Discussion on Maintenance Comment 201 & 202

(https://www.802-1.org/items/318 & 317)

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Comment 201: 802.1Qbv Tick granularity

- Tick input List execute FSM as time_unit signal;

- Tick granularity is the absolute time length for one tick;

<table>
<thead>
<tr>
<th>Table 12-28—The Gate Parameter Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>TickGranularity</td>
</tr>
</tbody>
</table>

Tick granularity is used to compute timeInterval/adminCycleTime length and set TAS time gate accordingly.
Comment 201: Tick granularity

- MII Interface for 1GE/10GE/25GE MAC.

<table>
<thead>
<tr>
<th></th>
<th>1GE</th>
<th>10GE</th>
<th>25GE</th>
<th>400GE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data path width@MII</td>
<td>8b</td>
<td>32b</td>
<td>64b</td>
<td>64b</td>
</tr>
<tr>
<td>Data path interface clocking (bit_time*bis_width)</td>
<td>8ns</td>
<td>3.2ns</td>
<td>2.56ns</td>
<td>0.16ns</td>
</tr>
<tr>
<td>MII TX_CLK</td>
<td>125Mhz</td>
<td>156.25Mhz</td>
<td>390.625 MHz</td>
<td>6250Mhz</td>
</tr>
</tbody>
</table>

- Interface clocking is a logic unit time, not implementation specific; (not friendly to FPGA)

- Tick granularity is the time basis of TAS scheduling port.
  - `timeInterval` is computed by number of ticks?! → Discuss

- Commenter suggests to couple tick granularity with MII interface clocking
  - For better alignment between time gating with physical data clocking.
Use Case with Different Tick Granularity

- Use case 1: aggregate flows from multiple port to one

  10GE → 25GE

  - Tick granularity is only valid on egress port;
  - Make TAS schedule for flow 1 & 2 according to TSpec

- Use case 2: schedule one flow over multiple device w/ different port rate

  1GE → 10GE → 25GE

  - Tick granularity are different on each device;
  - Make TAS schedule on each egress port according to TSpec

No need to care uniform tick granularity for multiple port rate.
Comment 201 Discuss

- Tick granularity is the capability of physical port, declaring minimal allocable time unit to the scheduling computation function block.
- Currently minimal allocable time/bandwidth unit is expressed by 0.1ns, which varies with port rate, from 1bit(GE) to 40bit(400GE).
- Shall we change minimal allocable time window from 0.1ns to 1e-x?
  - To make it align with physical MII interface clocking
Comment 202:
Qbv ConfigChangeError counter incremented incorrectly

- GateEnable signal input to all three Qbv FSMS;
**ConfigError Counter**

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**DISCUSS:**
- This erroneous scenario happens only when changing configuration during runtime and AdminBaseTime is mistakenly set.
- Correct procedure for runtime reconfiguration is set Admin variables first and then set ConfigChange trigger.

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**Figure 8-16—List Config state machine**

```plaintext
a) If:
   AdminBaseTime >= CurrentTime (8.6.9.4.10)
   (i.e., AdminBaseTime specifies the current time or a future time)
   Then:
   ConfigChangeTime = AdminBaseTime

b) If:
   (AdminBaseTime < CurrentTime) and (GateEnabled = FALSE)
   (i.e., AdminBaseTime specifies a time in the past, and the current schedule is stopped)
   Then:
   ConfigChangeTime = (AdminBaseTime + N*AdminCycleTime)
   where N is the smallest integer for which the relation
   ConfigChangeTime >= CurrentTime
   would be TRUE.

c) If:
   (AdminBaseTime < CurrentTime) and (GateEnabled = TRUE)
   (i.e., AdminBaseTime specifies a time in the past, and the current schedule is running)
   Then:
   Increment ConfigChangeError counter (12.29.1)
   ConfigChangeTime = (AdminBaseTime + N*AdminCycleTime)
   where N is the smallest integer for which the relation
   ConfigChangeTime >= CurrentTime
   would be TRUE.
```
My Views in 802.1Qbv FSM

FSM in Standard is just procedural guidance, not cycle accurate.
Dynamic Reconfiguration

- The only requirement for dynamic reconfiguration is smooth changing, it is desirable to have no interference for stable flow schedule.
  - Small jitter is tolerable
  - More analysis is preferred on efficiency of dynamic reconfiguration, aiming for less wasted bandwidth and traffic bursts.

FSM in Standard is just procedural guidance, not cycle accurate.
Thank you

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Dynamic Reconfiguration

- Dynamic reconfiguration procedure is long, it will include the following steps:
  1. Set Admin variables, and then Set ConfigChange, List config FSM enter CONFIG_PENDING
  2. Wait till ConfigChangeTime, List config FSM enter UPDATE_CONFIG, Copy Admin variables to Oper variables, and then set newConfigCT;
  3. newConfigCT will trigger cycleTimer FSM into CYCLE_IDLE state;
  4. After one UCT, cycleTimer FSM go to SET_CYCLE_START_TIME state and calculate CycleStartTime
  5. Wait till CycleStartTime, cycleTimer FSM go to START_CYCLE state and set CycleStart
  6. Finally CycleStart trigger list EXE FSM into NEW_CYCLE