FDOT D4 DTA/TIA Toolkit

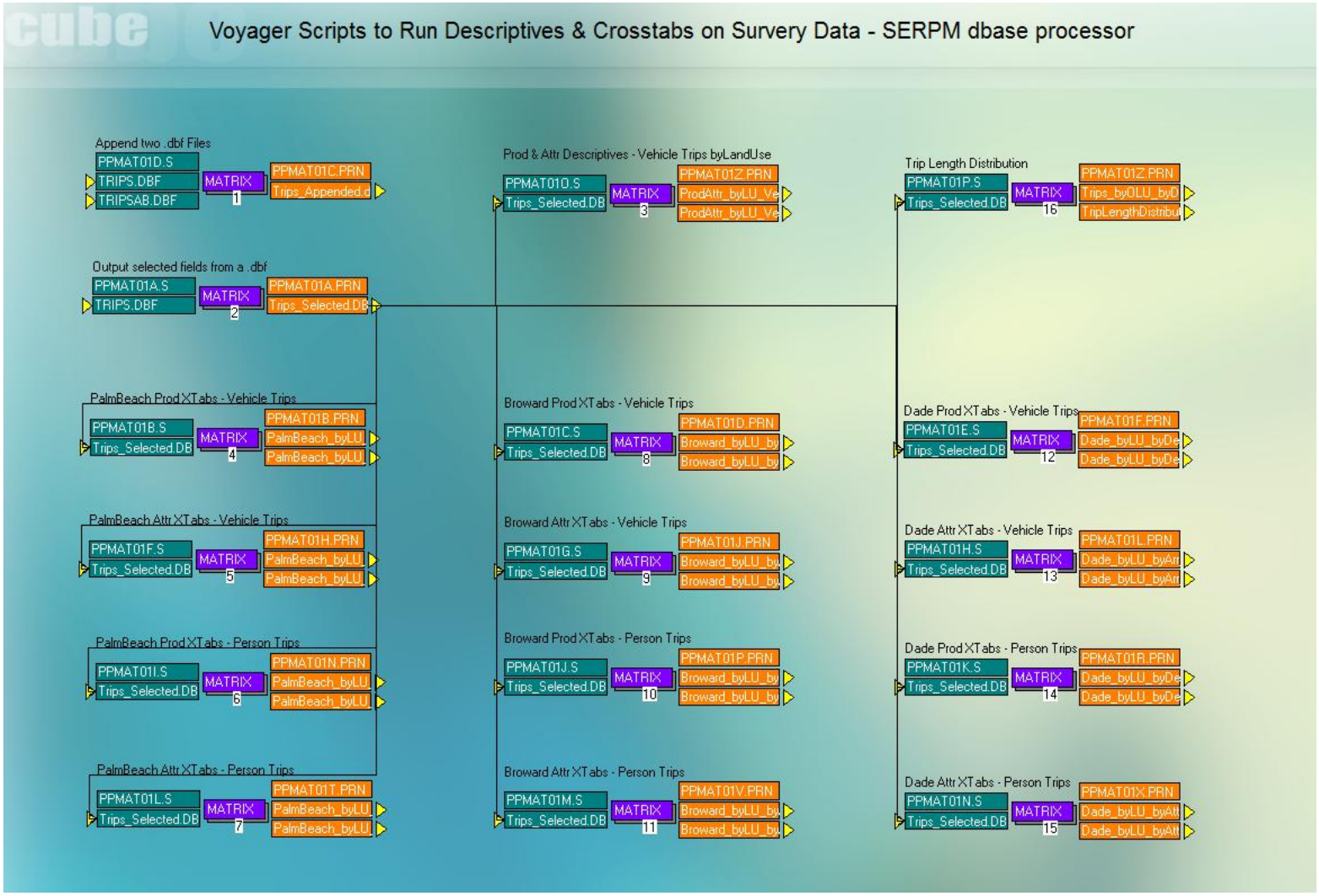
Overview

- **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

