

Iowa Standardized Model Structure (ISMS) Policy and Procedure Manual



Midwest Travel Model Users Group

Fall 2015 Meeting
Thursday November 19th, 2015



ISMS Update

- MTMUG/DOT Survey Results
- Mission Statement
- Goals/Objectives
- Architecture Survey Results
- Draft ISMS Model Architecture
- Input/Validation Data Summary (Working)
- Questions/Discussion

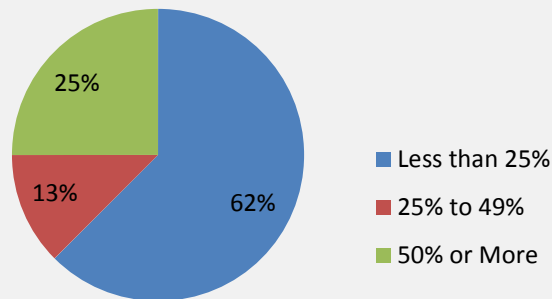
MTMUG Survey Results

1. Do you work for a public or private agency?

- All 9 MPO's responded
- One MTMUG At-Large response
- IowaDOT responded

2. Portion of time allocated to TDM?

**Percent of MPOs by Staff
Time Spent Modeling**



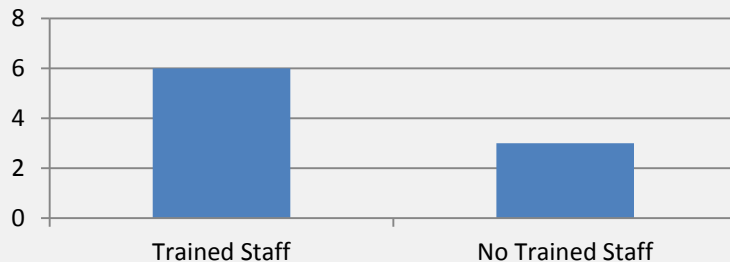
- DOT has 4 staff at nearly 100%

MTMUG Survey Results

3. Level of proficiency in TDM?

4. Problems in use of TDM?

Number of MPOs with Trained Staff



Issues Faced by MPOs

- Employment Data Accuracy
- Communication
- Policy Issues Related to Datasets
- Model Compatibility with Version 7.0 of TransCAD
- Turning Movement Data Not Incorporated
- Limited Time and Knowledge to Refine Model
- File Management
- Ease of Running Reports

MTMUG Survey Results

5. Agency's role in model develop/application?
 - 4 of 9 MPO's state they have a role in SE data
 - 4 indicated interest in more involvement
6. Process for potential project develop/eval?
 - 8 of 9 use model
 - Use of TDM varies by MPO; multiple scenarios or each project individually; LOS or benefit/cost.

MTMUG Survey Results

7. Process for HH/EMP data and projections?
 - Census widely used
 - Future SE developed in various ways
 - Several MPO's noted future SE uses community feedback or land use planning docs.
8. How often is model data updated?
 - Typically 5 years
 - 2 MPO's perform intermediate updates

MTMUG Survey Results

9. What survey data is used?

- Sources include NHTS, CTPP, on-board surveys, Census data, Bureau of Labor Statistics

10. Sources of traffic count data?

- Typically use DOT and some local muni counts.

MTMUG Survey Results

11. Current uses of TDM and data?

- Project selection
- LRTP development and scenario analysis
- Sensitivity testing
- EJ analysis
- Peak period analysis
- Accessibility contours
- Travel time analysis
- Forecasting
- Traffic count data and turning movements
- Congestion indicators
- STP Evaluation
- TIP Evaluation
- New development proposals/new road scenarios
- Fire department response time maps
- Traffic Impact Studies
- Develop traffic growth rates

12. Future uses of TDM?

- 2 MPO's-evaluate projects in planning docs.
- 2 MPO's-transit planning
- Interest in performance measures, congestion management and land use/trans scenarios

MTMUG Survey Results

13. Functionalities to aid your model?

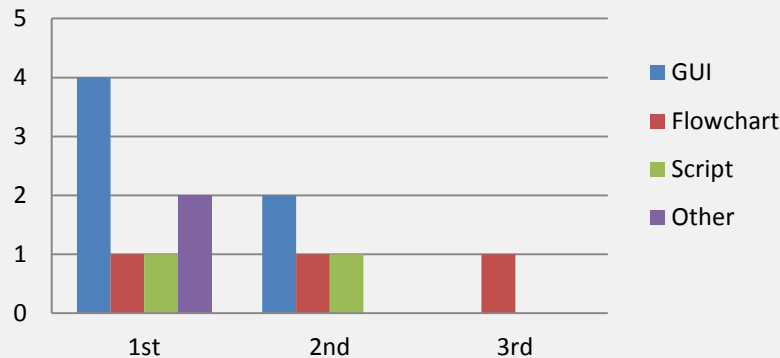
- Multimodal data, modal data, more scripting, intermediate years, peak hour, smaller zone data

14. Use of intermediate year models?

- Several MPO's have intermediate years
- Those that don't indicated use to include:
 - Evaluate fiscal constraint process
 - Sensitivity testing
 - Scenario planning
 - Peak hour forecasting
 - Project prioritization

MTMUG Survey Results

15.How do you prefer to interact with TransCAD?



16.Tech/Policy Board inclusion in TDM process?

- Varies by MPO:
 - no involvement
 - Review/approval of SE
 - Approval of all steps in TDM

MTMUG Survey Results

17. Educate member jurisdictions on TDM use?

- Typically done with LRTP process
- Several MPO's interested in more education

18. Training/resources to improve use of TDM?

- Documentation
- Interpretation
- Scripting
- Basic scenario testing

MTMUG Survey Results

19.How will you benefit from ISMS?

- Increased consistency between MPO's
- Improve documentation, data accuracy and improved quality

20.How can TDM in Iowa be improved?

- Interest in on-call consultant assistance

21.Additional comments

- Appreciation of Iowa DOT's assistance
- Continued progress report on ISMS

Mission, Goals and Objectives

Mission Statement

Provide a consistent comprehensive and standardized framework of best practices for the development and application of travel demand modeling and traffic forecasting tools. The tools will facilitate collaborative use in planning and designing transportation systems and facilities for the State of Iowa, promote sharing, and encourage continuing cooperation and good practice across the state.

Goals of ISMS

- institutionalize the use of travel demand models in the MPO planning and prioritization processes;
- increase technical capabilities and understanding of MPO staff with regard to travel demand model development and application;
- develop clear guidance and expectations with regard to the roles and responsibilities of travel demand modelers;
- achieve a consistent approach to travel demand modeling across the state of Iowa's 9 MPOs;
- implement ongoing development and maintenance practices to ensure continual readiness and currency of MPO travel demand models

ISMS Objectives

Function	Importance to MPO	Importance to DOT
Long range transportation plan development	Critical	Important
System-wide performance assessment	Important	Important
Traffic (auto and truck) forecasting	Important	Critical
Transit forecasting	Desired	Some Value
Freight analysis	Some Value	Important
Land use testing	Important	Important
Corridor Planning	Desired	Important
Environmental Justice analysis	Desired	Desired
Air/Noise analysis	Desired	Desired
Accessibility analysis	Some Value	Some Value
Project Prioritization	Important	Important
Road Pricing/Toll Studies	Limited Value	Limited Value
Campus Planning	Important	Desired
Analysis of High Schools	Desired	Some Value
Parking Studies	Desired	Some Value

Model Architecture

Standardize Model Architecture

- Architecture Defined:
 - Model/Data Organization
 - Model Structure
 - TransCAD Implementation
- Current Architecture Survey
 - Other DOTs/MPOs
 - Multiple (4) Options to Consider
- Recommended Model Architecture
 - List of Desired/Required Features
- Scenario Testing to Evaluate Options

Model Architecture Survey

Model Architecture Examples:

Large MPOs

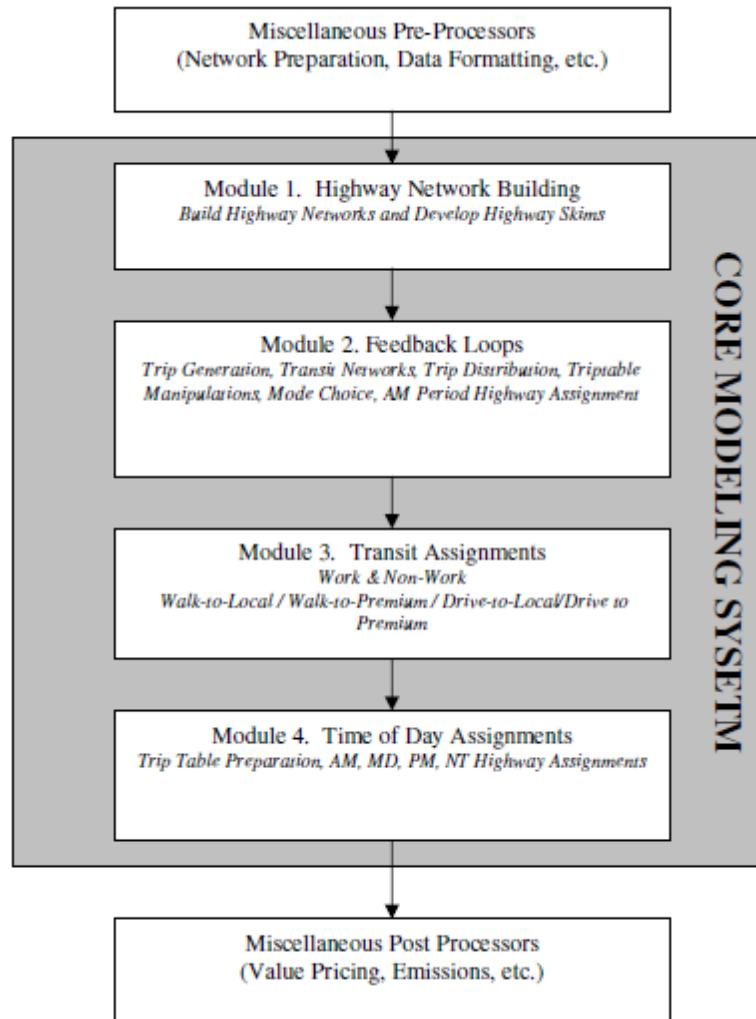
- Atlanta Regional Commission (ARC)
- Chicago Metropolitan Agency for Planning (CMAP)
- Maricopa (Phoenix) County Association of Governments (MAG)
- Metropolitan Washington (DC) Association of Governments (MWCOCG)
- Metropolitan (Minneapolis/Saint Paul) Council (Met Council)
- North Central Texas (Dallas Council of Governments (NCTCOG)
- Southwestern Pennsylvania (Pittsburgh) Commission (SPC)
- Puget Sound (Seattle) Regional Council (PSRC)
- San Diego Association of Governments (SANDAG)

