

Adapting to a world of connected devices

by Philippe Guillemette, Chief Technology Officer, Sierra Wireless

As we move towards a fully connected world, more and more of the things we use in our daily life - gaming consoles, televisions, DVD players, an increasing variety of mobile devices and services we use daily - are getting connected and becoming gateways to a broad range of services. The ultimate tipping point - when these connected services platforms shift from closed, bespoke solutions to open, standardized, consumer-focused cloud platforms - is coming. The only question is how soon it will arrive.



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Imagine a world where many of the items you use every day - your car, your coffee maker, your washing machine, anything and everything - are connected, talking to each other and to you, automatically providing you with information and services you currently must handle manually. What needs to happen to get us from here to there?

Imagine you get in your electric car to go to the shopping centre. You enter the destination in your navigation system, and, noting that your car's power level has dipped below half, it automatically checks the availability of charging stations there, and asks if you'd like to book a reservation. When you arrive, your car and the charging station have already negotiated the reservation and payment, and verified your identity. You simply park and

begin shopping. You browse some shops and buy a coat at a department store. As you're checking out, the cashier tells you your purchase entitles you to one free hour of vehicle charging. She sees that your car is already charging when she runs your payment, and asks if you'd like to apply the discount. Next, you stop to get a latte, and receive an alert on your smartphone that your car is fully charged and your reservation expires in 20 minutes.

Consider all the devices communicating in that scenario - your car, a charging station, a point-of-sale terminal - and your smartphone just negotiated a series of complex transactions to provide you with a customized set of services. The provider of your in-car information services, the operator of the

vehicle charging stations, the operator of the mall and its parking lot, and an individual store all communicated with each other and with these connected devices to enable these services. And it all happened seamlessly, in real-time, without requiring anything more from you than the occasional nod of approval.

This is just one example of what becomes possible as we enter the next phase of machine-to-machine (M2M) communications. It's easy to envision others:

- A wristband that monitors your vital signs and can contact your healthcare provider if it detects a serious health issue;
- A washing machine, refrigerator, or furnace that can detect malfunctions and send you alarms, or even contact a maintenance

service, before a problem causes extensive damage; and

- A coffeemaker that alerts you when your favourite beans are on sale at your local grocery store.

We're not there today, but in a world where we already access web-enabled services from connected tablets, e-book readers, televisions, DVD players, and a growing list of other consumer devices, this vision is not farfetched.

While tomorrow's connected services may seem like just the next natural step in the evolution of consumer technologies, they are, at their core, very different from the kinds of services we have today. Today's connected services are still driven almost entirely by people. In the M2M world of the future, services are driven by the devices themselves - they recognize each other, communicate with each other, and interact with third-party services that take advantage of their connectivity, with little human interference.

It's a world in which billions of connected devices will communicate constantly - generating more data than the people they serve. As much as this connected services vision seems almost within our grasp, some fundamental changes must occur before it can be a reality. Some of these changes are in the way that devices communicate with each other and with the network. Others will be in the way network operators, device manufacturers, application developers, and third-party service providers work together to offer these services to consumers.

Plug-and-play capabilities

At the device level, enabling the kind of open-ended connected services described above will require a new framework that provides plug-and-play connectivity. It's not enough for consumer devices to be equipped with wireless communication capabilities. They also need a standardized, organized, framework that enables them to discover other connected devices, broadcast their own capabilities, and recognize and use those of peers. Ideally, this needs to happen in a way that is both independent of and transparent to their users.

Consider what plug-and-play connectivity has done for your computer. Ten years ago, if you wanted to connect a new digital camera, you had to manually install the right drivers before your computer would even recognize it. Even then, you were

strictly limited to the software that shipped with the device.

Today, the process has been largely standardized. You can plug your camera into virtually any computer. The operating system recognizes it and makes all of its capabilities available to you within seconds, and you can choose from hundreds of third-party applications to work with.

Manufacturers and industry groups are beginning to develop frameworks to enable this kind of interoperability among connected devices, but a broad-based platform for true plug-and-play connectivity is still in its infancy.

Network ecosystem

Network operators are beginning to evolve to accommodate the M2M future. In a world where machines generate more data than people, they will need simple, scalable solutions to manage the enormous influx of new devices and subscriptions, and they will need to accommodate a much wider range of requirements as the variety of connected devices expands.

Conceptually, they also need to embrace new business models. A system that is largely based on the assumption of one or two devices per account needs to be re-examined as connections are multiplied across new devices and services for both consumers and enterprises.

A world in which billions of devices are using cellular and broadband networks presents a tremendous business opportunity, but network operators will need to cultivate closer relationships with device manufacturers, application developers, and M2M service providers reselling their network connectivity services.

Universally accessible cloud platform

The biggest shift that needs to occur to enable the M2M future is the creation of an open, universally accessible, cloud platform on which myriad devices and services can interact.

While many vendors are already creating and profiting from M2M applications in the marketplace, these solutions are almost exclusively closed, 'one-to-one' systems - one kind of device, connected to one kind of service, managed by one service provider. As long as this model continues, growth will be limited and slow.

Enabling the kind of open-ended connected services ecosystem envisioned in the above examples will require a cloud platform that supports a 'many-to-many' model. That means an open platform, in which all connected devices in your home and life can discover and communicate with each other. Even more important, it's a platform on which those devices are discoverable by third-party service providers offering applications that take advantage of this ubiquitous connectivity.

Right now, there is no such meeting place where connected devices can access other devices or services, or where innovative service providers can make their offerings available to consumers.

Who would operate such a platform? How would it work? At this point, we still don't know. But we will need to find answers to these questions to realize the full potential of M2M connectivity.

Security and privacy

Finally, as exciting as it is to imagine the possibilities of a world where we are surrounded by connected devices and services, it is all too easy to envision the inherent risks of that world. A key element to remember is that while we are considering machines talking to machines, ultimately these services serve real people in their daily private lives, and their trust is an essential factor.

Open networks and plug-and-play devices will be accepted and will deliver their potential only if they come with strong security and privacy safeguards that all of us trust. This is a considerable challenge, but there has been tremendous progress made in other areas of computer security that can provide the elements needed for a solution.

Approaching the M2M future

As we move steadily closer to a fully connected world, more and more of the things we use in our daily life - gaming consoles, televisions, DVD players, and an increasing variety of mobile devices - are getting connected and becoming gateways to a broad range of services.

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