The Internet of Things: IMPLICATIONS FOR SUPPORT SERVICES & SOLUTIONS

A Parks Associates Whitepaper Developed for

SUPPORT.CUM°



The Internet of Things (IoT)

The term Internet of Things (IoT) has several interpretations, but for the purpose of this paper, IoT is defined as devices that connect to the Internet and have accompanying virtual objects in the cloud.

Synchronized with the real-world objects, the virtual object represents the current state of the end device—whether it is on, the current settings, which mode of operation it is in, battery charge level, etc. The virtual object also retains historical information on the device's operation, including total operating time, total power up cycles, last time it was on, average operating time, time of day used, battery cycling data, setting history, and other information as desired. Devices may be static objects that simply report their properties, sensors that measure the physical conditions or status, actuators that perform operations, or any combination of these.

The Internet of Things

Consumers are able to manipulate this virtual object through an interface such as a smartphone, tablet, or computer that remotely operates the device in the home.

The device may also be queried or controlled by other platforms, controllers, or applications that coordinate multiple objects. In addition, the data from smart devices can be integrated with external data to create value added services.

Applications for the Internet of Things cross multiple device categories throughout the home: home entertainment devices such as TVs, game consoles and media players; home energy management devices such as thermostats and lighting controls; home security devices such as cameras and door locks; and home health care devices such as heart rate monitors, digital pill boxes, and glucometers. The potential breadth of applications is nearly unlimited with available applications increasing routinely.



Drivers & Applications of the Connected Home



Figure 1: Drivers and Applications of the Connected Home

Growth of the Internet of Things is driven by several ancillary trends (Figure 1) including the following:

INCREASE IN BROADBAND PENETRATION—

Broadband penetration in the U.S. has been increasing steadily since 2009 and is now approaching market saturation at 78% of U.S households.

DEVELOPMENT OF WIRELESS NETWORKING

TECHNOLOGIES—A growing number of wireless technologies now enable communication among devices. These technologies include: Wi-Fi, Bluetooth, Zigbee, Z-Wave, Insteon, DECT and Thread.

GROWTH IN MOBILE CONTROL INITIATIVES—

Manufacturers of smart devices now make them controllable from other devices, such as smartphones and tablets which are already in the home. Prior to the emergence of IoT, enabling such control required the purchase and installation of a central controller. **REDUCTION IN THE COST OF CONNECTED**

DEVICES—The cost of connected devices is lower than in the past, making them more easily affordable by more consumers.

INCREASE IN MARKET FAMILIARITY—

The marketing efforts of large companies promoting smart home systems are educating the general public on the capabilities and value propositions of connected home systems. These companies include security companies such as ADT, cable operators such as Comcast and Time Warner Cable, and telecom operators such as AT&T.



Impact on Support Services and Solutions

MORE DEVICES ENTERING THE HOME

The adoption of connected consumer electronics (CE) is growing across several fronts.

Parks Associates research shows that consumer purchases of home computing and Internetconnectible entertainment devices have all increased steadily over the past three years. Broadband households now own an average of seven connected devices (entertainment and computing)¹, up from five devices in 2011.

Two-thirds of all households now have a connectable device that is actually connected to the Internet.

The penetration of connected home management devices is also increasing. Connected thermostats have outpaced other devices in this category, with a current penetration of 11% in broadband households.² Another 10% of broadband households plan to purchase these devices within the next 12 months (Figure 2). Connectable medical devices are also slowly entering the home. While fewer than 40% of broadband households currently own medical devices, more than half of those owning the devices are now connecting them to the Internet and are using them to transfer information to computing devices or health care professionals.

Intention to Buy Smart Home Control Device

How likely are you to purchase the following within the next 12 months? Among All U.S. Broadband Households



- ¹ Connected devices include desktop computers, laptop/ netbook computers, tablets, gaming consoles, streaming media devices, and smartphones.
- ² Parks Associates, Multiple Survey: American Broadband Households and Their Technologies. 2013



% Likely to Purchase (Rating 5-7)

Implications for Support

As the number and complexity of devices in broadband households increase, the cost of providing support inevitably increases. Greater support costs largely stem from the increasing time required to address the growing support needs of consumers. To increase the efficiency of the support process, support providers have, in recent times, focused on automating various stages of their support services. By automating the support process, support providers not only increase efficiency, but also improve support accuracy, and reduce the overall cost of support. Some primary automation strategies being employed are outlined in the diagram below (Figure 3).