Model Architecture Examples: Medium/Small MPOs

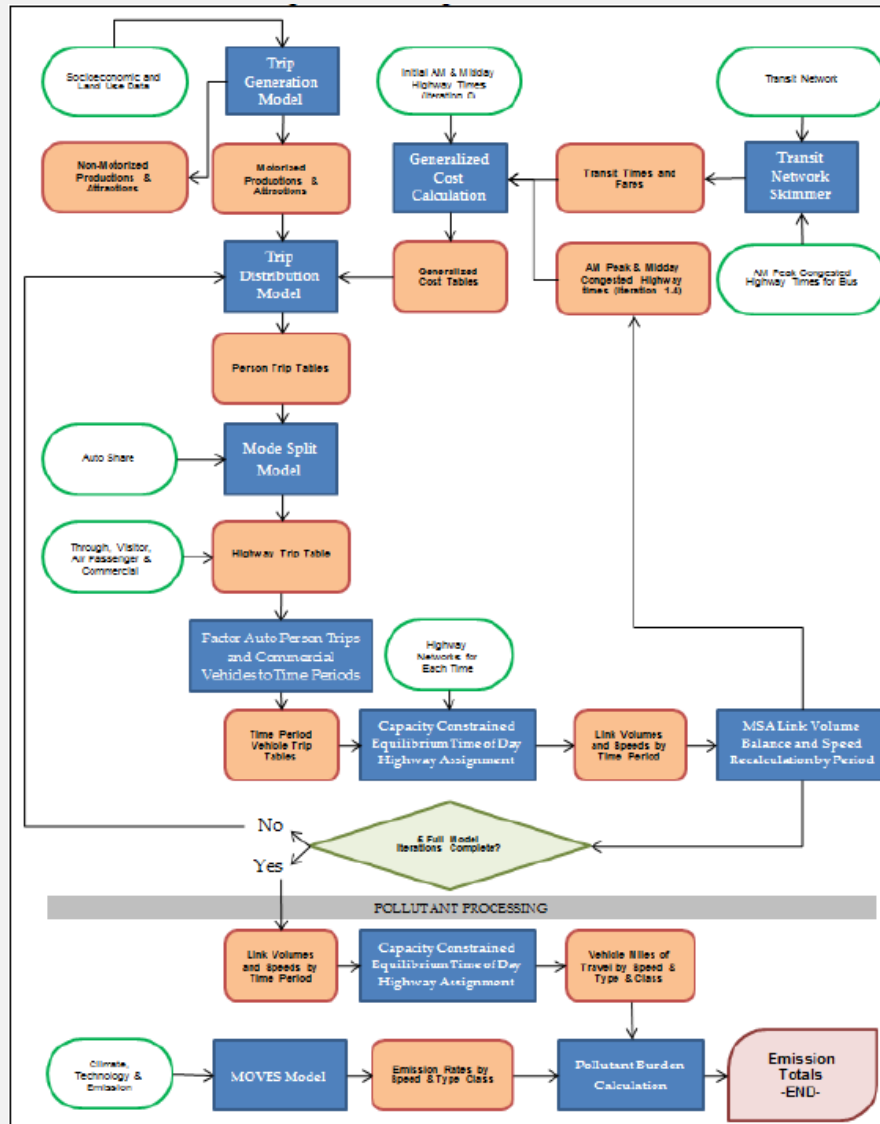
- Berks County, Pennsylvania
- Corridor (Cedar Rapids) MPO
- Fredericksburg, Maryland
- Hagerstown, Maryland
- Lancaster County, Pennsylvania
- Loudon County, Virginia
- Lynchburg, Virginia MPO
- Metropolitan Area Planning Agency (Omaha/Council Bluffs) (MAPA)
- York County, Pennsylvania

