TESCO METERING

TESCO NIGHTHAWK ADAPTIV TECHNOLOGY OVERVIEW

TESCO's Meter School
TESCOOL
July 20-23, 2025

July 21, 2025
10:30 AM - 12:00 PM
Jon Scott

Adaptiv™ AMI

Adaptiv™ Scalable AMI by NIGHTHAWK

About Nighthawk

- 30-years of utility experience
- 100+ utilities served

About Adaptiv™

- Unique zero-infrastructure network
- Cellular + Mesh Communications
  - Verizon LTE
  - AT&T
  - 1NCE
- **Ideal for either incremental or rapid deployment**
- Lowest total cost of ownership in the industry

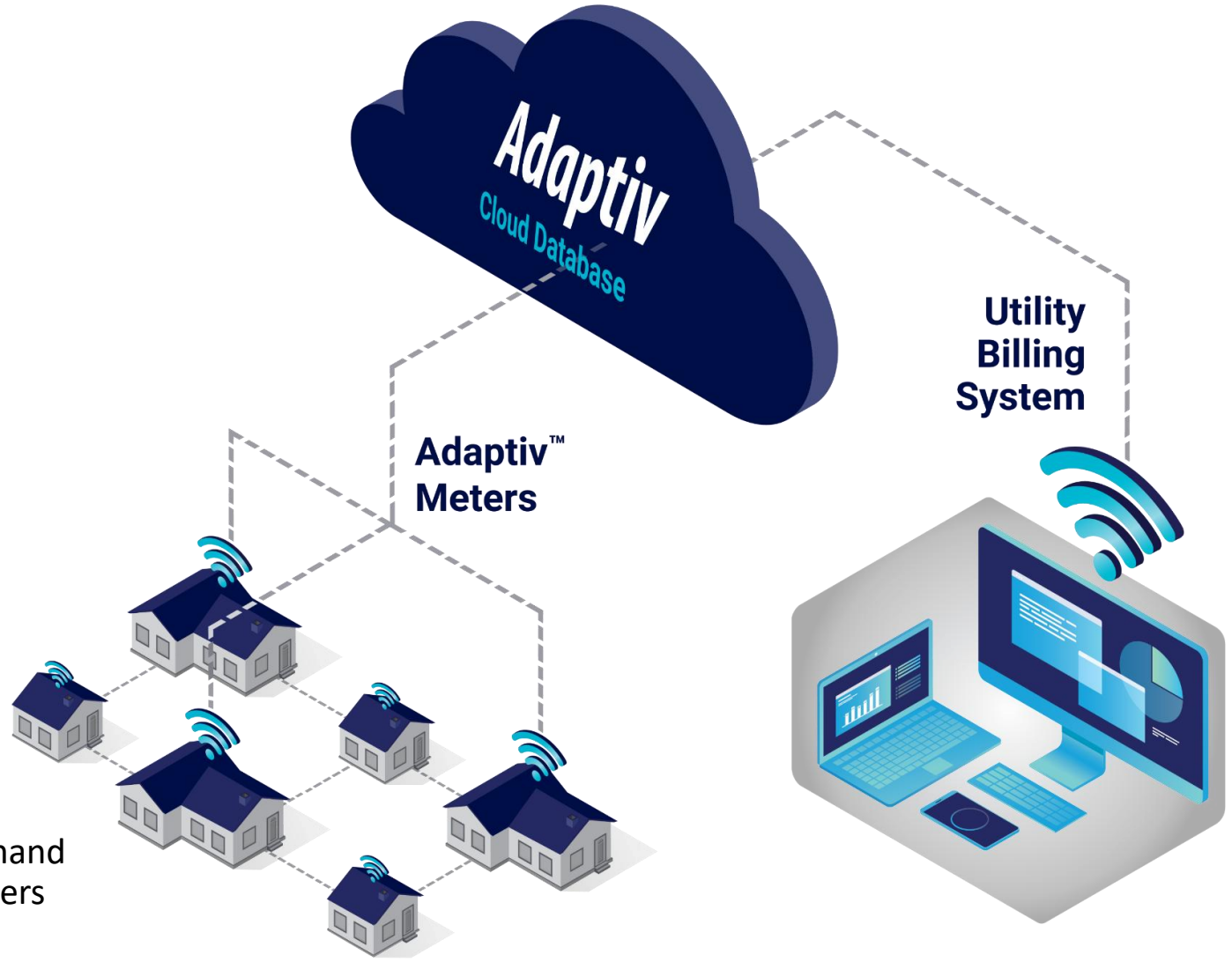
Nighthawk is a TESCO company.

THE EASTERN SPECIALTY COMPANY

- TESCO (The Eastern Specialty Company) is a manufacturer and service provider to the meter industry owned by, run by, and staffed by engineers.
- Headquartered in Bristol, PA
- Founded in 1904

