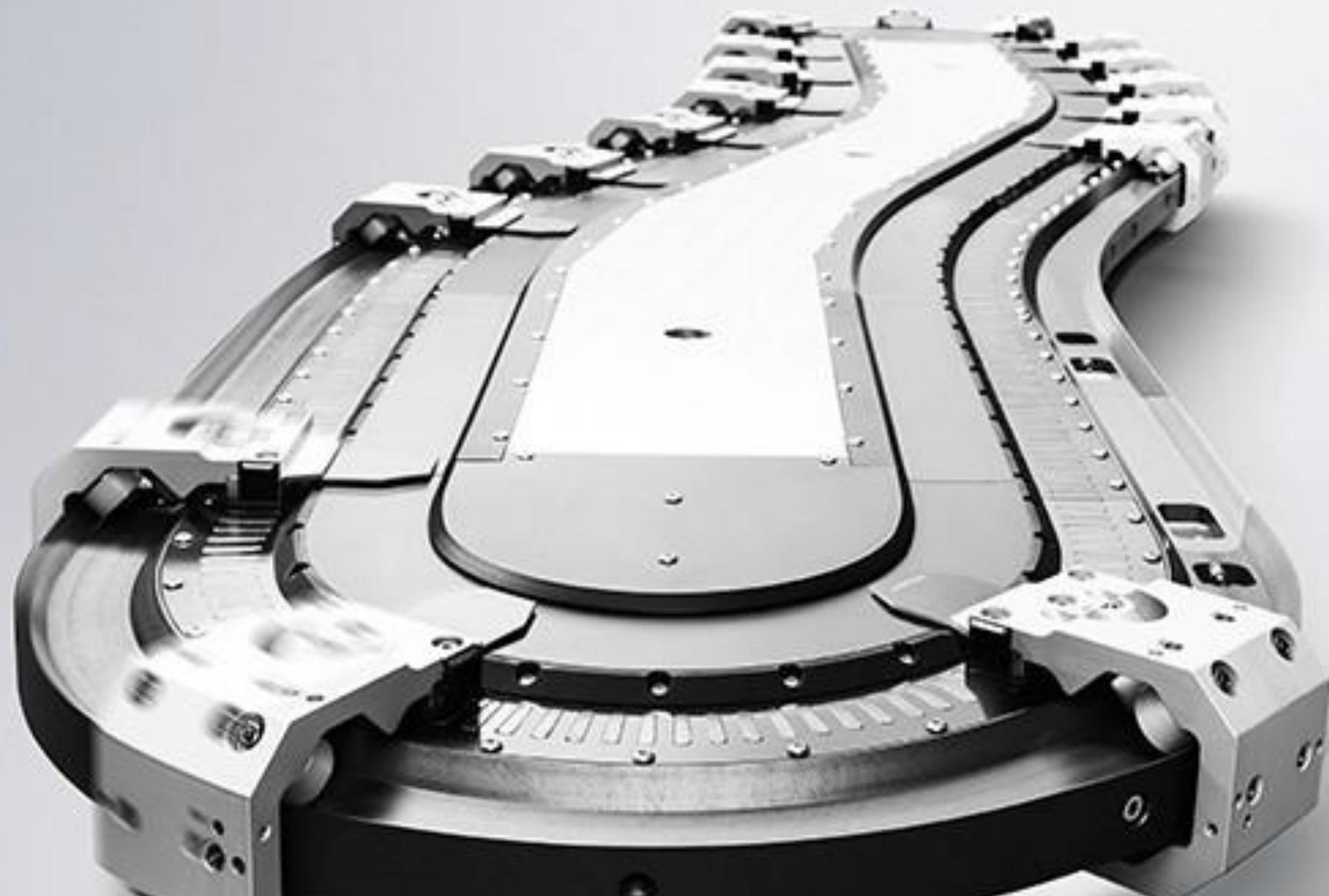


## XTS TRANSPORT LAYER – Station Geometry

BECKHOFF



- **Station based approach**

- The station is tasked with the coordination of movement
- The station carries the geometric information on the track.
- The stations' list carries the mover information (ticket)
- The geometric information has influence on the stations' behaviour
  - How many nests?
  - How long the distance until release
- The geometric information has influence on the movers' behaviour within a station
  - Forward move
  - Backward move

- **Station based approach**

- The station is tasked with the coordination of mover targets
  - Halting in the states you answer to.
  - The station will wait here forever, isolated, doing nothing until commanded
- Fall-through states you only see in the logs.
  - The station must be able to execute without delay until the next roadblock (either a state you answer to or an error exit)
- Handover is atomic and is either successful or leads to a fatal error
  - The linked lists are not using dynamic memory allocation.
    - Static memory allocation [0.. MAX\_LIST\_NODES] is ensuring that no memory fault or heap fragmentation can occur.

