DL DAQ/SlowCtrl

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Status

- Thanks to Laura and Kate for building the computers!
- 2 servers, 2 clients installed

Things I learned

- Don’t buy PC in parts if you don’t control the shopping cart.
- No ASUS

Server 1

- Data storage:
  - home and software from SSD (manually mirrored to server 2). Ca 4TB space (also shared with slow ctrl database)
  - data: 9 disks, raid z2, one hot spare -> about 100TB space
- Database server for slowctrl
  - Other slowctrl in preparation, see below
- LDAP for users (use ldapadduser to make new ones)
- SLURM controller
- Will also install DHCP/BOOTP/TFTP server for boot of VME and others as need
  - First have to finalize network, don't want to run in TRIUMF network.

Server 2

- No disks. Backup hardware for server1.
- Backup of ssd from server 1 (ZFS snapshots).
- slurm worker node

Clients

- About half for slurm, rest for interactive use
- One for slow ctrl, one for online data analysis

Software

- installed root, Xqilla, Geant4 in /software (mounted on all)
- Every user should install their own fork of the analysis software using theses installs
- (Might need to modify compile options to make binary work on all computers.)
- Will install MIDAS? Would be nice to teach MIDAS to write cooker-compatible root files directly.

SLURM

- Job management
- We have 16 (server1) + 32 (server2) + 2x10 (clients) slots. May need to modify
- Don't forget to tell slurm how much memory your job needs
- Not fully tested yet

Slow Ctrl

- Will install system used at OLYMPUS and MUSE (with some upgrades)
- How do I get EPICS information from TRIUMF?
  - Which channels
  - Who do I need to talk to?
- Are you aware of things you want monitored for your detectors/components? Let me know!

Electronics layout/ cables

- Upstairs:
  - 1 VME crate, MPD4 with long cables to APV boards downstairs
    - MK, do you have the cables? How are APVs powered? Do we have the new power supplies?
  - TDC/TRIGGER
    - How about power?
  - Magnet power supplies
- Downstairs:
  - Hall probes

Final position of servers?

Would like to establish private 10 gig capable network between servers.

- Ideal position on the roof, in climate controlled room
  - Connect:
    - Servers
    - Power supplies
    - MPD4
    - TDC/TRIGGER
    - Possibly: patched through to clients (but they are only 1 gig, so not 100% needed)

Some more DAQ considerations

- Newest GEM frontend code allows for essential "streaming" readout.
- But MUST limit amount of events-in-flight
- Two problems:
  - How to synchronize TDC/TRIGGER with GEM?
  - How to pace TDC/TRIGGER

Sync: Suggestion

- MPD4 allows APV clock to be inserted on front board -> this makes counting clocks reliable
- MPD4 can timestamp events
  - Record clocks since start when triggered
    - not tested. In MUSE, one seems to have a flacky bit.
  - Record trigger phase relative to clock.
    - Course mode found non-working
    - Fine-mode not tested

Even without phase, can get 25ns time alignment. That should be good enough (compare to 2kHz trigger rate)

Pacing: Suggestions

- TRIGGER needs to have small, fixed, hold-off time – minimial time between triggers. Say 1us
- MPD4 has no output, can't send "busy" by it's own. Readout is aware of triggers only by availability of data.
- Two ideas:
  - Add register module to VME that signals busy to TRIGGER if too many events in flight
  - This is possibly slow
  - Token borrowing. Everytime the readout reads an event, it sends off a packet (with a serial + timestamp) to the trigger. Trigger only sends out a max nr of triggers ahead of returned token.
- Depends on capabilities of TDC/TRIGGER electronics

Scenario for run start/run end

- TDC/TRIGGER resets internal counter, sends one trigger, and waits for the ACK back. This established deltaT between TDC/TRIGGER and MPD4
- Then TDC/TRIGGER sends up to N triggers ahead of returned serial, updating the serial every time a packet is received
- At end of run, TDC/TRIGGER stops issuing triggers, but waits until all issued triggers are acked.
- Should inspect returned times and compare with expected times. This detects missing / spurious MPD4 triggers