TRENDS, TECHNOLOGIES, & ECOSYSTEMS:
Evolution of The Digital Home

The connected home continues to evolve from basic connected home networks to a feature-rich collection of CE devices, broadband-enabled services, and multifunctional set-top boxes and residential gateways.

Existing and traditional services are continually offering more: **more** functions, **more** speed, and **more** consumer benefits.

CONSUMER PREFERENCES AND DEMANDS *are in large part driving the technological advances in devices and services.*

Parks Associates, *with more than 25 years of industry expertise and consumer research*, analyzes the top trends influencing the future of the connected home and digital lifestyle.

Consumers are being offered more services from a growing number of providers.

- Many of these services have some appeal, but consumers are willing to spend only marginally more than they currently do for services.
- New services must not only prove their value but also compete for value against other offerings.

Core features and functionalities are most important to consumers.

- For pay-TV services, improving the basic video experience is still more important than adding additional features.
- For tech support, break-fix ability is key.
- For security and home control systems, home safety and security are key.

Consumers want comprehensive solutions.

- Cobbling together a video solution that includes YouTube, Netflix, and pay-TV services is not ideal.
- Similarly, piecing together a tech support solution from different software, hardware, and service providers is not ideal.

Environmentalism and limited cost savings will not be major drivers for energy management services.

- Marginal savings and the "feel good" of energy efficiency are not enough to substantially change consumer behaviors.

BROADBAND SERVICE PROVIDERS adopt multiservice strategies to offset stagnant revenues and increasing OPEX costs.

Broadband services are the foundation for the growth of consumer technology products and services.

By 2016, 814 million households worldwide will have Internet service, and over 94% will have broadband.

Broadband access will account for almost 99% of all Internet households in the U.S. and most Western European countries.

In areas where wireline services have not achieved full coverage, *including markets such as Africa, the Middle East, India, and Latin America,* **wireless broadband is likely to outpace fixed line services**. This trend leverages the growth of mobile services, and even in developed markets, LTE services will provide a quality alternative to fixed-line services. But as wireline services move to 1 Gbps and beyond, these connections will work best in serving the consumer demand for online video and cloud-based services.

2016

the NUMBER *of*
Internet
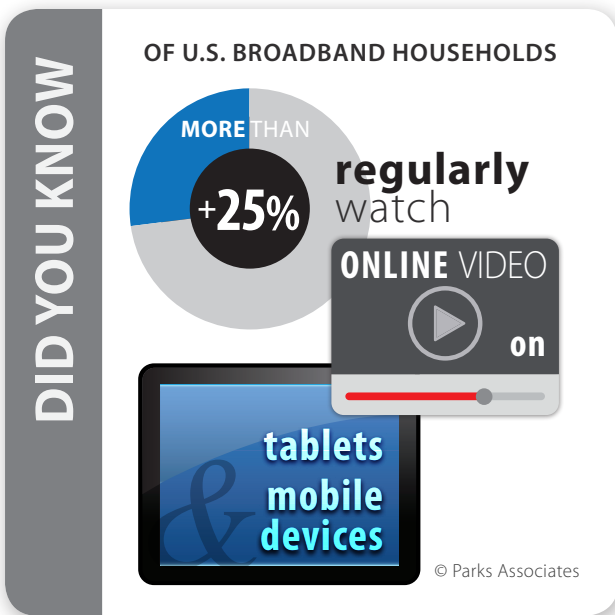HOUSEHOLDS
w rldwide
will
BE 814 MILLION

© Parks Associates

While broadband speeds have increased, pricing for broadband services has remained flat.

Broadband providers have watched their **revenue per bit drop as their expenditures and the volume of usage increase**. Usage-based business models will become more common moving forward, with providers encouraging consumers into different tiers of service based upon their usage profiles. Furthermore, service providers as well as wireless carriers are turning to a multiservice strategy to offset revenue losses from the commoditization of standard broadband services.

USER INTERFACES expand to allow for personalized search and discovery.

The popularity of OTT video services is **driving changes in the user interface** beyond pay-TV grid-based interfaces.

