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5 stages of event-driven architecture with Kafka

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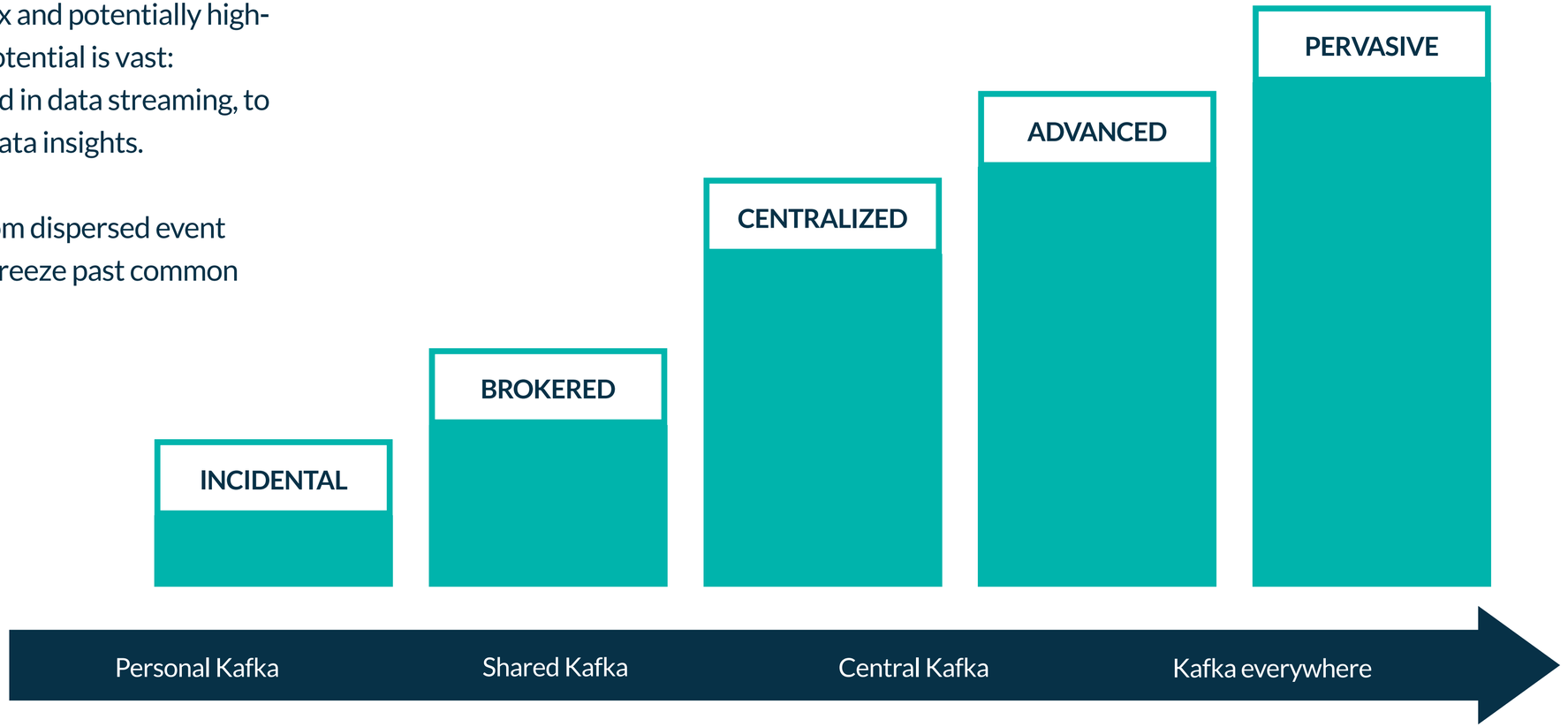
Introduction

The journey from early-stage exploration to a fully integrated, secure, organization-wide Kafka is complex and potentially high-risk for enterprise organizations. Yet the potential is vast: Leveraging Apache Kafka, the gold standard in data streaming, to optimize service provision with real-time data insights.

Here, we'll explore the typical evolution from dispersed event streaming to pervasive Kafka and how to breeze past common challenges enterprises face along the way.



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Stage 1 - incidental usage (personal Kafka)

At the incidental stage, an organization has basic, dispersed procedures in place for event management. Usually, one or two teams are separately using Kafka for their applications, with no central event management infrastructure in place. This is more like an experimental phase to experience the benefits of event streaming.

