IoT Package

By eft – June, 2015

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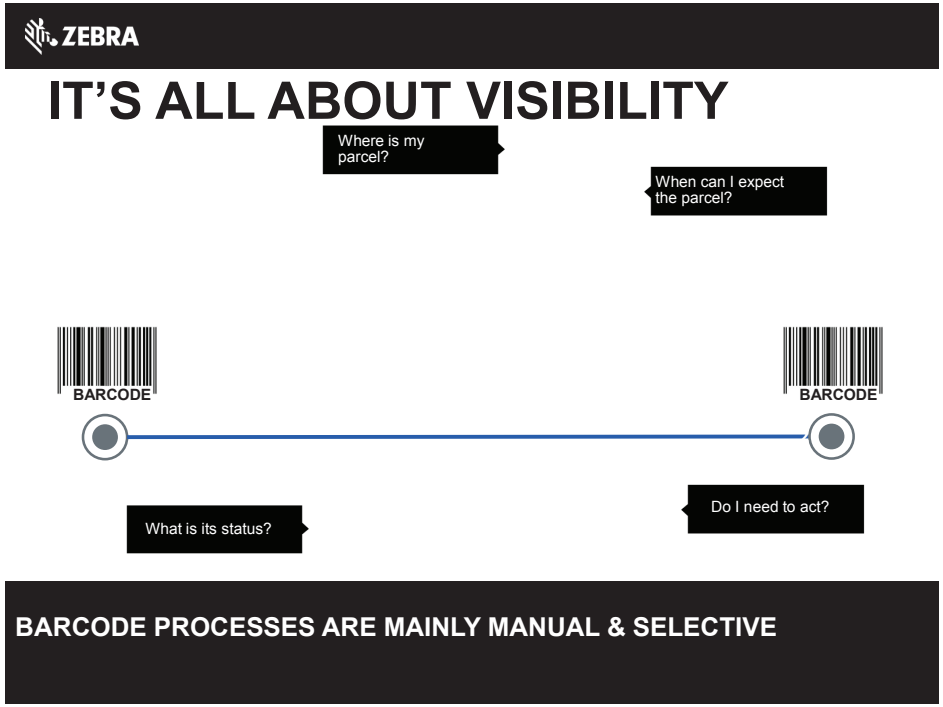
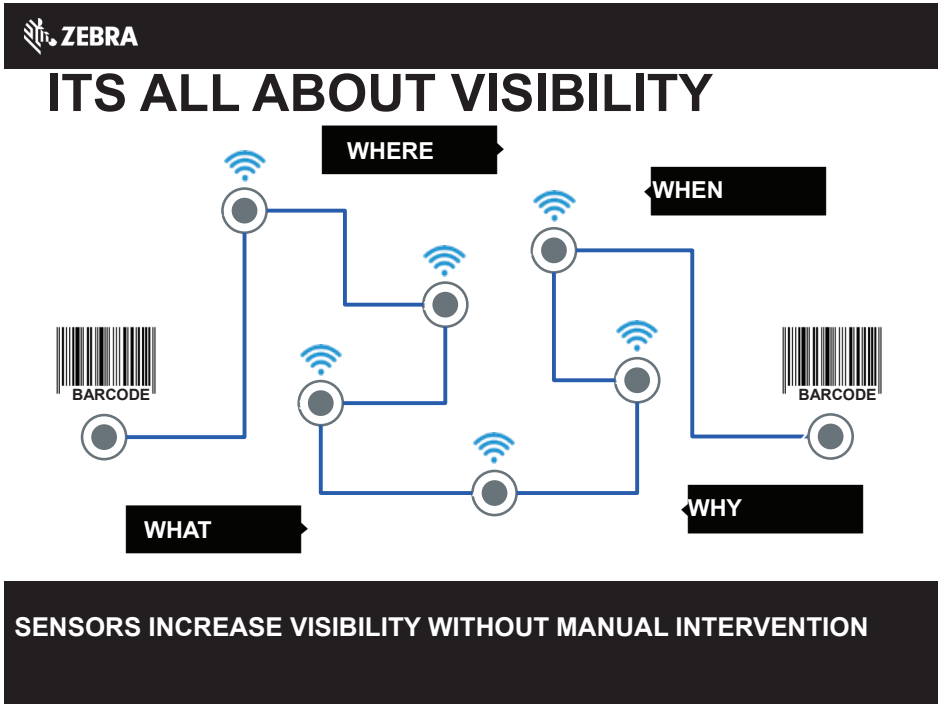
Presentations

