Outline of DAQ workpackage

Matthew Wing (UCL), on behalf of the DAQ group

- **Groups: Cambridge(?), Edinburgh(?), Imperial, Manchester(?), UCL, ...?**

- **http://www-zeus.desy.de/∼wing/calice.pdf**

  This note currently describes all thoughts and ideas on the subject of R&D for a data acquisition system for a calorimeter at the future linear collider. It is not yet a technical note nor a proposal draft to the funding agency; both are contained. It is partly a copy of Paul's ECFA talk, the minutes from the brainstorming meeting and subsequent brainstorming at UCL.

Suggested workpackages

- **DAQ 1: VFE to FE - VFE interface, FE board**
- **DAQ 2: FE to off-detector - Optical network, switching, control and clock distribution**
- **DAQ 3: Off-detector receiver - PCI card**
- **DAQ 4: Off-detector farm - PC issues, software and optimisation for physics**

DAQ 1: VFE to FE

1. **Neither is done in the VFE**

2. **Only the ADC is done in the VFE**

3. **Only the threshold is done in the VFE**

4. **Both are done in the VFE**

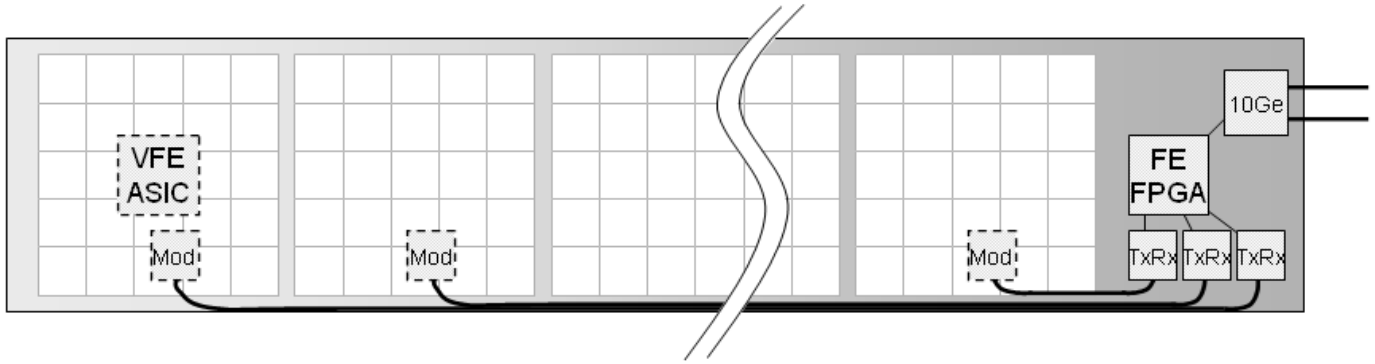
Consider 2) and 4) worthy of further R&D: 2) is better due to threshold suppression in FPGA at FE; 4) is better due to lower rates and similarity with MAPS.

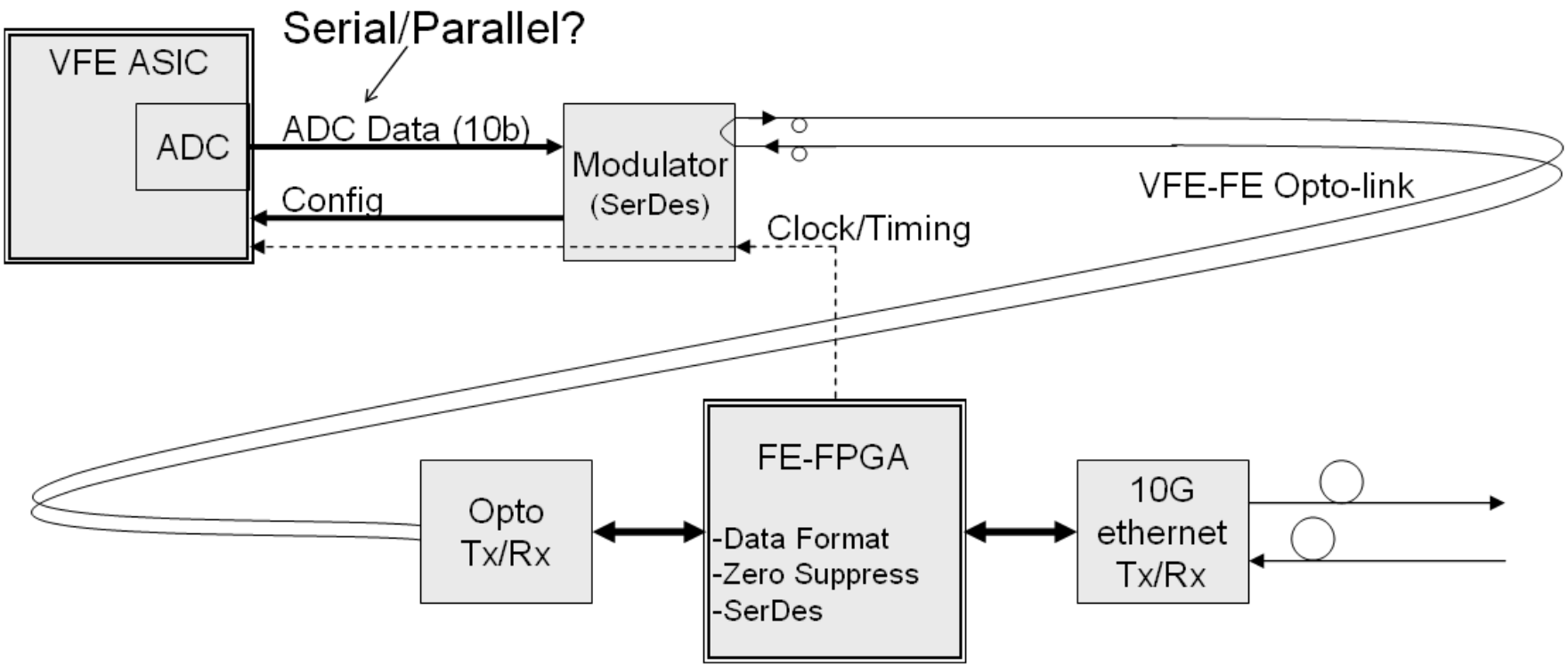
Build a mock data transfer (test) system; any new development (e.g. MAPS) can also be plugged in.

