# The Digital Home Universe is Expanding … Now What?

**a Parks Associates white paper on behalf of**


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# Table of Contents



# List of Figures

# 1.0 Purpose of this Paper

Digital Service Providers (DSPs) – including broadband, television, communications, and wireless service providers – are required to play an expanded role in the digital home. Facing competitive threats from both fellow DSPs and alternatives to the services that they have provided for decades – if not generations (voice, video, data services, communications, etc.) – DSPs face a risk/opportunity paradigm today. From Vonage to Google, the DSP faces more competitive challenges (and risk to their bottom line profitability) than ever. They must work harder and smarter to keep their own customers happy and to differentiate from their competitors. However, the digital home opportunity is a significant "Greenfield" area of development at the same time. With hundreds of millions of worldwide households establishing the basic connection points to enable multi-device connectivity, it is a wide-open field as to which companies can most successfully mine this new opportunity.

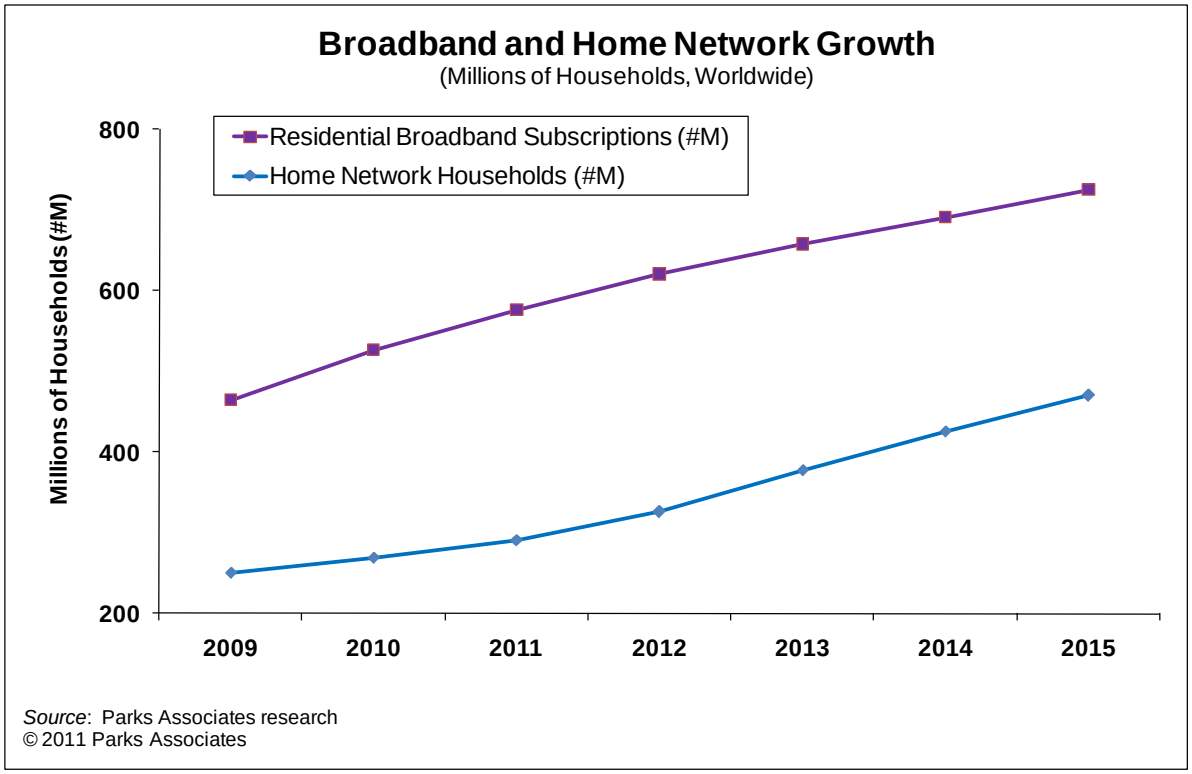


**Figure 1 Broadband and Home Network Growth**

From the deploying of home network equipment to delivering connected home applications spanning entertainment, communications, technical support, and home, health, and energy management, the DSP will leverage two-way communications (operator to the home and device-to-device in and around the home) to build new services to increase customer satisfaction and grow revenue per subscriber. As history has shown, however, the digital home is not yet a "set-it-and-forget-it" experience for either the consumer or the service provider. Instead of a world where all IP-connected devices easily self-configure, announce their capabilities, share similar interfaces, and function with out-of-the-box ease for the vast majority of consumers, installation is typically fraught with trial-and-error, missteps, and – to the detriment of the DSP – a customer support call. In other words, as DSPs pursue digital home opportunities, it is imperative that they consider the impact to their brand, customer service, and overall revenues of venturing into new areas. Particularly important are how both services **and** devices get connected and configured in a much more automated way and managed in a significantly more granular manner.

