

LoRa Cloud™ Modem & Geolocation Services

LoRa Cloud Modem & Geolocation Services offer cloud solutions to enable customers to add location as well as fine grain control to optimize usage of your LoRaWAN® end devices. Enjoy a simplified process to control your end devices and develop an ultra-low power geolocation solution that opens the door to a new set of indoor and outdoor asset tracking use cases.

Features include comprehensive device telemetry, modem configuration, clock synchronization, and advanced data transport services with configurable robustness against packet loss and transparent data fragmentation.

Enable New Asset Tracking Use Cases With Semtech's Ultra Low Power Cloud-Native Geolocation Services

Geolocation Services

Geolocation Services combine unique capabilities that create an ultra-low power and low-cost geolocation experience. To obtain latitude and longitude of your devices, two approaches are available namely the LoRa Edge™ Platform which runs on Cloud-native, LoRa Edge™ LR1110 enabled devices, or Time Division of Arrival (TDOA) gateways.

LoRa Edge™ Platform

The LoRa Edge Platform is an ultra-low power platform that integrates a long range LoRa transceiver, multi-constellation scanner and passive Wi-Fi AP MAC address scanner targeting asset management applications. The solution uses LoRa Edge devices that run on the LR1110 chip. This chip smartly combines two technologies to continuously and securely obtain the latitude and longitude of devices in any location, both indoor and outdoor:

Wi-Fi

Wi-Fi-based geolocation is realized thanks to a built-in passive Wi-Fi Access Point MAC address scanner. It is used for indoor facilities such as warehouses, stores and factories. Wi-Fi scanning is also effective in dense urban areas where GPS is not very accurate.

Main features

- Low-power high-sensitivity LoRa/(G)FSK half-duplex RF transceiver
- Multi-purpose radio front-end targeting geo-positioning purposes
- Cryptographic engine

GNSS (Global Navigation Satellite System)

GNSS-based geolocation is realized thanks to a built-in GNSS (GPS/BeiDou) scanner using the position of satellites to resolve the exact device location. It is used for fast and energy-efficient outdoor geolocation.

Main features

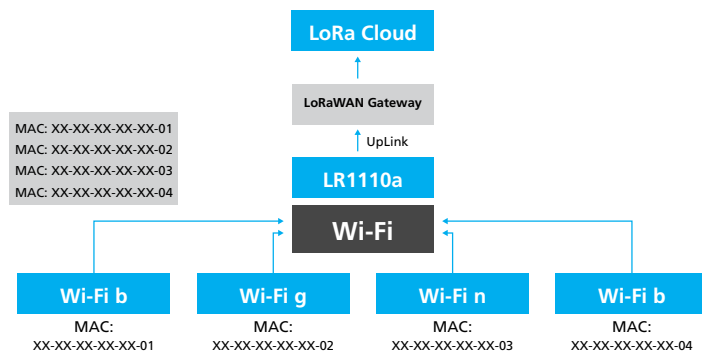
- Seamless Almanac updates over-the-air for GNSS positioning
- Device clock synchronization for accurate GNSS positioning
- Assistance position injection for more successful GNSS positioning
- Device state management for keeping the Almanac state up-to-date
- Achieves low energy geolocation by offloading time-intensive and compute-intensive operations to back-end system components.

LoRa Edge™ Platform (Continued)

Wi-Fi

How does it work?

- The LoRa Edge™ LR1110 chip is able to discover Wi-Fi b/g/n access points
- Extract MAC addresses allowing to geolocate the device
- To save power only a small portion of the Wi-Fi packets containing the MAC address information will be captured and demodulated
- Associated signal RSSI is also extracted and can be sent optionally
- The LR1110 chip can also extract the country code information
- MAC addresses are sent to a LoRa Cloud Wi-Fi lookup service which returns latitude / longitude



GNSS

How does it work?

- The LR1110 chip combines the measurements from GNSS signals into a concise binary message (the NAV message) which is expected to be sent (via any communication channel) to the GNSS Position Solver backend component for final position calculation.
- The LR1110 chip achieves best energy efficiency by taking into account coarse orbital parameters for different GNSS constellations (the Almanac parameters). In conjunction with a coarse time and position estimate, the LR1110 chip uses this information to optimize the search for, and acquisition of, GNSS signals.
- LoRa Cloud seamlessly handles the efficient management of the almanac, as well as the coarse aiding position and time information over the air with the help of modem protocol messages.

WiFi & GNSS Benefits

The integration of two technologies into one single chipset reduces both complexity and cost for customers.

