ERICSSON

Service Innovation through Smart Networks

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1 Introduction

A period of extraordinary revolution has started. New user behaviors, emerging technologies and an increasingly connected world are changing the way we lead our lives, both at work and during our leisure time. When everything is connected in real time, unimagined and truly limitless opportunities will open up. In the Networked Society, connectivity is the catalyst for innovation, collaboration and unprecedented business opportunities.

With new possibilities come new requirements. Ericsson believes in smart, end-to-end solutions - all the way from the server to the screen. Operators need to be able to detect changes in user behavior and content consumption, and to respond with attractive services. They have to do this in real time, supporting the latest applications and making sure their networks are capable of providing experiences to match user expectations.

Ericsson's Smart Networks solutions combine awareness of users and traffic with availability of resources and capabilities, creating differentiated experiences and operational efficiency. In short, Smart Networks help operators gain as well as save.

2 Mobile Services and Subscriber Trends

The Ericsson Mobility Report is published on a regular basis and provides updates on the status and projected future of mobile broadband services, user behavior and revenue opportunities for operators. A recent issue includes the following data and trends:

- There were 113 million new mobile subscriptions worldwide in Q3 2013, and 6.6 billion in total. However, of all the mobile subscriptions, just 25-30 percent are associated with smartphones.

- There has been an 80 percent growth in mobile data traffic between Q3 2012 and Q3 2013. Ericsson projects that data traffic will increase tenfold from 2013 to 2019.

- Online gaming communities, high definition video content and advert streaming contribute to traffic growth. In the US, 76 percent of Android and iPhone users play games on their devices, and they play an average 5.9 hours per month.

- Video traffic is increasing and will account for more than 50 percent of global mobile traffic by 2019. It is not consumed only by early adopters and younger subscribers. As many as 41 percent of people aged 65-69 stream video content over mobile and fixed networks every week.

Market potential for mobile broadband services is strong, and includes migrating basic phone users to smartphone subscriptions with customized plans. Video-based traffic will dominate but browsing and social networking will be constant demands.

Operators will need to focus on real-time network capabilities, and providing service differentiation based particularly upon video and gaming applications, which are now used by people of all ages as shown in the Ericsson Mobility Report. Customer attraction, satisfaction and retention will depend upon the promise and delivery of compelling user experiences. Operators are increasingly bundling ‘over-the-top’ content in their service offerings including music, premium sport and TV optimized for mobile networks.

The whole value chain (including content owners, network operators, equipment vendors, and device manufacturers) can work together to create attractive services and elevate user experiences. Operators benefit from the added perceived value of bundled content and can augment their brands through association with carefully selected players, with ‘cool’ factors or ‘household name’ recognition. Content owners, on the other hand, benefit from the operators’ reach (subscriber base and network coverage) as well as their established capabilities for marketing, charging, and revenue sharing.

Considering these trends, operators will wish to provide more personalized and granular service offerings, tailored to meet whatever market segment an operator decides to address: premium or basic value, high or best-effort performance, time-of-day dependent, bundled over-the-top content or application-specific access. Each service offering will aim to raise revenue from a new source by recognizing a particular market segment, or raise revenue per user from existing sources by offering premium service levels or exclusive content, for example.

3 Smart Networks

Ericsson's Smart Networks solution enables differentiated and targeted service offerings, and enhances user experiences. In other words, Smart Networks do not limit the creativity, scope or rapid delivery of new services. The solution has also been designed to let operators take full advantage of new opportunities in the Networked Society.

The Smart Networks solution comprises more than just a few products and extends beyond policy control, despite the potential offered by this functionality alone. More is required because the user experience is the combined result of every part of the network used to deliver services from server to screen (see Figure 1).

