Providing security, reliability, accurate ranging, and flexibility for the IoT

About us

SPARK Microsystems offers a unique wireless transceiver technology that achieves **40x more energy efficiency, 60x lower latency, and 10x more data throughput over** BLE and 600 times better than ZigBee on power.

Our technology **enables battery-less operation** of when paired with energy harvesting technologies.

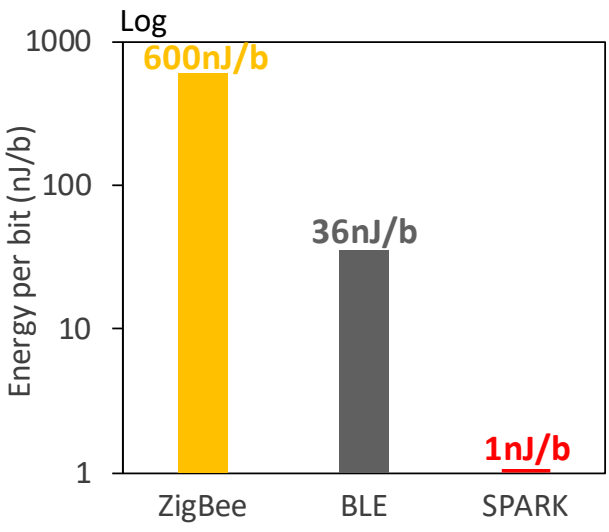
The Problem

The battery life of wireless devices is insufficient for many IoT applications, leading to overly frequent recharge cycles, limited connectivity, and bulky batteries or costly maintenance. In addition, long latency makes wireless inadequate in applications requiring real-time communications.

Many customers require more intelligence, tracking, control and analytics of their equipment and devices, however, installation and cost can be very prohibitive. This makes the decision to install IoT tags or sensors a difficult one.

RFID can be a low-power solution, but its usability is limited. Customers need a low cost solution for tracking and maintaining on-site equipment that is easy to install like RFID (no-batteries) but can provide more intelligence.

Energy Efficiency



Specifications

- Ultra-low power consumption
  - 1.5 nJ/bit energy efficiency (1 mW @1 Mbps)
  - 1.8 to 3.3 V supply,
  - 55 nA Hibernate, 750 nA deep sleep (with timing)
- Scalable data rate at up to 10 Mbps payload
- Ultra-short wireless latency below 50 µs @ 1 Kb
  - Down to 3 ms for uncompressed CD quality audio
- 3-9 GHz configurable ultra-wideband spectrum
- 10 dBm TX power
- 80 dB link budget
- 50 m range @3 Mbps; 100 m range @ 500 Kbps

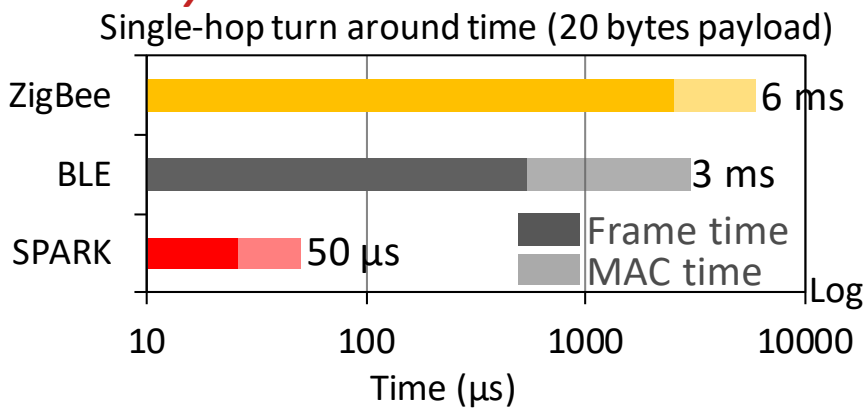
The Solution

The new SR1000 device family from SPARK Microsystems can communicate with such low energy that it can be powered by a simple low cost solar cell or other energy harvesting device and use a capacitive cell for energy storage. This eliminates wires and batteries, and vastly simplifies the installation process and extends the life of wireless devices.

However, unlike RFID, the SR1000 family can accept other machine input, such as engine hours, temperature, humidity, or other sensor input. Moreover, the communication latency of the SR1000 is so short that it can be used in the feedback loop of control systems such as in robotics to remove the need for wiring or complex timing management.

The SR1000 can be deployed in a mesh network to enable long range and agile short-latency communications within dense low-power networks.

