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THE NEXT PHASE OF THE INTERNET of THINGS
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Considerations for Building Out Your Connected Device Strategy

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The Internet of Things
Big and Getting Bigger

The Internet of Things (IoT) has nearly eclipsed the splendor of "big data"—in fact, it's enveloping big data into a much larger, more promising concept. And to prepare for IoT, companies in all sectors must build a connected device strategy that makes sense—from both a financial and logistical standpoint—if they want to capitalize on the enormous opportunity IoT offers. McKinsey Global Institute reports that the IoT business will deliver $6.2 trillion in revenue by 2025.

The convergence of machine-to-machine (M2M) application development, big data and the cloud is the foundation for building next-generation products and expanding IoT, enabling billions of connected devices and systems to share data that can be collected and used for numerous efficiencies, cost-savings and innovative capabilities. But to get there, we must figure out how to integrate disparate devices with cloud-based services across multiple communications protocols and in a highly secure manner. It's a complex mix of connectivity, requiring new logic in datacenters and edge devices, and the ability to analyze the increasing volume of data from these devices quickly and effectively.

Just how big is the market for connected devices? According to NPD's report, today there are more than 425 million Internet-connected devices inside U.S. homes across a population of about 315 million. Computers are currently still the primary devices for Internet access, but smartphones, video game consoles, tablets and already-connected HDTVs are also gaining traction. This is in the public sector alone. Research firm International Data Corporation (IDC) said worldwide shipments of smart connected devices grew 29.1% year over year in 2012, crossing 1 billion units shipped with a value of $576.9 billion. And, according to new statistics from GSMA, the number of connected devices will explode to 24 billion by 2020.

IDC also looked at the components, processes and supporting IT and connectivity for IoT, and expects IoT technology and services spending to generate global revenues of $4.8 trillion in 2012 and $8.9 trillion by 2020, growing at a compound annual rate (CAGR) of 7.9%. That sounds like a lot, but everyone's eye is on the real prize: Better outcomes from data and analytics projects made possible by IoT initiatives will correlate with an organization's ability to compete and gain competitive differentiation.

For service providers, manufacturers, platform players and others to make the most of this opportunity, a solid connected device strategy is an essential starting point. In this paper, we'll examine the considerations behind building such a strategy and how leveraging a standardized, embedded software solution for seamless cloud connectivity offers a speedy and secure transition into the IoT, no matter the device or its purpose. Considering the complexity of the IoT undertaking, the best way to reduce cost and risks and get to market quickly with new connected devices may be by banking on the expertise of a proven IoT platform provider.

The High Cost of In-House Expertise

Many companies think they can create connected devices completely on their own, but most don't have the experience or resources they need in-house. For example, a connected device strategy requires dedicated staff to manage the cloud infrastructure, ensure rock-solid security, and maintain the expertise needed to keep up with changing requirements of device connectivity. And, if you do all this in-house, it's going to cost you.

The IoT market by definition requires massive flexibility. Companies need to be able to connect to nearly any device, any type of data and any cloud platform. As a result, a broad array of capabilities is required to build a truly scalable, secure IoT platform. But trying to do so with internal resources means staff is distracted from core business activities. By the time you ramp up your staff, the market may have already passed you by.

Say you make refrigerators. Your company staffs experts on appliance design, refrigeration, energy efficiency and other technologies required to make a refrigerator. However, the science of refrigeration has nothing to do with cloud computing. To make a connected refrigerator—one that enables you to remotely control temperature or to check operational statistics—you would need to:

- **Create a secure cloud-computing infrastructure capable of collecting, storing and analyzing data from your hundreds of thousands of customers.**
- **Hire staff that can install, manage and monitor that infrastructure.**
- **Hire staff to design a chipset to install in your refrigerators that can connect to the cloud infrastructure, as well as your customers' mobile devices.**
- **Create a mobile app that communicates effectively with the refrigerator.**
- **Potentially, re-design or re-code the chipset everytime protocols or stack services change.**

Don't forget, you'll need security experts to ensure that people aren't hacking into your customers' refrigerators and attempting to spoil their food supplies.

IoT In Action

Healthcare

An elderly man with a heart condition wears a wristband or other discrete wireless sensors that transmit to a caregiver or loved one's mobile device, helping to ensure safety and provide information about disruptions in normal routines.

Light Industrial

Sensors can be installed in industrial equipment to monitor the performance and conditions of various devices and enable repairs before significant damage occurs.

