



Introduction to the DAQ

Bill Lee

DAQ Shifter Tutorials
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Control Room Shifters

- There are six shifters that are required to be on shift during data taking.
 - Captain – In charge of making decisions that could effect data taking.
 - Three Detector Shifters
 - CFT
 - SMT
 - CALMUO
 - GM – Watches data for irregularities
 - DAQ
- In addition, the OPs shifter looks after general operations



DAQ Shifter

- The DAQ shifter is the key to D0's ability to record quality data.
- It is his job to make sure that the DAQ system keeps data flowing.
 - If data flow stops, the DAQ shifter analyzes the problem and solves it directly or directs it to the appropriate detector shifter.



Shifts

- 3 shifts per day
 - Owl (0:00 – 8:00)
 - A Monday owl shift begins before the Monday daq shift.
 - Day (8:00 – 16:00)
 - Eve (16:00 – 24:00)
- You should arrive 15 minutes early to your shift to find out issues of the previous shifts.
- It is best to have read the run plan and the log book before arriving to your shift.



DAQ Schedule

- There are three training (buddy) shifts
 - If you are not ready after training, more can be scheduled.
 - Additional training is available from shifter tutorials.
- DAQ shifts are a total of six weeks.
 - One week on then two weeks off
 - Rotate through DAY, EVE and OWL



