



IoT Trends for 2020

As we approach 2020, here are the most significant IoT trends for the AIDC industry.



Keeping up with the latest IoT trends can be daunting given the popularity of the technology category and number of vendors and organizations refining and shaping what a cutting-edge IoT solution looks like. Indeed, it seems like every day there are exciting new rollouts, new applications, and features that drive efficiency and enable organizations to do more, better and faster. To get up to speed on the latest IoT trends as we enter 2020, *SCAN:DCR* spoke with Amber Walls, Chair, AIM IoT Industry Group and Global Standards Director, GS1 US.

SCAN:DCR: What are the enabling technologies of IoT?

Amber Walls, Chair, AIM IoT Industry Group and Global Standards Director, GS1 US: The

Internet of Things (IoT) is enabled by a wide variety of technologies throughout all of its layers. What tech is used can vary widely based on what the use case at hand happens to be.

Most tend to be more familiar with the hardware components. IoT devices collect and transmit data to wherever designated and, in some cases, make changes to the physical world. How this data is collected largely comes from sensors and smart devices. In the next step of getting that data where it needs to be, RFID, Zigbee, Wi-Fi, Bluetooth in its various forms, satellite, and cellular technologies, NFC, and good old fashioned Ethernet may be involved; along with others. IoT gateways, edge networks, data servers, and cloud infrastructure come next and begin to do something more with the transmitted data. To analyze the inputs, data

reporting, artificial intelligence, and machine learning could be in use. In applying the data findings, technologies of all kinds can be used to make adjustments. A report is created, a smart car accelerates, window blinds are closed to reduce temperatures in an office building, a 3D printer runs a calibration procedure – the beauty of IoT is that nearly any technology can be integrated to do what needs to be done.

SCAN:DCR: Does barcode technology still have a place or will the industry move to RFID, sensors or beacons?

Walls: Whenever a new automatic identification and data capture (AIDC) technology emerges or increases in popularity, the same comment nearly always comes up – “Barcodes are finally going to die.”

The important thing to remember about the humble barcode is that it is nearly ubiquitous. Systems all over the world are designed to interact with barcodes. Additionally, people are familiar with and able to easily interact with various types of symbols. While clinicians, cashiers, warehouse staff, and consumers may not know how barcodes work, they know what they do. The recognizable, visual representation of a barcode and human readable text are people-friendly. Elementary school children have QR Codes on their homework to take them to educational videos now-a-days. We are already trained.

Barcode technology will continue to meet basic needs at a scale that no other technology can for some time. The major transition occurring is that barcodes are less likely to stand alone. In many scenarios, barcodes can supplement, act as back-ups for, and enhance other technologies. For instance, with machine vision, it is extremely difficult for system to recognize everything it needs to at speed based on the physical “thing” alone. Supplementing image recognition with pulling object identification details from a standardized barcode greatly helps reduce issues with unidentified objects.

The key to transitioning away from barcodes is that everyone interacting with them now needs to move to something else that is interoperable. The human element in many use cases can be completely removed along with the barcode symbol, in theory. Barcodes are not technically needed for picking – but autonomous robots, appropriate sensors, RFID tags and all the networks and systems to run them need to be in place first. Barcode use may decline, but it road to get there stretches far off into the sunset at this point.

SCAN:DCR: How will software solutions need to change to accommodate IoT data collection and automation?

Walls: Build for interoperability, scale, and be sure to make it is secure.

IoT is all about connectivity and, whether dealing with industrial manufacturing or consumer wearables,



Since 1977, the premier management & marketing newsletter of automatic data capture, including:

- Barcoding, 1D & 2D symbologies
- Barcode printers, scanners, terminals, verification products and labels
- Wireless (RFDC & RFID)
- Magnetic stripe
- Voice recognition systems
- Vision systems, video scanners
- EDI
- Smart cards
- Biometrics
- Application software
- Peripherals or supplies for the above

Vol. 41, No. 17

Editor: Mike Monocello
PH (814) 806-3652
mike@scandcr.com



Contributing editor: Bernadette Wilson

Publisher:
MMC, LLC
936 West 8th Street
Erie, PA 16501
PH (814) 806-3652
mike@scandcr.com

Founders: George and Teddy Goldberg
Editor in Memoriam: Rick Morgan

SCAN/DCR is published monthly by:
Monocello Media & Communications LLC
936 West 8th Street
Erie, PA 16501
PH (814) 806-3652
Web Site <http://www.scandcr.com>

Copyright © 2019 by MMC, LLC Federal copyright law prohibits unauthorized reproduction by any means including photocopying or facsimile distribution of this copyrighted newsletter. Such copyright infringement is subject to fines of up to \$25,000.

