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Confluent Platform Ops Checklist


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Use this checklist to plan a new Confluent Platform (CP) or Kafka deployment, audit an existing CP or Kafka deployment, or for reference.

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Business Needs and SLAs

- Do I understand my business needs? Why am I using Kafka? What does Kafka need to do for my application?
- Do I understand my SLA requirements? For example:
 - Latency
 - Throughput -- bytes / second in and out, messages / second in and out
 - Maximum message size
 - Failure tolerance -- brokers, ZooKeeper, clients, data centers
 - Message delivery guarantees -- at most once, at least once, exactly once. [Learn more.](#)

Kafka Topics and Partitions

- Do I know what Kafka topics my application requires? This will depend on your application.
- Do I understand which producers will produce to each topic? This will depend on your application.
- Do I understand which consumers and consumer groups will consume from each topic? This will depend on your application.
- Are the right number of partitions set correctly for each topic? [Learn more.](#)
- Is the replication factor set correctly for each topic? [Learn more.](#)
- Which of my topics need to be compacted? [Learn more.](#)

Kafka Producers

- Is my producer making the correct latency-durability tradeoff with the acks configuration? Learn more by searching for "acks" [here](#).
- Am I making reasonable latency-throughput trade-offs in linger.ms and batch.size configurations?

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Am I making reasonable latency, throughput and message size and retention configurations?

Learn more by searching for these configs [here](#).

- Are the producers asynchronous? They should be.
- Is `max.in.flight.requests.per.connection` configured appropriately for your application? A value of "1" is required to ensure messages are sent to brokers in the same order they were produced, in the event of a retry. A larger number (the default is "5") will increase throughput for the same retry case, but potentially send messages out of order.
- Is Connect being used for applicable producers, for distribution and fault-tolerance? [Learn more](#).

Kafka Consumers

- Is my consumer properly committing (keeping track of) consumed offsets? [Learn more](#).
- Is my consumer group id (group.id) set correctly? Learn more about consumer groups [here](#).
- Is Connect being used for applicable consumers, for distribution and fault-tolerance? [Learn more](#).
- Is `offsets.retention.minutes` set correctly to allow for SLA for client uptime?

ZooKeeper

- Does my ZooKeeper cluster have an odd number of nodes? Ideally, 3 or 5.
- Is ZooKeeper running on the correct hardware? [Learn more](#).
 - A dedicated hard drive for the transaction log is the most important hardware configuration.
- Is ZooKeeper running on dedicated hardware? This is ideal.

Kafka Hardware

- Are brokers running on ideal hardware to satisfy my application's needs? [Learn more](#).
- Do brokers have enough memory? 64GB is ideal, but 32GB is sufficient.
- Do brokers have enough processing power? 24 cores is recommended.
 - More processing power is required in latency-sensitive application because requests will be smaller and brokers will serve higher requests per second.
- Are operating system and application logs on a different hard drive than my broker log data?
 - Broker log data is specified by `log.dirs` in `server.properties`.
 - Whereas application logs are specified by `log4j.properties`.
- Are broker log data directories on a local hard drive, instead of a NAS? NAS-mounted broker log data directories are discouraged for performance reasons.
- Have I decided on JBOD vs RAID for my broker log data directories?
 - Both JBOD and certain RAID configurations will perform well. Choosing JBOD vs RAID is up to you.
 - RAID offers certain benefits in exchange for more operational overhead. [Learn more](#). One additional benefit to RAID is it allows for larger partitions because in this configuration, a partition doesn't need to fit on one disk. If you choose RAID, we recommend either RAID0 or RAID10. We recommend against RAID5 and RAID6 for IO performance reasons.
- Are all brokers in the same data center? Cross-data center Kafka clusters are strongly discouraged.
- Disable all power save on disks and CPU core disabling

Software / OS

- Have I increased the open file descriptor limit in my broker's operating system? [Learn more](#).
- Is my broker log data in either an ext4 or XFS file system? These are the recommended file systems. XFS is easier to tune.
- Is my operating system supported and ideal? We recommend a modern version of RHEL, CentOS, or Ubuntu.
- Is my version of Java supported and ideal? [Learn more](#).
- Is the JVM tuned/configured correctly? [Learn more](#). In particular, use of G1GC is highly recommended.
- Am I installing Kafka and all other components (e.g., schema registry) from the Confluent Platform? This is recommended. [Learn more](#).
- Am I using the newest stable version of Confluent Platform? Our current recommendation is 5.0.1 (Kafka version 2.0.1).
- Is swappiness set to "1" in my operating system? [Learn more](#).
- In RHEL:
 - Are Transparent Huge Pages (THP) disabled? We recommend disabling them.

- Are `net.core.rmem_max` and `net.core.wmem_max` tuned for your application? We have seen good success with a value of "2097152". Ensure you have also set `net.ipv4.tcp_wmem` and `net.ipv4.tcp_rmem` of the increase to these core limits.
- If I'm using virtualization, are my partition replicas stored on different physical machines?
 - In a virtualized environment, it's possible for many virtual machines to be colocated on the same physical machine. If all partition replicas for a given partition are stored on the same physical machine (but different virtual brokers), the entire partition will be lost if the physical machine fails.

