

Competitive forces in the IoT Predictive maintenance market, lower-cost and value-add services, point to enterprise IoT Bluetooth

This section will focus on why specific aspects of new long-range Bluetooth and Bluetooth edge gateways will continue to provide a competitive advantage within the IoT predictive maintenance market more broadly, and for IoT system integrators specifically.

As may be expected of a fast growing market, the predictive maintenance market is attracting “several new players” to the global predictive maintenance market “owing to the high growth potential and absence of entry barriers,” according to a 2016 Persistence Market Research report.

Moreover, the new entrants to the IoT predictive maintenance market are described as “introducing low-cost solutions” resulting in the competitive responses: 1) to “lower the prices” by incumbent vendors, and 2) to “offer add-on services.”

Enterprise Bluetooth IoT: Competitive advantages

Bluetooth, specifically Bluetooth low energy (BLE) provides an extremely low-cost, growing worldwide standard, with billions of sensors shipping yearly. The flexibility and selection of low cost BLE sensors within a Bluetooth IoT predictive maintenance is unmatched by other protocols. Most of the industry-level protocols are two-way, if not all. But one advantage here using Bluetooth is that it’s an open and widely accepted standard, with good balance on interoperability and cost.

As a low-cost wireless IoT protocol with long battery life, BLE provides for monitoring in difficult to reach, previously unmonitored scenarios. Bluetooth IoT system integrators will compete by deploying much more monitoring, in unique use cases, at a lower cost, than competitive systems.

For example, unlike the cellular protocol, BLE sensors and connectivity cross nation boundaries without the added costs of national provider-specific sensors and monthly data fees. Also, BLE data gathered by a IoT Bluetooth gateway or router, connects to existing infrastructure -rather than requiring a new connectivity layer overlay - via backhaul using ethernet, Wi-fi, or even cellular (if necessary), further reducing costs of an Bluetooth IoT predictive maintenance system.

Moreover, until recently Bluetooth was constrained by short-distance and one-to-one connectivity. Now, enterprise IoT Bluetooth gateways, provide distances up to 1000 feet and connectivity in one-to-several hundred. As a result, this increased “connection density” results in a significant higher return-on-investment (ROI) for BLE to Bluetooth IoT gateways employed in Bluetooth IoT predictive maintenance systems. Additionally, Bluetooth IOT gateways provide cloud-based bi-directional control of BLE sensors, via platforms and applications. In turn, the low-cost delivery of enterprise Bluetooth IoT data to the cloud provides big data analysis required for IoT predictive maintenance.

IoT Predictive Maintenance: Ingress Protection (IP) rating

Ingress protection (IP) is an important factor when deploying Bluetooth IoT predictive maintenance gateways in an industrial environment, and where dust and water is prevalent – whether indoor or outdoor.

The [Cassia X1000 Enterprise Bluetooth router](#) is an example of an Bluetooth IoT predictive maintenance gateway which is IP65 certified. IP65 certification provides “total protection against dust ingress,” as noted by the International Electrotechnical Commission (IEC), as well as rain/weather protection to the degree that IP65 certified products are “protected from high pressure water jets from any direction.”

The Cassia X1000 IP65-certified gateways can operate in temperatures of -40°C to 65°C (-40°F to 149°F), humidity conditions of 0% to 90% non-condensing, storage and transportation temperatures of -50°C to +70°C (-58° F to +158° F) and are wind resistant of up to 85-MPH in sustained winds, and up to 135-MPH in wind gusts. Industrial predictive maintenance environments which include “dirty” conditions or require indoor and outdoor system, may be well suited to a predictive maintenance gateway with an IP65 designation.

Bluetooth IoT Edge Gateways: Predictive Maintenance value-add

As noted in the 2016 Persistence Market Research report, as the IIoT predictive maintenance market rapidly matures, simple connectivity solutions are destined to lose market share to low-cost and value-add systems. Therefore, a predictive maintenance system with third-party application support on the gateway, or “edge” capabilities is a competitive advantage. Moreover, it is likely that predictive maintenance IoT edge capability, built into the early-stage deployment of a system, will evolve with the end user.

As noted in the Deepwater Horizon example, high capacity production systems and machines quickly experience cascading bottlenecks and catastrophic downtime failures. It also results in more self-sufficiency and efficient data processing occurring in parallel, machine-to-machine learning, as well as faster feedback, alert triggers, responses, and fixes. Moreover, the bi-directional capability of a self-sufficient edge gateway reduces the risk of failure if a network issue occurs.

A Bluetooth low-energy (BLE) system allows for a sensor environment in which a predictive maintenance monitoring system can be locally powered for years, rather than days, or hours. In addition, local analytics can help to detect a security issue if abnormal node or network behavior is detected. Especially valuable are edge-enabled local insights based on contextual circumstances (ex. weather data). For example, a remotely monitored orchard, with no network access, may report in real-time that several cloudy days have had an impact on the solar-power batteries used to power a watering system.

Processing machine health data at the edge relieves the network burden of data. Moreover, processing data with edge algorithms at the local level substantially reduces the network costs of data “noise” in the network freeing up bandwidth for cloud enabled services using the “batch” data associated with larger data sets.

Rather than a “store all that data and ask questions later” approach, Bluetooth edge IoT predictive maintenance systems (PdM), such as enabled by the [E1000 Bluetooth IoT Edge Router](#), have many value-add advantages, including: real-time reactions (milliseconds), reduced latency, easier accessibility to remote sites with limited network connectivity,

BLE: Low power benefits more monitoring, lower cost

Range: gateways placement in “noisy” environments,

Data capabilities: APIs to cloud applications

Replacing phones and tablets with gateways