

Waste Management

LoRa® APPLICATION BRIEF

DESCRIPTION

Traditionally, waste collection has been performed on a fixed schedule. However, regularly scheduled waste collection is not optimal as it does not account for different individuals or businesses filling up their waste bins at different rates. This means collection trucks must stop at each point on their route to empty each waste bin regardless of whether they are full or not. It also leads to situations where some waste bins overflow before the next collection schedule.

By implementing sensors embedded with LoRa Technology into waste bins and using an intelligent low-power wide area network based on the LoRaWAN™ protocol, cities can significantly reduce their operational costs by streamlining their waste collection routes and deploying trash bins only where they are necessary.

HOW A LoRaWAN-BASED WASTE MANAGEMENT SYSTEM WORKS

Semtech LoRa Technology enables connectivity, real-time analytics, reporting, and additional functions such as geolocation.

- 1 Sensors embedded with LoRa Technology are placed on waste bins
- 2 Sensors periodically report the fill rate of the waste bins
- 3 Gateway sends information to the network where the data is analyzed by an application server
- 4 Application server creates an optimized trash route indicating which waste bins need to be emptied
- 5 The optimized route is sent to drivers via computer or mobile, so that they only empty full waste bins

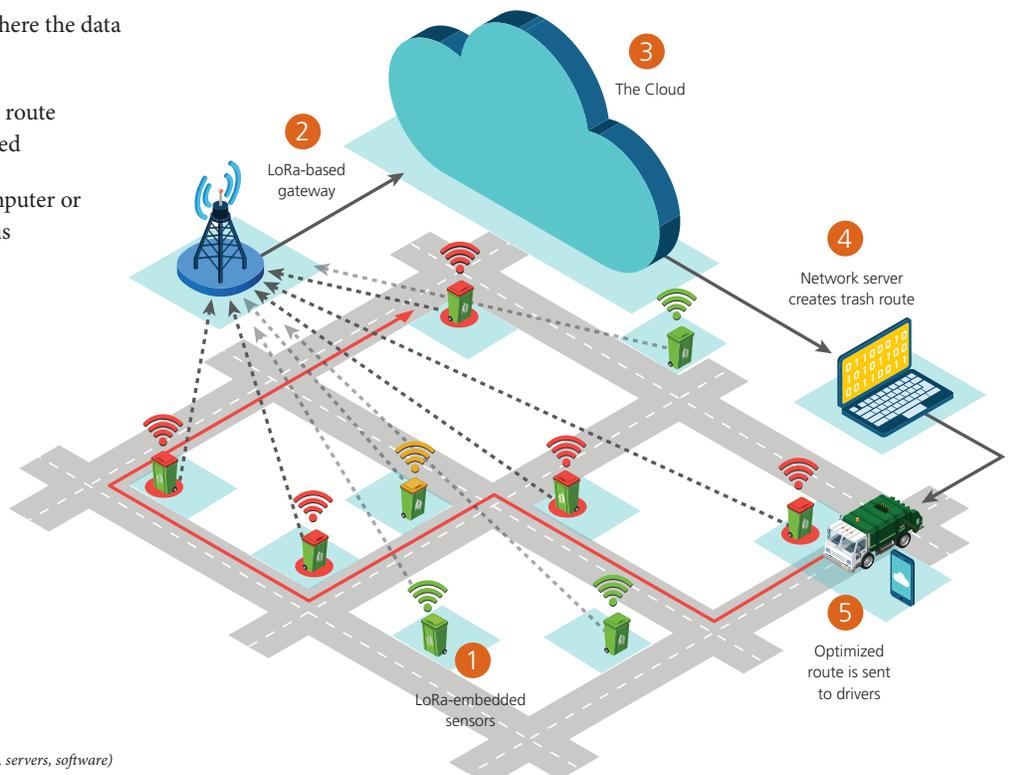
BENEFITS

- Reduce operational costs by streamlining waste collection through the use of sensors embedded with LoRa Technology
- Keep implementation and maintenance costs low, as wireless, battery-powered sensors can be placed on existing waste bins. Batteries can last up to 20 years without being replaced
- Reliable RF communication link between sensing infrastructure and LoRaWAN-based network provides excellent coverage
- Keeps cities cleaner by preventing waste bin overflow

APPLICATIONS

Smart waste management systems help:

- Monitor trash fill level
- Schedule optimal waste collection times and routes
- Determine the number of waste bins needed



Semtech products used in this application:

- | | |
|----------------|----------|
| Sensors | Gateway |
| • SX1272/3 | • SX1301 |
| • SX1276/7/8/9 | |

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



FIND YOUR IoT SOLUTION FROM SEMTECH'S LoRa ECOSYSTEM

MODULES & MODEMS

SENSORS

BASE STATIONS

NETWORK SERVERS

SYSTEM INTEGRATORS

For a full list of LoRa Ecosystem partners and services, visit our LoRa Community www.semtech.com/LoRaCommunity

KEY FEATURES OF SEMTECH'S LoRa WIRELESS RF TECHNOLOGY

LONG RANGE Penetrates in dense urban and deep indoor environments, connecting to sensors 15-30 miles away in rural areas

LOW POWER Enables multi-year battery lifetime of up to 20 years or more

HIGH CAPACITY Supports millions of messages per base station

GEOLOCATION Enables tracking applications without GPS or additional power consumption

STANDARDIZED LoRaWAN specification ensures interoperability among applications, IoT solution providers and telecom operators

SECURE Embedded end-to-end AES-128 encryption of data ensuring optimal privacy and protection

LOW COST Reduces upfront infrastructure investments, as well as operating and end-node costs

JUMP-START YOUR IoT DEVELOPMENT TODAY

Semtech offers several training options to help you get started:



Learn about Semtech's LoRa Technology platform: visit www.semtech.com/IoT



Join the LoRa Community: www.semtech.com/LoRaCommunity



Become a member of the LoRa Alliance™: visit 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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200 Flynn Road, Camarillo, California 93012 • phone: (805) 498-2111 • fax: (805) 498-3804 • www.semtech.com