This paper discusses the important elements of the DSP and the digital home, with a specific focus on device and service activation, provisioning, and management. Parks Associates is a market research and consulting company with approximately 25 years of experience studying consumers and the industries in the digital home space

# 2.0 The Digital Home Components

The digital home is comprised of the following elements:

- **Access services:** Facilities-based services, including broadband, pay-TV, communications, and wireless services
- **Content:** This can be facilities-based (such as pay-TV) or "over-the-top," including music, video, gaming, and user-created content that comes into the home to be accessed via numerous platforms.
- **The residential gateway:** Broadband and triple-play DSPs are using residential gateways in increasing numbers to terminate broadband access services, to help configure and manage home network settings and reduce or prevent customer support calls, and as launching points for new connected home services.

- **Pay-TV services:** As pay-TV providers face increasing competition from new entrants and alternatives (such as free-to-air and online programming), their connected home efforts are focused on allowing subscribers to access content and unique services in new ways. Concrete examples of such efforts include the whole-home DVR, the growing availability of online video content to television sets, and the use of the home network to bring user-generated or home server-based content to the television screen. Emerging TV Everywhere initiatives will first provide an increasing lineup of cable television channels on Internet-connected devices, but the pay-TV DSP's premium content is finding its way to a growing number of retail-based consumer electronics devices (game consoles, connected TVs, connected Blu-ray players, smartphones, tablet computers, and more).
- **Communications:** Advanced customer premise equipment, such as the femtocell, promise to not only improve wireless signal quality in the house, it can also serve as a distribution point for information and content on a wireless network to other devices and systems in the home.
- **Mobile devices:** The proliferation of smartphones and tablet computers in the digital home expands the DSP's reach beyond communications and into providing applications for entertainment and home and lifestyle management to the mobile environment. DSPs are expressing an interest in making TV Everywhere content available to mobile devices and leveraging these devices for control points for advanced television services or home and lifestyle management features.
- **Connected consumer electronics:** Retail-and DSP-deployed consumer electronics such as TVs, Blu-ray players, game consoles, and Web-enabled set-top boxes that can play a dual role. They can be pure "over-the-top" plays and have Web applications that receive content from unmanaged services. At the same time, we are seeing more development of consumer electronics that will link to premium managed services from television providers.
- **Technical support:** In growing numbers, consumers are seeking out professional technical support services to help resolve problems with home computers, peripherals, and home networks. These services can be delivered via multiple channels – at retail, in the home, by OEMs, and remotely. In addition, DSPs are now delivering premium technical support to complement their broadband and wireless businesses.
- **Home and Lifestyle Management**: The DSP role in home and lifestyle management is nebulous at present, but there is growing interest in at least leveraging broadband and wireless networks as the communications infrastructure between a smart meter and a utility to report real-time energy consumption information to the customer. Beyond this feature, DSPs – particularly in Europe – are interested in pursuing value-added applications that allow consumers to self-monitor their home for safety and security purposes. In addition, detection and reporting of environment hazards such as smoke and carbon monoxide can be implemented. Also, remote control of lighting, energy management devices and systems, and appliances may also be a significant feature.

# 3.0 The Role of the DSP in the Digital Home

Critical success factors for DSPs deploying connected home devices and services will be:

- How effective they are in deploying and managing their core services – with dynamic service provisioning, quality-of-service assurances, seamless billing and activation, and service and customer management as key tenets to high-quality delivery;
- Focusing efforts on "zero touch" service/device provisioning and billing, where the installation of both customer premise equipment (CPE: typically defines products such as modems, residential gateways, set-top boxes, eMTA terminals, etc.) and retail-purchased consumer electronics can be a highly-automated experience with much fewer configuration frustrations;
- How well they can deploy value-added services to segments of their subscriber base; and
- How efficiently they can scale their connected home service deployments to account for devices beyond the residential gateway – set-top boxes, network-attached storage devices, and other retail-purchased consumer electronics.

The next sections provide more detail on the DSP's role within the framework of deploying connected home services and devices.

