

BACKGROUND:

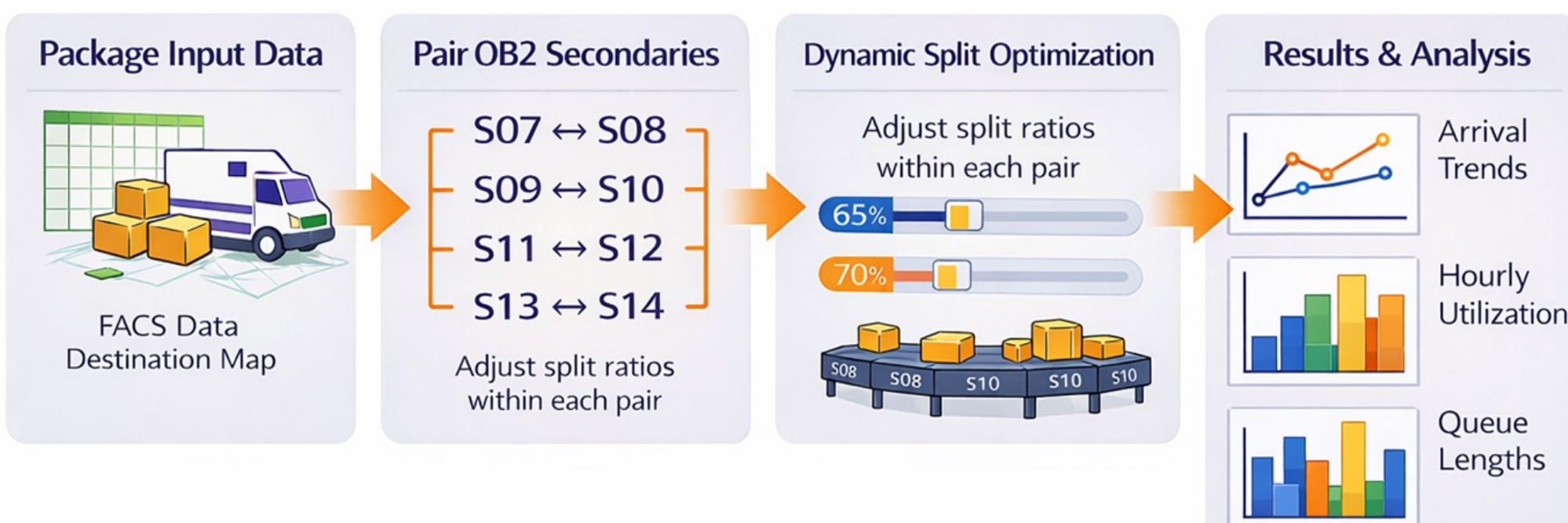
Problem:

The FedEx Indianapolis Hub is the company's second largest hub, moving 480,000 packages per day. Our FedEx partners want to optimize the layout of the facility to make the sorting more efficient, and prepare for days of peak volume and severe weather conditions

