Microsoft's Devices Supply Chain Transformation

Ken O Farrell

Our Products

Xbox

Surface Studio

Surface Hub

HoloLens

Surface

PC Hardware

Software

Our Products

HOLOLENS POINT OF VIEW

Transformation Motivation

Our Transformation to a Digital Supply Chain

Wave 3:
Cognitive

Amplify with algorithmic decision making and automated execution.
Intelligent. Empowered

Wave 2:
Predictive

Move from Reactive to Predictive with big data, machine learning, and IoT.
Smarter. Faster

Wave 1:
Connected

Leverage the cloud to connect, automate, visualize E2E view of business.
Interconnected. Aligned

Digital Transformation increases PACE

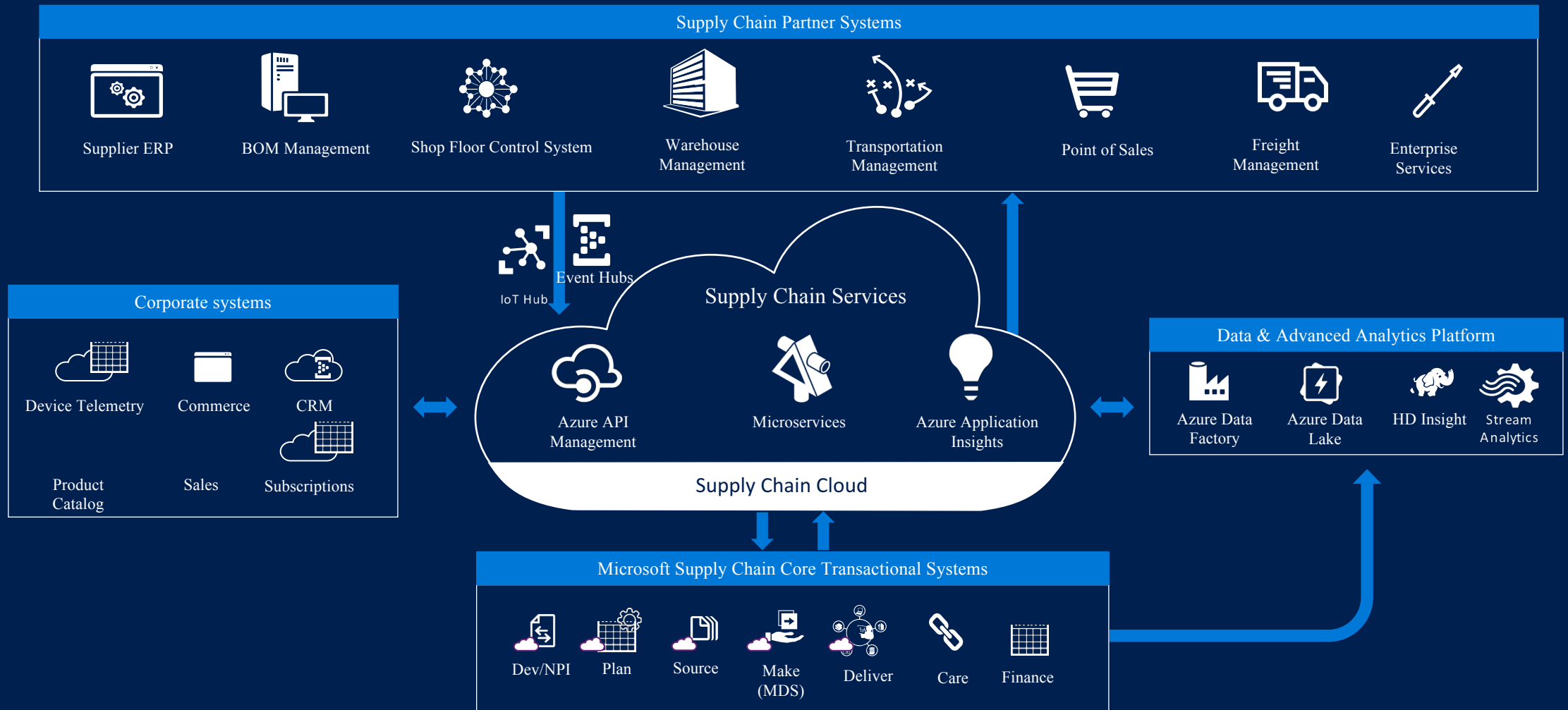|	
Trusted	Validate data & be correct, build credibility and convey the right message
Intelligent	Use cloud & analytics, understand variations and lead a conversation
Real Time	Move from weekly to real time, increase ability to respond – Requires a Culture Shift
Collaborative	Connect data streams, build reusable information assets and increase visibility & velocity