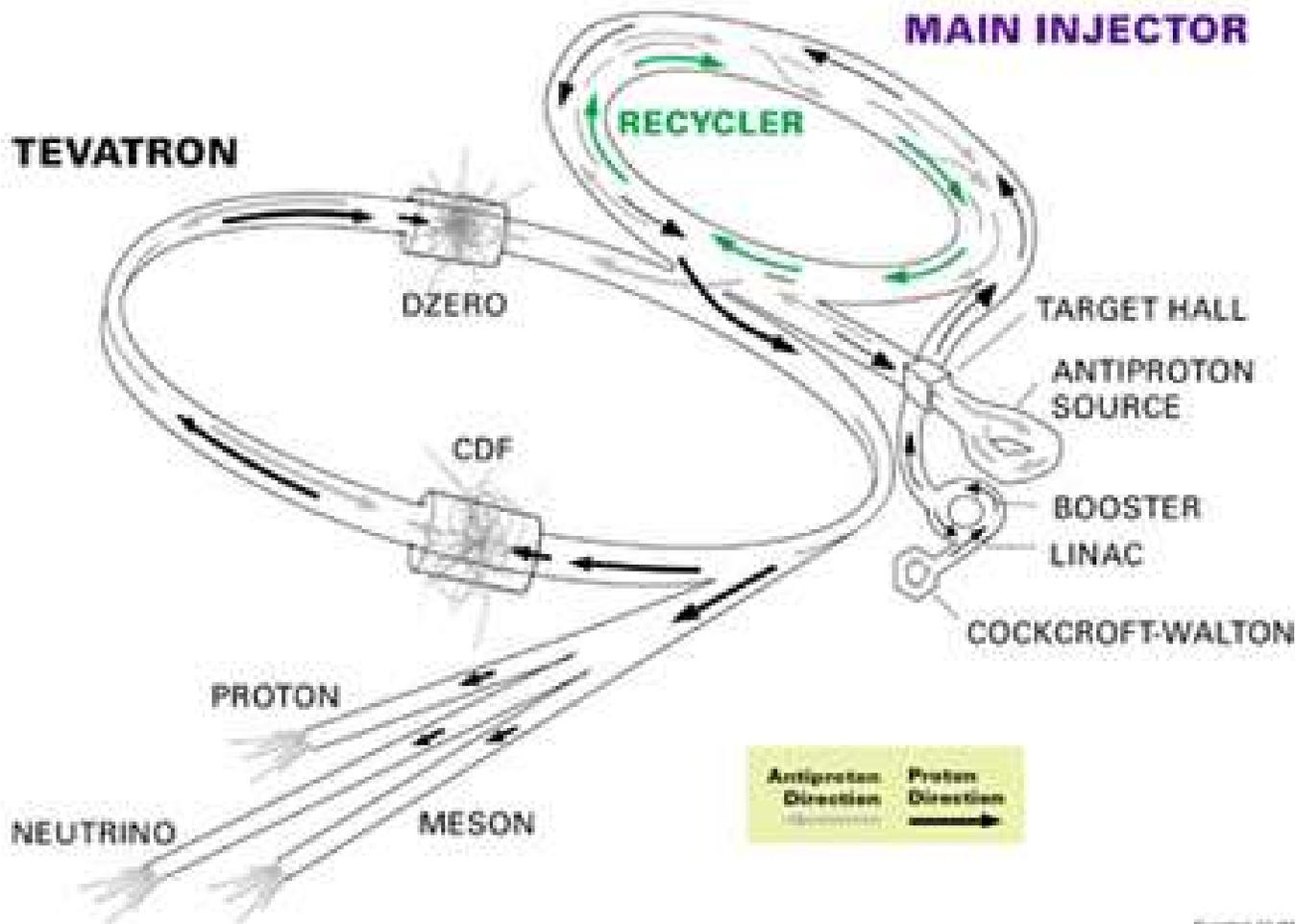
Safety Training

- The DAQ shifter and the OPs shifter are required to be around 24 hours per day, so they need to be trained to make a controlled access. This requires:
 - D0 Hazard Awareness
 - You should already have this.
 - LOTO Level 1
 - Offered occasionally, takes 15 min, contact Eric McHugh.
 - Radiological Worker
 - Through ES&H, 5 hours, offered ~weekly
 - Controlled Access
 - Through ES&H, 2 hours, offered ~weekly



