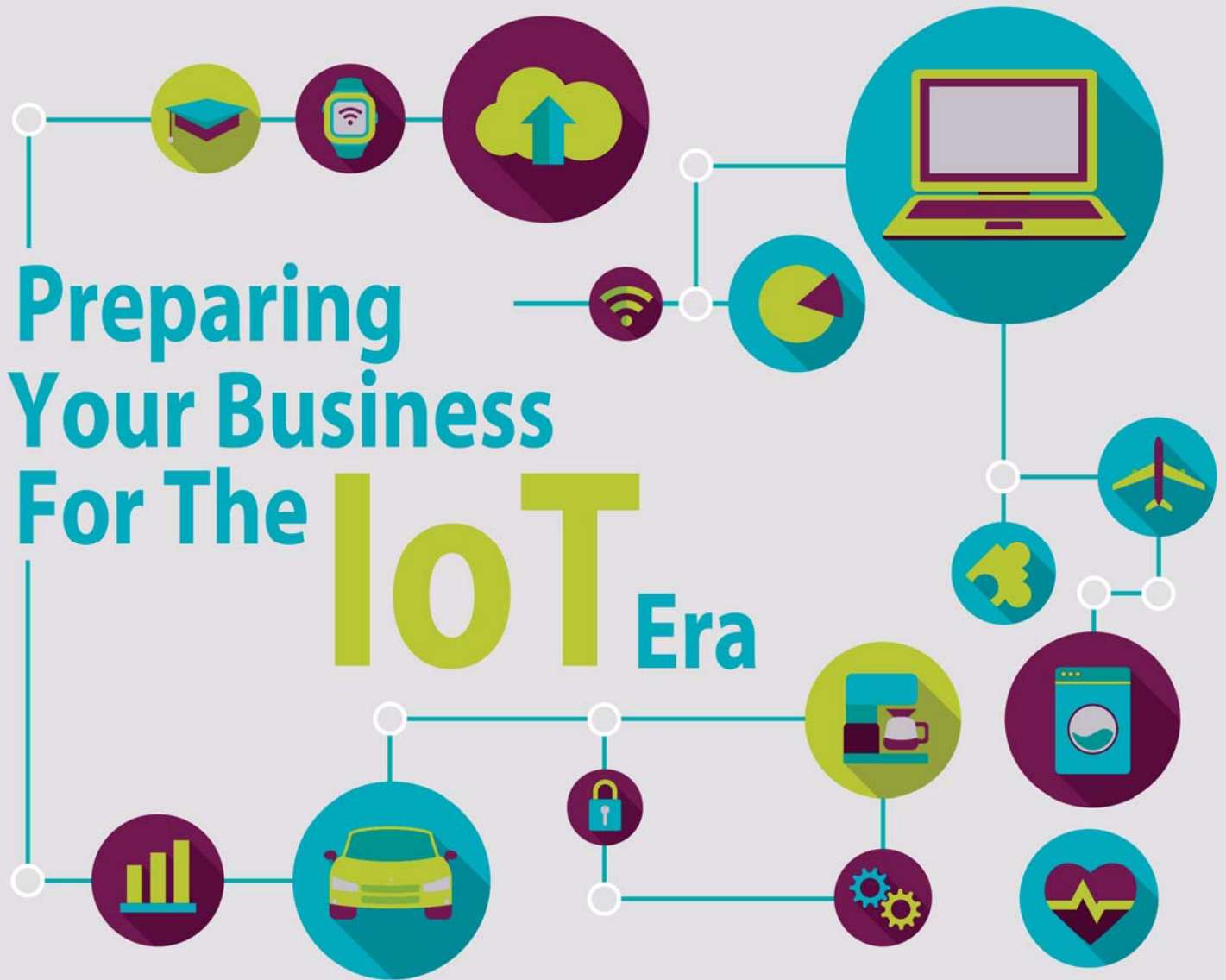# Field Technologies
OPTIMIZE FIELD WORKERS, SERVICE & ASSETS

Preparing Your Business For The IoT Era

3 Reasons The Time For IoT Is Now

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If you haven't already, it's time to jump on the Internet of Things (IoT) bandwagon. If you've been sitting back waiting to better understand the technology and its role in your operation, you now need to take action. IoT technology is arguably THE biggest thing happening in field service right now, and here are three reasons you need to be putting it to work for you.

