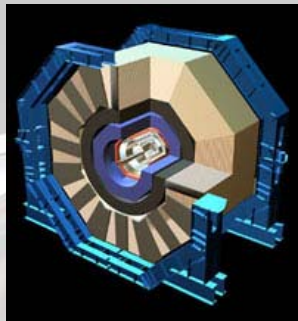


# Data Acquisition for the ILC Detectors



G. Eckerlin

TILC08, Sendai, March 6<sup>th</sup> 2008

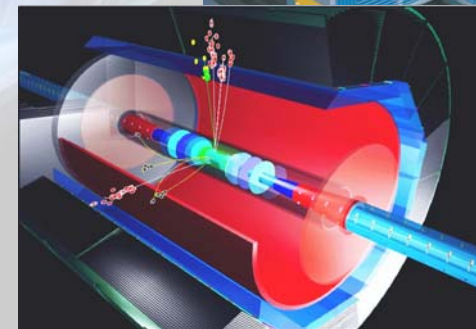
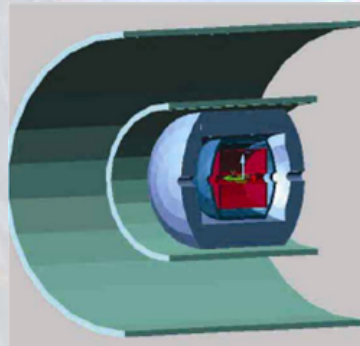
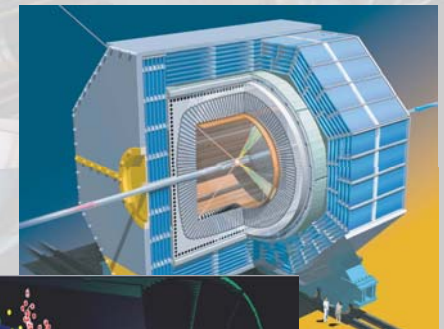