The Tevatron

FERMILAB'S ACCELERATOR CHAIN

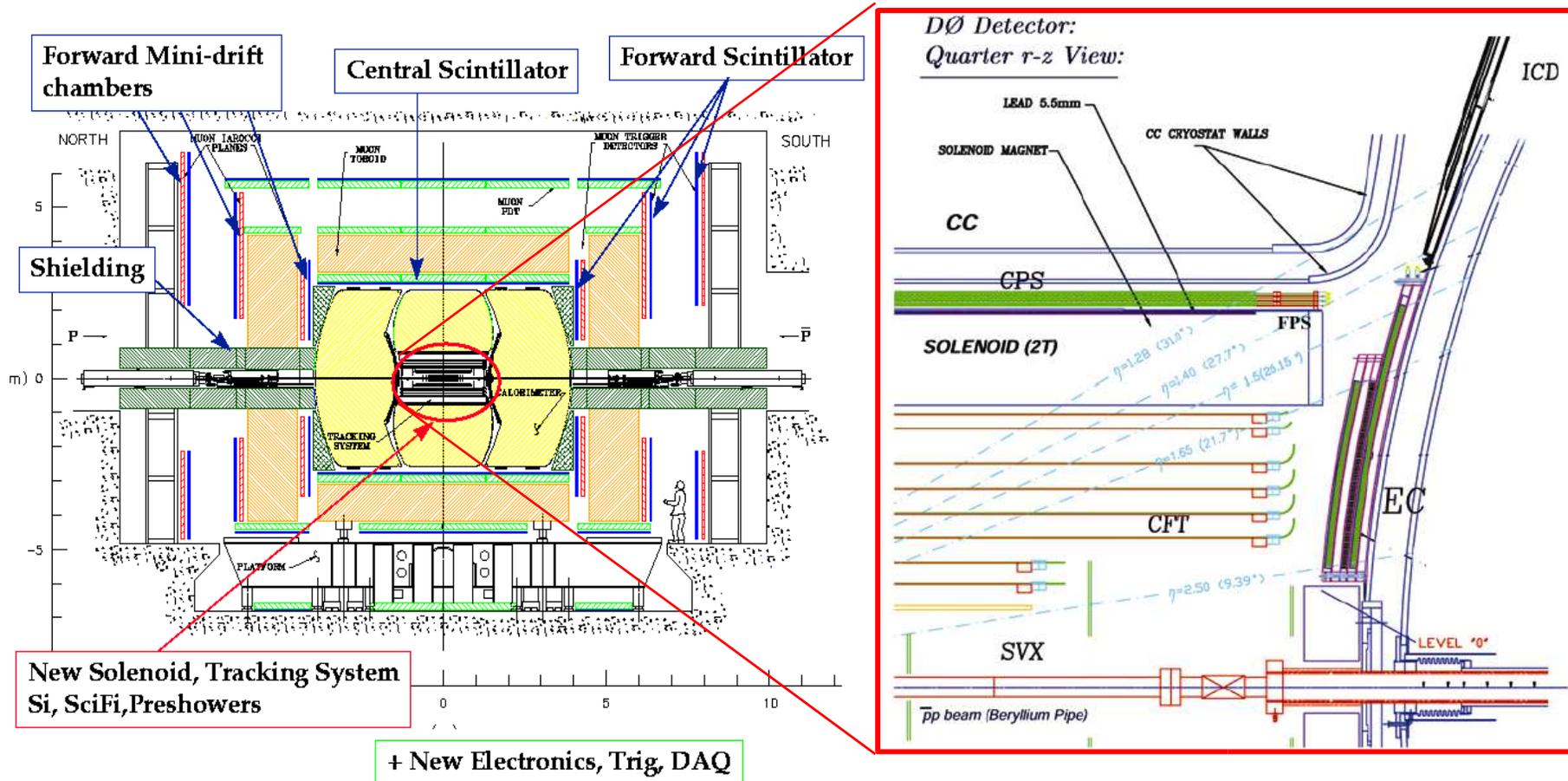


Terms to know:

- Stack
- Accumulator
- Stash
- Recycler
- Store
- Luminosity



The D0 Run II detector



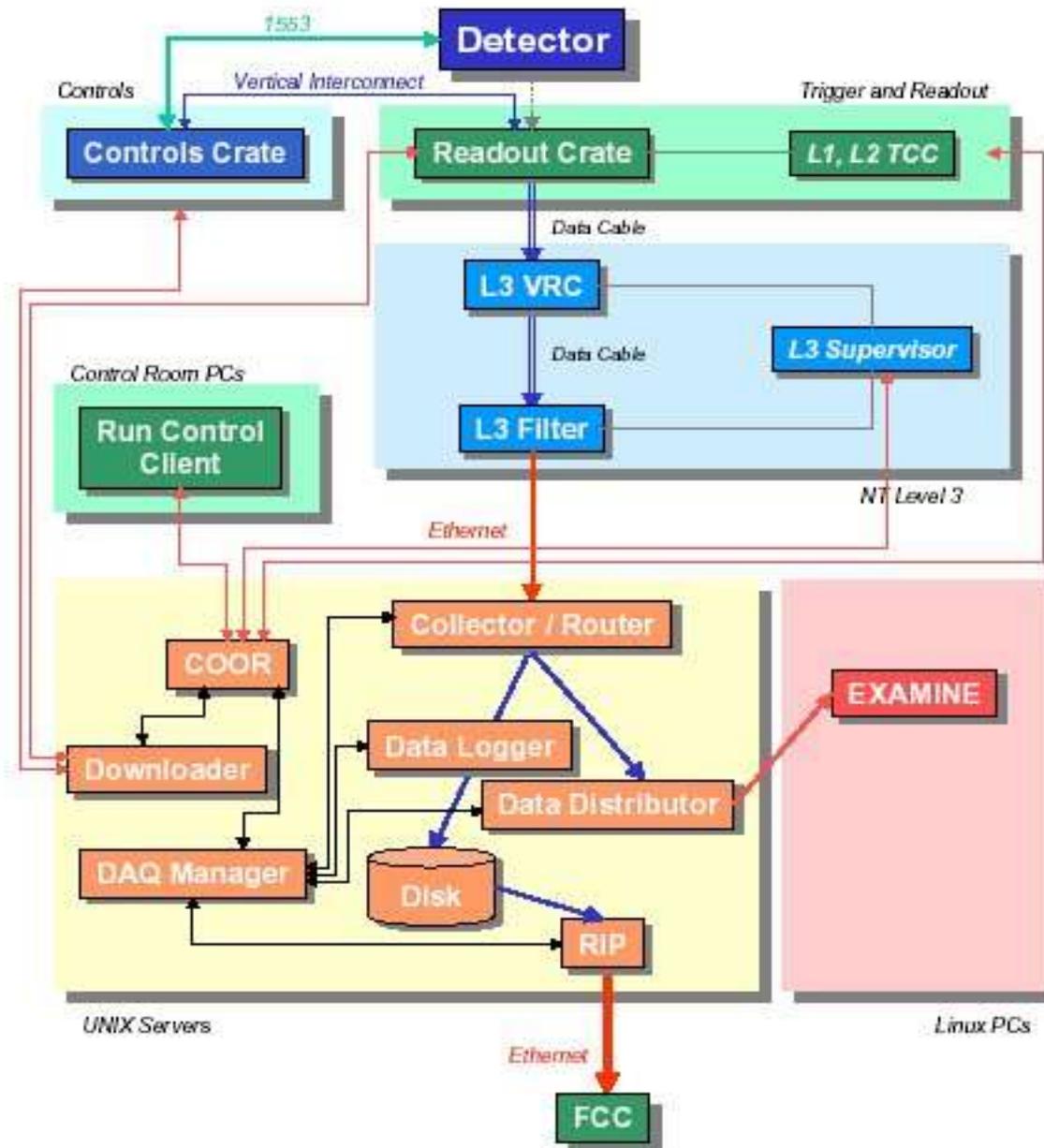


DAQ

- Many parts
 - Controls
 - Triggering
 - Readout
- It all has to work together.

