

# IMS – The Logical Choice for Future-ready Networks

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The evolving communications needs of end-users, and the need for a cost optimal network structure, require service providers to change the way they deliver services. To address end-user demand for blended, personalized services, service providers need technologies that will support legacy services and enable new IP-based (unified) services that will attract and retain consumer and enterprise end-users. Although there are a number of options, the IP Multimedia Subsystems (IMS) technology provides both a cost-optimized answer to short-term needs and the most flexibility for service providers that want to enable their networks to deliver the enhanced services being demanded today, and prepare for the services end-users will seek tomorrow.

## 1 Introduction

A few times in history, you know you witness a major technology shift. You recognize the paradigm that sets aside the established and convenient, bringing new opportunities onboard.

Such a paradigm happened to Telenor in the early 80s, when the digitalization of the Norwegian telephony network started. The goals then, as now, were new and better services for the end-user, a cost-efficient network and new revenue potential for Telenor.

The next paradigm was the broadband introduction. ADSL provided high bandwidth at affordable, flat fees. Today, more than 70 % of Norwegian households have fixed broadband, and Internet has become a part of daily life for the population.

Now, the next wave is underway. To ensure continued customer loyalty, service providers are turning to Voice over IP (VoIP) technology revamping their offerings to better align them with evolving end-user trends. VoIP is a logical choice because it enables service providers to leverage a unified, service-aware IP core as the basis for their evolving service offerings. A recurring question, however, is which 'flavour' of VoIP should service providers implement?

Service providers must consider a range of VoIP-based options for service evolution, including:

- A softswitch-based solution. Softswitches offer a monolithic approach to VoIP-based communications. They are often implemented as an evolution of legacy communications services and are primarily designed to replace and replicate the Plain Old Telephone Service (POTS) experience.
- IP Multimedia Subsystem (IMS). IMS was initially defined as a Third-Generation Partnership Project (3GPP) mobile standard but was also accepted

almost immediately by the fixed service provider community. This highly flexible, decomposed architecture was defined to support the service innovations on any access network.

- VoIP solutions originating in the web community. Here, arrays of VoIP solutions, quite often peer-to-peer, are implemented to support free PC calling services. These solutions are also increasingly available on mobile devices. Service providers can either copy solutions from web and over-the-top players, or they can simply resell or rebrand existing offers from these players.

In short, to capture and maintain a leading position, service providers need to ensure continued customer loyalty and establish a good base for ARPU-generating services across advanced fixed and mobile devices. Without a doubt, this service evolution will be based on a unified, service-aware IP core and, as a result, will rely heavily on VoIP.

This paper addresses the question: what developments are happening that force service providers to consider VoIP based technology and why is IMS the logical choice for such future-ready networks.

## 2 The Argumentation for VoIP Based Technology

A growing number of service providers invest significant resources in considering VoIP investment alternatives, either as a first off – or as a replacement of already existing VoIP infrastructure (we see currently a trend going from softswitch based solutions to IMS).

Service providers realize they have to consider not only the techno shift from Time Division Multiplexing (TDM) to VoIP to replace POTS, but at the same time they must consider the fact that both their core services offering and their accepted revenue-genera-

tion models are evolving. When considering the optimal VoIP investment strategy, it is also important to consider the evolutions taking place in broadband offerings in most markets. These include:

- The delivery of broadband, triple play or even quadruple play (fixed, mobile, data and video) bundles, with aggressively priced phone services. In the short term, the phone remains a key component of all broadband bundle offerings. In order to avoid a price fight for these bundles, smart service providers are looking for sufficient differentiation by offering more than just a like for like voice service, for example by offering calling on additional devices.
- A clear trend, especially of younger people, to move away from regular phone services to new style rich personalized communication services. This new style communication will gradually become mainstream, over time replacing the regular phone communication services.

When considering VoIP investment options, service providers need to take this evolution into account and select a solution which is able to support a traditional calling service while being able to evolve over time to the type of rich communication services which broadband consumers will increasingly be looking for.

### 3 IMS, much more than a SIP Based Network Standard

Before addressing the question of why IMS, let us first establish a common understanding of the scope of IMS.