Data is the new Currency

What We've Achieved

The Azure Platform Enables a Cloud Based Supply Chain

Supply Chain Partner Systems

| Supplier ERP | BOM Management | Shop Floor Control System | Warehouse Management | Transportation Management | Point of Sales | Freight Management | Enterprise Services |

IoT Hub Event Hubs

Supply Chain Services

Corporate systems

| Device Telemetry | Commerce | CRM |
| Product Catalog | Sales | Subscriptions |

Azure API Management Microservices Azure Application Insights

Supply Chain Cloud

Data & Advanced Analytics Platform

| Azure Data Factory | Azure Data Lake | HD Insight | Stream Analytics |

Microsoft Supply Chain Core Transactional Systems

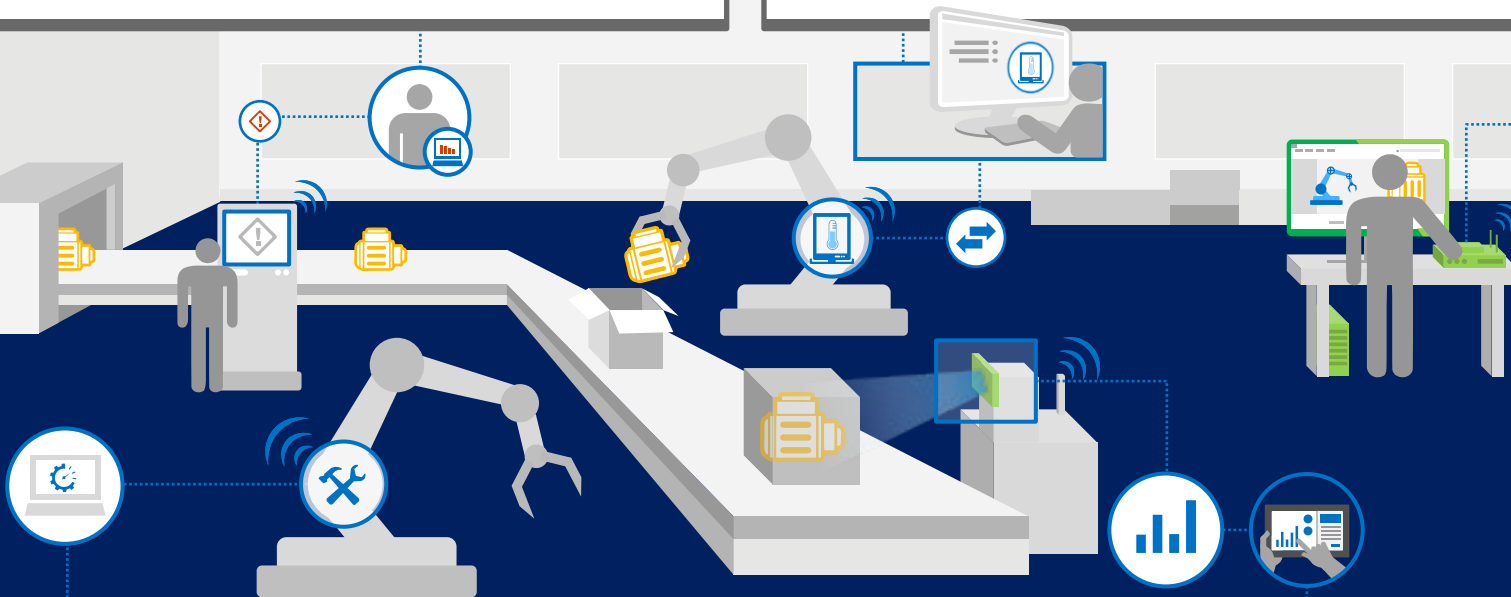| Dev/NPI | Plan | Source | Make (MDS) | Deliver | Care | Finance |

Optimize our Factories and Distribution Centers

Monitor production flow in near-real time to eliminate waste and unnecessary work in progress inventory.

Manage equipment remotely, using temperature limits and other settings to conserve energy and reduce costs.

Analyze plant data to act quickly on production insights like inefficiencies or bottlenecks and enhance productivity.

Provide cross-channel visibility into inventories to optimize supply and reduce shared costs in the value chain.

Implement condition-based maintenance alerts to eliminate machine down-time and increase throughput.