- **Station based approach**

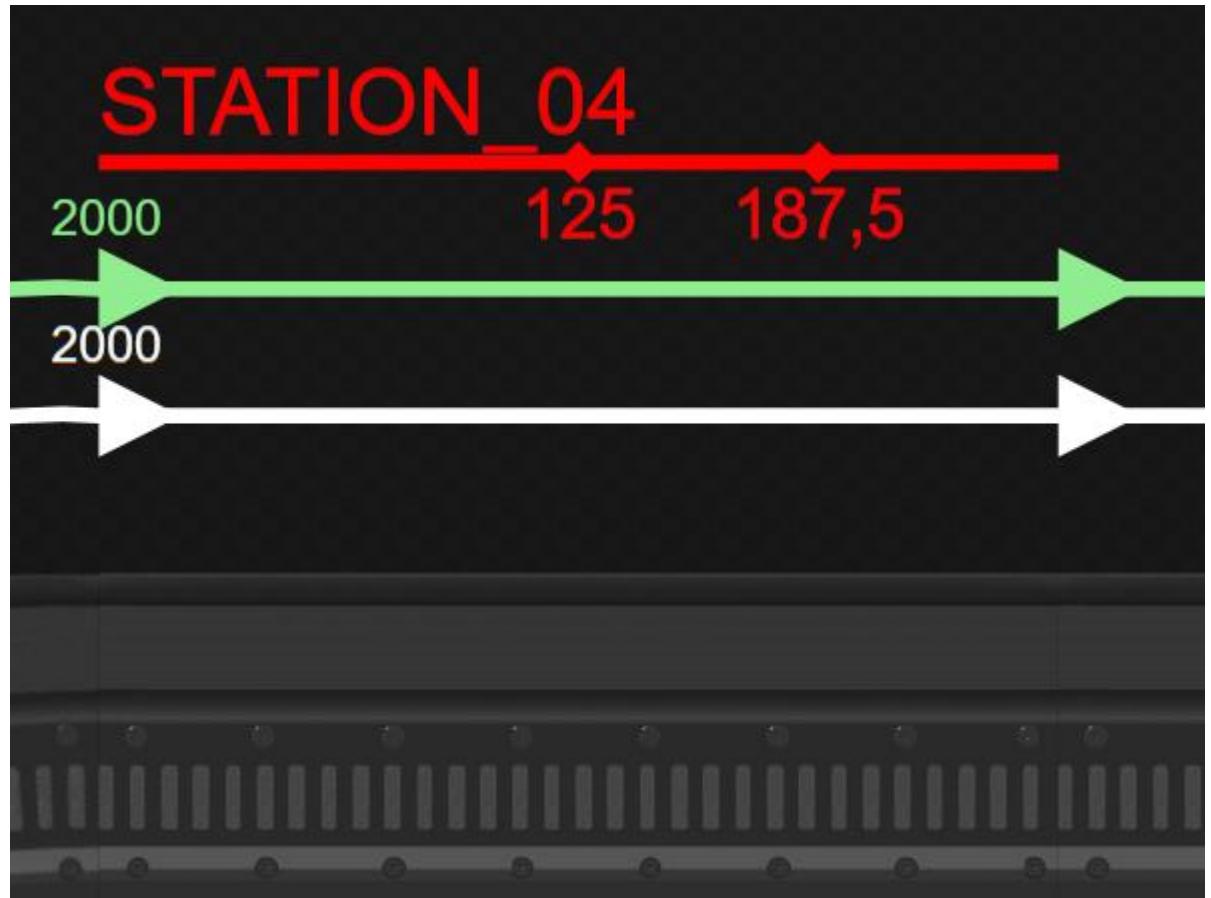
- Closed loop trade offs
  - No passing at all times.
    - This constraint is the main reason why lists may stay sorted simply by mapping the topology onto the logic.
  - High throughput and high speed
    - While a track switch enables highest flexibility regarding the mover targets
    - A track switch introduces a bottleneck which must be accounted for.