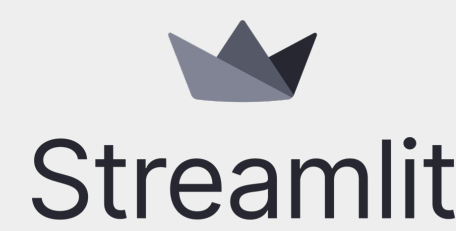
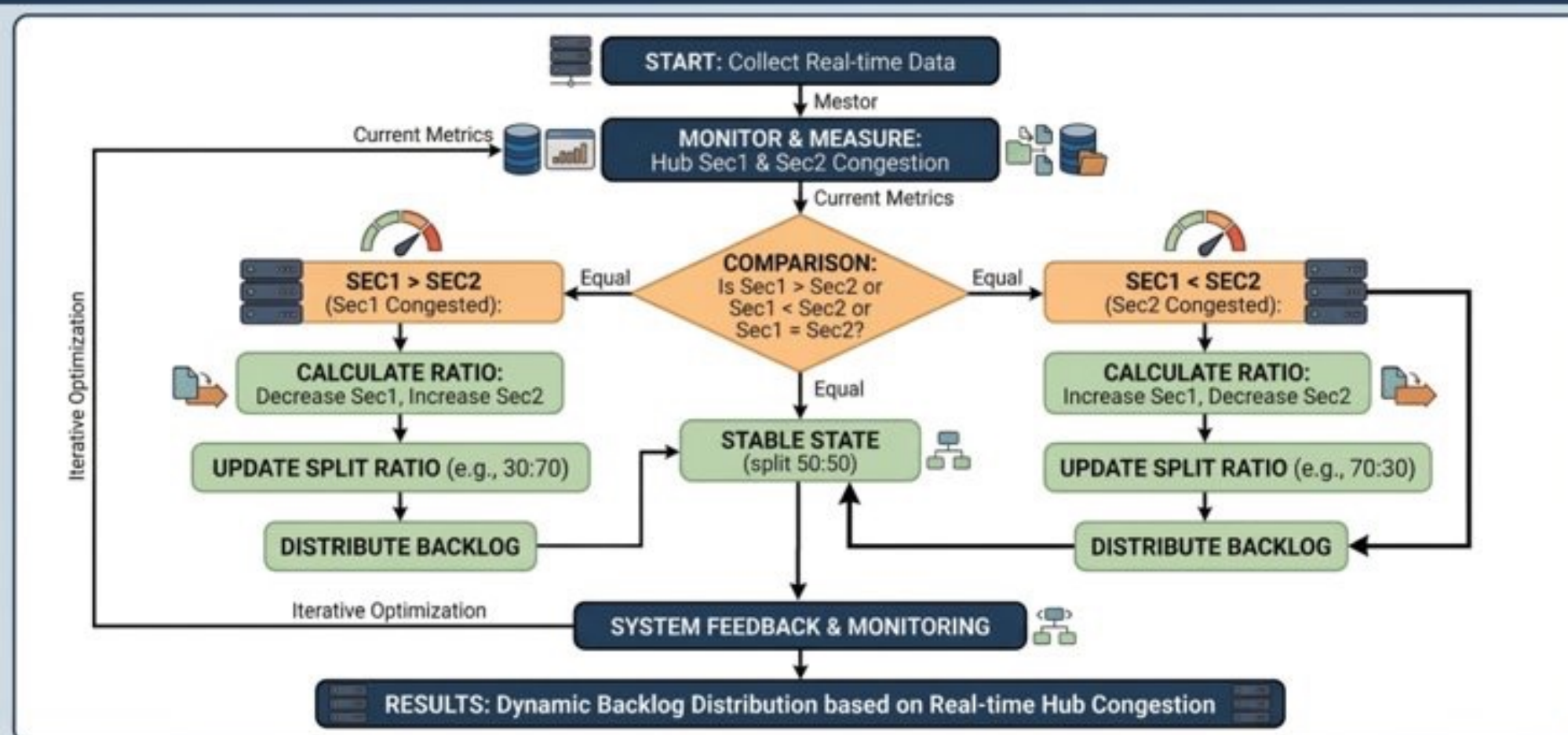
Our Goal:

An optimized layout configuration derived from a simulation of the Indy Hub Sorting Process and a dashboard that provides a solution based on different situations.

