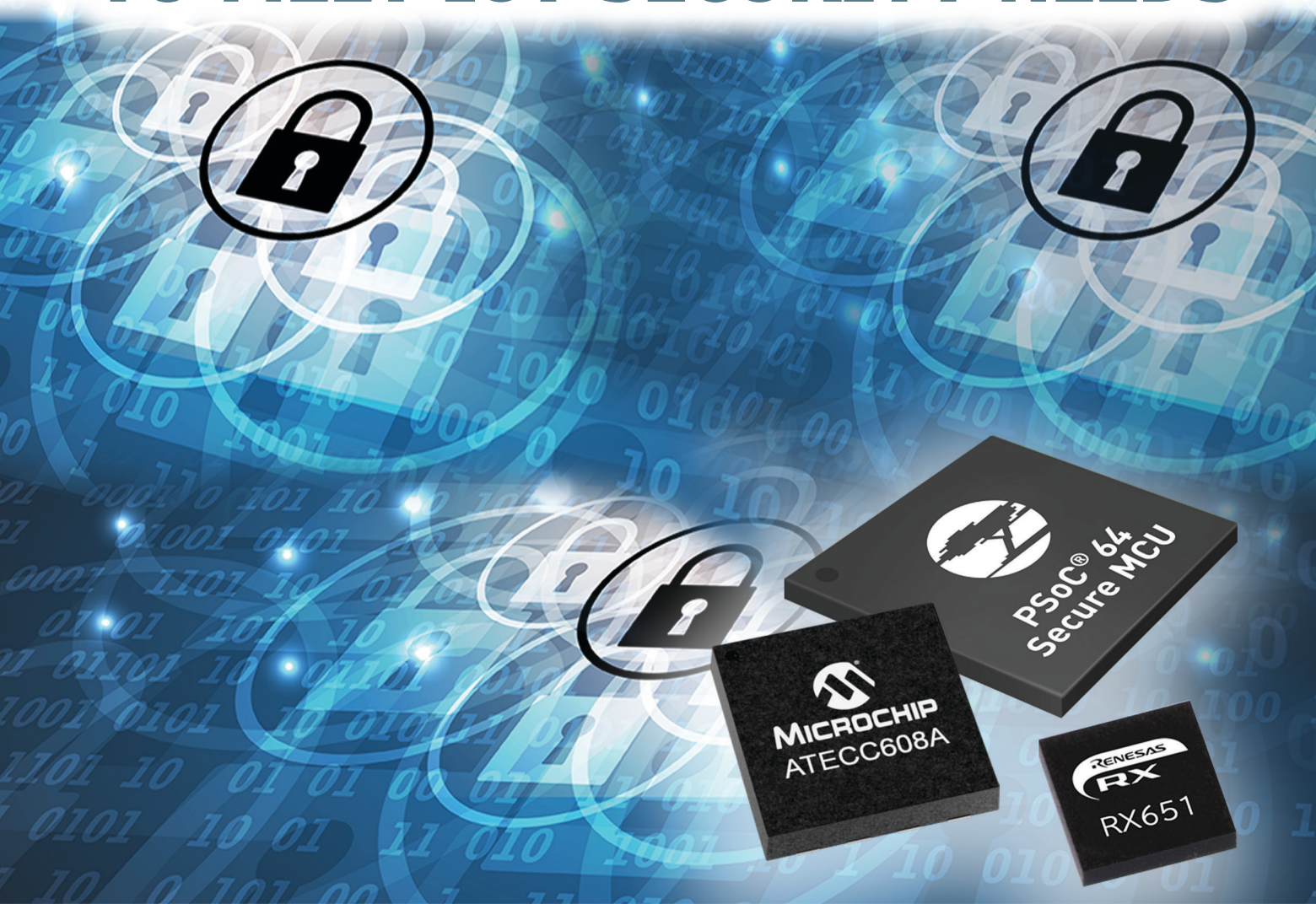# circuit cellar

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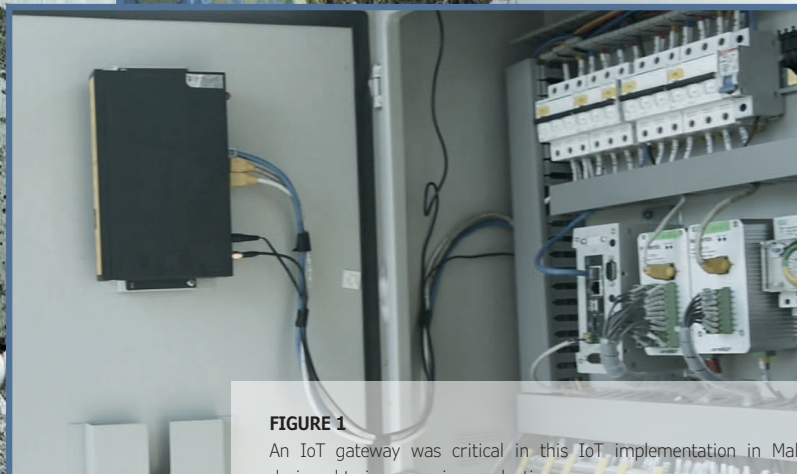
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Product Focus:
IoT Gateways

Linking the Edge and Cloud

By **Jeff Child,**
Editor-in-Chief

FIGURE 1
An IoT gateway was critical in this IoT implementation in Malaysia designed to increase rice production.