Aggregate product data, customer sentiment, and other third-party syndicated data to identify and correct quality issues.
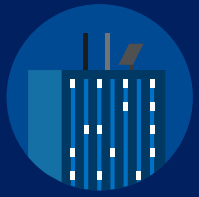
THIRD-PARTY LOGISTICS

CUSTOMER

Drive Digital Transformation End to End

Embrace customer centricity and empower our employees

Unify service, marketing and sales to gather consumer and product usage insights, improve the customer experience and increase sales productivity.
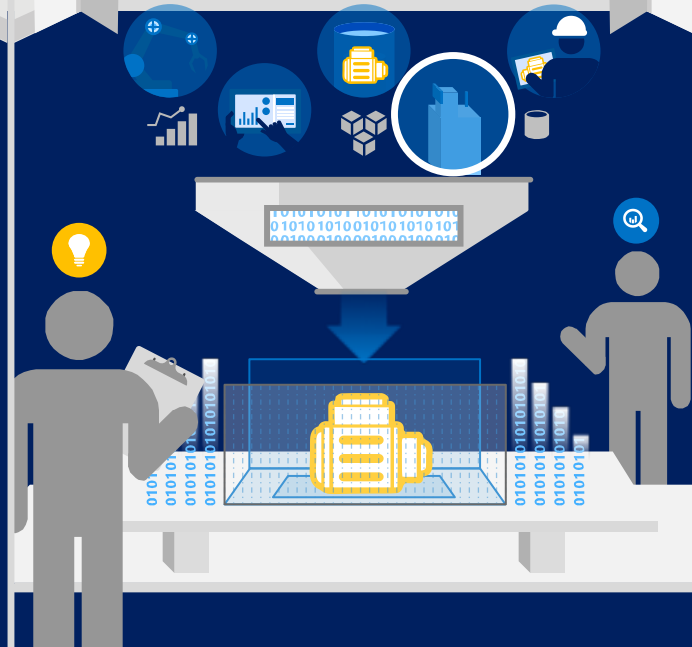
Customer Center

Innovate faster and transform our products

Act on data from the factory, global ops and the customer to seize new revenue streams, hasten new product and service introduction, and innovate.
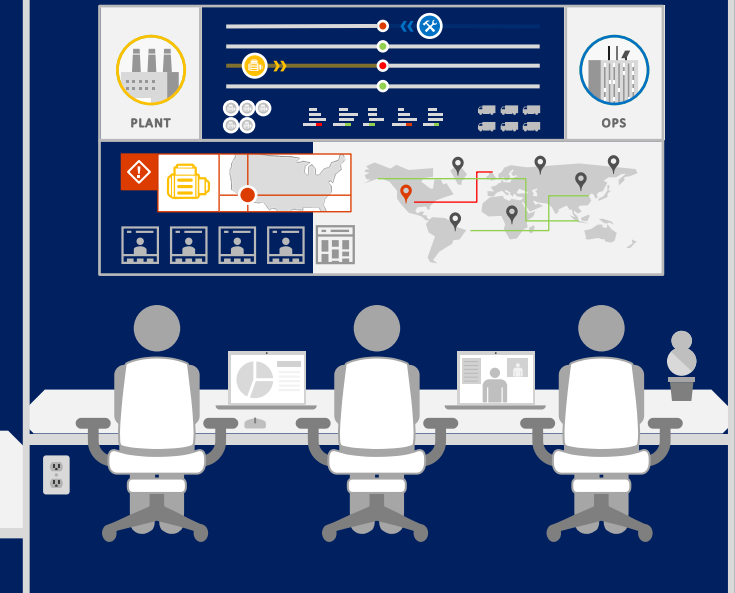
Research and Development

Optimize our operations and become more agile

Utilize global visibility to improve operational efficiency, streamline the supply-chain and increase the ability to scale seamlessly and quickly.
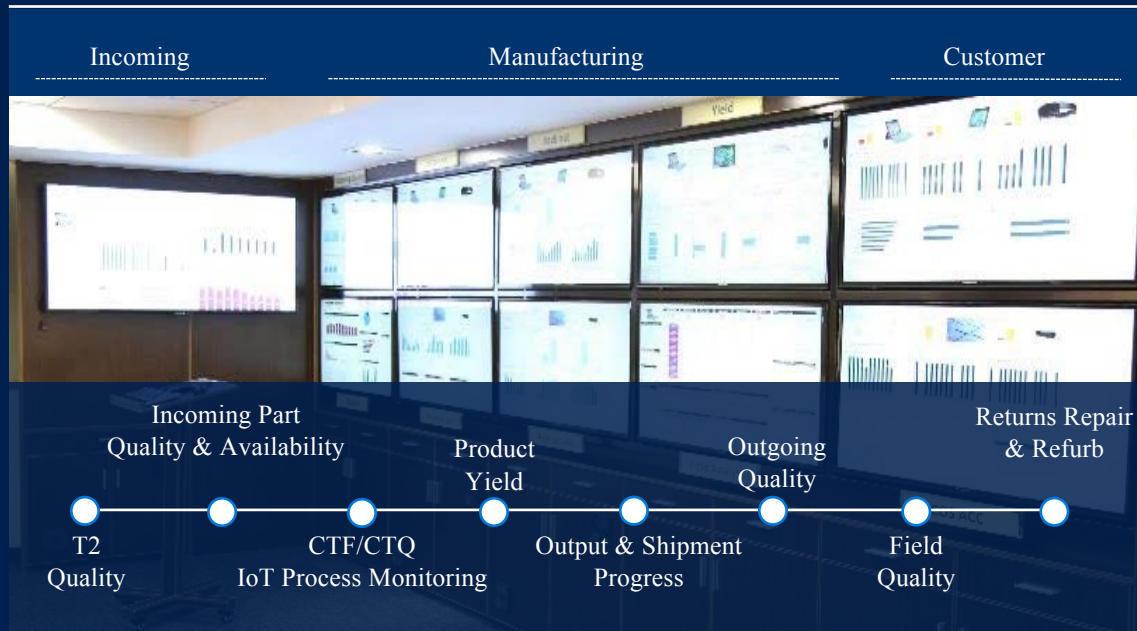
Operations & Supply-Chain Hub

