



**ATLANTA, GA**  
**OCTOBER 11-14**

**SCTE**  
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# UNLEASH THE POWER OF LIMITLESS CONNECTIVITY



**2021 Fall  
Technical Forum**  
SCTE • NCTA • CABLELABS





## Cloud & Virtualization

# Future Capabilities Enabling Network and Premise Health

**Shane Yates**

Executive Director, Analytics  
Cox Communications



## 'Old TV Caused Village Broadband Outages for 18 Months'

- 18 Months of intermittent outages
  - Hundreds of thousands of hours of degraded service
  - Thousands of calls
  - Thousands of truck rolls
- A full cable replacement program
- Days of engineering 'walks' to measure signal

### The Culprit...

- On old television set, turned on daily at 7AM, introduced ingress into the network for 18 months

This reactive operational model results in significant impacts on operational cost and customer experience.



Most customer-impacting events can be **predicted.**



Customer-impacting events are **complex** but **unique and identifiable.**



We can shift from the customer as a diagnostic to **prediction as a diagnostic.**

How do we transform from **react and respond** to **predict and prevent**?



# Service Health



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**Deep Understanding** of data that describes quality and use of service by our customers.



**Ability to Predict** future service impacts and mitigate or prevent them.



**Machines Executing** the right actions to take, at scale.



**Continuous Learning** capabilities to improve over time.



## Node Health

Predict, isolate, and prevent any customer experience issues at the node level



## Location Health

Predict home/business wiring, device, Wi-Fi customer experience issues



## Usage Health

Understand customer experience impact based on individual customer usage and behavior



## Interaction Health

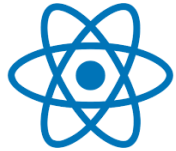
Link human conversation to Service Health root cause

Partnership between Operations and Analytics to deploy a proactive operating model using Node Health





# Network Measurement History



## Reactive (*Mandatory*)

- Service Affecting Events
- Demand Maintenance
- Single Customer Network Referrals



## Proactive (*Discretionary*)

- Preventative Maintenance
- RF Degradations
- CLI Leakage Detection

# RF Performance KPIs

- This metrics system is a **comprehensive scorecard** providing visibility to the Region, System, Head-End and Node-Level performance of Cox’s HFC Network
- **Key Stakeholders** include Operations teams supporting Cox’s Residential and Business HFC Customers
- The program identifies **key performance indicators** for the HFC Network that directly drive transactions to customer care and field services – and ultimately impact customer experience
- The goal is to **optimize HFC Network Performance, reduce transactions** to customer care and field services, and **improve the customer experience.**