DAQ Concept

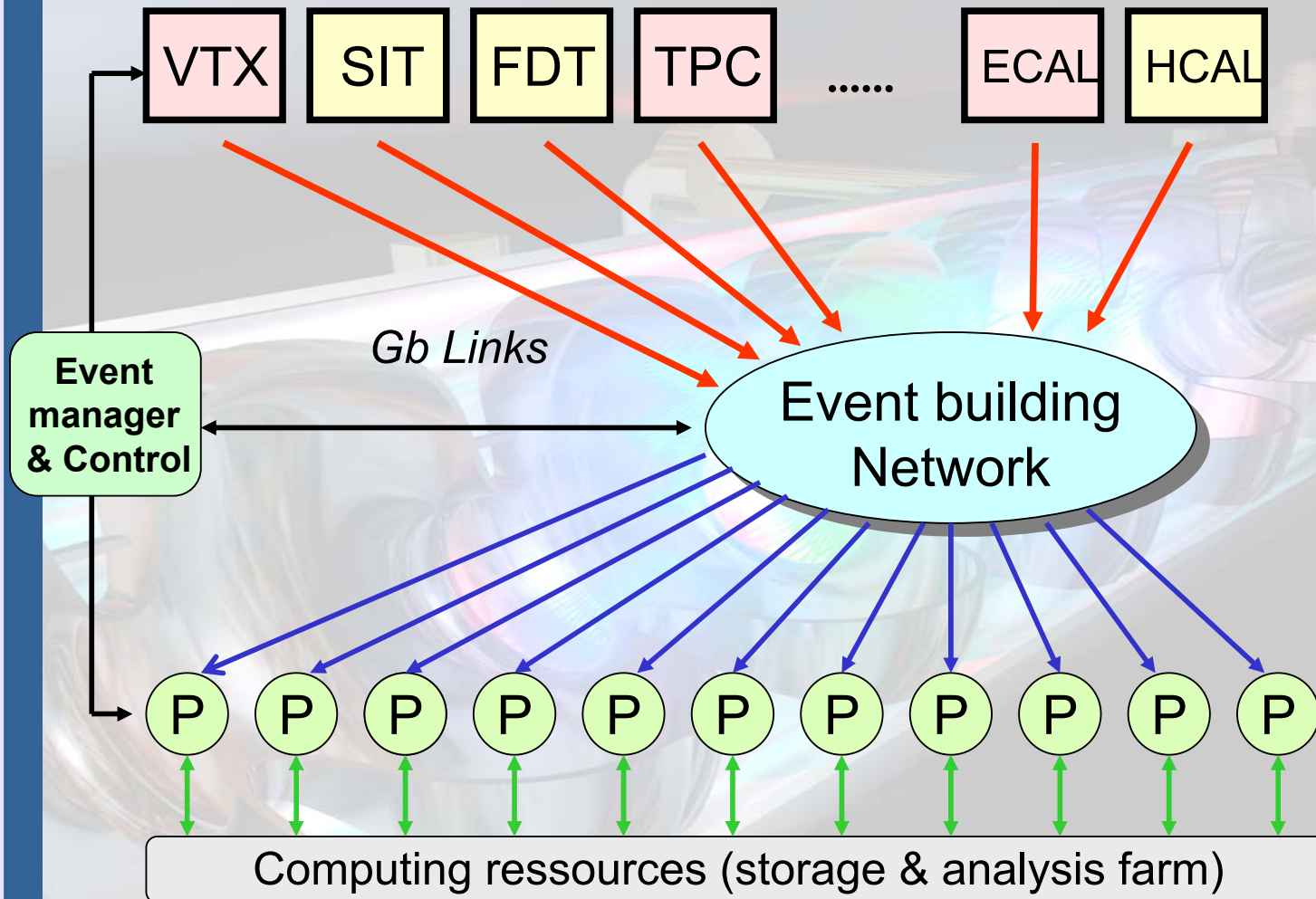
Front End Interfaces

Why not wait ?