- **Station based approach**
  - **Example of a closed loop XTS**

- **PROCESS** may have multiple stations
    - **STATION** may have multiple nests
      - **NEST** is a stop position for a mover



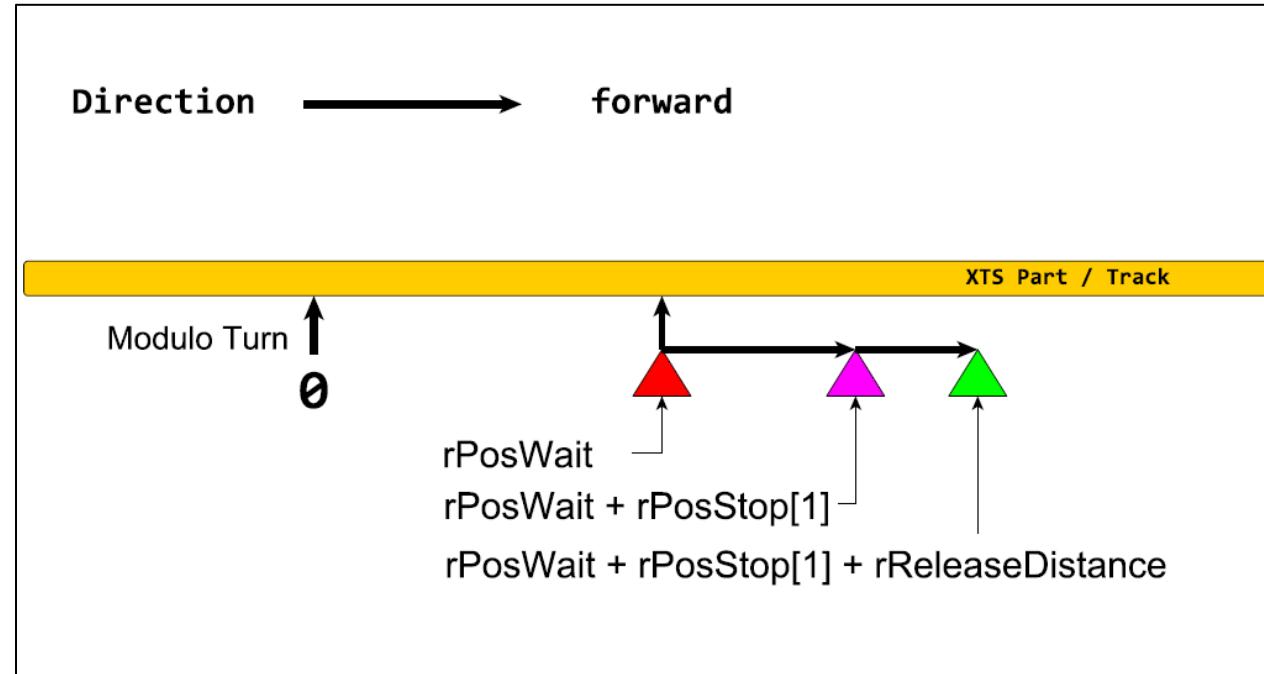
- **Station based approach**
- **STATION geometry:**
  - **WaitPos:** a position on the track where the station starts, and any other station may send a mover to.
  - **StopPos:** 1 to 8 possible **relative** positions a mover may stop at.
  - **ReleaseDistance:** distance a mover has to travel to logically leave a station.