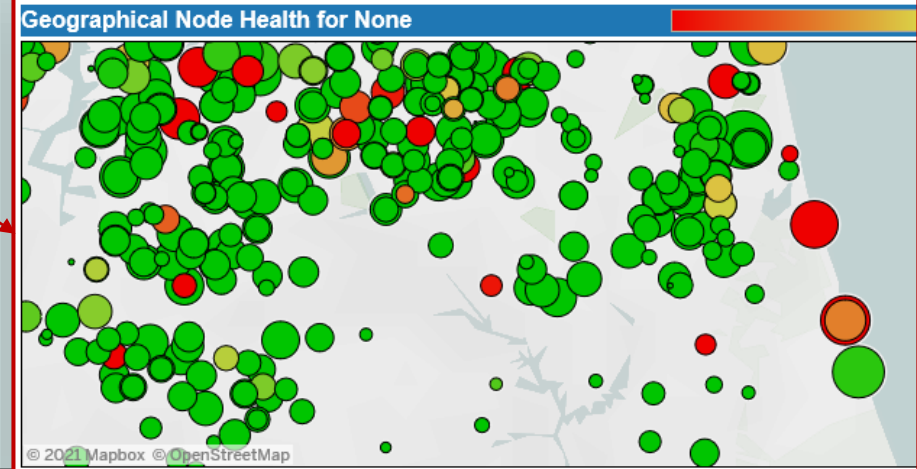
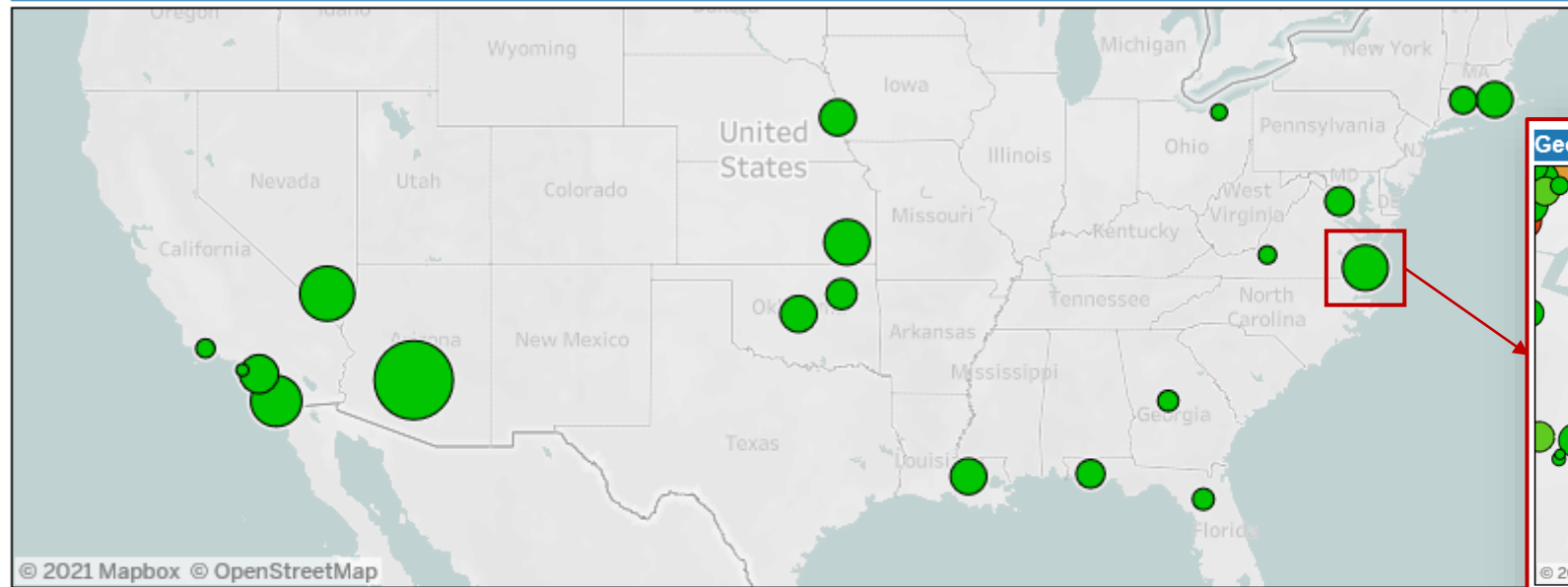
	Metric	Description	Spec
1	DS RX (Downstream Receive)	Downstream Power-level at the Customer modem within Docsis Spec	-12dB to +15
2	US TX (Upstream Transmit)	Upstream Power-level at the Customer modem within Docsis Spec	+30dB to +52
3	DS SNR (Downstream Signal to Noise)	Downstream SNR ration at the Customer modem within Docsis Spec	>+32 dB
4	US SNR (Upstream Signal to Noise)	Upstream SNR ration at the Customer modem within Docsis Spec	>+30 dB
5	DS FEC (Downstream Forward Error Correction)	Downstream packet loss at the Customer modem	<1% packet loss
6	US FEC (Upstream Forward Error Correction)	Upstream packet loss at the Customer modem	<1% packet loss
7	Aggregate Health	The combined score between all metrics	n/a



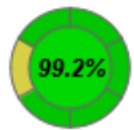
# RF Performance Scores Snapshot from July 2021

