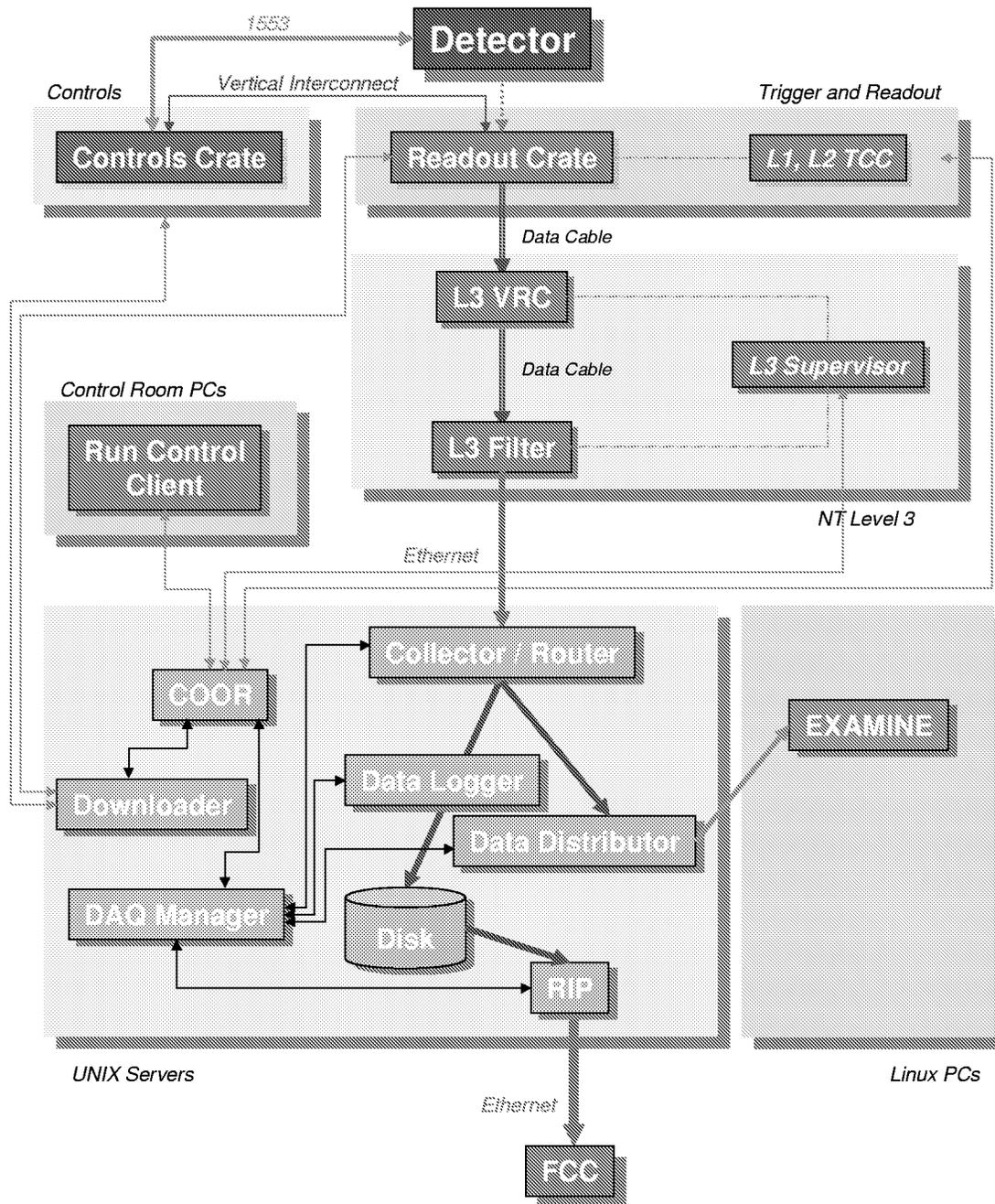


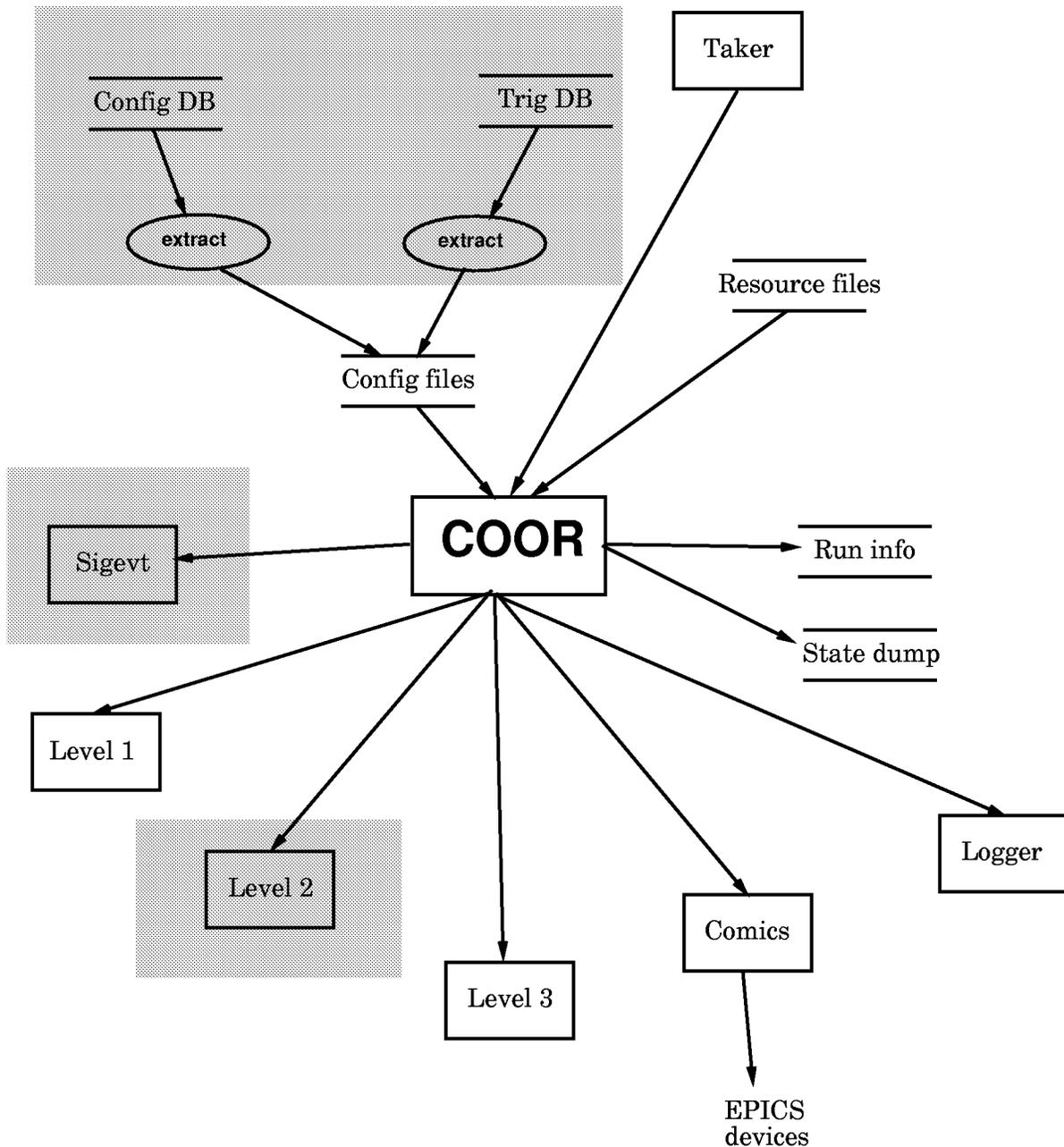
COOR

- 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.
- 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 `d0o1c`. 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.
 - `l3bits` — All defined L3 trigger bits.
 - `store` — The current store.
 - `streams` — All defined streams.