- **Station based approach**

- **STATION geometry:**

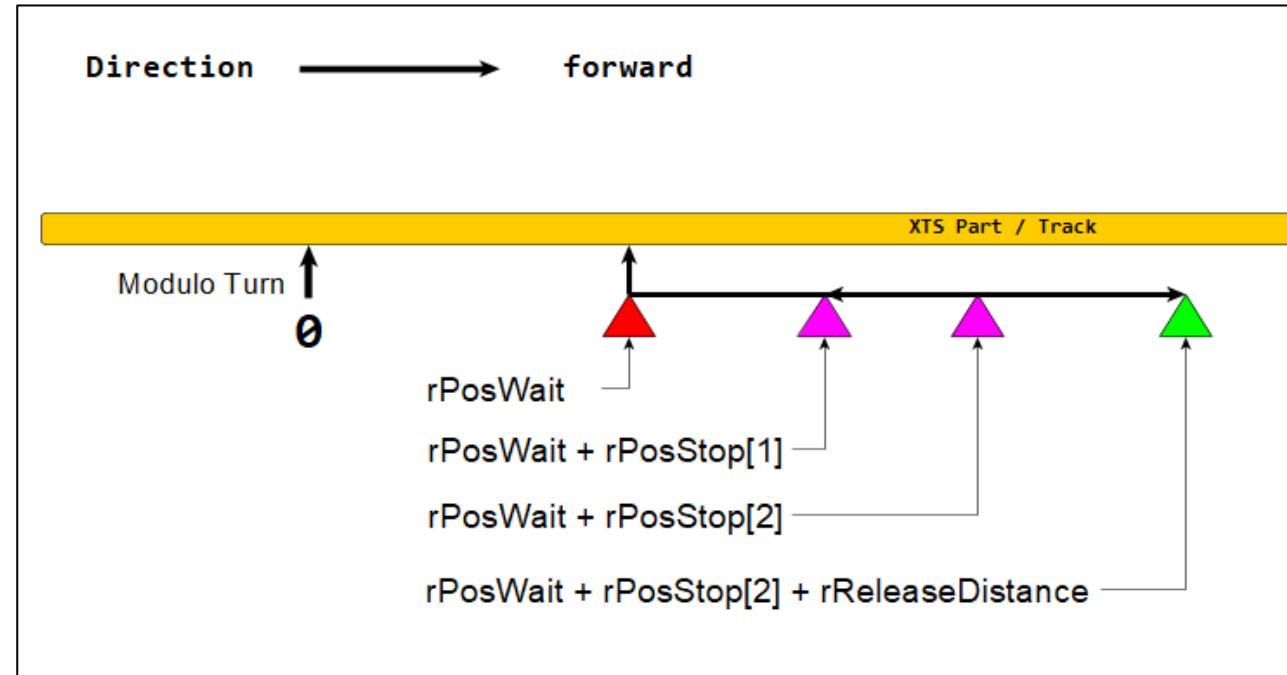
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- **Station based approach**

