

Evolution of IP subscriber management in mobile networks — keeping churn at bay

Executive summary

In a nutshell

Exciting new mobile services, devices, and applications are on the horizon, but only if mobile operators can effectively manage scarce network resources and grow profits. LTE isn't a silver bullet for the industry, so information technologies originally developed to optimize applications over IP wide area networks can and are being applied to solve mobile bandwidth bottlenecks to satisfy ever more demanding mobile customers.

Ovum view

IP traffic growth in both wireline and mobile networks is projected to skyrocket, but revenues aren't expected to keep pace. This rapid bandwidth growth is a greater engineering challenge for mobile operators than wireline operators because over-the-air bandwidth is a fixed and scarce commodity. Thus, mobile bandwidth exhaust is a serious concern for the mobile industry, particularly with the recent, rampant success of mobile broadband IP-based services.

Securing more wireless spectrum isn't a viable option in most countries, although forward-looking government regulators should be considering this option. LTE radio access technology will provide some short-term bandwidth relief, but since bandwidth is "addictive", greater mobile bandwidth availability is likely to fuel more end-user demand for it. Raising prices could slow bandwidth demand but this is difficult to do in a competitive market, as share loss, alternative solutions, or allegations of illegal collusion may result. Ovum believes other solutions are needed and preferable to best optimize mobile bandwidth in the face of rapid growth.

Evolving mobile infrastructure across all layers

IP introduces new systems architecture opportunities

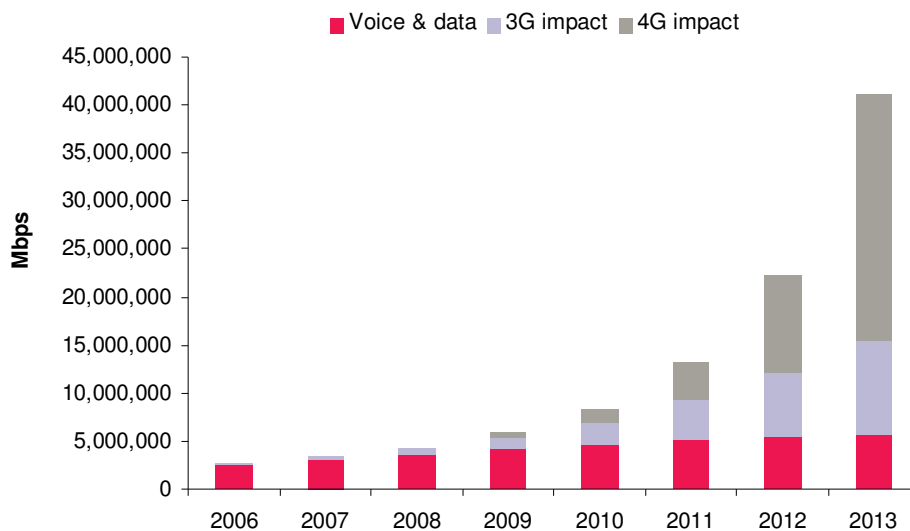
Mobile infrastructure will require a holistic evolution plan that spans all OSI transport and application layers to effectively address the challenges mobile operators will face. Cobbling together best-of-breed point solutions of disparate technologies just won't do. One often-overlooked aspect of mobile infrastructure

planning is subscriber management capabilities, for which IP technology provides some new systems integration opportunities.

Mobile broadband growth — the coming tsunami

Mobile isn't just for voice anymore — industry estimates are that a typical mobile broadband-connected laptop uses the same bandwidth as over 400 cell phones. Smartphones currently use less bandwidth than a laptop, but are rapidly growing in popularity. Interest in video-enhanced communications is expected to drive even more bandwidth, as are the predicted billions of machine-to-machine connected devices. While LTE-based networks are being designed to support about an order of magnitude more bandwidth than is available today, they won't be able to keep pace with the exponential growth Ovum is forecasting (see *Figure 1*).

Figure 1 **Aggregate global mobile traffic forecasts, 2006–2013**



Note: 4G includes LTE and WiMAX

Source: Ovum

Practical and cost-effective solutions are needed for the upcoming problem of mobile bandwidth growth. Ovum believes these solutions will come from the world of IT. In many ways, mobile bandwidth represents a classic supply and demand problem, the type of problem that IT has solved time and time again across industries. IT-oriented solutions like server load balancing, application acceleration, deep packet inspection, and WAN optimization can work equally well for an all-IP-based mobile network infrastructure.

Churn — the bane of the mobile industry

Customer satisfaction and their willingness to pay will keep the mobile industry vibrant and relevant. Churn is what happens when customers are dissatisfied with their service or find it too expensive for the value received, forcing them to seek greener pastures with competitors — be they traditional or disruptive competitors. As mobile operators experienced during the 1990s, churn forces operators to engage in costly marketing battles, while also investing in their networks to improve service levels. To avoid a rerun of this unprofitable scenario, we suggest “an ounce of prevention is worth a pound of cure,” namely that operators explore and invest in IT-oriented solutions now to maintain customer satisfaction and loyalty later as mobile networks grow and strain from usage.

As consumers become more reliant on their smartphones, mobile broadband dongled laptops, and netbooks, tolerance for slow application performance or network “busy” signals simply won’t be tolerated. Rapid churn would result, despite binding service contracts, with regulatory action soon to follow to unbind them en-masse. Investors will flock to mobile operators with better performance. Rather than dwell on an unpleasant scenario for mobile operators, let’s focus on what is meant by the phrase “IT solutions for the mobile broadband bandwidth exhaust problem” — namely, IP subscriber management tools applied to mobile infrastructure.

