



# Customer Case Study - Shenick supports testing of ARRIS DOCSIS® industry firsts

## ARRIS C4® CMTS Demo to Transmit 4.5 Gbps DOCSIS Downstream Bandwidth Over 128 Downstream Channels Into a Single Fiber Node



diversifEye



ARRIS C4 CMTS

### 0.5 Gbps Upstream 4.5 Gbps Downstream

*diversifEye is used to inject varying traffic loads with stateful application activity into the DOCSIS enabled network. diversifEye provides the performance measurement showing the consistent delivery of 4.5Gbps downstream traffic along with the 600Mbps upstream loads of the C4 CMTS.*

### Summary

Shenick helps to prove ARRIS C4 CMTS ability to transmit 4.5 Gbps DOCSIS Downstream Bandwidth Over 128 Downstream Channels Into a Single Fiber Node

diversifEye is used to emulate varying traffic loads with stateful application activity into the DOCSIS enabled network. diversifEye provides the necessary performance measurements showing the consistent delivery of 4.5Gbps downstream traffic along with the 600Mbps upstream loads of the C4 CMTS.

Shenick teamed up with ARRIS to develop a demonstration for real stateful traffic loads over DOCSIS. The goal was to show throughput of 4.5 Gbps of DOCSIS downstream traffic being transmitted over 128 DOCSIS downstream channels into a single fiber Node.

The demonstration consisted of an ARRIS C4 CMTS, configured to use four C4 CMTS 32 Downstream Cable Access Modules (32D CAMs) to source the 128 DOCSIS downstream channels.

In addition to emulating the stateful traffic flows diversifEye was used to monitor the bandwidth on both the upstream and downstream channels. ARRIS's equipment is shown to maintain a consistent downstream bandwidth of 4.5Gbps. The extreme bandwidth levels are a first in the cable industry and are used in large-scale IP Video systems.



*ARRIS successfully demonstrated the ability to handle 4.5 Gbps of stateful traffic at the annual cable industry show NCTA. This was not the only first for ARRIS as they also demonstrated a 5-200 MHz high-split DOCSIS upstream system with 575 Mbps of DOCSIS upstream bandwidth being transmitted over 24 DOCSIS Upstream channels out of a single Fiber Node.*



