Ethernet Load Generator

Axtrinet™ APG Ethernet Packet Generators offer affordable 40Gbps & 10Gbps full wire-speed Ethernet load generation, capture and analysis capabilities for R&D, manufacturing, sales and support teams developing and selling products with high speed Ethernet interfaces.

An intuitive Graphical Control Interface or TCL-scripted interface can be used to configure and control the packet generation, capture and analysis capabilities of the unit via a Linux or Windows PC, managing it locally over USB or remotely over Ethernet LAN.

This application note describes an example of how the load generation capabilities were used to test network equipment during soak, environmental and approvals testing.

Load Testing Requirement

A customer developing a 24-port 10Gbps Ethernet switch with 40Gbps Ethernet uplinks needed to fully load the switch during environmental/thermal testing.

Although simple packet passing tests could be performed with a PC and Network Interface Card (NIC) at 10Gbps, the 40Gbps ports could not be exercised, nor could the 10Gbps ports be fully loaded without specialist test equipment.

Surveying the market identified that many high speed Ethernet testers also came with sophisticated higher layer analysis capability, increasing the price higher than can be justified for this test requirement.

The customer wanted an affordable multi-port solution to load their switch during environmental and approvals testing; and check for packet errors without the need for complex packet analysis capability.

## Axtrinet™ APG Packet Generating Capabilities

The Axtrinet™ APG208 Ethernet Packet Generator has 8x 10Gbps ports and 2x 40Gbps. Each 40Gbps port can be configured to operate in 40Gbps or in 4x10Gbps mode*, allowing a single APG208 to provide 16x 10Gbps full wire rate ports.

Each port contains a transmit engine that contains 8 parallel independent configurable Ethernet stream generators. A transmit stream generates a controlled number of

Ethernet frames at a controlled length and rate; with a fixed header configuration, fixed or varying header contents, and a fixed or varying payload.
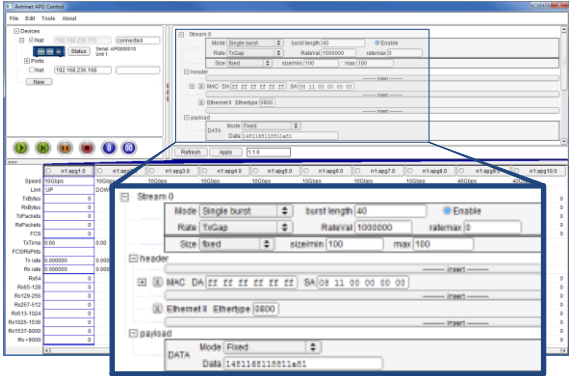
The stream transmit rate defines how the packets are generated; either continuously, or as a single or multiple burst containing a fixed number of packets.

* Available Q1'17
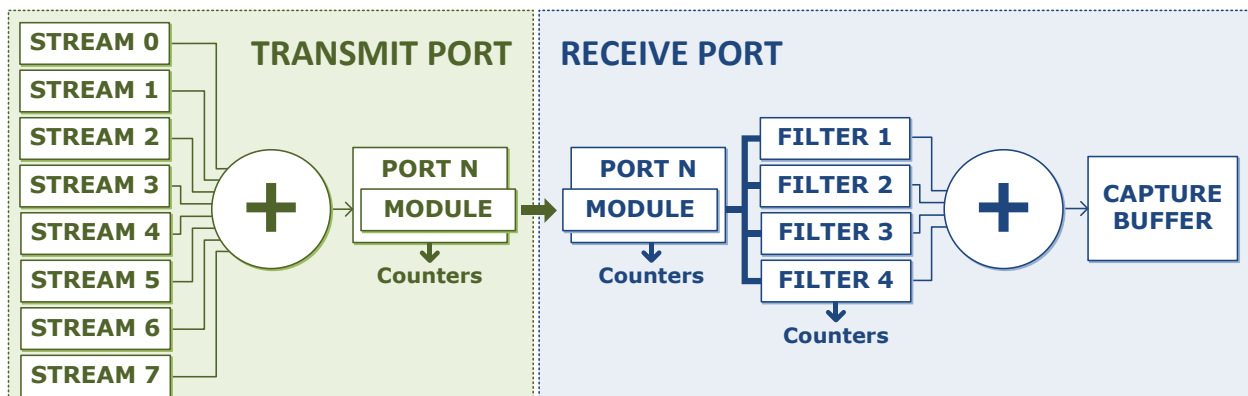
The packet length can be set to fixed, or incrementing, decrementing or random over a range.

The simple to use Graphical Control Interface allows an Ethernet packet to be easily defined.

A correctly formatted header is then created by selecting header types (eg MAC, VLAN, IPV4) for the packet; and a chosen

payload (eg incrementing, decrementing or random) is defined.

The transmit control panel allows the packet transmission to be started, stopped or stepped; and the port counters reset.

By making use of the port receive engine which contains a packet receiver, 4 independent packet content filters, and a wire-speed packet capture buffer, the received packets can be analysed and monitored for packet errors.

Transmit packet and byte, and receive packet, byte and error counts give an visible indication of any packet errors.

If required, the TCL scripting interface can also be used to automate the test generation and analysis process for unattended testing.

Test Configuration

The customer's requirement for 24x10Gbps and 2x 40Gbps ports was achieved by using two Axtrinet™ APG208 units.

On the first unit the two 40Gbps ports were configured into 4x10Gbps mode (used with QSFP+ to 4xSFP+ breakout cables) to provide a total of 16x 10Gbps ports.

The second unit was left in the default configuration with 8x 10Gbps ports and 2x 40Gbps ports.

Continuous Ethernet Packet streams were created and by analysing the packet error statistics on both units from one Graphical Control Interface, it was easy to see if any packet errors occurred during testing.

This configuration enabled the customer to perform comprehensive load testing during soak, environmental and approvals certification for fraction of the cost of alternative solutions.

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