



**FEBRUARY 5 - 6 • LOS ANGELES, CA**

# **SMART PORTS**

(INFORMATION TECHNOLOGY)

Title: Implementing an  
Interconnected Supply Chain

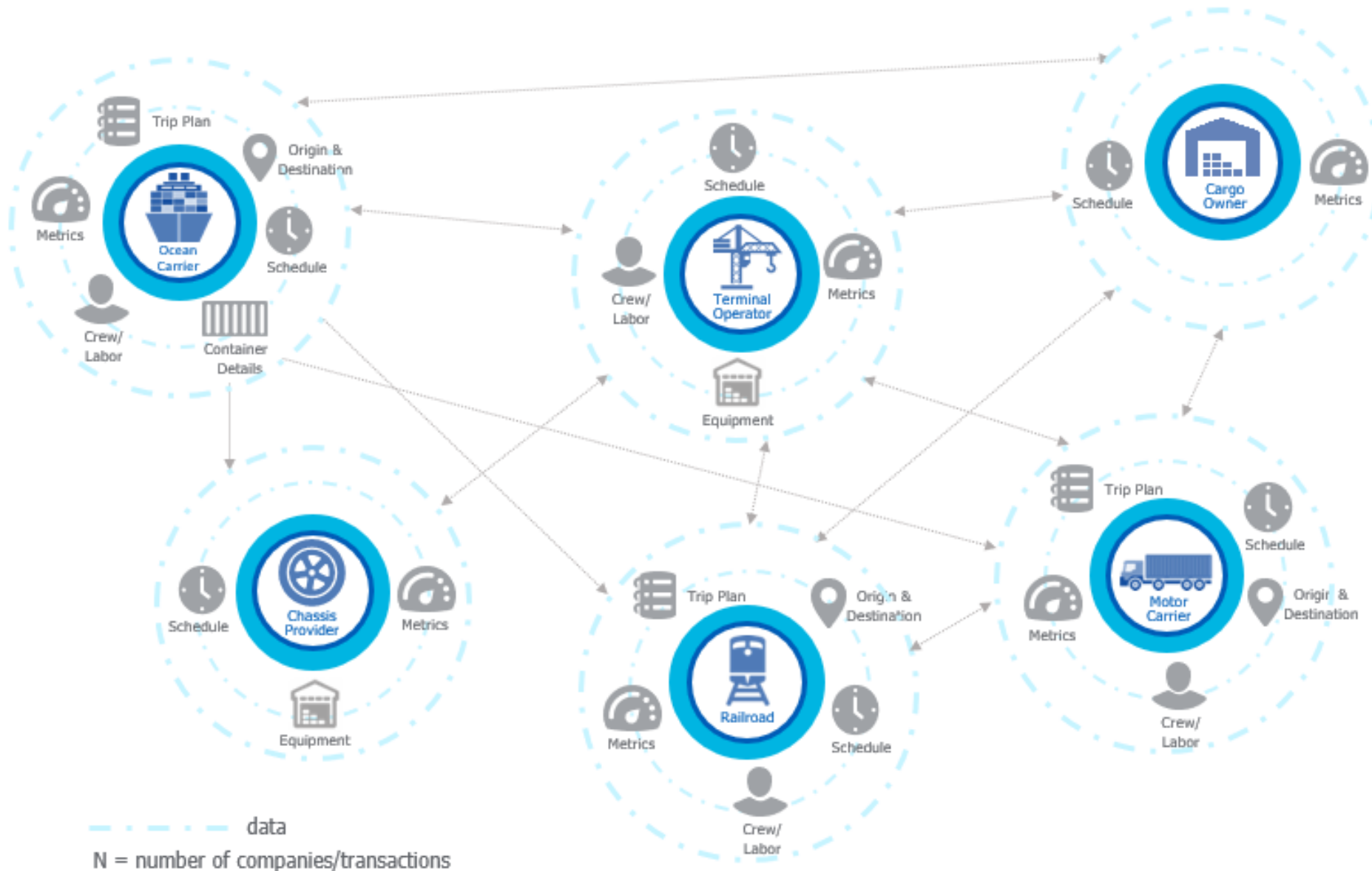
Presented By: James Shefelbine,  
Wabtec