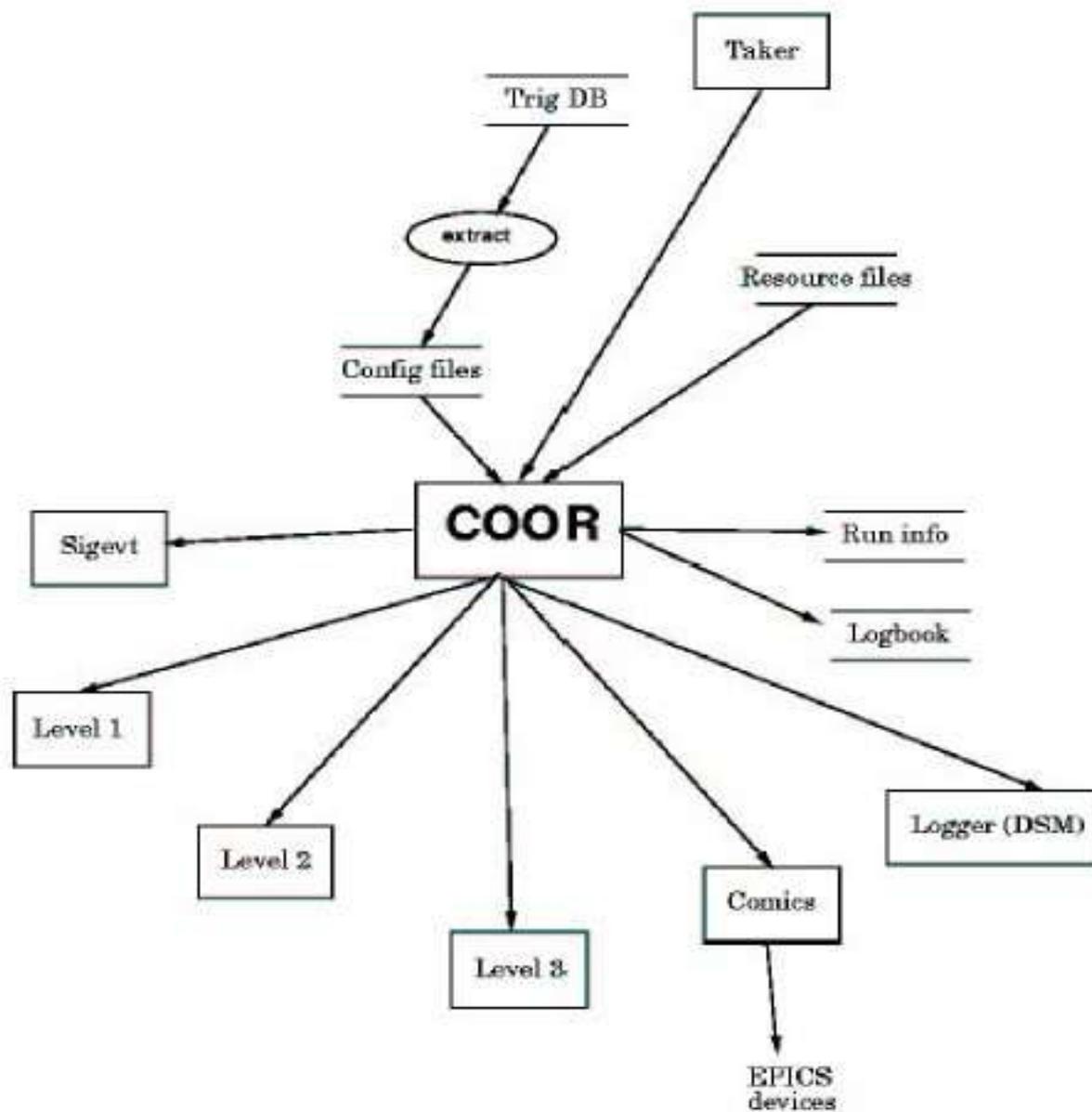


Run Control and Configuration





COOR Information Flow



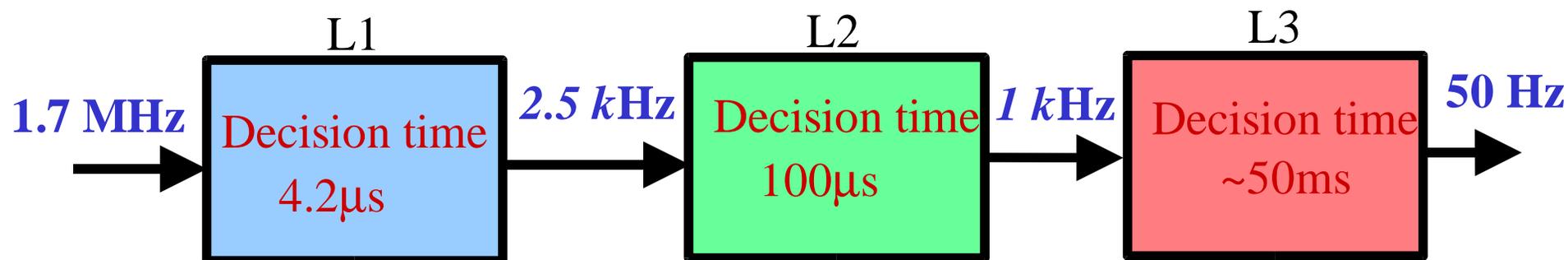


The D0 Trigger System



