

ORACLE

From Data to Decisions: How AI is Helping Reshape Logistics

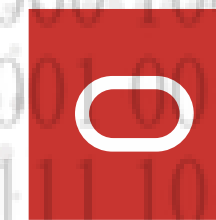
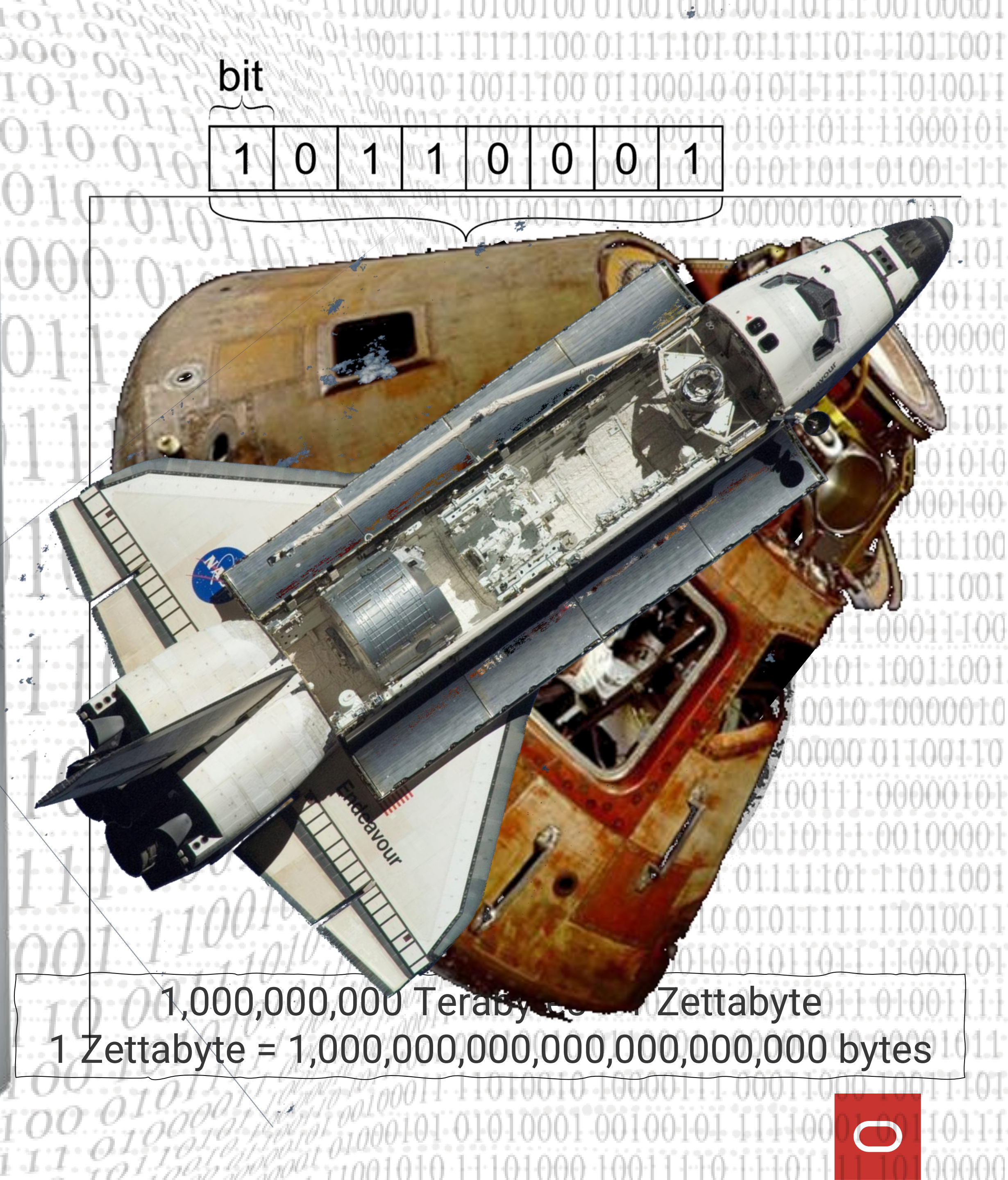
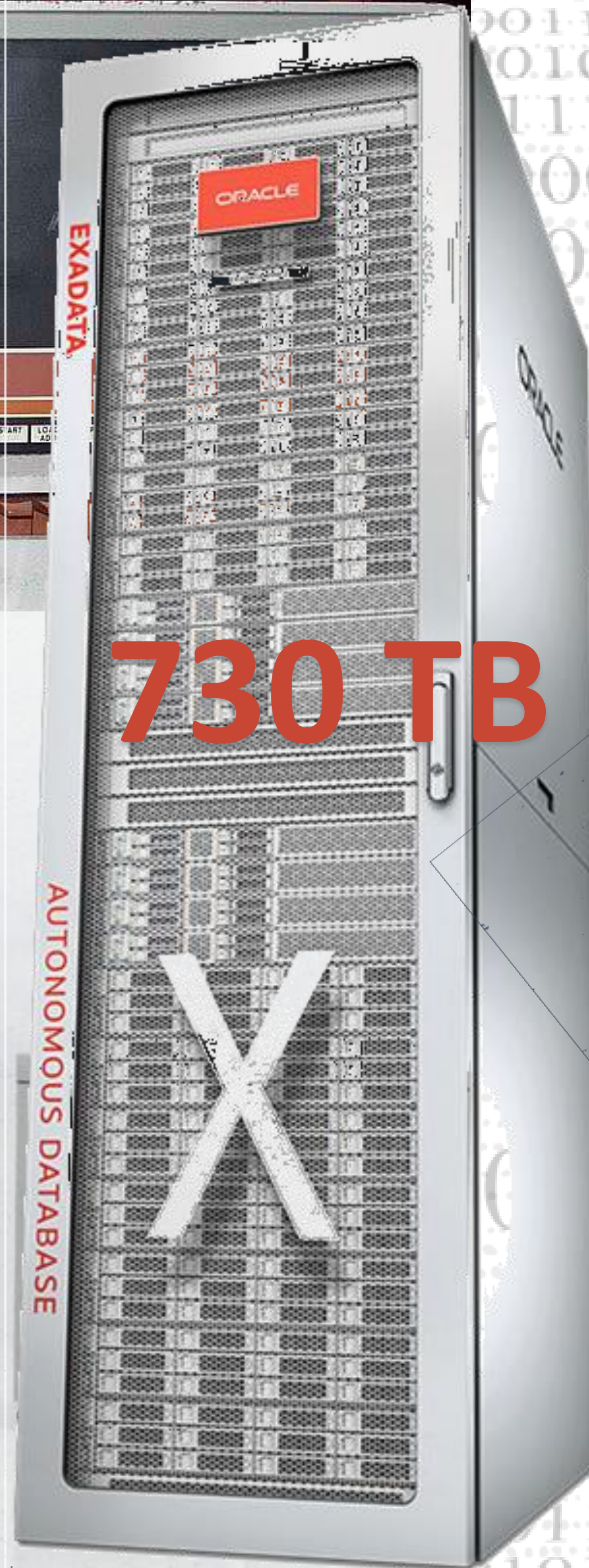
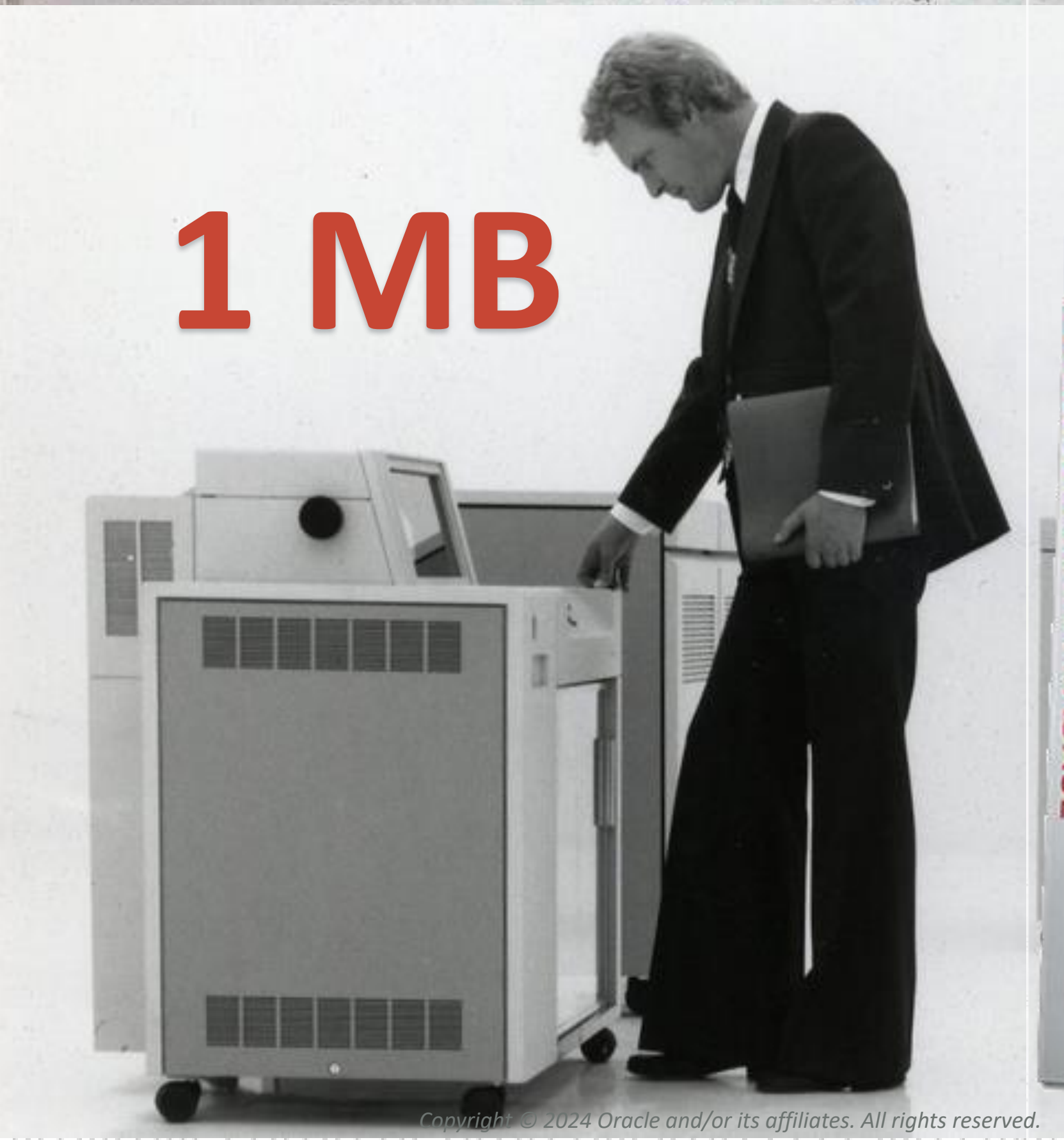
Dominic Regan
8th February 2024