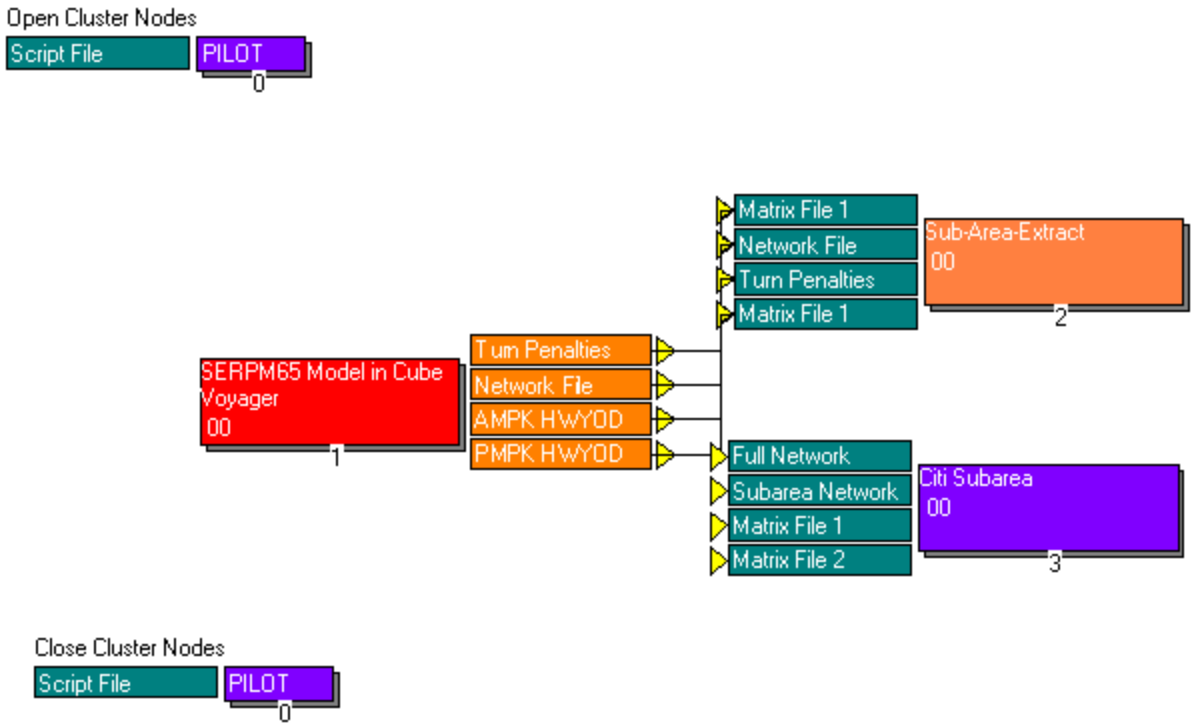
Data Mining App



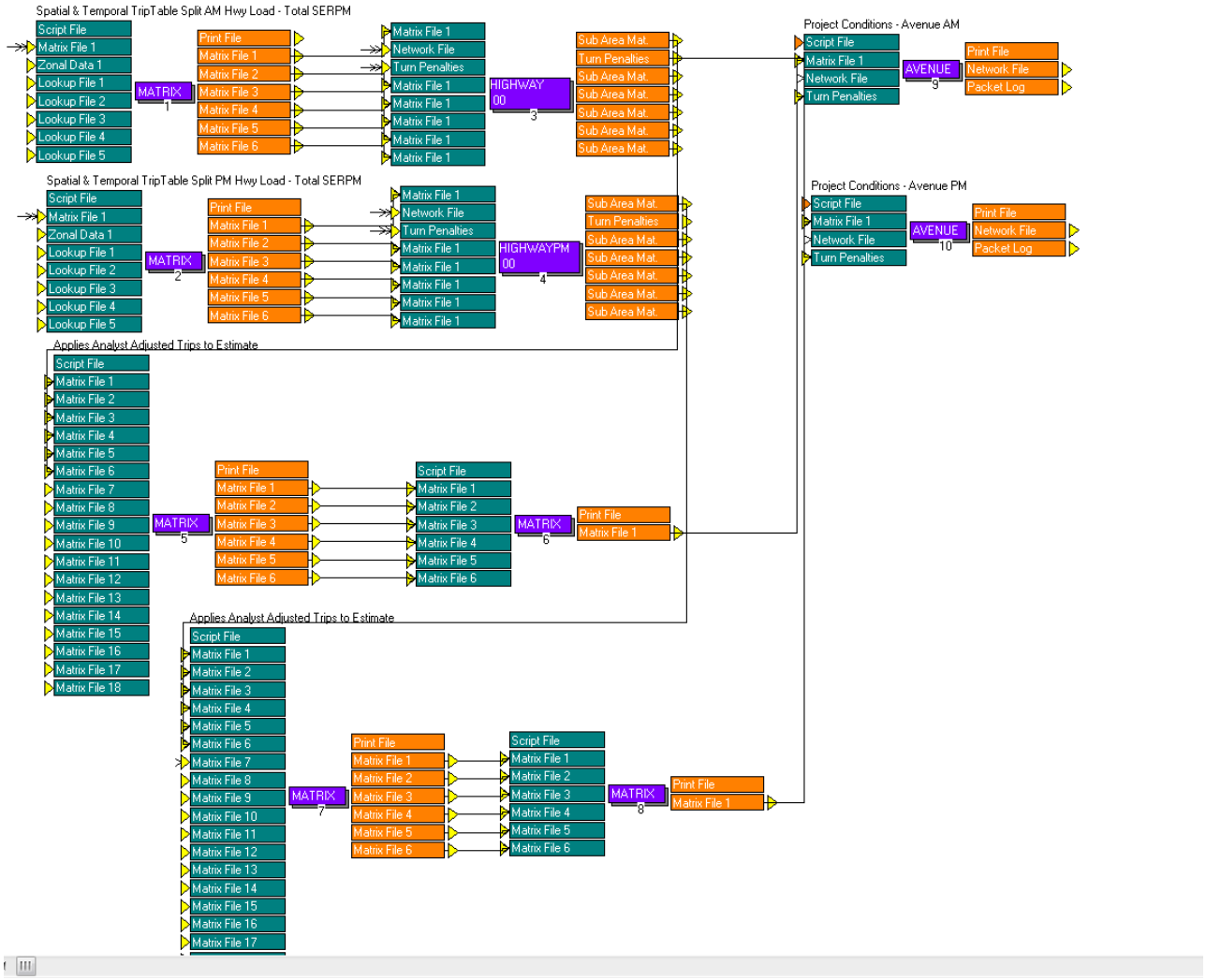
Task 2 – Subarea DTA App

- **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