# A new era of interdependence

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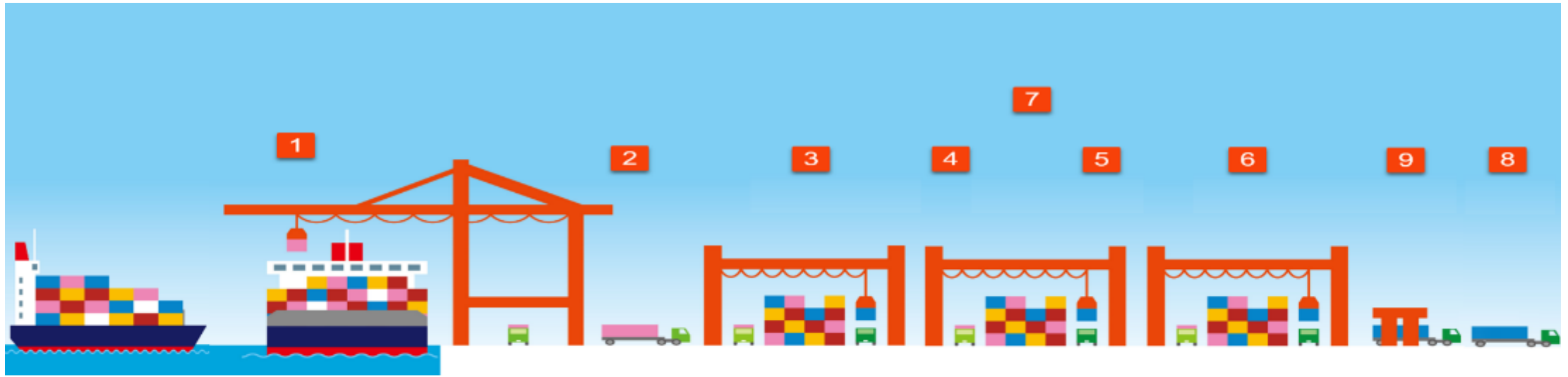
@ Scale: x N

Today, success requires:

- Eliminating silos
- Sharing information
- Predicting & optimizing



# Today's port ecosystem



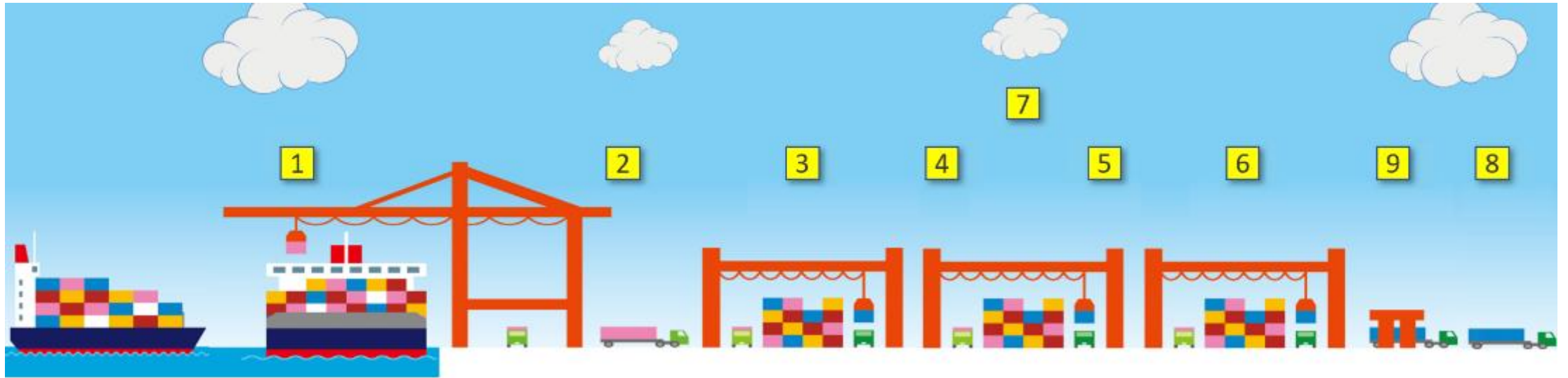
- 1 Inbound Container Volumes**  
Planning in Silos due to lack of collaboration
- 2 Horizontal Transport Route Optimization**  
Complex route optimization
- 3 Yard Inventory and Inspections**  
Labor intensive exception handling activity
- 4 Container Handling Equipment**  
Operations and APM Gap
- 5 Equipment and Yard Operations**  
Simple housekeeping and rehandles
- 6 Yard Bottlenecks**  
Demand/Supply unpredictability
- 7 Yard Capacity Management**  
Capacity tracking is a dynamic and complex
- 8 Container Delivery**  
Information gaps and inconsistent lead times
- 9 Gate Bottlenecks**  
Lack of pre-advised information and uncertainty