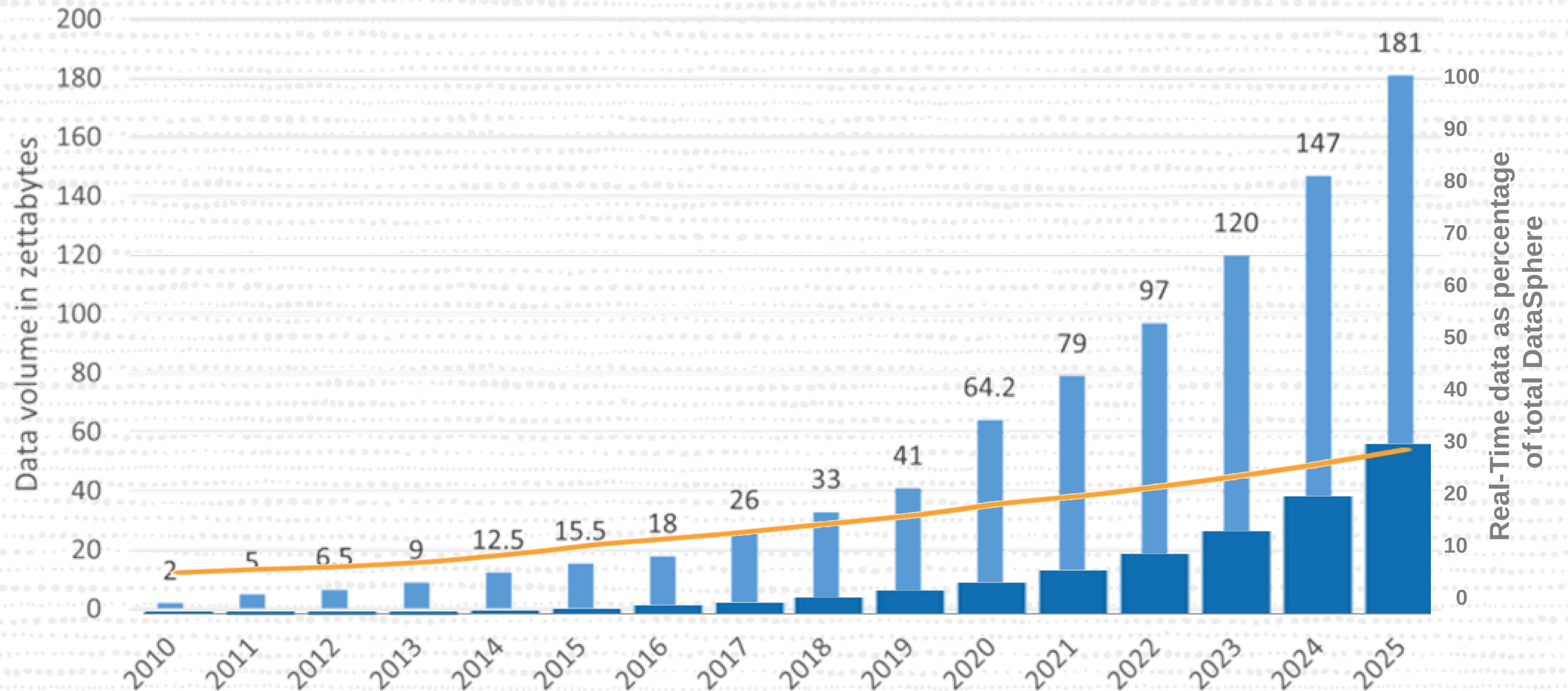
Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions.

The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.