## 3.1 Stage One: Service and Device Activation

The digital home opportunity for DSPs begin with the basics – service provisioning and activation. This is the opportunity for a DSP to establish the appropriate connections to the PC, set up e-mail accounts, and introduce the customer to the DSP-branded portal, which can host e-mail, entertainment services, and customer support information. The DSP goal is to bring service and device activation to the customer in the easiest way possible with the minimal amount of configuration.

During the initial home network set-up, DSPs have the opportunity to add value by enabling basic home network configuration tools. Why? Because a growing portion of their connected home customers expect it!

Today, less than one-half of U.S. households with a home network have a configuration whereby printers and centralized files are accessible and usable by the multiple devices on the home network. Yet, the demand for enhanced home network configurations among

households with a DSP-provided home network (printer and file sharing) is 30-150 percent higher in households that are already receiving at least a basic (broadband-sharing) home network from their service provider.

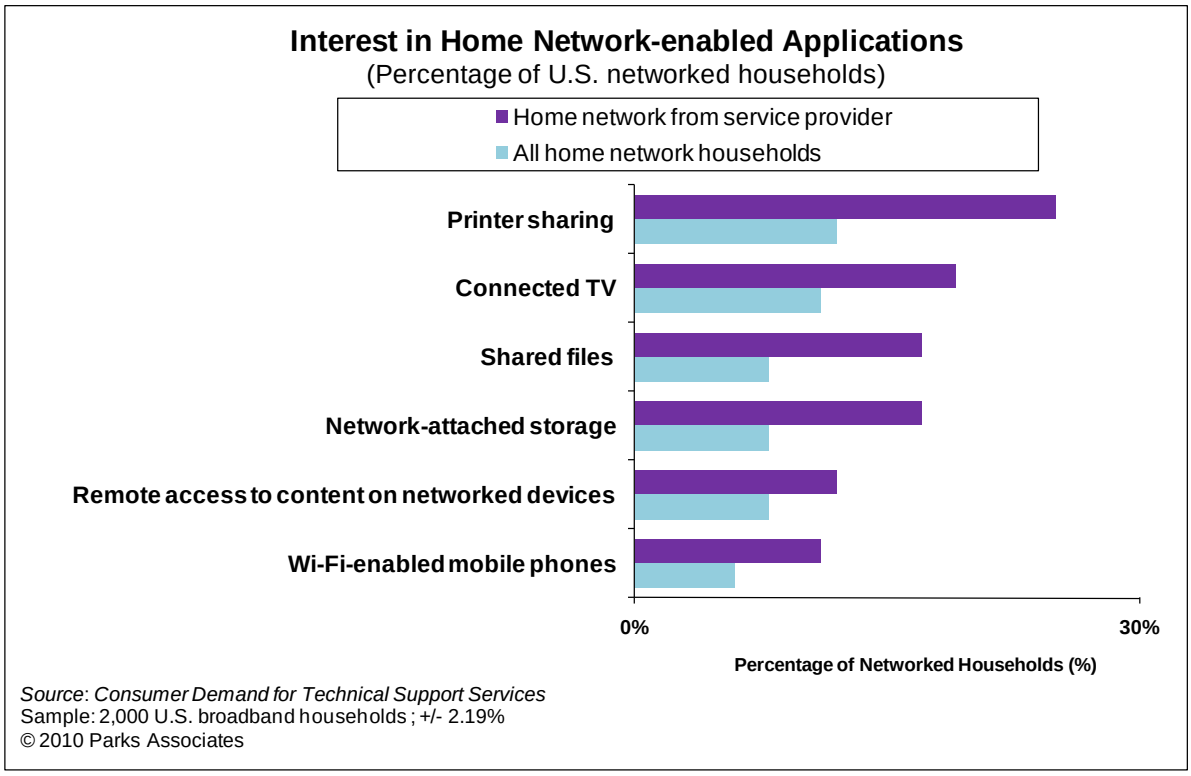


**Figure 2 Are Consumers Interested in Expanding Home Network Use Cases?**

This demand is an opportunity for a service provider that can provide branded home network configuration tools to enhance their customer support credentials. Not only can such services build loyalty in the short-term, but they can help establish the service provider as the go-to entity for additional home technical support services. These are services around which operators can build new revenue-generating services.

Beyond broadband services and customer premise equipment, DSPs also can play a more active role in the activation and proper configuration of wireless devices, including smartphones and tablet computers. With worldwide smartphone connections approaching 400 million by year-end 2014, these devices are expected to play a more active role as controllers, entertainment displays, and communications platforms blending fixed and mobile connections (voice-over-Wi-Fi and femtocells).

