

# Real Time Automation's Automation Insert



## ***Business and Technical Insight for the Next Generation of Industrial and Building Automation Professionals***

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### **The Internet of Things.**

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What is IoT? In a strange way I feel like that is like asking what is breakfast? Based on your personal preference and locations you might get a lot of different answers. Bacon and grits in some places and a fruit parfait in another. IoT is exactly the same. The root idea is universal but many different camps are vying to define certain pieces of technology as the barriers needed to be deemed IoT. My goal is not to persuade you that one camp has a better idea. I want to offer a generic high level understanding of IoT and emphasize that for those of us involved in Industrial and Building Automation, much of this "New" technology is far closer to our status quo than a new frontier.

#### **Definition by the book:**

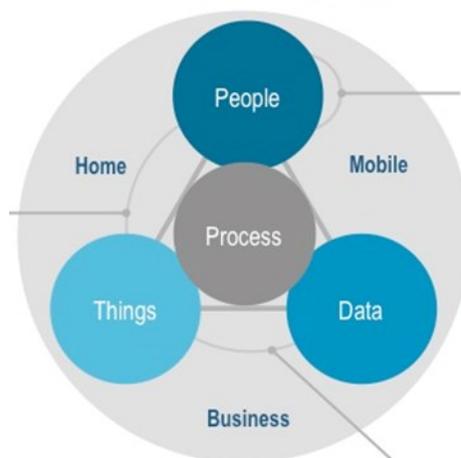
"The Internet of Things is the network of physical objects or "things" embedded with electronics, software, sensors, and connectivity to enable the exchange of data with the manufacturer, operator and/or other connected devices based on the infrastructure of International Telecommunication Union's Global Standards Initiative. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure."

The vagueness of that definition is really

the most important part. Note there is no requirement to be living in the cloud. There is no mention of self-acting intelligent devices or BIG Data. Those are all trends but not requirements for IoT. Simply, IoT is the ability to exchange data from things to other things and people. That model easily fits what most of us do daily. A PLC & BAS system fall within the definition of IoT. Many of us have been doing IoT for nearly a decade.

#### **Ignore the Acronyms:**

When IoT just isn't enough, we get specialization in the form of additional acronyms. The IoE (Internet or Everything), the IIoT (the Industrial Internet of Things) and the HIoT (the Human Internet of Things). IoE is IoT. There is no need to further open the realm of things by going to everything. The argument is that everything encompasses people, things, data, and process as seen below.



I don't care. All are still things to me.

IIoT and HIoT attempt to make a distinction between consumer usage and industrial usage. The differences are very similar to those of Ethernet vs. Industrial Ethernet. The differences being additional needs of determinism and speed. A conveyor line requires a lot more real-time action than a fit bit or your dryer does. I understand the difference but I don't understand the need to poorly rebrand consumer vs. industrial use cases. It wasn't my call. Saying IoT is not cliché, people are trying to further define the market, but IoT is a wonderful catch all term.

#### **There is no single technology of IoT:**

I recently saw Cisco's presentation on IoE. It was a pretty cool case study about a large mineral mine. A system was implemented that allowed the mine operators to see where all their equipment, and workers were. In a 50+ mile maze of dark tunnels, a mile below the earth, this is a big deal. Knowing where people are is great for safety and it also allows you to save a huge amount of energy. If no one is working in a tunnel you don't have to spend energy keeping it properly ventilated. The mine was safer and saving boat loads of money.

The presenter closed the presentation saying this would not be possible without the IoE technology created by Cisco's Wireless technology. It's true but I thought they took some liberties in the amount of credit they deserved.

The problem is claiming the "plumbing" of Ethernet alone created IoT is ludicrous. Cisco's technology is fantastic but all they did was create a wireless Ethernet network. To get the full benefit described, advanced devices, PLC's

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and communication protocols were used. As anyone in automation can attest simply getting the devices plugged into an Ethernet network is typically the starting point of the real application work. A plumber would not claim to be a home builder in the same light I'd argue Cisco should not claim to be the IoT provider. They provide an important component, but are not the whole solution.

#### **Communication Protocols and IoT:**

Which Ethernet based Industrial and Building Automation protocols are IoT? All of them! Feel free to contact the trade association attached to a protocol to hear why theirs is better. The truth is everything from the lowly Modbus TCP/IP up to EtherNet/IP, Profinet, BACnet/IP and OPC UA can be utilized to create IoT.

#### **Trends of note associated with IoT:**

##### **The Cloud**

I don't hear many customers wondering what the cloud is anymore. The idea of processing and storing data on a remote server is not a new idea. The cloud isn't going to replace control hardware but it can offer a very interesting value proposition when it comes to analyzing and storing data. It's easily accessible and has nearly infinitely expandable data storage with the potential for advanced diagnostics.

Many people are still reluctant to pay a monthly fee for access to their own data, but I think that is a fading feeling for all but the most sensitive data applications. When you do the rent vs. buy analysis the costs savings in a service based model are becoming substantial.

##### **Big Data:**

"Big data is high volume, high velocity, and/or high variety information assets that require new forms of processing to enable enhanced decision making, insight discovery and process optimization." The data is also delivered at a rate that inhibits commonly used software tools to capture and keep up. When we look at the big 3 V's it's likely that most of the applications we deal

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with don't neatly fall into the category of big data. Frankly 90% of automation applications move relatively slowly, have hundreds to thousands of points of data, not millions, and are fixed applications. All but some advanced process automation, massive commercial campuses and automotive assembly lines likely fall short of covering the big 3 requirements of Big Data.

That does not however mean we will not start to see some of the benefits of the Big data market. You now have systems that can literally support a nearly infinite amount of sensors. Big companies on big projects will start using a lot more sensors. The variety of low cost sensors will continue to increase and many sensing devices we currently pay a premium for will fall to commodity status.

The analytics these large applications use in real time can also be applied to your historic data. This should likely reveal correlations in data the average user would never notice. This is exciting for preventative maintenance.

#### **Security**

This is without question a topic that could be better addressed over an entire book. The big issue at ten thousand feet is that most application layer communication protocols we are familiar with have been designed to live in a closed world network model. You secure the network not the devices. Do you know anyone with encryption or validation between a device and their PLC? Most of the leading protocols have security specs in place or in the works but there are few if any devices utilizing the security in the field. The cost of adding the additional security to the end devices will be weighed against the benefit of having the device on an accessible network. Do you really need to interrogate a sensor directly if it's data is available in a controller? Probably not but an advanced power meter might be a different story.

If I had to bet, I believe the majority of the security advances in our industry will come from either switches or services in the next 5-10 years. Device manufactures move too slowly to effectively embed security technology in devices. There are simply too many devices out there. Yet a company controlling the traffic, be that natively in a switch or via a service model can easily implement many layers of security to otherwise insecure devices. Does that model solve all security problems, no. It does however solve many of the issues facing our industry and does so in a cost effective way. Which should be a great stepping stone.

#### **Conclusion:**

I have never viewed IoT as new. Heck it's a term coined in 1999. The advances in technology over the last few years have started to make the idea a reality. It won't alter the foundation of what we do in automation but it will open the door to many cool new opportunities. Regardless of the acronym they use I think it's safe to say we will be automating applications we never dreamed of in the near future.