SeaChange® WhitePaper

Conquering the Connected Home

INNOVATIONS REVITALIZING THE SUBSCRIBER VIEWING EXPERIENCE

video. personal. everywhere.

executive summary

This white paper discusses:

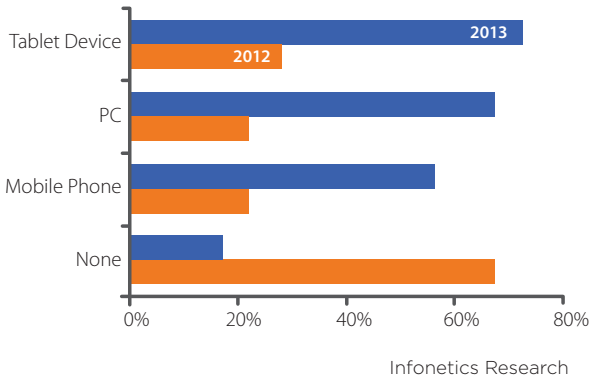
> *The emergence of OTT providers in the pay-TV industry.*

> *Service providers' response through the adoption of Media Gateway set-top box technologies.*

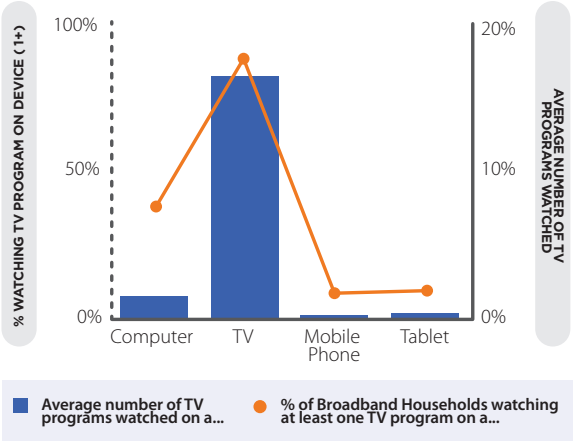
> *The creation of the industry RDK and its role in simplifying set-top development and enhancing speed to market for Media Gateways.*

The landscape of pay-TV is changing dramatically due to a number of industry and technology advances that impact the way subscribers watch video content, including the expansion of video across multiple screens, as well as the emergence of Over The Top (OTT). Multi-screen viewing is growing dramatically and has introduced new ways for subscribers to access video and other content virtually anywhere. As a result of growing content fragmentation, subscribers are in need of offerings that provide easy access to a range of blended entertainment services that combine live TV, video-on-demand, and OTT content with other media sources through a unified user experience across all screens. Cable and telco video service providers are best positioned to offer a blended entertainment service experience due to their extensive investments in network infrastructure, strong relationships with content providers, and their consistent Quality of Service (QoS). Although "TV Everywhere" services are becoming more prevalent among service providers, it is evident that the television screen still commands the majority of subscribers' daily viewing time. Service providers are inclined to invest in new technologies that enable increased speed, flexibility and control over the home viewing experience. While there's overwhelming focus and chatter about the emergence of multi-screen, the big screen at home is still the most watched and most valuable. In fact, the emergence of the **Reference Design Kit (RDK)** is making it easier for service providers to deploy new technologies that enhance the subscriber experience throughout the "connected home."

> MULTI-SCREEN VIDEO IS GROWING...