Connected home

A homeowner forgets to turn off the oven, which is a connected device. He receives a signal on his mobile device that the oven is on, then transmits a command to shut it off, without leaving his office.

Fitness and weight loss

Using your smartphone's existing sensors, such as GPS and compass functionality, along with connectivity options like cellular, Wi-Fi and Bluetooth, you can track and monitor your movements, workouts and activity levels throughout the day, and know how to adjust your daily calorie intake accordingly.

"The enormous number of devices, coupled with the sheer volume, velocity, and structure of IoT data, creates challenges, particularly in the areas of security, data, storage management, servers, and the data center network,"

Joe Skorupa,
Gartner Vice President & Analyst
March 2014

Enlisting the help of a third-party IoT solution provider can keep you focused on what you do best while providing all the necessary components to get you to market quickly with your newly cloud-connected devices--without the significant expense of creating and staffing a cloud infrastructure or hiring communication protocol experts to design, build and test a chipset.

Going Global? What's Your Sales Strategy?

The decision between buying and building your connected device solution becomes even clearer when you factor in a global sales strategy. Staying compliant with the communication protocols and Internet laws in the U.S. is one thing, but those factors vary significantly once you start to sell abroad. If you're looking to sell products in China, for example, you need to be a licensed Internet Content Provider (ICP), which requires compliance with a host of rules and regulations set by the Chinese government.

An IoT Platform partner with a proven platform has already thought of this, is already a licensed ICP in China, and is familiar with all the applicable laws, regulations and communication protocols for various regions. Such a partner probably provides cloud infrastructure in or can be deployed in multiple geographies, which means faster time-to-market as you execute your global strategy. Without such a partner, you'd be dealing with multiple vendors using multiple systems, and facing a great deal of complexity and inconsistency in doing business.

Mastering the Art of Security

Security is one of the most important considerations and the most difficult to build into your connected device strategy. It must be considered right from the solution architecture. Security must extend from the device to the cloud to the application, starting with encryption at the chip level to prevent spoofing and key transmission protocols like SSL to get information safely to its destination. Although we have had decades to perfect Internet security, applying those practices to the relatively young concept of the IoT world requires re-engineering to address the constraints of various connected devices.

Security really must be a multi-layered approach penetrating all aspects of data collection and transmission, from device booting and authentication, access control, firewalling, data transmission, auditing, and updates and patches. And those requirements will vary from device to device. For example, unlocking the doors of a house requires strong user authentication, while protecting medical data from an outpatient's heart monitor to the doctor's iPad requires a rock-solid data encryption solution.

Ultimately, manufacturers need to understand that security cannot be an afterthought but rather needs to be an integral part of the design of the connected device. Security controls need to be introduced at the device level and extend to the cloud and beyond to the mobile app, taking advantage of latest trends and advances in the market, and this is exactly where manufacturers can lean on IoT Platform providers for help.

The early bird gets the... well, you know

Tremendous market growth is only good for business if you can capitalize on it, and that depends on how quickly you can bring new products to market. As we have mentioned earlier, if you take the approach of building it yourself, be prepared for the potential delays as you build out the staff and the infrastructure.

Taking the approach of working with an IoT platform provider, manufacturers can significantly accelerate the product development process and get products in consumers' hands quicker. However it's critical to understand how your IoT platform provider's solution is architected. Many modern IoT platforms are taking advantage of Infrastructure-as-a-Service(IaaS) solutions such as Amazon Web Services for their cloud infrastructure. Leveraging these new platforms reduce the amount of custom code that must be generated for each connected device being created. In many cases, application libraries can be created with documented application programing interfaces (API's) to simplify the integrations between the devices and the cloud. Starting with an application from a pre-built library means you don't have to re-engineer a chipset each time you Internet-enable a new device. Plus, all the critical components—connectivity protocols, security, and the cloud infrastructure—are already part of the solution.

What's with all that data?

By connecting your devices, you open up the floodgate for data from customers and end users. But this data is only valuable to you and your business if you can collect, store and analyze it. As a device manufacturer, are you prepared to receive such massive amounts of data with your existing infrastructure, and do you have the tools and expertise on-hand to make sense of it?

The value of big data from the IoT world cannot be underestimated. Imagine the discoveries made possible by a baby sock that monitors heart rate, sleeping patterns and temperature and helps us to build out a comprehensive database of newborn and infant medial statistics. Or, consider a device that sends information about the performance of an appliance that can monitor and detect when a bearing may be going bad and send a notification to the manufacturer or distributor to contact the consumer proactively and schedule an appointment to repair the device, eliminating the need for multiple truck rolls.

