PROBLEM STATEMENT
Use historical data to predict how long individual tasks will take in a warehouse. Use these predictions to:
- Improve the warehouse tasking engine "Athena"
- Identify customers that take disproportionate amounts of time
- Create a baseline metric to evaluate warehouse workers

DATA WORK
- Pullled data from a selection of hundreds of tables
- 1.5 Billion rows
- 92 work types
- A large portion of our data joins came from pallet history, locations, and intersections datasets

EXPLORATORY DATA ANALYSIS
- Visualized time distribution of different task types
- Discovered significant amounts of noise in data
- Discovered distance has little bearing on time taken in task

FEATURE ENGINEERING
- Calculated variety of task type and warehouse specific features
- Calculated task completion-time as difference between start of task and start of following one

MODELING
- Unique Models for Each Task Type
- We hyperparameter tuned and 5-fold cross validated 96 different models

OUTPUT
- Time estimates in seconds
- Calculating completion-time distribution for all tasks

RESULTS
- $827,430.55 Approximate Savings
- ~30 $ Saved per Task
- ~3.4 Million Total Amount of Tasks

IMPACT
- Our customers range from small family-owned businesses to larger Fortune 500 companies like Starbucks, Walmart, McDonald's, and Tyson.
- Lineage moves over 50 billion pounds of food per year in their tech-heavy facilities worldwide.
- Since about 90% of the food we eat in America is refrigerated and 40% of those goods run through Lineage warehouses, optimization of any of their warehouses could create an enormous impact in the world’s leading temperature-controlled logistics company.

NEXT STEPS
1. Implement Athena in additional warehouses
2. Improve data gathering methodology in warehouses
3. Remodel on cleaner data
4. Test dynamic pricing with customers
5. Test objective bonus/promotion schemes for worker performance using baseline labor expectations