Conclusions



# The DAQ Concept

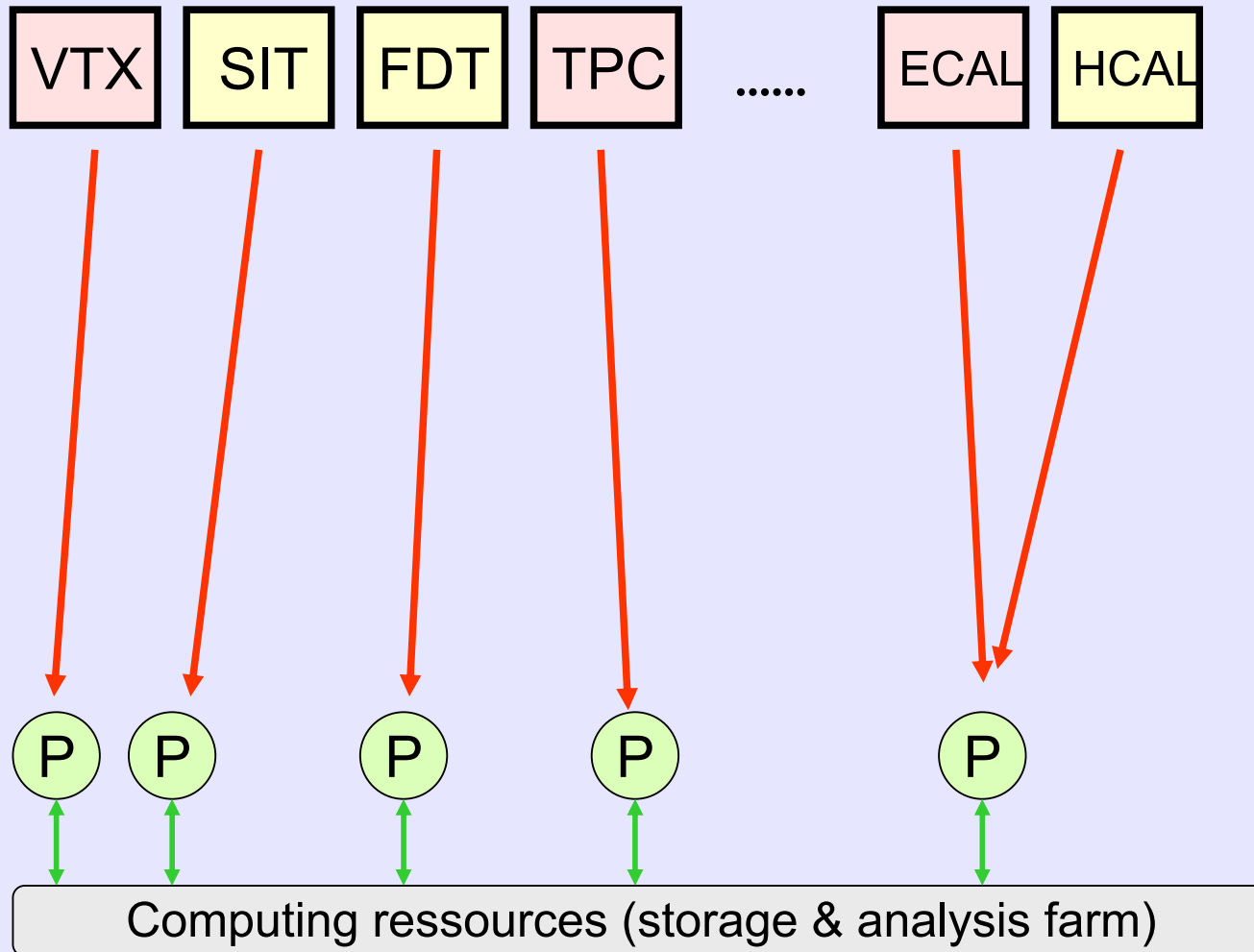


~  $10^9$  channels  
no hardware trigger  
1 ms pipeline

readout between trains  
commercial hardware

software event selection  
• full train data to 1 node  
• full detector information  
• full train information  
-> flexible & efficient

