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Battle for Bandwidth: Network Monitoring Put to the Test

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Today, network monitoring can mean many things: billing, charging, policy control, bandwidth management, traffic shaping, deep packet inspection, net neutrality, these are all issues that can be considered aspects of network monitoring.

The practice itself is nothing new. Various forms of network monitoring solutions have been around for years. What is new is how a number of loosely connected issues are converging to solve the growing problem of effectively charging people according to their bandwidth usage. As a result, network monitoring has become perhaps the biggest cog in the customer experience machine, working to reduce churn and boost revenues.

But, on its own, network monitoring is perhaps best described as "power without control," which is why today it is almost always mentioned in the same breath as policy control and bandwidth management. Such a combination is fast becoming communications service providers' (CSPs) best chance to achieve that ever-elusive goal of strengthening the connection between network operations and business strategy, open new revenue streams, and offer a superior quality of experience for customers.



But recent economic and technological changes have meant most providers are drastically changing how they prioritize network monitoring processes, and what they are used for. As next-generation devices grant access to more bandwidth-intensive content, and flat-rate billing plans become more

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ubiquitous, network monitoring is increasingly conducted for the purposes of providing more bandwidth-reactive, personalized offerings to customers. Done correctly in the face of new market conditions, network monitoring can keep providers profitable and customers happy.

Bandwidth Boom

The economy has had little to no effect on slowing the consumption of high-bandwidth services like app-stores, mobile TV, and peer-to-peer networking. Apple's iPhone 3GS, which sold more than 1 million units in the first three days of its release, proves that consumers are as hungry as ever for devices capable of accessing bandwidth-intensive applications and media-rich services. In late June, YouTube reported on its blog that in the previous six months they had experienced a 1700% increase in the amount of video uploads from mobile phones. Such a massive increase indicates that users are becoming more sophisticated in the ways that they consume bandwidth. It is no longer simply a oneway, download game. Customers are now more able to create content on their own that can be uploaded or widely distributed through social networks, causing an exponential jump in the impact that each individual user's activity has on overall bandwidth usage.

In many emerging markets, particularly the Middle East, Africa, and Asia, subscriber growth is as strong as ever. In the first quarter of 2009, while most other industries were languishing, Bharti Airtel in India added 8.4 million customers – the company's highest ever addition for a single quarter. More users, using more content.



Meanwhile, developed providers in saturated markets are finding new ways to increase the profitability of each customer and are actually encouraging customers to use more bandwidthintensive devices and services. The end goal is that providers will be able to charge them more for the kind of bandwidth they will need.

So, with more customers, growing use of bandwidth-heavy services, and increasing proliferation of devices to more readily access those services, existing bandwidth is being stretched to its limits. This is especially true for mobile providers who are hindered by the laws of physics. There is only so much radio transmission spectrum to go around.

Long term plans by providers to solve the bandwidth pitfall and increase customers' quality of experience have centered on making networks physically larger. By adding infrastructure, a larger pipe would be available to cram all the data through. Simple enough. But such build-outs are costly

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and are unlikely to produce a return on investment for several years. So, as headlines filled with terms like downturn, bailout, Madoff, and recession, providers turned to tools and strategies to make more of existing systems. By using monitoring and policy control methods like traffic shaping, more content can go down the existing pipe more quickly and reliably.

Flat-Rate Flat Line

The telecom world revolves around two basic billing and charging strategies – usage–based charging and flat-rate billing. Depending on region, subscriber type and provider type, there is usually a general preference for a particular type. In the emerging markets of East Africa, Asia-Pacific, and Latin America, mobile data services, for instance, are primarily usage-based: subscribers are charged varying fees for specific services, applications, and content usage. While in more mature markets like Western Europe and North America, mobile data plans tend to use a flat-rate structure: one price up front gives a user unlimited access.

Today, these flat-rate plans are doing well as broadband access and mobile data are still a relative novelty to many. But there are cracks appearing in the flat-rate model's shiny exterior, and operators that are benefitting from flat-rate plans today may face real service, network, and customer experience troubles quickly.

As flat-rate plans reach more of the mass market, and as users steadily demand higher and higher bandwidth levels, providers are beginning to hit a wall where maximum revenues are reached but customers continue to consume more: a serious dilemma for providers.

Complicating things further is the growing need to share those flat-rate revenues with an increasing number of partners. When the iPhone was launched, Apple became the first device manufacturer to actually take a share of AT&T's revenue for each service plan AT&T sold. The strategy has worked wonderfully with Apple as the only partner involved. But directing the correct share of the pie to a growing number of entities requires reliable network monitoring and policy controls. Glenn Lurie, who leads AT&T's new Emerging Devices Group, and who spearheaded the iPhone launch for AT&T, has said such revenue sharing models will only become more common: "We have to break the rules." (BusinessWeek. AT&T's Designs for the Wireless Market. July, 2009.)

"For Every Action..."

All of this means that providers are moving toward using networking monitoring and controls to make network operations more bandwidth-reactive and more granular to each customer's individual circumstances.

This principle has already been put to use in other industries. Airlines have had to become seatreactive in the same way that CSPs are learning to become bandwidth-reactive. For United Airlines' pricing system to be effective, for instance, it needs to automatically adjust prices or capacity for a certain destination based on demand. If the commuter weekday flight from JFK to Dulles has 90% of its seats booked 3 weeks in advance, the price of tickets on that flight gets raised immediately.

In a similar way, CSPs are using network monitoring techniques and systems like policy and charging controls to adjust billing practices and traffic flow in real-time. But while the business need for being able to manage bandwidth access is clear, the act of how to execute it is not always so obvious.

Changing airline seat prices for a particular flight based on demand can be done in a blanket fashion so that no matter who the next customer is, they will all be offered the same choice of seat at the same price.

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The telecom provider must react in a more personalized manner.

If, for instance, a subscriber pays extra for a mobile TV service but often experiences a low quality of service because of high traffic on the network, the provider can use network monitoring and policy control methods to reshape and smooth traffic to balance a congestion problem. Yet, if a blanket action is taken to reduce bandwidth temporarily for all peer-to-peer application users, the provider risks reducing some customers' bandwidth unfairly. With proper network monitoring and control, providers can shape traffic accordingly to boost the Mobile TV subscriber's experience while not adversely affecting other users', and still retain the value of the their premium service.

Edging Forward

Most examples of network monitoring and control solutions are based on a combination of best of breed technologies, although some complete end-to-end offerings are emerging that can be had at a price that makes financial sense.

The best solutions include systems that connect OSS back-office functions with on-network business policy systems. It is essential to link everything from user authentication to on-network systems for deep packet inspection and traffic analysis, to business control systems for maintaining alignment of user profiles with revenue and charging goals, and finally to service control systems that enforce real-time bandwidth reactions.

But the final piece of network monitoring and control comes from the real-estate business' old adage: location, location, location. CSPs, particularly of the mobile sort, can benefit greatly by positioning the charging and control elements of their solutions, and also by storing data crucial for popular services, farther out on the network edge. Called 'edge-caching,' this enables the provider to adjust traffic policies and redirect high-bandwidth applications to avoid bringing traffic across the mobile network where it's more expensive to handle. In this way, the burden of peer-to-peer, video downloads, flat-rate billing, and other high-cost services is better managed.

Network monitoring and control have become intrinsically linked functions, and they are proving to be the solutions of choice for realizing true revenue gains from existing and future services. The key to making it work, though, is focusing on the necessary integration of monitoring, charging, and control systems that can make real-time, personalized determinations to make networks more enjoyable for the customer and more profitable for the provider.

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