

## Successful delivery of broadband services

by Doug Dickerson, President, Tektronix Communications

Broadband carriers know the importance of delivering high quality low cost high-bandwidth services and applications. Future networks will deliver advanced applications over all-IP network architectures. These present broadband operators with challenges they need to overcome to meet subscriber expectations for convenience, cost and quality. Network intelligence gives multiple groups within a carrier actionable, real-time information that allows them to efficiently run their network, manage their services and make better decisions that have a positive impact on customer satisfaction and retention.



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Communications networks have evolved to accommodate changes in technology and users' demands for convenience, cost and quality. In 2008, mobile broadband 'took-off' thanks to the launch of Apple's iPhone and other smart devices which have greatly increased mobile data traffic and, consequently, increased demand for bandwidth to support it. The number of mobile broadband subscribers is likely to exceed the number of fixed broadband subscribers during 2011 and the proportion of total broadband traffic carried by fixed networks will diminish as mobile traffic increases. As of today, mobile data traffic has overtaken voice traffic on the network and the industry expects this trend to continue.

### Industry drivers

Customers are demanding more personalised, convenient and more transportable broadband

services. Concurrently, competition in the market is increasing and broadband operators are seeking to reduce business costs and develop new operating models. Additionally, quality is becoming a key differentiator between services available at similar costs. These trends are influencing network monitoring and broadband service assurance.

### Drivers of broadband service progress

The latest approach to network monitoring and management is called network intelligence. Operators seek a single, unified network assurance, or network intelligence solution, that can monitor and troubleshoot all their mobile and fixed networks. This solution must provide real-time, intelligent information that is accurate, comprehensive and easy to assimilate. A single interface for all its service troubleshooting and performance monitoring functions will

simplify operator training, reduce operational costs, and allow for multiple organizations to have access to and leverage the information.

### Convenience

Customers now expect and receive personalised services, such as multimedia applications linking video, voice and data. People access social networking websites such as Twitter and Facebook or watch TV programmes and film clips on their mobile phones and want access to these services from any location at any time whether delivered via land or mobile networks. To meet such expectations, operators are abandoning the concept of separate service-oriented networks and moving to converged networks capable of supporting multimedia applications on a common all-IP network that uses multiple fixed and wireless access technologies.

This network transition poses considerable challenges to broadband operators. During this transition, operators cannot lose sight of the customer. They need to clearly understand customer behaviour - how their end-users receive and perceive services. This requires monitoring solutions across multiple domains, that amass large volumes of data and then apply intelligence and integrate the data for display and analysis on one clearly defined dashboard. Fortunately, new tools have evolved for Customer Experience Management (*CEM*) that help an operator quantify the level of satisfaction a customer may have with a given service or application across multiple touchpoints throughout the product lifecycle.

### Cost

Customers want services at the lowest cost, so operators are under constant pressure to reduce capital expenditure and operating costs. When supporting multiple services, each with dedicated network architectures, complexity and cost is greater. A single, multi-service network architecture can exploit economies of scale, reducing capital and operating expenditure, as long as the network is fully optimised end-to-end. Bandwidth and channel utilisation, RF coverage, network element loading, network congestion and use of resources, including people, must be optimised and must also co-exist with legacy equipment.

The need to deliver flexible and profitable multimedia services has driven broadband operators to invest in all IP-based architectures. In such networks, monitoring for service assurance purposes presents major technical challenges because of the distributed nature of IP. Not only must a monitoring solution handle this complexity, it must capture information from a variety of locations in the network and correlate it accordingly.

### Quality

Moving to a converged IP-based multimedia network entirely redefines the concept of quality.

Quality of Service (*QoS*) was the way that network quality was defined in a circuit switched environment; if quality indicators at the network level were good, one assumed - often wrongly - there was no problem.

It is now apparent that the customer's experience defines the network quality, particularly the voice and picture quality perceived by the user. As a result, 'Quality

of Experience' (*QoE*) is the key parameter. Since operators must deliver high-quality video, voice and data services not only within their networks but also with interconnect partners in order to ensure end-to-end quality, many QoS and QoE measurements exist. In video and broadband, these are more complex. The adage that 'the customer is king' holds true today - quality is a competitive necessity.

### Monitoring solutions

A monitoring framework that addresses the critical real-time and historical information needs of network operators, allowing network operating staff to get closer to their customers and gain critical insight into the markets they serve, is necessary.

Consider a carrier that has just deployed a new VoIP service.

Knowing usage rates, failure rates and performance trends historically and real-time is critical to the new service introduction. If this carrier is serving a diverse group of customers with very different demographics and usage behaviours, it is important to understand how issues in the network are impacting specific users.

It is also important to see what happens as usage patterns change throughout the day, given that some network resources become overloaded. By using an appropriate service assurance system for voice services, operators can drill down from a failed call log report to the actual messages involved in the session, all the way down to each leg of the call, in order to isolate the problem and fix it. The result is improved customer satisfaction. Knowing which markets and the number of users affected enables an operator to be proactive and to alert high-value accounts and customers to the potential problem. By proactively tracking services that fail, the VoIP operator can identify which network elements have the greatest negative impact on the service performance.

This type of analysis typically involves historical data, which is often useful to illuminate potential network design issues. Quite often the problem is outdated element firmware or improperly configured hardware, which the system integrator or network equipment manufacturer may have missed during acceptance testing.

### Interconnection consideration

To ensure end-to-end quality, operators need advanced tools to isolate problems

that may exist in one of several interconnected networks operated by different carriers. It is critical for operators to know the quality of services obtained in each part of their service delivery chain, as well as the quality of services delivered to their wholesale customers and downstream interconnection partners.

In the past, interconnection was implemented at the circuit switch level and enforced using service level agreements (*SLAs*). With the advent of IP, interconnection takes place typically at the Media Gateway, where services are converted from the IP domain to the interconnect partners' domain (e.g. TDM).

There are many technical challenges in managing interconnection, ranging from interworking between carriers to the use of different signalling and media protocols and other issues such as transcoding. Operationally, there are challenges in performance and call quality, customer satisfaction, troubleshooting and problem isolation, security and capacity management. From the perspective of a carrier using interconnect partners to complete the service delivery chain, partner selection is based on which carrier can deliver the required volume of calls at the least cost and at the best quality.

A monitoring solution designed for interconnect services will help operators address many of the issues, remove the guesswork and help them make business decisions based on actual performance. Carriers can rank interconnect partners on quality indicators e.g. call failure ratio or ASR (*access service requests*). Knowing a given interconnect provider's ability to handle calls at a given quality, along with pricing information, allows network operators the ability to select interconnect partners as a function of quality and cost.

Broadband carriers realize the importance of delivering high-bandwidth services and applications at high quality and at the lowest cost possible. Different than networks in the past, future networks will be delivering these new applications over all-IP network architectures, which represents some unique challenges that broadband operators will have to overcome if they are to meet their customer expectations for convenience, cost and quality. By adopting a Network Intelligence strategy for broadband networks, multiple groups within a carrier are empowered with actionable, real-time information that allows them to more efficiently run their network, manage their services, and make better decisions that have a positive impact on customer satisfaction and retention. ●