#1: The Writing Is On The Wall

Is IoT a fad? No. Does it have a place in field service? Yes. Are other companies using it to their advantage? Yes. The writing is on the wall when it comes to IoT — just take a look at some of the statistics. Cisco estimates that the number of connected devices worldwide will rise to 50 billion by 2020. Gartner reports that by 2020, 25 billion "things" will be connected. General Electric estimates that the "Industrial Internet" market, which refers to connected industrial machinery, will add $10 to $15 trillion to the global GDP within the next 20 years. And McKinsey Global Institute estimates the potential impact from IoT applications on the productivity of field employees at $19 billion to $43 billion in 2025. IoT isn't just another buzzword that's going to fade away; it's the future of the field service industry.

#2: It Solves Your Biggest Problems

Field service has shifted to be far more customer-focused in recent times, and IoT can help you achieve many of your objectives related to improving customer service and experience (along with efficiency gains and cost savings). A recent report from Aberdeen Group, *Field Service 2016: Strengthen the Team and Bond with Your Customers*, examined the top pressures demanding service evolution. Fifty percent of respondents cited changing customer dynamics; 42 percent reported increasing competition in service; 41 percent mentioned the need to improve customer engagement; 32 percent pointed to increasing product-based competition; and 31 percent spoke of reduced service margins. These top pressures can all be lessened by leveraging IoT solutions.

#3: Hesitating Will Make You A Laggard

Vanson Bourne recently reported that when it comes to IoT, many companies still have reservations. Their report found that 88 percent of companies said there are challenges with connected devices, and 30 percent didn't believe sensors could replace human insight and instincts. While these concerns may be valid, they aren't a reason to ignore the role IoT can play in your organization. There are always challenges with technology — most all of them are able to be overcome. And I agree that sensors can't replace human insight. In my opinion, they aren't meant to; they are meant to serve as tools for your technicians and your company, which allow you to operate more effectively and efficiently. The reality is, letting your concerns, confusion, or desire to stick with the status quo prevent you from incorporating IoT into your business will cause you to fall behind your competition. Many service companies are already successfully leveraging IoT and transforming their businesses as a result. If you don't work toward doing the same, you are at risk of becoming a laggard — and that's something your customers are sure to notice.

Sarah Nicastro

Step One: Understand The Technology Essentials

IoT isn't a singular technology, but a concept born out of the convergence of a number of different technologies. For a company to utilize IoT for service, maintenance, or support applications, it must first have a number of different technology pieces in place and be able to link serviceable assets to the internet.

That last capability is often the biggest hurdle companies face when planning to join IoT. According to Aberdeen Group, even top-performing companies are only connecting half of all serviceable equipment to IoT for maintenance, tracking, and service. For other companies, that number is just one-third of equipment.

A PTC/Servicemax survey found that 42 percent of service companies believed they had a product that was suitable for sensor-based monitoring, while 26 percent weren't sure, and 23 percent said their products were not suitable for such monitoring. In some cases, equipment is already on the network — a lot of laboratory test equipment or industrial machinery, for example, is already hard-wired into company networks. In other cases, wireless technology can be used to retrofit assets. Some assets, however, will have to be fundamentally redesigned in order to support network-ability and the use of sensors. Depending on the length of the product design cycle, it could be several years before some classes of assets can be linked to IoT.

Once you get past the asset itself, there are several other technologies that companies may need to have in place in order to use IoT for service applications.

Sensors: To enable remote service and troubleshooting, companies will need access to a number of different data points. This will vary depending on the application, but temperature, shock/vibration, motion, moisture, and other types of sensors will provide important information required for diagnosing and fixing problems remotely.

