UPS Yard Scheduling Simulation

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United Parcel Service (UPS)

- U.S. Domestic and International Package
- Supply Chain and Freight
- 454,000 Employees
- Over 119,000 delivery vehicles worldwide

Problem Statement

- UPS's limited visibility of yard operations restricts their ability to accurately measure the potential impacts of changes to yard operations.
- UPS is looking to optimize the movement of their trailers to eliminate waste in the form of time, transportation, movement, and inventory.

Objectives

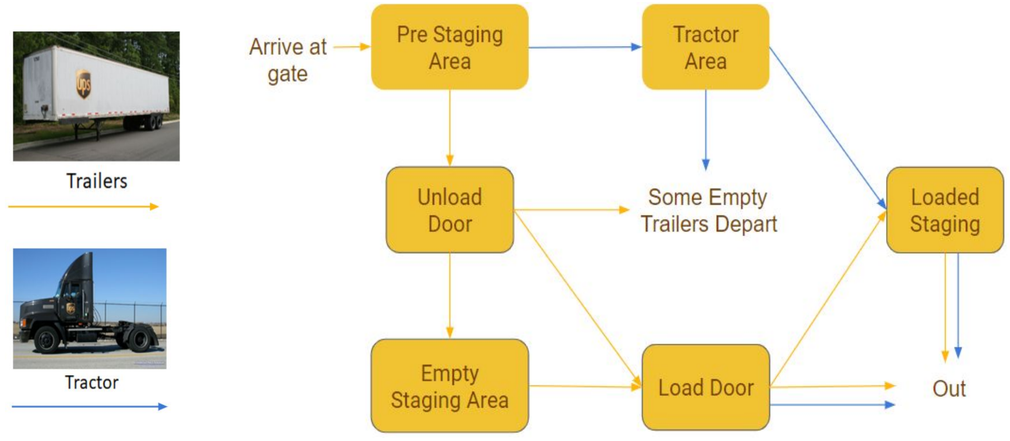
- Define the scope and generalize operation in yard at a UPS facility
- Develop a simulation model encapsulating yard operations
- Develop dashboards to visualize data about key performance indicators
- Experiment with different scenarios and capacities to summarize yard movement

Sorting Facility

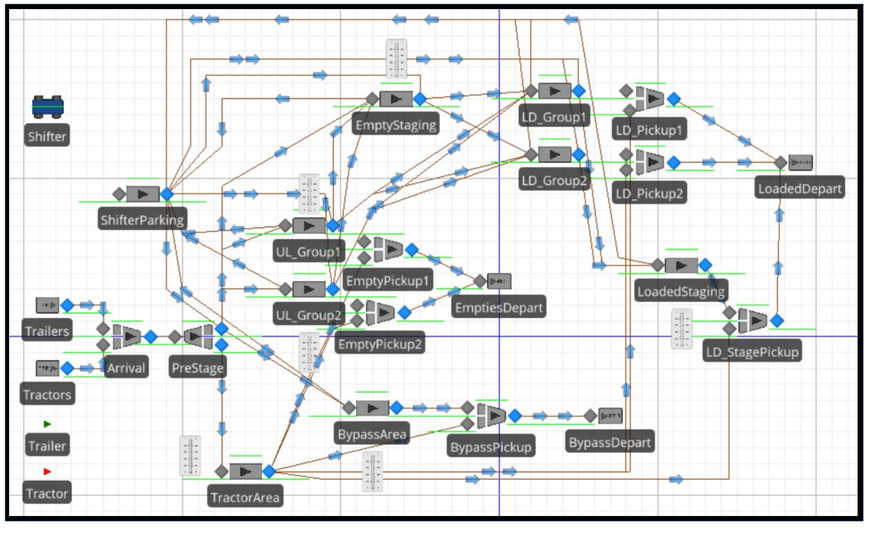
What is a sorting facility? – A sorting facility is a location within the delivery network that receives packages from many different sources, sorts them by destination, and sends them to the next step of the delivery network (e.g. another sorting facility).

What part of the sorting facility is being modeled? – We are building a simulation model of the sorting facility yard. The yard is the area outside and around the building in which tractors, trailers, and shifters move between load/unload areas and staging.

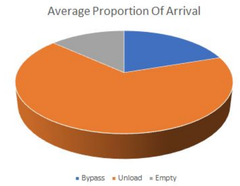
Flowchart of yard processes

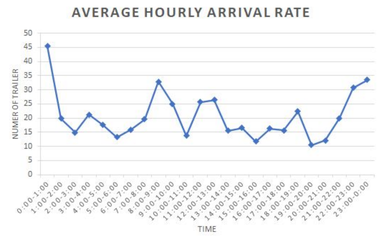


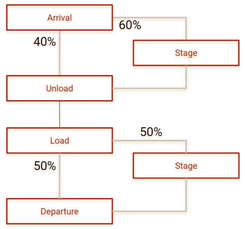
Simulation Model



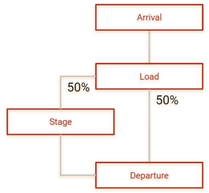
Data Analysis And Insights



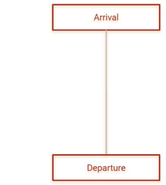




Unload Trailer Route



Empty Trailer Route



Bypass Trailer Route

The one-week data in the NEWPA facility is analyzed to serve the Smio model. The average hourly arrival and departure rates and the distribution of each type of trailer in arrivals and departures are obtained and applied in Simio model. By tracking several trailers in shifting data, we conclude the route for each type of trailer and calculate the average time consumption at each step. From the data, we observe the occurrence of peak value, the stable distribution of trailers and the normal distributed time consumption at each step. These results are used in the model for more accurate results.

KPI Dashboard