

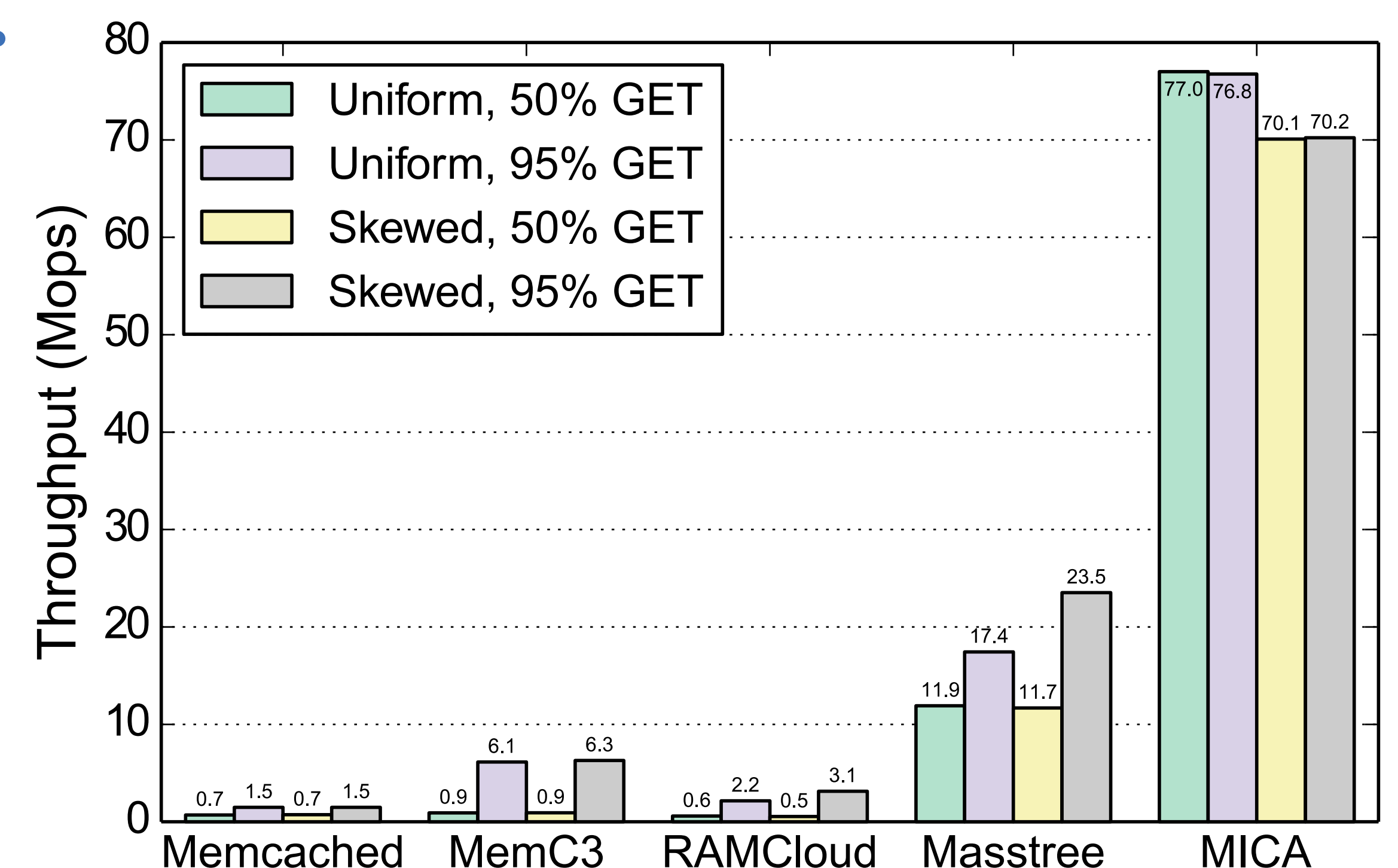
Efficiency: Important and Hard

In-memory key-value store: All key-value items in DRAM

- Examples: Memcached, MemC3, RAMCloud, Masstree, ...
- Goals: High throughput, low latency, low memory overhead

