



IN THE INTERNET OF THINGS, DATA IS EVERYONE'S BUSINESS



THE INTERNET OF THINGS promises an interconnected business world in which organizations will be able to track and analyze data not only from customers, partners, and employees, but also the products and services they use. However, embracing IoT means changes in long-held beliefs in technology approaches, as well as data management practices.

IoT represents a sea change in the way organizations handle data. From a commerce standpoint, it enhances products and offerings with embedded sensors and tracking mechanisms. This means that IT teams will be called to work alongside product development teams. In addition, IT managers will need to keep in touch with products long after a purchase is made—information pertaining to usage and other issues will continuously flow back to the manufacturer. Consider how an aircraft engine manufacturer can now receive constant data streams about the ongoing performance of the engine as it is used. Utility service providers will pull data that needs to be processed from connected home devices. Wearable fitness devices may stream data, such as customers' heart rates, for aggregation and quality assurance. Or, in another type of application, auto insurers are already embracing telematics, in which sensors are placed in policyholders' cars, with their consent, to document their driving patterns—and offer discounts to those who conduct themselves safely.

From an operational standpoint, IoT also will pair IT managers with their

counterparts in the production side of their companies. Data will be streaming in from various machines, vehicles, and devices that are employed across the enterprise. Internal operations is where the initial emphasis is being placed on IoT. A recent survey of 269 business leaders published by the Harvard Business Review and Verizon Enterprise Solutions finds IoT organizations intend to focus on remote asset management and asset tracking (36%), security (23%), energy data management (22%), condition-based monitoring (21%), and fleet management (19%).

To some extent, there has actually been an “Internet of Things” around for some time now. Data has been streaming into organizations from devices and sensors embedded within RFID tags, production equipment, remote point-of-sale terminals, and medical devices for years. What has changed is the availability of cost-effective technology to gather, store, and analyze data from these devices, as well as the growth of the internet and cloud to distribute this data.

There are numerous benefits to organizations beyond simply aggregating data from sensors implanted in devices, systems, wearable tech, or electric meters. The HBR/Verizon survey finds IoT is helping deliver results in terms of enhanced customer service, increased revenue, and improved use of assets in the field. “Much of the true value of the Internet of Things for enterprises isn't in the connections, it's in the data,” the

report states. More than one-third of enterprises that are early adopters of IoT say acquiring more information to support big data and analytics efforts is a key benefit. Many are turning to cloud to handle these new environments.

Another side of IoT is the emerging “Industrial Internet,” which brings the combined power of IoT and analytics together into supply chain and production environments. GE has been leading the way in this area, predicting that the Industrial Internet will enable a broad-based instrumentation of machines, from aircraft engines to power plants to factory production systems. These connected machines can automatically alert manufacturers when parts need replacing, or measure energy consumption. Big data is at the core of these systems, combined with enhanced processing power that will provide the analytics.

A recent study conducted by GE and Accenture finds strong interest in the Industrial Internet, particularly within the industrial and healthcare sectors. There is a sense of urgency among respondents to adopt the key components of the Industrial Internet. Eighty-four percent of executives indicated that the use of big data analytics “has the power to shift the competitive landscape” of their industries, and 89% say that companies that do not adopt a big data analytics strategy in the next year “risk losing market share and momentum.” Of particular interest among many of these firms is predictive maintenance, which identifies





equipment issues for early and proactive action, the study finds.

Implementing and leveraging IoT includes the need to:

ENGAGE BUSINESS LEADERS ACROSS THE ENTERPRISE

IoT requires IT managers and professionals to work closer than ever with their counterparts in other areas of the enterprise, such as product development, production, and supply chain management teams. This new sense of collaboration goes much deeper than simple teamwork or cross-organization communication. Managing IoT means an ongoing, agile-style relationship between these groups, well beyond anything that has gone before it.

DETERMINE WHAT IOT DATA MATTERS

There will be a wide range of devices and sensors sending information back to the enterprise, but only a small segment of this data will be of material importance to the business. Business decision makers will need to identify what information is most important to their requirements. There will also need to be data storage and archiving strategies put in place to maintain remaining data that may be of use for future applications that have not been yet conceived.

SEEK OUT THE RIGHT SKILLS

Moving to an IoT stance requires a range of skills that bring together data management, analysis and business capabilities. Much of the data coming into enterprises will be unstructured data, requiring environments such as Hadoop or Apache Spark to effectively process and package the data. In addition, data analysts or scientists may be needed to separate the actionable data from the noise, and present it to the business. Both business and data management professionals need to ask new questions previously not considered in their businesses, from what types of data needs to be collected, to what pieces of the data are actionable information.

DEVELOP NEW PRODUCT DEVELOPMENT APPROACHES

IoT is more than simply ingesting data and churning out insights—it means a realignment of companies' product lines. Products no longer are simply produced and sent out into the wild—through sensors, they continue to send information back to their manufacturers. This has two effects. First, it potentially brings producers closer to their ultimate customers, removing the retailer or distributor in between after the sale. Second, the rise of IoT-enabled offerings requires an interactive product development process that involves many

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parts of the enterprise beyond product development. Information streaming in from customers will create a constant quality loop. To prepare for this close-up, ongoing engagement with customers, companies will need to develop their customer service functions, as well as establish processes that will enable them to act quickly on requirements for change.

