Consistency in the Cloud II

Consistency v. Latency in Geo-Replicated Systems

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April 6, 2015

Paper 1: Li et al.

Title
Source
Authors
Date

Overview

Theorem

Every finite distributive lattice can be embedded in a boolean lattice.

Overview

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Theorem

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Proof.

Use join-irreducible elements. □

Example 2

Example 2

- a local maximum, or

Example 2

- a local maximum, or
- a local minimum, or

Example 2

- a local maximum, or
- a local minimum, or
- an inflection point.

Paper 2: Lloyd et al.

Stronger Semantics for Low-Latency Geo-Replicated Storage

Proceedings of the 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI13)

Wyatt Lloyd, Michael J. Freedman, Michael Kaminsky, and David G. Andersen

April 2013

Main Idea

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- Causal Consistency Instead of Eventual Consistency (causal is stronger)
- We require low latency
- Extend previous systems: Cassandra and COPS

Contributions

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- Eiger
  - Low Latency
  - High throughput (slightly lower than Cassandra)
  - Causal Consistency (rather than eventual as in Cassandra)

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- Write Only Algorithm

Background

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- Cassandra
  - Eventual Consistency

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- Cassandra
  - Eventual Consistency
- COPS

Consistency - Causal versus Eventual

Consistency - Causal versus Eventual

- p1

Column Family Data Model

Column Family Data Model

- p1

Column Family Data Model

- p1
- p2

Column Family Data Model

- p1
- p2
- p3

Eiger

Eiger

- p1

Eiger

- p1
- p2

Eiger

- p1
- p2
- p3

Evaluation

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- Versus Cassandra
  - Within 7% of throughput Using Facebook-like data
    - Ops/sec
    - Keys/sec
    - Columns/sec

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  - Within 7% of throughput Using Facebook-like data
    - Ops/sec
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- Versus COPS

Follow Up Research

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- p1

Ideas for Future Research

Ideas for Future Research

- p1

Bibliography

- **Stronger Semantics for Low-Latency Geo-Replicated Storage**, *Proceedings of the 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI13)*, Wyatt Lloyd, Michael J. Freedman, Michael Kaminsky, and David G. Andersen, April 2013