A YANG Data Model for Network Tester Management

draft-ietf-bmwg-network-tester-cfg-02

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IETF 117, BMWG, July 26, 2023.

Progress

- Completed reference client implementation rfc2544-benchmark - https://github.com/vlvassilev/rfc2544-benchmark.git

- Open-source gigabit media-independent interface (GMII) device implementation - Verilog (Ultra96 with 6x SFP+ extension board)
- Open-source 10BASE-T device implementation (yosys/iCE40) (work in progress)

- Test reports and comparison with commercial RFC2544 implementation (see links below)
- IETF116 Hackathon report presentation follows …

YANG model for management of Network Tester

- IETF116 Hackathon
- March 25-26, 2023
- Online

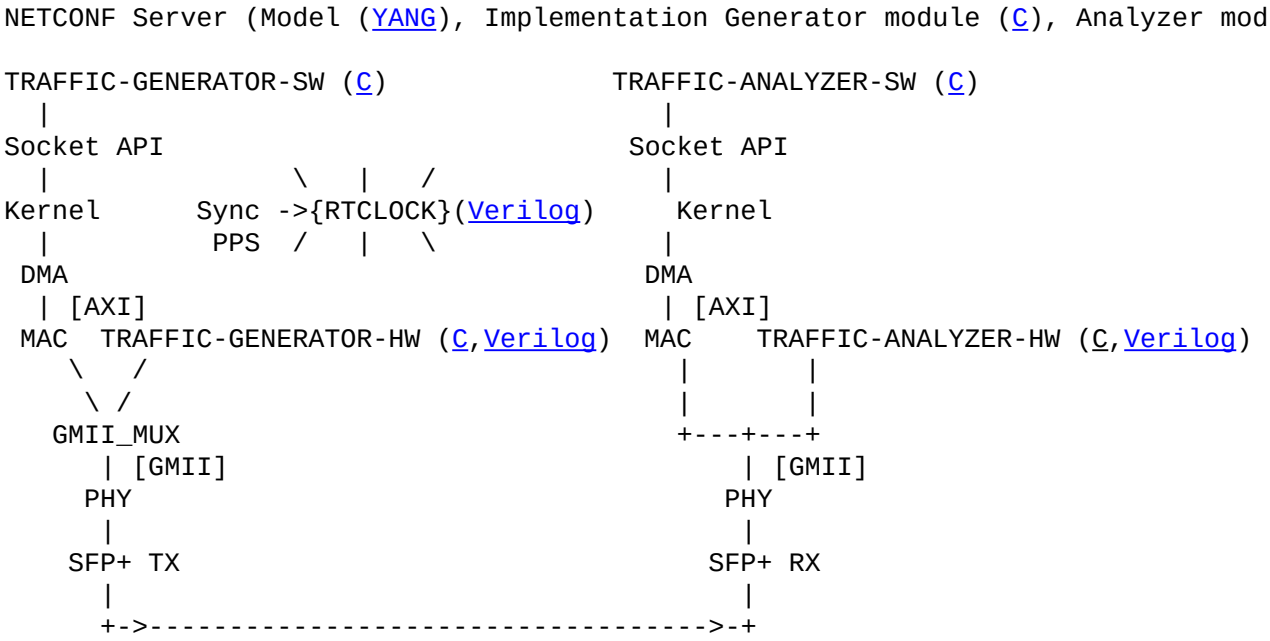
The project

Specification:
* draft-ietf-bmwg-network-tester-cfg-02

Client side:
* Test script – rfc2544-benchmark (Python)

Device side:
* Software - YANG/NETCONF server instrumentation code (C)
* Firmware - (Verilog)
* Hardware – off-the-shelf FPGA module Ultra96 + 6x SFP+ network programmability kit shield (KiCAD, Walk-through)

