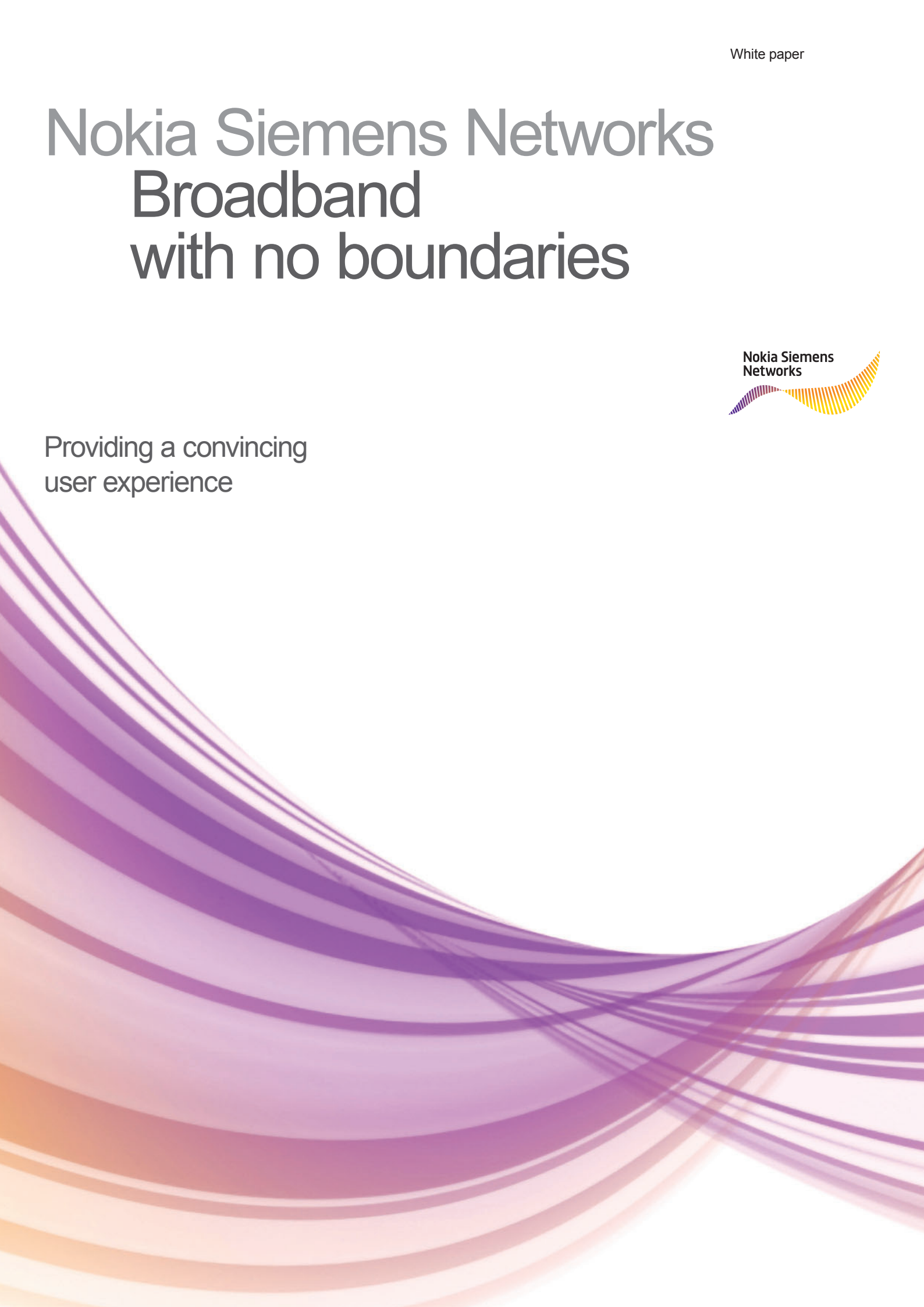
White paper

Nokia Siemens Networks Broadband with no boundaries

Nokia Siemens Networks

Providing a convincing user experience



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1. Executive summary

Broadband Internet is the growth segment in the telecommunications market. A dynamic evolution of interactive and multimedia web applications under the umbrella of Web2.0 is driving further broadband deployments, both in fixed networks as well as mobile. Web2.0 changes the character of the web, making it more open, where users actively participate in communities and upload content themselves. The rapid diffusion of broadband access lines allows new premium applications to be used as potential sources of new revenue, as the exploding use of video shows. On the other hand, with broadband and IP, services become independent of the network. As a consequence, traditional market boundaries between fixed, mobile, ISPs and telcos are breaking down, leading to fierce competition – major Internet players with their large communities are threatening fixed and mobile providers, a threat combined with a measurable drop in user loyalty. Increasing churn is also a result of an uninspiring user experience, caused by insufficient data rates and wireless disconnection problems which are mainly perceived at home.

Key success factors for improving user satisfaction are top service performance, attractive service portfolios, always on ubiquitous high speed broadband, high quality multimedia content independent of location and last but not least, much simpler in service access. User requirements go far beyond existing commercial multi-play service bundles and so providers need to act in three areas to offer a top user experience:

Premium interactive multimedia services are the key revenue drivers: Providers must define their Web2.0 strategy now. One option is to provide convenient access to Web2.0 content and existing communities for their own subscribers and provide additional value, based, for example, on the subscriber's location or profile. Another strategy is to establish own communities and tie the community together with a blended multimedia platform. Two mass services are an ideal base for such a platform: Premium VoIP with its enhanced collaborative and multimedia functions and IPTV, which provides more freedom of selection and interaction, even to rather inactive user segments. If possible, this should be provided in high definition quality.

