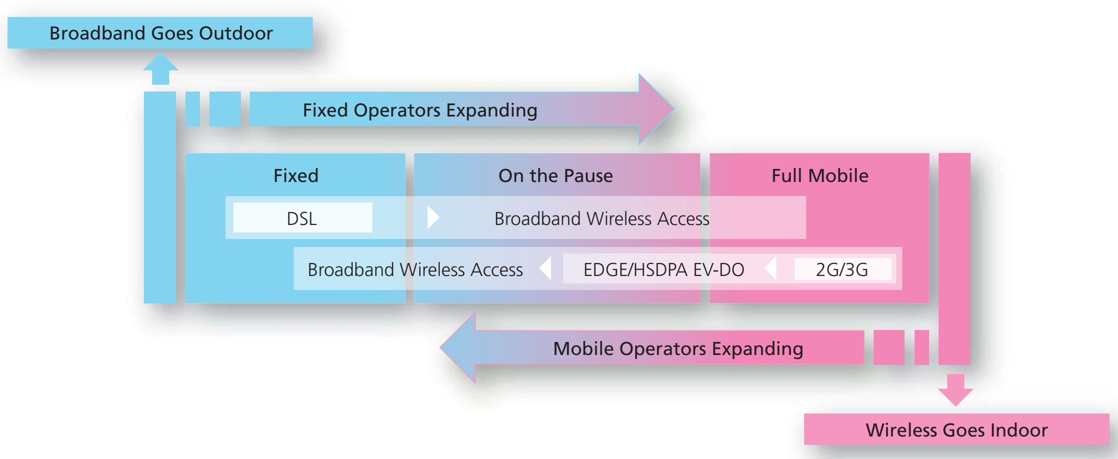
Realizing the Converged Broadband Service Provider

By E. Festraets, H. Bolande, S. White

The telecom arena is changing rapidly. The traditional, fixed, incumbent service-provider model – offering classical telephony and broadband DSL for Internet access – is becoming outdated and lagging far behind trends in end-user demand. End users are growing more and more dependent on broadband applications such as web-based social networking, multimedia messaging and online music and gaming. As a result, they want the convenience of being able to access them freely, "anywhere, anytime." Only by converging fixed access with broadband wireless access technology can service providers hope to offer always on, broadband services on a continuous basis (Figure 1).

Figure 1: **Moving to the "converged" service provider model**



Reinforcing this "converged" service provider model is the fact that, in many countries, the traditional incumbent is under attack from various competitive market players whose main weapon is the bundled offering. Traditional mobile operators are also looking to move beyond telephony (pure voice) to engage in this battle for the end customer, adding fixed residential offers to enhance their competitiveness. So, what does the future service provider model look like?

This article will take a closer look at the "converging" market trend and how it is driving service providers across the fixed/mobile boundary. It also will provide a look at some future bundled services (designed to meet a variety of customer demands) and offer a snapshot of new service provider business models with a focus on their potential role as mediator for the variety of communications devices inside or outside the home.

This mix of bundled service offerings, technologies and new business models will help this new breed of converged broadband service providers flourish.

Setting the Scene

Fixed and mobile boundaries are blurring. In Germany, for example, Deutsche Telekom, the traditional fixed operator, faces competition from mobile operators such as Vodafone and O2, whose "Zuhause" and "Surf@home" services emulate fixed broadband through third generation (3G) mobile connections. Conversely, fixed operators are increasingly looking to wireless technologies as a way to extend their broadband services beyond their home/office stronghold to "on-the-go" usage.