DID YOU KNOW

OF U.S. BROADBAND HOUSEHOLDS

MORE THAN
+25%

regularly watch

ONLINE VIDEO
▶ **on**

tablets mobile devices

© Parks Associates

As smart TVs and other connected CE devices integrate apps, online content, and second-screen services, their user interfaces (UIs) are evolving to handle multiple streams of content and to allow for better organization, customization, and personalization.

The manner by which consumers select content with a remote controller is evolving, particularly with the increase of graphics-oriented apps on smart TVs. Industry players are experimenting with enhanced access features like facial recognition, voice navigation, gesture control, and search and recommendation. Smart TV manufacturers will increasingly incorporate gesture and voice controls into their interface.

Platforms other than the smart TV also offer unique user interfaces.

Apple introduced the Siri voice-command feature in the iPhone 4S, and Microsoft integrated gesture and voice controls through Kinect on the Xbox.

For home systems, ease of access and control makes or breaks the adoption of a product. Recognizing this fact, smart home device and service vendors are driving control of their products away from a dedicated display (IHD) or device -specific touchpad to popular platforms like smartphone and tablet apps.

Providing **personal recommendations is a growing feature** of content services.

Service providers, content owners, and advertisers will all benefit from the ability of a connected device to suggest content and advertising based on a viewer's habits, demographics, or the context of a currently playing program.

The question of who will control the user interface remains a contentious issue as pay-TV providers seek to differentiate services and manage subscribers through unique experiences, while smart TV manufacturers seek to create a broader app interface on the big screen.

SERVICE BUNDLES, CONNECTED CE, & MOBILE PLATFORMS

are key to energy services and are opening new markets for IP-based home management services.

The promised **long-term growth of IP connected home management services** will help broadband providers deepen their relationships with subscribers while offsetting slowing revenue growth from core services.

Players such as Verizon, Comcast, Swisscom, and ADT Security have all entered this space with IP-based connected home solutions.

Service bundles including entertainment, technical support, home management, energy services, and healthcare *extend the operator's reach into the home*, leverage existing investments in marketing and equipment, and create new revenue opportunities.

Connected Systems & Services
GROWTH DRIVERS

- Mature markets

- High adoption of broadband and home networks

- Familiarity with smartphones and tablets

- Improved user experiences

- Lower equipment costs

This bundling strategy is especially important in the energy markets as consumer enthusiasm for energy savings and efficiency has waned. Parks Associates research in late 2012 shows interest in saving energy has declined slightly among consumers overall; however, in a hopeful sign for the future of this market, younger consumers are starting to show more interest in energy-saving products.

OVER **90%** of U.S.

Consumers **18-34** **WOULD PAY** FOR a smart thermostat — or — smart water controls **if the solution** *saves them* **20%** on energy consumption

© Parks Associates

These young consumers **come with certain expectations** for technologies.

Developers targeting this market **must ensure their home management service/solution provides** good functionality, with a modern and sleek user interface, and the solution needs to tie into other systems and popular connected platforms throughout the home.

A key driver for adoption of these services is the proliferation of connected CE and mobile platforms.

By extending their new offerings to these popular, and multipurpose, devices, providers will raise consumer interest and adoption of these services, which previously were behind closed and expensive proprietary systems.

Parks Associates estimates there are approximately **450,000** SUBSCRIBERS of bundled IP home management services in 2012, generating **$500** MILLION in revenues for these services.

MULTISCREEN SERVICES become standard on any device and for all video offerings.

Video has evolved beyond time and place shifting in the DVR model to an "*anywhere, anytime*" service, both in consumer usage and expectations.

of **PAY-TV** Customers *in* **North America** *have access to* **TV** EVERYWHERE

& **TWO-THIRDS** *of* **PAY-TV** Customers *in* **Western Europe** *have access to* OPERATOR-PROVIDED **MULTISCREEN SERVICES**

© Parks Associates

The wide availability of video content on the Internet has enabled any Internet-connected screen to become an entertainment device. Pay-TV providers, fighting to maintain their role as primary sources of video, have embraced Internet video through a rapid rollout of multiscreen services, one of the fastest deployments in history. *Ninety percent of pay-TV customers in North America have access to TV Everywhere, and two-thirds of pay-TV customers in Western Europe have access to operator-provided multiscreen services.*

In 2013, **106 million** pay-TV subscribers in North America **will have access** to these services, making pay-TV providers important players in the future of online video.

