

FDOT D4 DTA/TIA Toolkit

Overview

- **Objectives**
 - Task1 – Data Mining App
 - Task2 – Subarea DTA App
 - Task3 – OD Matrix Calibration
- **Implementation**
- **Next Steps**
- **Applications**
- **Summary**

Task 1 – Data Mining App

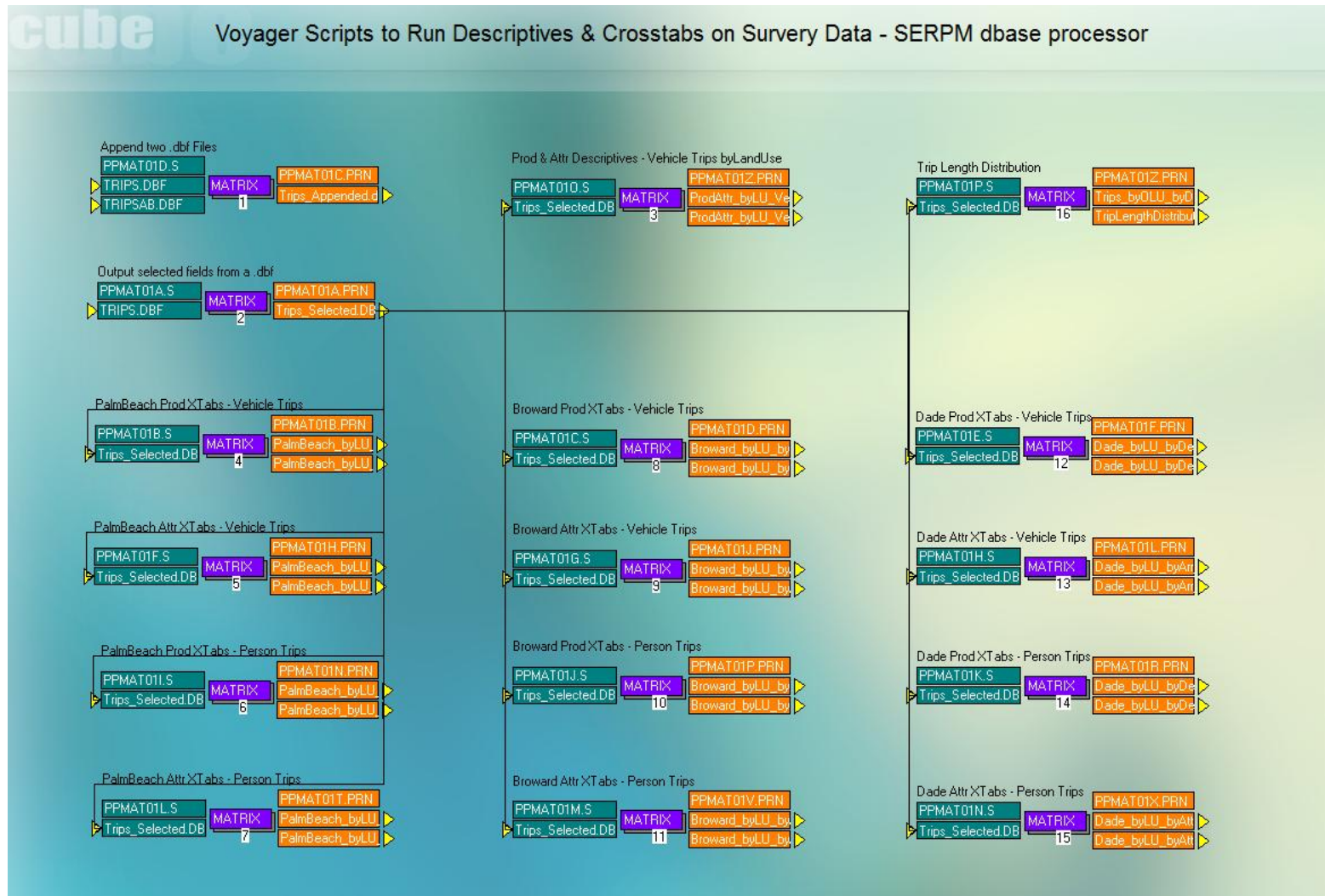
- **Analyze**

- Travel Survey Records
- Travel speed/time database
- Traffic volume database

- **Produce**

- Descriptive & Cross-tabulations
 - Trips by Land Use
 - Trips by Time Segment
 - Time period specific traffic counts – OD Estimation
- Trip Length Distribution
- Compute parameters used in congested time function

