



NATIONAL ASSOCIATION OF
ELECTRICAL DISTRIBUTORS



Executive Guide #18

The Internet of Things for Distributor Executives

Developed by the NAED Strategic Technology Committee

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THE INTERNET OF THINGS IS A BROAD CONCEPT ENCOMPASSING MANY DIFFERENT TECHNOLOGIES

The Internet of Things (IoT) is a broad concept incorporating many different sensing and actuating technologies, including many products electrical distributors have never dealt with before.

While there are many different definitions for the Internet of Things, NAED's Strategic Technology Committee recommends this generic definition: *"The Internet of Things (IoT) is a network of smart devices with embedded sensors — i.e., "smart devices" — with the ability to collect, exchange, sense, and react to external and internal conditions."*

Internet of Things (IoT) — Network of devices with embedded sensors---i.e., "smart devices"---with the ability to collect, exchange, sense, and react to external and internal conditions.

NAED's Strategic Technology Committee created this white paper to assist executives in understanding why the Internet of Things is relevant to electrical distributors, identify key success factors, and introduce some of the challenges in implementing the Internet of Things. Please use this information to stimulate conversations with your information technology, operations, sales, and training personnel to determine how the Internet of Things can be used as a competitive advantage in your company.

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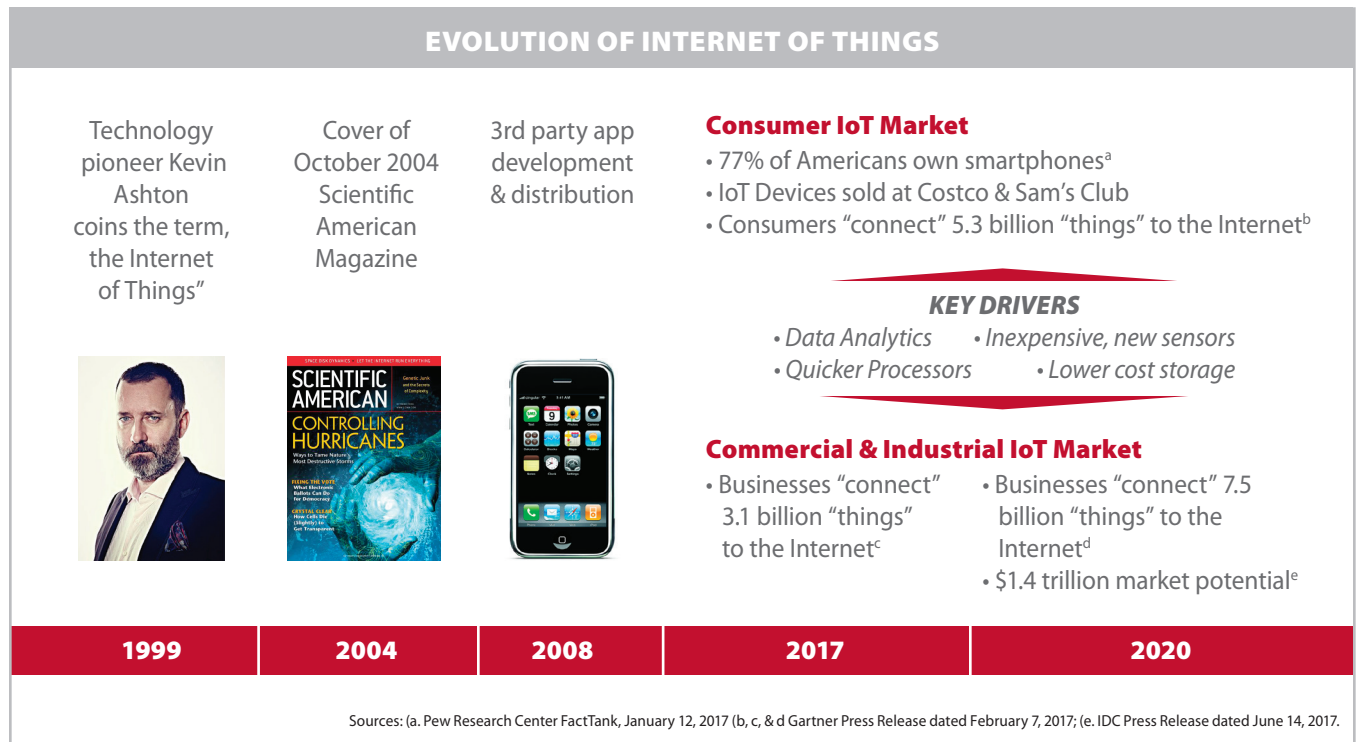
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TOP 3 REASONS THE INTERNET OF THINGS IS RELEVANT TO ELECTRICAL DISTRIBUTORS