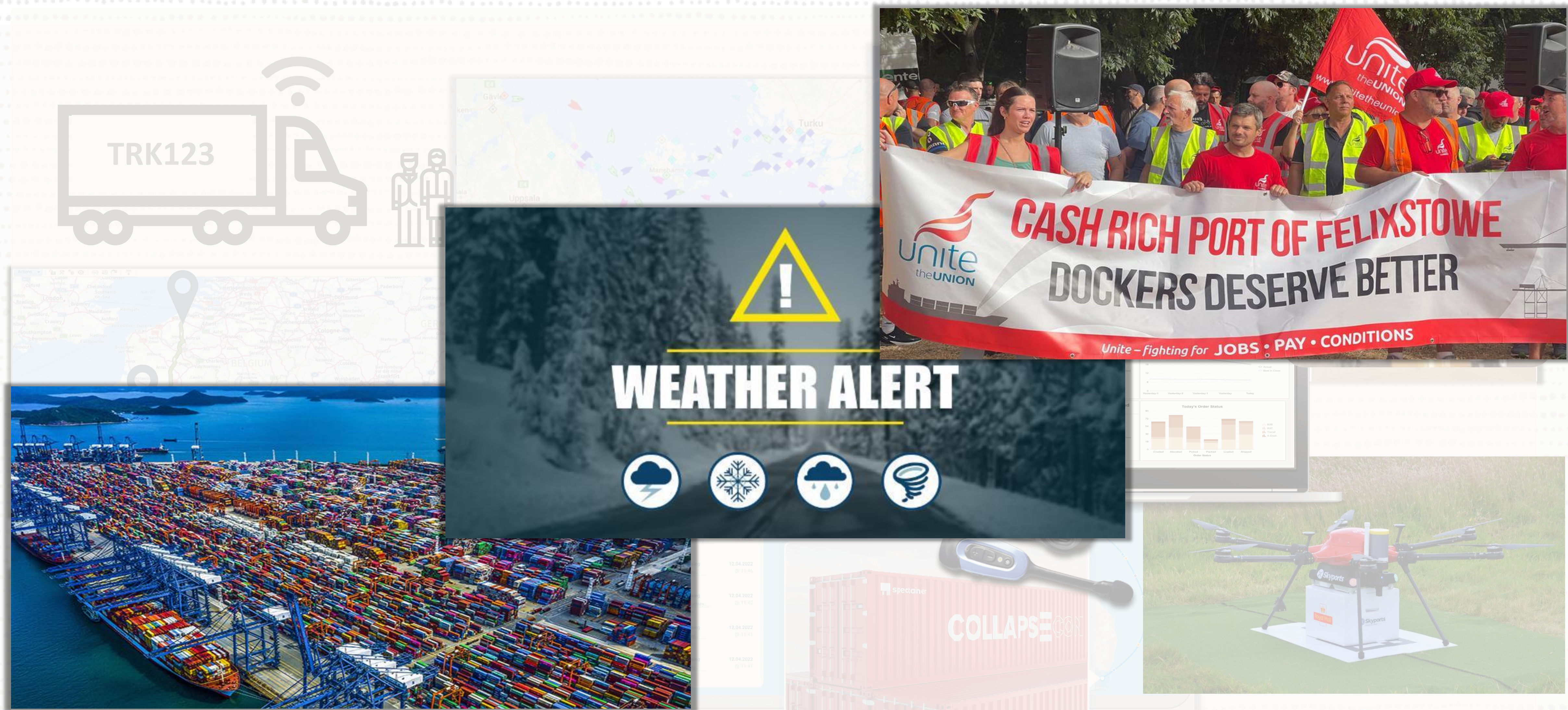


Volume of data created and replicated worldwide



Source: IDC, Global DataSphere Forecast 2021-2025

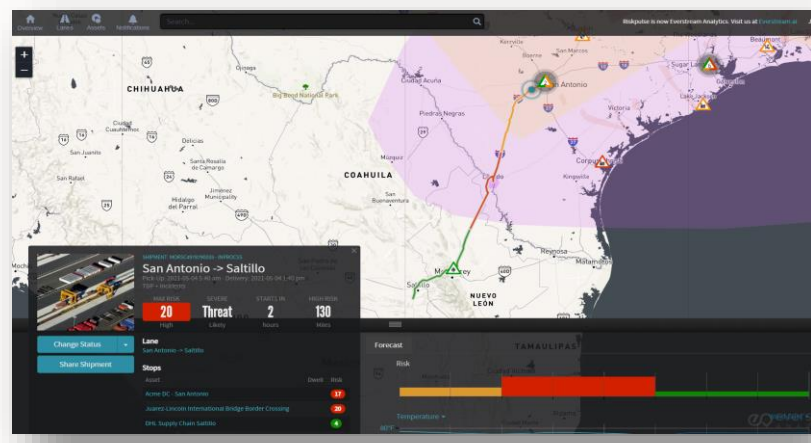
Sources of real-time logistics data



Data Related Logistics Trends

Existing Customer Base External Online

Shipment Risk Evaluation



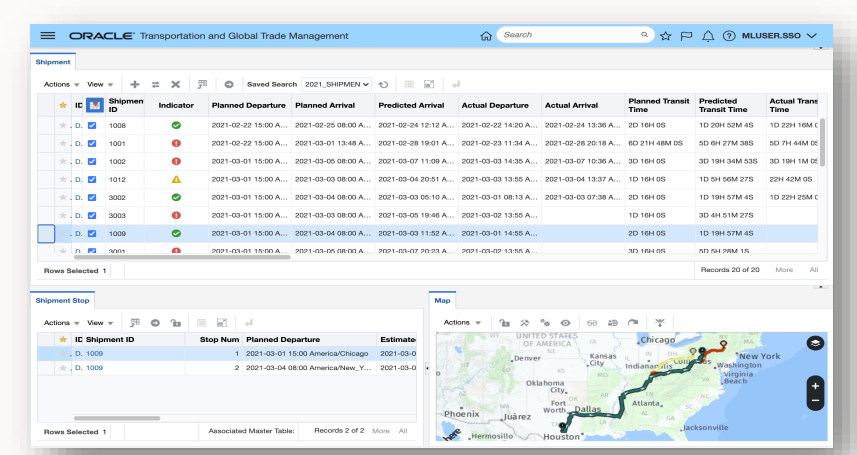
Commercial Data Sales

Data Visualisation

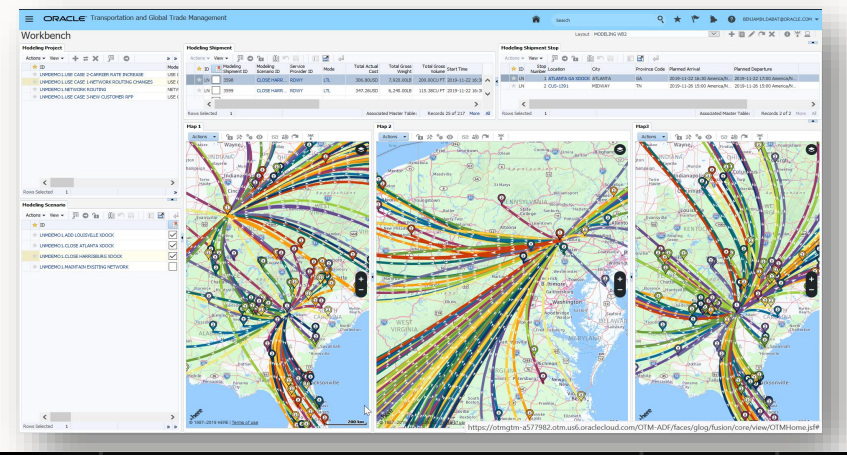


Marketing and Sales

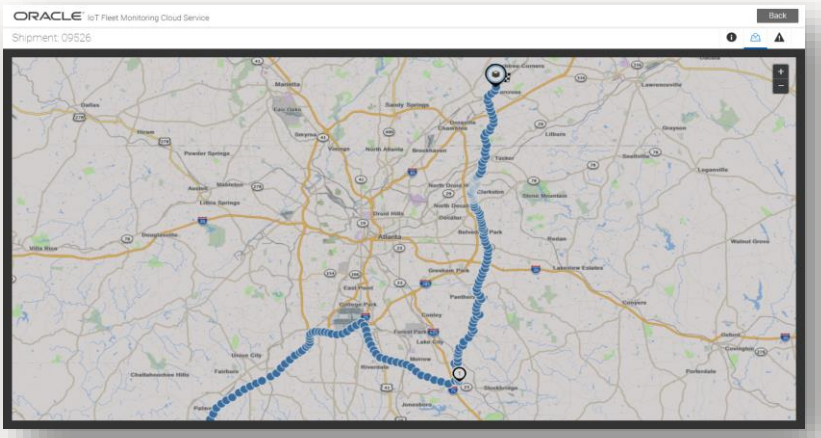
AI/ML for Logistics



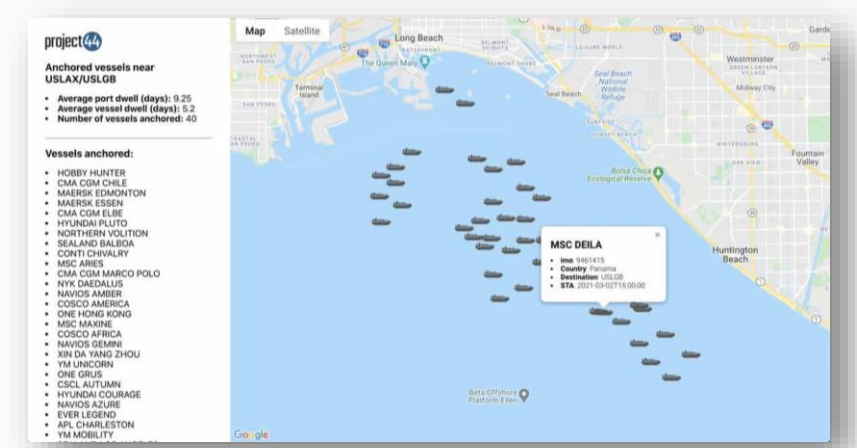
What-if Tactical Planning



Vehicle/Cargo Tracking



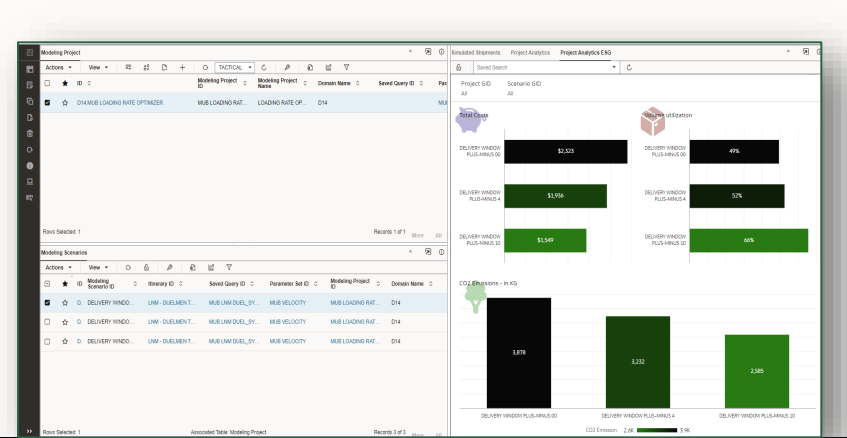
Visibility Aggregators



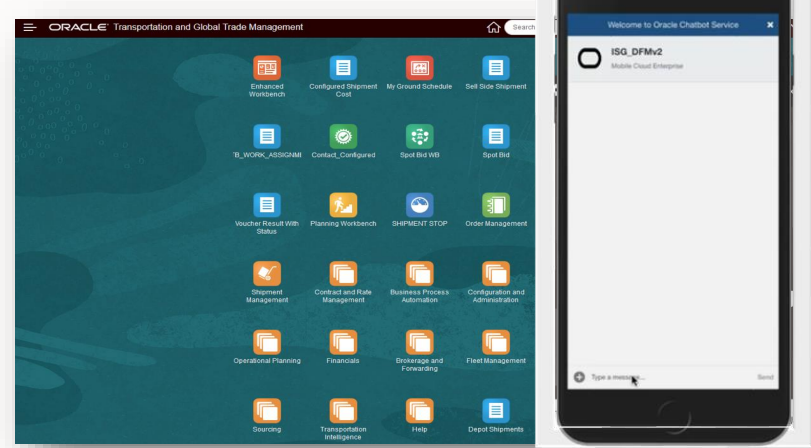
Multi-tier Visibility



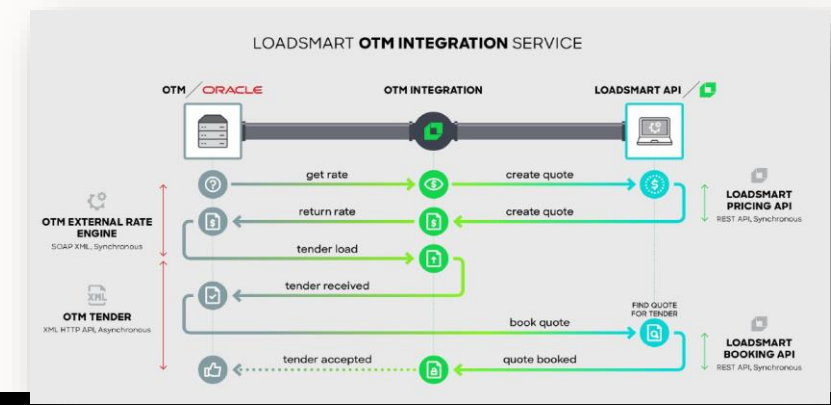
Sustainability & Fleet Electrification



Digital Assistant

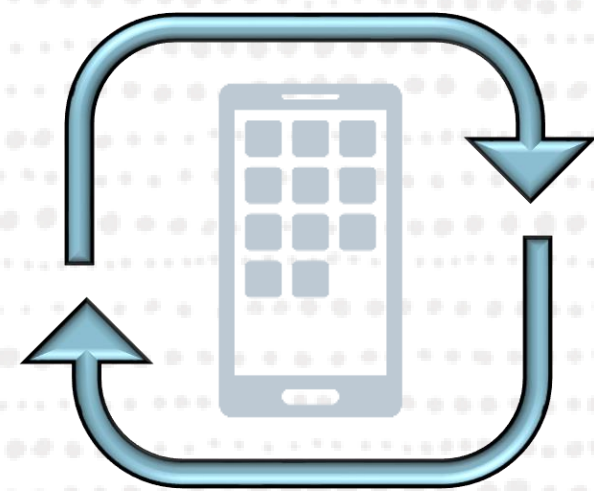


Digital Freight Brokerage & Market Benchmarking



The supply chain is data driven

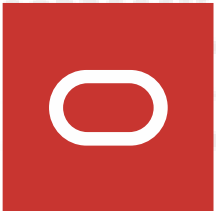
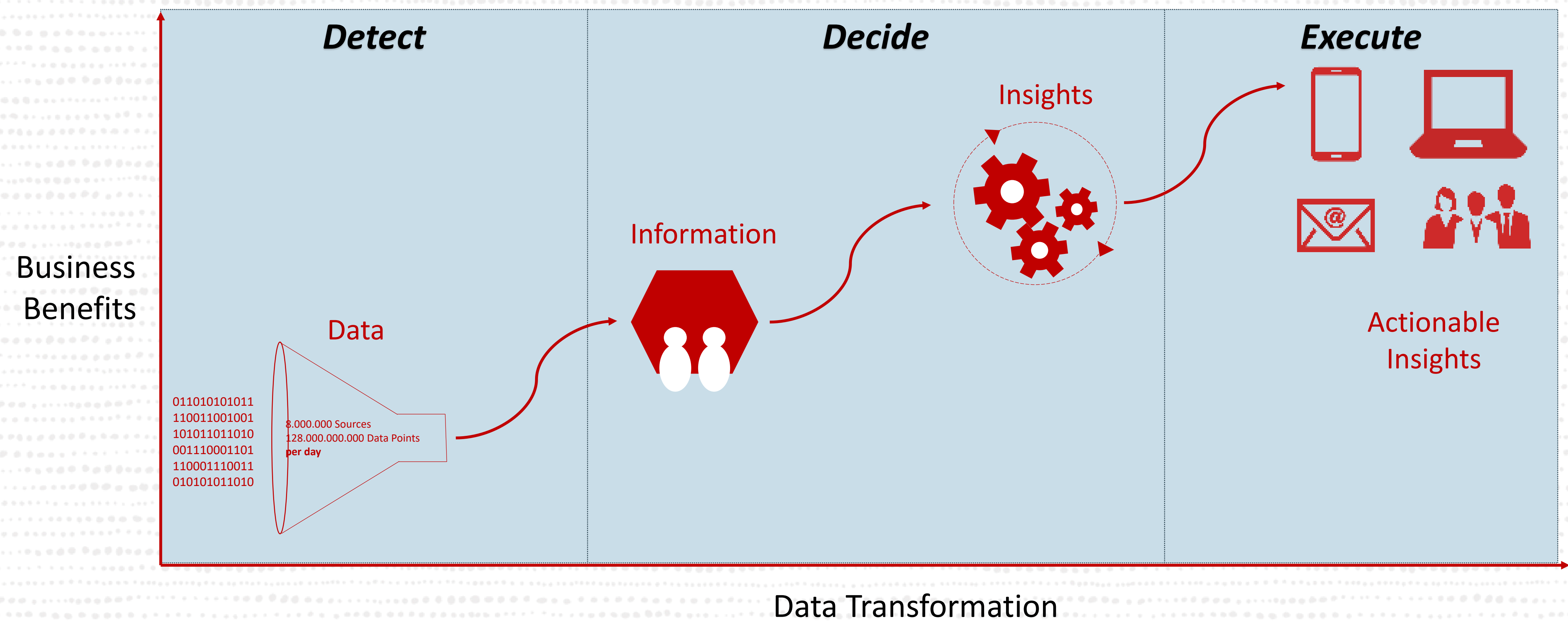
MOUNTAINS OF NOISE



Continuous



Supply chain data needs to drive actionable insights



Actionable insights drive supply chain value

Problem	Solution	Impact
Disrupted shipments increasing operations workload	Pre-transit and in-transit incident alerts by location, land and shipment	70% reduction in resource time „casing shipments“
