

Kafka Consumer Timing Guide

1. Heartbeat Interval (heartbeat.interval.ms)

- Consumer sends a heartbeat to Kafka at this interval.
- Rule: $\text{heartbeat.interval.ms} = \text{session.timeout.ms} / 3$ (approx)

2. Session Timeout (session.timeout.ms)

- If Kafka does not receive heartbeat within this timeout, consumer is marked dead.
- Must be $> 2 \times \text{heartbeat.interval.ms}$.

3. Max Poll Interval (max.poll.interval.ms)

- The maximum time allowed between two poll() calls.
- If poll() is not called before this expires, Kafka triggers a rebalance.
- Most important for handling long processing.

4. Poll Timeout (consumer.poll(Duration...))

- Blocking wait time for records.

Core Logic:

Given:

- Scheduler interval = 6 minutes
- Poll timeout = 10 minutes
- 1 record takes 1 minute
- Up to 15 records per poll

Worst-case processing:

$$15 \text{ records} \times 1 \text{ min} = 15 \text{ min}$$

Worst-case total delay:

$$\text{scheduler delay (6 min)} + \text{poll block (10 min)} + \text{processing (15 min)} = 31 \text{ min}$$

Therefore:

max.poll.interval.ms must be > 31 min → Recommended 30–35 minutes.

Recommended Config:

heartbeat.interval.ms = 30000

session.timeout.ms = 90000

request.timeout.ms = 120000

max.poll.interval.ms = 1800000 (30 minutes)

max.poll.records = 100

Summary:

max.poll.interval.ms must be greater than:

scheduler interval + poll timeout + max processing time

This prevents unexpected rebalances.