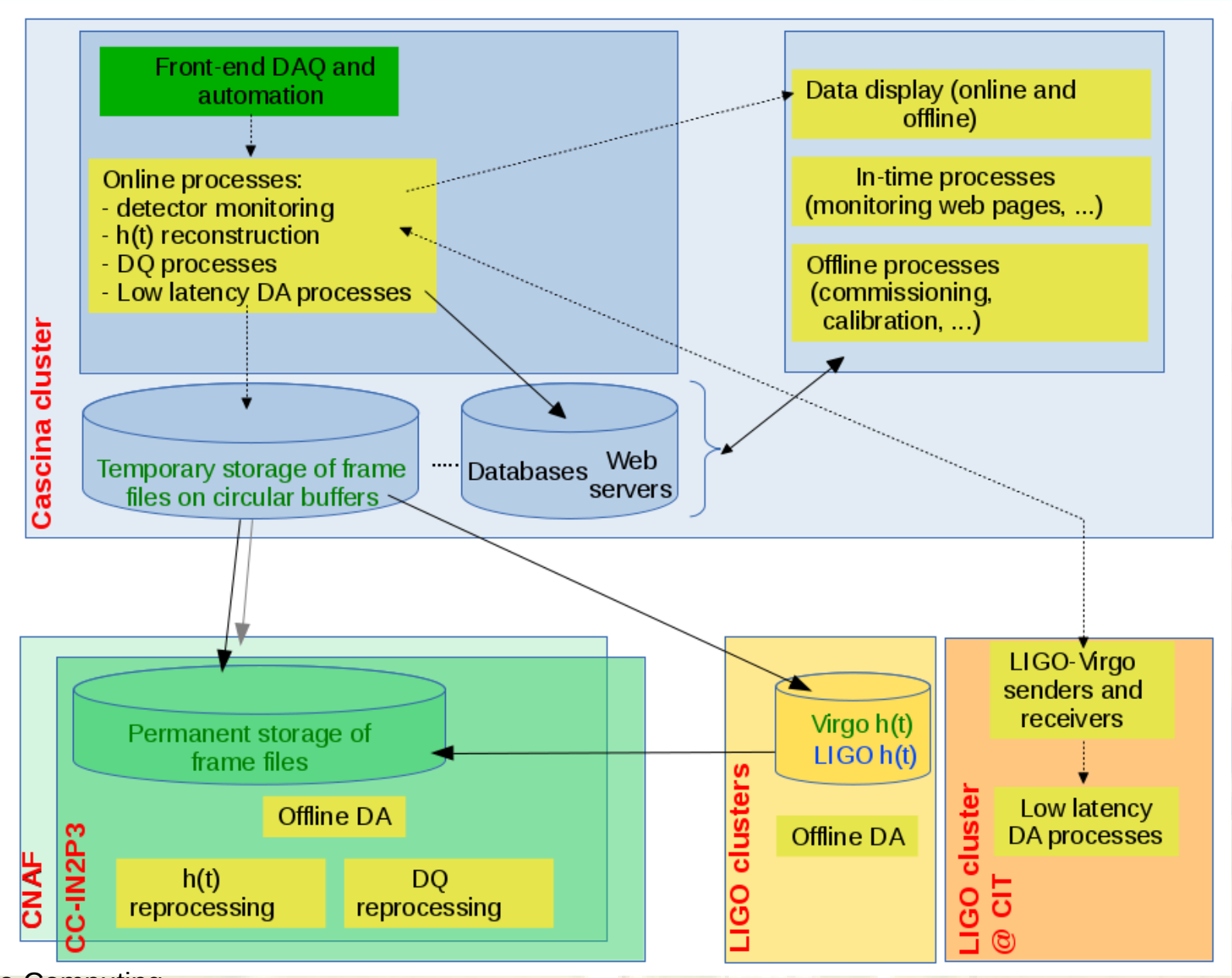
Virgo Big Picture

Main online data streams from detector to analysis

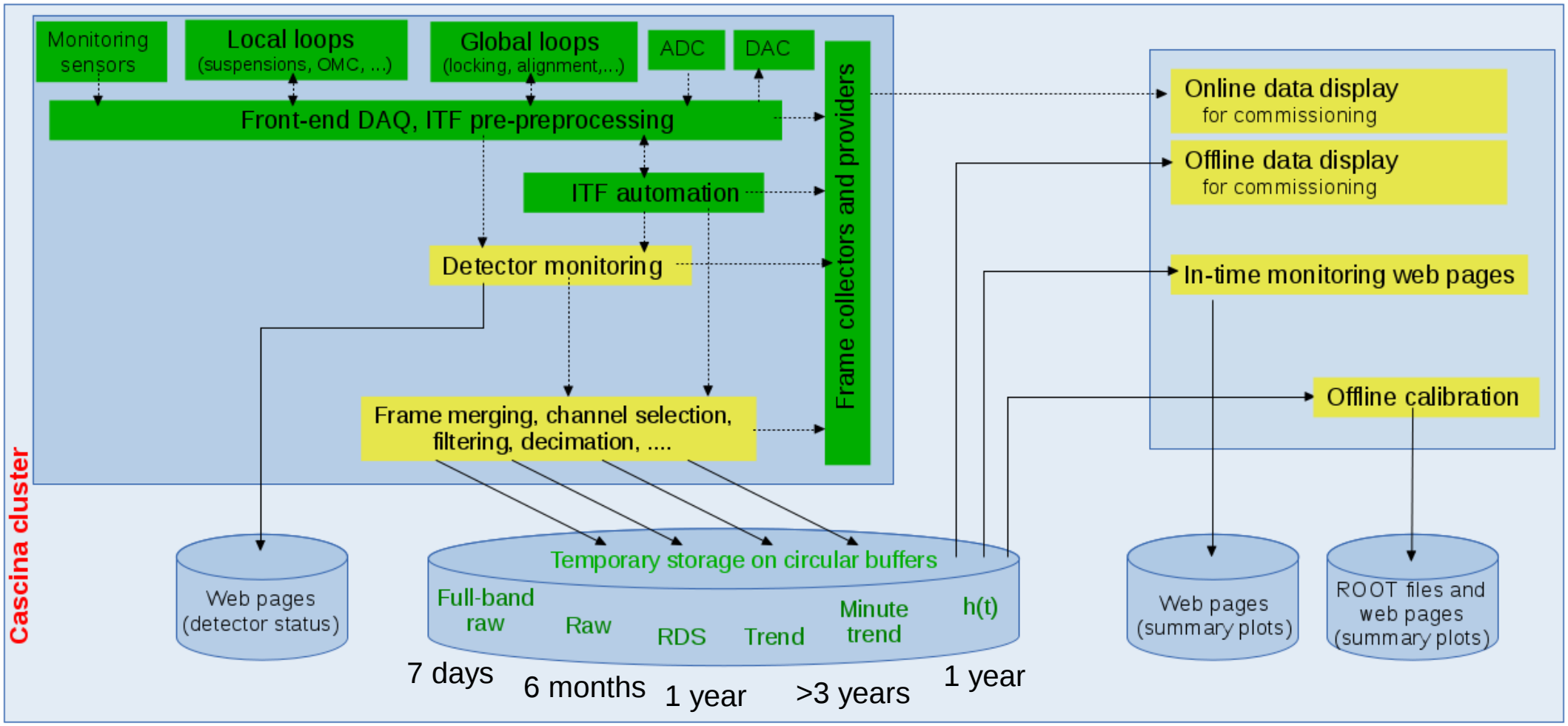
- DAQ streams overview
- Online h(t) and DQ at Cascina
- Low latency data transfer
- Virgo data storage and offline analysis
- Hardware injections
- h(t) and DQ reprocessing

