Conflict-driven Load Control for the Avoidance of Data-Contention Thrashing

Presentation of a paper by A. Moenkeberg and G. Weikum from the International Conference on Data Engineering (ICDE'91)

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The Problem

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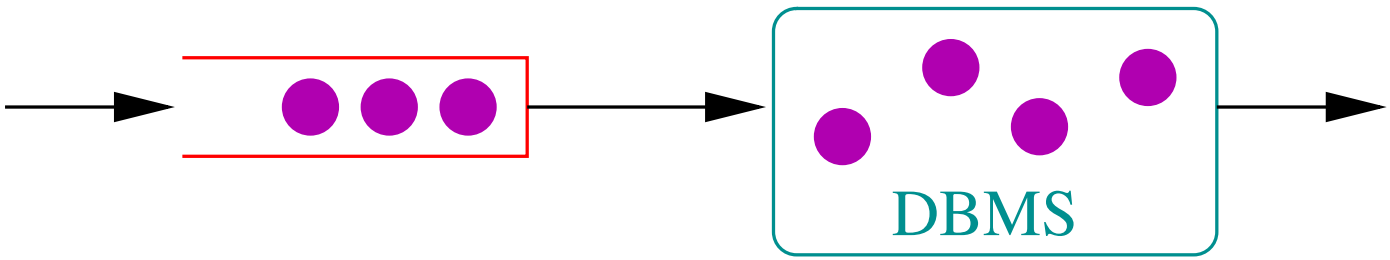
The Solution: limit the number of concurrently executing transactions



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  - transaction admissions

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Observation

This turns a dynamic optimization problem into a regulation problem.

Conflict Rate

$$\text{conflict rate} = \frac{\text{\# locks held by all transactions}}{\text{\# locks held by non-blocked transactions}}$$

- conflict rate ≥ 1
- conflict rate $= 1$ when no active transactions are blocked
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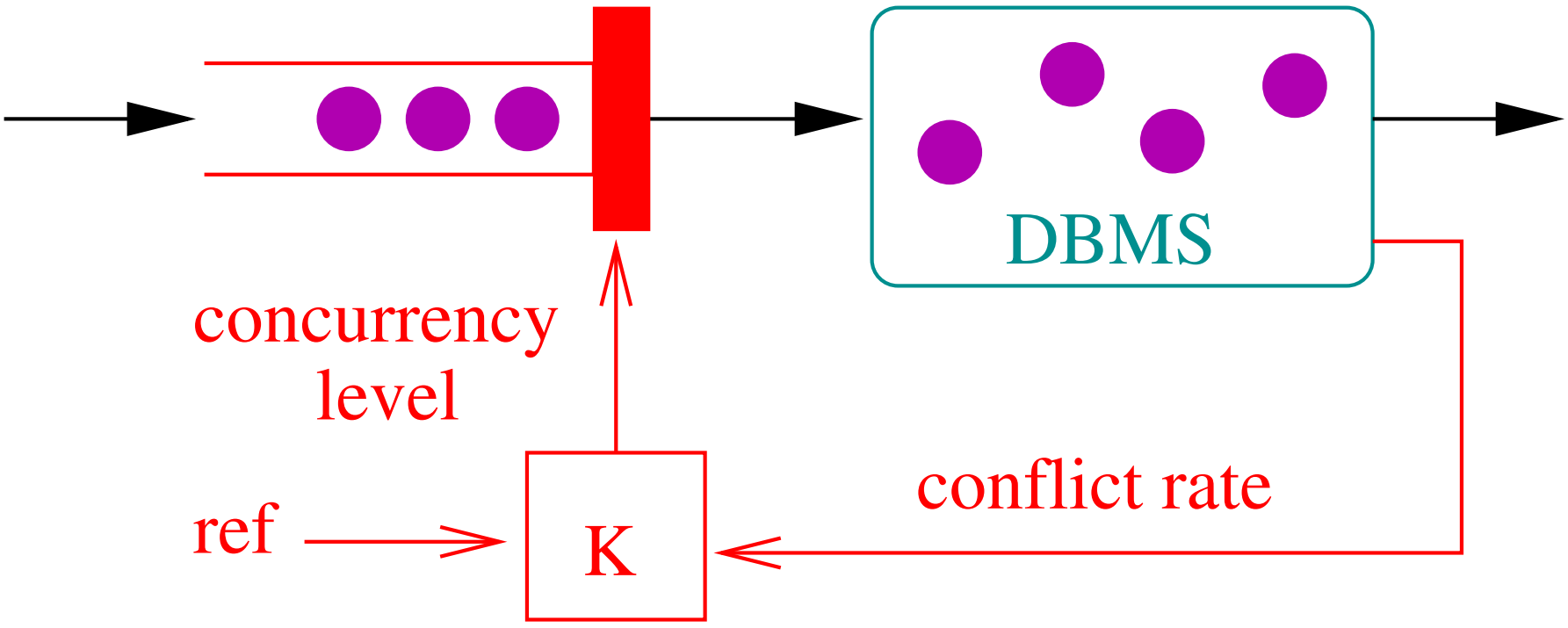
Claim

conflict rate ≥ 1.3 implies data-contention thrashing, regardless of the workload

Regulating Conflict Rate



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- when transaction blocks, consider aborting transactions

  C0: abort none
  C1: abort one
  C2: abort some (until conflict rate is below limit)

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  - disk contention
- Heiss and Wagner (VLDB'91) attempt to solve the dynamic optimization problem directly