PLANT

OPS

CUSTOMER

Analytics and Data

Our New Foundation Enables Power BI, Machine Learning, Advanced Analytics & Decision Making Capabilities

E2E Visibility from Incoming to Customer

Incoming | Manufacturing | Customer

Incoming Part Quality & Availability
Product Yield
Outgoing Quality
Returns Repair & Refurb

T2 Quality
CTF/CTQ IoT Process Monitoring
Output & Shipment Progress
Field Quality

- Creating Clarity via Personalized Dashboards
- Increasing Collaboration, Connected Data Streams enable Teamwork
- Improving Factory Productivity/Optimization

Proactive Alerting, Real time Insights

Big Data Mining
Proactive Alerting
Real time Insights
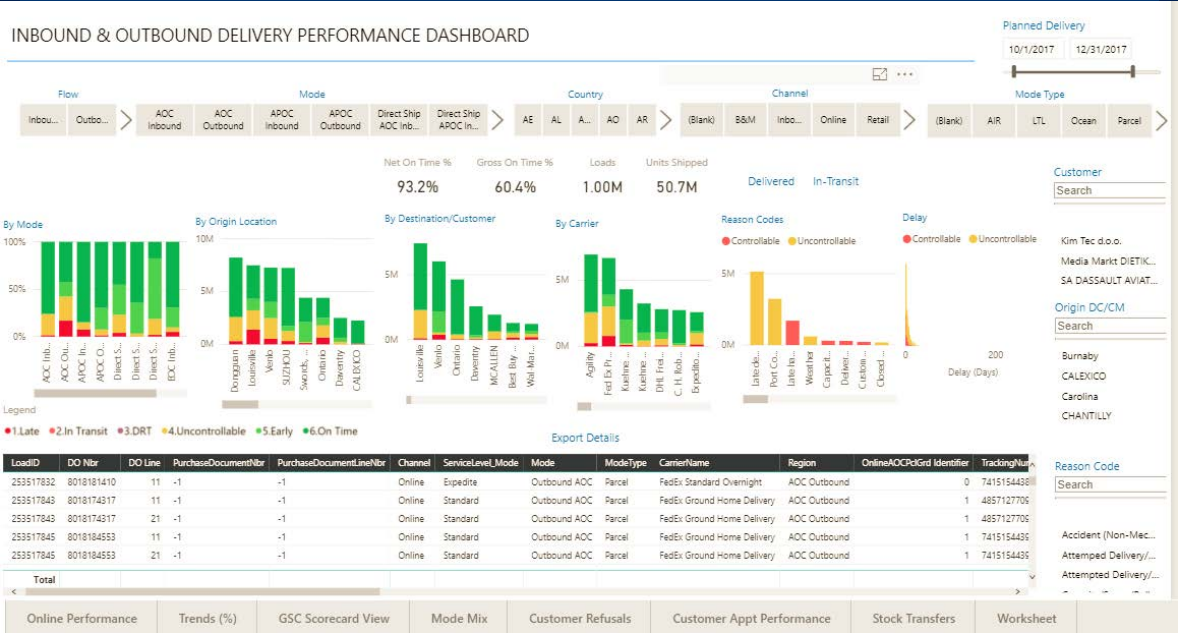Predictive Analytics
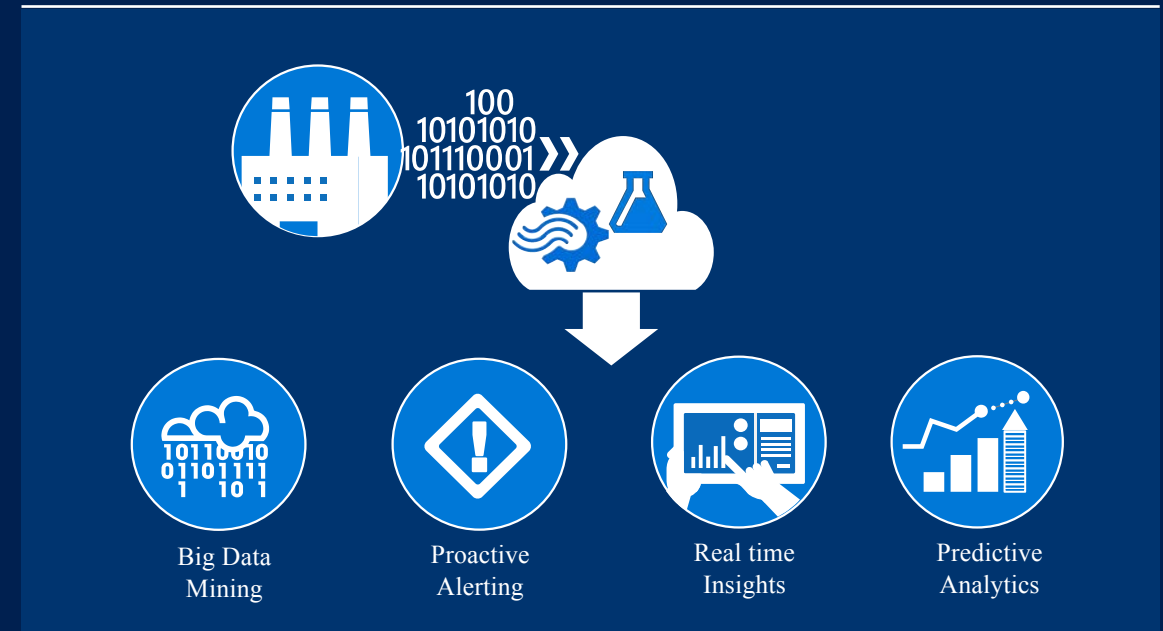
- Big Data insight and Machine Learning
- Proactive Alerting
- Predictive Analytics