General overview



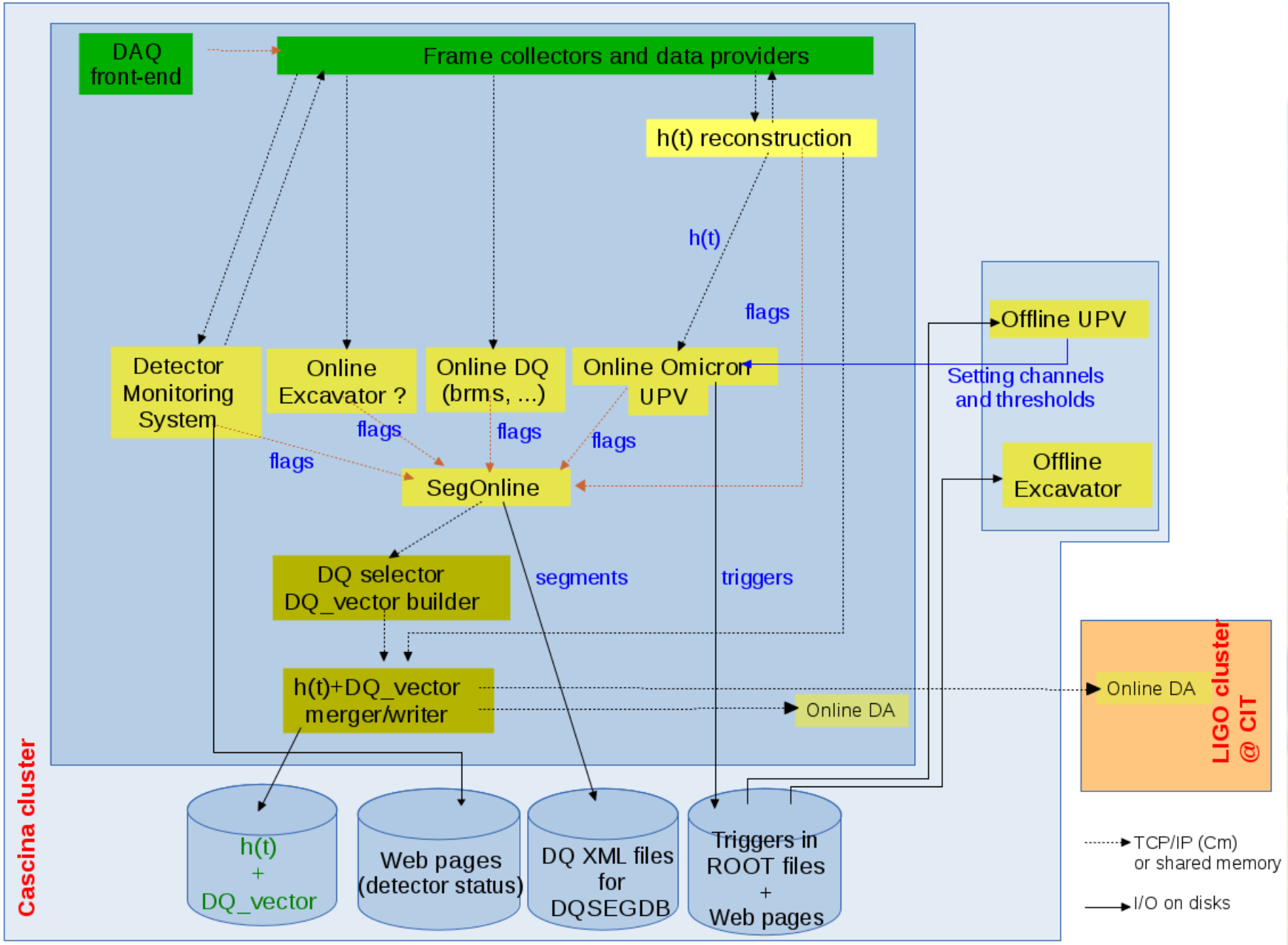
Virgo Computing Centers (CCs)

