

# Case Study

## AI for CPE Management



### Client



Cox Communications, Inc.  
(Cox)

### About Cox

Cox Communications, Inc. (Cox) is the third-largest cable television provider in the United States, serving more than 6.2 million customers providing digital cable service, high speed internet, digital telephone, and home security services to residential customers and business class services in their Cox Business organization.

### About Tallgrass.AI

Tallgrass.AI is a big data analytics solution provider that helps Fortune 1000 companies to unlock the true power of data-driven optimization. Tallgrass.AI has worked closely with North American MSO's for more than a decade to establish an industry standard for customer premise equipment (CPE) device failure at the 4th malfunction within 365 days. An operational malfunction is defined by removal of a device within 30 days of placement on a customer account.

Tallgrass.AI developed the legacy Watchlist system that successfully reduced MSO operating expenses by tens of millions of dollars. Today, Tallgrass.AI applies the common causes and triggers of device malfunctions to machine learning (ML) and have deployed Watchlist.AI at the highest level of confidence.

## Executive Summary

### 89%

#### CPE DEVICE MALFUNCTIONS OCCUR PRE-WATCHLIST

Over the past 10-years, Cox has owned 72 million devices of warrantable CPE devices which have been deployed to customers for the delivery of broadband services. The Tallgrass.AI legacy Watchlist delivered measurable cost savings by identifying repetitively malfunctioning CPE at the 4th malfunction or beyond for removal from circulation.

### 85%

#### PRE-WATCHLIST CPE DEVICES GENERATE NO REVENUE

To further optimize revenue, minimize operating expense and maximize customer experience, fresh-data tests found that 89% of today's CPE device malfunctions occur before the device even qualifies for the legacy Watchlist. The 2nd and 3rd malfunction now represent the Pre-Watchlist and 85% of these devices were found to have generated no revenue for Cox.

### 99.3%

#### AI PREDICTION ACCURACY

New Tallgrass.AI ML developments were tested with Cox and applied to all Watchlist statuses to **predict** CPE device malfunctions and provide the ability to **prevent** negative customer experiences. The ML engine accurately predicted 99.3% of device malfunctions that occurred within 30 days.

#### Key learnings from the AI case study:

1. Testing found that 89% of present-day CPE malfunctions will occur before the device qualifies for the legacy Watchlist, during its' Pre-Watchlist period.
2. The 2nd and 3rd malfunctions now represent 80% of all Watchlist devices.
3. Tallgrass.AI predicted 99.3% of all device failures that occurred within 30 days of install, during a 6-month period, starting at the 2nd malfunction.

Analysis based strictly on historical malfunctions continues to allow millions of unnecessary transactions, adding operating expense and negatively impacting customers. High predictability of device malfunctions creates the opportunity for Cox to proactively contact customers, replace devices, and avoid these device malfunctions.

**Tallgrass.AI created a completely new way of managing CPE malfunctions, now called Watchlist.AI AI, with Predict & Prevent capability.**

Watchlist.AI – Predict & Prevent volumes across departments	Transaction Quantity
In-bound CPE call volume to Tech Support	101,553
CPE equipment moves (customer, to tech/retail, to warehouse, to CDTI, and back)	84,815
Expensed CPE equipment repairs	2,385
Installs (times Pre-Watchlist failing CPE equipment was installed)	24,987

