

Nesting and Composition in Transactional Data

Structure Libraries

Gal Assa[‡]

Hagar Meir[†]

Guy Golan-Gueta^{*}

Idit Keidar[‡]

Alexander Spiegelman^{*}

[‡]Technion, Israel

[†]IBM Research

^{*}VMware Research

Motivation

- Transactions are powerful
- Transactional memory is costly
- Long transactions are not likely to succeed

```
Atomic
{
  a.Op1()
  a.Op2(b.Op3())
  ....
}
```

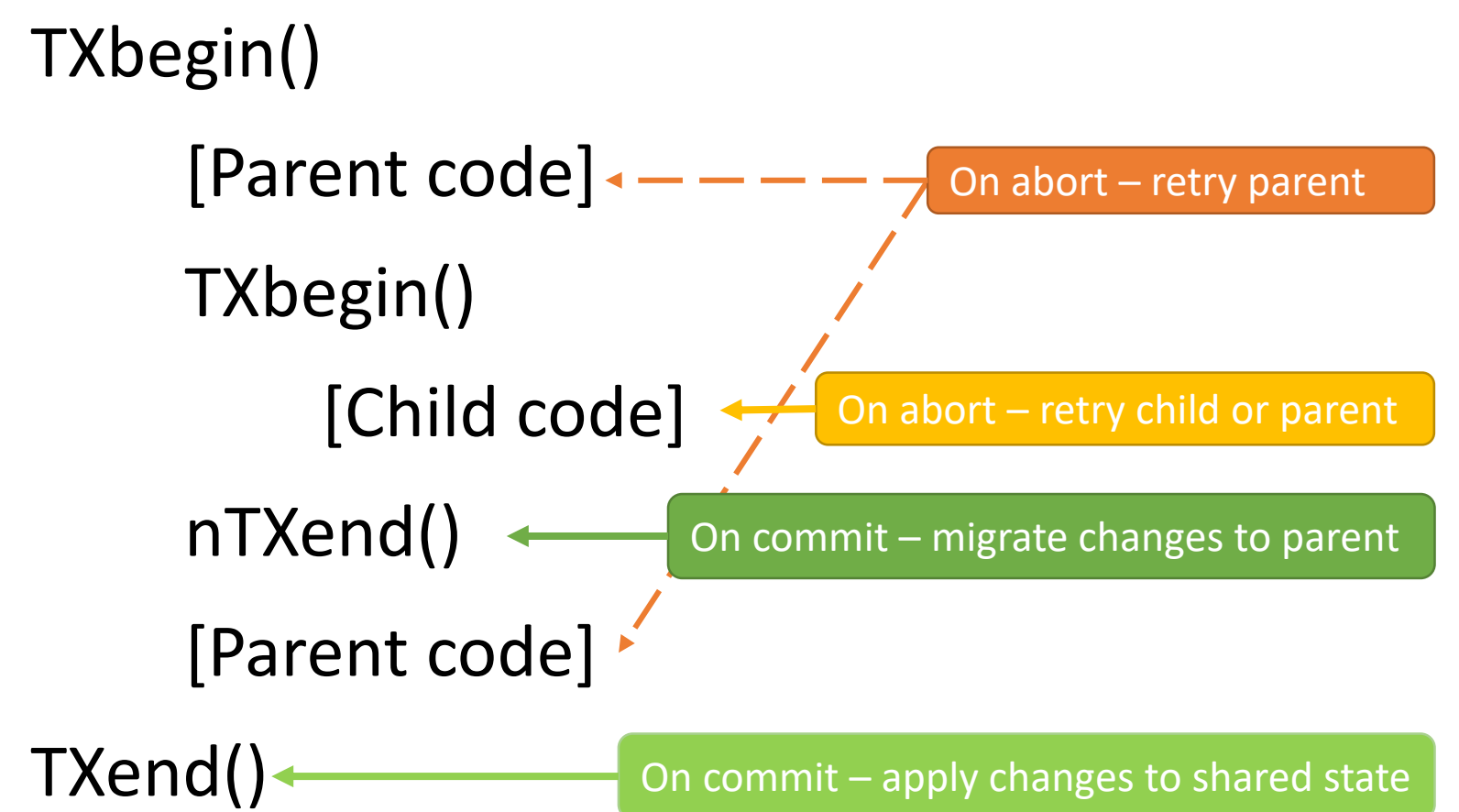
Contribution

- A Java transactional data structure library with support for nesting
- Additional transactional data structures
- A benchmark for transactional libraries and frameworks
- Guidelines for composition of transactional libraries