DAQ streams overview

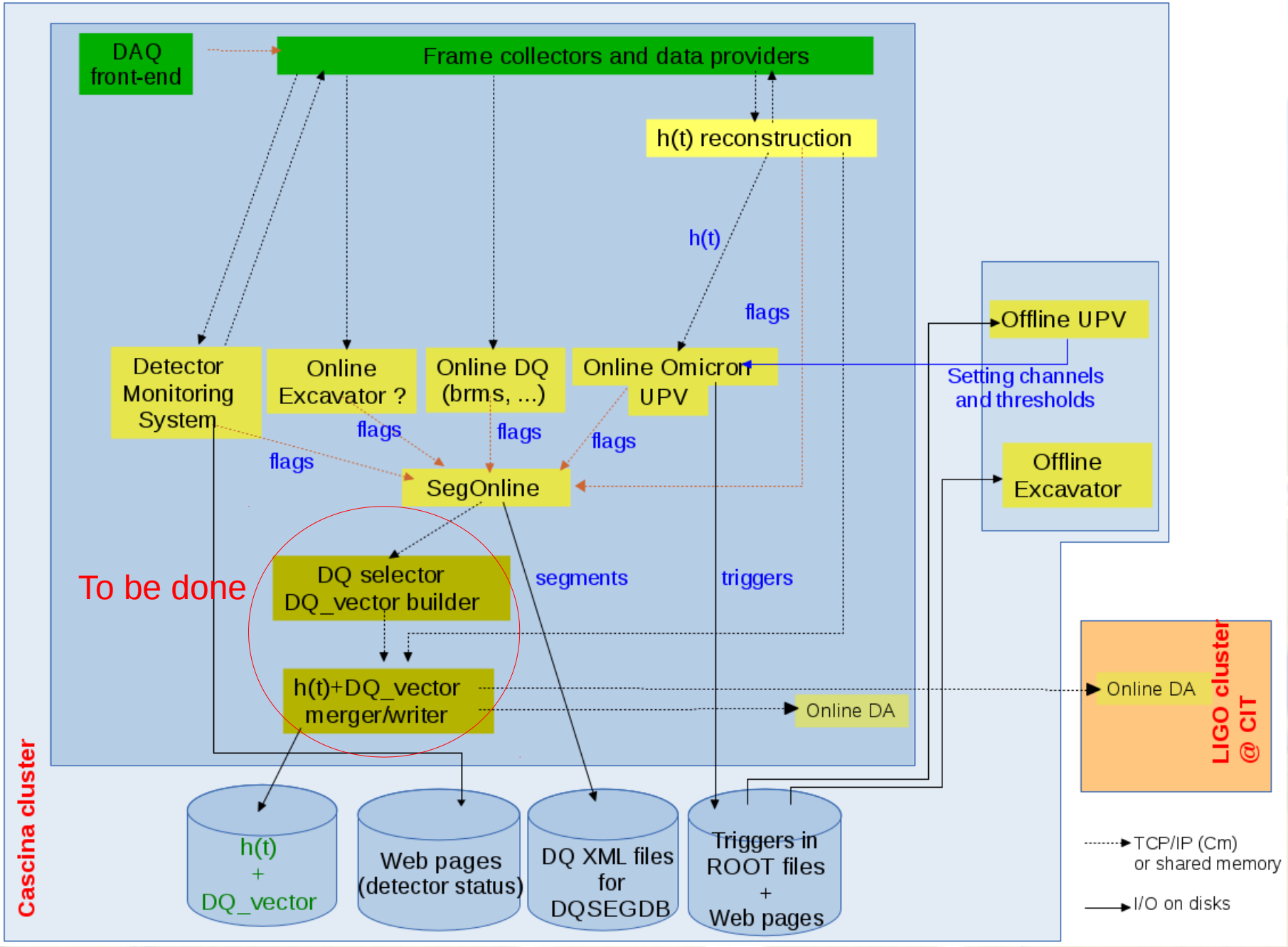


- DAQ software architecture mainly as in Virgo
- Online writing/reading frame data on “files in shared memory” (/dev/shm/)
- Different data streams written on disk at Cascina
  - RDS stream: channels at 50 Hz + other channels still to be selected