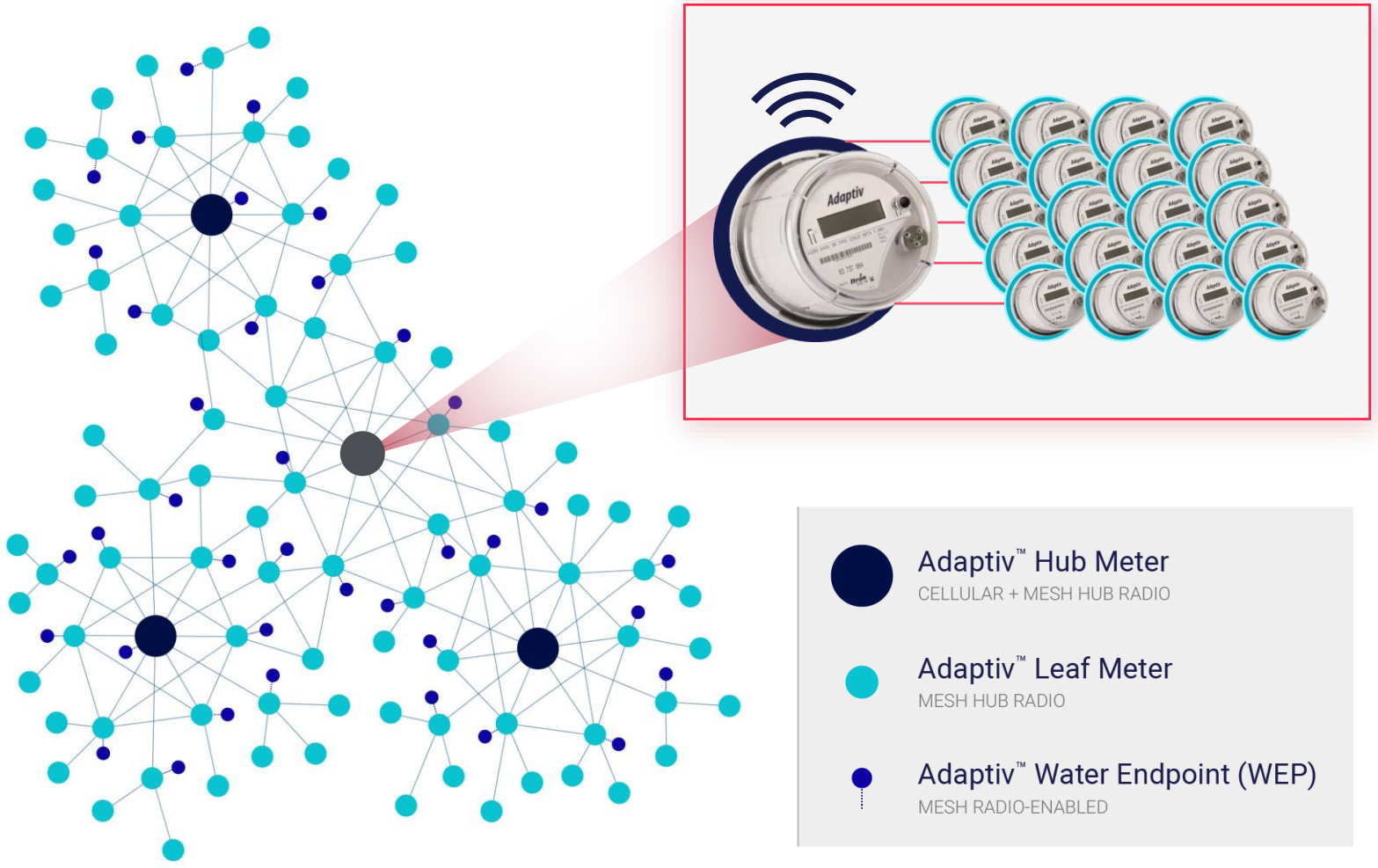
OVERVIEW

- Zero Infrastructure
  - Adaptiv™ AMI means no costly infrastructure to install / maintain
- Integrated Data Transfer
  - Standards-based integration to utility billing applications
  - Multispeak, MV-RS, CMEP
- Seamless Cloud Software
  - No hardware to buy or databases to manage
- Secure, Reliable Reads
  - Secure communications for on-demand move in/move out reads on all meters



Overview

- Scalable, self-healing, self-configuring network
- Next generation high bandwidth cellular-mesh
  - One Hub with cellular modem per cluster
  - Several Leaf meters within range of hub via short-hop RF
- Simple installation and maintenance



OVERVIEW

- Water LINK sends reads via Adaptiv™ smart meters
- Scalable, self-healing, self-configuring mesh network
- Built-in security and redundancy
- Interval data and leak detection with exceptional battery life

Adaptiv™ Hub Meter
CELLULAR + MESH HUB RADIO

Adaptiv™ Leaf Meter
MESH HUB RADIO

Adaptiv™ Water Endpoint (WEP)
MESH RADIO-ENABLED

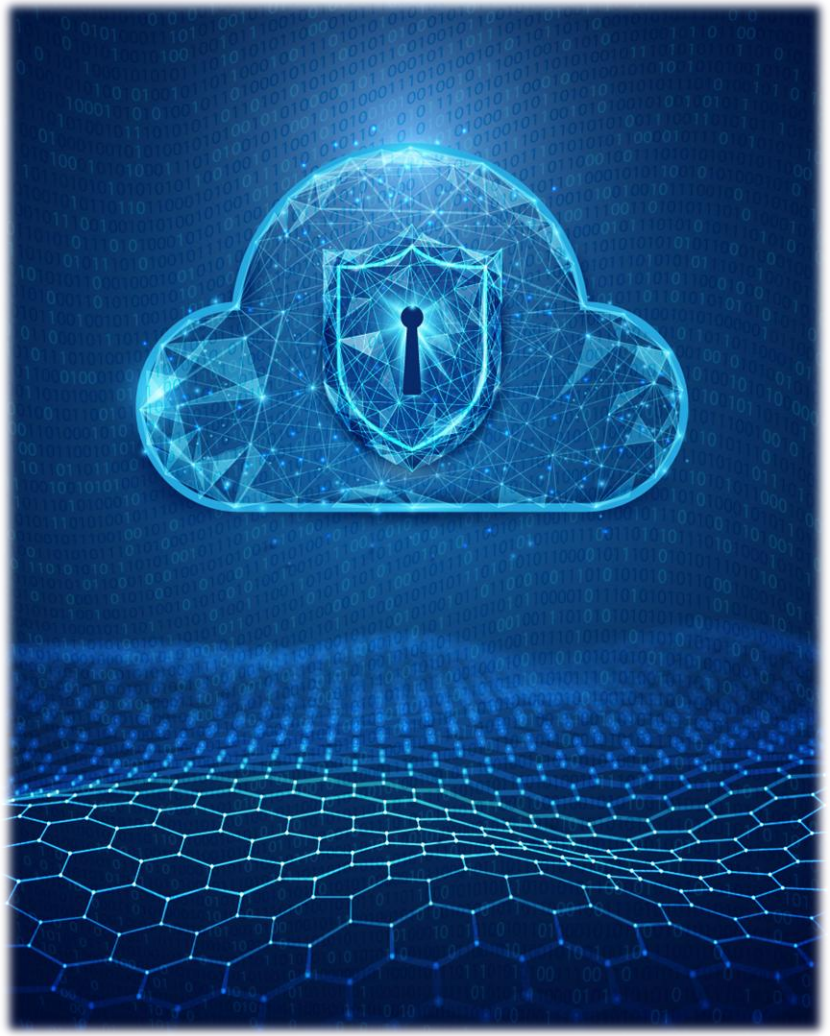
OVERVIEW

Adaptiv™ Value for Life
No additional charges for upgrades, maintenance or support for the life of the product

- Over-the-air upgrades to firmware
- Designed to evolve with the changing needs of the utility industry by enabling more features as required

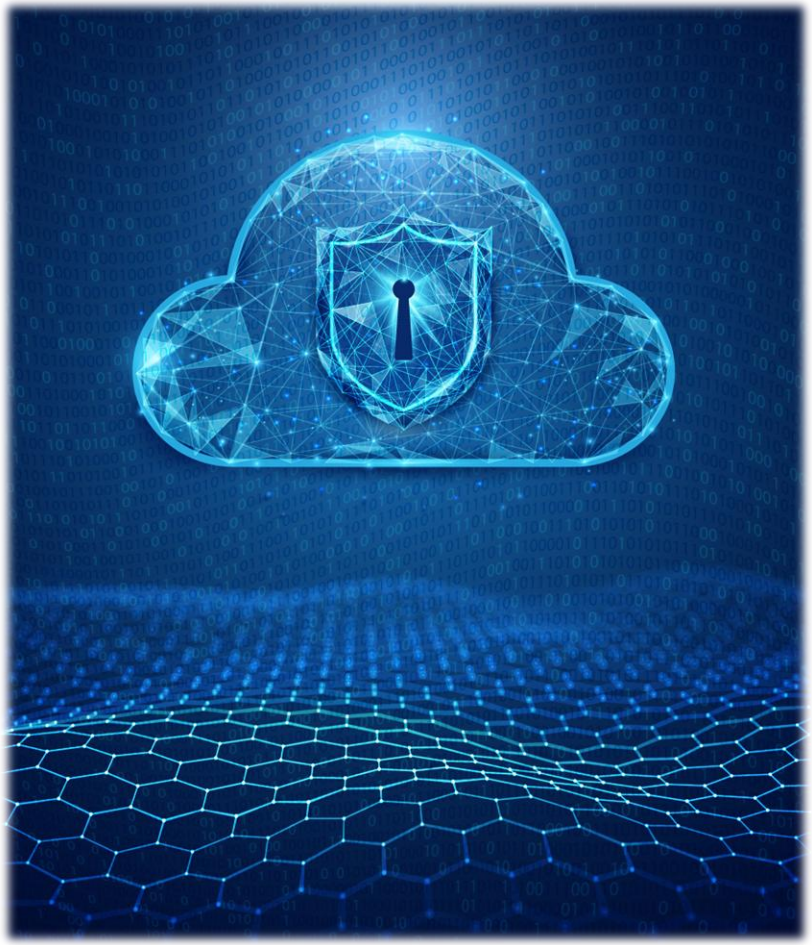
OVERVIEW

- **Database & Software Security**
  - Best-in-class accessibility and security standards
  - Secure communication via Thawte SSL
  - Available multi-factor authentication capability



OVERVIEW

- **Network & Device Security**
  - 128-bit AES encryption for all mesh-enabled devices
  - Unique AES encryption key to partition users' data
  - Protects against external tampering via:
    - Content encryption
    - Channel encryption
    - Dedicated private network



