enabling the digital home

Service Providers & the Smart Home

The new frontier where operators can conquer a new offering for multi-play bundles.

A SoftAtHome White Paper

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Introduction

Service Providers have been focusing on adding new offerings or “plays” to their multi-play offering. On one hand, many network operators are moving to quadruple play by adding a mobile offer to their existing triple-play Internet, voice and TV services. Pay TV operators on the other hand continue to convert their subscribers from TV-only packages to multi-play offers with communications services. Pay TV and network operators alike want to increase or maintain a blended ARPU. Network operators are facing tough competition in all these markets, with traditional voice revenues under especially strong pressure, having declined steadily over the last 10 years. This is mainly because of the success of voice over IP (VoIP) technology, and its providers such as Skype, Vonage or Google Talk. They undercut traditional voice services with increasingly robust and reliable VoIP based alternatives at a fraction of the price, especially for long distance and international calls. According to Arthur D. Little, voice revenue for European Telcos decreased from 30.4 to 26.3 Euros per user per month between 2009 and 2011. This trend is set to continue, with fixed line revenue for European incumbents forecast to fall from 53 billion Euros in 2011 to 43 billion Euros in 2015.

Unlike voice, video revenues have been increasing for Service Providers, but even these are now being threatened by OTT (Over The Top) vendors, which are coming in with new services all the time. There are however various avenues Service Providers can pursue to maintain their revenues and respond to the competition. The key lies with diversification, along four main areas of focus: payment services, cloud services, M2M (Machine To Machine), and Smart Home.

This white paper gives an overview of the latter: the Smart Home, which as a market holds great potential for Service Providers. We propose that this will become the fifth, or quintuple, play for Service Providers in addition to voice, broadband, video, and mobile.

What is the *Smart Home*?

Home automation has been a nascent market for a long time now, dating back twenty to thirty years.
Below we will explain why it is about to explode into the much bigger Smart Home field, an opportunity that Service Providers must be prepared for. At SoftAtHome, we see the Smart Home as an evolution of the Home Automation market. It is on the verge of taking off because the essential ingredients are coming together. These include greater broadband connectivity; applications that are more intelligent; and the availability in the home of smart devices, such as smartphones, tablets, PCs, and connected TVs, that enable control of other appliances like smart meters, sensors, cameras, HVAC (Heating, Ventilation and Air Conditioning) systems, or lighting.

Smart Home will enable users to connect, control and monitor all appliances and information in the home through simple and intuitive user interfaces. There are numerous different use cases that can be identified around four main application areas: Security, Energy, Comfort, and Healthcare.

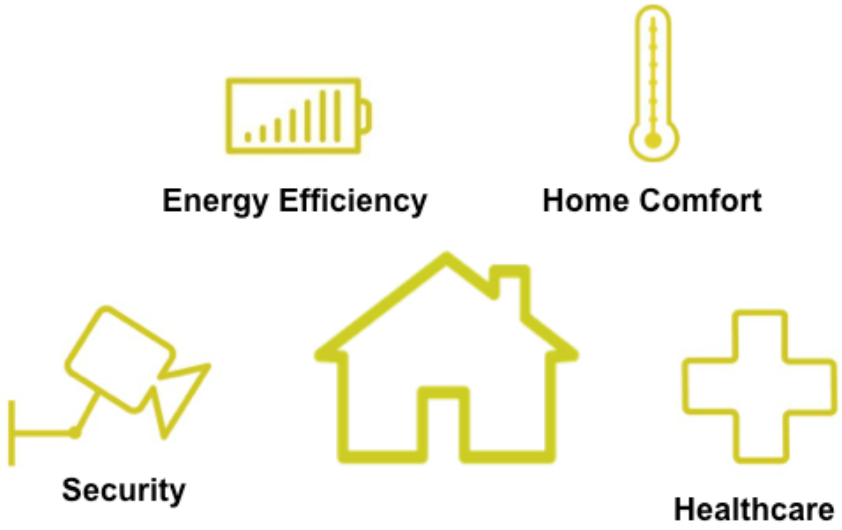
The market is still at a very early stage, but is already showing signs of taking off. The Consumer Electronics Association (CEA) reported that in 2011, home automation features had been installed in 10% of new homes in the US compared with less than 5% in 2010. Growth has been accelerating particularly quickly in Broadband-enabled Home Security and Remote Energy Management Security, with the number of US subscribers for these growing from 200,000 in 2010 to nearly 3 million by the end of 2011, and on course to reach almost 12 million in 2014.

Such numbers have led to projections of rapid growth in the overall Smart Home market over the next decade, with ABI research predicting that the European market, currently estimated at $1.4 billion, will reach $3.5 billion in 2015, and $8.4 billion by 2020. Similarly US service revenues for Smart Home applications will exceed $1 billion in 2013 and $2 billion in 2015, according to Strategy Analytics.

We note that Smart Home is a residential market and does not cover enterprise applications or initiatives launched by local authorities that are more closely related to the Smart Cities market.

The four main Smart Home markets

At SoftAtHome, we have identified four main segments for the Smart Home: Security, Energy, Comfort, and Healthcare.



The four main Smart Home market segments

Security

According to Berg Insight, almost 30% of US households have some form of security system installed, and 20% of all homes have monitored alarms systems that can be turned on and managed remotely by an alarm company.

This market is already quite mature in the US, but at an early stage of development in Western Europe. The main offerings in the security market include alarms, intrusion detection through motion detectors or door/window sensors, and video surveillance. It is now possible to remotely activate or deactivate motion detectors, sensors or webcams.

Connecting consumers' security systems to the network has many advantages. It is possible to remotely monitor their home settings, and send notifications by SMS or email of any security breaches. Home events such as movement detection, doors opening, or power outages, can be also stored locally or in the cloud. An electronic portal allows consumers' doors to be locked or unlocked remotely. The same platform can also be used to detect gas or water leaks, using sensors that trigger an alarm in the event of abnormal gas or water consumption. This enables users to take actions remotely if they are on holiday, or alternatively the Service Provider, as part of an extended package, could handle the situation.

Fire detection is also part of this security market. Today, most smoke detectors have an integrated alarm but are not connected to a network. Installing connectable smoke detectors, using specific radio protocols, would enable the consumer to be notified remotely when smoke is detected, and then connect to a webcam to check the home, or alert the fire service.

Consumers have already shown they are willing to pay for security and peace of mind, whether they are inside the home or traveling abroad. The ability to check the status of the home remotely therefore has clear potential for monetization by Smart Home players. Some insurance companies are already offering substantial policy discounts to homeowners, typically around 20%, if they install monitored home security systems. There is therefore already a clear financial incentive for the consumer.

Security can be seen then as the way into the Smart Home market for Service Providers, which can then expand from there into other applications. This has already started to happen in the case of dedicated security companies. For example ADT, the world's largest provider of home security services, has announced its Pulse product that takes the company right into the Smart Home domain with the ability to control heating systems and light.

Home Energy Management

Home energy management is mainly about monitoring and controlling home energy consumption. The main sources of power consumption in the house are heating systems, water pumps, cooling, lighting, and large electrical appliances. The three main actors in this market are utilities, regulators, and consumers themselves.
The consumer's interest is in reducing the monthly bill, or increasingly to become a green citizen, encouraging measures that reduce power consumption and one's carbon footprint.

The utilities' interest is in reducing the level and duration of peak consumption, and optimizing production capacity by being able to plan power generation on the basis of predicted customer demand. The often-mentioned Smart Grid market refers to power demand response management enabled also by putting more intelligence in consumers' homes. Smart meters provide detailed information on power consumption.

Regulators in many countries are pushing for the installation of smart meters to reduce power consumption. The number of smart meters installed in Europe is expected to double to 100 million by 2015, with further strong growth anticipated

after that towards the European objective of 80% of households being connected with smart meters by 2020.

Smart meters will enable a variety of services through being connected to mobile or fixed broadband networks. These include guaranteed data collection, which is vital for obtaining accurate and full information for billing, development and management of data collection platforms, billing itself, and customer care. However, smart metering is expected to provide very little additional ARPU, which will be less than 40 cents per month per meter, according to Arthur D. Little. Funding installation of smart meters will therefore be an issue for Utilities and Service Providers, with governments likely to meet a substantial proportion of the costs. There are probably new innovative applications exploiting smart metering just waiting to be conceived.

There will definitely be numerous other emerging services around home energy management with much greater scope for additional ARPU. These include visualization of actual energy consumption as well as recent history; consumption analysis and advice; better scheduling of energy-intensive tasks to off-peak pricing times; and providing feedback relating to events such as alarms to the consumer.

Comfort

The Comfort market embraces solutions enabling control of the home's environmental conditions. These include Heating, Ventilation, and Air Conditioning (HVAC), lighting control, shutters control, and garden watering. The objective is to enable centralized control of the home environment as simply as possible from a single platform. Lighting or windows control provides more comfort to the consumer but doesn't bring him as tangible benefits as HVAC, which when it is linked to energy savings, brings immediate ROI to the consumer.
Demos already abound where a content operator can create environmental conditions that could go with a mood or genre. So, if a kid's movie is ordered in a Smart Home, the lighting could automatically be set at medium with shutters open, but for a horror movie, shutters would be lowered and all lights extinguished. Lowering or raising the room temperature maybe beyond scope for this, but the idea shows that one could find way to go further in this direction.

This market is segmented into two main parts: new buildings, and high-end home renovation. It therefore involves either evolution of existing installations or installation of new electronic components intimately linked to the home infrastructure, performed mainly by professionals.

Healthcare

The cost of healthcare in the US rose to 16% of GDP in 2010, with similar increases elsewhere in the developed world. This rising cost trend has been driven in recent years by various factors, notably an ageing population, and an increasing incidence of chronic diseases like diabetes and hypertension. There is a clear desire by national and local governments to manage and reduce healthcare costs, and at the same time, there has always been a desire by older people to stay in their homes as long as possible.

These objectives can be met with the help of remote diagnostics and consultation via specific connected devices. A variety of such remote services are already being tested and deployed on a limited basis, including transmission of biometric data such as blood pressure, glucose level, and heart rate, to medical centers, as well as remote surveillance, and detection of falls for the elderly. There is even the potential for accessing specialists from the home, which is an exciting possibility that relies on high quality communication, and could be of great interest for Telecom operators. However, Service Providers may find it difficult to address this complex market through their residential offerings as there is a B2B market through many different healthcare providers.

The healthcare market is quite complex and fragmented and will be mainly addressed through B2B approaches. It has a great potential but it may take some time before it becomes mainstream. As we saw, the Comfort market still has a main roadblock in that the immediate benefits are not yet measurable enough for consumers to pay a monthly fee, say for automated lighting/windows control.
So, while the Comfort and Healthcare markets may both hold great long-term potential, the two markets that will likely represent the biggest short-term opportunity will be Security and Energy.

Main market barriers

The Smart Home still suffers from barriers to mass-market adoption. Historically, every major home automation manufacturer, such as Siemens, Legrand, Honeywell or Schneider, has built their own management system and often used their own radio protocol. Today, these systems are still not interoperable. A Honeywell monitoring system cannot supervise Schneider sensors for example. Furthermore, most of the systems currently require installation by specialized companies, and are not yet well promoted in the consumer market. This leads to a lack of knowledge by consumers about the Smart Home solutions that exist already. Generally, home automation is promoted only in new buildings, or in the luxury housing market, which conveys the impression to consumers that these solutions are expensive and targeted only at high-end homes. Also, consumers have difficulty understanding what benefits the Smart Home can deliver, and are not sufficiently impressed by the promises. For example, the potential of achieving a modest 5% to 10% saving in the gas and electricity bill does not usually seem sufficient to justify investment in a Home Energy management solution.

The main barriers then to adoption are:

- Lack of interoperability between systems suppliers
- Requirement for onsite installation by professionals
- Lack of consumer awareness
- Perception of Smart Home as costly and complex, reserved for luxury housing
- Insufficient tangible benefits

Main market drivers

At SoftAtHome we think that many drivers are emerging that will accelerate Smart Home market growth.
Broadband is now mainstream, and according to analyst firm Point Topic, it reached more than 600 million households at the end of Q1 2012. Internet connectivity will continue to grow via different technologies, including ADSL, VDSL2, cable, and fiber, as well as mobile broadband 4G/LTE. This Internet connectivity is key, because it makes it feasible to deploy remote monitoring applications, and delivers the power and flexibility of cloud computing platforms into the home.

The green movement is also a big factor driving the energy management market. According to the US Department of Energy's Lawrence Berkeley National Laboratory, households generate 25% of the country's entire energy bill, and by following recommendations on energy management; the average homeowner could reduce their energy bill by up to 50%. Homes will need to get Smarter to manage power consumption better, to host electric cars, and to manage power generation if they have solar panels installed, for example. Consumers are willing now to control or reduce their power consumption, not only for cost reasons but also to follow their social conscience.

Regulation will also play an important role in encouraging smart energy management. This is the case in Germany, where the government has mandated an end to the use of nuclear energy by 2020. In the UK the government has stated that all homes must be equipped with smart meters by 2019.

Consumers are now used to controlling many aspects of their lives from their personal screens, whether smartphones, tablets, or PCs. It will therefore come naturally to consumers to extend their usage of these devices from media consumption to the control of their home. The increasing number of screens in the home following the arrival of smartphones and tablets, based on open systems makes it easy for service providers to set up user interfaces to Smart Home applications in the home. There is no more need for specific and costly screens to manage home automation systems. The screen can be shared with other media applications, so reducing the cost for the consumer, and easing market development for Smart Home suppliers.

Finally, wireless standards are emerging from a new generation of systems from home automation providers. Some of these providers, including Control4, Creston, Legrand and Schneider, are now using Zigbee. Meanwhile Z-wave is being used by other notable companies in the home automation business, such as Motorola, ADT or Verizon. These two wireless radio protocols are now dominant in the Smart Home market. Another important emerging wireless radio standard is DECT ULE (Ultra Low Energy). This is an evolution of the DECT standard, which emerged originally for cordless telephony in the home, to support local wireless data communication with very low energy consumption for the terminals.

DECT ULE is an interesting and promising technology for telecom operators, since it can leverage their existing Home Gateway installed base that are equipped with integrated DECT base stations.

The main drivers for Smart Home are

- Mainstream broadband opening the field for remote monitoring and cloud computing
- Green tendency to smart energy management
- Regulation with Government incentives to reduce power consumption or to reduce healthcare costs
- Consumer's familiarity with the control of appliances from their screens (Smartphone, tablet, PC)
- Wireless standards converging around Zigbee, Z-wave and DECT ULE

Service Providers, a new market channel

Business models for the Smart Home are evolving. This market was traditionally organized around two channels. One was the professional installation by a systems integrator or an electrician. The second one was the "Do It Yourself" model, where customers familiar with technology and electrical wiring, bought their equipment in retail shops and installed everything by themselves. Over the last year, Service Providers have emerged as a third channel. They see Smart Home as a way to leverage existing customer relationships to add a new source of revenue and improve customer retention.
Service providers are of course telecom operators, cable operators but also, less intuitively for this new market, broadcast operators. Telecom and cable operators are used managing IP networks and see Smart Home as a natural extension of their ability to manage their customer's home network. Broadcast operators are facing tough competition from telecom and cable worlds but also from OTT providers. In order to offer competitive services, they need to offer video on demand, enriched EPG, catch up TV, gaming, etc. The only way to deliver these enriched new services is to introduce IP technology and to deploy hybrid boxes (using broadcast DVB alongside IP technologies). Broadcast operators are already moving to IP technology and their customer call centers are handling home network issues for their customers. So the Smart Home could be an interesting avenue with some economies of scale, for broadcast operators too.

Service providers have two ways to address the market:

- B2C: Direct relationships between Service Providers and customers
- B2B2C: Service Providers offer a platform that can be used by utilities to deliver their services (electricity, gas, watering, security, …)

Service Providers can address their own customers directly, as is being done by Verizon, which launched its service "Home monitoring and control" in October 2011. This service focuses on two markets: energy control, and security through home monitoring. A starter kit between $70 and $220 includes basic equipment that can be connected in the home. There is a monthly fee of $10, for which consumers get unlimited remote access to their home equipment. It is significant that while this offer is primarily pitched at Verizon's own customers, it will be made available to users of other broadband services as well, a Telco's own version of OTT. This will help Verizon chase new customers thanks to an innovative service that is not available yet from all other Service Providers. It also has the potential to churn away other providers' mobile customers. Examples of functions provided by such services are:

- Set up vacation mode that sends messages when something has happened
- Pass code-activated door locks that lock or unlock the home remotely whenever the consumer wants

- Control of the home via the Home Control dashboard on a TV, smartphone, tablet or PC
- Energy monitoring via a power sensor installed in the wiring box by an electrician

Another example in the energy management domain is the collaborative project Energy@home led by Telecom Italia with Electrolux, Enel and Indesit. This is a first step towards a Smart grid that will allow continuous real time bidirectional information exchange between electricity suppliers and appliances in the house. It enables customers to manage their energy behavior, to allow for varying power supply availability and price.

Service Providers' role

Service Providers can really help the Smart Home market progress from nice-to-have to must-have status.
Service Providers can market and promote new technologies to the mass market. They can conduct marketing campaigns that explain the tangible benefits for consumers from these new technologies. Offers that are purely linked to new technology are not so easy to promote to consumers. But operators were able to promote services such as video on demand and Voice over IP because of their clear benefits. Service providers can achieve the same results with the Smart Home. Furthermore, established providers already have direct and trusted customer relationships that can be leveraged to extend service offerings beyond quadruple play.

Service Providers are local players and have strong customer intimacy unlike global players such as Apple or Google. They have agencies close to customer houses that can be used to develop awareness. Providers can send technicians to customer premises to install or to repair Smart Home solutions.

Operators are good at delivering managed services. They already monitor key elements of the future Smart Home, such as the Home Gateway (HGW) or the Set Top Box (STB). The HGW is THE always-on device in the home delivering broadband connectivity to all home devices. The STB manages audio video services and renders content on the TV. Both devices have evolved to become multimedia centers providing a single place to store, index and access most of the home's digital content.
Service Providers can offer critical services with a high availability. For example, voice services are often delivered with an availability time of at least 99,999%. This capacity is key for security or healthcare markets where Service Providers can also provide Internet and power backup solutions. Service Providers can offer strong post-sales services with hotline and online support to customers to resolve their home network problems. These services can readily be expanded to cover the Smart Home domain.

Service Providers have multi-screen strategies and offer multimedia multi-screen applications. It will be simple for them to then offer convergent Smart Home applications that are easy and intuitive to use, on mobile phones, TVs, PCs, or tablets.

Finally, Service Providers' boxes that are already located in customer's homes can be used as service delivery platforms for Smart Home services. Service providers can leverage these existing devices to support Smart Home applications with a powerful software solution. They have a strategic advantage here, as they don't need to deploy new equipment in the home. They can also rapidly create a mass market thanks to the number of addressable customers.

Key assets of Service Providers include:

- Capacity to market new technologies
- Existing and trusted customer relationships
- Customer intimacy and local presence
- Ability to deliver and support critical managed services
- Intuitive multi-screens applications
- Devices already onsite for Smart Home service delivery

The role of the Service Providers' box

Service Providers can deliver their services through any combination of the Home Gateway, the Set Top Box or any single device depending of the operator's service delivery strategy.