Node Health Performance Results  
Every 0.8% improvement results in  
a 5% reduction to Calls/Trucks

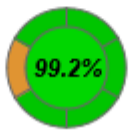
## Geographical Site Health for None



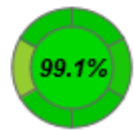
## Regional Health for None



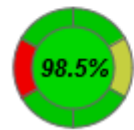
California



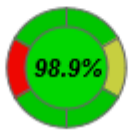
Southwest Region



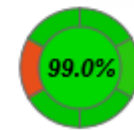
Central Region



Southeast Region



Virginia



Northeast Region

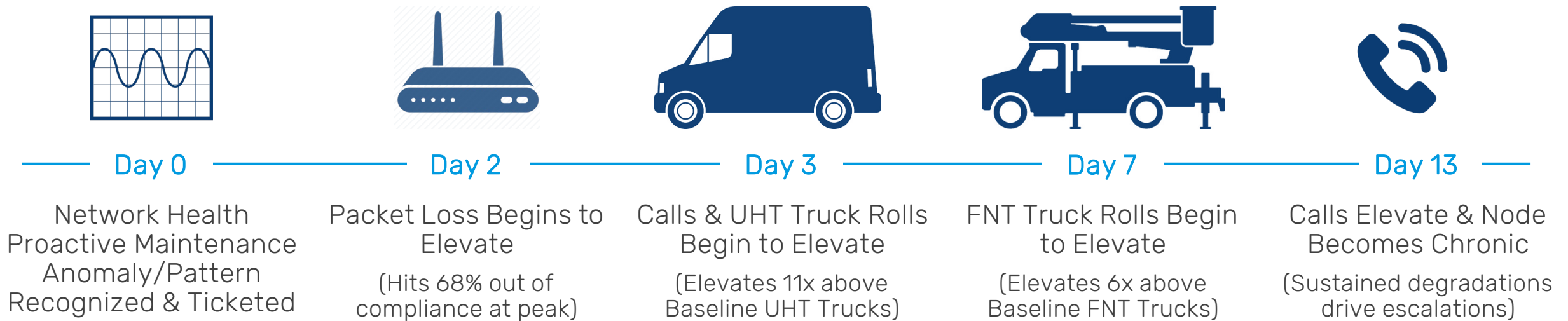


# Network Health Current State

# BAU Process Example

A Node within a Cox market experienced a significant degradation in RF performance, which drove a poor customer experience and high volume of reactive transactions.

Below is a decomposition of the impact:





# Service Health



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by our customers.  
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## Three Pillars of Node Health

### Performance

Identifies the quality of service for customers when using services to maximize performance

