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Evolution towards All-IP: the Service Layer

White Paper

The evolution to an all-IP infrastructure will have impacts on the Service Layer. New network architectures, such as IMS, put new requirements on the operators' service delivery environments.

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Contents

1 Executive Summary

Operators are increasingly feeling the impact of change as both market conditions and technology continue to evolve at an ever-increasing pace. Deregulation is motivating operators to seek differentiation from their competition by expanding the range of services they offer and developing the capability to deploy them quickly. At the same time, the arrival of Internet Protocol (IP) based transport and switching technologies is reducing the cost of delivering these services resulting in competitive pressures on existing networks.

Like any major change, the evolution from the traditional circuit switched service delivery infrastructure to a packet switched all-IP infrastructure presents challenges to operators. The Service Layer, in particular, will be impacted as the new capabilities made possible by this change affect both the operator's business and network infrastructure. Evolution towards all-IP will only be successful if the resulting networks deliver on the user's expectations of service quality and assurance, and then only if these networks can be integrated with the operators' business management and control systems. These objectives are met by an all-IP network, which provide a path for the gradual, long-term evolution of operator networks – Including both voice and data services.

The IP Multimedia Subsystem (IMS) is a key element of the evolution towards all-IP. IMS enables services to be delivered in a standardized, well-structured way that truly makes the most of layered architecture. At the same time, it provides a future-proof architecture that simplifies and speeds up the service creation and provisioning process, while enabling legacy interworking. The horizontal architecture of IMS enables operators to move away from vertical 'stovepipe' implementations of new services – eliminating the costly and complex traditional network structure of overlapping functionality for charging, presence, group and list management, routing and provisioning. For fixed and mobile operators there are benefits of introducing the IMS architecture today. On longer term, IMS enables a secure migration path to an all-IP architecture that will meet end-user demands for new enriched services.

By moving to IMS operators will ensure that they become and remain the users' supplier of choice for access to communications, media, content and services. Such evolution will ensure that operators can continuously provide new services and content to users, and efficiently manage this expanded business environment.

2 Network Evolution to All-IP

The move towards all-IP is being driven by a number of market and technology factors. The evolution of end-user needs and the Service Layer marketplace, and the business impact on operators are described in more detail in the Ericsson white paper “Key Business Issues in the Service Layer”.

This chapter looks at these factors in greater detail, as well as the pace of evolution, the transition from circuit switched to packet switched networks, network convergence, the technology and standards involved and how all these factors lead to a need for horizontal architecture.

2.1 Evolution Not Revolution

From a commercial perspective the main commodity sold by telecoms is services. The main operator goal therefore is to become the user’s supplier of choice for this commodity. The goal is meet by building or sourcing services, delivering them to the user and managing the ensuing financial flows.

The basic need for communication between people is the dominant driver for telecoms commerce. The role that telecoms play in the lives of users has now expanded beyond voice to include sound, text, image and video. Users also want to access content such as news, sport, games and music from any place and at any time.

Bringing these services to market at a profit places demands on operator business systems for supply-chain management, partner management, revenue sharing, customer management, service management and marketing to increasingly specialized segments. Therefore, the operator’s chosen network environment, its architecture and how it is implemented to provide service assurance, delivery and enablers, user databases, charging systems and so on, is a key factor for commercial success. Of course, access to new network services is also dependent on the evolving capabilities of devices such as handsets, personal digital assistants and personal computer clients.

Operators are facing a number of challenges as both market conditions and technology evolve. The highly dynamic Service Layer marketplace is changing daily, so flexibility to offer a broad range of services and the capability to deploy them quickly are key to both attracting new users and keeping existing ones. New IP-based transport and switching technologies are reducing the cost of delivering these services and putting competitive pressures on existing networks. Most operators are therefore faced with reconciling two seemingly unconnected trends – increasing revenues and at the same time reducing costs.

- Increase revenues: Consumer-driven change – in order to gain new revenues and to reduce churn, operators are seeking to both broaden their service and content offering through richer communication services and reduce time-to-market (TTM). Operators need the tools to create and deploy self-built and vendor-provided applications faster, but they are also relying increasingly on partnerships with external parties to expand their value chains (Figure 1).