Ubiquitous high speed access will be a must for competitive survival: The new services packages are more demanding in terms of instant availability, bandwidth, interactivity and content distribution. Broadband access can be offered in different ways: Via DSL and PON technologies, providing superior data rates, or via HSPA and WiMAX, providing superior mobility. The dray-horse of the broadband Internet segment is ADSL, but bandwidth hungry applications such as high definition IPTV, the enhanced need for uplink capacity driven by collaborative Web2.0 applications like Web video and VoIP as well as the capacity need of enterprise customers, drive the demand for bandwidth ever higher. This leads to a ramp up of VDSL and brings fiber much closer to the subscriber.

At the same time, mobile data is entering the mass market. Improved broadband wireless access with I-HSPA and WiMAX will further enhance the user experience and foster wireless Internet usage.
A mixture of wireless and wireline access gives maximum revenue, since users are always best connected, either for high definition IPTV at home or immediate upload of photo shoots from a real life context or spontaneous community chats with the most personal device: the mobile phone. This strategy results in competitiveness within the whole multi-play arena: Internet and TV, at home as well as on the move. Fixed and wireless technologies are complementing each other.

Access independent service availability enables competitive differentiation: Despite the variety of use cases, users must perceive a "single broadband service solution." Access to personal services and communities must be as simple as placing a voice call today. This kind of simplicity enables mass market usability and a much tighter subscriber lock-in than is possible with pure commercial service bundles. The user should automatically be always best connected with

- continuous service between different access types independent of the location
- an adaptation to the requirements of different device and service types – a video should be capable of being displayed on a mobile phone or a HD TV screen
- a simple "push button" like access to the personal service suite. Basics like the user profile and comfort functionality like presence, location and automated terminal configuration should be available independently of the access type.

A sound broadband strategy is the key success factor for further business growth, since it defines the use cases of the subscribers, the possible ARPU and finally the service provider's survival in an environment of ceaseless competition.

2. Market trends – Opportunities and challenges

2.1 Broadband take off continues

Fixed broadband is booming, driven by increasing data rates, new video applications and price erosion
The current dynamic evolution of Internet services is offering a wealth of new business opportunities. New collaborative and interactive web applications under the umbrella of the so called Web2.0 are driving further broadband deployments.

A never-ending hunger for bandwidth is now driving the market. From 2003 to 2006, worldwide Internet traffic grew at a compounded annual growth rate of 75%. The exploding use of bandwidth hungry web video services and enterprise applications is filling broadband access networks and backbones. Spare capacity in the backbones is shrinking, backbone providers are continually extending their networks and prices for backbone capacity are becoming more stable.

The dray-horse in the broadband Internet segment will remain copper based DSL, but bandwidth hungry applications like high definition IPTV, demanding interactive Web2.0 applications and the capacity needs of enterprises, bring high capacity fiber much closer to the user. More and more applications, such as office and community applications, as well as content such as user generated photo albums and personal blogs, are residing in the Web, increasing the need for fast access.

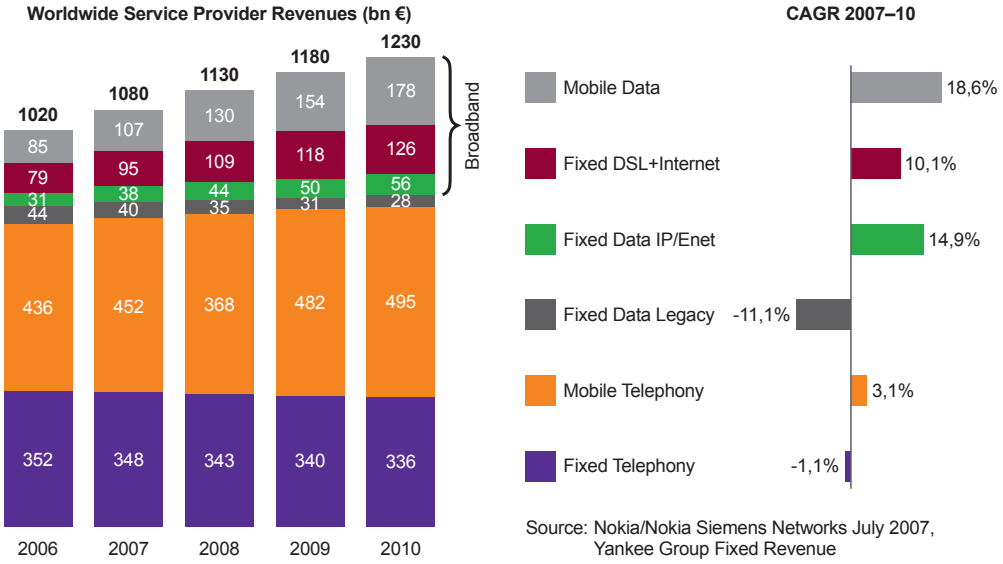

Figure 1. Broadband data is the growth segment in the telecommunications market.

Mobile Internet access is taking off and spreading to the mass market
After many years of unfulfilled expectations and failed predictions, the mobile Internet is now entering the mass market, driven by Internet browsing and e-mail. The key success factors in this uptake are users' ability to access all applications and content residing on the web, combined with true broadband speed. Worldwide operator experience and Nokia Siemens Networks' tracking of 3G usage clearly show that the frequency of mobile Internet use, the session length and diversity of applications used is affected by the speed of the connection. Internet browsing is the number 1 application, with a huge variety of application and content types used and clear growth can be seen in the use of bandwidth demanding photo and video related applications.

2.2 Boundless competition puts pressure on revenues

With broadband and IP, services become network independent
The rapid diffusion of broadband access allows new applications to be used as potential sources of new revenues. On the other hand, there is no longer a prime contractor offering the whole service of access, application and bill. The user has, and wants, the freedom of choice of using the variety of applications made available on the web. Telcos are massively attacked by the big Internet players, who are using their large user base to offer network independent communication services such as VoIP. Those players are constantly launching new applications to increase their communities and strengthen user loyalty.