#### Key Project

Dealer Solutions Suite

### Availability

Determines if customers have sufficient bandwidth to satisfy usage requirements

#### Key Project

HFC Automation Suite

### Utilization

Determines if customers have sufficient bandwidth to satisfy usage requirements

#### Key Project

Network Utilization, Node Planning Automation (NPA), & Node Action Analytics



# Node Health Project Roadmap



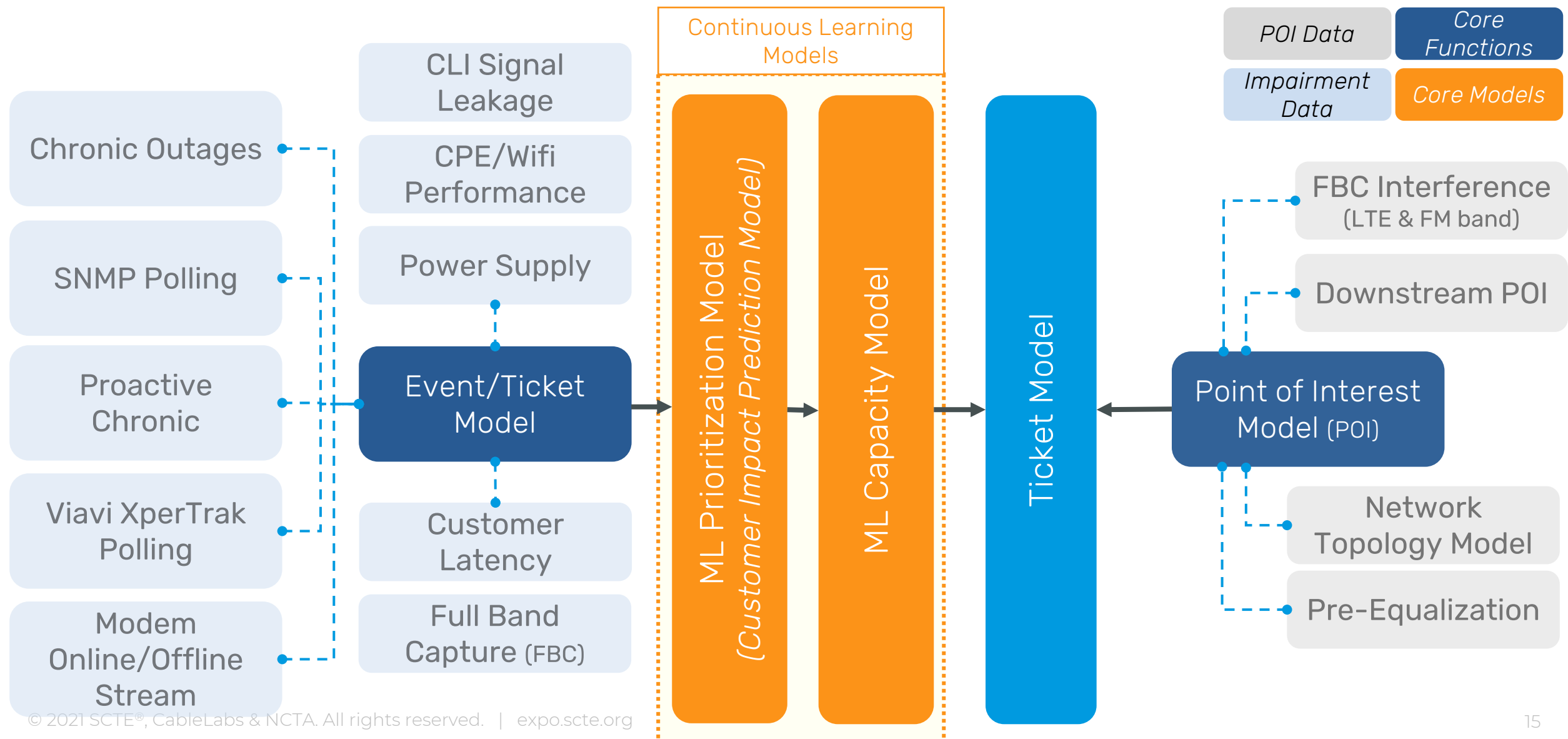
**Node Health** represents the health of the Outside Plant, traversing the network through the neighborhood down to the individual home.



