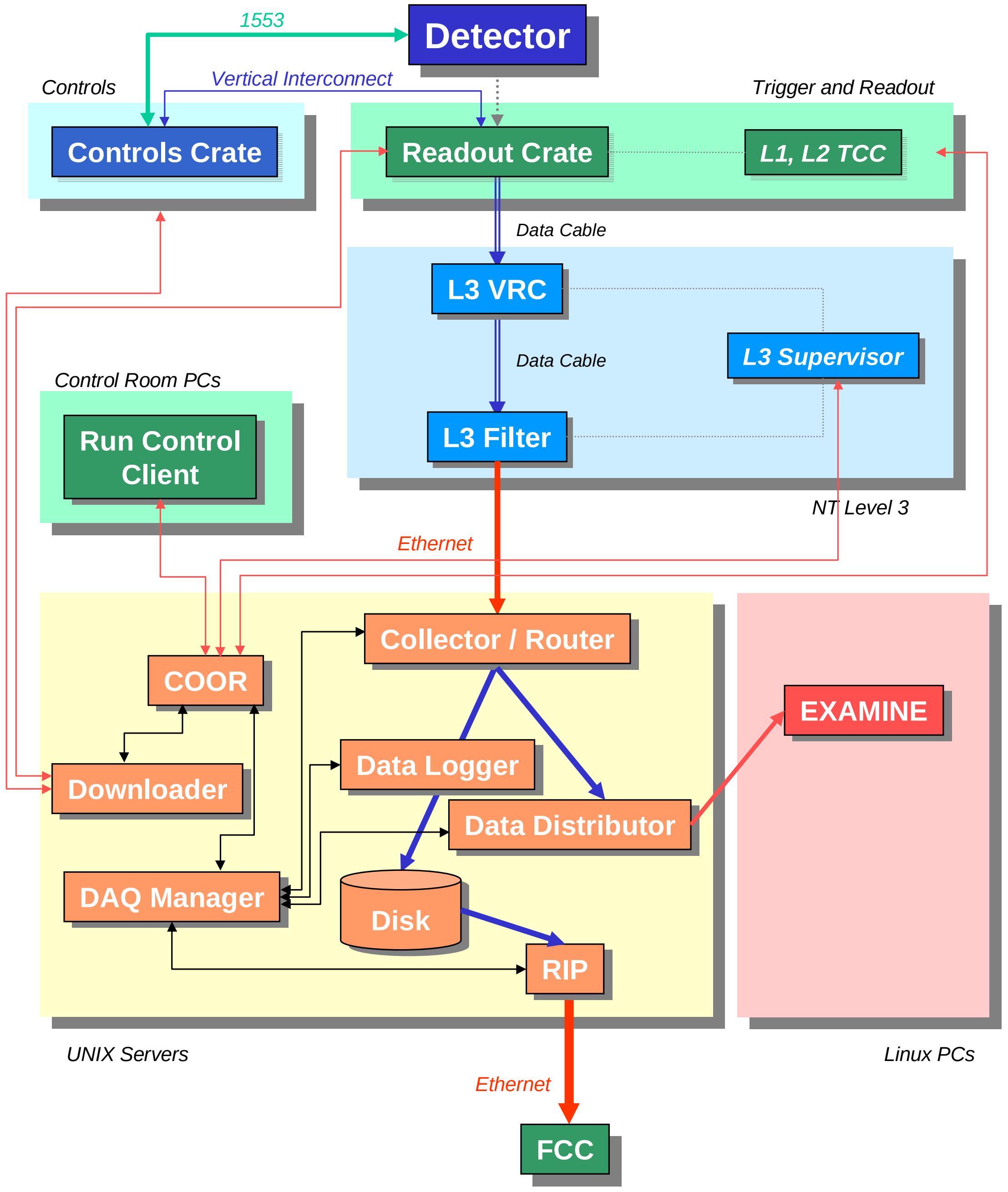