Organizations began processing data a long time ago — far before events were a recognized concept or asset. Over recent decades, however, the volume of data they're constantly being bombarded with has rapidly increased in volume and origin:

- Customer channels
- Communication with suppliers and partners
- Internal data sources
- Public data sources

Typically, enterprises implement a 3-step process to ingest data and process this ever-increasing information:

Step 1 - collect, ingest, filter and route
Step 2 - interpret, associate, process and calculate
Step 3 - Weigh, decide, plan and act

This 3-step process has accelerated over years, presenting increasing challenges for enterprises attempting to deal with this data influx. The number of data sources they're required to handle is increasing, as well as data volumes and ingestion.

The same goes for data processing speeds, given customers expect their requests to be processed right away, with a straight-through approach wherever possible. These sources, volume, ingestion, and instant processing needs lead organizations to turn to event streaming solutions — at which point event brokers play a crucial role.

Challenges at stage 1:

- Number of data sources are increasing
- Volumes, frequency and speed of data are increasing
- Sharing data across separate Kafka clusters is hard

Stage 2 - introducing event brokers (shared Kafka)

As organizations realize the need to rely on a central broker to manage their information exchanges, they tend to start by looking for the streaming technology they'll adopt.

They enter a diverse landscape of potential streaming engines (see image on next page), including SaaS building blocks offered by large cloud vendors, open source options, and proprietary solutions. Over the years, we've seen enterprises increasingly select Apache Kafka as their preferred event broker (in other words, their engine of choice for handling their organization-wide data streaming).

As a fault-tolerant, scalable, publish-subscribe messaging system enabling enterprises to develop distributed applications and run web-scale online businesses, Kafka has established itself as the gold standard for high-volume, real-time data streaming among enterprise organizations.

Yet it's not without its challenges for organizations' in-house teams. At the initial implementation stage, these are mostly technological.

There's a steep learning curve with Kafka, even for experienced IT architects. Setting up a robust, secure Kafka platform is a complex process. Maintaining and answering user questions about the platform creates an added burden. There are many, high-complexity failure scenarios, which your internal team needs to be aware of to support and leverage Kafka to its full extent.

For organizations that opt to deploy Kafka across various teams, it soon becomes clear that each of these teams deploying and maintaining Kafka independently isn't the most efficient approach. Instead, centralized scenarios become an increasingly attractive option.

Challenges at stage 2:

- Kafka has a steep learning curve
- Setting up a robust platform
- Maintenance day 2
- The complexity of failure scenarios

Stage 2 - introducing event brokers (shared Kafka)

Product	Base form	Popularity	Functionality	Quality / cost	Effort	On-premise	Cloud	DIY	Managed Service	SAAS
Amazon Kinesis	SaaS	+	+/-	+	++	No	AWS only	No	No	Yes
Azure EventHub	SaaS	+	+/-	+	++	No	Azure only	No	No	Yes
Google Pub/Sub	SaaS	+	+/-	+	++	No	Google only	No	No	Yes
Apache Kafka	Open Source	++	++	++	+/-	Yes	Many	Yes	Yes	Yes
Apache Pulsar	Open Source	+/-	+/-	++	+/-	Yes	Many	Yes	Yes	Yes
IBM MQ	Proprietary	+/-	+/-	-	+/-	Yes	No	Yes	Yes	Yes
Solace	Proprietary	+/-	+	+/-	+	Yes	Yes	Yes	Yes	Yes
Tibco	Proprietary	-	+	-	+	Yes	Yes	Yes	Yes	Yes

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Stage 3 - strategic event broker system (central Kafka)

At this stage, organizations develop a centralized event and broker setup, through which their teams can interconnect.

With all your departments — as well as their connected applications — arranged around a centralized Kafka, you'll unite a diverse range of business areas and skill sets to exchange business events. This rapidly expands the number of people who are involved with your centralized Kafka, all of whom will naturally have their own questions and requirements of the platform:

Data owner
"I want to be in control of streaming data"

IT Architect
"I want a future-proof streaming platform with great security"

Developer
"I want to develop robust streaming applications independently"

Operator
"I want a predictable and maintainable platform"

Out-of-the-box Kafka isn't enough to meet full-range requirements.

With a wide range of employee profiles required to connect to your centralized Kafka, the platform will need to cover all their requirements. The issue is, that out-of-the-box Kafka only supports a handful of them - it's a great and proven streaming technology and there are lots of vendors to choose from.

But, your Kafka team will face complex challenges during the shift to a centralized Kafka solution.