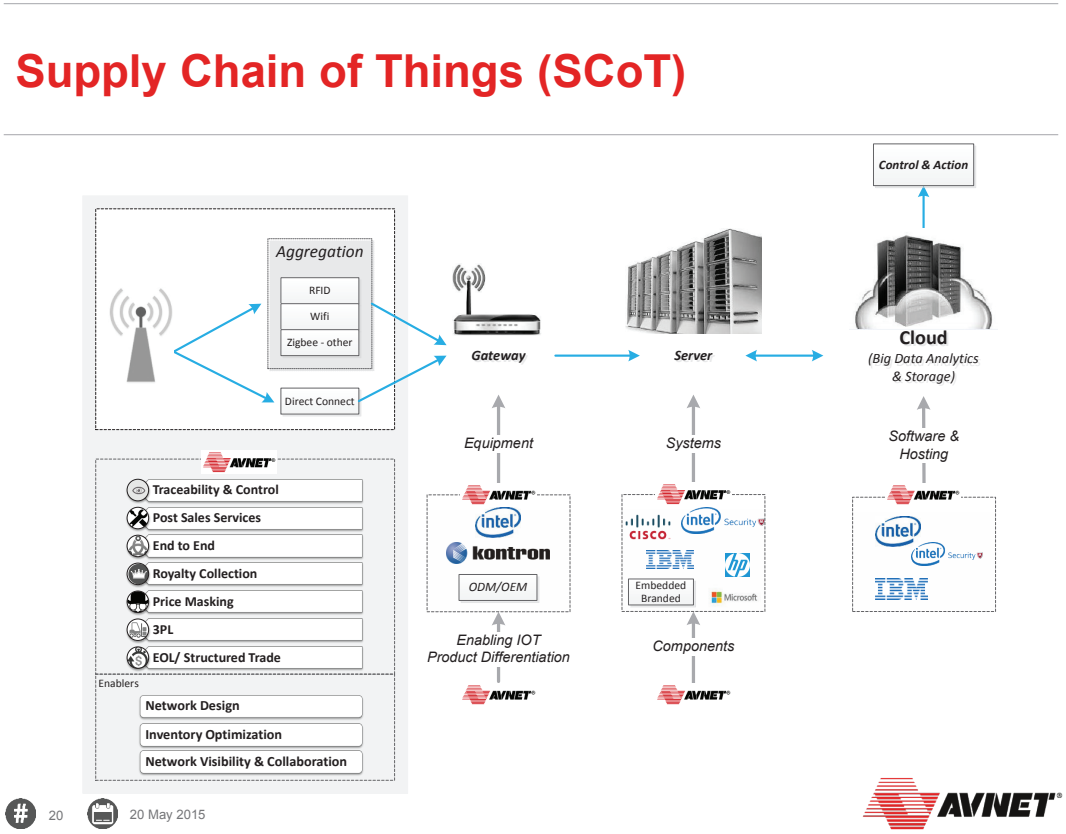
These presentations were all hosted at eft industry events. Read how Zebra technologies, Avnet, Cirrus Link and Jabil are currently using IoT to increase visibility within supply chain.





