



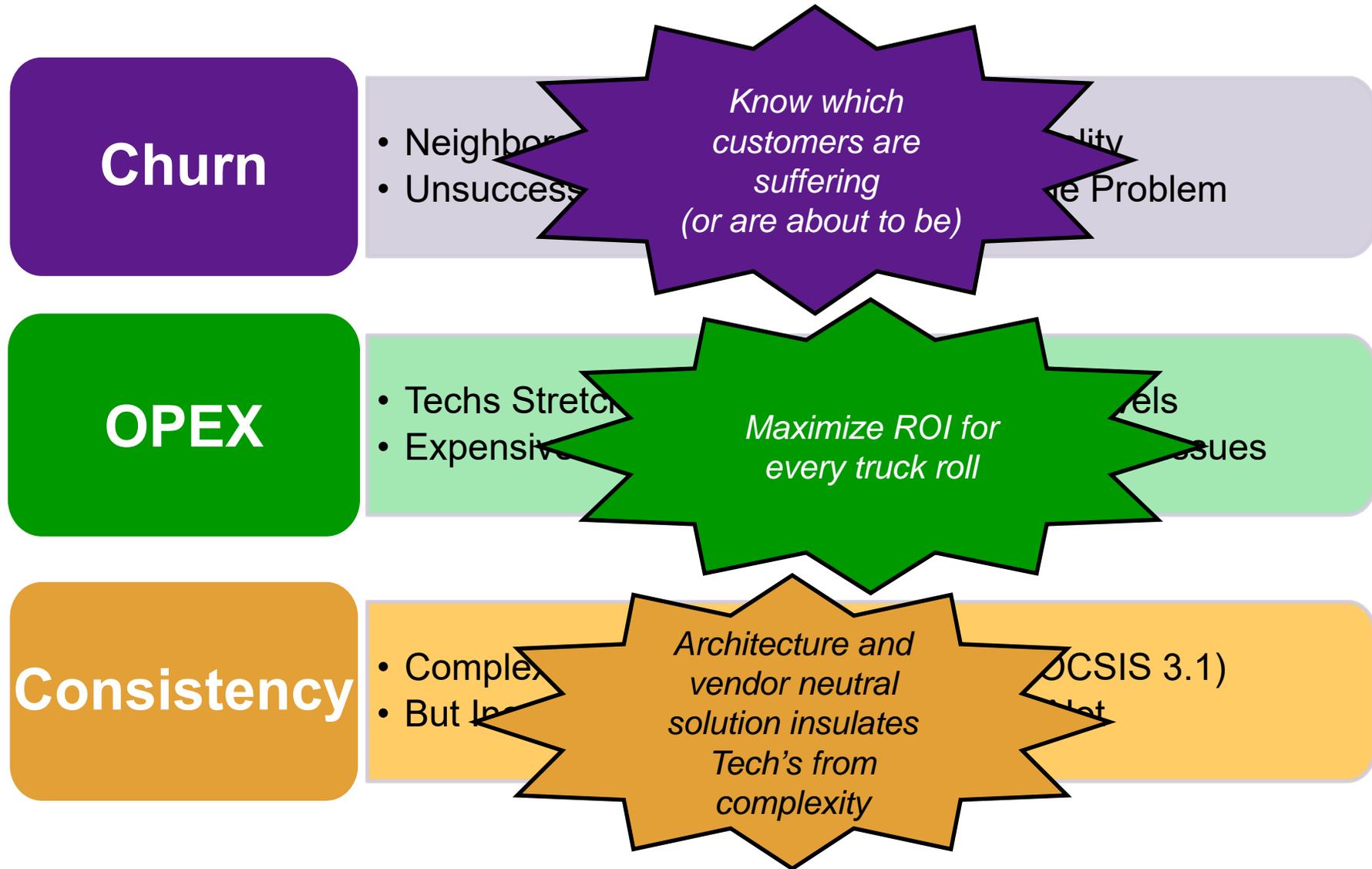
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# Viavi XPERTrak

