

# Technical Article

## Building the Industrial Internet of Things

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Avner Goren

The Internet of Things or **IoT** is an enabling technology that is delivering new use cases and services across a wide variety of markets and applications. When people think of the IoT, they often think of home or personal applications, but in reality, IoT-connected products will play a role in smart manufacturing, smart cities, automotive, building automation and health care as well.



The **Industrial IoT** has strong potential because of the services that will be provided as more sensors and equipment are connected to the cloud. It is important that IoT not be confused with machine-to-machine (M2M) connectivity since they are not the same. M2M is traditionally based on proprietary technology that is a closed environment vs. IoT which offers an open environment and leverages standard Internet accessibility and services – just like the ones we humans use. This level of openness enables a gas sensor to tweet or text an operator when there is a problem or for an industrial end-equipment to leverage a generic public data base to see how it is performing compared to industry benchmarks, things which are not straightforward with proprietary M2M systems.

At a high-level, IoT is about improving efficiency (e.g. energy, manufacturing, maintenance, etc.), and delivering increased safety and security, better experiences, new business services, and more to a variety of industries including:

- **Smart manufacturing:** Manufacturers are adding wired and wireless connectivity to their products or production line to improve the manufacturing process. With integrated **connectivity**, manufacturers are better able to get information from the factory floor to their cloud systems to quickly uncover and address any issues long before the product leaves the factory. Manufacturers also want to use connectivity to gather information

about equipment in the field. This information helps them find bugs, monitor equipment and also allows for software and firmware updates over-the-air – something that was not possible before.

- **Building automation:** Much like factory automation, building automation can connect to sensors to turn lights on an off depending on occupancy and allow dynamic control of HVAC systems, which allows for energy optimization. Predictive maintenance is also a benefit to ensure that service is done in a timely fashion, which reduces costs.
- **Smart cities:** Connecting elements with a smart city to the IoT can provide enhancements to improve electricity and water usage with e-meters to improve conservation efforts. Connected, smart street lights as well as cloud-connected surveillance and traffic control monitors help provide a smooth running city. Last, sensors throughout the city detect gas and water pipe leak keep citizens safe and ensure operation.
- **Automotive:** Connected cars provide **infotainment** services to stream entertainment and provide navigation and other connected services. Replacing wires with wireless connectivity is leading to lighter and more fuel efficient automobiles with sensor-driven predictive maintenance to save on costly repairs.
- **Retail stores:** A connected retail environment can better track inventory and dynamically change digital shelf labels. Combined with customer loyalty programs, IoT connected beacons within a store can serve-up coupons and offer sales based on customer preferences directly to their smartphones while they are shopping.
- **Healthcare:** There are additional opportunities to improve employee health and safety through the IoT outside of the workplace. Connected wearables and health care monitoring improve overall health and wellness.

Many of the examples above play out in the consumer market as well. However, the industrial IoT is different than consumer applications. Industrial requires different interfaces and communication protocols that are robust against noise, environmental changes, controlled latency and are highly secure because of the conditions and applications they are used in.

Additionally, the industrial market moves much slower than the consumer market so its move to connected IoT will take some time. The benefits of predictive maintenance, monitoring and big data analysis to improve output or working conditions, combined with the availability of the right hardware and software solutions, will provide a financial reason to migrate to IoT-connected systems in the future – it's just a question of how quickly it happens.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
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