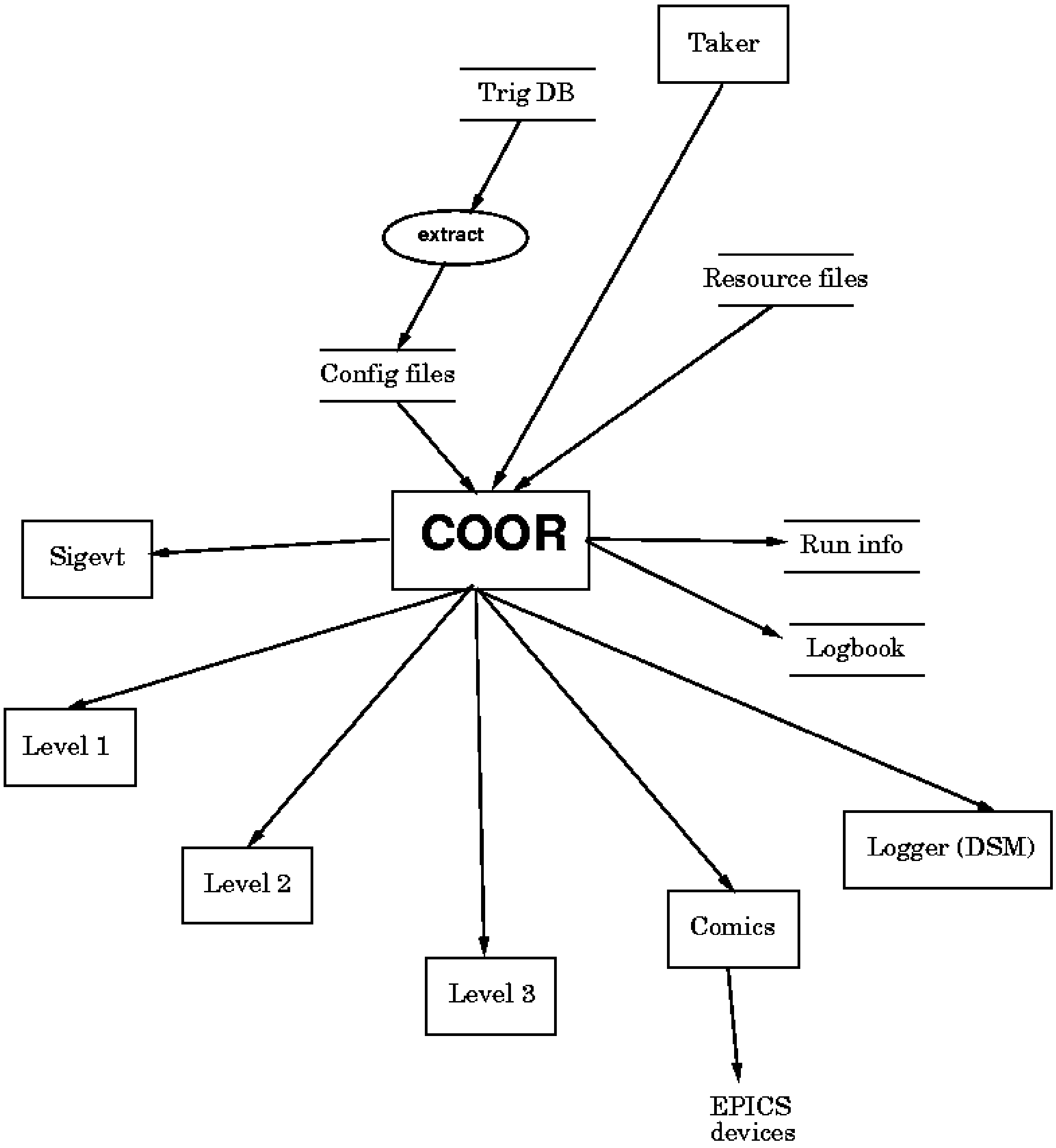
COOR