OVERVIEW

- All Adaptiv devices contain a 2.4GHz RF Mesh transceiver connecting all devices, including HUBS
- Cellular Hubs manage multiple LEAF devices
- Population diversity: ~10% HUB to 90% LEAF
- Electric meters available in all S Base form factors and classes

Device Type	Cellular + RF Mesh HUB	ERT Reader Cell+Mesh HUB	RF Mesh only LEAF	Disconnect option
Aclara kV2c	✓	---	---	---
Aclara I-210+c	✓	---	✓	✓
Itron Centron II	✓	✓	---	✓
Water End Point	---	---	✓	---

OVERVIEW

Lowest Risk Solution

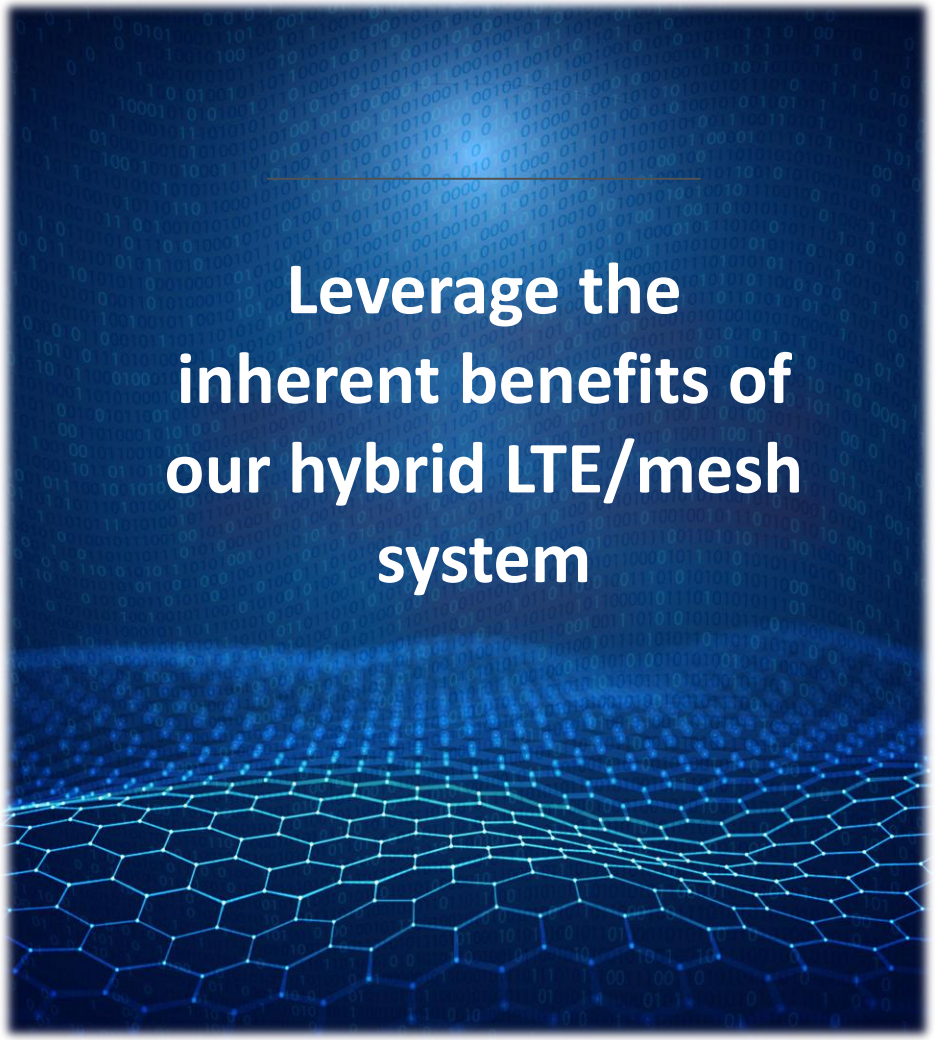
- Zero network infrastructure to install and/or maintain
- Low-cost flexible pilots
- Uses common radio frequencies (LTE and 2.4GHz) found in most households and businesses

Most Flexible Deployment Options

- Flexible deployment strategies based on your priorities and budget
- Solve problems with little effort or cost – disconnect meters (prepay enabled), scope outages, monitor voltage, polyphase first, etc.

Lowest Total Cost of Ownership

- Zero infrastructure investment or maintenance
- Cost reduction for project management and integration
- Easily train your team to use the solution within hours
- Low recurring costs are predictable and controllable



ADAPTIV DEPLOYMENT OPTIONS

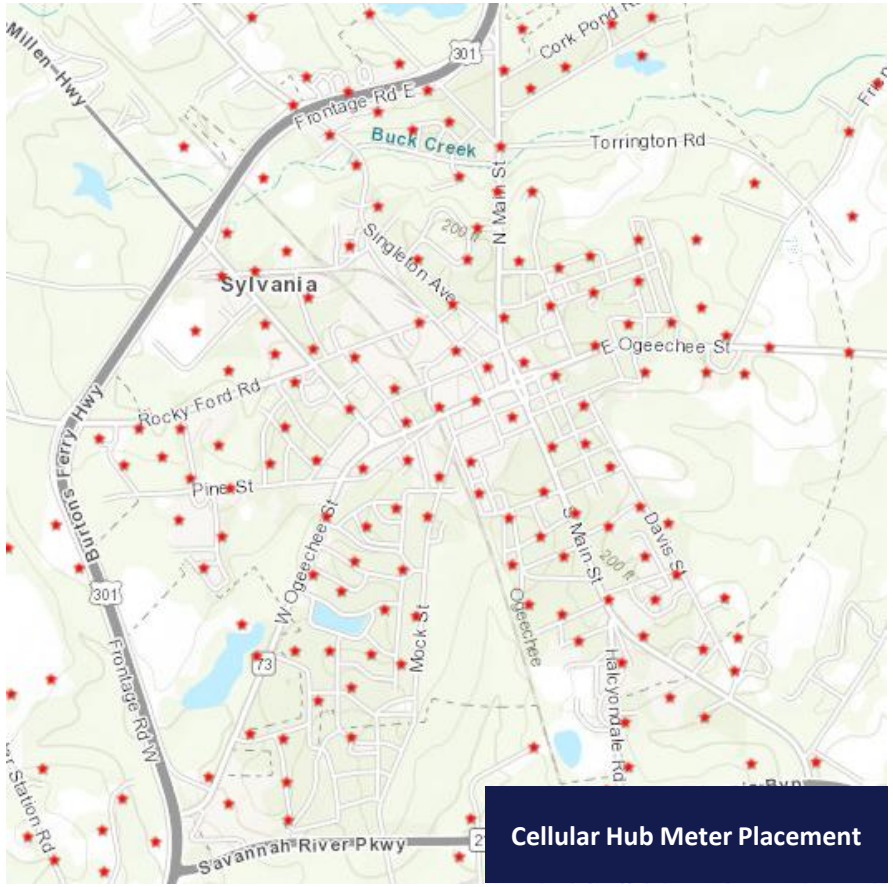
- Full AMI
  - Typically Cell + Mesh
  - Multi-service
    - Full two-way AMI for electric or electric + water (no water only).
    - Gas remote reading is handled through ERT collection using our ERT Collector Hub Meters. NOT full two-way AMI for Gas.
- Gap Fill
  - Typically to fill in gaps in existing AMI systems.
- Tactical/Targeted Solutions
  - Used for targeted applications like remote disconnect, remote reading, Christmas Lights, crypto-mining, etc.
  - When dealing with a utility, can naturally grow into a full AMI system.
- ERT Collection