Multi-play service bundles redefine the market place – borders between the traditional market segments no longer exist
To use their broadband bit pipes in the best way, many providers offer commercial multi-play packages consisting of high speed Internet access, voice, which can be either classic voice or VoIP, mobile telephony and TV services. Such bundles are offered by all types of providers, such as MNOs, FNOs, ISPs and cable operators, independent of which market segment they have originally focused on.

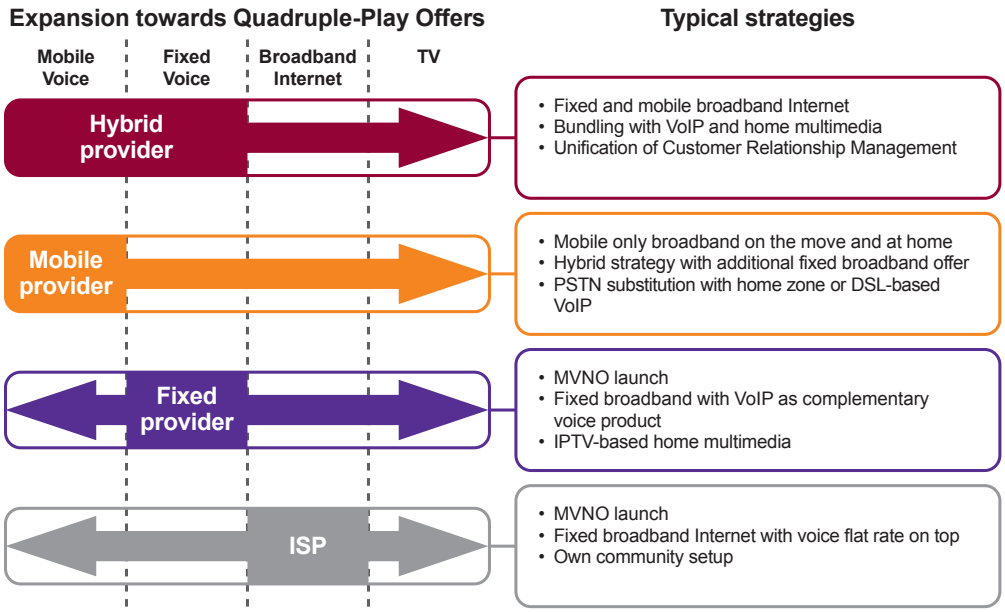

Figure 2. Market boundaries no longer exist.

The packages usually give the user the advantage of one-stop-shopping, a perceived discount on his entire monthly telecommunication and TV spending and cost control due to a single bill.

2.3 Users are searching for a better usage experience

User loyalty is decreasing strongly in the fixed as well as in the mobile market segment. One reason for this is that competition is predominantly based on cheap flat rate prices and nominal data rates. Today's broadband packages incorporate the risk for the provider of just being "me too" and therefore being directly comparable with other providers. Limited subscriber retention is producing price based competition, leading to steady erosion of the price per Mbyte.

Additionally, subscribers are to a certain extent dissatisfied with the quality of data service, the service portfolio offered, the bundling and the coverage. Besides price, service quality is the most important barrier in day-to-day wireless broadband usage. Users most often mention issues with the stability of the connection, speed and the video quality. The most evident wireless disconnection problems occur at home, putting wireless providers in a bad position in the competition for home services. In addition, there is already significant use of and healthy interest in high quality TV services, another indicator of the demand for premium quality and service content.

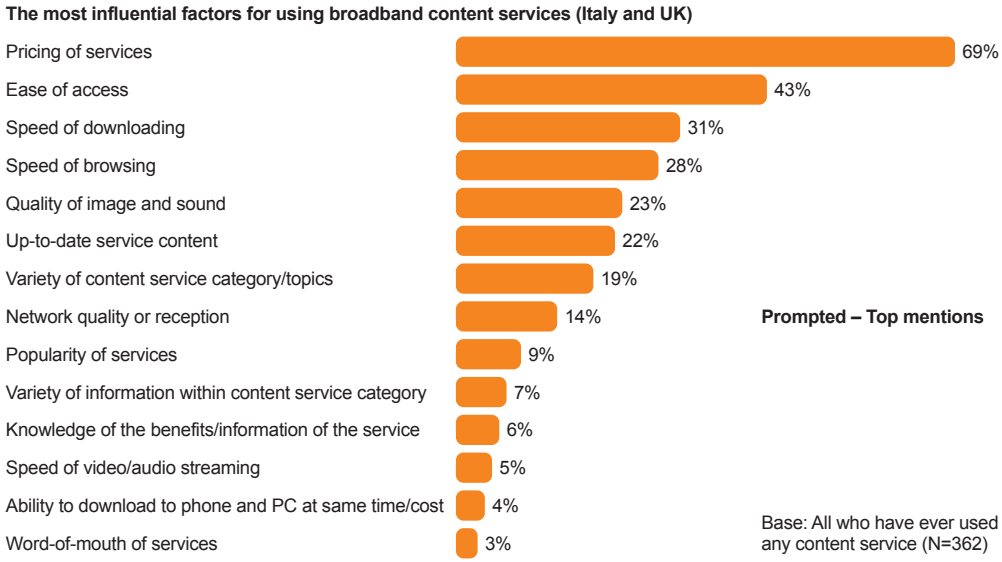

Figure 3. User experience: simplicity, quality, speed and ubiquitous availability are vital.

User research clearly points out users' key buying criteria in the area of broadband services: simplicity of access, speed, quality of multimedia content presentation, ubiquitous availability and the content itself.

In other words, three of the users' questions need to be answered in a convincing manner:

- Why should I use it?
- Where can I use it and how fast is it?
- How complicated is it?

3. Defining the broadband service strategy – differentiation with superior user experience

With decreasing growth rates in the traditional voice segment, different provider types are competing with each other for users' entire telecommunication and infotainment budget. In order to maximize their share, the providers must cover different use cases: at home and on the move, Internet applications and more TV style infotainment.