Resolve Problems That Matter Most



# Common MSO Challenges and How Viavi Will Help:

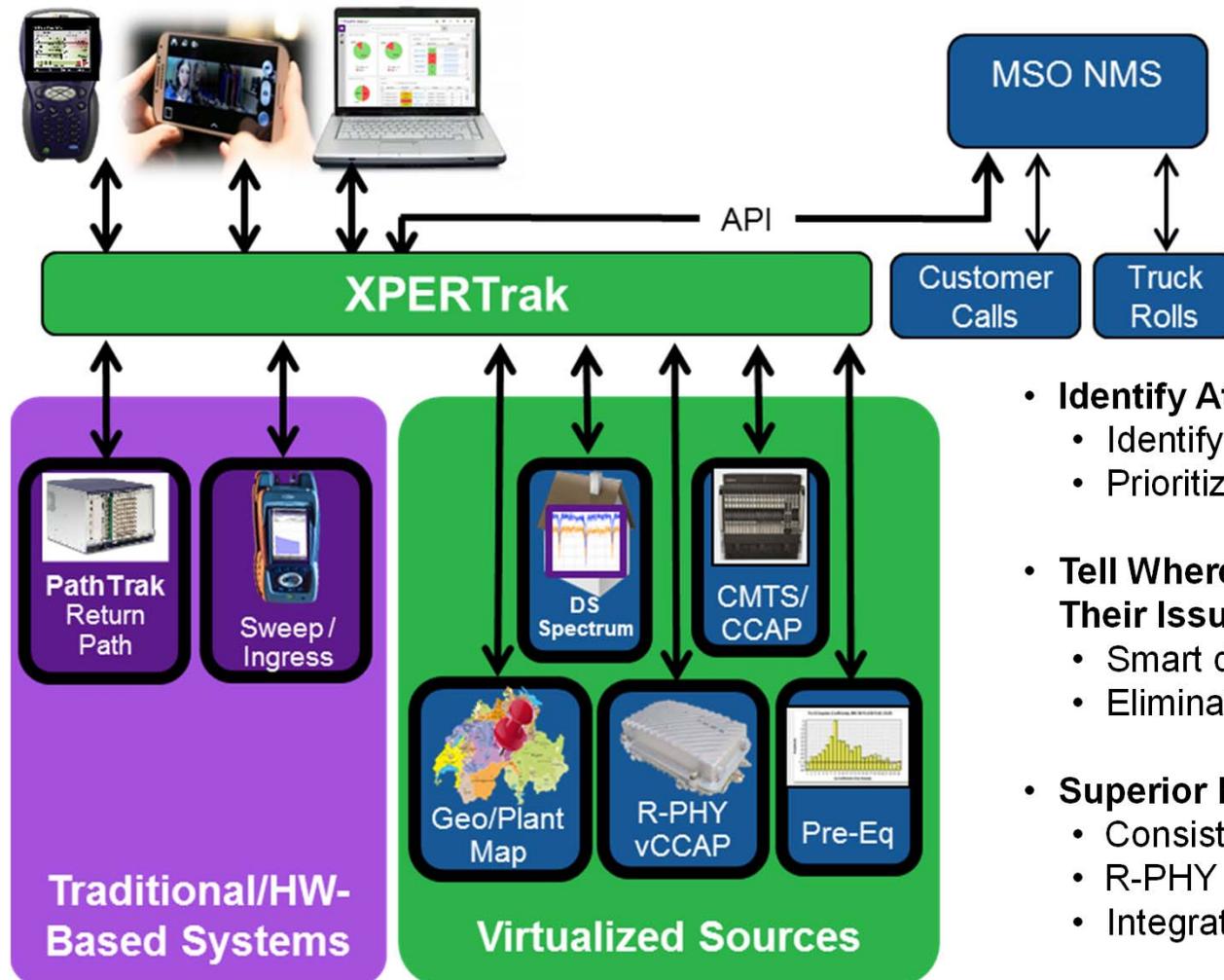


# The HFC Is Transforming At An Unprecedented Rate

- N+0/Fiber Deep Bring Exponential Node Count Growth
  - Rack space/power/cooling crunch in hubs, cost challenges as # subs/node shrink
- **Distributed Access Architecture (R-PHY, etc) Roll Out**
  - RF no longer present in hubs, Many new vendors enter NEM market
- DOCSIS 3.1 Is Here
  - New protocol→new gear, new metrics/practices for tech's to learn
- Frequency Extensions
  - Must qualify new spectrum, much of existing gear not capable
- ***Parallel, Phased Implementation Of All Of The Above***
  - Tech's will be challenged to deal with the proliferation, multi-year continuous state of change

