



# TGIP-CN - 28

## Delayed Message Delivery

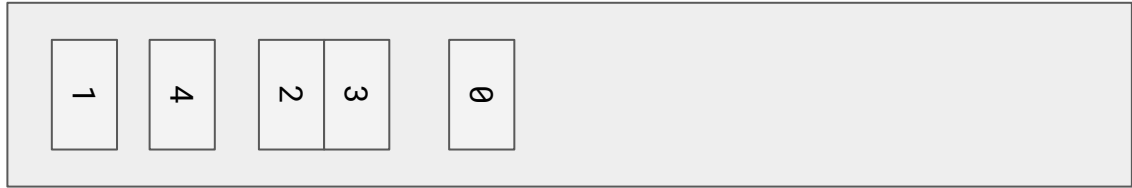
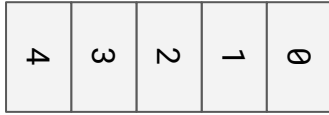
Penghui Li

2020/12/13

# Community

1. 2.6.3 Coming soon
2. PIP 70 Lightweight broker entry metadata
3. PIP 73 Configurable data source priority for message reading

# Delayed Message Delivery



# Delayed Message Delivery



# Delayed Message Delivery



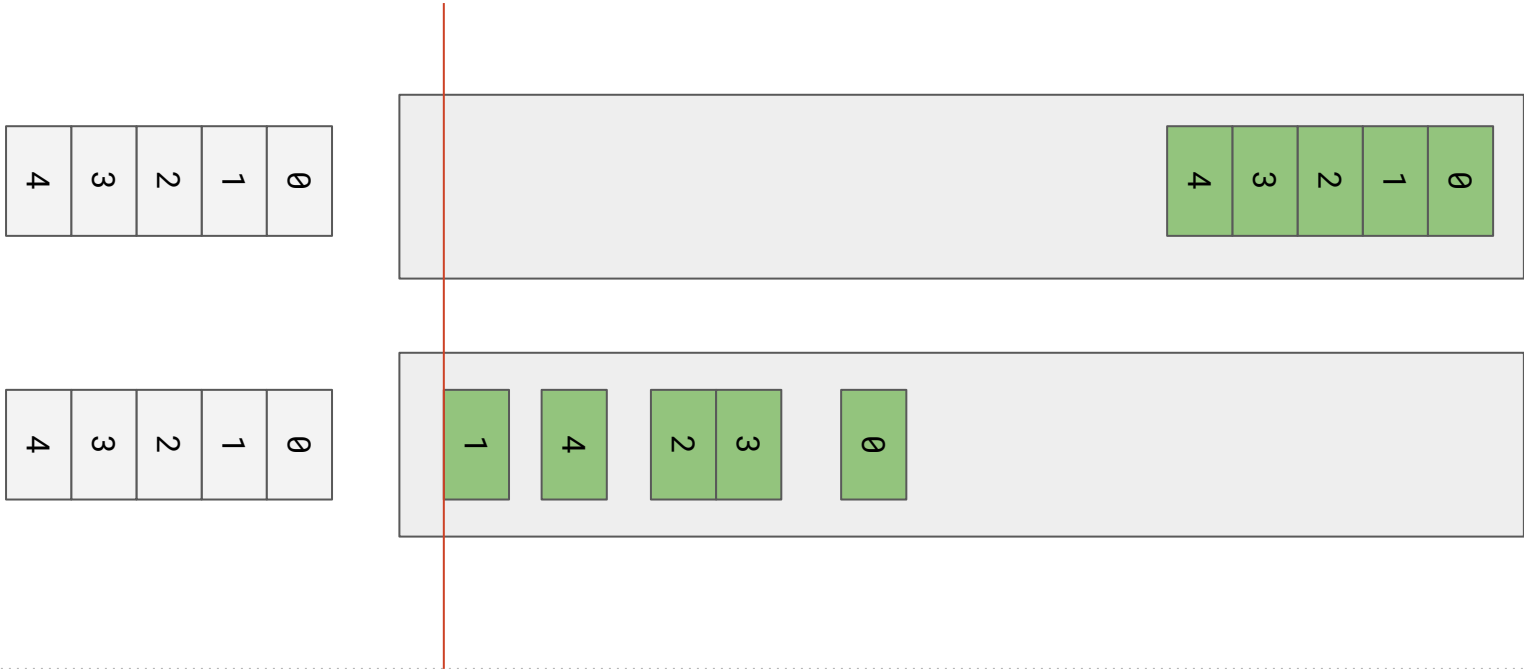
