



Testing HTTP adaptive streaming with diversifEye

Per HTTP adaptive stream performance measurements

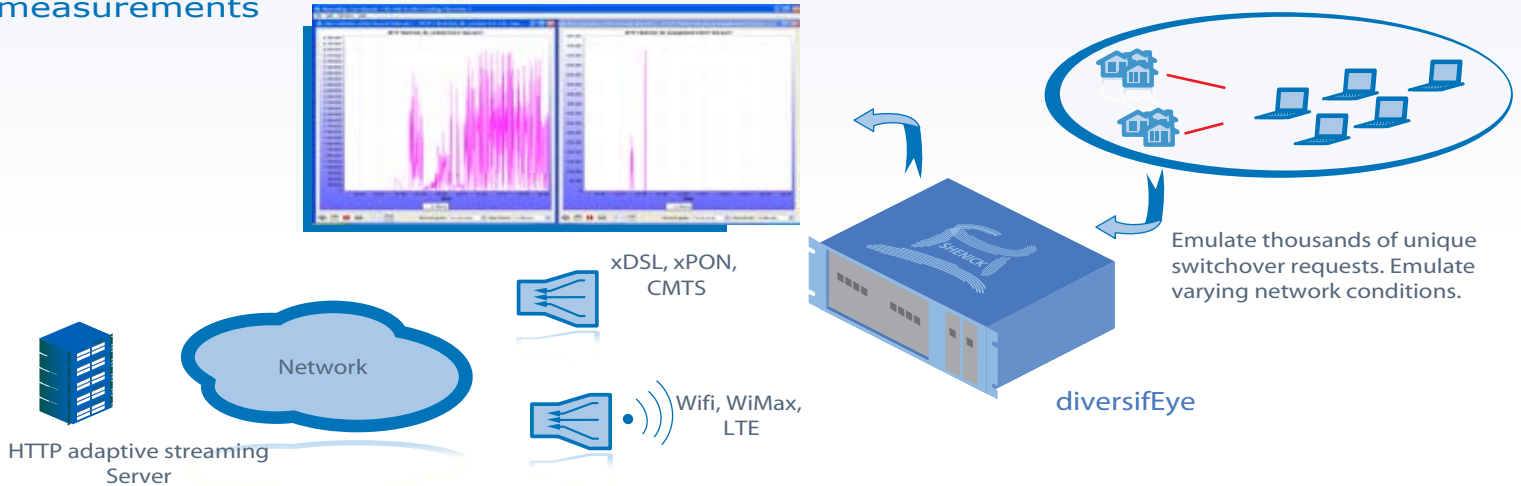


Figure 1 : diversifEye is used to emulate real end-points, connecting to the network and requesting content from third party adaptive streaming servers. diversifEye enables analysis of the server and network infrastructure by emulating real flow requests and providing analysis in real-time.

The foundation of HTTP adaptive streaming is the re-use of network infrastructure and in particular caching capabilities. A comprehensive test strategy includes a measurement of responsiveness of the cache especially to new requests for content already in circulation.

Another important aspect of HTTP adaptive streaming is the video content encoding process. A worthwhile consideration is the impact of varying the end-point buffer sizes. By testing various buffer sizes operators can examine the impact on quality if the fixed key frame size is to vary from video to video.

HTTP servers are prone to many security attacks. A critical component to the test strategy is to assess the mitigation functionality. Initial testing will have provided an indication to the maximum number of switchover requests a server may handle. Further worthwhile security investigations include generating multiple switchover requests, from a single end-point, faster than the server can respond to. Moreover how the server deals with routine DDoS attacks should be considered in the overall test strategy.

Performance is a correlation of the received media's quality and the performance of the underlying network infrastructure delivering the content. Testing quality of the HTTP adaptive streaming environment needs to be end-to-end with a focus on a per individual end-point basis. Shenick's diversifEye is one such solution providing the per flow test and performance measurements for HTTP adaptive streaming services.

HTTP adaptive streaming test strategy

What's at stake?

