



Shipment Quality

LoRa® APPLICATION BRIEF

DESCRIPTION

There are many tens of millions of packages and documents shipped daily to countries around the globe. Keeping track of these shipments is a tremendous undertaking. In addition, shipping companies and retailers need to be able to track the condition of temperature-sensitive or fragile items to make sure they arrive safely.

By implementing an Internet of Things (IoT) shipment quality solution comprised of sensors and gateways embedded with LoRa Technology, and a low power wide area network based on the LoRaWAN™ protocol, shipment quality can be determined as the sensors gather information on location including temperature, drops and ensuring items meet their final destination in the conditions necessary to confirm quality.

HOW A LoRaWAN-BASED SHIPMENT QUALITY SYSTEM WORKS

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

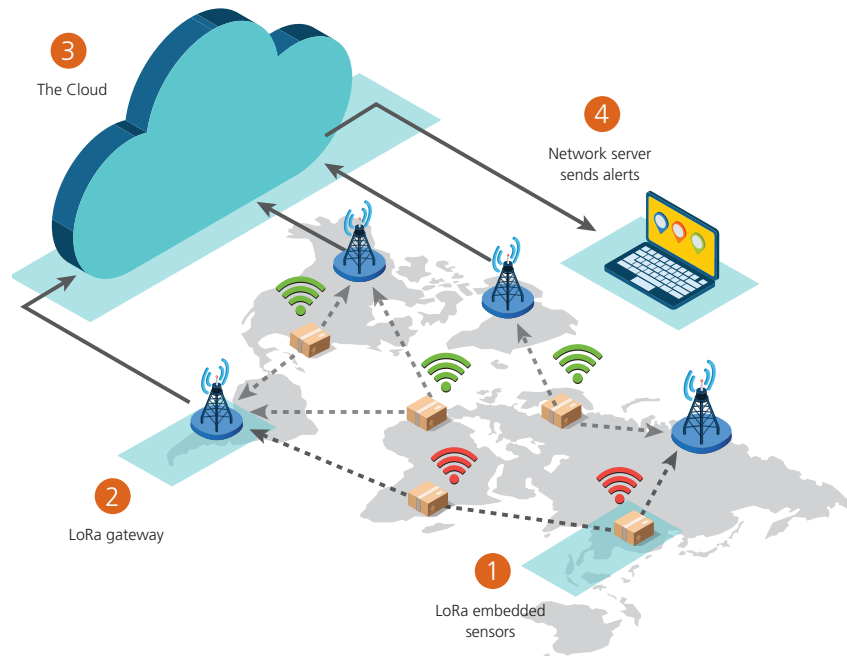
- 1 Sensors affixed to packages and embedded with LoRa Technology collect movement, location data and in special cases temperature or package opening data if the package is sensitive to environment or has a high value.
- 2 LoRa-based gateways collect data that is periodically transmitted by the sensors.
- 3 Gateway sends information to Cloud server where the data is analyzed by an application server.
- 4 Application server sends alerts to shipping company or retailer via mobile device or computer.

BENEFITS

- Monitor item location to ensure it arrives at its intended destination.
- Monitor temperature, humidity levels, drops, rapid movement, or package openings to ensure safety and quality of sensitive materials.
- Low maintenance costs thanks to LoRa sensors low power operation, ensuring batteries can last 10 years.
- Provides reliable RF communication link between sensing infrastructure and LoRaWAN-based network.

APPLICATIONS

Sensors placed on outgoing packages can detect location, temperature, movement, and other data to ensure items meet their final destination in the condition necessary to ensure quality.



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







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

- GEOLOCATION** Enables tracking applications without GPS or additional power consumption
- LOW COST** Reduces costs three ways: infrastructure investment, operating expenses and end-node sensors
- STANDARDIZED** Ensures global interoperability, speeding adoption and roll out of LoRaWANs and IoT applications
- LOW POWER** Protocol designed specifically for low power consumption extending battery lifetime up to 20 years
- LONG RANGE** Single-base station provides deep penetration in dense urban/indoor regions, plus connects rural areas up to 30 miles away
- SECURE** Embedded end-to-end AES128 encryption
- HIGH CAPACITY** Supports millions of messages per base station, ideal for public network operators serving many customers

JUMP-START YOUR IoT DEVELOPMENT TODAY

Semtech offers several training options to help you get started:

-  Learn about Semtech's LoRa Technology platform: www.semtech.com/loT
-  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/loT
-  Follow Semtech on [LinkedIn](#) and our [LoRa Showcase page](#)
-  To contact one of our global offices in North America, Europe and Asia: www.semtech.com/contact