# Delayed Message Delivery



# Delayed Message Delivery



# Delayed Message Delivery





# Delayed Message Delivery

Different delay granularity on a partition

Delayed messages and Non-delayed messages in  
a partition

# Usage

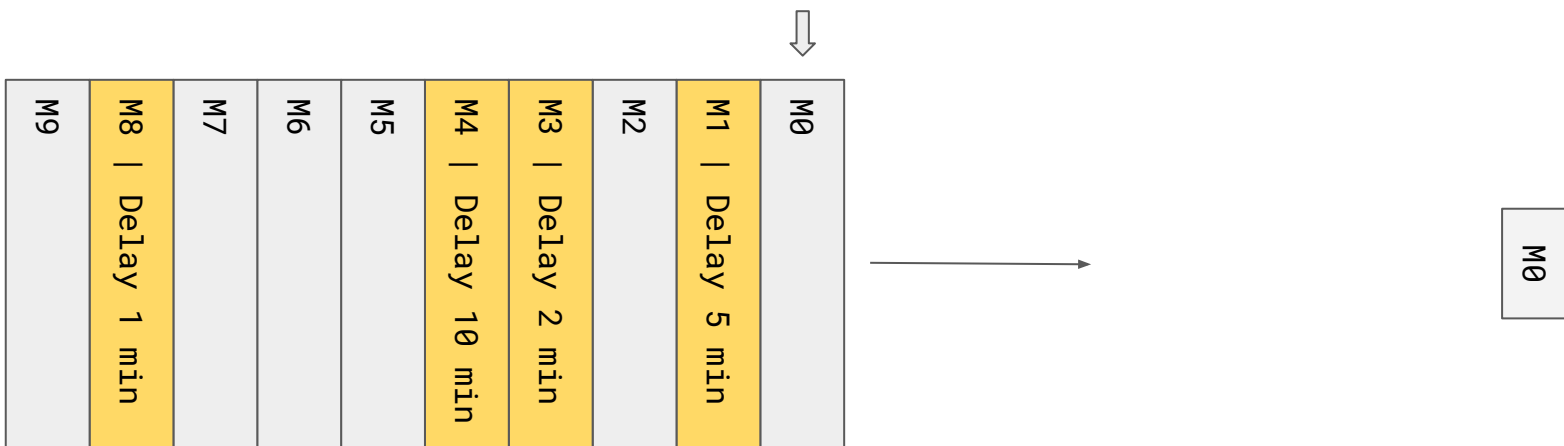
```
producer.newMessage()  
    .deliverAt(long timestamp)  
    .sendAsync();
```

```
producer.newMessage()  
    .deliverAfter(long delay, TimeUnit unit)  
    .sendAsync();
```

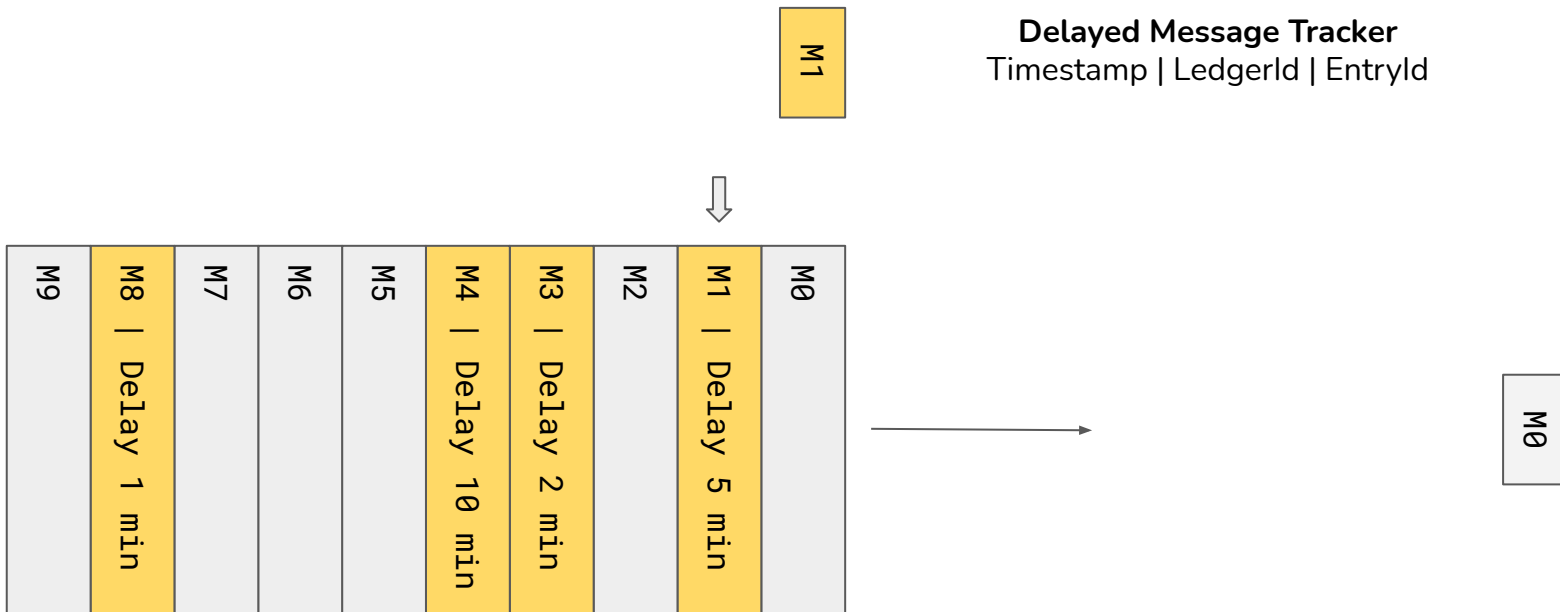
# How it works?