Because subscriptions are our main source of income, newsletter publishers take copyright violations seriously. Some publishers have prosecuted and won enormous settlements for infringement.

To encourage you to adhere to this law, we make multiple-copy subscriptions available at a substantially reduced price.
Subscriptions: \$597 per year for electronic copies.

everything needs to be able to speak to each other. Most organizations have data collection inputs siloed to some degree. If software is not in place that connects all of the pieces, you will never see the full picture. Increased use of open, industry standards will greatly help with integrating systems and preventing being locked into solutions that may not be able to meet long-term needs.

If anyone thought “big data” was big fifteen years ago when the term was coined, just wait until IoT data begins flowing -no, flooding in. Real time, live stream sensor data coming in from hundreds, if not thousands of individual devices makes for a lot of data. Having software in place that is capable of handling what is needed and knowing what to do with it is critical. Having extraordinarily granular data on an entire operation does absolutely no good if it cannot identify what to do with it to start with. In a lot of cases, even the best data scientist or analyst could not wade through the flood on their own. They will need the software tools to support their efforts and turn the data into actionable results.

Lastly, the sort of data being collected through IoT can be sensitive. On top of that, IoT systems commonly employ devices that can make changes in the physical world, such as changing temperatures, unlocking doors, placing purchase orders, notifying staff, or not notifying staff. Secure the devices. Secure the networks. Secure the data.

SCAN:DCR: How important is open source data collection solutions for IoT systems?

Walls: Open-source software (OSS) is a key contributor in expanding the growth of IoT. OSS for any application rallies together a community of creative, diverse parties and directs them towards a common goal. The ease of accessibility, cost benefits, and shared learnings are instrumental for some individuals and organizations knowing where to start, finding ways to improve their systems, and preventing unnecessary missteps as a result of learning from others. Peer review of the solutions work to keep the developers accountable and build better solutions. Like with anything, not all OSS data collection solutions are created equally. Going too far down the wrong rabbit hole with one not well-suited to meet the specific needs can be problematic.

SCAN:DCR: Please share examples of IoT applications using various AIDC technologies in use today and a few that will emerge in the near future.

Walls: The applications of IoT currently being

piloted and implemented are extraordinarily varied.

RFID tagging has enabled massive wins in supply chain visibility. Sensors are being used to monitor status, identify, and fix problems before they occur for preventative maintenance. Camera systems, RFID, sensors and other AIDC technologies are all being used to automate processes to remove the human element and reduce costs while gathering critical data points. Automation examples include powering autonomous cars, automating fulfillment, or optimizing a power grid.

It is not all about supply chain efficiencies. AIDC is supporting IoT saving the world, too. Weight sensors track beehive weight and send updates to help track and combat colony collapse. Machine vision is used to automatically sort refuse so items can be recycled correctly. The examples can go on for more pages than anyone would be willing to read.

In the near future, all of these use cases will build on themselves as more “things” become connected and the ability to analyze and use the data increases. In terms of technology, most of what is needed is already here. Yes, 5G and other emerging technologies will certainly provide benefits to the system, but the real limiters in today’s IoT world come down to imagination – and budgets.

Here is an example of what a near-term development might look like:

Now: A thermometer monitors a cold storage facility and logs the temperature every thirty minutes. These records can be accessed, as needed, to confirm temperatures thresholds were maintained.

Near-Future: Temperature sensors are placed in the facility and provide real-time updates. All temperature adjustments are now autonomously completed. Motion and proximity sensors are added to points of entry into the space. Slotting and inventory information that includes product attributes are integrated into the IoT system. Analysis is done and doors are automated so that manually opening doors is no longer required and the total amount of time doors remain open is minimized. Overtime, machine learning identifies a correlation between specific product placement and amount of time workers are in the area. Slotting is optimized to minimize time spend. Savings are realized from reduced cooling cost and hourly wages. **SCAN**



How Healthcare is Using IoT Technology

Internet of Things (IoT) adoption is exploding in healthcare. The Institute of Electrical and Electronics Engineers (IEEE) research found that 60 percent of healthcare organizations used IoT technology in 2016, and that number was forecast to climb to 85 percent in 2019.

