Readout Network Progress

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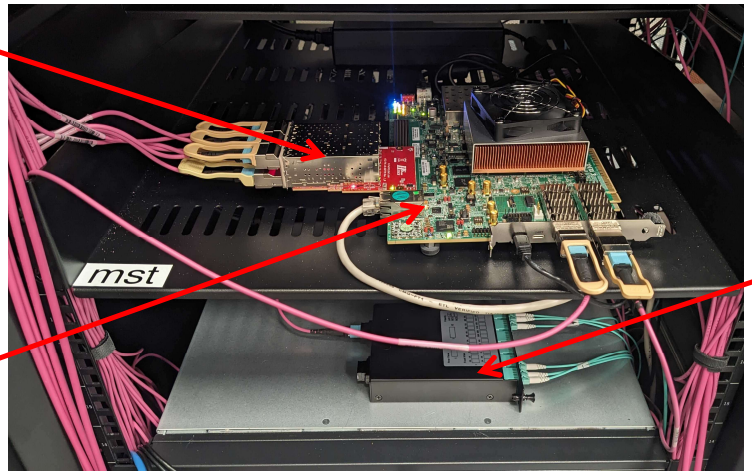
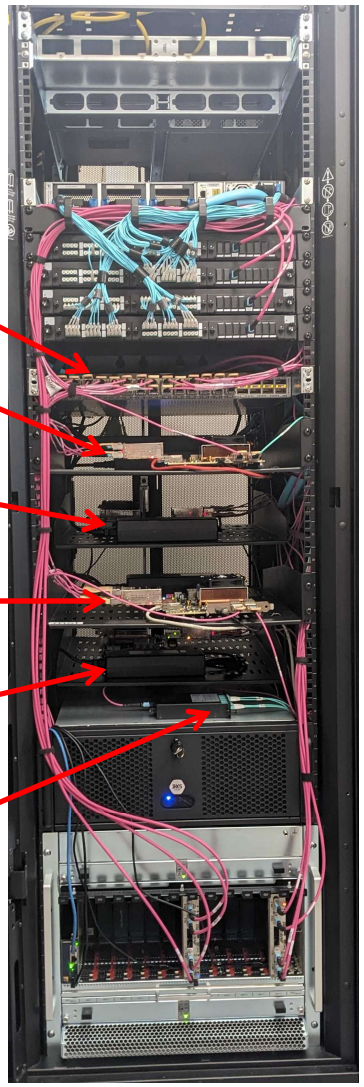
Agenda

- 40 GbE Switch Test Results
- Recent Developments
- Outlook

40 GbE Test

- 40 GbE emulator consists of four VCU118 development board with HTG FMC+ cards attached.
- 7 data links 1 sync link per board.
- 28 input data links and 7 output links uses 35 of the available 36 ports on the N9K-C9336C-FX2.





Switch Counters

- Command “sh int count br” presents data and frame rate over past 30 and 300 second intervals.
  - Inputs: 19.1 Gb/s 578418 f/s ~4kB frames
  - Outputs: 75.7 Gb/s 2313671 f/s ~4kB frames

  ← 4 kB chosen as small packet size should lead to inefficient memory usage and greater power consumption.

- Command “sh int count error” presents error counters, all zeros.

- Command “sh eth1/n”

