The Ubiquitous Internet of Things

One Connect

One of the most frequently used phrases of the past year is "the Internet of Things" (IoT). It would be difficult to open up the business section of a newspaper or magazine without running across a mention of it.

Most media outlets herald IoT as a paradigm-shifting development that will potentially revolutionize how we live. They paint it as a fundamental change in the way that people interact with their possessions. This is all true, more or less, but what the media outlets don't generally do is pin down exactly what is meant by IoT. Also, though reporters address how IoT might change the lives of consumers, they very seldom discuss how IoT will change the lives of businesses.

IoT, at its most fundamental, is the networking of products for which Internet connectivity isn't an essential part of its primary function. This includes almost any object people use—from the full range of household appliances to vehicles and even clothing. It's clear that IoT will change people's lives, but what about businesses? The answer is this: quite possibly,

IoT will have even a greater impact on businesses than on consumers.

A Game Changer

IoT is a game changer. Adding networking and communications functionality to an existing product line or developing new product lines that incorporate connectivity don't just make a business more competitive and agile, they change the way that business runs.

IoT's primary game-changing touch-points are in three areas: customer interactions, revenue streams, and operational needs and methods.

Customers

IoT products represent an always-available line of communication between a business and its customers. This line of communication can provide organizations with fantastically powerful data and metrics that a business would be unable to obtain any other way.

IoT also produces an additional dimension on the part of a company's customer base. When products

are connected 24/7, customers expect 24/7 availability when their needs demand it.

Revenue

Internet is a service. Things are products.

These statements may seem very simplistic, but, in truth, each has its own far-reaching implications. When a business adopts IoT by adding Internet to things, that business can't successfully continue using a product-based model, nor can the business move solely to a service-based model.

A business that moves into IoT straddles the fence between the two business models. Finding the right balance between them can be a challenge.

Operations

A surprising variety of new business methods and management tools are needed when a business changes the type, frequency, and timing of customer interactions and the development of new revenue streams. IoT adds to that a potential flood of user data and new metrics.

Businesses need the software tools to collect, analyze, and act on the data, and they need the

infrastructure to manage increasing levels and new types of customer contact. Businesses also need methods to handle recurrent billing, subscriptions, and other service-based revenue streams. And because the internet is global, at some point, an IoT business likely will scale it all to a global market.

This is where service IT comes into the equation.

Service IT

Service IT is a blanket term for all the systems and the software necessary for launching, managing, and maintaining an IoT business. The specific services required can vary significantly from company to company, but some of the more common elements are the following:

- Data-handling software that monitors devices in the field and manages the resultant data.
- Specialized billing software that can handle the Byzantine billing relationships that arise with connected devices in the real world.
- Deep, "under-the-skin" integration with various communication protocols, including WiFi, Bluetooth, 3G, and 4G.
- The ability to integrate the new software and functionality seamlessly with existing IT infrastructure.

Evolving into an IoT business creates challenges and many more opportunities, all of which can be daunting. This paper analyzes benefits of moving to an IoT business model, identifies some significant challenges involved in doing so, and explains how service IT can help minimize the effects of those challenges while enabling a business to capitalize on the opportunities.

Benefits

There are numerous benefits to be gained from moving into the IoT space. One of the most readily, discussed benefits is the ability to provide customers with new services and products—ones that wouldn't be possible any other way and ones that have a significant impact on their lifestyle.

New Services

The benefits of the new services and abilities provided by IoT devices to consumers are obvious. The benefits to businesses, of course, reside in their ability to provide novel and unique functions that set them apart from the competition.

These new types of interactions generally come in one of three flavors:

- Providing a new way to do something people already do.
- Providing a more convenient or automatic way to do something people need to do but don't necessarily want to do.
- Providing the ability to do something customers couldn't do before.

These types of products tend to combine the word "smart" with a product name, and they tend to allow the customer greater control over a process or to provide some measure of automation over a mundane or tedious task.

Automation

In addition to automation for consumers, IoT products also provide opportunities for automation on the business side of things. This is particularly true in the case of data entry and routine maintenance tasks, but it also factors into business areas such as logistics, inventory management, and billing.

Because IoT devices are programmable and already online, they are often able to perform their own data entry. For convenience, too, updates and diagnostics

can be rolled out automatically to all devices simultaneously rather than requiring a physical visit from technicians.