Chris Sullivan, Global Healthcare Practice Lead for Zebra Technologies, sees several areas where IoT technology is benefiting healthcare providers — and where opportunities exist for integrators/software developers.

Medtech Systems and Medical Devices

The Medtech industry is looking for assistance from software developers to connect their products to healthcare IoT networks. “They have decades of experience building devices, but not as much experience on the software side,” Sullivan explains. “There are definitely opportunities here for software developers.”

Moreover, many medical devices and Medtech systems are standalone solutions that don’t integrate with each other or with a healthcare organization’s EHR system. Not only does this make using and maintaining systems more complex, but it also tends to silo data.

“A doctor or nurse with many patients is managing many things at one time. It’s not effective to funnel independent data streams to them,” Sullivan says. “Also, data from one device may not provide a clear picture of a patient’s status, but data from a combination of devices may quickly reveal it.”

“It’s also beneficial to provide a hierarchy to alerts determining what’s critical and what could be handled by support staff,” he adds. “Analytics is an area that holds a lot of promise, but also requires a great deal of work.”

Wearables

Consumers have adopted a variety of wearable devices or apps that help them monitor their activity, sleep patterns, heart rate, or other metrics. However, Sullivan comments, “This is just the beginning. For the most part, wearables just provide data. There hasn’t been much progress on using them to manage health.”

Software developers can integrate data from wearables with national databases, standards, and other resources to provide information, guidance and health coaching.

The Environment of Care

Sullivan points out that the physical environment is just as critical to healing and patient safety as other aspects of hospital operations. Electrical, HVAC, communications infrastructure, building maintenance monitoring and management are all essential to a facility’s ability to support care.

Although there are providers who are laser-focused on supporting healthcare facilities’ unique requirements, there may be opportunities to enhance the environment of care with new IoT solutions, such as smart lighting. LED lighting can recognize that a person enters a room or trigger an alert.

“Real-time locationing of people and things, using light and motion sensors is an interesting concept,” says Sullivan. “For the same investment in lighting, you get double value for it. But it’s not well-functioning yet. ISVs can provide some help there.”

Supply Chain

IoT can provide value to supply chains across the entire spectrum of verticals, but for healthcare, it can address the challenge of replenishment at the point of care. “No hospital ever wants a stock out, so they keep too much in stock,” Sullivan says. “Without an intelligent system, the hospital may experience more waste than necessary due to products expiring, and managing product recalls can be more complicated.”

“Hospitals can benefit from machine-to-machine automation, tracking and replenishment capabilities as consumption occurs,” he says.

Additional Opportunities

With Windows Mobile phasing out, there is a strong upsurge in Android for healthcare mobility. Sullivan explains that although iOS is popular among physicians, issues with interoperability and upgrades limit its use. “Historically, iOS has been used for simpler applications like texting

and messaging,” Sullivan says. “Now, healthcare organizations want to connect mobile devices to smart medical equipment. Android’s open nature makes it easier to connect than iOS. Android mobile is a real opportunity for ISVs.”

Security, in general, represents another opportunity for ISVs and software developers. “IoT devices can be a security nightmare,” comments Sullivan. “Each can be an entry point for hackers.” Healthcare industry leaders at Zebra’s HIMSS event stressed the urgent need for device security and challenged ISVs to accelerate the development of security solutions for IoT.

There’s Room in the Healthcare IoT Market

Sullivan says that the healthcare technology industry’s giant names can be intimidating, but there is definitely opportunity to penetrate the market. “It may be hard to align with major players, but there are a lot of mid-tier companies that don’t have the software depth and need outside help,” he says. Furthermore, depending on the application, you may not need clinical or healthcare knowledge to work with them.

Explore the opportunities healthcare IoT technology offers and what it could mean for your business. *SCAN*



Cloud IT Spend is Rising. Will You Capitalize?

