Confluent Cloud vs. Amazon MSK

The rise of Apache Kafka managed services

Apache Kafka was designed with scale in mind. Capable of scaling horizontally to handle extremely high fanout and throughput as needed, Kafka is an ideal event-streaming technology for use cases that require high performance and increasing adoption within an organization.

However, due to its distributed architecture, the operational burden of managing Apache Kafka can quickly become a limiting factor on either adoption or developer agility. With an ever-increasing demand for technical talent, especially those with deep Apache Kafka expertise, organizations often look to managed services to accelerate development timelines and boost developer productivity while lowering total cost of operating Apache Kafka.

Every managed Apache Kafka service has the potential to check certain boxes in your list of your technical requirements , since they are all leveraging the same open-source technology. What sets them apart is each service's level of automation and cloud-native features across planning, provisioning, operating and scaling stages in order to enable your team to focus on application development versus managing infrastructure.

This guide will walk through the complete journey of an Apache Kafka deployment while comparing the experience between a cloud native service and a cloud hosted service as to inform application developers, architects and technical leaders on whether their choice of managed Apache Kafka service will truly enable them to meet their unique business objectives.

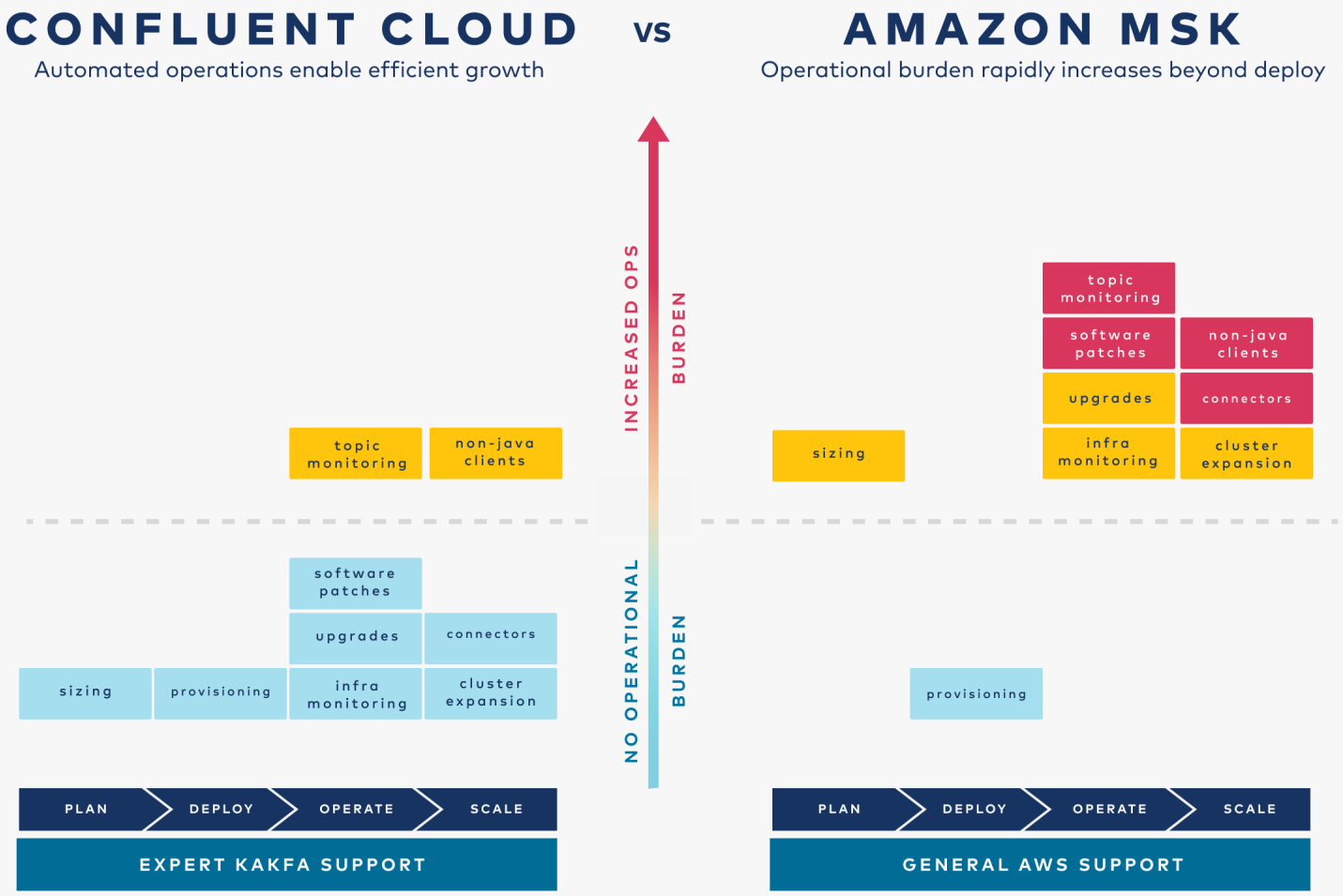
Types of Apache Kafka managed services

Cloud Native

A true cloud native service for Apache Kafka, such as Confluent Cloud, is one that is built from the ground up specifically for the cloud. It embraces the scalability and elasticity of public cloud infrastructure by decoupling compute and storage and abstracting the underlying complexities of operating Kafka. With this type of service, users can focus on their applications; operational tasks such as deployment, maintenance, scaling, and security management are automatically handled.

Cloud Hosted

A hosted service for Apache Kafka, such as Amazon Managed Streaming for Apache Kafka (Amazon MSK), is one that takes existing software and installs it in a public cloud environment and adds automation to some operations. With this implementation, the end user is still required to manage and monitor clusters at a broker level. In the long term, this adds complexity, overhead and potential operational risk as teams are handed the responsibility of maintaining highly available clusters during manual cluster scaling and upgrades. .



CLOUD NATIVE

Automated product capabilities with no operational overhead

SELF MANAGED

Manual execution with tools and/or support from provider

CUSTOM

Development and maintenance without support from provider

Plan

Sizing