Adding to the power of automation is a significant reduction in response times once problems are identified. Problems can be identified almost instantly, and solutions can be formulated before the customer is even aware that a problem exists. Because the status of all devices in the system can be monitored at all times, real-time support becomes a viable option.

Real-time Monitoring

One advantage that directly benefits business management is real-time monitoring. Because it is possible to monitor the status of every device in the system, businesses have a head start in identifying and solving customer-facing problems. IoT also provides a business with the ability to constantly monitor almost every aspect of itself and, therefore, to respond with speed and precision to changing business conditions.

For food and beverage suppliers, for example, this information is essential for inventory control. Knowing when clients are low on a product is

necessary and profitable information to possess. It allows a company to arrive at the client's business with the exact products needed—exactly when they need them.

Likewise, a rental car company could use real-time tracking of its fleet to more precisely manage inventory and to identify and ameliorate vehicle imbalances between two cities. The implications of real-time monitoring on response times are as varied as the number of businesses in existence.

At the end of the day, most of the business advantages of IoT come down to better understanding customers and their needs. The ability to get this information is revolutionary on its own. The ability to get the level of detail possible through IoT and to do so in real-time is nothing short of miraculous. The overall results are a more flexible, more nimble business that is poised to take advantage of every opportunity that presents itself.

The Challenges

IoT isn't all wine and roses, however. While the payoff for moving into connected devices can be enormous, there are some significant challenges awaiting businesses that transition from a

product-centric to a product-and-services model. These challenges can be grouped into the three stages of IoT business development: launching the service, managing the service, and monetizing the service.

Launch

There are many concerns to address before a business starts to offer IoT. Between identifying your business model and going live, businesses will need to take these steps:

- Solve the technical hurdles of adding Internet connectivity to products.
- Enable devices to communicate with global wireless networks that use a variety of standards and protocols.
- Predict and document the business cases and operational parameters for the whole product life cycle.
- Configure products' APIs (application programming interfaces) to both conform to global mobile carrier specifications and to meet the unique needs of the business.

All of the above will need to be integrated into the organization's standard mode of operation.

Management

Once IoT has gone live, businesses will have more challenges to address. To truly utilize the collected data and to make good on the implied promise of a vastly superior customer experience, businesses will need to be able to monitor the connected devices, analyze the resulting data, and act on that analysis expeditiously.

Businesses will need to be able to run diagnostics remotely to identify any problems with products as they happen and to identify potential problems before they happen. When issues are identified, businesses will need the capability to effect fixes through OTA (over the air) firmware and software updates. Businesses also need the ability to determine when a remote solution isn't feasible and when a more traditional course of action is appropriate.

Monetization

The money side of an IoT business brings its own host of challenges. This is more true for businesses that are more accustomed to selling products than offering services. On top of setting competitive yet profitable rates at the varying types and levels of

service offered, companies likely need to navigate billing relationships with customers, OEMs, suppliers, mobile network operators, and partners.

Connected devices send and receive data, and moving data costs money. IoT organizations need to set appropriate data thresholds for devices and establish solid cost controls to prevent unforeseen circumstances from pulling the balance sheets from black to red.

All the metrics at a business's disposal will be useful for more than just managing the services that generate them, too. Companies need to develop the ability to analyze that information; this will help create new revenue streams and will lead to the development of new services and products to meet customer needs.

Service IT Revisited

For most product-based businesses, developing into an IoT business is not like expanding into a new market or developing a new product line. If developing a new product line is akin to a surgeon performing a tonsillectomy, then a business developing IoT capabilities would be a general

practitioner performing open heart surgery: it's just not what you do.

Transitioning from a product-centric business model to one that straddles the line between product and service is a difficult task. Developing the capability to produce, manage, and monetize connected devices, especially given the complexity of the world's communications networks, is exceedingly challenging. Meanwhile, companies making this transition must do so while continuing to operate their business.

If you need heart surgery, you don't do it yourself: you find a cardiologist. If a business needs to develop the ability to make, market, and manage connected devices, the business calls on service IT.

The road to the Internet of Things is paved with many great challenges, and with great challenges come great rewards. Service IT is the difference between success and failure in meeting those challenges and realizing the rewards.