



Medical Refrigerators

LoRa® APPLICATION BRIEF

DESCRIPTION

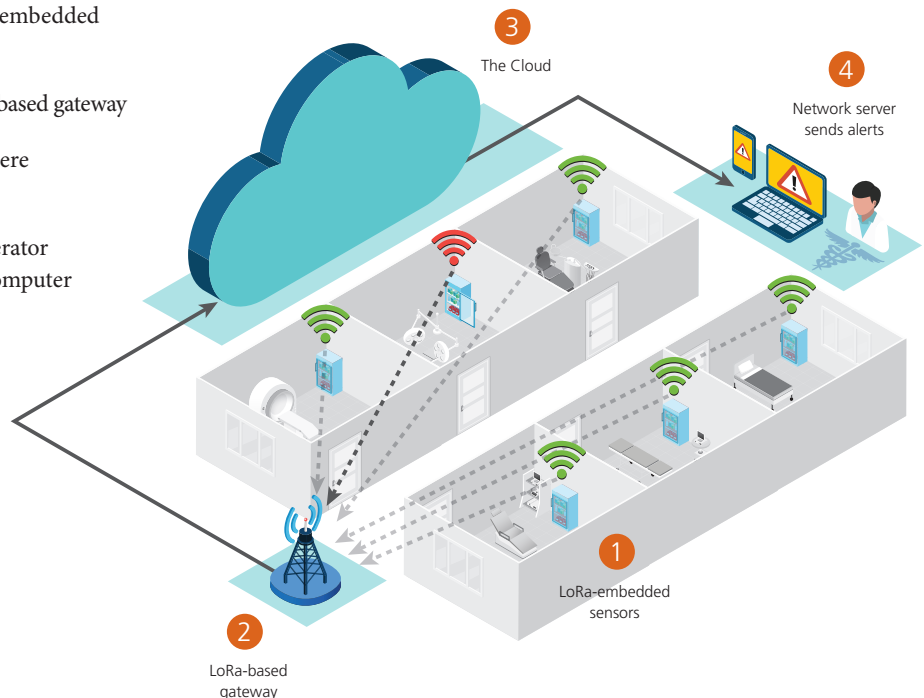
When personal refrigerators lose power, although a hassle, the worst thing that can happen is that groceries spoil and will need to be replaced — a fairly easy task. Medical refrigerators however, carry incredibly important medications, vaccines and blood donations that can be very costly or difficult to replace. Physicians and pharmacists rely on these items for the health and safety of their patients. So if a medical refrigerator loses power after hours or if employees have accidentally altered the refrigerator temperature, how would the facility know and determine the risk to the contents inside?

By implementing a medical refrigerator monitoring solution comprised of sensors embedded with LoRa Technology and an intelligent low power wide area network based on the LoRaWAN™ protocol, medical facilities and pharmacies can monitor whether a refrigerator is failing or determine for how long it has lost power and if the temperature is still appropriate for the contents inside, saving the facility from unnecessary costs and helping to keep patients safe.

HOW A LoRaWAN-BASED MEDICAL REFRIGERATOR MONITORING SYSTEM WORKS

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

- 1 Power and temperature data collected by sensors embedded with LoRa Technology
- 2 Data from the sensor is periodically sent to a LoRa-based gateway
- 3 Gateway sends information to network server where the data is analyzed by an application server
- 4 Application server sends alerts on medical refrigerator status to facility managers via mobile device or computer



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.

BENEFITS

- Monitors outage times and duration to assess impact on medical supplies
- Ensures proper storage temperatures and optimal operation
- Reduces costs associated with medical supply replacement
- Easy to set up and low power operation ensures sensor batteries can last up to 20 years
- Enables mobile monitoring and warning outside of typical working hours
- Provides reliable deep indoor wireless communication link between sensors and LoRaWAN-based network

APPLICATIONS

Sensors on medical refrigerators can monitor outage times, duration and proper storage temperatures to keep medications, vaccines and blood donations safe and effective for patients.



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
-  Follow Semtech on [LinkedIn](#) and our [LoRa Showcase page](#)
-  To contact one of our global offices in North America, Europe and Asia, visit www.semtech.com/contact



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