Support Automation Strategies

Figure 3: Selected Automation Strategies



As an automation strategy, remote connection has revolutionized tech support by dramatically increasing the efficiency and reducing the operational cost of the support process.

By giving agents control of consumers' computers, remote connections dramatically reduce the number of truck rolls necessary to resolve problems and minimize frustration stemming from consumer participation in the resolution process. While remote support is widely embraced due to its efficiency in computerrelated support request, this method has not gained much traction in the support of other connected devices now prevalent in the home, such as smartphones, tablets, and home entertainment devices like set-top boxes.

Only 27% of devices support remote access today.³

With the growing network of connected devices in broadband households, the ability to resolve problems remotely will provide support providers competitive advantages.



It is important, therefore, that the tools developed or acquired for remote services be extensible to other devices in the home.

WebRTC technology now enables remote connections between devices that use a web browser-based interface, eliminating the need to acquire additional tools to connect remotely. For devices that use a web browser-based interface, device management companies are aggressively trying to partner with device manufacturers in order to have remote management firmware installed on those devices. The benefits of accessing devices remotely extend beyond minimizing operational cost through remote diagnostics.

OTHER BENEFITS ALSO INCLUDE:

ALLOWING PROVIDERS to update and manage software on devices remotely

ENABLING PROVIDERS to monitor device/equipment performance

HELPING DEVICE MANUFACTURERS to gain a better understanding of how customers interact with products and services

These additional benefits help providers to serve their customers better and gather information that can be used to further develop segments and engineer new products with targeted features and capabilities.





Increase in Connectivity & Bandwidth Needs

Broadband networks are central to the performance of connected devices and connected home systems; they must be able to sustain the increasing data and capacity requirements of consumers and their connected devices.

Streaming entertainment content is a major driver of bandwidth consumption in broadband households.

Sixty-four percent of U.S. broadband households now own at least one connected entertainment device,⁴ compared to 50% in 2012,⁵ and the number of consumers using these devices to access content has increased steadily since 2010 (Figure 4).

Percentage of Broadband Households Connecting CE Devices to Internet (2010-2014)

Does your household connect any of the following CE products to the Internet to access online content / applications?



Among All U.S. Broadband Households

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Figure 4 Percentage of Broadband HHs Connecting CE Devices to Internet (2010 - 2014)

⁴ Connected entertainment devices include: connected smart TV, connected Blu-ray player, connected gaming console, connected STB and/or a digital media receiver.

⁵ Parks Associates, 360 View CE Adoption and Trends. Q1 2014

Implications for Support

As home networking becomes more extensive and complex, support providers must pay special attention to bandwidth usage and capacity.

Tools that monitor and manage broadband networks will be important investments, helping the providers to prevent poor network performance that results in consumers having less than optimal device experiences. Some support and broadband providers now provide intelligent routers that allow providers to have visibility into customers' broadband networks. These routers often provide information about:

- Bandwidth consumption
- Network performance
- The devices connected to the network
- The connectivity status of these devices (i.e., online/offline)

This level of network visibility helps support agents to remotely identify the cause and resolution of simple network-related issues more quickly.

Broadband network management at this level is often enabled by the TR-069 technology standard/protocol.

TR-069 TECHNOLOGY ADDRESSES OTHER BROADBAND SUPPORT NEEDS.

IT AUTOMATES SIMPLE NETWORK PROVISIONING by allowing devices to auto configure and connect to networks. **IT ALSO FACILITATES SELF-HEALING** of broadband networks by automatically resolving connection issues related to mis-configurations—in many cases before the connection issue becomes apparent to the consumer.

