

FPGA based data-flow injection module at 10 Gbit/s reading data from network exported storage and using standard protocols

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The goal of the LHCb readout upgrade is to speed up the DAQ to 40 MHz. Such a DAQ system will certainly employ 10 Gigabit or similar technologies and might also need new networking protocols such as a customized, light-weight TCP or more specialised protocols. A test module is being implemented, which integrates in the existing LHCb infrastructure. It is a multiple 10-Gigabit traffic generator, driven by a Stratix IV FPGA, which is flexible enough to either generate LHCb's raw data packets internally or read them from external storage via the network.

For reading the data we have implemented a light-weight industry standard protocol ATA over Ethernet (AoE) and we present an outlook of using a filesystem on these network-exported disk-drivers. We will present here first the implementation of the complete IP protocol stack (including ARP, ICMP) up to the UDP level, which allows to tie into standard utilities like for example syslog. We present studies on higher-level protocols such as TCP.

We will go through the technology analysis, implementations and performance measurements.

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