Demonstrate workability for both ECAL and HCAL.

Use commercially available products.

DAQ 1: VFE to FE - scenario 2) schematic





DAQ 2: FE to off-detector

- A fibre point-to-point to a PCI card.

- A fibre directly connected to a network - no currently available network switch could sustain the throughput required.

Concentrating on the fibre point-to-point to a PCI card:

Fibre initially passes through a passive router which checks which PCs are alive.

Geographically close information sent to the same PCI card to allow for clustering in the PCI card.

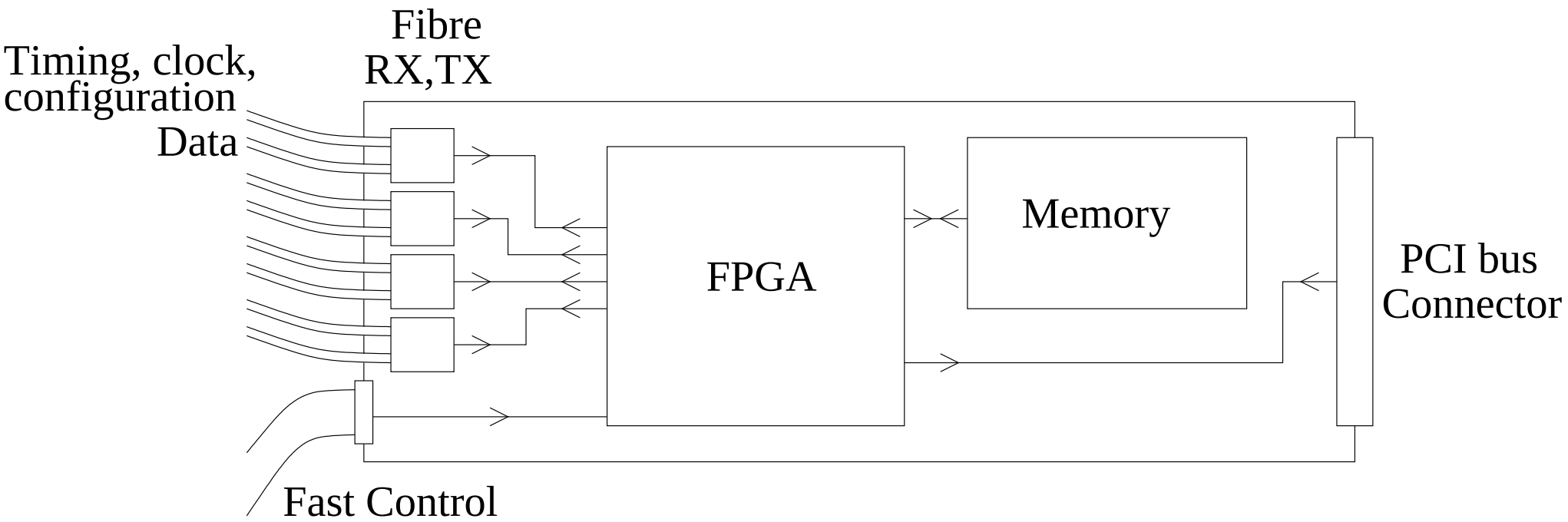
Again build a test system.

DAQ 3: Off-detector receiver

Standard PC with a PCI Express bus. PCI Express cards: 32 lanes, each 2.5 Gbit/s in each direction.