System Design

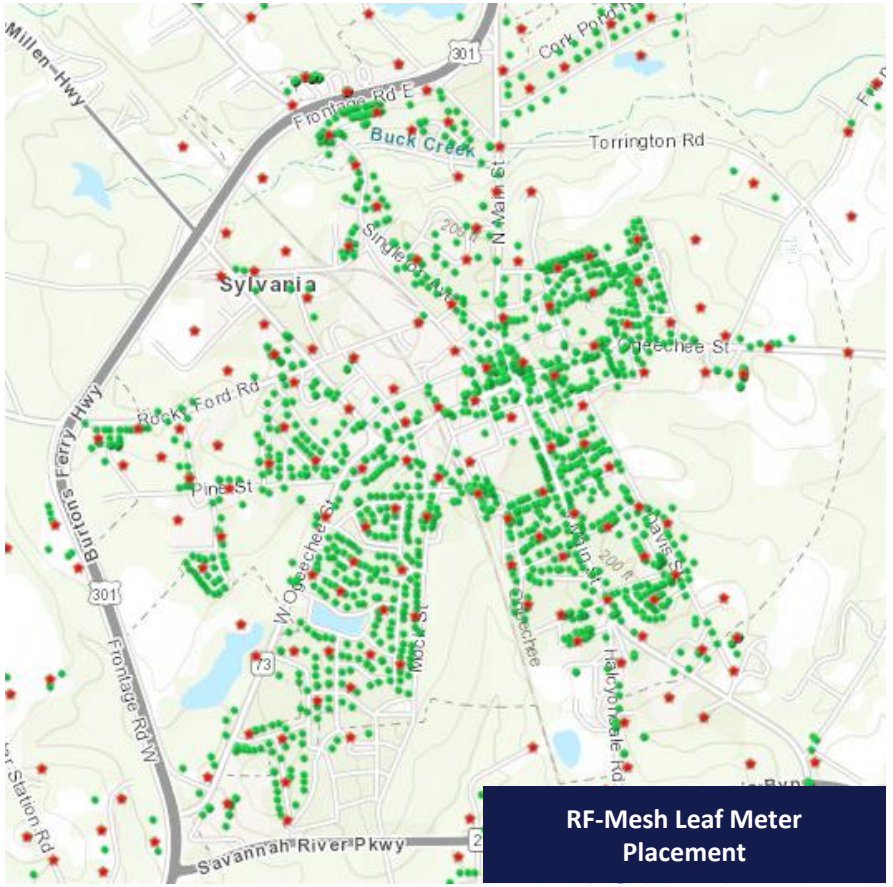
Plot Meter Locations	Overlay Cellular Map(s)	Survey Potential Gaps	Provide Rollout Guidelines
• Customer location data is plotted using ArcGIS	• Verizon/AT&T maps are overlaid to determine cellular coverage.	• If necessary, a site survey can be done to determine actual data coverage	• A guideline is provided to the utility for Hub placement

Leverage Deep Utility Experience

System Design



Cellular Hub Meter Placement



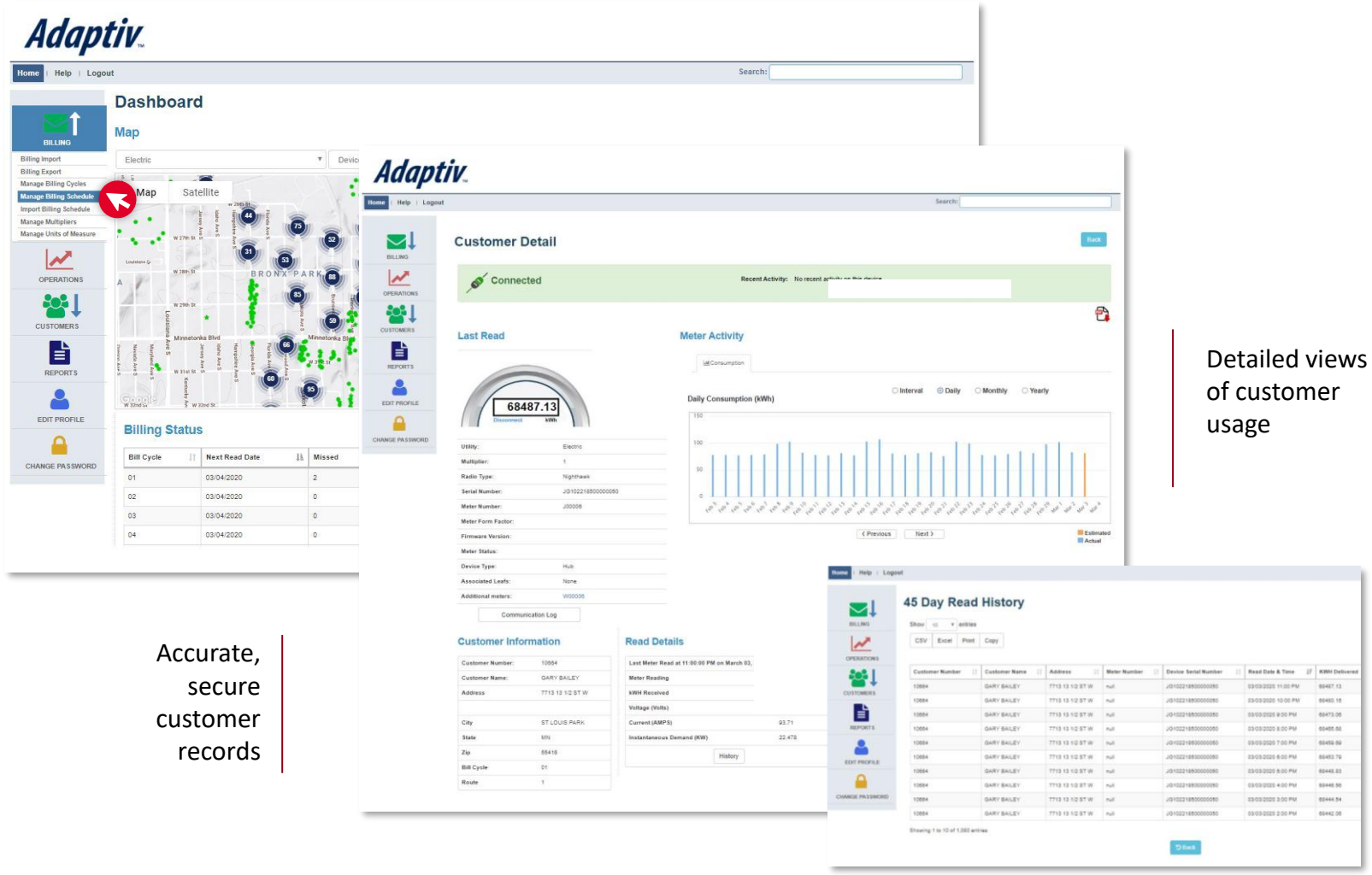
RF-Mesh Leaf Meter Placement

PRODUCT DEMONSTRATION

Predictive Billing

> Know what's missing before it's too late!