There are an endless number of applications for IoT data, with the potential to change how we live, what we know, and how we innovate. It opens doors to new business models and opportunities that we can't even imagine today, and has the potential to help us cut costs, use fewer resources, streamline business and be more profitable. While you are collecting, storing and analyzing all the data, who is building your devices?

Creating the infrastructure necessary to store and manage incoming data from your connected devices can put you at a competitive disadvantage as you struggle to maintain and provision resources to keep up. When data starts flowing in, you'll likely need different server, disk and network infrastructure than what you currently have installed. Real-time analytics of petabytes of data requires specialized tools and dedicated staff with the appropriate skill set and expertise. An established IoT platform provider will have already made these investments, and by leveraging their infrastructure and experience, you can capitalize on the data from your devices right away, with very little effort, cost or risk.

No need to re-invent the wheel

IoT development is a complex undertaking that requires expertise in several domains—from embedded application development, communication protocol, to web and/or mobile app development and more. Additionally, managing connected devices requires not only knowledge in transmitting the data, but also a high degree of data security and account management savvy. Using an existing platform and leveraging the proven expertise, methodology and best practices of an IoT solution provider rather than trying to "reinvent the wheel" can help you seize opportunities around the connected device market while staying focused on your core business and lowering project cost and risk.

Develop your device & system quickly.

Watch what happens.

Improve your system quickly.

Repeat quickly.

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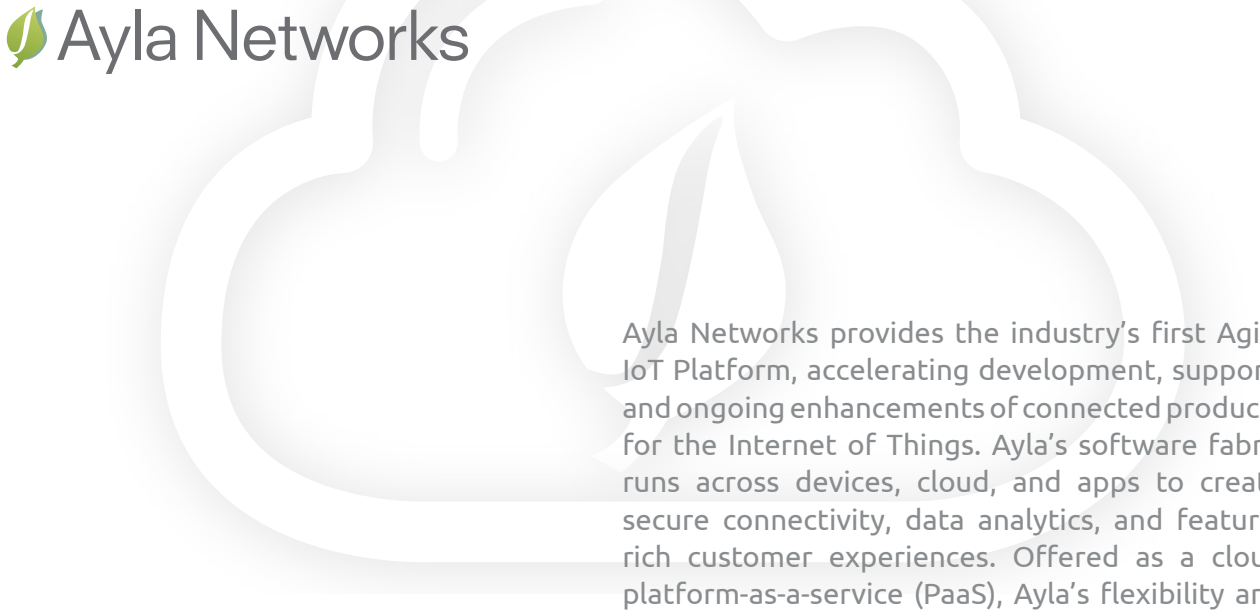

Ayla Networks provides the industry's first Agile IoT Platform, accelerating development, support, and ongoing enhancements of connected products for the Internet of Things. Ayla's software fabric runs across devices, cloud, and apps to create secure connectivity, data analytics, and feature-rich customer experiences. Offered as a cloud platform-as-a-service (PaaS), Ayla's flexibility and modularity enables rapid changes to practically any type of device, cloud, and app environment.