Inaccurate ETAs driving high operational costs	Risk adjusted ETAs during planning up to 2 weeks before departure	1-5% improvement in on-time performance
Unplanned disruption mitigation costs	Predictive pre-transit and in-transit disruption alerts per shipment	1-2% improvement in expedited freight
High cost of refrigerated transport	Risk scores that provide guidance on when reefers are and are not needed	\$2M temperature sensitive optimization savings

AI-Powered Logistics





Driver/Stakeholders

Conversational User Experience
[AI Natural Language Processing & Entity, Intent Recognition]



OTM Mobile App



Logistics Digital Assistants





Planner

Personalized Redwood Smart UX
[AI User Preference Analysis]

Enhanced UI



Data Visualization

Business
Input



Manual Entry



Integration



Documents

Data & Platform	Planning & Execution	Strategy & Performance
Error Detection [AI Outlier Detection] Document Extraction [AI Computer Vision]	AI Fulfilment Prediction  AI Put-away Slotting  AI Order Routing & AI Order Consolidation  Transit Time Prediction 	Volume & Budget Forecast [AI Forecasting]
Performance Monitoring [AI Anomaly Detection] Log Analysis [AI Text Analysis]	Advanced Restricted Party Screening [AI Search & Text Transformation] Intelligent Product Classification [AI Classification]	Capacity Forecast [AI Forecasting]

Business
Outcome

Better Contracts



Lower Costs



Higher Reliability



Sustainable Supply Chain



Embedding AI/ML into Logistics

Designed for change. Built
for you.