Figure 1: Consumer driven trends to increase revenues.

- Decrease costs: Technology-driven change – the standardization of infrastructure from circuit switched to packet switched technology is resulting in reduced cost of ownership to network operators by lowering integration costs and interoperability problems. It also makes future evolution of infrastructure less risky by enabling incremental improvement of existing networks (Figure 2)

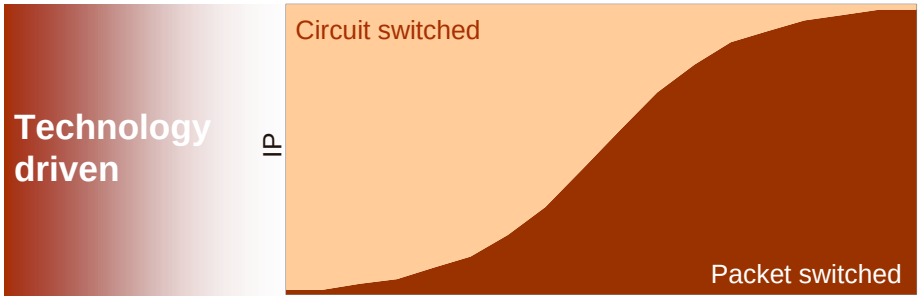

Figure 2: Technology driven trends to reduce costs.

Many operators are going through a multi-stage evolution to upgrade their service networks. The Service Layer is a way to implement a structured approach to providing increasingly more sophisticated services to an increasingly broad customer base. To achieve this, operators require more sophisticated business-to-business interfaces, improved assurance of interoperability, access to the internet and the web, and open standards that are global and network agnostic.

IMS-based network infrastructure makes it possible to deploy the same services on a wide variety of deployment platforms with true scalability and a gradual evolution path for services. It also provides a way to reduce the cost of new service development over multiple networks. Churn can be reduced by providing the same services to subscribers when they move to 2.5G and 3G networks. IMS allows operators to provide the same services to subscribers as they move from 2.5G to 3G, reducing churn and consequently accelerating the uptake of 2.5G and 3G network offerings. It also by makes it easy to integrate the features of next-generation networks with existing 2G services.

Operators can also deploy the same services over many different networks, rapidly deploy successful services to other markets and optimize investments by making excess capacity at one regional member available to other global partners. Other benefits include:

- A much broader developer base, hence more services.
- Interoperability testing through Service Layer standards groups such as the Open Mobile Alliance (OMA) and Parlay, which reduces development time and integration costs.
- The opportunity for developers to offer their services to a worldwide market, spreading development costs over a wider customer base.
- Extremely low cost for deployment of new services to the market, through partnerships with third parties, providing a low-risk way to “cherry pick” among services and maximize the possibility of finding the next “category busters”.
- The ability of operators to deliver multiple service packages with different quality and price characteristics This allows them to create sub-brands targeting specific markets and hence reduce churn and increase average revenue per user (ARPU).

In summary, the Service Layer is used to capture an end-to-end perspective on the service environment and the services provided through a telecom network. This includes everything that is needed to ensure that services can be presented to the end user in a convenient, attractive and understandable manner. Within an operator network, the Service Layer provides:

- User services beyond traditional voice (consumer and enterprise).
- Services for content and application providers.
- Support for operators’ business processes.
- Access to functions in the core and access networks.

2.2 Transition from Circuit to Packet Switched Networks

One major evolutionary trend is the transition from circuit switched (CS) to packet switched (PS) networks. The inherently lower transport costs of PS networks for voice is driving the transition from traditional CS voice networks. Standardization organizations, such as the Third-Generation Partner Project (3GPP), have specified protocols and application programming interfaces (APIs) that define how real-time telecom applications can be delivered over IP networks, greatly expanding the types of services that can be offered. The standards include IMS and Open Services Architecture (OSA) among others.

Stage one - 2G (CS based)
The 2G market for this segment, dominated by traditional operators, basically works according to well-known traffic and business models. A prerequisite for success is interoperability and roaming between operators. Competition and differentiation are primarily driven by tariffs and bundling through branding and loyalty programs once coverage and mass-penetration of new technologies have been achieved.