M0
M1   Delay 5 min
M2
M3   Delay 2 min
M4   Delay 10 min
M5
M6
M7
M8   Delay 1 min
M9

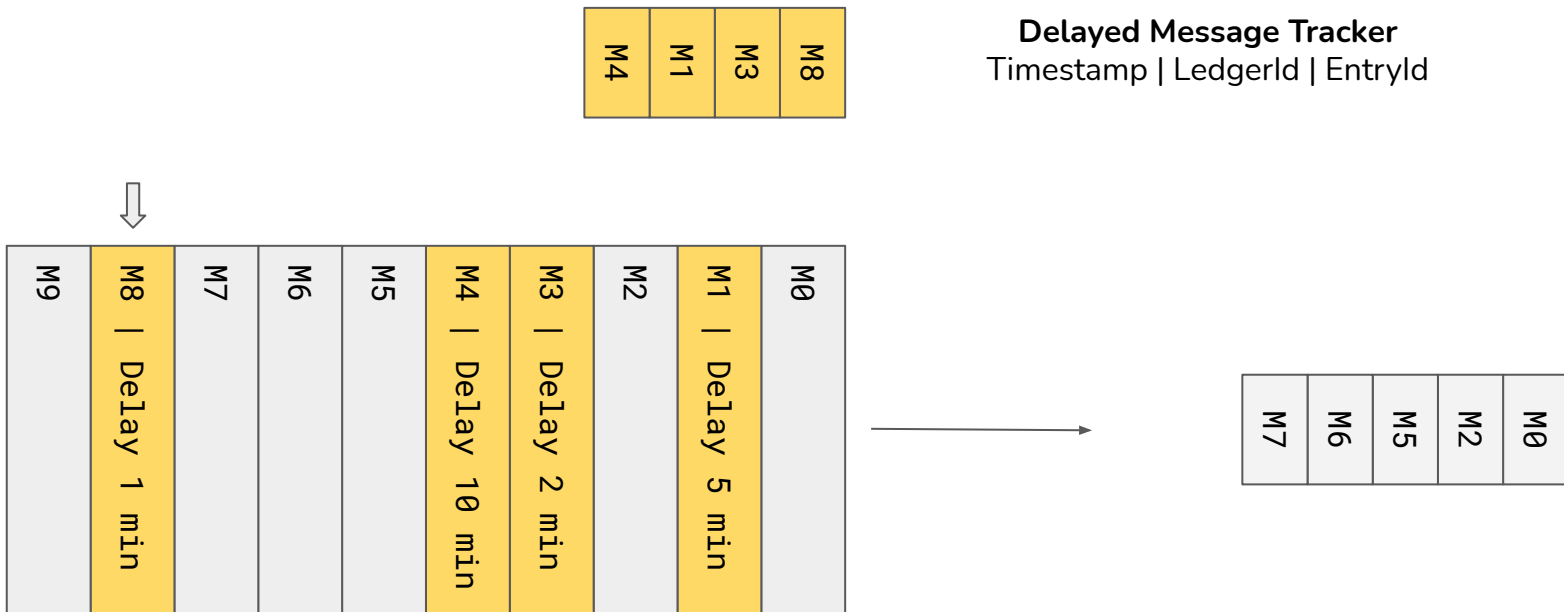
# How it works?