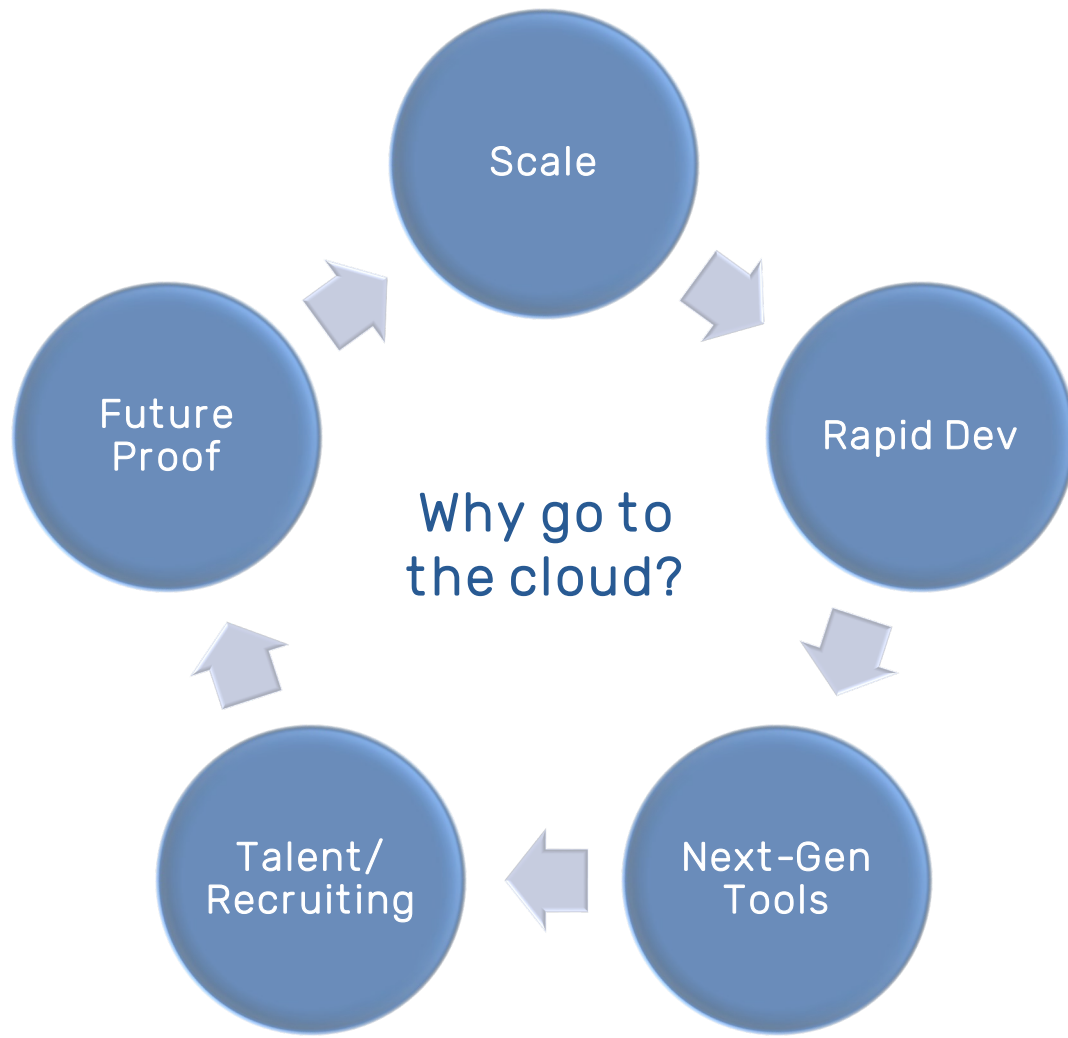
Node Health: RF Performance	Node Health: Event Correlation	Node Health: Point of Interest	Node Health: Outage Detection	Node Health: Transaction Cancelation	Node Health: Transaction Deflection
<p><b>Project Description:</b> Predict high-priority proactive maintenance activity based on patterns in RF Performance</p>	<p><b>Project Description:</b> Identify network issues with a common cause and correlate them into a single event</p>	<p><b>Project Description:</b> Predict likely sources of network health degradations based on probability and network topology</p>	<p><b>Project Description:</b> Identify outages in real-time using streaming data, while simultaneously reducing non-actionable events</p>	<p><b>Project Description:</b> Identify avoidable truck rolls scheduled to customers homes and auto-cancel through SMS processes</p>	<p><b>Project Description:</b> Inform customers of all probable performance issues through x-channels to prevent unnecessary transactions</p>
<p><b>Result:</b> Improve Network Health &amp; Transactions</p>	<p><b>Result:</b> Reduce unnecessary/duplicate Tech labor</p>	<p><b>Result:</b> Reduce repeat events and time to restore</p>	<p><b>Result:</b> Reduce tech labor time &amp; duplicate work</p>	<p><b>Result:</b> Reduce avoidable customer transactions</p>	<p><b>Result:</b> Prevent avoidable customer transactions</p>