Stage two - 2.5G (CS augmented with PS enablers)
In this stage, operators leverage second-generation infrastructure by introducing services with lower-bandwidth text and content functionalities, such as MMS, downloadable games and polyphonic ring tones. Voice-based applications have significantly changed the evolution picture by offering ways of integrating the data and content services with second-generation intelligent network (IN) services such as virtual private network (VPN). Operators can also significantly expand their service offering by using service creation environments for IN and Parlay/OSA as a technology base for in-house development. These can reduce development costs by using standard off-the-shelf development tools and platforms, and significantly increase the number of services that can be launched each year.

Stage three - 3G and beyond (mostly PS-based networks, some CS)
The much higher data bandwidth of third-generation networks supports a far wider variety of applications. Service Layer standards such as IMS, Liberty Alliance and Parlay/OSA provide support for all-IP and converged networks, reducing operational expenditure (opex) and the life cycle costs of deploying a greatly enlarged service offering. Most users will switch to a 3G network only if: the cost of voice calls does not increase; the enhanced services offered are beneficial; and their existing services are maintained. Affordable and readily available 3G handsets are also needed in order to capitalize on many of these benefits.

Network Convergence
Convergence is an important driver in the ongoing evolution of the Service Layer market. It is implemented in three dimensions: user-services convergence, device convergence and network convergence. User services are converging as users demand simultaneous, simple, uniform and integrated

access to personal communications, media and the internet. Users want services to function seamlessly from any device or any network they chose to use.

To implement convergence of user services, consolidation of the service provisioning capabilities to give person-to-person (P2P) and person-to-content (P2C) services is needed. Access must be possible over different access networks, on different devices, with access and device awareness, using one identification and charging identity.

Convergence facilitates a more efficient network based on a multi-Service Layered architecture: a horizontal structure including a “service and application enabler” layer, a “communication control” layer, a “backbone” layer and access networks.

A common architecture for all access types (fixed broadband, WLAN, 2.5G and 3G) enables increased revenues by improving service quality and improving transmission efficiency and support for the efficient introduction of new multimedia services over different access networks based on IMS. Opex will also be reduced due to simplified network planning and upgrades, shared competence and shared operation and maintenance functions.

2.3 Technology and Standards

The all-IP scenario is becoming increasingly visible as more and more commercial systems are put in place, but several challenges remain. Many of them have been experienced in recent years in the internet domain, in particular security issues, the spread of viruses and spam. It is increasingly important for operators to have spam-prevention strategies for applications, products and devices, to meet the anti-spam laws being introduced across the globe. The transition to IP-based technologies gives operators the opportunity to incorporate virus and spam prevention in their networks.

The Service Life Cycle

In an all-IP context, operators are increasingly dependant on a much wider variety of network and service delivery elements from disparate sources. The resulting increase in the number of different protocols, APIs, nodes and vendors takes place as operators seek to increase the number and type of services they offer and reduce the time and expense of bringing them to market. It is therefore increasingly important that service networks are structured to optimize service life cycle management.

For end users this means being able to quickly and easily: discover and activate new services; understand the charging and billing requirements; manage, provision and customize the service’s behavior, either directly or with the operator’s CRM infrastructure; and cancel a service and receive notification if and when a service will be withdrawn by the operator.

For operators, the priority is identifying which new services will be desirable to users and therefore profitable to deploy. These services must then be realized, brought to market in line with target markets and effectively integrated into an operator's network and business infrastructures. Operators must also consider how to manage the services to allow changes to access, charging and provisioning of the services, according to the needs of target market segments and changing usage patterns.

The all-IP world has significantly increased the business opportunities and complexity of service life-cycle management. At the same time, horizontal network architecture has been evolved to provide the concepts and tools operators need to make their implementation possible. Vendors have also greatly expanded their analysis, integration and managed service offerings to operators, as well as hosting services and service infrastructure such as BREW and Ericsson's M-USE.

Standards are replacing proprietary solutions

Operators have the choice of using standards-based service frameworks as part of their Service Delivery Platform (SDP) or building one themselves.

Choosing to develop all services internally, or on contract to developer partners, allows the operator to specify how these applications will integrate with and interact with their various network and business systems. They can also establish a specific look and feel in line with their brand image.

