

Testing Broadband Internet QoE



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Erick Davila joined VeEX in March 2019 as a Product Manager for the Ethernet & Transport lineup. He is responsible for products like the NET-BOX™, TX300s platform, RXT-1200 platform, among others. Before joining VeEX, he worked at Amazon Web Services, Coriant and Sunrise Telecom in several roles including technical and pre-sales support, training, network design and engineering. He has 15+ years of telecommunications experience, focused on both legacy and next generation transport and Ethernet technologies.

Recent worldwide shelter-in-place events have shown that even best-effort services such as broadband Internet access can become essential services. That is, when most of the population works, learns and communicates remotely, the network must cope with usage surge requirements that perhaps were never considered a plausible scenario.

Building for typical rather than peak demand is considerably less expensive. As we've seen, network planning is mostly based on predicted exponential growth of Internet applications and services, which require greater bandwidth. In order to cope with such demand, Internet service providers (ISPs) started deploying new access technologies such as fiber-to-the-home (FTTH) and DOCSIS 3.1, allowing them to make gigabit Internet services available to their home and enterprise subscribers as well as preparing their networks for the unstoppable increasing surge of bandwidth. Although most of the focus is on access technologies, optimizing bandwidth sharing and core transport network upgrades are equally important to carry all the aggregated traffic.

New broadband Internet services, particularly those surpassing 500 Mbps and emerging ones taunting gigabit speeds, have brought new challenges to ISPs, such as bottlenecks in the access network that slow

down, and sometimes disrupt subscribers' services. These bottlenecks can also be caused by legacy home or enterprise equipment, like 802.11n wireless routers that can't keep up with the contracted Internet service speed. All of this translates into a higher volume of service calls from upset subscribers claiming they are not receiving the promised speed, unnecessary truck rolls to subscribers' premises, increased opex and notably important, bad user feedback on quality of experience (QoE).

Tech-savvy customers will always test their Internet service speed with off-the-shelf equipment like smart devices or high-end laptops. The problem with these CPU-based devices is that they lack the power and capabilities to test gigabit speeds at full-line rate. For instance, speed tests for line rates above 500 Mbps become unreliable when performed by even high-end laptops and are virtually useless at the 1 Gbps mark or above.

With gigabit Internet services growing at such a fast pace, ISPs face problems even in best case scenarios where service technicians use similar off-the-shelf devices to validate Internet speed at the time of installation. In worst case scenarios, crews don't have test devices due to lack of or reduced budgets. Troubleshooting and isolating issues at the customer premise continues to be a challenge as the market lacks the necessary tools to test and measure gigabit Internet services accurately.