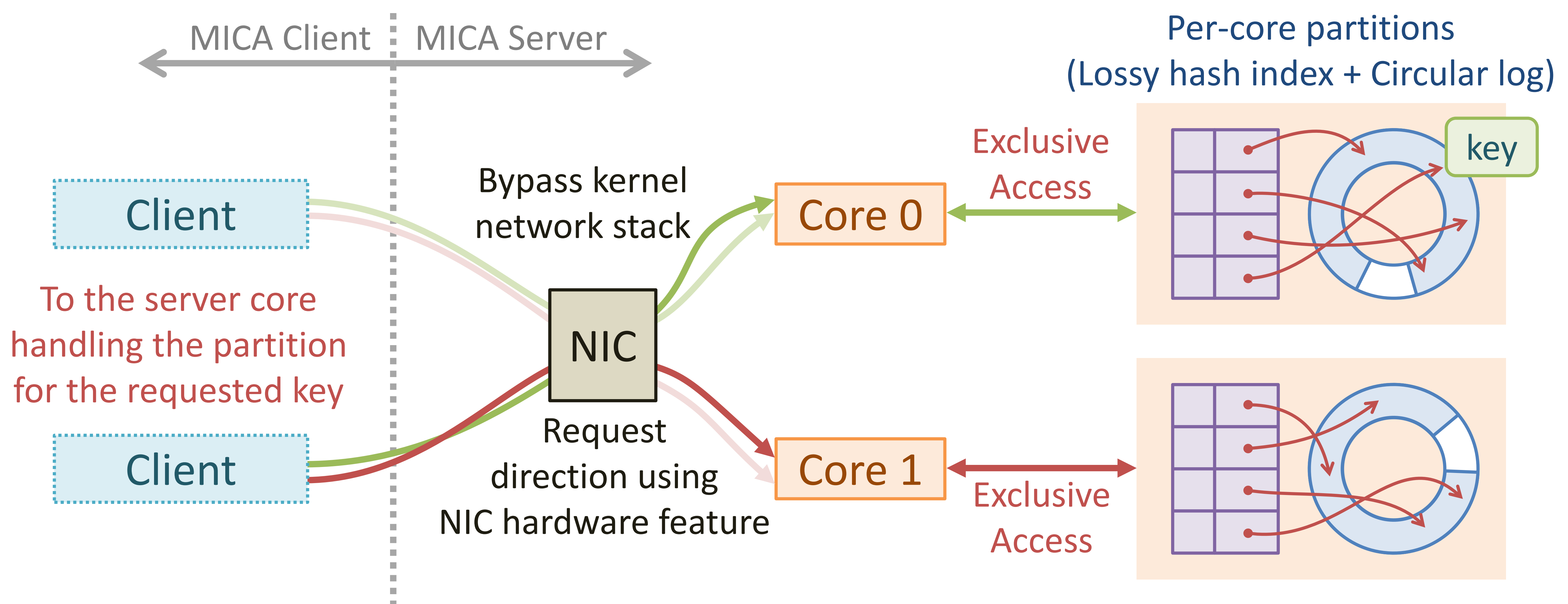
Main challenges: Performance and space efficiency

- **Expensive concurrent writes**
 - Existing solutions only for read-mostly workloads
- **Network stack overhead**
 - Partial solution (request batching) does not scale
- **Memory fragmentation** or **expensive garbage collection**
 - Low capacity and/or low performance