# XPERTrak – Resolve Problems That Matter Most

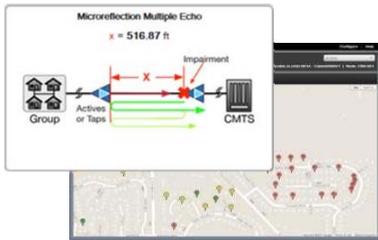
*Not just more red lights, but insight and tools to turn them green*



- **Identify At-Risk Subscribers**
  - Identify issues before customers call
  - Prioritize repairs on service impact
- **Tell Where To Go, What To Do To Fix Their Issues**
  - Smart dispatch to fix, not find
  - Eliminate unneeded maintenance
- **Superior Find and Fix Process**
  - Consistent across architecture/vendors
  - R-PHY & DOCSIS 3.1 leaders
  - Integrated with Viavi instruments

# Virtualization is Not New To Us...

*Viavi Has Been Virtualizing PathTrak for Many Years Already*



## Pre-Equalization Analyzer

- Provides exclusive easy-to-understand analysis pane
- Finally moves PNM past the science project stage, widely applicable
- Looks at both CMTS and modems



## Downstream Monitor

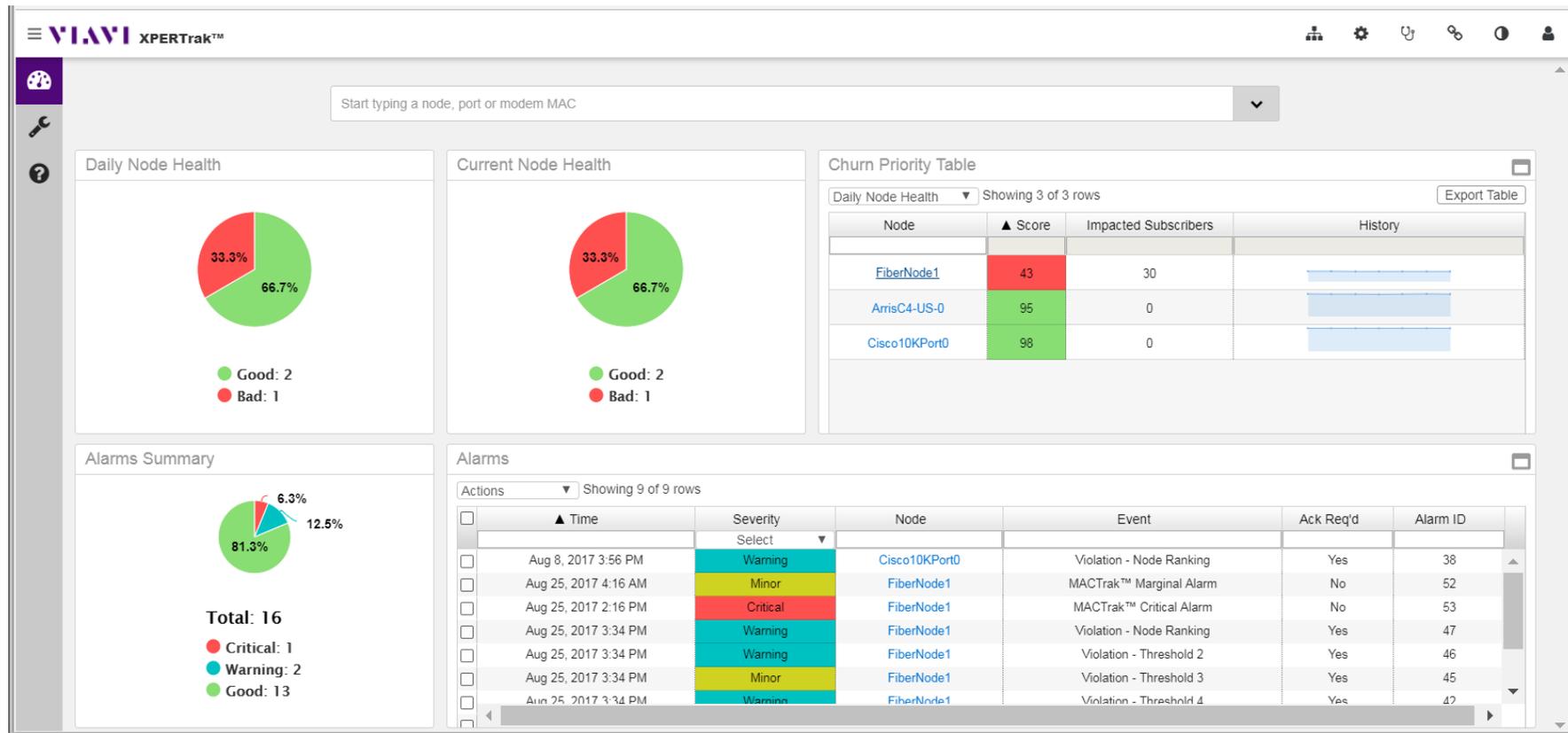
- Automatically detects and classifies 9 common downstream impairment types
- Maps modems by impairment type(s)
- Removes subjectivity from spectral analysis, opens DS analysis to much wider user base



