



TESCO METERING

CELLULAR METERING SOLUTIONS AND INTEGRATION WITH MV-90 AND FIBER

TESCO's Meter School

TESCOOL

July 21-24, 2024

July 22, 2024

1:00 PM -- 2:30 PM

Jon Scott



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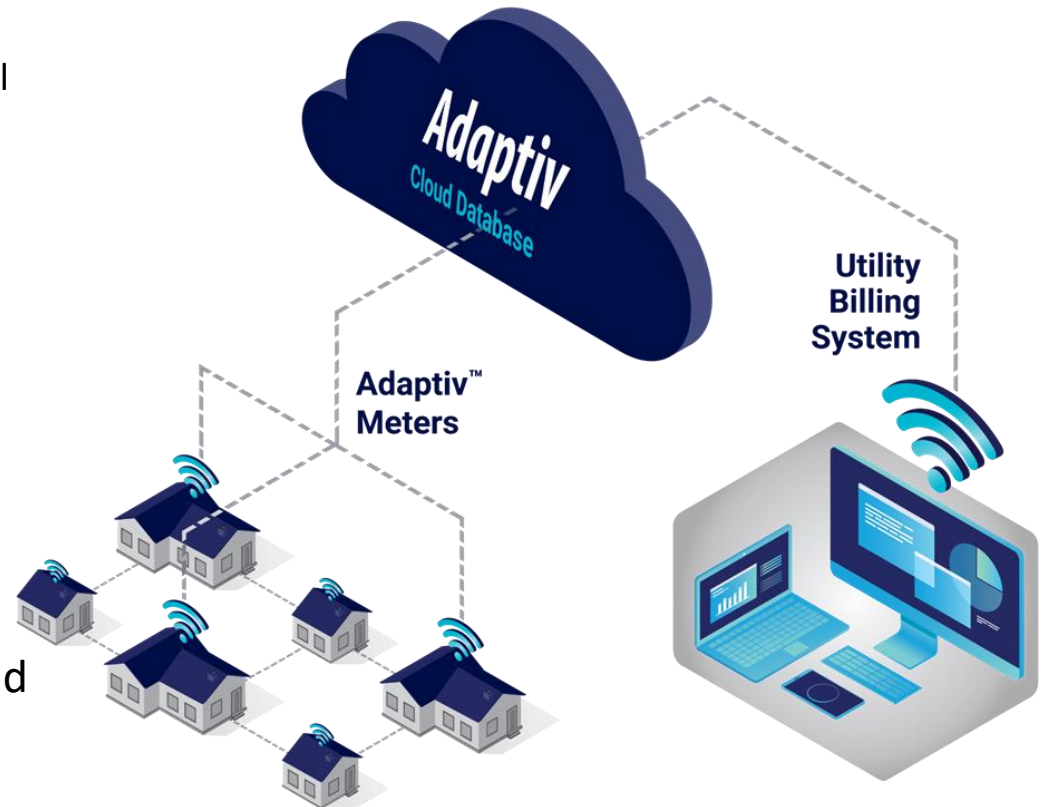
ADAPTIV ARCHITECTURE



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ADAPTIV BENEFITS

- Zero Infrastructure
 - Easy to deploy
 - No costly infrastructure to install or maintain
- Billing Data Transfer
 - Standards-based integration to utility billing applications
 - Multispeak, MV-RS, CMEP
- Solution as a Service
 - Seamless Cloud Software and Support
 - No IT hardware to buy or databases to manage
 - Nighthawk provides all hosting and support
- Secure, Reliable Reads scheduled or on demand
 - Daily consumption
 - Move in/move out reads
 - Disconnects





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ADPATIV DEPLOYMENT OPTIONS

- Full AMI
 - Typically targeted at small – medium-size municipalities/cooperatives.
 - 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 targeted at larger utilities 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
 - For electric and water customers, can be used as a bridge to Full two-way AMI.
 - Rarely do we reliably collect ALL electric, water and gas ERT signals.