- Enables best-in-class battery life
- Lower or no monthly fees when using a LoRaWAN® network
- Global coverage for positioning, including China



Cloud-native

Solved in the cloud and made instantly available for downstream apps



Continuous

Outdoor to indoor positioning (works without view of sky)



Lowest power

"Months-years" of battery life vs. "weeks-months"



Lowest TCO

Cloud service pricing + hardware BOM cost of ownership to customers over 3 years



Global IoT market

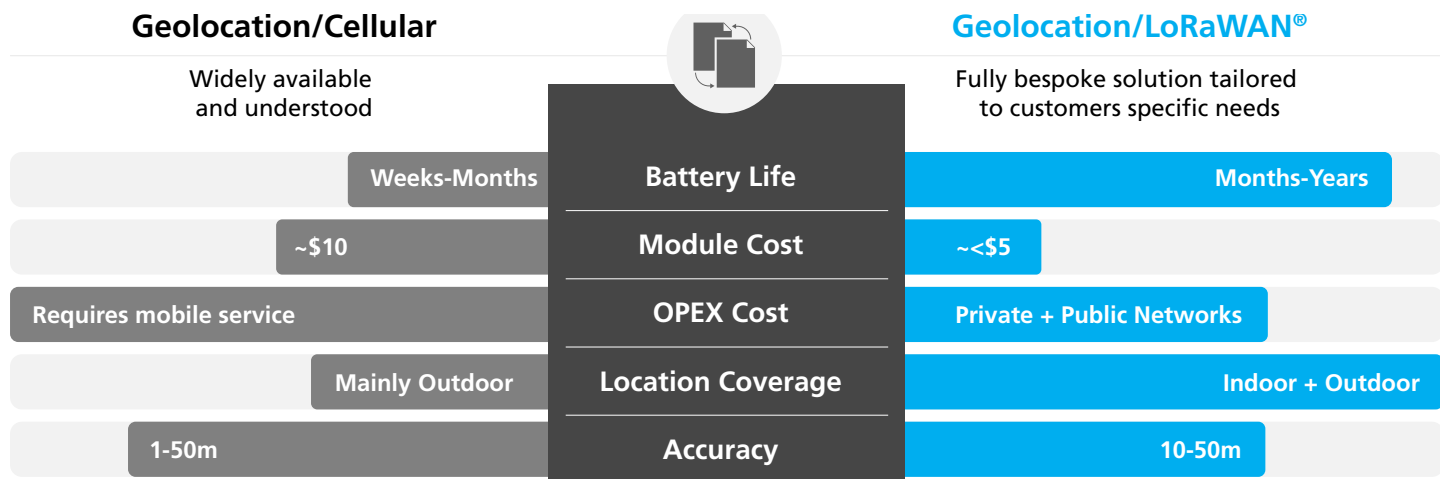
Worldwide IoT customers who want to track and trace assets in several verticals

LoRa Edge™ Platform (Continued)

Ultra-Low Power Geolocation Explained

Geolocation Services is a simple cloud API that can be easily integrated with a LoRaWAN network or application server to enable estimating the location of any LoRa-enabled device. Whereas regular solutions calculate the location of the asset by the asset itself, Geolocation Services utilizes a Cloud-based solver.

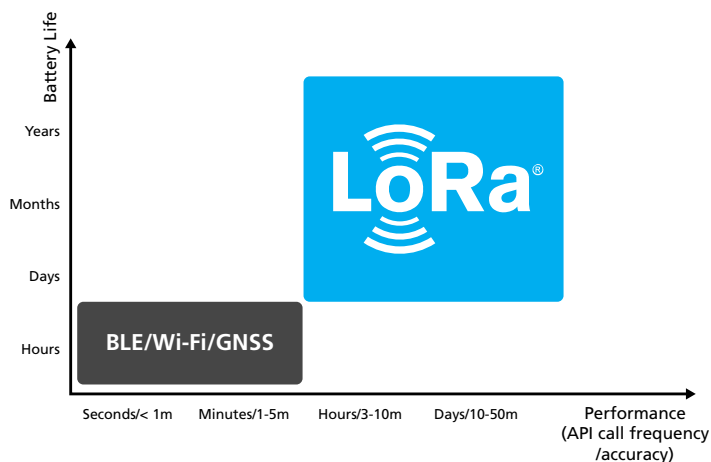
This is done by engaging a multi-constellation satellite scanner and a Wi-Fi 2.4GHz access point scanner on the chip to send data to the Cloud where the calculation of the location takes places. By offloading time-intensive and compute-intensive operations to back-end system components and by shifting the responsibility of solving a location from the device to the Cloud, the device's power usage is significantly reduced. The result is a tracker with up to 10 years of battery life, versus weeks or months in regular solutions.

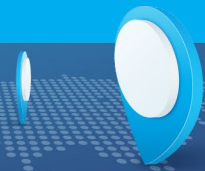


Target LoRa Edge™ Use Cases

LoRa Cloud Geolocation & Modem services enables use cases that can be found throughout the entire global supply chain.

- Cold chain monitoring and tracing
- Warehouse monitoring
- Cattle tracking
- Bicycle tracking
- Industrial asset tracking
- Global cargo tracking
- Fleet management
- End to end parcel tracking and tracing
- Inventory management
- Asset loss and theft prevention





TDOA Geolocation

TDOA geolocation is enabled by LoRa® gateways which receive a data packet transmitted by a LoRa-enabled device and attach metadata such as the precise time of arrival as well as received signal-strength and signal-to-noise ratio. The LoRa Cloud Time difference of arrival (TDOA) Geolocation algorithms take this metadata in a simple HTTP API and estimate the location of the sending LoRa device.

Benefits

- Supports location from all LoRaWAN® endpoints
- No need for on-device GPS chip
- Location accuracy similar to Cellular offering

Create your account on
LoRaCloud.com
to start using Geolocation Services



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