Data stream simulation

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Input data structure

No trigger = No classical events anymore

Primary data unit: **time slice** (1 us — 8.3 ms)

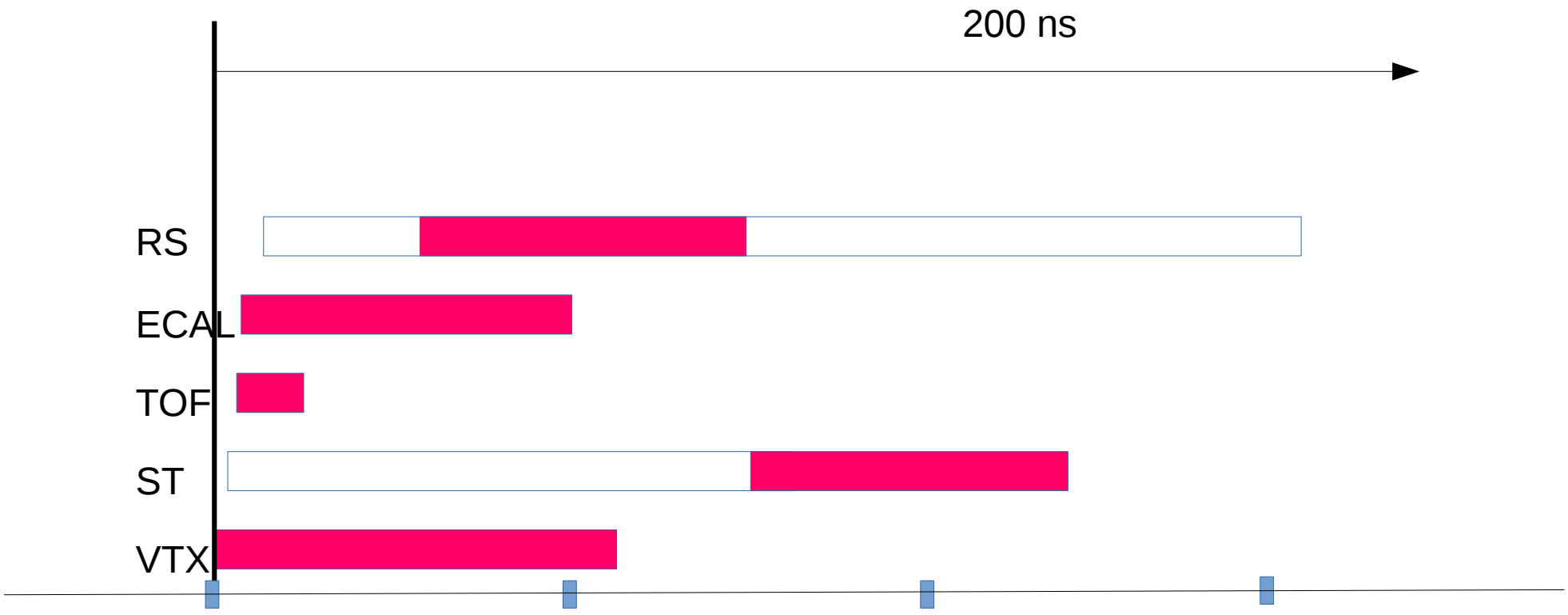
Time slices combined in **time frames** (up to 549 s, 16 GB max, < 160 MB to fullfil 20 GB/s limit)

Intermediate units — **time chunks** of 0.1-0.2 s (2-4 GB or ~10^5-10^6 events) are being discussed now

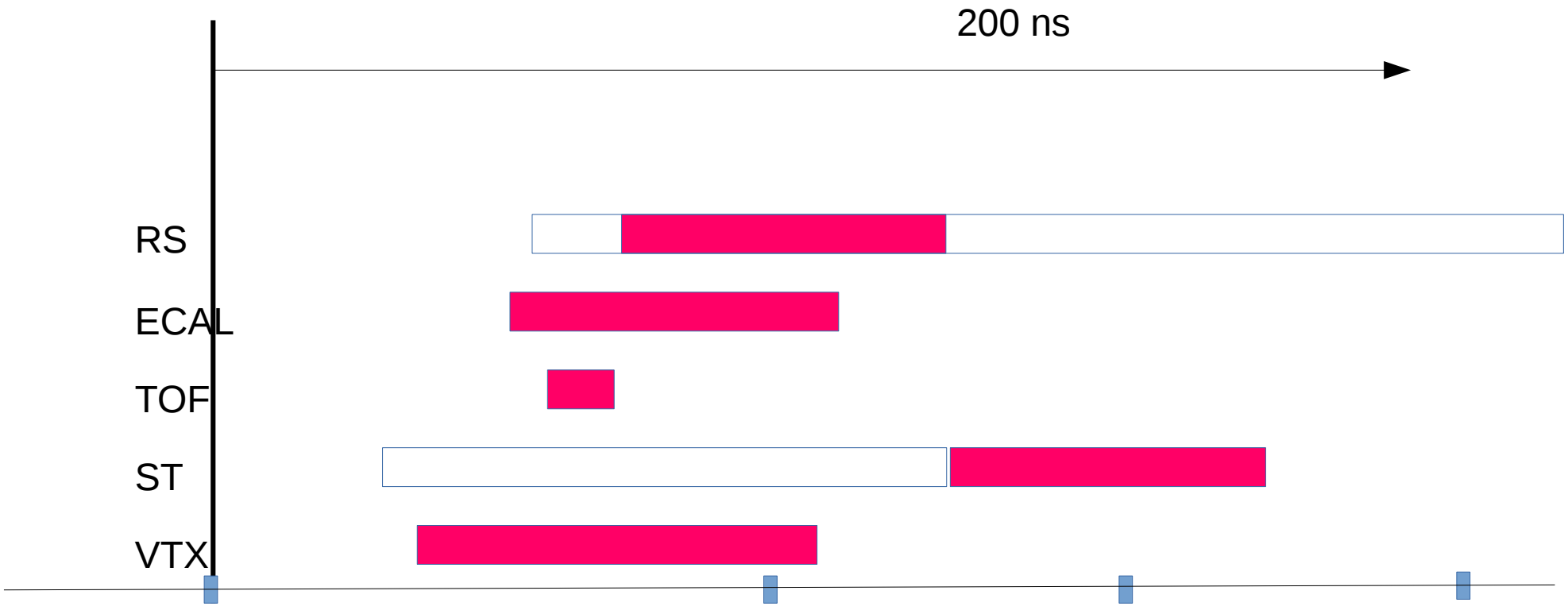
Every time slices will contain signals from 1 or few collisions (events)

Event building have to unscramble events from a series of time slices.

Time scale



Time scale (+t0)



Goals of the simulation

- Develop the event building procedure (separate signals related to the same collision)
- Provide labeled data sample for the machine learning algorithms in scope of the OF design
- Select an optimal duration of a time slice
- Develop the offline reconstruction of pile-up events

Simulation procedure

- A ROOT script taking the MC simulated data as an input
- Determine random bunch offset (uniform in [0, 76 ns])
- Determine number of bunches in the slice
- For each bunch:
  - determine number of collisions Nc in a slice (Poisson with λ=0.3)
  - read Nc events from the MC file and combine MC points
    - check if there any MC points beyond the time slice end, take it out of the time slice and keep for the next slice
    - add any MC points from the previous time slice