

- **RASHPA: RDMA-based Acquisition System for High Performance Application** (ESRF DAQ framework)
- Ethernet is a standard communication protocol now can offers more than 100 Gbps throughput
- RDMA over Ethernet becomes more and more popular in DCB
- Need of a dedicated, modular and expendable RDMA over Ethernet protocol to be used for 2D X-RAY detectors

Motivations

- Current and upcoming advanced detectors produce very high data throughput.
- Industrial Ethernet based DAQ protocols present a reasonable level of complexity
- The need to develop a generic, dedicated and controllable protocol
- Expandable in terms of supporting other Ethernet protocols



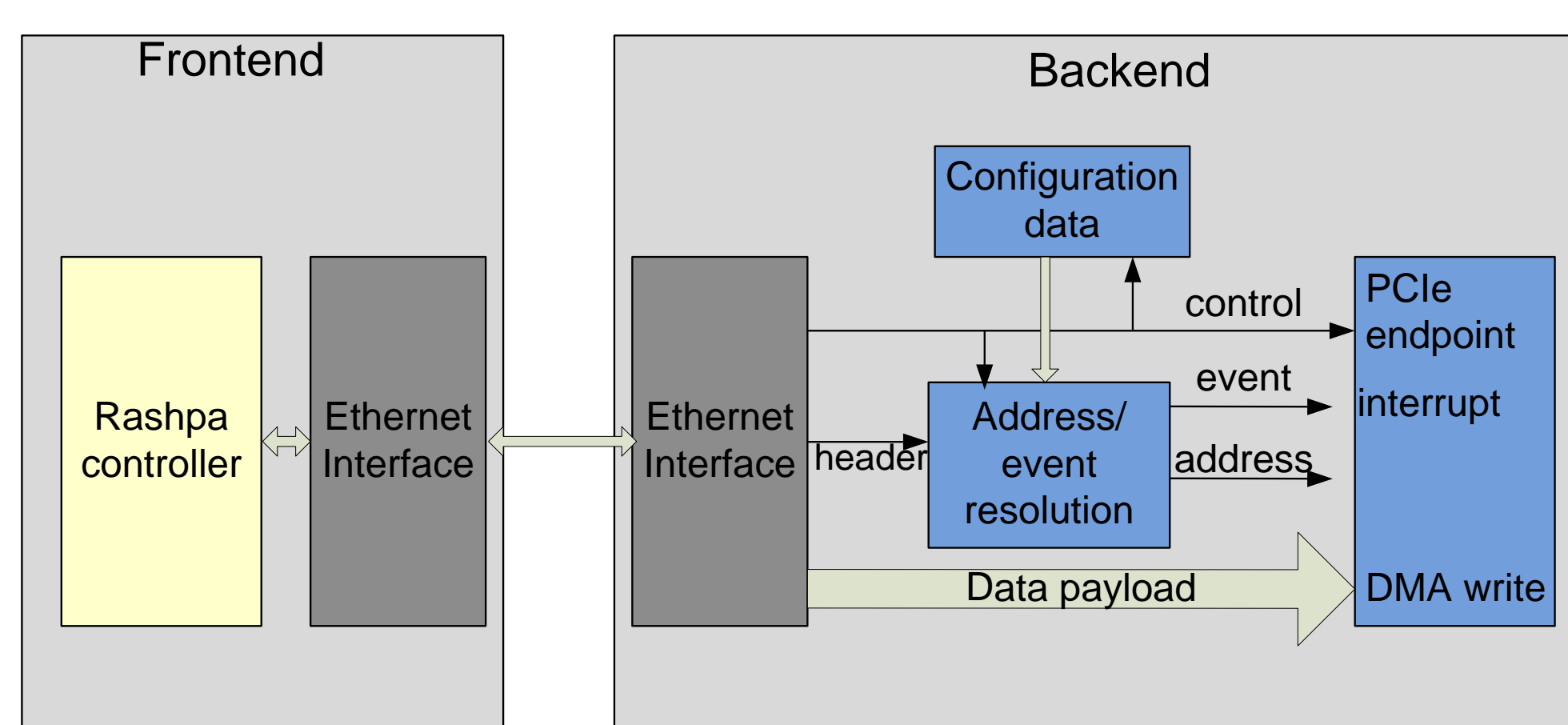
pco.edge
> 1 GByte/s



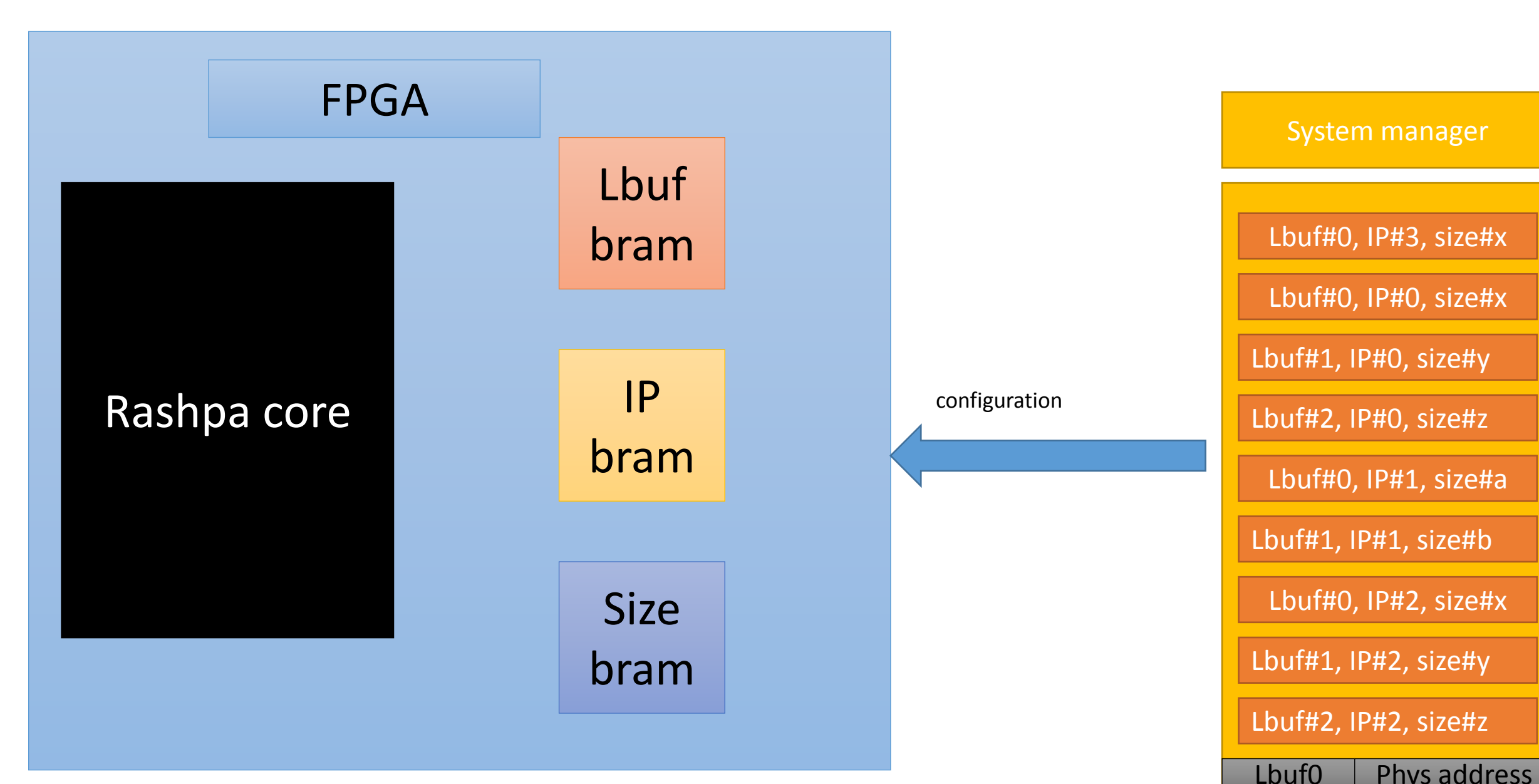
PSI/Eiger 9M
~ 45 GByte/s

System Architecture

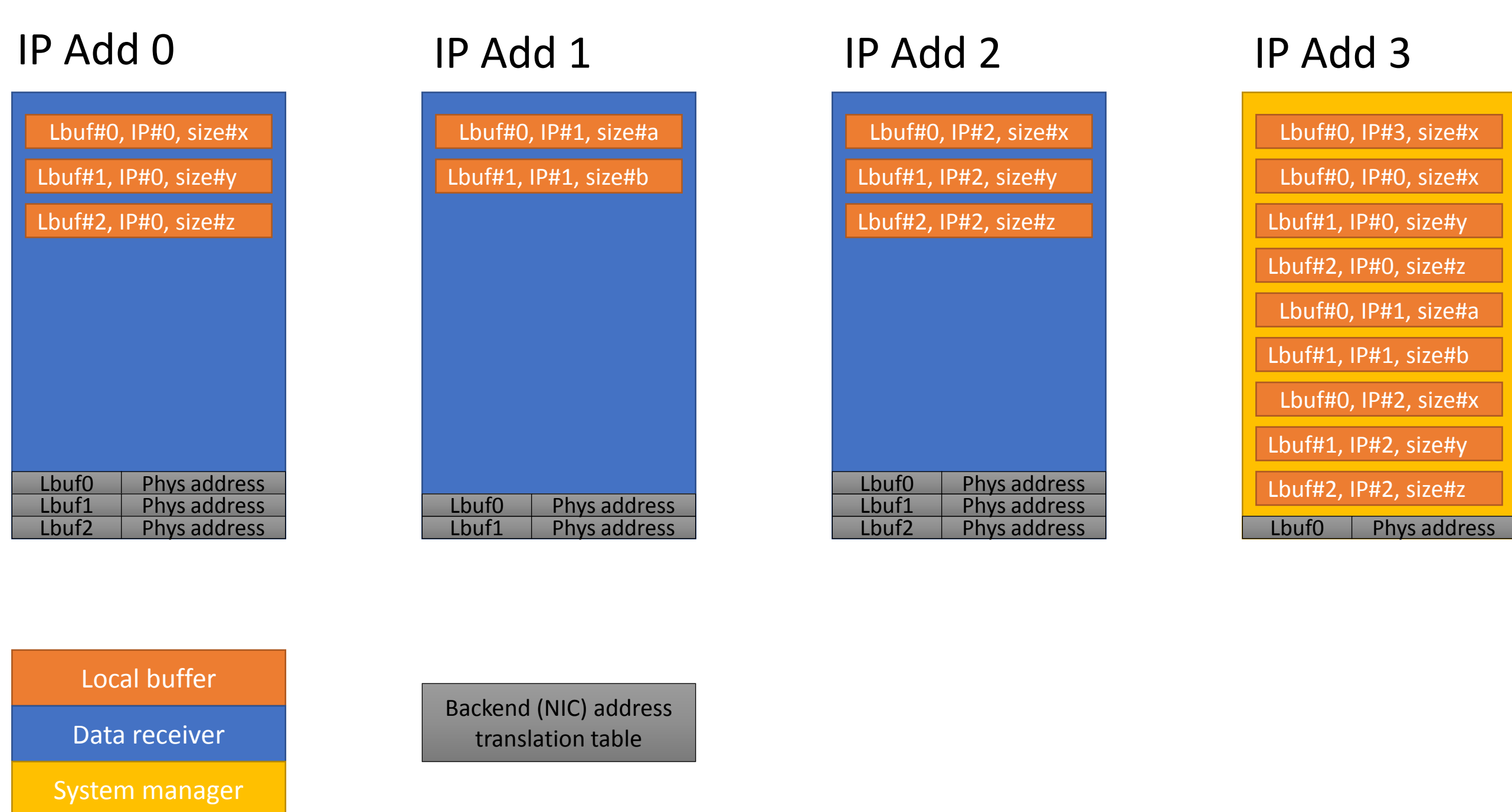
- Support RDMA data transfer.
- Support Events generation and interrupt handling.
- Packet loss detection
- Support other protocols