Businesses have come to the realization that it doesn’t make sense to manage IT the way they did 25 years ago. Matt Steiger, Strategy and Business Development, Epson Cloud, points out that businesses wanted tools in house to control their applications and data, but “as time went by, the overhead to manage in-house IT became overwhelming and business needed more agility to respond to changing customer demands.”

Software as a Service (SaaS) — and as a Service business, in general — have emerged over the last decade to give B2B and B2C companies a solution to the challenges of on-premises IT.

Gartner predicts that global IT spending will total \$3.79 trillion in 2019. SaaS subscriptions account for \$427 billion of the total spend, up 7.1 percent from 2018. Steiger points out that with total IT spending increasing at a rate of 1.1 percent over 2018, spending for cloud solutions is growing at a much faster rate.

Reasons for Increases in Cloud Spending

Steiger points to several factors driving this trend:

- **Lower barrier to entry:** Businesses can find an application created specifically for their business needs and easily adopt it. “The ERP of the past has been replaced by targeted solutions that address specific problems in a market,” Steiger says.
- **Mobility:** Many SaaS applications are easily accessible by mobile or remote employees.
- **Trading a CAPEX for an OPEX:** With SaaS, it’s not necessary to make a large, upfront investment. Instead, IT becomes an operating expense.
- **Less risk:** There’s a lower threshold of commitment with SaaS. “It follows the principle of ‘if you’re going to fail, fail fast,’” Steiger says. Businesses can use freemium or light versions as a trial, and if a SaaS solution doesn’t meet their needs, it’s easier to change than with an on-premises solution.
- **Faster ROI:** Return is measured in days or weeks rather than months or years.

Steiger comments that a greater awareness SaaS and the benefits it offers are also a factor in adoption. “Businesses used to commit massive resources to buy software in a box,” he says. “They are aware that they don’t have to operate and go through life the way they used to.”

New Business Opportunities and New Revenue Streams

SaaS and other cloud applications and services are creating opportunities and providing additional value that no one predicted years ago. IDC research has found, for example, that Salesforce and its partner ecosystem will create 4.2 million new jobs and \$1.2 trillion in new revenues from 2019 to 2024.

Established businesses can also find new revenue streams through connected, cloud environments. Steiger says Epson, an enterprise with a 50-year history, has leveraged cloud to create new applications and services, such as its ReadyInk ink replenishment program. Printers connected to the Internet notify the user when ink is low and can automatically order replacement cartridges. “It’s connectivity supporting a business need,” says Steiger.

With New Opportunity Comes New Challenges

As more businesses rely on the cloud to access their applications and store their data, security and privacy issues are raising concerns.

“Data privacy is something SaaS providers and users are being forced to address,” says Steiger, requiring compliance with regulations such as the EU’s General Data Protection Regulation (GDPR) and the California Consumer Privacy Act. “Those trends are not going to go away,” Steiger says. “Integrators need to build those standards into their software.”

Businesses will also need guidance for complying with those standards. “It’s not something that enables them to just flip a switch and say they’re compliant,” Steiger comments. “It’s a process — and something that everyone will have to deal with.”

He says integrators need to be aware that the regulatory climate is changing faster and “be nimble enough to adapt before your business becomes obsolete.”

Taking SaaS to Market

Steiger advises integrators to give thought to the best distribution model for their cloud-based products. Some SaaS products lend themselves to direct sales, but, says Steiger, “If your software is more sophisticated, it may be better to distribute through a channel to help users get the most value from it. Users may need someone who knows the ins and outs.”

Choosing a distribution model also depends on your business goals. “Some integrators and developers have a vision as a provider of ancillary services. Others may aspire to provide best-of-breed applications and comprehensive solutions for their customers.

“You need to decide if you want to be a jack of all trades or a master of one and do it really, really well,” he concludes. *SCAN*

Zebra Warehouse Solution Increases Worker Productivity Up to 24 Percent

Zebra Technologies recently announced warehouse offerings designed to optimize workflows, maximize productivity in the warehouse, and improve employee onboarding. Offering a user experience that leverages Zebra’s Android-based mobile computers and optional accessories like the new enterprise-class HD4000 head-mounted display, Zebra FulfillmentEdge transforms existing warehouse management systems (WMS) by enabling real-time dynamic workflows and routing mobile workers for picking, packing and put-away — without costly and risky upgrades or backend changes.