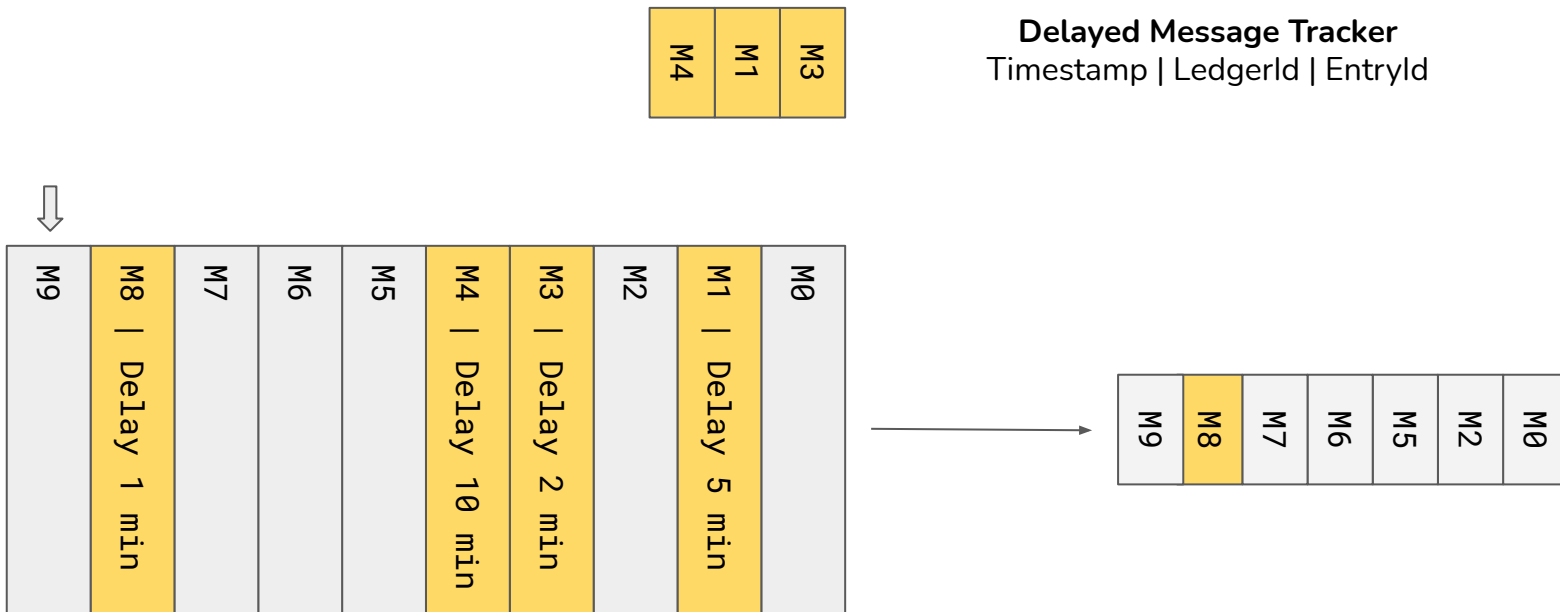
# How it works?