- Central "coordination" process.
- Performs run control functions:
  - Users talk to COOR to use the system.
  - Configuration and run transition requests go through COOR.
  - COOR sends commands to the other components of the system.
  - COOR maintains a model of the current detector configuration.
  - Users can allocate individual pieces of the detector for readout and control.
    * COOR ensures that requests don't conflict with each other.
  - COOR steps the various pieces of the system through run transitions.
  - Maintains the name database.
- Full documentation:
  `http://www-d0.fnal.gov/d0dist/dist/packages/coor/devel/doc/coorover.ps`

Run Control and Configuration



COOR information flow



- Processes to which COOR sends information are called *downloaders*. COOR initiates these connections. Processes that connect to COOR to request services or information are called *clients*.

Starting and stopping

- Setup:
  - `setup d0online`
- Start:
  - `start_daq coor`
- Stop:
  - `stop_daq coor`
- Coor usually runs on `d0olc`. It appears in `ps` listings as a process running `coormain.x`.
- Log files:
  - `/online/log/coor/*.out`
    - Standard output/error. Stack tracebacks will appear here in the event of a crash.
  - `/online/log/coor/YYYY/MM/*.log`
    - Daily log files. Contains detailed tracing of activities.

Control scripts

- Reinitialize:
  - `initcoor`
    - (Will only work if no client has allocated resources.)
  - `initcoor --force`
    - (Force all clients to give up resources they've allocated.)
  - Drops and reestablishes connections to all downloaders. Preserves all clients connections. Rereads parameter and resource files.

- Request SCL init:
  - `sclinit`

- Reinitialize L1 framework:
  - `initl1fw`
  - (No need to redo downloads.)

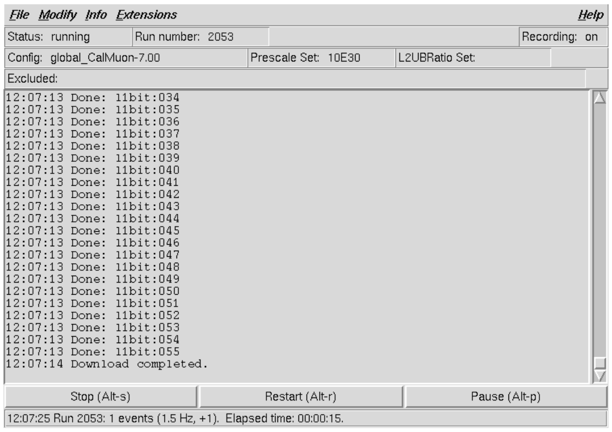
- Declare store beginning and end:
  - `store_begin` *store-number*
  - `store_end`

Reports

- Use ‘`coorinfo` *type*’ to get information about:
  - `clients` — All connected clients.
  - `crates` — All crates owned by some clients.
  - `downloaders` — Status of COOR’s connections to all downloaders (and SES).
  - `itc` — All of COOR’s ITC connections.
  - `l1bits` — All defined L1 trigger bits.
  - `l1egs` — All defined L1 exposure groups.
  - `ll2bits` — All defined L2 trigger bits.
  - `l2tools` — All defined L2 tools/filters.
  - `l3bits` — All defined L3 trigger bits.
  - `l3clients` — All defined L3 client objects.
  - `store` — The current store.
  - `streams` — All defined streams.