Figure 1

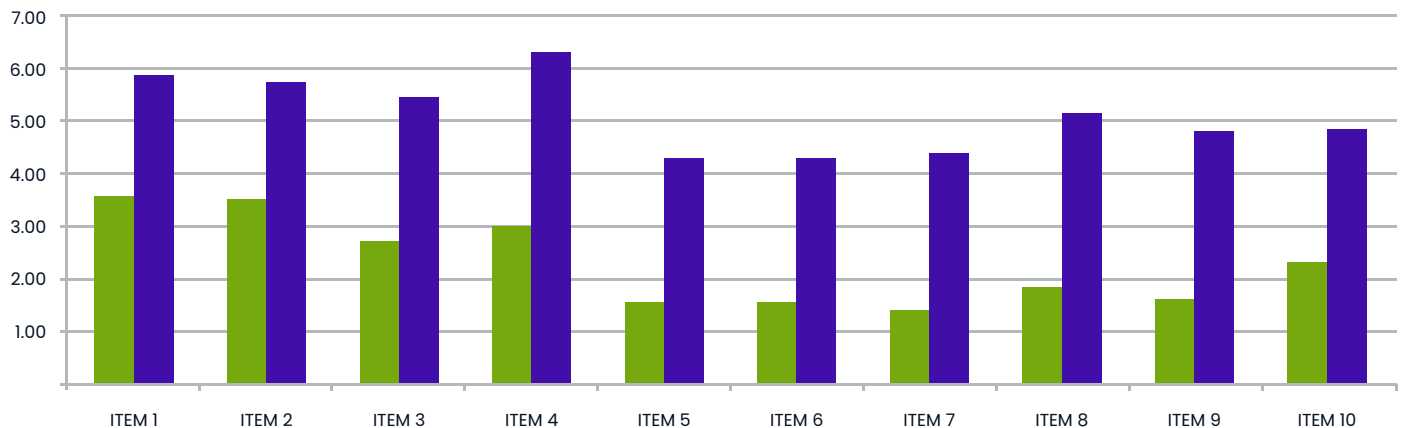
Values can be customized, but when we apply standard average values of \$4 per tech support call, \$20 per CPE movement, \$20 per CPE repair, and then \$100 per install, the cost avoidance opportunity for these activities reaches \$4,648,912 for the two quarters reviewed.

### \$4.6M

**OPERATING COST SAVINGS  
OFFERED BY AI PREDICTIONS**

# The Problem

The legacy Watchlist established an industry standard for failure of a CPE device at 4 or more malfunctions within a 365-day rolling time-period. Once reached, individual units would be placed on an active Watchlist for future correction. This system produced favorable results demonstrated by average-failure-rate (AFR) reductions for warrantable devices from 2.0% to 1.2% and for non-warrantable devices from 4.4% to 1.6%. Despite these outcomes, millions of dollars of unnecessary operating cost and preventable bad customer experiences continue to occur.



*Figure 2. The variance of install rate between the total equipment universe and Watch List equipment, by model.*

Figure 2 demonstrates the difference in failure rate between Watchlist CPE devices and the global universe of CPE.

## Watchlist and Pre-Watchlist devices cause:

- **Avoidable operating costs due to device churn**
  - Customer Care/Tech Support cost per inbound call
  - Field technician cost per trouble call truck roll
  - Retail store handling cost for devices returned by the customer
  - Supply Chain handling and shipping costs
  - Repeat professional install costs
- **Repair cost on non-warrantable devices**
- **Malfunctioning devices in repair do not generate rental revenue**
- **Reduced subscription revenue due to customer churn**

The problem we seek to minimize with ML is negative customer experiences which decrease net promoter scores and result in higher customer churn rates, elevated operating expenses, and reduced revenue.

# How Tallgrass.AI Helped

Tallgrass.AI implemented the Business IQ and Business Analysis System tools to provide Cox analysts with complete life cycle genealogy for their entire universe of devices, across 45 dimensions and 20 customer-focused metrics, per serial number, for each CPE device. CPE performance is recalculated daily for new movements, failures, and removals to monitor shifts in real time. Ultimately, Tallgrass.AI is integrated with equipment manufacturers and repair centers to further improve the accuracy of its federated data, ML-engine and applied AI.

The Tallgrass.AI federated data lake contains 10 years of CPE device genealogy along with enriched, block-chained, multidimensional, real-time data by serial number, which provides a milestone model containing the most complete device profile in the industry.

