

Whitepaper

# The Service Gateway..

## The Future of Connected Home Applications

### Executive Summary

Over the coming years, exciting applications will help consumers improve their day-to-day lives via innovative energy management and home management applications over their home network. **Broadband service providers can differentiate their subscriber experience with practical applications** like home management, energy management, and home health services. As the focal point of the connected home, the service gateway is an essential component in managing and deploying these new services. This whitepaper discusses emerging whole-home applications, as well as the key technical factors that should be considered when selecting a service gateway for this new environment.

### Introduction: The Rise of the Connected Home

Over the past decade, the home broadband market has undergone enormous transformation and evolution. Statistics from the FCC's recent National Broadband Plan paint the picture.

- The number of Americans with home broadband service climbed from eight million in 2000 to nearly 200 million in 2009
- Home broadband use has grown from approximately one hour per month in 1995, to more than 15 hours per month in 200, to close to 29 hours per month in 2009

Consumers are finding more valuable content and increasingly sophisticated applications online — and our relationship with the Internet is dramatically shaping our daily lives, both personal and business. At home, broadband users are collaborating with colleagues in the office or overseas via teleconferencing. Teenagers challenge each other to head-to-head match-ups in the latest gaming action. Consumers go online to purchase anything from their groceries and household staples to books, clothes, and even cars. Families stream HD movies to their big screen TV over the Internet. **In short, we're using broadband in ways we could not have imagined just a few short years ago.**

People are also increasingly connecting to the Internet through an assortment of devices including computers, phones, game consoles, set top boxes, televisions, and tablets. The growing popularity of these Internet-enabled devices is changing how consumers engage with media. We've entered a new era of the 'Connected Consumer'.

More and more home appliances and devices will offer Internet or home network connectivity — from the HD television to the home security system and refrigerator. Consumers can view their photos posted on Flickr on the large display of their television, check a traffic or personalized stock widget while watching TV, or turn off the backyard lights from their mobile device.

And we can expect the Internet to play an even larger role in daily life in years to come, as consumers embrace increasingly sophisticated applications for entertainment, communication, personal productivity, home automation, telecommuting, and more.

## The Changing Role of the Service Provider... from Dumb Pipe to Advanced Services

As residential broadband adoption rates near ubiquity in certain regions and competition heats up, **speed and price can no longer be the primary focus for differentiation**. Rather, broadband service providers must bring unique value to their customers through reliability, unmatched customer support, and value-added services that can't be found elsewhere.

Over the past decade, bundled services (i.e. triple play/quad play) have been touted as the key to broadband success. By packaging voice, video, and data services together, service providers can streamline account management for consumers (i.e. one bill to pay), as well as reduce customer churn compared with their pure-play counterparts. But even these bundles are becoming commonplace now. Service providers can further differentiate their offerings through value-added applications and services. Enhanced entertainment and home control applications create new revenue opportunities and increase customer satisfaction. Specific examples of value-add applications include:

- Access to exclusive online video or gaming content
- Home monitoring and security (i.e. monitor web cameras from the TV or laptop)
- Home automation (lights, heat, appliances)
- Energy Management
- Video conferencing
- Online backup services
- Personal media management (photos, videos) and storage
- Enhanced technical support (chat, remote troubleshooting of devices and home network)

## Advanced Home Services

Consumer interest in home management/monitoring capabilities will certainly grow as more 'smart' appliances enter the marketplace and consumer awareness of the potential applications increases. As a result, service providers should be considering deploying a mixture of the following advanced home services:

### Home Automation

Home automation applications let homeowners centrally manage their household electronics such as lights, security cameras, thermostats and more. Consumers have complete command of all their connected electronics through a common interface at home as well as remotely by PC, mobile phone or Internet-enabled TV, making it possible to turn lights on/off or turn on/off the thermostat to pre-heat or pre-cool your home from hundreds of miles away.

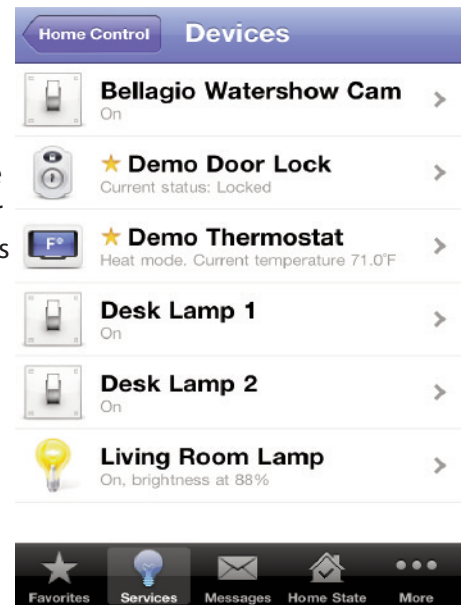
While home control and smart home management systems have been promoted for several years, research firm Parks Associates anticipates that 2011 will see the resurgence of the smart home concept following a series of CES announcements.

