



# Polte\* Offers Low-Cost, Low-Power Location Technology for IoT

Many IoT applications require location services but can't support the expense and power demands of GPS or Wi-Fi. Polte enables IoT product and application developers to add cost-effective, low-power location capabilities to IoT devices.



## Overview

With the proliferation of internet of things (IoT) devices, the need is growing for a location solution that is low power, low cost and delivers highly accurate location information with an emphasis on increased security. Traditional global positioning system (GPS) technology has been the de facto solution for outdoor applications, but it drains batteries and is not cost effective for broadly deployed IoT applications. Wi-Fi delivers indoor location information, but also utilizes a great deal of power as the modem needs to constantly scan for access points. Currently, to provide location both indoors and outdoors, IoT devices require the use of both GPS and Wi-Fi radios, plus the additional battery power to run them.



For the billions of IoT devices that are coming online, a cost-effective, low-power location solution is requisite for advanced services.

Polte\* offers location as a service (LaaS) comprising Cloud Location over Cellular (C-LoC) firmware and the Polte Cloud. The C-LoC firmware runs on the LTE modem in an IoT device and offloads compute-heavy calculations from the device to the Polte Cloud. The C-LoC software platform leverages today's 4G cellular networks, and is ready for 5G networks, to deliver seamless indoor and outdoor coverage with no need for GPS, Wi-Fi, or other radios.

By utilizing patented algorithms in the Polte Cloud, IoT sensors can support location services with security features without a significant battery life impact.

## Location Is Critical for Many IoT Applications

While GPS, assisted GPS (AGPS), RF pattern matching, Bluetooth,\* Wi-Fi, and LoRaWAN\* (Long Range WAN) all provide location services, the use of these technologies is limited for IoT applications. Each of these leading location technologies delivers on some of the features required for IoT applications, such as low power, low cost, small size/form factor, and seamless indoor/outdoor coverage. But none of these technologies is optimized to provide all these requirements, and thus be suitable for broad IoT deployment. An important requirement is indoor-outdoor coverage, which is critical for accurate asset tracking. Cellular provides this coverage naturally, whereas some combination of GPS, Wi-Fi, or other technologies is required to locate things as they travel between indoor and outdoor environments.

## Providing Location Utilizing Cellular Networks

Polte C-LoC firmware embedded on a 4G chipset sends a small sample of the LTE signal to the Polte Cloud. The transferred data is a small payload, which does not contain location coordinates. The location is only computed in the cloud, thus providing an inherently more secure solution for tracking.

Figure 1 shows how the Polte system computes location. The Polte Cloud utilizes patented advanced radar techniques, multi-path mitigation, and machine learning. Together, these techniques overcome inherent challenges of using radio frequencies to identify a device's location.

Moving the underlying location data to the cloud for computational processing offers several distinct advantages. First, as a software-only solution, updates can be quickly implemented. Second, data derived from location information is utilized in advanced machine learning and artificial intelligence. The use of the cloud also reduces power consumption on the sensor because the modem wakes up only when it is time to send the radio signals to the Polte Cloud, thereby reserving device power. This means the sensor's power draw can be significantly less than GPS-based sensors.

