

September 9<sup>th</sup>, 2025



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# Speaker

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## Nelson Alfaro Rivas

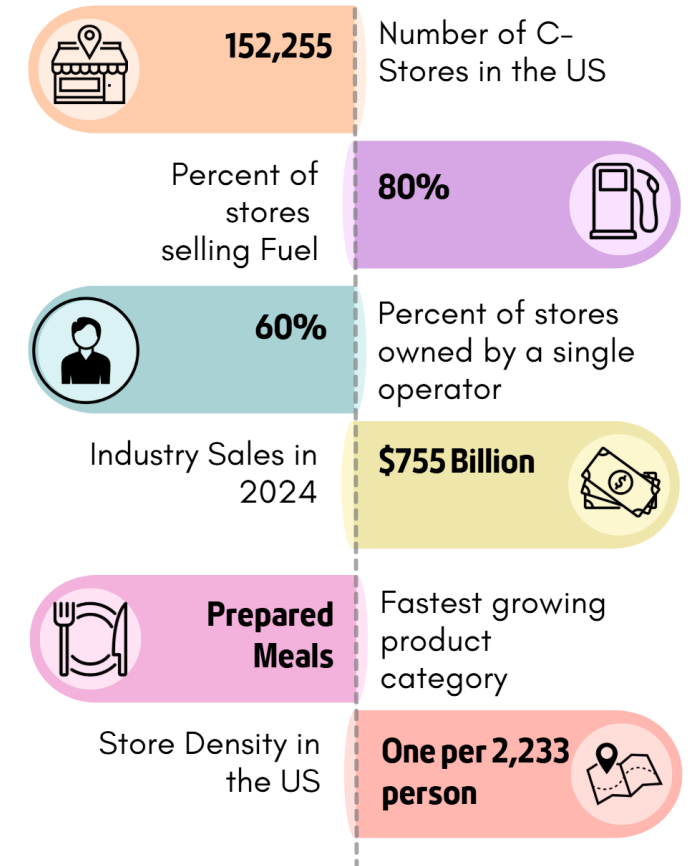
Simulation Consultant, MOSIMTEC LLC  
Simulation consulting, Manufacturing engineering

MS in Applied Systems Engineering  
BS Mechanical Engineering

# Project Background

- Client was a large convenience store chain
  - Convenience Stores are known as “C-Stores”
- Traditional C-Store products are not providing desired growth
  - Majority of store revenue is low margin fuel sales
  - Millennials and Gen Z want healthy food options
- Pivoting to healthy on-the-go meals
  - Higher gross margin on food helps offset revenue decline in other product categories

## C-STORE BUSINESS Highlights



# Implementation Challenges

- Remodeling thousands of existing store
  - Multiple layouts and configurations
  - New food products and holding equipment
  - New cooking equipment and procedures
- Uncertainty around new app and loyalty program
  - On-demand food delivery
  - Permit customer self-checkout



# Implementation Challenges

- Customer perception

- Patrons may not expect high quality fresh food at a convenience store

- Garnering support from franchisees

- Independent owners across the entire United States
- Franchisees control store labor and training
- Effectively have full discretion over menu items





# Why Simulation?

- Accurately predict store performance after remodeling
  - Track store revenue, cost, food waste, and total profit
  - Quantify expected benefit of loyalty program
  - Visualize employee and customer movements
- Quantitatively alleviate franchisee concerns
  - *“If I invest more labor, will I actually make more money?”*
  - Flexibility to model any store



# Model Focus Areas

## ■ Store features

- Dynamic layout generation and product zones
- Cooking and merchandizing equipment size and behavior