Large MPOs

ARC

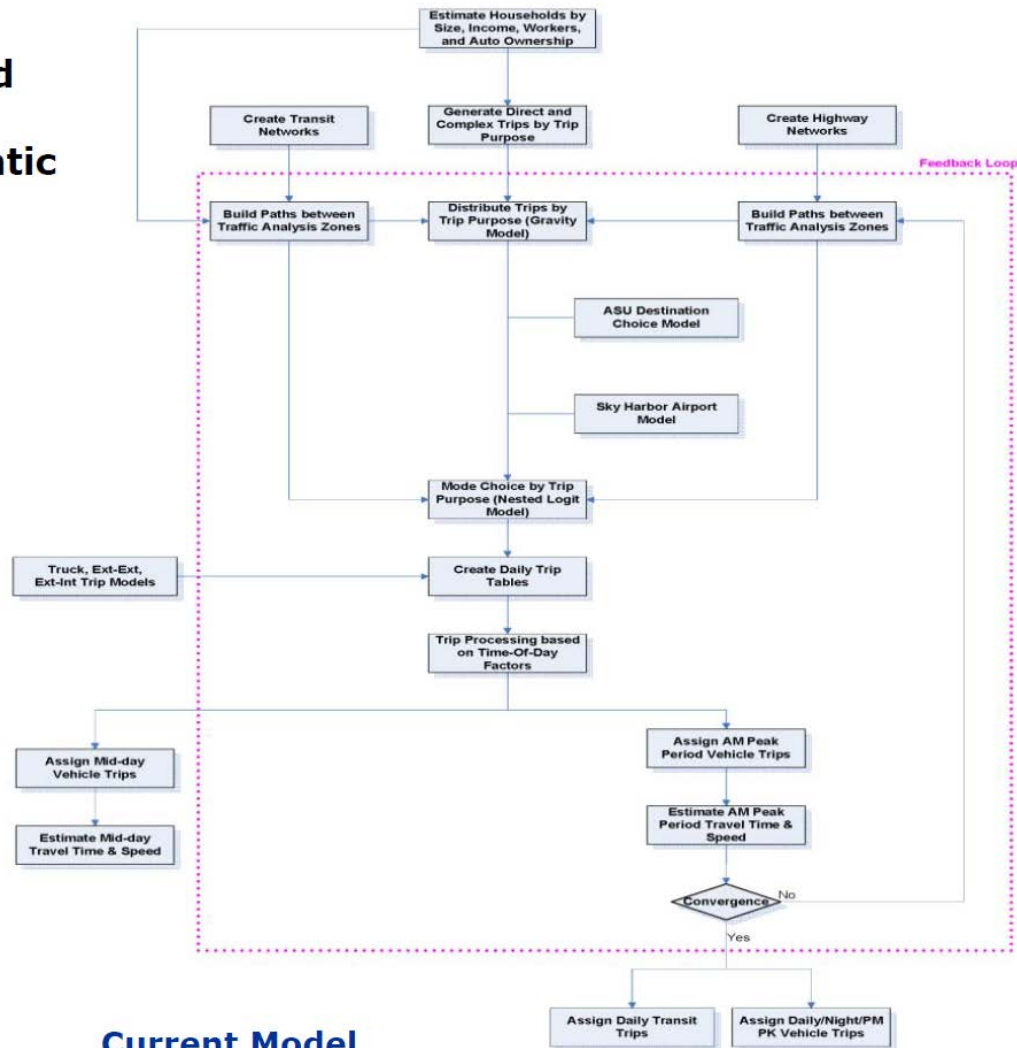


CMAP



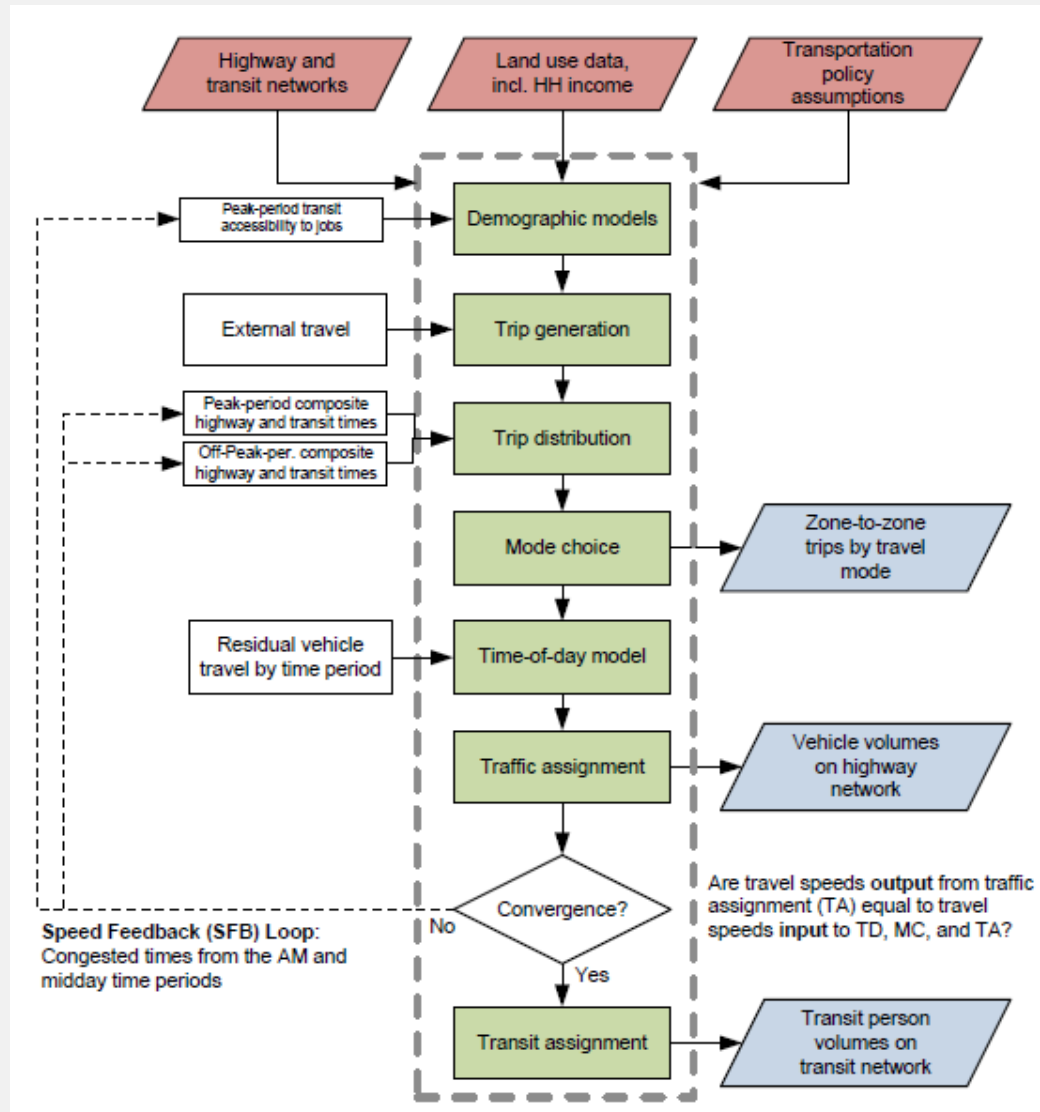
MAG

Travel Demand Model Schematic

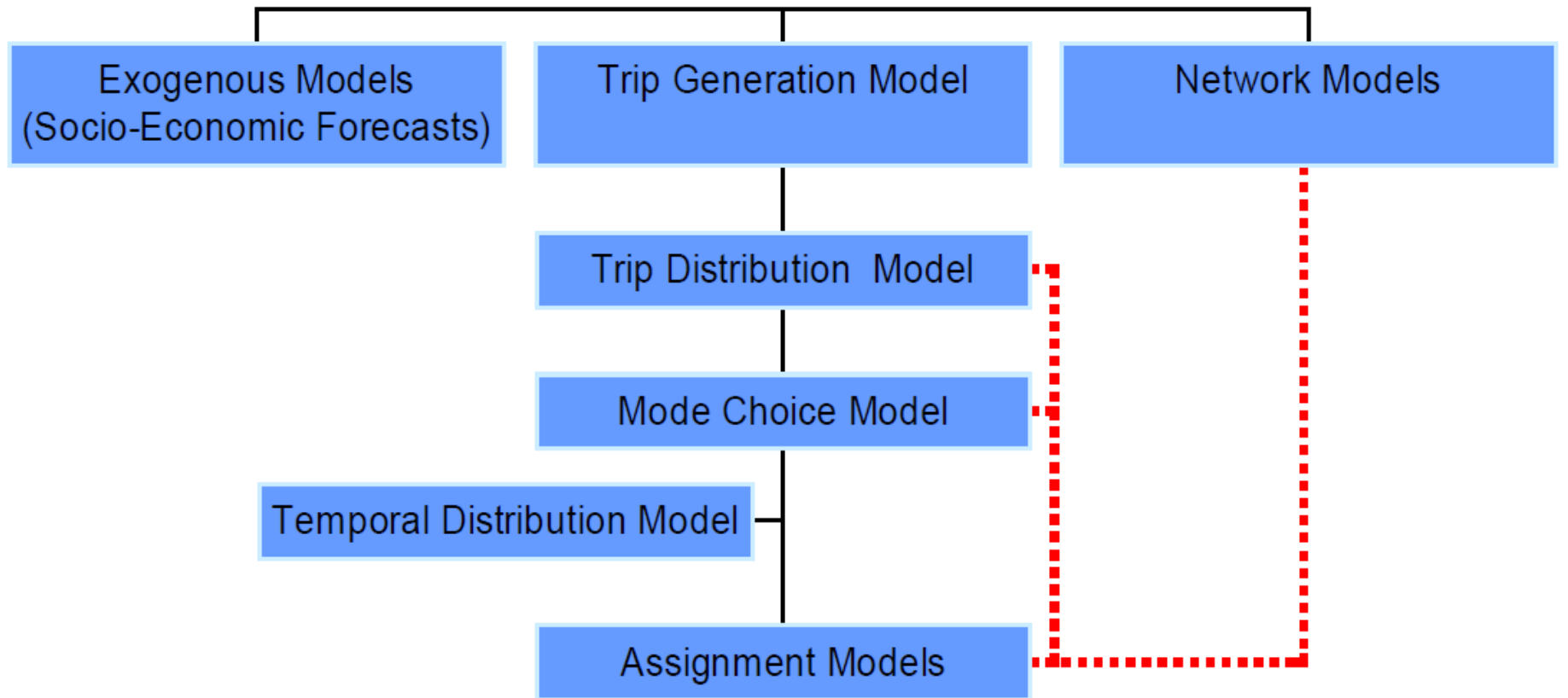


Current Model

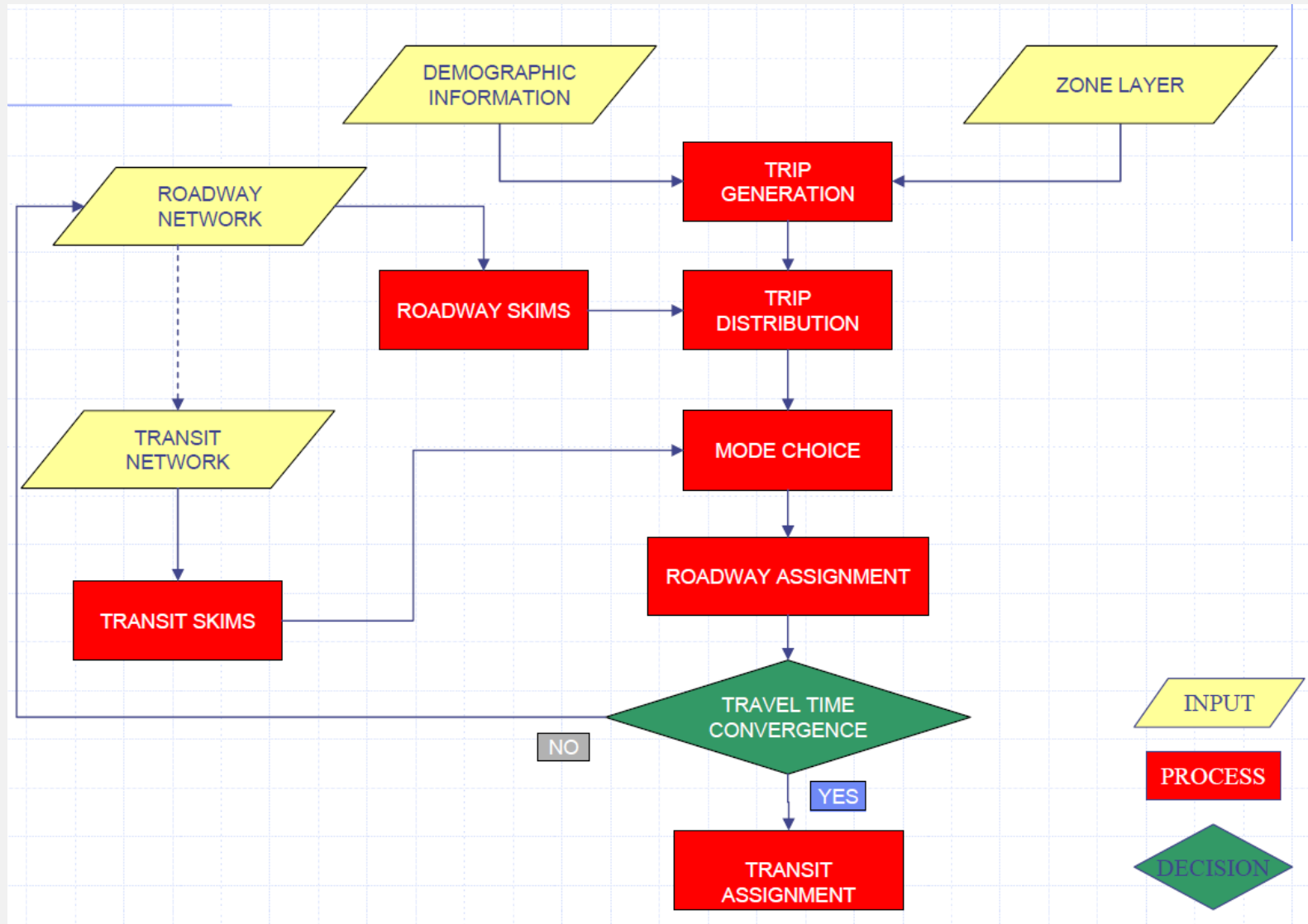
MWCOG



Met Council

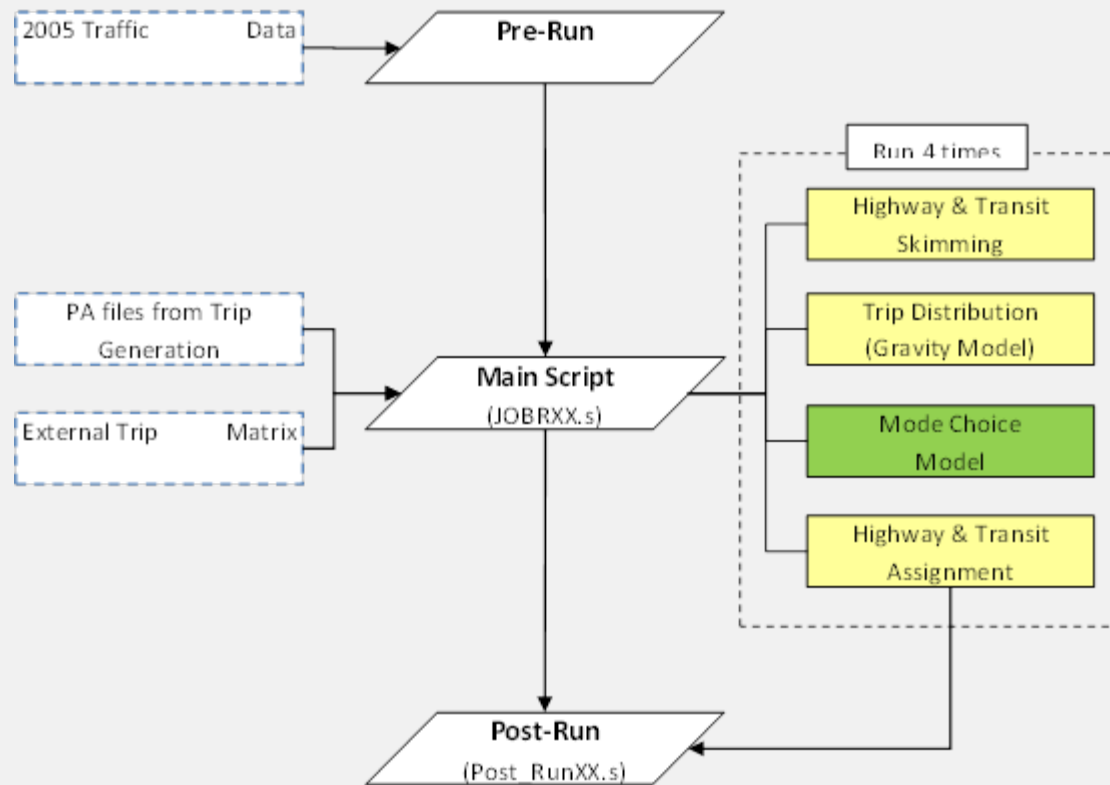


NCTCOG

