

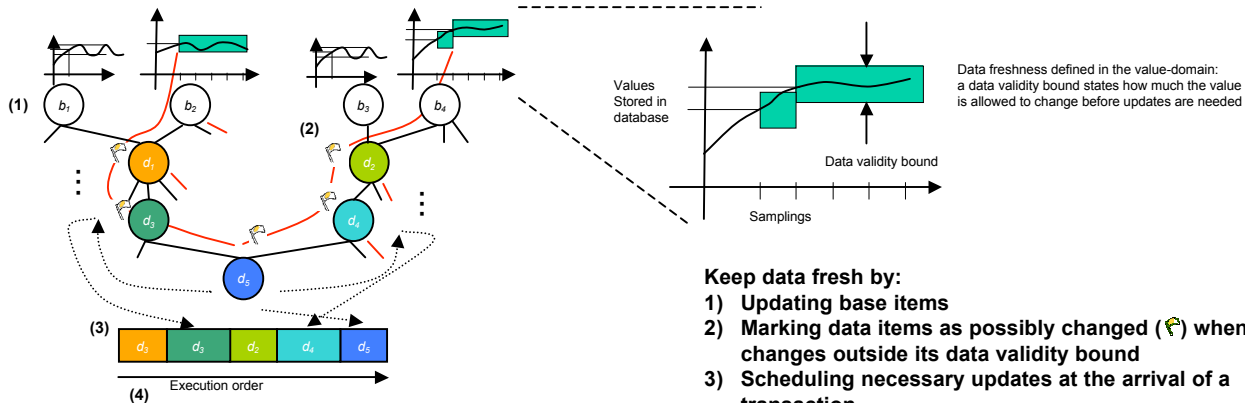
Real-Time Databases for Engine Control in Automobiles

Thomas Gustafsson and Jörgen Hansson

{thogu,jorha}@ida.liu.se

RTSLAB, IDA, LiU

Maintenance of fresh data

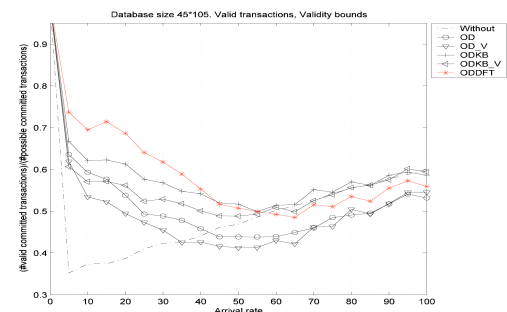
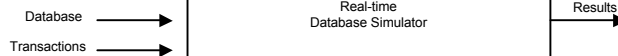


Keep data fresh by:

- 1) Updating base items
- 2) Marking data items as possibly changed (🔍) when a parent changes outside its data validity bound
- 3) Scheduling necessary updates at the arrival of a transaction
 - (i) prioritize pending updates, e.g., d_4 before d_3
 - (ii) traverse the graph such that precedence constraints are fulfilled. Needed updates are put in the schedule
- 4) Executing updates from the schedule

Results

Baseline	Time-domain	Value-domain
On-demand	OD	OD_V
On-demand knowledge based	ODKB	ODKB_V

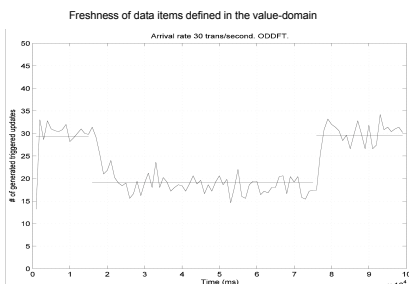


- Baseline algorithms are well-known on-demand updating algorithms focusing either on consistency of produced results (OD) or throughput of transactions (ODKB)
- The baseline algorithms are extended with the proposed updating scheme in value domain of data items (OD_V and ODKB_V)

- The proposed updating algorithm maintains consistency well since needed updates are always investigated and put in the schedule if possible

- The required number of updates is different for different system states

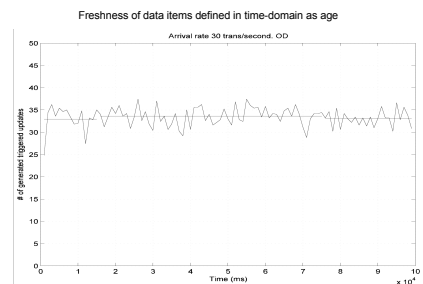
- Base items change much in the intervals 0-15 sec and 75-100 sec, and less in 15-75 sec



ODDFT uses different number of updates in the different states



Baseline algorithms extended with the proposed updating scheme also adapts the number of updates to different states



Baseline algorithms using data freshness in time-domain cannot easily adapt required number of updates