> ...BUT, TV IS STILL THE SCREEN OF CHOICE



NEW PAY-TV ENTRANTS

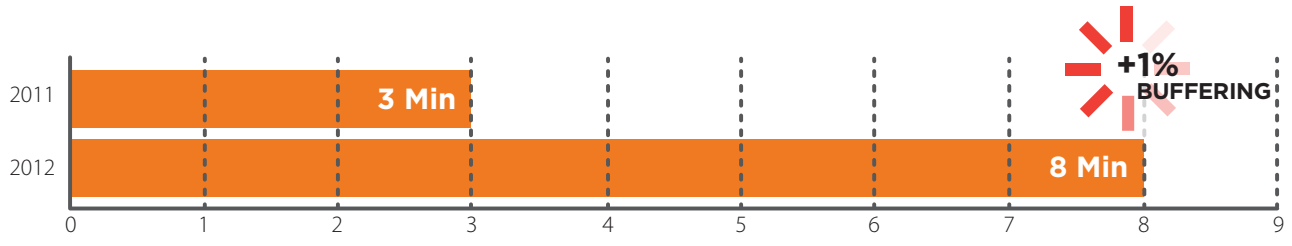
The emergence of OTT video delivery is allowing subscribers to enjoy a variety of streaming content through non-traditional channels with attractive pricing models. Popular OTT providers like Netflix, Hulu, Apple and Amazon drove the global OTT market past $8 billion in revenue[1] in 2012. Subscribers can access OTT content using dedicated IP set-top boxes (such as Roku or AppleTV) as well as almost any device with an Internet browser (PCs, tablets, game consoles, etc.).

The biggest obstacle to even more widespread success of OTT has been that providers have not yet figured out how to consistently provide a superior Quality of Service (QoS) experience using the Internet. Buffering, latencies, and video quality all have been shown to negatively impact viewer engagement. While subscribers have accepted jerky, low-bandwidth video for YouTube viewing over the past few years, high-quality HD and surround sound are the norm for viewing the latest action movie.

That said, OTT providers should still be considered a formidable threat that service providers ignore at their own peril. Subscribers find many features delivered by the OTT providers to be compelling and that quality is getting better each year.

According to a recent Viewer Experience Report[2], in 2011 a 1% increase in buffering resulted in 3 minutes less of viewing time per view of long form content. In 2012, that identical 1% increase led to 8 minutes lost in viewing time per view for similar content.

In 2012, global premium content brands lost $2.16 billion of revenue due to poor quality video streams and are expected to miss out on an astounding $20 billion through 2017. — Digital TV Research, Online TV and Video Forecast



> AMOUNT OF TIME LOST ON AVERAGE WITH AN INCREASE OF 1% BUFFERING

[1] ABI Research http://www.abiresearch.com/press/over-60-growth-in-worldwide-over-the-top-video-rev
[2] 2013 Viewer Experience Report

ADOPTING MEDIA GATEWAYS AND SET-TOP INNOVATIONS

Service providers are developing new ways to enhance the connected home, and provide a richer and more compelling viewing experience for their subscribers. Whole-home DVR, multi-screen video, content sharing and streamlined user interfaces are all aspects of this new wave of blended entertainment services.

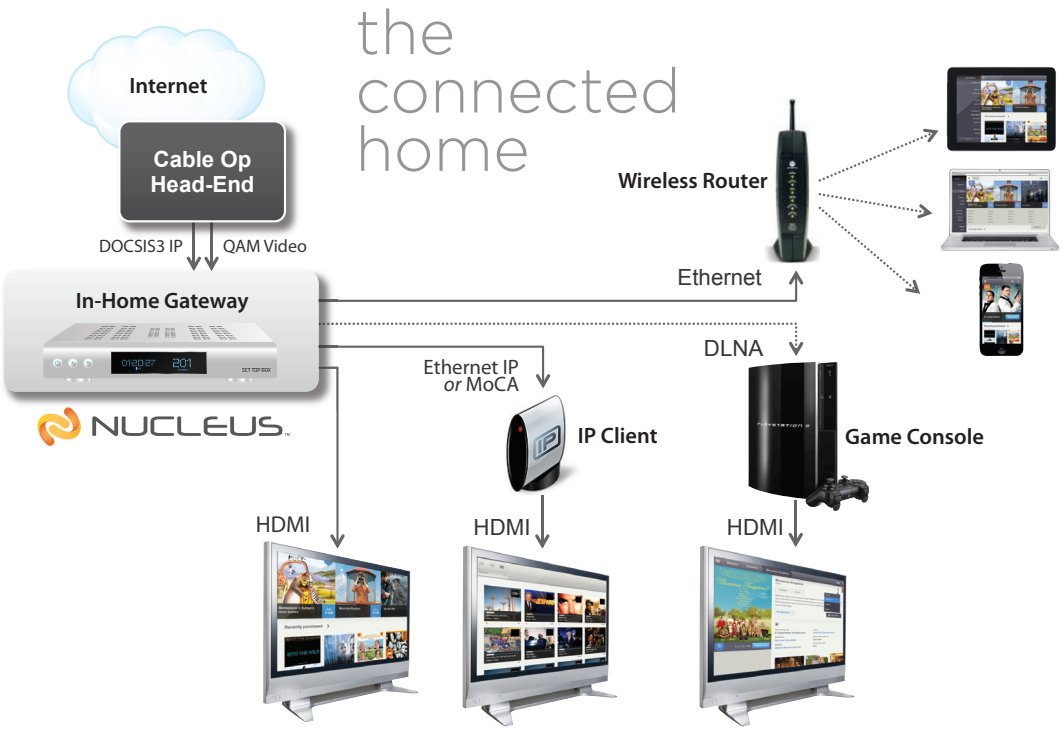
As service providers continue the transition to IP-based video delivery over their managed networks, subscribers are benefitting from the removal of barriers between the TV and broadband platforms, resulting in increased connectivity and integrated user interfaces for all screens and platforms within the home.