# How it works?



# How it works?



# Disadvantages

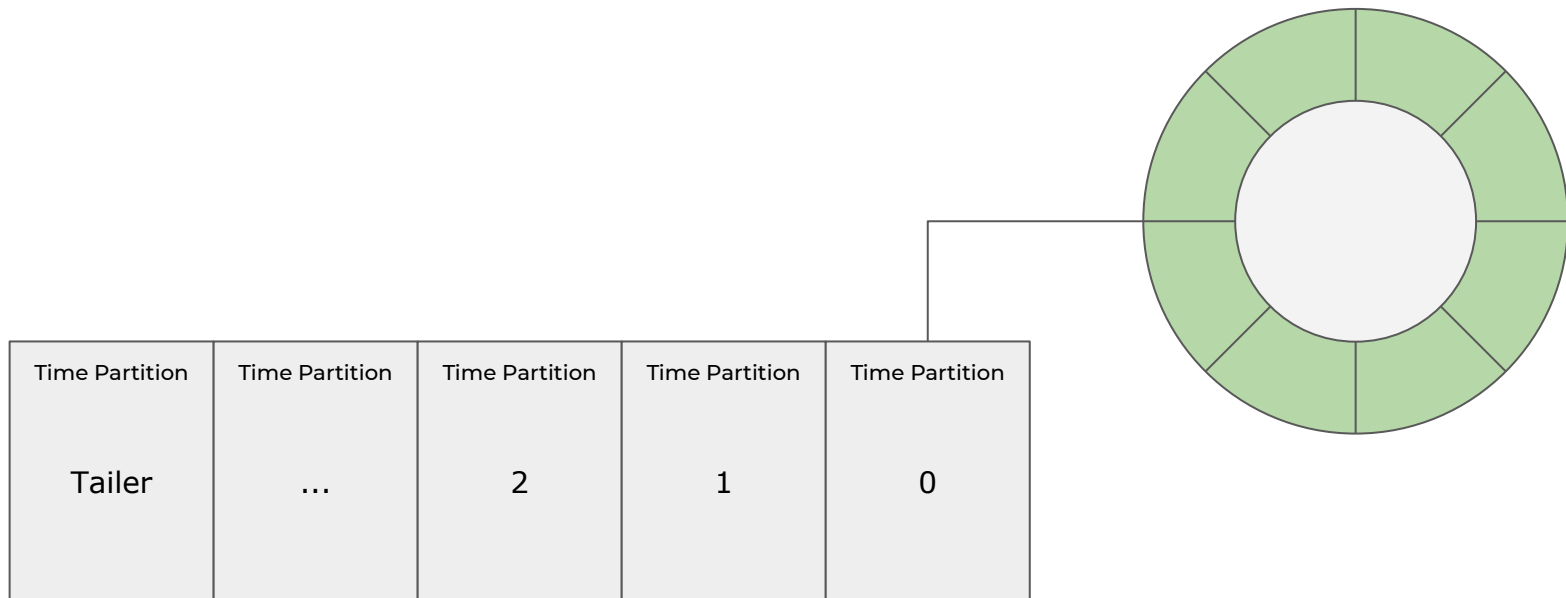
Delayed index memory limitation

Rebuilding delayed index

The index only available for a subscription

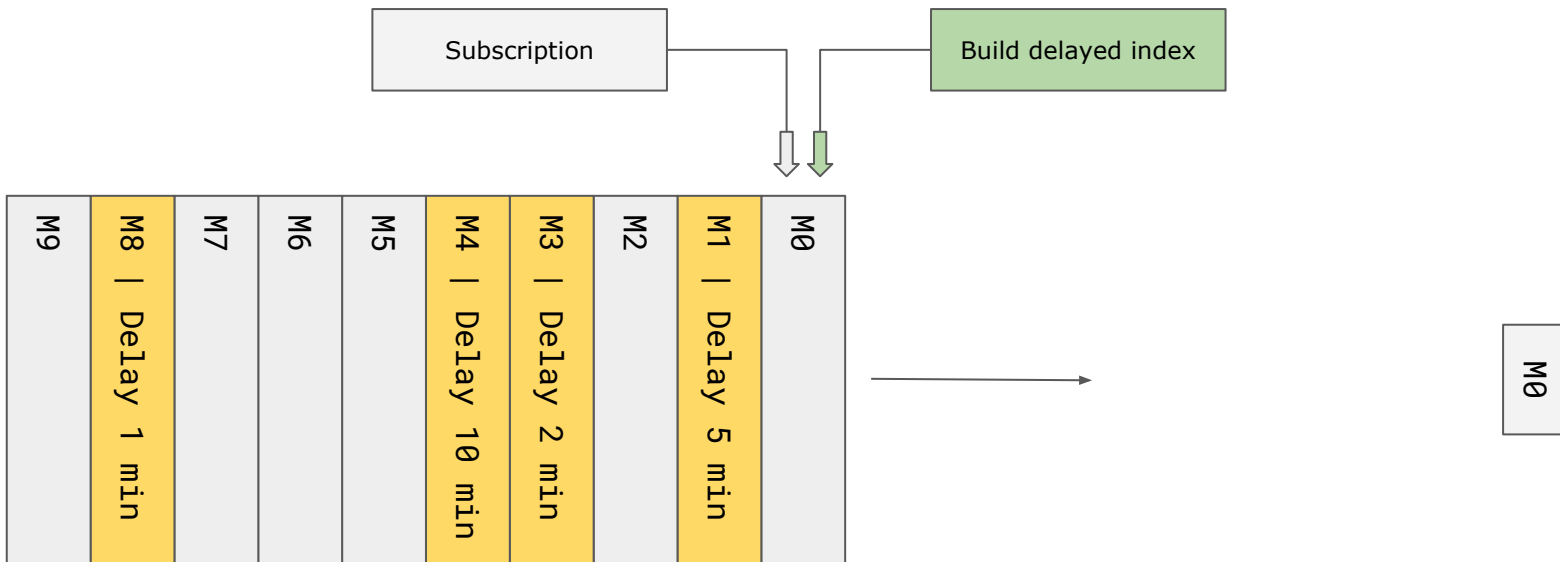