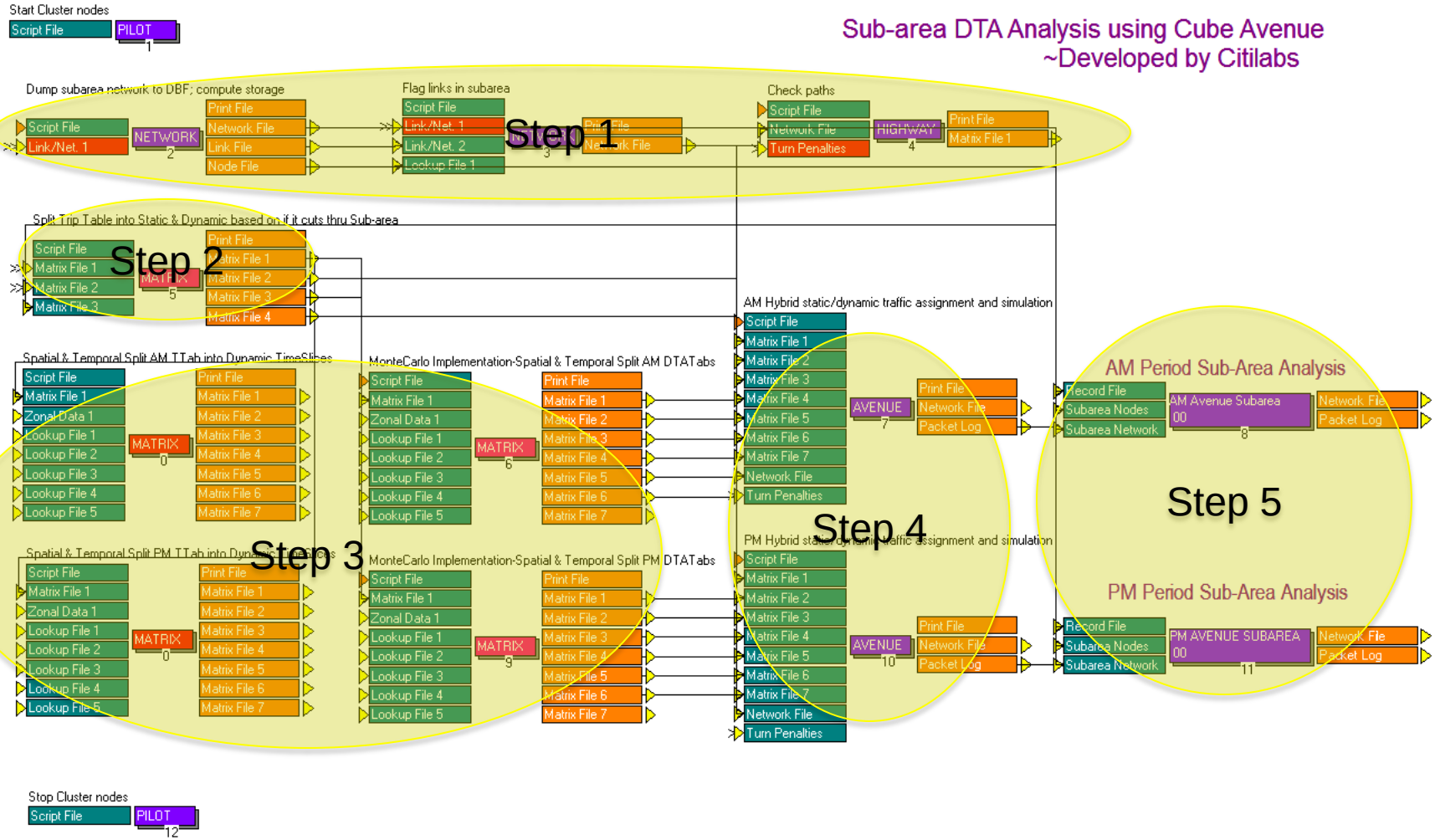
Existing Subarea App



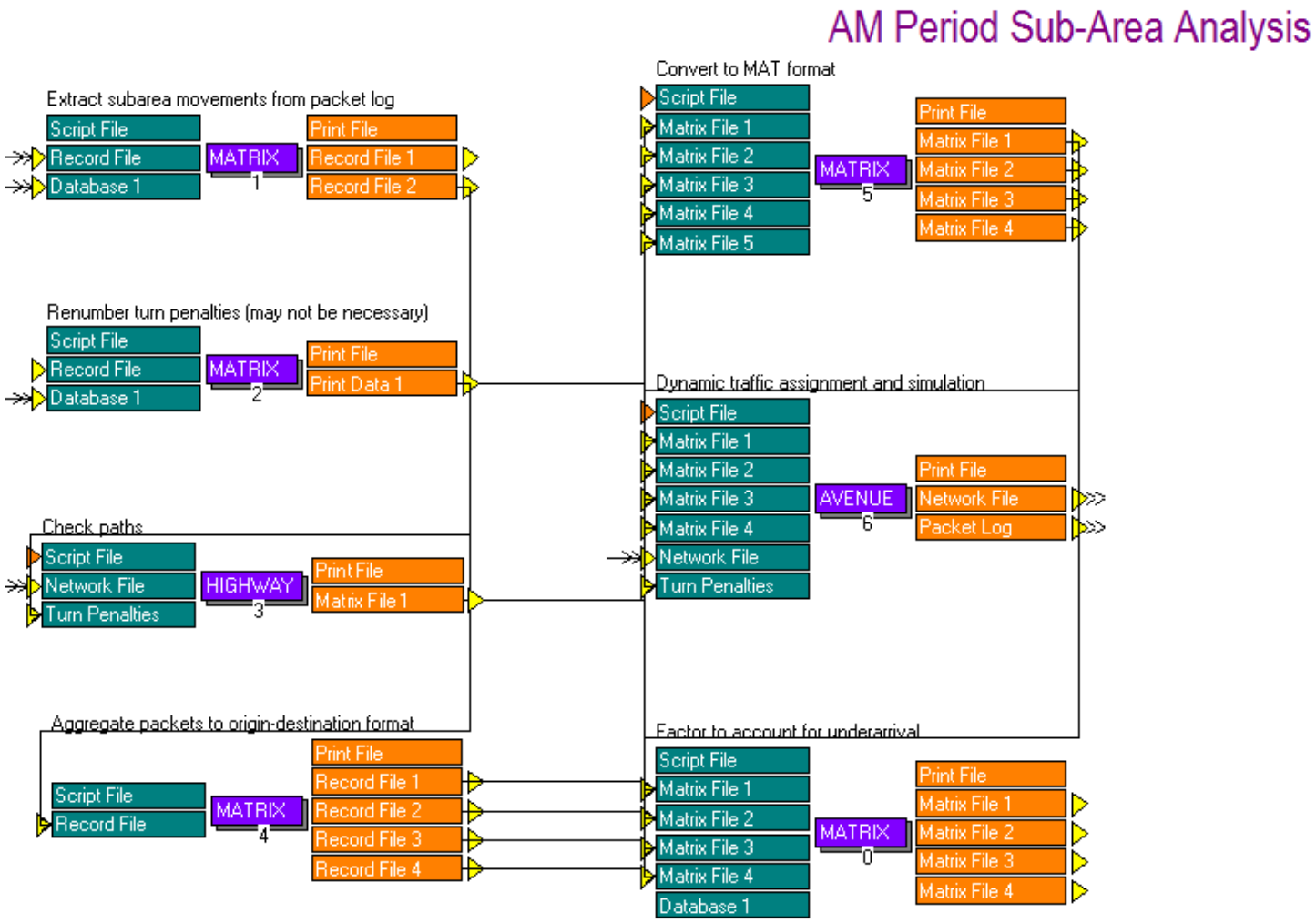
New (Citilabs) Subarea DTA App

- **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



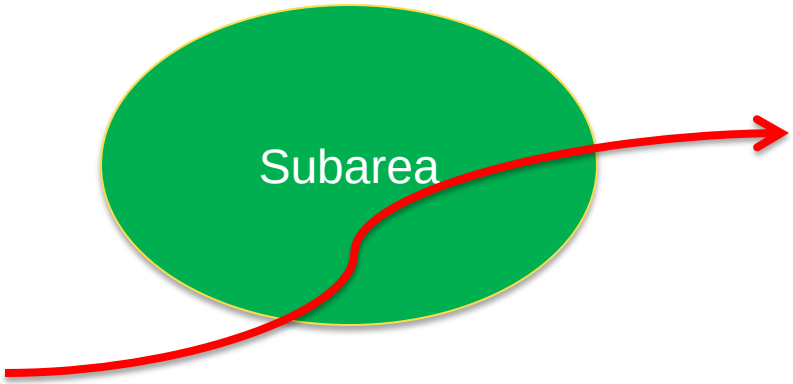
Implementation – Citilabs Subarea DTA App



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 – <u>In Progress</u>**
  - Heuristic
  - Optimization based techniques

