Artemis 2.0

Clebert Suconic
RedHat

~~Artemis 2.0~~

Artemis 2.1

Clebert Suconic
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Things are moving fast!!!!!

Agenda

- Origin
- Features
- Development Stream
- Some architecture
- AMQP
- Little demo

ActiveMQ/Artemis

- Message Broker
  - Messages stay in memory (fast delivery)
  - Paging when slow consuming
  - Acked and guaranteed delivery

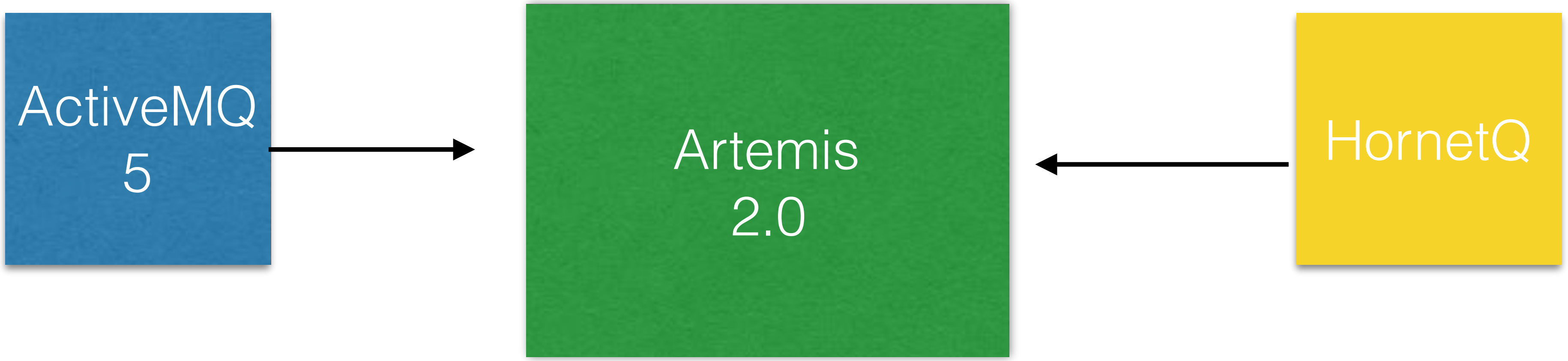
Origin

- HornetQ merged ActiveMQ in Oct 2014
- HornetQ itself had its own history
    - JBoss MQ -> JBoss Messaging -> HornetQ

ActiveMQ Artemis

- Apache Open Source process
- Community oriented
- Lots of improvements on Artemis
- over 3K commits since joined Apache ActiveMQ
- Lots of QE

ActiveMQ Artemis

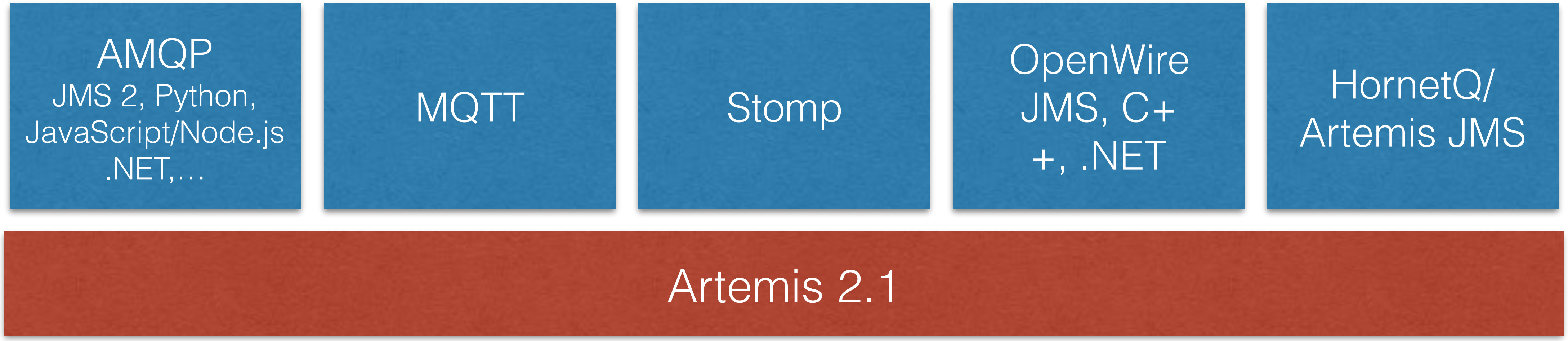


- OpenWire support
- export data from AMQ5
- OSGI / Karaf
- Security Models
- Improved XA
- NIO Models / Multiple protocols

2.x accomplishments

- Improved AMQP support
  - High performance
    - qpid cpp client can generate 70K messages / second on a simple laptop
      - https://github.com/ssorj/quiver
  - Stable (a lot of testing done)