Core to the delivery of these new blended entertainment services is a new generation of set-top boxes that act as **Media Gateways** for the home. A Media Gateway is a central network hub within the home for accessing broadcast and on-demand video content, and making it accessible on any connected device throughout the home.

Media Gateways typically contain multiple tuners and can transcode both MPEG 2 and MPEG 4 (H.264) encoded video to various formats used by tablets or other connected devices. In addition to making it easier to view and share quality content throughout the home network, Media Gateways provide the high QoS that subscribers have come to expect from managed service provider networks.

Media Gateways can be configured as Headed or Headless. A **Headed** Media Gateway takes the place of a traditional DVR set-top and is connected directly to a TV, while adding the whole-home DVR experience. A **Headless** Media Gateway is closer in principle to a cable modem that contains a hard disk drive but no direct connection to a TV. A headless gateway can be placed anywhere in the home, whether it's a closet or the garage, and serve the multiple screens and devices in a discreet fashion. In both cases, the Media Gateway handles conditional access for content coming from the public network and playing Digital Rights Management (DRM)-protected video content to other devices in the home.

To complete the whole-home media experience, service providers are also deploying very small and simple "IP-only" client devices that consume live or recorded video content distributed by the gateway throughout the home. Via the gateway these devices present the service provider branded user experience that would otherwise be unavailable on smart TVs, or other **Digital Living Network Alliance (DLNA)** devices. By incorporating these technologies throughout the home, subscribers gain a rich and unified experience in the home that enables interconnectivity among screens and seamless blended entertainment services. Subscribers can access the content they want to watch from browser-based UIs and access additional services and entertainment through an app storefront similar to those created by Roku, Apple and others.



Media Gateway features:

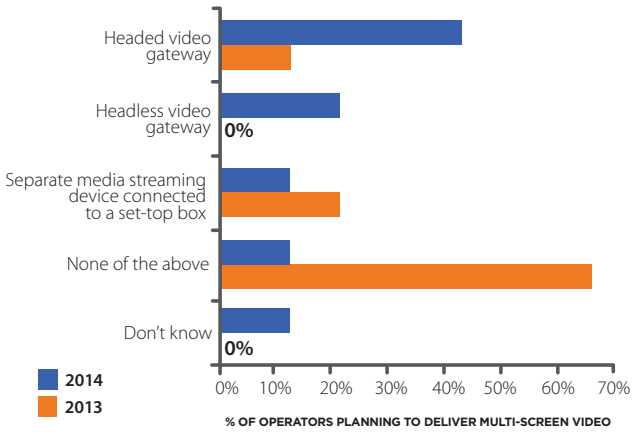
- *HTML5/Web-based Application Environment (Webkit, Opera, others)*
- *Multiple tuners*
- *Whole home networking*
  - *Ethernet*
  - *MoCA (data transmission over coaxial cables)*
  - *W802.11 (Wi-Fi for throughput greater than 1 Gbps)*
- *DLNA for digital media sharing between CE devices*
- *Docsis 3.0-Broadband support for high speed data transfer from the head end*
- *MPEG-2/H.264 Decoders*
- *Transcoders for HLS support*