RFID: High-memory RFID tags can identify assets and store data on maintenance/service events. Integrating these tags with sensors provides important service data that can be accessed on-site or remotely.

Remote Monitoring: In order to provide remote service, you have to be able to access the equipment from outside of your customer's own firewall. In existing M2M

service applications, this is accomplished either by providing network access to the service provider or by using a separate, cellular-based point of contact for the asset. Either method will require you to ensure the security of data transactions. It's also important to evaluate the potential costs of moving data from thousands of assets across the cellular network.

Big Data And Analytics: IoT can provide a torrent of data. You should evaluate ahead of time what data is most useful in order to limit the amount of data you collect and store. That data will take many forms, some of it structured, some of it not. Big Data and analytics software tools will help you turn that flood of data into actionable information.

The Cloud: To that end, many companies are unlikely to have the storage capacity or computing resources to store and analyze potentially very large data sets. Cloud-based storage and analytics applications can help ease the burden of maintaining those resources while providing the ability to scale-up as your use of IoT expands.

The cloud also eases infrastructure requirements, not just in server investments, but also in bandwidth. If continuous streams of data have to be collected, it's better for them to hit the cloud server first; that way, your own internal networks and broadband connections aren't bogged down by the increased traffic.

Security: Every connected device offers a potential point of access for hackers or malware attacks. Your approach to security (including encryption and authentication) should take into account the vulnerability of the remote assets and their likely limited support for onboard security support. Customers may also want more control over what data is communicated and how often.

Dynamic Scheduling And Dispatching Tools: Once you are able to receive real-time alerts about potential service issues from the assets themselves, your scheduling capabilities have to be agile enough to respond. In some installations, alerts from connected equipment can automatically generate work orders in a field service management system and dispatch them to the correct technician. That will require a high level of flexibility and intelligence from the scheduling/dispatch engine.

Step Two: Put IoT Data To Work

The value of IoT isn't the technology itself, but the information that the technology can provide. Analyzing and using that data creatively and finding ways to manage terabytes of information will be an ongoing challenge. Once you are able to separate the signal from the noise, there are a number of ways to leverage connected device data to improve the business process.

The benefits can provide a significant pay-off. According to data from The Service Council, using IoT in service can improve remote resolution rates by 41 percent, boost first-time fix rates by 11 percent, increase asset uptime, and reduce mean-time-to-repair by 9 percent. To achieve those types of results, companies should be deliberate about the data they collect, identify potential value opportunities that exist from collecting that data, and then configure their products/assets accordingly to provide the data they need.

How IoT Can Help You Lower Costs

There are a number of ways to put this data to work that can positively affect both the top and bottom lines. The first is by using IoT data to lower costs and increase profits. Having remote, real-time access to asset/product performance data allows service organizations to get in front of maintenance issues before they turn into failures. If you are able to remotely access and repair equipment (i.e., via a software/firmware update or by remotely adjusting or

and reducing costs, service organizations will improve customer loyalty. In an increasingly competitive market, the ability to add value beyond simply completing a repair will make it harder for other companies to poach your customers, even if they offer up-front cost savings. Customers value the ability of a service company to provide proactive or remote service because it ultimately improves their own operations and reduces costs both through avoiding more expensive repairs and reducing costly equipment downtime.

Service companies can also use IoT to increase revenue by offering new, value-added services at a premium. With remote access to products/assets, you can create new service packages or service contract tiers based on responsiveness or even access to performance data. For example, ATEK Access Technologies, which provides industrial sensing and monitoring of fuel storage tanks, deployed a remote monitoring solution that includes sensors on the tanks via a cloud-based solution that allows ATEK to offer these monitoring services to its customers while making it easier to ensure that the tank sensors are working correctly.

The IoT data is inserted into business processes within Salesforce and generates alerts based on predefined operational parameters. Uptime has increased, and customers can use the information to improve their own fuel truck scheduling. ATEK also offers different tiers of intelligence with its service packages, available at a premium.

For manufacturers that service their own products, IoT also offers a previously unavailable window into real-world performance that can improve product development.