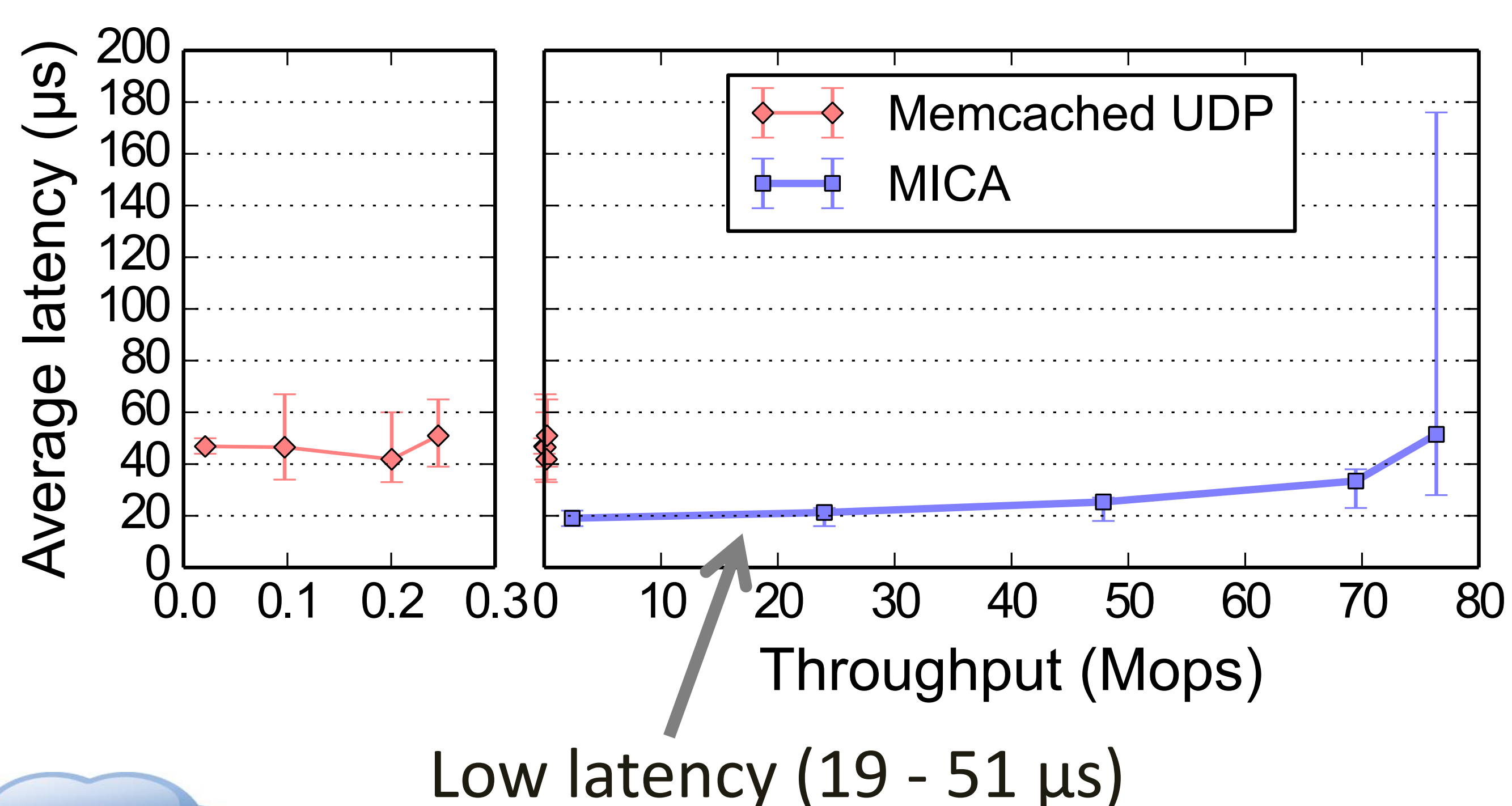


Full-system performance over the network
 All systems use our network stack No batching
 16-byte items Zipf-distributed key popularity

MICA Design



End-to-End Latency on Ethernet



CPU Scalability