In order to facilitate both efficiency and scale for service and device activation, DSPs will require activation solutions that provide both minimal configuration and the ability to reach a variety of devices beyond the modem, residential gateway, and/or the set-top box. Consona's Service Gateway solution is a good example of one such solution. Its benefits include Zero-Touch Provisioning, the ability to access any device that supports TR-069 and other Broadband Forum standards or proprietary functions, and support for the Broadband Forum requirements for the Simple Traversal of UDP Networks (STUN), which is important for a service provider to be able to communicate with devices sitting behind a firewall. In other words, as consumers add more devices to the home network, they will be able to scale their communication to these new devices.

## 3.2 Stage Two: Value-added Services

There is no question that the bundling of core access services – broadband, television, home phone and mobile – increases customer satisfaction. Depending on the number of access services on the bundle, the percentage of consumers indicating very high satisfaction improves anywhere from 10 to 20 percent (overall, 62 percent of broadband subscribers are highly satisfied with their service). However, the bundling of value-added services within a DSP's core offerings may have an even more significant impact on customer satisfaction. In examining consumers who receive a typical value-added services package (a home network router/residential gateway, parental controls, Internet security and access to premium tech support to name a few), the percentage of customers giving their broadband service provider high ratings for satisfaction figure rises to 80 percent!

Beyond services bundling, however, which value-added services will play the greatest role in both improving customer satisfaction and loyalty and contributing to new revenue streams? Parks Associates research finds that the presence of exclusive entertainment content (video and music offerings for example), home networks, and a variety of customer support and assistance offerings (data backup, premium technical support, parental controls, and managed

Internet security) increase the percentage of highly satisfied broadband customers by 8 to 18 percent.