- *IoT is happening now...with or without us*
- *IoT is a strategic opportunity, i.e., "Blue Ocean," to sell new products and services*
- *IoT is powering a new wave of innovation*

THE INTERNET OF THINGS IS HAPPENING NOW... WITH OR WITHOUT ELECTRICAL DISTRIBUTORS

The Internet of Things is not another passing fad. It has been transforming our world for nearly a decade. Despite the fact the term “Internet of Things” was coined in 1999, it seemed still science fiction when Scientific American Magazine published an article about it in October 2004. Can you imagine going back to a life before the Internet or smartphones? Soon, the Internet of Things will be thought of in the same way.



A wide range of mainstream consumer products—from doorbells to thermostats to toasters—contain embedded sensors, allowing owners to measure, monitor, detect, and control their “things” remotely. While consumers have the freedom to use as much or as little of the Internet of Things as they choose, there is no doubt IoT has moved beyond innovators to the mainstream—more and more IoT products continue show up on the shelves at wholesale clubs and other retailers.

Gartner posits consumers will connect over 5.3 billion “things” to the Internet in 2017.¹ Furthermore, Swedish Information Communications Technology (ICT) company Ericsson expects Internet of Things sensors and devices to exceed mobile phones as the largest category of connected devices in 2018.²

1) Gartner Press Release dated January 17, 2017 available @ <http://www.gartner.com/newsroom/id/3598917>

2) <https://www.forbes.com/sites/louiscolombus/2016/11/27/roundup-of-internet-of-things-forecasts-and-market-estimates-2016/#4388c50f292d>

WIDELY RECOGNIZED INTERNET OF THINGS PRODUCTS USED BY CONSUMERS		
APPLICATION		
Artificial Intelligence (AI) Hubs	<i>Amazon Echo</i>	
Activity, Fitness, & Health Monitoring	<i>Fitbit</i>	
Environmental	<i>Nest Smart thermostat</i>	
Inventory Levels	<i>Amazon Dash button</i>	
Leak Detection	D-Link Wi-Fi Water Sensor, <i>Fibaro Flood Sensor</i> , Honeywell's Lyric Leak & Freeze detector, etc.	
Lighting Control	Lutron Caseta, <i>Philips Hue Smart Lighting</i> , Leviton Decora Smart Plug, etc.	
Location Services/ Asset Management	<i>Life Alert "I've fallen and I can't get up!" button</i>	
Safety/ Air Quality Monitoring	<i>First Alert Wi-Fi enabled CO2 detector</i> , gas leak detector, smoke alarm, etc.	
Security	Nest Cam Outdoor Network Camera, <i>Ring Video doorbell</i>	

“Unplugging is nearly impossible now; by 2026 it will be even tougher.”³

As many consumers—*especially those born after 1980*—expect similar technical sophistication at work to what they experience in their personal lives, the Internet of Things is beginning to gain traction in commercial and industrial markets, too. Gartner projects over 3.1 billion connected “things” will be used by businesses in 2017 and more than double, to 7.5 billion devices (Valued at \$1.4 trillion) in 2020.⁴











3) Pew Research Center study released June 6, 2017—“The Internet of Things Connectivity Binge: What are The Implications,” Available for download [click here](#)

4) Ibid.

