

# Faster Concurrent Range Queries with Contention Adapting Search Trees Using Immutable Data

Kjell Winblad<sup>1</sup>

<sup>1</sup> Department of Information Technology, Uppsala University, Sweden  
kjell.winblad@it.uu.se

---

## Abstract

The need for scalable concurrent ordered set data structures with linearizable range query support is increasing due to the rise of multicore computers, data processing platforms and in-memory databases. This paper presents a new concurrent ordered set with linearizable range query support. The new data structure is based on the contention adapting search tree and an immutable data structure. Experimental results show that the new data structure is as much as three times faster compared to related data structures. The data structure scales well due to its ability to adapt the sizes of its immutable parts to the contention level and the sizes of the range queries.

**1998 ACM Subject Classification** D.2.8 Performance measures, E.1 Trees, H.2.4 Concurrency

**Keywords and phrases** linearizability, concurrent data structures, treap

**Digital Object Identifier** 10.4230/OASIs.ICCSW.2017.07



© Kjell Winblad;  
licensed under Creative Commons License CC-BY  
2017 Imperial College Computing Student Workshop (ICCSW 2017).  
Editors: Fergus Leahy and Juliana Franco; Article No. 07; pp. 07:1–07:1  
Open Access Series in Informatics



**OASIS** Schloss Dagstuhl – Leibniz-Zentrum für Informatik, Dagstuhl Publishing, Germany

ICCSW17