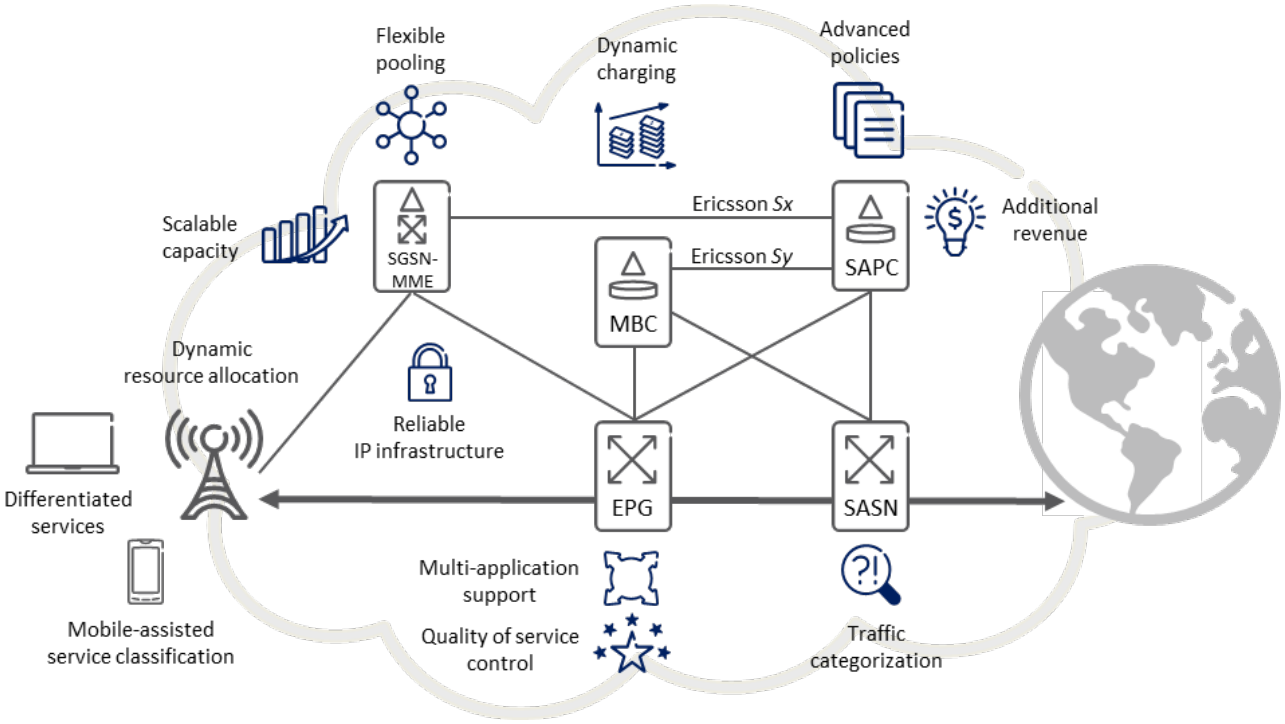

Figure 1 Key components of Ericsson's Smart Networks solution

What makes Ericsson´s solution 'smart' is a tight integration of network and *policy control capabilities*. Highly scalable multi-application platforms, performance management and network security are also important elements in Smart Networks.

Service-Aware Charging and Control (SACC), Ericsson's policy control solution, is the centerpiece for quickly refining offerings and enabling new services and business models. It brings together functionality for *traffic categorization*, quality of service control and *charging,* with the direct Sy interface between the policy control server and the charging system.

Another unique feature of Ericsson's policy control server is the direct Sx interface to the Serving GPRS Support Node and Mobility Management Entity. This interface enables operators to implement mobility-based policies. *Resource utilization* is also improved due to effective use of complementing radio access network technologies and packet gateway selection.

The solution provides effective quality-of-service control that helps operators to offer graduated levels of service performance, while cost-effectively scaling their network capacity. The integrated policy control and charging functionality allows operators to *create service offerings* and payment models to meet the needs of subscribers in diverse market segments. It also gives operators the opportunity to work with over-the-top players to offer superior performance services with premium content and applications.

In a similar way, Ericsson's Mobile-Assisted Service Classification feature can improve the user experience from the *mobile terminal* rather than the network. Based on the terms and conditions of subscriptions, the policy control server can be triggered to take action according to a set of *predefined rules* when certain types of applications are run. This means operators can easily offer subscriptions with access to specific applications or use the feature to allocate more network resources to improve performance of individual sessions.

Ericsson's Smart Services Routers (SSR 8000) family offers high-capacity *multi-application* IP/MPLS routing and runs the Ericsson IP Operating System. Telecom-grade availability and highly dependable *quality-of-service delivery* are fundamental to the product family. The multi-application capabilities reduce operational expenses and ensure flexibility.