Eth1/1

RX

138566272055 unicast packets 0 multicast packets 0 broadcast packets

138566272054 input packets 572971534947425 bytes

138566272055 jumbo packets 0 storm suppression bytes

0 runts 0 giants 0 CRC 0 no buffer

0 input error 0 short frame 0 overrun 0 underrun 0 ignored

0 watchdog 0 bad etype drop 0 bad proto drop 0 if down drop

0 input with dribble 0 input discard

0 Rx pause 0 Stomped CRC

Eth1/35

TX

547021814589 unicast packets 123784 multicast packets 0 broadcast packets

547021938373 output packets 2266136319114702 bytes

547021814588 jumbo packets

0 output error 0 collision 0 deferred 0 late collision

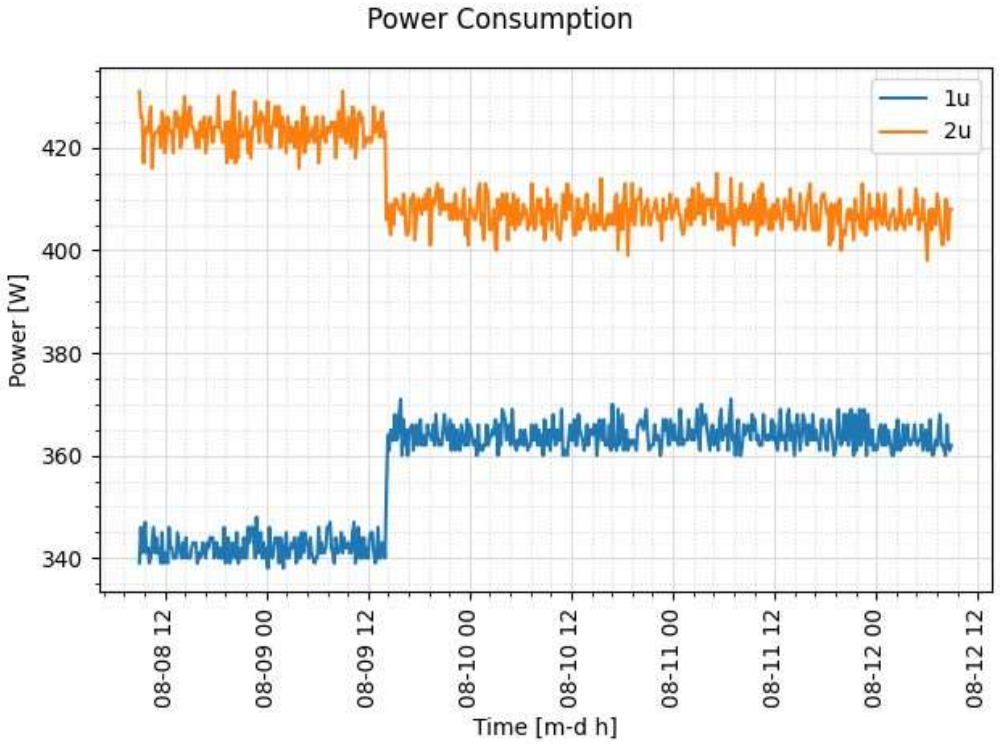
0 lost carrier 0 no carrier 0 babble 0 output discard

0 Tx pause

Power Consumption

- 100 GbE QSFPs transferred from N9K-C93360YC-FX2 (2U) to N9K-C9336C-FX2 (1U). Explains change in power consumption.
- Power consumption of N9K-C9336C-FX2 (1U, switch under test) between 360 - 370 W.
- Delta between max power observed on the chart and max power stated on datasheet is 470 and 349 W for 2U and 1U switch, respectively.

Model	Vendor	Size (U)	Max Power from datasheet (W)	Typical Power from datasheet (W)
N9K-C93360YC-FX2	Cisco	2	900	404
N9K-C9336C-FX2	Cisco	1	719	337
N3K-3232C	Cisco	1	402	205
S5296F-ON	Dell	2	893	457
S5232F-ON	Dell	1	635	360
Z9100-ON	Dell	1	605	195



Recent Developments

- Rx tests:
  - Server from Bristol.
- Rx Developments:
  - PCIe Interface.
  - LEDs.

- Automation of tests:
  - Pytest Framework.
  - Launch DUNE DAQ environment as “long-running” subprocess in background.
  - Pass - Access Rx firmware.
  - Fail - Dump switch counters.
  - Automatically generated report using Sphinx.

- 25 GbE

Outlook

No.	Milestone Description	Jan 2024 Proposed Baseline	Feb 2024 OsC Forecast	June 2024 Forecast	Variance (days)	% Complete
M2.1	Readout prototypes and test stand assembled	2023-12-31	2023-12-31			100%
M2.2	Readout baseline firmware complete	2023-12-31	2023-12-31			100%
M2.3	Readout network tests complete	2024-06-30	2024-06-30	2025-03-01	244	65%
M2.4	Ready for Readout network PRR	2024-09-30	2024-09-30	2025-03-01	152	15%
M2.5	Readout network PRR complete	2024-12-31	2024-12-31	2025-06-30	181	0%
M2.6	Readout network procured	2026-03-31	2026-03-31	2026-03-31	0	0%