Artemis 2.x Clients



AMQP
JMS 2, Python, JavaScript/Node.js .NET,…

MQTT

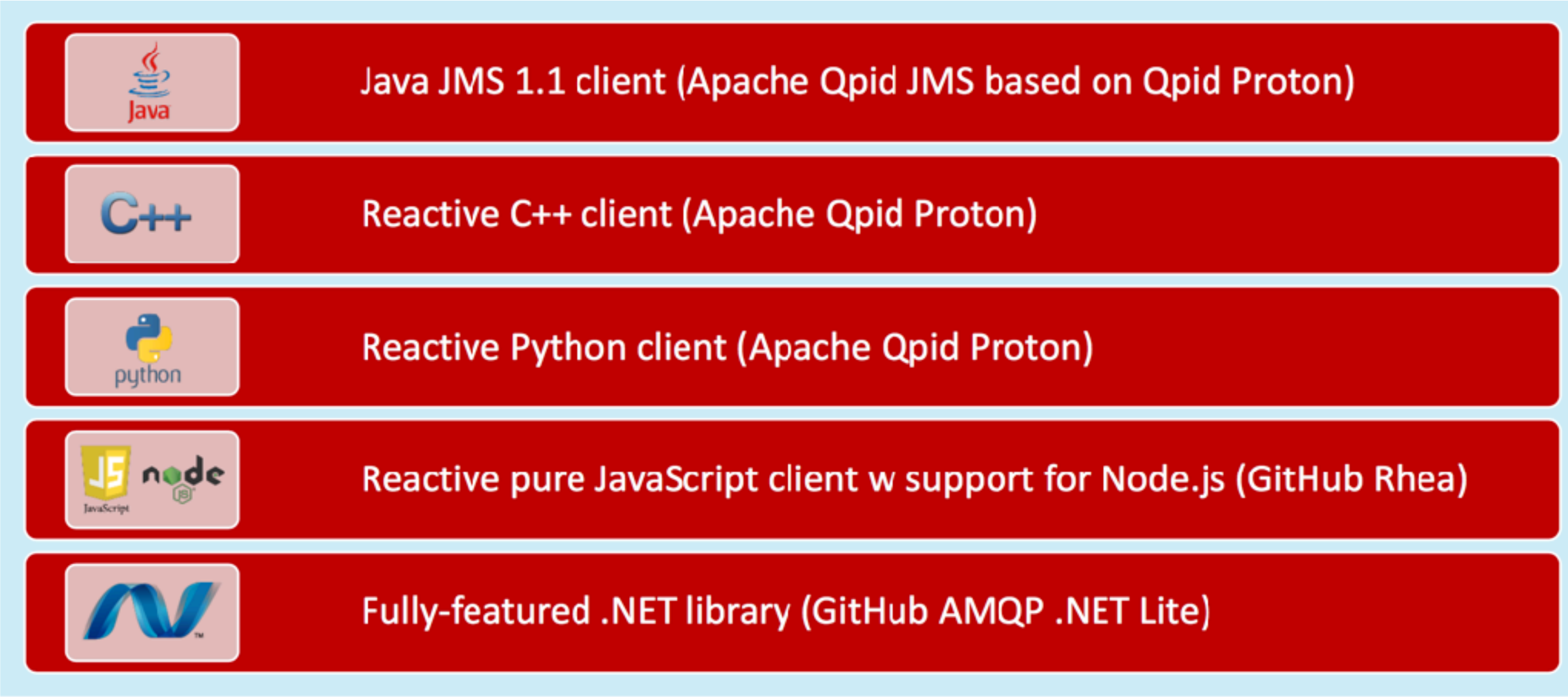
Stomp

OpenWire
JMS, C++, .NET

HornetQ/
Artemis JMS

Artemis 2.1

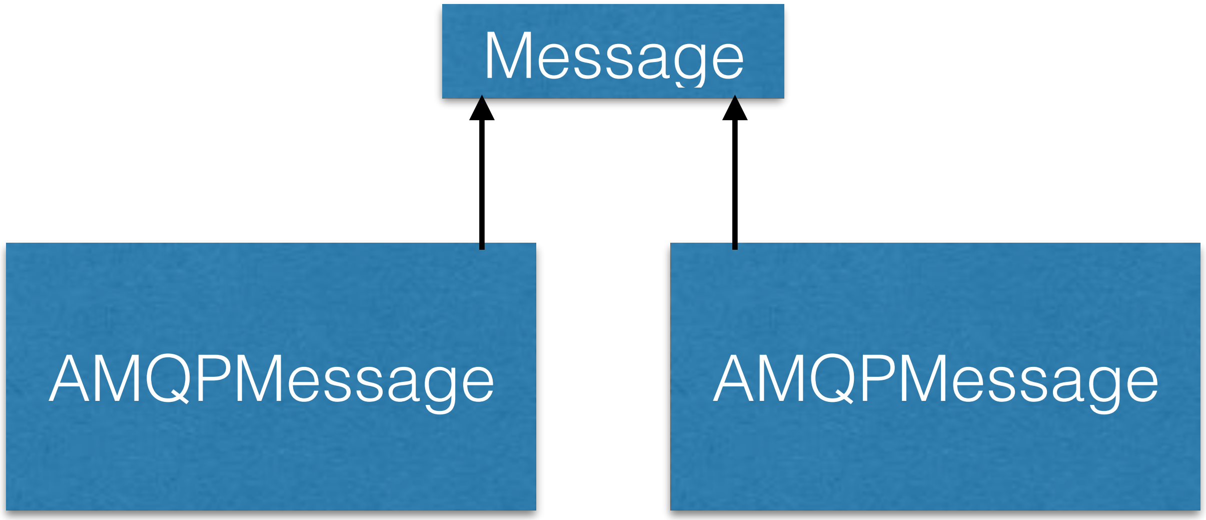
AMQP Clients


Java
C++
python
JS
JavaScript
node

- Java JMS 1.1 client (Apache Qpid JMS based on Qpid Proton)
- Reactive C++ client (Apache Qpid Proton)
- Reactive Python client (Apache Qpid Proton)
- Reactive pure JavaScript client w support for Node.js (GitHub Rhea)
- Fully-featured .NET library (GitHub AMQP .NET Lite)

Artemis 2.x

- Messages on their Protocol
- (currently AMQP and Core)



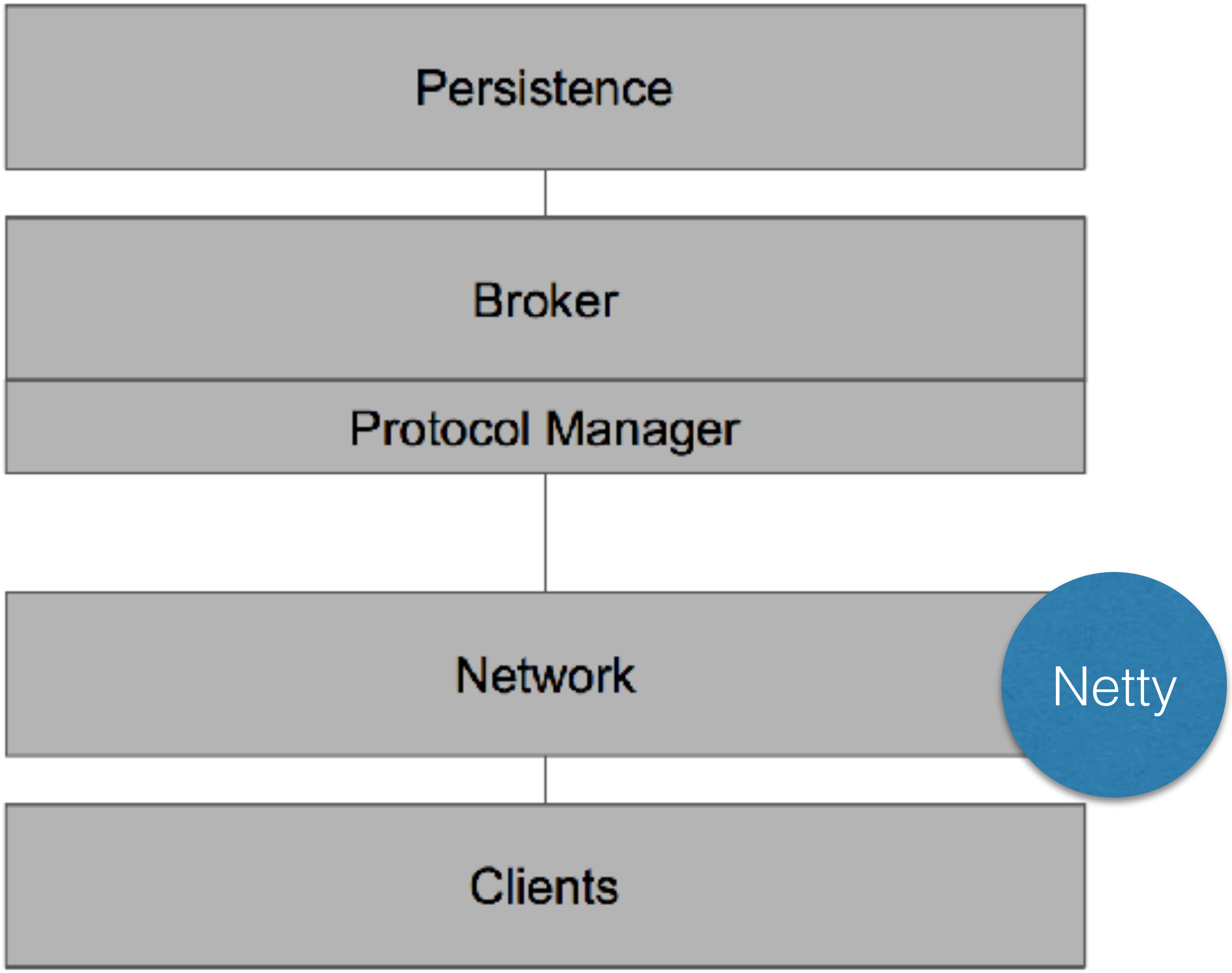
This Means:

Artemis is protocol agnostic now

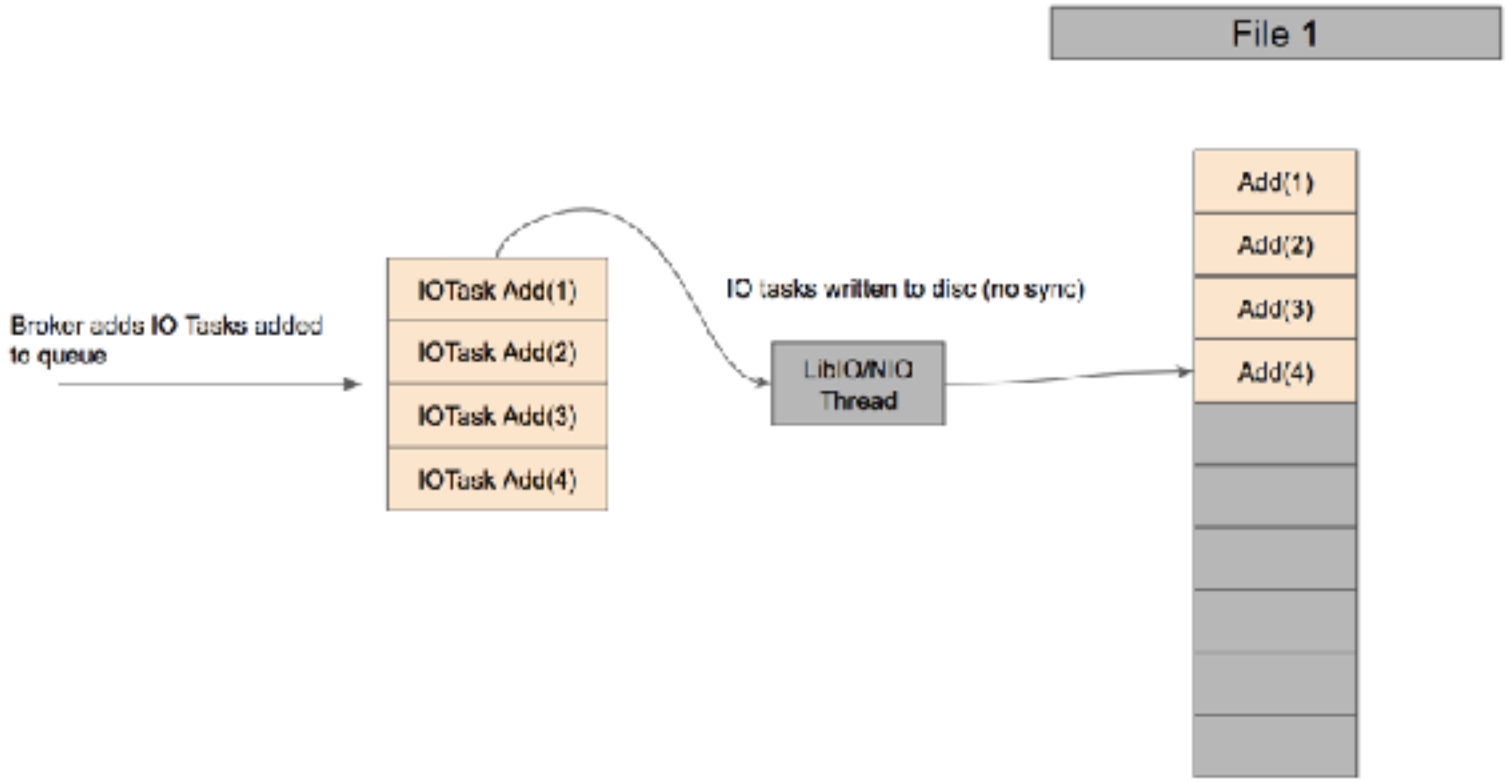
New Addressing Model

- New address object exposed with two routing type options
    - Anycast
        - Point to point: Messages are distributed amongst many consumers
    - Multicast
        - Publish / Subscribe: Every Queue(subscription) receives a copy of every message
    - New Queue fields
        - Allow explicit broker side configuration of queues with different semantics
        - Max-consumers: Restricts sharing
    - Purge-on-no-consumers: Behaves like a non-durable subscription

