

## Accepted Manuscript

Grasping the gap between blocking and non-blocking transactional memories

Petr Kuznetsov, Srivatsan Ravi

PII: S0743-7315(16)30126-5

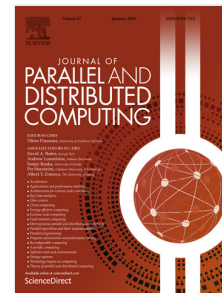
DOI: <http://dx.doi.org/10.1016/j.jpdc.2016.10.008>

Reference: YJPDC 3546

To appear in: *J. Parallel Distrib. Comput.*

Received date: 1 February 2016

Accepted date: 4 October 2016



Please cite this article as: P. Kuznetsov, S. Ravi, Grasping the gap between blocking and non-blocking transactional memories, *J. Parallel Distrib. Comput.* (2016), <http://dx.doi.org/10.1016/j.jpdc.2016.10.008>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Grasping the Gap between Blocking and Non-blocking Transactional Memories

Petr Kuznetsov<sup>a</sup>, Srivatsan Ravi<sup>b</sup>

<sup>a</sup>Telecom ParisTech, FRANCE, Email: petr.kuznetsov@telecom-paristech.fr

<sup>b</sup>Dept. of Computer Science, Purdue University, Email: srivatsan@srivatsan.in

---

## Abstract

Transactional memory (TM) is an inherently optimistic abstraction: it allows concurrent processes to execute sequences of shared-data accesses (transactions) speculatively, with an option of aborting them in the future. Early TM designs avoided using locks and relied on non-blocking synchronization to ensure *obstruction-freedom*: a transaction that encounters no step contention is not allowed to abort. However, it was later observed that obstruction-free TMs perform poorly and, as a result, state-of-the-art TM implementations are nowadays *blocking*, allowing aborts because of data *conflicts* rather than step contention.

In this paper, we explain this shift in the TM practice theoretically, via complexity bounds. We prove a few important lower bounds on obstruction-free TMs. Then we present a *lock-based* TM implementation that beats all of these lower bounds. In sum, our results exhibit a considerable complexity gap between non-blocking and blocking TM implementations.

*Keywords:* Transactional memory, Obstruction-freedom, Memory stalls, Expensive synchronization, Lower bounds, Invisible reads, Disjoint-access parallelism, Perturbability, Blocking, Non-blocking

---

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات