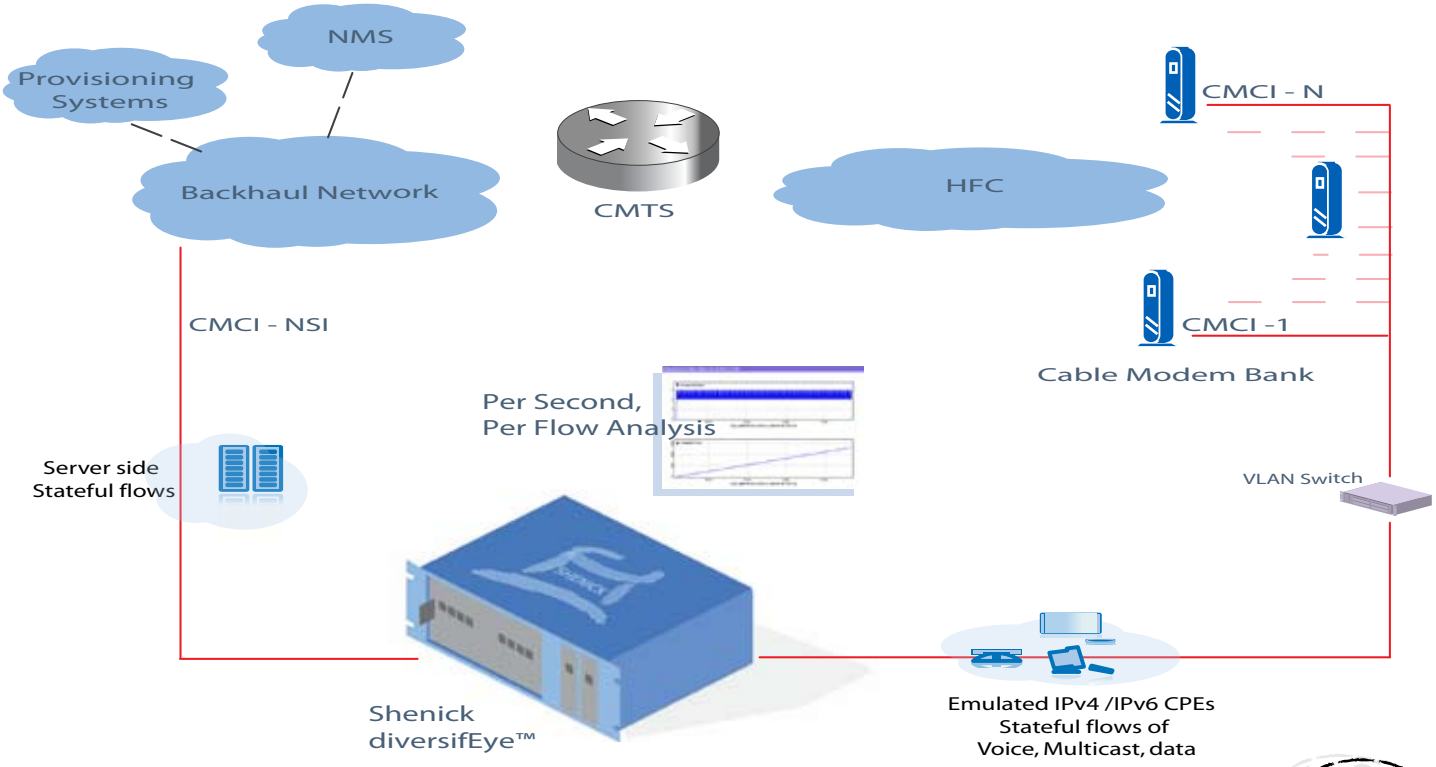
Testing DOCSIS® 3.0 with diversifEye

DOCSIS 3.0 enables a high quality delivery platform for delay sensitive traffic such as voice or multicast multimedia applications. DOCSIS® 3.0 is achieving this performance through innovative enhancements by delivering increased bandwidth for applications through channel bonding, IPv6 enabled Customer Premise Equipment (CPE) and new service offerings through multicast applications. In addition, DOCSIS 3.0 CMTS and CMs are now enabled to prioritize traffic through Quality of Service settings.