Component approach

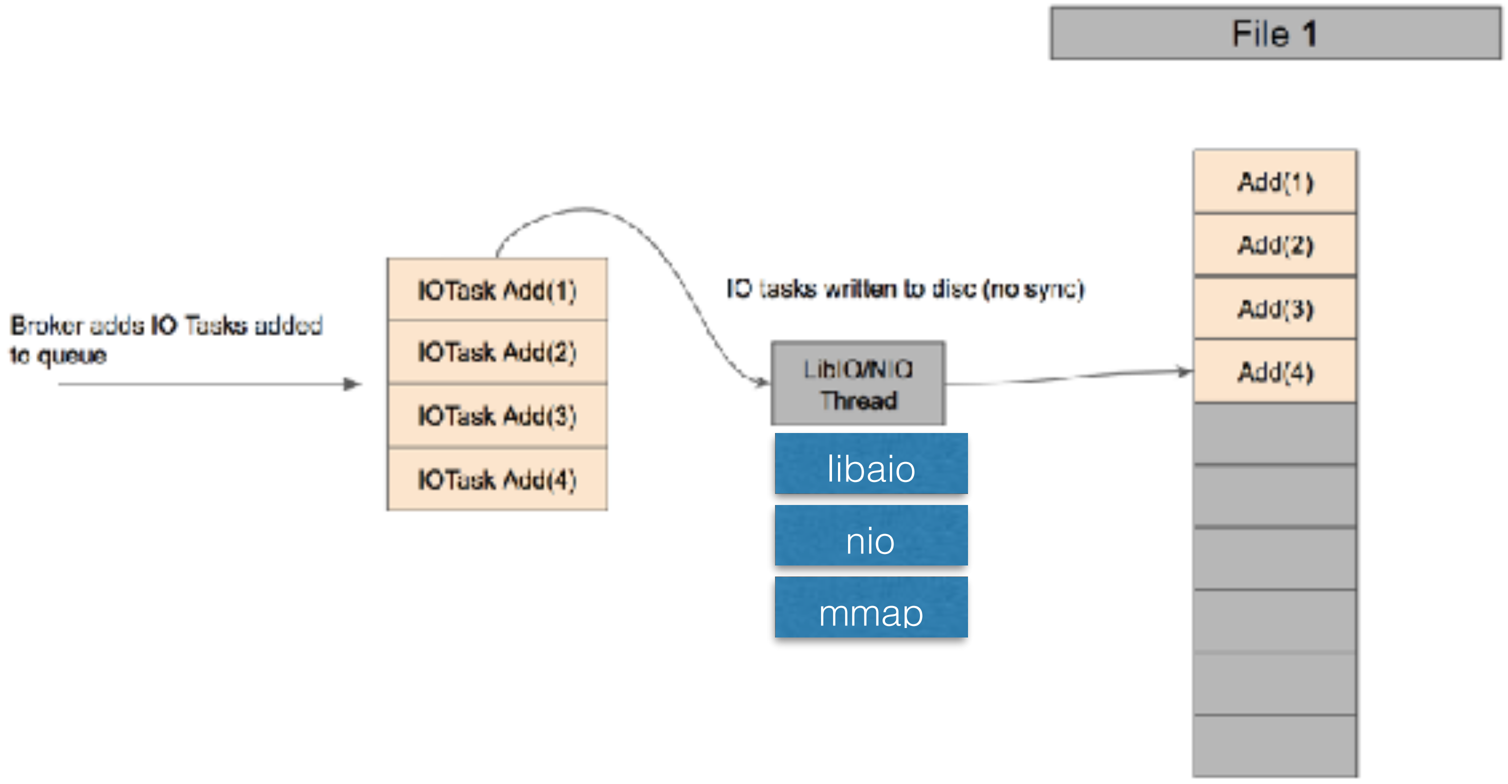


Asynchronous Internal Tasks



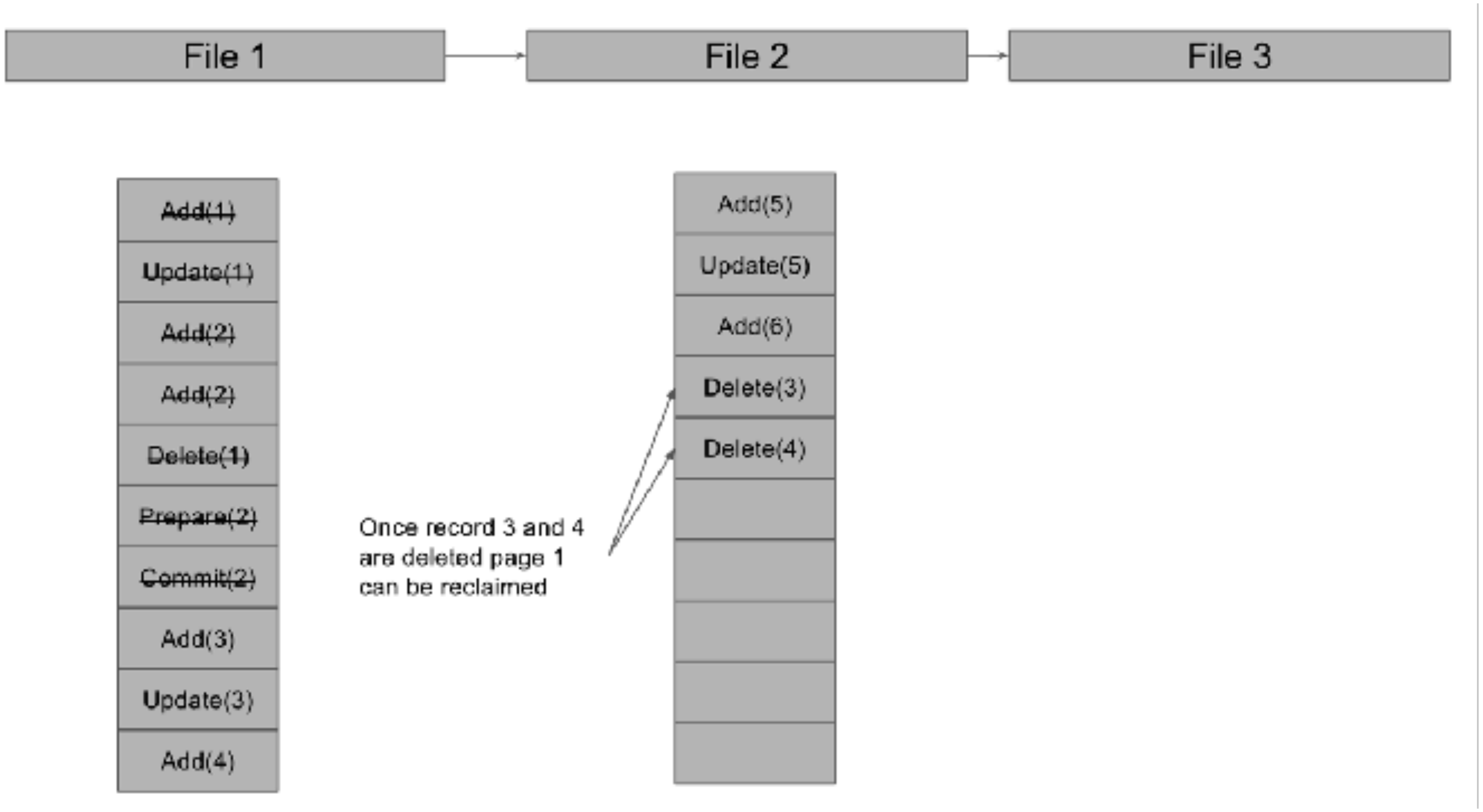
Result: Less resources from server

Asynchronous Internal Tasks



Result: Less resources from server

Journal Internal Format



File 1

File 2

File 3

~~Add(1)~~

~~Update(1)~~

~~Add(2)~~

~~Add(2)~~

~~Delete(1)~~

~~Prepare(2)~~

~~Commit(2)~~

Add(3)

Update(3)

Add(4)

Add(5)

Update(5)

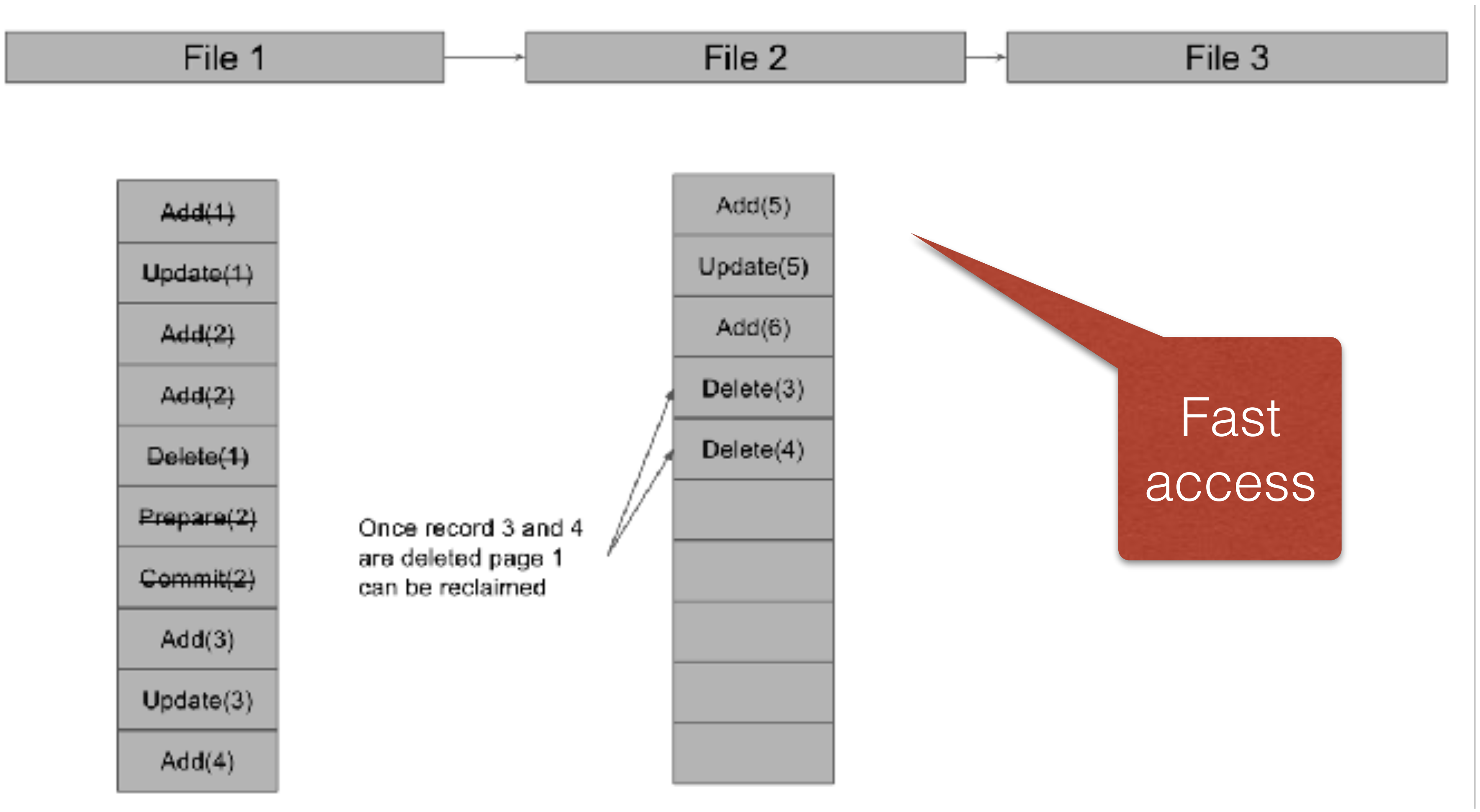
Add(6)

Delete(3)

Delete(4)

Once record 3 and 4
are deleted page 1
can be reclaimed

Journal Internal Format



File 1

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File 3

~~Add(1)~~

~~Update(1)~~

~~Add(2)~~

~~Add(2)~~

~~Delete(1)~~

~~Prepare(2)~~

~~Commit(2)~~

Add(3)

Update(3)

Add(4)

Once record 3 and 4
are deleted page 1
can be reclaimed

Add(5)

Update(5)

