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Delivering the Goods on IPTV

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Television has come a long way since the time I watched “The Honeymooners” and “I Love Lucy” on my parents' black-and-white floor model. We had to make sure to turn the set on five minutes before our show started so it could "warm up," and every now and then it would go on the fritz, and I would walk with my dad to the drug store with the spent vacuum tube in hand to find a replacement.

With IP having been designed as a "best effort" protocol, one envisions a return to those old days of television when hearing talk of IPTV, but such is not the case. As the third leg of the much-heralded "Triple Play,” IPTV has a lot riding on it. Customers are willing to pay for the trio of services in a single package, and are likely to enjoy the convenience of a single offering, but only if the price is right, and only if the quality of all three areas--telephony, Internet, and television--is at least equal to, if not greater than, what is already being offered.

The Market

Initial deployments of IPTV have encountered some delays. Several major providers, including Telstra, Swisscom, and SBC, have put off their rollouts of IPTV, due in part to technical problems and the need for improved stability. These difficulties will no doubt be overcome, but it will take time.

IP broadband television does have several advantages over other television services. The interactivity of IP naturally lends itself to services that are not possible on traditional television. Interactive applications such as video blogs, or other types of television shows that could include the viewing audience, may become the reality show of the future. Television shopping will be as easy as shopping over the Internet. You will be able to order that Pocket Fisherman with just a few clicks of your remote, instead of calling the 800 number.

From VoIP to IPTV: Not Such a Big Leap

One of the biggest reasons for the current difficulties being seen in IPTV is simply that the technology is still in the early stages of development. IP, in relation to its original use--transmission of data--didn't need much in the way of quality of service. If a packet arrived out of order, it didn't much matter. Then VoIP came along. Those first, experimental VoIP implementations, usually implemented on a PC-to-PC basis, were fuzzy and choppy. Today, VoIP quality is equivalent to POTS, and its presence continues to revolutionize the telephony industry thanks to improved QoS.

"Many of the QoS features that have allowed us to deliver VoIP can be leveraged to deliver IPTV," says Dave Boland, Senior Manager, Next Generation Solutions at Juniper Networks. From a router perspective, those QoS issues include Diffserv-based traffic classification, rate limiting of the queues, and the ability to prioritize traffic types per subscriber and place traffic in the appropriate queue.

The Need for QoS

Telcos are facing increasing pressure to diversify their revenue streams by offering the triple play that includes IPTV. But doing it right, and delivering superior quality, requires a very large risk and a very large CAPEX investment. In offering an IPTV service, a market study by BNS Ltd.shows that consumers rank channel variety as the greatest factor in making a purchase decision; but the second-greatest factor by only a slim margin is the quality of the signal. Low monthly cost comes in at a distant third.

There are five areas that must be considered when delivering excellent network performance through IPTV; these include scalability, security, manageability, QoS, and availability. All are important in delivering the type of advanced, high-quality viewing experience the consumer will no doubt demand.

Scalability is essential for planning for the future. Manageability is also an important element, especially since components are often compiled from different manufacturers. Systems integration is vitally important for effective day-to-day operations. The IPTV Management System itself (the middleware) must be able to interact with every element of the IPTV system.

Existing DSL networks were designed to be inexpensive and simple. But, according to Boland, "The equipment and network architectures were not designed to offer voice or video services, and QoS was not considered." New services, most notably IPTV, need not only more bandwidth, they need security

and a guarantee of quality. "Now that new access networks and hardware are being rolled out to deliver IP voice and video (Verizon, FiOS, SBC Lightspeed, etc.), QoS and network design are critically important, and are receiving a lot of attention."

In addition to dumping huge amounts of bandwidth to each user's doorstep, a provider may first be tempted to overbuild and over-engineer the access network in order to provide this guarantee. But, Boland explains, "from the routing perspective, hierarchical queuing mechanisms allow service providers to deliver voice, video and data services without having to overbuild the access network."

Video traffic must, by design, be sent with very low loss and low latency, and with guaranteed bandwidth. Boland notes, "To a certain extent, there isn't much QoS per se to apply when you look at the problem in isolation. Either the bandwidth is there or not," assuming that the traffic is properly shaped by the video source and reshaped at the last hop. But, when you add VoIP and video, strict priority must be enforced.

However, the most overlooked element here is high speed Internet (HSI). Delivering superior service for one leg of the triple play must not come at the expense of the others. "Most people are very dismissive, due to the 'best effort' nature of the service. And several QoS architectures for broadband are based on basic per-traffic-class and per-port scheduling, enforcing prioritization of VoIP and video, but adversely impacting HSI." When bandwidth-hungry file sharing applications are factored in, there's naturally going to be disruption without advanced QoS features like per-subscriber fairness and weighted queuing.

Boland takes note of the fact that most consumer Internet services have no formal SLA, despite the fact that this service is the mainstay for existing broadband service providers. If there is degraded service, the end users will notice it, and the providers will have more tech support calls--and more customer churn. "So how can carriers afford to deploy new services if this would disrupt their bread and butter activity for both consumers and small business offices? And this is exactly what will happen with a mix of video, VoIP and HSI if no advanced QoS is used."

By design, however, just having a very large amount of a bandwidth delivered to the subscriber's door is just as important as QoS. Boland notes that managing the bandwidth is critical. "The routers in the access network need to provide per-subscriber and per-service queuing. Per subscriber/service queuing helps to prioritize traffic within a subscriber VLAN which enables each service to be optimized for delay, jitter and packet loss."

Conclusion

The growing demand for IPTV as part of a triple-play bundle is already placing tremendous demands on the industry, and requiring providers to lay out big money for infrastructure changes. The competitive front will be vibrant, but Boland says, "I do not think that the number of players will diminish. In a few years, I expect to see additional service providers come to market with a triple-play offering based on wireless access. That will create an interesting competitive battle between wire and fiber companies versus wireless."

Ultimately, though, customers don't really care how their service gets delivered, only that it is good quality, and they get lots of television channels with cool new features. IPTV is going to fill those consumer demands for a number of reasons, including the availability of pricing discounts available for bundled service packages, consolidated billing, and more creative channel bundles that would allow the consumer to individually select, and pay for, only the channels they want. In addition, IPTV will allow for more interesting features, such as onscreen caller ID, email notification, multiple picture-in-picture, menu screens, and unlimited other options not available with traditional cable television.