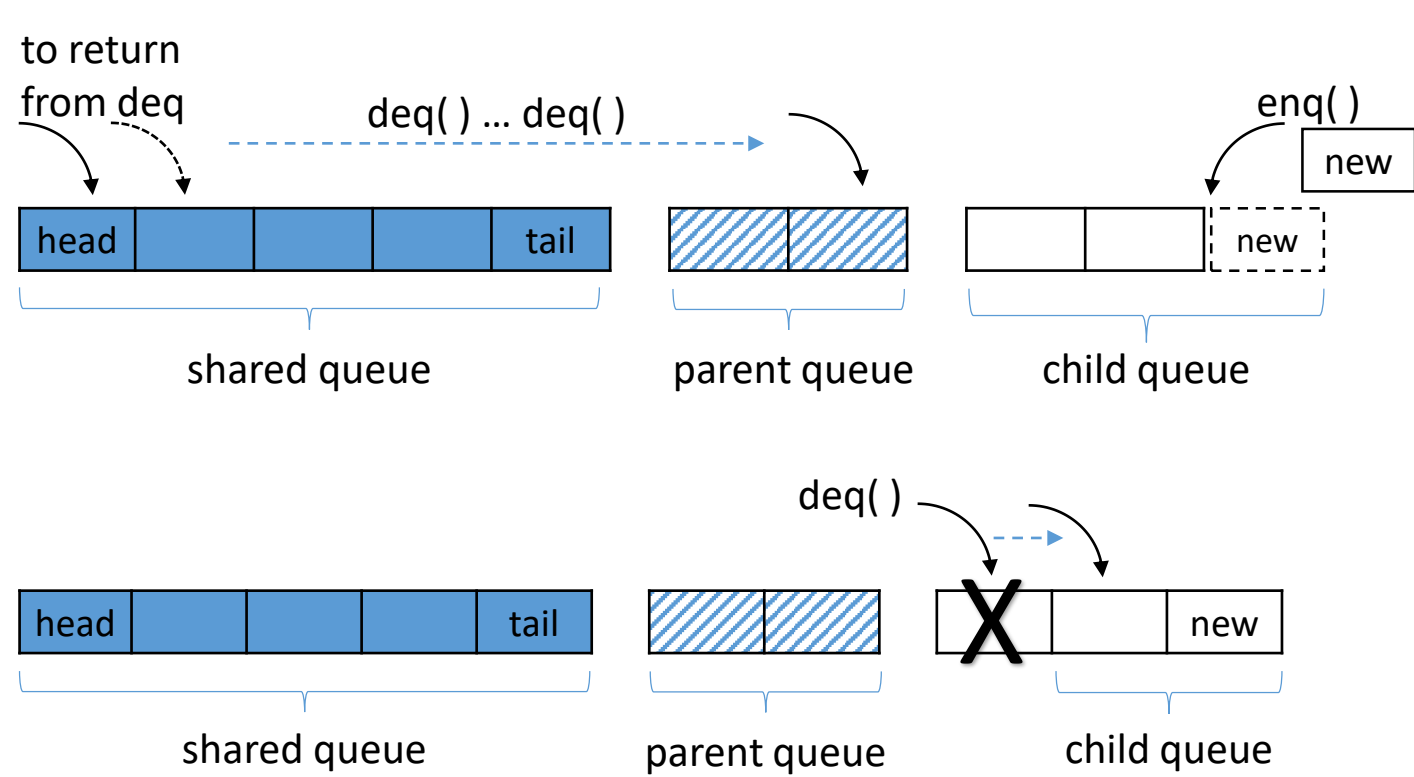
Nesting

- Create checkpoints, retry less → save time and work
- Child transactions are isolated until migrated
- Lock management is required

Nesting: Limit Scope of Abort



Data-structure Specific Nested Operations



Case Study: NIDS

- Network intrusion detection system benchmark
- Long transactions
 - Multiple objects
 - Significant computations