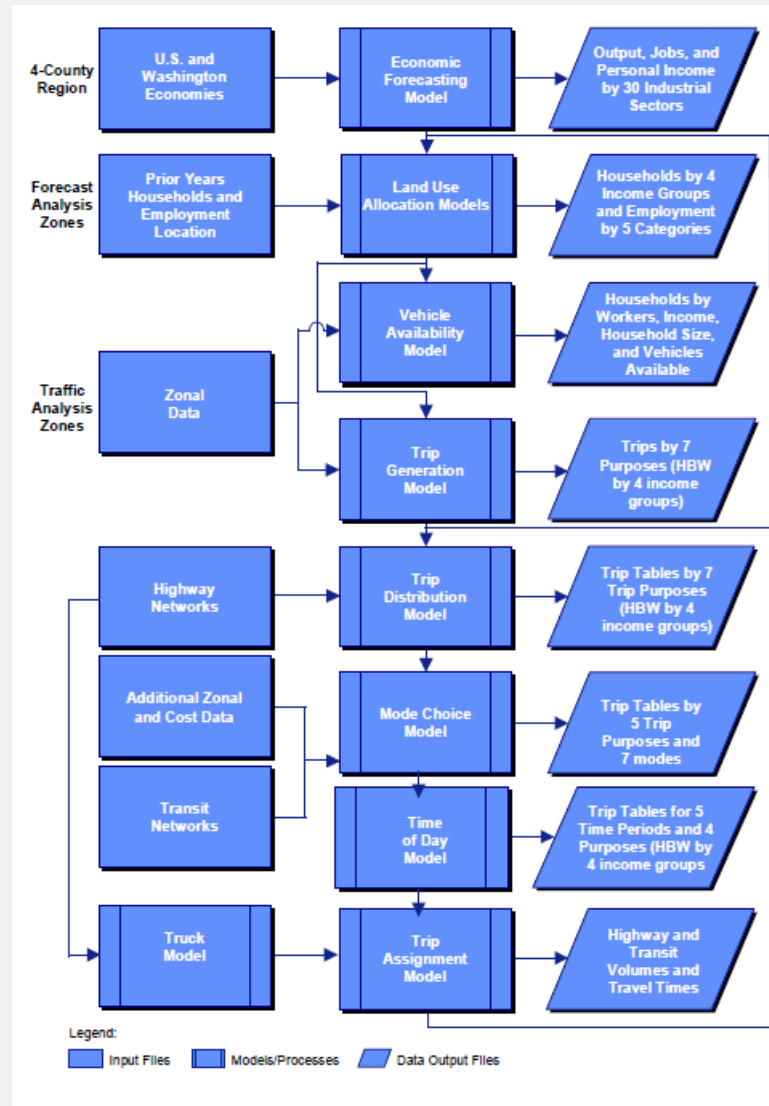


SPC

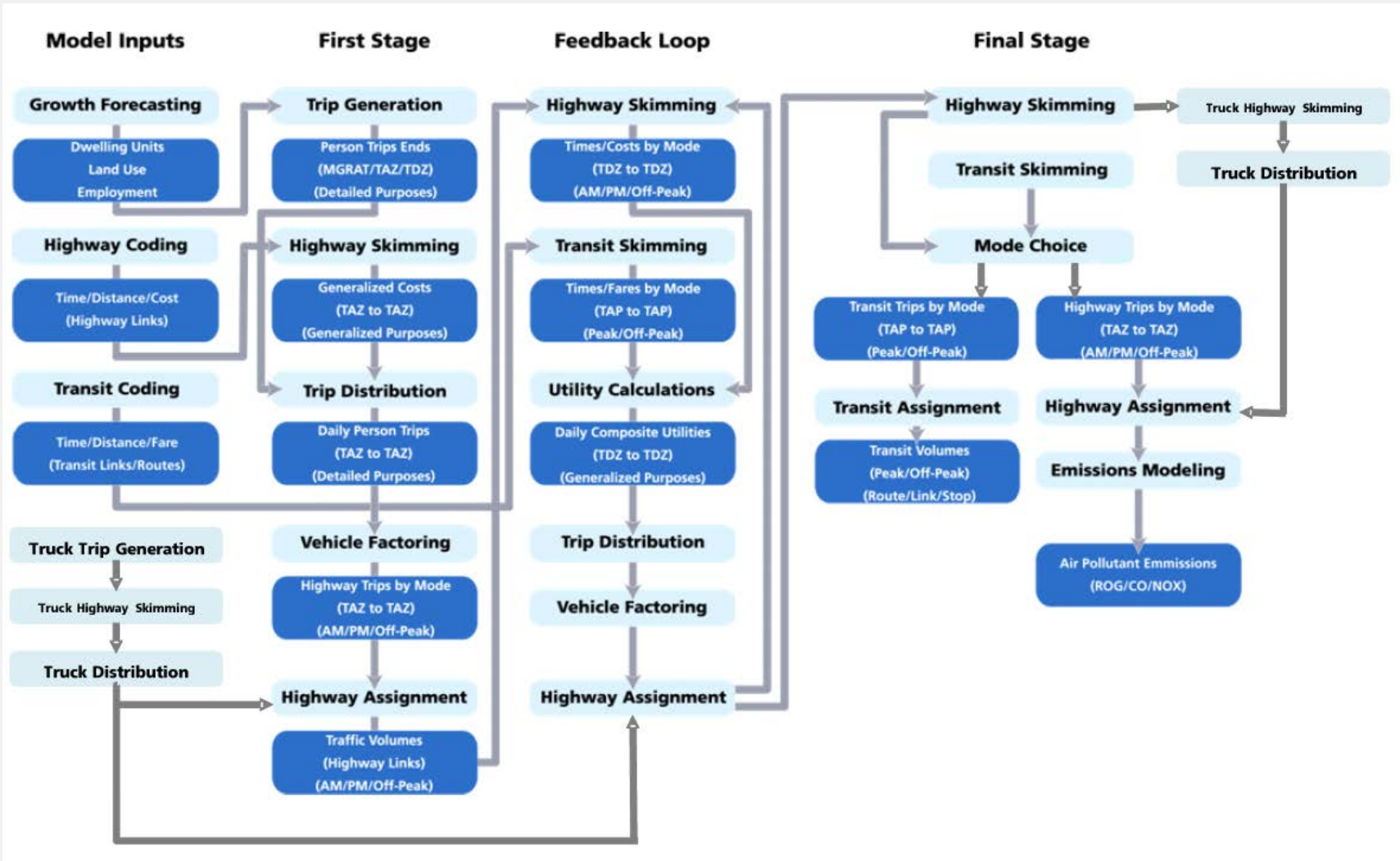
SPC Travel Model Flowchart



PSRC

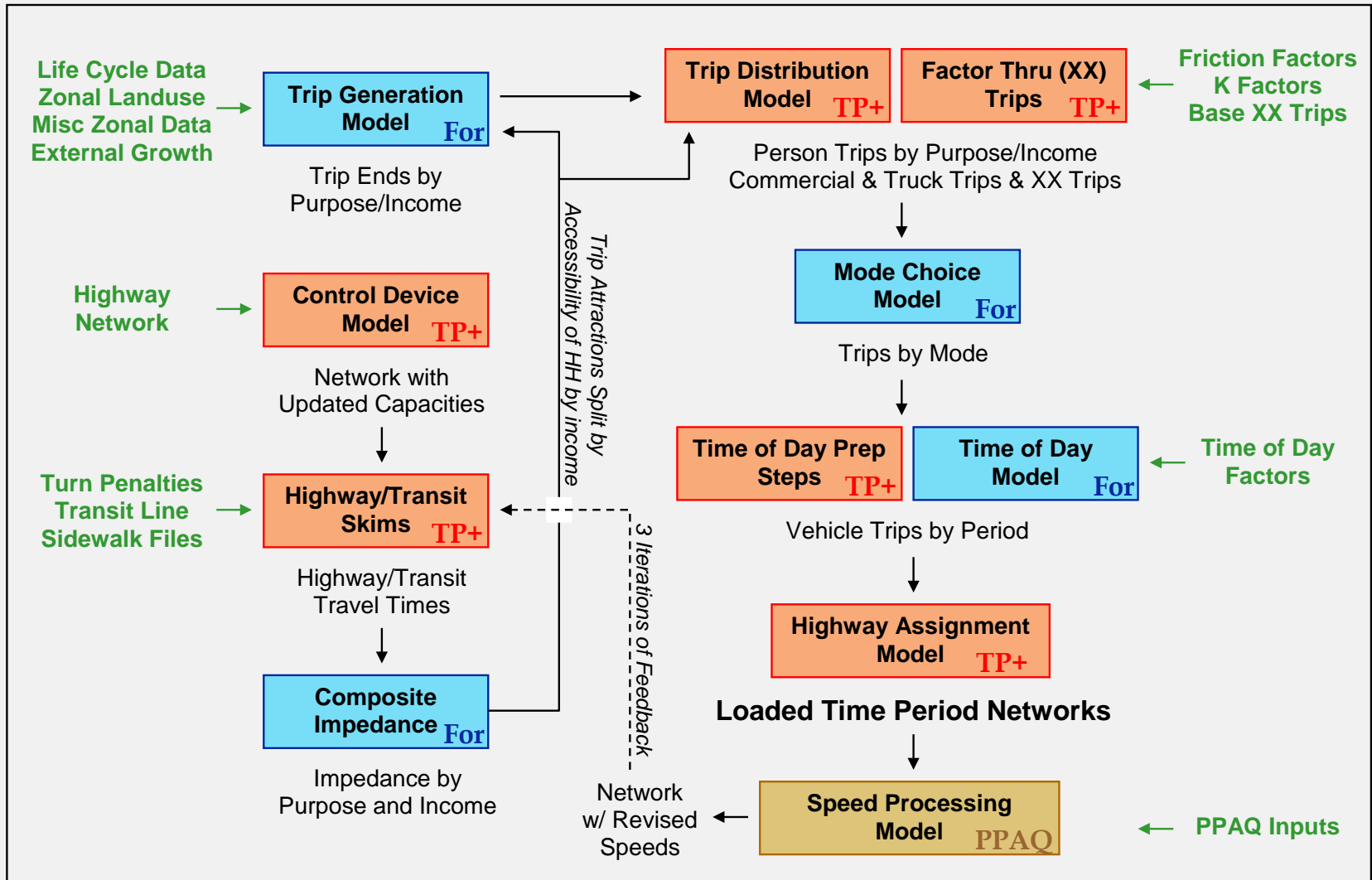


SANDAG

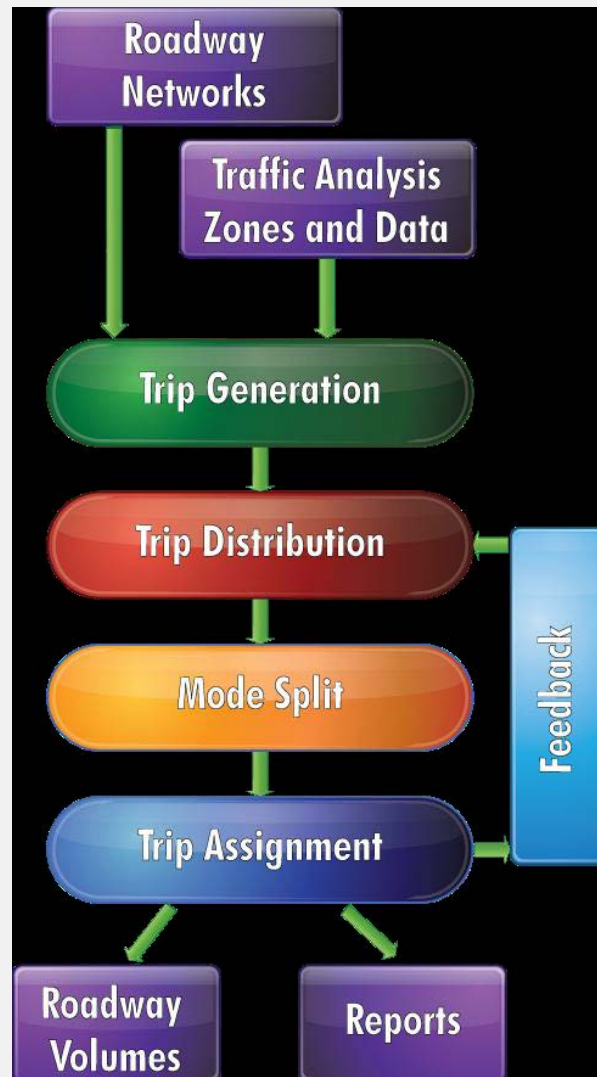


Small/Medium MPOs

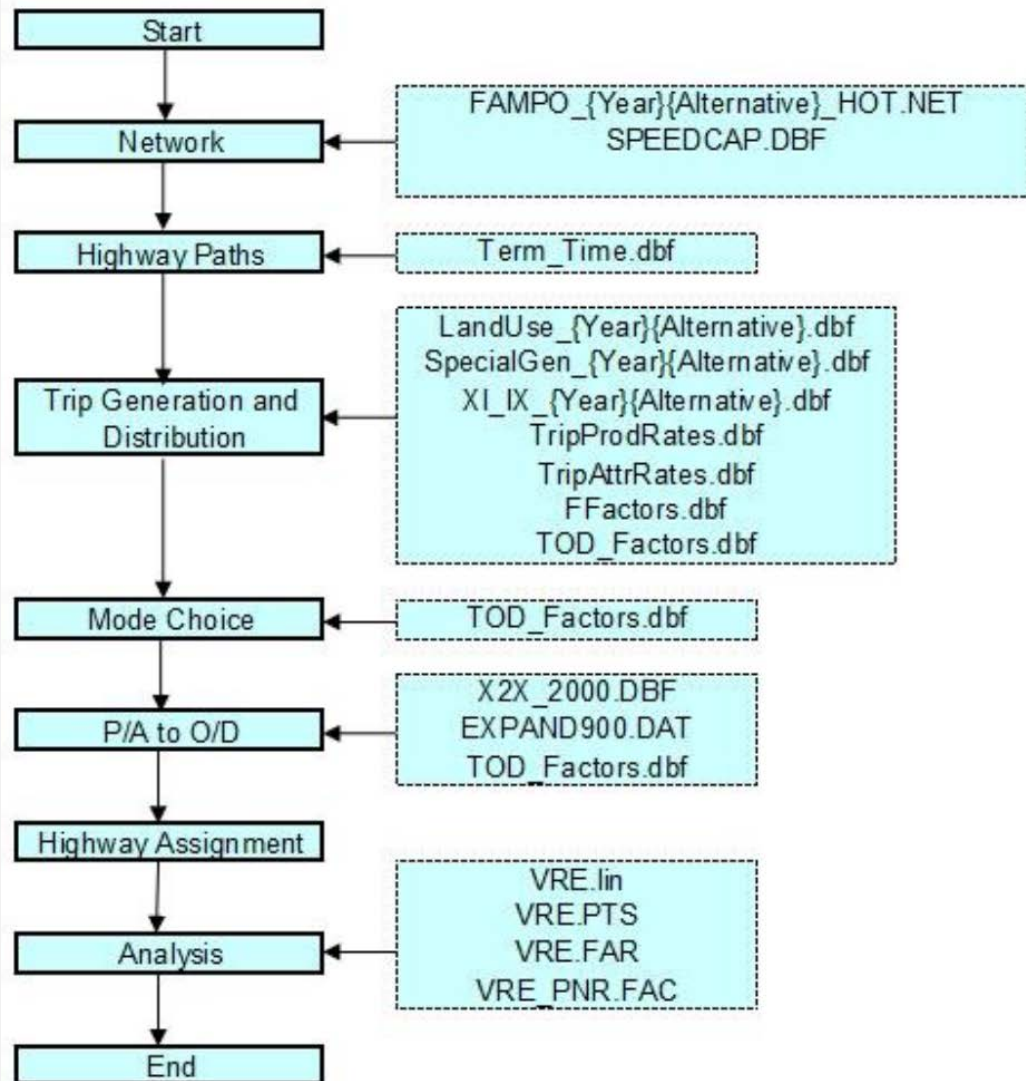
Berks County, PA



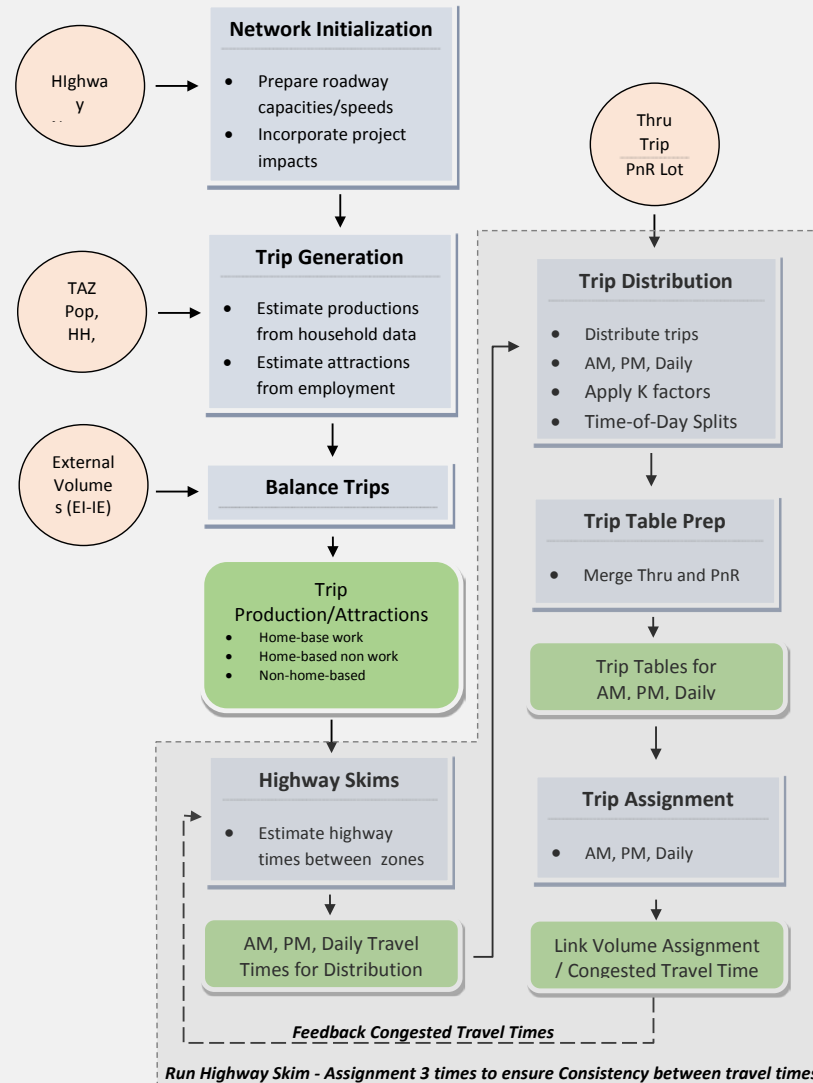
Corridor MPO



Fredericksburg, MD



Hagerstown, MD



Loudon County, VA

Batch Run Process - Loudoun.bat

Loudoun County Model

Step 1
Build Highway Network

LDZBLD.S
(Page 1)

Step 2
Create Highway Skims

LOVSKM.S
(Page 2)

Step 3
Split Highway Skims by
Income Level

LDIMPBS.S
(Pages 3-4)

Step 4
Trip Generation

TRIPGEN.S
(Page 5)