Figure 2: **The move to "anywhere, anytime..."**

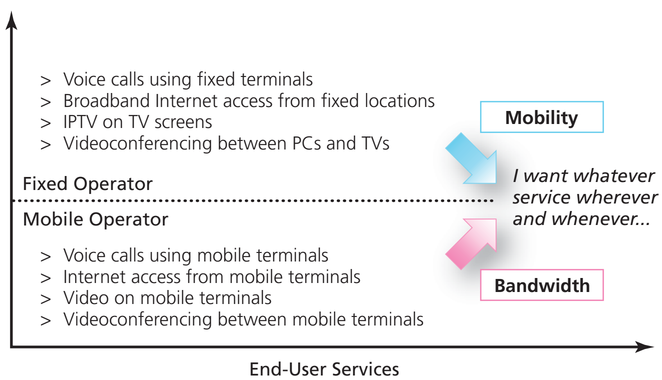


Figure 2 describes how both fixed and mobile operators will extend their offerings, with fixed service providers adding mobility to their standard set of services and mobile service providers coping with the need to deliver more bandwidth. Today, this "convergence" is mostly happening at the level of commercial service bundles, as opposed to the integration of technologies and network infrastructure, although we have seen some notable moves in that direction. The next step will be a more profound re-architecting of the network to deliver fixed and wireless services side by side.

What will this step toward full fixed/mobile integration look like?

The answer is fixed/mobile (wireline/wireless) service integration and blending. Some examples of these integrated service packages are:

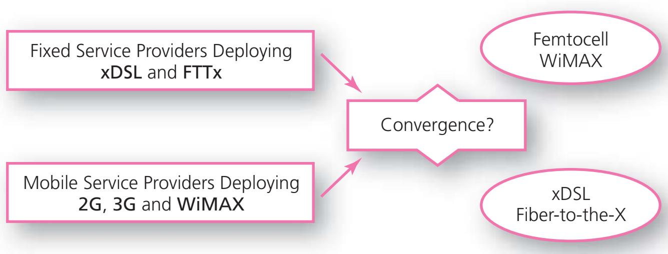
- Dual Mode (WiFi – 2G/3G) mobile voice terminals and femtocells
- Single number/agenda for fixed/mobile terminals, single voicemail box
- Videoconference between 3G mobile terminals and PCs
- Remote home surveillance through 3G mobile terminals
- Remote access to multimedia files in the PC from a 3G mobile terminal
  – Content streaming to mobile terminal overcomes memory limitations
- Convergent fixed/mobile TV package
  – TV on mobile terminal and home screen
  – Access to TV listings and PVR programming through mobile terminals

In order to make these blended service offerings a reality, the right network infrastructure needs to be in place, encompassing the IP/Multi Protocol Label Switching (MPLS) core, edge and aggregation network and various fixed and mobile access technologies.

Converging the Access Network Technologies

Fixed and mobile service providers intending to become converged broadband service providers face both challenges and opportunities. Zooming in on the access network, several comp-lementary technologies can be utilized to realize full convergence (Figure 3).

Figure 3: **Complementary technologies for fixed and mobile**



Challenges for the Mobile Service provider

The traditional mobile service provider has a number of barriers standing in its way as it contemplates moving toward a broader, more universal role in connecting all aspects of the end user's life. Winning a role as a provider of broadband services in the home and office is greatly desired, as it offers the potential for incremental top-line revenue and a way to reduce churn.

However, the infrastructure must be powerful enough to offer broadband throughput. In mature economies, end users have already become accustomed to the high bitrates they enjoy on xDSL, cable or fiber-based networks: therefore they are unlikely to use wireless technology – either as complement or substitute – if it means falling back to a narrowband quality of experience. At a minimum, they expect megabit-per-second speeds. The evolution of existing mobile networks to High-Speed Packet Access (HSPA) and Evolution-Data Optimized (EV-DO) Rev. A have brought that goal within reach, and some wireless service providers are positioning themselves on this basis as an alternative to fixed-line broadband.

