



Robust Real-time Query Processing with QStream

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- **Focus**

- QoS requirements on a per query basis
- Guaranteed result quality of DSMS queries

- **(Real-)time dependent QoS requirements**

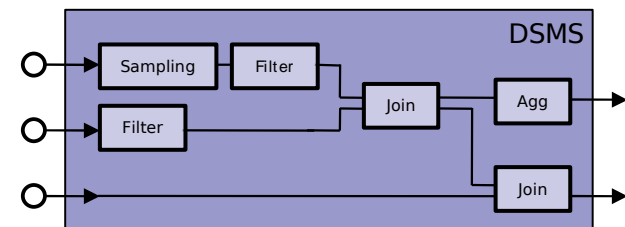
- throughput
- output delay

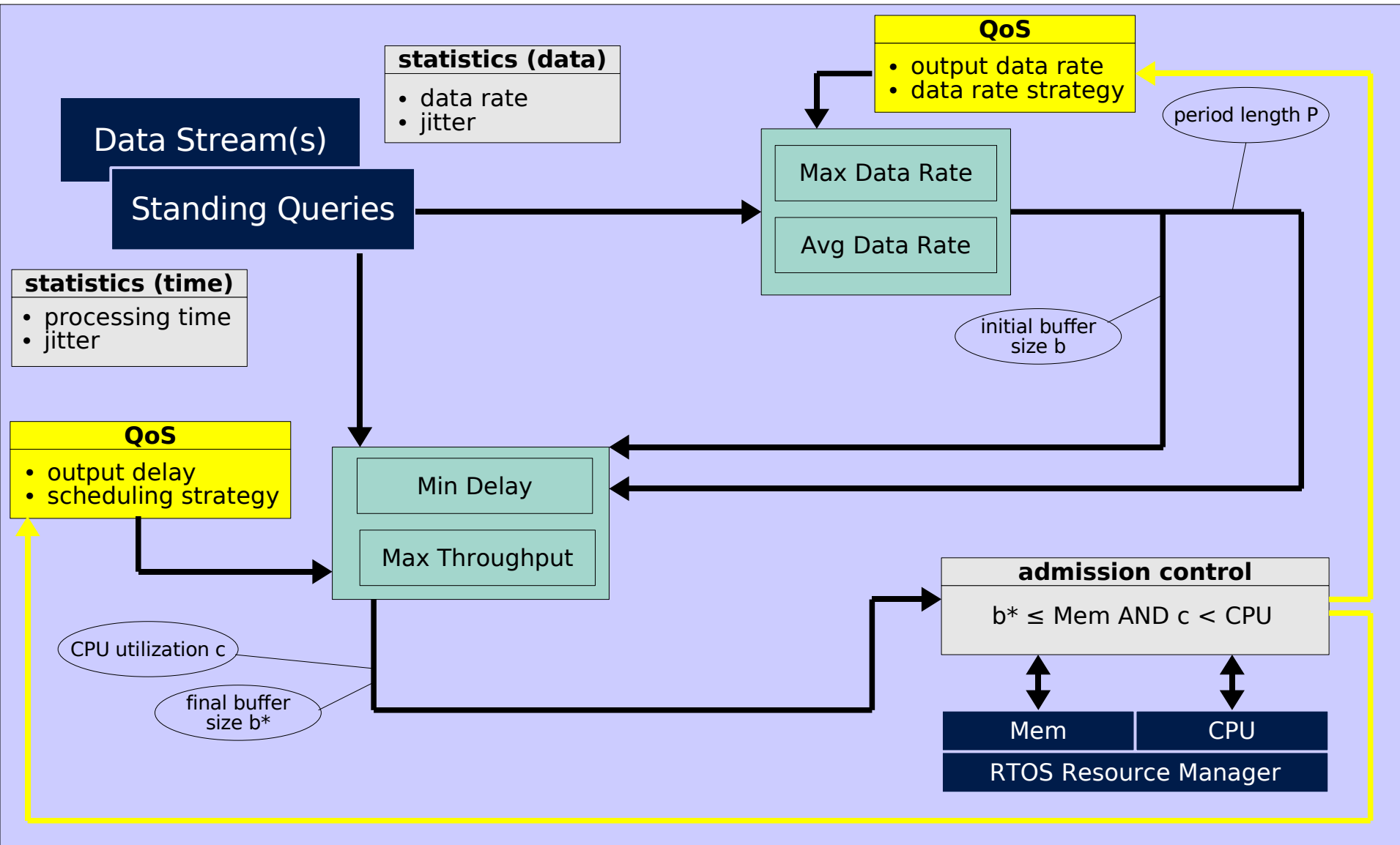
- **Data-dependent QoS requirements**

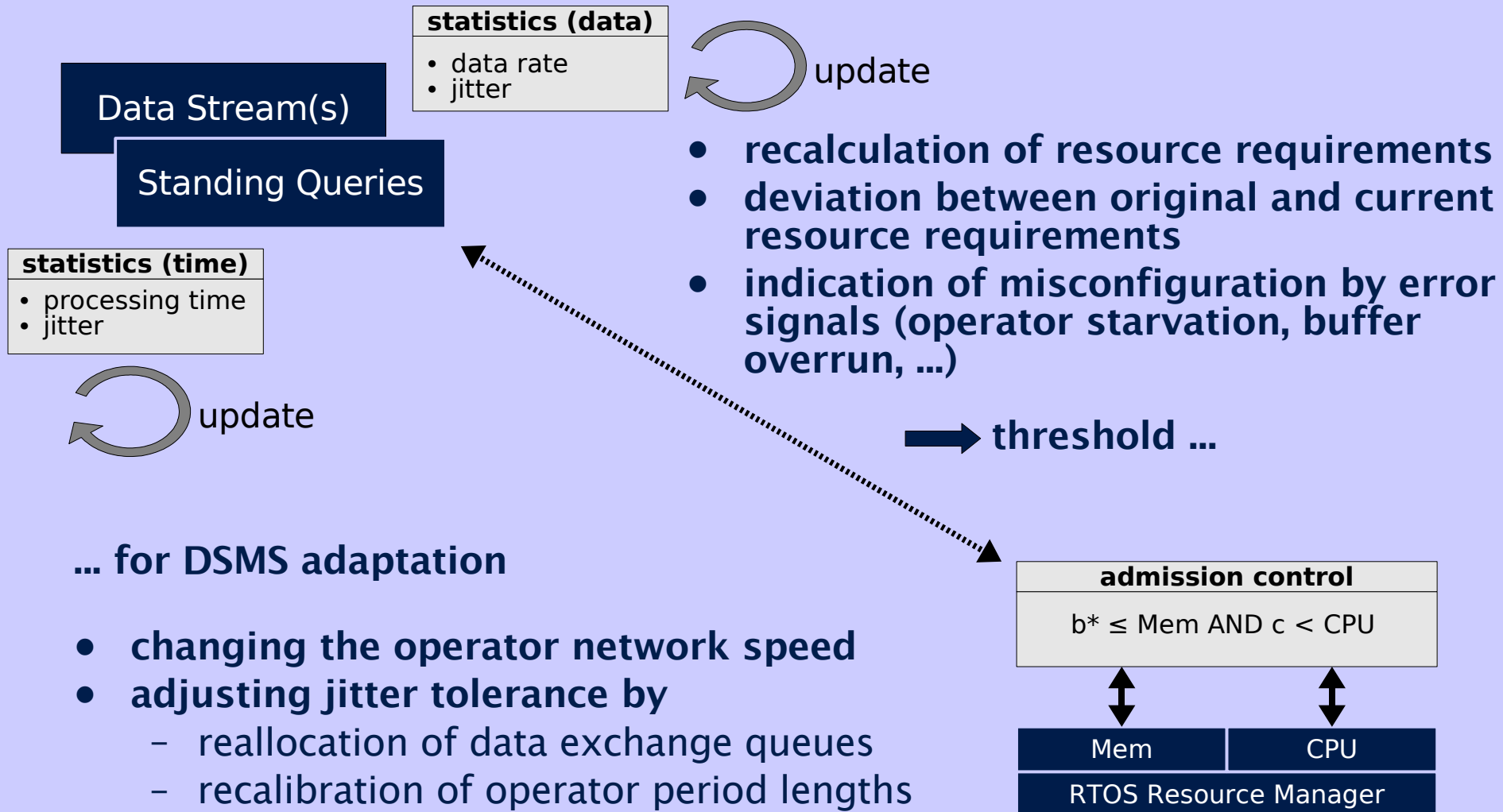
- precision
- sampling rate