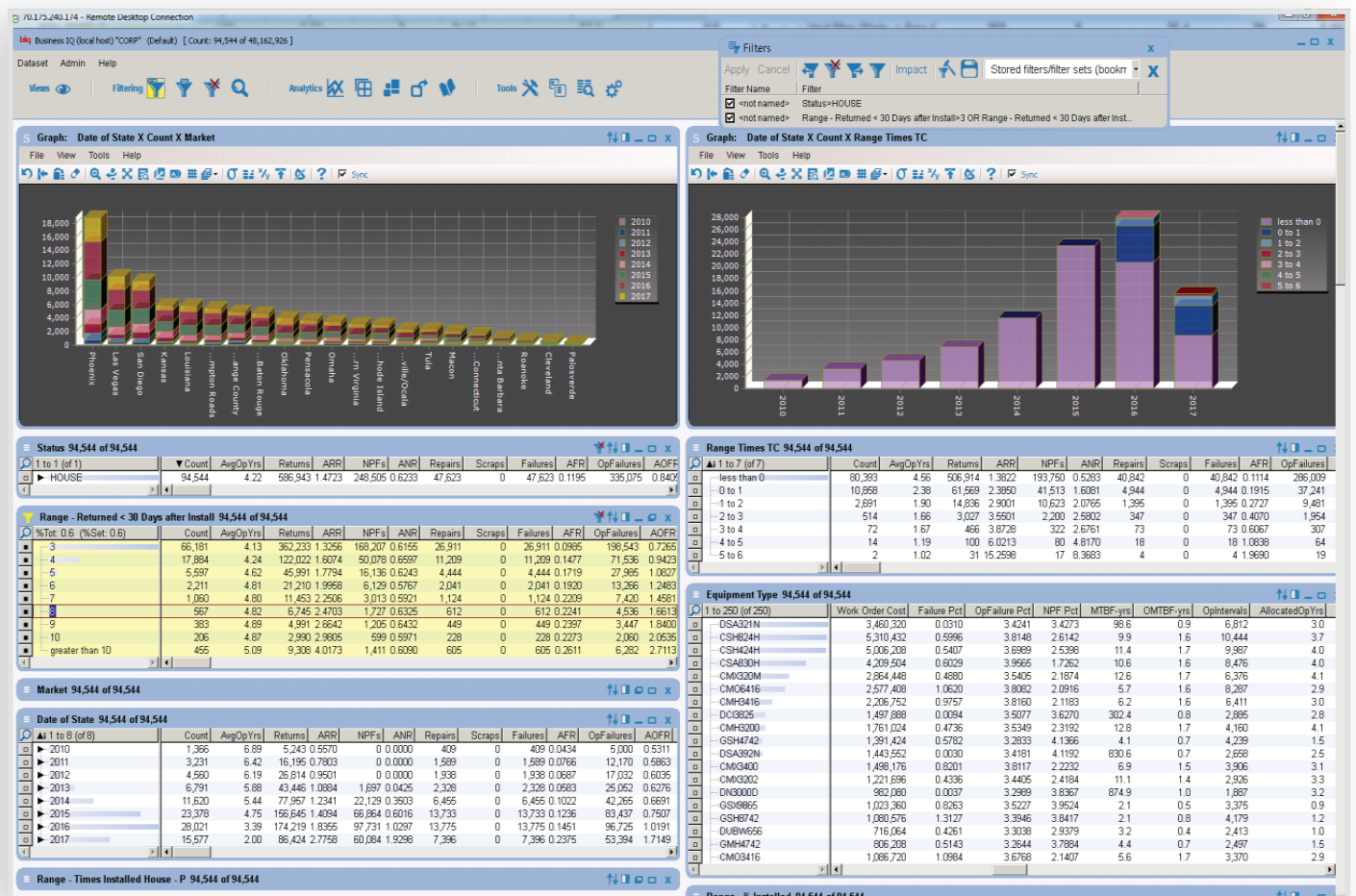


Figure 3. Tallgrass.AI BIQ analyst screen



# Results

While the legacy Watchlist delivered significant operating cost savings over the past 10 years, our first key learnings from the initial data set found that 89% of CPE device malfunctions now occur before the device even qualifies for the legacy Watchlist. Only 11% of devices now attain the 4th malfunction or beyond, where the legacy Watchlist reports operational failure.

Of the 89% of malfunctions that occur Pre-Watchlist, 80% of those are the 2nd or 3rd malfunction. Additionally, 85% of Pre-Watchlist devices generate no rental revenue.

Watchlist type	Device Malfunctions	Total Malfunctions	% of Malfunctions	% of Total Devices
Pre-Watchlist	1X	449	83% of Total	89% of Total
	2X	6,666		
	3X	6,612		
Legacy Watchlist	4X	1,960	17% of Total	11% of Total
	5X	642		
	6X	216		
	7X	35		
	8X	24		

Figure 4

Next, the ML-engine was engaged on two test dates to predict device malfunction #2 and #3 in two time periods, 30-days and 90-days. The Tallgrass.AI enriched, federated, multidimensional data enabled the ML to predict 99.3% of all CPE device malfunctions that occurred within 30 days of install.