These frameworks, however, can be expensive to develop and require operator-specific custom gateways and software development kits (SDKs), which then need to be maintained. If only a limited number of developers are involved in SDP development, the choice of services could be limited. Developers who work "on spec" may also require an up-front payment to disperse the business risk of developing the services.

Publishing the specification as an open API and aggressively promoting it within the local developer community, could avert some of these problems. NTT DoCoMo's i-mode, for example, attracted a huge developer base when the operator used this approach.

Operators can alternatively use a standards-based framework or work with service aggregators that have already established their own standard frameworks and third-party developer networks. These options, which largely provide the same benefits as the proprietary frameworks, are available without the up-front development and maintenance costs.

The open standards-based approach is reflected in OMA, Parlay/OSA and Web Services where network equipment vendors supply the required infrastructure, gateways and SDKs. Some vendors, such as Ericsson through Ericsson Mobility World – which hosts tools and provides assistance to developers in many areas including Parlay/OSA and OMA – also have third-party developer programs with a large stable of tested services.

BREW is a good example of the aggregator model, where developer support, testing, verification and business-to-business interfaces, hosting of the application servers and support of the gateway to the operator, are all handled by the aggregator. Aggregators can also customize application interfaces to meet the operator's own look and feel.

The third options is the service delivery model, utilizing the before mentioned technologies, in combination with hosting by an external agency. M-USE, a joint effort between Ericsson and Sony Music, where Ericsson hosts the service and Sony provides the content, is a good example of the service delivery model.

Protecting partner assets – Digital Rights Management
Protecting the value of content delivered to users must also be considered. Most rights owners want to ensure the quality of their product and protect it from unauthorized distribution. Digital Rights Management (DRM) standards have been defined within OMA to ensure that intellectual property is protected. Some content providers will only partner with operators who provide a clear DRM strategy. The arrival of OMA DRM is expected to significantly boost the amount of available content.

2.4 The Need for Horizontal Architecture

A structured Service Layer architecture that caters to each operator's unique needs, goals and starting position, will make it easier for operators to evolve their networks towards all-IP. In the CS world, networks often used proprietary protocols and technologies, and services were specifically developed, end-to-end, for individual networks. This "vertical" approach to user services presents many problems for operators, including dependence on vendors, integration difficulties, interoperability issues and expensive upgrades, if they are possible. The development of IP standards has resulted in a progressive standardization of Service Layer elements into a "horizontal" approach, based on common functions with re-usable elements.

Unfortunately, there are a vast number of options for implementing these network functionalities and interfaces. The extreme complexity can be best managed by means of a horizontal Service Layer: an open architecture, based on industry standards, that is specifically designed, from the bottom up, for creating adaptable solutions. The horizontal Service Layer gives a set of rules and reusable guidelines that describe how to build service network solutions that effectively implement these common functionalities.

By leveraging a structured architectural framework for common management, provisioning, session management and other shared common services, the framework supports the shift from a vertical to a horizontal Service Layer, while reducing business risk and integration costs. This supports an evolutionary approach to service network deployment, allowing an operator to evolve the

service network over time and plan long-term investment. It also provides a reference blueprint defining the common functions and peer interfaces needed to interact with them.

A well-structured service network secures scalability and ease of management as more users are added. By reducing the complexity of the Service Layer and evolving the service network, an SDP can be used to make service networks more efficient. For operators, this means projects become more predictable and time plans more credible, and related projects regarding launch and marketing programs can be better planned and coordinated.

Ericsson's Service Network Framework (SNF) is a recipe of how to build a horizontal service network architecture. SNF provides a structure in which the actual service network operates. A well-structured service network secures scalability and ease of management as more users are added. An SDP can be used to make service networks more efficient, by reducing the complexity. For operators, this means projects become more predictable and time plans more credible, and related projects regarding launch and marketing programs can be better planned and coordinated.

Key Service Network capabilities and enablers
In addition to enabling enriched voice services and services beyond voice, service networks provide a variety of key capabilities and enablers. Networks and devices are evolving hand-in-hand: networks are providing increasingly higher access bandwidth resulting in a corresponding increase in processing capability within devices themselves. These trends have let to an expanded range of deliverable services and applications. The all-IP network scenario brings enhanced peer-to-peer communication capabilities between devices, blurring the distinction between client and server, and further widening the range of commercial opportunities.