Presentations

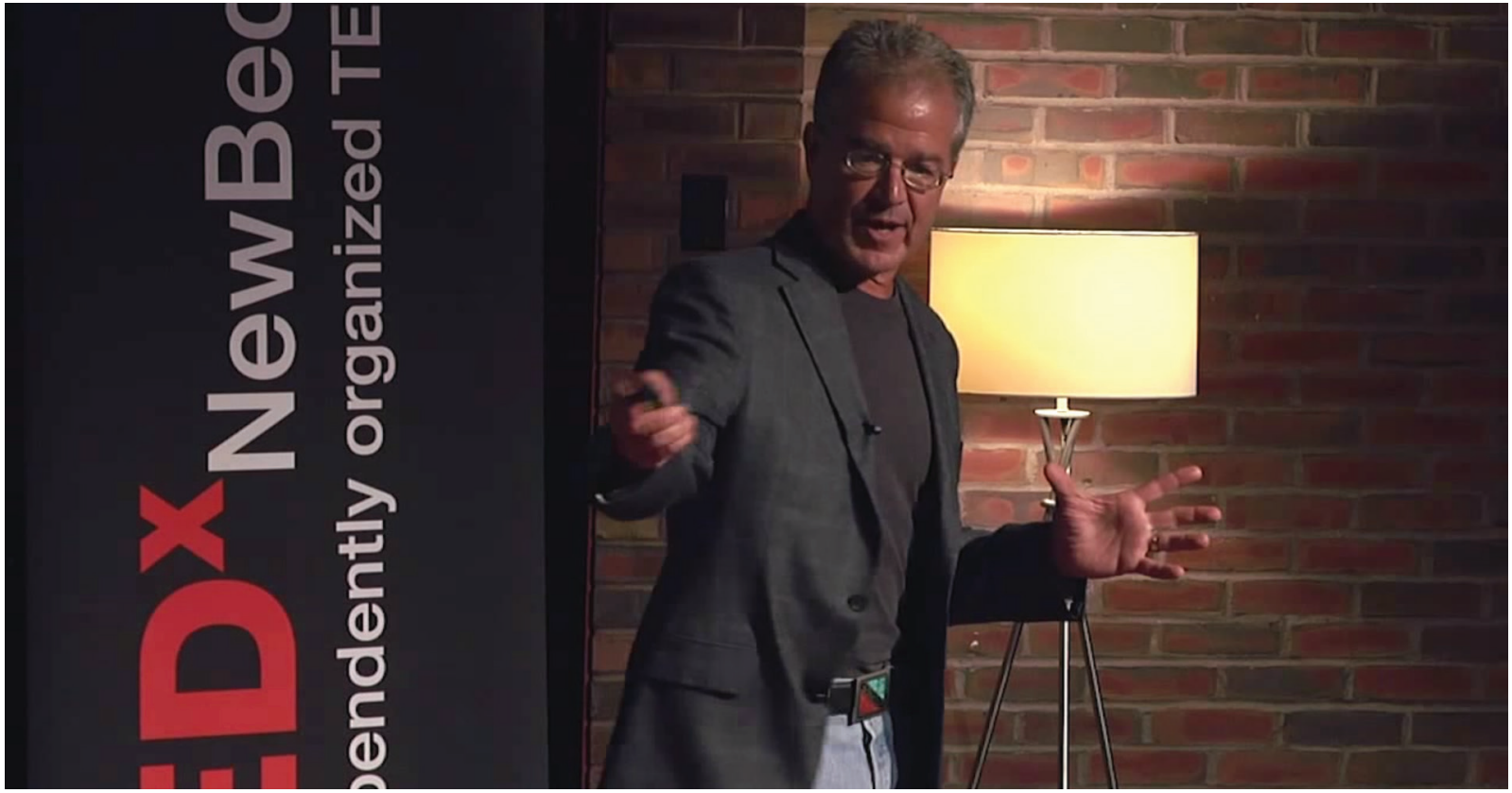
Pascal Fernandez VP, Business Development at Avnet, shared his insight on the Supply Chain of Things and what's changing: IoT is making devices less secure due to connectivity, software is becoming the biggest investment and traceability more difficult, so how has Avnet begun to solve those issues? Click on the image below to view the full presentation.



Presentations

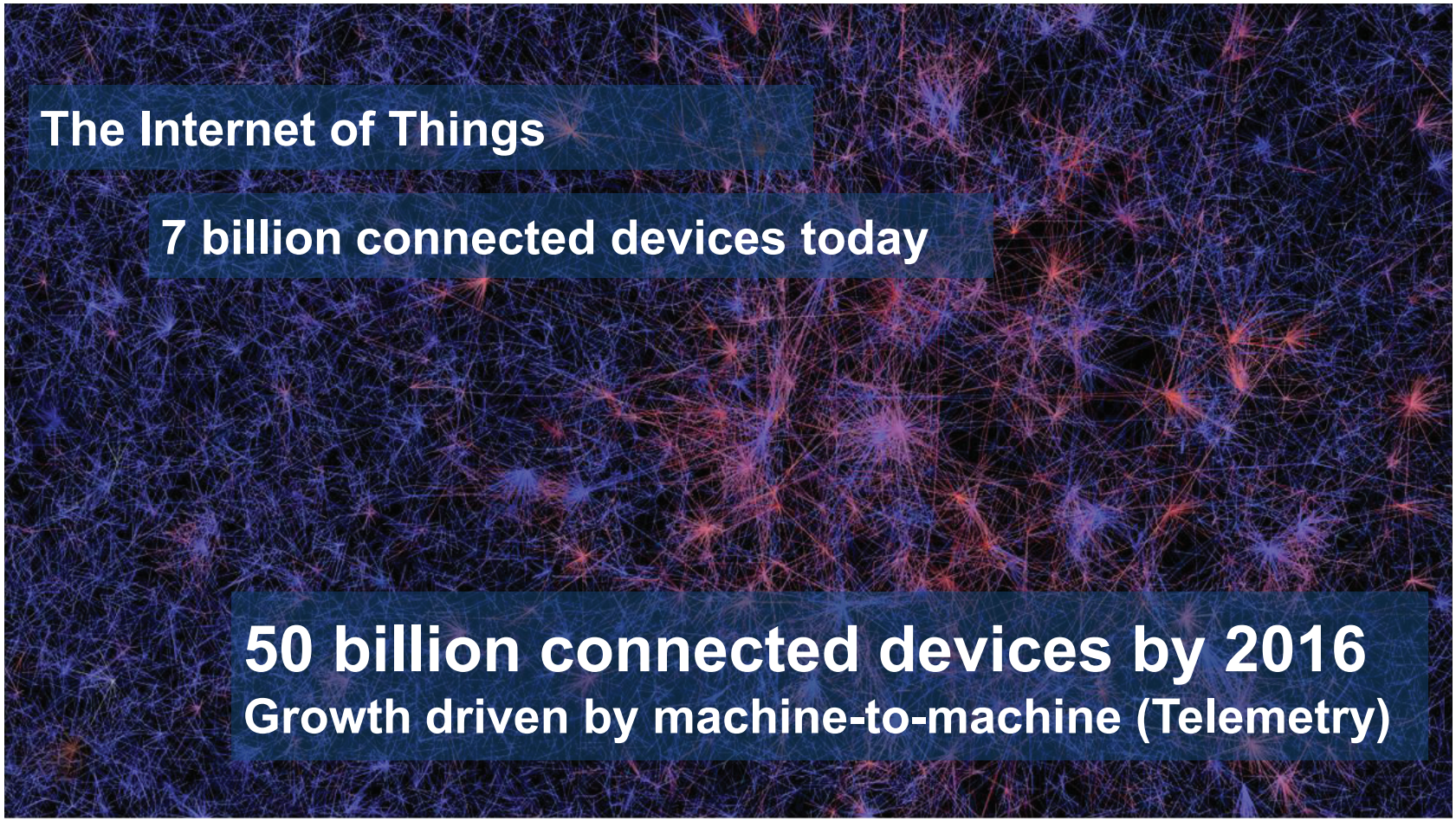
Arlen Nipper, President and CTO at Cirrus Link's Ted Talk on everything you need to know about IoT in 17 minutes. Click the image below to see his Ted talk.