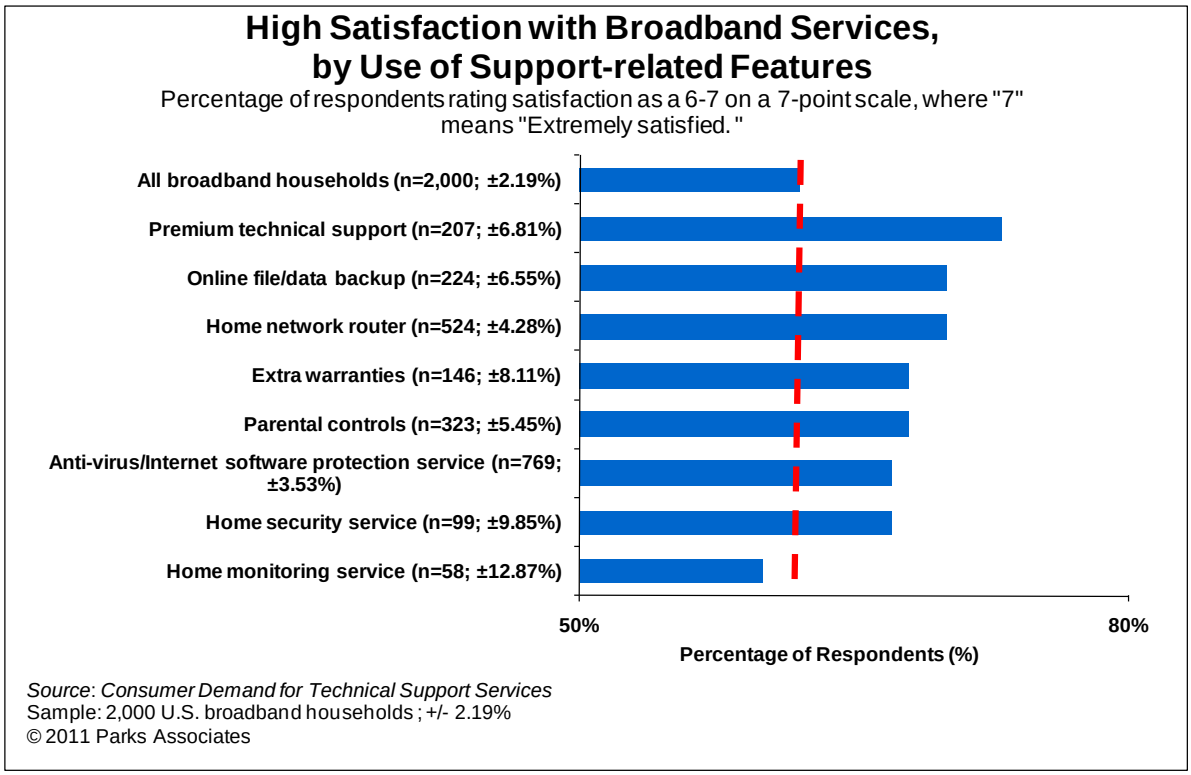


**Figure 3 How do Value-added Services Contribute to Customer Satisfaction?**

With proper activation of services and devices, DSPs set the stage to be able to deliver both core and value-added services features in a proactive and cost-effective manner, as their subscribers desire them. Many customers sign up initially for a few basic services – perhaps just a broadband connection. However, as service providers roll out new services (voice-over-IP, IPTV, Web camera monitoring, etc.), they not only want to activate the accompanying hardware required, but also make sure that back-end systems (billing) are notified that the customer has activated the service and should be billed accordingly.

The Service Gateway solution from Consona allows DSPs to extend value-added services offerings to customers (including the requisite hardware) with the confidence of knowing that the service can be provisioned as needed and the premise equipment can be properly configured and managed automatically.

## 3.3 Stage Three: Tech Support for OPEX Savings and Revenue Generation

With the increased number of devices being added to the home network, comes the risk to the DSP that their customer support calls will grow substantially. In fact, one-quarter of consumers reporting a home networking-related problem indicate that they contact their broadband service provider for assistance, regardless of where the home networking equipment was actually purchased. Assuming that support calls for home networking alone will remain on their current trajectory, the cost to DSPs will total in the hundreds of millions of dollars annually based on our current projections, DSPs ***must*** implement solutions that provide for more automated, remote, and dynamic resolution of device and service configuration issues.

Remote management of the customer premise equipment such as modems, set-top boxes, and home networking equipment offers service providers a number of benefits. First, service providers can offer online technical support, solving CPE problems using remote diagnostics tools that can repair problems without the need for a customer support call or a service appointment. Second, remote management of CPE allows service providers to increase the quality-of-service (QoS) for customers by intelligently managing network traffic. The ability to intelligently manage the network is especially important as service providers anticipate the adoption of next-generation services such as VoIP and IPTV. Ensuring QoS is essential to maintaining subscriber satisfaction and reducing churn. Without QoS, a scenario in which one household member's VoIP suffers from pauses while another family member downloads a file is certainly possible. That same scenario would cause a delay in video, and customers will not tolerate these service problems. Finally, remote management capabilities allow service providers to update CPE firmware and software remotely. This is particularly critical with video-related services, for which remotely enabled firmware and software upgrades deliver a QoS for smooth voice conversations and video viewing. Customers may be willing to put up with a slight "crackle" on a phone call or a small delay in receiving an e-mail, but a bad image during the big football game can ruin a good viewing party!

As customer support focus increases, service providers and equipment vendors will be driven by cost savings from implementing more automated initiatives to decrease support costs. Reduction in calls is a key metric in evaluating the effectiveness of any one integrated customer support solution, as a call volume reduction of 10 percent can be considered a resounding success by today's standards. However, cost savings may be only one of the reasons for the service provider to evolve from a reactive to a proactive entity that delivers greater value to customers. Evidence suggests that broadband providers can implement technical support services that not only allow them to manage their incoming technical support calls, but also develop fee-based businesses to handle a variety of technical support issues.

Consumers respond quite favorably to the idea of using services such as PC tune-ups, virus detection and removal, home network support, peripheral problem resolution, and help with common PC applications (such as e-mail and Web browsing) from their DSP. Three-fourths of consumers also indicate a preference for receiving a variety of technical support services from a single vendor, which would lend itself well to the DSP's strength as a trusted brand and its ability to bundle the cost of premium care services onto the monthly bill that the customer receives already.