IMS is a service architecture that is accepted as a standard, supporting an advanced service offering as defined in the previous section – across fixed and mobile assets. The mobile standards are defined by 3GPP and 3GPP2, the fixed standard is defined by ETSI TISPAN, and the Cable standard is defined by CableLabs in PacketCable2.0. Recently, as part of 3GPP R8 (Common IMS), the standardization activities are merged to assure continued alignment. This implies that with IMS, service providers embrace a standardized way to bring advanced services to users in a converged way across fixed and mobile.

IMS has been designed to support a rich service offering. To this end, it is defined as a decomposed architecture with a clear separation between the various layers of terminals, access, core control functions, and applications. The control layer is service independent, enabling full reuse at any time of control layer capacity as part of the continually evolving service mix. Additionally it provides much more than just SIP service, but includes extensive interworking with the PSTN, PLMN and IP interconnection points. This implies that with an IMS core network investment, the service provider not only serves SIP users, the IMS supports extensive service interworking with

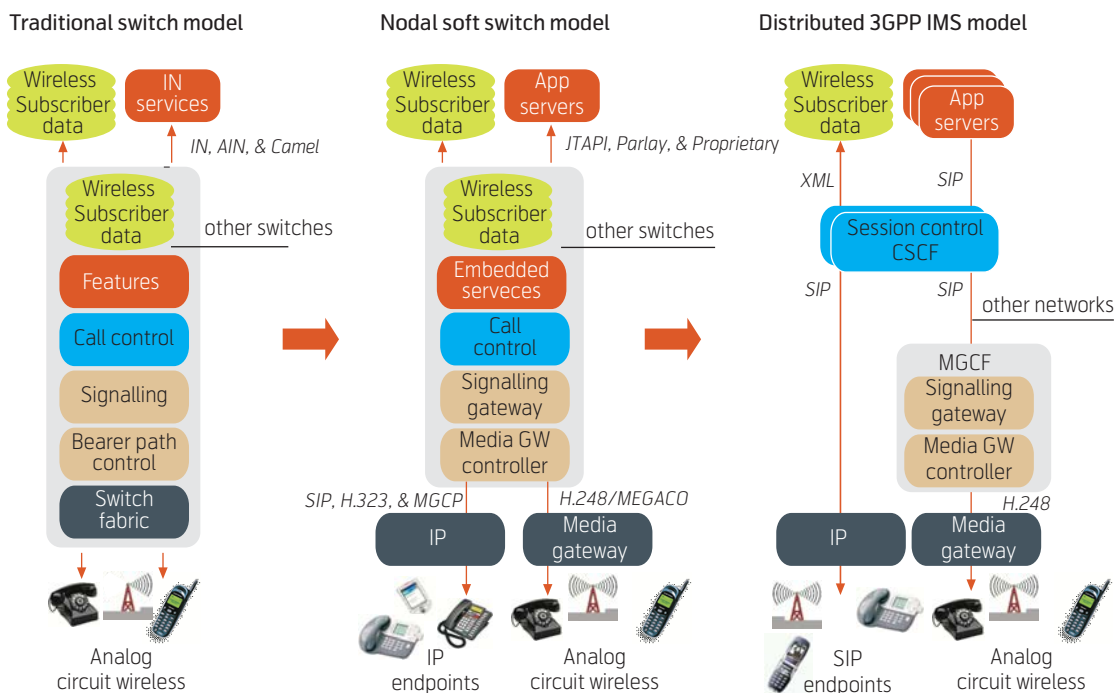


Figure 1 Evolution of switching

the existing customer base and service offering. Figure 1 illustrates the evolution from traditional TDM switching to the softswitch model where the switching fabric has been replaced by the IP network, and finally the step to the fully decomposed IMS architecture with dedicated application servers.