You can also see his full eft presentation on 'Applying IoT Technology to Logistics'



Big Data and Visualizing Complexity

Fred Hartung, VP X at Jabil, presented at eft's Hi-tech & Electronics Supply Chain Summit on Big Data and Visualizing Complexity. With 7 billion connected deviced today and 50 billion connected devices by 2016…



The Internet of Things

Part 1 By Steve Brady

The "Internet of Things" has been a topic of discussion for several years now and, like so many of the innovative topics this column will discuss, can mean different things to different people.

We have heard how your refrigerator will "tell" you when you need to buy more milk, or how using the NEST Thermostat will save you money and improve the comfort of your home. Or, for those more interested in "big" ideas, sensors embedded in the road help find parking spaces or as part of a network designed to measure traffic along the highways. In fact, this NPR story highlights one city in Europe that has installed sensors to

"measure everything from air pollution to where there are free parking spaces. They can even tell garbage collectors which dumpsters are full, and automatically dim street lights when no one is around."

The central theme throughout the discussion though hinges on the two key points: the interconnectedness of the sensors, and the ability of the sensors to provide data that can be used to inform decision making.

As supply chain experts we have already been engaged in the use of sensors as central to our decision making process. Over the past 20 years or so we have applied cameras and weight sensors to the manufacturing process for quality control, used bar-code readers tied to automated systems for package sorting, and hand-held readers for package delivery. Sensors give us "in transit visibility" throughout the shipping process, and provide early detection of maintenance problems on many of our most expensive MHE and transportation assets. Of course, the implementation of each of these technologies requires extensive capital investment and generally provides data through stove-piped, proprietary systems. The "big dogs" can play--and no one else.

We are about to see an explosion of innovation in sensor technology that, when applied judiciously, can be truly disruptive and move us another step towards a more level playing field between small, medium and large businesses.

New startups are developing and selling sensors that are priced not in the tens, or hundreds of thousands of dollars, but are instead only a few hundred dollars. Wunderbar is a start-upwith the novel approach of "breaking off" sensors as you

would candy off a candy bar. The sensors use BlueTooth technology to talk to one another and to the "main" board which then uses wifi to move information up to "the cloud.: They will be selling these "suites" of sensors for less than $200, making them quite attractive for small businesses. Other tools are following in their wake that can open up the discussion for just what can be measured, what should be measured, and what can we do with the data?

Of course, they come with one essential trade-off: these tools come without solid "off the shelf" applications. Over the next few columns I will be exploring the possibilities that open up with these sensors, and seek to not only answer the questions of what can and should be measured, but also point to ways that with a little elbow-grease smaller players in the market can start to gain leverage by collecting the data they are already creating--and then using that leverage to gain efficiencies and market parity, if not leverage.

Internet of Things, and connected processes need no longer be the playground of only the big dogs.