But data acquisition rate is limited to 50 Hz

⇒ **3 Level Trigger System**



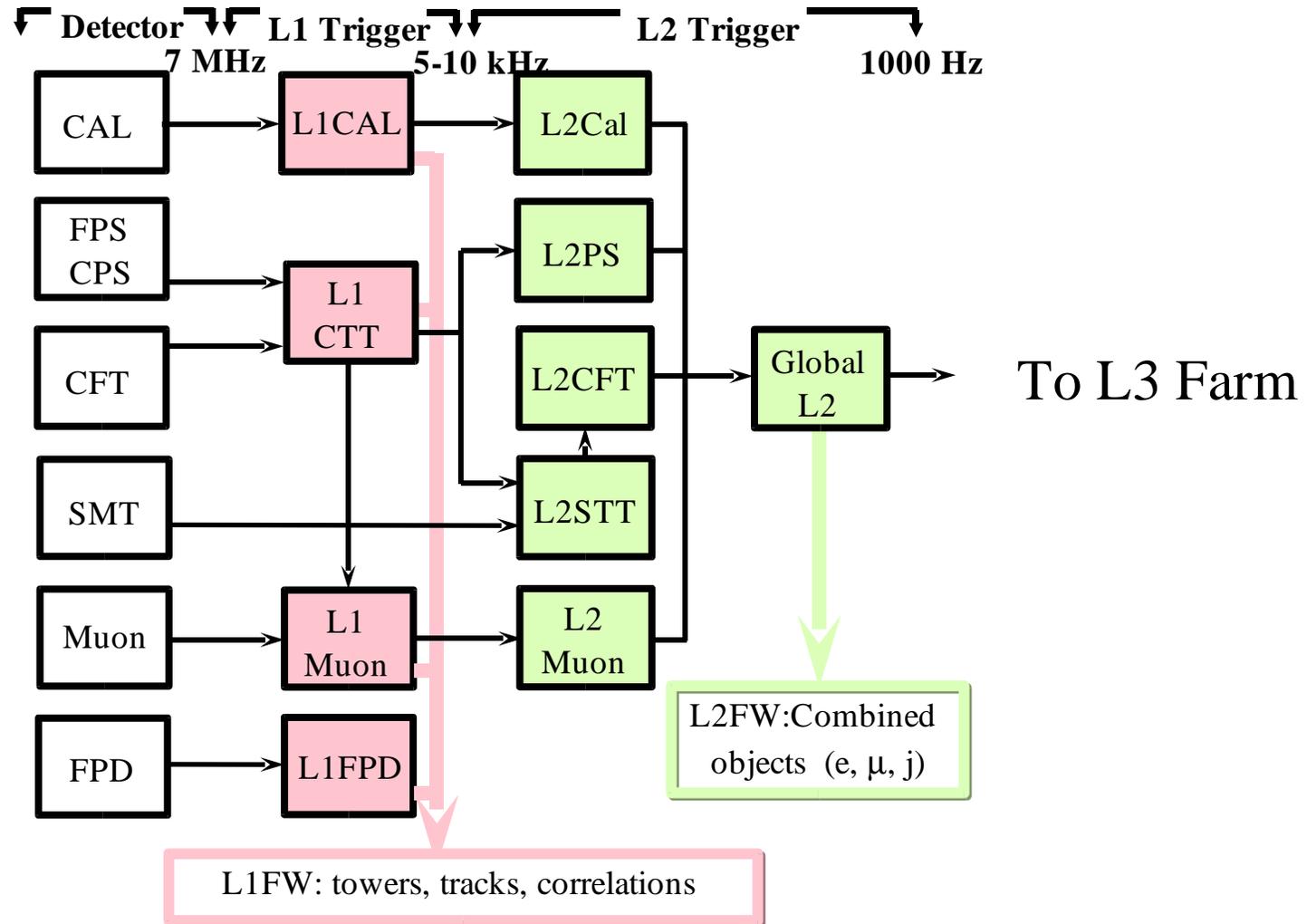
- Hardware based
- Simple Signatures in each Sub-Detector