- Video viewing on tablets doubled to 0.6 hours per week between 2010 and 2012

- Video consumption on mobile phones more than doubled

- Roughly 20% of broadband users watched video on a mobile phone in the past 30 days

Contrary to speculation, however, **households are not abandoning physical media *en masse***. Only 8% of U.S. broadband households have abandoned DVDs and Blu-rays completely in favor of TV and Internet video, and consumers who are abandoning discs do so because they dislike the movies being released in general. **Consumers have not reached the point where cloud copies are valued at the same level** as physical media, but subtle price changes make a substantial difference in responses.

Not all new distribution methods for video will be successful.

FOR EXAMPLE

JUST 10% of U.S. users express a willingness to rent and watch video through a social networking site.

© Parks Associates

The industry will have to continue to experiment with new services, including free, ad-supported video content and new apps, providing consumers the flexibility demanded with today's new multiscreen environment.

ADVANCED RESIDENTIAL GATEWAYS AND CLOUD-BASED SERVICES provide new opportunities for service providers

Disruptions in distribution channels are forcing all players to reexamine their value propositions. In particular, as 2013 progresses, service providers will stake a bigger claim in the home through more service and media offerings.

Wide availability of online video has transformed **all Internet-connected screens** into entertainment devices, and OTT services such as Netflix Watch Instantly have underscored the new challenges to service providers.

Netflix's services

DOMINATE

© Parks Associates

THREE *of the* **FOUR** SCREENS **consumers use to watch** MOVIES & TV PROGRAMS, a domain that otherwise would seem a natural extension of pay-TV providers' traditional services.

> **These OTT services are also consuming bandwidth over their networks while competing directly against their transactional VOD services.**

BY 2017
BROADBAND SERVICE PROVIDERS
w🌐rldwide
will *deploy*
120 MILLION
residential gateways + routers
UP FROM **75** MILLION *in 2012*

© Parks Associates

In response, pay-TV **providers have embraced Internet video through rapid rollout** of multiscreen services to the majority of their customers, *but these efforts will not stop at video*.

Providers are **moving to monetize** a variety of value-added services.

Many are investing in network infrastructure to deliver cloud-based services to consumers and to enable cloud-based features for in-home devices. For some service providers, gateways, especially high-end models, will be an important aspect of their strategies to capture new revenues.

By 2017, broadband service providers worldwide will deploy 120 million residential gateways and routers, up from 75 million in 2012. Thirty-nine million of units deployed in 2012 will be **high-end, feature-rich residential gateways**, increasing to **over 65 million** by 2017. These high-end gateways allow providers to expand their offerings to include options such as VoIP, advanced home network monitoring, and media sharing.

CONSUMER DEMAND FOR MOBILITY AND PORTABILITY
will collide with operator efforts to expand tiered pricing offerings.

As Internet-connectable products continue to achieve higher penetration, **opportunities for advertising, gaming, control apps, and second-screen interactions will increase**.

Major advertisers and content owners are providing more personalized advertising environments and applications that link the television to a mobile device, **encouraging greater interactivity** between portable and fixed consumer electronics.

Almost every consumer experience now has a **mobile component**, from video viewing to controlling home systems, and these second-screen offerings tap into the growing consumer expectation for ubiquitous access, both fixed and wireless. At least one, and often two, smartphones are in over one-half of broadband households in the U.S. market, and by the end of 2012, there will be over 180 million smartphone users.

+

Consumer use of data-heavy applications, namely video streaming, **is soaring** along with adoption of these devices, **requiring more capacity and greater efficiency for mobile data**. The rollout of LTE networks is an important step towards the realization of future "true" 4G capabilities. For the fourth year in a row, global mobile data traffic more than doubled.

