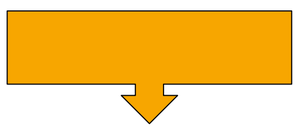
Improvement of explicit transaction parallelization with PLP

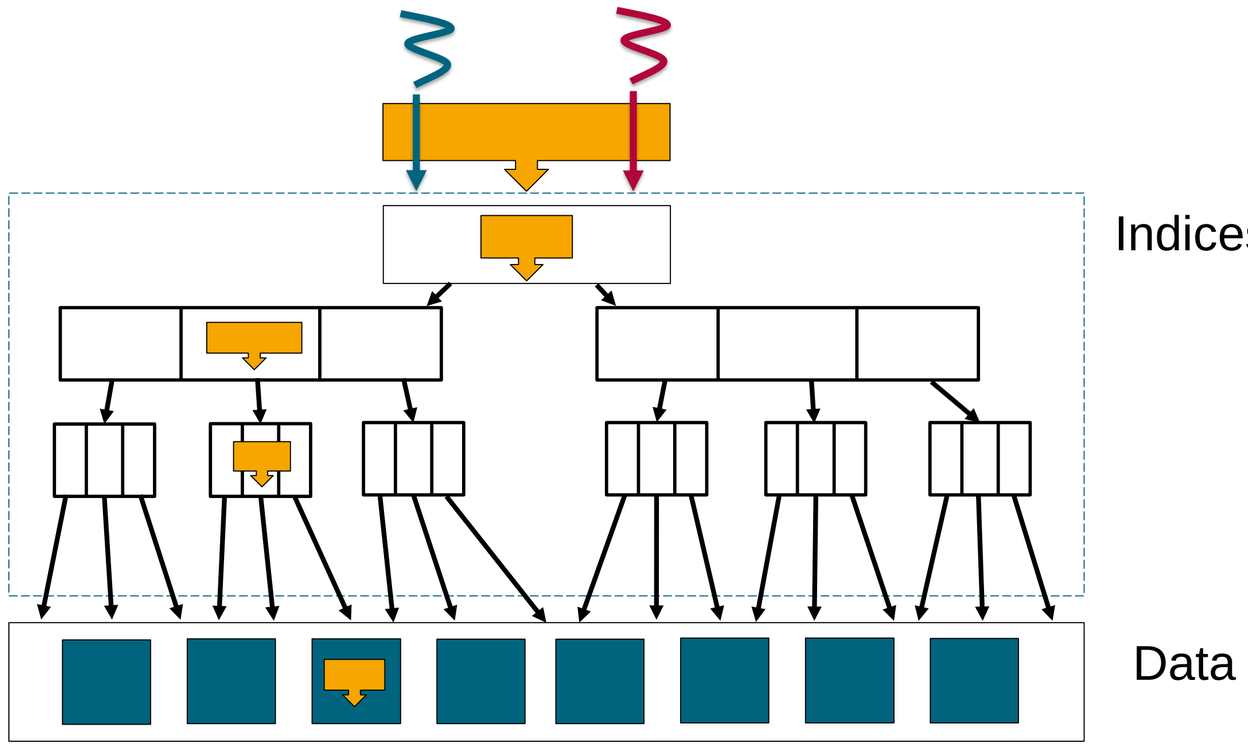
Data access is an important topic in explicit transaction parallelization. Different threads are accessing the same sectors for example on a database. Because those accesses of different threads are unpredictable, some sections of the hard drive get a critical section because multiple threads access those sections at the same time. This leads to a higher transaction execution time because threads need to be synchronized and must wait for each other.

The data access problem

Threads

Synchronisation (Lock)

