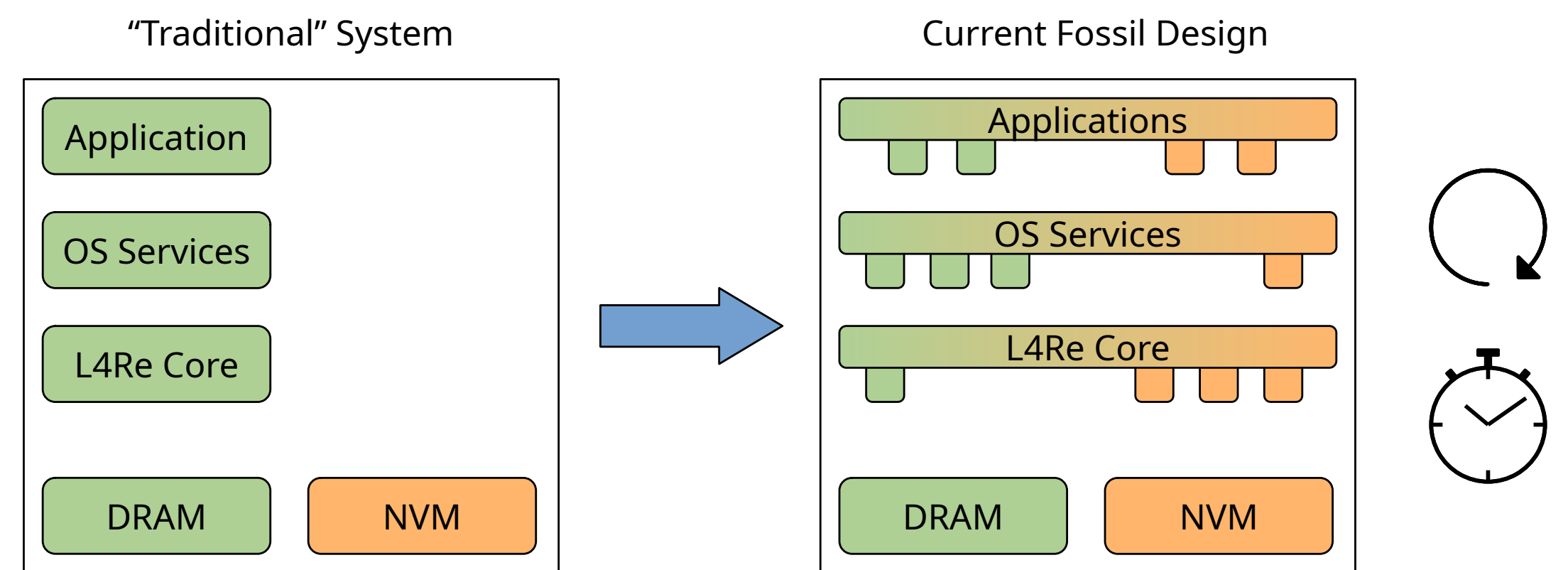


FOSSIL: Operating System Support to Leverage Byte Granular Non-Volatile Memory Technologies