**Siloes, On Premise Technology**





# The future port ecosystem



## Big Data

1

### Inbound Container Volumes

Shared visibility and planning across ports

### Shipping Line Collaboration

Standard and efficient exception handling for better operations

## Machine Learning

2

### Horizontal Route Optimization

Pattern recognition, adaptive algorithms

## Artificial Intelligence

3

### Yard Inventory & Inspections

Video recognition, automated yard processes

4

### Container Handling Equipment

AI cranes with adaptive algorithms

5

### Equipment & Yard Operations

Human like thinking/automation

6

### Yard Bottlenecks

Real time simulations, evaluations

## Internet of Things

7

### Capacity Management

IOT devices to track cargo

8

### Container Delivery

Connectivity across systems & stakeholders

9

### Gate Bottlenecks

Smart cities connectivity across multiple ecosystems

Interconnected Cloud Systems, Reliable, Autonomous, Data Driven



# The opportunity



**Cargo Owner**



**Broker/FF /3PL**

**Visibility + Cargo Velocity**

- ↑ visibility for better customer service
- Better planning for dray partners → ↑ cargo velocity thru ports



**Marine Terminal Operator**

**Cargo Dwell + Cargo Velocity + Productivity**

- ↓ container dwell
- ↑ velocity through better planning
- Reduced and improved handling (touches, etc)



**Ocean Carrier**

**Visibility + Cargo Velocity**

- ↑ velocity of cargo thru port
- ↑ velocity of empty returns



**Motor Carrier**

**Turn Times + Productive Turns**

- Faster truck turn times
- ↑ number of productive turns per day



**Railroad**

**Rail Volume + Visibility + Speed**

- ↑ rail volume through ports
- ↑ visibility to export dates
- Improved equipment planning
- ↑ speed of rail volume thru ports



**Chassis Provider**

**Accuracy + Chassis Utilization**

- ↑ accuracy of chassis inventory and forecast → ↑ chassis utilization
- Improved planning → ↑ chassis utilization



# Data overview: examples ...

## Data Acquisition

### Vessel Data:

Ocean Manifests  
Booking Files  
Baplie/Stowage  
Assigned Railroad  
Marine Terminal Destination  
Empty Return Quotas

### MTO Data:

Terminal Movement Data  
Ocean/Terminal Status  
Container Availability  
Crane Split and Work  
Instructions  
Train and railcar release ETDs

### Railroad Data:

Rail B/L  
Rail Waybills  
Rail Consist Files  
Rail Car Location Messages

## Data Transformation

### Data Services/Offerings

- Vessel ETAs
- Eastbound Container Volumes by destination
- Westbound empty container requests
- Containers by Railroads
- Train and railcar ETDs
- Container ETDS
- IPI Destinations
- Container loaded positions
- Realtime updates for railcar release
- Empty railcar availability at MTO
- Container availability at MTO
- Vessel stowage information



# Different data ... how to integrate?

## **EDI:**

Domestic  
International

## **API:**

Custom  
Standardized

## **XLS**

## **PDF**

## **Blockchain** (future)

### EDI

- Computer-to-computer
- Industry standards
- Utilizes batch files

### API

- Cloud-to-computer
- Customized for each customer
- Utilizes individual transactions



# Architecture approach

Outcomes

↑ **Visibility**

↑ **Productivity**

↑ **Predictability**

↑ **Throughput**

## Applications & Micro Services

Visibility & Insight

Vessel Tracking

Vessel Operational Status

Container Tracking & Tracing

Container Allocation

Empty Container Management

Operational Status

Chassis Readiness

Advance Notifications



Cloud Services

## Enterprise Data Cloud

*Integrated and correlated data across systems*



Data Inputs  
*(examples)*



Ocean Carriers



Marine Terminal Operators



Federal Agencies



Municipal Agencies



Intermodal Equipment Providers



Motor Carriers



Railroads



Other Data



- ERP
- Business Systems
- Operations
- Traffic
- Weather
- Local





# Port Optimizer™

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**IMPROVES SUPPLY  
CHAIN PREDICTABILITY**