In this broadband multi-play arena, stationary Internet use, including voice at home or in the office, provides the largest addressable ARPU for communication providers, since most application use, from voice to intensive high speed Internet, takes place at home. Once stationary broadband is covered, there is a big business opportunity to provide a fully fledged home entertainment solution. Users are willing to pay for premium content combined with interactivity and thus the provider is able to enlarge his user base with more TV style users.

As large numbers of users want to be always on in order to stay connected with relevant content and their peers, Internet and TV on the move is a key differentiator. The stationary use cases promise more ARPU, but communication and infotainment on the move is essential for subscriber acquisition and retention, providing a seamless usage experience.
A convincing multi-screen service strategy prevents pure price competition, such as can be seen in the highly competitive and saturated Internet and mobile markets.

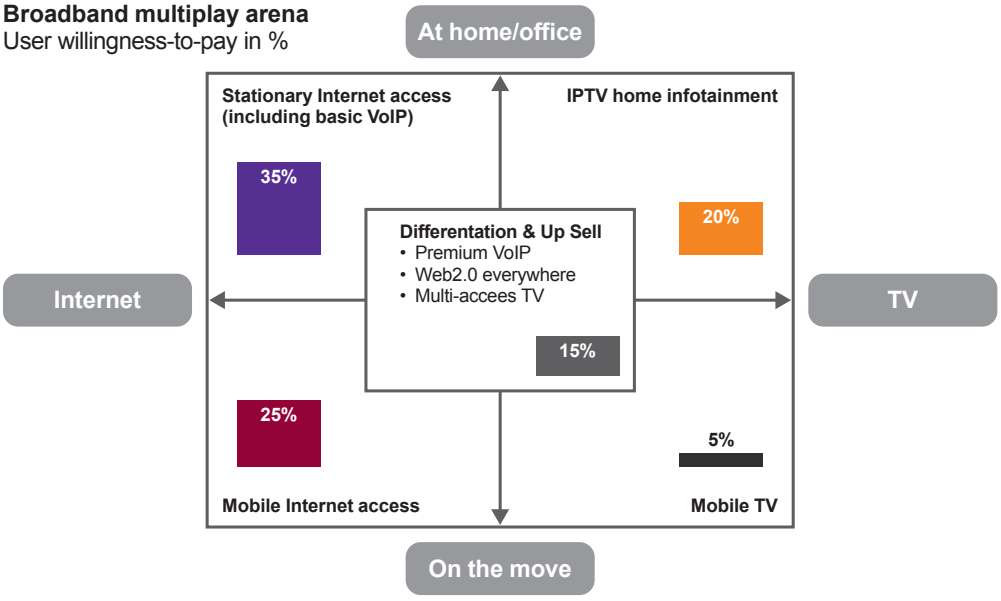

Figure 4. Offer a variety of broadband use cases to win maximum share of the subscriber's budget.

Since multi-play strategies are today a common practice, the question is, how sustainable will current strategies be in the mid-term. Providers have to differentiate themselves by providing a better user experience than the competition. Competitive advantages can be gained by simultaneously offering

- Premium interactive multimedia services
- Ubiquitous high speed access
- Access independent service management.

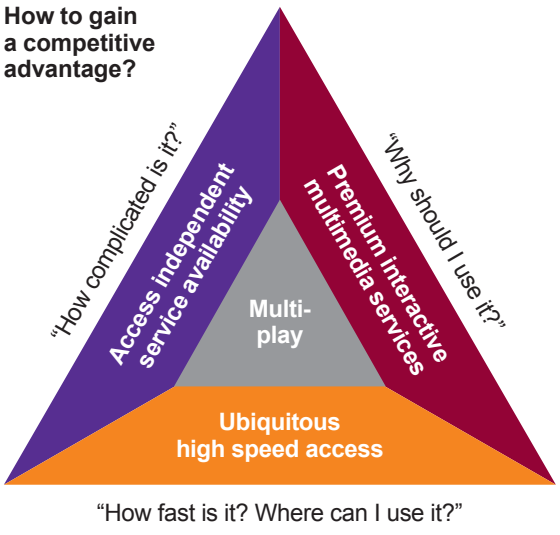

Figure 5. The competitive advantage for service providers – offering premium services ubiquitously and simply.

3.1 Premium interactive multimedia services – beyond the traditional Internet

Profiting from the Web2.0 paradigm shift

Web2.0 is the name of a new generation of web services, which can be characterized as more open, flexible and participatory in terms of creating content, applications and business models. Many users are changing from passive consumers and content retrievers towards active "prosumers", who share their self generated or self selected content with other users having similar interests. The value of this uploaded content increases through the tags and comments of interested peers and it is natural for peers with the same interests to form a community. Well established communities create a huge amount of traffic, especially if video sharing is involved. In many markets, around about half the mobile users are already members of an online community, with most of them actively sharing self-generated content.

Broadband boosts the specific user benefits of Web2.0 even further: Users are always connected with their community, they are always aware of what is going on and they get the latest news. They can immediately take photos or videos and put them directly onto the web and perform online games. Last but not least they can chat with their most personal device: the mobile phone.

It is now time for broadband providers to define their Web2.0 strategy:

- One option is to act as a third party Web2.0 aggregator, focusing on the enrichment and aggregation of Web2.0 content and applications for their own subscribers. The key success factor is to offer a preconfigured convenient access to the largest existing communities and use additional features such as location dependency.
- A different method is to establish communities. The key is to provide blended multi-media communication channels, tying the community together and fostering intense communication.

Facilitation of communities with enhanced VoIP based communication

Many of the largest communities are currently tied together with VoIP. VoIP is the routing of voice conversations over an IP based network, mainly the Internet. Broadband access and VoIP application are separate, and so the access provider is used only as a bit pipe.

Aided by widespread broadband coverage, VoIP is being taken up quickly. On its introduction, VoIP was more of an inconvenient niche application for technology savvy early adopters and the main differentiator has been the price. In the meantime, VoIP has achieved mass market status and has already grabbed large pieces of the fixed telephony cake. VoIP players are also successfully providing new services around VoIP.