The first step in the event streaming journey is sizing your initial production environment. In a self-managed world, this means picking instance or VM types for Kafka and Zookeeper nodes - a process that can take anywhere from days to weeks depending on the number of performance tests needed to choose the right instance type. Once that is completed, it is time to then choose the number of brokers needed to meet streaming requirements such as peak throughput and data retention requirements.

Sizing the cluster with Amazon MSK is not very different in that users still need to think in terms of brokers. On the contrary, Confluent Cloud uses a throughput based model to abstract the complexity of sizing the underlying Kafka infrastructure. By not having to worry about the number of brokers, you can get started in minutes versus weeks. With throughput based sizing, you can remove cumbersome performance testing cycles and eliminate concerns around overprovisioning clusters and running up the cloud bill or underprovisioning and impacting application performance with the risk of causing downtime.

Deploy

Provisioning

Automating provisioning is key to accelerate your team's access to production-ready environments. Provisioning automation includes implementation of Kafka security best practices such as automatically enabling at-rest and in-transit data encryption. Both Confluent Cloud and Amazon MSK can help you gain access to production ready environments in minutes as part of a cloud native experience.

A unique value proposition of a cloud native solution such as Confluent Cloud is the ability to deploy clusters where you only pay for usage versus infrastructure. For example, Confluent Cloud Basic clusters can be provisioned within seconds, and with their scale-to-zero pricing, they can be leveraged to reduce infrastructure costs during development phases. Once development is complete, these same clusters can be automatically upgraded to Standard clusters which are ready for production with higher SLAs and multi AZ replication for higher resiliency. By paying for usage instead of paying for provisioned infrastructure, your team can optimize costs throughout the Kafka journey.

Operate

Infrastructure monitoring

When self-managing Apache Kafka, monitoring infrastructure metrics such as CPU and disk utilization are key to maintain the uptime and performance of each cluster. Not so differently, other than the additional cost to export metrics, with a cloud hosted service such as Amazon MSK you have to consume low-level metrics with the goal of self monitoring, diagnosing and correcting issues related to cluster performance. With Confluent Cloud, our Kafka experts are proactively monitoring and optimizing the underlying infrastructure so you can stay focused on your applications.

Operate

Topic level monitoring

Topics are a key architecture element in Apache Kafka. Kafka topics are divided into a number of partitions that allow you to parallelize a topic by splitting it across multiple brokers. To monitor how much data is flowing through a topic you must manually aggregate partition level metrics from each broker. As more brokers are added to a cluster and partitions are rebalanced the aggregation logic also needs to evolve.