Challenges at stage 3:

- Building own governance mechanism
- Setting up fool-proof security
- Providing self-service for DevOps
- Supporting and maintaining the whole Kafka stack

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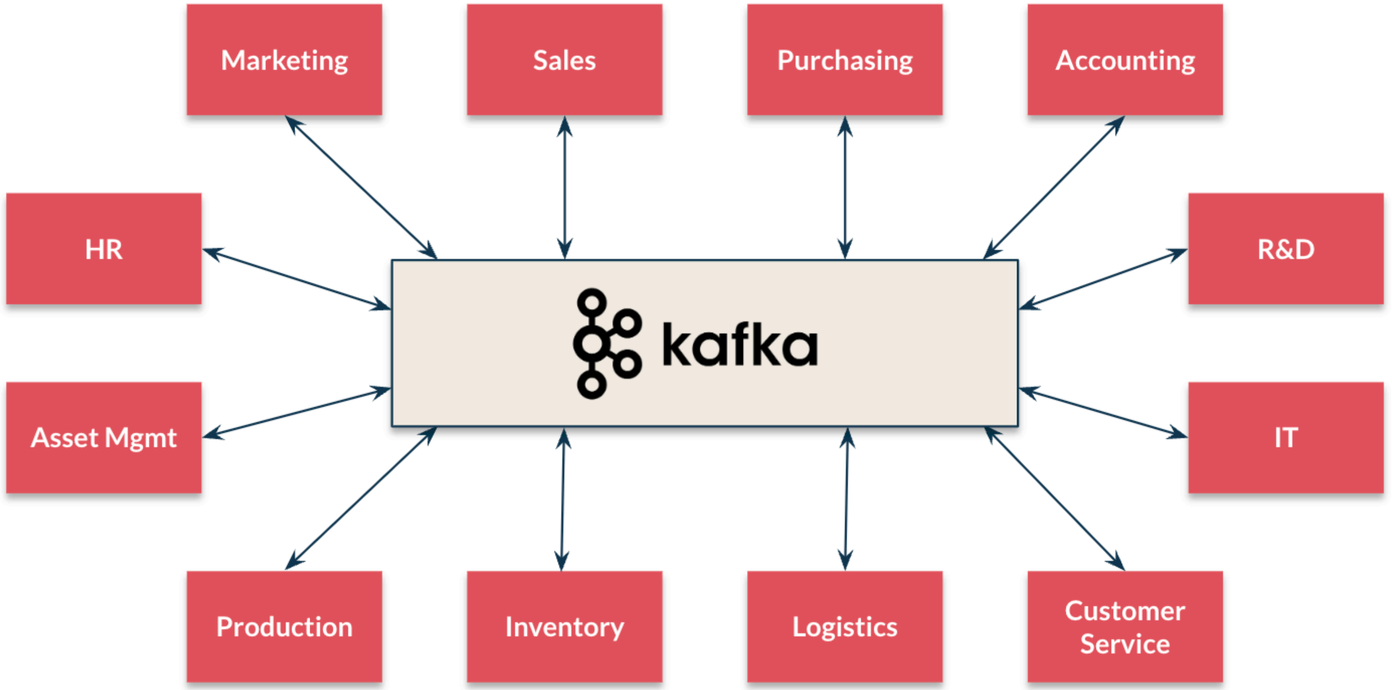
Stage 3 - strategic event broker system (central Kafka)



A marketplace where applications exchange business events at the moment they occur

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Stage 4 & 5 - advanced Kafka presence (Kafka everywhere)

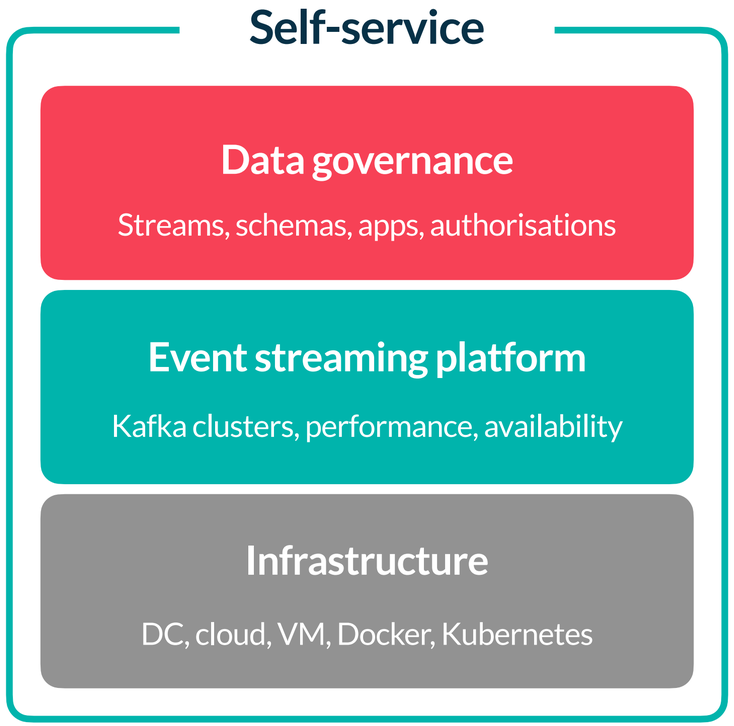
At this stage, your organization's myriad apps will be exchanging events as a standard approach to data exchange. Your organization is able to capture a mass of business events from its ecosystem for business-critical intelligence, innovation, and scale. In addition to this, you will notice that event governance, analysis and decision control are essential parts of the organization's business activity.

