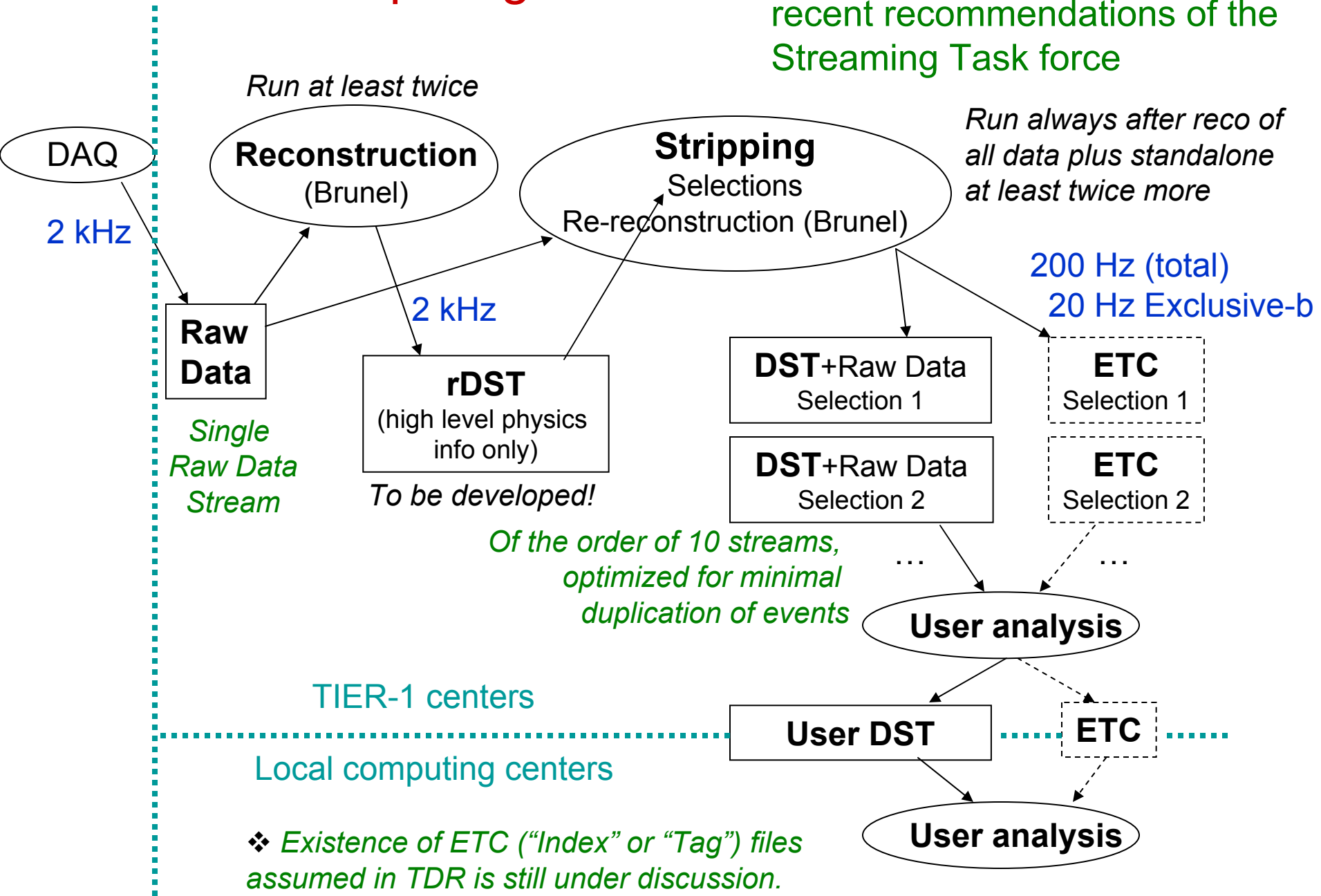


Trigger stream in stripping

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Off-line computing model

- Based on Computing TDR and recent recommendations of the Streaming Task force



Dedicated trigger stream in stripping

- Need dedicated trigger DST to enable off-line trigger studies:
 - Avoid duplication of effort among trigger folks
 - Big speed-up in access time when analyzing sparse events
- Advantages of putting our selection in the production stripping instead of writing our own DST by running on the DSTs produced in the stripping:
 - Eliminates cumbersome bookkeeping and cumbersome elimination of duplicate events
 - Otherwise events of interest to us will be scattered among many streams
 - Automatic distribution of Trigger Stream among TIER-1 centers
 - We could save events skipped by all other selections