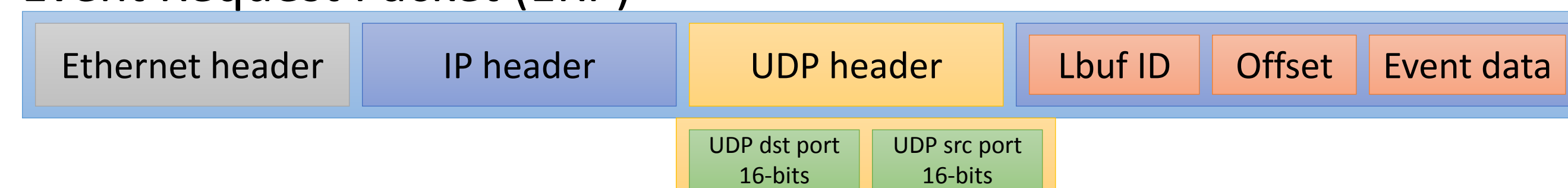
Protocol description



System Configuration

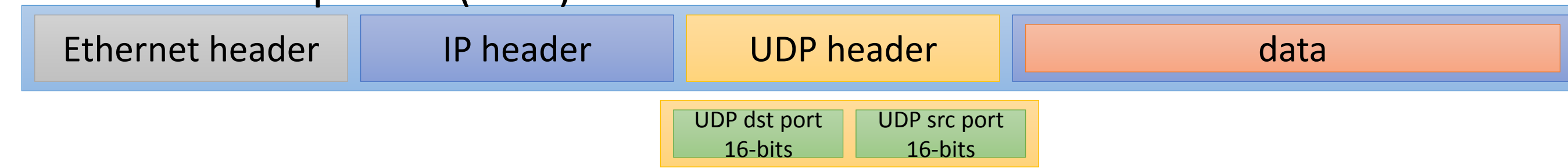


Event Request Packet (ERP)



32 bits can be used as an opcode for event opcode (0x0B0BCODE)

Detector Data packet (DDP)

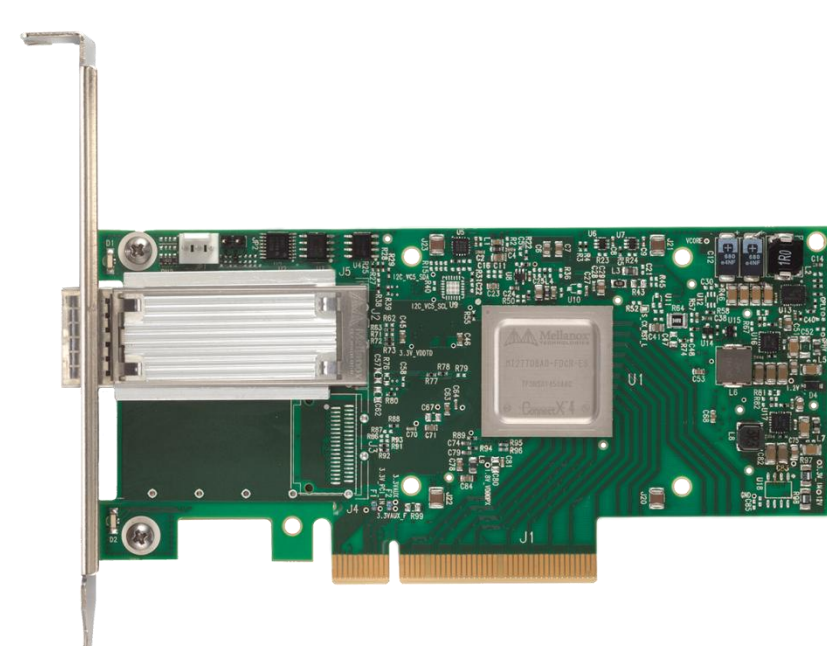
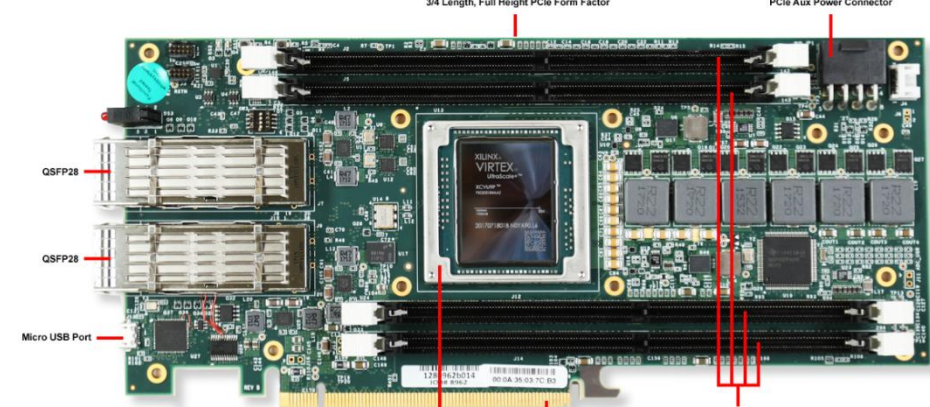


32 bits can be used as the new **offset** of the data in the final destination

Experimental tests

FPGA Board

- Virtex Ultrascale+ VU9P
- High density and parallel memory banks
- Two QSFP28 100G interfaces
- PCIe Gen3x16 or Gen4x8



Mellanox NIC ConnectX4 Supporting RoCE

Bandwidth Measurements