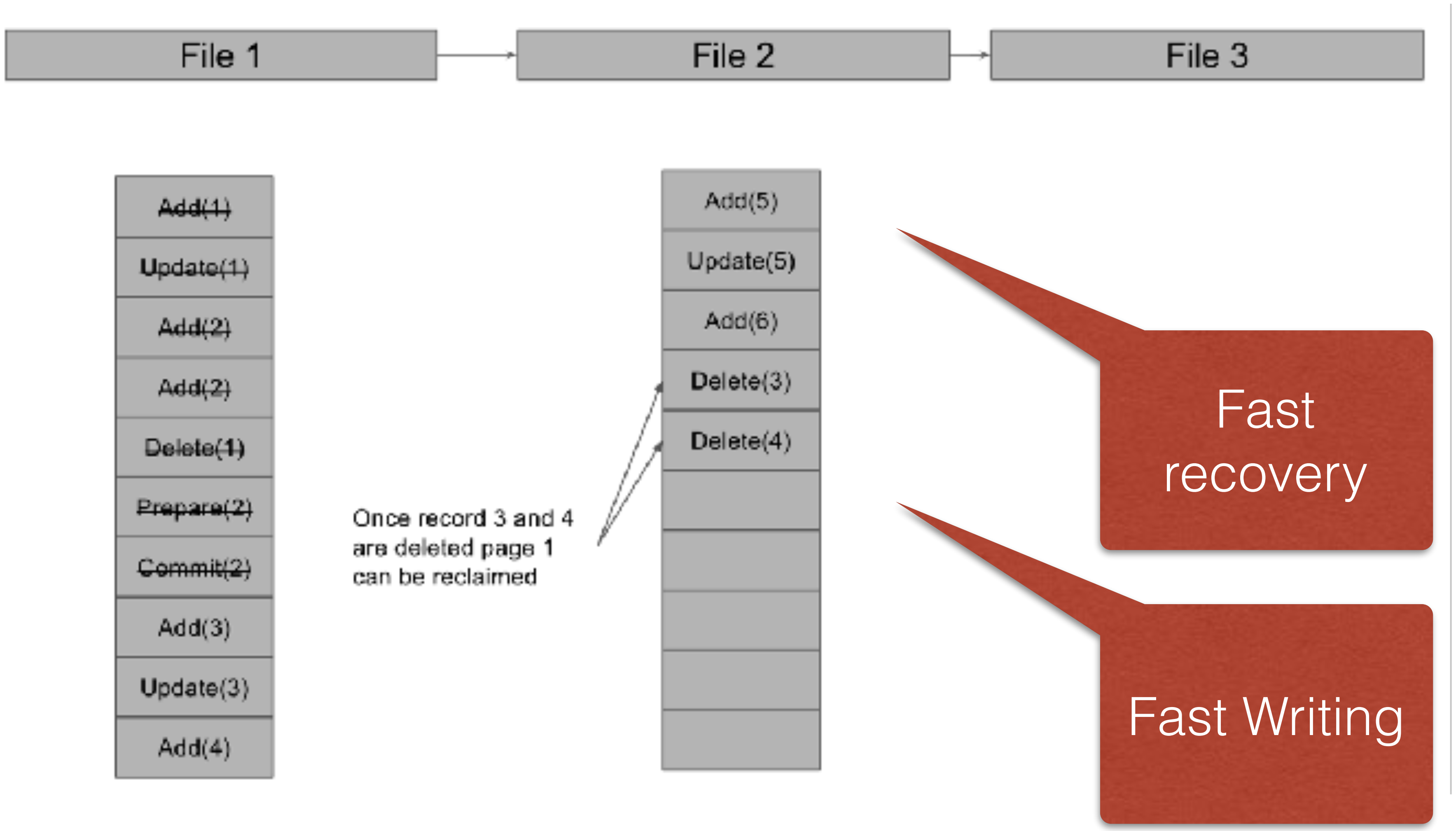
Add(6)

Delete(3)

Delete(4)

