# L1Calo State Transitions

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17 May 2006

- Introduction
- Configure
- Connect
- Prepare for Run
- Others

# L1Calo: Overview

- Hardware
  - 17 crates: 1 * TTC, 2 * ROD, 8 * Preprocessor, 4 * Cluster processor (CP), 2 * Jet/Energy processor
- Use of transitions
  - Presently use both existing load and configure
  - Load: reset hardware/firmware and clocks
  - Configure: download parameters and check connections between crates
  - Could remap to new configure+connect
  - Or use old load+configure as internal substates of new configure transition and move connection check to new connect transition

# Transition Actions: Load

- Configure (part 1, "load")
  - Load hardware description (presently OKS), parse crate setup and all connectivity (from COOL later?). Currently ~1s (small system), more with final system
    - At present allow IS flags for quick enable/disable of modules
  - DB access done in singleton once for all RCD modules
  - Reset modules, reset clocks, wait for internal synchronisation. Wait for firmware to load. Check on board firmware is correct version, if not download latest firmware (tens of seconds/module).
    - Resets and waits might benefit from multithreading?
  - If firmware stored in COOL could be >10Mbyte/crate
  - Presently 1-10s per module (without firmware download), but very likely this can be optimised.

# Transition Actions: Configure

- Configure (part 2, "configure")
  - Load standard settings. These might be run type dependent.
    - At present we have several sets of simple run types all defined in OKS DB and read together
    - In future expect more complex descriptions in CORAL.
    - In test systems, run type change needs reload, but might not be required in stable final system
  - Load calibration data (now from OKS, but will be from COOL/CORAL). Worst case may be ~1MByte/crate. Typically ~50kByte/crate.
  - Downloading settings should be fast (<1s/module) so this phase probably dominated by DB access time

# Transition Actions: Connect/Prepare

- Connect
  - If we reorganise present load and configure, then:
  - Check connections successfully established between crates, reset error counters
  - No new DB access. Should be fast (<1s)?
  - Could use disconnect/connect to reset links
    - Though at present this needs another load transition
- Prepare for Run
  - Might want to reload trigger thresholds (~1s)?
  - Possible reaccess of trigger menu DB
    - However it is envisaged that values of thresholds dont change during a fill, only prescales which is done at the CTP and doesnt affect L1Calo settings

# Transition Actions: Others

- Other transitions
  - StartTrigger: used to remove busy. Also to start set of calibration/test triggers
  - No use of checkpoint yet
  - Do use user broadcast commands for calibration/test (but no additional DB access)
  - Unload/unconfigure closes DBs: reload cycle will reread DBs completely, ie no update yet
- During the run
  - At present no DB changes and no response to any other asynchronous changes
  - But envisage monitoring and response to hot cells