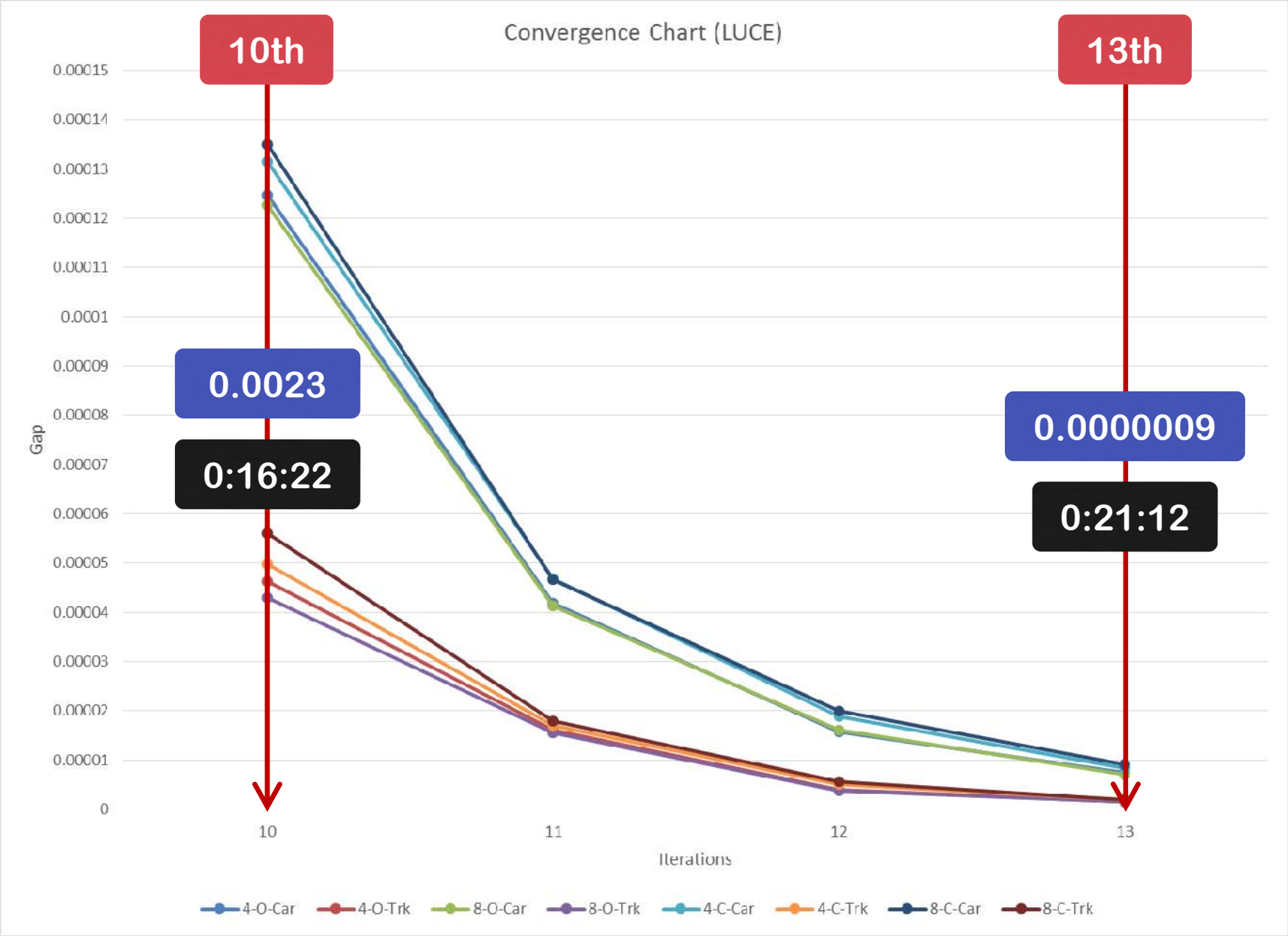
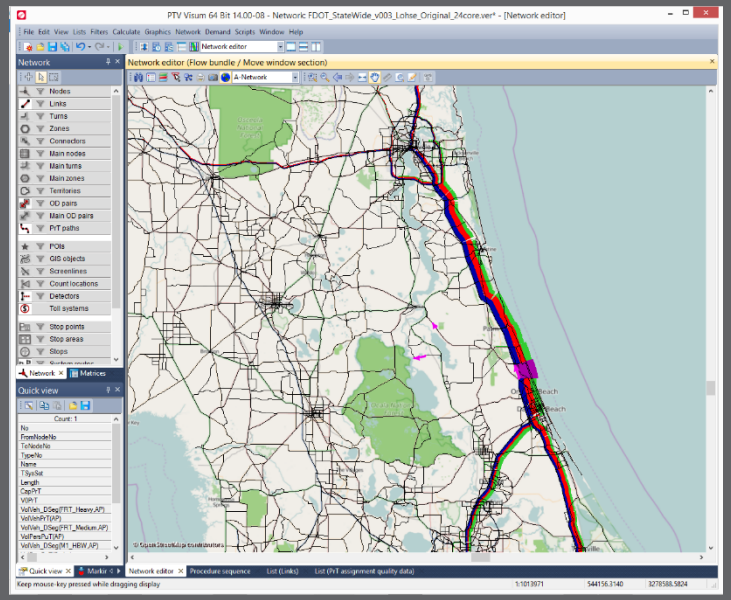
Assignment Performance

