Experts tackle common IoT questions and misconceptions

B+B SMARTWORX

Powered by ADVANTECH

Intelligence at the Network Edge

It's a common statement: the Internet of Things (IoT) isn't on its way, it's already here. Numerous research studies align with this way of thinking. According to a recent Boston Consulting Group (BCG) market analysis, $267 billion will be spent on IoT technologies, products and services by 2020. The BCG predicts the following industries will be at the top of the list when it comes to IoT growth through 2020: discrete manufacturing; transportation and logistics; utilities; health care; process industry; energy and natural resources; and retail.

There aren't many industries that aren't feeling the touch of an IoT transformation — a trend that will only continue to grow. But just because we're in the midst of growing IoT acceptance and execution doesn't mean every person, every team, every business is prepared or ready for a full transformation. Due diligence must be done and there are still many questions regularly heard regarding implementation, best practices, future-proofing applications and more.

In this eBook we've compiled advice and explanations from B+B SmartWorx IoT experts regarding questions and concerns they regularly hear, or misunderstandings that frequently come up in conversation. We hope you find it helpful.

—*The B+B SmartWorx team*

HOW TO TAKE THE FIRST STEPS IN THE IOT JOURNEY

By Mike Fahrion, B+B SmartWorx CTO

While the Internet of Things (IoT) may be a simple concept, making that concept profitable and transformative isn't as simple. Implementing the Internet of Things is really a journey. And like any journey, it's best to start with a road map. Here are four basic steps you must take in order to embark on a successful IoT journey.

Step 1: Connect existing equipment and start collecting meaningful data

The journey begins with connectivity. The reality is likely 90% of connections are existing devices and assets. Outside of the consumer world, nobody is expecting perfectly good capital to be taken out of service and thrown away. So, your first step is to get connectivity to your devices and assets, and start to collect data.

Step 2: Analyze the data … and expect some surprises

With your new data, you'll enter a new level of situational awareness. This will take some analytical work on your end, but you'll have a new understanding of how your resources and assets are really being used. In time, you will learn which data you can filter out and which data is most important.

Step 3: Data becomes insight and insight increases efficiency

Next is your first return on investment. Here, you're going to optimize your use of assets and resources based on the data you previously gathered. At this stage, for processes that were previously unmonitored and probably unmanaged, you're going to see some huge results.

For example, who knew that more than 50% of their irrigation water was likely wasted in run-off? Or that 30%

of the energy of your biggest energy- consumer in the plant is likely wasted? Or that your fleet vehicles are idling more than 60% of the time?

> " With your new data, you'll enter a new level of situational awareness."

Step 4: Innovation and increase the value of your services and products

When you reach this phase, you've optimized your resources. You're probably even starting to scare some of your competitors. But you're not done. You're really just getting started. At this stage you can start to innovate and produce new value streams for your customers. You can start to introduce predictive capabilities — even prescriptive capabilities — to start to increase the value of your products and decrease your costs.

Your journey into the Internet of Things has the capability to ultimately transform your business. And like any journey, it all begins with a single step.

WHAT MAKES M2M DIFFERENT THAN IOT?

By Tim Taberner, B+B SmartWorx Technical Sales Director

I recently got into a discussion with a peer discussing the differences of machine-to-machine (M2M) and the IoT — his view is they are essentially the same thing. As far as he is concerned, the IoT merely adds new sensors to collect data at lower price points, and allows for more powerful computation capabilities at the enterprise to enable massive data mining and analytics. He summed up his point with the following statement: "We measure the data with new sensors, we transmit it to the enterprise and then some clever people do clever things to transform the data into actionable information."