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ADAPTIV ENDPOINTS



- 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

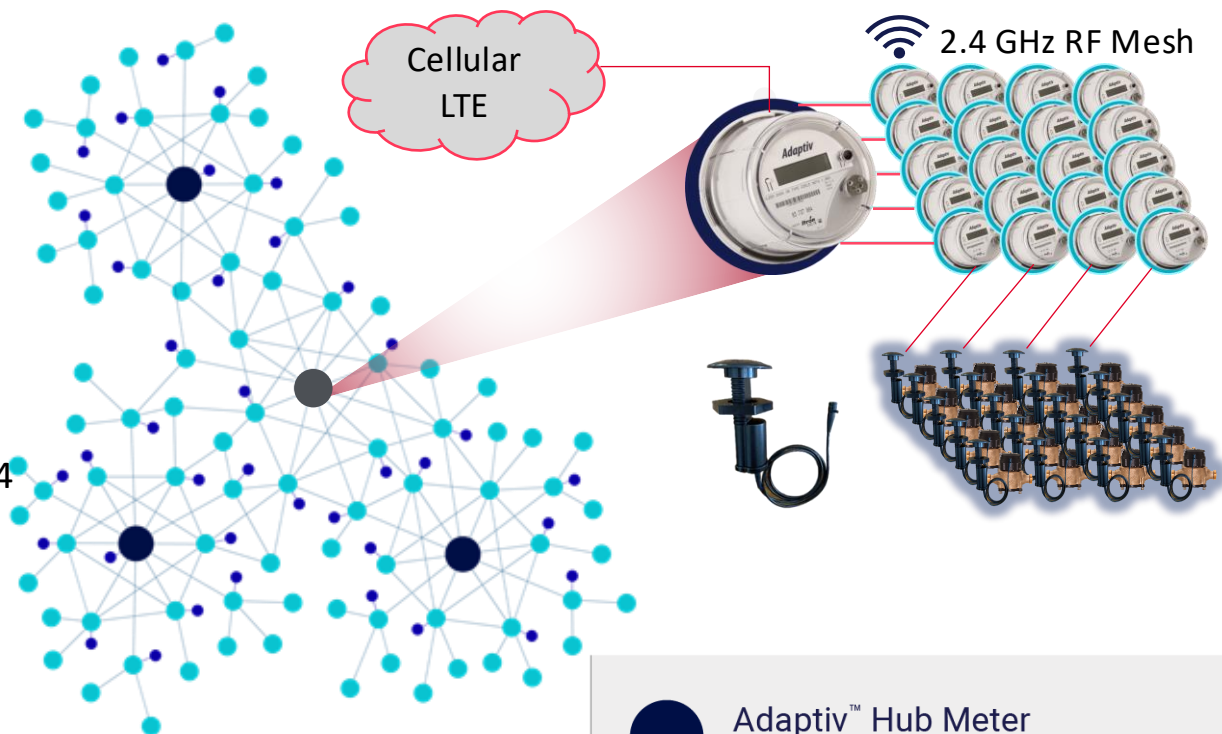
Device Type	Cellular + RF Mesh HUB	ERT Reader Cell+Mesh HUB	RF Mesh only LEAF	Disconnect option
Aclara kV2c	✓	---	---	---
Aclara I-210+c	✓	---	✓	✓
Itron Centron II	✓	✓	---	✓
Water End Point	---	---	✓	---



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ADAPTIV™ | ONE HUB TO MANY LEAFS

- Scalable, self-healing, self-configuring RF Mesh network
- High bandwidth LTE cellular-mesh
 - One HUB per cluster of 10 - 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



Adaptiv™ Hub Meter

CELLULAR + MESH HUB RADIO



Adaptiv™ Leaf Meter

MESH HUB RADIO



Adaptiv™ Water Endpoint (WEP)

MESH RADIO-ENABLED



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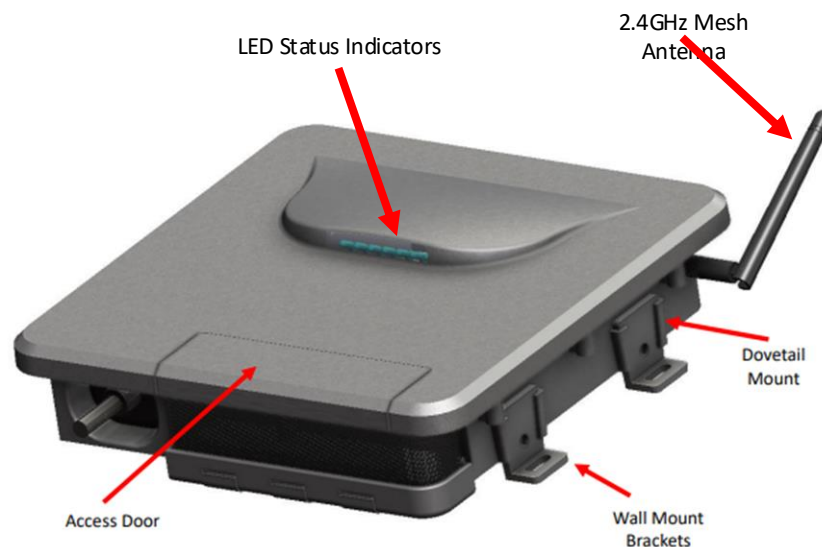
WHAT DOES THIS HAVE TO DO WITH FIBER?



