

Balancing Bandwidth Usage

As consumers spend more time on the Internet and demand higher levels of service, providers struggle to keep up. New tools can help providers and consumers bring bandwidth supply and demand into balance.

By Stephane Bourque ■ *Incognito Software*

The connected home is no longer a futuristic idea. Today's average household is likely to use a combination of desktops, laptops, tablets, smartphones, IPTV and gaming consoles to access broadband Internet for social interaction, work and entertainment.

This connected lifestyle raises a number of issues for broadband service providers: How far can bandwidth be stretched within a household? Is it possible to maintain service quality in this environment? And perhaps the most contentious question of all – who should pay for the infrastructure to deliver these services?

Ready or not, there's no avoiding the fact that the number of Internet-connected devices is fast increasing. The Cisco Visual Networking Index predicts that the number of devices connected to IP networks will be nearly three times larger than the global population by 2016. More devices mean more device manufacturers and possible interoperability problems, but the immediate issue is bandwidth contention. The rapid increase in devices means there are now more ways for subscribers to use bandwidth, and that can result in congestion bottlenecks during peak periods.

Consider the broadband needs of a family of four on any given night. A household of two adults and two teenagers may have four smartphones and two tablets, which are used simultaneously to check Facebook, video chat with friends, play games and download books and magazines via a number of apps.

The teens may also use their laptops' Wi-Fi to watch videos or conduct research for school assignments while downloading or streaming music. Mean-



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while, one parent logs into work from a desktop computer while the other enjoys a favorite show on Netflix via a gaming console connected to the TV. All these activities, and potentially many more, use a large amount of bandwidth. The more bandwidth is stretched, the more likely this household is to experience a loss in quality of service.

These days, even temporary service blips are unacceptable to someone working from home, making a VoIP call, in the middle of a TV program, or half-way through playing a game. Without a holistic picture of what is going on in their home networks, subscribers who experience poor service are unlikely to consider dialing back their Internet use or wonder whether they are too far from a Wi-Fi access point. They are far more likely to blame their broadband providers – and if slow service continues, they may look elsewhere for a better deal.

FIND OUT WHAT'S GOING ON

What can a service provider do to avoid this potential customer service disaster? The first step is to find out what is happening on the network by gathering in-

formation from access points to monitor service quality. The Broadband Forum's TR-069 specification gives cable and wireline providers visibility into home networks by allowing for real-time monitoring of customer-premises equipment beyond residential gateways. This can help a provider identify potential service quality problems on TR-069-enabled devices. The only hurdle is the continuing use of older, off-the-shelf subscriber devices that are not TR-069 enabled, which limits insight to just the home gateway (such as a cable modem).

Simple Network Management Protocol (SNMP) provides vital information about network health. This protocol, which has been used in the wireline and cable industries for decades, allows extraction of data from most networking equipment. The data includes quantitative measures, such as the number of bytes or packets sent or received through any interface on the network, and qualitative data, such as the number of dropped packets or retransmissions. Analyzing SNMP data allows a provider to find out where on a network performance problems are occurring.

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However, information about network health can go only so far without accurate data about subscriber consumption patterns. Various tools are available that use technology such as IP Detail Record (IPDR) and Deep Packet Inspection (DPI) to find out how much bandwidth a specific service uses and identify consumption patterns per subscriber.

A provider can then cross-reference this bandwidth consumption information with network data to identify where and when bottlenecks are occurring on a network, what applications and services are hogging bandwidth, and who the highest users are in a particular region and during peak periods.

IMPROVE SERVICE PROACTIVELY

Armed with this information, service providers have the opportunity to proactively provide better service and more options for subscribers. Network intelligence can be used in several ways to prevent bottlenecks. First, providers can use this data to re-engineer networks where appropriate to avoid congestion. Second, providers can offer more appropriate, even tailor-made, service bundles, based on real subscriber patterns.

Finally, providers can implement a chargeback model, which would cause bill increases for a percentage of high-bandwidth users while giving low-bandwidth users the option to choose a cheaper plan. Alternatively, a provider may throttle high-bandwidth users in peak periods, affecting performance rather than bills.

Whatever method is chosen, accurate DPI, IPDR and SNMP-based tools are essential to breaking down individual consumption patterns and educating users. Many subscribers may not realize just how much bandwidth they consume through multiple devices or how much data many apps and over-the-top video services such as Netflix use.

Service providers are in a position to educate subscribers by providing accurate details of household bandwidth consumption patterns and presenting the information to users in a simple-to-understand pie chart or guide.

TRANSPARENCY

Ideally, subscribers could access this information at any time through an end-user Web portal that shows the amount of data consumed during the billing cycle, what applications use the most bandwidth and how often they use these applications. This level of transparency would allow subscribers to choose how best to mitigate their bandwidth use and avoid bill shock.

For example, heavy users, such as the family mentioned above, may avoid overage charges by moving to a more appropriate service package, such as an unlimited Netflix or high-speed data plan. Alternatively, they may simply change their usage habits – limiting their use of video streaming to two hours a day, for instance.

Transparency is essential in implementing any kind of tiered pricing plan. These models alleviate network congestion and offer consumers a level of choice they already experience in other industries. Skeptics such as U.S. Senator Ron Wyden, who recently introduced the Data Cap Integrity Bill to Congress, may not realize just how much increased traffic can affect

Service providers can use data about broadband consumption patterns to plan network investment, design new service bundles or adjust pricing.

quality of service and that someone has to pay for a pipe large enough to meet demand.

Bandwidth is free only in the eyes of the consumer. Service providers must be able to offer enough of this precious resource to provide a quality service or else risk customer churn. Proper network infrastructure is vital for providers to accurately monitor service quality and bandwidth consumption patterns and to build a sustainable business model.

Accurate tools and transparency will go a long way to help ease concerns about fair-use policies as more providers turn to some form of chargeback model in the future. The days of accessing broadband via a single device are long gone, and the era of multiple devices is here. Investing in the right infrastructure at the right time will be essential to meet subscribers' increasing appetite for bandwidth and provide the best possible customer experience. ❖

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