SDN Testing & Validation

ONF SDN Solutions Showcase Theme Demonstrations
Testing & Validation

Ixia testing OpenFlow for Extreme Networks, HP, Flowforwarding.org and OpenDaylight

Solutions:
- IxANVL
- IxNetwork
- IxNetwork Virtual Edition
About Ixia

✓ Ixia develops amazing products so its customers can connect the world.

✓ Ixia helps its customers provide an always-on user experience through fast, secure delivery of dynamic connected technologies and services.

✓ Through actionable insights that accelerate and secure application and service delivery, Ixia’s customers benefit from faster time-to-market, optimized application performance, and higher-quality deployments.

Customer requirements for OpenFlow

✓ Ensure OpenFlow switches conform to ONF standards to ensure interoperability.

✓ Ensure the functionality, quality and scale of OpenFlow controllers and switches in physical and virtual environments to ensure predictable and proven performance.

✓ Establish scale and performance maximums through benchmarking to ensure quality and create market differentiation.
Testing Challenges for OpenFlow

- OpenFlow Conformance Testing
  - IxAnvil Server
  - OpenFlow Controller

- OpenFlow Switch Testing

OpenFlow Controller Testing

- IxNetwork Switch Emulation

IxNetwork Controller Emulation with integrated traffic

Support for physical and virtual testing through IxNetwork Virtual Edition
Conformance Test Solution

**Objective:** Validate Switch implementation to OpenFlow specification

**Solution:** Ixia IxAnvl OpenFlow v1.3.1 Test Suite

**Validate:** Switch conformity to ONF Switch specification
**Objective:** Validate Switch Flow Table capacity

**Solution:**
- Pre-canned IxNetwork OpenFlow Switch Flow Table Capacity QuickTest
- Performs binary/step to find out the maximum number of flow switch can store in its flow table.

**Validate:**
- Switch ability to store flows (either in software or hardware TCAM)
- Switch ability to forward traffic (at line rate) for the installed flows by analyzing comprehensive QuickTest report

Additional OpenFlow Benchmarking tests:
- L2/L3 Address Learning Rate
- Switch Flow Failover Performance
- RFC2544
- RFC2889
- RFC3918
**Objective:** Validate Switch ability to monitor and rate limit traffic on a per flow basis.

**Solution:** Establish OFP 1.3 connection with DUT and install flow with associated rate meter and drop packet action beyond desired traffic rate threshold

**Validate:** Verify maximum packet rate and packet loss conform to the bandwidth profile given by the rate limit imposed by the DUT while it is policing the flow.
Testing an OpenFlow Controller with OpenDaylight and Loom

Objective: Validate Controller ability to discover large Switch topology connection and convergence changes

Solution:
- Emulated large number of OpenFlow switches with various topologies
- Perform link/port down to create network convergence

Validate: Controller ability
- To discover network topology links via LLDP by verifying the installed flows
- To respond to network convergence by analyzing packet_out/Flow_mod from controller.
**Objective:** Validate Switch ability to redirect traffic to high and low priority paths based upon flow modifications emulating dynamic changes in the network.

**Solution:** IxNetwork Virtual Edition is connected to OVS 2.1.0 installed in cloud infrastructure. Ixia negotiates OFP 1.3 and pushes flow modifications to install multiple virtual paths.

**Validate:** Verifies traffic destination, packet loss and packet loss duration correspond to config changes pushed via OFP.
Viewing the Live Demo

Download our new eBook:

Demystifying NFV in Carrier Networks – A Definitive Guide to Successful Migrations

www.ixiacom.com/nfv

Download our Case Study:

SDN Controller Testing

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