Design and implementation

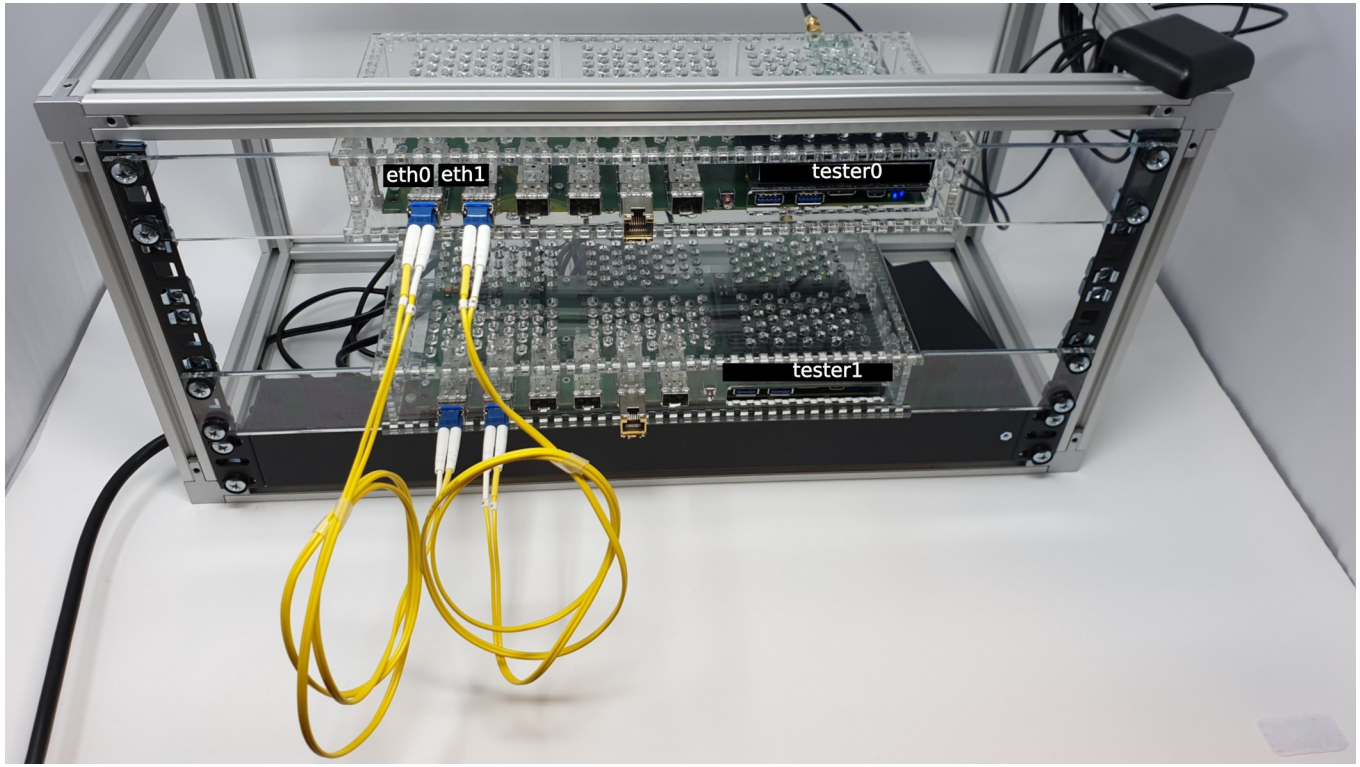


* - underlined text has links to repositories

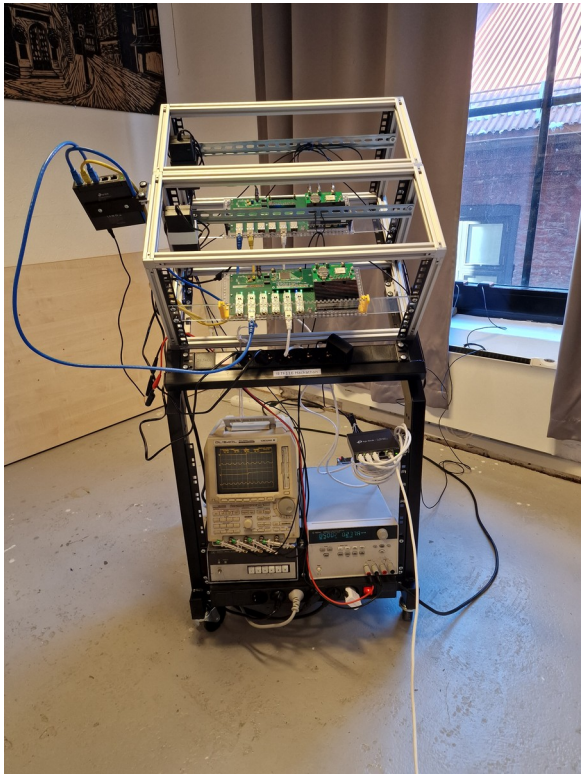
Network testers

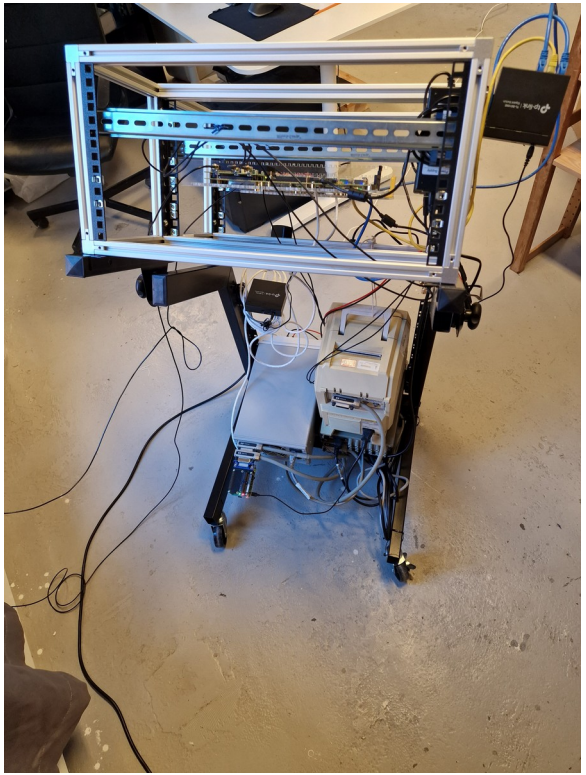
```
      +-----------------+
 eth0 |                 | eth1
   +-<|TG   tester0   TA|<-+
   |  |                 |  |
   |  +-----------------+  |
   |        +-----+        |
   +------->| DUT |>-------+
            +-----+

      +-----------------+
 eth0 |                 | eth1
   +-<|TG   tester0     |x
   |  |                 |
   |  +-----------------+
+-----+
| DUT |
+-----+
   |  +-----------------+
   |  |                 |
   +->|TA   tester1     |
      |                 |
      +-----------------+
```