According to Zebra’s recent 2024 Warehousing Vision Study, IT and operational decision makers are already taking steps to upgrade their facilities and WMS platforms. Findings show that 54 percent of surveyed organizations plan to implement full-featured WMS and mobile worker execution systems by 2024. FulfillmentEdge integrates existing real-time WMS data with real-time location information, providing visibility into the location of workers, inventory, and material handling assets. The solution then analyzes the information and creates real-time workflows delivered as electronic tasks that can contain visual directions to the next pick location and photos of the item to ensure picking accuracy. Now, one worker can simultaneously pick multiple orders, enabling businesses to dramatically increase order fulfillment times and boost worker productivity up to 24 percent.

“The on-demand economy is placing pressure on warehouse operations to quickly fulfill more orders than ever before, requiring a highly productive and efficient workforce,” says Joe White, senior VP of enterprise mobile computing, Zebra Technologies. “Zebra’s FulfillmentEdge software and optional HD4000 head-mounted display provide mobile workers with clear, step-by-step instructions that reduce training time by 90 percent to allow near-instant onboarding while decision makers benefit from the real-time insights and analytics that enable better data-driven decisions.”

Zebra’s 2024 Warehousing Vision Study also found that 62 percent of companies say they plan

to add or upgrade to wearable computers, such as smart watches, smart glasses, or hip-mounted devices. Zebra's first enterprise-class, head-mounted display is lightweight for hands-free and heads-up, directed-action workflows that increase task efficiency and accuracy by overlaying contextual information such as shelf location and layout, pick quantity, remaining picks and bin sorting information within each worker's field of vision.

The rugged, monocular HD4000 head-mounted display is an optional accessory for select mobile computers capable of running the FulfillmentEdge solution. It tethers via USB, providing all-day power and increased productivity to warehouse, manufacturing and field service workers who can benefit from hands-free, directed-action workflows.

Zebra also announced its rugged, single-finger RS5100 Bluetooth ring scanner that helps improve worker productivity by freeing up workers' hands for inventory management, picking, packing and sorting applications in industrial environments. Zebra's smallest and lightest ring scanner offers a long battery life and features a single-sided- or double-trigger to enable workers to use gloves or bare hands for all-day comfort. It also supports NFC tap-to-pair with most Zebra enterprise-class Bluetooth-enabled mobile devices and offers high-performance 1D/2D omnidirectional scanning to maximize worker productivity. **SCAN**

Printronix Introduces New Thermal RFID Printer Series

Printronix Auto ID recently unveiled its new T6000e thermal barcode printer, an enhanced version of its T6000 printer series with new features and advanced RFID capabilities.

"The T6000e is the fourth product Printronix Auto ID has launched in the last 12 months and reflects our continued commitment to the AIDC printer market," says Andy Edwards, director of product management. "The upgrades to our midrange platform not only include 600 DPI printing but also RFID on both the 4- and 6-inch models allowing us to offer a solution for emerging wide-web printing and encoding applications. In addition, not only does the T6000e support standard and on-metal RFID labels and tags,

but we've also significantly optimized the encoding and printing process making it ideal for high volume RFID applications."



The dual flexibility of being able to encode and print on-metal and standard RFID labels and tags positions this printer for RFID asset tagging of tools and equipment used in manufacturing, supply chain, IT, healthcare, and service yard industries. On-metal tags typically include a foam insulator and a metal foil backing that makes them incompatible with most standard RFID printer/encoders, but the T6000e was engineered to handle this media. Because accuracy is critical in every application, the T6000e will back-up and completely overstrike RFID labels that fail to encode properly. The T6000e is also backwards compatible with existing T6000 applications.

Created for the enterprise market, the T6000e is engineered for industrial applications such as manufacturing, automotive, transportation, retail, and logistics. For optimal productivity, the printer offers 14 inches per second print speed, high-quality 600 dpi printing, advanced RFID features, and a complete suite of connectivity options.