1

Predictive ETA (Estimated Time of Arrival) for shipments, both at planning as well as during in-transit

Oracle
Transportation
Management

2

Predictive order fulfilment times, to predict when an order will be shipped from the warehouse

Oracle
Warehouse
Management

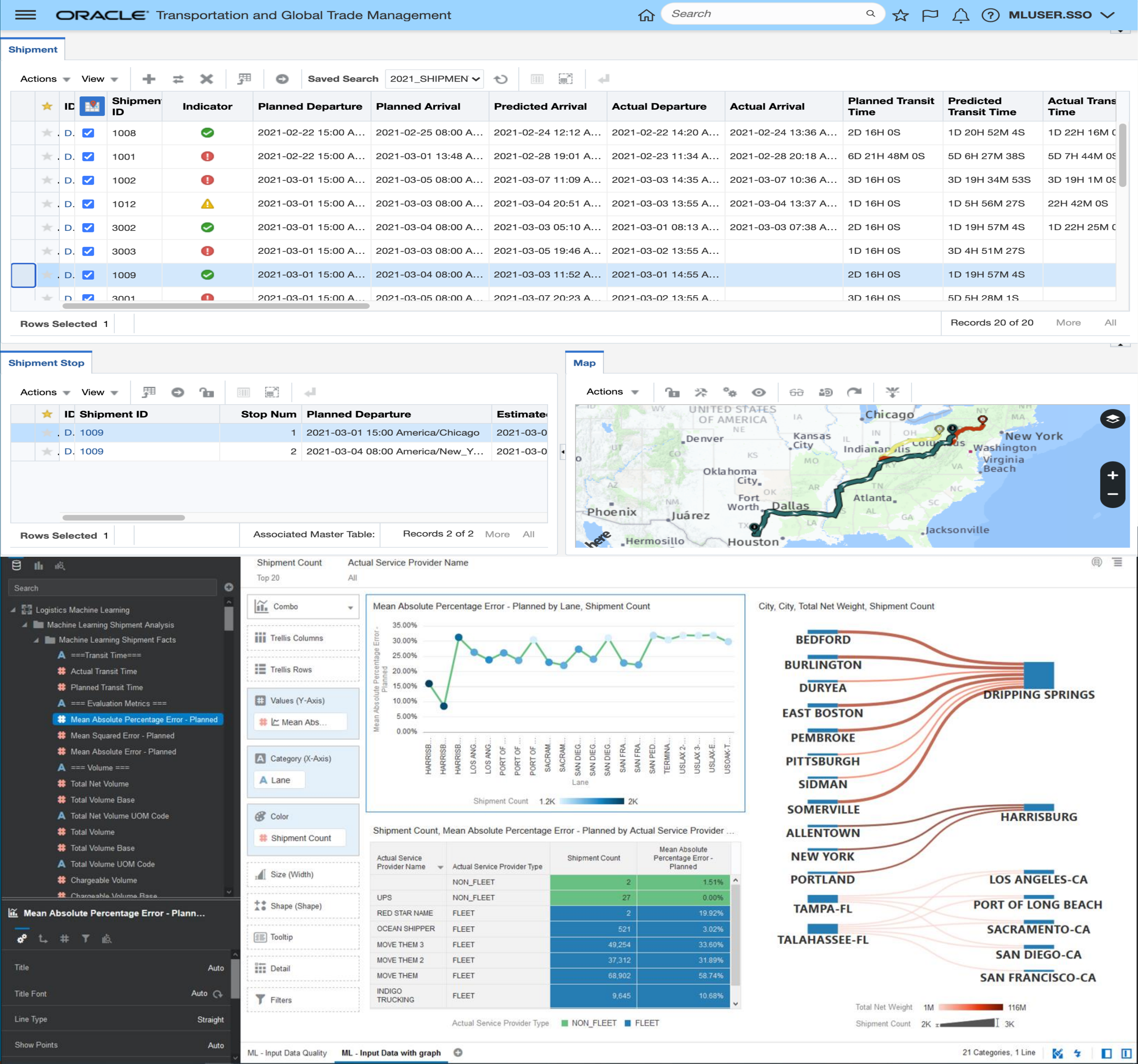
3

Predictive warehouse slotting using market basket analysis, to locate and re-locate items in the warehouse

Oracle
Warehouse
Management

AI/ML for Predictive ETA's (Estimated Time of Arrival)

- Calculate ML-based transit time prediction via automatic processes or ad-hoc queries
- Applies both during planning and while shipments are in-transit
- For each shipment, the ML algorithm:
 - Analyzes shipment characteristics
 - Chooses the best business-specific model
 - Applies the ML Model and produces ML predicted transit time
 - Compares Planned, Predicted and Actual Transit Times side-by-side



Machine Learning Process Flow

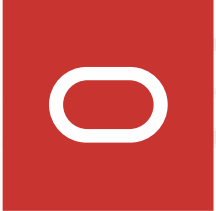
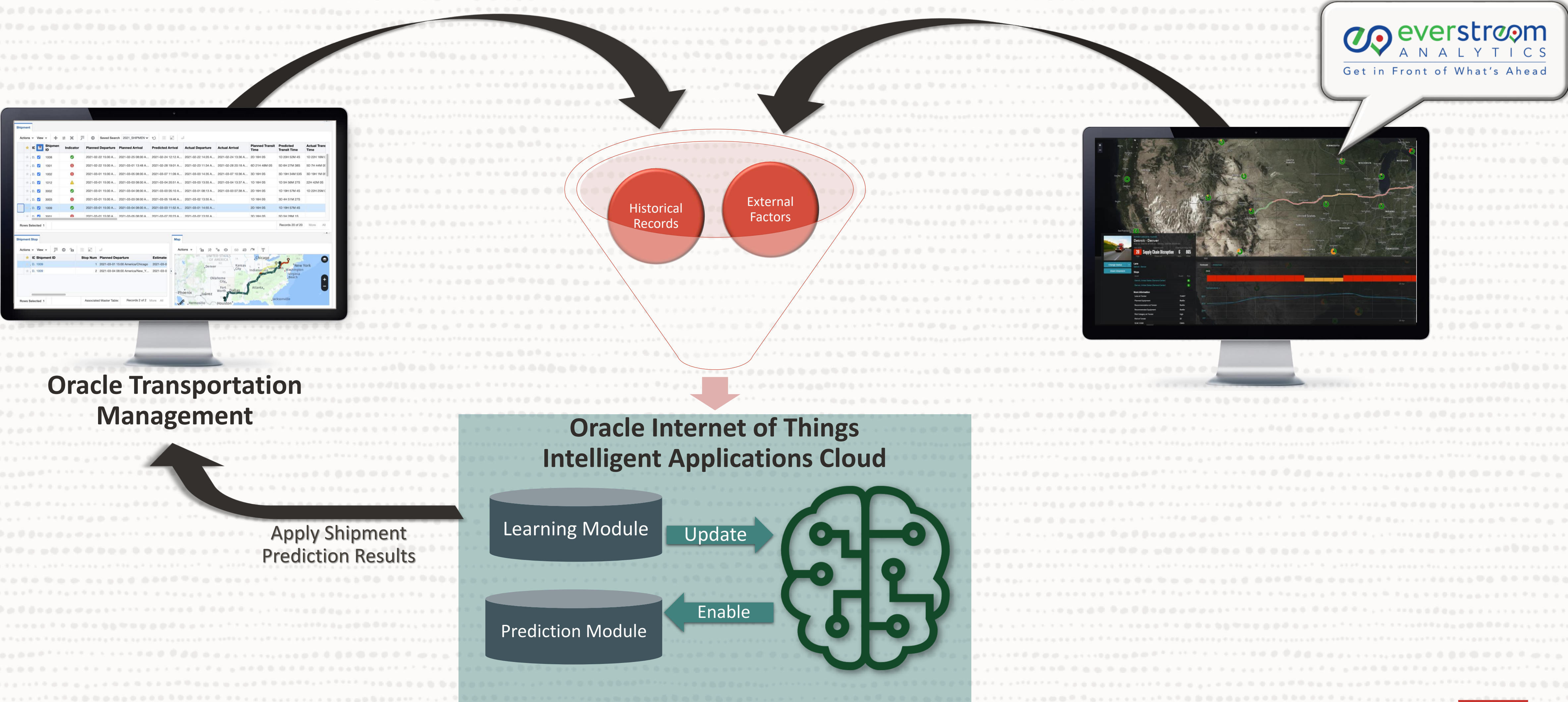


Machine Learning Admin (ML Admin)



Regular TMS User

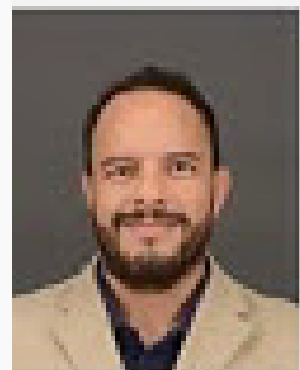
Machine Learning Process Flow





“Oracle Transportation Management's built-in machine learning capabilities have helped improve ETA accuracy from 64 percent to 93 percent, which is an invaluable result in terms of an improved customer experience.”

About the presenter



Julio E. Magallanes is a Senior Logistics Analyst with 20 years of experience in logistics and supply chain operations.

A team member of the Western Digital Center of Excellence doing research and development to enhance Western Digital's competitiveness.

Leads the team developing the Digital Assistant App for Logistics and Global trade compliance and collaborates in the Logistics machine learning project.

My daughter Michelle was 15 years old when she started her online store, which motivated me to learn about chatbots to improve customer service at Western Digital.