The availability of real-time product performance information from the field adds a new dimension to product quality and the design process. Insight into how prod-

> # Using IoT in service can improve remote resolution rates by 41 percent, [and] boost first-time fix rates by 11 percent.
>
> **The Service Council**

recalibrating a device), you can save a costly truck roll — savings that can amount to several thousand dollars per incident, depending on the industry.

If a technician visit is required, IoT data can help ensure the right technician arrives with the right skillset, parts, and repair information to successfully complete the job on the first visit. This can eliminate hours of wasted time and labor, as well as costs associated with obtaining and returning incorrect parts. Organizations can simultaneously reduce the cost of completing each work order while making technicians more productive. The company can then provide more service with fewer resources and at a lower cost.

By providing more timely service, increasing first-time fix rates,

ucts are performing and how customers are actually using them can be fed to the engineering and design teams to help improve future iterations of those same products or to help guide them in creating new products. Developers of product data management (PDM) and product lifecycle management (PLM) are just beginning to explore how IoT data can be incorporated into their solutions and then linked back to quality and computer-aided design (CAD) systems. The top three PLM vendors (PTC, Dassault Systemes, and Siemens PLM Software) have all made aggressive moves into the IoT space.

IoT creates a real-time, integrated link between service and product development that in the past was fragmented for most companies, if it existed at all.

Step Three: Connect People To IoT

Using IoT in the service sector won't just require new technology; it will also require new skills and capabilities. IoT doesn't just automate service processes and activities, it changes the way service is delivered in a fundamental way and in some cases creates all new processes.

The proactive service approach enabled by IoT is still very foreign to many service organizations. A survey sponsored by PTC and Servicemax found that 44 percent of field service organizations were still largely reactive when it came to customer service, while a third were taking a mixed approach of proactive and reactive service.

Employees need to transition to an environment in which they are expected to react in real time to conditions. Scheduled maintenance will give way to usage-based service. Daily schedules may become more dynamic.

Make sure that technicians, dispatchers, managers, and other employees are involved in the process as early as possible, so that everyone knows why the new technology is being deployed, how it will benefit customers and employees, and what changes they can expect to their own duties and workflows.

Coordination Among Service, Sales, And IT Is Crucial

There will also be more coordination among service, IT, sales, and manufacturing. Functional roles may overlap and blur. Each of these departments will receive larger volumes of new data, and they should be trained in advance how to interpret the information and respond to it.

New roles may also emerge. There will be requirements for more data management resources within the organization. Some companies have established customer success management directors or divisions to help coordinate efforts among sales, service, and manufacturing so that IoT data can be leveraged effectively to improve the customer experience across every point of contact. According to the *Harvard Business Review*, the customer success management unit assumes primary responsibility for customer relationships postsales, performing roles that traditional sales and service organizations may not be prepared to take on (such as monitoring product use data).

IoT-enabled services will also affect customer interactions on multiple levels. PakSense is a cold-chain monitoring specialist that provides a sensor-based remote monitoring solution to its customers. The company has positioned its new offering as a way to generate data that makes their customers more efficient and that can help them make better business decisions, and that strategy led to a reevaluation of contracts and pricing. The company is also working out how to package some of the additional business intelligence that the tags provide. Potentially, the company can create

new offerings around that data that can provide additional revenue streams while improving customer service. "We're updating the way we do business so that selling 'things' is less important than selling the service we provide," Kaz Lawler, the company's CTO, told *Field Technologies*. "We have long-term contracts, and we're more integrated into our customers' business practices."

Employees will need help in understanding the new data they will receive. Employees will need to know how to interpret the data and what the next steps are in the workflow, so that they can apply the information to their own functions or use it to escalate an issue to another employee or a different department.

Training should also emphasize security. Large amounts of data from far-flung devices will be flowing into your applications from multiple customers. Employees should understand the required security processes and any rules related to storing, using, or sharing that data (particularly data from customer locations).