Dedicated trigger stream in stripping

- We discussed the idea in the Streaming Task force:
 - Even if all of our events can be found in other streams, the task force endorsed the idea of dedicated trigger stream as long as the event rate is not much larger than 2Hz
 - Flavor Tagging group will likely need dedicated stream for similar reasons
- A good match to Hans's idea of selecting events passing tight off-line selections which are of TIS type (“TIS-stream”) with respect to the selected B candidate:
 - Exclusive-b streams based on tight off-line selections will output equivalent of about 20 Hz
 - Alley level-TIS (an OR between all alleys) ~20% (?)
 - Not exactly the same thing but DC04 off-line selected J/ψ (to $\mu\mu$) has:
 - 1.8% TIS via HLT Muon Triggers (1.4% Single Muon)
 - +16.2% TIS via HLT Hadronic Trigger
 - Since we can **scale down** the most populous (or all) selections, the 2Hz allocation looks doable
 - This stream will be good for evaluating trigger efficiency (TOS) for exclusive-b channels being already part of the HLT and stripping selections

Improving HLT Trigger Strategies

- Efficiency:
 - For already selected channels, run HLT emulation on the “TIS-stream”
 - For new channels, design an off-line selection and get it into stripping to add to the “TIS-stream” (some fraction of signal events present in the Raw Data stream via inclusive-b HLT trigger; 900 Hz single- μ !)
- To achieve necessary minimum bias rejection rate (without relying on MC) need trigger-unbiased streams
 - Ultimate test is to take a test run with a prototype trigger code. Off-line samples will be useful for initial testing of ideas.
 - Don't need to be passed such events through the reconstruction/stripping since the whole point is to re-run HLT on Raw Data:
 - However, burying these events in the common Raw Data stream will make them unusable:
 - Add their selection to the reconstruction/stripping job anyway?
 - Other groups may have some use for such events as well
 - Increases event size by a factor of 3 (limiting our storage-bandwidths for these events)
 - Include only in the first stripping run?
 - Alternative approaches:
 - Argue with the Streaming Task Force for an exception from the single DAQ-output stream rule
 - Run special one-time trivial stripping on Raw Data (with full DST or just Raw Data output) in TIER-1 centers (practiced in CLEO)

Trigger-unbiased Streams

- Here consider off-line streams only:
 - in Monitoring Farm can easily get bigger rates of such events, without possibility of saving them
- 1 Hz of events gives **0.03%** statistical limit in 1year of running ($\times 10^7$ sec=10M events) compared to:
 - 2 kHz/1 MHz=0.2% rejection rate of entire HLT process with respect to L0
 - 200 Hz/1 MHz=0.02% r.r. of HLT exclusive b-selections with respect to L0
 - 10 kHz/1 MHz=1% r.r. of HLT-generic [=HLT-alleys ?] with respect to L0
 - 200 Hz/10 kHz=2% r.r. of HLT Exclusive b-selections with respect to HLT-generic
 - 1 MHz/40 MHz=2.5% r.r. of L0 with respect to bunch crossing rate
- **Proposal suitable to put such events through the stripping without arguing for more storage-bandwidth:**
 - **1Hz ($1:10^6$) of L0-triggered events:**
 - Sufficient to study trigger rates of HLT-alleys with sensitivity of $1/10^{\text{th}}$ of its total rejection rate in $1/10^{\text{th}}$ of yearly data set
 - **0.1Hz ($1:10^5$) of HLT-alleys triggered events:**
 - Sufficient to study rejection rates of HLT Exclusive selections with sensitivity of nearly $1/10^{\text{th}}$ of their total rejection with respect to the HLT-alleys in $1/10^{\text{th}}$ of yearly data set
 - **0.4Hz ($1:10^8$) of random bunch-crossing events:**
 - Sufficient to study trigger rates of L0 with sensitivity of over $1/10^{\text{th}}$ of its total rejection rate in $1/10^{\text{th}}$ of yearly data set
 - Is it sufficient for L0 efficiency optimization (bandwidth division)?
 - Such rates should be quite acceptable within the rate allocation the Streaming Task force has already endorsed for the trigger group

Summary

- Alley-level “TIS-stream” for exclusive off-line selections doable in production stripping within the guidelines given by the Streaming Task force:
 - Will need to re-evaluate event rate on DC06 and possibly agree on down scaling factors (if any)
 - Prepare signal selection for channels we may not be yet triggering/selecting well ahead of stripping in order to develop/test a new trigger scheme to be used in the future data taking
- We may want to have trigger-unbiased streams in off-line for initial tests of trigger improvements:
 - I made specific proposal which would be highly non-controversial from the point of view of resource allocation and off-line production cycles
 - Alternative solutions are also feasible