

ABSTRACT

At Port Houston, excessive container dwell time creates costly congestion that impacts all cargo, including breakbulk. Our analysis identified critical bottlenecks in gate processing, chassis availability, and customs holds. To solve this, we propose a dual solution of an AI-driven truck appointment system and a “peel-off” stacking strategy. This approach is projected to reduce average dwell time by 15-20% and improve truck turn times by 25%, directly enhancing terminal capacity and fluidity for breakbulk operations.

IDENTIFYING THE BOTTLENECKS


CUSTOMS / AG HOLD

- Cause: Documentation error, random scan, or flagged commodity


CONTAINER BECOMES STUCK IN YARD


- It now occupies valuable terminal space, blocking other containers


THE TERMINAL-WIDE EFFECT

- Terminal efficiency drops.
- Slows down the entire yard.







TRUCKING OPERATIONS DISRUPTED

- Driver’s turn time increases, wasting fuel and hours of service.


THE FINANCIAL CONSEQUENCE

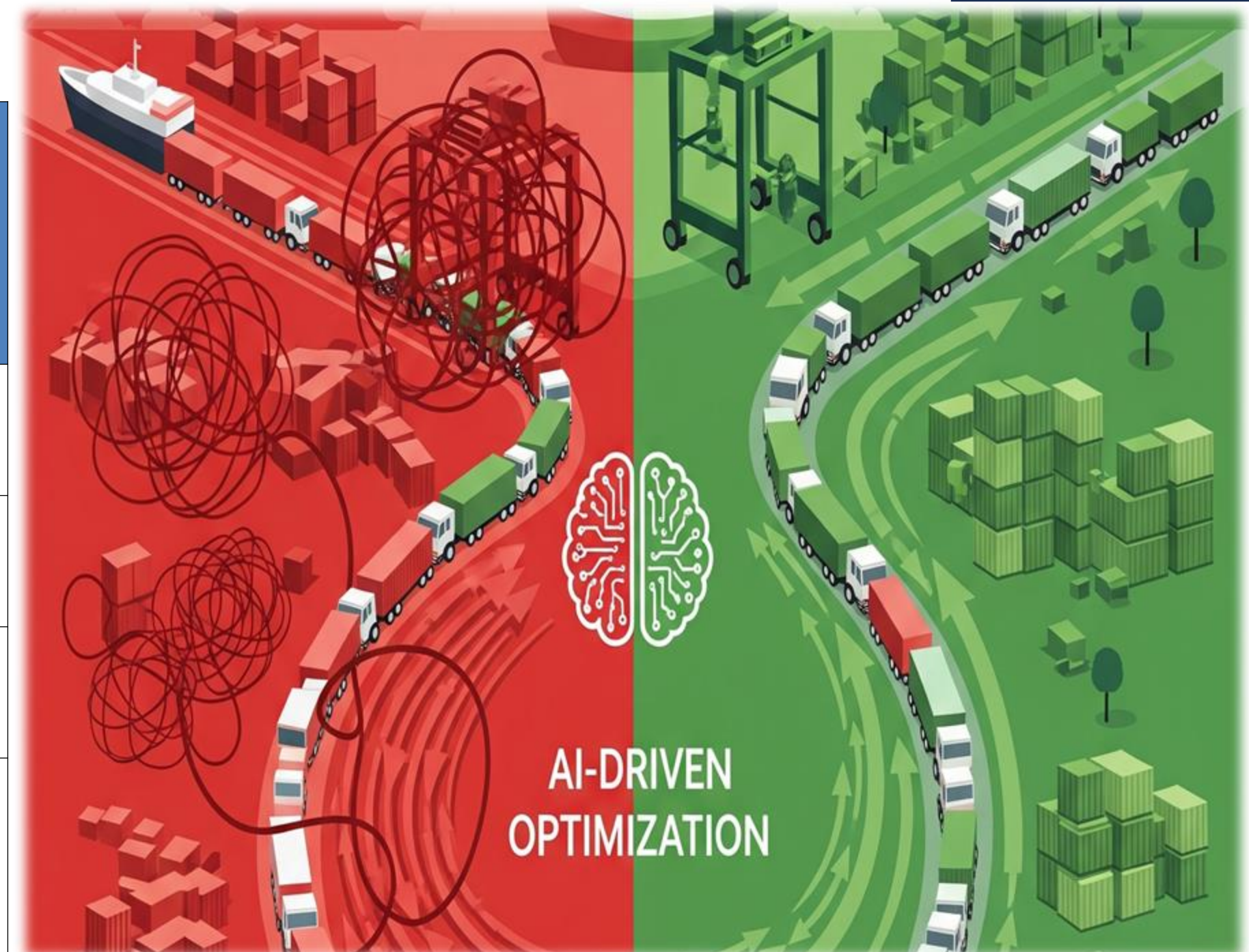
- Demurrage: Terminal storage fees begin.
- Per Diem: Container rental fees begin.

MAP THE CONTAINER FLOW

Stakeholder	Stage 1: Vessel Arrival	Stage 2: Yard Ops	Stage 3: Gate Processes	Stage 4: Departure
 Shipping line	Discharge list provided	Yard ops	Cargo clearance	Gate ops
 Terminal Operator	Vessel discharge	Yard transfer	Gate processing	Truck dispatch
 Importer/BCO	Customs filling	Drayage coordination	Free settlement	Delivery coordination
 Trucking Company	Operations prep	Truck handling	Pickup Scheduling	Container dispatch
 Customs (CBP)	Screen manifest electronically	Cargo inspection	Inspection hold	Container clearance

KPI IMPROVEMENT PROJECT

KPI	Truck Turn Time	Yard Utilization (%) - Bayport	Dwell Time (days) - Export	Dwell Time (days) - Import	% Imports ≥14 days
Current Value	42	80	9.02	3.53	3.78
Target Value	35	65	6	2.5	2
Improvement %	16.7	18.8	33.5	29.2	47.1
Description	faster	less crowded	shorter wait	shorter wait	fewer long-stay container



PROPOSING SOLUTIONS


Proposed Solutions

Scheduling & Gate

- AI Truck Appointments:** Cut gate queues and truck idle time.
- "Peel-Off" Stacks:** Achieve 40–50% faster turns for high-volume importers.
- Automated Gates (OCR):** Speed up truck processing by 30–40%.

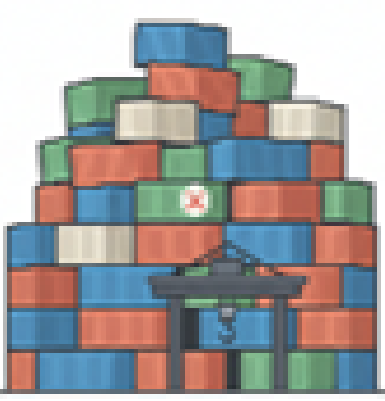

Yard and Equipment


- AI Predictive Stacking:** Reduce costly container re-handles by 20–25%.
- "Gray" Chassis Pool:** Eliminate shortages, saving 10–15minutes per trip.
- Yard Automation (AGVs):** Boost equipment productivity by over 15%.



PORT HOUSTON

THE INTERNATIONAL PORT OF TEXAS™




Optimizing Container Dwell Time at Port Houston

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