In addition to training existing employees on the new technology, companies may need to hire specialists in areas where they previously had no requirements. You may need in-house data science and analytics resources. IT will also need to collaborate more
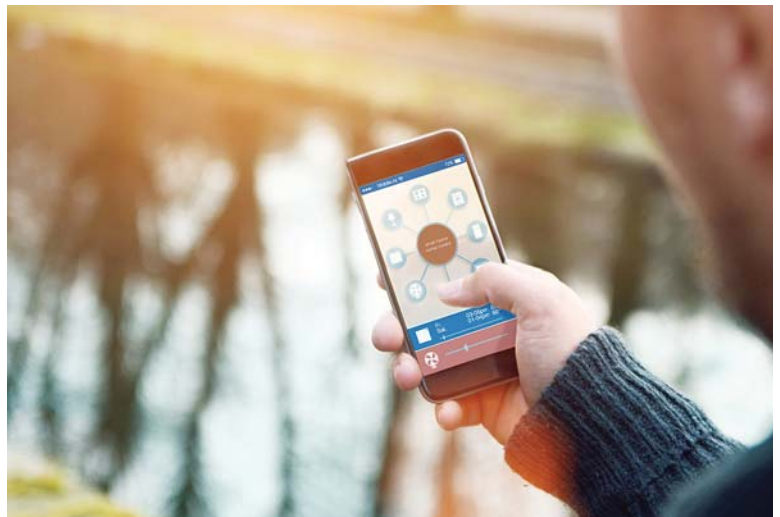
closely with the engineering teams responsible for designing and servicing the connected products. IoT (particularly the industrial IoT) requires a combination of IT and mechanical expertise that is difficult to come by.

IT training programs are just beginning to create programs that marry these two specialties; until enough trained specialists are available, IT and engineering teams will need to collaborate in new ways to ensure the success of the IoT initiative.

Step Four: Keep Customers In The IoT Loop

oT allows service organizations to offer predictive and preventive services based on real-time feedback from installed equipment. Continuous monitoring and automated triggers can initiate service calls and escalate work orders based on service level agreement (SLA) requirements.

Customers also need to be in this new IoT loop, and those triggers and alerts should be circulated to relevant supervisors or executives at the customer site as well. IoT initiatives should benefit customers as well as internal stakeholders.

PakSense, the cold-chain monitoring company mentioned earlier in this report, uses its IoT solution to provide customers with email or text information on suppliers, products, temperature alert conditions, and temperature averages. The data can also be aggregated for carriers and suppliers and used for route analysis.

Customers have embraced this new level of real-time insight, making PakSense's remote monitoring solution the fastest-growing item in the company's service portfolio. PakSense focused on making sure the solution provided value to its customers by saving them time and providing them with more information faster.

Just as important is the potential to use IoT information to document and demonstrate the service organization's success rate. Aggregate performance data can be shared with customers to prove out the value being provided by

the IoT offerings specifically and by the service organization as a whole.

Leverage IoT To Improve Customer Communications

This information can also be used to spur honest conversations with customers about the most cost-effective ways to approach their existing equipment or assets. Should an aging, obsolete, or troublesome piece of equipment be repaired or replaced? IoT data can provide insight that helps illuminate the most cost-effective approach. Are asset life cycles short enough that perhaps a rental structure would be preferable to an actual purchase?

Companies can even tailor customer training programs. IoT data can uncover differences between the expected use of a product and actual daily operational conditions. If customers are using equipment more often than expected or in ways that might negatively affect performance, the service provider can step in with the appropriate training. In its May 2016 report, *The Internet of Things and Field Service Innovation*, Aberdeen framed it this way: "Savvy service organizations and manufacturers leverage IoT to tailor service offerings and are better equipped to engage in the right conversations at the right time in the customer lifecycle."

IoT also presents new ways to address revenue. If the customer doesn't have a service contract, equipment failure and repair data can help make the case that a contract would provide cost benefits over ad hoc repairs. Service organizations can also charge for different levels of access to equipment data or pay for different levels of responsiveness or remote access.