**ENHANCES CONTAINER  
VISIBILITY + REPORTING**



**INCREASES  
PRODUCTIVITY**

**Enabling visibility and execution across an integrated supply chain**





CAPE AKRITAS  
DESTINATION LOS ANGELES  
ETA: 12/6 - 19:00



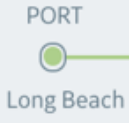
- Increase visibility of inbound shipments
- Receive ETAs directly from the vessel traffic control center
  - Dynamically updated



# Vessels

## COSCO ENGLAND

Inbound 032E



VESSEL CODE	OWNER SCAC	TERMINAL	CONTAINER COUNT	ATA	ATD
9516428		PCT	20	31 Jul   00:00	05 Aug   00:00

## EVER LASTING

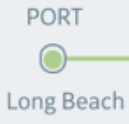
Inbound 0996E



VESSEL CODE	OWNER SCAC	TERMINAL	CONTAINER COUNT	ATA	ATD
9595450	EGLV	ETS	12	27 Nov   00:00	30 Nov   00:00

## EVER LUCENT

Inbound 0TB4G



VESSEL CODE	OWNER SCAC	TERMINAL	CONTAINER COUNT	ATA	ATD
-------------	------------	----------	-----------------	-----	-----

View ocean carrier status with up-to-date ETAs/transit information

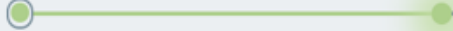


Back

## Vessel Details

**COSCO ENGLAND**

Inbound 032E

PORT  
  
 Long Beach

VESEL CODE	OWNER SCAC	TERMINAL	CONTAINER COUNT	ATA	ATD	STA
9516428		PCT	20	31 Jul   00:00	05 Aug   00:00	O

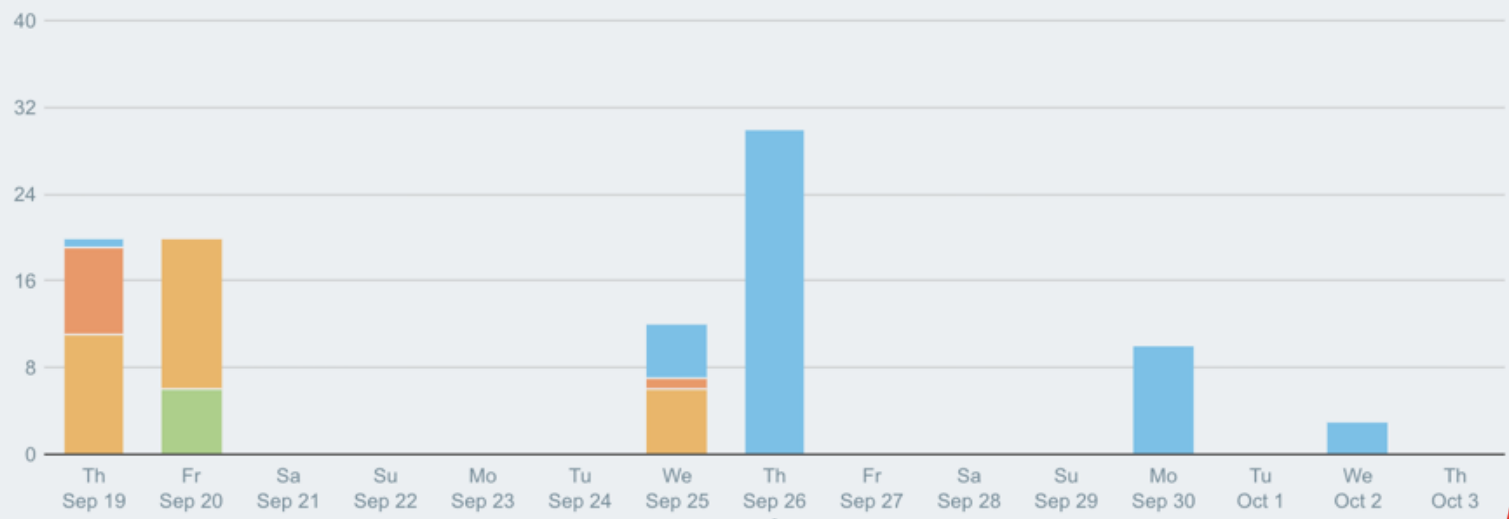
Filter By Reset Filters

<input type="checkbox"/>	<input type="checkbox"/>	HOLDS	CONTAINER	STATUS	EVENT DATE	LOCATION	OWNER	CUSTOM 1
<input type="checkbox"/>	<input type="checkbox"/>		APHU73736...	On Vessel			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APHU46272...	Discharged			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APHU62977...	Docked			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APHU69847...	Discharged			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APHU70165...	Discharged			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APHU73096...	Docked			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APZU3158560	Docked			Brian Hill	
<input type="checkbox"/>	<input type="checkbox"/>		APZU4308006	Discharged			Brian Hill	