IoT gateways provide a critical link between sensors at the edge and the cloud. Even as the industry becomes less married to the term "gateway", IoT gateway functionality is creeping into a variety of box-level embedded systems.

IoT gateways continue to serve an important role in Internet of Things (IoT) implementations. These gateways move data from the edge to the enterprise using common protocols—mostly wireless protocols at the edge. By decoupling data providers and data consumers, IoT implementations reap the benefits of scalability and flexibility enabling them to integrate and consolidate data streams. Today's crop of IoT gateways are built ready-to-deploy as industrial grade smart devices. They enable communications, computation power, simplified application deployment and M2M platform integration for immediate service generation.

An interesting shift has happened over the past year where the terminology surrounding IoT gateways has become much looser. Many box-level embedded PCs essentially have all the components and features needed to provide IoT gateway functionality. Such systems are often not marketed as IoT gateways, but rather as embedded computer systems that can serve as an IoT gateway. Over the past 12 months, IoT gateway manufacturers have rolled out a steady stream of new products, including both general purpose IoT gateways, and those purpose-built for a specific application segment. As the product gallery in this article shows, the design directions in today's IoT gateways range from increased ruggedness to smaller sizes to enhanced cloud connectivity.

A gateway was critical in an IoT implementation designed to increase rice production. Kontron worked with a local IoT solutions specialist Abbaco Controls in Malaysia and the effort led to Kontron embedded IoT gateway technology being used in an IoT project to increase rice production on behalf of the Malaysian Ministry of Agriculture (MOA). Rice production uses significant amounts of water. A system was needed to make measurable improvements to the accuracy of actual and predicted water levels, speed of response times, system operational costs, water conservation and rice crop yields (**Figure 1**). The water supply and demand management system were designed and implemented by Abbaco Controls and features an IoT gateway based on Kontron's Industrial Computer Platform KBox A-201.

For local data acquisition, this fanless system supports a broad range of industrial interfaces such as 2x Gbit Ethernet, 2x USB 2.0, as well as an optional CAN bus and/or Profibus interface, whereas legacy installations benefit from two serial interfaces (RS-232/485). For wireless connection to the cloud or the local network, the Kontron K-Box A-201 mini can be equipped with LTE (4G) and GSM (2G/3G) or Wi-Fi. Three external antenna connectors enable high signal quality.

IoT Gateways

Rugged IoT Gateway Facilitates Quick Deployment

The IFB125 from Axiomtek is a DIN-rail industrial IoT gateway powered by the NXP i.MX6UL processor with the ARM Cortex-A7 microarchitecture. This compact IoT gateway is designed for versatility of use and quick deployment. The IFB125 is suitable for a variety of applications including applications that require remote control and monitoring management.

- NXP 528 MHz i.MX 6UltraLite processor
- 256 MB DDR3 SDRAM onboard
- 8 GB eMMC flash onboard
- 1x SPI, 1x I^{2}C, 1 wireless (Wi-Fi or 3G/4G)
- 2 digital inputs and 1 digital output
- 9 VDC to 48 VDC input range with terminal block
- Embedded Linux operating system (Yocto)
- Fanless design
- Wide operating temperature range from -40°C to +70°C

Axiomtek
www.axiomtek.com

Flexible Gateway Embeds Qseven Module

The Conga-IoT 2 from Congatec is a highly flexible IoT gateway that embeds an Atom Quad Core-based Qseven module. This application ready platform is easily customizable for rapid field deployment.

- Conga-QA5 Qseven Module
- Dual-channel 4 GB DDR3L memory
- Internal: 2x USB 2.0, 1x M.2 card slot, 6x mini PCIe (USB 2.0), 2x mSATA
- External: 2x LAN 10/100, 1x PoE support
- Connector for external 19 VDC PSU
- 4x RP-SMA antenna connectors
- 4x SMA antenna connectors
- Operating temp. commercial: 0 to +40°C
- Operating temp. extended: -20°C to +50°C

Congatec
www.congatec.com

IoT Gateway Features Automotive-Grade Design

Eurotech's DynaGATE 10-06 is a multi-service IoT gateway that is carrier pre-certified, with integrated LTE Cat 1 cellular, GPS, Wi-Fi, BLE, E-Mark and SAE/J1455 certifications and a -40ºC to +85ºC operating temperature.

- NXP Arm-based i.MX 6UltraLite CPU
- Automotive features: E-Mark and SAE/J1455 certifications, GPS with Dead Reckoning, 6-32 V power supply with ignition sense, surge, noise, reverse polarity, overvoltage and short protection
- Carrier certified LTE Cat 1 cellular modem with European, North American and Japanese variants, ready for immediate deployment
- IP67 ingress protection with rugged connectors, wide operating temperature range and a sturdy metal enclosure
- Internal UPS provides up to 5 minutes of operation and safe shutdown
- Open platform Everyware Software Framework (ESF)

Eurotech
www.eurotech.com