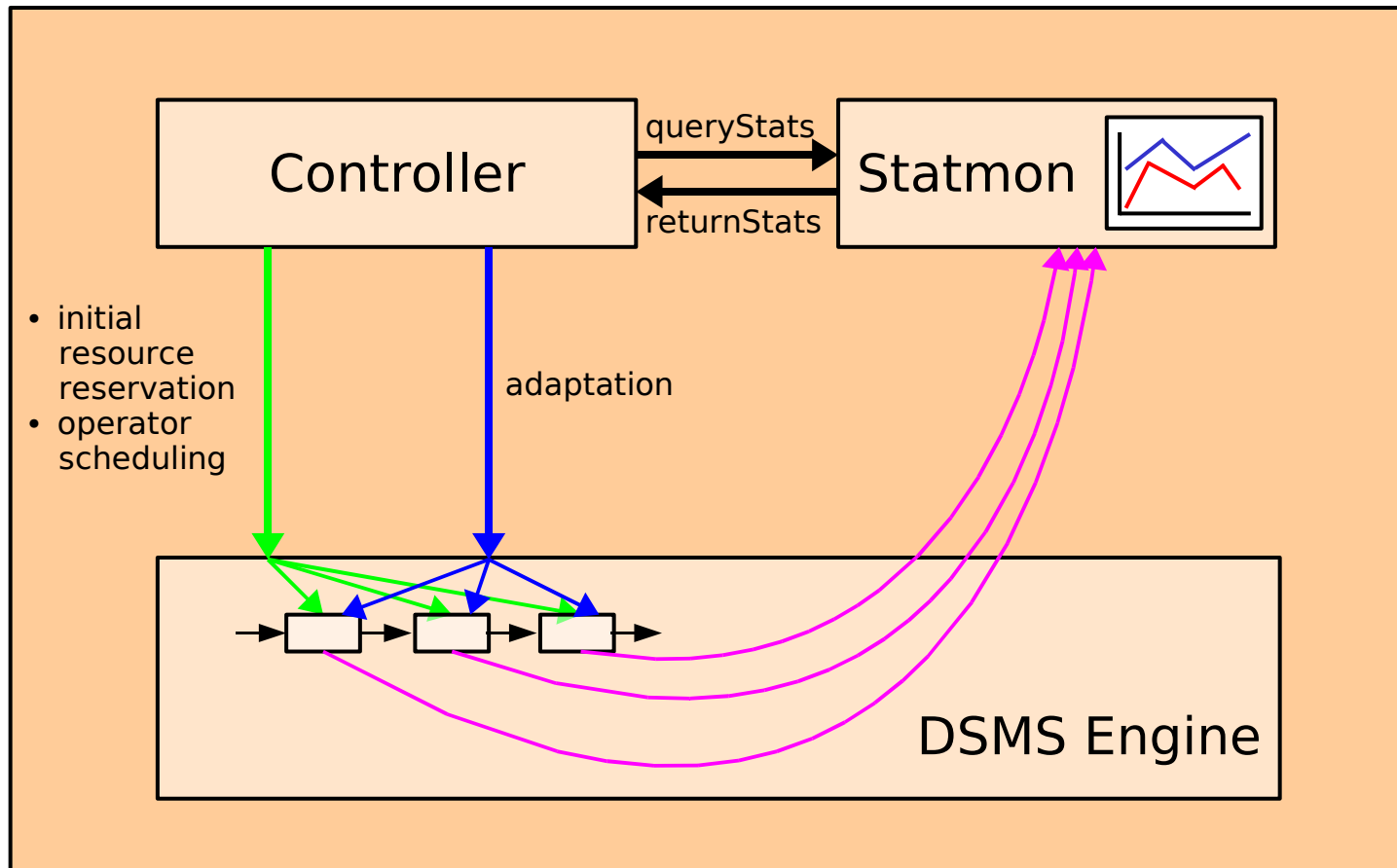
- **Concept**

- set of basic operators form operator network (queries)
- description of resource consumption / quality influence of each operator
- calculation of overall resource requirements

