Accelerate 1588/PTP and TSN Testing: A UNH-IOL Webinar on vIOLett® Software

-presented by Bob Noseworthy and Daroc Alden

www.iol.unh.edu
Please type any questions you have into the “questions” window at anytime – we will address these at the end.

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Agenda

- Who is the UNH-IOL
- What is vIOLeTT® & How it Works
- Key Features
- Demo
- Road Map & Test Tool Access
- Q&A
The InterOperability Laboratory (UNH-IOL) was founded in 1988. Main UNH campus is located in Durham, New Hampshire, USA

The UNH-IOL is a non-profit neutral, third-party laboratory dedicated to testing data networking technologies through industry collaboration.

A brief history of UNH-IOL and AVB/1588/TSN:
- 1988 - Testing Ethernet for over 30 years,
- 2005 - Residential Ethernet leads to AVB,
- 2010 - ISPCS host (1588 Conference/Plugfest),
- 2012 - NIST 1588 Support for initial test plans
- 2012 - Avnu Alliance & UNH-IOL start AVB development
  - Developed conformance tool is “Violett”
IEEE 1588 Power Profile Certification
  - Supported by NIST, IEEE-SA’s ICAP program, Utilities and Manufacturers
  - IEEE/IEC 61850-9-3 & IEEE C37.238

Additional IEEE 1588 services:
  - Default profile, Silicon validation for TCs, ITU-T G.8275.1, G.8275.2, G.8262.1 (in dev)

Avnu Alliance Recognized Test Facility
OPEN Alliance Test House + Contributor
IEEE/IEC 60802 CA (Industrial TSN Profile)
  - Currently supporting Ethernet-APL testing
vIOLett is a test framework for automating conformance testing for:

- Avnu Bridges, Milan and ProAV Endstations
- TSN Automotive Equipment
- Precision Timing including:
  - IEEE 1588 Power Profile (IEEE Certification program for 61850-9-3 & C37.238)
  - In Development:
    - ITU Telecom Profile, IEEE 1588-2019 Updates / 802.1AS-2020 Updates
    - NTP NTS C&I thanks to a generous gift from the Internet Society

Plans to support additional 1588/TSN needs are underway, as well as additional Automotive and Industrial Testing (OPEN Alliance, 60802, etc)
vIOLett Features

- More than 1,500 Conformance and Interop test-cases
- Automated testing for most tests
  - Automated analysis to assist manual testing for remaining tests
- Captures and signed test logs for every test
- Controllable via a REST API
- Widgets to test scenarios not covered by the formal test plan

UNH-IOL uses vIOLett in-house to perform conformance testing
REST Server enabling automation of the framework:

- Run tests, get results, modify configuration

Example Open Source RESTful Client available
User-controlled Widgets aid in debugging: Wireshark Sniffers, PTP & 1722.1 Emulation, etc.
Violett has command-line “batch mode” support with an xml file

- Using the violett launcher (linux):
  - violett -- -b batch.xml
- Simpler than RESTful control for some users.

```
<?xml version="1.0" encoding="UTF-8"?>
<batch>
  <!-- load a mode and run test(s) from it -->
  <changenode modeName="1722 (AVTP MAAP)" />
  <runmode testName="AVTP.c1.1a" />

  <!-- "echo" command -->
  <echo message="Now running all endstation tests" />

  <!-- run all endstation test modes -->
  <runmode modeName="1722 (AVTP MAAP)" />
  <runmode modeName="BA-Endstation" />
  <runmode modeName="Co-Existence" />
  <runmode modeName="FQSSEndstation" />
  <runmode modeName="Interop" />
  <runmode modeName="MediaClock" />
  <runmode modeName="MRP-Endstation" />
  <runmode modeName="gFTP" />
</batch>
```
vIOLett has ability to run Credit Based Shaper (FQTSS) tests using Ixia TSN capable blades

- Requires IXIA hardware, IxNetwork and appropriate UNH-IOL license
Pre-configured Systems

Available on request at modest fee

- Pre-configured hardware and pre-installed tools
Demo
Presented by Daroc Alden
Road Map & Test Tool Access
1588 Offerings -- iol.unh.edu/solutions/test-tools/ptp
Avnu Offerings -- iol.unh.edu/solutions/test-tools/avnu

Several test packages are offered:

- Avnu Violett® Milan(*)/Base Endstation Test Package
- Avnu Violett® ProAV(*)/Base Endstation Test Package
- Avnu Violett® Bridge Test Package
- Avnu Violett® Bridge (w/ IXIA Automation) Test Package
- Avnu Violett® Automotive Endstation (AED-E/GM) Test Package
- Avnu Violett® Automotive Bridge (AED-B/GM) Test Package
- Avnu Violett® Automotive Bridge (AED-B w/ IXIA Automation) Test Package
- New Violett® IEEE 802.1Q packages for MSTP, RSTP, VLANs, FDB, Jumbo Frames
- Coming Soon Violett® IEEE 1588 Power Profile (61850-9-3 & C37.238) Certification Test Package
- Coming Soon Violett® IEEE 1588 ITU 8275.1 Telecom Test Package
- Coming Soon Violett® IEEE 1588 ITU 8275.2 Telecom Test Package
• TSN/AVB Capable FPGA-assisted NIC in development
• Leveraging decade+ of FPGA based tools for Ethernet Conformance
  ○ UNH-IOL BitPhyer tool available today (non-NIC traffic generator)
• TSN/AVB NIC planned capabilities
  ○ 802.1AS-2020 ready – Time Relay & gPTP in hardware.
    ■ master/slave, 1PPS in/out, & one-step support
  ○ 802.1Qbv, Qbu, .1CB
  ○ Slow protocols to/from host PC / Violett (MSRP/MVRP/etc)
  ○ Hardware driven Stream traffic generator
• Hardware and Test plans in development to support DoD interests.
Additional Roadmap

● DUT Command & Control Interface
  ○ oss.iol.unh.edu/dut-cnc/Auto_and_ProAV_Command_and_Control

● End-user test creation / editing.

● UNH-IOL TSN Plugfest CY’21 (ITU 8262.1, Preemption, TAS, etc)
  ○ Calnex NEO, Ixia, Spirent, Xena, & UNH-IOL solutions available

● IEEE Power Profile Certification Launch (when IEEE ballot completed)
● IEEE Telecom Certification under consideration
Membership in our 1588, Avnu or TSN groups provides:

- Discounts on vIOLett licenses
- Increased support
- Reservation(s) in the UNH-IOL testing calendar
  - 3rd party test/debug/reporting and Certification
Please type any questions you have into the “questions” window

Twitter @UNH_IOL | Facebook @UNHIOL
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Contact Info & Tool Access

• Contact: ptplab@iol.unh.edu for 1588 or avblab@iol.unh.edu for Avnu/Automotive or tsnlab@iol.unh.edu for TSN Development or apl-lab@iol.unh.edu for Industrial Advanced Physical Layer

• We have several levels of Test Packages based off your needs

• All information can be found on our website:

www.iol.unh.edu

Products & Solutions