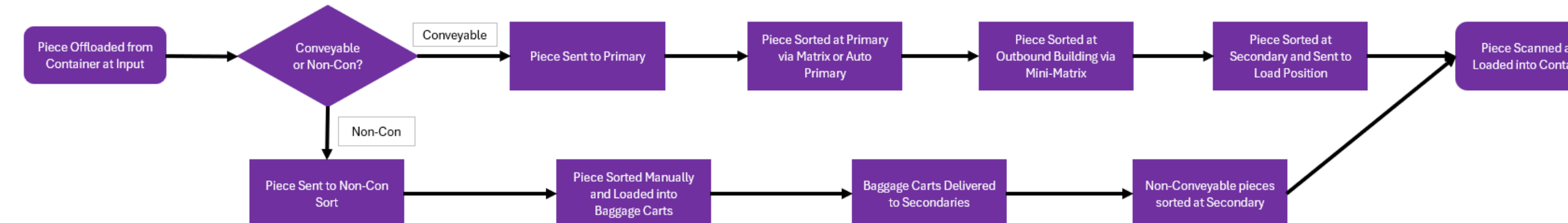
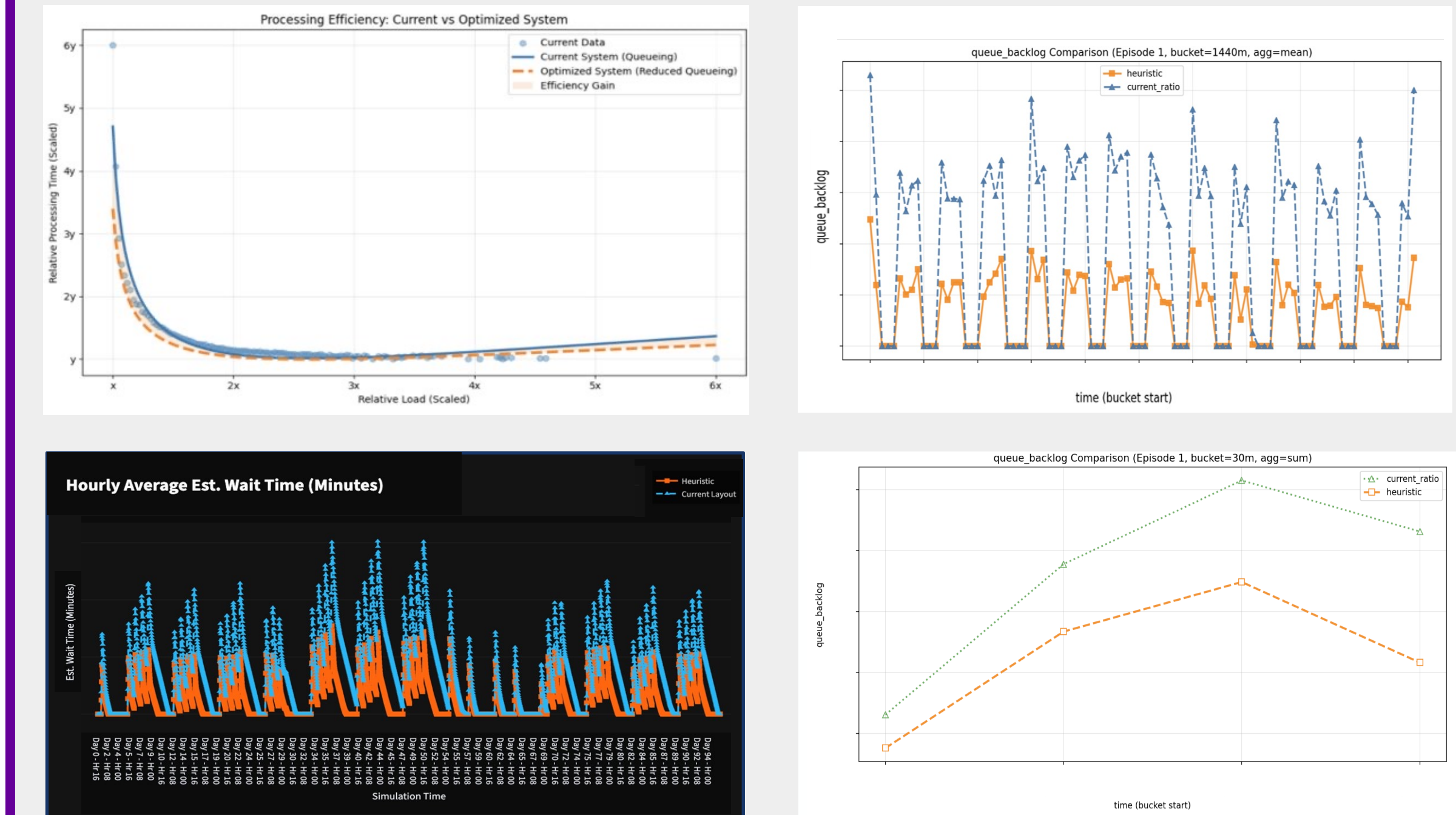
METHODOLOGY:



Dynamic Load Balancing Algorithm Flowchart



RESULTS:



PROGRESS BY SEMESTER:

SEMESTER 1:

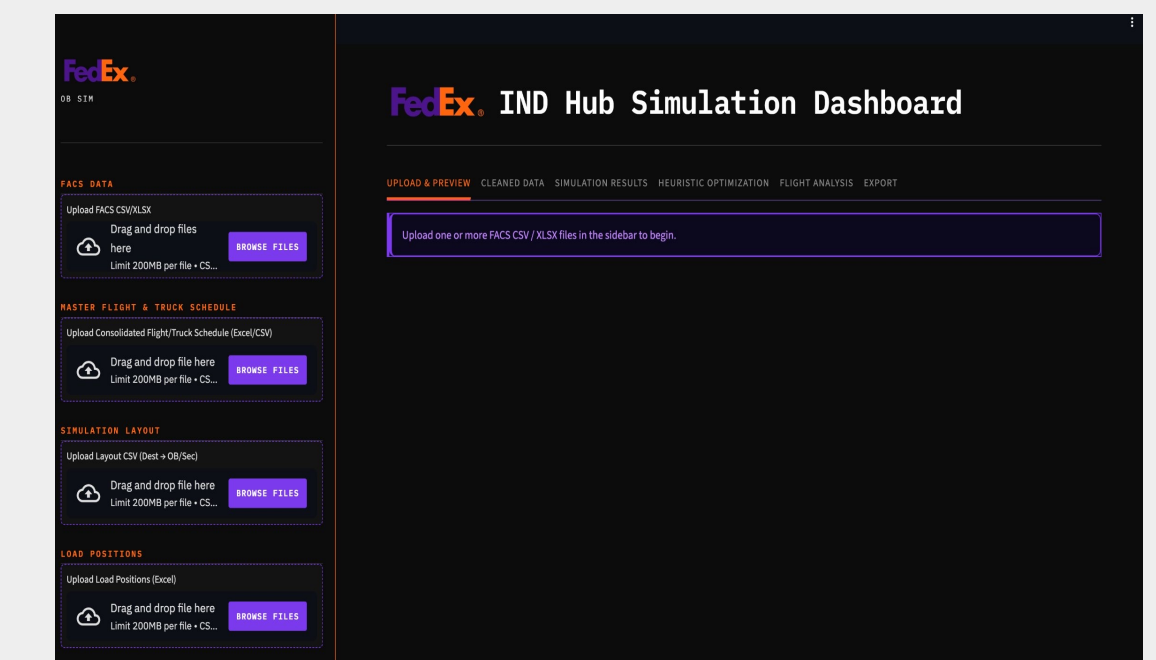
- Worked on mock data
- Modeled the system according to mock data and ran several belt down scenarios at various utilization rates.
- Compared the deterministic and stochastic models

SEMESTER 2:

- Worked on real FACS data
- Made a comprehensive system model and then optimized using heuristic model
- Created an interactive and robust dashboard using Streamlit hosted on Anvil

DASHBOARD:

- Users input current layout and package data files, as well as flight and truck schedules
- Enables users to create and save customized contingency scenarios
- Simulates FedEx Indy Hub sort process with both current layout and optimized layouts
- Produces graphs and KPIs of simulation performance



CONCLUSION:

The average estimated package wait time at the Indy Hub has been reduced by **72.4%** in simulation, and FedEx now has a dashboard that prepares them for various scenarios. This strengthens FedEx within the national supply chain by enabling them to be more efficient with their sorting process at this facility and also improves customer experience by allowing packages to arrive in a timely manner.

FUTURE GOALS:

A future goal for the project would be to expand the optimization of the hub beyond the layout. This can be done by optimizing flight schedules and truck routes by market volume. We would also like to continue to explore an RL model, which we had previously tried to use in this project.

ACKNOWLEDGEMENTS

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