With this way of thinking, he is missing some of the fundamental differences between the "old" M2M and the "new" IoT architectures. In particular, he is overlooking the ways in which IoT pre-processes data at the network edge before sending it on for consumption, and how it transmits the data to the enterprise.
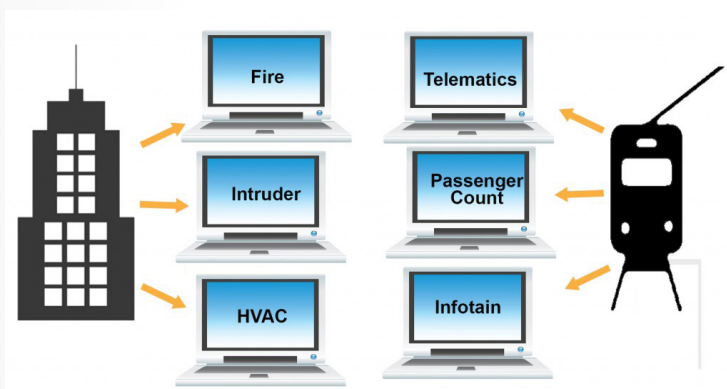
Traditional M2M systems have typically been applied to the monitoring, control or optimization of a single process. They have been specified, designed and implemented to address a point-in-time problem with a point-in-time solution. Using old M2M architecture, for example, a building might have separate systems for HVAC control, security and fire detection. Quite often, these discrete systems will take the same measurements at the same places via separate sensors. The sensors are wired back to separate instrumentation cabinets, and then to separate operator screens. Each system will communicate internally using its own (often proprietary) protocols and standards. Sharing data between systems is difficult, often impossible.

On the positive side, it has been relatively easy to specify M2M systems. When we're dealing with a point-in-time problem, we can scope out the measurements that we need to make and the way we want the information summarized. The boundaries of what we want to achieve can be defined, and an ROI case is relatively simple to justify (or reject).

A traditional M2M system can be thought of as a manager sitting in an office, constantly contacting his team of remote workers in a never-ending cycle. The manager asks if everything is OK and deals with any issues that come up. To do this, the manager must know how to contact and exchange information with each of his workers. And because of the repetitive nature of the inquiries, and the limited topic of the discussion, they all use a shorthand language they mutually understand. This allows them to communicate efficiently amongst themselves, but their language is not easily understood in the wider world. It cannot easily adapt to new situations and use cases.

The IoT, on the other hand, is about systems of systems. It's about producers of data publishing information without needing to know what applications or users will be consuming that data. It's about making data available to multiple systems in a way that can be expanded and revised as new requirements emerge. It's about being able to investigate dependencies and causality between seemingly unrelated data feeds. It's about optimizing not just a single process, but optimizing an entire ecosystem, and having the ability to adapt and evolve as new requirements and use cases emerge. It's about repurposing data and combining it freely without having to define everything that we want to do on the first day of the project.

> " IoT architectures need to provide flexibility, which has never been a major consideration in traditional M2M."

The initial use case may justify the ROI for the system, but we don't necessarily have to know how we want to expand the system in the future. IoT architectures need to provide this flexibility, which has never been a major consideration in traditional M2M.

Think of it as Twitter for machines. If I am a device, all I have to do is subscribe to a topic of interest. I don't need to know who is tweeting, or how they are connected to the network. I simply receive the relevant information and I can then determine what to ignore and what to act upon. New devices can subscribe to the data at any time, and existing devices can unsubscribe at any time. None of these devices interfere with one another. Similarly, additional producers of information can come online at any time and begin contributing their information to the knowledge pool.

Many kinds of data are mission critical, of course. And in the IoT world, information is being transferred without human intervention. Our security and recovery procedures need to be very robust. We also need topic definitions that have finer granularity than a simple hashtag.

Let's come back to the engineer's comment that "we transmit it to the enterprise."

This comment ignores the critical contribution made to IoT architecture by the edge device located at each remote asset. Unlike traditional M2M equipment, such as RTUs, PLCs or routers, IoT edge devices provide data processing functions before passing the data along. The IoT edge device not only provides the physical network interface for lower order devices and sensors, it provides the necessary translation as well as the decoupling between the data recovered from these systems and the information sent to the enterprise.

It filters out data with little or no value and aggregates it into summary data. It provides event detection and provides data enrichment, contextualizing information into something which is self-defining and semantically searchable. It provides communications management and security around the data transactions. It allows user business logic to be embedded in the edge device to provide responsive local intelligence.