Step 5
Trip Distribution

TRPDSTBS.S
(Pages 6-12)

Step 6
Simplified Mode Choice Process

LDMC2.S
(Page 13)

Step 7
Highway Trip Table by the Time
of Day

PSTMCALL.S
(Page 14)

Step 8
Adding Other Trips

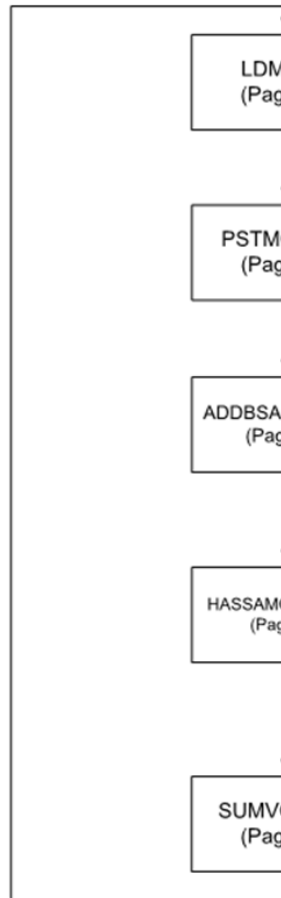
ADDBSAMPPOP.S
(Page 15)

Step 9
Highway Trip Assignment

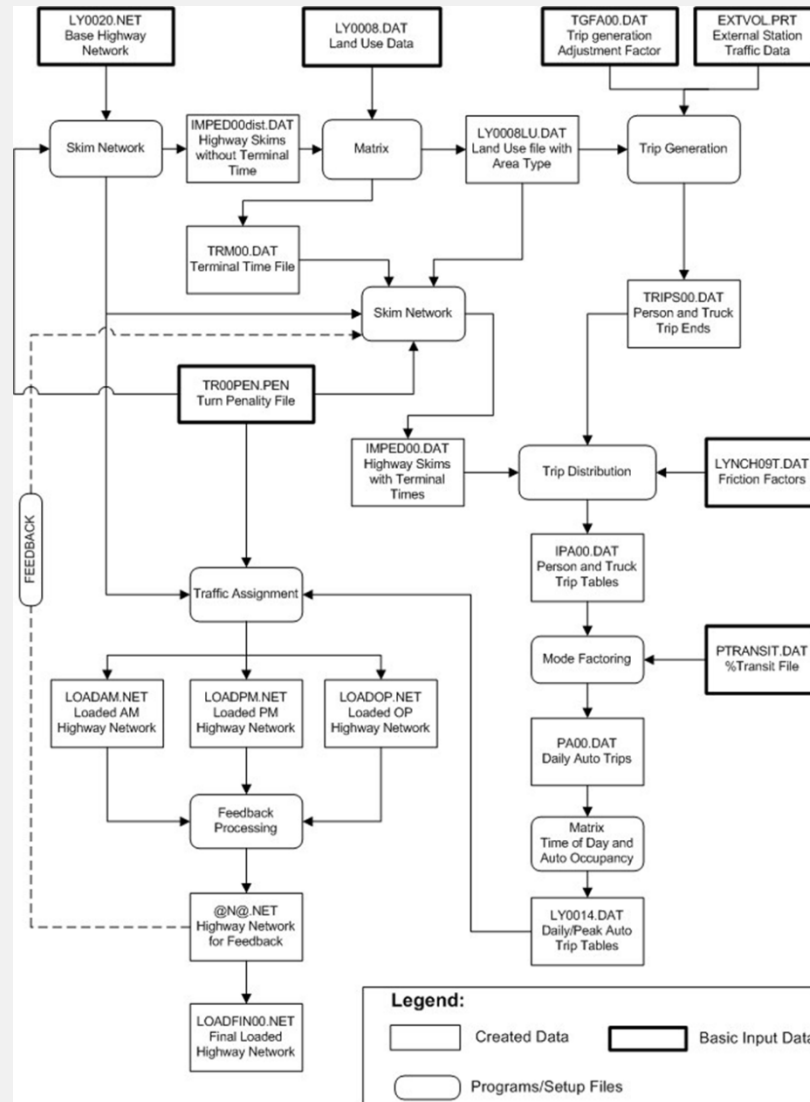
HASSAMOPPMBS.S
(Page 16)

Step 10
Summary of Assigned Volumes

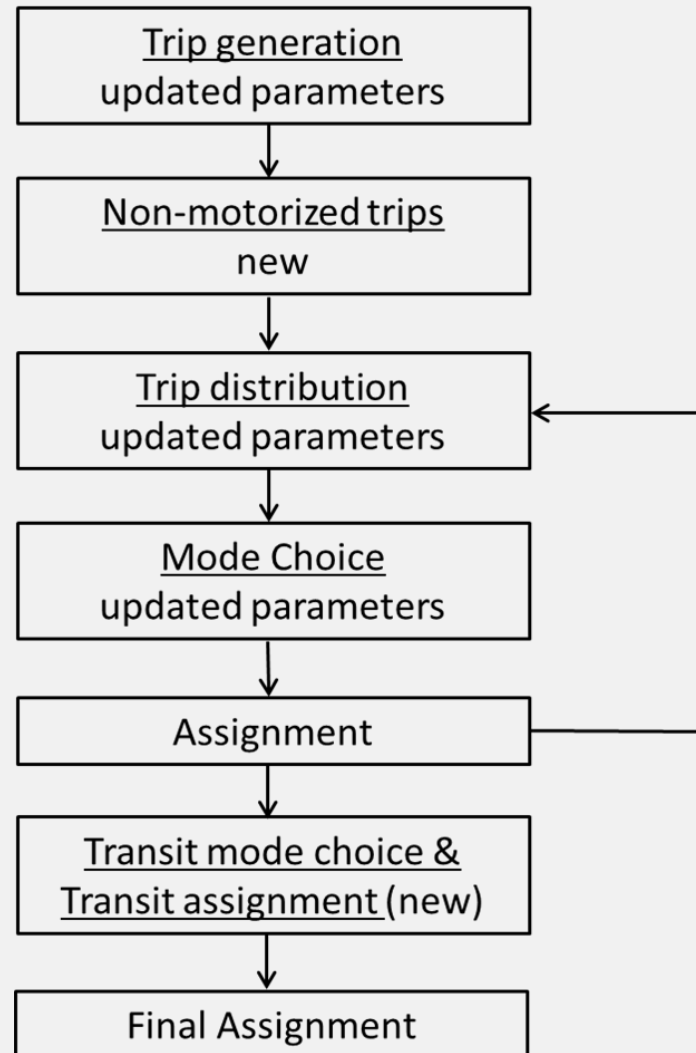
SUMVOLBS.S
(Page 17)



