MicroAP

A WAN-enabled Communications Module

The Silver Spring MicroAP is a unique implementation of cellular connectivity for meters. Unlike any other point-to-point cellular device, the Silver Spring MicroAP Communications Module supports both cellular/mobile and RF mesh communications simultaneously. Initially designed to reside in our partners' meters, a MicroAP leverages cellular communications for backhaul connectivity and can use the RF mesh communications to connect with other nearby Silver Spring devices using Silver Spring's innovative Micromesh technology.

Overview

A MicroAP supports a combination of 2G or 3G technologies and carriers and RF mesh communications. Each MicroAP can provide backhaul connectivity on behalf of up to 20 Silver Spring-enabled meters, connected in a Micromesh deployment.
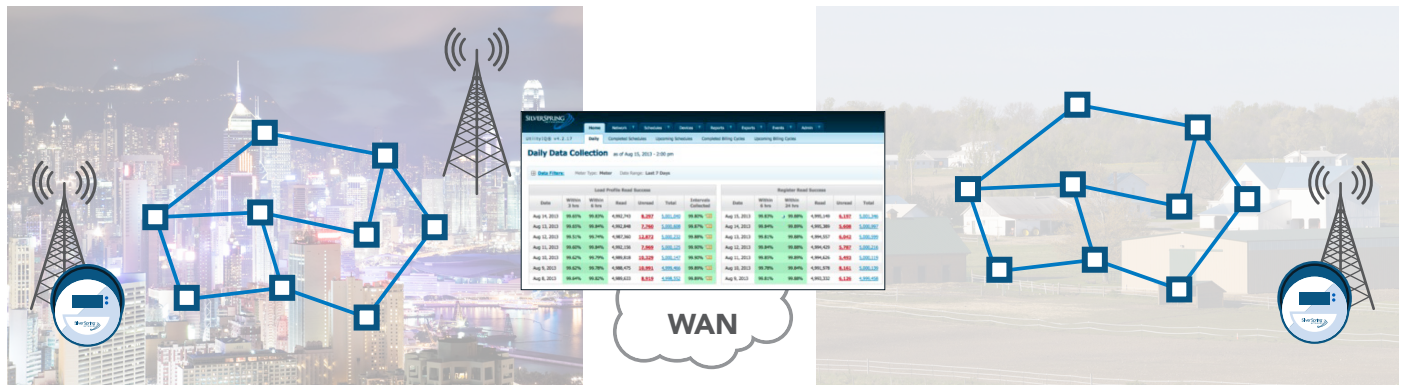

Figure 1: A MicroAP provides communications to UtilityIQ applications and connects with other nearby meters through Silver Spring's innovative Micromesh technology.

Key Benefits

The MicroAP provides high performance, deployment flexibility, and operational savings as utilities connect remote or hard-to-hear locations across the service territory.

Cost savings

Because a MicroAP can host nearby devices on the mesh network, it sharply reduces operating costs compared with having a discrete cellular connection for each of the remote devices. Over time, the MicroAP devices may be able to connect to the back office over the network as it expands, enabling that cellular connection to be disabled, driving even more cost out of the deployment.

Flexibility and business agility, with lower risk of stranded assets

The MicroAP cost-effectively addresses deployment conditions in environments such as rural communities, urban "hard to hear" locations, and opt-in programs. As service providers upgrade their networks, the Micromesh capability mitigates against the risk of stranded assets. Simply upgrade one MicroAP to the latest technology and all the devices within the Micromesh community gain the new capabilities – the previous MicroAP simply uses its RF mesh communications option.

Improved performance and resiliency

Gen4-based networking technology with gear shifting enables faster data transfer and lower latency, speeding field operations such as teaming in DA deployments. Support for data transfer rates from 100 kbps to 300 kbps delivers application performance and backward compatibility but also enables devices to dynamically optimize between range and performance.

Seamless integration

Rather than force separate network management or data collection, the MicroAP integrates with Silver Spring's software and firmware, including UtilityIQ Advanced Metering Manager, GridScape Network Manager, and UtilOS firmware.

Feature Details

Gen4-based networking technology with gear shifting Supports

100 kbps to 300 kbps raw data speeds. Provides link-by-link gear shifting for backward compatibility and dynamic optimization between range and performance.

Cellular support

Incorporates a cellular modem along with standard 900 MHz NAN and 2.4 GHz HAN radios. Supports GPRS, HSPA, EVDO, and 1-XRTT cellular options.

Micromesh support

Enables MicroAP to form a mesh with neighboring devices and provide cellular backhaul to UtilityIQ applications.

System-on-Chip (SOC) security

Accelerates security key set up and verifies secure bootloader supporting authentication and encryption.

Advanced watchdog

Enables full power cycle of the device eliminating truck rolls.

Deployment scenarios

Isolated Groups of Meters

Where population density is unlikely to reach critical mass for a typical mesh deployment, MicroAP provides a cost-effective solution. Later, if density increases sufficiently to build out the network with traditional APs and Relays, operators can simply disable the cellular connectivity of a MicroAP and have it join the RF mesh network. This transition is managed from the utility back office.

Opt-In Only Deployments

The MicroAP approach is useful for utilities offering an opt-in approach to smart meters. The first customers that enroll receive a MicroAP-based meter. Later, when other customers within range sign up, their meters mesh with the MicroAP to form a Micromesh community, leveraging the MicroAP for their cellular backhaul. The opt-in network works immediately and grows over time.

Hard-to-Hear Locations

When a group of meters cannot mesh effectively with Access Points or Relays, a properly placed MicroAP serves as a self-contained Access Point. For example, some large structures contain many meters in the building core. If these meters cannot be reached with traditional network gear, a MicroAP may be installed to serve as the take-out point for the building.

Considerations

The MicroAP offers compelling cost efficiencies and deployment simplicity but is not appropriate in all scenarios. The MicroAP does not include batteries for continued operation during outages. If the utility requires rapid outage scoping across all service points, then deploying a standard Silver Spring wireless mesh with battery-backed APs and Relays is preferable. A MicroAP-only network also has limited extensibility to other business applications such as distribution automation and demand-side management, although MicroAP deployments can be transitioned to a traditional mesh network with support for multiple applications over time. Silver Spring can provide utilities with network design guidance to optimize MicroAP deployments from both technical and business perspectives.