# PIP 26 Hierarchical Timing Wheels

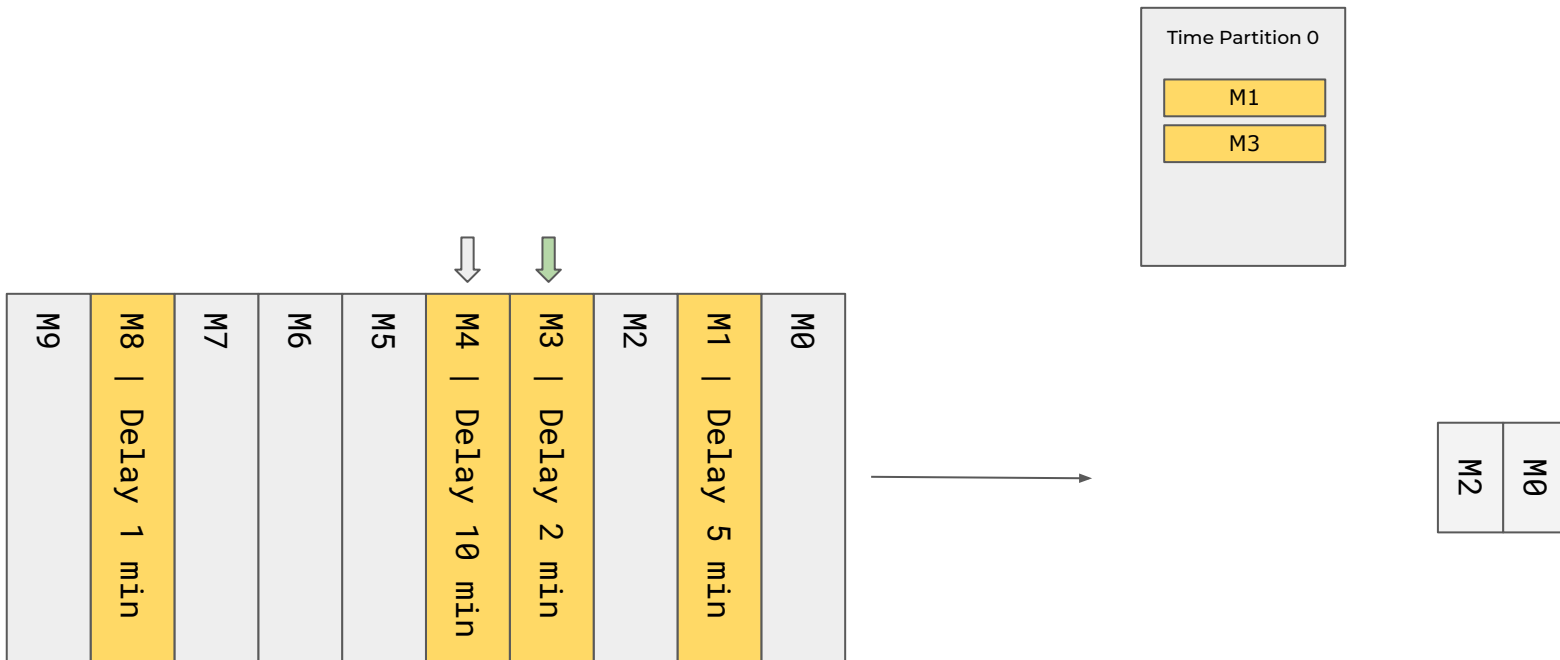


<http://www.cs.columbia.edu/~nahum/w6998/papers/sosp87-timing-wheels.pdf>  
<https://blog.acolyer.org/2015/11/23/hashed-and-hierarchical-timing-wheels/>

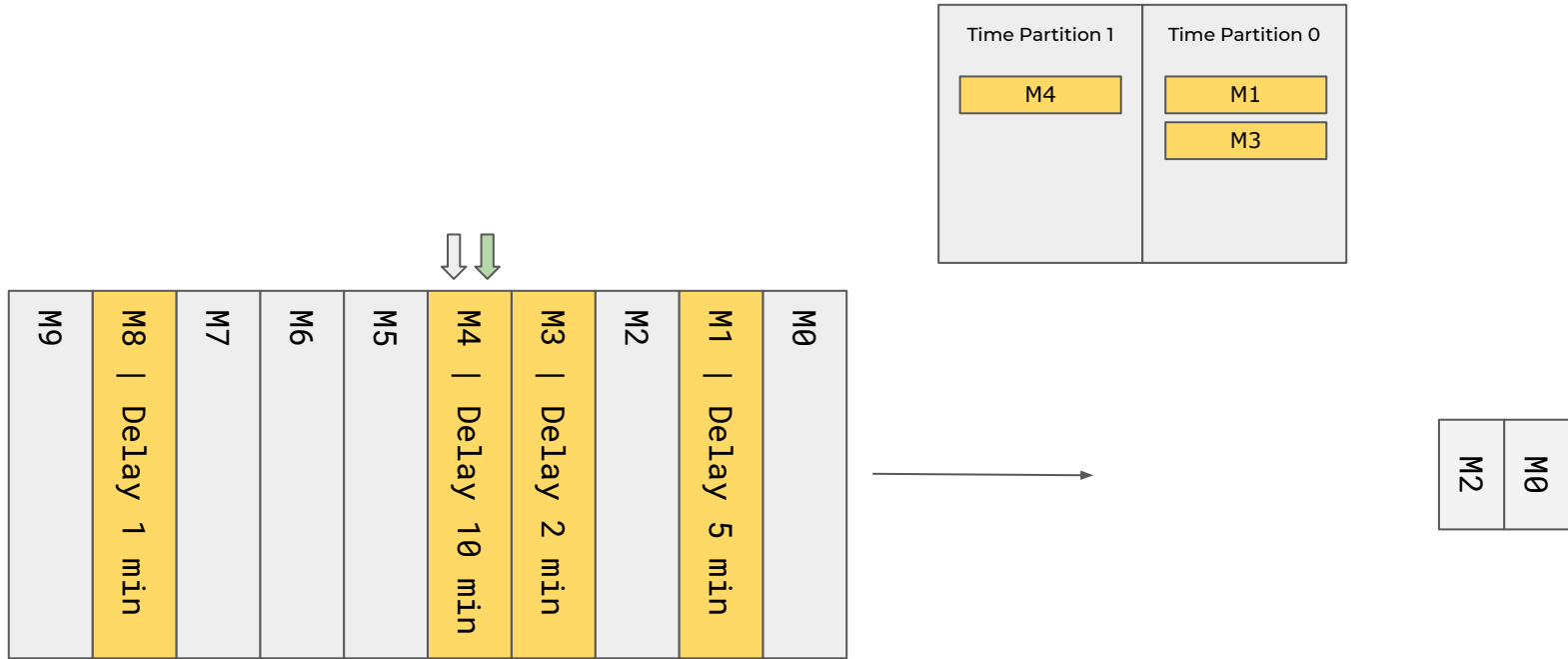
# How it works?