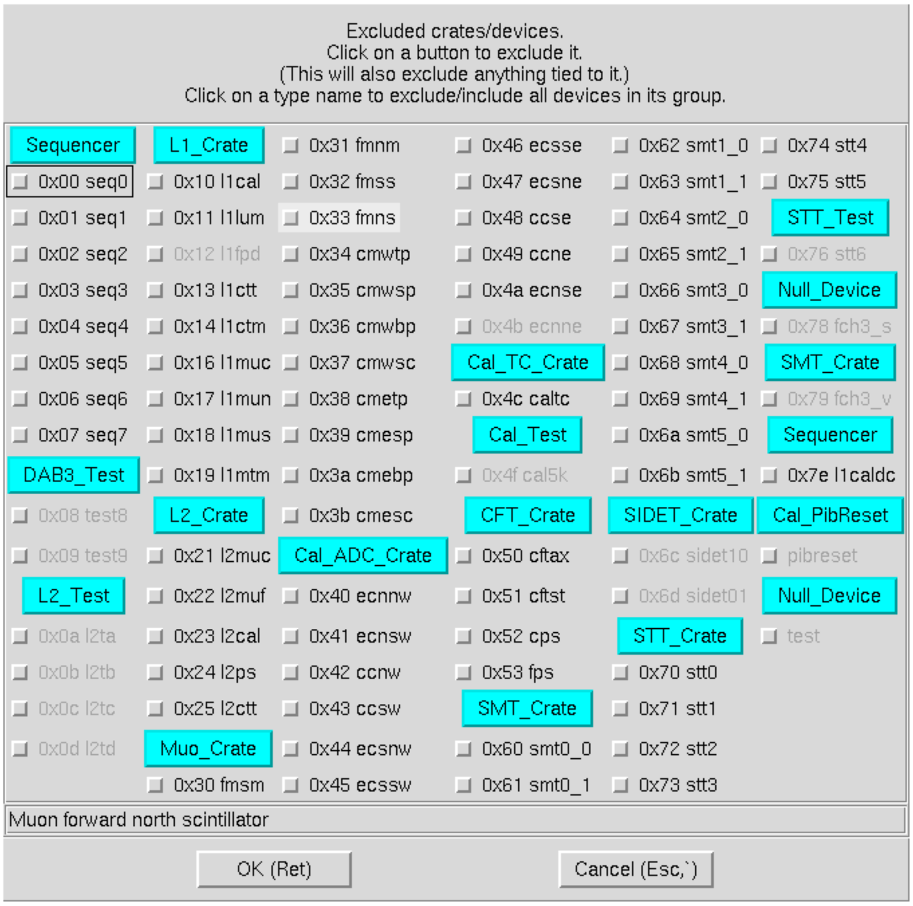
Taker

- Primary user interface for controlling COOR.
- Start with '`taker`'.



- Modify menu:
  - `Change Trigger...`
  - `Free Trigger`
  - `Revalidate`
  - `Invalidate...`
  - `Recording`
  - `Change Prescales...` or `L2UBRatios...`
  - `Prescale Set...` or `L2UBRatio Set...`
  - `Run Parameters...`
  - `Reenable auto-disabled triggers`
  - `SCL Init`
  - `Exclude Crates...`

Crate Exclusion



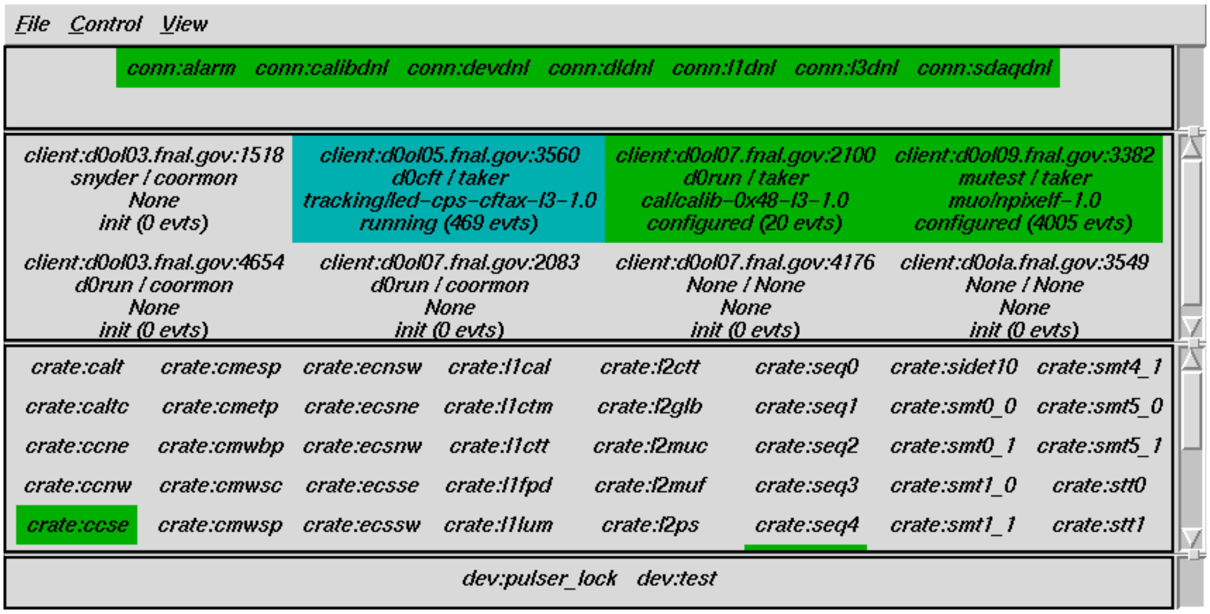
- Crates may be selectively excluded from the run without having to redo the entire download.

