

## Automating Industrial Equipment Controls with M2M Communications Platforms and Services

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Traditional control systems used to monitor and automate industrial field equipment provide very specific functions. These systems generally control local equipment functions, like process control, and allow one-way data communication of data from the industrial product to a business application typically used by a few individuals working within a single department.

New machine-to-machine (M2M) communications technologies can vastly expand and improve upon those earlier control systems. These new M2M solutions make it possible for companies to build and deploy smart automation systems for industrial equipment, providing new control and management capabilities that deliver more detailed, actionable information at lower cost and often in a more timely manner.

### Choices in hardware to meet specialized requirements

M2M devices include embedded modules and gateways that can be added externally to the monitored equipment. Gateways are sometimes preferred for industrial equipment because they're relatively simple to service or upgrade with new communications technologies that might become available over the long service life of the equipment. Rugged gateways meet various requirements in terms of moisture penetration, extreme temperatures, vibration, shock, and resistance to power fluctuations, making them safe for use in volatile environments.

Prices of M2M gateways have come down significantly and low-cost off-the-shelf devices are readily available. New gateways provide two-way data communications over 2G, 3G and 4G cellular networks and come pre-integrated into a mobile network operator's infrastructure for easy deployment. Gateways are also equipped to interface directly to the variety of serial, Ethernet or USB data protocols used to provide online connectivity to equipment used in industrial environments.

### Tools to speed up development and deployment

Choosing the right hardware is only a small part of creating an overall solution. How the data is collected, analyzed, and used is critically important as well. It pays to look at the big picture in choosing an overall solution. The software – both on the device and applications interacting with the device – plays a key role, and can significantly improve a project's development, deployment, and long-term maintenance.

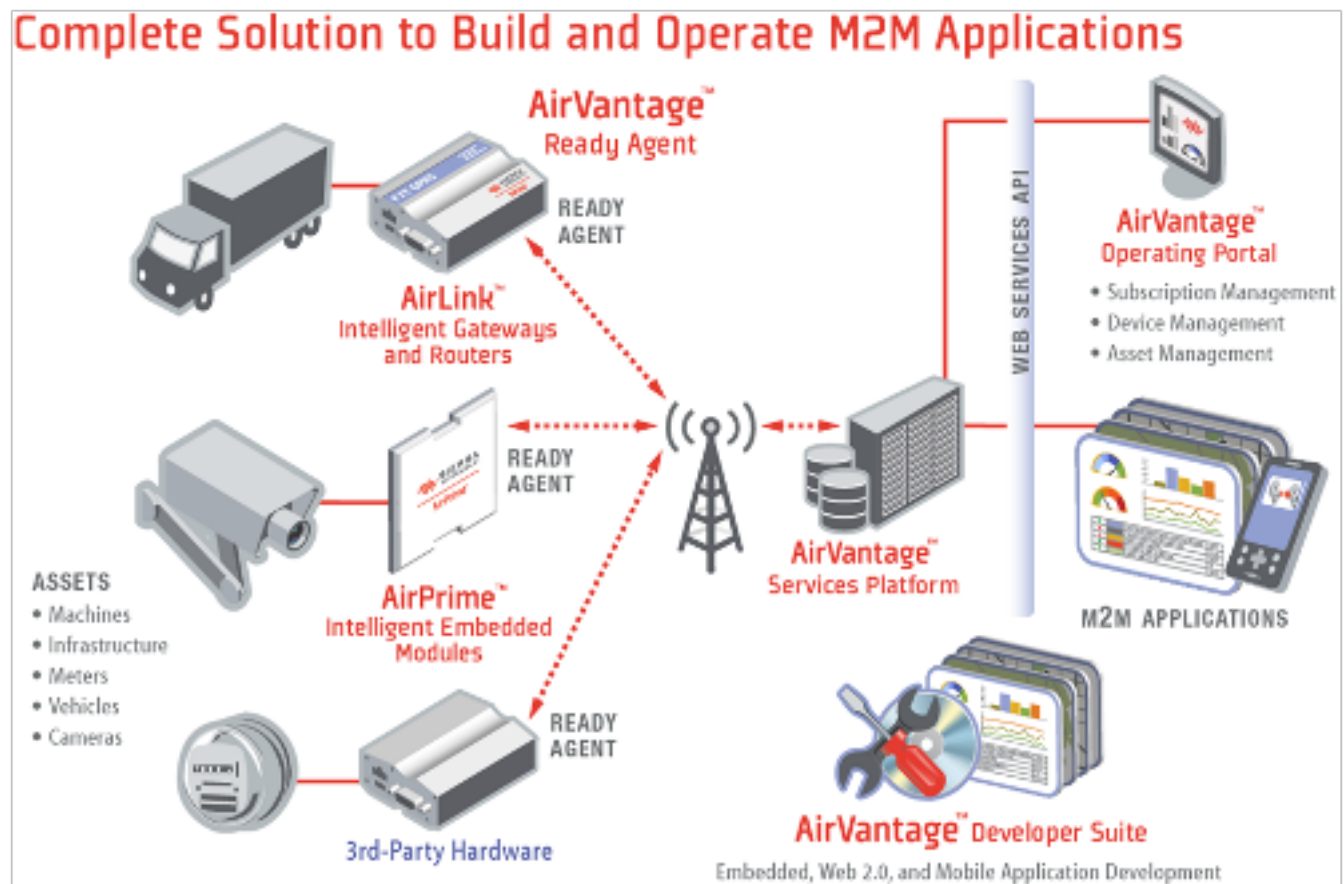
Some M2M gateways are embedded with highly sophisticated application