Providing consumers with tools to self-manage broadband networks is a growing practice that should minimize support requests to broadband providers. A few companies have launched premium services that provide consumers with visibility into their home networks through an interface on a smartphone or tablet. These services are typically enabled through a broadband router, allowing consumers to see the devices that are connected to their network and the bandwidth consumed by these devices. Routers enabling these services may also perform additional functions such as:

- Allowing consumers to manage access to their networks
- Alerting consumers to network problems
- Providing basic network troubleshooting assistance
- Optimizing streaming media quality

Eventually, as home networks grow more complex, network management tools may need to evolve to include more advanced capabilities that not only allow agents to see the devices connected, but also to see how these devices interact or communicate with each other. This enhancement should also improve the efficiency and effectiveness of network support.



Devices are more Complex

With increased connectivity, devices are able to receive a wide range of information, allowing device manufacturers to increase the capabilities of these devices, making them more complex.

According to the Technology Services Industry Association (TSIA) benchmark survey of customer service executives, 65% of consumer technology products are "highly complex" in 2013, compared to 42% in 2003. Incidents involving 3rd party products take 45% longer to resolve.⁶

Implications for Support

While complex connected home devices and systems add convenience to our lives, they are more difficult to support.

Performing new functions on new devices is daunting to some consumers and has resulted in an escalation in the number of support calls requesting assistance with how to use or enable device-related functions. Most support providers report a dramatic increase in the number of enablement or "howto" support calls they have received in the past few years,⁷ forcing providers to place more emphasis on these services.

Some providers have launched "Advisor" or "Tutor" premium services that are available both as part of subscription or one-time payment. For many, however, these services are provided as basic level support and are perceived necessary to encourage adoption of new devices. In an effort to reduce the volume of these calls to call centers, support providers now invest in tier-0 support services and tools.



TIER-0 SUPPORT is a combination of self-help and self-healing support solutions provided to consumers to reduce the use of contact/call centers for tier-1 or basic support needs.

SELF-HELP SUPPORT channels are those that empower consumers with information and tools to solve technical problems themselves.

Self-healing tools typically resolve technical problems in the background, often before the problem comes to the attention of the consumer. Tier-0 support tools include: Web pages with Frequently Asked Questions

(FAQs), interactive support forums, web portal with articles and video tutorial that address simple and common technical problems with devices, and tools and downloads that troubleshoot and resolve technical issues.

Some support providers also offer mobile device support apps that give consumers access to web portals.

⁶ TSIA. Benchmark Survey of Customer Service Executives. 2013

 $^{\scriptscriptstyle 7}$ Based on Parks Associates interviews with support providers.





While many consumers now set-up individual devices themselves, the processes required to enable advanced home networking and connected home systems such as home automation/control systems are less intuitive for most consumers. Brands selling connected home products and systems must make the set-up/on-boarding process for their services as easy and seamless as possible in order to attract consumers and capture the revenue opportunity.

Enabling device-to-device communication or device interoperability necessary for enhanced connected home systems and services is often challenging.

EVEN WITH THE GROWING AVAILABILITY OF DEVICE

COMMUNICATION PROTOCOLS, many OEMs use proprietary software in their devices and systems that limit access and control by third parties. Similarly many service provider connected home systems are not equipped with the ability to add third-party devices or to integrate third-party applications. According to Cap Gemini, only 15% of companies that offer an IoT solution integrate with another company's products or services.⁸

GIVEN THE GROWING VARIETY of connected products, gateways, networking technologies and home control platforms, developing solutions that provide interoperability is of paramount importance if the industry is to deliver on the promise of convenience to consumers.

CREATING AND ENFORCING INDUSTRY STANDARDS is

one approach for achieving greater interoperability. However, establishing industry standards requires extensive and challenging collaboration among companies with divergent goals.

The use of open APIs and integration adapters can improve the ability to enable and support these systems.

FINALLY, SINCE SMARTPHONE-ENABLED APPS naturally reduce the time between an issue arising and a support interaction, **customers have a heightened expectation** of real-time problem resolution, which means device data must be captured in real-time and be usable by the support organization.

Learn More!

DOWNLOAD THE WEBCAST PRESENTATION—THE INTERNET OF THINGS: IMPACT ON SUPPORT SERVICES AND SOLUTIONS

This webcast highlights the growing importance of support services for the successful adoption and usage of connected home products and systems.

www.parksassociates.com/ support-internetofthings he Internet of

Heightened Security and Privacy Risks

Device security has always been a primary concern for owners of connected devices.