Data reduction on card - local clustering and removing isolated hits. To by shared with simulation.

How does the clocking work? R&D project.

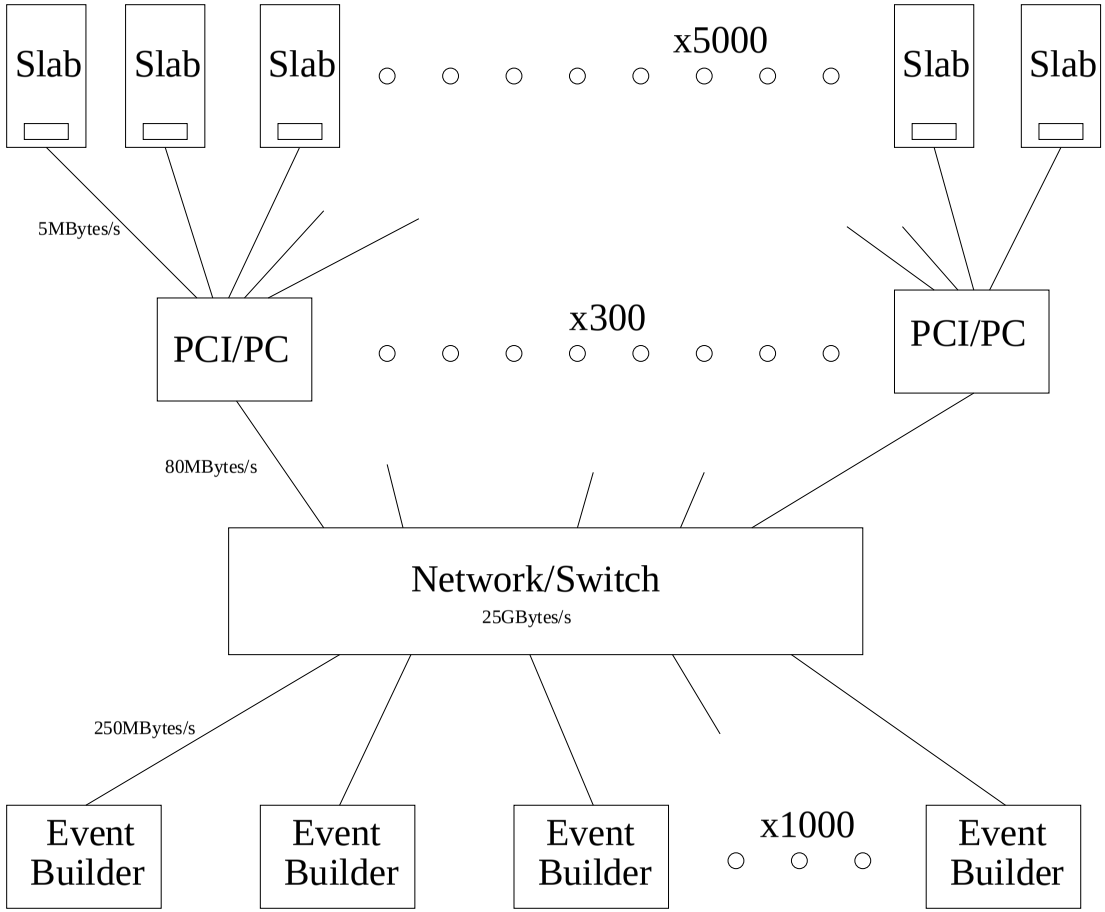


DAQ 4: Off-detector farm

PC reliability: 1 our of 200 goes per day. How many spares needed?

Software and optimisation for physics.

Transfer via network switch to event builder.



Next steps

Finalise the R&D programme and costings and finalise this table.

Name	Position	Institute	Funding	2005/6	2006/7	2007/8
M. Goodrick(?)	Engineer	Cambridge	PPARC (RG)			
D. Ward(?)	Academic	Cambridge	HEFCE			
?	?	Edinburgh				
P. Dauncey	Academic	Imperial	HEFCE	?	?	?
O. Zorba	Engineer	Imperial	PPARC (RG)	?	?	?
New RA	RA	Imperial	PPARC (new)	?	?	?
R. Barlow(?)	Academic	Manchester	HEFCE			
R. Hughes-Jones(?)	Engineer	Manchester	PPARC (RG)			
S. Kolya(?)	Engineer	Manchester	PPARC (RG)			
M. Lancaster	Academic	UCL	HEFCE	0.2	0.2	0.2
M. Postranecky	Engineer	UCL	PPARC (RG)	0.3	0.3	0.5
M. Warren	Engineer	UCL	PPARC (RG)	0.3	0.5	0.5
M. Wing	Academic	UCL	HEFCE	0.3	0.3	0.3
New RA	RA	UCL	PPARC (new)	0.6	0.6	0.6

Input is gratefully received now and will have a meeting of interested parties soon.