Fast access

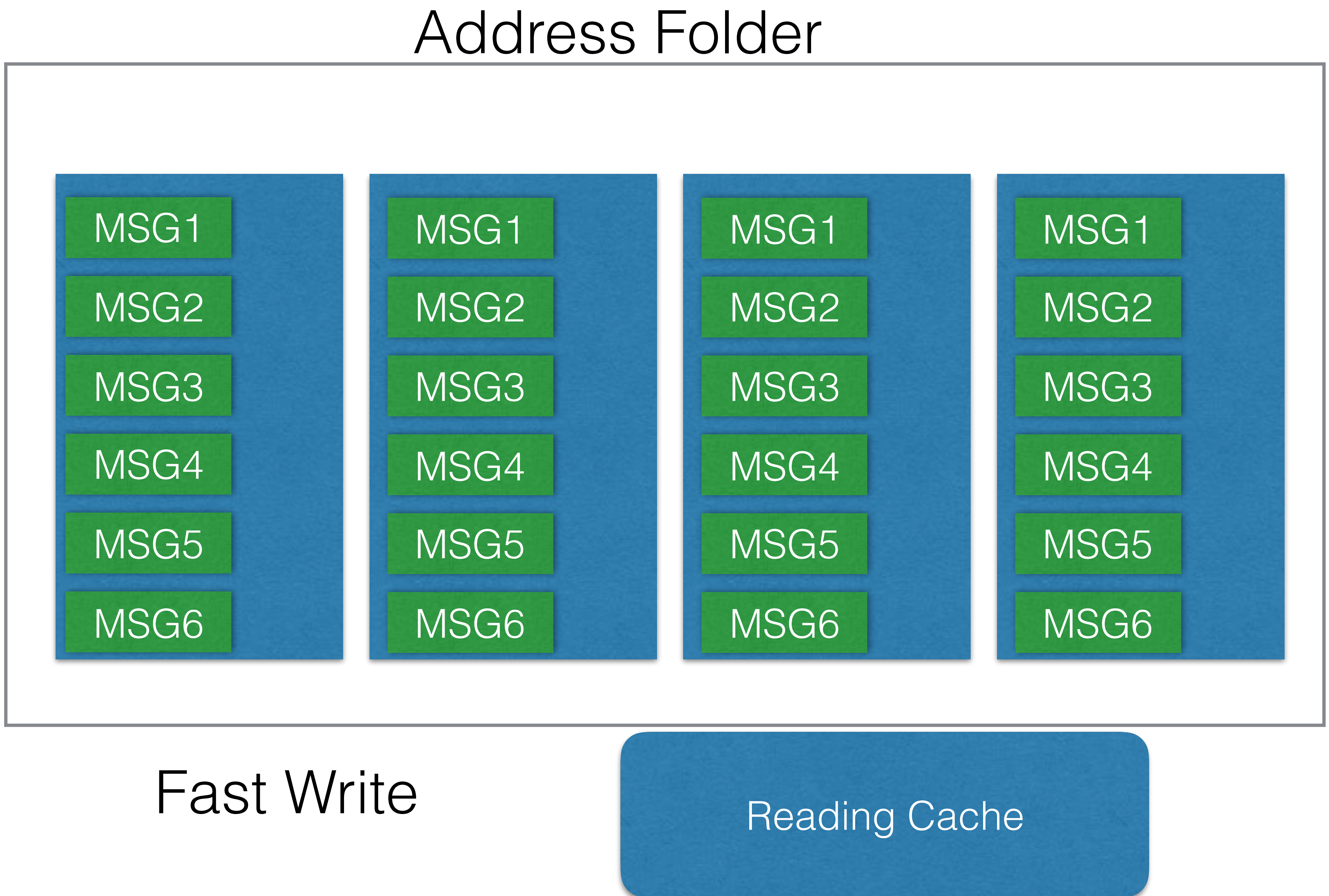
Journal Internal Format



Fast recovery

Fast Writing

Paging internal Format



Address Folder

MSG1
MSG2
MSG3
MSG4
MSG5
MSG6

MSG1
MSG2
MSG3
MSG4
MSG5
MSG6

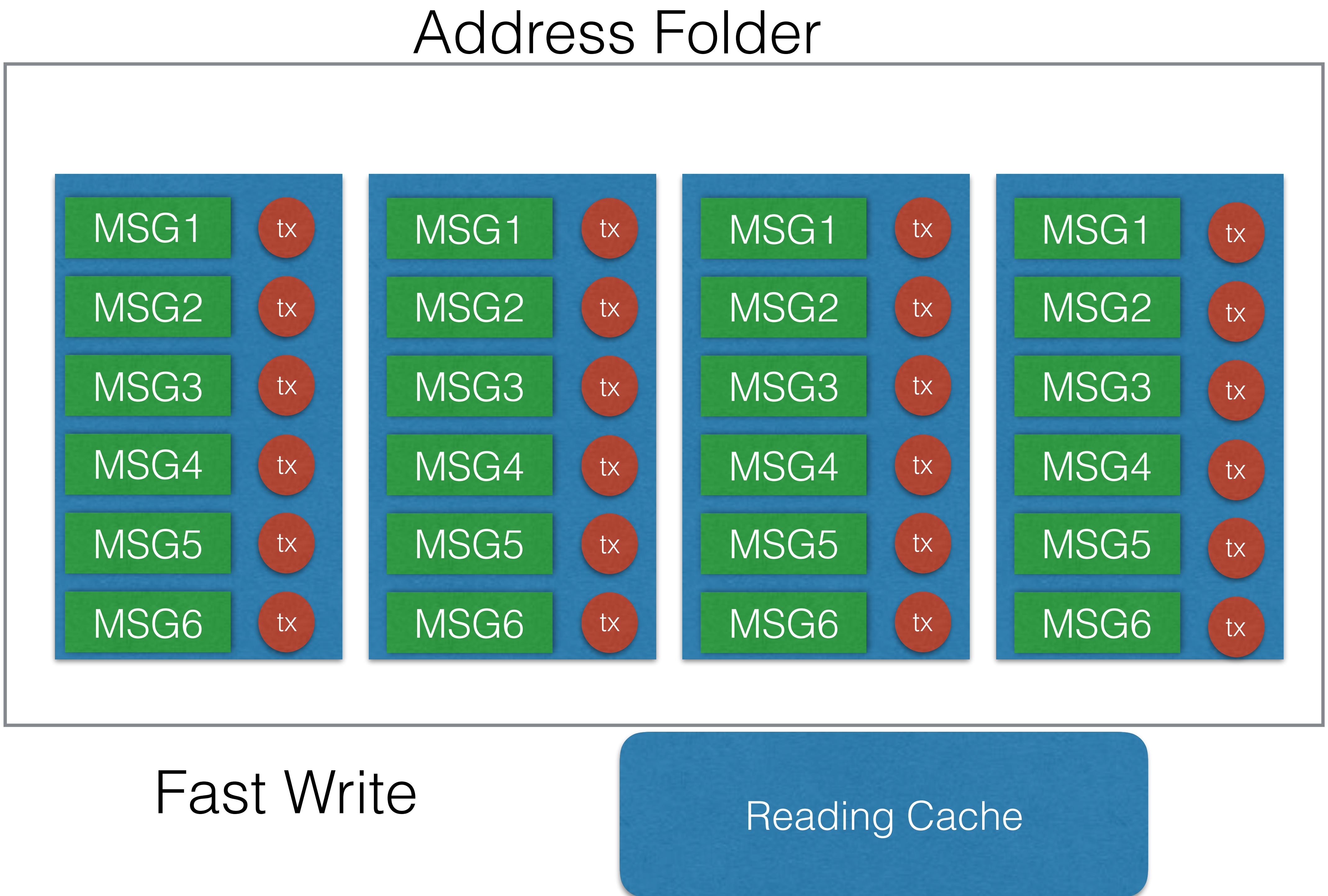
MSG1
MSG2
MSG3
MSG4
MSG5
MSG6

MSG1
MSG2
MSG3
MSG4
MSG5
MSG6

Fast Write

Reading Cache

Paging internal Format as TX



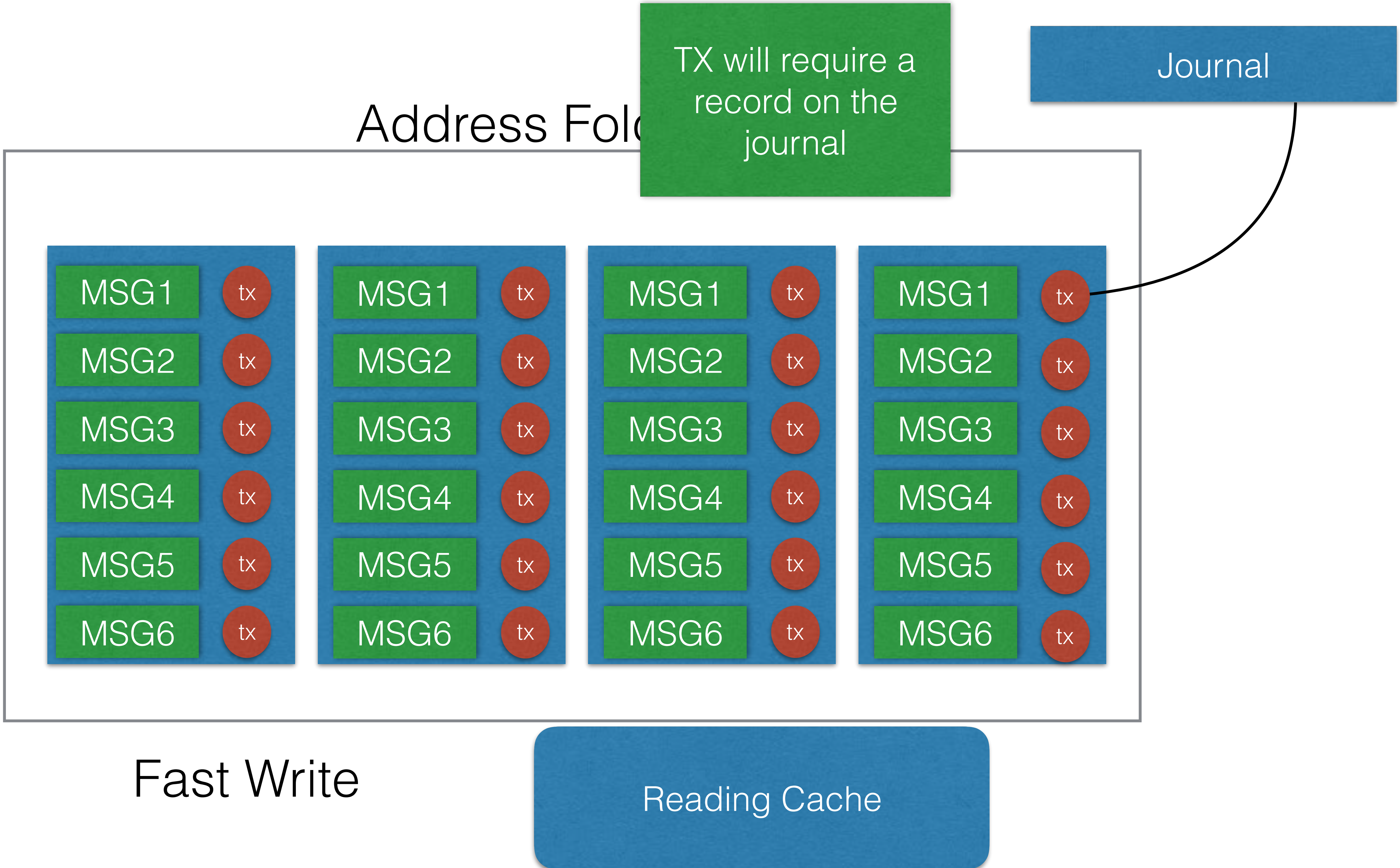
Address Folder

MSG1	tx	MSG1	tx	MSG1	tx	MSG1	tx
MSG2	tx	MSG2	tx	MSG2	tx	MSG2	tx
MSG3	tx	MSG3	tx	MSG3	tx	MSG3	tx
MSG4	tx	MSG4	tx	MSG4	tx	MSG4	tx
MSG5	tx	MSG5	tx	MSG5	tx	MSG5	tx
MSG6	tx	MSG6	tx	MSG6	tx	MSG6	tx