Like all Printronix Industrial printers, the T6000e was built on the Printronix System Architecture (PSA) platform that combines exclusive features with a common set of building blocks to simplify printer replacement/installation and improve productivity. The printer comes with nine printer emulations for easy drop-in installation and has a large LCD color screen for easy operation. The T6000e is also available with PrintNet Enterprise, a remote printer management tool. **SCAN**

Impinj Unveils Two New RAIN RFID Tag Chips

Impinj introduced the Impinj M730 and Impinj M750 integrated circuits (ICs), the first tag chips in the company's Impinj M700 endpoint IC family. The Impinj M730 and M750 ICs deliver high performance, fast inventory capability, and advanced features for next-generation RAIN RFID tags that can be attached to, or embedded in, nearly

any item, and that operate worldwide.

Developed in an advanced semiconductor process node, the Impinj M730 and M750 ICs deliver increased sensitivity to enable the development of small, universal RAIN RFID tags. The new ICs also allow retailers to operate their RAIN RFID readers faster than with other tag chips, reducing inventory time and improving productivity. And advanced features enable new solutions for loss prevention with frictionless self-checkout and embedded tagging with seamless product returns.

Impinj M730 and M750 ICs Enable Advanced IoT Capabilities

“Today we achieved a significant milestone by offering the Impinj M730 and M750 endpoint ICs to our global inlay partners,” says Chris Diorio, Impinj’s CEO. “These ICs represent our most significant endpoint IC innovation since we introduced our first tag chip in 2005 and they portend a future of Impinj innovation and technology advancements that I believe will enable extending the Internet of Things to everything—from clothing to food to luggage and beyond.”

“Successful retailers are advancing their operations with the integration of IoT technology, like RAIN RFID. Innovative performance improvements made to sensitivity, interoperability, read consistency, and overall dependability across the supply chain are supporting the increasing speed of retail operations,” says Myron Burke, a 25-year veteran of Walmart, owner of Divergent Technology Advisors, and consultant to Impinj. “This growth in performance is opening new doors to greater value propositions like loss prevention, order accuracy to support MABD (must arrive by date), customer pick-up order accuracy and completion tracking, and many more capabilities when coupled with other IoT sensors.”

Memory Configuration Options Available Now

The Impinj M730 IC has 128-bit EPC memory. The Impinj M750 IC has 96-bit EPC memory and 32-bit user memory. Both new Impinj ICs provide increased sensitivity, improved readability, advanced features, and are compatible with the GS1 UHF Gen2v2 protocol which ISO/IEC standardized as 18000-63.

Impinj is now taking orders for the Impinj M730 and M750 ICs with expected delivery starting in the first quarter of 2020. Samples of these ICs are available to all Impinj inlay partners. New products based on the Impinj M730 and M750 ICs are expected over the coming months from leading RAIN RFID inlay manufacturers. **SCAN**

RAIN on the Road

**By Steve Halliday
President, High Tech Aid**

After writing last month about the benefit of trade shows and the need for horizontal vs. vertical shows, I find myself in California at a “kinda” horizontal trade show and conference.



The show is run by the ID Tech Ex organization and brings IoT, electric vehicles, energy storage innovations, graphene, printed electronics, wearables, and sensors together. While these technologies seem disparate on the surface, they actually form the cornerstone of our future.

The RAIN Alliance and AIM have put together a pavilion with some of our members to showcase the AIDC technologies to an audience that may not be as familiar with them. In previous years this show has proven to be very good for AIM and RAIN to spread the word about the various technologies with many companies visiting the pavilion.

The show yet again proved to be a success for the Alliance with many visitors stopping by to understand RAIN and the other AIDC technologies. Having 12 organizations in the pavilion, visitors were able to see the different aspects of the technologies. With around 3500 attendees, the show visitors came from a wide variety of industries and many had questions about AIDC technologies.

Pavilions are a great way for companies to get exposure to a show without a major expense. Taking a slot in a pavilion can cost a fraction of the cost of a traditional booth and yet it provides all of the exposure and maybe more.

RAIN is currently looking at taking a pavilion at the Passenger Terminal Expo in Paris in 2020. If you are interested in being a part of this event, reach out to me for more information. If there are events where you would like to be part of a pavilion to reduce your costs, then let me know so that we can investigate the idea and see if it can be arranged.

Is your company keeping up with the rapid changes in international standards that relate to AIDC? Are you aware of how the Internet of Things will affect your business? High Tech Aid can provide detailed, customized reporting, monitoring, and meeting attendance for your company needs. Email steve@hightechaid.com for more information.