# Current Status

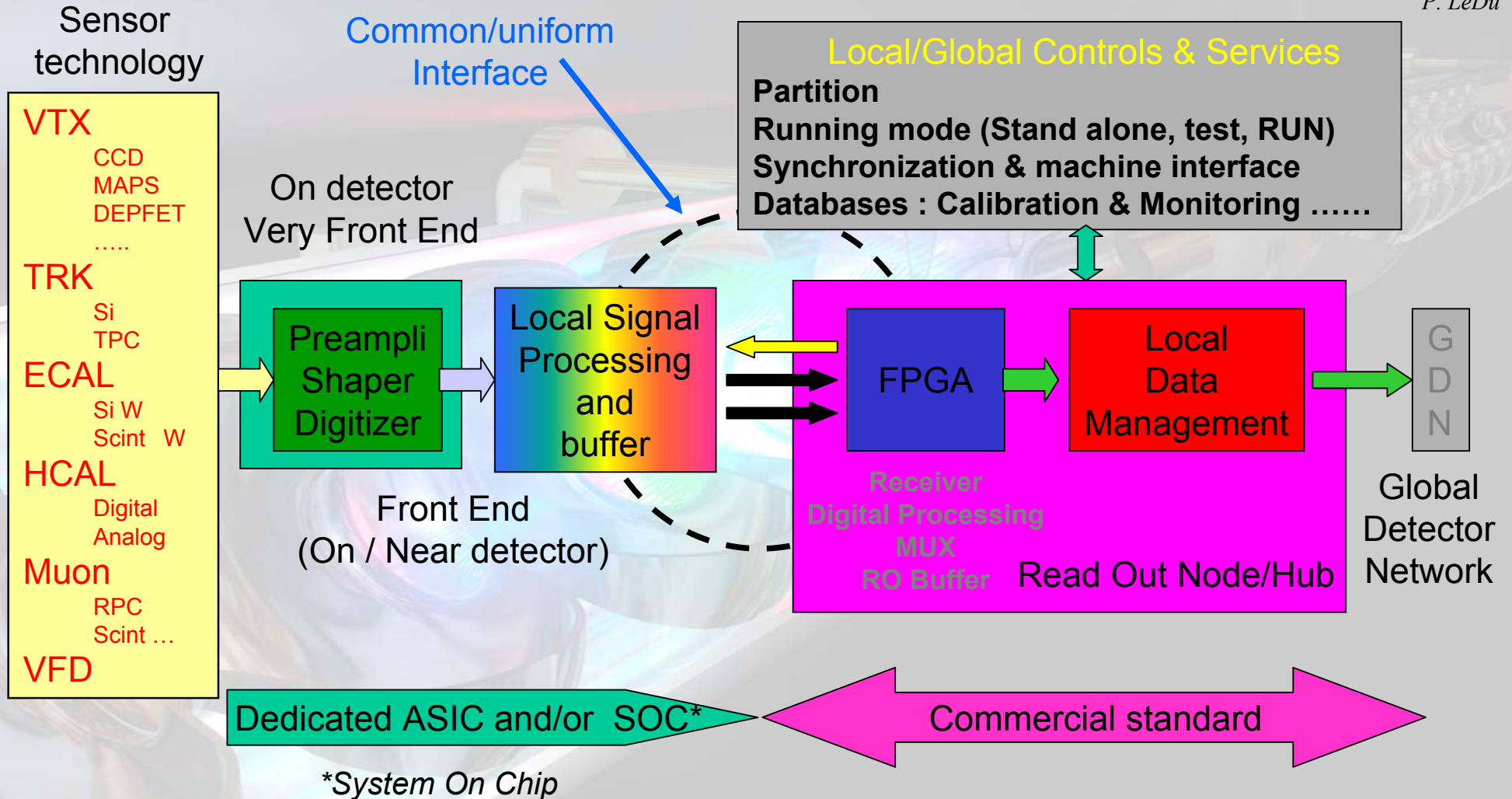


# How to connect the Front End Readout



Worldwide Study of  
the Physics and Detectors  
for Future Linear  
e<sup>-</sup>e<sup>+</sup> Colliders