- Immediate access to current customer information
- Detailed views of customer usage by day, month, or year
- Resolve billing concerns quickly and efficiently
- Remotely disconnect and connect meters



Detailed views of customer usage

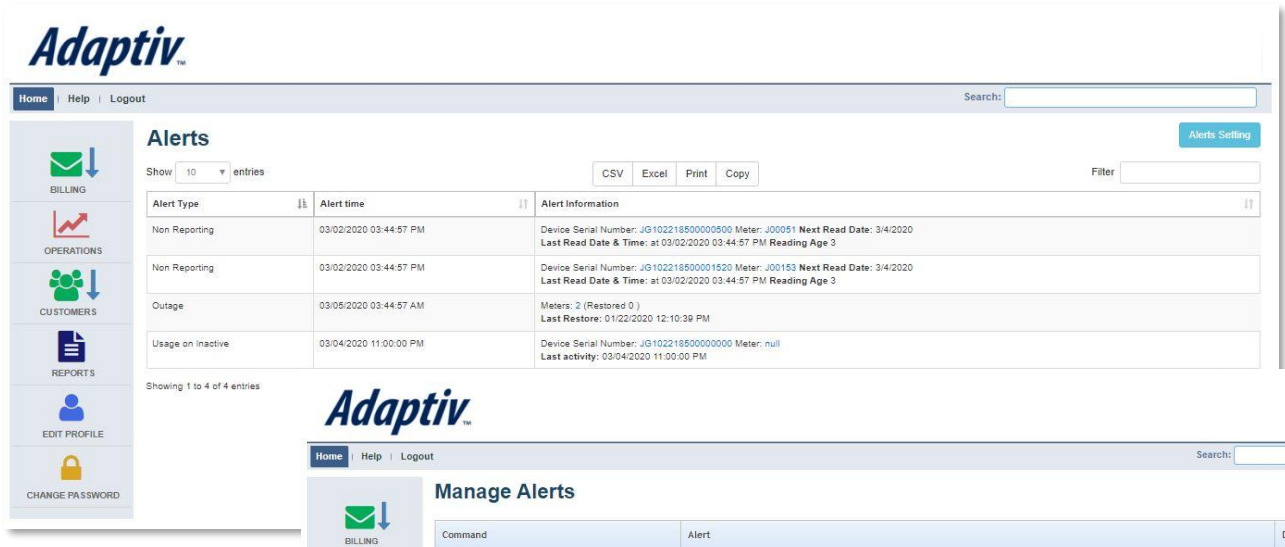
Accurate, secure customer records

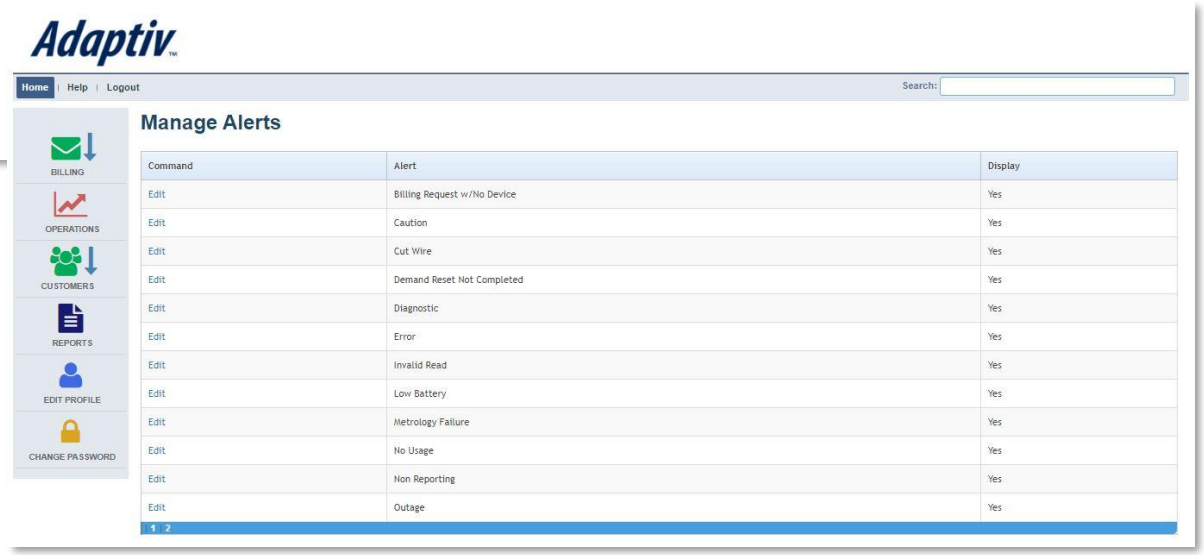
TESCO METERING

PRODUCT DEMONSTRATION

Outages and blinks are monitored daily, managed easily and effectively

- Immediately notify utility personnel of a sustained outage
- Effectively monitor blinks and momentary outages with daily reporting
- Provide precise outage data for power quality reporting