Data Mining App

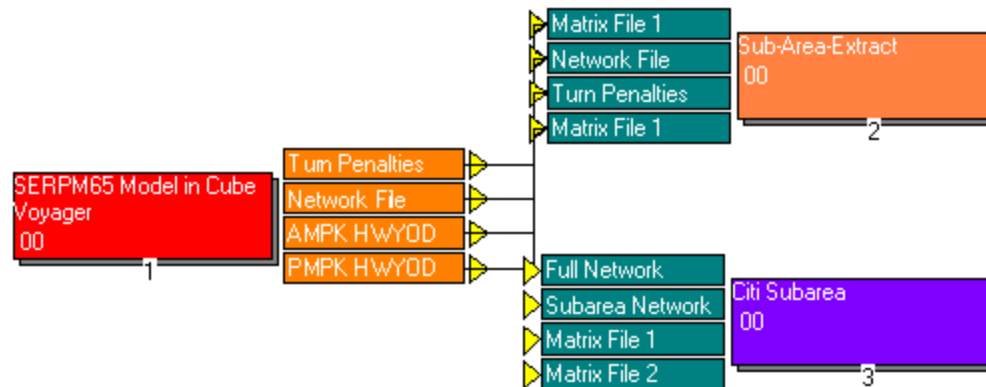


Task 2 – Subarea DTA App

- **Network Pre-processing**
 - Define & Extract subarea network
 - Flag subarea links/nodes
 - Full network (with flagged links) & Subarea network
 - Clean – Remove short links, inconsistencies, unconnected links
 - Precondition – Refine capacity by facility type (HCM Calculations)
- **Subarea analysis**
 - Perform the DTA – Developed by Citilabs
 - Differences in approach – Existing Vs New (Citilabs)
- **Network Post-processing**
 - Link based statistics – Volume, Congested Speed, VMT/VHT by fac-type
 - Path-based gap convergence – Simulation quality
 - .VPR File – Visualization – Query packets