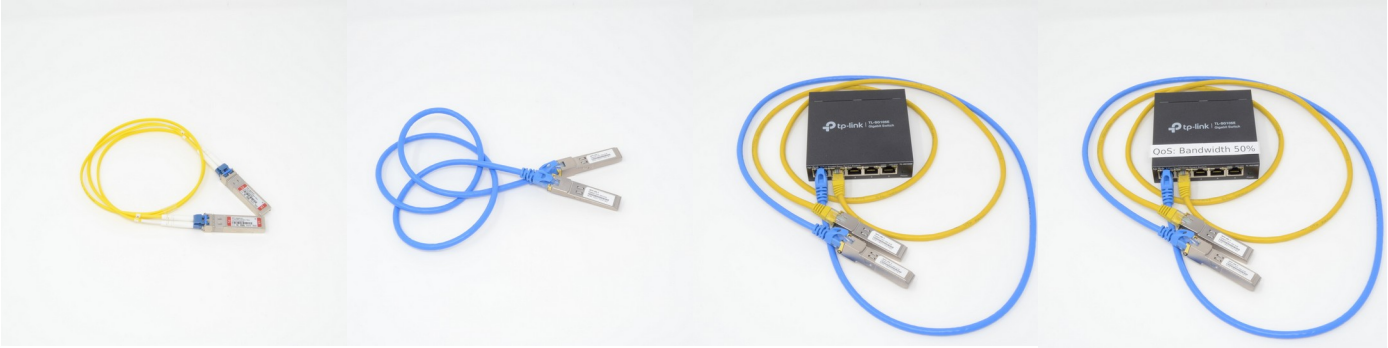


Mobile lab





Results



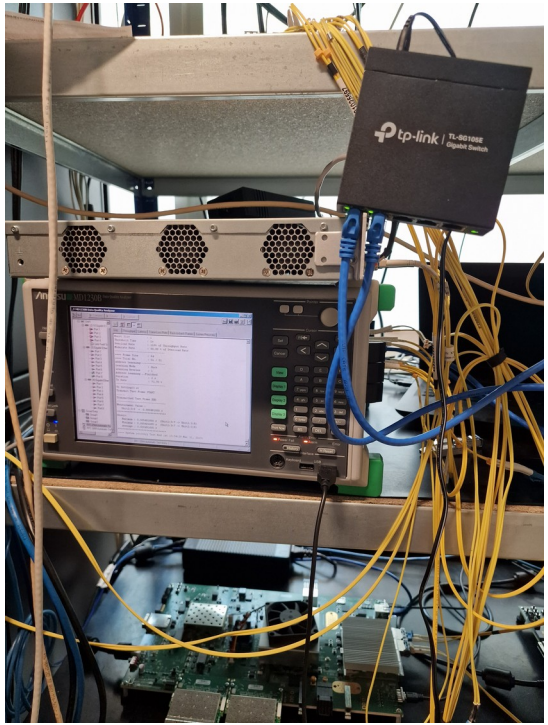
* DUT0 (optical SFP modules + 1 m. fiber) - report, verbose-log

* DUT1 (copper 1000BASE-T modules + 1 m. Ethernet cable) - report, verbose-log

* DUT2 (low cost Ethernet bridge TL-SG105E wo QoS - 100% bandwidth) - report, verbose-log

* DUT3 (low cost Ethernet bridge TL-SG105E w QoS - 50% bandwidth) - report, verbose-log

Validation of results



Validated results for DUT3 (low cost Ethernet bridge TL-SG105E w QoS - 50% bandwidth) against results for same DUT3 tested with commercial tester:

* reference (anritsu-md1230b-log.txt)
* result

Summary:
* 997024 (67%) vs. 1000000 (67.2%)
* 6668 ns vs. 24440.4 nanoseconds (24 ns is the actual maximum delay. None is wrong.)
* Frame loss 32%,25%,15%,3% vs 32%,24%,15%,3%
* 1682 back-to-back frames vs. 1679
* System recovery 0.000491 sec vs. N/A

The End