Node Health represent a **10-15%** reduction to Calls/Trucks (*5% already realized*) and **20%+** reduction to Customer Referrals

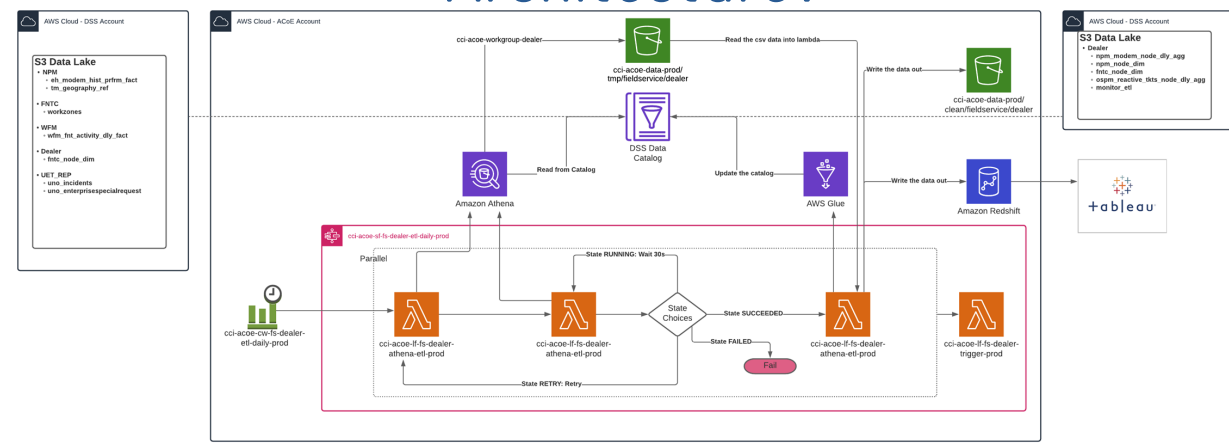
# What is the Node Health RF Performance & Why is it Different?