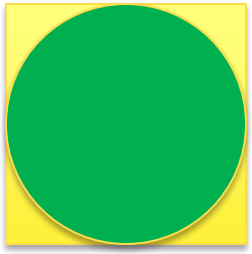
Applications

- **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

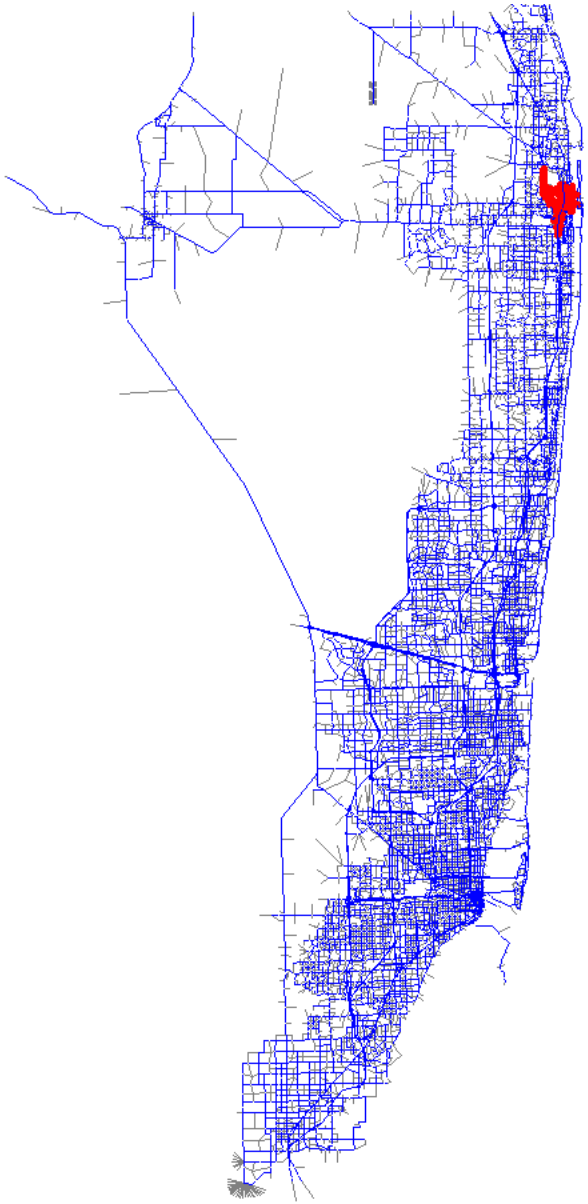


- **Our Context – Trip Tables by LU & TS**
  - Choose departure LU at random based upon TAZ level %s
  - Conditional on above, choose a random departure TS (%)
  - 6 LU – Residential, Retail, Finance, Government, Industrial
  - AM Peak – 30 min TS(6 segments)
- **Repeatability**
  - Seed the Monte Carlo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

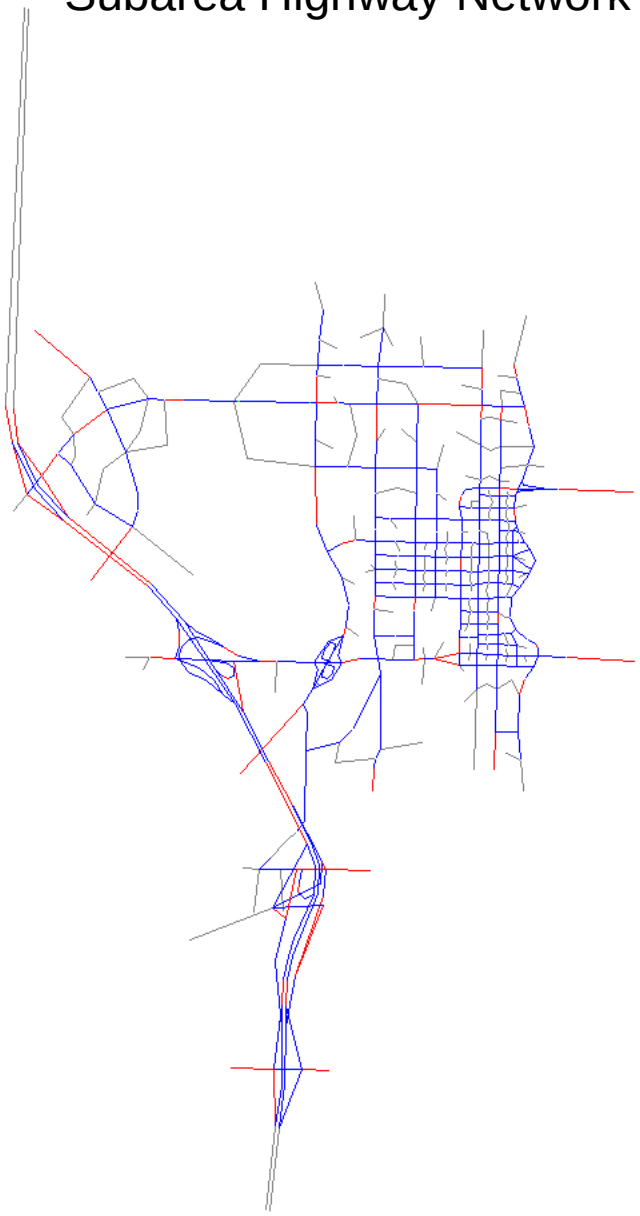
Subarea Analysis

- **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