State-of-Practice: Temporal Assignment

**A Flowchart of State of Practice**

**Freight Demand Models**

- **Generation** ➔ **Distribution** ➔ **Mode Choice**

  - Annual Commodity OD Flows in Tonnage

  - Convert Annual Tonnage Flows to Annual Truck Trips Using Payload Factors

**Temporal Assignment**

- Weekday Daily Truck Trip = Annual Total Truck Trips / 306
- Weekend Daily Truck Trip = Weekday Daily Truck Trip × 0.44

**Network Assignment**

**State of Practice**

- Changes are linearly mapped to daily flows.

**Our Model**

- Sensitive to policy changes such as fuel pricing and land use rezoning.

**Fixed Factors**

- Annual Flows

**Supplier Selection Module + Inventory Simulation Module**

- Annual Flows

**Day of the Year**
Inventory-based Freight Microsimulation

- Convert annual commodity flows to daily values using the concept of EOQ inventory model.
Implementation Challenges

Firm Synthesis
- 58 CA Counties
- 14 Commodity Groups
- 900K Firms
- Solve A Quadratic Programming Problem of 900K Variables and 812 Linear Constraints

Supplier Selection Module
- 5 FAF Zones
- 14 Commodity Groups
- 12 Firm Classes
- Solve A Linear Programming Problem of 705.6K Variables and 364 Linear Constraints

Inventory Simulation Module
- Simulate 900K Firms’ Inventory Decision-makings of 365 Days

Parameter Calibration
- Calibrate the Inventory Holding Cost of 840 Firm Groups Using Genetic Algorithm

Model Validation
- 2007 Model Base Year
- Validate in Year 2002/2010