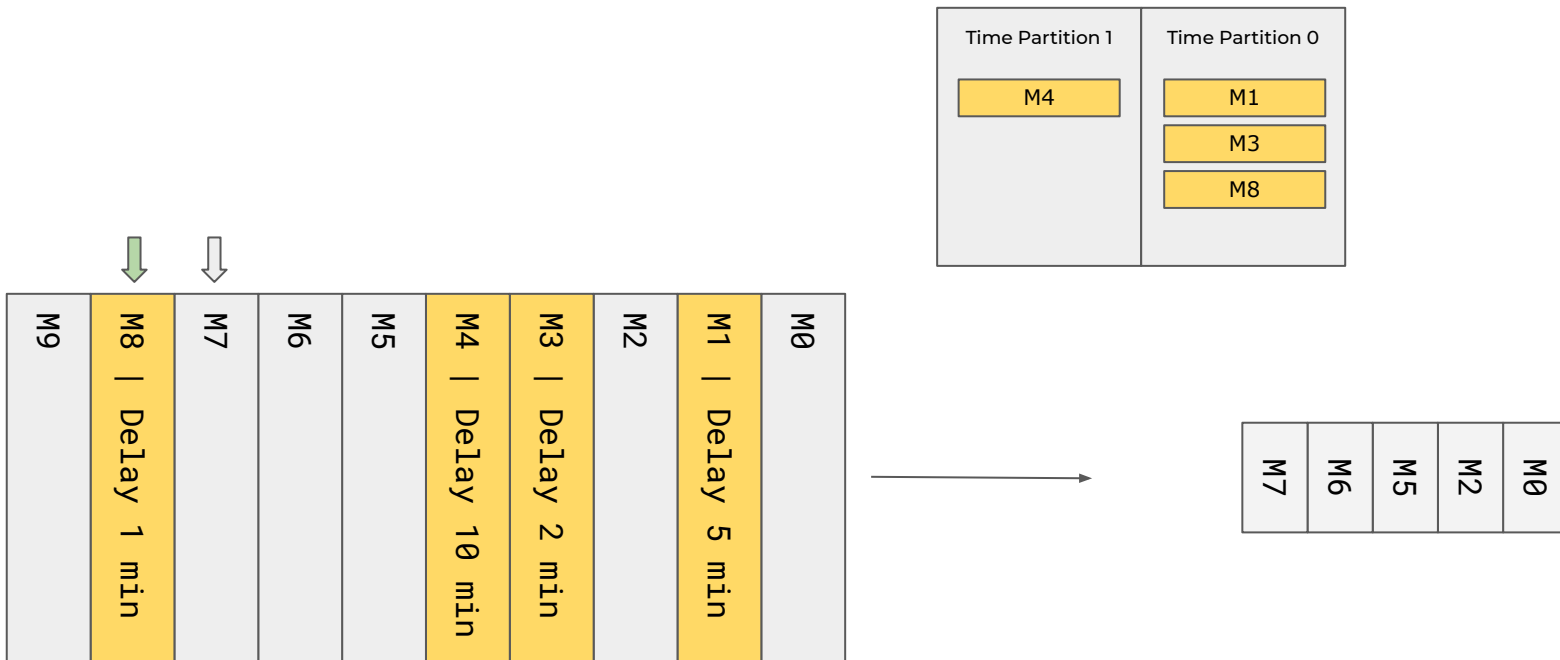
# How it works?



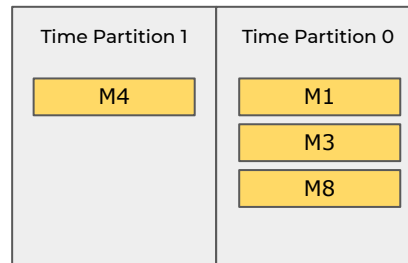
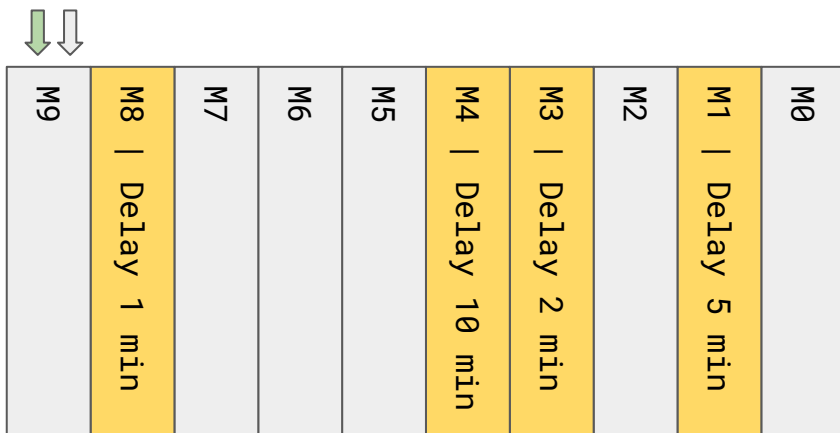
# How it works?