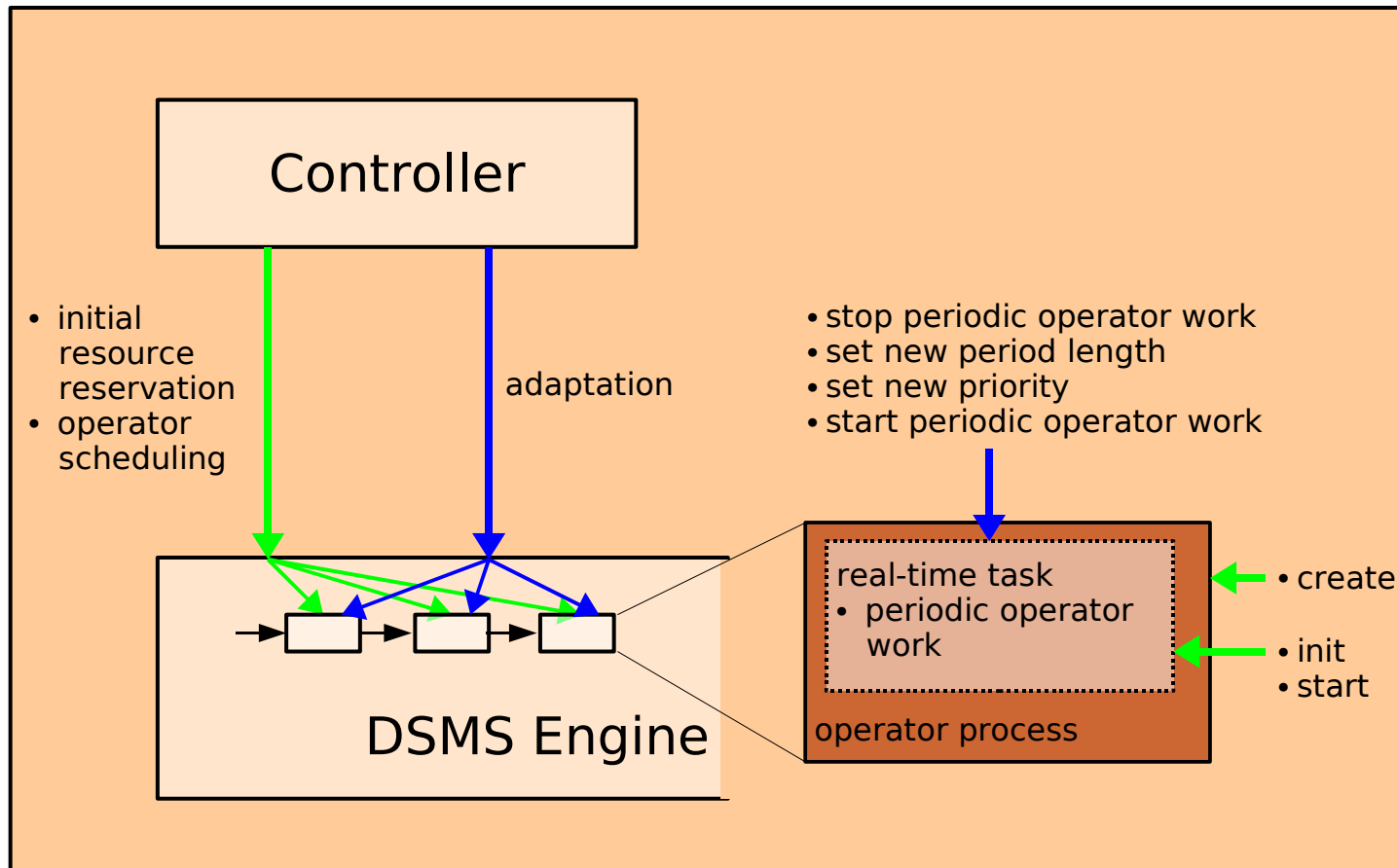




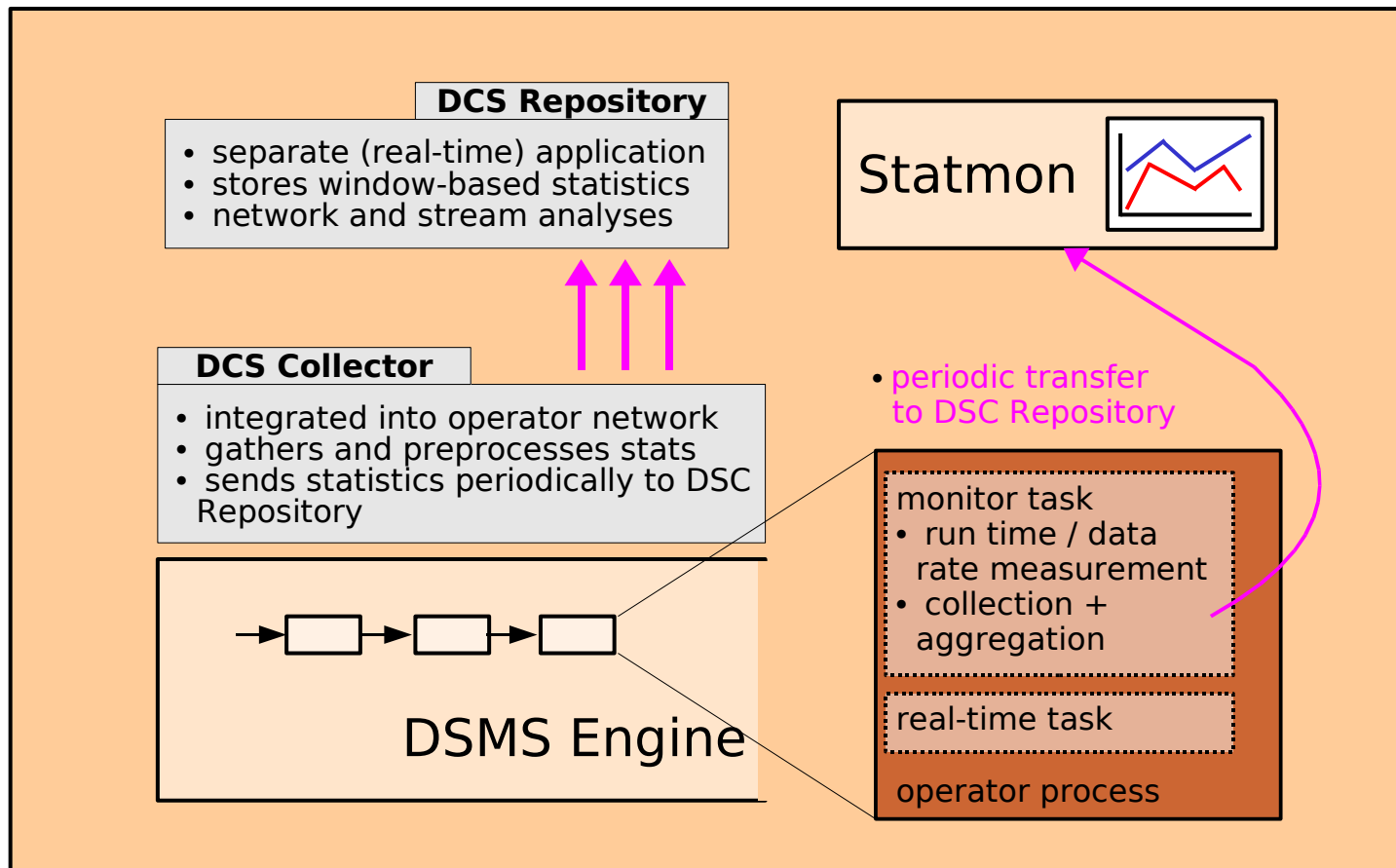