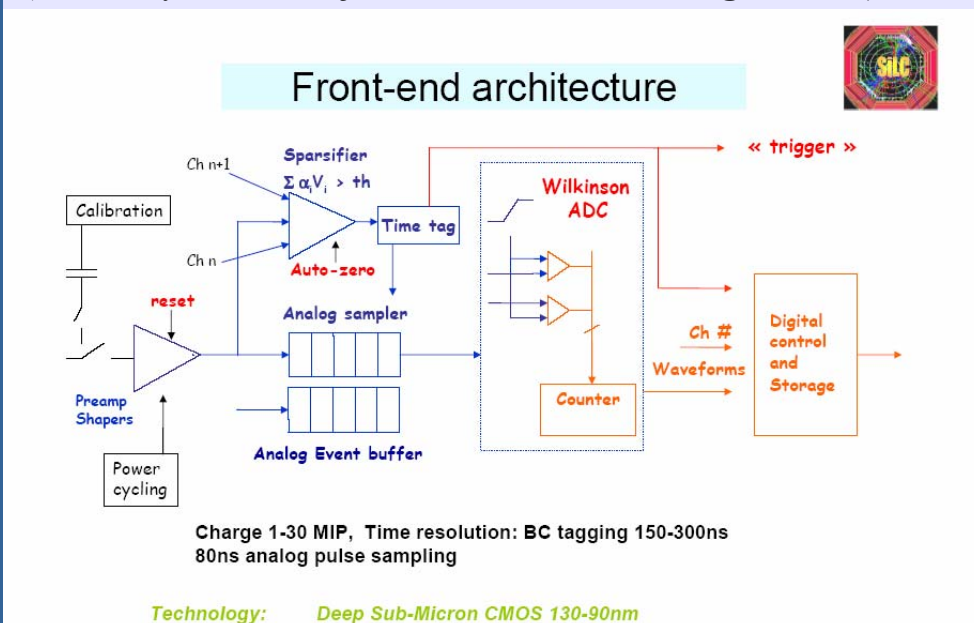
P. LeDu



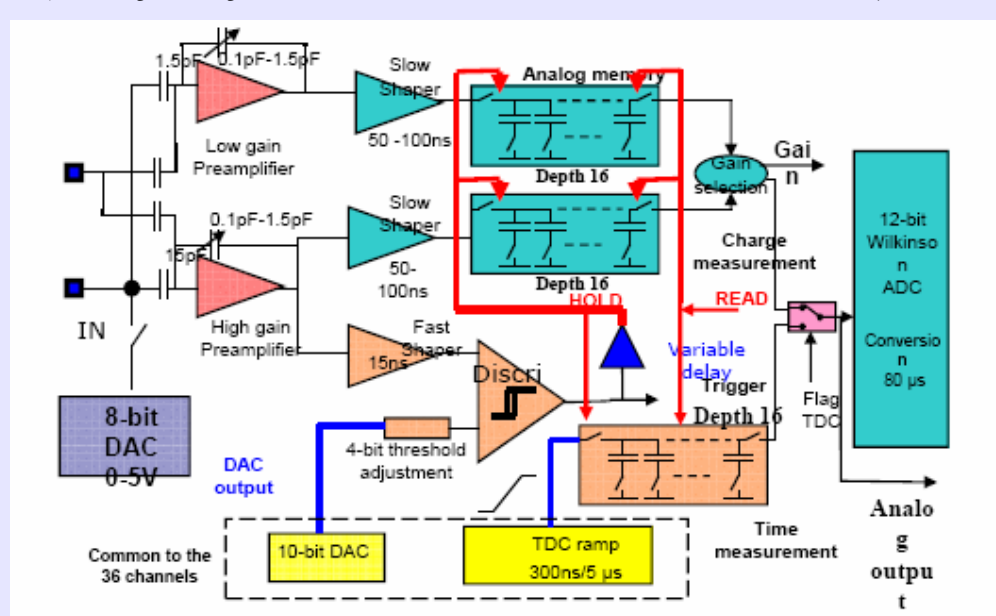
# Front End R&D Examples



*Architecture of CMOS readout chip of Silicon Strips  
(A. Savoy-Navarro for SiLC in the tracking session)*



*New ASIC readout chip for analog HCAL tests  
(F. Sefkow for CALICE in the Calorimeter session)*



*Many designs now fully integrate shaping, digitizing, hit detection, processing and digital buffering.  
Getting closer to a real design for the ILC operation.  
Output mostly digital via serial links (LVDS)*



# Why worry now ?



- R&D work for detector front end electronic in progress
  - make sure design complies with DAQ concept
  - need to define common interface to front end
- New industry standards develop (like ATCA/ $\mu$ TCA/AMC)
  - need to get experience with new standards
  - likely be used for ILC, detector DAQ and maybe for front end ( $\mu$ TCA/AMC)
- Need to synchronize online/offline developments
  - define suitable online/offline data formats (LCIO, etc)
  - need to interface to conditions and calibrations database

# Some more Questions



- How do we calibrate the detector
  - Do we need dedicated calibration runs ?
  - Or will we have calibration data in normal data stream ?
- Is power pulsing compatible with detector commissioning
  - Can we afford to use only 1 % of the cosmic tracks if not in beam ?
  - How will the commissioning been done ?
- How to interface with the machine
  - Need many machine parameters in data stream
  - Do we need machine parameters between trains (or any other data)?

# Conclusion



- Although event building and backend DAQ is not urgent we
  - need to learn how to profit best from new technologies
  - need event building for test systems with 'ILC like architecture'
  - need to define standards and common interfaces for different detectors
  - good examples : EUDET (FP6), still to be shown for EUVIF (FP7)
- Newly developed readout systems get closer to reality
  - make sure the readout interfaces do not diverge
  - encourage even more R&D groups to use a common interface
  - address further common issues (calibration, commissioning, data formats)
  - need to agree on compatible answers to the previous questions



# Thank You for Listening



Hope to see many of you at the next DAQ sessions !

(likely to be at the ECFA workshop in Warsaw)