Lynchburg, VA



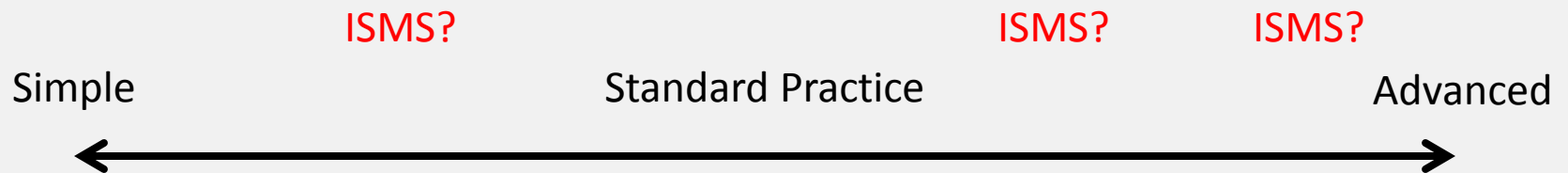
MAPA



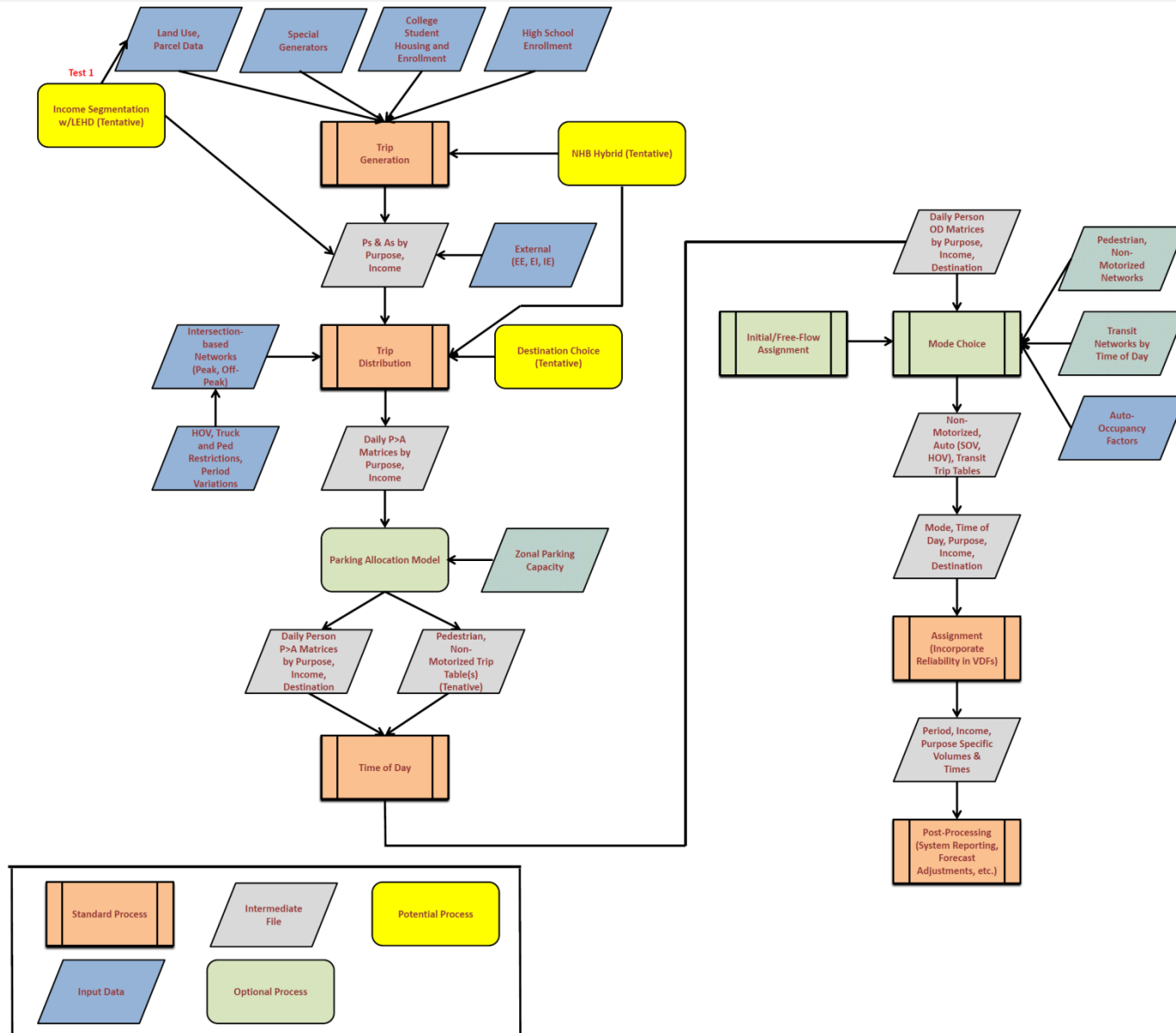
Draft Model Architecture

Draft Model Architecture

Spectrum of Model Complexity



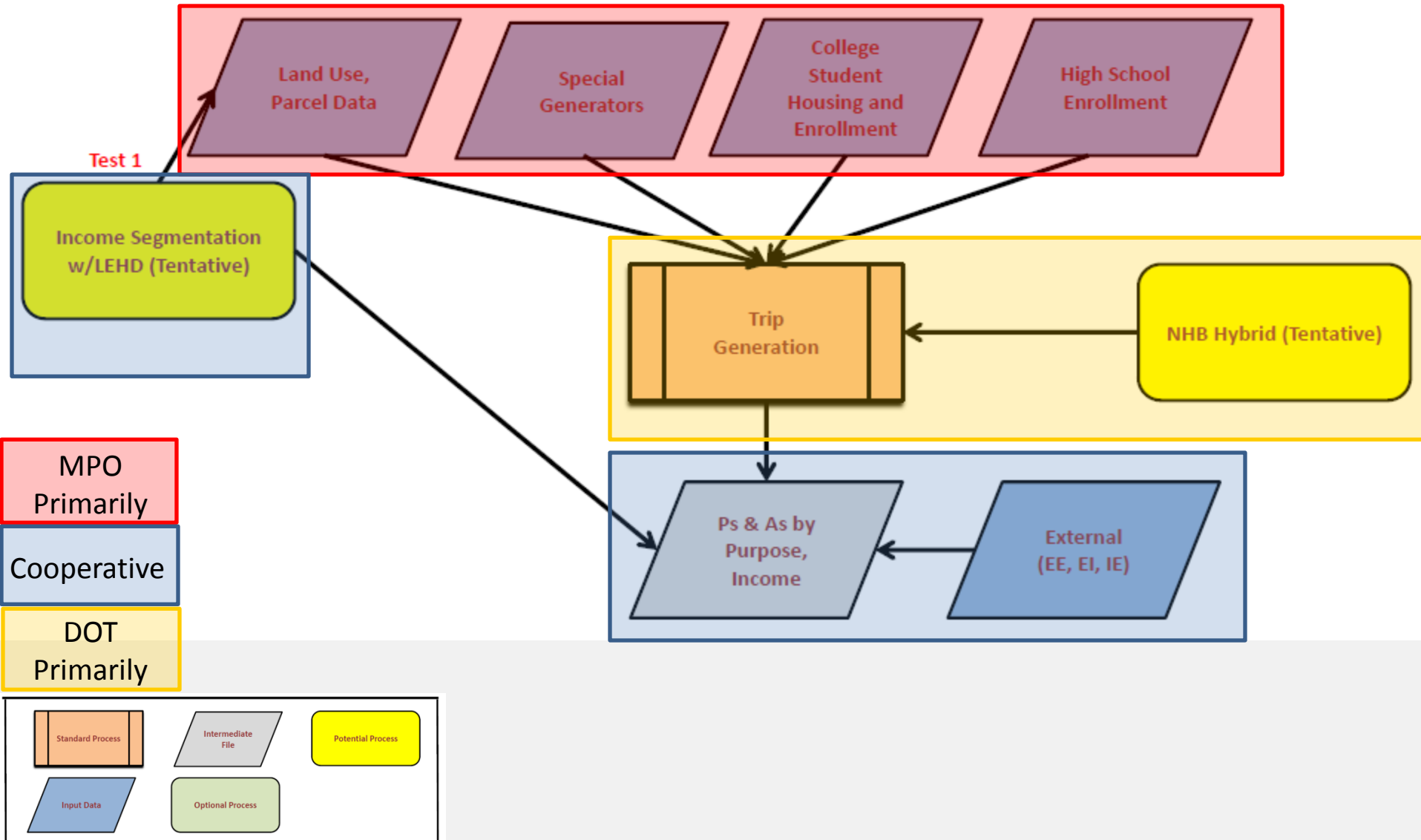
Draft Model Architecture



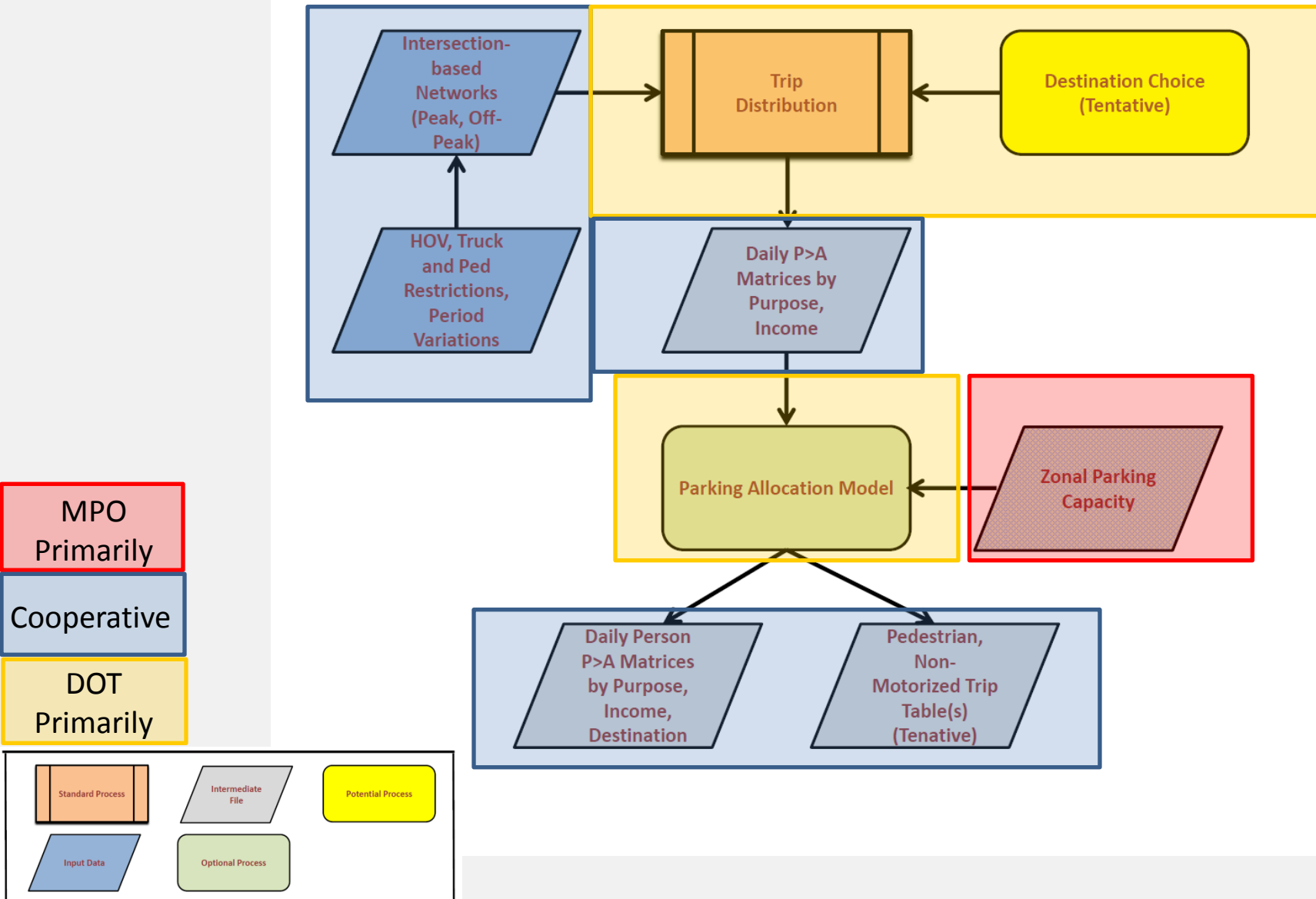
Draft Model Architecture

- Roles and Responsibilities
 1. MPO Develop, Review & Approve, DOT Assist
 2. Cooperative MPO & DOT Function, MPO Approve
 3. DOT Led Effort, MPO Review and Approve

