

## INTRODUCTION

- **Software Transaction Memory Systems (STMs)** are a convenient programming interface for a programmer to access shared memory using concurrent threads without worrying about concurrency issues.
- STMs export the following methods: `t_begin`, `t_read`, `t_write`, `tryC`, `tryA`.
- **Object-based STMs (OSTMs)** operate on higher level objects rather than primitive read & writes operations which act upon memory locations.
- OSTMs exports `t_begin`, `t_insert`, `t_delete`, `t_lookup` and `tryC` methods for *Set*.

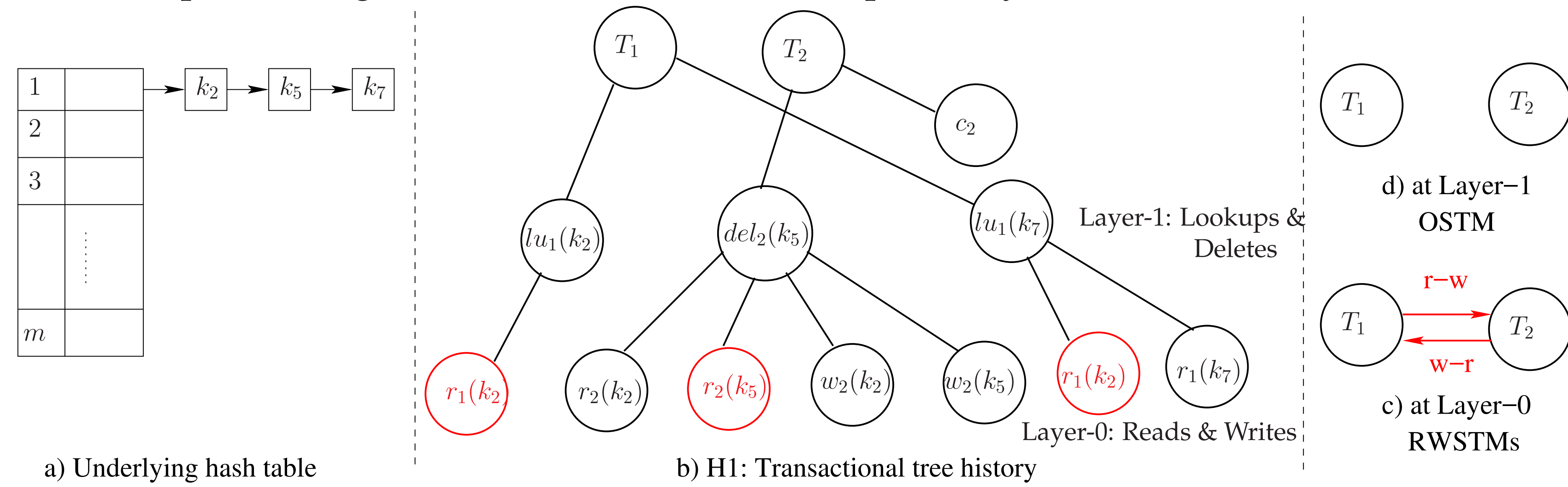


Figure 1: Motivational example of OSTMs Vs RWSTMs

## MOTIVATION

- Multi-version OSTM (MVOSTM) reduces the number of aborts and provides greater concurrency.