Commercial and industrial applications for the Internet of Things are often just more complex versions of those found in the consumer market.

Commercial and industrial applications for the Internet of Things are often just more complex versions of consumer applications. However, the commercial and industrial market for the Internet of Things is expected to be much larger since there are many more things to measure, monitor, detect, and control. The list of potential commercial and industrial applications for the Internet of Things continues to expand every day. Pricewaterhouse Coopers, doing business as PwC, expects it to eventually overshadow the consumer segment by several magnitudes.⁵

While a few examples are illustrated below, potential applications for the Internet of Things are only limited by the imagination.

APPLICATION	CONSUMER PRODUCTS	COMMERCIAL APPLICATION	INDUSTRIAL APPLICATION
Artificial Intelligence (AI) Hubs		Business Activity Monitoring (BAM)	Custom Factory Automation Systems
Condition Monitoring & System Usage		Monitor usage of copiers, printers, etc., then schedule maintenance based on actual usage and conditions.	Monitor usage and conditions of various machines in the factory, then schedule maintenance based on actual usage and conditions.
Environmental		Smart thermostats, occupancy sensors with auto adjust, remote monitoring, scheduling, etc.	Machines that shut down when not in use, exhaust and noxious fume monitors, Smart thermostats, occupancy sensors with auto adjust, remote monitoring, scheduling, etc.
Inventory Levels		Auto Replenishment.	Auto Replenishment for raw materials, tool crib, and finished goods inventory.
Leak Detection		FloLogic, FloodMaster, TraceTek, etc.	Level controls to monitor underground areas for flooding, gas leak detection on pipelines, noxious fume detectors, etc.
Lighting Control		Acuity NLight Air, Leviton Zwave, Lutron Quantum, etc.	Daylight harvesting, warehouse lights that turn off when no one is in it, etc.
Asset Management		Locate employees, equipment, inventory, shipments (inbound & outbound), etc.	Locate employees, equipment, inventory, shipments (inbound & outbound), etc. PLUS Route automation.
Safety & Air Quality Monitoring		Wi-Fi enabled CO2 detectors, gas leak detectors, smoke alarms, etc. PLUS Air flow management.	Air flow management, chemical sensing, leak detectors, noxious fume detectors, sealed spaces, etc.
Security		Alarms, video surveillance cameras, etc. can be set up to report the number of people in each room. Some also provide disaster warnings, and mitigation suggestions.	
Traffic Patterns		When/where customers are in store.	How material moves through the factory (Via conveyors, forklifts, etc.)

"Smart homes and other connected products won't just be aimed at home life. They'll also have a major impact on business. And just like any company that blissfully ignored the Internet at the turn of the century, the ones that dismiss the Internet of Things risk getting left behind."

— Jared Newman, Fast Company Magazine

5) Download 2016 PwC White Paper, "The Industrial Internet of Things," @ <https://www.pwc.com/gx/en/technology/pdf/industrial-internet-of-things.pdf>

THE INTERNET OF THINGS IS A STRATEGIC OPPORTUNITY FOR ELECTRICAL DISTRIBUTORS

At home and at work, products with embedded sensors will continue to connect people to their “things.” As this trend gains momentum, modern society will be transformed to a point where the Internet interacts with everything around us, i.e., becomes the “Internet of Everything.” In the process, the information collected, exchanged, and analyzed will create opportunities electrical distributors cannot even imagine today.

The Industrial IoT is set to rocket towards 100 billion devices.⁶

The Internet of Things offers electrical distributors a window of opportunity to capitalize on currently uncontested market space—i.e., a “blue ocean”—for pathways to organic growth. As a channel, no one is in a better position to provide innovative IoT solutions than electrical distributors. We have local personnel, established relationships, hands-on knowledge of customers’ installed base as well as mastery of their product preferences. We also have years of experience combining products from multiple manufacturers into the best solution for the customer’s problem. This provides an economic moat that is difficult—but *not impossible*—for others to replicate. But time is of the essence.