For these reasons, many incumbent providers are offering VoIP services in parallel to their classic offerings and bundling them with broadband access. A strong uptake of flat rate VoIP services and the rollout of wireless broadband will also increase the price pressure on MNOs even more. Already today, the average VoIP user in Western Europe generates more than 300 minutes per month, whereas the mobile user generates about 150 minutes with mobile voice calls. The heavy growth of VoIP users and traffic indicates a market revolution. How can service providers earn additional revenues with VoIP?

- Incumbent providers can leverage their existing assets by providing VoIP to their existing customer base, especially to high profile customers like enterprises.
- VoIP can drive broadband business. Packaging VoIP with broadband is an unbeatable combination.
- VoIP is a service enabler and allows up-selling into the application domain. Combined with differentiating functionality like presence, video and collaborative features, VoIP is ideal for the participatory context of Web2.0. A premium IP communication bundle is an effective means to establish a provider's own Web2.0 communities and win market share.
- Due to its network independence, service providers can extend their market reach with VoIP by out-of-region plays and fixed mobile convergence packages using numerous fixed and mobile access network types.

- The brand can be prepared for the future, since with no VoIP offering, there is a risk of being viewed as a technology laggard. Being perceived as an “innovator” is better than having the image of a “dino-vator.”
- On the downside, incumbents are facing substitutional effects, since profitable classic voice is cannibalized to a certain extent.

To sum it up: VoIP provides an excellent basis for a provider’s own Web2.0 like communities. Some classic voice cannibalization is inevitable but there is anyhow a high risk of losing the subscriber base to other VoIP players.

IPTV as interactive broadband mass service

Beside voice and the Internet, TV is the most widespread medium worldwide. In contrast to other communication services and media, TV is also used among people with a rather inactive lifestyle. But the passiveness of TV is changing and the recipients want the freedom to choose the content they like, to consume it when and where they like. Changes in user behaviour are largely driven by Web2.0 video services where users are uploading and consuming content very selectively. On the other hand, TV broadcasters are offering their broadcast content piece by piece on the web, from where it can be retrieved selectively by the users at the time and location they prefer. At the same time, user expectations regarding video and audio quality are steadily rising – HDTV quality is state of the art, setting the benchmark for all video services.

A consequence of these trends is IPTV. This is the label for multimedia services, such as TV, video, audio, text, pictures and data transmitted over IP based networks with the necessary premium visual and audio quality, security, interactivity and reliability. IPTV can be used from any device with Internet access. Typical components of IPTV are:

- Video on Demand: Users are able to interact via the backchannel and they are able to use video recorder like functions. Users are able to select content flexibly or it can be selected automatically according to their preference profile.
- Internet access, electronic program, video telephony, chat, E-commerce
- Web2.0 features for a high degree of interactivity and personalization such as setting up individual playlists and upload of videos

Premium quality TV and video content combined with the interactivity and personalization of Web2.0 enables a totally new kind of user experience. In this sense, IPTV is the premium Web2.0 service package suitable for the mass market. As a result, the take up rates of IPTV are promising – in advanced markets such as Western Europe, IPTV penetration rose from 1.2% in 2005 to 3.1% in 2006. North America and Asia Pacific show 4.9% and 2% penetration respectively (Strategy Analytics, 2006). Over 100 service providers globally offer IPTV, ranging from live multi-channel TV to Video on Demand and rich interactive services (Jupiter Research, 2006).

In parallel, mobile TV services are also gaining momentum. Following the first commercial launches of DVB-H networks, high-quality mobile TV can also be offered to the mass market via a wide range of compatible handsets from all major phone manufacturers. User acceptance potential is also there – according to Nokia Siemens Networks’ user research, more than 60% of mobile users worldwide are interested in Mobile TV. There is a great need for different use cases, such as live TV, video on demand and video download. About half of the target users would use the service on a daily basis. Mobile Entertainment (TV plus music) accounts for more than 50% of the users’ willingness-to-pay for mobile data services.

3.2 Ubiquitous high speed access – preparing for increasing speed and quality demands

Broadband downstream evolution in Germany

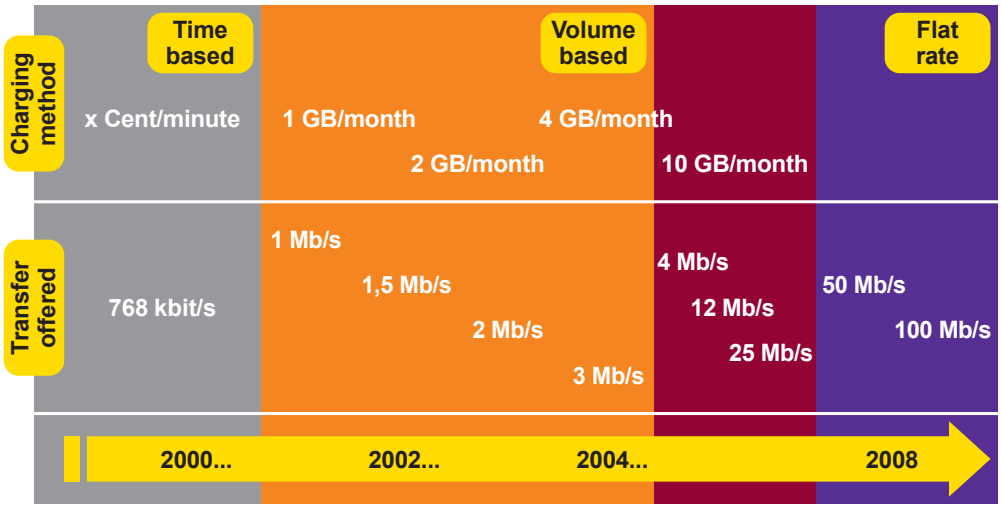

Figure 6. Slow initial DSL adoption was boosted with increased bandwidth, flat-rate offers and service bundles.