ENSURE PRIVACY AND REGULATORY COMPLIANCE

Since there will increasingly be instances of companies reaching deep into customers' organizations, or even individual habits, on an ongoing basis, IoT will require great sensitivity to privacy and security issues, as well as adherence to laws and mandates regulating the use of the data being gathered. Organizations are recognizing this challenge, as found in the HBR/Verizon survey—privacy and regulatory compliance were at the top of respondents' list of concerns (cited by 46% of respondents). An IoT framework

also needs to be supported with the most robust security technology.

FOCUS ON PREDICTIVE ANALYTICS

The transparency IoT provides into ongoing operations provides opportunities to address issues before they occur. As noted by the GE/Accenture study, this extends well beyond system optimization to business growth. “For example, with complete visibility into output from a fleet of power generation plants, an energy trader can execute optimal transactions in the market, leading to greater profitability. It is also important to think about tomorrow's partner ecosystem.”

ADOPT AUTOMATION

As enterprises move into IoT, they will be adopting a variety of new data sources and data types, resulting in significantly increasing volumes and formats. It will be critical to be able to collect as much of this data as possible. Much of the information streaming into enterprises will trigger alerts, requiring responses on a real-time or near real-time basis. Systems will need to be programmed and aligned with business rules to respond with little to no human intervention.

The Internet of Things represents the next new frontier for organizations, requiring new approaches to data management. Most significantly, data management is expanding beyond the IT organizations to become a vital part of everyone's job. ■

—Joe McKendrick

Close to the Edge

How to Prepare for the Internet of Things

IT MAY BE THE BIGGEST BUZZWORD OF 2015. The Internet of Things has been discussed in just about every type of popular media, and in the world of IT; it is projected to be one of the largest areas of new spending this year. Of course, machine to machine communication is nothing new. But the accelerated pace of innovation and development in big data and analytics software has opened up a new universe of possibilities for connected devices. And that's what makes the potential of IoT so exciting to so many people.

But along with these new possibilities come a new set of challenges. The very nature of IoT is to monitor, upload and act upon data from what are often complex entities. Consider the examples of manufacturing and healthcare, in which a large number of sensors are continually uploading data that needs to be analyzed and acted upon to improve outcomes. Whether it's predicting equipment failure or hospital readmissions, there are multiple parameters of information that are being monitored and analyzed, data that changes every second or even multiple times a second.

In order to successfully implement IoT initiatives, organizations need to be prepared to address three primary challenges:

1. The vast volumes of information that need to be uploaded from sensors to the central monitoring system.
2. The need to rapidly consume continually changing information in near real-time to gain an accurate understanding of what's happening in the moment.

3. The ability to not only understand historical data, but to anticipate and predict what will happen next to prevent or facilitate certain outcomes.

Predixion Software is uniquely positioned to help organizations overcome these challenges to achieve highly effective and adaptive IoT implementations. Unlike traditional analytic software that generates a mathematical model as the end result of its processes, Predixion focuses on making the results operational at the point of impact. In other words, Predixion transforms data science and real-time analytics into an action or decision on the spot.

That's a critical capability for any IoT initiative. Bringing an action "close to the edge" where sensors and data meet is the ultimate payoff of IoT.

Predixion calls this focus "the last mile of analytics"—delivering predictive insights directly to the agents of decision-making. That may be a nursing supervisor who needs to improve patient outcomes. Or an engineer who needs to predict equipment failure before it happens.

For IoT, it means making decisions on the edge. Decisions that sometimes may not involve human interaction at all. Predixion is able to generate these analytical-based decisions and actions instantly in IoT devices, without the latency of uploading data to a cloud or a centralized processing environment. Pushing decision-making to the sensors in this way reduces the amount of data that has to be uploaded and relieves the pressure on server processing.

For example, imagine a huge underground drill boring deep inside a

mountain. In such an environment, there may be no Internet connection or enough time to analyze sensor data to predict that an equipment failure is about to occur. Predixion is able to embed the action to stop drilling before a failure occurs directly within the sensor. Preventative action is taken in near real-time.

Predixion's patented MLSM (Machine Learning Semantic Model) allows data scientists and subject matter experts to collaborate and rapidly create, adapt and improve predictive models for specific IoT applications. The MLSM streamlines and simplifies this process, eliminating the need to understand the inner workings of machine learning such as shaping, managing and transforming data.

Predixion also allows developers to build predictive models with a variety of tools including analysis services from Microsoft, Mahout, and R. Predixion can also consume predictive models built on other platforms such as SAS and SPSS via the PMML (Predictive Model Markup Language). In order to serve the widest variety of IoT sensors, Predixion analytical packages can be wrapped into an OSGI (Open Service Gateway Initiative) bundle that runs on any device that supports Java.

From beginning to end, Predixion offers a superior ability to create, collaborate, deploy and continually improve the predictive analytics that make IoT possible.

It's the most direct path for organizations that need to overcome IoT challenges and push ever closer to the edge.