Kafka Configuration

- Is Kafka configured correctly? Learn more [here](#). Below is a list of recommended configurations. If a configuration is not listed below, we recommend the default value. Also see [Latency, Throughput and Durability Configuration](#).
 - `zookeeper.connect` -- list of ZooKeeper nodes.
 - `broker.id` -- unique integer ID for each broker. No two brokers can have the same ID.
 - `log.dirs` -- directories where the broker log data is stored. Ensure that each hard drive (or RAID array) intended to store Kafka broker log data is included in this configuration.
 - `advertised.listeners` -- the listeners to publish to ZooKeeper. This should be set in an IaaS environment.
 - `num.partitions` -- default number of partitions for new topics. An ideal configuration will depend on your application and deployment.
 - `default.replication.factor` -- default replication factor for new topics. To ensure fault tolerance, we recommend setting this to at least "2". "3" is most likely an ideal configuration.
 - `min.insync.replicas` -- the minimum number of in sync replicas (ISRs) needed to commit a message, when `ack` is set to -1 or "all". We recommend "2" or greater, based on how much durability you want.
 - `unclean.leader.election.enable` -- whether or not a replica that fell out of the ISR should be elected a leader as a last resort. Set this to "0" if you don't want to accidentally lose data. You can always switch to "1" in a dire situation where you decide that losing data is the best choice. [Learn more](#).
 - `compression.type` -- the type of compression used to compress messages, end-to-end. We recommend "snappy". [Learn more](#).
 - `log.retention.*` -- these configuration options configure how long log data is kept on the broker, per partition. Keeping log data longer gives more application flexibility (for example, in the event of a failure) but will consume more disk space. When setting these configuration options, consider the number of partitions per broker and the amount of disk space per broker. And be careful: running out of disk space is the leading cause of long broker downtime.
 - `num.recovery.threads.per.data.dir` -- the number of recovery threads per data directory at startup and shutdown. For JBOD, set this to 1; for RAID, set this to the number of disks in the RAID array.
 - `message.max.bytes` -- the maximum message size. Anything higher than 1M is strongly discouraged.
 - `replica.fetch.max.bytes` -- must be higher than `message.max.bytes`.
 - Also, the JVM heap size must be larger than $(\text{replica.fetch.max.bytes} *)$
 - Does `num.io.threads` equal the number of cores? Setting this to the number of cores on the broker will increase throughput.
 - Is `offsets.retention.minutes` set correctly to allow for SLA for client uptime?
 - Are the reasons for non-default settings well documented?

Kafka Security

- Do I understand my application's Kafka security requirements, given my application requirements and deployment environment? [Learn more](#).
- Do I need encryption? If so, [learn more about SSL here](#).
- Is truststore used to validate certificates, instead of a signing authority?
- Do I need authentication? If so, learn more about SSL authentication and SASL authentication with Kerberos [here](#).
- Do I need authorization and access control limits (ACLs)? If so, learn more about authorization [here](#).
- Do I need ZooKeeper authentication? [Learn more](#).
- If I am not using encryption, authentication, and authorization, is my cluster behind the correct firewalls/firewall settings? The Confluent Platform must run behind a firewall if the above security

implementation settings. The Confluent Platform installation settings document lists the default security options are not active.

Kafka Benchmarking

- Has the cluster been benchmarked to ensure it meets my SLA requirements?
- Have configuration tweaks been tested to optimize performance?

Kafka Staging Environment

- Does a staging environment exist that replicates my production environment, where I can stage changes before making production changes?
- Have I performed reliability tests on the staging cluster, ensuring the cluster is reliable enough for my application? For example, force-killing a broker, unplugging a hard drive, etc., while actively producing and consuming.

Kafka Monitoring

- Are important JMX metrics being monitored? Important JMX metrics are documented [here](#).
- Are system metrics being monitored, such as CPU usage, network i/o, disk i/o, etc?
- Have I read the [Monitoring Kafka Operations Guide](#)?

Kafka Alerting

- Are alerts working for important JMX metrics? See your Confluent architecture review.
- Are alerts working for important system metrics? See your Confluent architecture review.
- Are alerts being delivered to the correct people in my company?
- Am I confident I know how to respond to each alert type?

Schema Registry

- Is the schema registry running on ideal hardware to satisfy my application's needs? [Learn more](#).
- Is the JVM tuned/configured for my schema registry? [Learn more](#).
- Is the schema registry configured correctly? [Learn more here](#) and [here](#).
- Is the schema registry properly monitored? [Learn more](#).

Kafka Connect

- Are connectors running in distributed or standalone mode? [Learn more](#).
- Are the correct number of tasks configured? [Learn more](#).
- Are workers configured correctly? [Learn more](#).
- Have I read the [Monitoring Connect Operations Guide](#)

Kafka Rest Proxy

- Does my application require the rest proxy? [Learn more](#).
- Are rest proxy instances running on ideal hardware to satisfy my application's needs? [Learn more](#).
- Are there enough rest proxy servers to handle my application's load? Benchmark this.
- Is the JVM tuned/configured on my rest proxies? [Learn more](#).
- Are my rest proxies configured correctly? [Learn more here](#) and [here](#).
- Are rest proxies properly monitored? [Learn more](#).
- Are all non-Java clients using the rest proxy? In general we recommend all non-Java clients use the rest client or librdkafka.

Multi Data Center

- Have I thoroughly and carefully architected my multi-data center design? There are many large trade-offs that must be considered. See Confluent's architecture training.
- Have I read the [Replicator Performance Tuning Guide](#)
- Is the schema registry architected correctly for a multi-data center environment? [Learn more](#).

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