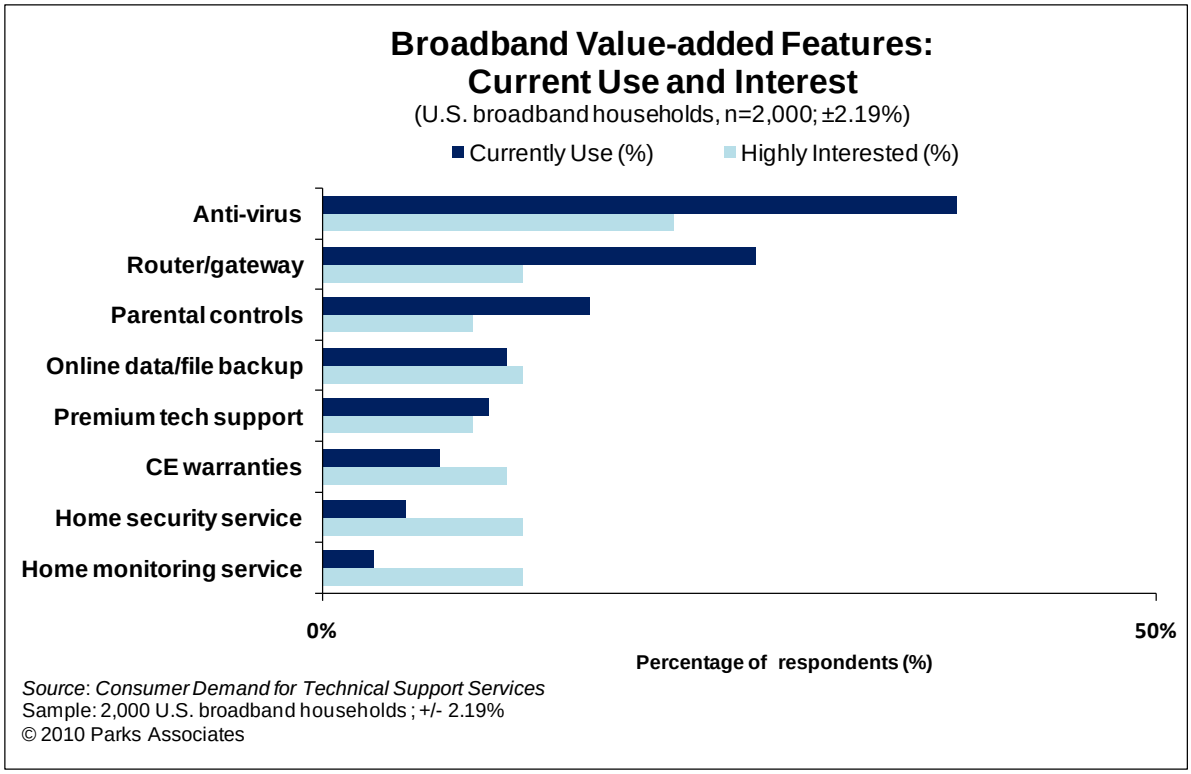


**Figure 4 Current and Desired Value-added Features from a DSP**

The top technical support services that are of interest to consumers are:

- **Anti-virus/Internet security services:** Managed services from broadband providers that detect and remove malicious software from home computers. These services typically have service provider-generated alerts that inform users of new security threats, security tips and troubleshooting.
- **Parental Controls:** Common parental control services offer filters to prevent children from accessing inappropriate content online. Additional features typically include restrictions to chat/instant messaging sites, file sharing blocking, day-and-time restriction scheduling, and monitoring and logging of Internet habits for parents to review.
- **Online data back-up services:** Automatically copy documents, photos and videos from home computers to a service hosted on the Internet.

- **Technical support services such as automated home networking and technical support, telephone and/or online live technical support:** Includes remote and on-site support services.

In total, the premium care opportunity for service providers is expected to grow from $2.4 billion in 2010 to $4.5 billion in 2014. To meet this increasing demand, Consona CRM offers a vast portfolio of solutions to support both the OPEX-savings and enhanced customer care goals of DSPs in a much more efficient manner. These solutions are used by some of the largest service providers around the world for both call reduction and premium customer care services. (see sidebar).

**Consona CRM Solutions for DSPs**

**Service Gateway**
Vendor independent TR-069 compliant Auto-Configuration Server (ACS). Automated remote activation of products and services. Automated remote diagnostic and management of customer premise equipment (CPE).

**Subscriber Assistance**
Automated PC installation, activation, problem detection and resolution. Desktop resident service environment.

**Service Verification**
Integration with network management systems to provide installation engineers and support technicians with a view of the quality of the network.

**Live Assistance**
A complete suite of call center tools. These allow the support technician to remotely ascertain the state of a customer's PC and then provide methods for remote resolution. These vary from remote e-mail configuration through to full remote control. Both 'chat' and traditional phone channels are supported.

**Self-Service**
Provides all the functionality and content that customers need to resolve their issues themselves, immediately, 24/7.

**Knowledge Management**
Streamline knowledge capture, improvement, reuse, and measurement for both customers and analyst usage.