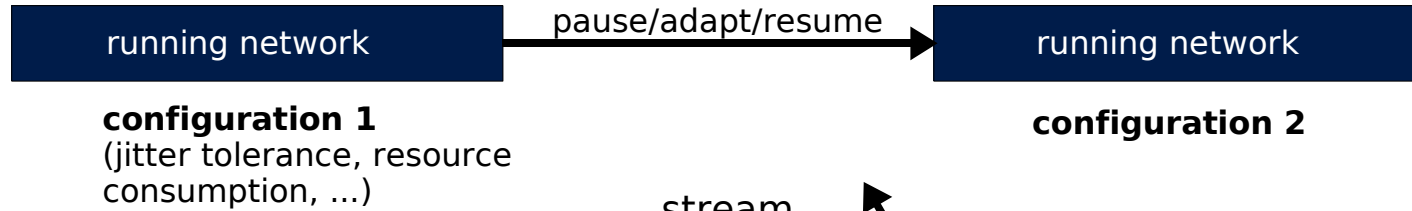
- Controlling the operators



- Monitoring: two-layered Statistics Collection



- **Concept**

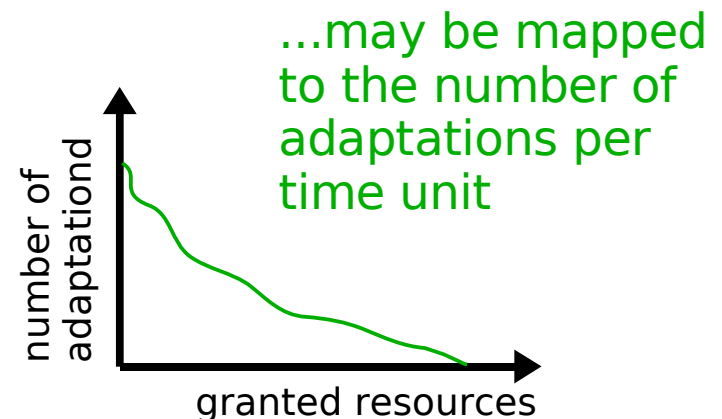
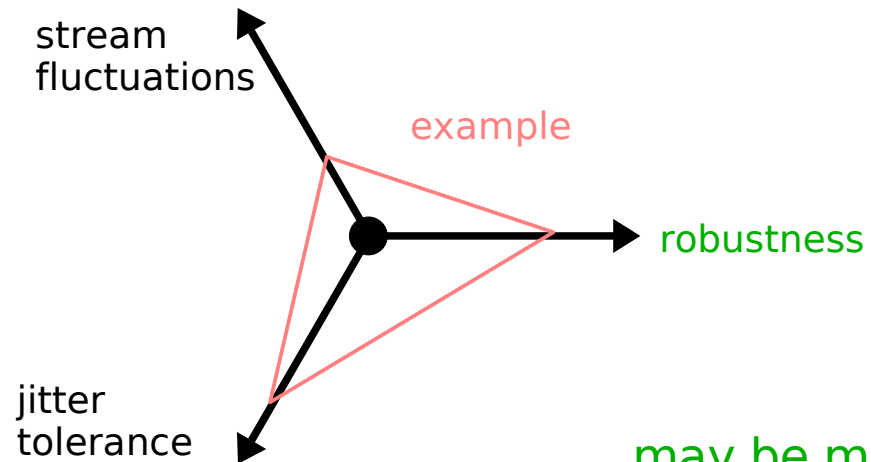