According to Bill Ablondi, Director, Home Systems, Parks Associates, "We think there is a significant opportunity for service providers to enhance their offerings with value-added services such as remote home control and monitoring. Our research has consistently pointed to increasing interest in mobile and web-based home monitoring applications."

Such home monitoring and management applications include:

- Remote home security monitoring (i.e. monitor web cameras from the TV, laptop, or smartphone)
- Remotely control appliances from any device with a web browser – turn on/off lights, sprinklers, garage door, security alarm, thermostat, pool heater...
- Schedule appliances – for example, create automated profiles such as 'sleep' at night or 'wake' in the morning to schedule the lights, water heater, alarm system, heat, and more.

Z-Wave is one of the leading technologies to enable home automation. Based on Zensys' Z-Wave open standard, this wireless protocol uses simple, reliable, low power radio waves that travel easily through walls, floors, and cabinets. Z-Wave control can be added to almost any electronic device in the home, including devices that normally aren't considered 'intelligent' such as window shades and lights.



The Z-Wave Alliance is a consortium of independent manufacturers that have agreed to build their wireless home control products based on the Z-Wave standard. Certified Z-Wave products are sure to work with other Z-Wave products and controllers, regardless of the manufacturer. Consumers can purchase appliances with built-in Z-Wave support. In addition, non Z-Wave devices can be made compatible by using a Z-Wave accessory module or plug-in adapter.

### Energy Management

Given rising energy costs and consumer interest in conservation, smart grid and home energy applications are hot issues for consumers. According to a Parks Associates survey, 80 percent of consumers are interested in cutting energy costs; two-thirds are willing to pay for energy monitors; and over 50 percent of these people prefer an online application.

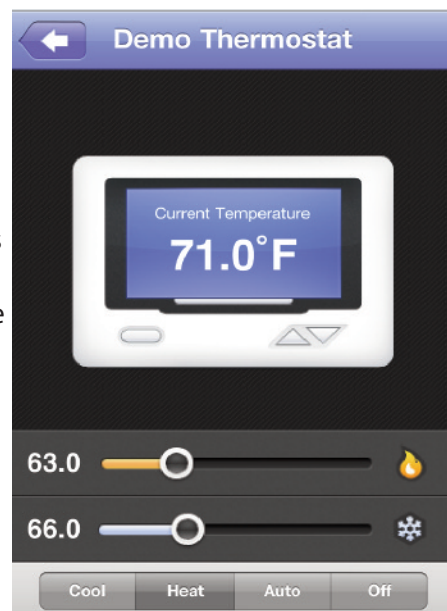
The energy managed home empowers consumers to play an active role in managing their energy usage and costs. Consumers are given real-time visibility into their energy use (whether for the whole home or individual appliances), so they can better understand how much, when, and where energy is consumed in their home. As a result of this visibility, consumers can modify their behavior to reduce their consumption, lower costs, and optimize their usage based on availability and peak/off peak rates and times. And in the future, homeowners will even be able to select the source of their energy — for example, they can choose to run the clothes dryer only when wind power is available.

From 2011 to 2015, the U.S. household smart appliance market is projected to grow from \$1.42 billion to \$5.46 billion, respectively. Consumers will initially aim to purchase larger appliances such as refrigerators, dishwashers, clothes washers and dryers, and stoves/ovens.

And according to research firm Pike Research, there will be more than 28.1 million users of home energy management systems worldwide by 2015, including over 11.1 million users of web dashboards worldwide and 2.6 million users of energy management applications on mobile devices.

Through smart home energy management applications, consumers can use their TV, computer or mobile device to log into the home network, set their energy usage profiles and preferences, turn on/off and schedule appliances, and monitor their energy use in real time. In this scenario, the broadband home gateway serves as an easy-to-use bridge between the utility (smart meter) and smart appliances in the home.

There is not yet one standard for the energy managed Home Area Network (HAN) and products. ZigBee Smart Energy from the non-profit ZigBee Alliance is one of the leading



wireless HAN standards. Other HAN technologies include Wi-Fi, Z-Wave, 6LoWPAN, FlexNet, HomePlug, and LonWorks. Service providers looking to deploy energy management applications should keep a close eye on industry and standard developments, as well as keep their current solution flexible to adapt to changing trends.

### Remote Health Monitoring

Home health products are aimed at fitness monitoring, health and wellness, chronic disease management, aging independently, medication administration and other applications in the telehealth arena.

In their report, Uptake of Personal Health Tools & Services, Parks Associates found that nearly 20 percent of U.S. consumers caring for an ill family member are willing to pay out-of-pocket for a home health monitoring service. According to Parks, the key drivers for adopting home health monitoring include concerns that caretakers will be unable to accurately measure and track their loved one's vital signs.

We know that consumers already access health information and monitoring tools through more than 250,000 mobile health application for the iPhone and 30,000 for Android devices. Home monitoring and care management solutions can also be integrated into the home gateway and delivered by the broadband service provider.