## 3.4 Stage Four: New Connections & Services

The digital home is not a static environment, and consumer demand for enhanced value-added services spanning communications, entertainment, home and health monitoring, and energy management are expected to make up the majority of new home network connections in the next few years. With the digital home infrastructure in place, connected devices are expected to grow quickly beyond the residential gateway, router, and wireless access point. Parks Associates forecasts that more than s billion devices will be connected on the home network by year-end 2015 (**Figure 5**). This evolution of the digital home to include consumer electronics, home controls, and communications nodes represents a significant greenfield opportunity for DSPs to play a role in configuration and management of the home network. The first opportunity will be to support the proper configuration of more basic home

networking settings, providing consumers with the ability to get more than just basic functionality from the home network. Enhancing the usability of the home network by helping consumers establish proper settings for shared printer and shared data file access across home networked devices is the first step in augmenting the basic functionality of the home network. As home network functionality expands into connected consumer electronics devices, there will be a greater need to bring in retail-based consumer electronics into proper home network configurations and provide at least basic management functionality to ensure a high quality of experience, particularly in their use as video playback devices.

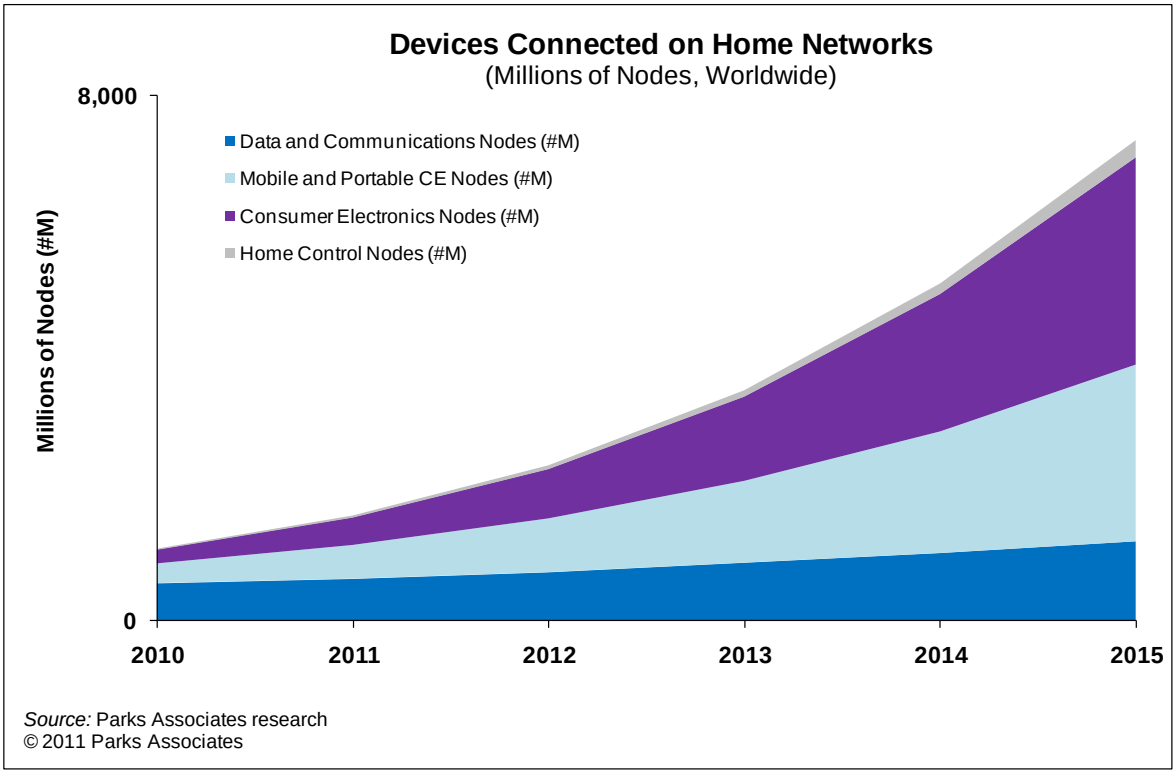


**Figure 5 Devices Connected on Home Networks**

To account for many different segments of consumers desiring different digital home applications—as well as regional differences that will place varying emphasis on what digital home features matter most, DSPs will require very flexible activation, provisioning, and monitoring solutions that are capable of providing support for a great many devices and services.