The idea of converged broadband services, however, typically bespeaks a symbiotic collaboration between fixed and wireless infrastructures. One new technology that leverages the strength of wireless and wireline technology to offer a converged experience is the femtocell, also known as the home base station. This device combines the compact size and easy installation of a consumer-electronics device with the performance benefits of carrier-grade network equipment: it extends the full power of the wide-area mobile network through a compact, plug'n'play box. Because the femtocell provides a strong wireless signal in the home or office, it can support clearer voice conversations and offer optimal bitrates for broadband wireless access, thus allowing the end user to reap the full potential data rates of HSPA or EV-DO Rev. A, whether they are using a handheld device or a PC with card adapter. Traditionally, mobile subscribers have suffered from much-reduced signal strength in most indoor situations, since physical structures impede connection to the nearest outdoor base station.

The femtocell device also leverages the high bandwidth of the home's fixed connection, using that link to backhaul traffic, further improving the performance and quality of experience. The Holy Grail of fixed/mobile convergence is the notion of seamlessness, i.e. the ability of the end user to switch between different access types and networks without any noticeable inconvenience. Here, too, the femtocell has a role to play, because it enables the end user to move from outside to inside the home (and vice versa) without changing phones.

Another major benefit of the femtocell is the tight integration of this technology into a residential gateway to incorporate the mobile phone fully into the home network. This will enable content to be shared across different devices in the home, giving the service provider tight control over many home-based applications.

The ultimate level of fixed/mobile convergence would enable truly user-centric services that would be access-agnostic and centrally managed; this would require an end-to-end IP network architecture with multiple access networks sharing a single core. This is a longer-term goal, as most mobile service providers lag behind their fixed counterparts in the evolution to full IP. However, IP transformation often proceeds in stages, starting with, for example, the transport level, as mobile providers seek efficiently to ramp up capacity to cope with the fast-rising levels of traffic that non-voice services are bringing.

Challenges for the Fixed Service Provider

Fixed service providers suffer huge churn in their customer base due to competition from a variety of alternative players, whether mobile service providers bundling their offers, or “network-less” service providers such as Google and Skype, who threaten to “own” the end user by extending services to them using third-party network infrastructure. The traditional fixed service offerings (classical fixed voice, Internet access) cannot respond to the end user’s evolving service demands and are thus insufficient to counter these aggressive market players.

The emergence of new technologies such as Worldwide Interoperability for Microwave Access (WiMAX) and femtocell represents a definite growth opportunity. However, they are also part of a deeper trend toward fully converged broadband services, which give the service provider an opportunity to more deeply intertwine itself and the services it provides in the fabric of the end user’s life. This is one of the most important defense strategies against dis-aggregation, i.e. the threat of becoming the proverbial “big dumb pipe” that application providers such as Google, Yahoo! and Microsoft exploit to own the customer and dominate the highest position in the value chain.

The best defense against the threat of being relegated to the role of a faceless, brandless intermediary is the ability to provide seamless, always on, anytime/anywhere broadband services to any individual. Service providers who already possess both mobile and fixed networks are in the best position to become a converged service provider. They face a twofold challenge, to transform both their internal organization and their network.

The first challenge should not be underestimated, as fixed and mobile branches of service providers have typically been operationally autonomous, co-existing under a corporate roof but sharing very little in terms of leadership, hierarchy and culture. A complex merger is required which, in the case of companies such as Telefonica and Verizon, began with the CTO organization.

The second challenge, the merger of existing networks, is itself a project that can require significant investments in time and money. Thankfully, network transformation to a unified, all-IP architecture pays off not only in terms of new services (as described above) but in cost efficiency, as reduced network complexity drives down operational expenditure dramatically.

Operators with an exclusively fixed or mobile focus face a challenge that is more technical in nature. Fortunately for them, there are unprecedented technical opportunities for rounding out their capabilities. For fixed service providers, WiMAX in particular offers a compelling opportunity.

Well-suited to their practices and current network deployments (as an access technology, it interoperates seamlessly with existing back-end infrastructures), WiMAX answers two different kinds of consumer needs: first, the desire, largely in urban areas and among business users, for high throughput on the go; second, the desire for broadband access in rural areas where the economics of extending wireline networks can be prohibitive.