44:53

SCM Western Digital Presents Extending Logistics with Digital Assistant and Machine Learning

258 views • 1 month ago



OracleSupplyChain

As part of Western Digital's journey into the most innovative 4th Industrial Revolution (4IR) technologies, Western Digital ...

Link to presentation: [Western Digital Extends Logistics with Digital Assistant and Machine Learning](#)



AI/ML Predictive Fulfillment Dashboard

- Historical KPI data along with predictions for the future, using ML algorithms
- Customer centric KPI's
 - Order Cycle time
- Anticipate changes in KPIs
 - Predict an increase in order cycle time



Order Cycle Time 38% Above Average

32 Hrs
Average order cycle time in hours

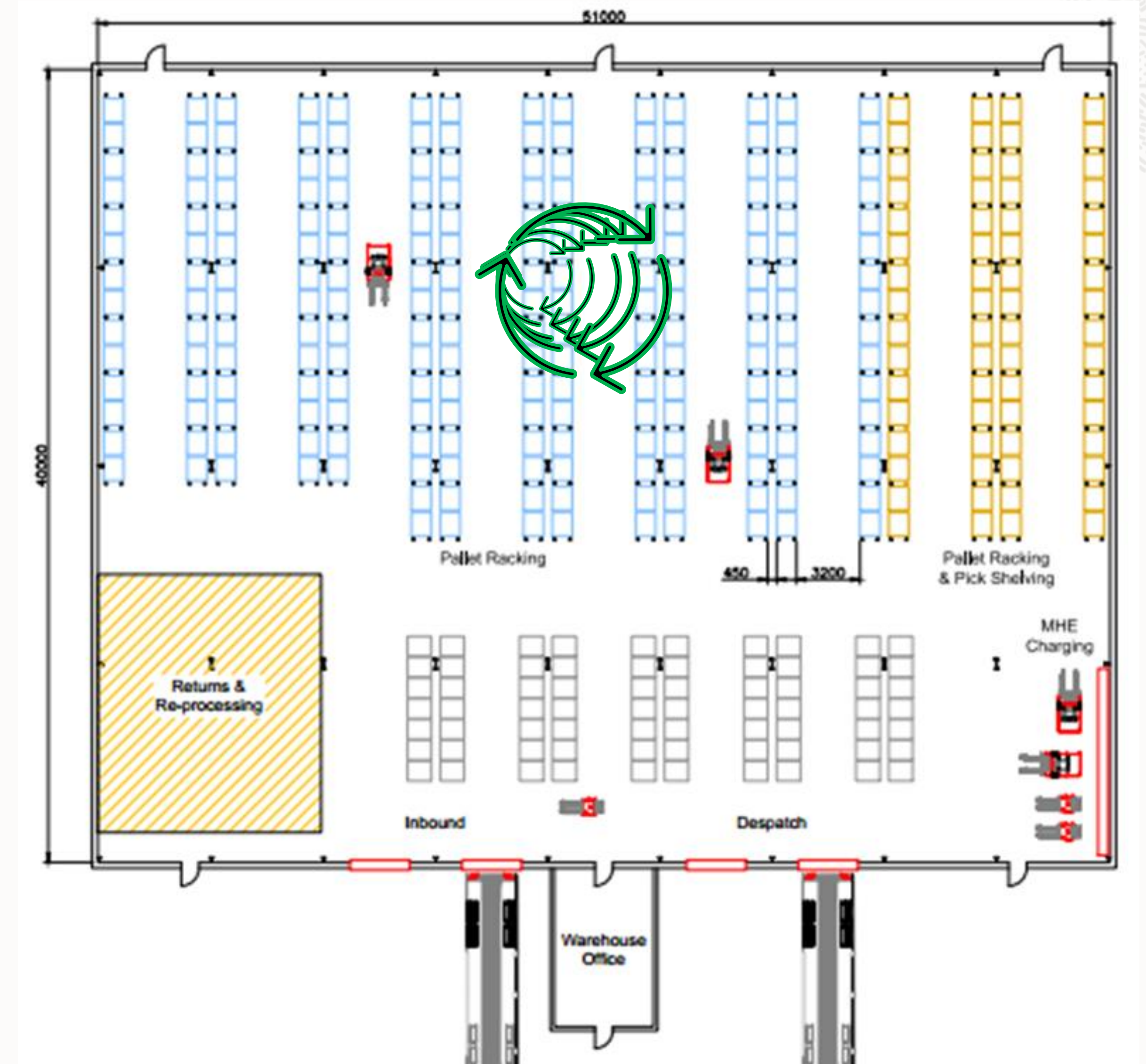
Orders above target threshold

Order Nbr	Order Status	Order Type	Predicted Time (Hours)	Expected Shipped Date Time	Required Ship Date
JPORD0410_5	Loaded	JP STORE FLW&WAVE	36.58	9/28/2022, 10:31:47 PM	6/28/2019
KHORD20190823A	Loaded	KH Order Type	36.42	9/28/2022, 10:21:47 PM	8/23/2019
ORDER09_17_1	Loaded	Store order without short	36.28	9/28/2022, 10:13:47 PM	8/22/2019
ORDER8292008	Loaded	Store Ord	36.13	9/28/2022, 10:04:47 PM	
GUORD04121907	Loaded	For pick and alloacte	36.10	9/28/2022, 10:02:47 PM	12/4/2019
ORD103190012	Loaded	Store Ord Partial	36.07	9/28/2022, 10:00:47 PM	10/3/2019
KHORD20191109AD	Loaded	KHORDT02	35.70	9/28/2022, 9:38:47 PM	9/11/2019
ORDER0828_SH1	Loaded	SHStore order	35.67	9/28/2022, 9:36:47 PM	9/14/2018
ORDWJ92519002	Loaded	Store Ord Partial	35.32	9/28/2022, 9:15:47 PM	6/10/2019

Overview

AI/ML Predictive Slotting

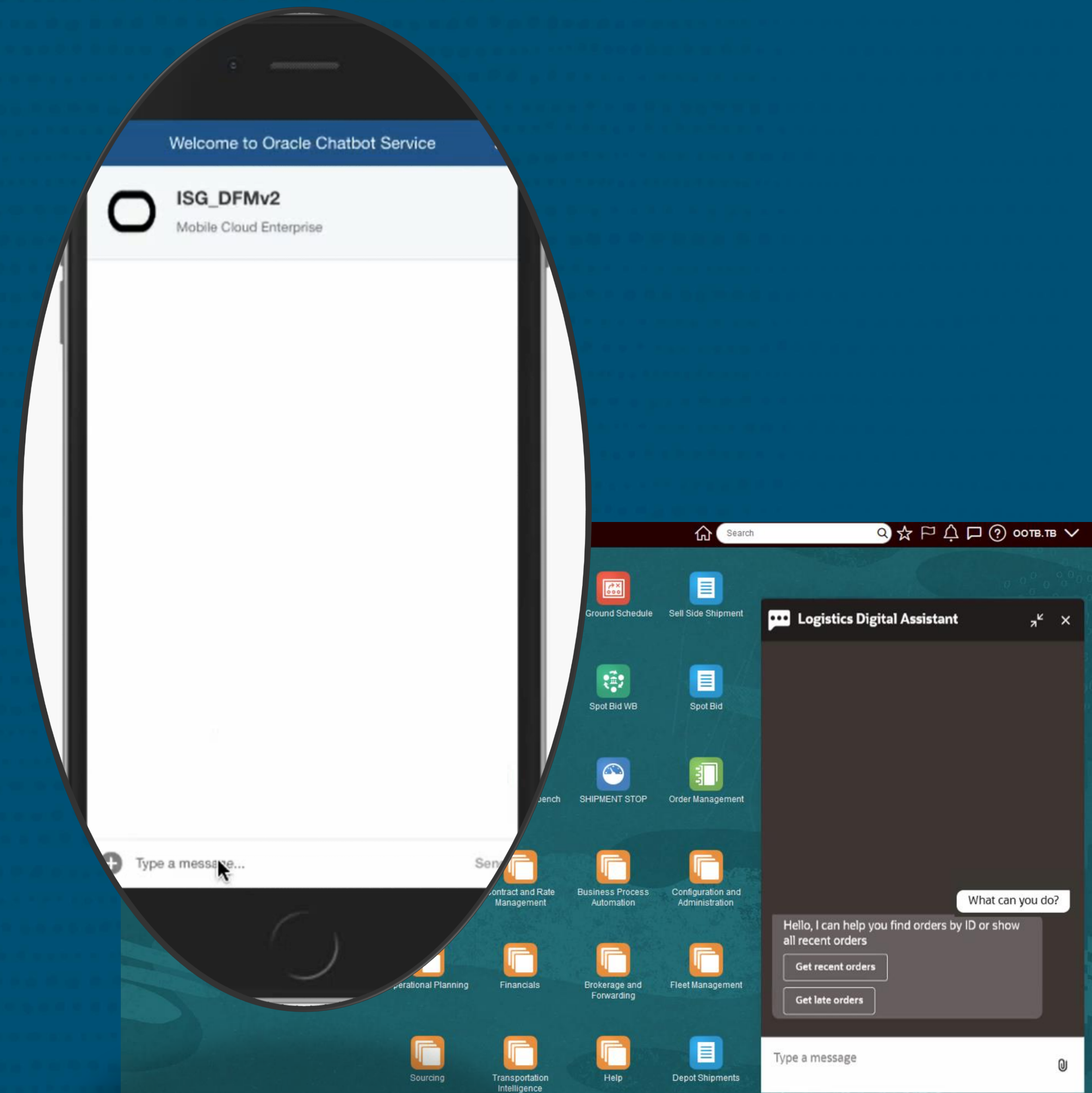
- Analyze your inventory using Market Basket Analysis, generating a report that displays items in your warehouse that are commonly ordered together
- Leverage Market Basket Analysis for Putaway, evaluating candidate Locations based on the Primary Item's Location
- Gradual centering of clusters
- Incorporate into current operations
- Perform re-slotting over time without the time consuming and disruptive traditional process