- With no configuration loaded, can mark any crates as excluded.

- With a configuration loaded, can only exclude/unexclude crates that that configuration uses.

Coormon

- Displays current state.
- Use View menu to control what's displayed.
- Click on an item to display internal attribute values.



- Control menu. (Caution: errors not reported.)
  - Flush log
  - Reconnect
  - SCL init
  - Force timeout

Coormon color scheme

- Connections:
  - Green — Connected.
  - Red — Not connected.
  - Yellow — Waiting for reply.
- Clients:
  - Neutral — Connected, but no configuration loaded.
  - Green — Configuration loaded.
  - Cyan — Running.
  - Black — Paused.
  - Yellow — Transition in progress.
  - Red — Cleaning up after abort or disconnect.
- Items:
  - Neutral — Not allocated.
  - Green — Allocated and valid.
  - Red — Allocated and invalid.
  - Yellow — Download pending.

Name Service

- COOR also maintains a database of name/value pairs.
- Serves the d0online names database (server network addresses).
- Can be used to send time-dependent information to the trigger system.
  - Example: Sending vertex information to STT.
- Can be used to selectively disable L2 inputs.
- May be freely used by detector groups.
- Names are hierarchical, separated by periods.
  - Example: `.l2_stt_beam_pos.bar0.phi`
- Names may also have properties (additional name/value pairs) associated with them.
- Property settings may be used to write name server information into the brun/erun files.
- Use `nv_editor` to browse or edit name database. (Should only be modified by experts.)

Detector model

- Detector modeled by a collection of *objects*, with names of the form *class:obj*.
  - Some are permanant, some are created as needed.

- Types of objects include connections, clients, and *items* (everything else).

- Items have *attributes*. (In the coormon display, these start with ‘`d_`’ or ‘`i_`’.) Object attributes are specified when a configuration is loaded.

- Items can be owned by clients. An item may be owned by multiple clients, provided they specify the same attribute values. A client may allocate an item *exclusively*, meaning no other client can allocate it. Some items are always allocated exclusively (e.g., L1 bits).