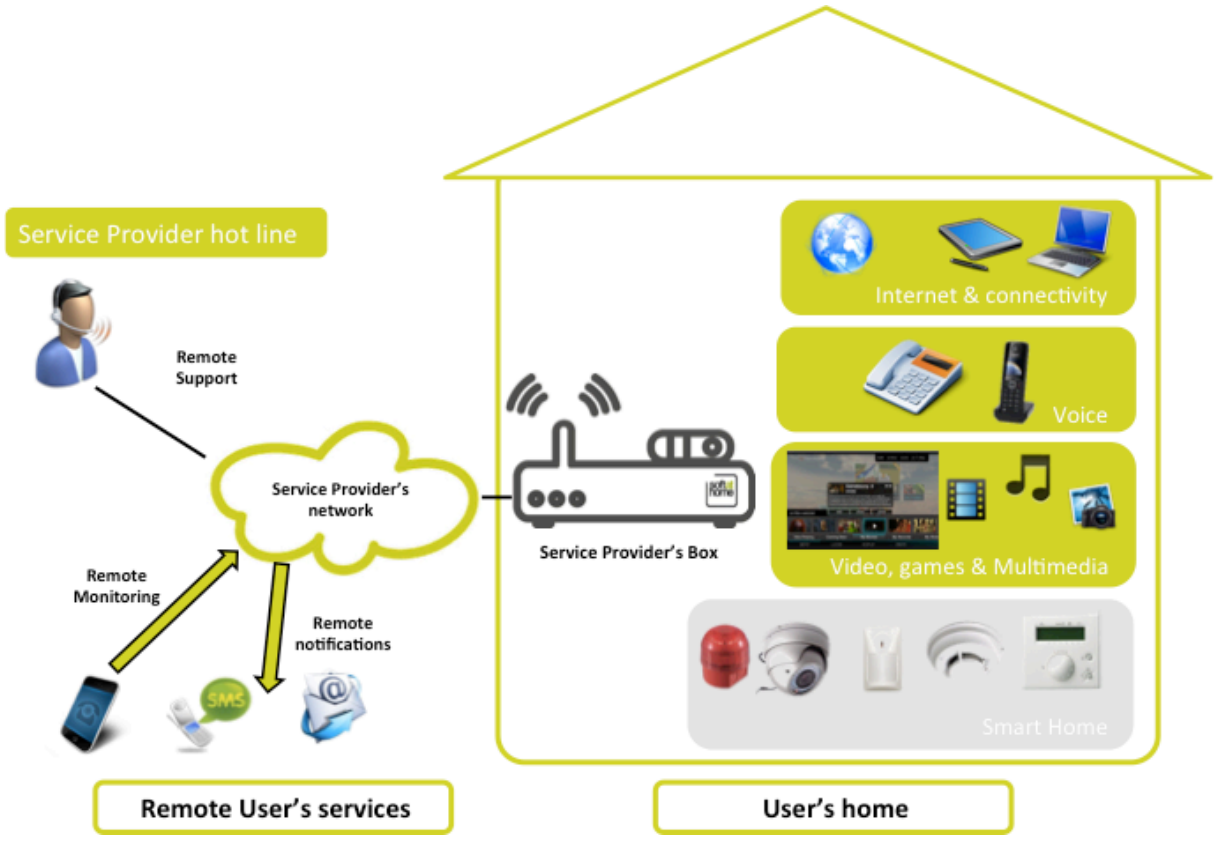
Home Gateways usually manage wireless protocols such as WiFi, and even DECT in the case of the more sophisticated devices. In 2012, an evolution of DECT known as DECT ULE (Ultra Low Energy) is under standardization at the DECT Forum and ETSI. Evaluations by Service Providers are ongoing and the first products are expected in 2013. DECT ULE could be a disruptive technology in the Smart Home because it operates in a frequency range (1.9GHz) that is far less crowded than the 2.4GHz used by WiFi and Zigbee protocols. This makes it ideally suited to Smart Home applications, and is supported by the latest generation of DECT chipsets. It will enable Service Providers to offer connectivity in the HAN (Home Area Network) from the Gateway, which can also host additional wireless protocols such as Zigbee or Z-wave by simply adding a dongle. Service Providers can offer simple mechanisms to pair and to manage Smart Home appliances from the Gateway, whatever radio protocol is in use.

The Set Top Box manages all media services rendered on the TV. Service Providers can use their Set Top Box to provide easy, intuitive user interfaces to consumers via the TV. Service Provider boxes usually host a web server to enable local configuration as well as remote access. Service Providers can easily reuse this web server to host specific applications linked to the Smart Home. The Service Provider's box can therefore be the software services platform hosting specific Smart Home applications. The box can become the home

communication center and even integrate a rules engine that detects all kinds of events, such as intrusion detection; smoke detection; network security breach and door unlocking. It can then take appropriate actions, such as sending emails or SMS to warn users or companies contracted to provide assistance.

Service Providers can offer a unified view of all home appliances, such as sensors, motion detectors, and cameras in addition to phones, PC and tablets. This is possible thanks to a home topology discovery mechanism hosted on the box that monitors all devices of the home across a variety of connection types, like Ethernet, WiFi, DECT, Power Line (PLC), Bluetooth, Zigbee, and Z-wave. As such boxes evolve, Service Providers will be in a position to help consumers manage their entire home network and provide support. At the same time, embedded diagnostic tools will help consumers solve many of their own connectivity problems.

With all these developments, the Service Provider's box, powered by open, carrier-class innovative software, can become the service delivery platform of the Smart Home. The SoftAtHome Operating Platform (SOP) is an example of such software enabling all these applications.



Smart Home services delivery through Service Provider's box

Conclusion

To remain competitive, Service Providers must perpetually differentiate. We suggest an avenue extending beyond quadruple play into a fifth component. The Smart Home could be this fifth-play. It answers unmet needs and desires of residential customers to better secure and manage their environment financially but also as greener citizens. With their customer relations, Service Providers can create a strong strategic advantage here. Both network operators and Pay-TV platforms are well placed to move forward in this market by stimulating customer awareness of what is already possible and thus accelerating rate of adoption.

A service delivery platform in the home such as the SoftAtHome Operating Platform is a key element for Service Providers to build an open, innovative and reliable Smart Home Offering.

Appendix: List of references

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