Conversational AI

Provide real-time information through conversational interaction:

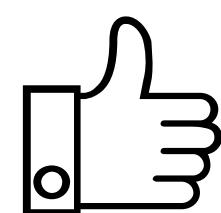
- Easy mobile access to order, shipment & product information
- Send requests using text or speech, supports MS Teams, WhatsApp, SMS, Slack, Messenger, etc.
- Latest status and location based on IoT, sensors, etc.
- Extensible and adaptable via the Oracle Digital Assistant Platform:
 - Use REST APIs to access relevant business objects: orders, shipments, invoices, etc.
 - Integration with heterogenous IT landscape



Western Digital - Logistics Assistant Bot

<https://community.oracle.com/customerconnect/events/603659-scm-western-digital-presents-extending-logistics-with-digital-assistant-and-machine-learning>

- **Western Digital's first Logistics Assistant Bot**, can make an impact in the operation with efficiency, scalability and strong R.O.I
- **Major function** include shipment tracking, document retrieve, Product Packaging info, Invoice status, Claim tracking and Subscription etc. It can further be expanded to Planning, Procurement, Manufacturing.
- User feedback for **learned behaviors** and predict and provide personalize service



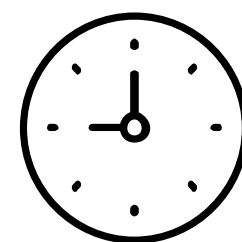
4.3

User Rating



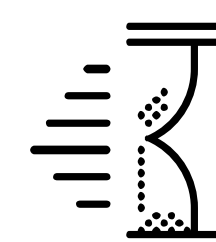
17%

Reduced
Email traffic



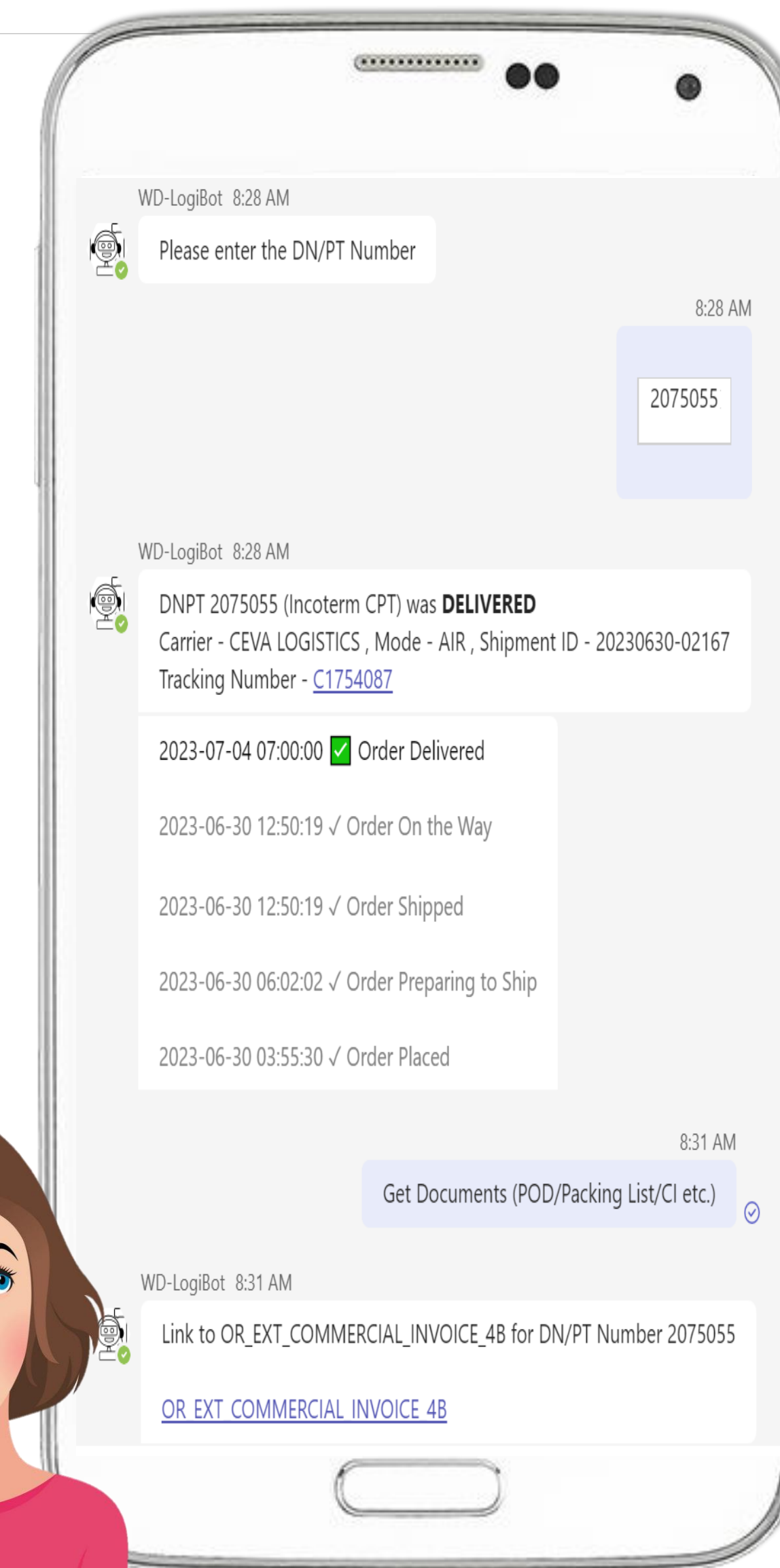
700hrs

Of working hours
saving annually

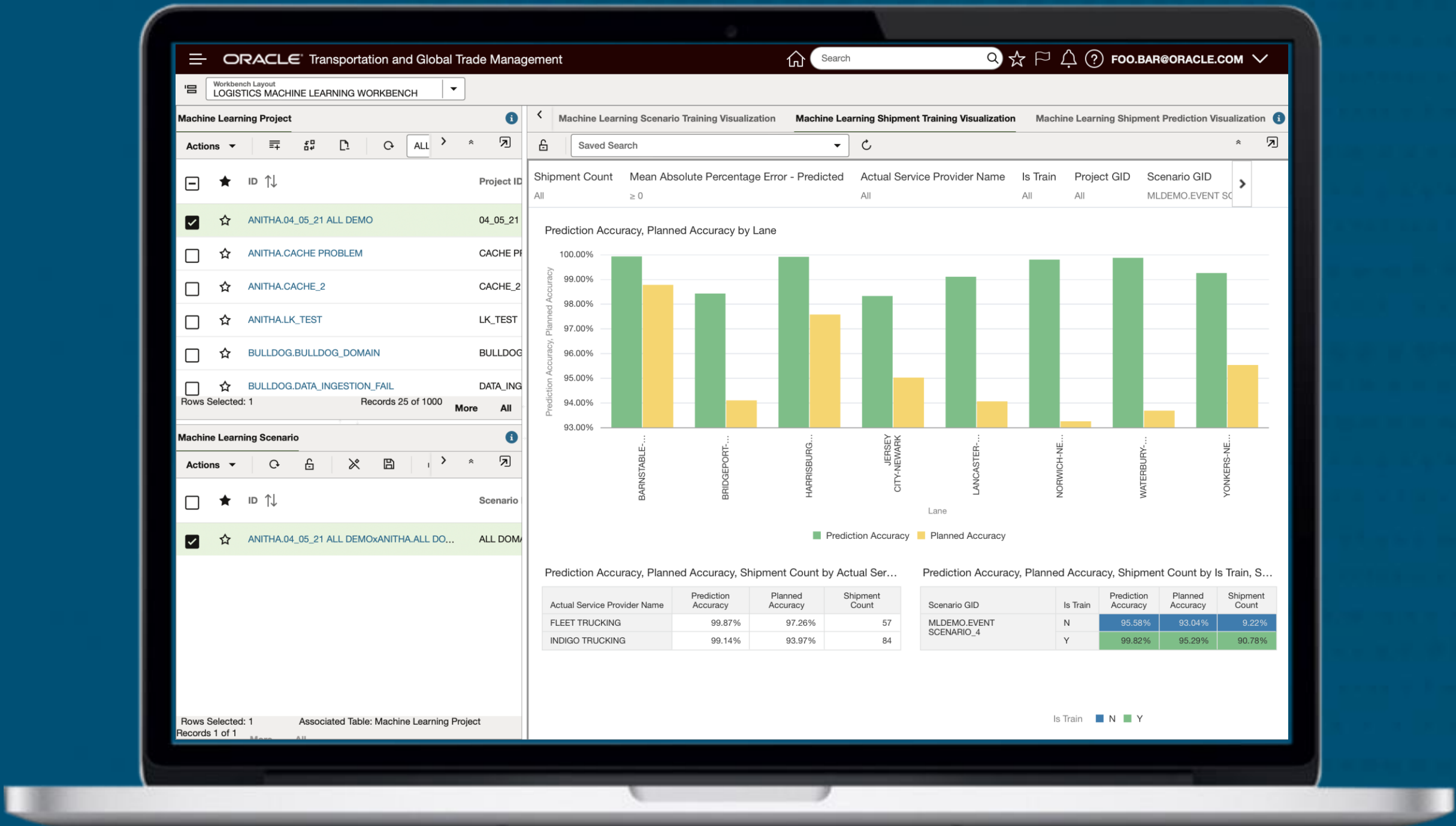


6hrs

Turn-around time
reduction



Continued AI/ML Expansion



Order Routing and Order Consolidation

- Determines the desirability of orders consolidating in same shipment; ensures orders follow user-preferred route

Data Anomaly/Outlier Detection

- Analyze data as received or entered by a user: screen for anomalies & potential errors in real time

Document Extraction and Anomaly Detection

- Convert documents into data for ingestion and avoid effort & errors from manual entry.

Product Classification

- Reduce user effort & errors in identifying the correct classification codes (e.g., HS codes)



Introducing Cohere

The Oracle + Cohere strategy is simple:

*Deliver the most impactful and intelligent generative solutions for your business. Oracle has partnered with leading generative AI company Cohere to create the industry's best generative AI solutions for the **enterprise**.*



Generative AI and Supply Chain

According to analysis undertaken by Ernst & Young in 2024, supply chains can benefit from Generative AI through its ability to:

- Classify and categorize information based on visual or textual data