- **STATION geometry:**

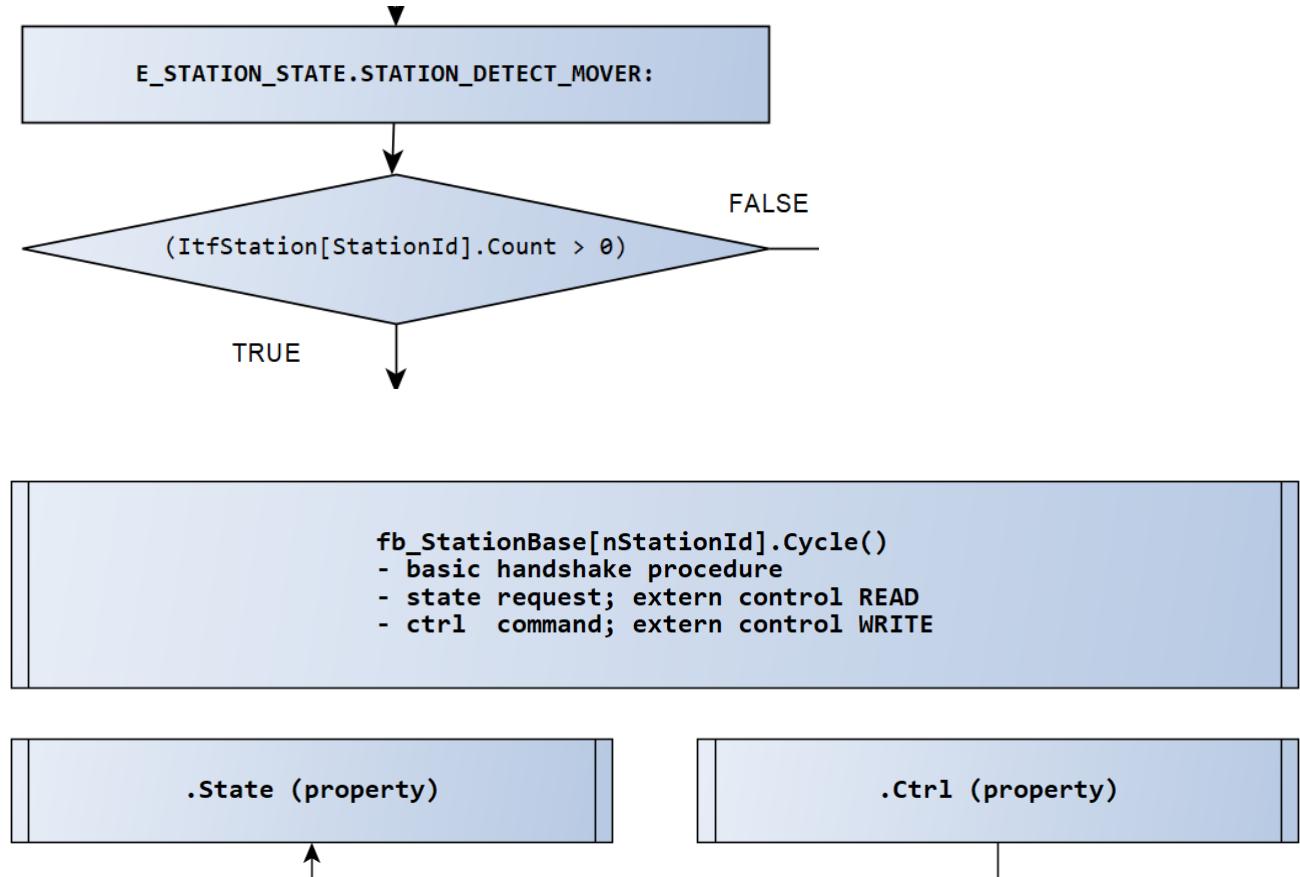
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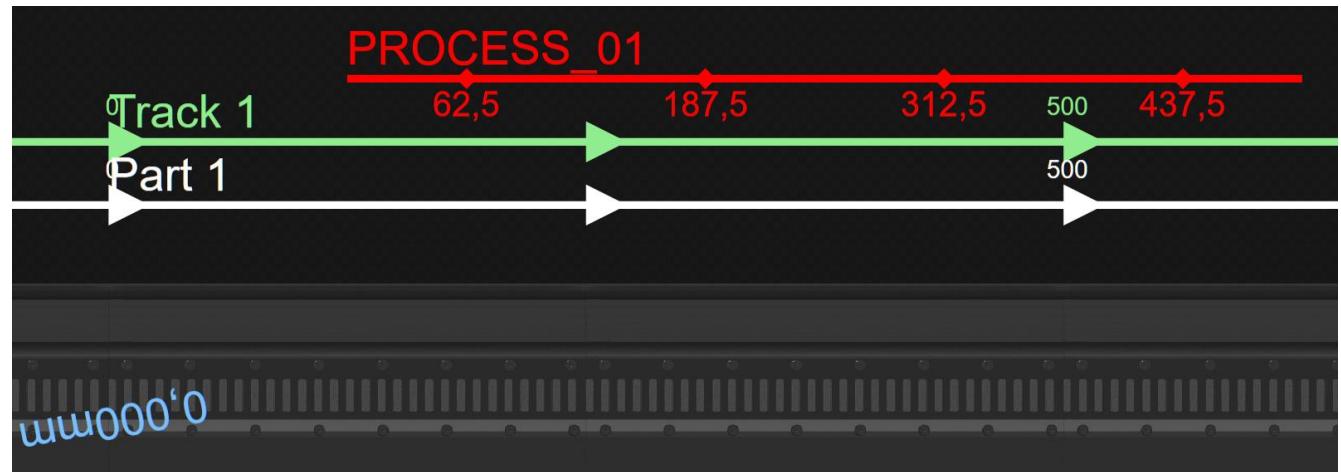
- **Station based approach**

- **STATION operation:**

- **StationList:** a list in which a sending stations writes the mover ticket for this station. Station checks its own list cyclically and reports detection of a new mover.
- **StationCtrl:** control struct to command station
- **StationState:** state information you have to react to.