## CMTS/R-PHY Spectrum Analyzer

- Upstream spectrum analysis from most widely-deployed CMTS/CCAP
- Industry-exclusive live spectrum support from DAA/R-PHY units
- Vendor/architecture-agnostic solution

# Service Dashboard



## At-a-glance determine:

- Worst performing nodes based on adjustable QoE thresholds
- Node quality vs time
- Nodes violating performance thresholds

## Drill down using mobile or desktop device to:

- Determine root cause of QoE problem
- Map impaired subscribers with plant map overlay
- Trend problems over time
- Generate live displays to resolve issue, verify fix

This technology roadmap is for informational purposes only and does not create an obligation for Viavi to deliver any of the features, functionality or products. Due to our rapidly changing technology environment, Viavi can not commit to a specific item or date and reserves the right to make changes to the roadmap at any time.

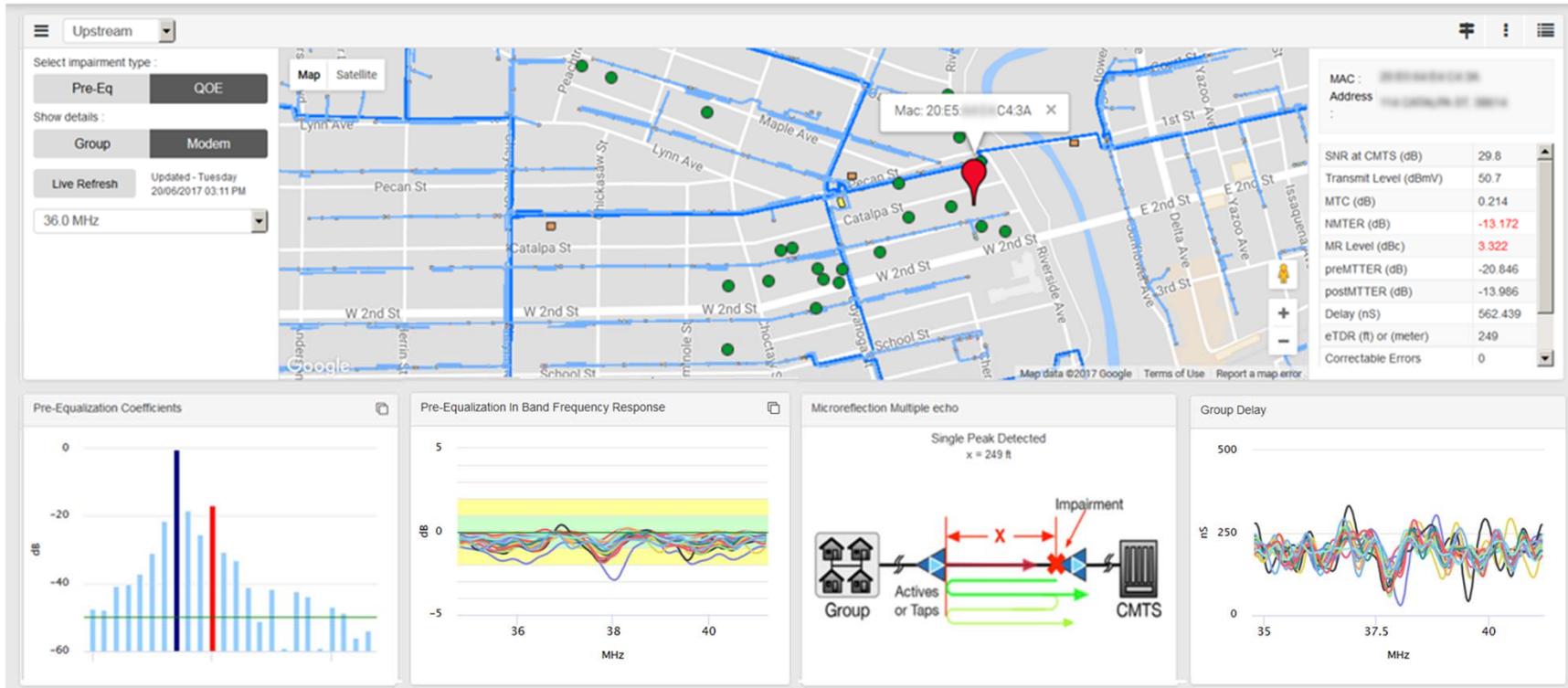
# Node Analysis Display



- **Problem Segmentation**
  - Upstream
    - Spectrum/MACTrak
    - CMTS
  - Downstream
    - Spectrum/CPE
- **Focused on Subscriber impact**
  - Metrics driven by subscriber health
- **Branches workflow to right tool**
  - Ingress suppression
  - Localized US HFC issues
  - Localized DS impairments
  - Sweep

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# Impairment Maps



- **Localize issues**

- Upstream
- Downstream
- Plant maps

- **Prioritize issues**

- Fix the worst/most subscribers first
- Fix low-hanging fruit while techs are there

- **Validate fix**

- Verify issues resolved before techs move on

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# Impairments Correlated to Impacted Subscribers

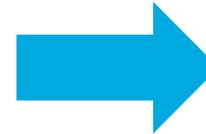
## Upstream

- Ingress vs time
- % impulse noise vs time
- Low receive levels
- Low/High transmit levels
- Main Tap Compression
- Micro reflections
- Group delay
- Laser clipping
- Home (tap down) issues



## Downstream

- Low level
- Tilt
- Roll Off
- Suck Out
- Resonate Peak
- Ripple
- FM Ingress
- LTE Ingress