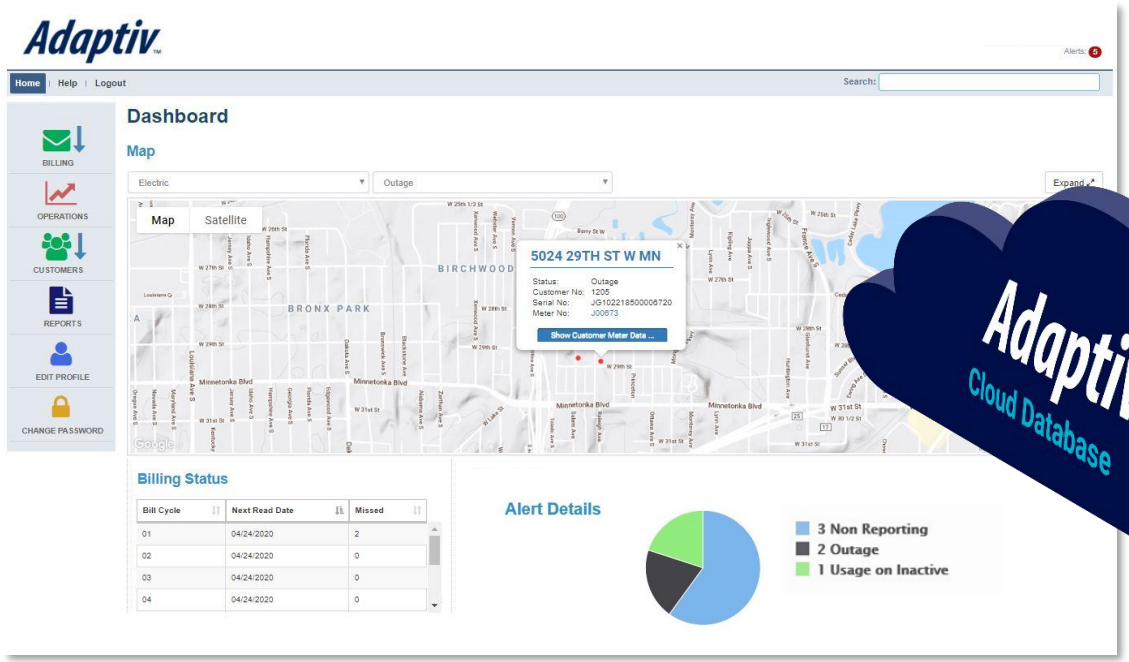


Refine your alerts to enhance your OMS

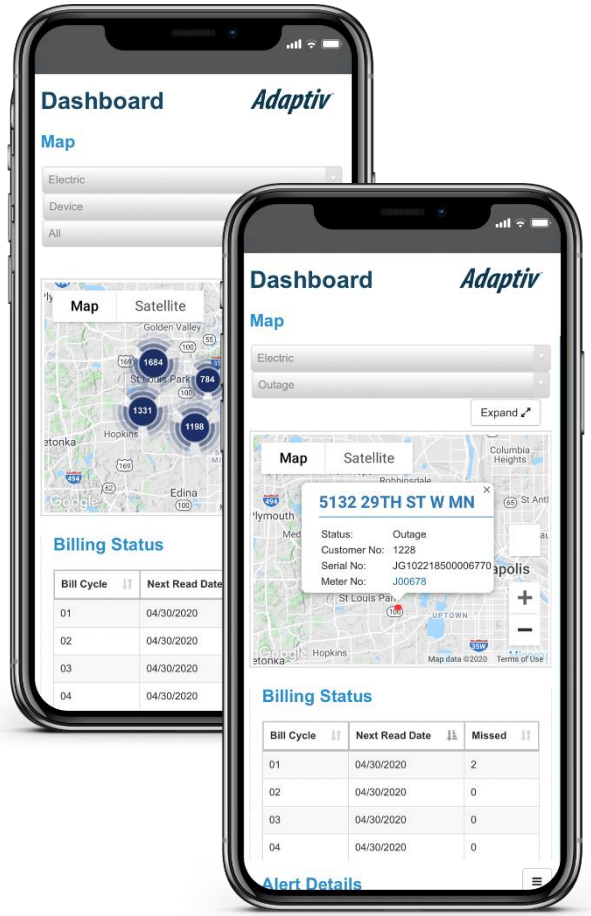
***Integration Fees May Be Incurred**

TESCO METERING

PRODUCT DEMONSTRATION



Smart billing integration with secure mobile access

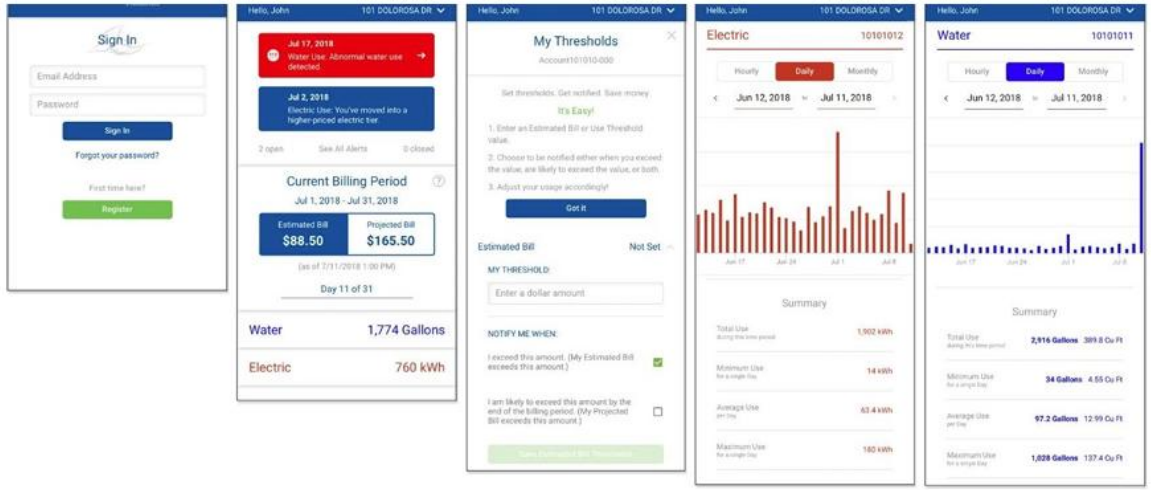


Utility Billing System

Over-the-air configuration and upgrades on all Adaptiv™ units

TESCO METERING

CUSTOMER PORTAL



Compatible with all data acquisition software that supports TCP/IP connections

Itron MV-90 xi

PrimeStone
Intelligent Data Collection + Analytics

Trilliant

Aclara MeterMate™

DirectConnect Solution

- Introducing Nighthawk DirectConnect TCP/IP connectivity on the Aclara kV2c
  - Connects directly to the meter's C12.19 data structure
- Connects directly with **Itron MV-90**, **Aclara MeterMate**, **Trilliant PrimeRead**, or **Trilliant UnitySuite** data acquisition software
- Robust, secure, and efficient bidirectional message delivery mechanism
- Utilizes same proven LTE hardware as Adaptiv HUB solutions (less RF mesh module)
  - Cellular devices only
- Full data retrieval
- Features such as last gasp, modem configuration and firmware update supported
- Can use MeterMate to update meter firmware and configuration
- Compatible with Nighthawk kV2c meters – full meter functions supported
- Itron Poly to follow

DIRECTCONNECT SOLUTION

- Does not require any middleware
  - Stand alone solution that does not require Adaptiv HES or other Adaptiv endpoints
- No recurring fees from Nighthawk. Utilize existing utility private contract with AT&T or Verizon
  - Customer provides SIMs
  - Other carriers can be supported
    - Other carriers can be supported with purchase commitments
    - Requires testing and certification
- Warranty Term: 1 year

TESCO METERING

MODULE SPECIFICATIONS

Radio Performance

protocols	• TCP/IP
modulation	OFDM (Orthogonal Frequency Division Multiplex)
data rate	LTE Cat-1 (5 Mbps ↑, 10 Mbps ↓)
frequency band	LTE Bands 2, 4, and 12 or 13
transmit EIRP	+20 dBm (including antenna gain)
sensitivity	-103 dBm (@ 1% PER; incl. antenna gain)

DirectConnect Functionality

connectivity	AT&T or Verizon LTE cellular
security	ANSI C12.22 128-bit AES/EAX' (combined encryption/authentication)
memory	40 kB
clock synch	to LTE network
firmware	over-the-air upgradable
power outage & restoration reporting	aggregated real-time reporting

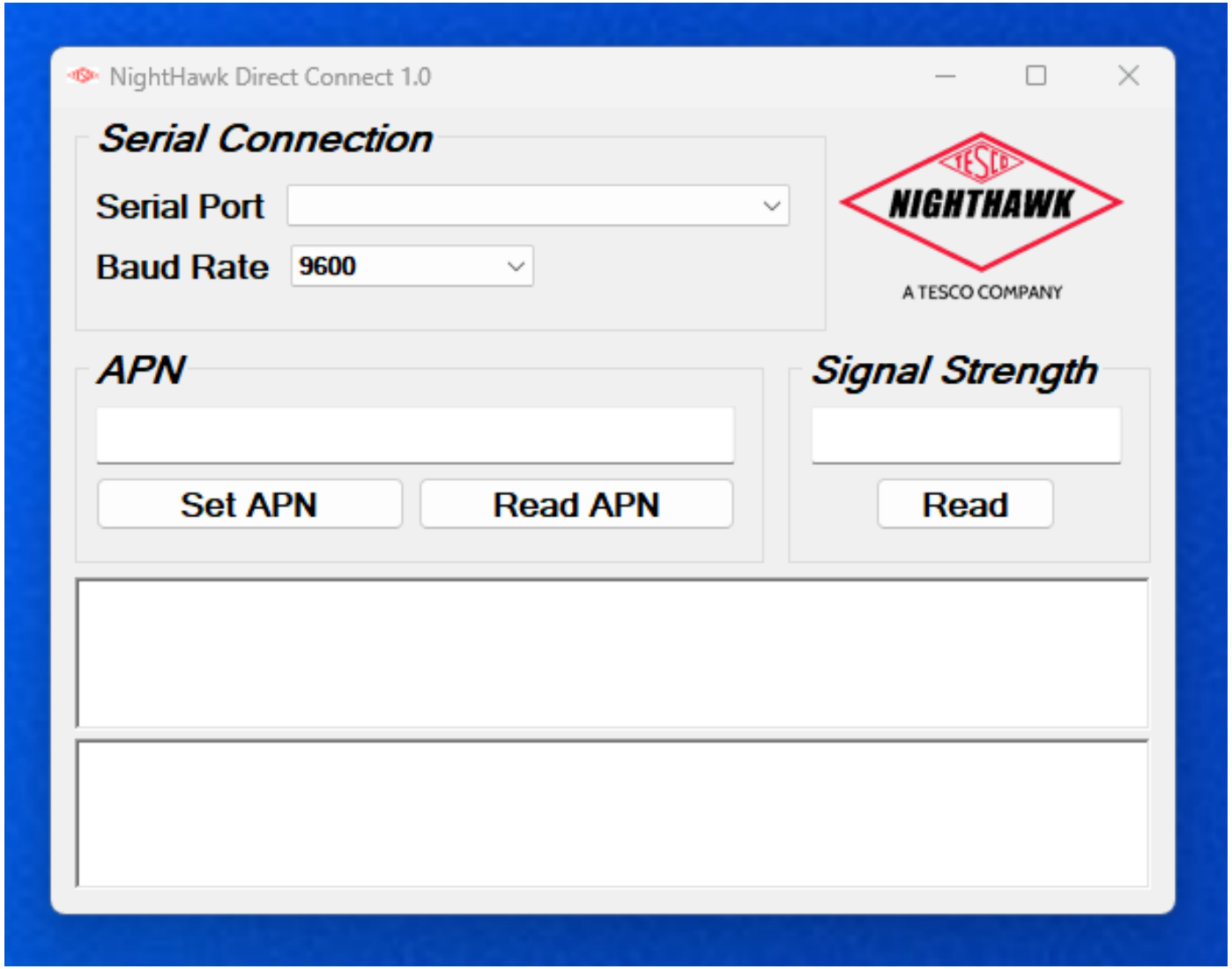
Power, Physical, & Environmental

burden (including module)	• 120 V: 1.3 W • 240 V: 1.6 W • 277 V: 1.7 W • 480 V: 2.4 W
S-Base	• 6.95"/17.65 cm (diam). x 4.38"/11.11 cm (D) • 4 lbs / 1.8 kg net
temperature	-22° F / -30° C to +158°F / +70° C
humidity	5 to 95% non-condensing