- **Immediate Action List**

30-day total predictions were 5,955 devices and 5,927 DID churn (99.5%). 5,917 of those churned within 30 days (99.3%) and 4,275 new predictions were identified.

- **Action List\***

90-day total predictions were 34,263 devices and 27,807 DID churn (81.2%). 24,377 of those churned within 90 days (71.1%) and 24,004 new predictions were identified.

\* NOTE: 30-day predictions were also found within the 90-day predictions.

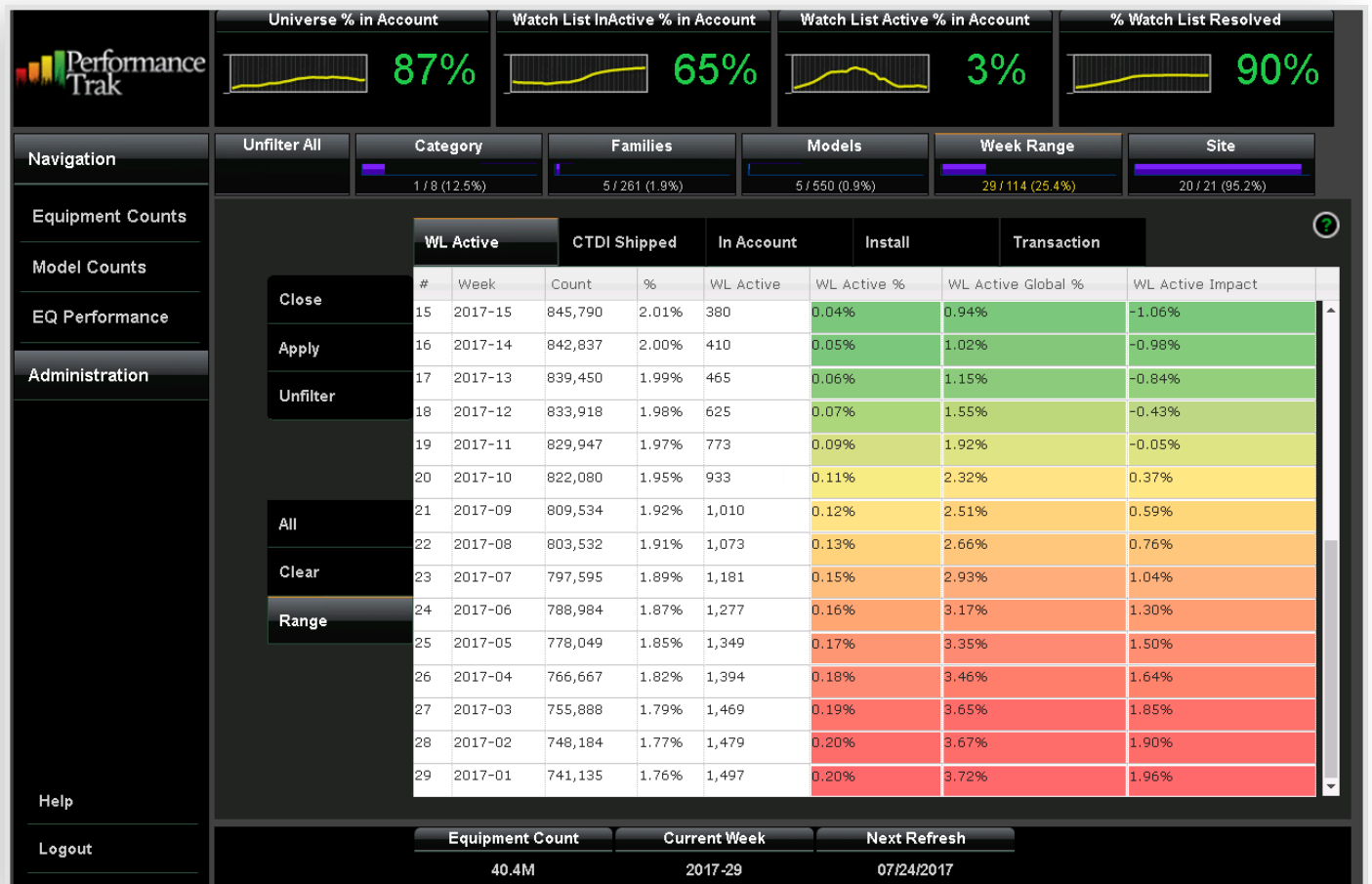
Finally, the operating expense associated with CPE malfunctions across the enterprise for the two quarters of reviewed was \$4,648,912 based on the values assigned to each departmental activity. The values included in Figure 5 are generally accepted values across the industry, but company specific values are easily applied to the template.