- Adjacency



## Corrective Action

- **Who (Workgroup) ?**
  - Maintenance/sweep tech
  - Home tech
  - External (Power Company)
- **Where ?**
  - Home
  - HFC
  - Hub
- **When ?**
  - Don't send when impairment not present!
- **With what?**
  - Meter
  - TDR
  - VSE
  - Mobile device

Viavi has decades of experience to draw on to define appropriate impairment correlation and corresponding corrective actions.

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# Why Viavi as the Vendor of Choice for Evolving Networks?

- **Viavi Focus:** Help Service Providers Through Technology Transitions
  - Provide seamless technician experience as they evolve technologies
- **Viavi Credentials:**
  - Undisputed leader in physical test for decades
  - We understand home/HFC testing and technician workflows
  - Experience with virtual CPE/CMTS data in large PathTrak installed base
  - Largest vendor-neutral T&M player
  - Engaged with early DAA adopters, lab testing through go-live prep
- **Result: Viavi Is Best Positioned To**
  - Combine physical/virtual test to maximize productivity, minimize technician disruption / perceived complexity
  - Offer solutions spanning multiple technologies, multiple NEMs

# Transition Details

- All current PathTrak customers under M&S entitled to XPERTrak upgrade
  - Target late summer 2017 for launch
- What's Included:
  - Release includes PathTrak 4.6 and core XPERTrak capabilities/GUI
  - Automated database migration
  - PNM customers get free QoE data enrichment using data from modems and CMTS for all nodes monitored with MACTrak
- User & Admin training packages available by end of Q2'17
  - Strongly recommend training users BEFORE upgrading server
- Services are available for remote and onsite training

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# **XPERTrak Value To Cable Operators:**

*It's As Easy As 1-2-3*



**Identify At-Risk Subscribers**



**Tell Where To Go, What To Do To Fix Their Issues**



**Superior Field Find & Fix Process**



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