

Data Transport Session

Joint CBM and PANDA DAQ

Developments

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1 GENERAL REMARKS

- Various data transport between FPGA-based electronics and computers have been presented including: Ethernet, FADE and PCIe-based solutions
- Agreement on introduction of 10GbE as significant number of electronics migrate to Kintex devices
- Agreement on the value of Lightweight TCP/IP on FPGA solution for various applications

2 DATA AND CONTROL LINK VIA GbE (G. KORCYL)

- Modular GbE implementation for TRBv3 has been presented
 - Configurable GbE instances in terms of enabled links, included protocols and buffer sizes
 - Allows to separate the SlowControl channel from the data readout – more responsive control and monitoring of TRB3
 - Increased throughput for the readout data
- J-PET Central Controller board has been presented
 - A Zynq-based platform with 16x SFP and DDR3 memory
 - Designed to perform online UDP data streams parsing and TRB-TDC data extraction
 - Provides facility for online histogramming, filtering and data unpacking into high-level structures
 - Hardware foreseen to be delivered ~3 months

3 ETHERNET TRANSPORT PROTOCOLS (W. ZABOŁOTNY)

- FADE system has been presented as a custom, Ethernet-based, reliable data transmission solution
 - A custom protocol of Layer 3 has been developed and evaluated on both 1GB and 10GB networks
 - Provides retransmission functionality
 - Requires custom kernel modules for handling the transmission
 - Introduces reasonable CPU load on the receiving side, while keeping the consistency check of all transmitted data words
 - Makes use of Jumbo Frames

- Presents comparable transmission speed as standard TCP/IP
- No routing functionality

4 FLES INPUT INTERFACE (D. HUTTER)

- A solution for data transport between Data Processing Boards and First-Level Event Selector (CBM) has been presented
 - FLES Input Interface is a FPGA-based PCIe board supporting long distance optical connections
 - As transport layer Aurora 64/66B is used on 10GB links with AXI user interface
 - On the receiving side, the data is stored via DMA channels

5 DATA TRANSPORT FPGA TO COMPUTER IN PANDA (W. KUEHN)

- 10GB Ethernet as the suggested standard for the data output from the Compute Node facility
 - Next revision of Compute Nodes will be equipped with Kintex devices and Avago Minipods, capable of handling multiple 10GB transmissions
- Lightweight TCP/IP in FPGA solution suggested for the network protocol
 - Commercially available solutions are limited and expensive
 - A set of characteristics of the Lightweight module has to be defined