SERPM DTA Model App

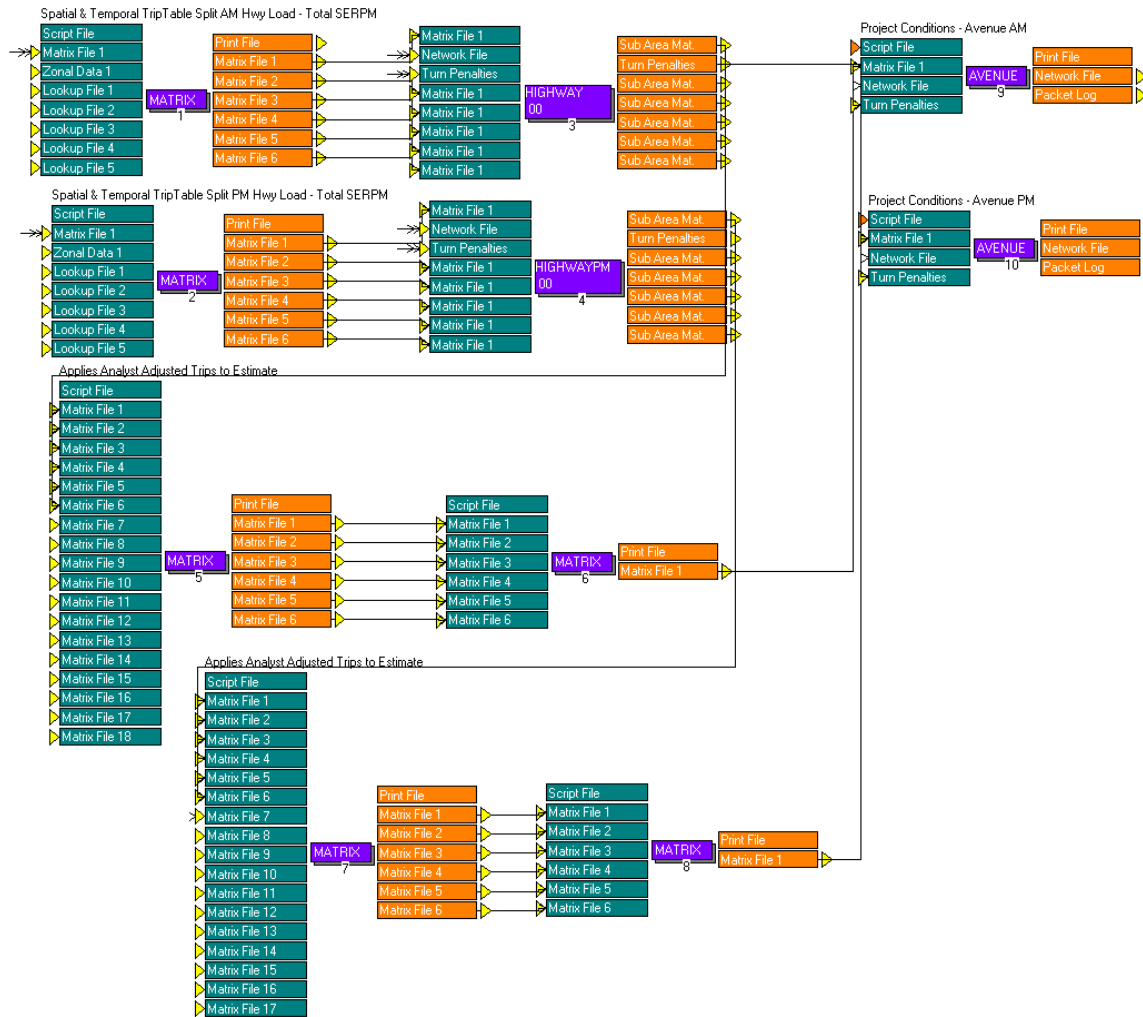
Open Cluster Nodes



Close Cluster Nodes



Existing Subarea App



New (Citilabs) Subarea DTA App

- **Step 1 – Identify paths that use Subarea** (based on Static assignment)
- **Step 2 – Separate Trip tables**
 - Static and Dynamic
- **Step 3 – Dynamic Trip tables → by Land Use & Time Segment**
 - Multiplicative probabilities (% by LU & TS from Survey)
 - Monte Carlo simulation (% by LU & TS from Survey) – Cleaner approach
- **Step 4 – Hybrid Static-Dynamic Assignment → Packet log**
- **Step 5 – Detailed Subarea Analysis**
 - Packet log → Origin, Destination, Time of Departure, Travel time, SA-Origin, SA -Destination, Time of entry into SA
 - Packet log → Subarea time-dependent OD matrices
 - DTA & Simulation of SA Trip Table on SA Network

Implementation – Citilabs Subarea DTA App

Start Cluster nodes

Script File PILOT 1

Sub-area DTA Analysis using Cube Avenue
~Developed by Citilabs

Dump subarea network to DBF; compute storage

Flag links in subarea

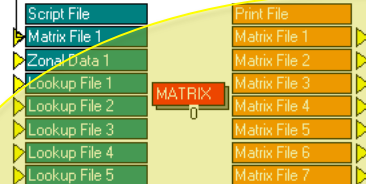
Check paths



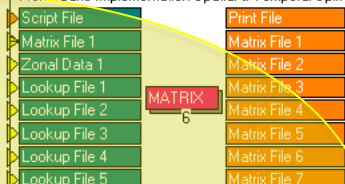
Split Trip Table into Static & Dynamic based on if it cuts thru Sub-area



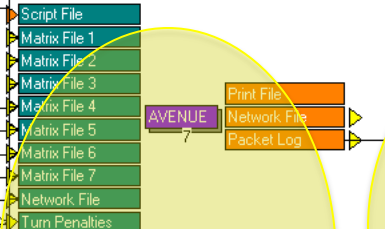
Spatial & Temporal Split AM TTab into Dynamic TimeSlices



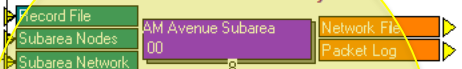
MonteCarlo Implementation-Spatial & Temporal Split AM DTATabs



