Trigger Strategies and Their Paths, and Message Schema and Their Names

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Overview

- High-level diagrams showing various organization of **trigger strategies** into **trigger paths** through a conceptual processing graph.
- Example expansion from conceptual to physical.
- Proposed **trigger message schema** (meta) requirements.
- Promote the semantic meaning of **Trigger Candidate (TC)**.
- For TPC activity-based trigger strategy, introduce **new message type name**.
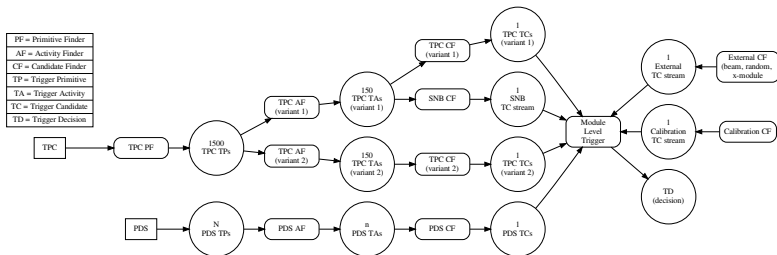
Conceptual Trigger Stages

Just one particular trigger path/strategy.

- In general: a **trigger strategy** implements one conceptual **processing path** which progresses as:
  - ▶ high → low data rate.
  - ▶ low → high semantic meaning.
  - ▶ variety → generality of representation.
- Path is **conceptually linear**, physically a **broad subgraph** of trigger processing:
  - ▶ A path spans multiplicity of processing nodes.
  - ▶ Multiple simultaneous strategies (various self, external, min. bias)
- Formalize: **Trigger Candidate** (TC).
  - ▶ Pen-ultimate message type, **input to MLT** by each path/strategy.
  - ▶ Excludes any path-specific information not required by MLT.

Multiple Conceptual Trigger Paths

Multiple Conceptual Trigger Paths - explanations

- Number is a guess at multiplicity.
- Circles represent message **schema**
- Common base schema:
  - "origin", "data time" and "sequence number"
  - used for high level algorithms: Window/Zipper/Filter
- Further commonality
  - eg all paths use TC base schema.

- Variants of TPC trigger strategies
- PDS may also have self-trigger path(s)
- SNB path may fork a TPC path (for eg)
- Non self-trigger paths also produce TCs
  - external trigger, calibration, minimum bias, etc.
- Single, per-path TC stream in to MLT
  - Variation on base TC message schema possible but limited to only info required for MLT to make Trigger Decision (TD)
- Schema used prior to TCs:
  - Each path determines required message schema
  - Prefer reuse, avoid reinvention.
  - All schema uniquely named and abbreviated.

Myriad of Physical Trigger Paths
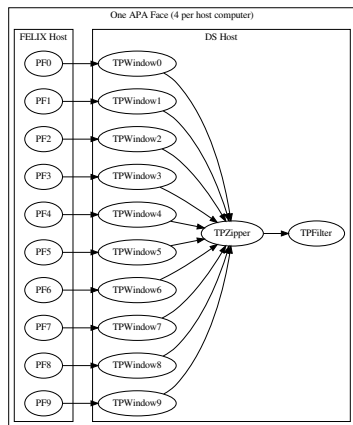
Mentally expand conceptual (↑) to
← physical, focus on just one APA **face**:

- Eg, TPC activity-based trigger strategy
- Shown only 10/face **primitive finders**
- Window/Zipper (a'la PTMP and future ZIO) message routing
- 1/face user code **activity finder** running in TPFilter, output TAs
  - ▶ later aggregation to TCs not shown
- Drawing hides full story, nominally will put 4x this in one FE + one DS computer.

Message Schema Requirements (proposal)

1. The input message type to the MLT SHALL be called a **Trigger Candidate** (TC).

2. Each trigger path/strategy (TPC variant X, external, SNB, etc) SHALL result in **exactly one stream** of TC messages input to the MLT.

3. A common TC **message schema** SHALL be used as a basis for the message type produced by every path/strategy.

4. A path/strategy MAY **extend** the base TC schema but SHOULD **only add fields which are required** for the MLT to determine a Trigger Decision (TD).

5. A trigger path/strategy MAY define **any number of intermediate message schema** to represent messages prior to production of TC messages.

6. A novel trigger path/strategy SHOULD **reuse existing, suitable message schema**.

7. Names and their abbreviations for message schema SHALL be **unique**.

The streamed, activity-based TPC strategy defines these message types:

Trigger Primitive (TP) regions of interest spanning some time on a specific channel

Trigger Activity (TA) regions of interest spanning time and channel.[1]

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[1]used to be called "trigger candidate"