



# Modeling 101

## *Freight Truck Model*

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Metro's new Freight Model replaces the current trip-based truck model that utilizes fixed commodity flows with a truck tour model designed to reflect decisions made by shippers, receivers, truck operators, and terminal managers. The model simulates movement of individual shipments throughout the supply chain, including both direct shipments and those that travel through transshipment facilities. Shipments are allocated to trucks of various classes, and the movements of all freight vehicles are simulated over the course of a typical weekday.

#### **How does it work?**

The model begins by estimating synthesized firms as an input to goods movement around the region. A list of business establishment locations generate truck trip demand. Synthesized firms are used as an input to both the national supply chain model and truck touring models.

The national supply chain model simulates the transport of freight between supplier and buyer businesses, with a focus on movements that involve Portland. Its output is a list of commodity shipments by mode. This list is extracted from the supply chain model and used as input to the freight truck touring models.

Truck touring models simulate truck movements within the Portland regional that deliver and pick up freight shipments at business establishments. This tour-based model builds a set of truck tours including transfer points at which shipments are handled before delivery/pick up for shipments with a more complex supply chain (i.e. warehouse, distribution center, or consolidation center). The model generates trip lists by vehicle type (medium or heavy truck) and time of day so that they can be combined with the appropriate trip tables from Metro's passenger model for highway assignment.

#### **Why does it matter?**

Portland's economy is heavily reliant on and supported by goods movement. The new Metro Freight Model estimates these movement by simulating three functions particular to our region: International trade, domestic trade, and local deliveries. These three functions are estimated in the freight model and are quantified in terms of truck vehicles, value and tonnage on the roadway network.

What's new to this model is its ability to estimate warehouse and distribution center commodity flows unique to our region rather than borrowing flow estimates from external, secondary data sources. The new freight model estimates commodity flows for the Portland Metro region using FAF data forecasts and regional employment forecasts by industry sector. With the ability to track buyer/supplier movements more refined it is now possible to evaluate goods movements or policies to improve freight mobility and communicate freight movements to decision-makers and the public.