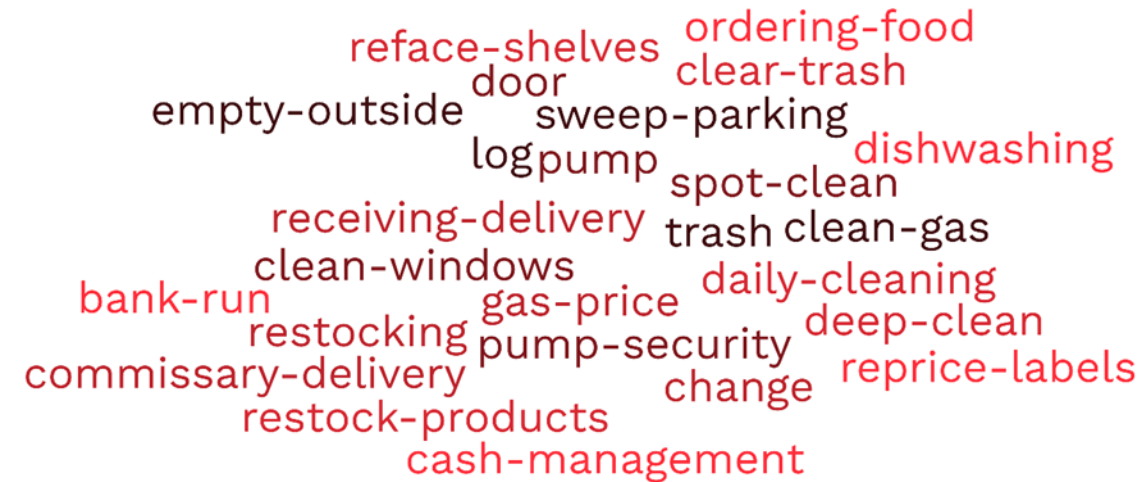
## ■ Customer behavior

- Size and composition of shopping baskets
- Customer arrival patterns

## ■ Employee labor

- Staffing schedule
- Areas of responsibilities

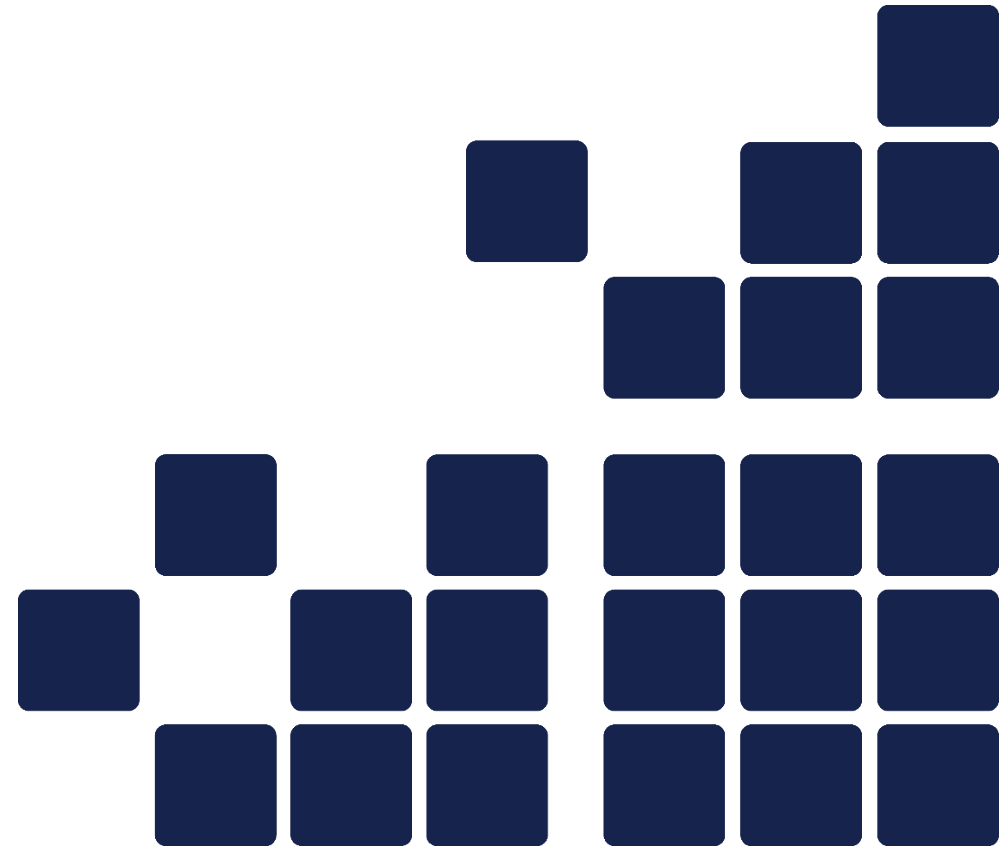
## *C Store Everyday Tasks*



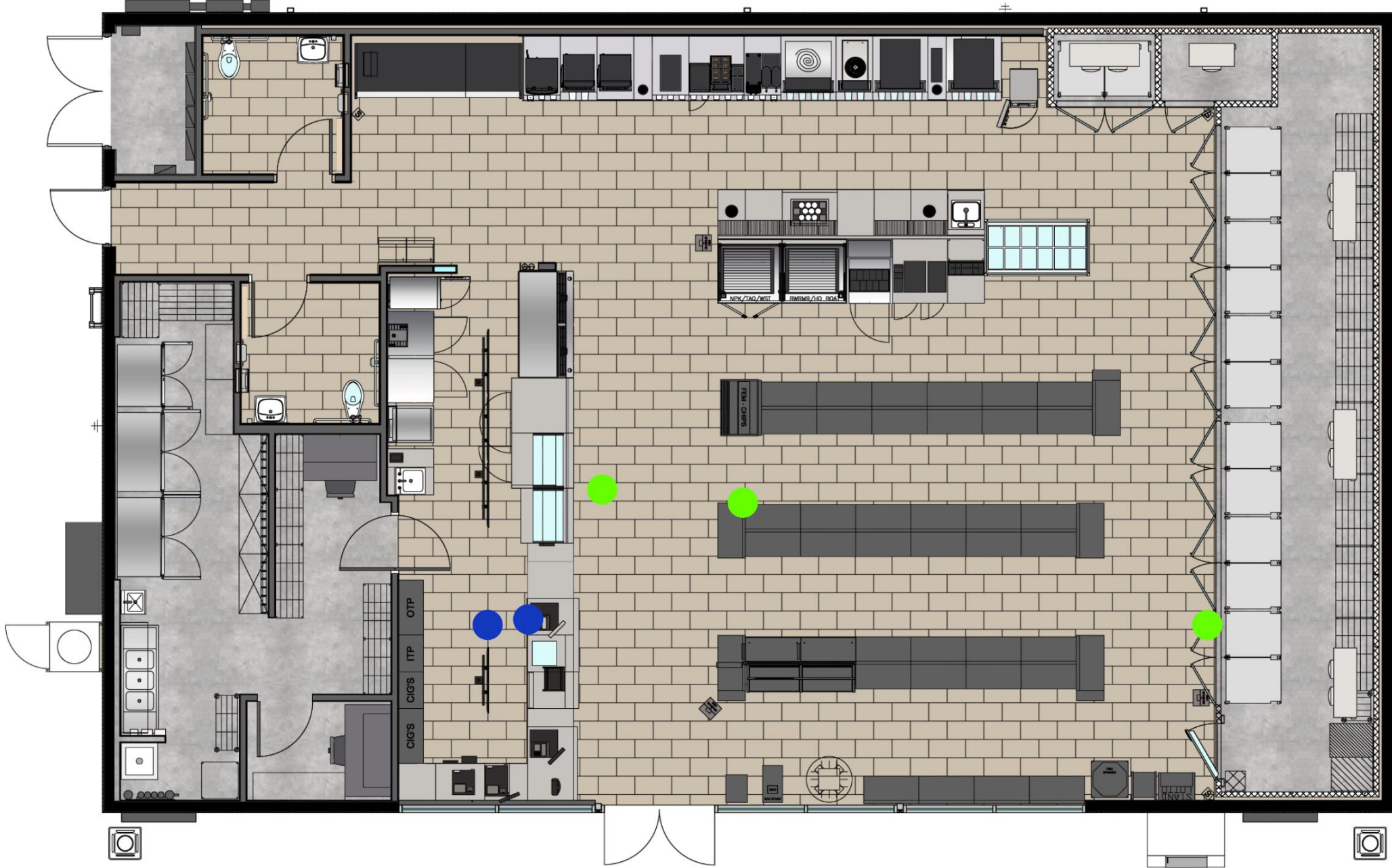
A word cloud of various tasks performed in a C Store, arranged in a circular pattern. The tasks include: refacing shelves, ordering food, clearing trash, sweeping parking, spot cleaning, dishwashing, receiving delivery, trash cleaning, gas cleaning, daily cleaning, deep cleaning, repricing labels, changing, cash management, restocking products, commissary delivery, restocking, gas price, pump security, clean windows, empty outside, door, log pump, and bank run.

reface-shelves ordering-food  
clear-trash  
empty-outside door sweep-parking  
log pump spot-clean  
dishwashing  
receiving-delivery trash clean-gas  
clean-windows daily-cleaning  
bank-run gas-price deep-clean  
restocking pump-security reprice-labels  
commissary-delivery change  
restock-products  
cash-management

# Demo







# Identifying Meaningful Outputs

## ■ Franchisees

- Labor hours
- Checkout queue size
- Customer wait times

## ■ Franchisor (Client)

- Food revenue and cost
- Food stockouts
- Outstanding tasks at shift end

## ■ Equipment & Architecture Team

- Cooking equipment throughput
- Holding equipment utilization
- Store congestion points



# Example Summary Dashboard

Food Forward Simulation

Summary

Sales

Customers

Baseline Foo...