Compliance

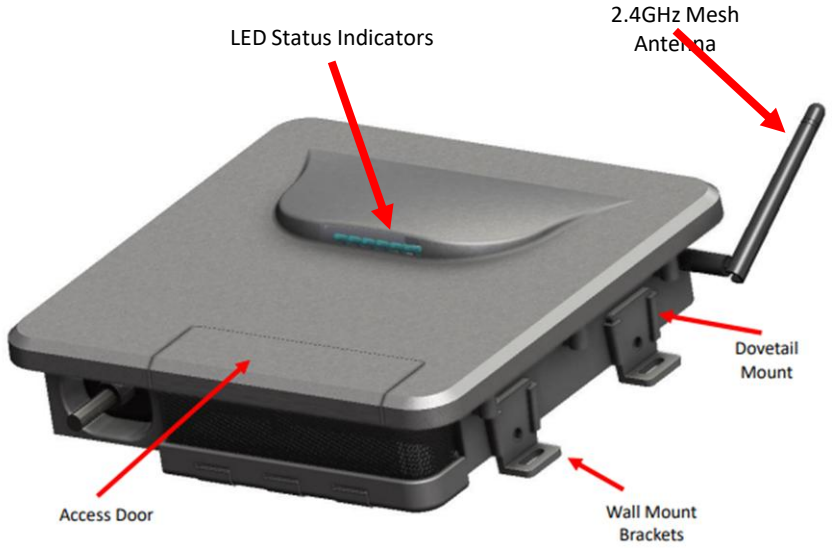
radio emissions	• FCC Part 15 Class A • Industry Canada ICES-003 Class A
device IDs	• FCC ID: RI7LE910NAV2 • IC ID: 5131A-LE910NAV2
safety	• ANSI C37.90.1 • ANSI C62.41
metrology	• ANSI C12.1 • ANSI C12.18 • ANSI C12.19 • ANSI C12.20 • ANSI C12.21

SIMPLE CONFIGURATION



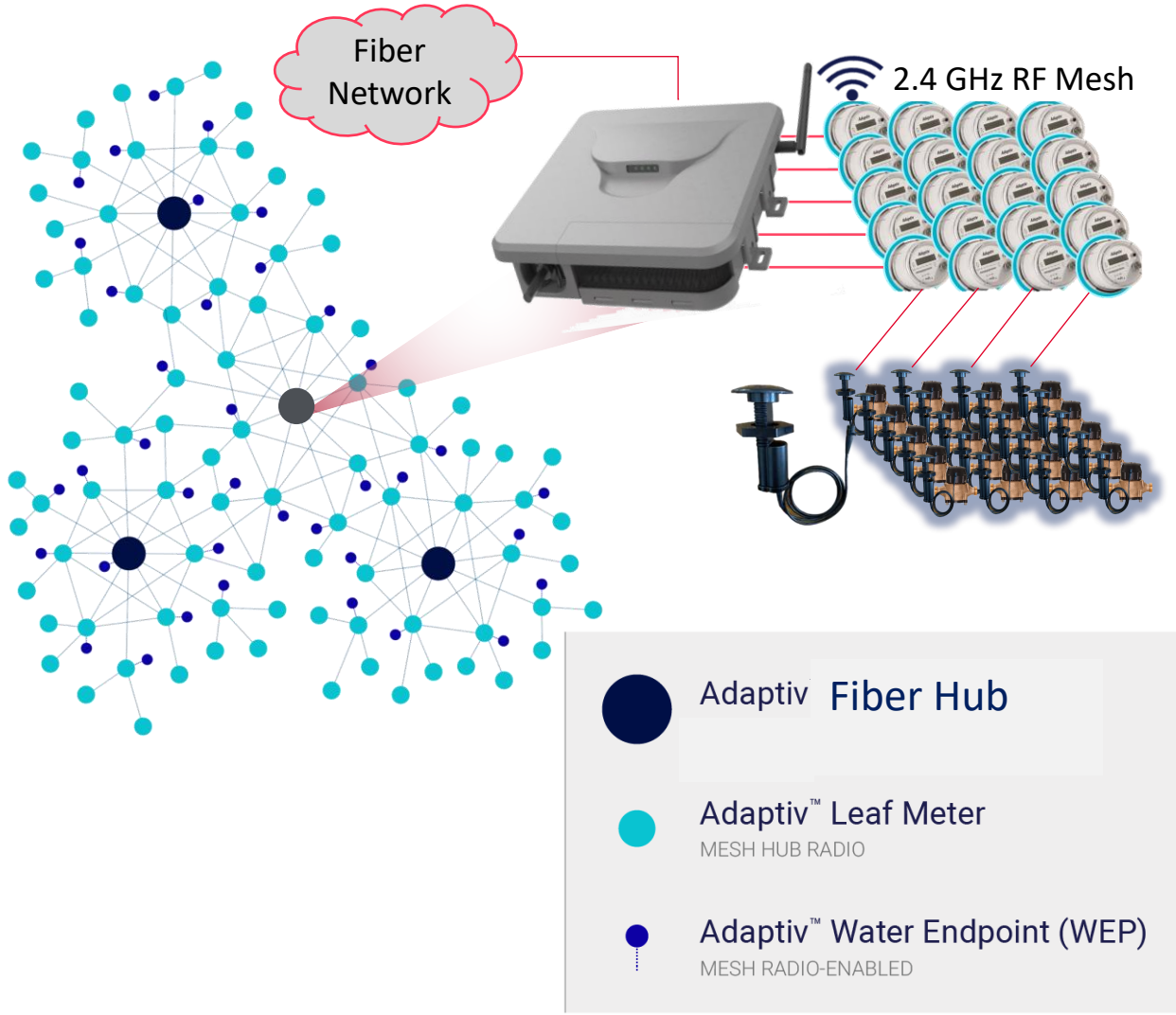
Fiber Hub Intro

- The Nighthawk Ethernet HUB product is a self-contained mesh HUB device with a wired Ethernet uplink.
  - Fiber hub is Adaptiv compatible – uses same Synapse mesh module
  - Acts as a collector for multiple devices
  - Technically an infrastructure device
- “Fiber” is used because the initial product offering has been designed to work with customer deployed PON networks
  - With further development, network uplink could be connected to any copper Ethernet interface
  - Circuitry included to support cellular based version (replaces PON) – reduces operating costs (less cellular outtakes)
- Customer assisted testing and validation ongoing