A key component of the IMS solution is the application layer. Even though the standards are not always fully clear, we consider it critical to accompany the IMS evolution with the appropriate application investment. These take the form of advanced application servers, which rely on best in class IT and web technologies enabling service providers to effectively engage web players. This includes:

- A capability based approach whereby a range of advanced functionalities such as presence, network based address book, push to X, click to X, etc., are delivered as flexible functions designed for fast and easy integration into an advanced set of applications;
- A Java based service development environment enabling service providers to easily mix IMS services and even web functionalities into a unique end user experience;
- Support for state of the art web 2.0 functions such as web widgets and other technologies to support a personalized dynamic web experience.

These advanced application servers provide a web-like agility for service providers. Similar to web players, they can now implement new services very fast. Additionally, as they are using IT development tools commonly applied in the web environment, service providers can now easily include web functions such as Google maps in their service offering.

Early investment examples going back as far as 2003 confirm the unique ability of IMS to launch advanced service offerings in a fast way.

One of the best examples is a recent contract signed by Alcatel-Lucent with a tier 1 service provider in AsiaPacific. The service provider was charmed by the ability to acquire a set of service building blocks as part of their IMS investment giving them an unmatched ability to deliver new services fast. At the same time, participation in the RCS testfest in Macao convinced the customer of the integration ease to deliver such services across a wide range of mobile devices. At the end of 2008, the customer acquired the Alcatel-Lucent 5400 IAS (IMS application server) with its presence and network based address book. Leveraging this investment they immediately defined a set of unique applications such as a “vending machine man-

agement application whereby the vending machine using presence to signal the need for maintenance or filling”. Coding of such applications relies on standard java programming and is done very fast. Quite a transformation when a service provider can fully control the development of his own set of unique applications.

Coming back to RCS, the GSMA Rich Communication Suite Initiative which was mentioned in reference above focuses on interoperability. To assure availability of rich communications across a wide range of devices from different manufacturers, RCS defines explicit interworking scenarios and organizes interworking tests. The initiative fully relies on existing standards such as IMS and OMA assuring that a large and ever growing set of devices becomes available which support full interworking.

Till now, we have described how IMS leverages web technology to enable service providers to have the agility of a web player as the basis for their evolving offering. Not all services delivered are however web-like services. Especially in the early years, service providers will keep on supporting enriched calling services to a phone. To optimally support these mass market services; service providers will require highly efficient solutions keeping the cost of service delivery under strict control. To meet this need, highly efficient feature servers are delivered as part of the IMS. These application servers primarily offer rich voice calling services in an efficient way.

By nature, IMS represents a highly decomposed architecture consisting of many functions. In large scale deployments, the IMS functions are distributed over a number of product components allowing a unique flexibility to permanently tune the architecture to the local context and evolving service offering.

The ability to deliver IMS both in tightly integrated and a highly distributed architecture yields an unmatched flexibility to competitively address the service needs from service providers of varying sizes, for network deployments of varying sizes, offering service mixes from rich calling to the most advanced multimedia blended services.

Additionally, significant optimizations in recurring OPEX results in a lower TCO (total cost of ownership) for your IMS deployments in most – if not all of the cases encountered. Based on these optimized voice feature servers, and use of tightly integrated deployment models, service providers can use IMS technology as the basis of a competitive class 5 deployment.

## 4 Why IMS and not Softswitch

Now we come to the key question: why IMS?

Most service providers agree that over time their business will transform and they will need to launch fundamentally new service offerings. However many service providers believe this is still some time off. In the short term their fight focuses on broadband triple play or even quadruple play bundles. Additionally, they are launching simple services to increase the ARPU generated by their captive customer base. A softswitch would be able to address these short term needs, so why not invest in a softswitch now and wait and see?

Indeed, the advanced service evolution whereby service providers will actively engage web players is still a while off in many markets. We should point out, however, that the market is already changing and so service providers might be underestimating the speed of change.

Let us assume that some service providers indeed feel that the fight with web players is not a short term requirement. In these markets, the fight will center around bundles, first securing bundle loyalty and then defining simple up-sell services to generate more ARPU from captive bundle customers. As already pointed out, smart service providers look for differentiation to avoid a pure price fight. A rich VoIP offering beyond simple calling is a cornerstone of this evolution. Flexibility to keep on evolving the voice part of the bundle offering is also key to achieving permanent differentiation and assuring bundle loyalty without sacrificing too much ARPU.