The Internet of Things can be a game changer for electrical distribution. We can act now and leverage our traditional strengths or stand on the sidelines while manufacturers and technology companies disrupt the industry in ways we cannot envision. The time to act is now.

The time to pursue the Internet of Things is now!

A Vision for the Future with IoT

CURRENT STATE

New market entrants

LOTS of competition selling discrete, individual, electrical products

Manufacturers go directly to customers



POSSIBLE STATE

Little competition selling Internet of things solutions & systems



⁶) PWC, *ibid.*

The Internet of Things will continue with or without electrical distributors. Electrical distributors who rise to the challenge first will be set apart from those who stand by. They can serve to discourage new market entrants such as Amazon or other technology companies, big box retailers, and distributors specializing in other channels; and be a vital line of defense against manufacturers selling direct to commercial and industrial customers. On the other hand, those electrical distributors who chose to “wait and see” how the Internet of Things unfolds risk putting themselves at a disadvantage that may be difficult to overcome if other distributors, new market entrants, and even manufacturers gain a foothold with commercial and industrial customers. IoT can be the future of the industry or sound its death knell.



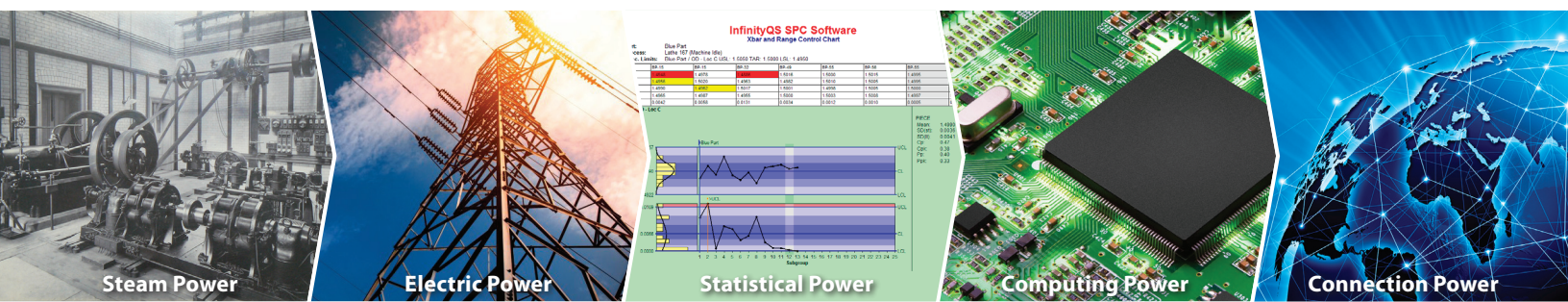
The Internet of Things Enables Fee-Based Service Offerings!

- *Selling the Internet of Things adds the opportunity to service what we sell for a fee. New fee-based service offerings based on specific customer knowledge can also be developed.*

Furthermore, distributors can become managed service providers for customers. For example, concierge services could be provided for IoT solutions by providing a single point of contact for IoT system design, implementation, software updates, etc. Concierge IoT design service could be especially valuable since unlike consumer IoT products, most commercial and industrial IoT products were not designed to work out of the box. And until communications protocols are standardized, there will be product interoperability issues most commercial and industrial IoT customers (especially the electricians installing IoT products) cannot handle alone. Other valuable services include ensuring factory default passwords are changed and updated, software patches are installed on a regular basis, and perhaps even providing the customers' information technology infrastructure.

The opportunities for using the Internet of Things to generate new revenue streams and get closer to customers are endless!