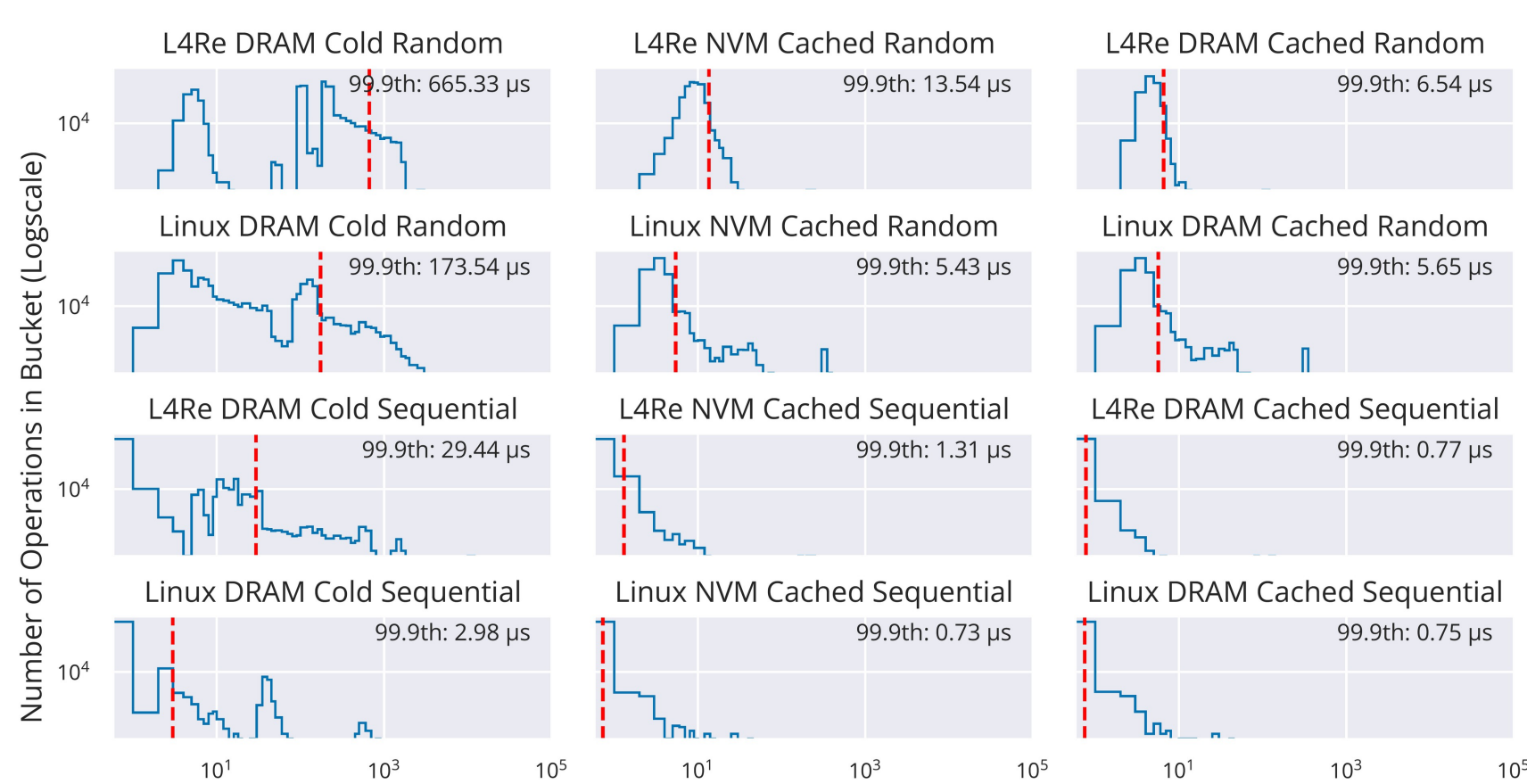
Till Miemietz, Michael Roitzsch, and Hermann Härtig

Done – Enabled a Microkernel OS to Run on NVM:

- Exploit microkernel benefits (fault containment, ...)
- Offer fine-grained data placement decisions
 - Whole system persistence (WSP) for consistency
- Evaluated system performance & recovery time



Latency Histogram of LevelDB Read Benchmark for Reboot (Cold) / Resume (Cached)



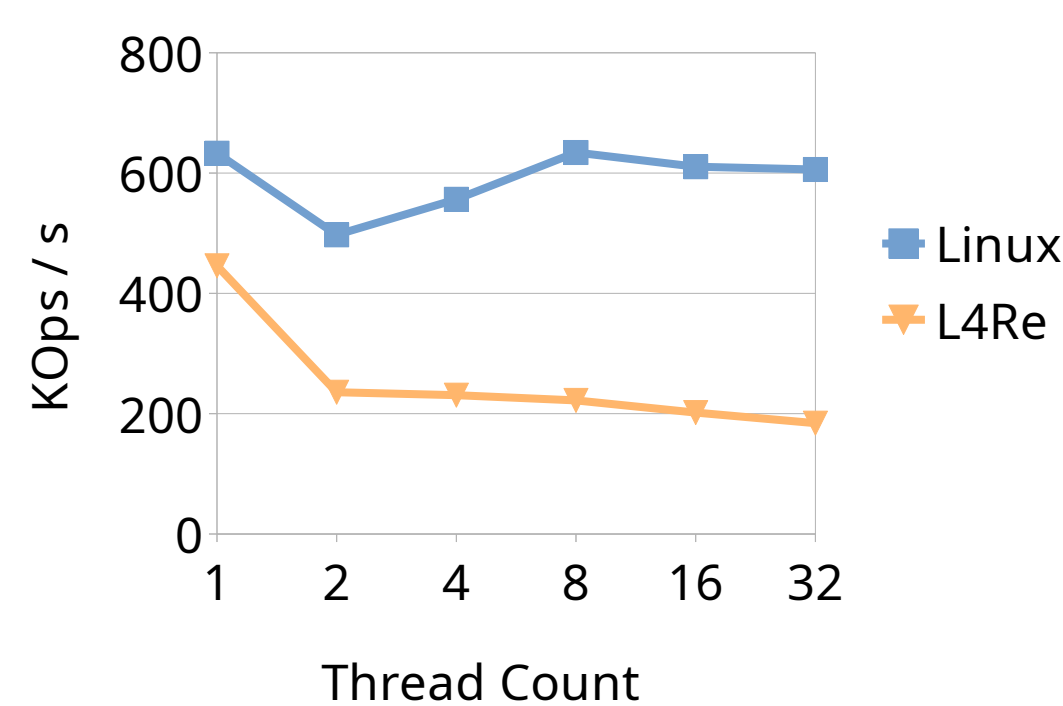
Publication – WSP on Server Systems (DIMES'23):