Fast Write

Reading Cache

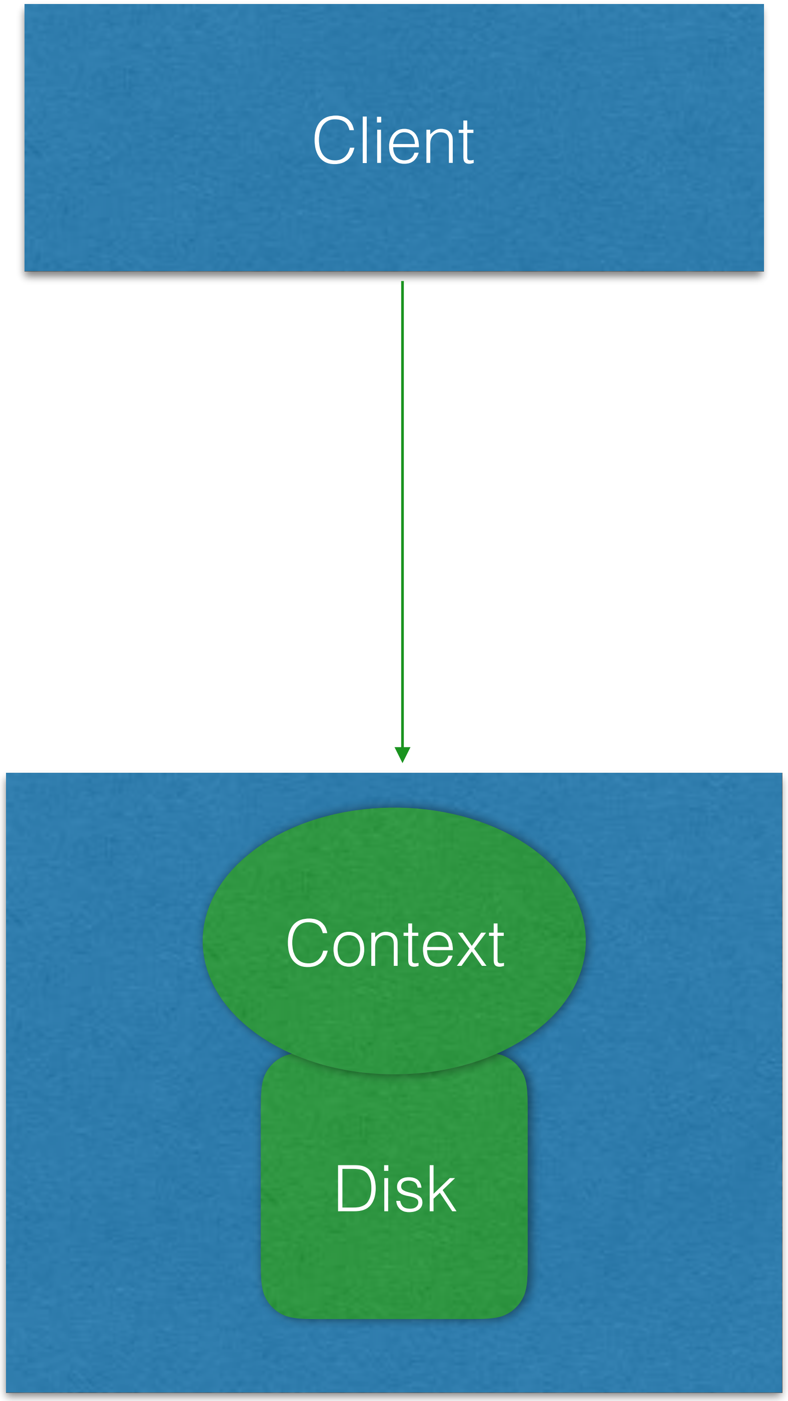
Paging internal Format as TX



TX will require a record on the journal

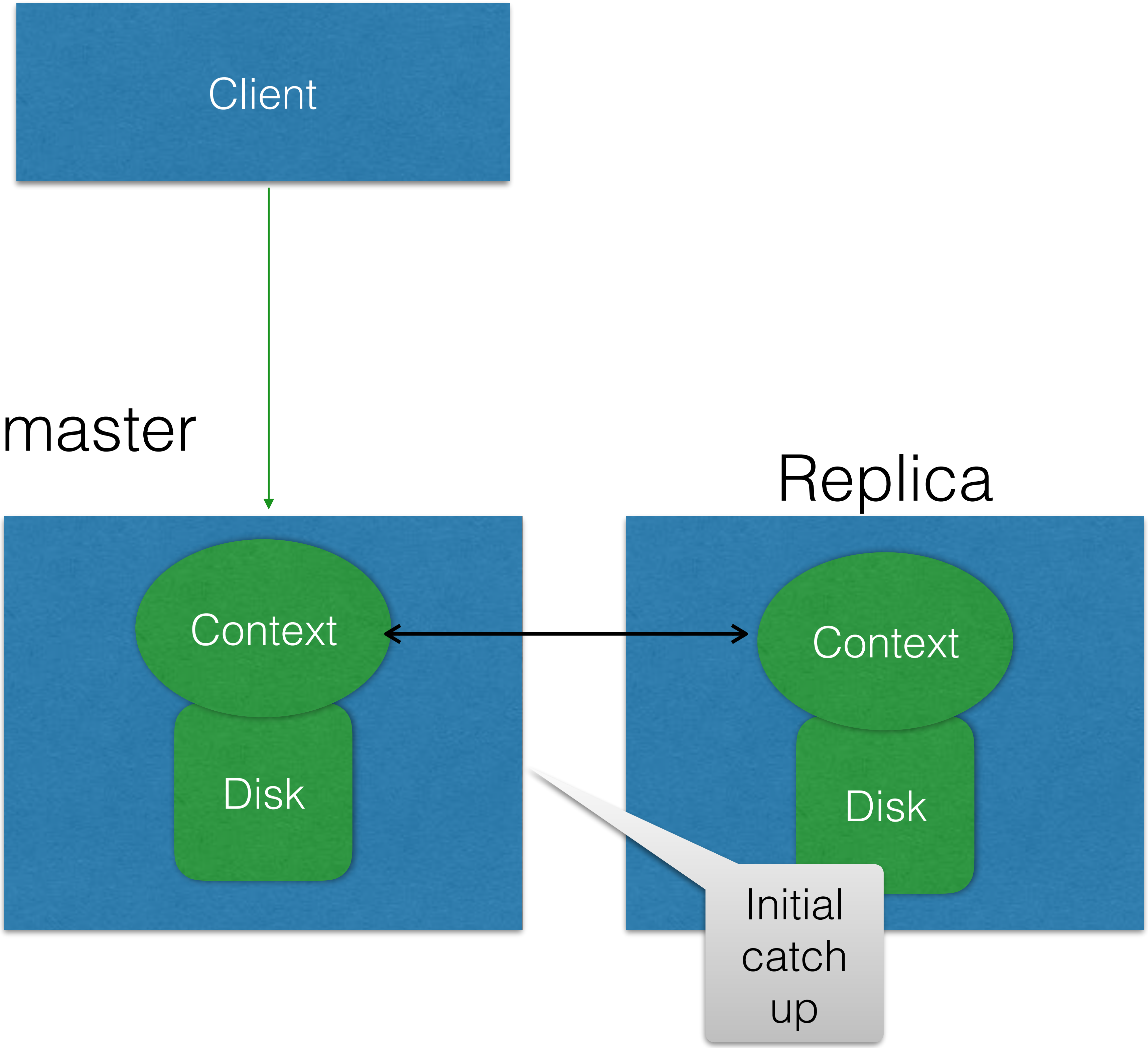
Fast Write

Sync of writes

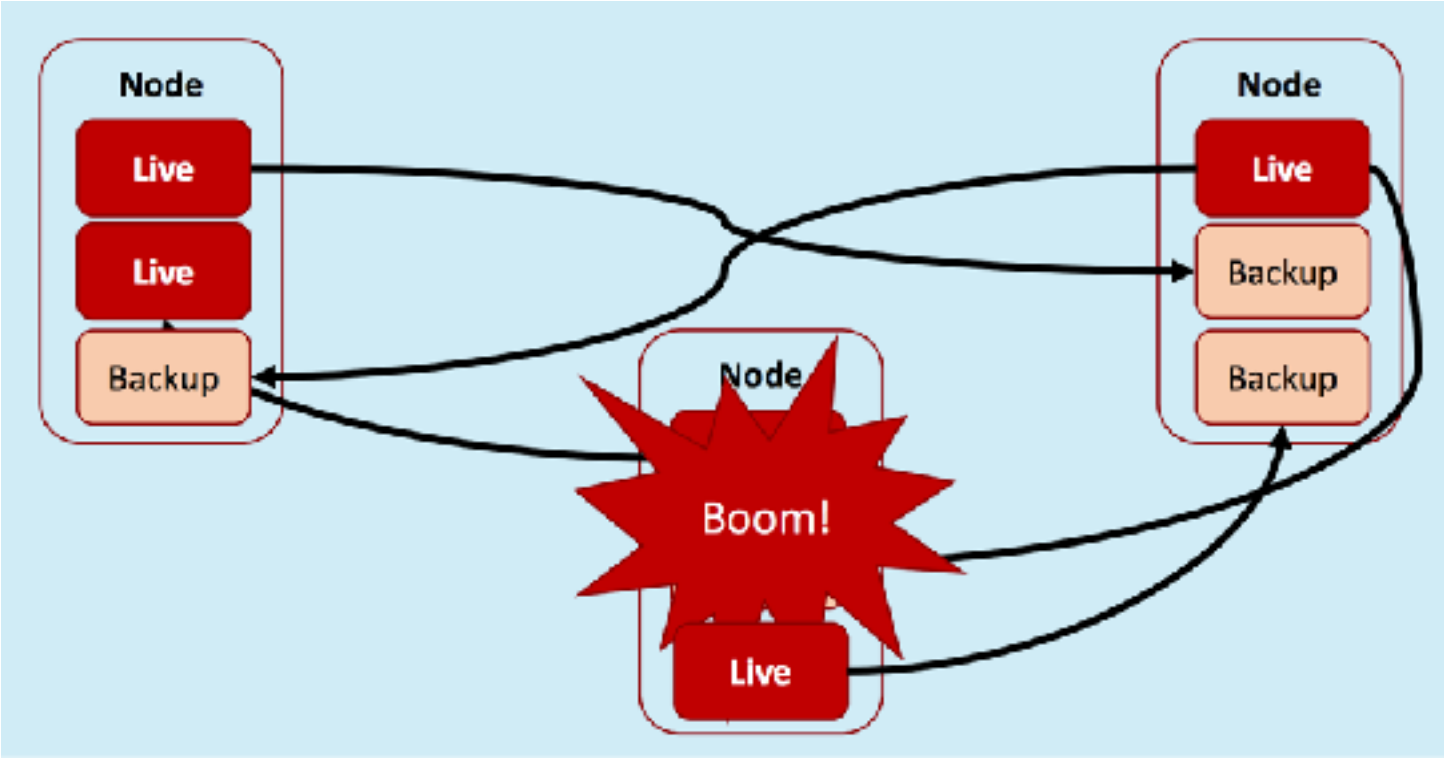


Sync of writes on replica

- initial catch up
- minimal delay on master



High availability



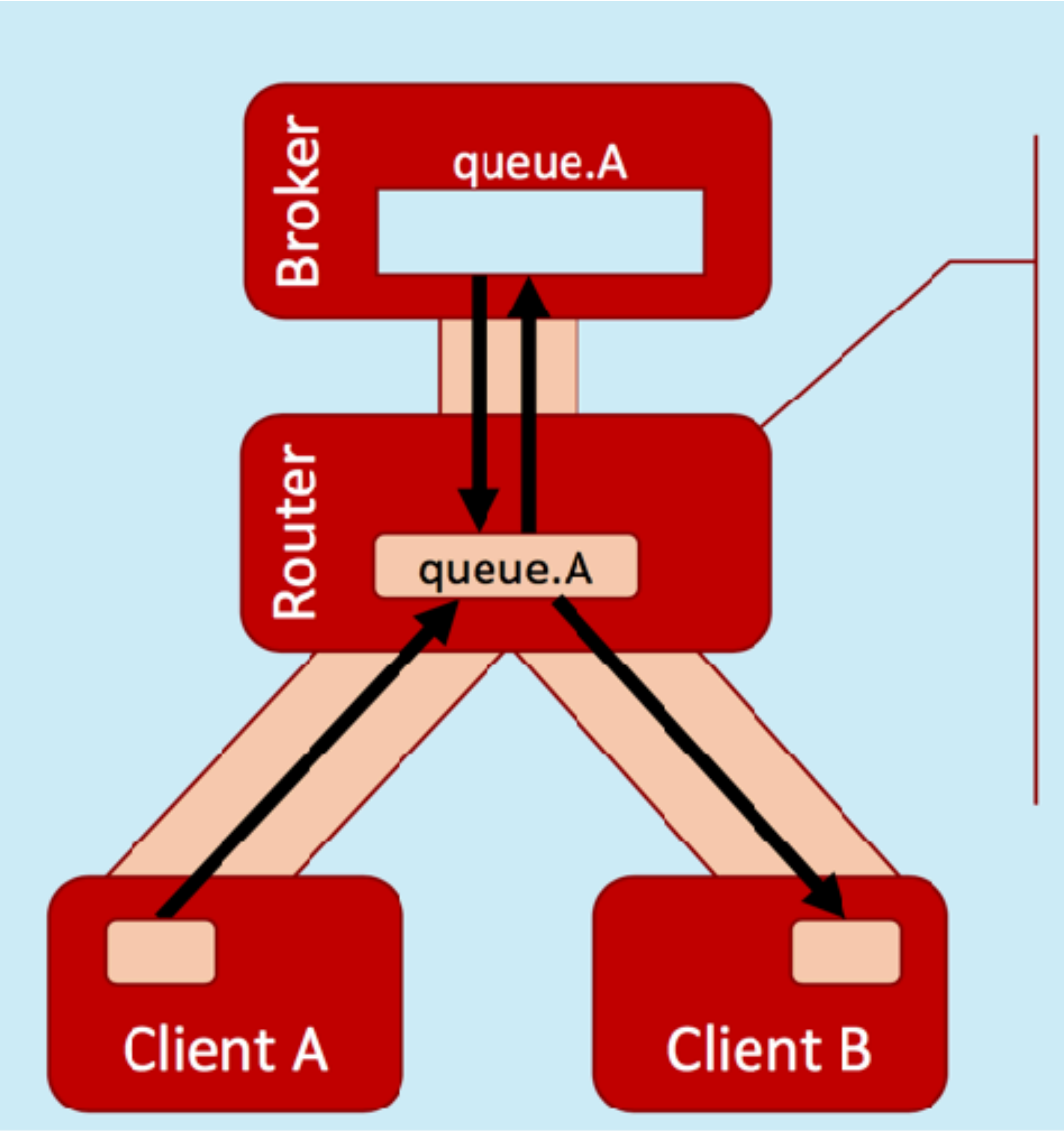
- Replication
  - Split Brain protection
    - PINGS
    - QUORUM (3+ Pairs (best))
- Shared storage

Clustering

- Artemis Internal Clustering
    - Bridges / Destinations
        - Especial for Topics

- AMQP offers you more opportunities
    - qpid-dispatch-router will offer great possibilities
        - http://qpid.apache.org/components/dispatch-router/

qpid-dispatch Clustering



Pooled Buffers

- Netty Pooled Buffers every where on the communication layers
- Improving 2.2.0 now with buffer pooled on bodies
- low GC pressure