

# Nail Video Service Testing

**Successful Triple Play rollouts depend on delivering quality of experience, reliability and getting it right the first time**

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By 2011, more than 13 billion video streams will be delivered over IP on a monthly basis, producing an estimated 3.3 billion dollar revenue stream with another 1 billion tossed into the pot for downloaded video, according to The Yankee Group. With so much at stake, savvy Telcos must insure that their networks and infrastructure can reliably support the bandwidth and throughput requirements that this emerging combination of video, voice and high-speed data services over Internet Protocol on one line will make. Just as importantly, if the Telco expects to woo customers away from their other sources, Telcos must be able to reliably deliver a quality of experience to their customers that meets, if not exceeds, the services the customer currently receives. To meet these strong demands, a robust investment of new IP infrastructure is required and since a mix of various video services will gobble up the lion's share of the bandwidth in a triple play environment, it's imperative to thoroughly test this cornerstone of the bundle as well as the new infrastructure pre-deployment to ensure a successful service rollout.

While Video over IP and IPTV are both part of the triple play landscape, technically they are not the same and must be looked at in a testing environment both separately and simultaneously to be fully understood. Delivered across the public Internet, Video over IP, sometimes referred to as "over-the-top" video, may arguably be classified as any of three things: One category that people see converging on the Internet is user generated video, such as YouTube. Secondly, there is previously aired content from broadcast television networks, such as ABC, NBC and CBS, re-broadcast across the Internet. Last, but not least, are live, as well as re-broadcast Webcasts. IPTV on the other hand, is typically considered to be linear or on-demand video content served up to subscribers over separately managed, autonomous IP network.

For Telcos, delivering Video services over IP presents some critical technical challenges, not the least of which is that IP was not designed to transport real-time traffic. They do not have a mature proving ground either in the lab or with a large installed base of early adopters and as a result have not had the chance to self-validate. In short, it's all new to them. As if that wasn't enough, they're faced with new technologies, new platforms and emerging standards, many of which are still baking. Technically, it's not like waking up in the morning with HDTV's mature H.264 standard and getting up to speed.

With the revenue stakes as high as they are, Telco's realize they need a comprehensive, well-planned testing program. They have to ensure that their IP networks and infrastructure are scalable enough to accommodate future growth and the addition of new services and will efficiently and reliably carry high quality services all the way from the core to the all important edge—the customer premises, even during peak hours, under peak load and when equipment failures raise their ugly heads... without flinching.

Testing doesn't have to cause Telecoms a migraine. There is a silver lining for those who strategically plan their testing program. Thorough testing can be accomplished on a single platform more efficiently and economically, producing more meaningful results and making speedy deployments and revenue realizations a reality.

Begin looking at the solution from the service provider's point of view and then turn it around and come at the video applications delivery testing from the customer point of view. Start by systematic testing and verification of various network devices in each of the video transport architectures including video content servers, core as well as edge routers, access devices and IP CP equipment. This provides an understanding of individual device performance and may determine how much impact each has on the polished solution. Next, move on to system-level tests that will incorporate more than one demarcation point in the transport architecture so a clear understanding is gained as to how well the individual systems play with each other and then finally extend this approach to test the solution end-to-end. As part of this sequential process expect, to run most standard routing tests, forwarding performance tests, looking at packet loss, or latency, characteristics under different load conditions purely from the packet side to ensure that the packet core is set up well enough to demonstrate it will scale. Once the network has proved itself in this arena, move up to test the solution from an application delivery standpoint.

Now flip the test perspective to what the user sees sitting on their couch. The solution needs to be tested using a test tool that simulates a mix of real-world traffic using stateful application so it proves it actually delivers user defined application requests within pre-determined standards. Determining video quality or in other terms, what will be good enough for the customer to see, and who defines that standard, becomes a critical factor in the test process. Everyone's benchmarks are different.

Test maybe 25,000 and assess how well the video is delivered and how well it's perceived by the clients. Since video traffic makes high bandwidth demands, it has little tolerance for jitter and even less patience for packet loss. For example, a distribution network designed to deliver SD content to 100,000 subscribers at 5% peak rate requires around 19 Gbps forwarding capacity. No network offers 100% forwarding capacity so networks supporting video have to be engineered to meet a very slim drop rate during congestion. A high QoE (Quality of Experience) is what's ultimately critical. Some key ways to ensure QoE include performing channel request validation,

monitoring channel change performance and measuring network service quality as well as measuring perceived video quality.

It's important to test how the network's characteristics affect a video stream based on network delay and loss. This can be quantified as the MDI (Media Delivery Index). It's comprised of the DF (Delay Factor) based on the arrival time of a packet at a given point of measurement, and the MLR (Media Loss rate) or the number of packets lost per second. More detail on MDI may be found by reviewing RFC 4445.

Telcos need to be able to see and objectively assess user perception of video quality, and VQS (Video Quality Score) as well as TVQ metrics offer an efficient, scalable way to do this. VQS delivers a CODEC dependent objective quality score between 1 and 5. While not strictly subjective, it is normalized to a MOS-like range, considers original video quality before encoding and transport as well as the video's sensitivity for packet loss. VQM simply provides a score between 0 and 50 of the RTP channel's capability to support video transmission. Numerous tests are available with variations configured for specific networks that extend beyond the scope of this article, but these suggestions provide a few areas to get started with that may then be expanded upon depending on specific network requirements.

Triple Play services, including all variants of video services, driven by increased broadband revenue on a per user basis, is a means of survival for service providers, not just top-line revenue. Infonetics Research estimates that with nearly 40% of service provider CapEx budgets going to triple play service infrastructure, service providers are sending a clear message that the combination of voice, data, and video services is a long-term differentiator for them. According to Infonetics, "Carriers are demanding complete interoperability, full standards compliance, and an open and flexible architecture from their suppliers to ensure the content and services they provide will work right out of the box and far into the future." In Asia Pacific however, not all is well either on the strategic planning front or the development and deployment phase. According to In-Stat, "[d]eployment, launch and marketing strategy specifics are still largely on the drawing board for several carriers." This means these companies will have to work over-time to ensure their very existence which will include taking as many strategic and technical short-cuts as possible to roll-out.

The stakes are high and the challenges numerous but once Telecom operators have their IP video services testing dialed in, successful, timely deployment will become a reality and they'll be able to take their Triple Play services revenue to the bank.