

Partition count, Replication factor

- 2 most imp parameters when creating a topic.
- impact performance and durability of system overall
- It is best to get parameters right the first time.
If Partition count ↑ during a topic lifecycle, you will break your key ordering guarantees.

If Replication factor ↑ during a topic lifecycle, you put more pressure on your cluster, which can lead to unexpected performance decrease.

Partition count.

- Each partition can handle a throughput of a few MB/s. (measure it for your setup!)

More partitions \Rightarrow better parallelism

- better throughput
- ability to run more consumers in a group to scale
- ability to leverage more brokers if you have a large cluster.
- BUT - more elections to perform for Zookeeper
- More files opened on Kafka

Guidelines:

Partitions per topic :

- Intuition - Small cluster (< 6 brokers) : 2x # brokers.
Big cluster (> 12 brokers) : 1x # brokers
- Adjust for no. of consumers you need to run in parallel at peak throughput
- Adjust for producer throughput (increase if super high throughput or projected increase in 2 years to come).

TEST : Every Kafka cluster has different performance
Don't create a topic with 1000 partitions!

Replication factor.

- should be at least 2, usually 3, maximum 4
- Higher the replication factor (N):
better resilience. $(N-1)$ brokers can fail.

- BUT more replication = high latency (esp. if acks=all)
- BUT more disk space. (50% more if RF is 3 instead of 2)

Guidelines:

- set it to 3 to get started.
- IF replication performance is an issue, get a better broker instead of less RF.
- *-NEVER SET TO 1 IN PRODUCTION***

The screenshot shows a video player interface. At the top, it says "Learn Apache Kafka for Beginners" and "ZooKeeper". To the right are icons for views (3,305), likes (25,818), and a plus sign. Below that is a user icon with "520 active". The title "Clusters guidelines" is centered, with a profile picture of Stephane Maarek to its right. The video content lists guidelines for Kafka clusters, starting with accepted limits for partitions per broker and broker-wide, followed by recommendations for handling higher partition needs through adding brokers or creating multiple clusters. A note at the bottom encourages testing with a reasonable number of partitions. The video player includes standard controls like play/pause, volume, and a progress bar showing 8:27 / 8:36. The video is titled "I know it's not a definitive answer".

- It is pretty much accepted that a broker should not hold more than 2000 to 4000 partitions (across all topics of that broker).
- Additionally, a Kafka cluster should have a maximum of 20,000 partitions across all brokers.
- The reason is that in case of brokers going down, Zookeeper needs to perform a lot of leader elections
- If you need more partitions in your cluster, add brokers instead
- If you need more than 20,000 partitions in your cluster (it will take time to get there!), follow the Netflix model and create more Kafka clusters.
- Overall, you don't need a topic with 1000 partitions to achieve high throughput.
Start at a reasonable number and test the performance