- **Robustness**

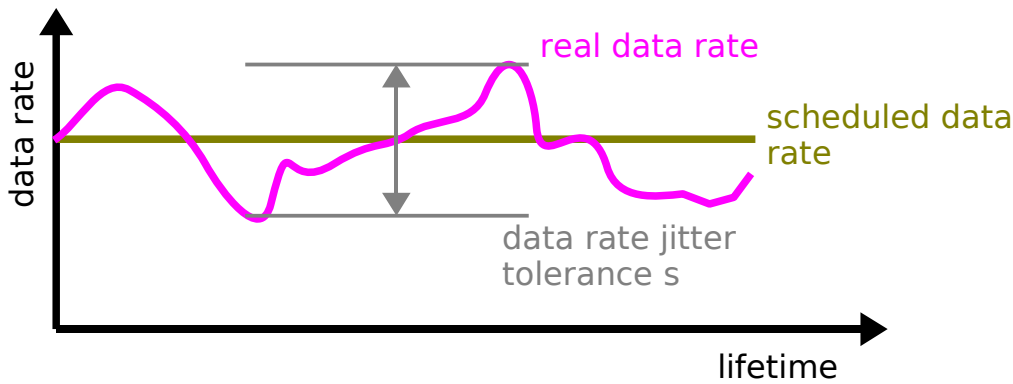
- abstract measure of system steadiness

- **general assumption**

- the more (initial) resources the user spends, the higher the robustness
- the less the data stream fluctuations are, the higher the robustness

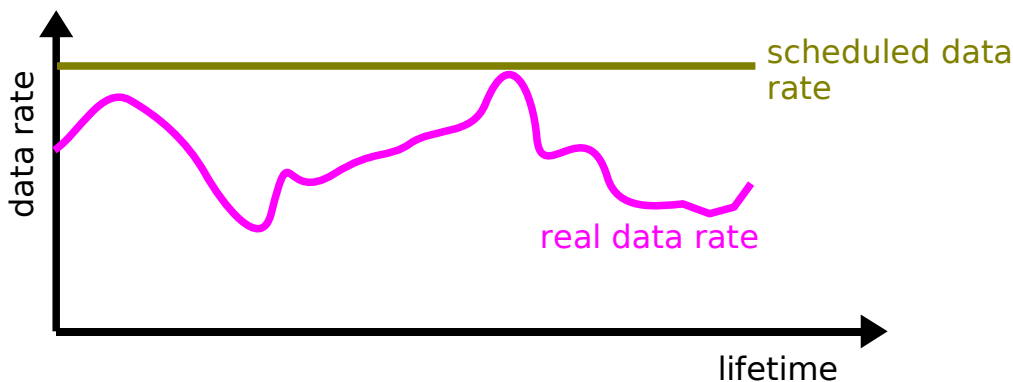


• Avg Data Rate (ADR)



- period length P determined by avg data rate (P “large”)
- leads to lower CPU utilization
- jitter tolerance given as a cumulated value; must be large enough for covering all jitter
→ compensated by buffers (large buffers)
- continuous, uninterrupted data flow (no buffer access errors)

• Max Data Rate (MDR)



- period length P determined by max data rate (P “small”)
- leads to higher CPU utilization
- no jitter to cope with
- intermediate buffers only for adjusting batch sizes (small buffers)
- data flow permanently interrupted by empty buffers
- as soon as data becomes available it will be processed with QoS guarantees

QStream Demonstration Outline

- **Resource calculation strategies for CQs**
 - **Statistics collection**
 - **Adaptation of our real-time DSMS**
 - **Trading between robustness and granted resources (QoS measure)**
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- **Wednesday, 14:00–15:30**
 - **Friday, 11:00–12:30**