It's easy to talk about the IoT while missing the devil in the details. "We send the data to the enterprise" is a very obvious example of this. If you want to know the difference between M2M and IoT, consider the phrase: "I don't know what I don't know."

M2M systems have historically ignored the unknown, whereas IoT architectures embrace it.
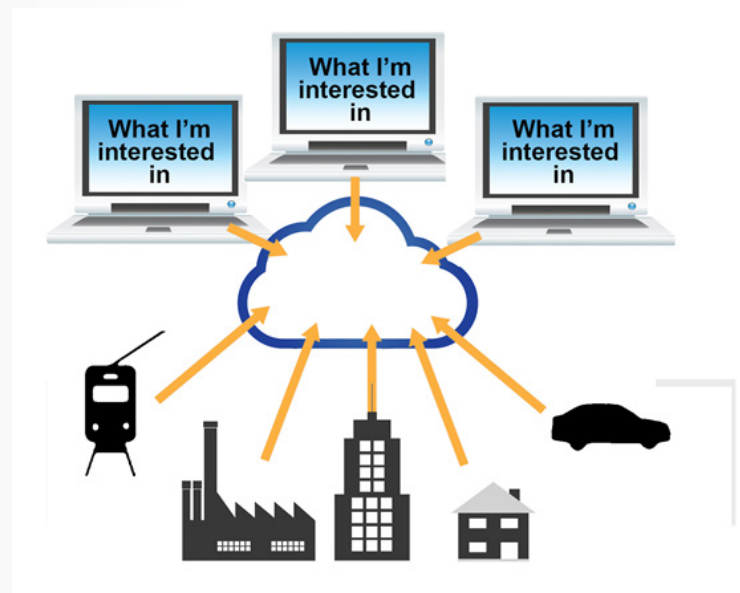
APPROACHES TO IIOT REALITY AND HYPE

By Mike Fahrion, B+B SmartWorx CTO

The "Show Me" Group

Members of this group work with critical processes and are always keeping an eye out for new technologies that will improve those processes. They may even be willing to be early adopters. But they are definitely not willing to be the first adopter; they worry there is too much riding on the outcome.

This group fully buys into the industrial IoT concept. They have the experience to recognize the industrial IoT promise of increased efficiency, predictability and reduced downtime is real, and that it will produce real returns on investment. But this group is also risk averse.

Members of the "Show Me" group may be left behind by competitors who are more willing to embrace new technologies. Quite often these competitors have special teams assigned to evaluating and proving out new solutions. Some solutions will be disqualified as being mere science experiments, of course. But some will make it into production environments. When they do, it gives that competitor a head start.

If you're a member of the "Show Me" group, and you're waiting for a competitor to adopt and prove a technology before you'll even consider it, you may be placing yourself in a precarious position. The future may not be kind to you.

The "Nothing New" Group

Members of the "Nothing New" group are often traditional automation system integrators and SCADA engineers who have been putting together complex automation and remote monitoring systems for decades. Staples of their toolkits are PLCs and HMIs. They can engineer solutions for all kinds of problems, as long as the requirements are clearly defined up front. And months or years later, when the requirements change, they'll be available to re-engineer to meet those new requirements. But that's the dreaded "rip out and replace" cycle. It's expensive, and it doesn't anticipate future needs.

As skilled as the members of this group may be, they're failing to grasp the important differences between traditional M2M and industrial IoT.

For example, machine builders may know that by connecting machines and capturing data they can improve services. But if they're still thinking in terms of traditional M2M solutions, they're overlooking the power of industrial IoT technology.

Have they thought about getting a leg up on the competition with a pay-per-use model? Are they adding more service revenue streams to their business model? Will they need to capture and analyze more data in the future? What happens when you can add external sensing capabilities, and integrate with multiple software platforms? These are systems that will have constantly evolving requirements.

A properly designed IoT solution can not only scale and grow (or shrink) to meet the future "unknown unknowns," it also eliminates the dreaded "rip and replace" problem. This ability to scale, grow and integrate future requirements is fundamental to industrial IoT solutions.

