Fast Multi-Coordinated Atomic Broadcast

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Outline

Problem

Standard Solution

Collision-Fast

Multicoordination

Fast Multicoordinated
Problem

P2P systems are

- Loosely coupled
- Completely decentralized
Problem

P2P systems should be

- Loosely coupled
- Completely decentralized
Problem

P2P systems should be

- Loosely coupled
- Completely decentralized

May need some sort of agreement
Problem

P2P systems should be

- Loosely coupled
- Completely decentralized

May need some sort of agreement

- Update membership
- Update metadata
Solution – Atomic Broadcast
Solution – Atomic Broadcast

Paxos
Solution – Atomic Broadcast

Paxos

Physical

Logical
Solution – Atomic Broadcast

Paxos
Solution – Atomic Broadcast

Paxos

Physical

Propose

Coordinate

Logical

Accept

Learn

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Solution – Atomic Broadcast

Paxos
The problems with Paxos

Propose
Accept
Coordinate
Learn

Performance
Resilience

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The problems with Paxos

Propose

Accept

Coordinate

Learn
The problems with Paxos

Propose → Accept → Learn
Coordinate

Performance
The problems with Paxos

Propose  Accept  Learn
Coordinate

Resilience  Performance

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Performance – Collision-Fast
Performance – Collision-Fast

Propose > Accept > Coordinate > Learn

1

...
Performance – Collision-Fast

- Propose
- Accept
- Coordinate
- Learn
Performance – Collision-Fast

Propose → Accept → Learn
Coordinate

Diagram with nodes and arrows labeled 1, 2, 3.
Performance – Collision-Fast

Propose — Accept — Learn

Coordinate
Performance – Collision-Fast

Propose -- Coordinate -- Accept -- Learn
Performance – Collision-Fast

Propose → Accept → Coordinate → Learn

Diagram:

- 1
- 2

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Performance – Collision-Fast
Performance – Collision-Fast

Propose → Coordinate → Accept → Learn

1
2
3

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Resilience – Multi-Coordinated

Propose ➔ Accept ➔ Learn

Coordinate
Resilience – Multi-Coordinated
Resilience – Multi-Coordinated

Propose

Accept

Coordinate

Learn
Resilience – Multi-Coordinated
Fast Multi-Coordinated Atomic Multicast
Summary