Online h(t) and data quality at Cascina: sketch



Online h(t) and data quality at Cascina: sketch



Online h(t) and data quality at Cascina: to do's

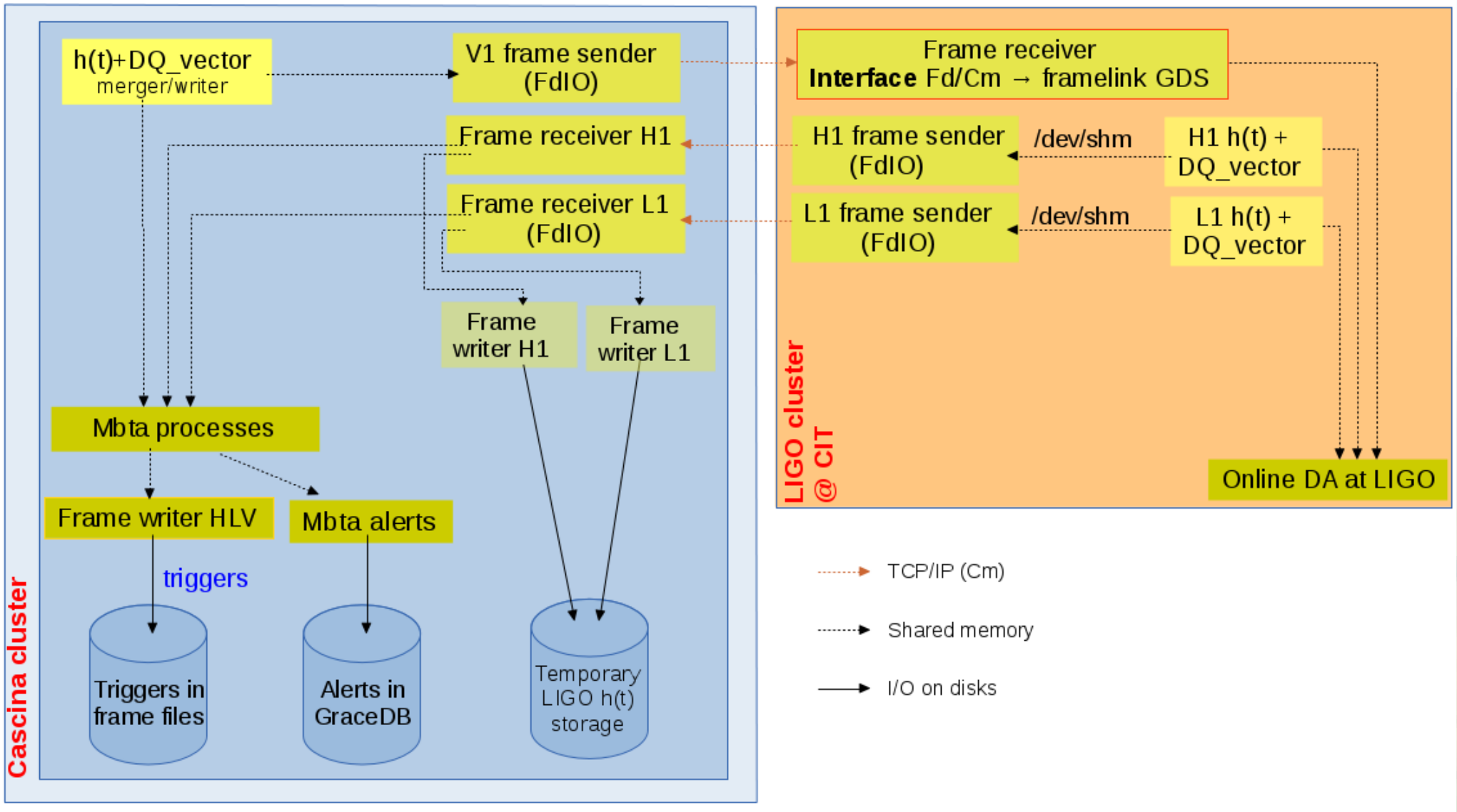
Online DQ:

- DQ selector : what cat1,cat2 DQ flags are selected ?
- Monitor the online DQ production and transfer
- Monitor the DQ safety and DQ performance
- An architecture for offline DQ reprocessing
- DQSEGDB server and client
  - One server or two synchronized DB ?