Taker

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

```
File Modify Info Extensions Help
Status: running      Run number: 1258      Recording: on
Config: calorimeter-1.0      Prescale Set:
Downloading.
Done: logclient:000
Done: logtriggers:000
Done: stream:001
Done: l1eg:000
Done: l1bit:000
Done: crate:ecnse
Done: l2client:000
Done: l3client:000
Done: l3l1shad:000
Done: l3l2shad:000
Stop (Alt-s)      Pause (Alt-p)
17:40:40 Run 1258: 5 events (5.5 Hz). Elapsed time: 00:01:01.
```

- Modify menu:
 - Change Trigger...
 - Free Trigger
 - Revalidate
 - Invalidate...
 - Recording
 - Change Prescales...
 - Prescale Set...
 - Run Parameters...
 - Ask Begin/End Questions
 - Reenable auto-disabled triggers

Coormon

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

File Control View

<i>conn:alarm conn:calibdni conn:devdni conn:dldni conn:l1dni conn:l3dni conn:sdagdni</i>							
<i>client:d0o103.fnal.gov:1518 snyder / coormon None init (0 evts)</i>	<i>client:d0o105.fnal.gov:3569 d0cft / taker trackingled-cps-ctax-l3-1.0 running (469 evts)</i>	<i>client:d0o107.fnal.gov:2100 d0run / taker calcalib-0x40-l3-1.0 configured (20 evts)</i>	<i>client:d0o109.fnal.gov:3392 mtest / taker muhpikett-1.0 configured (4005 evts)</i>				
<i>client:d0o103.fnal.gov:4654 d0run / coormon None init (0 evts)</i>	<i>client:d0o107.fnal.gov:2083 d0run / coormon None init (0 evts)</i>	<i>client:d0o107.fnal.gov:4176 None / None None init (0 evts)</i>	<i>client:d0o1a.fnal.gov:3549 None / None None init (0 evts)</i>				
<i>crate:calt</i>	<i>crate:cmesp</i>	<i>crate:ecnsw</i>	<i>crate:l1cal</i>	<i>crate:l2cft</i>	<i>crate:seq0</i>	<i>crate:sdet10</i>	<i>crate:smt4_1</i>
<i>crate:caltc</i>	<i>crate:cmetp</i>	<i>crate:ecsne</i>	<i>crate:l1ctm</i>	<i>crate:l2glb</i>	<i>crate:seq1</i>	<i>crate:smt0_0</i>	<i>crate:smt5_0</i>
<i>crate:ccne</i>	<i>crate:cmwbp</i>	<i>crate:ecsnw</i>	<i>crate:l1cft</i>	<i>crate:l2muc</i>	<i>crate:seq2</i>	<i>crate:smt0_1</i>	<i>crate:smt5_1</i>
<i>crate:ccnw</i>	<i>crate:cmwsc</i>	<i>crate:ecsse</i>	<i>crate:l1fcd</i>	<i>crate:l2muf</i>	<i>crate:seq3</i>	<i>crate:smt1_0</i>	<i>crate:stt0</i>
<i>crate:ccse</i>	<i>crate:cmwsp</i>	<i>crate:ecssw</i>	<i>crate:l1lum</i>	<i>crate:l2ps</i>	<i>crate:seq4</i>	<i>crate:smt1_1</i>	<i>crate:stt1</i>
<i>dev:pulser_lock dev:test</i>							

- Control menu. (Caution: errors not reported.)
 - Flush log
 - Reconnect
 - Reinitialize
 - Force reinit
 - L1FW init
 - Force timeout
 - Stop COOR