Detail views at a per vessel level for ease of tracking



### CONTAINER COUNT BY ETA



Filter By

Reset Filters

Download

Edit

<input type="checkbox"/>	<input type="checkbox"/>	CONTAINER	STATUS	HOLDS	BOL	VESSEL	TERMINAL	ETA / ATA ↑	OWNER
<input type="checkbox"/>	<input type="checkbox"/>	APHU7...	On Vessel	-	NJZC362302	COSCO ENG...	WBCT	19 Sep	Brian Hill
<input type="checkbox"/>	<input type="checkbox"/>	APHU4...	Discharge		QDGS10304...	COSCO ENG...	WBCT	19 Sep   07:00	Brian Hill
<input type="checkbox"/>	<input type="checkbox"/>	APHU6...	Docked		TJSE190467...	COSCO ENG...	WBCT	19 Sep   07:00	Brian Hill
<input type="checkbox"/>	<input type="checkbox"/>	APHU6...	Discharge		TJLAXSH00...	COSCO ENG...	WBCT	19 Sep   07:00	Brian Hill
<input type="checkbox"/>	<input type="checkbox"/>	APHU7...	Discharge		CNSE469403	COSCO ENG...	WBCT	19 Sep   07:00	Brian Hill

View cargo from a single view for all terminals and carriers



Filter By Reset Filters

Sort by: Date ETA

<b>KTDU3477964</b>	30 Aug 04:55
Out Gated TERMINAL	
<b>AURU9283868</b>	31 Aug 08:17
Out Gated CUSTOMS	
<b>QOOU1204038</b>	31 Aug 08:17
Out Gated	
<b>HXIU1031589</b>	31 Aug 13:25
Out Gated TERMINAL	
<b>BPHU8966326</b>	31 Aug 09:13
Out Gated CUSTOMS	
<b>KZYU6098378</b>	31 Aug 09:13
Out Gated	
<b>YYDU5991839</b>	31 Aug 09:13
Out Gated	

### KTDU3477964

Out Gated  
TERMINAL

#### DATA

BOL MAEU498031732	SHIPPING LINE MAERSK LINE	CUSTOM HOLDS Cleared	ORIGIN PORT Valparaiso
VESSEL BALTIC AUTUMN	ATA 30 Aug   04:55	VOYAGE NO. 924A	DESTINATION Los Angeles
TERMINAL APMT	BERTH	YARD LOCATION	TERMINAL Yes
LAST FREE DAY	OUTGATED TIME 08 SEP   06:20	MODALITY (SCAC) Rail	CHASSIS
TYPE CODE 42T6	HAZARDOUS	BAPLIE VIEW <input type="checkbox"/> 2D <input checked="" type="checkbox"/> 3D	

Tracker Notes Interested Parties

#### CONTAINER TRACKER



Delivers detailed information on each container:

- Customs status
- Holds
- Empty container availability
- Last free day
- Dwell time