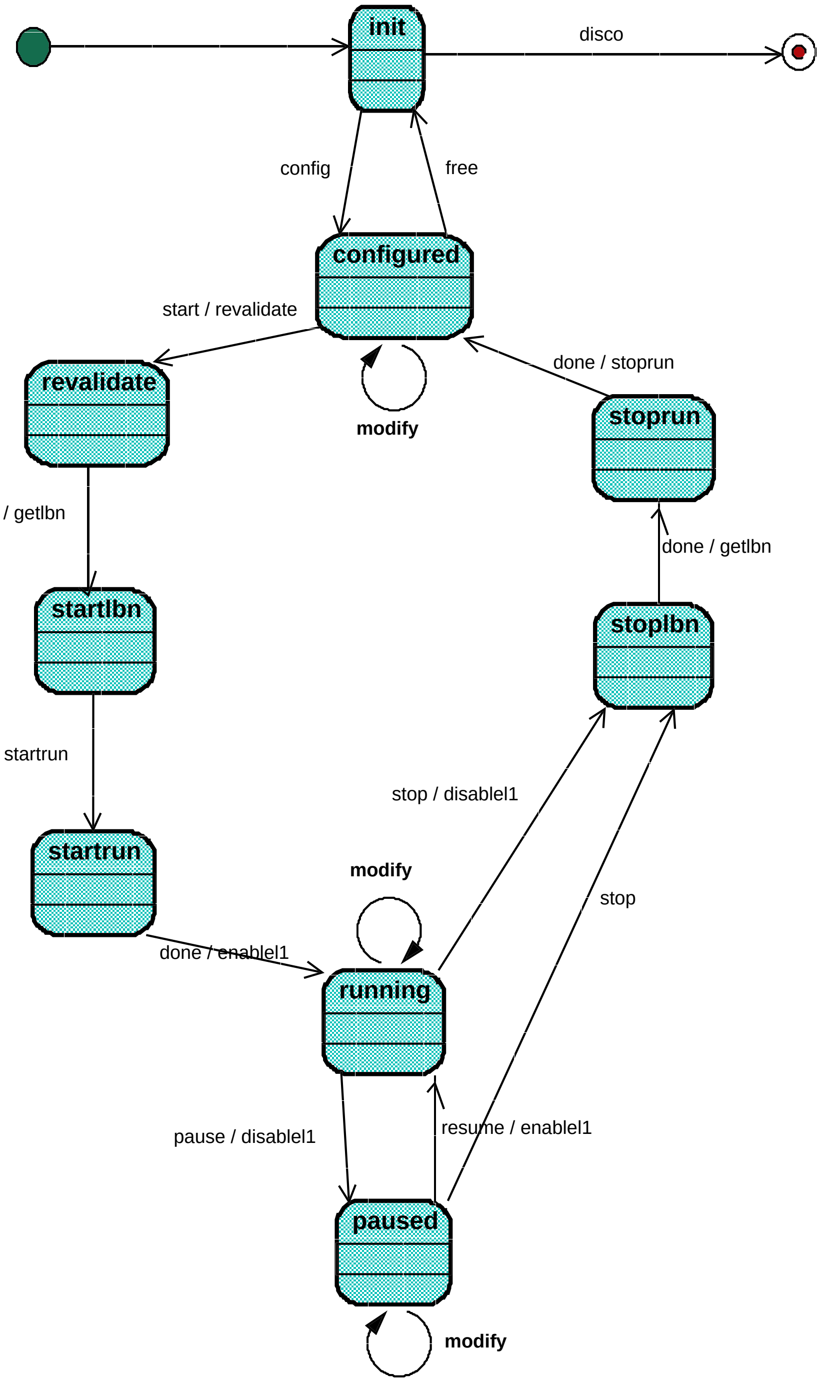
- Owned item states:
  - Valid — Item has been programmed to the requested state.
  - Invalid — Item is not known to be in the requested state; a download is required.
  - Downloading — A download for this item is pending.

Item validity

- To start a run, all items owned by a client must be valid.
- When a start run is requested, COOR attempts to make all invalid items owned by the client valid.
- To force this without starting a run, select 'Revalidate' from the taker menu.
- Use the 'Invalidate' item from the taker menu to inform coor that an item needs to be redownloaded.
- If a downloader connection breaks, the items it manages are marked as invalid.
  - Implies that, for example, when L3 is reset, you don't need to redownload the configuration — just try to start it again.

Run Transitions

- Simplified client state diagram.