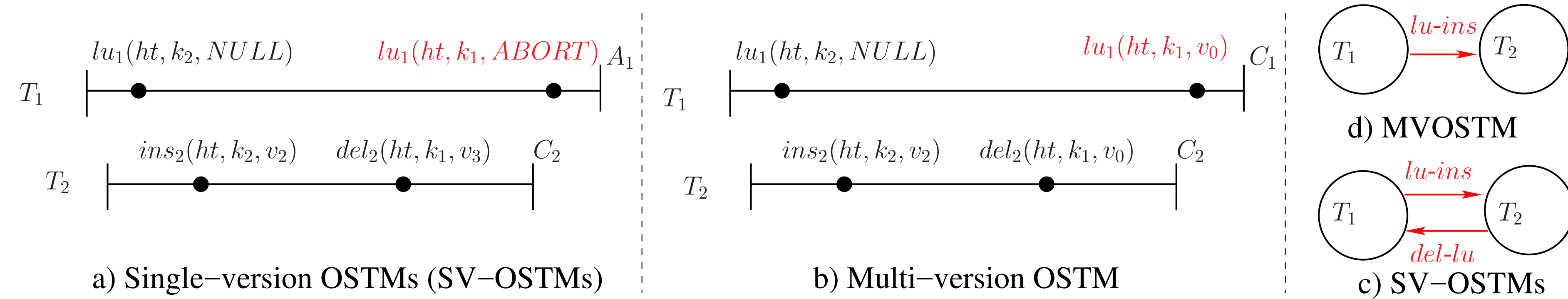


Figure 2: Advantages of multi-version over single-version OSTM

## PROPOSED PROTOCOL: HT-MVOSTM

- The effect of whole transaction  $T_i$  will be atomic in that sense it ensure compositionality.

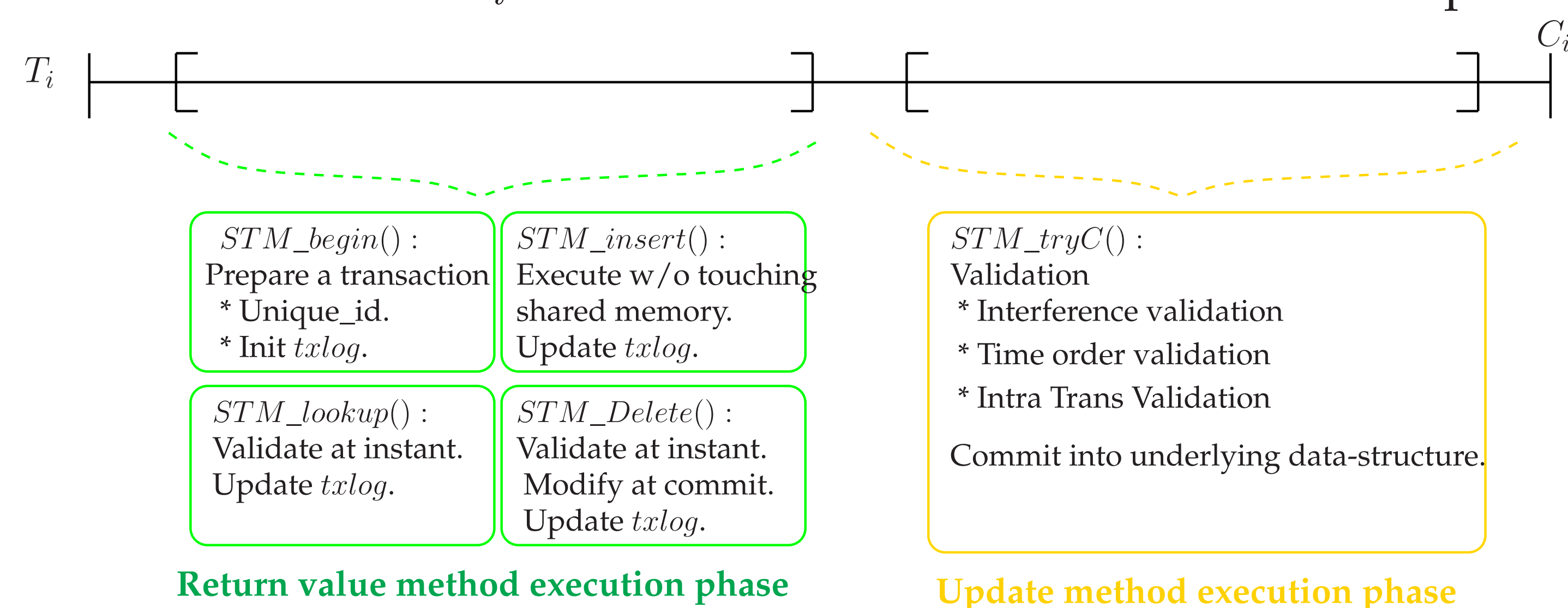


Figure 3: MV-OSTM transaction lifecycle

## HT-MVOSTM DESIGN

- We have proposed the new *CDS* as *lazyrb-list* to reduce the traversal time.
- Each key  $k$  maintains multiple versions to reduce the number of aborts.