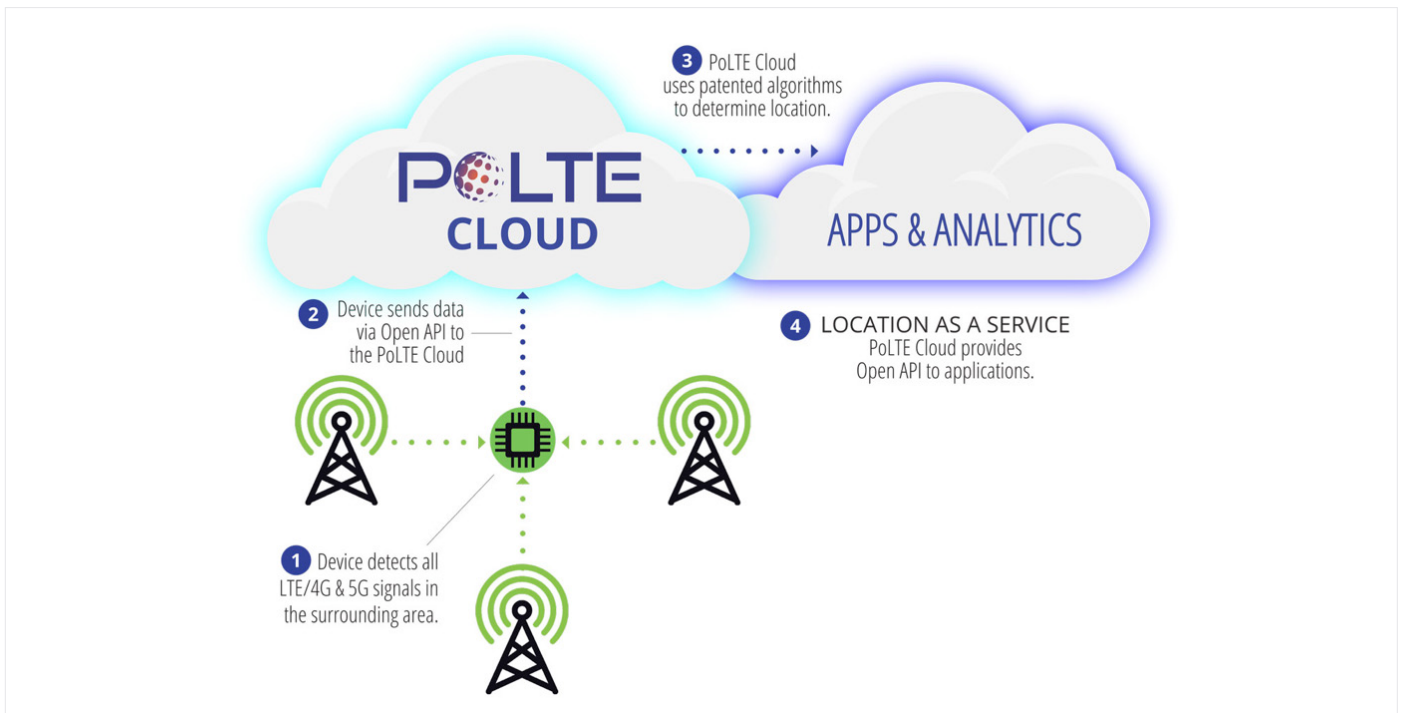


Figure 1. How Polte firmware and Polte Cloud determine location.<sup>1</sup>

C-LoC supports use of other location signals (GPS, Wi-Fi, etc.) in a hybrid/sensor fusion mode for use cases in which device size or energy consumption are not a constraint. The location information gathered in the Polte Cloud can be combined with other data sets to provide actionable intelligence that can help businesses automate processes and increase efficiencies.

Polte's cost-effective, long-battery life, indoor/outdoor location software solution changes the economics of location for IoT, helping drive broader adoption and growth in the marketplace.

Polte is compatible with all 4G and defined 5G and IoT-specific profiles, including Cat-1, Cat-M, and NB-IoT. Polte's patented algorithms utilize Super Resolution and other advanced techniques to deliver highly accurate location. Because of these technologies, Polte provides very fast location fixes.

## Optimized for Intel® Xeon® Processor-Based Servers

The Polte Cloud solution is optimized to run on cloud servers powered by Intel® Xeon® processors. These include Intel Xeon Scalable processors, which feature new technology for compute, network, and storage workloads. This processor family is based on an entirely new processor architecture with the scalability to deliver workload-optimized performance in NFV applications. Polte Cloud services can also run on servers powered by Intel Xeon processor E5 and E7 product lines.

## Conclusion

Location services are important for many IoT applications, but traditional location technologies are lacking in their ability to enable rapid deployment of IoT devices and applications. The Polte platform enables an entirely new category of comprehensive location intelligence and changes the landscape for the cellular connected IoT and mobile device ecosystem unleashing the real power of the IoT.

## About Polte

Headquartered in Dallas, Texas, Polte is a software company that delivers a highly accurate Cloud Location (C-LOC) solution. Leveraging 4G and 5G signals, Polte's cloud-based platform locates internet of things (IoT) and mobile devices seamlessly in real time as they move between indoor and outdoor environments. With a robust global patent portfolio of 74 geolocation technologies, Polte redefines location.

## About Intel® Network Builders

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<sup>1</sup> Figure provided courtesy of Polte.

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