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AS A RESULT, many carriers

notably **Verizon Wireless** & **AT&T**

are moving their subscribers to **tiered** & **shared data plans**.

Consumers accustomed to **UNLIMITED** data plans will object…

ALTHOUGH early data from Parks Associates show **subscribers will quickly adjust their behaviors** (e.g., use free WiFi when available) to compensate for data limits.

This transition to tiered/shared data plans **is** a **key change to watch** in 2013.

Tablet purchases `are now`
E Q U A L I N G
or exceeding
desktop purchases in **EVERY age group**

© Parks Associates

Over **one-third** of U.S. broadband households **have a tablet,** and that percentage *will increase* as this device is a popular item for the 2012 holiday season. **By 2013, 66%** of U.S. broadband households will have a tablet**.**

Tablets will continue to sell well in 2012, and in 2013, alternative form factors such as Ultrabooks will test the tablet's dominance.

Early consumer research indicates Ultrabooks could lure consumers back to purchasing laptops but only if they don't have to pay a premium for this device. For example, purchase intentions for the Microsoft Surface were at 45% in the third quarter of 2012 but dropped to 21% once pricing and product details were announced.

TECH SUPPORT SERVICES become a critical component of customer satisfaction.

Technical support services, *if properly implemented,* offer improved customer satisfaction, differentiation, increased revenues, and long-term relationships with end users.

For service providers, a tech-support option creates a **new level of service** "stickiness" *and* **increases customer satisfaction**. **Seventy-three percent** of U.S. consumers with access to tech support services from their service provider **are very satisfied with their broadband service**, compared to 62% of broadband subscribers overall.

Service relationships are providing coverage beyond basic warranties to include ongoing maintenance and remote support services.

The scope of support services is expanding to include mobile devices and accessories and mobile-specific security offerings such as remote location, lock, and data-wipe services. The next level of support services is the deployment of "unattended" technical support services (coined Tier 0 services). These services enable "agent-less" problem resolution and advanced problem detection—resolving problems prior to the user's awareness.

Retailers and product manufacturers are also looking at tech support as a new tool to counter reduced product margins and attract new customers. Extended warranties and service plans can increase the average expenditure per customer and encourage additional visits to the store.

The purchase of extended warranties and/or product insurance for products such as televisions, computers, and mobile handsets has remained steady for the past couple of years, with nearly 20% of consumers purchasing service plans for personal computers, but consumers are more likely to purchase support services when they buy tablets and computers through retail channels as opposed to online purchases.

Approximately **50%** *of shoppers feel* **TECHNICAL** SUPPORT SERVICE

is an IMPORTANT CONSIDERATION when choosing a retail store

© Parks Associates

APPS continue to expand across platforms, creating new opportunities for advertising and content services, and must contend with mass-market challenges.

Apps provide not only user-interface and control features but also self-contained ecommerce ecosystems.

ONE-FIFTH

of

U.S. Broadband Households

OWN *at least* **THREE** of **four**

APP-BASED devices:

smartphone

tablet

smart TV

game console

© Parks Associates

One-fifth of U.S. broadband households own at least three of the four app-based devices: smartphone, tablet, smart TV, and game console. Sixty percent of U.S. broadband households own a smartphone, and 33% have a tablet. Among users of smart-TV apps, 17% have purchased a product or service through these apps.

As adoption diffuses beyond early adopters, the number of app downloads will **level off and even decline** in some cases.

This trend is already occurring in smartphones.

The average smartphone owner today has downloaded 14 apps since purchasing a handset and uses 4 apps on a regular basis, compared to 19 apps purchased and 6 apps used in the third quarter of 2011.

Developers have to be more focused on their app's **functionality and target marketing** in order to capture significant reoccurring usage.

Increasingly metered bandwidth is also a growing challenge for app developers, especially as apps move across platforms. People are turning to multiple screens in their homes for entertainment and information. Already 47% of tablet owners, or 15% of U.S. broadband households, engage in at least one second-screen activity on their tablets monthly. The most popular activity is searching for products or services, followed by searching for TV show-related information.

Going forward in 2013, **success of an app will depend largely** on its **performance across platforms**.