CPE Device Failure Transaction volume predictions for two quarters of 2019	Transaction Volumes	Value	Avoidable Cost
Tech support in-bound CPE call volume	101,553	\$4.00	\$406,212
CPE equipment moves (customer, to tech/retail, to warehouse, to CDTI, and back)	84,815	\$20	\$1,696,300
Expensed CPE equipment repairs	2,385	\$20	\$47,400
Installs (times Pre-Watchlist failing CPE equipment was installed)	24,987	\$100	\$2,498,700
<b>Total</b>	<b>213,740</b>		<b>\$4,648,912</b>

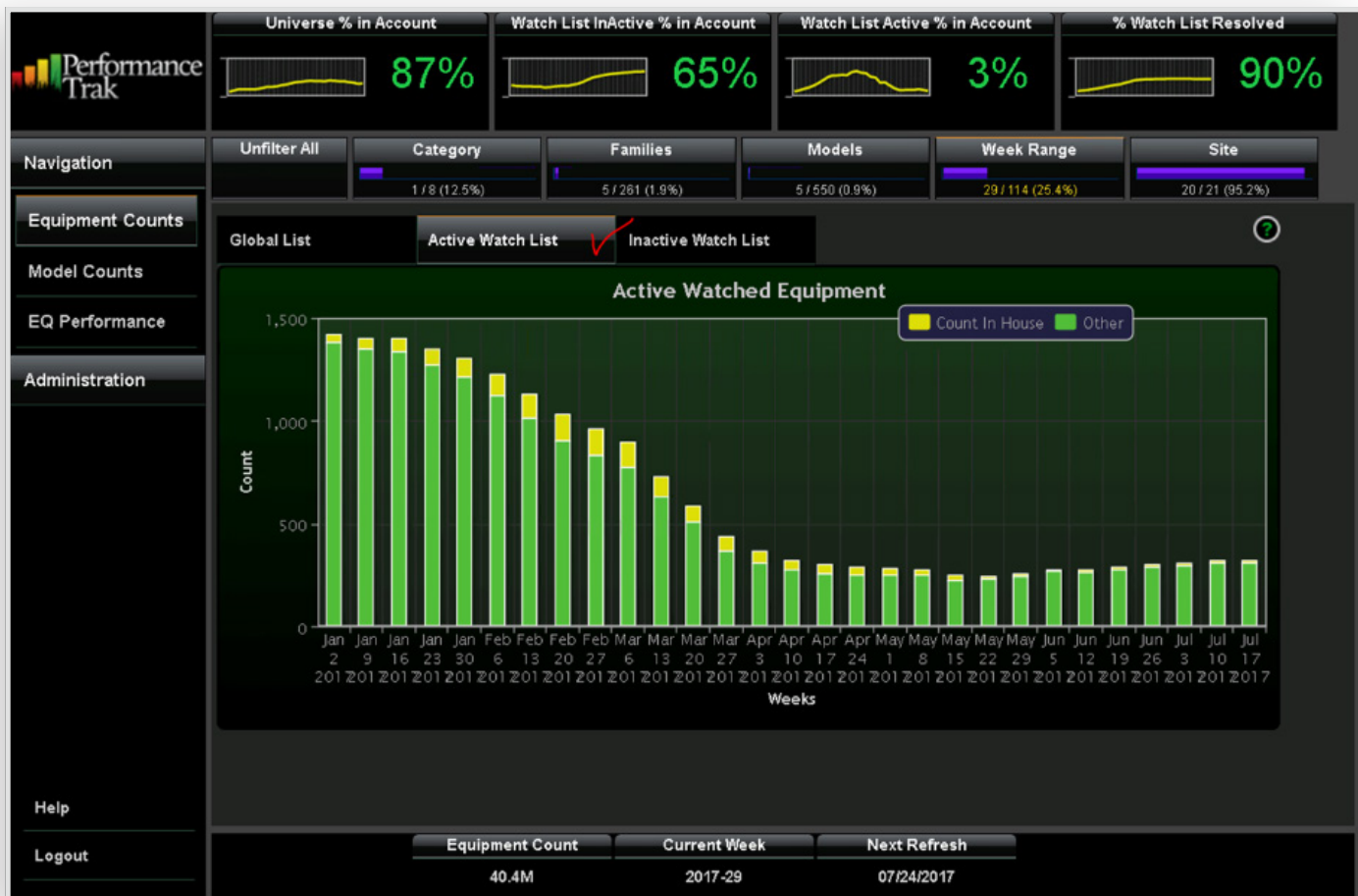
Figure 5