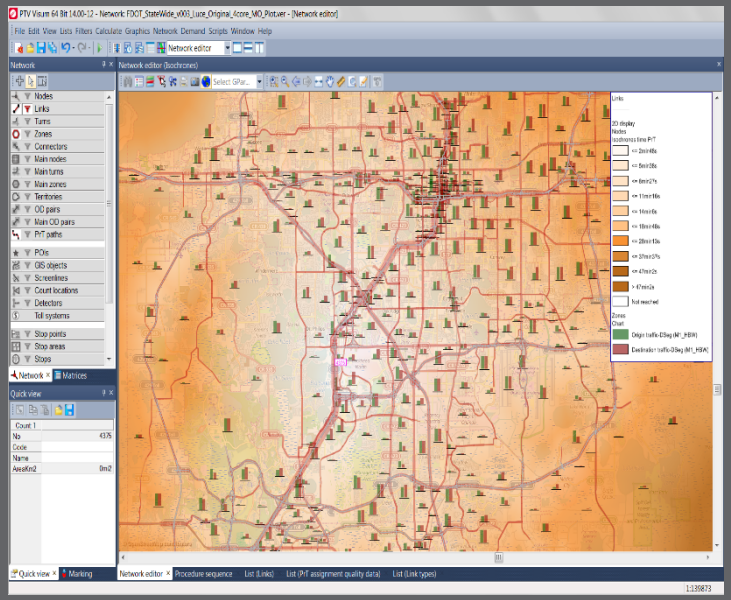


Post-Assignment Analysis

Select Link Analysis

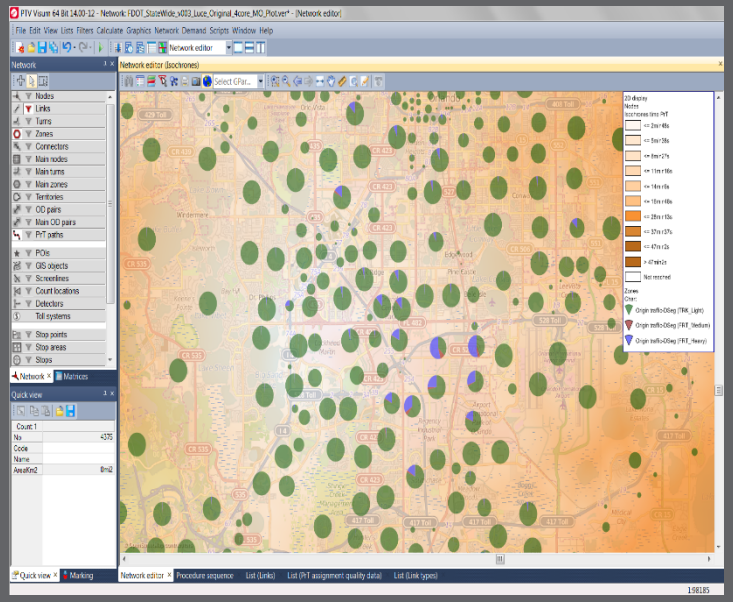


Accessibility Isochrones

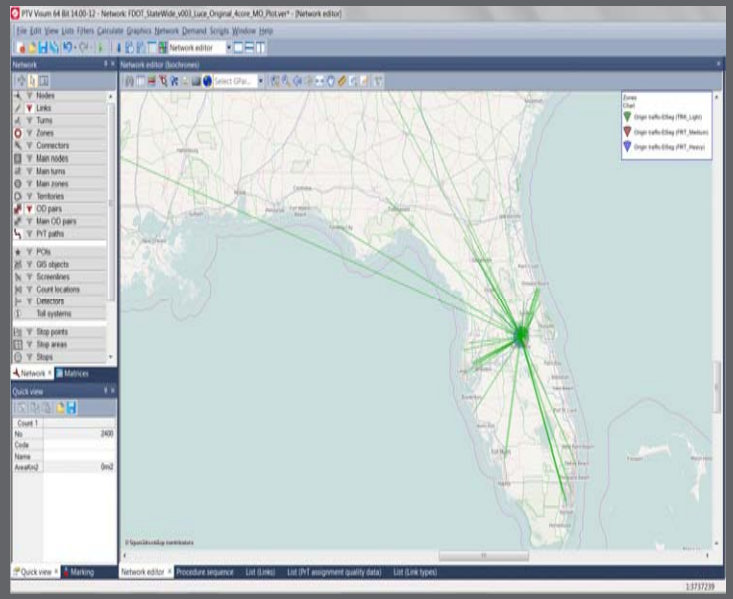


Post-Assignment Analysis

Trip Origins by Truck Types



Desire Line from MCO



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Moving Forward

STRATEGIC PLANNING	OPERATIONAL PLANNING	REAL-TIME TRAFFIC MANAGEMENT
PTV VISUM	PTV VISSIM PTV VISWALK PTV VISTRO	PTV OPTIMA
Long-term (20 yrs)	**Mid-term (5 yrs)**	**Short-term (15 min)**

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Thank You!

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