- Use case: Fast startup of seldom used servers
- Evaluated system concepts and technologies
- NVM is key for a reasonable WSP implementation
- A compartmentalized system is fast, too

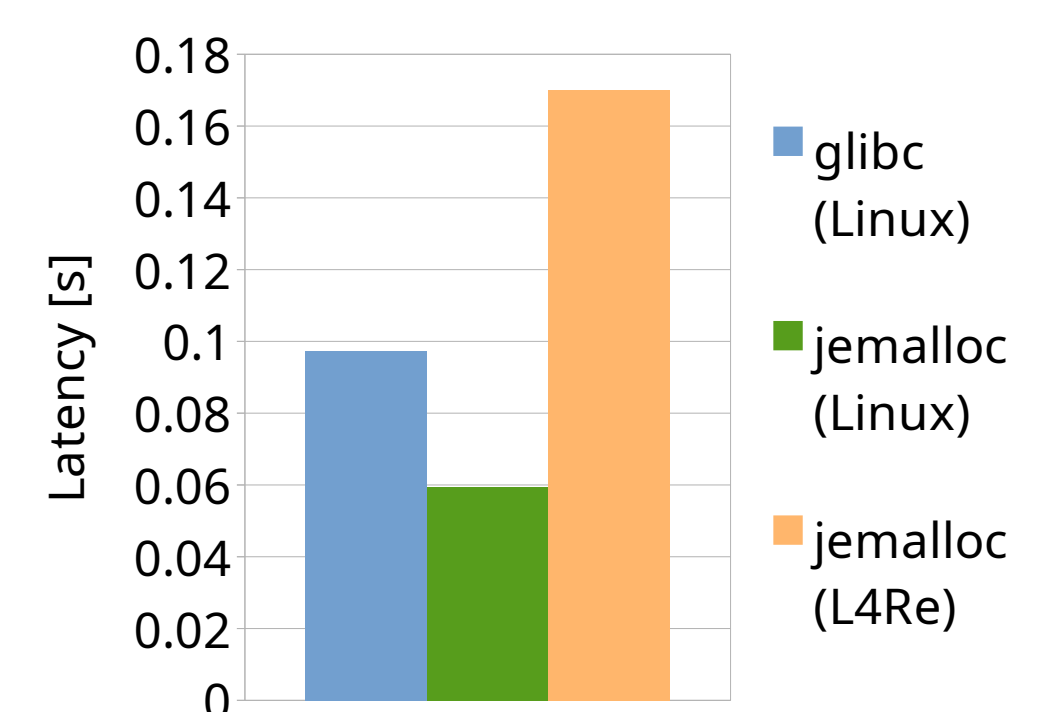
Issues Spotted – Reliance on Optane, Scalability:

- Use CXL-attached remote memory to replace NVM
 - Persistence through separated power domains
- OS needs to efficiently manage large memories
 - L4Re has performance issues on server systems

Performance for YCSB, Workload A (Hashtable)



Latency for Allocating 2 Million Memory Objects



- Goal for next year: Increase the scalability of a microkernel-based OS to efficiently handle large amounts of heterogeneous memory
 - Can serverless use cases like function-as-a-service benefit from NVM?
 - How do these use cases interplay with a microkernel architecture in terms of scalability, security, performance, and predictability?
 - Is there a fundamental tension between server-grade scalability and low-complexity microkernels?