IoT doesn't just allow service companies to troubleshoot and repair equipment remotely, it also provides feedback that can enable remote optimization of product performance. Equipment can be adjusted or calibrated to operate more effectively or efficiently based on real-time usage data. In some cases, those adjustments can be made automatically using advanced software solutions.

Offering these types of services may also require a marketing adjustment. You aren't just selling repairs or maintenance contracts; you are selling services and data that can optimize operations for your customers. This is a more consultative approach than most service organizations are used to. If you don't have the experience in-house to market and sell services at that level, you may need to bring in that type of experience.

IoT can be used to improve the customer experience from top to bottom. It also enables a continuous level of customer interaction that service companies should be prepared to support. Every alert from a connected device presents an opportunity to support your customers, add value, and demonstrate the benefits of doing business with your company.

Step Five: Consider The Future Of IoT

There will be billions of connected things on the network by the end of this decade — anywhere from 6 billion to nearly 40 billion, depending on which forecast you believe. In any case, the number of connected devices is going to expand quickly. How quickly? Networking giant Ericsson expects IoT sensors and devices to surpass mobile phones as the largest category of connected devices by 2018.

Berg Insight reports the installed base of wireless IoT devices in industrial automation reached 14.3 million 2015 and will see a CAGR (compound annual growth rate) of 27.7 percent, reaching 62 million by 2021. The IoT security market could see a CAGR of 36.1 percent over the same period, according to RnRMarketResearch. IndustryArc expects manufacturing and healthcare to experience the highest growth, with the industrial IoT market reaching $123.89 billion. This growth will be fueled by continued adoption of cloud-based solutions and analytics, as well as the expansion of 5G wireless networks, off-the-shelf sensors, and microelectromechanical systems.

Companies that aren't already planning for IoT adoption should create a road map and select partners with the right skill-set to help implement the processes and systems needed to get data from your equipment. Identify which products or assets can be linked to IoT, what the cost of connecting them will be, and what potential value you can derive from that connectivity. If you have products in the field where uptime is critical, determine the cost of that product failing and encountering unplanned downtime. Work through those scenarios, develop and pilot the solution in the field, and use those results to guide further adoption. You should focus on potential applications that will improve key ROI points like first-time fix rates, mean-time-to-repair, remote fix rates, reduced truck rolls, improved technician utilization, SLA compliance, and dispatch efficiency.

Establish goals with quantifiable metrics. A survey by IoT analytics specialist ParStream found that a third of companies track their IoT projects without any metrics, and many others are gauging success against unmeasurable goals. An IoT initiative without a predetermined measuring stick for success will result in aimless applications without any clear ROI.

The biggest stumbling block for most service organizations will likely be data management and analysis. The ParStream survey found that only 8 percent of companies are making full use of their IoT data, and roughly 17 percent capture and store IoT data, but don't do anything with it. Compounding the problem is that sensors and connected devices are generally not intelligent enough to filter the data at the point of activity, which has left early adopters struggling to organize and analyze the large streams of raw data they receive.

Expect New IoT Data Processing Solutions

Technology companies are developing new products and services that can help. Within the past year, Amazon and Salesforce announced AWS IoT and IoT Cloud, respectively, to help manage and analyze IoT data in the cloud. The Salesforce system will leverage its Thunder architecture to evaluate data and trigger responses, for example.

Service organizations should have a data management, storage, and analysis plan in place. Determine what data you need to collect from the initial group of connected devices, what form that data will be delivered in, how and where it will be collected and stored (in the cloud or using in-house infrastructure), and how it will be analyzed and communicated.

Surveying employees is also important. Ask your stakeholders, "If we give you this type of data, what could you do with it?" This exercise can generate ideas that will help improve the use of connected device data and the ROI of the solution.

The shift to smart, connected devices will continue as manufacturers add more intelligence to their products and equipment. Service organizations should carefully evaluate how (and when) they can best take advantage of that connectivity and plan to have key enabling and support technologies and systems in place in advance of an IoT pilot or deployment.

> **The installed base of wireless IoT devices in industrial automation will reach 62 million by 2021.**
>
> **Berg Insight**

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