Snowball effect: Bandwidth growth stimulates usage which again fosters bandwidth demand
New Web2.0 enabled multimedia, as well as ordinary Internet access, need sufficient bandwidth at the so called first as well as at the second mile. User expectations have grown quickly during the last decade of Internet boom. Starting with analog modems, it was a great user experience to retrieve rather poor text based content via two combined ISDN channels. After that, copper based ADSL set the benchmark: our user research during the first ADSL field trial in 1997/98 clearly uncovered user inspiration of this first mass market broadband technology. State-of-the-art downstream bandwidth was 1Mbit/s or less. Nowadays, entry packages start with 2Mbit/s, 6Mbit/s is common and up to 20Mbit/s is offered at the high end with ADSL2plus. Also, developments in pricing reflect the enhanced user expectations regarding speed and data volume, moving from time based prices over volume based with growing thresholds towards flat rates.

Providers must prepare their broadband access strategy to cope with more demanding services and changing usage behaviour
Whereas ADSL2plus provides the entry card into IPTV, the quality demands of a user generation that becomes used to HDTV can only be met by VDSL speed of up to 100Mbit/s in either direction. ADSL is an asymmetric access technology with a downstream to upstream performance ratio of 10:1 and therefore well suited for traditional Internet access. VDSL with its 1:1 ratio is advantageous for enhanced user uploads and interactivity in the context of Web2.0, including HDTV IPTV with multiple high-definition TV channels, high speed Internet access and premium VoIP in parallel.

In the past, users were only evaluating the downstream capacity. The enormous success of MySpace and YouTube has shown that uploading of user generated content is exploding. Further developments within VDSL and fiber based PON (Passive Optical Networks) technologies such as BPON, GEPON or GPON provide a nearly unlimited performance at a significant higher network reach. PON is a very cost effective technology which shares fiber between different users. The Optical Line Terminal (OLT) which is placed in the Central Office connects the access network to the aggregation Network. The user is connected to the network via the Optical Network Termination (ONT) which is available in different variants for FTTH (Fiber to the Home)

or FTTB (Fiber to the Building). Between the OLT and the ONT, the signal is distributed through passive splitters with splitting factors of up to 1:64. This point-to-multi-point technology results in a very efficient use of fiber and minimizes the number of central office ports, making PON commercially very attractive. With GPON, symmetrical data rates of 100 Mbits/s can be achieved over distances of 20 km.

The following considerations illustrate the need for service providers to include VDSL speeds or greater in their service packages – about one third of today's global Internet traffic already consists of bandwidth hungry video services – which affects the required downlink as well as the uplink capacity – with a strong growth tendency. A video in normal quality tailored to a PC or TV-display consumes 50 to 100 times more bandwidth than pure sound (700 kbps–3 Mbps compared to 15–30 kbps for VoIP). High definition video, which consumes up to 10 times more bandwidth than normal video (6–15 Mbps compared to previous 700 kbps–3 Mbps) boosts the required access speed further towards VDSL and beyond.

Ubiquitous high speed access is a major differentiator in the market
Users demand broadband Internet access on the move. Beside the increasing capacity and quality requirements of the end users, the need to be always on has been increasing at the same time. Ten years ago, a limited reachability was normal in business life. Today's standard is to be reachable at any time, at any place by phone, SMS and e-mail, leading to the requirement of continuous Internet access. In addition ubiquitous access is required in white spot areas where the use of wireline technologies is economically not feasible, for example in remote areas with long copper lines.

Both use cases can be covered with real wireless broadband coverage by upgrading 3G networks with HSDPA, providing maximum downlink data rates of 14.4Mbps and HSUPA, enabling uplink rates of up to 5.76Mbps. With HSPA+, maximum data rates are growing towards 28.8 Mbps at the downlink with an upside potential of 43.2Mbps and 11.5Mbps at the uplink. Additionally, the flat I-HSPA network architecture clearly improves the user experience by lowering latencies with its flat architecture. The robust and efficient HSPA radio interface implements extremely high peak rate and fast channel set-up times suitable for new truly real time applications. The I-HSPA simplified network architecture results in a shortened round trip and channel set-up time. The system latency is as important as the actual peak rate for many IP based applications such as video, fast e-mail synchronization, real time gaming and VoIP. Target Round Trip Time for I-HSPA is about 25 ms, which gives significant improvements compared to a maximum of 120ms typically achieved in HSDPA networks today.

An alternative to HSPA/LTE is WiMAX which is providing wireless broadband over long distances in a variety of ways, from point-to-point links to full mobile cellular access. WiMAX and HSPA/LTE have been developed in parallel and show similar performance characteristics for comparable scenarios. Temporary advantages of the one over the other exist, but are not mission critical. Both technologies will co-exist in the market each addressing segments with 100+ million CPEs. WiMAX provides an interesting option for BWA new entrants with an Internet centric services offering.

The broadband access strategy determines the provider's service portfolio and value proposition
True broadband access can be offered in different ways: Via DSL and PON technologies, providing superior data rates or via wireless HSPA and WiMAX providing superior mobility.

The stationary "high capacity pipe" strategy focuses on a bandwidth evolution from ADSL towards VDSL and PON, optimizing down- and uplink data rates to a sufficient level for interactive Web2.0 and high definition IPTV. This strategy is limited to the home and office market and mainly applied by FNOs and ISPs.