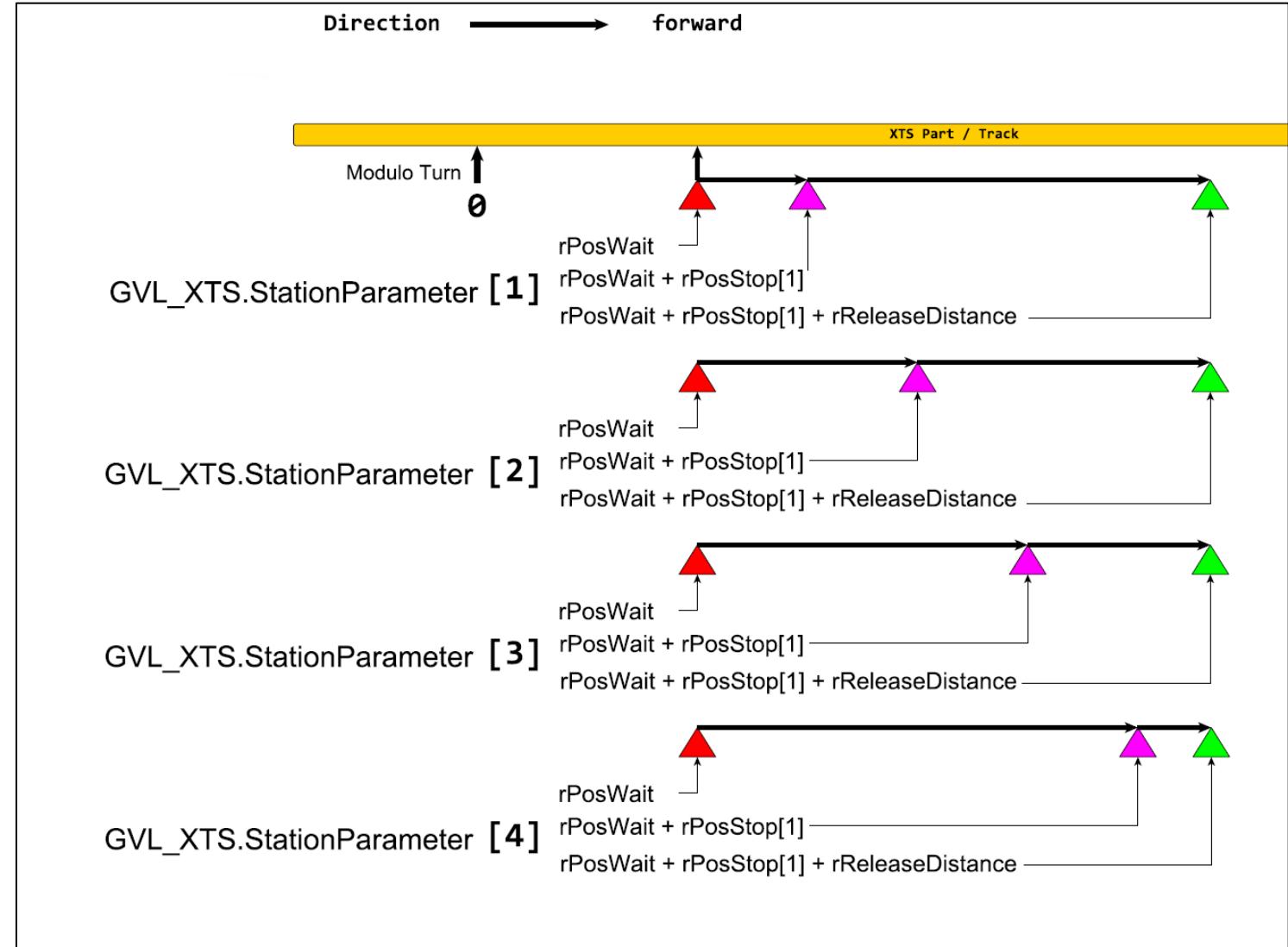
- **Station based approach**
- **PROCESS:**
  - may have one or many stations
  - works stations simultaneously
  - may mute stations
  - Stations in processes may have multiple nests