Latency



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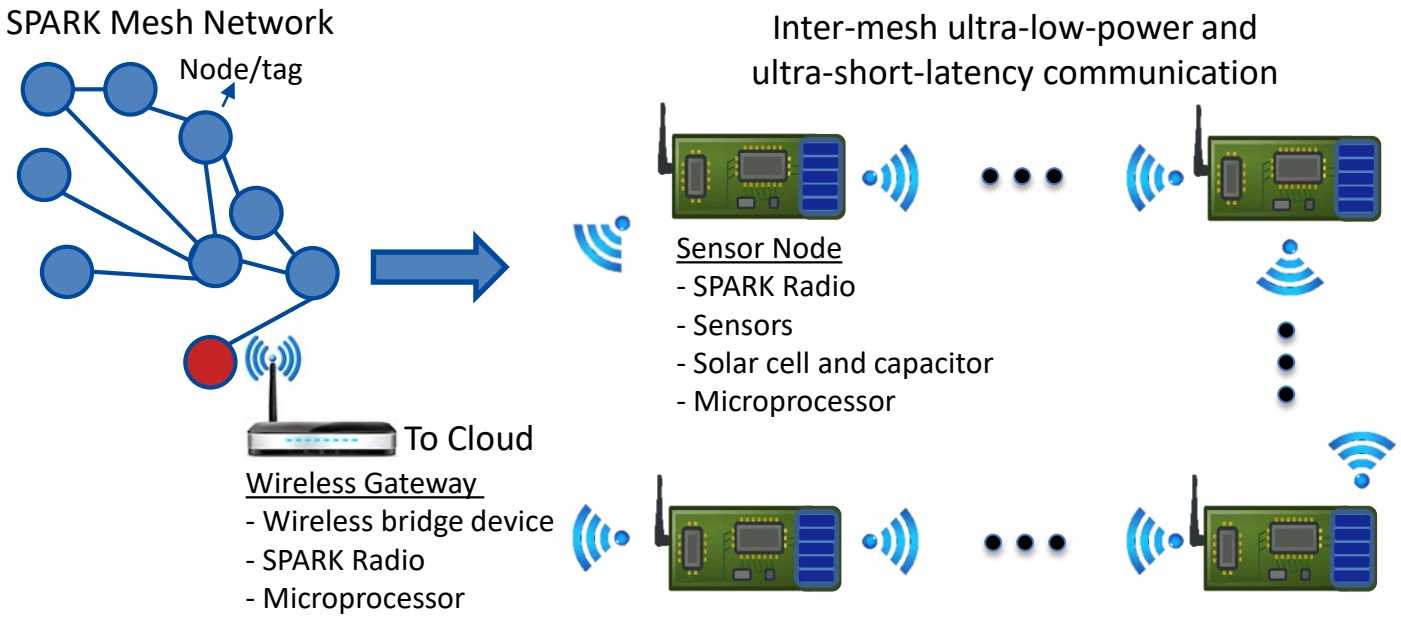
Example Solution



Note: SPARK is working on an integrated microprocessor and radio which will in turn provide another level of cost reduction.

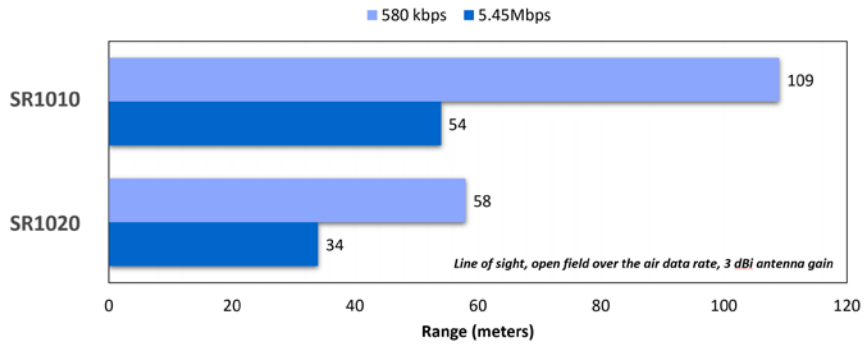
Flexibility

- SPARK can support device-to-device, star, and mesh network configurations. These features allow for increased connectivity and reliability, as well as better coverage of large areas, factories, and warehouses. A gateway device can then send the SPARK Network data to the cloud.
- The ultra-low latency and energy efficiency of the SPARK radio enables robust and high performance mesh network capabilities when compared to other protocols.
- SPARK can multiplex hundreds/thousands of users/devices in the same space.

Ranging

- In addition to communication, the SPARK technology lends itself to both coarse and highly accurate location ranging based on time-of-flight: a two-way ranging system can be integrated with the SPARK radio to estimate of the distance between two devices with an accuracy of 30 cm.
- Using three fixed SPARK radio chips, the exact 3D location of another moving/fixed SPARK radio chip can be determined.

Wireless Range



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