



Comparing Solace and Apache Kafka

A quick look at the differences between Apache Kafka and Solace and how they address common data movement use cases.

Kafka was created by LinkedIn engineers to aggregate logs and ingest them into big data stores in near real-time, because they were dealing with volumes that open source messaging products like ActiveMQ and RabbitMQ couldn't handle.

Kafka has been used to address other big data use cases with similar needs around data volumes, deployment scale, and near-real-time delivery, but its core design isn't optimized for event-driven messaging across IoT, hybrid cloud and multi-cloud architectures.

When trying to apply Kafka to messaging use cases, developers have to code capabilities into their applications, build proxies, or add components. In most cases they'd be better off choosing a technology that inherently meets their needs.

	 kafka	 Solace PubSub+
Overview	Kafka was born as an in-house project to meet LinkedIn's log aggregation needs, and donated to Apache as an open source project. Kafka is good at aggregating high volume low value data such as activity logs.	Solace's state-of-the-art messaging technology enables all kinds of messaging and streaming across hybrid/multi-cloud and IoT systems using standard protocols and APIs in a way that's easy to deploy, secure and scale.
APIs & Protocols	Kafka provides a proprietary Java API. Other APIs are created independently so they are inconsistent, usually unsupported and don't promise backwards compatibility.	Solace provides APIs for standard protocols including AMQP, JMS, MQTT, REST and WebSocket, and supports open APIs like Apache Qpid and Eclipse Paho.
Performance	By default, Kafka message delivery and storage is unreliable even with partition replication. Kafka throughput and latency is severely impacted when high QoS with messaging ordering and zero message loss is required and/or TLS security is enabled.	Solace offers high performance messaging for all qualities of service, and with TLS turned on is faster than Kafka.
WAN	Complex tiers and components create points of failure and places where messages can disappear.	Solace offers highly optimized WAN distribution thanks to intelligent routing and streaming compression.
Security	Kafka's connection model relies on bridges and connectors, pushing client credentials/security to the bridge layer. Apache Kafka also requires separate security configuration for clients and for brokers in Zookeeper. ACLs are based on simple read/write and IP address privileges. Authorization requires integration with external authorization services via custom pluggable services.	Solace offers role-based admin and access control lists including queue-level access controls. Solace is easy to integrate into all authentication architectures, with client authentication and data movement segregated into application domains.
Topics	Kafka only supports limited scale, exact match subscriptions on flat topics, which prevents fine-grained filtering and makes it hard to overlay multi-zone hierarchy in hybrid/multi cloud systems.	Solace enables sophisticated routing and filtering with support for topic hierarchies, filters and wildcard subscriptions.
Messaging Features	Kafka only supports publish/subscribe messaging, with no support for request/reply, non-persistent delivery, point-to point queues, or state replication.	Supports request/reply, non-persistence QoS, point-to point queues, replication for inter-datacenter routing and disaster recovery.
Architecture	Requiring multiple components for configuration, state coordination and inter-cluster communication, Kafka's complex architecture makes it hard to achieve lossless multi-site disaster recovery.	Solace holds configuration data and message state in the broker for a clean architecture that doesn't usually require other components making it easy to deploy, run and scale.

Hybrid / Multi-Cloud

Connecting applications and information sources across cloud and on-premises environments requires an adapter or bridge to map legacy messages (including header fields) and topic/queue hierarchy. Solace makes this easy, but this mapping can be quite difficult for Kafka in scenarios with complex messages.

In order to support distribution over WAN links between multiple cloud and on-prem environments, Kafka requires MirrorMaker and aggregation clusters, all of which need to be deployed as fault-tolerant pairs.

Solace supports such distribution out of the box, and minimizes bandwidth consumption through fine-grained topic filtering that enables the delivery of exactly and only the messages required by consumers on the other end of a long-distance connection. Solace also optimizes bandwidth by sending just one copy of each message over the WAN no matter how many consumers need it, and fanning it out on the other end.

Solace supports routing with REST out of the box, while Kafka requires a bridge.

Similarly, Solace offers sophisticated management tools and visibility into your messaging system, while Kafka requires you to bolt together 3rd-party and open source components to build your management and monitoring system.

Learn more at <https://dev.solace.com/kafka#cloud>

Microservices

Solace supports the open Web and mobile protocols that can be used to implement rich, real-time, event-driven micro-services.

Solace enables both context-aware and context-free scaling of applications with selective acknowledgements without the risk of duplicates on reconnect, while Kafka limits you to stateful, sequential apps that can experience duplicate events on reconnect.

Solace provides mature support for the session-based transactions that are required when orchestrating microservices. Kafka is adding limited support for session-based transactions, but they can only exist within a cluster.

Learn more at <https://dev.solace.com/kafka#microservices>

Internet of Things

Solace can terminate hundreds of thousands of Web or MQTT connections per broker, letting massively scaled open Web/Mobile applications send data to analytics engines, and unique command and control messages to individual devices and vehicles. Kafka requires a bridge or broker to terminate web and MQTT connections, so there's no real connection layer support for IoT applications.

Kafka offers a simple connection model for back-end applications, but are limited to coarse-grained topics, i.e. don't extend to the client level.

Solace lets you secure data in motion between connected devices, cloud services and back-office applications with encryption, authentication and authorization functionality that's easily centrally managed. With Kafka security is inherently disjointed because it relies on bridging extra components for authorization, and doesn't support tokenized access control lists for publish/subscribe.

Learn more at <https://dev.solace.com/kafka#iot>

Digital Transformation

Solace provides a fully federated architecture with integrated WAN distribution, built-in fault tolerance, compression and security, while Kafka requires additional components and plugins that inherently add complexity and instability. Kafka security features, specifically ZooKeeper, can cause performance issues and system complexity.

Solace supports fine-grained and dynamic topic matching with wild-carding that allows consumers to easily subscribe to whatever messages they need, completely decoupled from producers. Kafka's coarse topic matching tightly couples consumers to the publishers of information. If partial streams are needed, you need to introduce custom mediation which introduces complexity and the risk of cascading failures.

Solace supports leading open APIs and protocols, such as AMQP, JMS, MQTT, REST and WebSocket, so consumers can access data with their protocol of choice while still adhering to centralized security management. Kafka requires bridges to achieve same message distribution, making solution only as secure and robust as the bridge implementation.

Learn more at <https://dev.solace.com/kafka#digital>



Solace provides the only unified advanced event broker technology that supports publish/subscribe, queueing, request/reply and streaming using open APIs and protocols across hybrid cloud and IoT environments. The company's smart data movement technologies rapidly and reliably route information between applications, devices and people across clouds. Established enterprises such as SAP, Barclays and the Royal Bank of Canada as well as high-growth companies such as VoiceBase and Jio use Solace to modernize legacy applications and successfully pursue analytics, hybrid cloud and IoT strategies. Learn more at solace.com.