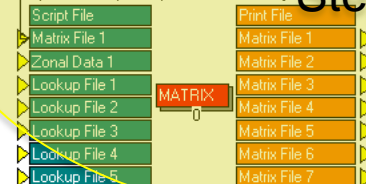
AM Hybrid static/dynamic traffic assignment and simulation



AM Period Sub-Area Analysis



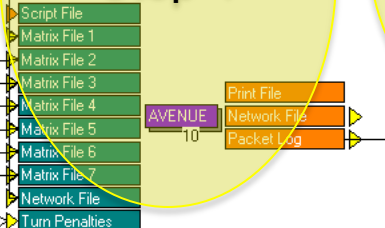
Spatial & Temporal Split PM TTab into Dynamic TimeSlices



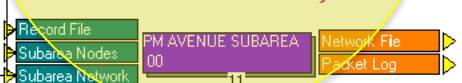
MonteCarlo Implementation-Spatial & Temporal Split PM DTATabs



PM Hybrid static/dynamic traffic assignment and simulation



PM Period Sub-Area Analysis

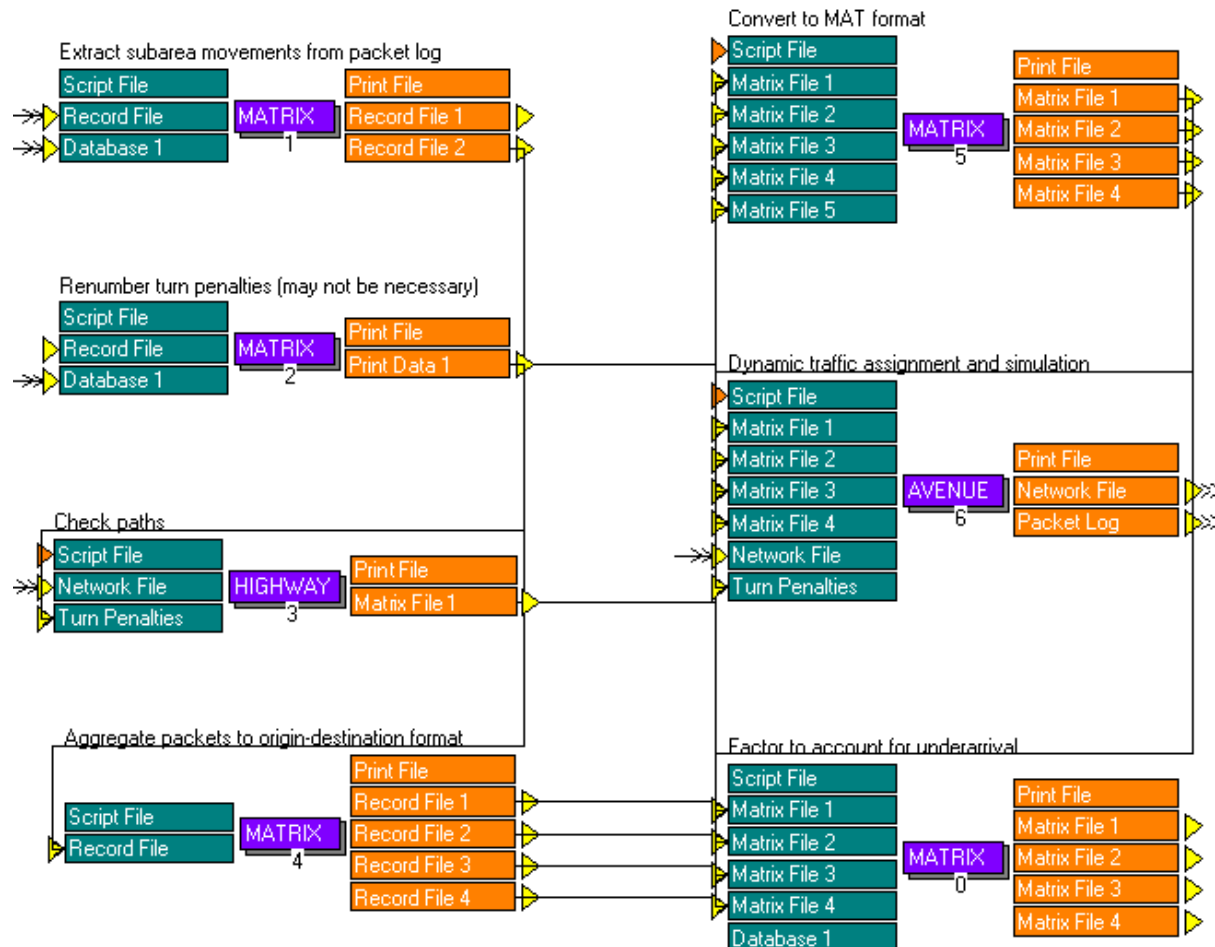


Stop Cluster nodes

Script File PILOT 12

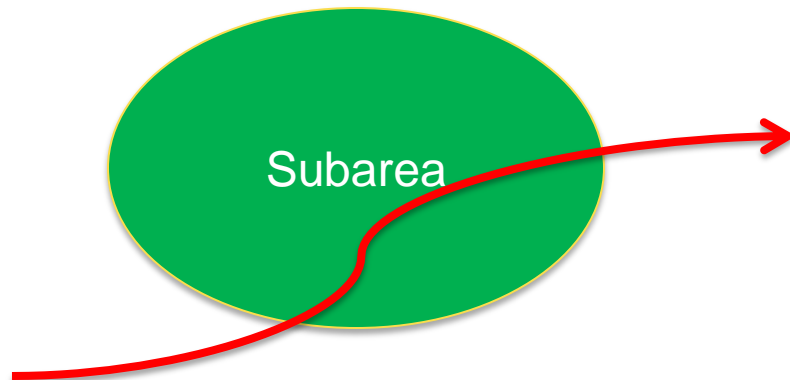
Implementation – Citilabs Subarea DTA App

AM Period Sub-Area Analysis



Differences - Existing Vs New (Citilabs)

- **Increasingly Dynamic as it approaches SA boundary**
- **Addresses boundary problem**
 - Static SA extraction process – Can't determine when the trip crossed SA
 - Dynamic SA extraction process – Hybrid Assignment
 - Realistic flow rates @ the SA boundary
 - Estimate of congestion from static and dynamic loads



Task 3 – OD Matrix Calibration

- **(Adjust) SA OD pattern ← Regional OD pattern**
 - Before passing through SA Cube Avenue Simulation
- **Limitations – Cube Analyst**
 - We Need - Time dependent shortest paths –
 - Analyst assumes – Route choice probabilities constant over time
 - Simulation enforces capacity constraints – Not necessarily balanced
- **Develop Dynamic OD Estimation process – In Progress**
 - Heuristic
 - Optimization based techniques

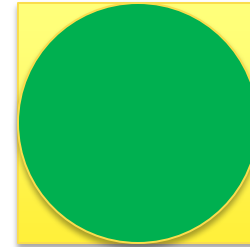
Applications

- **Answer planning & policy related questions that cannot be adequately addressed by Static methods**
- **Effects of land use changes on:**
 - Temporal distribution of trips
- **ITS measures to manage dynamic traffic conditions**
 - Variable pricing
 - Managed lanes – Reversible lanes
 - Traveler information services

Thank You!