Delta Food...

Baseline CO...

Delta COS...

Task...

Equipment

Roller Grills

Clear Filters

Day(s) Of Week

All

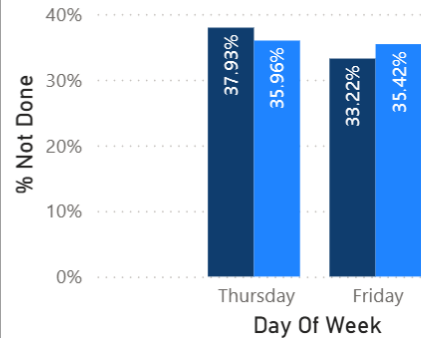
Daypart(s)

Lunch

Filters:

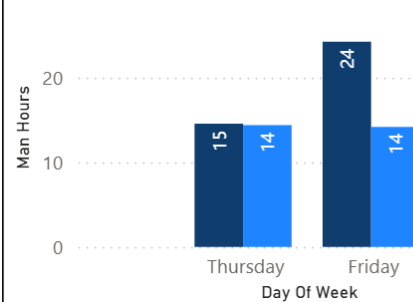
## % Tasks Not Done

Scenario ... ● Baseline ● Future



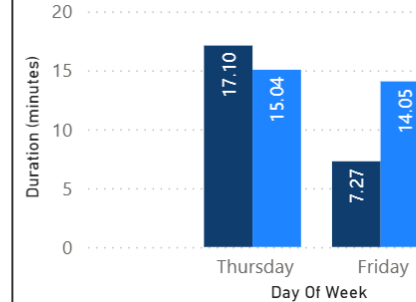
## Man Hours Required For Unfinished Tasks

Scenario N... ● Baseline ● Future



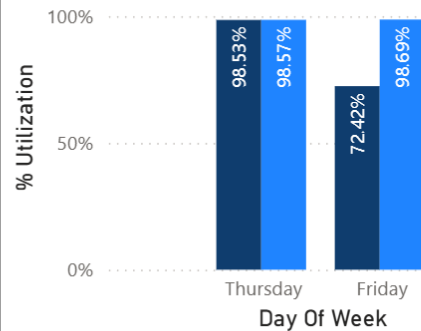
## Task-Start Avg Time Delay

Scenario N... ● Baseline ● Future



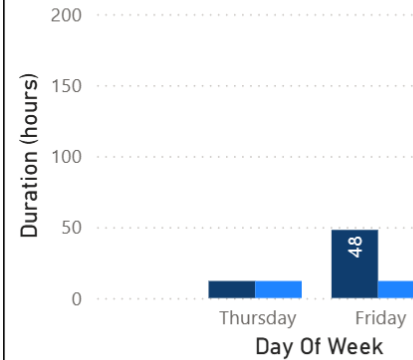
## Employee Utilization

Scenario ... ● Baseline ● Future



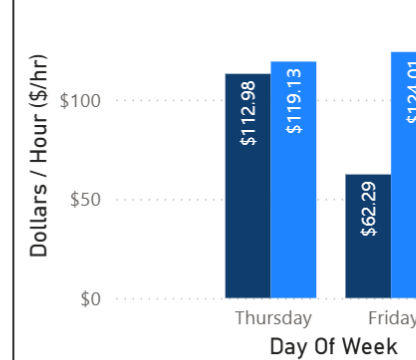
## Labor Man Hours

Scenario ... ● Baseline ● Future



## Sales Per Man Hour

Scenario ... ● Baseline ● Future





# Learnings From the Journey

- Built trust with Franchisees by communicating clear understanding of pain points
  - Most concerns alleviated after trust is established
  - Embraced simulation as tool for experimentation
- Project forced conversation around tradeoffs
  - How much food to cook?
  - Which cooking equipment is necessary?
  - How should tasks be prioritized?



# Findings

- Fresh food initiative can be successful
  - Requires more labor than initially expected
  - Fresh food has higher margin than non-perishables
- Food delivery can be disruptive if unprepared
  - Staffing a restaurant is different than a store
- Self-checkout has biggest impact in the morning
  - Alcohol/tobacco sales in evenings are ineligible for self-checkout



# Questions



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