Investment in a softswitch will support a like for like POTS experience as part of the bundle strategy or as up-sell services around captive bundles, but will lack the flexibility required to have the maximum differentiation. Service providers who invest in IMS from the outset will have far superior flexibility to regularly redefine the bundle offering, in that way avoiding a pure price fight for bundles.

Let us look at some examples of service providers who opted for bundle differentiation clearly beyond the bundle with a traditional phone. The first example is British Telecom (BT). When launching their Total Broadband triple play bundle, BT opted for bundle differentiation rather than a price fight. In actual fact, the BT triple play offering is not the cheapest in the UK marketplace and BT makes this very clear to the end user. BT however provides a set of free gifts as part of the bundle which makes it better value for money. One of these free gifts is a PC client accompanied with dual ringing. All BT Total Broadband customers will be able to access calling services from

a (DECT) phone. At any time, customers can also install a PC client. From this time onwards, calls will result in parallel ringing and a common set of features is delivered across the phone and the PC client. Such scenarios are an integral part of IMS but might be hard to implement through a softswitch. This is just a first step. At any time, BT will be able to enrich the service experience around the PC client.

The second example is the U-verse bundle launched by AT&T where calling still relies on a phone but where an extensive set of end user calling services are supported from a dedicated portal page. These include easy control of selective services, missed call list and buddy list with click to dial, etc.

Additionally, the service evolution to really advanced web-like services is unavoidable. Here service providers are challenging and are challenged by web players who rely on highly flexible service offerings. A softswitch does not have the agility to effectively fight these web players, so service providers who started with a softswitch would need to complement their softswitch investment with a more advanced investment over time. At that point in time, they will either end up with a hybrid architecture leading to significant operational inefficiencies or they will need to phase out the softswitch. Both alternatives are far from attractive.

Furthermore, the actual call minutes are shifting away from traditional services to advanced personalized services accessed through buddy lists. Service providers who rely on a softswitch as the basis of their short term bundle strategy will need to invest in sufficient capacity to support existing calling needs on their softswitch. Over time, traffic will start to move away to personalized services, which will leave this customer with a growing amount of spare capacity on their softswitch.

Using a strategy that begins with IMS addresses these challenges. As outlined before, special high performance feature servers enable service providers to cost effectively launch both fully fledged class 5 and simple calling services from the IMS relying on a highly cost competitive IMS solution. With an IMS investment, the service provider is now ready for an evolution either to more advanced calling services or towards web-like services as a natural evolution. As IMS relies on a common service agnostic core and as more advanced services still require advanced calling feature as part of the end user experience, reuse of the feature server and IMS core investment is assured every step of the way. This makes this proposal the only pragmatic option for service providers who are focused on launching more basic service offers. The

solution enables service providers to launch simple services relying on efficient application servers while the investment assures reuse.

## 5 Why IMS and not Reselling Offerings from Web or Over-the-Top Players

Two scenarios are considered in this chapter:

- Web and/or over-the-top players approach service providers with an offer to resell existing PC-based communications and/or instant messaging services. More recently, we see similar proposals also appearing in mobile, where web players also start offering communication services.
- Besides the resell of services the web and over-the-top players are starting to discuss technology transfer to the service providers. By this, the service providers can use it to launch their own set of IP communication services.

The first offering is quite tempting as it brings additional value to the broadband bundles offered by the service provider without the need for the service provider to invest in this technology.

So what is the downside? The service also becomes available to the competitor which puts a downward pressure on bundle pricing. Additionally, the basic bundle offering is increasingly considered as a commodity for which end users are willing to pay but only a modest fee. So service providers who exclusively fight on bundles will see their margins eroding away.

Web and over-the-top players address this challenge by relying on new revenue sources derived from the end user's profile data. This profile data is used to unlock content revenue and also advertising revenue. The profile data however belongs to the provider of the web like services. In this resell model, the profile data derived from providing the over-the-top services and thus the advertising and content revenue goes to the web or over-the-top player. This revenue is not only a major growth area; it also represents a high margin since no major asset investment is required to access such revenues.