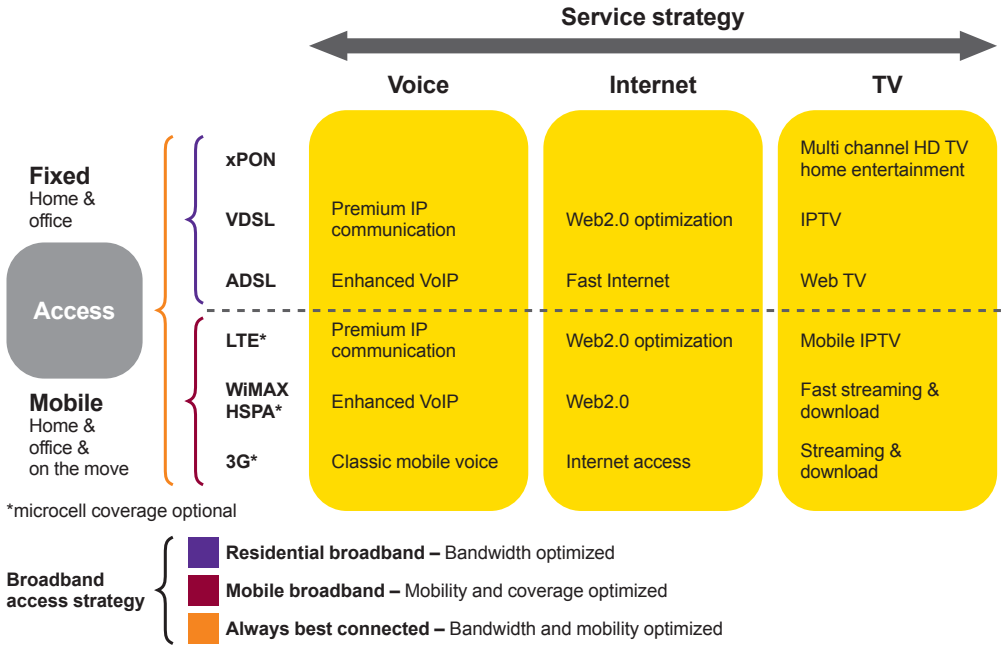

Figure 7. The broadband access strategy determines the service portfolio and value proposition.

	Residential broadband		Mobile broadband		Always best connected	
Use cases / Coverage	–	• Home, except remote areas • Office, except remote areas	+	• Home • Office • On the move	+	• Home • Office • On the move
Capacity & quality	+	• Premium with VDSL and xPON	–	• Severe limitations with pure 3G • HSPA & WiMAX are acceptable on the move • Inhouse radio degradation	+	• Premium with VDSL and xPON deployment at home • Acceptable quality and speed on the move
Service range	o	• Full suite up to HD IPTV at home	o	• HD IPTV not possible • Mobile applications available	+	• Entire suite up to HD IPTV at home • Mobile applications available
User convenience	–	• User is disconnected on the move from major services • Different voice phones	+	• Same cellular device at home and on the move • Simple movements	+	• Services always available at best possible quality • Voice at home over cellular or fixed phone
Target segments	o	• Stationary Internet users only	–	• Highly mobile users with limited multimedia usage at home	+	• Highly mobile users with intensive broadband usage at home
Revenue potential	o	• Limited to classical @home usage • Upsell with high bandwidth services like IPTV	o	• Limited due to service range constraints and bandwidth disadvantage for stationary usage	+	• Entire market for broadband and broadcasting addressable

Figure 8. Assessment of different access strategies.

The “mobile broadband” strategy of many MNOs aims at upgrading 3G networks towards HSPA or introducing WiMAX to drive wireless Internet access on the move but also at home. In many markets, MNOs position HSPA as a DSL substitute. With single macrocell coverage, some in house radio degradation occurs if Femto solutions are not in place and compelling high definition services for the home are not possible.

A mixture of both strategies gives maximum revenue, since users are “always best connected”, giving competitive advantage to the provider within the whole broadband multi-play arena. Fixed and wireless technologies also complement each other. At home, users can freely choose whether they prefer, for example, music downloads and private chats on their personal mobile device or the fully fledged home entertainment center. Many MNOs follow this approach, combining their mobile Internet offering with DSL. On the other hand, FNOs as well as ISPs can act as MVNOs. Hybrid providers can upgrade their existing wireline and wireless access networks with broadband technology. The challenge is to unify the often separate Customer Relationship Management for fixed and mobile that resulted from the disintegration trend of a few years ago. Strengths and weaknesses of the different access strategies from a revenue perspective are discussed in detail in Figure 8.

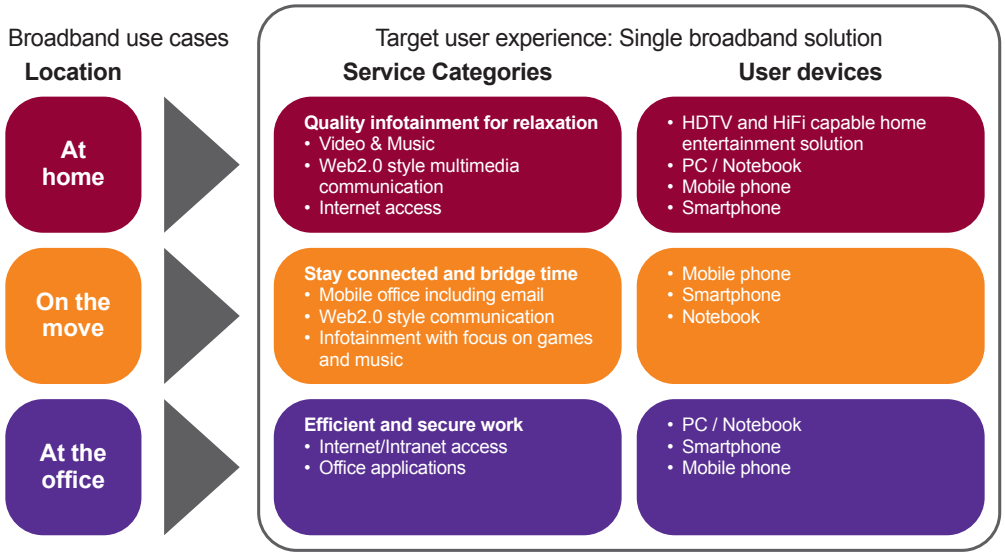

Figure 9. Users want a single broadband solution regardless of the use case.