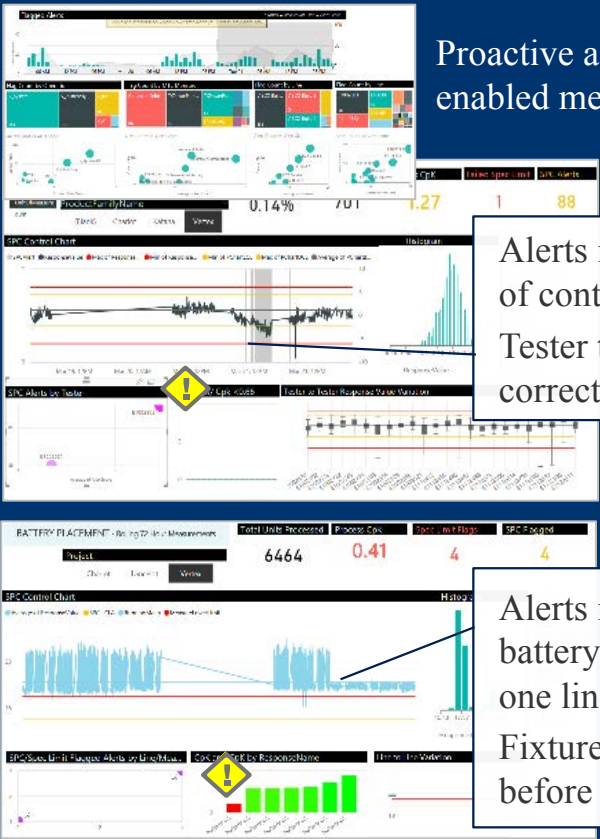# Using Data and Analytics to Drive our Day to Day Operations