Consona's own experience bears out the importance of such dynamic service and device provisioning. Among select customers, Consona's Service Gateway solution has provided DSP's

improvements in initial configuration and a reduction of provisioning phone calls. (See sidebar for more information on Consona's Service Gateway solution.)

In addition to the aforementioned benefits of enabling NAT transversal (to provide visibility to connected devices behind the firewall), administrators are also provided with tools to manage new devices via data models that can be managed with a GUI interface. For example, recently at a large United Kingdom DSP, a set of modems were released with a significant firmware fault. In recent years, the approach to resolving this would have been to either send an engineer to replace the modem or have support walk the customer through a time consuming upgrade process. With Service Gateway, the DSP in question was able to upgrade the firmware on these modems without the need for human intervention.

### *Service Gateway provides*

- Support for Ethernet and ADSL gateway devices, including home gateways, VoIP ATAs, IPTV STBs and both fixed and mobile wireless terminals
- Access any device that supports TR-069 and other related Broadband Forum standards or proprietary functions using our Software Development Kit (SDK)
- Customizable and feature-rich Policy and Workflow engine
- Integration with northbound Web services and southbound protocol abstraction for operation support systems (OSSs)
- CSR UI with an interactive Web 2.0 experience for customer and fault management
- A device capability discovery engine
- Flexible tools for building and aggregating device configuration templates
- Supports the latest Broadband Forum requirements for Simple Traversal of UDP Networks (STUN) enabled devices
- Integration with Consona Subscriber Assistance and Service Verification solutions
- GUI friendly Data Model Import tool allows your administrators to more easily import, update and customize data models for new devices
- Ability to integrate with third-party tools to monitor key system performance metrics via Java Management Extensions (JMX)

## 4.0 Summary Thoughts

DSPs need to extend their reach further into their subscribers' homes via set-top boxes, residential gateways, and femtocells – and expand to new devices and services, including Web-enabled consumer electronics, mobile devices, and monitoring and control solutions. Operators can take advantage of connected consumer electronics to launch home networking, online storage, remote DVR scheduling, and other types of advanced services. Providing managed digital home services can be either a revenue generator or a differentiating factor for service bundles. And home services and blended applications which 'converge' entertainment and communications offer the potential to grow ARPU significantly.

Our recommendations for DSPs as they evaluate different customer support solutions include the following:

1. The solution must enable granular metrics and provide a roadmap for extensions.

Data and metrics matter to the service provider, and any customer support solution must account for these numbers from all links in their service portfolio – including home networking equipment or other digital lifestyle equipment. The mantra from service providers is metrics equals management, so the solution must fit well with existing and emerging standards for remote management, including TR-069. The solution must also allow for the migration of applications, including even more minute and localized measurement. The ability to pull specific data about quality-of-service (packet loss, latency, etc.) from individual set-top boxes and other entertainment receivers is a critical next step to many remote management systems offerings. Tools that enhance the provider's ability to analyze and aggregate data will also be important to mining the data for new opportunities for cost reduction or revenue generation.

2. The solution must scale to consumers' changing needs.

In initial rollouts of enhanced customer support solutions, we assume that the majority of subscribers will be content with significant amounts of automation in terms of troubleshooting and self-help. Most do not want to be involved in the process of diagnosis or repair; some will not want to be aware that a problem was diagnosed and fixed; they simply want to have their equipment and services working as promised. However, as customers grow more accustomed to their service provider as an experience provider and perhaps even a trusted digital home advisor, the solution must take into account the likelihood that customers will want to customize its use (i.e., designate it as more interactive or less) to fit their particular lifestyle. As important, the service provider may not want to remain a hidden fixer; there may be significant value in branding certain aspects of customer care. On a simple level, this branding may entail something like proactive messaging in the form of e-mail or instant message that alerts customers to new virus outbreaks and offers solutions. On a more advanced level, the carrier may actually want to deploy a customer-facing and subscription- or fee-based customer support solution and value-added services that extend its basic offerings.

## About the Author

Kurt Scherf studies developments in home networks, residential gateways, digital entertainment services, consumer electronics, and digital home technical support services. Kurt is the sole author or contributing author/analyst to more than 100 research reports and studies produced by Parks Associates since 1998.

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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.

Each year, Parks Associates hosts executive thought leadership conferences CONNECTIONS™, with support from the Consumer Electronics Association (CEA) ®, and CONNECTIONS™ Europe. In addition, Parks Associates produces the online publication **Industry Insights** in conjunction with the CONNECTIONS™ Conference series.

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