In both scenarios, WiMAX complements fixed-access offerings rather than competing with them. It expands a fixed service provider's service portfolio and – in the rural case – provides a cost-effective way of responding to the often mandatory, regulator-driven requirements to serve rural customers.

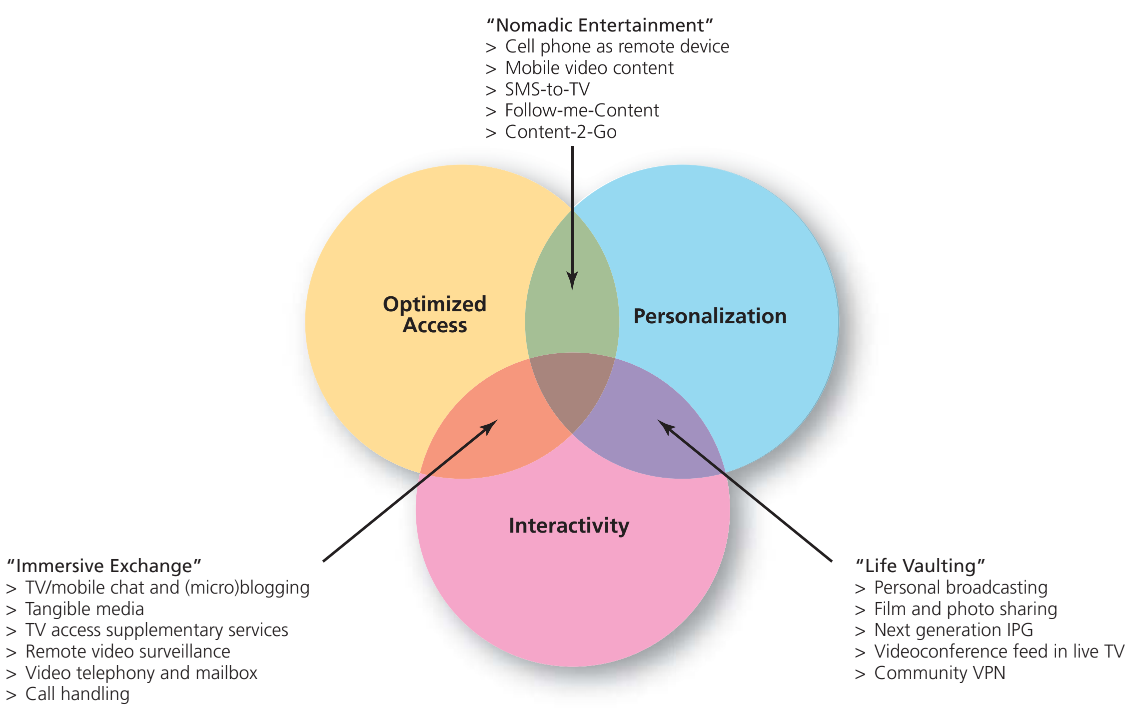
Creating Converged Services – the "Anytime/Anywhere" Experience

Converged broadband services anticipate changing consumer behavior and the ever-evolving "hunger" for an advanced user experience. The ultimate service offering can be found at the intersection of three underlying concepts:

- **Personalization** (I want my stuff, when I want it)
- **Interactivity** (I want to communicate, when I want to)
- **Optimized access** (I want uninterrupted service, irrespective of access technology)

The latter concept covers the fixed/mobile convergence discussion, in terms of handing over a particular service (movie, sporting events, live performance) from wireline to wireless access networks and vice versa, depending on the location of and applicability for the consumer (Figure 4). In principle, these brand-new service offerings require higher bandwidth, generate additional revenue, and differentiate the proposal from the competition.

Figure 4: **Converged end-user services**



Conclusion

Fixed/mobile convergence is a hot topic today, and all service providers have the opportunity to evolve beyond the fixed/mobile boundary. Those providers who best realize the converged broadband service provider model will be most successful in their markets and win the battle for the end user.

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