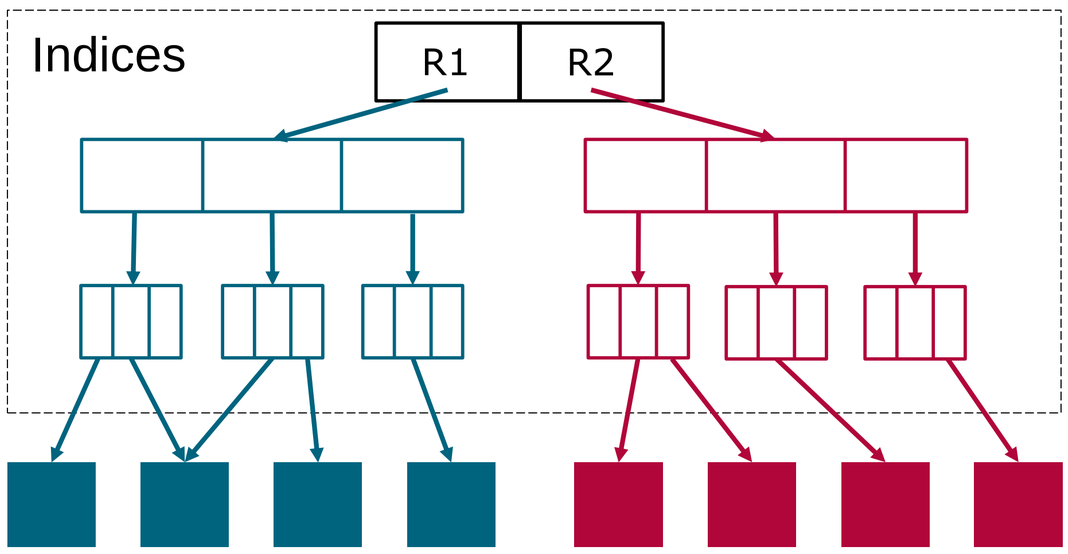




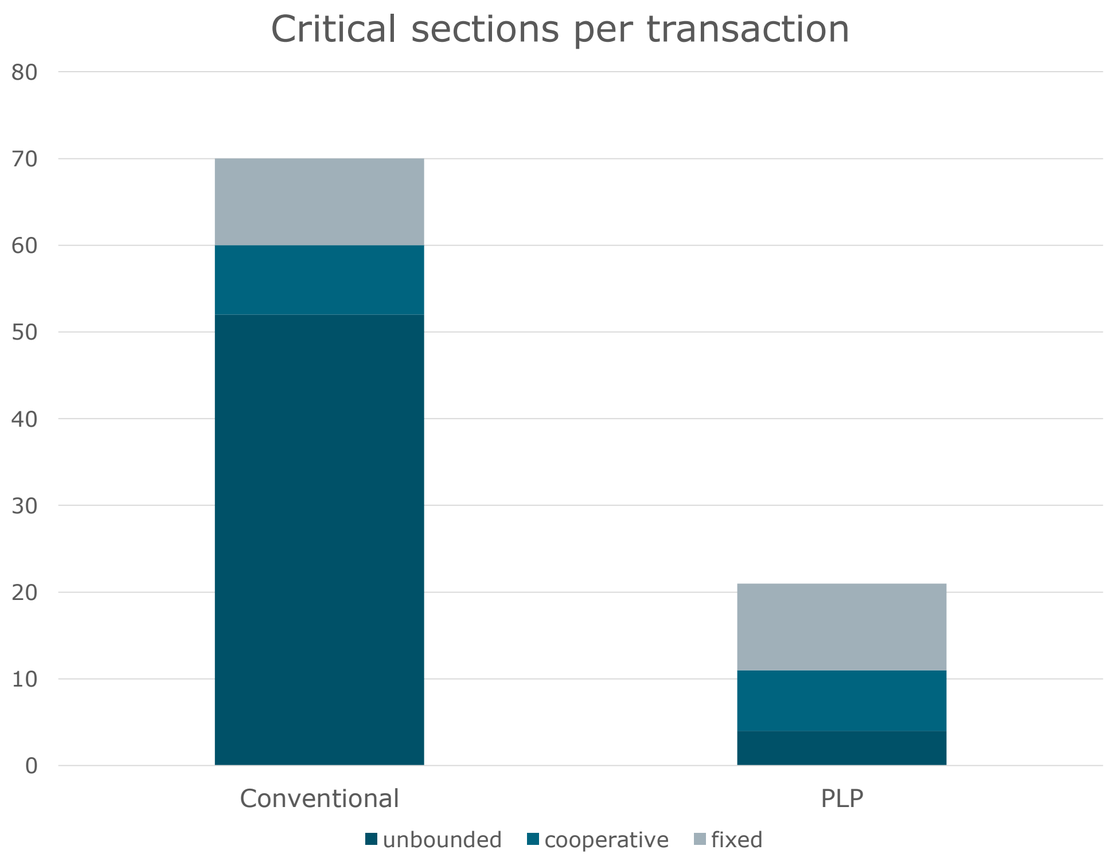
Physiological partitioning (PLP) describes the process where the index of the same address space is split into different ranges. Those ranges get assigned to specific threads. As you can the in the following example the indices of the data got separated into two ranges and get assigned to different threads. This means that those two threads should rarely wait on the other thread for data access because they only access separate sections of the indices.

Example

Range	Threads
A - M	
N - Z	



Evaluation



That means PLP eliminates 70% of the critical sections[1]

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Lecture Series on Practical Data Engineering
Based on the talk by Prof. Pınar Tözün

References
[1] https://www.tele-task.de/lecture/video/7891/

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