Standards are needed to ensure that this increasingly complex environment does not equate to increased complexity for the user. Some of the key enablers and capabilities coping with this evolution are discussed further in the following pages. Through these standards mobile, as well as fixed, devices will be reachable seamlessly, but the type and availability of commercial devices will be dependent on market demand.

Charging is the fundamental ability of operators to be paid for the use of their network resources. Charging can take many forms including: per use, duration of usage, subscription, value-based (value of content), – differential rates depending on time of day, day of the week, quality of service – as part of a bucket plan, with volume discounts, prepaid and postpaid. Each allows users to keep control of their spending in realtime. The flexibility and sophistication of charging capabilities has become a major element of the operators' value proposition towards external content and application providers, and remains a key advantage the operators and the telecoms industry have over most Internet Service Providers (ISPs).

In the all-IP scenario, the trend is to move from bearer-based to value-based charging models. This enables operators to extend their value chains and protect their revenue streams. It also appeals to end users who prefer charging models that are easy to understand and are directly related to their user experience. IMS supports access-independent charging, which is a key ingredient in any fixed/mobile convergence scenario.

The complexity of **provisioning new services** is seen as a major barrier to the acceptance and commercial success of these services. A well-defined service life cycle management process covering all phases, from deployment to offering and activation, is a must. In the IP scenario, devices have greater flexibility to interact with the network, expanding the possibilities of automatically configuring the devices and operator revenue opportunities. Service and user data is kept consistent across the IP network, usually through a single point of provisioning. Automatic device configuration allows operators to provision devices to immediately activate new services as soon as they are purchased and make existing services available on different devices, with little or no direct interaction by the user.

Service Interaction and Orchestration ensures that services can be used consistently, or in the right order, when the user has subscriptions to multiple services. This is particularly important when linking CS enablers, such as call control and SMS messaging, into the PS world to build combinational services and when combining network services with services executed within a device.

Presence and Availability Management establishes a way for services to change their behavior depending on the user's location and availability. This makes it possible to send calls or messages to an active device or, under certain, predetermined circumstances, avoid interrupting the user. "Automated attendant" type services, screening services and so on, use this ability. In the all-IP scenario, the possibilities for enhanced interaction through group lists, external servers, automated agents and "follow-me" type services increases dramatically, creating new revenue opportunities for operators, particularly those in the enterprise market.

Presence will also stimulate spontaneous communication between users, create more successful voice calls and stimulate new data traffic from services such as SMS, MMS, instant messaging, push-to-talk and e-mail. Other applications, such as mobile gaming, are also considered more attractive if enhanced with presence functionality. A number of operators have already succeeded in attracting new users by launching applications that utilize presence in their networks. Today the leading standard for mobile presence is the OMA Instant Messaging and Presence Services (IMPS), which, according to major terminal manufacturers, will be supported in a large percentage of all new devices.

Presence is being standardized within 3GPP IMS Release 6, based on SIP/SIMPLE from Internet Engine Task Force (IETF), as well as within the OMA Presence and Availability Working Group (PAG), both are cooperating

closely to develop a single common standard. Terminals with presence based on the IMS standard and therefore support multimedia IMS application, will soon enter the market.

Messaging – text, voice, instant or deferred, with or without multimedia enrichment – is a mainstay of operator revenues around the world. These aspects of messaging are being brought together via ongoing standardization efforts. Messaging will evolve from today' s services to a presence-enabled service portfolio using the IMS standard. It is necessary to secure a framework for the present services to work with the new IMPS and voice mail options. In the long term it is likely that IMS will replace the existing messaging platforms giving opex reductions while offering an identical user experience for SMS/MMS type services on both fixed and mobile services.

2.5 Voice Services Evolution

Despite heavy investment into new data oriented services, voice services remain the dominant revenue driver in telecoms, providing on average 80 to 90 percent of all service revenues. Operators are looking for ways to tap into additional service revenues by extending existing voice services. These enriched voice services would leverage existing end-user calling behavior, and capitalize on new network capabilities and increasingly advanced terminal devices. In their move towards all-IP, operators can deliver a more open infrastructure that enables enriched voice services by gradually evolving currently installed solutions.