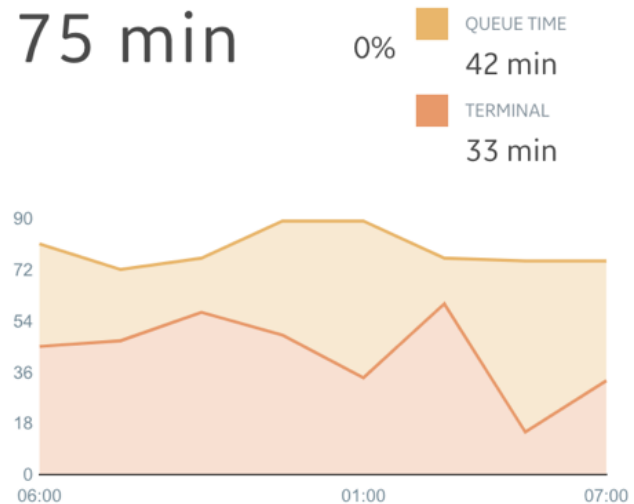
DATA

TERMINAL WAIT TIME

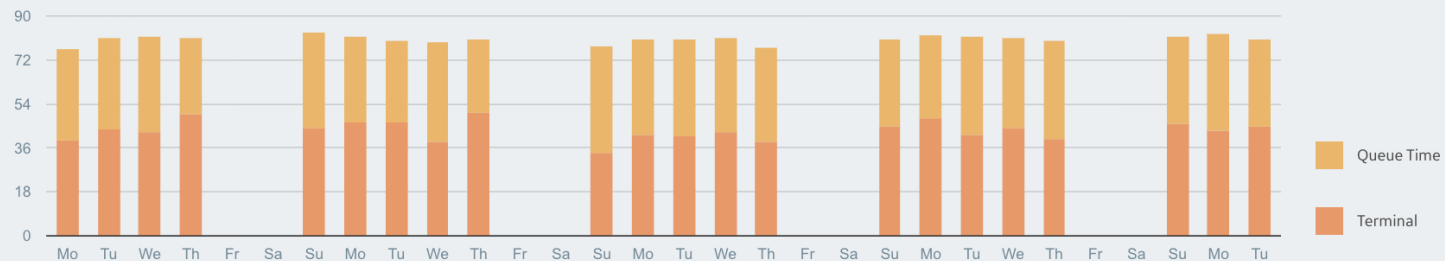
AVERAGE TOTAL TIME TODAY

75 min

CURRENT STATUS  
0%  
42 min  
33 min



TOTAL TERMINAL WAIT TIME



View wait times/turn times at a terminal level powered by GeoStamp

Back

## Empties Return

Today

Tomorrow

Download

Filter

Updated 1 hrs ago

SHIPPING LINE	TERMINAL SHIFT	20 GA	20 RF	20 FT	20 OT	40 GA	40 HQ	40 RQ	40 FT	40 OT
CMA-CGM	Shift 1	Yes	Yes	Yes	Yes	Dual	Yes	Yes	Dual	Yes
	Shift 2	No	No	No	No	No	No	No	No	No
YTI	Shift 1	Yes	Yes	Yes	No	Dual	No	No	Dual	yes
	Shift 2	No	No	No	No	Yes	No	No	No	No
Evergreen	Shift 1	No	No	No	No	No	No	No	No	No
	Shift 2	No	No	No	No	No	No	No	No	No

This terminal has notes

Updated 2hrs ago

SHIPPING LINE	TERMINAL SHIFT	20 GA	20 RF	20 FT	20 OT	40 GA	40 HQ	40 RQ	40 FT
Maersk	Shift 1	Yes	Yes	Yes	Yes	No	Dual	No	Yes
	Shift 2	No	No	No	No	No	No	No	No
APMT	Shift 1	Yes	Yes	Dual	No	Dual	Yes	No	Dual
	Shift 2	No	No	No	No	Dual	Dual	No	No
ONE	Shift 1	No	No	No	No	No	No	No	No
	Shift 2	No	No	No	No	No	No	No	No

Cross terminal empty return details





Better forecast  
equipment and  
resource needs  
up to two weeks  
in advance





View milestones as a container moves through the terminal, from offloading to outgate.






Views customized uniquely for each user persona:

- Beneficial Cargo Owner
- Port
- Marine Terminal Operator
- Ocean Carrier
- Motor Carrier
- Railroad
- Intermodal Equipment Provider

Please select below which Port Optimizer Notifications you wish to receive

Vessel Working Notification

Container Claim Notification

Excessive Dwell Notification 

Subscribe

Notification Pinned / Unpinned

Pinned  Unpinned

Notification Type

Email

Update Frequency

Morning  Evening

How many days should a container be on the terminal before a notification is sent

Set up notifications to receive information that is important to you – automatically.