Part 2 By Steve Brady

In the last column I wrote how innovations in sensor technology are driving down the costs and increasing the availability of connected sensors. This has the potential of truly transforming the way small businesses, and supply chains, operate.

As mentioned, the "internet of things" (IoT) is more than just having "smart" devices. There are many devices and appliances that have intelligence built into them. Take the iRobot's line of products, including the Roomba. This is a robot that learns about your house and vacuums your floor. This is an "intelligent" device, but isn't (at least not at this writing) connected to the outside world. What makes the "internet of things" truly revolutionary is the connection of the device to the larger world through wifi, or bluetooth, or other connectivity approaches.

How can small businesses begin to leverage these technologies? I propose that we begin to "think differently" about how we manage our businesses, and look to see what questions we have always wanted to have answered, but never seemed to have the data to answer the question. Sometimes answering the question would be too expensive, and as a friend would say "the juice isn't worth the squeeze." But often, if one could answer the question, it could lead to significant benefits and competitive advantage.

For example, let's consider a florist. Perhaps the most important and costly single expense for a florist is the walk in cooler. Properly controlled temperatures can extend the useful life of fresh-cut flowers significantly. In fact, the range of acceptable temperatures is actually quite narrow (ideally 33-35 degrees F.) The impacts of higher than normal temperatures lead to a higher respiration rate, and faster water consumption shortening the life of the cut flowers.

The impact of shorter lifespans of flowers are obvious:

- increased cost of spoilage to ensure a sufficiently wide assortment
- carrying less inventory to reduce spoilage risking lost sales by not having what the customer wants

- customer dis-satisfaction from a significantly shorter life of the flowers and arrangement delivered.

Imagine if the florist could exercise tighter control over the environmental controls--the longer lived flowers, coupled with the ability to offer a wider selection with greater life-spans of floral bouquets certainly could provide an advantage in business.

So here is where the "internet of things" steps in. Of course coolers have always had thermometers inside them. I worked at a local florist to earn extra cash during the holidays while in high school, and we were regularly checking the temperature in the cooler. But imagine…

Imagine a sensing system that once installed will notify the florist (by email, text, or even a robocall) when the temperature is "out of specification" for a set period of time, and during specific times. The system could be set to text the owner any time during non-business hours when the temperature is too warm or too cold. Perhaps this is an indication of a door left open, compressor failure, or a power outage--assuming the IoT system is on a battery backup. That could mean the difference between a significantly shortened life of the product or continued business success.

But wait--there's more! The coolers should also maintain a high relative humidity, in the range of 90-95%. a Hygrometer sensor can notify the owner when the humidity falls out of specifications.

Now, perhaps the problem is simple--the door was left open and the cool (and damp) air has been escaping. Then a proximity sensor to detect the status of the door would be helpful allowing the owner to quickly assess the problem.

On the other hand the problem could be more complicated, and could include a failure of the compressor motor.

This is where this moves from simply interesting to being quite useful when sensors are applied in other locations as well. For instance, vibration and temperature sensors could be placed on the the cooling compressor motor. The data being provided by these sensors, combined with the performance measures of temperature and humidity, can provide insights into the health of the cooling system itself.

The vibration sensor can not only track the operating of the compressor, but also the duration it is running and any change in the performance (increased vibrations, or decreased.) In this way, the sensor data can begin to track changes in performance before the potential catastrophic outcomes of poor temperature control.

This example, while limited to one type of small business, serves to show the ways sensors can be used to monitor crucial aspects of a business that perhaps were unable to be closely monitored before, usually because of a lack of technology, or because of the high costs associated with implementing the technology. Both of the barriers to problem solving are disappearing quite quickly.

Having sensors throughout the establishment reporting on the critical measurements in real-time can lead to significant dollar savings, potential improvements in product offerings, and avoidance of possible catastrophic events. A well designed dashboard integrating the measures, with appropriate heuristics in place to provide the "expert analysis" that traditional small business

owners normally would be unable to perform, can really enhance their operations.

But this is not the limit. Next issue we will explore what can happen when your data is "set free" and shared with others in your supply chain.

Part 3 By Steve Brady

In the first article in the series we established the baseline, discussing the new affordable sensors that can enable small businesses to join in the Internet of Things (IoT) and play with the big dogs. In the second article, we used a florist as an example of how the IoT can be implemented in critical ways to ensure the freshness of their product and meet customers expectations.

It's not a big step to realize then that, once data is being collected on systems and used to drive decisions at a local, or retail, level, the data may actually prove beneficial to others as well.