Example: Inbound and Outbound Shipment Dashboard

Example: Proactive Alerting

Personalized dashboards align to Logistics Manager's purpose

Proactive alerting monitoring critical IoT enabled measurement data

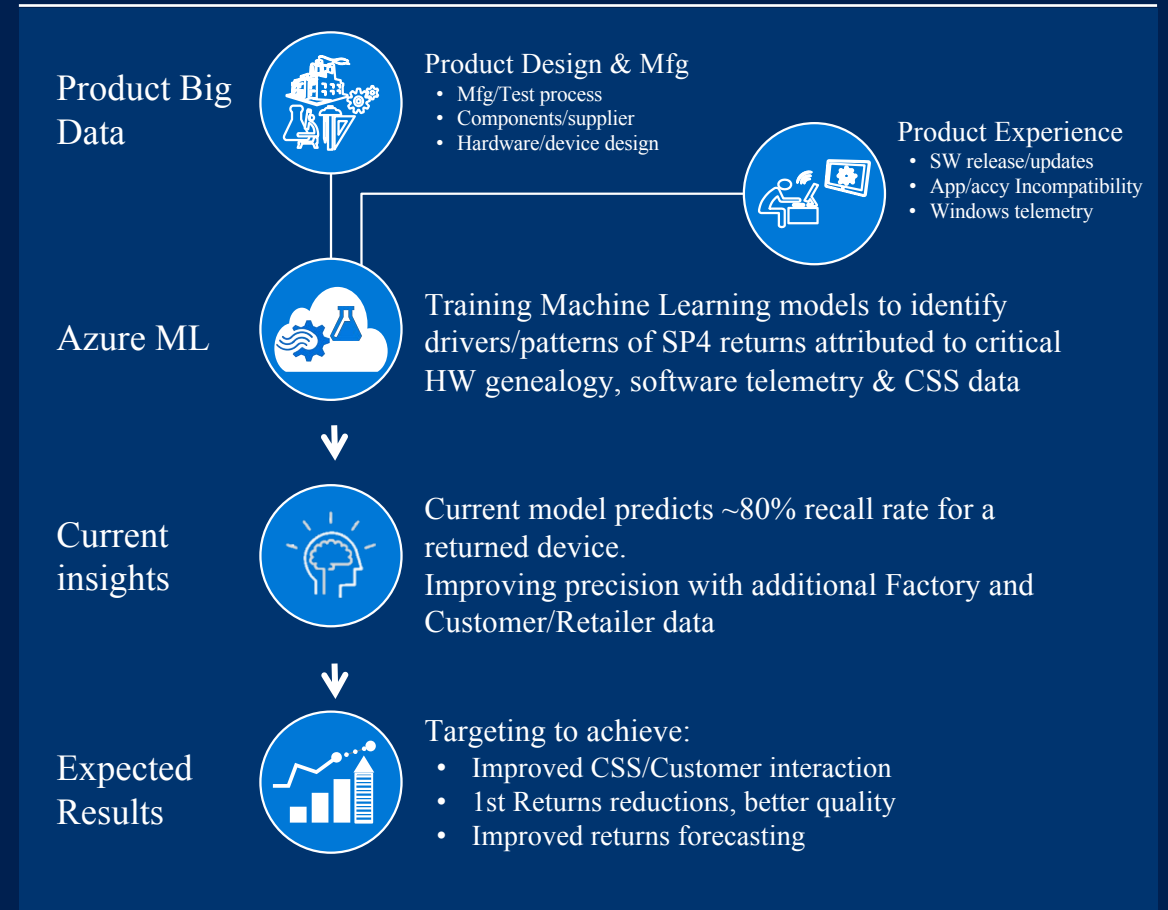Alerts identify one tester drifting out of control

Tester taken off line, and issue corrected before yield impacted

Alerts identify significantly different battery placement measurements on one line vs others

Fixture alignment issue corrected before quality impact

Utilizing Predictive Analytics & Machine Learning

Example: Predictive Yield Improvement

Factory Data
Assembly component, Genealogy, MES, Environmental

Azure ML
Analytics engine evaluated multiple attribute variables to predict top patterns across Wafers, Chips

Predictive insights
Model predicted optimal patterns and optimized manufacturing parameters for improved yield

Results
Targeted patterns/combinations demonstrated ~30% yield improvements and $2M in scrap reduction

Example: Predictive Return Insights

Product Big Data

Product Design & Mfg
- Mfg/Test process
- Components/supplier
- Hardware/device design

Product Experience
- SW release/updates
- App/accy Incompatibility
- Windows telemetry

Azure ML
Training Machine Learning models to identify drivers/patterns of SP4 returns attributed to critical HW genealogy, software telemetry & CSS data

Current insights
Current model predicts ~80% recall rate for a returned device.
Improving precision with additional Factory and Customer/Retailer data

Expected Results
Targeting to achieve:
- Improved CSS/Customer interaction
- 1st Returns reductions, better quality
- Improved returns forecasting

One Transportation Management System (TMS)