Current applications include Evolved Packet Gateway, and Service-Aware Support Node for IP/MPLS routing and traffic categorization. The platform also supports Network Integrated Wi-Fi, and the Broadband Network Gateway application for fixed subscriber management. The routers offer multi-dimension scalability so that operators can effectively scale services for user plane throughput, control plane signaling and subscriber numbers.

The Ericsson Blade Server Platform hosts *multiple applications* for the control plane, such as the Serving GPRS Support Node, the Mobility Management Entity, and the Service Aware Policy Controller. The platform features a small footprint, low power consumption and sufficient *scalability* to handle the signaling needs of 36 million users (a medium-sized country), and 2,304 million users in a *pooled configuration*.

The policy controller provides traffic control for a wide range of services, and can, for example, control quality of service and access to premium content, or personalize services in any number of innovative ways.

Ericsson's Evolved IP Network solution provides a *highly dependable* and cost-effective IP transport foundation for multi-service broadband offerings, built on Ericsson's broad portfolio of IP, microwave and optical products. What makes this solution smart is its 'end-to-end' approach, providing connectivity all the way from the radio base station to packet gateway. Smart IP 'services' such as performance management, synchronization, *network security*, and deterministic quality of service, ensure optimal user experiences and save operators the task of complex systems integration.

4 Implementation Insights

Implementing Smart Networks solutions for operators around the world has provided Ericsson with important and instructive insights, five of which are discussed in this chapter.

4.1 Partnerships produce better user experiences

User experiences are optimized when every part of the service delivery chain is working at its best. The network needs to be integrated and tested with devices, applications and content in a coordinated way.

The collaborative approach can also extend to creating new service offerings, with commercial advantages for each player. Operators need strategies to better monetize the rapid growth in traffic, which is driven primarily by the popularity of video-based services. Similarly operators need ways to capitalize on the value their networks provide in delivering content with superior performance, and their reach in terms of subscriber base and network coverage.

This requires operators to adapt business models, working with over-the-top players to provide value-added content and applications to users. Making these offerings cost effective can be achieved through collaboration with advertisers, or by using premium content to attract new high-revenue subscribers.

4.2 Segmentation models maximize profitability

A proper segmentation model with a range of services will maximize profitability and meet the needs and budget of almost everyone as illustrated by Figure 2. Each service, from left to right, provides a progressively better user experience with more bandwidth and fewer restrictions on quota, time of day, or necessity for top-ups, for example. The services provide opportunities for users to upgrade when their requirements and budget change. The curve showing the distribution of disposable income is a generic illustration, and could of course vary from country to country.