The Tallgrass.AI dashboard is tailored to provide analysts and business leaders with clear, defensible data that provides both overall results and drill-down capability to validate results down to the individual serial numbers. It is built to provide:

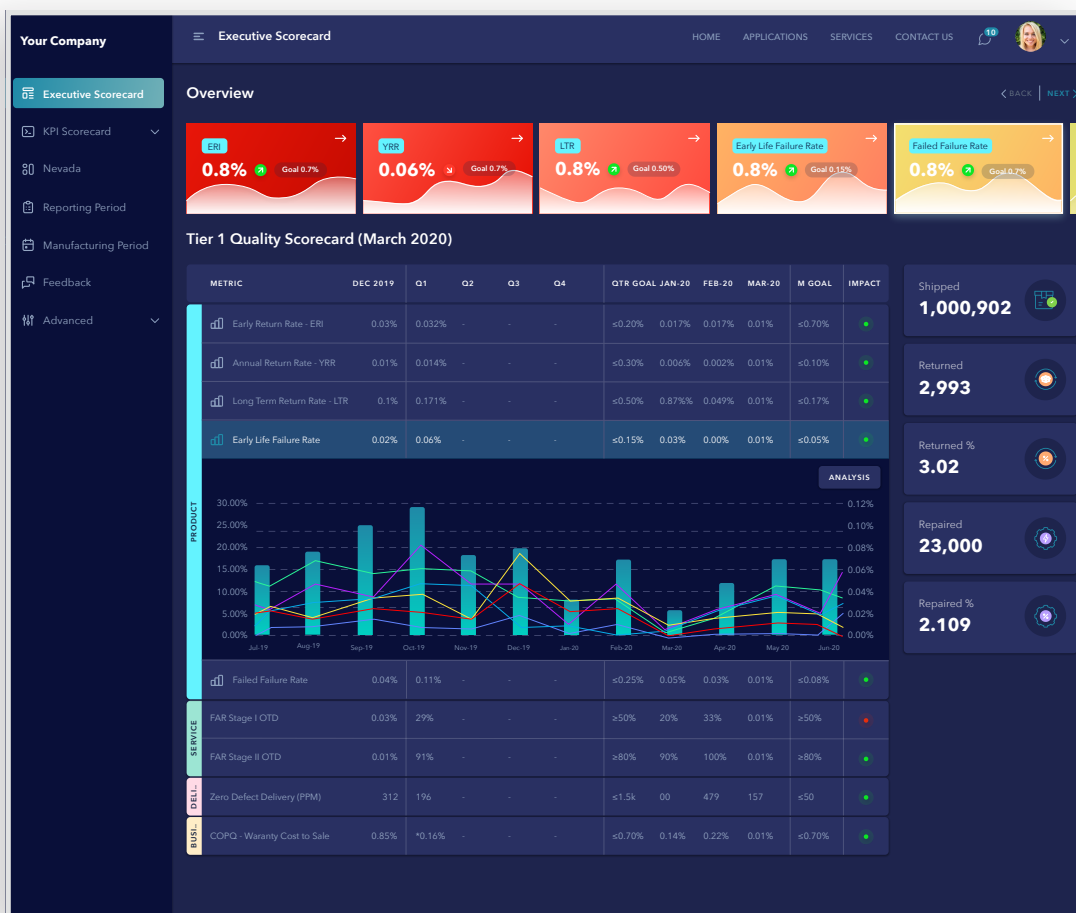
1. Multidimensional drill-down capabilities by model, market, or many other options
2. Real time AI-driven insights
3. Efficient UI with a single interface tab so all metrics are easy to track
4. Configurable so users have access to customize settings