Managing the Digital Supply Chain on Navisphere Vision
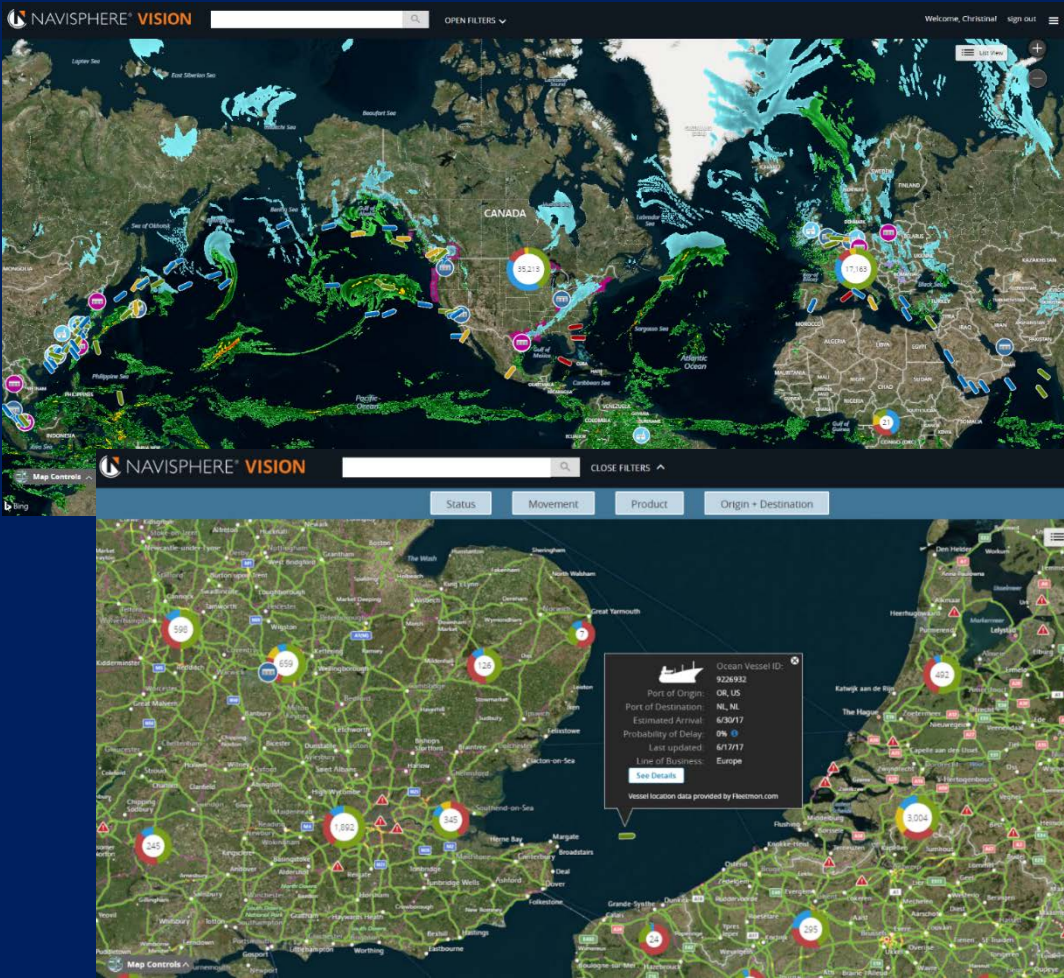
Navisphere Vision is the integrated Global Platform DSC is using to visualize our supply chain.

Millions of data points both internally and externally to the supply chain are being processed in real time through a data science model and displayed in the UI
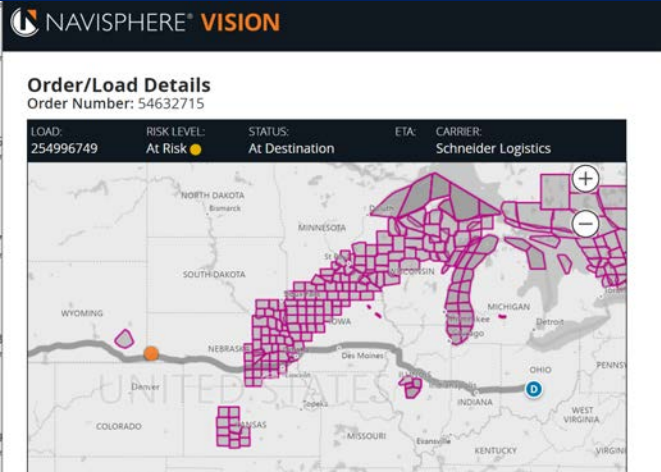
Building the fundamental architecture for machine learning and predictive analytics

35+ ELD AGGREGATORS/
GLOBAL GPS PROVIDER

ALL VESSEL
VOYAGES
GLOBALLY

ALL
FLIGHTS
GLOBALLY

ELECTRONIC DATA
INTERCHANGE
11K customers
3.5K Carriers

CELL PHONE
TRIANGULATIO
N
4.5 million/month

Machine Learning & Predictive Analytics in Navisphere Vision

As the supply chain industry moves forward and the Internet of Things continues its expansion, the ability to consume, combine, and analyze data from growing number of integrations is essential

Machine Learning and Artificial Intelligence methodologies need to be incorporated to create predictive capabilities that evolve and improve over time

Live Route Calculation

Predictive ETA using Data Science Model

Push Notifications to Customers/Stakeholder

Use of Blockchain in Supply Chain

Reduces Fraud, Increases Trust
Highly secure and transparent, making it nearly impossible to change historical records.