- **Station based approach**

- **PROCESS:**

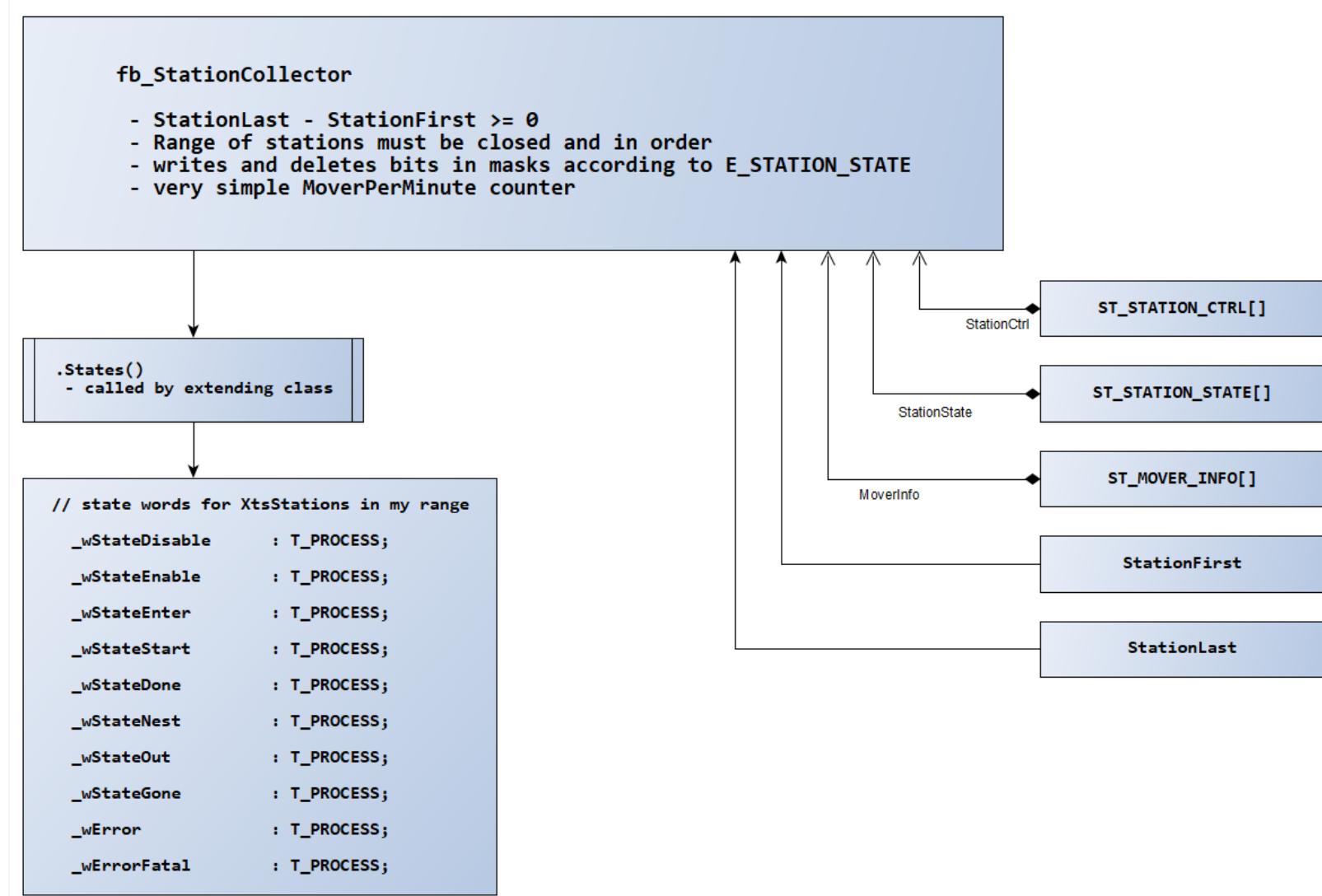
- may have one or many stations
- works stations simultaneously
- may mute stations
- Stations in processes may have multiple nests