Consumers consistently show high interest in support services that protect computers from viruses and spyware. With the increase in the range of devices connected to the Internet, consumers are exposed to more risk and the consequences of device hacking could be even more detrimental to home owners. For example, if hacked, connected home control devices (door locks, surveillance cameras, baby monitors, etc.) can give criminals or curious individuals unauthorized access to or control of consumers' homes.

Recent research from Parks Associates indicates that two-thirds of broadband householders have privacy concerns about smart home systems.

Smart Home Privacy Concerns

Among All U.S. Broadband Households



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Figure 5: Smart Home Privacy Concerns (Q2/14)

Nearly 40% are "very concerned" about unauthorized access to the devices; a similar number are concerned about unauthorized access to the historical data records generated by such systems (Figure 5).

Implications for Support

To achieve consumer confidence in connected home products and systems, brands must demonstrate that security is a priority and address support issues with vigilance and a sense of urgency.

Protection and repair of a malfunctioning door lock or Internet-connected health monitoring device may require a greater sense of urgency than the repair of a tablet or even smartphone. Proactive approaches to security support that minimize the risk of invasion will be most appealing to consumers of connected home products and systems. It is important, therefore, that support providers consistently test systems for vulnerability and leverage databases of malware intelligence in order to recognize and block intrusions before they are able to cause much damage



Privacy concerns among consumers have also become more prevalent in the wake of the Internet of Things.

With more devices and systems collecting and storing information about our behaviors and habits, information can be accessed and distributed to unwanted sources. Information collected by connected medical monitoring devices, for example, will likely store sensitive information that can be misused in the wrong hands.

The amount of consumers' personal information that is accessible to marketers, government and media is often overwhelming to some, prompting the European Union (EU) ruling last month on the "right to be forgotten," which allows EU citizens to request that certain personal information be removed from Google search results. More personal data being collected on a daily basis will likely result in a growing need for services that manage our information online or our privacy.

Conclusion

New connected home systems and services emerging out of the expansion of the Internet of Thing must be extensively supported in order to promote product adoption and sustain product use among consumers.

As support providers evolve their services in order to meet the new demands, it is important to acquire tools and strategies that increase efficiency and reduce the increasing cost burden of support.

CONSIDERATIONS FOR TOOLS ACQUIRED INCLUDE:

SCALABILITY/EXTENSIBILITY—Extensible tools that can address a growing number of devices and the growing complexity of broadband households will add greater value to support providers' operations and will minimize the cost of investment in replacement systems.

EASY INTEGRATION—The cost and time to implement new tools also affect support costs. Leverage tools that are cloud-, software- or web browser-based, which are typically lower in cost and faster to implement. **ADAPTIVE INTELLIGENCE**—Intelligent tools that promise to use each incident to improve the capabilities and performance of the overall support process will provide higher ROI for providers than those that are more static in nature.

BUSINESS INTELLIGENCE—Solid business analytics must underpin all call center and other support activities. This data needs to be transformed into actionable insight that helps the call center to not only identify opportunities to improve support efficiency and effectiveness, but also to spot trends that can be used to drive revenue and improve the product and service.



About The Author



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Patrice Samuels studies digital home technical support services across global markets, with a focus on market trends, business models, and provider strategies. In addition to exploring events and disruptions in the technical support space, she examines pay-TV and broadband services in North America and Europe, digital media, and digital music services.

Patrice earned her MBA from Texas A&M University at College Station and BSc. in Psychology from the University of the West Indies in Kingston, Jamaica.

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About Parks Associates



Parks Associates is an internationally recognized market research and consulting company specializing in emerging consumer technology products and services. Founded in 1986, Parks Associates creates research capital for companies ranging from Fortune 500 to small start-ups through market reports, primary studies, consumer research, custom research, workshops, executive conferences, and annual service subscriptions.

The company's expertise includes new media, digital entertainment and gaming, home networks, Internet and television services, digital health, mobile applications and services, consumer electronics, energy management, and home control systems and security.

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