3.3 Access independent service availability – making it simple for the user

High speed access to premium Web2.0 services helps achieve an inspiring user experience and sustainable competitive advantages for the provider that results in increased customer lifetime value. However, this is not sufficient on its own. The different wireline and mobile broadband access pipes must be combined into a single broadband solution for the user, hiding all the network complexity.

A major deterrence to adoption and a good user experience is complexity. Getting access to the personal communities and services must be as uncomplicated as placing a voice call. But today’s users are often confused in the face of an exploding variety of services, bundles, applications, content and technologies: “How can I use all the services I used to have at home on the mobile? Does my device support the service? Do I need a specific software client? If yes, how do I install it? Is the security guaranteed? What is the password for this application? What are the costs of this particular service? The typical considerations are what, where, how and how much. If a service provider has a simple answer, his competitive advantage is sustainable.

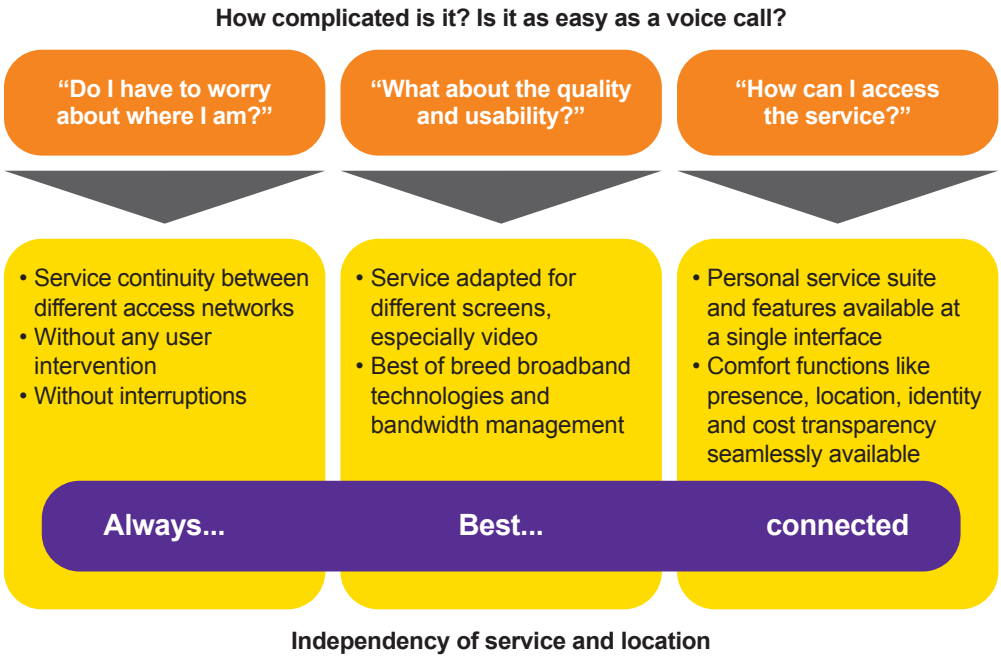

Figure 10. Access independent service management leaves the user always best connected.

Always...
Seamless mobility in the sense of roaming and handover between different access types, e.g. DSL when he is at home and HSPA if he is on the move, is a key differentiator: No call disruptions, no new log-ins and always connected to the personal application and content suite. The user does not have to care about the location. All subscribed services can be used anywhere.

Best...
The capabilities of different broadband access technologies and device types must be considered automatically. Most evident adaptation needs exist within videos, since different qualities ranging from mobile TV on an ordinary mobile phone to high definition TV on a large flat screen at home must be supported.

In order to ensure high speed connectivity, particularly for real-time applications, providers must implement an efficient bandwidth management. Providers stay in control of the traffic by differentiating applications with Deep Packet Inspection and prioritizing different traffic types. Bandwidth allocated for, for example, greedy file sharing applications can be limited to allow an optimal use of scarce network resources. Traffic differentiation according to criteria such as subscription, access network type, application used or time of day, also enables a variety of charging schemes. Step based charging and on-line subscriptions can be applied to encourage service usage among different user groups.

Connected
The Internet and the personal service suite should be made accessible at a single point. Basics like the user profile and comfort functionality like presence, location and automated terminal configuration should be made available independently of the access type. In order to integrate different applications into one service, a single user centric charging policy should be in place. This also allows for efficient charging of up sells.

In a typical always best connected scenario, users can for example select and buy IPTV program content on the move and start watching it on their mobile phone. Users can also program all VCR functions on their mobile device. Arriving home, the user can seamlessly continue watching, but now in HD quality on his TV set where he can also answer the latest e-mail message. Due to the simplicity, access independent service availability provides a much tighter lock-in than pure commercial service bundles.

4. Implementing broadband with Nokia Siemens Networks

Nokia Siemens Networks' portfolio of fixed and wireless broadband access solutions is the widest in the industry, ranging from all DSL variants to different fiber options. In the wireless area, Nokia Siemens Networks is able to offer HSPA with a clear evolution path towards LTE as well as WiMAX as a complementary technology. Together with the experience of numerous successful implementations, customers can count on us to select the best solution and evolution path, while also taking cost items, existing assets and synergies into account during the migration. The Nokia Siemens Intelligent Connectivity concept supports all kinds of user applications over copper and fiber in a most simple and cost-effective way. It guarantees the migration to an end-to-end packet infrastructure, such as voice migration and ensures fast and reliable end-to-end services.

Far beyond connectivity, Nokia Siemens Networks has a proven track record on VoIP and IPTV solutions as well as on other off-the shelf applications designed for a rich and convenient user experience and providing an open framework for new applications. The Nokia Siemens Networks IMS and FMC solution provide all components for providing the seamless user experience of being always best connected, independent of the specific fixed or wireless access network.

In addition, our market insights, based on permanent customer business talks, the presence in all important industry fora and our systematic market research help service providers ensure that new broadband offers are compelling, useful and easy to access.

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Product code B301-00182-RE-200801-1-EN – Indivisual

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