



EXPERT OPINION:

Integrating policy control and charging into LTE networks

The exponential growth in smartphones and data-rich applications has created a need for more capacity in the network, as mobile operators struggle to meet the increasing demand for bandwidth and manage associated costs. So it comes as no surprise, says Joe Hogan, that leading operators worldwide, including *AT&T*, *Telefonica/O2*, *TeliaSonera*, and *Verizon* are investing in Long Term Evolution (LTE) networks.



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LTE networks bring new challenges to mobile operators when it comes to integrating the charging and billing infrastructure into the new network. Mobile operators are faced with some difficult choices in deciding how to evolve their charging, policy management and billing mediation platforms as they deploy LTE and the evolved packet core (EPC). The critical trade-off is between delivering the full potential for LTE and IMS (IP multimedia subsystems) to enrich the end user experience and the cost of replacing and upgrading the existing network and support systems.

Mobile operators are realising the need to optimise their network and service architectures. According to the analyst house **Yankee Group**, over 65% of service providers recently polled now require policy control or will do so within the next 12 months to manage mobile data growth in their 3G networks, and are not waiting for LTE.

Increasingly, policy and online charging are seen as integral to maximising capacity, increasing revenues, managing devices and meeting subscriber expectations. Operators need to plan ahead, so current investments in policy management can be integrated into future LTE deployments.

The business case for LTE strictly refers only to the radio access standards introduced by 3GPP in release 8. This is part of a broader 3GPP programme called system architecture evolution (SAE) that includes an evolved packet core (EPC). But LTE is part of a broader SAE that will bring additional benefits. Alongside LTE in the radio access network (RAN) operators will deploy the EPC. Together, these provide a flatter and simpler IP architecture with lower latency and more sophisticated capabilities.

Compared with legacy networks, LTE improves spectral efficiency and employs a flat-RAN

architecture, which also reduces the number of network nodes. Jointly, the benefits of improved spectral efficiency and flat-RAN architecture reduce network carriage costs and create a cost-growth curve that tends to track revenue rather than demand, allowing the operator to maintain a healthy profit margin. Also, compared with previous access technologies, like GSM, CDMA or UMTS, the smaller size of the LTE access node brings other benefits, including lower power consumption and a much smaller space requirement.

Wireless data growth will be the principal driver behind the first wave of LTE deployments. Mobile data traffic is doubling every nine months, according to **Cisco**, and for some operators this is even higher. But revenue per megabyte is falling and will continue to fall, driven down by increasing competition and flat rate pricing, forcing operators to deploy LTE to cope with data growth and deal with the divergence of revenue and cost.

The success of smartphones and laptops is a key factor that helps explain the increasing demand for data services. The use of netbooks and laptops with 3G USB dongles, mainly by enterprise customers, will continue to grow rapidly as tariffs become more attractive. Also, smartphones with large touch screens, high bandwidth connections and compelling user interfaces have changed the way consumers use their mobile phones. And this trend is accelerating.

According to Mark Newman of **Informa**, second generation mobile technologies still account for 90% of the world's subscriptions. But by the end of 2012, this figure will fall to 70%, and by the end of 2014, over half the world's 6.7 billion mobile subscriptions will be to 3G and 3.5G+ technologies.

Advances in mobile data services and mobile devices have made the full internet available to ►

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mobile end users. This in turn has stimulated development of mobile-specific applications and services that enhance existing internet services such as **Facebook, Google maps, Google search, Twitter and YouTube**. These include location, operator billing, reduced bandwidth requirements and mobile-specific user interfaces that are becoming increasingly popular.

Moreover, new types of connected electronic devices – from GPS devices to eReaders – are starting to exploit the unique characteristics of mobile data services. **Amazon's** Kindle is an example of an application-specific device that uses a dedicated mobile service.

Machine to machine type services will drive further growth in these types of applications. Improved network coverage and reliability will also stimulate the use of cloud computing to simplify deployment and management of new applications.

These factors will lead to ongoing growth in wireless network traffic per user over the next five years. This is good news for operators, but comes with a big challenge; if data traffic is on flat-rated plans, this growth will only be accompanied by a relatively modest increase in average revenue per user (ARPU) and this will result in a significant decline in revenue per megabyte. The cost of maintaining the existing network without LTE will soon begin to erode operators' profit margins and will eventually outstrip revenue.

Policy control & charging

In current 2G/3G networks policy control, charging and billing mediation are already complex functions. The key challenge operators will face is how to evolve these functions to accommodate the needs of LTE, requiring a migration path from the legacy environment to the LTE/SAE architecture.

Eventually, most legacy components will be replaced during the migration due to the growth in transaction rates that the PCC will be required to support. The IN prepaid platform in particular will be gradually eliminated as balance management migrates to the online charging platform, and the circuit switched infrastructure will eventually be phased out.

In the short term the evolution of policy control, charging and mediation to support LTE will mean that existing billing platforms will need to be augmented to support the EPC elements.

With rapidly increased data traffic these will need scaling to meet demand. Where these systems are complex and expensive to upgrade, operators should focus on enhancements to the policy control and charging, to mitigate stresses on these older systems.

Operators can achieve significant benefits by centralising control across mobile access technologies. Benefits include smoother service migration and better management of mobile data traffic and applications such as the ability to direct traffic and applications to the optimal access network. This can result in significant capital and operating cost savings.

As the cornerstone for mobile personalisation and management, 'smarter' subscriber, service and session controls will enable mobile operators to better monetise data traffic and create innovative, personalised services for subscribers.

Conclusion

The rise of LTE networks and deployment of full IMS capabilities will significantly increase the volume of events that the policy and charging control and mediation functions must deal with. Consequently, operators must carefully evaluate the scalability and performance of systems deployed during the transition phase to full LTE/IMS deployment.

Policy management can also be used to help operators better utilise the network. An appropriate approach would be to encourage consumers to increase usage during off-peak hours with lower rates and decrease usage at peak hours. Operators can combine capacity improvements with controls that manage the flow and demand for data – motivating subscribers to adapt their behaviour in a way that optimises how the network is utilised.

Policy and online charging will become increasingly connected as the network evolves towards full LTE/IMS. Therefore, operators must evaluate how these will integrate over time. LTE will offer the increased capacity operators and their customers require. However, to ensure an appropriate return on investment, carriers will need to ensure charging and policy controls offer the scale and control needed to support an exponential rise in the number of events and new services. Only an integrated and well planned network will enable mobile operators to monetise on the data explosion and deliver a superior user experience. **\$**

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