### About ARRIS

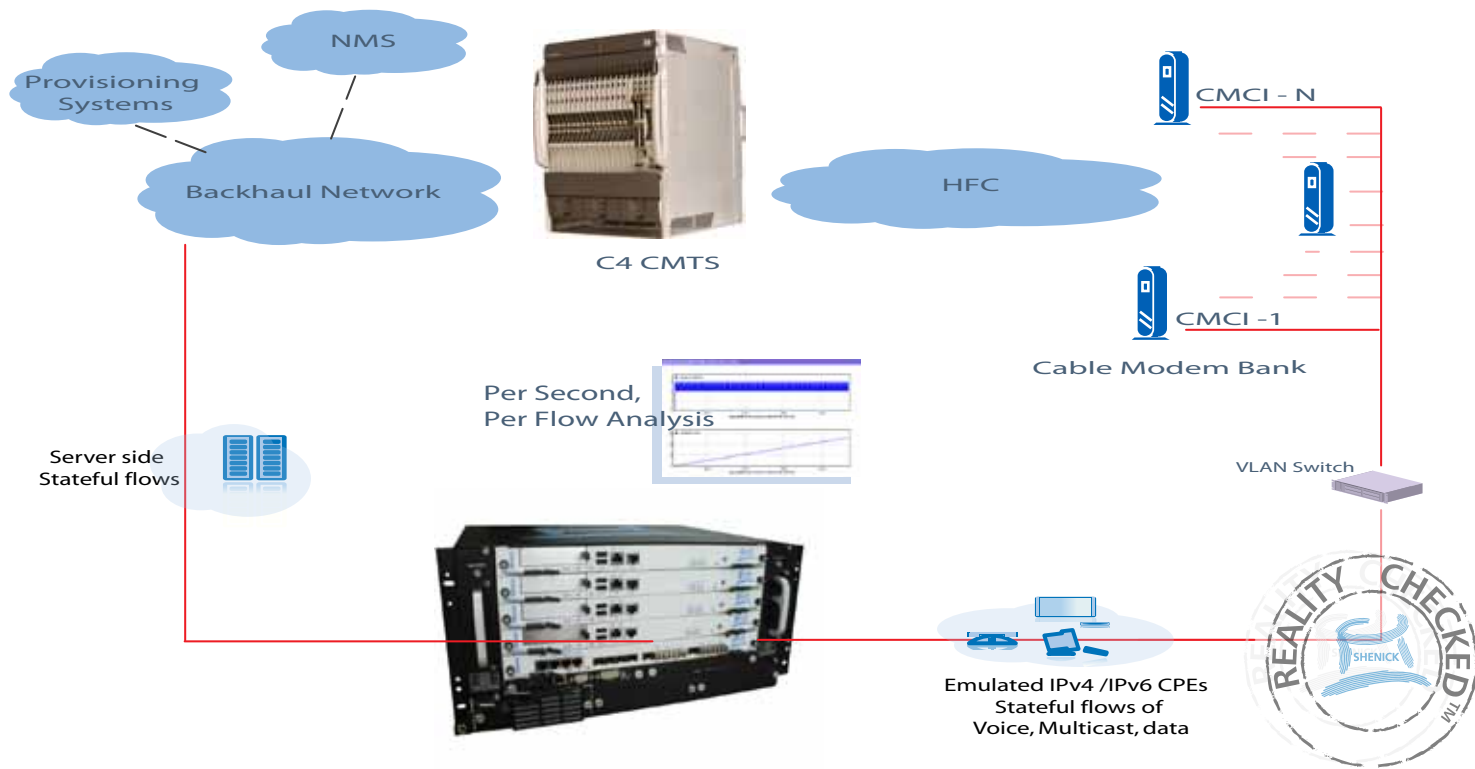
ARRIS is a global communications technology company specializing in the design, engineering and supply of broadband services for residential and business customers around the world. The company gives broadband operators the tools and platforms they need to deliver reliable telephony, demand driven video, next generation advertising and high speed data services.

## diversifEye feature tests for ARRIS C4 CMTS

The Shenick / ARRIS demonstration shows C4 CMTS handling several gigabits of traffic flows and further shows that C4 CMTS has no impact on the delivered traffic's quality. A critical aspect of the demonstration was proving that a delay sensitive application such as IP video is delivered with no degradation, ensuring the highest level of subscriber Quality of Experience.

ARRIS chose diversifEye because of its ability to emulate stateful traffic flows and measure performance on each and every application flow. The per flow approach is critical in measuring performance for DOCSIS 3.0. Per flow performance measurements assess that Channel Bonding is correctly handling flows and records that each flow is correctly identified by the QoS traffic priority settings and load balancing functions.

Using diversifEye's GUI client ARRIS was quickly able to build a test scenario which uses a number of diversifEye's application features including FTP and RTSP in the same test case. The setup requirement limited the number of external devices available to ARRIS, so diversifEye is used to emulate both clients and servers. The emulated clients use dynamic address allocation (DHCP). In the event of a single emulated client losing connectivity, a visual display showed the consequence as a real-time inflection on a dial.



The performance data was displayed via a web page containing a flash enabled object. The display dial was refreshed on a per second basis.

diversifEye emulated FTP clients uploading and downloading a number of file sizes including files of several gigabits. diversifEye's emulated RTSP clients connect to H.264 encoded video streams, streaming at 280Mbps.

The sensitivity of the demonstration reveals that the slightest change in any of the emulated clients performance resulted in a needle inflection.

A clear benefit of diversifEye is the ability to lift a simple test result and elevate it to the next level of visual presentation. ARRIS used a 42" monitor to proudly present the DOCSIS firsts!

The ARRIS demonstration utilized diversifEye software release 7.1.

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