- Software and Firmware based
- Physics Objects e, μ, jets, tracks

- Software based
- Simple versions of reconstruction algorithms



The D0 Trigger - L1/L2





A Typical Readout Crate

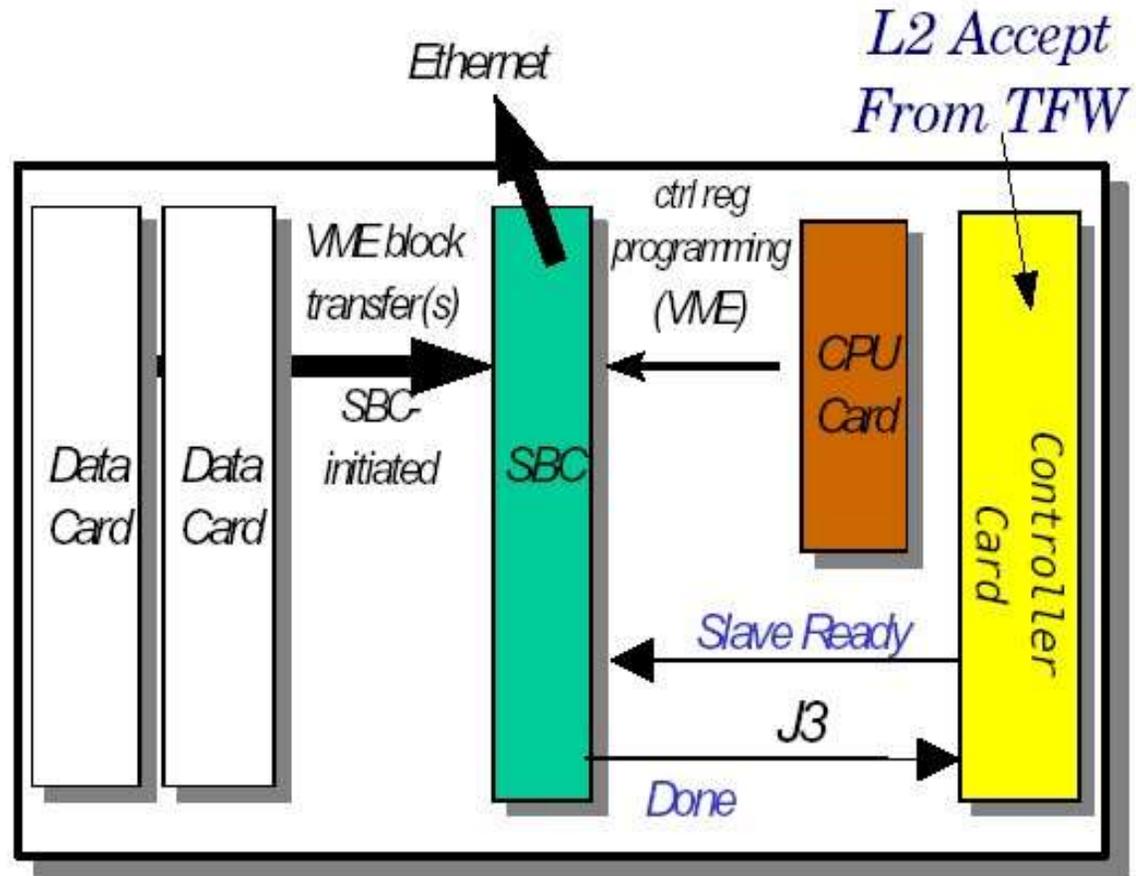
After a L1 accept the data is stored in the Input Buffers of the crate.

Input buffers full -> L1 Busy

On a L2 Accept the data is moved to the Output buffers and the SBC is told the data is ready to be moved to L3.

