COMP 513 Project

Presented by Olivier Michaud, Akshay Gopalakrishnan McGill

Introductio

C -4...

Experiments

Conclusion

COMP 513 Project Rolis

Presented by
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Project Description

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Rolis: A software approach to efficiently replicating multi-core transactions

- Proposes a new consensus algorithm to improve throughput.
- Uses multiple threads per leader/follower to process transactions.
- Performs well upon failure recovery using watermarks to ensure synchronization when necessary.

Choice of Experiments

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Throughput

- vs Silo Algorithm is built by modifying Silo.
- vs Calvin Existing state-of-the-art.
- Latency
 - On different batch sizes.
 - Measured for 10^{th} , 50^{th} , 95^{th} percentiles.

Chosen Test Environment

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Comparison (right) with original system (left)

- Azure
- 32vCPUs (Intel Xeon Platinum 8272CL)
- 128GB RAM
- 16,000Mbps Network
- Ubuntu 18.04 LTS
- Hypervisor: Hyper-V
- Single Socket (assumed)

- AWS EC2
- 32vCPUs (Intel Xeon Platinum 8259CL)
- 128GB RAM
- 10,000Mbps Network
- Ubuntu Server 20.04 LTS
- Hypervisor: KVM based
- Shared Instance

Steps to Run

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- Virtual Private Cloud
- Security Groups
- Start EC2 instances.
- Setup SSH connections.
- Run install.sh.
- Setup IP addresses (guide given by the paper).
- Run one-click.sh.

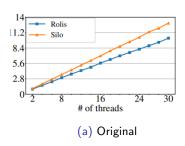
Throughput: Rolis vs Silo (YCSB++)

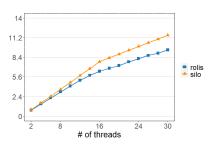
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Throughput: Rolis vs Silo (TPC-C)

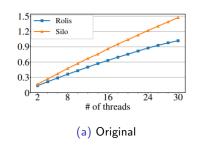
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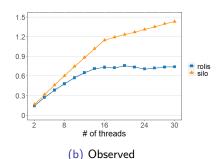
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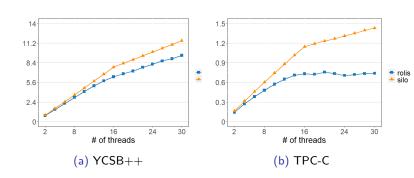
Discuss Observation

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- VM Resource Overcommitment vs Bare Metal Instance.
- CPU sockets.

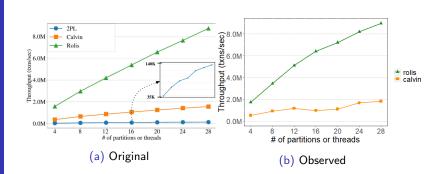
Throughput: Rolis vs Calvin (YCSB++)

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Discuss Observation

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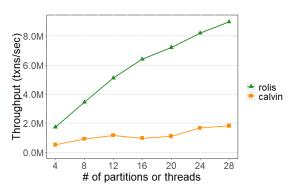


Figure: Observed Throughput of Rolis vs Calvin

- Calvin's thread-implementation vs Rolis.
- CPU Sockets (Calvin experiment needs just one Machine). 4 - > 4 - - > 4 - - > 4 - - >

Latency: Batch-Size Take 1

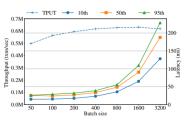
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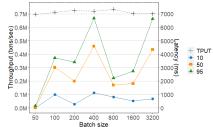
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(a) Original (16 threads)

(b) Observed (16 threads)

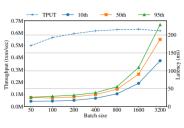
Latency: Batch-size Take 2

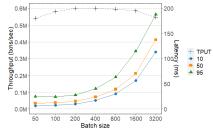
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Experiments





(a) Original (16 threads)

(b) Observed (12 threads)

Discuss Observation

(a) Observed (16 threads)

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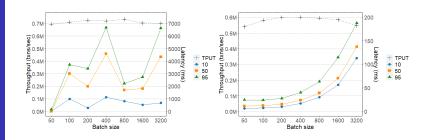
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- Shared Instances Network Bandwidth.
- Shared Instances Congestion Control.

(b) Observed (12 threads)

Thank you

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■ Rolis: Paper

■ Rolis: Experiments Repository

Questions?