Common color scheme

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

Detector model

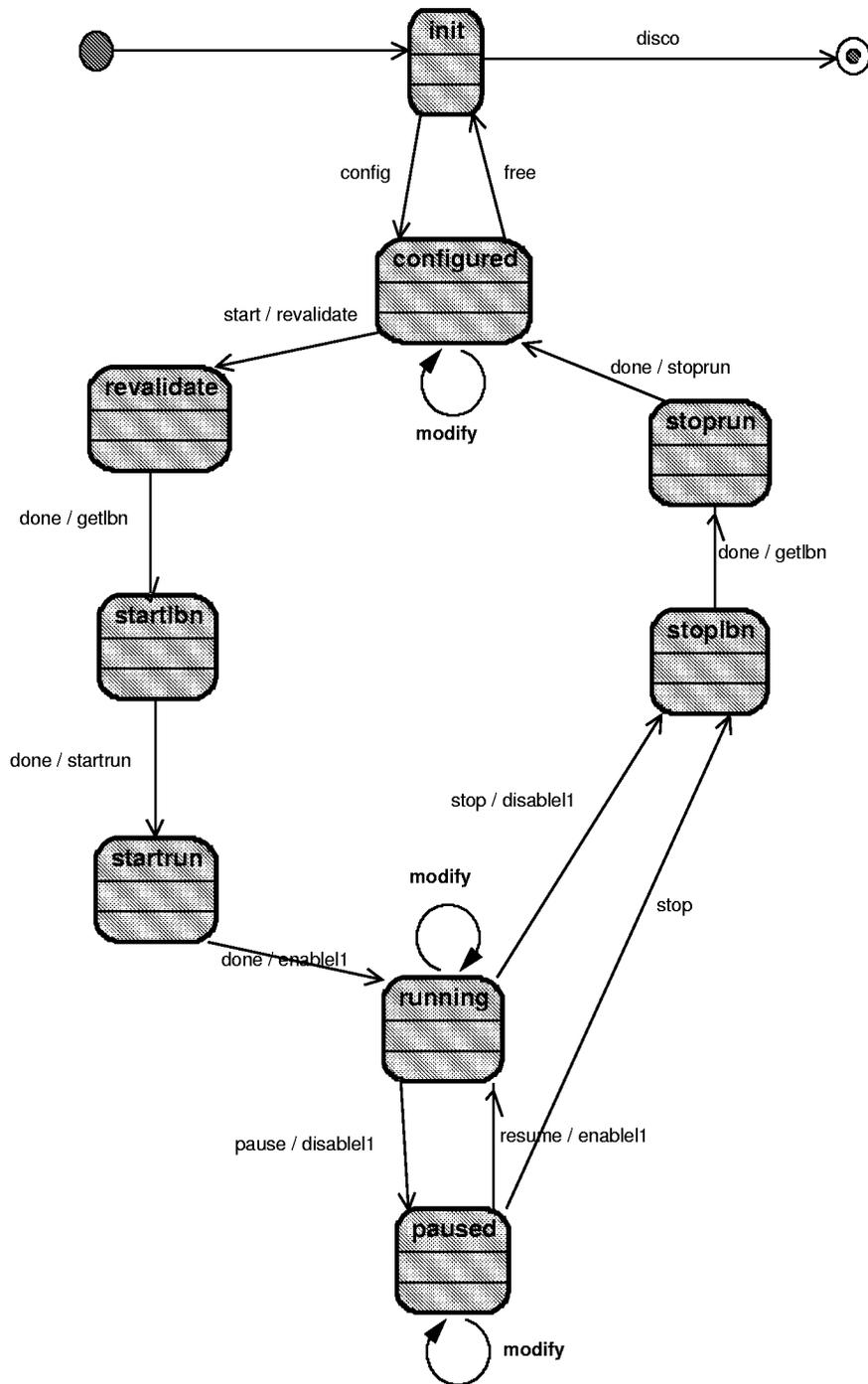
- Detector modeled by a collection of *objects*, with names of the form *class:obj*.
 - Some are permanent, some are created as needed.
- Types of objects include connections, clients, and *items* (everything else).
- Items have *attributes*. (In the common display, these start with 'd_' or 'i_.') Object 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.
- Host/port addresses used by coor are listed here.
- List of hosts allowed to connect to coor is also here.
- Don't change unless requested by experts.

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.
- 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!

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.

Troubleshooting

- To force reinitialization of one of the processes COOR talks to, start coortalk and:
 - `disconnect dni`
 - `reconnect dni`
 - No need to free the trigger configuration — the necessary commands will be automatically resent when needed.
- 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.