A growing number of service providers realize this challenge and question the accepted practice of reselling the offering of web players, and are instead considering the launch of their own web-like services. This enables service providers not only to secure bundle revenues but also to gain access to the profile data which forms the basis for advertising based revenue streams. So, while a resell of the offering of web players can be a viable short term tactic,

the only viable mid term strategy is to launch a separate IP communication offering.

The second scenario is currently expected to be a trend that a growing number of service providers will be approached by web and over-the-top players, not only with a proposal to resell their offering but with a proposal to use their solution as the basis for their own offer of web-like services.

This is leading a number of service providers to question the optimal investment that enables engaging web and over-the-top players at their own game. Should service providers choose IMS as the basis of this fight, or should they just use the technology and solutions already used by web players?

Just embracing solutions already proven by existing web players has the advantage that these services have been proven in a web context. The choice to copy current actions already taken by web players however presents significant downsides:

- The service provider will be relying only on the same solution set as already successfully introduced by web and over-the-top players in their market. This leaves little if any room for offer differentiation versus these web players, thereby giving web players a clear early mover advantage in this space.
- Many solutions from web and over-the-top players primarily target dedicated user communities. The web community is a virtual community stretching across the globe, which makes such an approach feasible for a web-only offering. However, service providers with their national scope require openness to optimally address the broader market that exists beyond dedicated user communities.
- Most communication solutions from web players are weak in terms of legacy protocol interworking, often relying on simple access to legacy networks (eg. ISDN PRA), which is inefficient in handling significant traffic volumes. At the same time, although PC to PC services tend to be delivered free of charge, interworking with legacy remains a significant source of revenue generation.
- Most web services are implemented peer-to-peer effectively bypassing the service provider assets. This strategy, which makes sense for over-the-top players who by definition do not own the network assets, is not optimized for a service provider environment. Network based approaches are much better suited to enable service providers to leverage their extensive legacy and state-of-the-art assets.

On the upside, however, it is to be noted that solutions from web and over-the-top players fully embrace state-of-the-art IT solutions applied in the web 2.0 context. This enables these players to mash up very powerful application experiences in a fast way and launch them over highly personalized clients.

With an investment in IMS, service providers have the best of both worlds. They will have access to a solution with the same flexibility as solutions from over-the-top players, allowing service providers to match the current offering of over-the-top-players. At the same time, the solution will rely extensively on network based assets and functions providing the basis to assure significant differentiation.

As already outlined, an advanced service investment based on IMS relies on:

- A Java based application scripting environment, enabling service providers to mash up their own communication capabilities with leading web functionality, thereby creating a unique end user experience. The tools used are exactly the same tools as used by web players to develop their applications;
- Extensive use of state-of-the-art client technologies, such as web widgets, creating a highly personalized user experience;
- An open approach leveraging full openness to existing web communities, enabling service providers to profit from existing web communities.

The solutions developed on such state-of-the-art IMS are by all means at par with solutions delivered by web players. But there is more; with an IMS investment, service providers will be able to create differentiation from web players.

## 6 IMS, the Basis of an Enhanced Enterprise Experience

The argumentation outlined above remains valid both for the consumer and the enterprise environment. Indeed we see an increasing interest in the enterprise space for access to advanced web-like clients as the basis of their communication service offering. The need is such that in many enterprises where such services are not delivered by the enterprise infrastructure, employees just install their own 'Google Talk' and start to use it to be aware of presence and be able to chat with colleagues.

In the same way, we see a high interest in a single number service whereby an end user has a single number from which calls can flexibly be routed across different devices such as his mobile and his office extension and PC.

Even more than in the consumer space there is a need to support extensive interworking with legacy and continuity of service across traditional enterprise and state-of-the-art devices. The difference is however that the core enterprise functionality does not reside in a telephone switch but already resides in application platforms.