For example:

- Be alerted when containers exceed targeted dwell times
- Proactively monitor priority containers

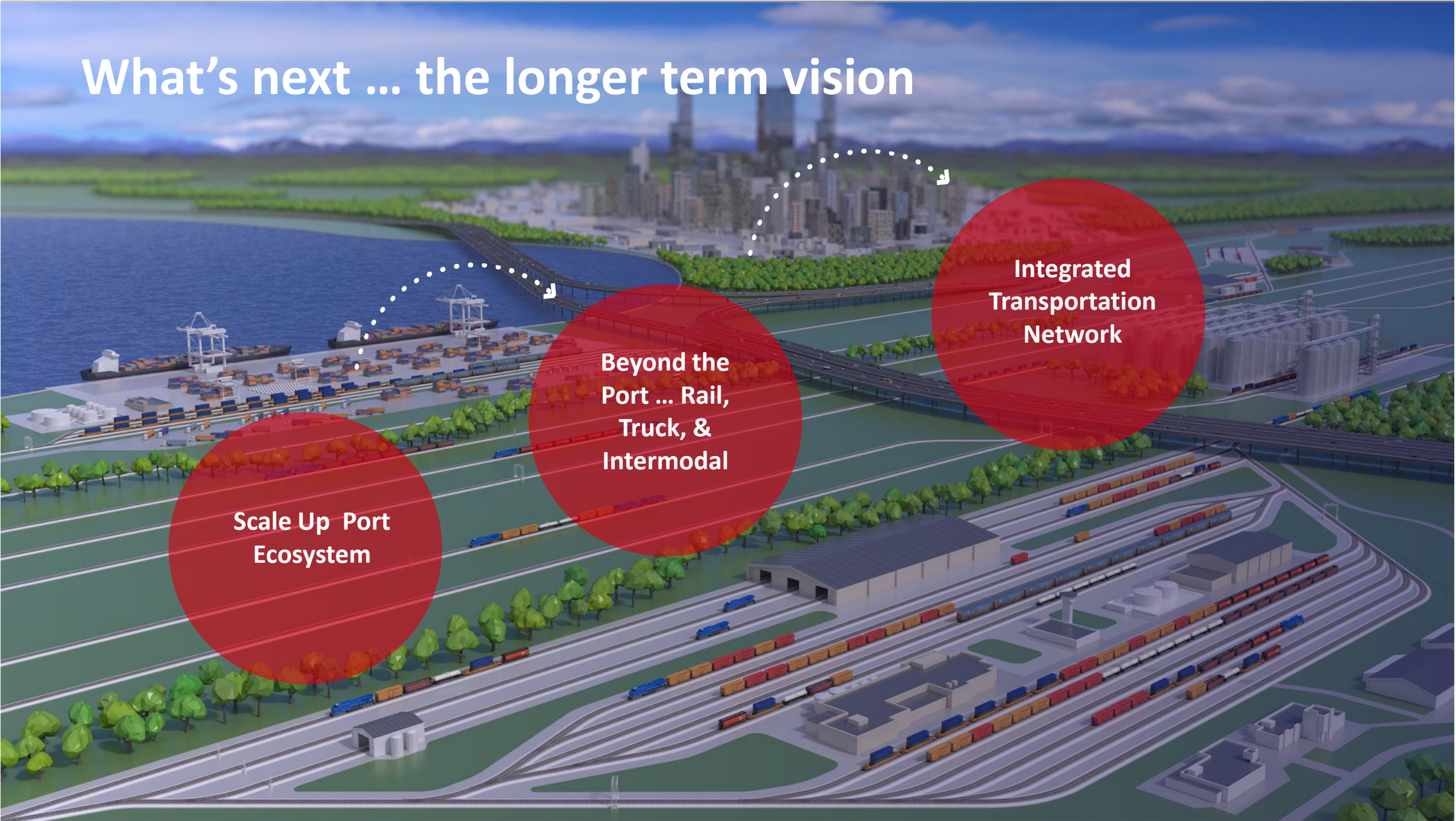


# What's next ... the longer term vision

Scale Up Port  
Ecosystem

Beyond the  
Port ... Rail,  
Truck, &  
Intermodal

Integrated  
Transportation  
Network





## 3 Lessons Learned ...

1

### **Get started! Refine the scope: *Pilot***

- Create a digital solution that works (think: minimum viable product)
- Demonstrate value quickly



## 3 Lessons Learned ...

2

### Create a Digital Thread:

- Vertical: Digitize within key processes
- Horizontal: Digitize across key processes





## 3 Lessons Learned ...

3

**Strong Leadership:** *Visionary thinking*

- Someone who can take the vision of digital transformation and sell it across the organization as well as with external stakeholders.



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