THE INTERNET OF THINGS IS POWERING A NEW WAVE OF INNOVATION (ALONG WITH PROCESS EFFICIENCIES, AND COST REDUCTIONS)



Steam power gave rise to the industrial revolution. Electric power increased the spread of industrialization. Then Bell Laboratories pioneered Statistical Process Control (SPC) to monitor industrial processes, improve efficiency, and reduce costs.⁷ In the 1960's, computers began automating businesses, taking Statistical Process Control to new heights. The Internet of Things puts SPC on steroids.

Think of the Internet of Things as Statistical Process Control (SPC) on steroids

Computers excel at executing simple step-by-step instructions and manipulating massive amounts of data. When IoT sensors automatically collect and analyze information about the context of an operation, the appropriate actions (or alerts) can be triggered immediately.

Businesses run more effectively when routine decision-making is automated, leaving personnel more time for higher level analysis and value-added activities. The Internet of Things' real-time knowledge of assets and operations facilitates innovation by providing contextual information previously not available (or if available, buried in a report somewhere); optimization modelling with forecasts of what might happen based on actual versus historical operating conditions; and prescriptive modelling with a list of suggested actions for humans to undertake. This leaves people time to innovate.

Today, many electrical distributors use the Internet of Things in areas such as environmental control; warehouse lighting; condition-based, preventative maintenance of printers and copiers to minimize unplanned downtime and maximize machine uptime; delivery truck routing to avoid traffic congestion and provide accurate delivery time projections; and for security.

However, there are many other distributor operations that can be networked to provide real time information to make better decisions, innovate internally, and reduce operating costs. For example, tracking sensors can be applied to high value items to help minimize lost goods within your building or while in transit. Spatial relationships can be analyzed to optimize the warehouse and rather than leaving their desks for visual stock checks, distributor personnel could dispatch small unmanned aerial vehicles—UAV's, also known as drones—in the warehouse to visibly compare the items on the shelf to those alleged to be in inventory. The list of possible uses is endless.

➤ *The Strategic Technology Committee recommends starting with a small, internal IoT project as a testing ground before bringing the Internet of Things to customers.*

7) Among other things, SPC is credited with helping U.S. manufacturers produce the materiel necessary to win World War II. After the war, W. Edwards Deming's used SPC to transform Japanese industry into a global powerhouse.

IMPLEMENTING THE INTERNET OF THINGS: KEY SUCCESS FACTORS

Distributor executive buy-in and sponsorship of the Internet of Things is crucial since it impacts every facet of an electrical distributor's business model, lengthens the sales cycle, and may also require distributors sell products from other high-tech industries. The Internet of Things also merges information technology with operations technology and creates a new role of data scientists to manage the information IoT generates. However, the Internet of Things' most significant impact is on the sales force.

IoT changes how distributors sell—from *selling discrete products to selling integrated system solutions*. The skill sets necessary for sales personnel will change too—*requiring expertise in solution selling, knowledge of information technology networking, communications protocols, data security, etc.* And the target customer will shift from engineering, maintenance, and/or purchasing to C-level executives in finance, operations, and technology.



TOP SUCCESS FACTORS FOR IOT INITIATIVES⁸

1. *Collaboration between IT and Operations*
2. *Executive sponsorship*
3. *IoT expertise*

Organizational changes of this magnitude require collaboration between IT and operations, as well as strategic guidance and leadership from the top, and expertise dealing with the technical issues of the Internet of Things to be successful. While every company's roadmap to success will differ, "human factors" such as culture, organization, and training play an enormous role. To ensure

success, distributor executives must work with information technology, operations, sales, and other cross functional areas from initial planning through implementation to rollout.

Surprisingly, acquiring the requisite technical expertise may be the easiest part of an IoT initiative. One solution is to hire outside expertise to handle the technical issues associated with the Internet of Things.