From an end-user perspective, the successful evolution of voice services would result in two major developments:

Enriched voice services
Converged voice and data services, with voice carried over CS networks during the call phase and PS enrichments before or after the call phase. These services could include:

- Richer call setup - the subscriber gets a menu of choices on how to set-up a call depending on called party's status or availability, set priority, or send a text message ahead of the call relating the subject of the call.
- Richer call alerting - personalization of via music or pictures of ring-back tones for each caller, show a picture of who is calling etc.
- Richer call completion - offer multimedia content/information when a user is not available, link to a personal information page, visitor log etc.
- Richer incoming call handling - offer choices on how to handle incoming calls, for example start chatting when in meeting, transfer to secretary, reject call with reason.

Combinational services
These services enable truly rich calling experiences through the use of PS enrichments during the CS voice call phase. These services could include:

- Enable the user to instantly and interactively share information such as images, live video and web content with their caller, while talking. Examples of these services are push-to-view and push-to-watch services.
- Communication control through a voice mail on-screen menu presented to the calling.
- Text or images such as maps displayed on-screen in visual IVR menu when calling information numbers.
- Presentation of a phone directory to select or find the contact of choice on calling company/VPN number.

Specific terminal support may also be required, if services, in particular combinational enriched voice services, are to evolve to full all-IP based services (all media, including voice, being carried over IP-based networks). However, CS telephony enrichment will have to be maintained, even after all-IP networks are widespread, until such a time that all users have migrated in full to the all-IP network. The gradual approach to All-IP makes this transition smoother, allowing end-users to adopt new services one at a time, reducing the possibility of churn, and maintaining operator revenue streams throughout the evolution.

3 IP Multimedia – Evolution to IMS

In today's increasingly fast-paced telecoms market, operators are looking for ways to expand their service offerings and compete more effectively by reducing network and operational costs and TTM for new services. As described in the preceding chapters, an all-IP approach to service delivery will achieve this. The challenge is to deliver easy to use, reliable and easy to pay for IMS-based multimedia services that users want while protecting existing service revenue streams and leveraging investments in circuit switched technology. IMS is the key standard that will answer this challenge. This chapter explores IMS and its contribution to the evolution towards All-IP.

3.1 End-User Value Proposition

For users, IMS-based services will enable richer P2P and P2C services using voice, text, images and video, or any combination of them, in a highly personalized and controlled way. Users will have the flexibility to communicate in real-time (conversational) mode and with immediate or deferred messaging. They will have the best possible common experience thanks to situation-sensitive service control logic, in which the control mechanisms for the

originating and terminating parties can interact to select the best possible bearer, applications etc.

3.2 Common Enablers and Combinational Services

IMS provides certain network enablers as core functions and expands their scope to simultaneously handle and keep synchronized several media at the same time. These common enablers include presence and group list management. The common enablers add value to consumer services, such as IP Telephony, push-to-talk, video telephony, video conferencing, instant messaging, just to mention a few.

IMS also introduces a common way of handling certain network functions so they can be used in isolation but also to build services that utilize multiple functions, or combinational services. This involves combining voice with pictures, video, music, games and so on, sharing experiences and emotions, and building on existing behavior so that they are easy to adopt.

The combinational services approach enables a new voice-centric user experience to be added to existing voice services. In this way, new services are introduced in evolutionary steps. The approach enables operators to utilize the telephony performance of their circuit switched infrastructure and leverages on established user behavior, combining traditional telephony calls with other types of media.

A further advantage is that consumers can quickly learn how to use these services during an ongoing call/session. This low entry barrier for new users is a key factor for successful introduction a new service to market.

3.3 Application Support

One of the major advantages of IMS is its flexibility in handling applications in both protected and unprotected spaces. IMS builds on previous work by the 3GPP and the 3GPP2 groups to bridge 2G and 2.5G with 3G technologies. It provides a systematic way to establish Service Creation Environments that simplify the design of IMS applications. IMS benefits from the all-IP approach, which enables services to be developed by operators in-house or by third parties. IMS also brings the richer possibilities inherent in IP-based networks to handle a much more intelligent device, which acts not only as a client but a server, making it possible to quickly introduce new services.