Developers will need to ensure that their app can scale properly from a low-end Blu-ray player or a smartphone with a small screen to a high-end smart TV or game console.

App developers will be *wise to learn* from early successes such as Netflix, which pushed deployment of its app *across platforms and was rewarded* with high levels of consumer engagement.

SOLUTIONS BASED ON "BIG DATA" ANALYTICS create smarter home systems and enhance consumer comfort.

Connectivity has created vast amounts of data, **providing opportunities to turn "big data"** into predictive intelligence.

The truly smart home has systems that can accurately anticipate the needs and comfort of the inhabitant, without user intervention.

Data analytics can help home systems operate and function in this way while also increasing the comfort, convenience, and security of the user.

Energy monitoring and control systems HAVE DEMONSTRATED **ENERGY SAVINGS** *approaching* **17%** *in some homes*

© Parks Associates

Energy monitoring and control systems have demonstrated energy savings approaching 17% in some homes.

Systems can analyze data to reduce electricity usage in times of peak demand. Beyond cost savings, data may be used to optimize comfort and convenience by adjusting lighting scenarios, unlocking doors, or reporting irregular activities. Applications of smart systems today include predictive maintenance of appliances, with notification to the home owner warning of impending failure of a refrigerator compressor or washing machine belt.

Data analytics of home systems can also **benefit insurance companies, energy utilities, police and fire departments, and the environment, to name a few.** Initial reluctance to share personal data may slow the deployment of analytics-based solutions until consumers realize the benefits of these systems.

In the advertising space, **real-time bidding (RTB)** is a new process that **leverages large amounts of data** to *target specific audiences*.

Through RTB, ad agencies place auction-based bids for individual ad impressions based on complex algorithms. This process allows agencies to adjust their placement strategies "on the fly" based on the performance of individual sites and ad impressions. The online advertising industry will increasingly use RTB, attracted by its ability to optimize ad relevance, and by 2017, RTB will account for 34% of all online display ad revenues.

Data analytics will play an **increasing role in the functionality** of many home systems, impacting partnerships, competition, and product deployments.

CLOUD SERVICES start to become the standard for storage, content access, and security of consumer media.

Content in the cloud promises **access anywhere, at any time, from any device**.

Popularity of devices that combine mobility with the capacity to display rich media and the availability of 4G/LTE data speeds will accelerate this trend. Consumers are also using these devices to purchase and consume non-physical media:

71% *of* **Smartphone Owners**   HAVE **AT LEAST**   **ONE PAID** app on their phone

© Parks Associates

The ongoing migration away from physical, disc-based media in favor of content in an electronic format increases the need for better storage and access options. **Most consumer environments lack the storage capacity** to distribute stored files beyond the primary storage device. **Virtually hosted or cloud-based hosting of content presents a possible solution** for organizing digital content, so digital media solutions will increasingly come with storage and distribution options.

Despite the increase in consumer awareness of these new solutions, there is still **some hesitation to accept "the cloud"** as a replacement for more conventional storage and usage models.

As noted earlier, consumers **do not yet value** a "cloud copy" at the same level as a disc.

Despite the widespread use of Facebook for personal photos, many consumers **do not trust personal content to cloud-based storage services due to fears over security, privacy, and continued access** to that content. High profile failures in 2012 by major companies to secure consumer account information have only reinforced that doubt.

Desires for convenience and ubiquitous access **will move consumers ever more into cloud services** as a repository for their digital files.

A comprehensive, user-centric approach to cloud media is needed and will require partnerships across the value chain. Continuing improvements in broadband performance will also help the transition, as consumers realize they can rely on the cloud for a high-quality entertainment experience.

Databases, including entertainment collections and applications, will increasingly be available via the cloud, providing greater flexibility for accessing services and content. **Security of personal and premium content will remain a critical issue** as consumers and content creators become comfortable with living in the cloud.

Over the next several years, new companies and unique partnerships will emerge that rely on a cloud-based delivery model for their service.

A new category of services will arise that blends storage, streaming, management, and virtualized functionality to produce a wide variety of unique services available only via the cloud.