Monte Carlo Simulation

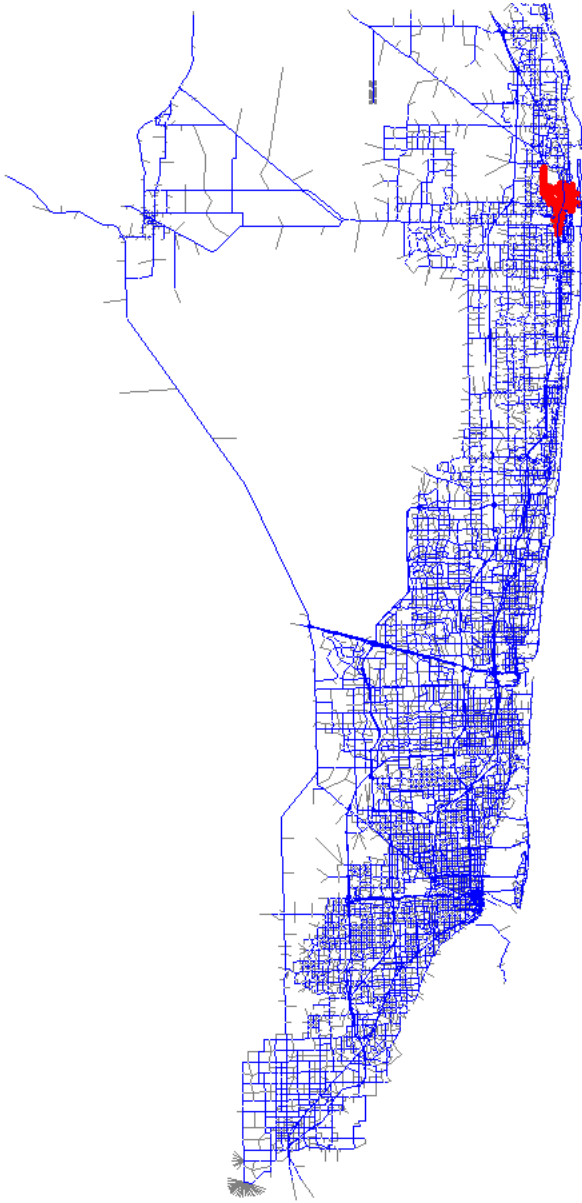
- **What is Monte Carlo Simulation?**
 - Example – Calculate value of Π
- **Our Context – Trip Tables by LU & TS**
 - Choose departure LU at random based upon TAZ level %s
 - Conditional on above, choose a random departure TS (%)
 - 6 LU – Residential, Retail, Finance, Government, Industrial
 - AM Peak – 30 min TS(6 segments)
- **Repeatability**
 - Seed the Monte Carlo draw



Subarea Analysis

- **Storage - Vehicles perLane perMile in jam conditions**
- **Warm-up period (First 30 mins)**
 - PARAMETERS MODELPERIOD = 180, SEGMENTS=7*30
- **Retain SERPM components**
 - Vehicle Class – DA, SR2, SR3P, Trucks
 - Capacity/Speed/Storage values
 - Link Class/Exclude Groups
- **Pathload + Dynamic Pathload statements**
 - PATHLOAD PATH=COST, VOL[1]=MW[1], PENI=1-2, EXCLUDEGROUP=1,2,9 ;
 - DYNAMICLOAD PATH=TIME, VOL[5]=MW[(100+__ts__)], PENI=1, PACKETSIZE=1
- **Run time**
 - 3.5 hrs – 2.4 GHz(2 core), 8 GB RAM, 64Bit Windows 7

SERPM Highway Network



Subarea Highway Network



Animation in Cube Avenue

Cube (Licensed to Citilabs) - [SUB_DTA_AM.NET (C:\Abishek\Projects\SERPM-DTA\Clean2_SERPMDTA\CUBE\CITI_SUBAREA)]

File Scenario Edit Run Link Node View Post Transit GIS Tools Path Intersection Polygon Drawing/Screenline Tools Other Apps Window Help

HWY:SUB_DTA_AM.NET

Animation
Incr 1 sec Speed (0.01 set) 1 Repeat Play Start at 0 1:37:40 Start Sync Start Pause Stop Close Options ...

_Clean2_SERPMDTA.cat

Scenarios
- Base

Data
Inputs
Outputs
Reports

Applications
Sketch Planning Model

Keys

Key	Value
SerEmp	4
Penalties	Clean2_SERPMDTA\OUTPUT\OUT-05R\TURNS_05.PEN
TripTable1	ERPMDTA\OUTPUT\OUT-05R\HWYOD-PMPK_R05.MAT
TripTable	ERPMDTA\OUTPUT\OUT-05R\HWYOD-AMPK_R05.MAT
MacroIterations	5
Storage	330
Network	lean2_SERPMDTA\OUTPUT\OUT-05R\6HNET_05.NET
SubNetwork	MDTA\INPUT\IN-05R\WPM_TOD_SubArea_Large1.net
SubZones	143
MesoIterations	30

Animation Running ...

981009.3.862133.7(35.3891)

Desktop Cube »

10:25 AM