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FIBER HUB INTRO

- Introducing late 4th quarter 2023
- The Nighthawk Ethernet HUB product is a self-contained mesh HUB device with a wired Ethernet uplink.
 - Fiber hub is Adaptive 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

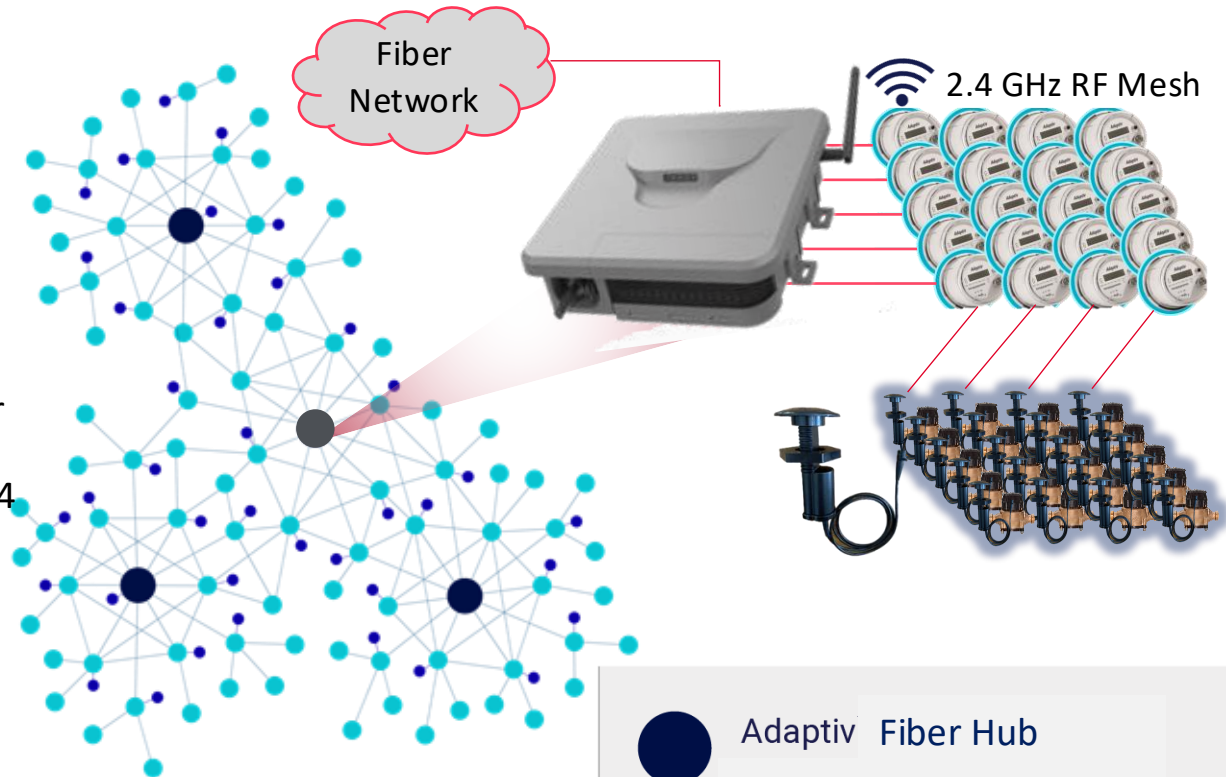




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ADAPTIV™ | ONE HUB TO MANY LEAFS

- 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



Adaptiv Fiber Hub



Adaptiv™ Leaf Meter

MESH HUB RADIO



Adaptiv™ Water Endpoint (WEP)

MESH RADIO-ENABLED

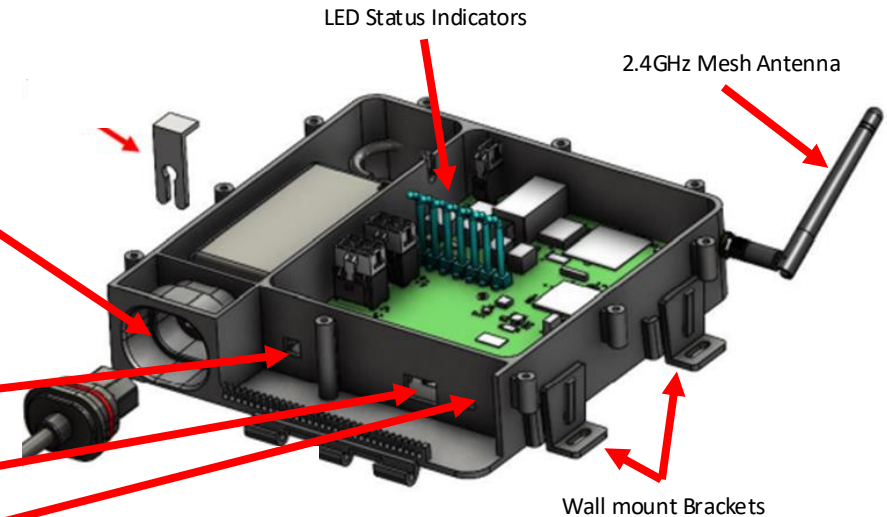
- Ideal for utilities who have mostly fiber throughout service territory
 - Federal government incentivizing rural coop fiber to the home
 - Utilities looking for applications to use the deployed fiber
- Allows for network performance tuning
 - Mounting on a pole improves device connectivity – increased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