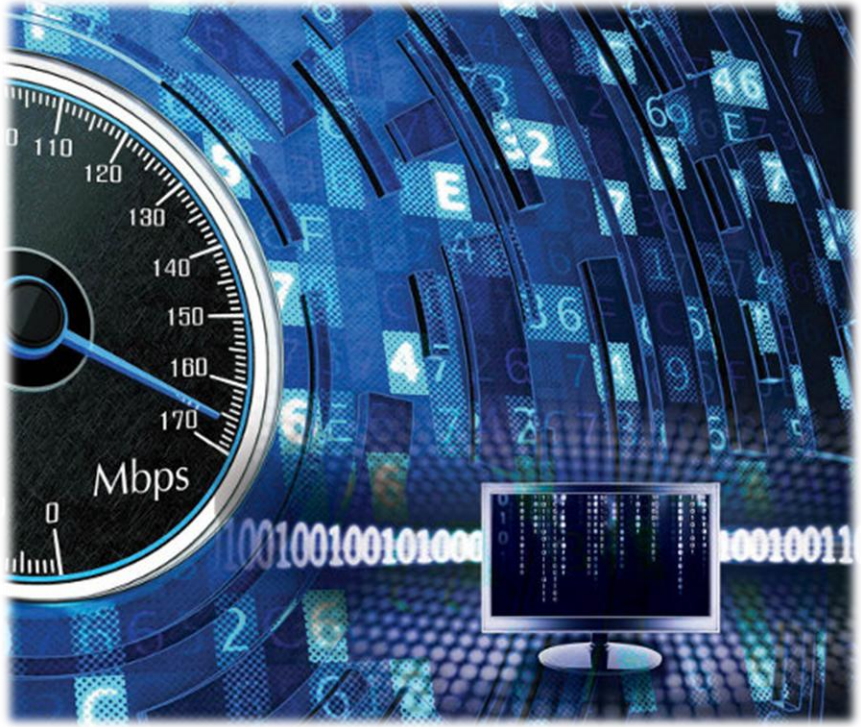
ADAPTIV™ | ONE HUB TO MANY LEAFS

- Scalable, self-healing, self-configuring RF Mesh network
- Utilize High bandwidth Fiber backhaul
  - One HUB per cluster of greater than 20 LEAF devices – electric and water
  - LEAF devices provide up to 4 hops to maximize coverage
- Built-in security and redundancy
- Water interval data and leak detection with exceptional battery life
- Simple installation and maintenance



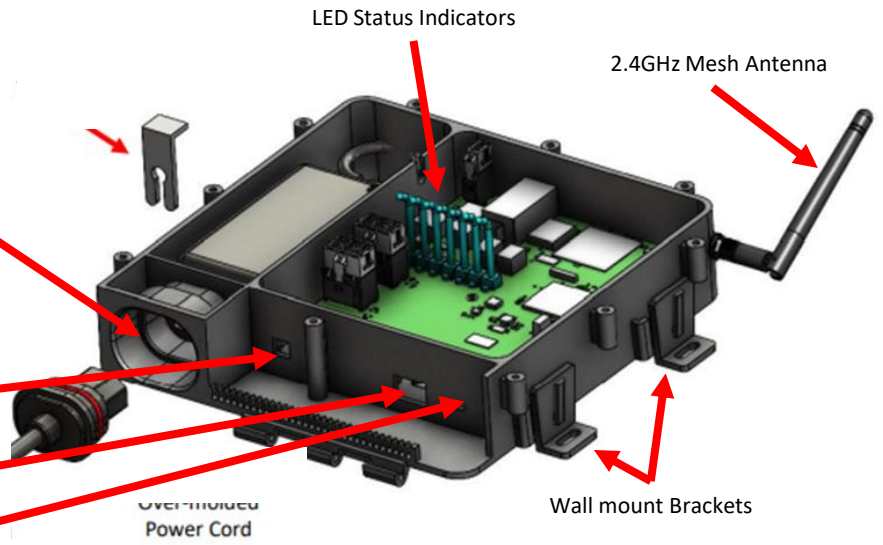
Fiber Hub Use Cases

- Ideal for utilities who have mostly fiber throughout service territory
  - Federal government incentivizing rural coop fiber to the home
  - Utilities looking for applications to use the deployed fiber
- Allows for network performance tuning
  - Mounting on a pole improves device connectivity – increased RF range
  - Allow stranded devices network access
- To be confirmed in validation testing:
  - Connect > 50 devices via mesh
  - Height is our friend
  - Standard hub averages up to 10-20 leaf devices
  - Maximum hub capacity 150 leafs



Fiber to Ethernet Hub Features

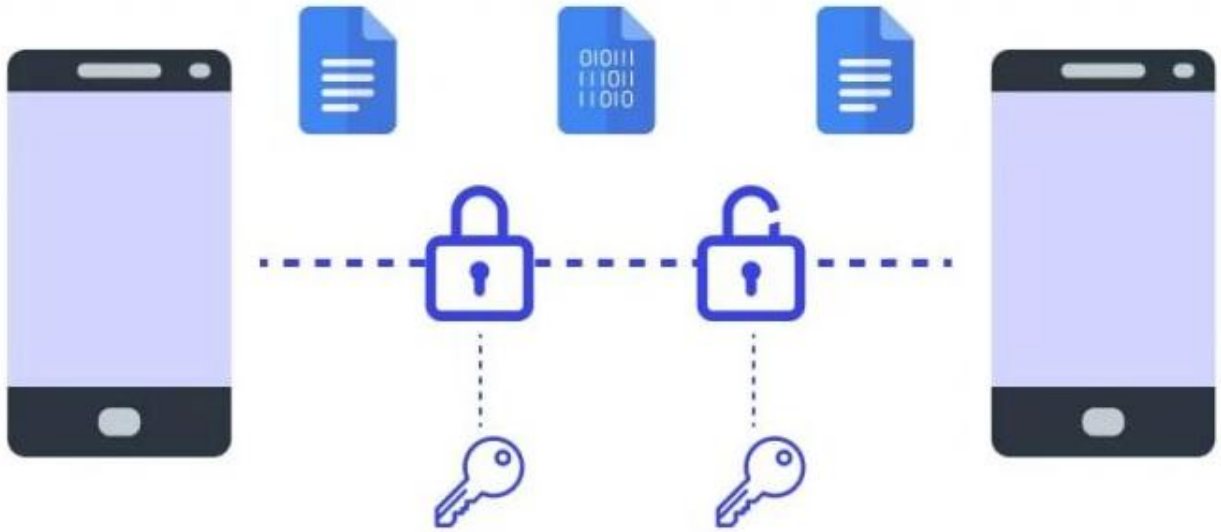
- 120/240 VAC power input
  - Locking power cord
- Size: 7” x 6” x 2.5”
  - Wall or Pole mounting
- Operating Temp: -20C / +65C
- External I/O’s:
  - 12 VDC output for downstream devices (optional)
  - RJ-45 sealed connector – 100Base-TX
  - USB-C sealed Terminal Access Port for configuration, diagnostics, and Synapse script upgrades
- LED Status Indicators for power, network uplink, and alarm status
- Microprocessor based to support multiple peripherals
  - ST Micro STM32F767ZIT6
  - Processor firmware OTA upgradable



Pole Mount Option

Fiber Hub Features – con't

- Advanced Outage Management power fail detection
  - Configurable blink and sustained outage event thresholds, event logging and data upload
- Rechargeable Battery Backup of 10 minutes to allow for last gasp transmissions
  - Powers internal circuitry only
- Supports OTA firmware upgrades to associated mesh devices
- Robust end to end security and encryption



Course Feedback

Please Take a Few Minutes To Provide Feeback About The Course & Instructor

Questions and Discussion

Jon Scott

TESCO NIGHTHAWK Sales Manager

TESCO – The Eastern Specialty Company

Bristol, PA

404.451.8444

This presentation can also be found under Meter Conferences and Schools on the TESCO website: tescometering.com

ISO 9001:2015 Certified Quality Company
ISO 17025:2017 Accredited Laboratory