There is no single wireless standard for home health applications. The healthcare industry coalition, Continua Health Alliance, has selected Bluetooth low energy (along with ZigBee) for the wireless technology in its product guidelines. As with energy management applications, service providers deploying home health applications should be able to accommodate changing standards.

## Introduction to the Service Gateway

At the heart of the smart home is the home gateway, or broadband home router. And as smart home applications become more advanced, these home gateways need to grow in sophistication and power to keep up with current and future demands. Given that most broadband routers in the home today do not support these value-added applications, Actiontec designed the SG200 Gateway Device as an add-on to the existing home network. This powerful device can power the smart home with a range of home automation, home health, and energy management applications in conjunction with the home's existing broadband router. As a result, service providers can keep their existing modems/routers and deliver on the promise of the 'connected home', while increasing revenue streams and attracting more subscribers in the process.



The SG200 incorporates several essential features to ensure successful smart home deployments, including:

### Robust Platform

The SG200 gateway provides a powerful platform to support just about any home application. The device integrates 802.11N Wi-Fi access, Z-Wave home control support, and dual USB 2.0 ports. With a 1.2 GHz Marvell processor and 512MB DDR3/512MB NAND Flash memory, the device can handle the most serious media and developer applications. This power means more home networking options, and greater entertainment and communication choices. The gateway can even be used as a multimedia server, distributing video and audio to DLNA-enable players such as iPhones, iPads, or Sony PSPs.

### Wireless Support

The gateway supports 802.11N Wi-Fi access and Z-Wave home control. Other models also support Zigbee. As a result, it can easily support service provider-branded connected home applications.



### USB for Expandability

As discussed above, the communication standards for smart home and home health applications are still evolving – and tomorrow's connected home is sure to contain several applications not even considered today. Equipped with two USB ports, the SG200 can easily grow to meet new application needs down the road. The expandability of USB ports also gives service providers a flexible and cost-effective way to offer their customers premium services without having to deliver high cost hardware devices across their entire customer base.

The following examples highlight the potential of plug-in USB sticks/accessories:

- **USB ZigBee stick:** A simple plug-in USB stick can add support for ZigBee or any other smart grid technology. As a result, broadband service providers can add ZigBee-based home automation to their service packages.
- **USB Bluetooth stick:** A simple plug-in Bluetooth stick can add support for Bluetooth or any other home health technology.
- **USB HDD:** With support for USB 2.0/1.1 storage devices, users can simply attach a USB portable hard drive to create shared network storage complete with RAID support. For example, homeowners can plug a USB MP3 (iPod...etc)

player or a standard USB memory stick loaded with music into the gateway and listen to stored songs through TV speakers or their home audio system.

### **Universal Application Framework**

As the number of applications increase, service providers need an easy way to manage and activate applications across their subscriber base. With a universal application framework, applications from different developers can be dynamically enabled/disabled with ease. This unified architecture makes the potential of a connected home a reality, as providers can now bring a full range of applications from a vibrant and creative developer ecosystem into the home.

The SG200's flexible architecture lets consumers pick and choose the specific applications they want. The SG200 is loaded with Java and OSGi, to bring 'app store-like' ease to the application process. Service providers can dynamically turn on/off applications based on subscriber orders. And OSGi can help manage how an application can be consumed — whether it's one-time use, unlimited use, or subscription.

The gateway's app model for the connected home can be quite similar to that used for cell phones and mobile devices. Subscribers can browse for applications on their computer or television. Once they select and pay for their application, the app will be automatically downloaded to the SG200. Once downloaded, the application will begin to run (without any kind of firmware load). The entire process can be completed within minutes — giving subscribers instant access to their new application. And service providers won't need to incur the time and cost of releasing new firmware each time they want to add a new application offering for their subscribers.

## **Conclusion**

By selecting a powerful and flexible service gateway platform, service providers can better position themselves to take advantage of the growing number of connected devices in the home, as well as smart home applications. With a powerful and expandable architecture, the service gateway can deliver the next generation of entertainment, communication, and home control services — providing consumers with greater options and enabling service providers to better differentiate their packages with high-value applications.

## About Actiontec

Actiontec Electronics develops broadband connectivity and broadband-powered solutions that simplify and enrich the digital life – delivering a unified experience that encompasses communications, entertainment, home management, and more. Actiontec offerings range from the market's broadest selection of IPTV-capable broadband home gateways for bringing IP-based video services into the home, to DSL modems, wireless networking devices, routers and digital entertainment devices. The company's carrier-class products are easy to install, manage, and use, and are sold through retail channels and broadband service providers. The company is committed to protecting the environment through energy efficient products and other green-friendly practices. Founded in 1993, Actiontec is headquartered in Sunnyvale, CA, and maintains branch offices in Colorado Springs, CO; Shanghai, China; and Taipei, Taiwan.

## Appendix: Resources and References

<sup>1</sup>Connecting America: The National Broadband Plan. Federal Communications Commission.

<sup>2</sup> 2010 Zpryme Research & Consulting

<sup>3</sup> Press Release: Home Energy Management to be a Critical Element of the Smart Grid User Experience. Pike Research. May 27, 2010