- Quickly analyze and modify strategies, plans and resource allocations based on real-time data
- Automatically generate content in various forms that enables faster response times
- Summarize large volumes of data, extracting key insights and trends
- Assist in retrieving relevant information quickly and providing instant responses by voice or text

Source: Ernst & Young, 2024, https://www.ey.com/en_us/coo/how-generative-ai-in-supply-chain-can-drive-value

Generative AI and Logistics

Example areas of value for Generative AI in Logistics include:

- Logistics network design
 - Optimize the design of logistics networks considering factors such as warehouse locations, transport links and demand patterns to generate the most efficient configuration. This leads to reduced delivery times, lower costs and improved service levels.
- Last-mile dynamic route optimisation
 - For logistics operations, one of the major challenges is routing in real time. Generative AI can continually update and optimize delivery or pickup routes based on changing factors like traffic conditions, weather and the priority of deliveries. This leads to increased efficiency, reduced fuel consumption and improved customer satisfaction.
- Global trade optimisation
 - Analyze the myriad variables, including tariffs, customs regulations, trade agreements and shipping costs, to suggest the most efficient and cost-effective trade routes and strategies. This aids companies in navigating complex international trade networks, helping ensure compliance while minimizing costs.

Source: Ernst & Young, 2024, https://www.ey.com/en_us/coo/how-generative-ai-in-supply-chain-can-drive-value



Digital Twins

What-if Tactical Planning

Define, optimize, analyze & compare logistics scenarios

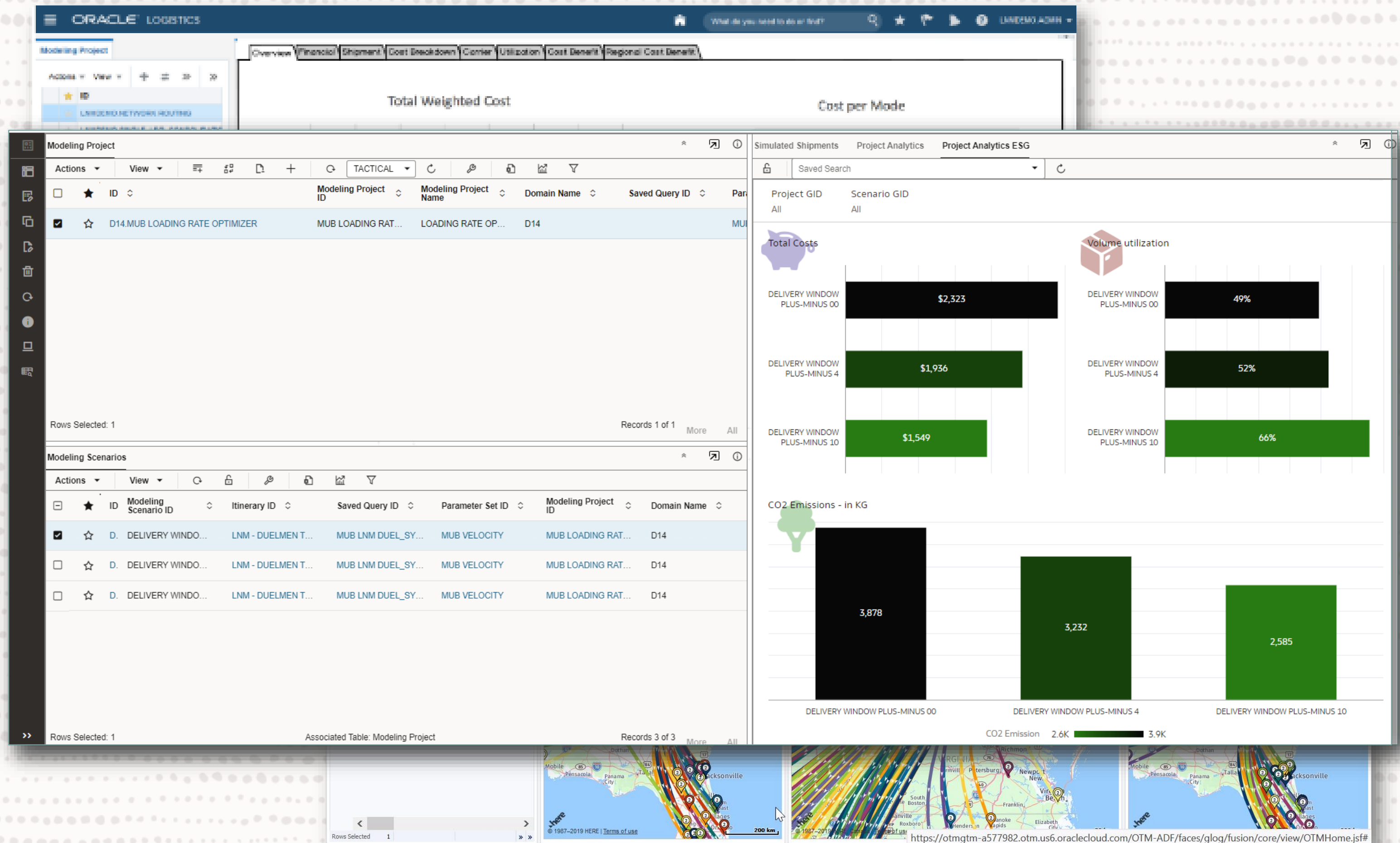
- Network Design
- What-If Analysis

Simulate network performance using real-world, operational data

- Carriers, rates, capacities, locations, equipment, items, order history, etc.

Intrinsic part of TMS for seamless execution

- Use operational data in scenarios
- Implement decisions and changes for immediate effect



Digital Twins

What-if Tactical Planning

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DOW'S LNM PROJECTS FOR 2021

1H 2021	2H 2021
NAA Logistics: Multi-Pick TX Sites Cross Company	EMEA Logistics: Multi-Stop Distance_Based Rates
NAA Logistics: Multi-Pick KY Sites Cross Company	NAA Logistics: Multi-Stop New Contracts
	NAA Logistics: Spot Bidding w Redwood Logistics
	APAC Logistics: Multi-Stop Savings Estimate Short Haul Multi-Stop Savings Estimate Long Haul



Q&A