frameworks, which systems integrators can use to create customized applications and services to meet their deployment needs. No complex programming is required to set up and configure intelligent gateways, and programs already built into the devices make it easy to connect to cellular networks and managed assets. Further, because application processors are included, companies gain the benefit of processing data locally, at the end-point of the network, eliminating the cost of additional hardware for local logic. This makes it more convenient and cost effective to monitor data and optimize the transmission of data back to the server, reducing communication costs.

Cloud platforms and services for M2M applications make it possible to control connected devices from a single user interface, uniting all elements of an M2M solution including the connected hardware, software and network services while eliminating the cost to build IT infrastructure and connect the devices to operator networks. Another important benefit of M2M cloud platforms is that cloud-based services make it possible to remotely upgrade applications and adjust equipment monitoring and other M2M functions for the entire life cycle of devices in the field—very important in industrial applications, where a device may be deployed in the field for 10 years or more. It enables companies to continually operate equipment in accordance with business objectives and regulatory requirements, and it lowers the total cost of ownership over the lifetime of the equipment.

## Selecting an architecture

This example identifies the various pieces that should be considered in an end-to-end M2M solution.



The M2M services platform hosts the redundant database, the application server, the web services APIs, interfaces to each device agent, the Operating Portal web application, and interfaces to the Mobile Network Operator systems.

The services platform and the agent in each fielded unit are tightly coupled with a secure and reliable messaging system. The agent is a small, reliable, secure software component residing in the wireless device or in an application processor connected to the device.

Application support staff use the Operating Portal to monitor and manage the fielded wireless devices and connected machine assets.

An interface to the mobile network operator system allows support staff to use Subscription Management to manage activations of devices on the network, and monitor data usage. Using Device Management, support staff can monitor wireless devices and network activity as seen from the device. Other capabilities include device firmware upgrades, remote command execution, using the standard OMA-DM protocol.

With integration from the Agent to the asset, operational support staff can execute asset commands. The asset data, along with the device management data, is available to the M2M cloud services API, enabling the creation of M2M applications.

A good architecture will provide end-device intelligence that allows the business to monitor equipment locally for key performance parameters and then transmit only data required, because this minimizes airtime usage and operating costs. The cloud platform should be integrated with the cellular networks and secure. It should provide a standard API that can be used to create new applications or integrate existing applications into the cloud services.

When selecting an M2M platform and architecture, make sure that it can support multiple applications based on the data coming from the equipment, as needed, to meet diverse business needs. Often, for example, an industrial equipment manufacturer will want to set up its own M2M service-based applications for use in monitoring leased equipment uptime or providing remote service, but the customer may require a different set of operational data from the same asset.

Finally, a good M2M platform for industrial equipment applications should be easily scalable so it can support services for tens of thousands or hundreds of thousands of assets. It should also provide global connectivity and integration with wireless networks around the world, because most industrial products manufactured today are sold to global markets.

**About the Author:** Brian Anderson is the vice president of solutions and services at Sierra Wireless and is responsible for Product Management and Product Marketing for the AirLink and AirVantage hardware and software solutions for developing, deploying and operating M2M and connected product applications.

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