DOCSIS 3.0 compliancy and performance testing requires stateful two-way interactive flows to effectively measure these new enhancements. Performance testing includes everything from DHCP, IPv6 CPE behavior, QoS effectiveness and the Upstream/Downstream channel bonding capability. Defining actual service quality requires an end-to-end 'Per flow' test, in which real CPE flows are processed to the CMTS-NSI, resulting in real end-end application performance measurements.



diversifEye feature tests for DOCSIS 3.0

Channel Bonding -
Examine channel bonding features with emulated CPE clients using real, stateful TCP compliant applications. Analyze upstream channel bonding of CM and CMTS with real applications.

IPv6 Migration Testing -
Analyze application quality on emulated CPEs using IPv6 only and in conjunction with IPv4. Analyze traffic mixes, including dual stack enabled applications. Performance test DHCPv6 servers.

Traffic Prioritization -
Emulate large volumes of mixed stateful traffic flows, efficacy test QoS capabilities. Test ability to identify, prioritize and class flows correctly. Determine load balancing effectiveness.

'Per flow' Application Performance –
Emulate CPEs with stateful Voice, Data and Multicast Multimedia flows. On a per second basis analyze performance when CMTS changes occur i.e. channel adjustments when a CM goes live.

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diversifEye™

diversifEye's per flow architecture is used to validate DOCSIS® 3.0 compliancy through effective testing of bonded channels and the protocols used such as IPv6, DHCP, IGMP and MLD. diversifEye emulates both CPE and server side, running stateful applications.

diversifEye™ is the only integrated network, application and security attack emulation and performance analysis IP test system that provides granularity on a per flow basis. Examine application performance of multiple CPEs to CMTS-NSI responses from a single unit.

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

Analysis Software Overview

- Concurrent IPv4 and IPv6 application flows
- DHCP v4 & DHCP v6
- PPPoE
- VLAN & Double Tagging (Q-in-Q) with priority
- Multicast - IGMP v1, v2, v3, MLD v1, v2
- Voice and Video Quality Metrics (both no reference and full reference analysis)
- RTSP (Video on Demand)
- TWAMP
- VoIP (SIP & RTP)
- HTTP
- FTP
- SMTP
- POP3
- P2P
- SSL
- Attack Traffic - Spam / Viruses / DDOS
- PCAP file replay (>1Gb)

DOCSIS 3.0 Testing

DOCSIS Migration	Performance test DOCSIS 3.0 through emulated IPv4 and IPv6 enabled CPE flows and application types. Connect over DOCSIS 3.0 CMs and examine I-CMTS or M-CMTS architecture peformances. Examine for legacy issues by mixing with pre DOCSIS 3.0 CMs.
Performance Reliability	Emulate multiple CPEs with varying flows, examine CM and CMTS class of service reliability. Measure performance on each flow, determine consistency among measurement results.
Quality of Experience	Ensure in real-time, on a per flow basis that all CMTS adjustments have no impact on revenue generating or delay sensitive applications such as voice.
Security Attack Mitigation	Emulate attack conditions with Multicast weaknesses such as channel change requests and membership reports. Emulate a mix of legal and illegal flows, ensure no performance loss.

diversifEye Summary Features and Benefits

- Per flow QoE granularity for individual emulated CPEs and application flows, analyze in real time application traffic flow performance over DOCSIS 3.0 platforms.
- Latest protocols supported from Data Applications (HTTP, FTP, POP/SMTP, P2P), IPTV (IGMP/MLD), VoD (RTSP), VoIP (SIP/RTP) all in a single test package.
- Support for SSL, IPv4 and IPv6.
- 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, Web Mail or Internet Gaming.
- TCP Replay Substitution automatically varies payloads so no two PCAP sessions are the same, ideal for QoS tests.
- 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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