In the example of the florist, the cooler has sensors in place and software designed to report any deviation from performance (temperature, humidity) that might shorten the life of their flowers. Additionally, the sensors can be placed to help diagnose the cause of the deviation (door, compressor failure). The sensors, internetworked and providing analysis, allows the owner to correct the problem. The owner can now also determine the projected life of the flowers and adjust pricing and sales to ensure the product moves. This is not much different than they do now (as do bakeries, or any other business with a perishable commodity.) The additional data simply adds a level of intelligence to their decision to reduce spoilage.

The next step is to share that data. First, it makes sense to share performance data with the manufacturer of the cooler. As a manufacturer that data can prove quite useful for diagnosing problems long distance before sending a technician out. Based on the sensors discussed in the last article, it is possible to know whether the problem is a compressor, or perhaps a seal, or simply that the door was left open. Remote diagnostics, and the ability to plan a maintenance event before arriving on site, can bring significant benefits to operations and the bottom line.

Perhaps even more beneficial is the idea of "prognostics" or, predicting the future.

Imagine the manufacturer having sensors on not one, but perhaps 50, or 100 compressors and coolers in a region. If the sensors are reporting back the performance of the coolers the manufacturer can, over time, start to track the performance characteristics of their products. As failures are reported, they can pore over the data prior to the events and, as more data is aggregated, discover trends.

This aggregated data supports what is known as "Prognostics" or using data to identify key indicators that precede a failure. Many firms in the transportation industry, from trucking to rail to aviation, already makes extensive use of sensors to monitor the health of their fleet. Prognostics (the ability to forecast future failures and avert them) plays a key role in "Preventative maintenance." Of course, the transportation systems all require significant upfront investments either by designing in the sensors from the start or retrofitting existing fleets at substantial costs.

Articles

The manufacturer can now identify potential failures, reach out, and schedule maintenance before a catastrophic failure can potentially wipe out the whole inventory of a small business.

We are discussing something different. In this "brave new world" of empowered small businesses, the local retailer or small business can implement sensors that can make a direct improvement on their operations. They can, through sharing their data, improve not only their system's operations but can contribute to a stream of data that lets their manufacturer improve service and improve their product.

But wait--there's more! What happens when these affordable sensors, that are sharing data, are embedded throughout the value chain? That is the next issue...

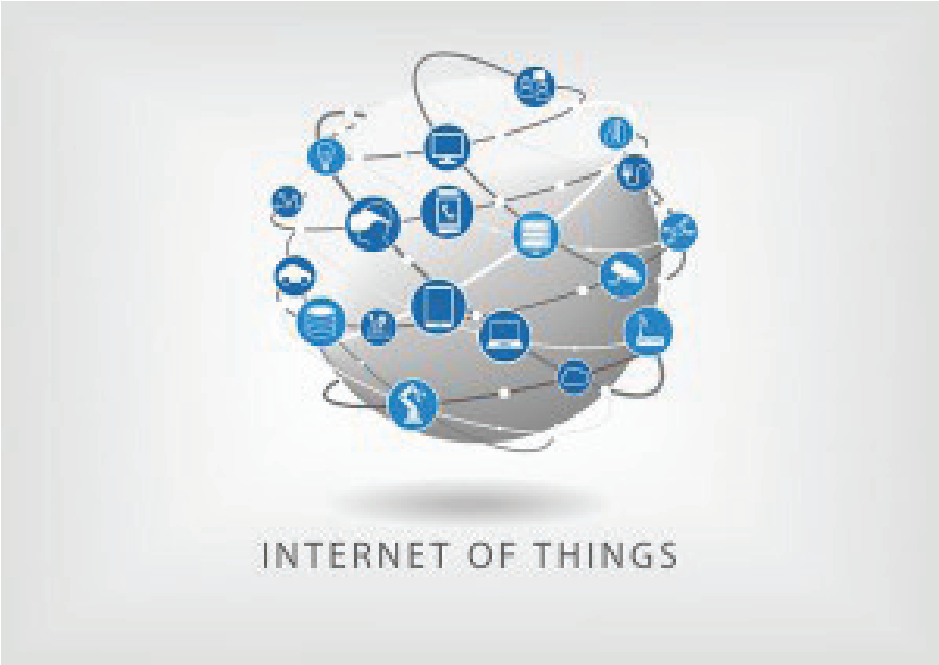
Internet of Things Will Revolutionize How Healthcare is Delivered

by Karen Reddington

The big technology shift sweeping the global connection of healthcare is the supply chain becoming part of the Internet of Things. Pieces of the supply chain are already connected so packages can be tracked and monitored but in the future, more tiny...

Like nearly every other area of commerce, healthcare is now a global market. It is projected to be worth US$3 trillion in 2015 and tipped to grow at 5.3% per year on average between 2014 and 2019, driven by an aging global population and chronic diseases; improving healthcare access around the world; and advancements in technology . In the ten years to 2012, the global trade in medical devices and pharmaceuticals grew four times faster than commerce overall . And crucially, the distinction between foreign and domestic healthcare products is fading: for instance, a growing share of medical devices used in Asia are imported; while some 80 percent of active pharmaceutical ingredients used in the United States are manufactured outside of the country .