This makes the IMS environment the ideal platform for supporting an enterprise evolution strategy. All that is needed is a graceful evolution path of the IN based applications currently deployed to support enterprise services in a TDM fixed and mobile context into hybrid applications by extending them with

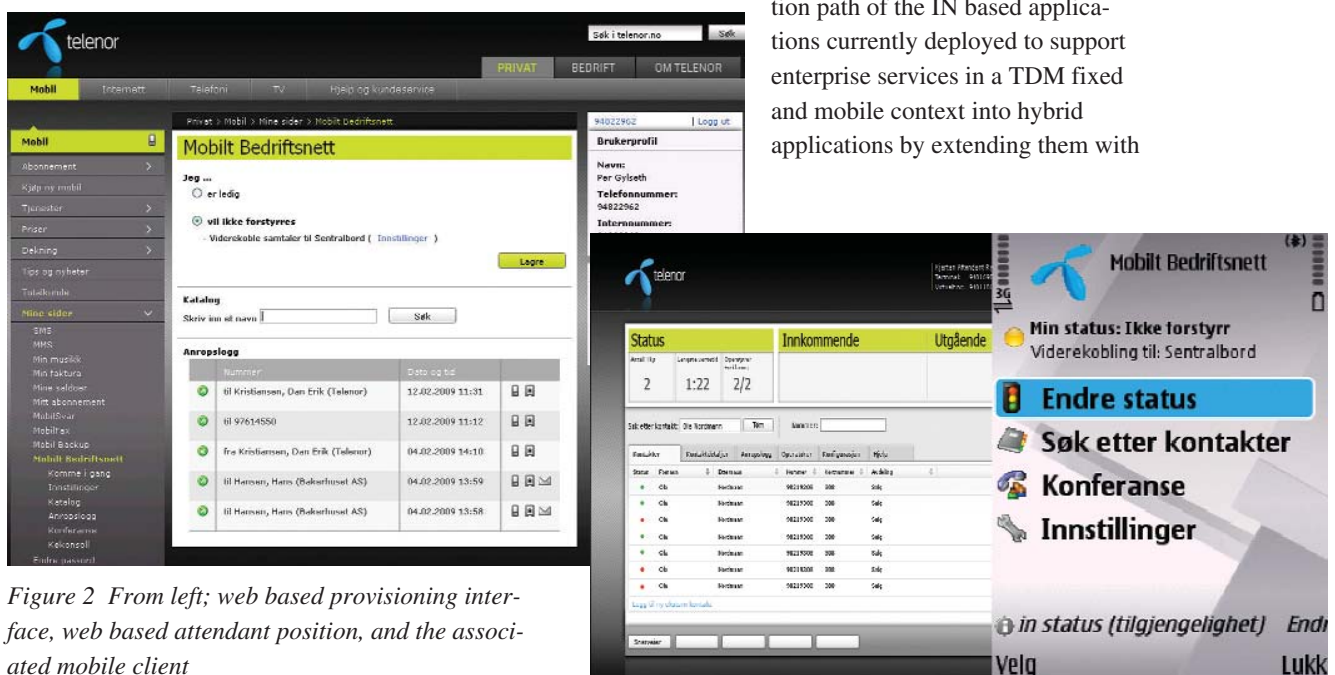


Figure 2 From left; web based provisioning interface, web based attendant position, and the associated mobile client