Creates Transparency
Allows partners involved to see every step along the process

Increases Efficiency, Speed & Scale
Simplifies transactions and enables almost instant settlement time.
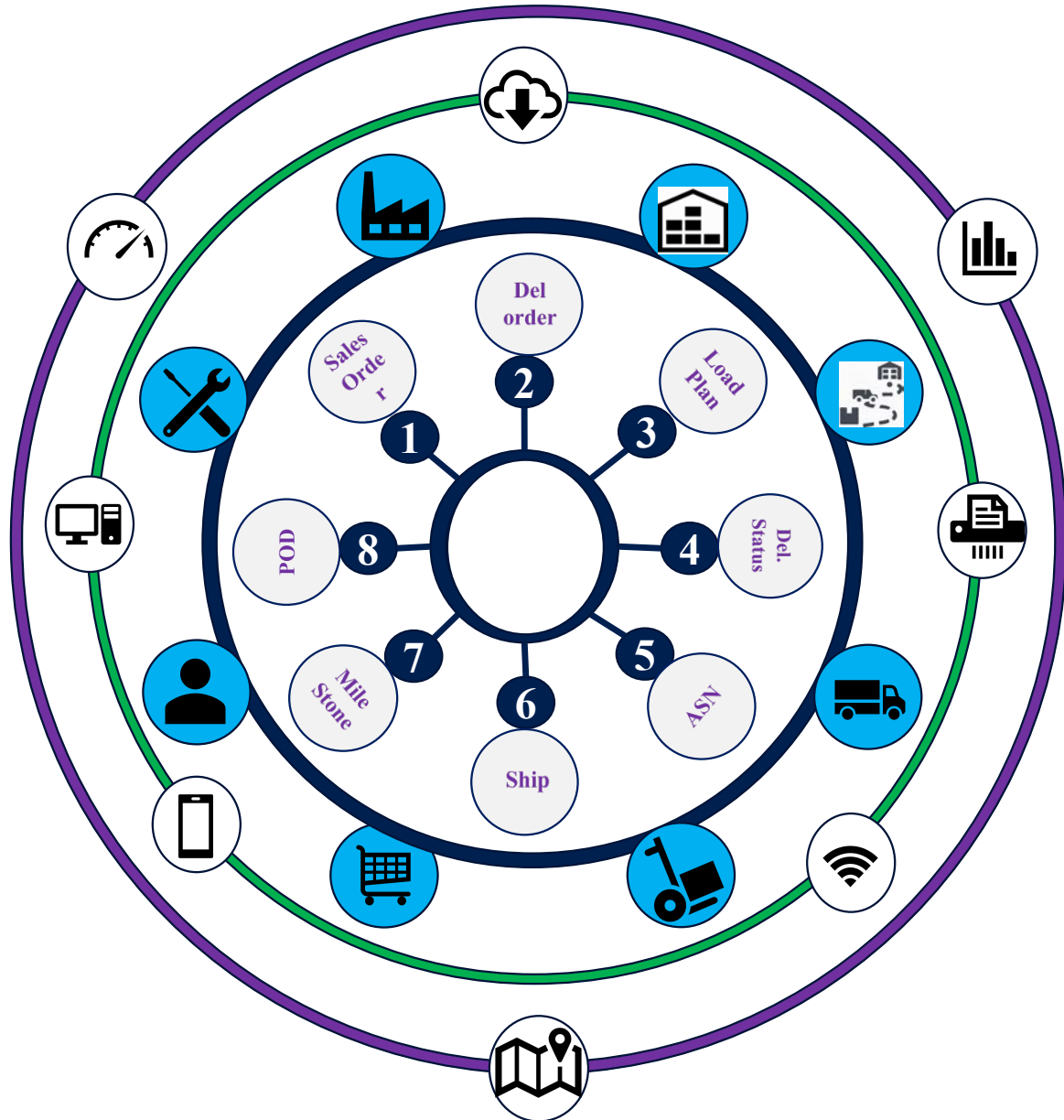
Increases Revenue and Savings
Potential savings opportunities through more efficient processes and increased productivity.

Enablement of Automation
Through the use of Smart Contracts, processes can be executed with given the right permissions.

Our Supply Chain Network – a Sample

Thank You