IP Subscriber Management 2.0 — defining the IT based solution

From a mobile operator’s perspective, what is needed is a way to transparently scale and grow mobile services and subscribers. Revisiting their business model is a key first step so that profits can be maximized while still satisfying customers. In *“Mobile broadband traffic management and QoS prioritization”*, Ovum recommends mobile operators define “fair-use” policies for their mobile data services to avoid many of the pitfalls wireline broadband providers have encountered in trying to monitor and limit “offensive” uses of their networks, like bandwidth-hogging peer-to-peer (P2P) file sharing or heavy “over-the-top” (OTT) video consumption. Once broadband fair-use policies are in place, operators can institute traffic-monitoring and policy control solutions to better manage their network traffic and subscribers’ services via controls like caps or the throttling of service bandwidth. Traditionally, such functions fell upon subscriber management systems, which provide functions like admission control. For example, in ATM networks, connection admission control (CAC) sets up connections, but only if the network has available resources to support the requisite quality of service (QoS).

In the IP networking world, the AAA (Authentication, Access control, and Accounting) system provides for key functionalities to manage customers and their access to services on the network (AAA runs on carrier-class servers). RADIUS (Remote Authentication Dial In User Service) and its successor Diameter are computer-to-network AAA protocols to monitor and control IP-based traffic and services. These powerful tools provide mobile operators with new ways to manage

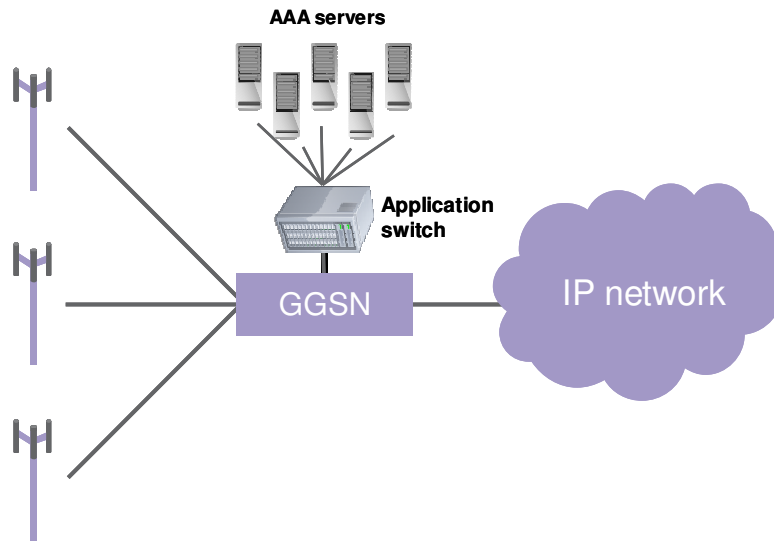
subscribers' services and traffic on their networks. 3G mobile networks use IP for broadband data, and LTE mobile networks will be IP end-to-end for all services, including voice.

IP brings new capabilities to mobile networks

IP networking technologies like AAA are being integrated today in 3G mobile broadband and tomorrow in LTE networks as defined by the 3GPP (3rd Generation Partnership Project). To maximize the value to mobile operators, the AAA infrastructure must support carrier-class attributes for high transactional performance, reliability, in-service upgrades, and fast fail-over. As subscriber management is a server-based function and geographically distributed, special attention is needed to ensure distributed AAA servers can meet carrier-class requirements and are load balanced, meaning AAA server connectivity optimization and excellent RADIUS or Diameter application performance.

A carrier-class appliance (aka "server platform" or "application switch") with additional capabilities such as DPI (deep packet inspection), IPv4/IPv6 NAT (network address translation), compression, rate shaping, security functions, and acceleration is needed. Service provider routing vendors typically OEM such appliances from companies like F5, Coyote Point, Radware, and Traffix to help ensure a quality customer experience in the LTE era with policy and traffic management and optimization tools that reduce traffic and network congestion; respond to real-time network conditions/user requirements; and help retool mobile operator business models for the broadband world. Carrier-class appliances impacting OSI layers 5-7 that are integrated with transport layer solutions will allow mobile operators precision traffic control, ensuring high customer satisfaction. These appliances typically connect to the mobile network as depicted in *Figure 2* at the GGSN (Gateway GPRS Support Node). A well integrated system solution provides for much-improved policy control and traffic optimization.

Figure 2 **Mobile IP subscriber management system**



Source: Ovum

Mobile operators possessing a carrier-class application IT infrastructure will have what they need to police and enforce fair-use policies and provide suitable quality of service for revenue-generating IP-based services. Mobile operators need a well thought-out vision for LTE services and network infrastructure that includes not only the transport layers but the application layers as well. The report referenced earlier, "*Mobile broadband traffic management and QoS prioritization*", provides service strategies for developing fair-use policies and traffic prioritization.

Recommendations for mobile operators and suppliers

Ultimately, customer satisfaction with their services and carrier is what will prevent churn. Many of the policy control and IP traffic optimization tools that will be needed are available in AAA today, but still need to be incorporated in a high-performance system solution. Geographically distributed AAA systems need a solution with server virtualization capabilities to improve the performance of a highly transactional type of system.

Customer satisfaction is the mobile operator's best weapon to fight off competitors. Mobile operators are well advised to avoid letting customer satisfaction slip.

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