The Adopters

If you're an adopter, you're embracing the rapidly accelerating IoT technology curve and coming along for the ride. You're in constant test and tune cycles, and you're discovering all kinds of tools that enable return on investment. You're reducing waste, reducing downtime and increasing efficiency. You're pushing your management and they're listening; the business cases are too compelling to ignore. But you're not a fool. You're proving out the readiness of the solutions before you take them mainstream.

At B+B SmartWorx, our "adopter" customers are putting our IoT tools to work in hundreds of applications. Examples already include heavy machine manufacturing, mining, foundries, water, building automation, energy and more. Many start slowly. They pick up an IIoT starter kit or a SmartSwarm IoT gateway. They start gathering new kinds of data, or they explore new possibilities in remote device connectivity. They test, they experiment and they prove out real business cases.

The Industrial IoT isn't something that is going to appear down the road. It's already here and moving. Which group do you want to be in?

DON'T CONFUSE IOT WITH THE '80s VIDEO WARS

By Tim Taberner, B+B SmartWorx Technical Sales Director

One of the questions I often see in forums and hear from the floor at conferences is: "What will be the standard protocol for the Internet of Things?" Or sometimes I hear the alternative: "What will be the standard framework/architecture for the Internet of Things?"

I understand why the question is being asked. Those of you old enough to remember the '80s will remember the war of the competing video formats — VHS, Betamax and V2000. Many consumers and corporations had their hands burned by picking the "wrong" standard, and ended up with equipment that had no long-term upgrade path and content that became increasingly more restricted.

I was one of those who guessed "wrong." I needed a format that would both play and record and I, being an engineer, went for the better technical solution: BetaMax. But the industry adopted VHS, mainly because the political power of the corporations backing this technology was greater than that of those invested in other solutions. Did it make any difference to me? I don't think so; I enjoyed better quality recordings than mates with VHS. The cost was ending up with a few unusable pre-recorded movies, which I eventually traded up. (Although by then DVDs were on the horizon and so, effectively, everyone else ended up in the same place as me).

The memory has lived long within the technology sector, and organizations continue to be reluctant to adopt new technologies until it is clear that they are future-proofed. And what better way is there than to wait for the emergence of an all-consuming, universally adopted standard in order to guarantee long term, cross industry support?

Except here's the problem: in the context of the Internet of Things, waiting is nonsense.

The video wars were about one type of device performing one type of task. In the video industry, it served the interests of the all-powerful media distribution companies to only have to supply on one format, rather than support three.

This is a completely different scenario than what faces us in the Internet of Things.

If you ask 10 different industry experts to outline a typical IoT system, you will get 10 different answers ranging applications from smart homes, smart cities, individualized retail, smart grids and more, plus the range of industrial IoT use cases aimed at process optimization, predictive analytics, etc. It is inconceivable that a single standard can emerge to encompass this diversity, while also addressing the vastly differing needs of different applications with regards to security, authentication, data privacy, data storage, system latency, communications and more.

Do I want standards for the Internet of Things? Of course, but I don't want to have to wait for 10 years until I know which ones are going to emerge as the predominant ones. That's why we at B+B SmartWorx designed our SWARM architecture in a way which makes it easy to slot in different components to address different standards requirements, whatever they may be.

This means we can start bringing applications to market now and adapt as standards emerge. If two verticals end up adopting different security standards or different IoT protocols, we will be able to slot in appropriate modules for each but retain the integrity of the rest of the architecture. As we'll still have the benefits of cross vertical application layers.

This is just a sensible engineering practice given the history of how standards have emerged over the years in the technology industry. Sadly, I fear the IoT standards process will not be any different for some than that of the past video wars of the 1980s. The trick is not to bet on one standard or spread a bet on a number of them. The trick is to move ahead now, selecting solutions that can adapt in the future as winners emerge.

WHAT IS A SWARM DEVICE?

Instead of having to find or pay to develop a single complex device that has all needed individual functions, a SWARM device is built using simpler units that are more likely to be available off the shelf. More importantly, as system requirements grow and change additional devices can be added to the SWARM to adapt to emerging needs. Learn more about SWARM intelligence here: advantech-bb.com/swarm-intelligence-product-brochure/

B+B SmartWorx

Powered by **AD\ANTECH**