Output buffers full -> L2 Busy

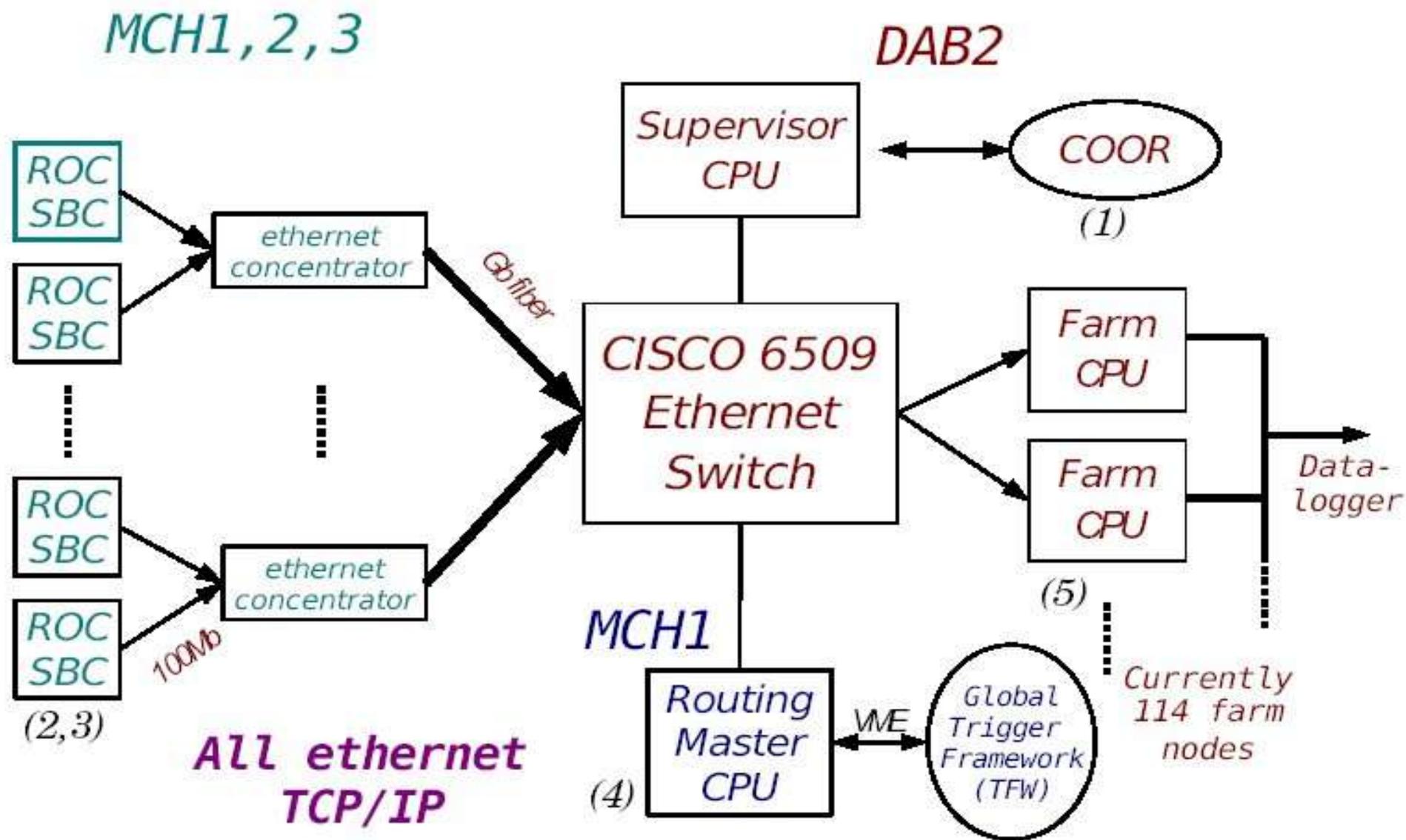
On a L2 reject, the data is discarded.



- Data card, CPU, and Controller cards specific to crate type



L3 DAQ





More information

- The DAQ shifter page has a lot on information:
http://wwwd0online.fnal.gov/www/groups/daq/daq_main.html
 - Buddy Guide
 - Run Plan
- Feel free to contact me <bill1@fnal.gov> if you have any questions.
- I will try to keep the DAQ shifter page up to date but let me know if there are any errors.