Amazon MSK provides users with predefined Kafka metrics in Cloudwatch, a separate AWS service built for general monitoring and APM across ~70 AWS offerings. MSK users can access raw metrics to perform manual analysis needed for metrics not delivered out of the box through Cloudwatch. Confluent Cloud provides users with pre-aggregated metrics, some not even available with Kafka such as storage used per topic, to help developers simplify topic level monitoring and gain the most valuable insights about their streaming applications. With Data flow, visualizing and monitoring end to end flow from producers to consumers can easily be done within the Cloud UI with the option to build custom dashboards in your monitoring tool of choice using Metrics API at no additional cost.

Upgrades

A fully managed service comes with the expectation of running on the latest software version. Confluent Cloud automatically upgrades customers to the latest version of Kafka, and it delivers upgrades faster than other vendors because of its unmatched insight and investment into open source Kafka. MSK requires users to trigger the upgrade cycle, which becomes available to customers after AWS determines whether they will support that given release.

Vulnerability patching

Streaming with the latest stable version of Kafka means streaming with the latest vulnerability patches. Confluent Cloud's rapid and automatic upgrades ensure that its users never miss the critical patches that any new release of OSS Kafka may contain. When combined with Confluent's Kafka-specific technical support team, these rapid updates allow Confluent to offer an all-encompassing SLA to users. In contrast, MSK provides an SLA specifically for its service uptime, but excludes failures resulting from the given version of Kafka that any number of customers may be running at any given time.

Scale

Cluster Scaling

Cluster scaling, whether up or down, will be required at multiple points in time in your Kafka journey. Some will be part of planned expansions such as onboarding a new application, but many times there will be unplanned expansions needed as part of unexpected surges in traffic. With elastic scaling and self-balancing clusters, Confluent Cloud is architected to drastically reduce the operational burden of managing cluster capacity changes.

MSK enables customers to scale using their console or an API, but that process requires active manual monitoring of your environment in order to kick off an automated process at just the right time. MSK also requires a manual process to rebalance and reassign partitions, which is a non-trivial task while scaling out.

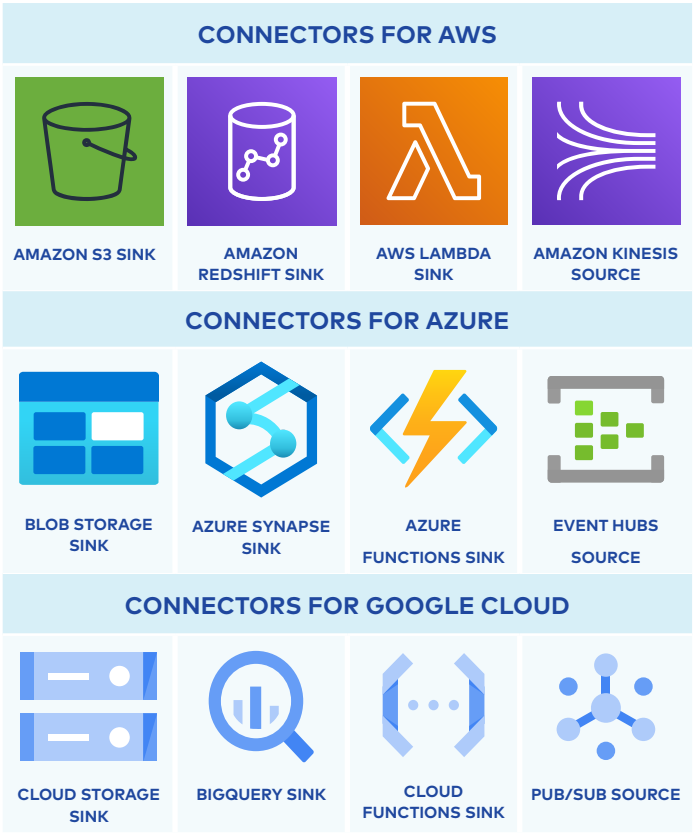
In a hypercompetitive digital world where customer loyalty is aligned to the best performing applications, every millisecond delay could be another lost customer. This could be the difference between hitting or missing revenue targets and making headlines for the wrong reasons. Adjusting to the real-time needs of your mission-critical apps, without paying for over provisioned infrastructure, is only possible with a cloud native service like Confluent Cloud. With self-balancing clusters, Confluent Cloud is continuously optimizing resource allocation to manage consumer lag without any operational burden to you.