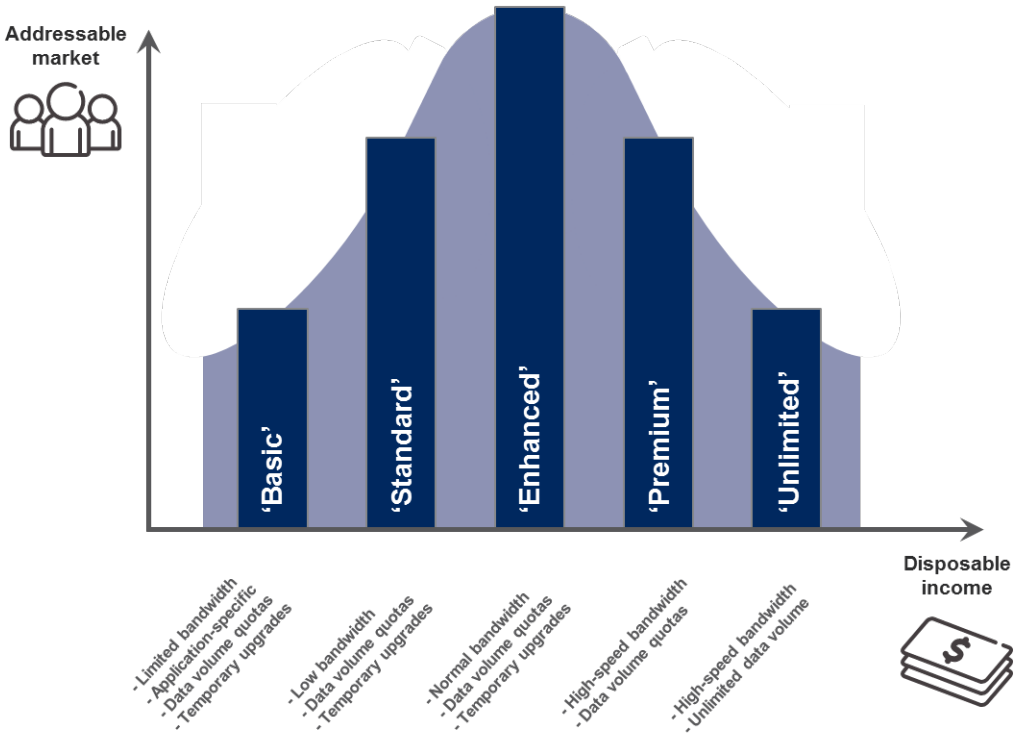

Figure 2 Tiered service offering based on disposable income

There is also an increasing demand from users for application-based packages. Operators could respond to this demand by offering services with access to specific applications, beyond their fixed volume or time-based packages. For example, operators could provide unlimited use of specific social networking applications and email services, special roaming packages, higher quality of service for specific multimedia applications, and zero rating of sponsored services. Packages of these types enable two-sided business models and help drive top-line growth.

4.3 Shared subscriptions extend the user base

Shared data plans are becoming popular because they permit seamless internet access from multiple devices, bundle multiple accounts with flexible data consumption, and receive a single bill. The shared plans also enable parents to give their children access to the internet without signing up for new subscriptions. For operators, the shared data plans help attract new users while increasing the loyalty of existing subscribers.

The shared data plans also enable operators to encourage a mindset of “multi-device-based” plans and thus pave the way for adding more device types such as connected cars, homes and electrical meters. The logical next step is then to create a business for machine-to-machine communications. Smart Networks solutions provide capabilities to create such plans with ease, and Ericsson has already enabled many leading operators to implement shared data plans.

4.4 Integrating policy control and charging generates competitive advantage

Significant benefits can be gained from implementing the direct Sy interface between the policy control server and the charging system as defined by 3GPP. In addition to providing support for setting spending limits, Ericsson’s implementation adds value beyond the standardized interface by:

- Centralizing the handling of user information. Subscription information duplication and any need for manual intervention are removed.
- Providing one common environment for the creation of service offerings, taking both policy control and charging into consideration.
- Enabling cross-service promotions and bonuses. For example, an operator could provide a bonus of 1G byte of mobile broadband data when a subscriber exceeds a threshold of 500 minutes of voice calls.

4.5 Professional services unlock full business potential

Innovation only goes so far without the ability to put the good ideas into practice. Smart Networks solutions are based on a holistic approach to network planning and design, making use of key functionality in different parts of the network.

With Ericsson’s professional services the various components of Ericsson’s Smart Networks portfolio are integrated to provide maximum revenue-generating potential. All the included products are designed to work together effectively and efficiently, and tested as a whole. With literally hundreds of successful deployments across the globe, Ericsson’s comprehensive professional services delivered by experienced consultants ensure that the transition to Smart Networks is smooth.

5 Innovative Service Offerings

The following three examples show how Ericsson Smart Networks components have been used to good effect to enable innovative service offerings.

5.1 Superior mobile-TV experience from Avea, Turkey

Avea is the newest mobile operator in Turkey and describes itself as driven by a “spirit of innovation.” It has a particularly high percentage of younger subscribers and promotes services based on a network featuring the latest technology. With a subscriber base in excess of 14 million, a large share of the revenue comes from mobile data services.

When its group company started an online mobile-TV service, Avea wanted to map this service easily to its existing mobile broadband offerings and provide a guaranteed high quality user experience. The operator chose to achieve this aim quickly and flexibly, using existing investment in the Ericsson Service-Aware Charging and Control solution, and minimizing additional capital expenditure. This avoided the need to build a completely new IPTV service with additional infrastructure, and the service was launched as a new ‘Mobile-TV’ application that subscribers could easily download.