- Station based approach

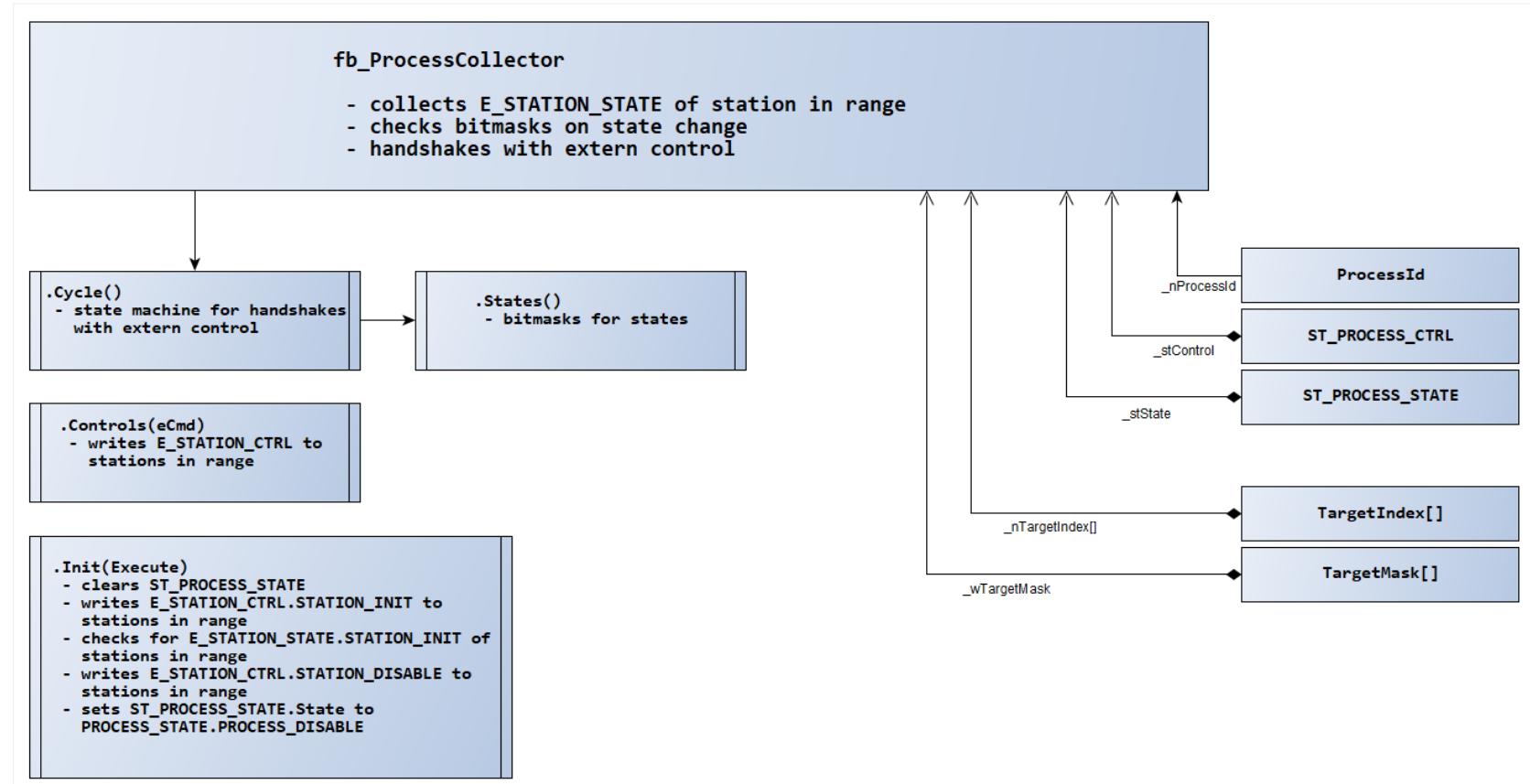
- PROCESS:

- collects information from the stations.



- Station based approach

- PROCESS:
  - commands stations via dedicated structures



## XTS\_TRANSPORT\_LAYER project

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