In-network Contention Resolution for Disaggregated Memory

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Memory Disaggregation

Good

Scalability

Power Efficiency

Cost Savings

Bad

Latency.

Faults

Contention! The Price of Remote Memory Clover Throughput vs YCSB Writes to shared Clover (Default) 20.0 memory collapse 17.5 performance 15.0 -(SdOW) 12.5

A(50%)

20x Slower than Local DRAM

Networking Can Save Us! (But it's Tricky)

Centralized Programmable Switch



Switch Serializes Packets (RDMA) At **Egress Port**

Challenges

5.0

2.5

C(0%)

B(5%)

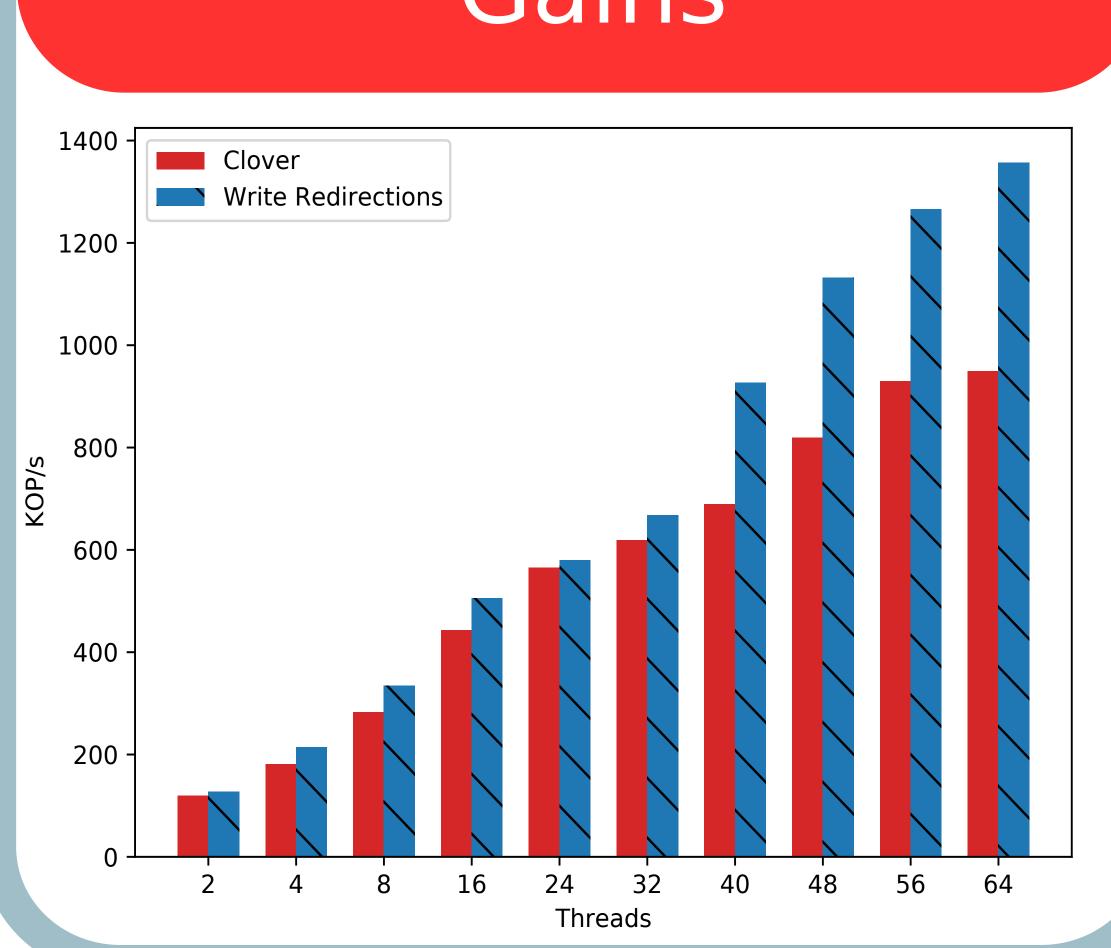
- Scarce Memory
- Intended to

Forward Packets

Restrictive

Programming

Performance Gains



Memory Usage

Performance vs Cache Size --- Default Throughput 1200 1000 600 200 128 256 512 1028 32 64

Cached Keys (top-N)

Memory Footprint 10^{7} Barefoot Tofino 2 (64MB) **Key Caching Memory** 10² 32K 256K 64 4K Key Space

THANKS!!

Networks Can Improve Remote Memory Performance