While the healthcare industry was previously squarely based on the US and Europe, it has been rapidly shifting to Asia Pacific. In recent years, Asia's healthcare and pharmaceutical industry has been growing exponentially. The total size of Asia's healthcare market now stands at US$279 billion and is expected to grow at an average 12.8% per year between 2012 and 2018 – more than double the rate for growth for the global market as a whole . Within the



region, certain healthcare hubs are poised to reap the benefits: Singapore's combined pharmaceutical and healthcare market is tipped to be worth US$1.6 billion by 2022.

Global and Borderless

FedEx sees the healthcare industry as global and borderless.

But the healthcare industry needs to adapt to this new environment of distinct healthcare clusters dotted around the world. These hubs need to be connected seamlessly and securely through advanced technology if the true benefits of globalized healthcare are to be realized. Even a decade ago, it would be difficult

Internet of Things Will Revolutionize How Healthcare is Delivered

to imagine what's now possible through the intersection of global trade, healthcare and technology. For instance, a heart patient in Taiwan receiving a pacemaker made half way around the world, in just one night; or transporting sensitive biomaterials such as human liver cells between Japan and the US – and having them arrive in perfect condition.

The globalization of healthcare and the varied needs of different subsectors bring a greater degree of complexity to how it is connected through the healthcare supply chain. More is being demanded from a technological perspective, whether it is unique needs like temperature control, light sensitivity and humidity – or simply an efficient supply chain that meets the needs of cost, speed, reliability and security. It's estimated that the global cold chain logistics market will grow at nearly 16% per year on average between 2014 and 2019 . By 2016, more than half of the top 50 best-selling drugs are likely to require temperature sensitive transport . Asia Pacific is leading the charge, with the region expected to account for nearly 30% of the global healthcare cold chain logistics market by 2017 .

But while medical technology has made stunning advances in the last three years, many medical and life-science products are still being transported the same way they were 30 years ago.

Think about this: a typical pharmaceutical manufacturer has a lead time of about 75 days to deliver to distribution centers out of a formulation and packaging plant , whereas a typical laptop manufacturer can accept an order on a Monday and deliver a pallet of newly assembled customized computers to a European customer on Tuesday of the following week. And much of the industry is still using the dated method of dry ice and styrofoam as a deep frozen shipping method. While technology now allows clinical trial samples to be shipped in a liquid nitrogen dry-vapor container at -150° c for up to days. The possibilities this new technology opens up were previously unimaginable.

Internet of Things and Healthcare

The big technology shift sweeping the global connection of healthcare is the supply chain becoming part of the Internet of Things. Pieces of the supply chain are already connected so packages can be tracked and monitored but in the future, more tiny embedded sensors will enable more pervasive tagging and an unprecedented degree of real-time tracking and tracing. This will provide unique visibility of critical information such as location, temperature, light exposure, humidity, barometric pressure and shock. It will also ensure the integrity and security of healthcare goods. Fraud and security is a widespread problem in the industry; according to the World Health Organization (WHO), 8% of medical products are estimated to be counterfeit and pharmaceutical theft is becoming more widespread and sophisticated.

While supply chain control and visibility is important for all industries, it's absolutely vital for the healthcare industry. From biologic manufactured items

Internet of Things Will Revolutionize How Healthcare is Delivered

to pharmaceuticals, the items the healthcare industry ships are important, sensitive and difficult to replace. Imagine if a shipment holding medicine that was personalized for the DNA of a cancer patient was spoiled or stolen. You can't pull a substitute off the warehouse shelf and ship it overnight. The complete visibility of healthcare shipments is needed as medicines become more personalized and more potent. This is why connecting every element of healthcare shipping industry is critical to delivering the huge potential globalized healthcare can offer.

The future of global healthcare is on building out smart, connected healthcare supply chains that are efficient, flexible, accessible, compliant, and economically viable. In spite of all our knowledge, and scientific and technological breakthroughs, it doesn't do human kind any good if we can't access and disperse the benefits of healthcare advancements – and it doesn't do the industry any good if it can't get products to people that want and need them.

In the end, no other industry affects the well-being of people like the healthcare industry does and connecting the global healthcare industry isn't just a matter of economic opportunity, it can dramatically improve and save lives.

Interview

IoT – what's really in it for logistics?

In an effort to better understand the Internet of Things and what it means for logistics, eft engaged with IoT experts at the global IT service provider, Luxoft, for answers.