DetChar tools

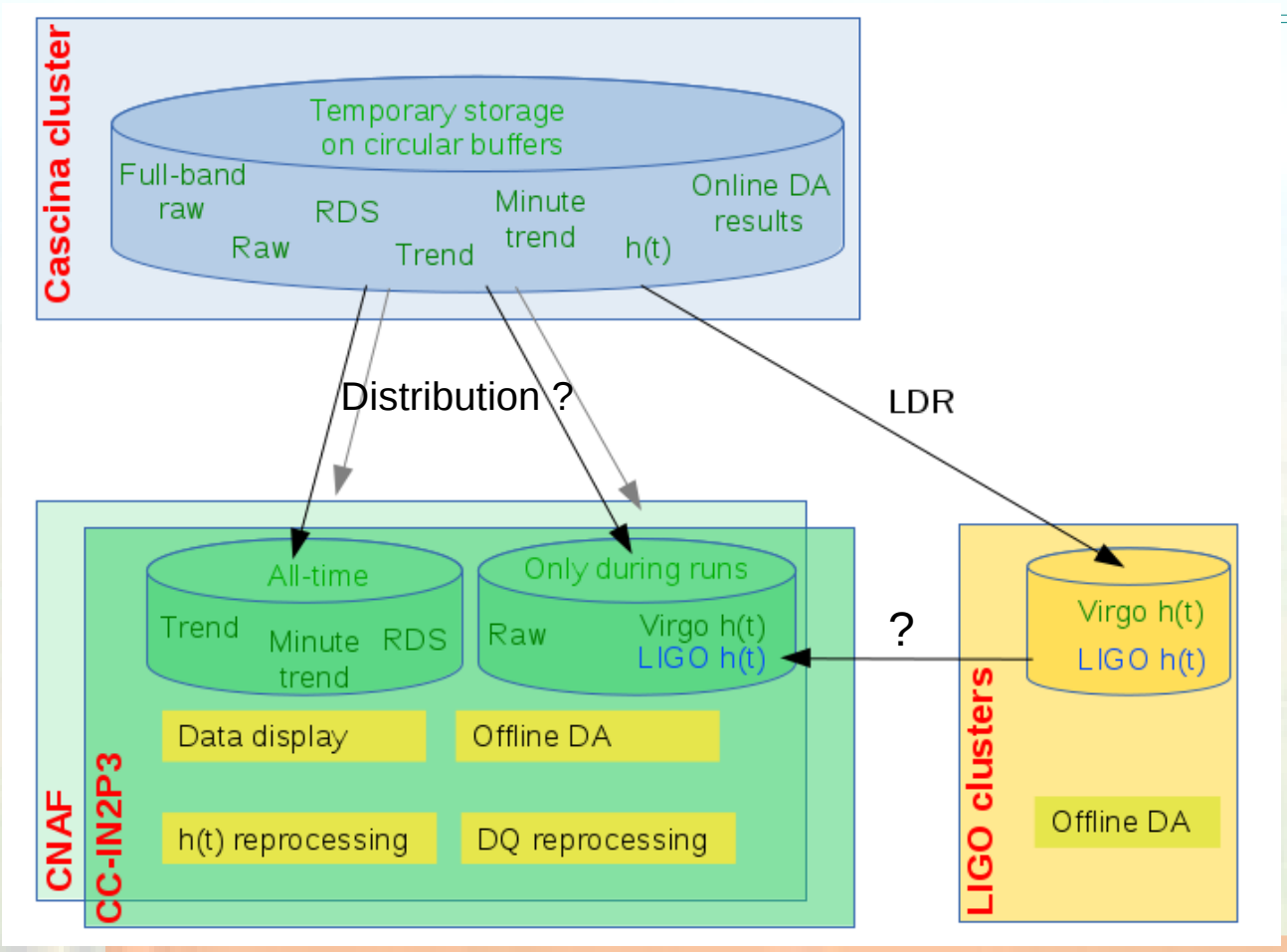
- Channels DB (need update and links. We look at CIS)
- A web page similar to LigoCAM
- A central summary page to be used by commissioning users
- Tool to find glitch families ?
- MonitoringWeb (similar to Summary pages + LigoDV)
- UPV, Excavator web pages
- Noemi, Coherence web pages
- NMAPI

Low latency data transfers (and mbta data analysis)



