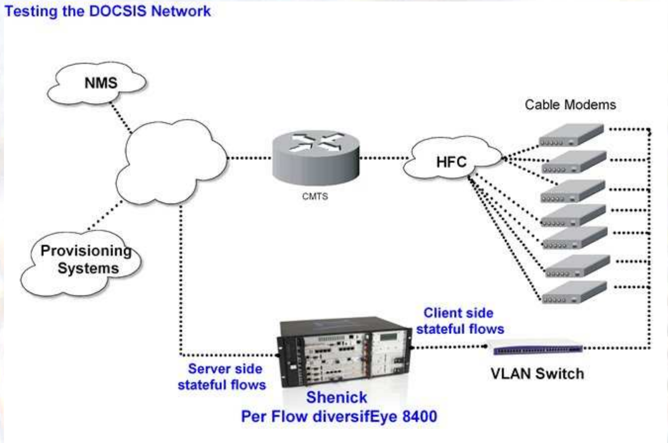
Testing the DOCSIS Network with Shenick’s diversifEye

2008

Shenick Network Systems
Draft version


Testing the DOCSIS Network
NMS
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Cable Modems
Client side stateful flows
VLAN Switch
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Background

Cable Modems located at the customer premises are responsible for bridging packets from the CPE devices to the Cable Operators HFC (Hybrid Fiber/Coax System) plant. At the Cable Operators head-end the CMTS (Cable Modem Termination System) connects the back office and core network with the HFC network. The main function of the CMTS is to forward packets between these two domains, and between upstream and downstream channels on the HFC network.

Typical CPE devices are set-top boxes, personal computers and home routers. These devices may use IPv4, IPv6 addressing and can employ a wide variety of Ethernet based Layer 4-7 protocols (examples: UDP, TCP, HTTP, FTP, SIP, MPEG…..)

In order to conduct effective testing of the CMTS/Cable Modem environment, the test setup must duplicate the as closely as possible, the real world deployment environment. Such an environment will likely have many individual clients and application types behind each Cable Modem.

Summary Testing Requirements

1. Build, test and measure on a per client/per flow basis with several unique individual voice, video and application data clients operating behind each Cable Modem (with/without QoS settings enabled).

2. Verify upstream and downstream bonding capabilities per DOCSIS 3.0.

3. Measure IGMP leave/join latency, zap rate and other performance metrics on a per client basis for each set top box (STB), with multiple STB's

4. Establish DHCP/PPPoE sessions, with all necessary options enabled, on a per household basis to external DHCP and PPPoE servers. Run and measure individual application and client flows within each DHCP/PPPoE session.

5. Provide a unique MAC and IP address per client. This is critical to validating security in many environments.

6. Measure individual client performance and quality of experience, including video (MPEG & RTP) and voice quality metrics on a per client basis.

7. Measure the effect of one client on another client behind the same Cable Modem.

8. Emulate surges in usage by adding individual clients into the environment in real time, without stopping the test.

9. Run individual voice, video and application data clients against external voice, video & application data servers. This demonstrates real world performance and QoS (as the clients are interacting with the actual deployed servers through the network).

10. Run individual voice, video and application data clients against internal voice, video and application data servers.

11. Have multiple individual clients inside multiple individual VLANs (with priority enabled) and with double VLAN tag available as required.

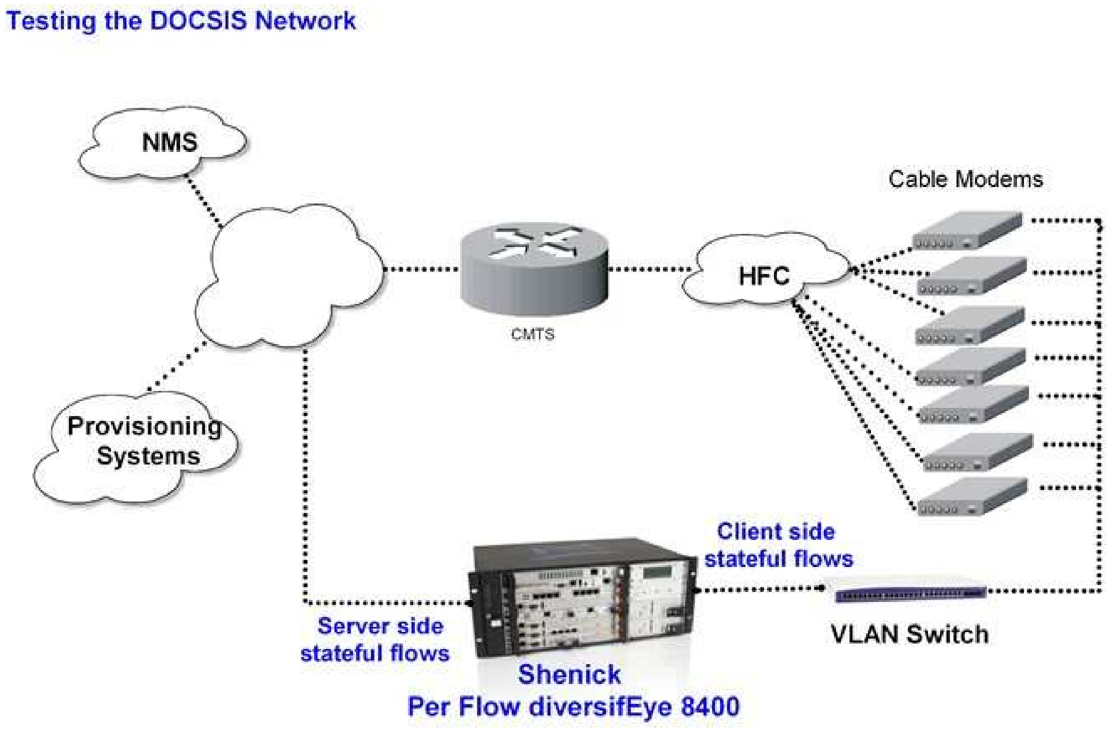
12. Create statistical profiles to match real world use of voice, video and data services and apply on both a per client and per application basis.

13. Run both normal (HTTP, IGMP, POP3, SMTP etc) application flows and disruptive flows (P2P, DDOS, IGMP floods, spam, viruses) within the same GUI for synchronization of cause and effect and other metrics.

14. Run real, stateful TCP based application flows along with video and voice flows. Access real e-mail documents, URLs and attachments in order to emulate realistic, per client web traffic flows..

15. Intermix V4 and V6 application flows.

16. Replay traffic scenarios with original or altered timing using 'capture and replay' capabilities.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