# Node Health RF Performance: Cloud Architecture

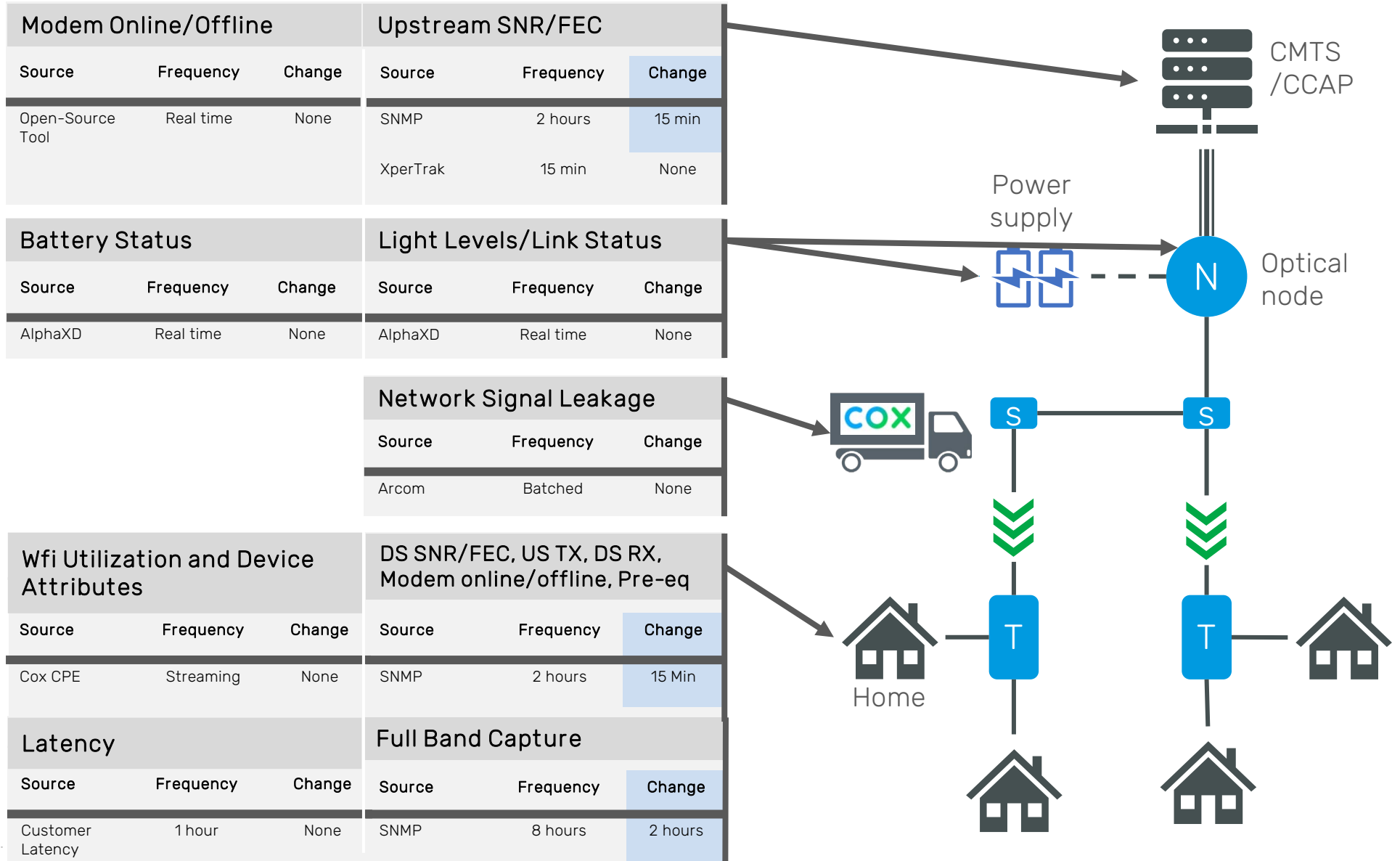


## What is the Architecture?





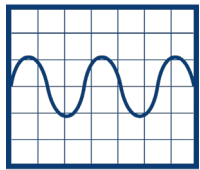
# Feeding Node Health: Primary Node Monitoring Ecosystem



# Future Proactive Enhancements

In the Future, we will:

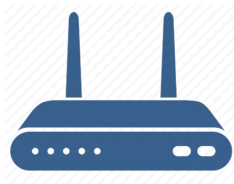
Leverage enhanced POI/diagnostics to inform technicians



Day 0

Network Health Proactive Maintenance Anomaly/Pattern Recognized & Ticketed

Exposure Node Health(Dealer) events to care to prevent unnecessary transactions



Day 2

Packet Loss Begins to Elevate

Escalate based on SLA/performance to ensure visibility



Day 3

Calls & UHT Truck Rolls Begin to Elevate

Auto-cancel avoidable UHT trucks and auto-notify customers

Correlate events to ensure 1-issue, 1-ticket



Day 7

FNT Truck Rolls Begin to Elevate

Auto-validate events

Release all dealer proactive events to prevent transactions



Day 13

Calls Elevate & Node Becomes Chronic



# Closing

## With Service Health: 'Cox Proactively Prevents Old TV from Impacting Entire Neighborhood's Service'

- **Node Health:** Detects the ingress from the television and isolates to a specific house.
- **Location Health:** Detects an anomaly for a subset of customers on the node adjacent to the customer's house.
- **Usage Health:** During this time customers video gaming and video chatting would be notified of a known issue that is being fixed.
- **Interaction Health:** Detects conversations reporting intermittent service issues.
- A Universal Home Technician is rolled to the home and informs the customer of issues in their home.



Calls are minimized. Trucks avoided. Customer impact mitigated or avoided.

Node Health represent a *10-15%* reduction to Calls/Trucks (*5% already realized*) and *20%+* reduction to Customer Referrals





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# Thank You!

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