REACHING THE TIPPING POINT

Media Gateways are offering service providers flexibility, control and a range of other capabilities. Therefore it's no secret why service providers are increasingly choosing these appealing platforms for multi-screen video distribution. ABI Research predicts the growth of Media Gateway shipments to triple from 2011 through 2015, reaching upwards of 216 million[3]. The increasing investments made in Media Gateways and advanced set-top technologies by service providers demonstrates the growing commitment to advanced video network configurations in the home.

> VIDEO SERVICE PROVIDERS ARE INCREASINGLY LEVERAGING MEDIA GATEWAYS FOR THEIR MULTI-SCREEN VIDEO DISTRIBUTION STRATEGIES

Infonetics asked operators: How will you deliver multi-screen video?



[3]ABI Research

ENTER THE RDK

Service providers are preparing to launch a new class of integrated whole-home devices and services, based on a Media Gateway and IP Client architecture. One of the key building blocks in the rollout of these new services is a new specification for set-top operating systems and software called the Reference Design Kit (RDK). The RDK is a specification based largely on open-source software (i.e. Linux, OpenGL ES, GStreamer), combined with a number of key components made available by Comcast.

Previously, developing and deploying the foundational software for Media Gateways was a daunting task that took a tremendous amount of resources in order to create proprietary software solutions. The unification of a standard software development stack has ultimately helped provide the following benefits:

- **Speed to Market** - Increases commercial set-top time to market through faster vendor integration and reduces time spent creating and launching new apps and services
- **Standardization** - Consistency, predictability and common interfaces across hardware vendors enabling service providers more options to choose from
- **Collaboration** - Open and shared source components that promote innovation and continuous improvement

The RDK specification is expected to ultimately reduce costs associated with purchasing set-top devices, as well as the work required to test and launch platforms. At a recent cable industry event, Matt Strauss, SVP Digital and Emerging Platforms at Comcast, discussed the speed and ease at which the RDK allowed on-the-fly updates. He referenced that the Comcast X1 platform which leverages the RDK was updated 100 times over18 months. Previously, without the RDK, the platform could only be updated once during that same time span. The RDK defines a standardized software base that can promote innovation and be optimized to meet the needs of individual service providers going forward.

On the benefits of the RDK — Over 18 months, the RDK enabled Comcast to update the X1 platform 100 times. Previously, the platform could only be updated once during a similar period.

ADOPTING THE RDK

While the RDK is improving the software stack development process it is not a deployment ready, standalone configuration and often requires some customization to fit a specific service provider's network environment. Service providers implementing the software stack for the first time typically require a significant amount of custom integration and configuration to tailor new customer premise equipment (CPE) devices to fit their complex environments.

Service providers need to consider this and account for the following factors when implementing the RDK into their operation:

- Internationalization of network and signaling protocols
- Service provider application frameworks
- Service provider-specific signaling protocols and paradigms
- Interoperability with existing OCAP/tru2way devices
- Cloud-based vs. local application execution models
- Interactions with other CE devices in the home

To learn more about how SeaChange can help service providers implement the RDK, visit us at **www.schange.com** or on **YouTube**.

About SeaChange International

Ranked among the top 250 software companies in the world, SeaChange International (NASDAQ: SEAC) enables transformative multi-screen video services through an open, cloud-based, intelligent software platform trusted by cable, IPTV and mobile operators globally. Personalized and fully monetized video experiences anytime on any device, in the home and everywhere, are the product of the Company's superior video platform, advertising and in-home offerings.

SeaChange's hundreds of customers are many of the world's most powerful media brands including all major cable operators in the Americas and Europe, and the largest telecom companies in the world. Headquartered in Acton, Massachusetts, SeaChange is TL 9000 certified and has product development, support and sales offices around the world.

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