Coortalk

- COOR/client communication uses text commands.
- Coortalk allows sending those commands directly.
- Start with '`coortalk`'. Exit with Control-D.
- Some useful commands:
  - `help` — Get a list of commands.
  - `info` *type* — As earlier.
  - `disconnect` *dnl*... — Drop connection to *dnl*.
  - `reconnect` *dnl*... — Reconnect to *dnl*.
  - `force_invalidate` *pattern* — Invalidate items matching RE *pattern*.
  - `scl_init` — Generate a SCL init.
  - `timeout` — Force a download timeout.
  - `broadcast` *text* — Send a message to all clients.
  - `exitcoor` — Tell coor to exit.
  - `force_free` *run/client nb* ... — Force clients to give up resources.
  - `force_pause` *run/client nb* ... — Pause runs.
  - `force_stop` *run/client nb* ... — Stop runs.
  - `reinit` — Reinitialize coor, but only if there are no owned resorces.
  - `force_reinit` — Reinitialize coor.

Parameters file

- `/online/data/coor/coor.params`
- Read during startup and reinitialization.
- Taker, coormon, coortalk read it too.
- Format is Python source.
- Don't change unless requested by experts.
- Host/port addresses used by coor now come from `d0online_names.py`.
- Other file paths set here.
- Taker dialog formats defined here.

Other data files

- Resource file.
  - `/online/data/coor/resources/coor_resources.xml`
  - Read during startup and reinitialization.
  - Describes the available detector resources.
    - Assignment of names to crates, L1 terms, etc. is done here.
  - Don't change unless requested by experts.
  - Other files in this directory define L1 trigger manager terms and L2 resources.
- Trigger configurations.
  - Live under `/online/data/coor/configurations`.
  - Canned configurations that can be selected from taker.
- Current run number.
  - `/online/data/coor/runnumber`
  - Don't change!
- Name service database.
  - `/online/data/coor/name_server_db.dat`
  - A Python pickle file.
  - Should normally never need to change this by hand.

Other Output Files

- Brun/erun/rrun files:
  - `/online/data/coor/brun`
  - COOR writes files in here on run transitions.
  - Files read by `rungrabber` and entered into the database.

- Logbook spool directory.
  - `/online/data/coor/elog_spool`
  - COOR writes files here temporarily, pending transmission to the logbook server.
  - Other processes can also write files here to be sent to the logbook. (Actual transmission may be delayed by up to 10 minutes.)

Online simulator

- Can be used to check trigger configurations.

- Run with

  - `coorsim_onl` *configuration*

  - *configuration* can be a file in the configuration tree, or a path to a file somewhere else.

- Will output the text that COOR would send back to Taker.

- Will create in the current directory a bunch of files containing the text that COOR would send to the downloaders, as well as logging information.

Reinits, etc.

- Many sets of instructions tell you to free the trigger list or reinit COOR when you don't really need to.
- Should only need to reinit coor the parameters file or a resource file has changed.
- (Other than general cleanliness before a store...)
- To force reinitialization of one of the processes COOR talks to, start `coortalk` and:
  - `disconnect` *dnl*
  - `reconnect` *dnl*
  - No need to free the trigger configuration — the necessary commands will be automatically resent when needed.

Other hints

- If COOR is taking a long time to respond, look on the first row of coormon. If something is yellow, that means COOR is waiting for a reply from that process — so if it stays yellow for a long time, that process may be having problems. Check its log file, etc.

- COOR will timeout after one minute if it doesn't get a response. However, there's often cleanup that has to be done afterwards that involves sending more messages — for which COOR will also wait a minute before responding. Thus, if something isn't responding, COOR can sometimes take a couple minutes to complete an operation. If you know that there is no point in waiting (because whatever COOR's waiting for will never complete successfully) you can try connecting with coortalk and issuing 'timeout'. That will force coor to time out immediately.

- If there is no apparent reason why COOR isn't responding, check the .out file in `/online/log/coor`. If there's a Python stack traceback there, COOR will need to be killed and restarted.

- Let me know if you have to kill COOR because it's misbehaving.