Connectors

In order to maintain a real-time view across your entire business, Apache Kafka as the backbone of your application data architecture is only as valuable as the number of data services connected to it. On average, it takes Confluent engineers anywhere from 3-6 engineering months to design, build, and test each connector before providing it as a fully managed component. By leveraging our +100 pre-built and fully managed Connectors, you can de-risk time-to-value and accelerate your team's productivity. Connecting existing data systems to Kafka in a repeatable way will enable your team to focus on developing streaming applications instead of building and operating foundational tools such as integrations to data sources and sinks. Without AWS supported Kafka connectors for Amazon MSK, teams must own the responsibility of building, managing and providing technical support for integrations that must meet production level requirements.

Non-Java Clients

Enabling developers to easily connect to clusters in their most productive language is a key step in making Apache Kafka widely available to all developers. Confluent Cloud enables the adoption of Kafka through your organization with a wide variety of Confluent clients that are easy to use, high performing and battle tested to meet the demands of modern applications. AWS does not provide technical support for Confluent or other community-built clients leaving teams with the operational burden of integrating and supporting non-Java clients on their MSK clusters.



See all available connectors at www.confluent.io/hub

Expertise

Support

Businesses that embrace Kafka often build their most critical applications and processes on it. This makes expert support critical, because if your Kafka service goes down, your business can go down.

Confluent's Technical Support Engineers have over 1 million hour of Kafka expertise solving tens of thousands of Kafka related issues. Our support engineers resolve issues hand in hand with the same engineers that contribute to the open source project. As such, you are working with a committer-led team specialized in maintenance and development of Kafka, Connect, ksqlDB, and Kafka Streams as opposed to general support. With a global team of experts ready to resolve even the most complicated Kafka issues 24x7, you can minimize the time required to take Kafka to production and truly free your team from spending time monitoring clusters.

To accelerate your project's time to market even further, Confluent also offers customers advisory services to provide expert guidance and share best practices for your streaming architecture and streaming applications.

AWS offers support across the over 200 services in its portfolio, including MSK. With this breadth, it's important to understand the variety of support levels offered for each service. AWS does not offer SLAs around its software for MSK and does not make clear to customers how Kafka-related issues are triaged within its broader support for data and analytics.

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Future Proof

Environments

Confluent provides the ultimate freedom in terms of flexibility and choice to truly enable your strategic initiatives for hybrid and multi-cloud deployments whereas Amazon MSK was built to run only on AWS.

As a cloud native service, Confluent Cloud provides a consistent Kafka experience in more than 40 regions across all three major cloud providers - AWS , Azure and Google Cloud. And with Confluent Platform, our self-managed software, you can also deploy a consistent data architecture in your on-premises or private cloud environments.

Ecosystem

Confluent Cloud is more than a managed Apache Kafka service while Amazon MSK is a service that is limited to help you deploy Apache Kafka clusters only.

In addition to pre-built and fully managed connectors to popular data sources and sinks, Confluent Cloud also offers Schema Registry and ksqlDB as fully managed components. With managed Confluent Schema Registry, developers can adhere to standard schemas across Kafka applications in a simple, centralized and scalable way to maintain application compatibility with no additional infrastructure to manage. AWS offers a schema registry for Kafka through AWS Glue, a separate data integration service.

With Confluent's fully managed ksqlDB, non-Java developers can build streaming applications by developing real-time transformation pipelines with a lightweight SQL syntax to join, transform and enrich streaming data without having to manage any infrastructure. AWS offers streaming analytics capabilities as well, but does it outside of the Kafka ecosystem through Amazon Kinesis.