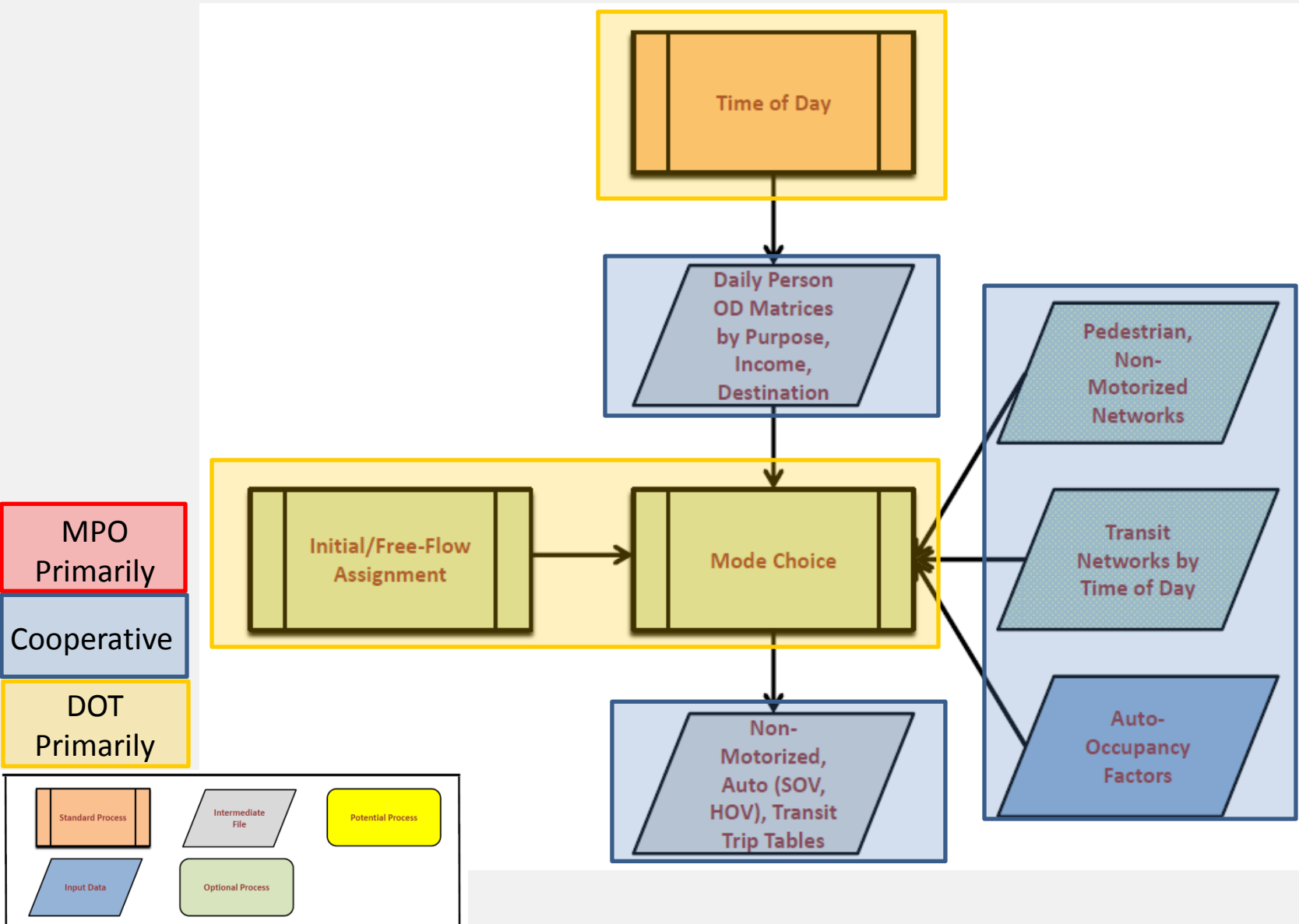
Draft Model Architecture (1)



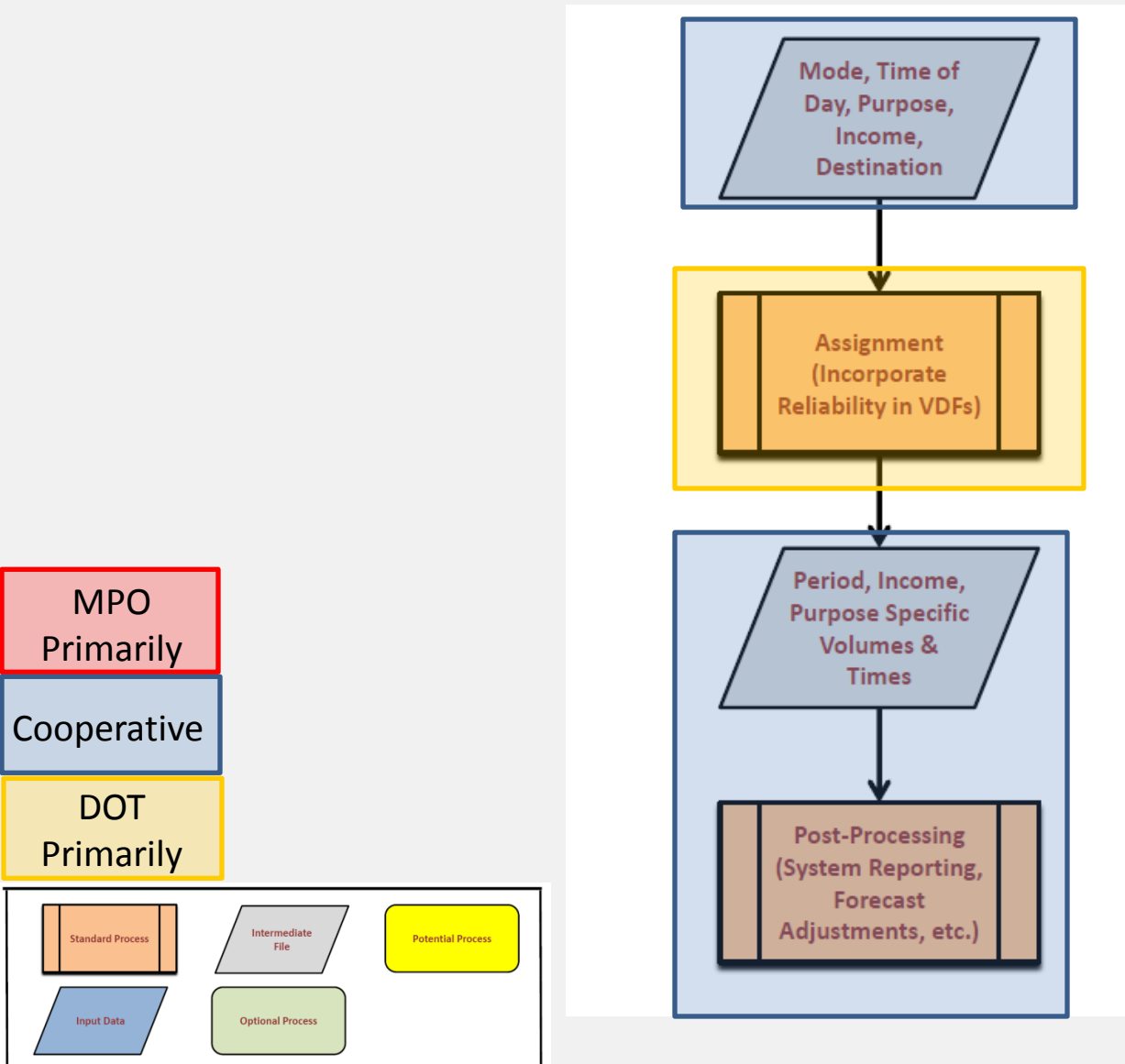
Draft Model Architecture (2)



Draft Model Architecture (3)



Draft Model Architecture (4)



Input/Validation Data Summary

Data Sources (Working)

- Developing guidance on data sources for direct model inputs and model validation.
- Directory includes:
 - data source location and agency,
 - description of data,
 - attributes of interest,
 - recommended use and
 - steps for processing

Data Sources (Working)

Data Type	Data Set	Data Source	Agency	Description	Attributes Used	Steps for Processing Data	Notes
Housing	Census Block	http://www.census.gov/data/data-tools.html	US Census Bureau	Household data collected by US Census Bureau Content hidden.	Shapefile with data loaded; Housing10: total households Pop10: total population	Data ready for incorporation into TAZ data	
		http://www.iowadatecenter.org/2010-block-data	Iowa Data Center (by county)		Excel file; Total: total households	Content hidden.	Content hidden.
	ACS/ Census Block Group	https://www.census.gov/geo/maps-data/data/tiger-data.html 2009-2013 Detailed Tables	US Census Bureau	Household data collected by US Census Bureau through the American Community Survey (ACS) Content hidden.	Geodatabase with 21 tables. Specific attributes of interest include: Content hidden.	Content hidden.	Content hidden.
	ACS/ Census Tract	https://www.census.gov/geo/maps-data/data/tiger-data.html 2009-2013 Detailed Tables	US Census Bureau	Content hidden.	Geodatabase with 29 tables. Specific attributes of interest include: B26001e1: Group quarters population.	Content hidden.	
	PUMS			Public Use Microdata Sample (PUMS) is data for geographic areas of at least 100,000 people called Public Use Microdata Areas (PUMA).	Data is similar to ACS data at the Census Block Group and Tract level, but at too large of geographic extent to provide detailed data for travel demand model development within the model area.		
Employment	ES202		Iowa Workforce Development				
	Parcel Data InfoGroup		Iowa Counties InfoGroup				
	LEHD Resident and Worker Data	http://lehd.ces.census.gov/	US Census Bureau	Longitudinal Employer-Household Dynamics provides data on work location and housing location of income-specific groups	CSV files: Content hidden.	Content hidden.	
	LODES	http://lehd.ces.census.gov/	US Census Bureau	Longitudinal Employer-Household Dynamics Origin-Destination Employment Statistics (LODES) provides worker flows by income group	CSV file: Content hidden.	Content hidden.	"Content hidden.
Travel Characteristics	Journey to Work	https://www.census.gov/hhes/commuting/data/commutingflows.html Table 3 2009-2013 ACS Data	US Census Bureau	Journey to Work data by County and Minor Civil Division; worker flows from residence to workplace.	Excel spreadsheet: Content hidden.	Content hidden.	Content hidden.
	NHTS-HH	http://nhts.ornl.gov/download.shtml	NHTS	Content hidden.	CSV file: Content hidden.	Geocode HH table to TAZ	
	NHTS-Person	http://nhts.ornl.gov/download.shtml	NHTS	Content hidden.	Content hidden.	Join Person table to HH table	
	NHTS-Vehicle	http://nhts.ornl.gov/download.shtml	NHTS	Data relating to each of the household's vehicles. Content hidden.			
	NHTS-Trip	http://nhts.ornl.gov/download.shtml	NHTS	Content hidden.	CSV file: Content hidden.	Content hidden.	
	Transferability	http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/subject_areas/national_household_travel_survey/index.html	NHTS	Content hidden.	Text file at Census Tract level: Content hidden.	Join to Census Tract geography	Content hidden.
	Trip Chaining		NHTS	Dataset from 2009 NHTS that identifies how Tours are flagged in the data			Data not directly applicable
Network	Travel Time		INRIX, HERE				
	GIMS	http://www.iowadot.gov/gis/downloads/default.aspx	IowaDOT	Contains road centerlines, structures and rail crossing data, along with a variety of associated attributes.			
	Aerials						