

## Kafka 實作：in-sync-replicas (ISR)

題目：

請試著run 3個broker, 設置min.insync.replicas=2，並且驗證in-sync broker 數量少於min.insync.replicas時會發生什麼事情？請以截圖搭配說明並作成 pdf 上傳 實驗：

**ISR** 的作用：ISR 指的是需要跟 partition leader 保持同步的 replica 數量，舉例來說，如果我們這裡有 3 個 broker, 那在 partition leader (kafka1) 發送消息，則 kafka1 需要把消息 replicate 到 kafka2, kafka3 才會回覆 client 發送成功。

準備環境：

**docker-compose.yml**: (設定KAFKA\_MIN\_INSYNC\_REPLICAS: 2)

```
x-common-env: &common-env
  KAFKA_ZOOKEEPER_CONNECT: zookeeper:2181
  KAFKA_LISTENER_SECURITY_PROTOCOL_MAP:
EXTERNAL:PLAINTEXT,INTERNAL:PLAINTEXT
  KAFKA_INTER_BROKER_LISTENER_NAME: INTERNAL
  KAFKA_MIN_INSYNC_REPLICAS: 2

version: '3'
services:
  zookeeper:
    image: confluentinc/cp-zookeeper:7.2.1
    container_name: zookeeper
    environment:
      ZOOKEEPER_CLIENT_PORT: 2181
  kafka1:
    image: confluentinc/cp-kafka:7.2.1
    container_name: kafka1
    ports:
      - "8097:8097"
    depends_on:
      - zookeeper
    environment:
      KAFKA_BROKER_ID: 1
      KAFKA_ADVERTISED_LISTENERS:
EXTERNAL://localhost:8097,INTERNAL://kafka1:9092
      <<: *common-env
  kafka2:
    image: confluentinc/cp-kafka:7.2.1
    container_name: kafka2
    ports:
      - "8098:8098"
    depends_on:
      - zookeeper
    environment:
      KAFKA_BROKER_ID: 2
      KAFKA_ADVERTISED_LISTENERS:
EXTERNAL://localhost:8098,INTERNAL://kafka2:9092
```

```
<<: *common-env
kafka3:
  image: confluentinc/cp-kafka:7.2.1
  container_name: kafka3
  ports:
    - "8099:8099"
  depends_on:
    - zookeeper
  environment:
    KAFKA_BROKER_ID: 3
    KAFKA_ADVERTISED_LISTENERS:
EXTERNAL://localhost:8099,INTERNAL://kafka3:9092
<<: *common-env
```

創建 topic:

```
> docker exec -it kafka1 kafka-topics --create --topic test-topic --partitions 1 --replication-factor 2 --if-not-exists --bootstrap-server kafka1:9092

Created topic test-topic.
```

```
$ docker exec -it kafka1 kafka-topics --create --topic test-topic --partitions 1 --replication-factor 2 --if-not-exists --bootstrap-server kafka1:9092
```

在 kafka1 使用 console-producer 發送消息:

```
$ docker exec -it kafka1 kafka-console-producer --broker-list kafka1:9092 --topic test-topic
```

```
> docker exec -it kafka1 kafka-console-producer --broker-list kafka1:9092 --topic test-topic
pic
>hello
>world
>
>hello
>world
>abc
>from kafka
>1234
```

發現可以正常傳送。

在 **kafka3** 使用 **console-consumer** 接收消息，發現可以正常接收

```
> docker exec -it kafka3 kafka-console-consumer --bootstrap-server kafka3:9092 --topic test-topic --from-beginning

hello
world

hello
world
abc
from kafka
1234
```

在關掉 **kafka2** 後，使用 **console-producer** 發送消息 **try after isr**，會產生 **NOT\_ENOUGH\_REPLICAS** 錯誤

```
>try after isr
>[2024-01-05 01:16:47,332] WARN [Producer clientId=console-producer] Got error produce response with correlation id 12 on topic-partition test-topic-0, retrying (2 attempts left). Error: NOT_ENOUGH_REPLICAS (org.apache.kafka.clients.producer.internals.Sender)
[2024-01-05 01:16:47,436] WARN [Producer clientId=console-producer] Got error produce response with correlation id 13 on topic-partition test-topic-0, retrying (1 attempts left). Error: NOT_ENOUGH_REPLICAS (org.apache.kafka.clients.producer.internals.Sender)
[2024-01-05 01:16:47,544] WARN [Producer clientId=console-producer] Got error produce response with correlation id 14 on topic-partition test-topic-0, retrying (0 attempts left). Error: NOT_ENOUGH_REPLICAS (org.apache.kafka.clients.producer.internals.Sender)
[2024-01-05 01:16:47,666] ERROR Error when sending message to topic test-topic with key: null, value: 13 bytes with error: (org.apache.kafka.clients.producer.internals.ErrorLoggingCallback)
org.apache.kafka.common.errors.NotEnoughReplicasException: Messages are rejected since there are fewer in-sync replicas than required.
```

Ref: [Kafka Topic Configuration: Minimum In-Sync Replicas](#)