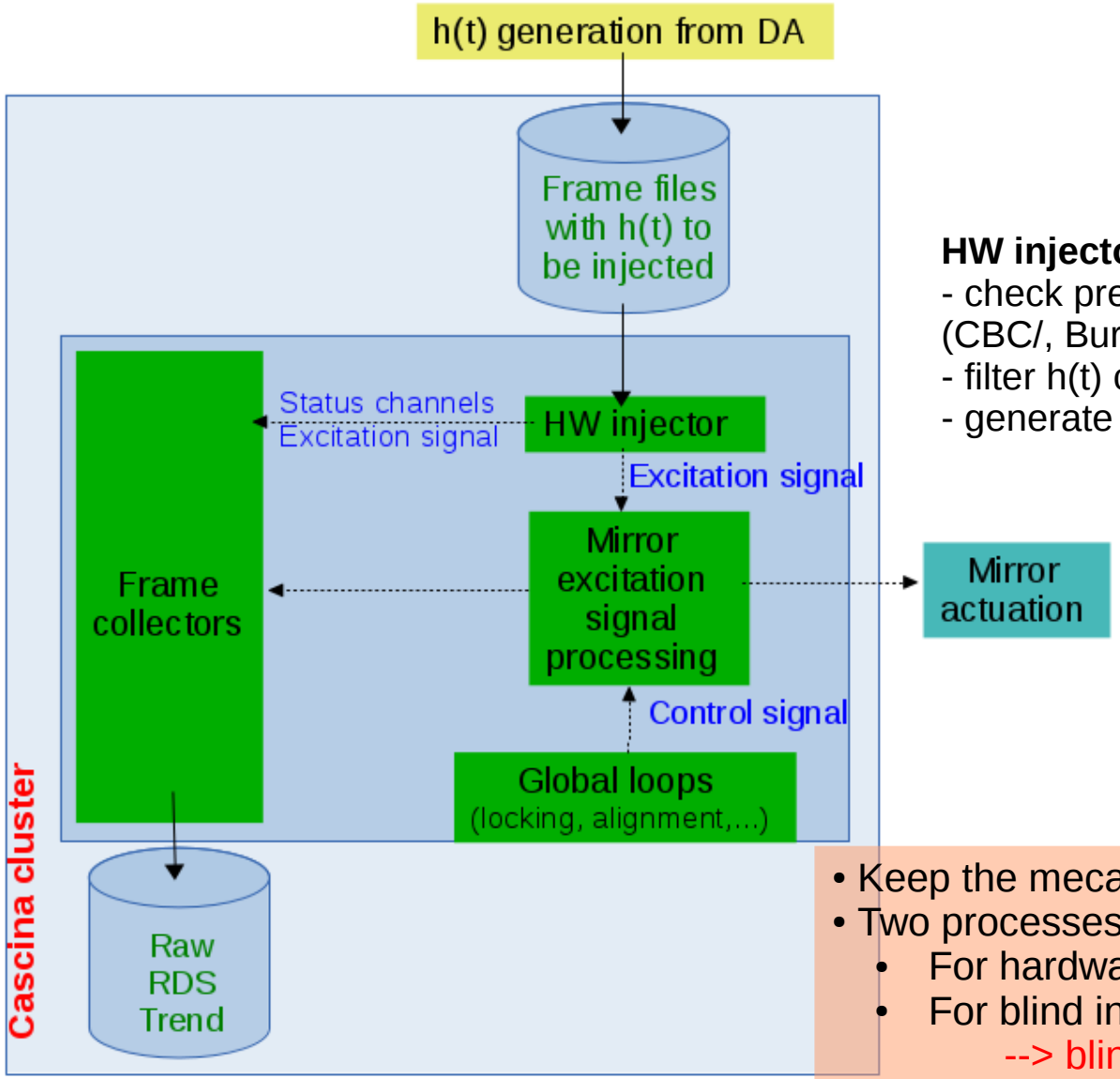
- Online data transfer architecture and software already running for ER runs

Virgo data storage and offline data analysis



- **Virgo data transfer to CCs:**
  - Continous transfer of Trend and RDS to CCs for storage
  - Transfer of raw and h(t) during science runs + calibration + astrowatch periods
- **LIGO ↔ Virgo data transfers:**
  - h(t) (+ DQ_vector): online streams and reprocessed data
  - RDS transfer needed ? Can make Virgo RDS available through LDR from Cascina
  - Need to define how/where the data are pushed and get on each side
- **Tools for Virgo transfer** (+monitoring) being tested for choice and setup

Hardware injections at Virgo: sketch



HW injector:
- check presence of h(t) to be injected in some directories (CBC/, Bursts/, ...)
- filter h(t) channel w/ mirror actuation calibrated parameters
- generate excitation signal + status channels

(Software injections have a similar mechanism)

- Keep the mecanism and processes developped for Virgo+
- Two processes in parallel:
  - For hardware injections
  - For blind injections
    --> blindness mechanism configuration to be setup
- Mirror actuation:
  - Electromagnetic actuators
  - Current goal: use a photon calibrator for blind injections

h(t) and DQ reprocessing

Location of reprocessing:

- Mainly Virgo clusters: CCIN2P3 and CNAF

DQ reprocessing

- Output: new version of segments in DQSEGDB
- Software architecture for DQ reprocessing to be setup in the CCs

h(t) reprocessing

- Output: new frame files with h(t) time series (w/o DQ_vector)
- Transfer the new frame files to LIGO clusters

Offline analysis

- Use selected/last version of segments in DQSEGDB
- Use latest version of h(t) (no need of DQ_vector since info in DQSEGDB)