3.4 Added IMS Benefits in the Service Layer

IMS also specifies interoperability and roaming, provides bearer control, charging and security, thus making it easier to achieve service interoperability

across operator domains and national boundaries. It enables operators to implement a horizontal, layered architecture that allows enablers and functions to be reused automatically in new applications and services that are supported by a variety of devices across network and operator domains.

IMS builds on the foundation of a structured service network architecture, such as SNF, and reinforces its value to operators. Services based on IMS can be created and delivered quicker reducing TTM, and can be scaled more easily to meet demand. The reuse of common infrastructure, enablers and competence provided by IMS minimizes risk and has the potential to significantly reduce total cost-of-ownership, especially in areas such as service provisioning, operation and maintenance, customer care and billing.

3.5 Integrating IMS into the Installed Base of Services

IMS provides a solid foundation for operators to begin rolling out IP-multimedia services via Session Initiation Protocol (SIP), Customized Applications for Mobile network Enhanced Logic (CAMEL) and Parlay/OSA capabilities. These enable fast, flexible service creation and provisioning, while also providing for legacy inter-working and combinational services that make the most of existing investments.

Professional services will be critical for a successful introduction of IMS services. As mentioned previously, the Service Layer in the all-IP world often consists of heterogeneous network elements from a variety of vendors, supporting multiple protocols and APIs. Bringing all these elements together in harmonious cooperation requires not only knowledge of systems integration in the IP world, but also an understanding of how to build end-to-end solutions that offer the service quality and availability expected by telecom users. IMS, in particular, uses a telecoms approach to bring together multimedia solutions that will meet these expectations.

Migrating existing service and IN revenue streams to an IMS base will be key to the success of IMS business. Operators of 2G and 2.5G networks will require a global understanding of these technologies, and how to access their functionality and integrate it in the IP context, to successful deploy IMS. Integrators with a deep understand of telecoms issues are best equipped to provide the advisory, integration and management services to help operators to take maximum advantage of the potential of IMS.

4 Conclusion

Operators need a flexible and rapid way to create, source and deploy new services that will allow them to compete effectively in today's fast-paced Service Layer market. At the same time, they need ways to reduce opex and total cost of ownership by moving to standards-based infrastructure. The move to an all-IP network meets both of these objectives and provides a long-term path for operators to evolve their networks.

Wireline and wireless networks are already evolving to IMS, to take advantage of the benefits of IP while preserving the quality users expect and maintaining the control and charging integration necessary for operators to profitably conduct their business.

In the immediate term, IMS adoption in the Service Layer is being driven by P2P applications, with other Service Layer infrastructure providing P2C services and content. This is particularly appealing to wireline operators looking to expand their service offering to compete more effectively with wireless operators.

In the longer term, IMS adoption in the Service Layer will be driven by network convergence and the need for network agnostic solutions for both P2P and P2C services. Both wireline and wireless operators will benefit from reduced opex as well as a broader base of services and applications. Operators that deploy both types of networks will be able to do so from the same network infrastructure, at a significant saving.

The move towards all-IP will ensure that operators: become and remain the user's supplier of choice for access to communications, media, content and services; can source new services and deliver them to the user; and manage the financial flows involved via an efficient business infrastructure.

5 Glossary

3GPP	Third Generation Partner Project
3GPP2	Third Generation Partner Project II
API	Application Programming Interface
ARPU	Average Revenue Per User
CS	Circuit switched
DRM	Digital Rights Management
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IMPS	Instant Messaging and Presence Server
IN	Intelligent Networks
IP	Internet Protocol
OMA	Open Mobile Alliance
OSA	Open Service Access
PS	Packet switched
P2C	Person-to-content
P2P	Person-to-person
SDP	Service Delivery Platform
SDK	Software Development Kit
SIP	Session Initiation Protocol
TTM	Time-to-market
VPN	Virtual Private Networks

6 References

Ericsson white paper “Key Business Issues in the Service Layer” at:
http://www.ericsson.com/products/white_papers_pdf/service_wp_layer.pdf

Ericsson white paper on IMS can be found at:
http://www.ericsson.com/products/white_papers_pdf/ims_ip_multimedia_subsystem.pdf