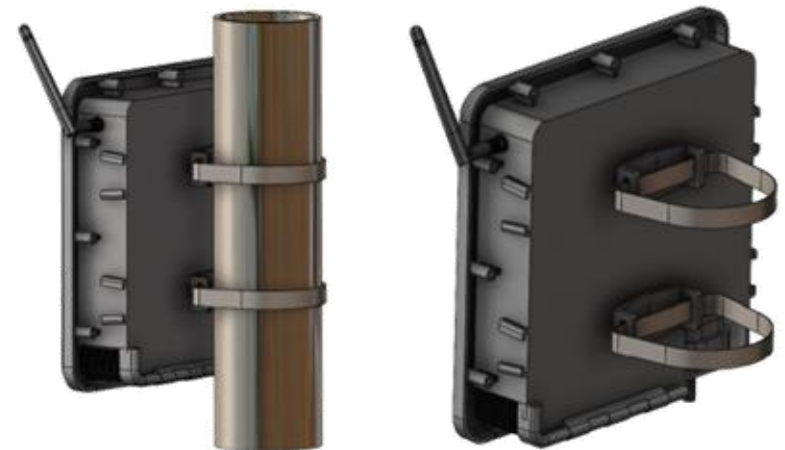
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FIBER HUB FEATURES

- 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



- 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



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DIRECTCONNECT

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



MV-90 xi

Aclara
MeterMate™



PrimeStone
Intelligent Data Collection + Analytics

Trilliant

tescometering.com

- Introducing Nighthawk DirectConnect TCP/IP connectivity on the Aclara kV2c mid second quarter 2023
 - 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 – not compatible with Leaf (mesh) meters
- In final testing now
 - 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 late 2023/early 2024
 - Currently supported on Verizon or AT&T

- 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

MODULE SPECIFICATIONS

Radio Performance

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

DirectConnect Functionality

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

Power, Physical, & Environmental

<i>burden (including module)</i>	<ul style="list-style-type: none"> • 120 V: 1.3 W • 277 V: 1.7 W • 240 V: 1.6 W • 480 V: 2.4 W
<i>S-Base</i>	<ul style="list-style-type: none"> • 6.95"/17.65 cm (diam). x 4.38"/11.11 cm (D) • 4 lbs / 1.8 kg net
<i>temperature</i>	-22° F / -30° C to +158°F / +70° C
<i>humidity</i>	5 to 95% non-condensing

Compliance

<i>radio emissions</i>	<ul style="list-style-type: none"> • FCC Part 15 Class A • Industry Canada ICES-003 Class A
<i>device IDs</i>	<ul style="list-style-type: none"> • FCC ID: RI7LE910NAV2 • IC ID: 5131A-LE910NAV2
<i>safety</i>	<ul style="list-style-type: none"> • ANSI C37.90.1 • ANSI C62.41
<i>metrology</i>	<ul style="list-style-type: none"> • ANSI C12.1 • ANSI C12.18 • ANSI C12.19 • ANSI C12.20 • ANSI C12.21



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SIMPLE CONFIGURATION

The image shows a screenshot of the "NightHawk Direct Connect 1.0" software window. The window has a title bar with the TESCO logo and the text "NightHawk Direct Connect 1.0". Inside the window, there are several sections: "Serial Connection" with dropdown menus for "Serial Port" and "Baud Rate" (set to 9600); "APN" with a text input field and "Set APN" and "Read APN" buttons; "Signal Strength" with a text input field and a "Read" button; and two large empty text areas at the bottom. A TESCO NIGHTHAWK logo and "A TESCO COMPANY" text are also present in the upper right area of the window.

NightHawk Direct Connect 1.0

Serial Connection

Serial Port

Baud Rate

APN

Signal Strength

TESCO NIGHTHAWK

A TESCO COMPANY

Jon Scott

TESCO NIGHTHAWK Sales Manager



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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