You'll have Kafka documentation across your internal processes, as it's just another of your company's regular integration methods.

The challenges you face in this phase or now are likely to be organizational than technical.

Challenges at stage 4 and 5:

- Define organizational standards
- Governing the Kafka catalogues
- Speed up team onboarding
- Scope of the entire Kafka setup grows



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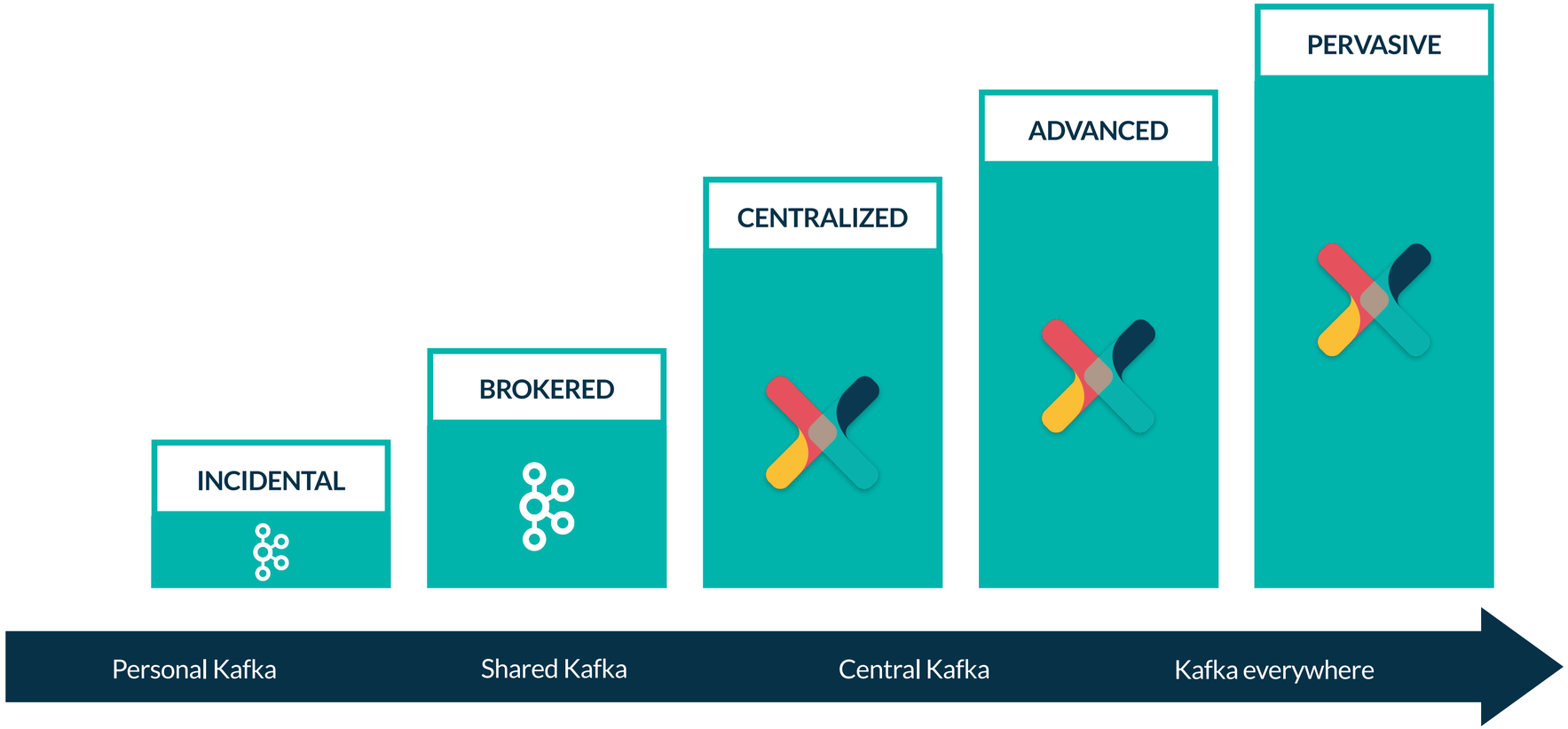
Axual helps organizations towards a centralized Kafka and enterprise-wide data exchange