Start Your Cloud Native Kafka Journey with Confluent Cloud Today

confluent.io/cloud-native-kafka

	CONFLUENT CLOUD	AMAZON MSK
PLAN		
Sizing	**Throughput-based** • Eliminate cumbersome performance testing and capacity planning with cluster sizing based on your streaming requirements. • Reduce infrastructure costs with elastically scalable, scale-to-zero pricing clusters where you only pay for usage versus provisioned infrastructure.	**Broker-based** • Allocate time and technical resources to run multiple performance tests to pick broker types and broker count. • Always pay for provisioned infrastructure, both compute and storage, for every cluster, even for those that may have low throughput during development.
DEPLOY		
Provision	**Self serve, on-demand** • Provision Kafka clusters along with any other Confluent Cloud component including Schema Registry, Connect & ksqlDB	**Self serve, on-demand** • Provision Kafka clusters
OPERATE		
Infra Monitoring	**Confluent proactive monitoring** • Stay focused on app development with proactive cluster monitoring and maintenance from the Kafka experts • Infinite Storage enables unlimited cluster-level storage use cases while reducing risk of disk space-related failures	**Manual monitoring** • Assign resources to monitor broker metrics such as CPU utilization to proactively manage cluster performance • Monitor and create alerts for disk space to prevent failures due to storage capacity
Topic monitoring	**Pre-aggregated and free** • Gain the most valuable insights about your applications at no additional cost with access to key metrics aggregated at the topic and cluster level with Data flow • Consume aggregated metrics with your third party monitoring service of choice using Metrics API	**Manual aggregatiom and exta costs** • Gain access MSK metrics via CloudWatch, a separate tool for monitoring multiple AWS products. Pay for access to partition-level metrics needed to optimize manual partition rebalancing/reassignment during scaling. • Maintain metric processing and aggregation logic to accurately show data after scaling events when partitions are rebalanced across different brokers

CLOUD NATIVE | SELF-MANAGED | CUSTOM

	CONFLUENT CLOUD	AMAZON MSK
OPERATE		
Upgrades	**Always on latest version** • Zero intervention as part of rolling upgrades to latest stable Kafka version that includes strategic patches ahead of scheduled Apache releases • High availability guaranteed with non-disruptive upgrades	**Limited version support** • Manually trigger upgrades once AWS adds support for it after the scheduled Apache release; MSK only supports a subset of Kafka releases • User responsible for cluster availability based on ability to implement Amazon MSK best practices
Vulnerability patches	**Proactive fixes** • Stream confidently and reliably with Kafka experts that proactively address known bugs and vulnerabilities and resolve even the most complicated Kafka issues	**Reactive fixes** • MSK chooses to offer only select versions of Kafka and does not provide a software SLA. Embracing a subset of releases forces a reactive approach to vulnerabilities discovered in any number of previous versions customers may be running.
SCALE		
Cluster expansions	**Elastic scalability** • Automatic resource allocation to your cluster to manage consumer lag as throughput scales up or down with self balancing clusters • Eliminate cluster compute over-provisioning when increasing topic retention with Infinite Storage feature	**Add brokers w/o data balancing** • Manual data rebalancing process required using Cruise Control after brokers are added to any cluster • Storage per broker limitations force users to either overpay for compute or force exporting data out of Kafka for long data retention use cases
Connectors	**Pre-built & fully managed** • Accelerate integration to modern and legacy services across on-premises and public clouds with a continuously growing portfolio of +100 Confluent connectors • Reduce operational burden of provisioning, managing and supporting additional infrastructure to run connectors	**Self develop & manage** • Slow down delivery timelines with non-repeatable integrations to data services • Increase operational effort even when using community-built connectors by having to self manage infrastructure without AWS technical support
Non-Java clients	**Confluent supported** • Enable developer velocity and make Kafka widely accessible to applications and services with a wide variety of battle-tested clients for C, Java, .Net, Go, Python and more	**Self supported** • Leverage self-built or community-built connectors without expressed technical support from AWS

CLOUD NATIVE | SELF-MANAGED | CUSTOM

	CONFLUENT CLOUD	AMAZON MSK
EXPERTISE		
Support	**Committer-driven expertise** • Expert 24x7 support engineers have solved tens of thousands of Kafka-related issues that become commits to the open source • Accelerate time to market even further with expert guidance with advisory services team	**General AWS Support** • AWS boasts over 200 services, of which MSK is just one. Their support is not as focused as Confluent's on Kafka • AWS does not offer an SLA for MSK software
FUTURE PROOF		
Environments	**Freedom of Choice** • Consistent cloud native experience across AWS, Azure and Google Cloud • Extend consistent data architecture to on-premises or private cloud environments with Confluent Platform, our self-managed software	**AWS only** • Only available on AWS limiting hybrid cloud and multi-cloud use cases
Ecosystem	**Complete** • Maintain application compatibility with fully managed Confluent Schema Registry • Develop real-time ETL pipelines with a lightweight SQL syntax with fully managed ksqlDB	**Limited** • Apache Kafka® clusters only

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