Another approach is to reposition internal Information Technology resources from technology functions that can be easily outsourced to Managed Service Providers (MSPs)—*apps, data center management, help desk support, disaster recovery services, IT security, network operations, web/e-commerce systems, etc.*⁹—to active roles in the IoT initiative. This will allow time for distributor IT personnel to transfer their technical knowledge to others in the organization, make joint sales calls, participate in customer presentations, etc.

⁸) CISCO study results released May 23, 2017 can be downloaded [click here](#)

⁹) For additional considerations in using managed IT services, please see NAED's "Executive Guide #12: IT Services: Use In-House Staff or Outsource?", available for download @ www.naed.org/research

IMPLEMENTING THE INTERNET OF THINGS: SYSTEMIC CHALLENGES

As with any rapidly growing market, the Internet of Things is experiencing systemic challenges. These challenges are not insurmountable. Furthermore, if history repeats itself, market forces will eventually provide resolution before governments legislate them, as we've summarized below.



EXAMPLES OF SYSTEMIC CHALLENGES IMPACTING THE INTERNET OF THINGS		
INTERNET OF THINGS SYSTEMIC CHALLENGES		POSSIBLE RESOLUTION
Communications Protocols	Today IoT has no communication protocol standard. Instead, most manufacturers use proprietary communication protocols. This has led to the creation of hundreds of different IoT communications protocols.	Eventually, market forces will bring standardization. For example, personal computer operating systems eventually standardized on Windows, MAC, Linux. And cell phones standardized on iOS and Android.
Concerns for Human Safety	The interconnectivity of the Internet offers just as many opportunities to protect human safety as to harm it, depending on the motive of the user.	Stay tuned to see if market forces step in to protect human safety before governments legislate minimum protection levels.
Data Privacy & Security	Since anything connected to the Internet is vulnerable to attack or misuse, patch management will be as critical to security as core infrastructure. Data ownership, compliance, risk mitigation, etc. will be required Standard Operating Procedure for IoT products too.	NAED's Strategic Technology Committee published 3 Executive Guides on Information Security, Passwords, and Preventing Data Loss. Download Executive Guides 14, 15, & 16 Click Here
Interoperability	Products from various manufacturers may not "work" effectively together, if at all, due to differences in connectivity ranges, data rates, and power requirements, etc.	Interoperability was also an issue with early personal computers. It was improved after PC and component manufacturers got together to specify and adopt specifications for plug and play components, USB classes, etc.
IoT Solution Support	Combining products from multiple manufacturers into one system opens the door for one manufacturer to claim the other is responsible for any problems as well as deny responsibility for providing the necessary product support	Electrical distributors can be a single point of contact for IoT system design, implementation, software updates, etc. and create new revenue streams by offering fee-based IoT solution support.

"You have to decide, am I going to be someone who forces the topic and is a leader in this, be a fast forward? Or am I going to potentially suffer the consequences of hanging on to the legacy traditions?"

— John Rossman, Digital and Internet of Things Strategy and Execution Leader

RECOMMENDED RESOURCES

“Harnessing the Industrial Internet of Things: How to Derive Big Business Benefits from the Connected World”

https://www.forbes.com/forbesinsights/pitney_bowes_iot/index.html

“The Industrial Internet of Things”

<https://www.pwc.com/gx/en/technology/pdf/industrial-internet-of-things.pdf>

“Addressing ROI in Internet of Things Solutions”

http://download.microsoft.com/download/2/a/9/2a95ea76-140b-4844-8904-4d27a1d756e9/addressing_roi_in_internet_of_things_solutions_white_paper.pdf

WHAT YOU CAN DO

This document is intended as a high-level introduction to the Internet of Things. However, one IoT strategy will not fit all electrical distributors—*everyone has different go-to-market strategies, competitive differentiation, sales approaches and geographic dispersion.*

Please use this white paper as a starting point for discussions on how your organization can participate in the game changer called the Internet of Things. The Internet of Things is poised for an explosion of growth. What are you going to do to make sure your company grows with IoT?