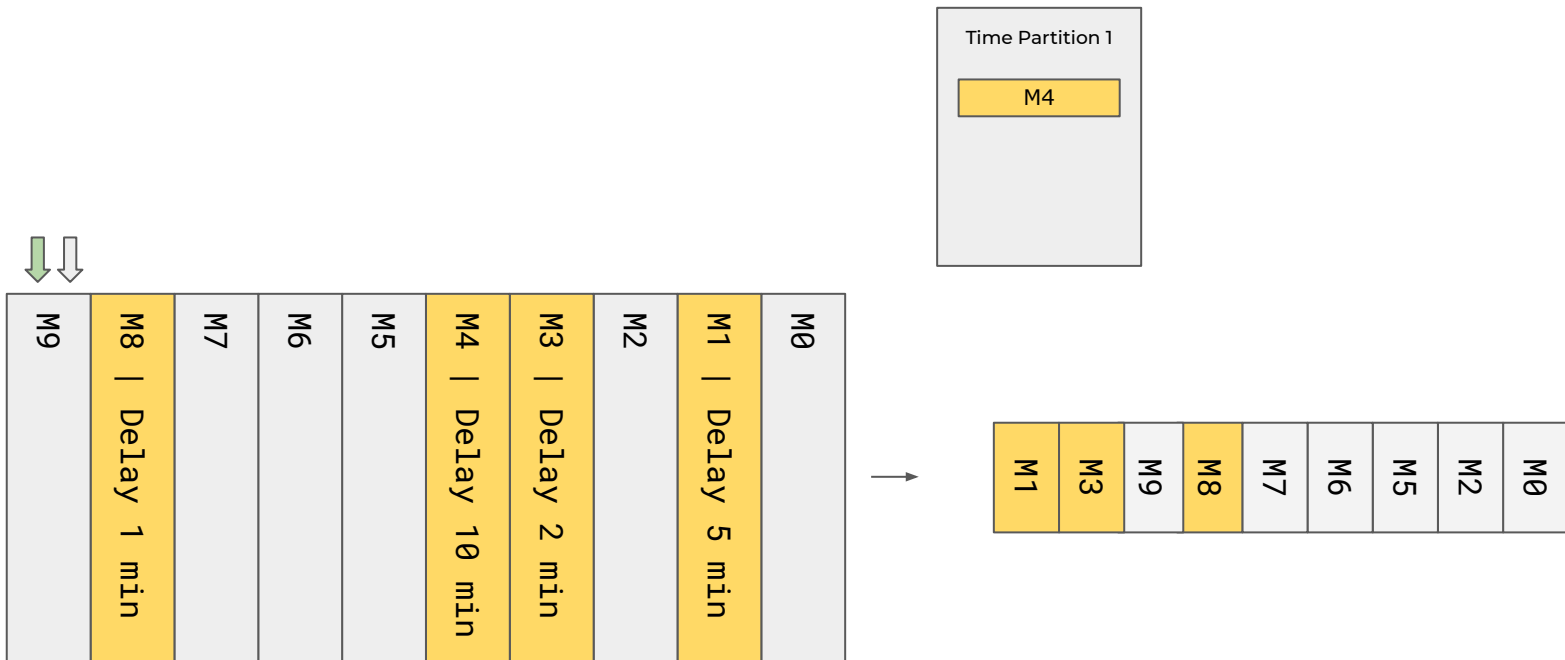
# How it works?



# How it works?



# How it works?



# Advantages

Load delayed indexes more efficiently

Reduce the memory usage for delayed indexes

Avoid rebuilding indexed by replaying too many entries



# Challenges

Data cleaning

Safe position for subscription to start read

Too much individual acks introduced much memory overhead

## Wechat

Apache Pulsar / StreamNative

## Bilibili

<https://space.bilibili.com/391380821>

## Email

[dev@pulsar.apache.org](mailto:dev@pulsar.apache.org)

[users@pulsar.apache.org](mailto:users@pulsar.apache.org)

## Slack

[#general / #china](https://apache-pulsar.slack.com)

register: <https://apache-pulsar.herokuapp.com/>

## Github

<https://github.com/apache/pulsar>

<https://github.com/apache/bookkeeper>

<https://github.com/streamnative>

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streamnative.io



# Thank You



[streamnative.io](https://streamnative.io)