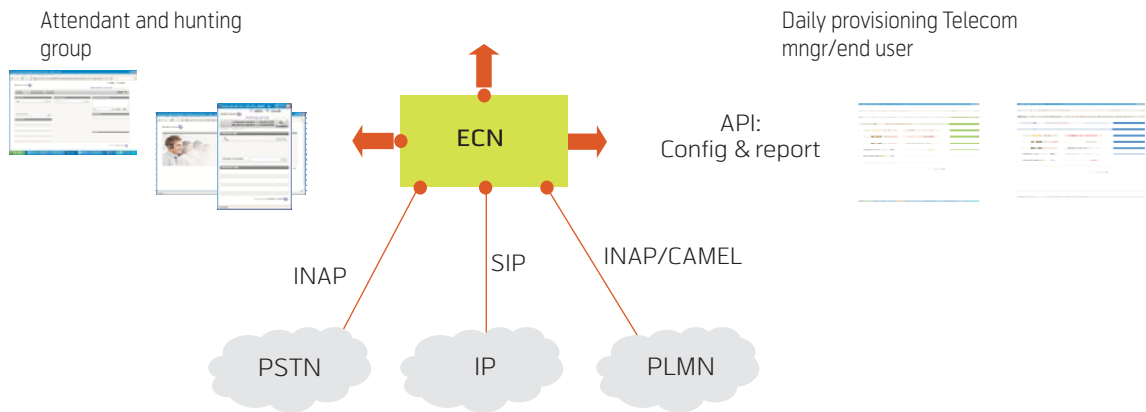


Figure 3 'Mobilt Bedriftsnett' is delivered through the ECN (Enterprise Communication @Network) application available on the Alcatel Lucent multi interface OSP platform

SIP ISC IMS interfaces. In this way, existing enterprise applications can support seamless enterprise services across TDM and VoIP based assets.

A recent example is the newly announced 'Mobilt Bedriftsnett' service offered by Telenor for the SMB market. It offers the web-like mobile client and the one number feature across different devices. The end user provisioning and the Attendant position is offered through a web based interface, Figure 2.

The 'Mobilt Bedriftsnett' may be seen as a hybrid application as it is initially offered in the TDM network and will later be extended to the SIP ISC IMS interface.

In a next step, it is now easy to rely on multi-application triggering in IMS to introduce state-of-the-art functionality into the enterprise environment such as support of PC clients with presence and instant messaging. In this scenario employees are given a Google like experience but they still retain full access to all enterprise features.

## 7 Conclusion

To capture and maintain a leading position in broadband value creation, service providers need to follow a dual track strategy. Creating differentiating bundles assures continued customer loyalty. Additionally, it establishes a good base for the up-sell of ARPU generating services across advanced fixed and mobile devices. Without a doubt this service evolution will be based on a unified service aware IP core and so will rely heavily on VoIP.

In 2005, 3GPP IMS was accepted as the standard for such advanced service evolution by both the fixed and mobile service provider communities. Alternatives exist, however; both in the form of softswitches or in solutions coming from the web.

tives exist, however; both in the form of softswitches or in solutions coming from the web.

A continued reselling of offering of web players as part of the evolving bundle offering can be a good short term tactic but is not recommended as a forward looking strategy, because it gives away the profile data to the web players; profile data which may prove to be a real asset.

Use of a softswitch, especially at the outset of your evolution, is not recommended. Early mover examples clearly confirm that the flexibility to easily evolve the communications offering is key in achieving bundle loyalty. Additionally, a softswitch investment merely delays the introduction of IMS, leading to either hybrid architecture with its inefficiencies, or to an early phase out. Finally, the availability of a tightly integrated IMS solution with integrated optimized calling feature server enables service providers to execute class 5 replacement program at a lower TCO.

When considering an advanced service evolution, IMS offers clear advantages versus an investment in a solution used by web players. It brings the same flexibility and possibilities as experienced in a web 2.0 context. Additionally, however, an IMS investment with its heavy focus on network based capabilities brings real differentiation for the delivery of services across a range of devices and networks. IMS also enables leveraging to maximize the Telco's assets. Finally, some dedicated initiatives such as the GSMA's RCS already address cross-device and cross-service provider challenges. While an investment in a web technology will bring providers on a par with the web players who will be the main challengers, an investment in IMS will start by bringing providers on a par and then build a strong differentiation on top.

So in a nutshell, whether providers are still in the early stages of the evolution of broadband offering or whether looking to create their own IP communications offer, IMS from the outset brings significant benefits, both in the short and long term, when compared to alternative investment proposals. Such an IMS investment is an investment in an end-to-end architecture which can be delivered either as a tightly integrated or a highly distributed architecture. The tightly integrated architecture is suited for small

deployments or to support simple service offering boasting a softswitch like TCO. The highly distributed architecture gives an unmatched flexibility to support a deployment tuned to local market context and service offering.

Alcatel-Lucent supports these IMS offers in an end-to-end way committing evolving end user packages across both tightly coupled and highly distributed architectures.

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