SEMTECH

SMART METERING

Wireless Gas Level Monitoring

LoRa® APPLICATION BRIEF

Semtech's LoRa Technology Enables Efficient, On-Time Delivery of Utilities Using Public or Private Networks

DESCRIPTION

LoRa® devices and wireless RF technology (LoRa Technology) is making it easy and affordable for smart metering to monitor and manage gas levels remotely. Self-reporting gas bottles can add intelligence, efficiency and higher-levels of service to the far-flung web of customers serviced by a typical bottled gas distributor. Long-range, LoRa-enabled wireless sensors can transform a conventional storage bottle or tank into a smart device, which detects its own state of fill and communicates the information to a Cloud-based inventory management and scheduling application.

Now, gas bottles running low on fuel can initiate a delivery request that appears on the appropriate route driver's smartphone. LoRa Technology also allows bottled gas distributors to anticipate their customers' needs by providing real-time information about their consumption patterns. This technology can be easily adapted to nearly any application involving enclosed metal tanks holding liquids, combustibles or liquid gases.

BENEFITS

The smart containers in a LoRa-based gas bottle will communicate with their associated inventory management and scheduling application across a network of wireless gateways that provide coverage across the distributor's territory. The gateways can be deployed as a private network or added to an existing low-power wide-area network (LPWAN) infrastructure, such as those used by cellular carriers and cable operators.

Any gas container equipped with a long-range, low-power radio that supports the LoRaWAN™ protocol can communicate with a LoRa-based gateway at a distance of between 20-30 miles in a rural area. When embedded within a sensor module, the radio enables the container to report its state of fill, and to request delivery of a new bottle when its contents fall below a specified level. It is also possible to determine a LoRa-equipped gas container's location using radio triangulation.

APPLICATION

A wide area wireless solution that monitors the fuel level in stationary and portable gas bottles that generates refill alerts in time to assure customers a steady supply of fuel.

SEMTECH'S LoRa TECHNOLOGY FOR GAS BOTTLE SENSING AND MANAGEMENT SYSTEM

HOW IT WORKS

Semtech's LoRa Technology enables remote status reporting, geolocation, real-time analytics, and automatic delivery scheduling.

1. An ordinary gas bottle can transform into a "Smart Bottle" which reports its state of fill across the LoRaWAN network with the addition of a self-powered, wireless sensor module. The module, which can be attached to the bottle without tools or modification, contains an ultrasonic level sensor, a micro-controller embedded LoRa transceiver and a unique ID number.
2. The sensor module takes periodic measurements of the gas level and transmits them to the network of LoRa-based gateways within its range (typically 30 miles).
3. The gateways forward the measurements to a Cloud-based application server which matches the bottle's unique identifier to its associated customer and distributor. The server allows gas bottle distributors to access their customer's status via a smartphone application.
4. If the bottle's level is low, a request for a refill is automatically passed to the system's scheduling and dispatch application, along with the customer's address.
5. The gas distribution system can also analyze information collected by the LoRa network to provide the bottled gas distributors with analysis of their customers' past consumption patterns and predictions of future demand.

