

# Readout Network PRR Plan

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DUNE DAQ Planning Workshop

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# Deliverables

Results in review documentation. Following structure:

- Introduction
- Overview of Experiment Setup
  - Physics aim through to constraints.
- Technical Specification
  - Use relevant part of appendix A from network specification document (EDMS: 3059736)
- Testing & Procurement Process
  - Introduce JISC framework - Justify this approach.
  - Test plan
  - Test results
- Present selected model(s)
  - Cost & schedule

# Test Plan

For each emulator:

Packet Size (kB)	100 GbE Output Data Rate (Gb/s)							
	50	60	70	Nominal Data Rate	90	97	98	99
3	Pass	Pass	Pass	Pass	Pass	Pass	Fail	Fail
6	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail
7	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Fail
9	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

At different occupancies:

Emulator (GbE)	Model	Grouping	N Groups to obtain Approx. % Port Utilisation			
			15	40	70	100
40	C9336C	4:1	1	3	5	7
25	C9336C	1:1	3	7	13	18
10	C93360YC	12:1	1	3	5	8

# Test Plan Continued

- Therefore 128 tests per switch:
  - 32 test to sweep packet size and link utilisation.
  - Repeated at 4 switch occupancy levels.
- Test will last for a fixed duration of 3 hours. 384 hours of testing or 16 days.
- Measurements:
  1. Switch power consumption (polled throughout test).
  2. Data rates recorded by switch (sampled at end).
  3. Receiver Statistics (sampled at end):
    - Total number of AXI4s frames received on a per link basis.
    - Variance in AXI4s frame size on a per link basis.
    - Sequence number out-of-order/skips on a per channel basis.
    - Timestamp out-of-order/skips on a per channel basis.
- Calculated results:
  - Input & output data rates at switch (computed from runtime and measurement 2)

# Recent Progress

Created Rx firmware targeting au50.

10 GbE Emulator:

- Created 48-link firmware with revised data source capable of sweeping.
- Fixed synchronisation issues.

40 GbE Emulator:

- Created 7-link firmware design targeting VCU118s with FMC+ cards.
- Refactored control scripts into butler program.

# Future Tasks

- Control Software:
  - Adding sweep control to butler program.
  - Integrate with pytest framework.
- 25 GbE Firmware:
  - Hardware support (GTY 32.75 Gb/s).
  - Use the same IP core.
  - Firmware has been architected in a reusable way.
- See Gantt Chart.