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Axual is a ready-to-go event streaming platform

Axual is a streaming platform, including self-service capabilities with which teams can easily set up and manage data streams through an intuitive UI. On-premise, in the cloud, or in a hybrid setup.

Axual provides:

- Self-service for Apache Kafka
- Multi-Kafka and multi-tenant
- Battle-tested security
- Built-in data governance
- Topic management
- Support for CI/CD and GitOps

Trusted by enterprises across the world

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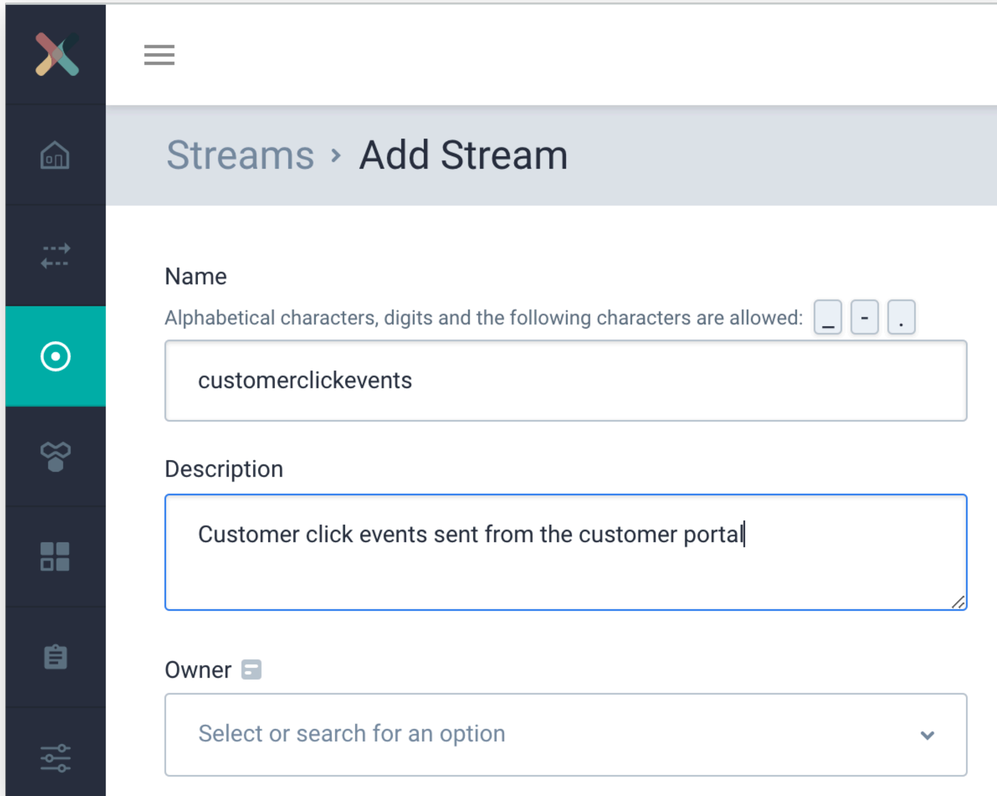

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Our customer achieve real results

Rabobank

€500,000

annually saved in Kafka maintenance

STEDIN NET

20,000

connecting smart grid devices

Eneco

20-30%

gaining in energy savings

> Engaging Axual is a major step towards a realtime business and event-driven enterprise. Product vision and execution outranks any other vendor.

Gartner peerinsights™ 4.7 ★★★★★

Enterprise Architect
Financial Services company

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Spending too much time on Kafka maintenance?

Trying to scale Kafka data governance and security?

Looking for a multi-cloud, multi-cluster and hybrid Kafka setup?

Would you like to empower your DevOps teams with self-service?

We can help.

REQUEST A DEMO