REAL USE CASE SOLUTION

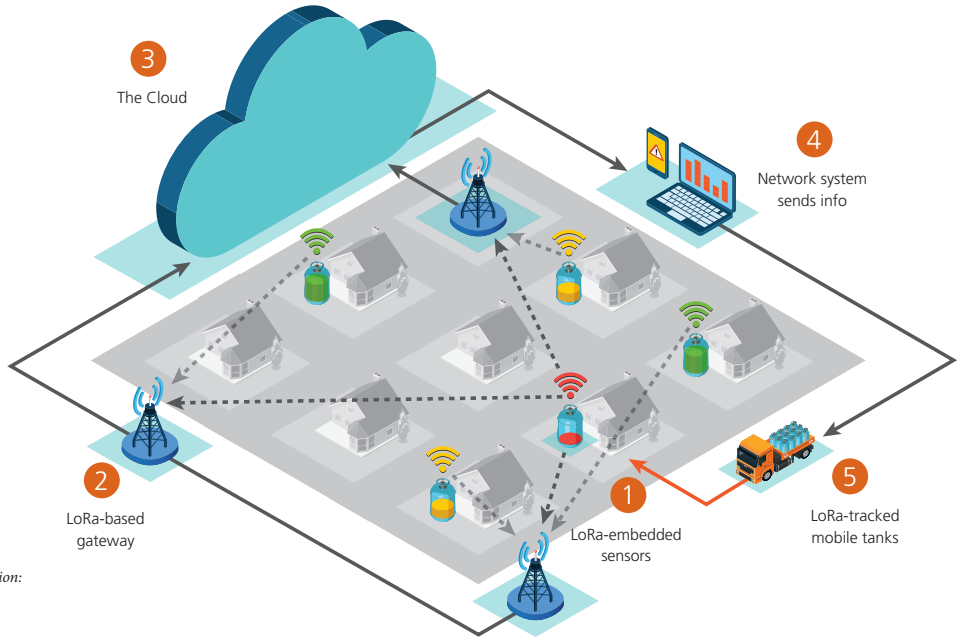
Butano 24, a division of Serviglp SL, a Spanish company that provides order processing services for bottled fuel products to energy and utility companies, evaluated several wireless technologies for its next-generation IoT-based gas bottle level sensing and management application. In the end, Butano 24 chose LoRa Technology as the basis for their platform because it offered a unique combination of advantages that competing solutions could not match. These include:

LOW DEPLOYMENT COST

A LoRa Technology application can operate over public infrastructures when they are available, eliminating the need for large capital expenditures. This enables Butano 24 to quickly deploy its gas level measurement application over commercial LoRaWAN™ networks with greatly reduced CAPEX requirements. For applications that require a dedicated infrastructure, LoRa Technology's long-range, low-power technology can connect to sensors more than 20-30 miles away in rural areas, thereby minimizing the number of gateways needed to serve an area.

LOW PER-UNIT COST

Adding LoRa Technology to an end-node sensor module requires a single low-cost IC, making it affordable for Butano 24 to quickly add self-reporting capabilities to a distributor's entire fleet of containers and delivery vehicles. LoRa-based gateways are equally affordable, with carrier-grade units, capable of covering a 15+ square miles service area, available for around $1,500 USD.



Semtech Products used in this application:

Sensors
- *SX1272/3*
- *SX1276/7/8/9*

Gateway
- *SX1301*

All application elements (sensing modules, gateways, servers, software) are available through LoRa Alliance™ partners.

REAL USE CASE SOLUTION CONTINUED

LOW OPERATING COST

Butano 24 and its customers enjoy minimal downtime and maintenance costs because LoRa Technology's low-power operation allows a battery-powered end-node sensor module to operate up to 10 years between battery replacements.

GPS-FREE GEOLOCATION

The LoRaWAN protocol supports radio triangulation techniques that can pinpoint the location of a delivery truck, gas bottle or other assets equipped with an inexpensive, long-lived, battery-powered LoRa transceiver. In addition, LoRa Technology operates in the 900MHz ISM-band that can reach deep into tree-covered roads, steep valleys and other places where weaker, higher frequency GPS signals cannot.

STANDARDS-BASED

Because the LoRaWAN protocol is a globally-approved standard, Butano 24, and its parent company Serviglp SL can sell products and services that have assured global interoperability. LoRa-based products also benefit from the economies of scale that reduce unit costs and further accelerate its adoption.

SECURE

LoRa Technology secures all communications using end-to-end AES128 encryption, making Butano 24's systems highly resistant to cyber attacks and data theft.

HIGH CAPACITY

A single LoRa base station can handle millions of messages, ensuring Butano 24's gas bottle sensing and management solutions are able to support multiple, large, distributor operations on the same wireless gateway network.

JUMP-START YOUR IOT DEVELOPMENT TODAY

TRAINING OPTIONS TO GET STARTED

Learn about Semtech's LoRa Technology platform
www.semtech.com/iot

Join the LoRa Community
www.semtech.com/LoRaCommunity

Become a member of the LoRa Alliance™
www.lora-alliance.org

Attend a LoRa Boot Camp for a full-day of training featuring LoRa Technology and real world applications
www.semtech.com/iot

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