HTTP adaptive streaming enables users view online or OTT videos at an effective bandwidth rate ensuring the highest level of Quality of Experience. Adaptive streaming provides user independent actions by adjusting video bit rates to suit the network conditions.

Test of such a dynamic environment requires a per flow test strategy. One in which the individual emulated test end-points can adapt to the varying network path conditions that each is experiencing and request an appropriate video rate suitable for the prevailing conditions.

Part of any test strategy for HTTP adaptive streaming will include analysis of the HTTP adaptive streaming server. Tests should include measurement of performance under varying load conditions. Defining the limitations of the server under extreme load conditions will help in planning load capacity for frame rate switchover requests from the client side end-points.



diversifEye 5500

Testing a highly scalable environment like HTTP adaptive streaming is a complex challenge. diversifEye's per-flow test architecture simplifies this challenge, enabling Service Providers and Equipment Vendors to concentrate on delivering the most efficient and advanced service or solution offering.

diversifEye 5500 delivers tens of gigabits of stateful traffic requests and real time Quality of Experience performance metrics on each and every individual switchover request, on each and every emulated end-point within a single chassis.

diversifEye is the industry's only per flow test solution providing unparalleled test functionality for HTTP adaptive streaming. diversifEye as an integrated 'Per flow' test solution permits active traffic emulation and QoS/QoE analysis on a per subscriber basis, from a single chassis.

diversifEye's emulated end-points are fully stateful and are capable of interacting with the leading 3rd party HTTP adaptive streaming sever providers. A key feature of the active or stateful emulated end-points in diversifEye is the ability to measure performance of the network infrastructure and incoming content on a per end-point basis.

An example of the efficiency gained by using diversifEye's per flow architecture is when testing the effectiveness of key frame sizes versus end-point actual buffer sizes. diversifEye greatly simplifies the test procedure and removes the need for tens or even hundreds of PCs with unique settings.

A further benefit of using diversifEye's per flow functionality is evident when testing the HTTP adaptive streaming server limitations. diversifEye generates thousands of unique switchover requests for content per second. diversifEye's functionality is not limited to large volume request generation, but caters for the creation of one time unique request with varying frame rates or screen sizes through the use of substitution keys. Ensuring each flow is unique each and every time an individual emulated end-point generates a switchover request.

General Overview

The Shenick diversifEye platform and GUI supports per flow test and measurement of :

Analysis Software Overview

- DHCPv4 & DHCPv6
- PPPoE
- VLAN & Double Tagging (Q-in-Q) with priority
- Concurrent IPv4 and IPv6 application flows
- IGMP V1, V2, V3, MLD V1, V2
- Voice and Video Quality Metrics
- Telepresence
- RTSP (Video on Demand)
- VoIP (SIP & RTP)
- HTTP
- FTP
- SMTP
- POP3
- P2P
- TWAMP
- Attack Traffic - Spam / Viruses / DDOS
- PCAP file replay (>1GB)
- IPSec / SSL / TLS / DTLS

diversifEye Summary Features and Benefits

- Network QoS and per flow QoE granularity for individual emulated client users across multiple devices and application traffic flow types.
- Latest protocols supported from Data Applications (HTTP, FTP, POP/SMTP, P2P), IPTV (IGMP/MLD), VoD (RTSP), VoIP (SIP/RTP), Telepresence all in a single test package.
- TCP Replay Substitution, automatically varies payloads so no two PCAP sessions are the same.
- Support for TWAMP, IPv4, IPv6 and /or Dual-Stack Lite.
- DHCP emulation, PPPoE and IPoE Service Interoperability Scenarios. Emulate per device MAC and IP address assignments.
- Security Attack Mitigation support for DDoS style attacks SYN/RST/UDP/ARP floods, reflective DDoS attacks, Ping of death, etc.
- Large memory space (>1GB) for PCAP replay for Instant Messaging or Web Mail.
- Client and server support on a single blade within one chassis with complete flexibility on port allocation. Full support for multiple daisy chained chassis all controlled from a single GUI.
- Low cost of ownership and ease of use by avoiding multiple test systems and non integrated software applications.

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