The buzz surrounding IoT is taking off – and for good reason. Connected devices have existed for years – for example, in 1982 a Coke machine was able to report on its own inventory and RFID has been used for decades. As the costs associated with various sensors plummets, wireless connectivity expands and improves, the opportunities for what has now been packaged as 'IoT' seem boundless. Given logistics' many moving parts, IoT is inevitably set to benefit.

In this interview we discuss everything from IoT's history to its ROI in logistics companies. We look at how organizations should be incorporating IoT into their strategies and the costs to become a connected business.

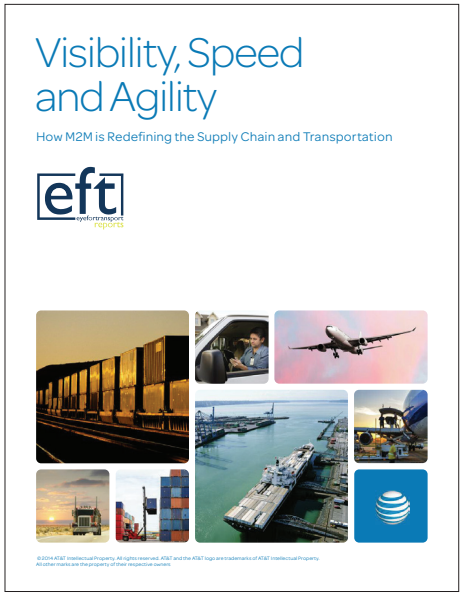
Click here to hear the full interview with the Luxoft team.

- Michael Minkevich – VP Technology Services, Luxoft
- Anders Brown – MD IoT Practice, Luxoft
- Patrick Corcoran – Director of Analyst & Advisor Relations, Luxoft

Report

Visibility, Speed & Agility

eft in conjunction with AT&T conducted a global survey of shippers and logistics providers to find out how the supply chain is being monitored now and in the future. A global internet based survey was created and received over 750 responses. Click on the report below.



Transportation and supply chain management are critical pillars of global commerce and are facing unprecedented challenges and change. Notthe least of which are:

- Higher operating costs and the commoditization of prices
- An increasingly complicated regulatory environment
- Capacity crunches in the face of swings in customer demand
- Demands for business growth and delivering higher customer satisfaction results

The new and original information in this study sheds light on how executives attransportation and supply chain management companies use or plan to use technology to address these issues and more. Key findings in the survey data revealthat"operational visibility" – knowing where a shipmentis and monitoring the environmental conditions in nearreal-time of cargo in-transit – is becoming a criticaltoolforthe supply chain and the transportation industries. In fact:

- Around 90% ofrespondents reportthatimproving operational visibility and realtime information is either 'critical and necessary' or'very important'.
- Organizations are becoming more sophisticated in their visibility requirements, looking beyond location checks for nearreal-time information on temperature, security, vibration and environmental conditions that are critical to maintaining the quality of goods from departure to destination.
- M2M as a means for gathering information is growing in popularity and will overtime surpass RFID and bar codes, ranking second to GPS as a visibility tool.

Want to learn more?

eft's annual European 3PL Summit and CSCO Forum will be happening in Venlo, Netherlands – October 16-18.

2020 Supply Chain Redesign: Preparing for the New Normal

- Enhance your visibility capabilities by using the data provided by IoT to track where your products have been and what exactly has happened to them along the way
- Overcome key security challenges - see how methods such as robust authentication processes can help reduce your vulnerability and ensure customer confidence
- Put your customers first: learn how you can use intelligent analytics to proactively respond to their demands, get real-time feedback on how they are using your product and identify potential opportunities to improve their overall experience
- Understand the specific supply chain applications that IoT can address- from providing current insight into your manufacturing operations to ensure optimum production levels to improving inventory management and warehouse optimisation

For more information about the CSCO Forum and the 3PL Summit, including agenda topics, latest speakers and sponsorship opportunities , visit www.cscoforum.com/eu or contact the event director, Sophie Farrow, sfarrow@eft.com

Speakers already confirmed:

Kris van Ransbeek, CSCO, **Maxeda DIY**

Virginie Vast, Head of Vodafone Asset Management Services & Tactical Sourcing, **Vodafone Procurement Company**

Edwin Van Der Meerendonk, Vice President European Operations, **Walt Disney Home Entertainment**

Danny Hendrikse, VP Intercompany Operations, **Pfizer**

Tom Rose, Head of International Operations, **SPAR**

Fred Hartung, VP Supply Chain, **Jabil**

Sheila Leenders, VP Supply Chain, **Philips Lighting**

Jonathan Beddows, Head of Supply Chain, **Media Saturn**

Ivanka Janssen, MD Global Supply Chain, **Diageo**

Rudi Roex, CEO Logistics, **Steinhoff International**