VeEX's new NET-BOX™

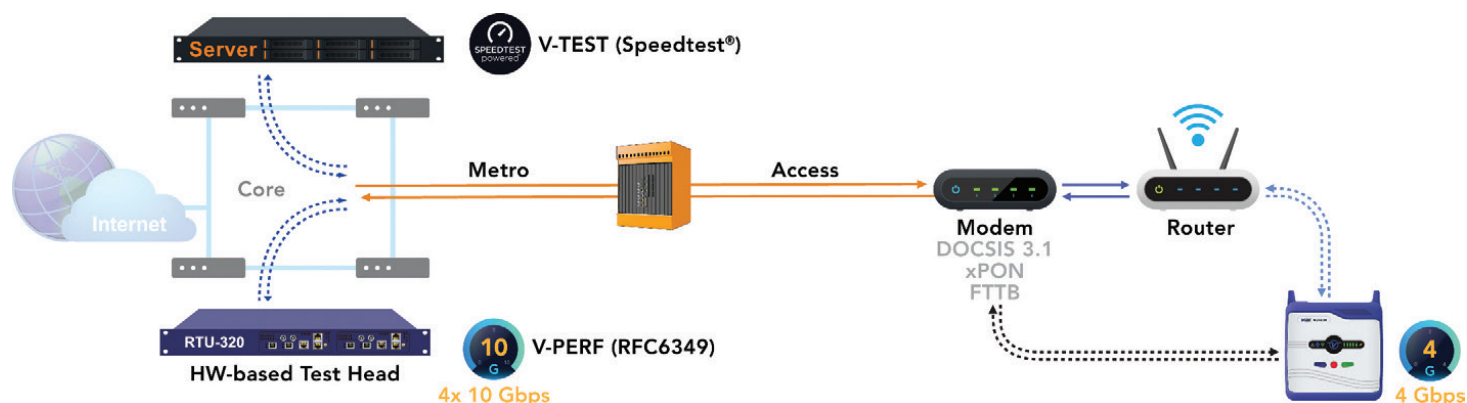


Figure 1. Reliable Internet speed testing topology using the NET-BOX and RTU-320.

Traditional telcos and cable operators, which have been gradually updating their access networks to offer higher top speeds, tend to focus too much on what they know best — their cable plant, the physical layer. Although their access networks have been cleaned, groomed, fine-tuned and optimized, they may have paid little attention to data traffic engineering. It is not unusual to hear customer service representatives say these frustrating words to suffering and already upset customers, “I ran some tests, and everything looks fine on my end. The signal is good!” Having a “good pipe” or knowing how much speed can be reached in ideal conditions is not the point. It is about actual traffic, oversubscription and bottlenecks from the subscribers and their families who are working from home and streaming all day, that can bring shared data services to a crawl.

But how can ISPs cope with all the challenges mentioned above? The answer is simple, ISPs have an urgent need to improve the way they test Internet speed at the customer premises with tools that are quick and easy to use, providing accurate, repeatable and reliable test results. There is no need for expensive or companion test equipment.

VeEX’s new NET-BOX™ is a truly scalable, low cost and reliable Internet speed test solution. With a multi-port architecture and intuitive mobile application for iOS and Android devices, every field technician can use it within minutes.

VeEX’s NEW NET-BOX™ IS A TRULY SCALABLE, LOW COST AND RELIABLE INTERNET SPEED TEST SOLUTION. WITH A MULTI-PORT ARCHITECTURE AND INTUITIVE MOBILE APPLICATION FOR IOS AND ANDROID DEVICES, EVERY FIELD TECHNICIAN CAN USE IT WITHIN MINUTES.

The NET-BOX is a standalone high-performance, FPGA-based test set that eliminates the need to carry expensive and/or companion test sets. With up to 4 Gbps full line rate capability, the truly scalable NET-BOX is equipped with the required physical interfaces to test multiple 100/1000BASE-T, 1000BASE-X, and 2.5G BASE-T. The NET-BOX enables repeatability and reliability in testing methodology and procedures.

The NET-BOX features Layer 4 Internet speed tests (V-TEST) and RFC6349 tests (V-PERF), measuring true customer QoE. Internet speed tests require proprietary HTTP servers or Speedtest® by Ookla® servers (Figure 1). With its multiple testing modes, the NET-BOX gives the flexibility to load the user’s proprietary list of servers, manually enter server details or use Ookla servers.

Service providers delivering traditional carrier Ethernet services have adopted RFC6349 testing. This approach requires high performance and dedicated TCP and web servers, field portable test equipment (for the service assurance/service turn-up phase) and test heads supporting speeds from 1G to 100G.

VeEX’s RTU-320 operates as both a TCP server and TCP client when testing against field test equipment. The RTU-320 performs bi-directional upstream and downstream tests, IPv6 V-PERF, bi-directional V-PERF that combines client-to-server and server-to-client tests into one. With up to two independent test blades, the RTU-320 enables 4x 10 Gbps test interfaces ensuring reliable and repeatable data.

In summary, legacy equipment and home networking issues are proving challenging for ISPs. To avoid deployment failure and leave no room for doubt that the gigabit Internet service meets customer expectations, ISPs should equip their service technician crews with reliable test equipment that perform consistent speed tests and stateful TCP throughput like RFC6349. Using test solutions like VeEX’s NET-BOX and RTU-320, field technicians can verify and assure true customer QoE.

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