The service implementation had to be smart because it required the Mobile-TV application to work independently of the fair usage policy associated with the subscriber’s service plan. In other words, if the subscriber’s traffic quota is exhausted and the quality of service for regular traffic is consequently downgraded, then the mobile-TV experience should not be affected.

Other Ericsson Smart Networks features used by Avea with their Mobile-TV application include Parental Control, Bill-Shock Prevention, and a Day and Night Package (policies based on time of day)..

Thanks to the flexible policy management and strong charging capabilities of the Service-Aware Charging and Control solution, in a period of only a few weeks Avea was able to implement a new value-adding application, complementing the offering of its parent group.

5.2 Social networking packages by Telkomsel, Indonesia

An Indonesian mobile operator, Telkomsel, with more than 120 million subscribers, was looking for innovative ways to introduce new users to its network, many of whom had never accessed the internet before. The success of social networking packages and small denomination offers showed that providing differentiated services does not necessarily mean only offering premium services at higher rates. There is money to be made from offering low-cost services, tailored to the demands of lower income subscribers, especially when the potential subscriber base is enormous.

Telkomsel permitted unlimited access to a bundle of social networking applications. The services were offered either as monthly tariffs or as pre-paid small denomination 1, 7 or 30 day limited-time purchases. Telkomsel provided further graduated service offerings, effectively providing ‘something for everyone’, according to income and service expectations. This provided an upgrade path for first-time users, once familiar with the benefits of mobile internet access and willing to pay a little extra for enhanced service.

Through the use of sophisticated policy control, traffic categorization and quality-of-service delivery, Telkomsel has been able to flexibly respond to key subscriber opportunities with music streaming, religious content, location-specific service access, and holiday promotions. The operator is also able to provide certain services free of charge as part of a corporate responsibility program. Indicative of Telkomsel’s commercial success with targeted offerings, Telkomsel benefitted from 600 percent data subscriber growth in less than one year after introducing small denomination plans.

5.3 Korea Telecom deploys Mobile Cloud Acceleration

To gain a competitive edge, South Korea's leading telecoms provider, Korea Telecom, is working with Ericsson to launch mobile content acceleration with its live LTE network. This will be the world's first commercial deployment of its kind, and builds on technology provided by Ericsson. In situations with high load and network congestion, the Mobile Cloud Accelerator has reduced download times for prioritized traffic by a factor of up to three.

Ericsson’s Mobile Cloud Accelerator is a compelling solution for operators wishing to reduce download times for web content from selected premium content providers and commerce sites. Load times for web pages can be critical in determining a user’s quality of experience, and in securing a successful online purchasing experience. Each second of delay has a detrimental effect, and operators can be rewarded by both the user and the content owner or e-commerce companies for securing prioritized connectivity and making sure that expected transactions take place.

The Mobile Cloud Accelerator consists of Ericsson technology to prioritize traffic, so that it does not suffer the effects of radio network congestion. The solution includes Smart Networks components for traffic categorization and prioritization, policy control and packet gateway functions. Integration within the operators’ network infrastructure provides fine-grained control of resource allocation and quality of experience.

6 A Smart Future

Looking to the future, the confluence of Software Defined Networks, Network Function Virtualization and Cloud Computing promises to change the way networks are built. Together they can transform the network model, and allow users to personalize their experiences in an agile and responsive manner.

Operators will also be able to reduce provisioning costs and shorten time-to-market, making it possible to rapidly launch, evaluate and refine new services. The network will be treated as a resource where slices are allocated to specific customers (e.g. enterprises and virtual network operators) or certain types of service (e.g. machine-to-machine communication).

The capabilities of Smart Networks solutions will become even more important since knowledge about end users, applications and network state can be used to program or shape the network to deliver optimal end user experiences. Network resources will be used with increased efficiency since it will be possible, in real time, to differentiate between the quality-of-service needs of different kinds of consumers, enterprises and machine-to-machine users.

Access to network state information will also enable a cloud application to monitor its own network performance and request a desired level of service without manual intervention. Being able to monitor end-to-end network state and program the network in real time to achieve desired end user experiences will be key factors for future success. The combination of Smart Networks capabilities, service agility and network programmability can create an adaptive network-enabled cloud, consistently meeting the needs of end users. Innovation will thrive, limited only by human imagination and ingenuity.

7 References

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