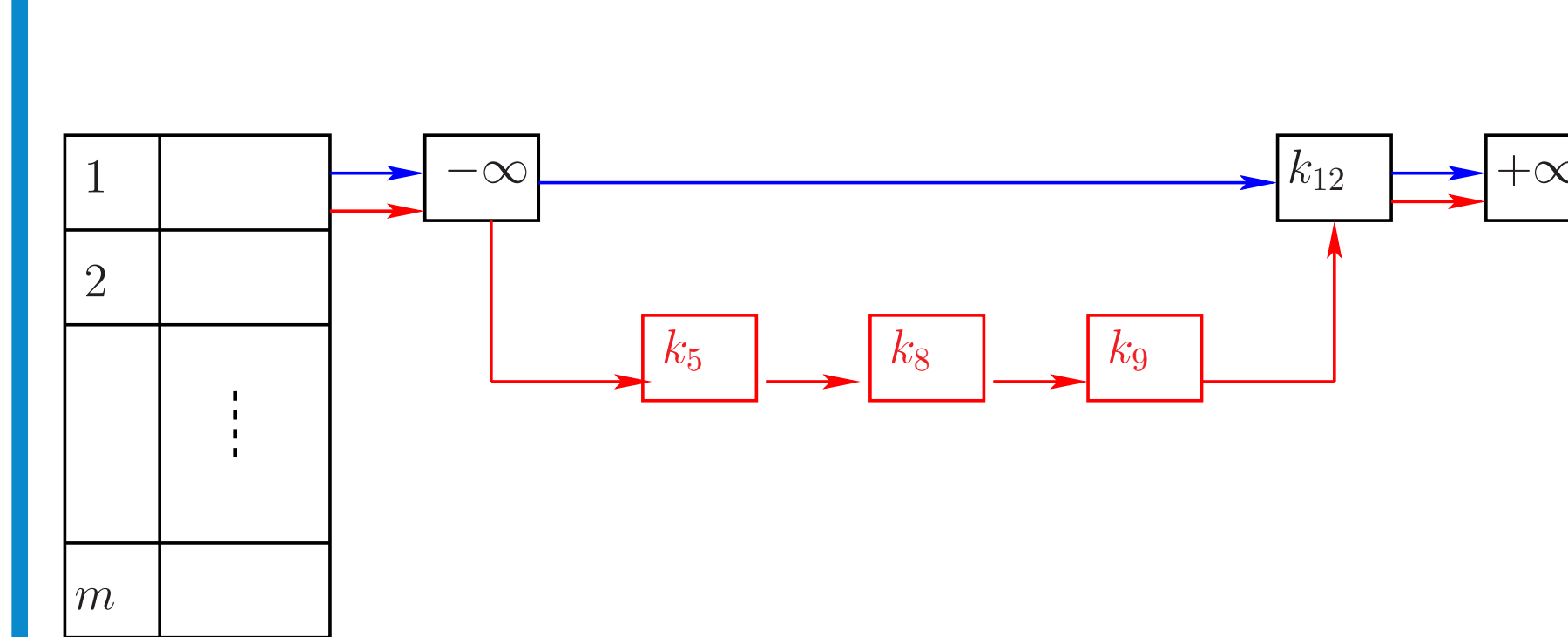


Figure 4: HT-MVOSTM with Lazyrb-list

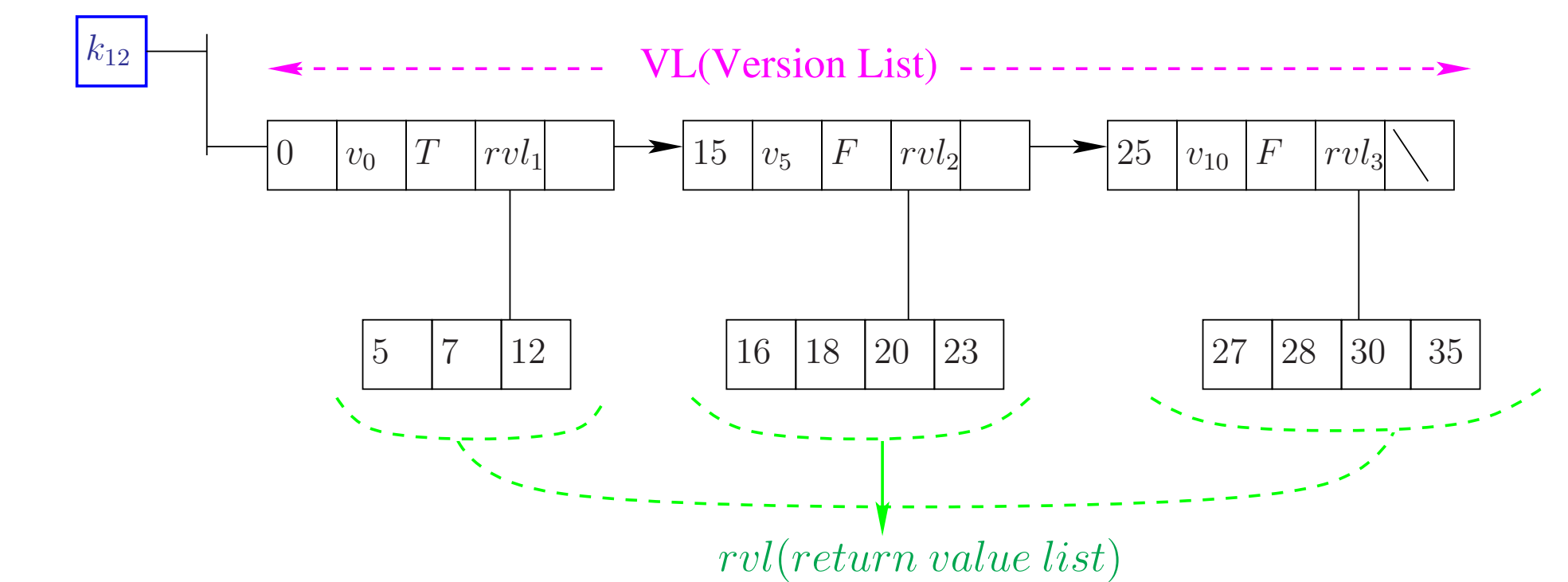
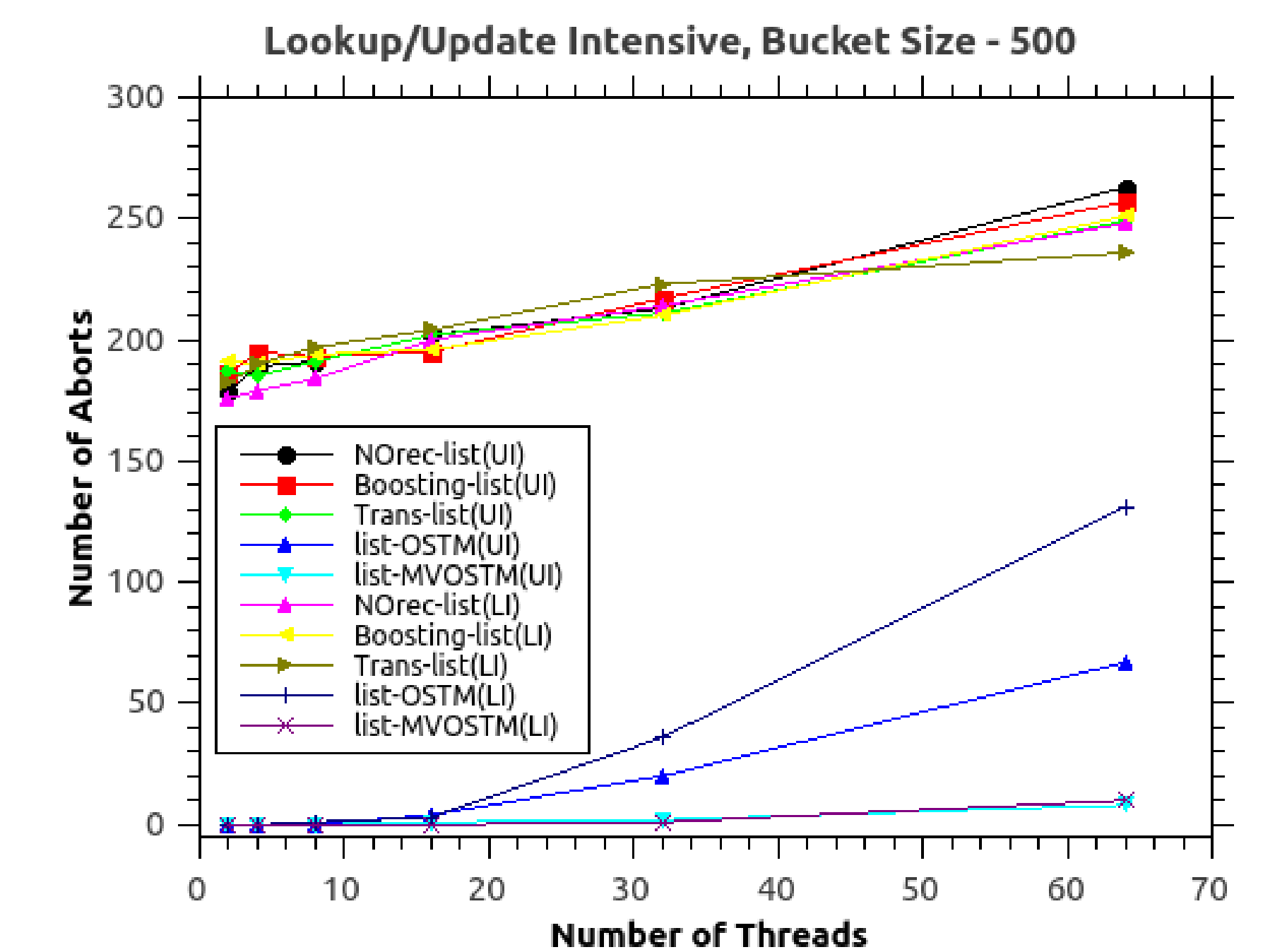
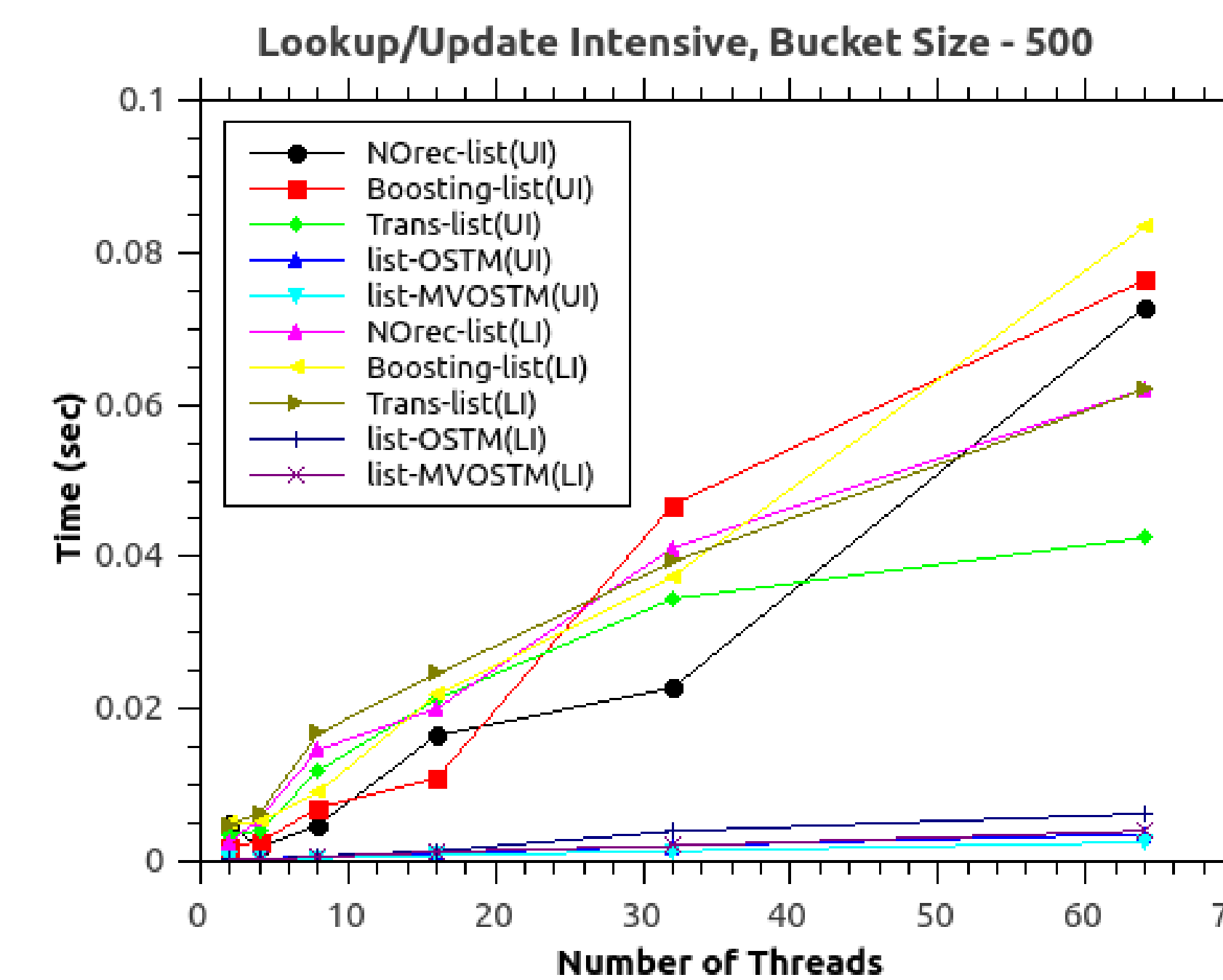


Figure 5: Maintaining Multiple Versions

## EXPERIMENTAL EVALUATION

- We have compare our proposed *list-MVOSTM* with state-of-the-arts STMs (NOrec-list, Boosting-list, Trans-list, list-OSTM).
- LI and UI workloads are (lu-90%, ins-8%, del-2%) & (lu-10%, ins-45%, del-45%), respectively.
- *list-MVOSTM* outperform 15 to 20 times speedup and negligible aborts as compare to other STMs.



## CONCLUSION & FUTURE WORK

- We have proposed a new STM as MVOSTM which provides greater concurrency with the help of multiple versions to reduce the number of aborts and it's composable too.
- MVOSTM ensures *mv-permissiveness* which never aborts a return-value only transaction.
- MVOSTM satisfies opacity.
- It can be extended for other *CDS* as well.

## CONTACT INFORMATION

Web: [http://www.iith.ac.in/sathya\\_p/](http://www.iith.ac.in/sathya_p/)  
Email: (sathya\_p, cs15resch01001)@iith.ac.in  
Phone: (040) 2301 8446