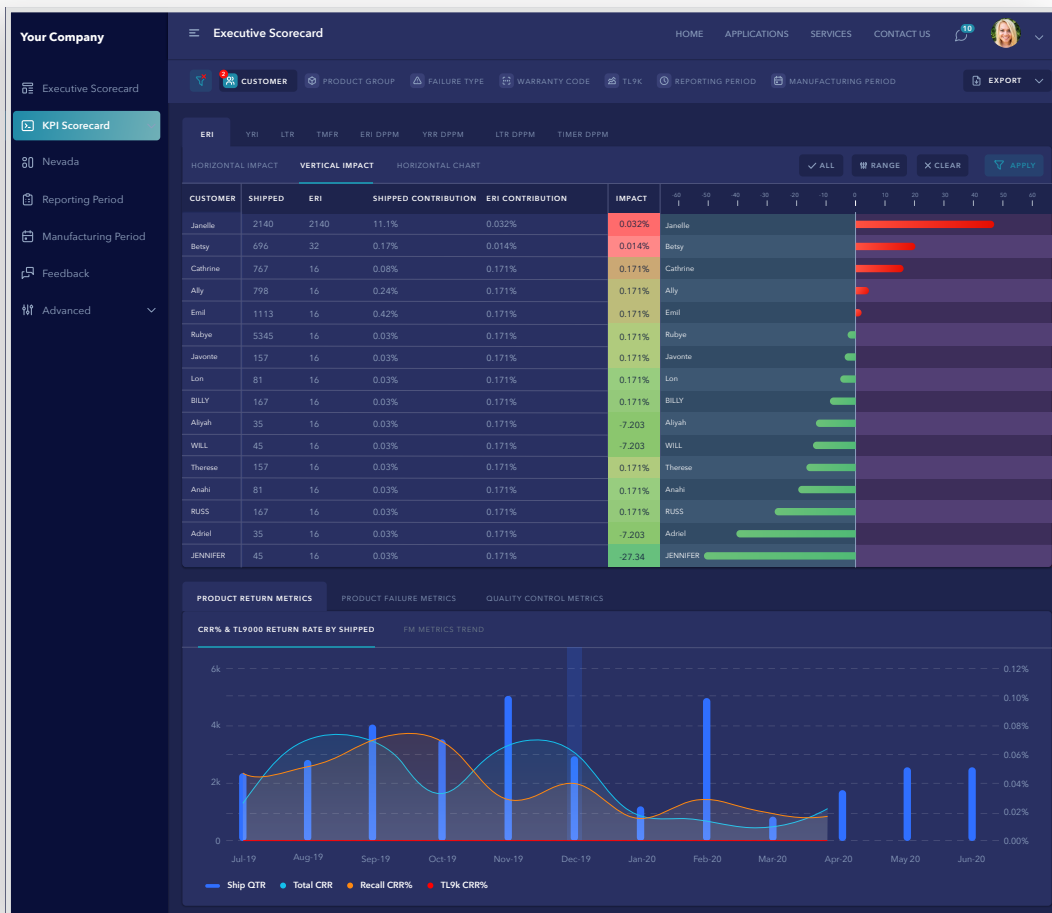
Model Selection and Heatmap



Active Watched Equipment count



Executive Scorecard Dashboard



KPI Scorecard Impact

More information about the Tallgrass.AI capability to predict customer activity and identify cost avoidance opportunities is available in the following blog on the Tallgrass.AI web site:

[www.tallgrass.ai/how-rpa-evolves-competition-ecology-for-modern-businesses/](https://www.tallgrass.ai/how-rpa-evolves-competition-ecology-for-modern-businesses/)

For more information, visit [www.Tallgrass.AI](https://www.Tallgrass.AI)