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GOTO LONDON 2024

Optimizing Amazon EventBridge Pipes with Apache Kafka at ProSiebenSat.1

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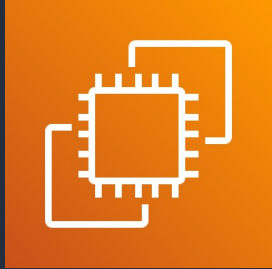
AWS Community Builder



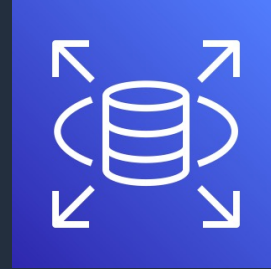
<https://dev.to/ymwjbxxq>



Key figures of the ProSiebenSat.1 Group



5600+ Amazon EC2 instances running each day



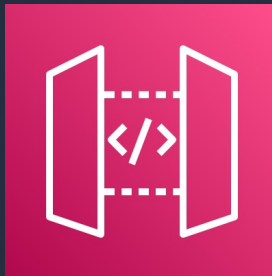
Over 450 Amazon RDS instances running per day



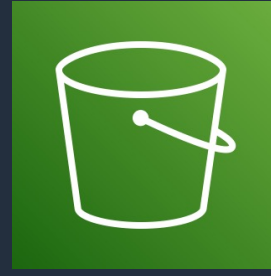
Over 1.5 petabytes transferred via Amazon CloudFront per day



Over 340 million AWS Lambda invocations per day

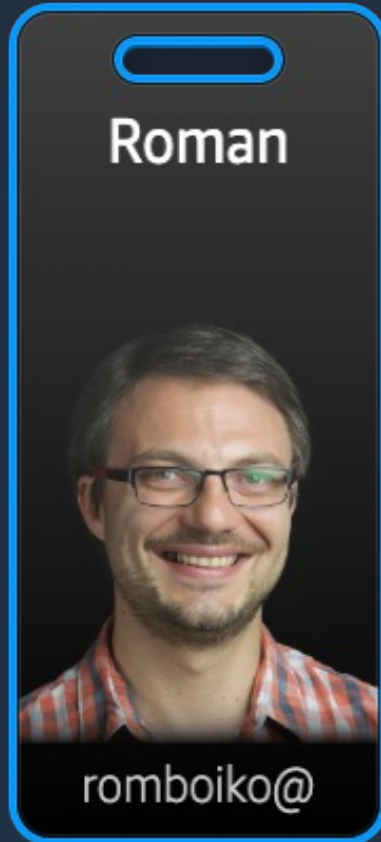


Over 1.4 terabytes of data transferred via API Gateway per day



Over 12 petabytes of storage stored in Amazon S3

Roman Boiko



Serverless Specialist SA



@romannboiko



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The challenge

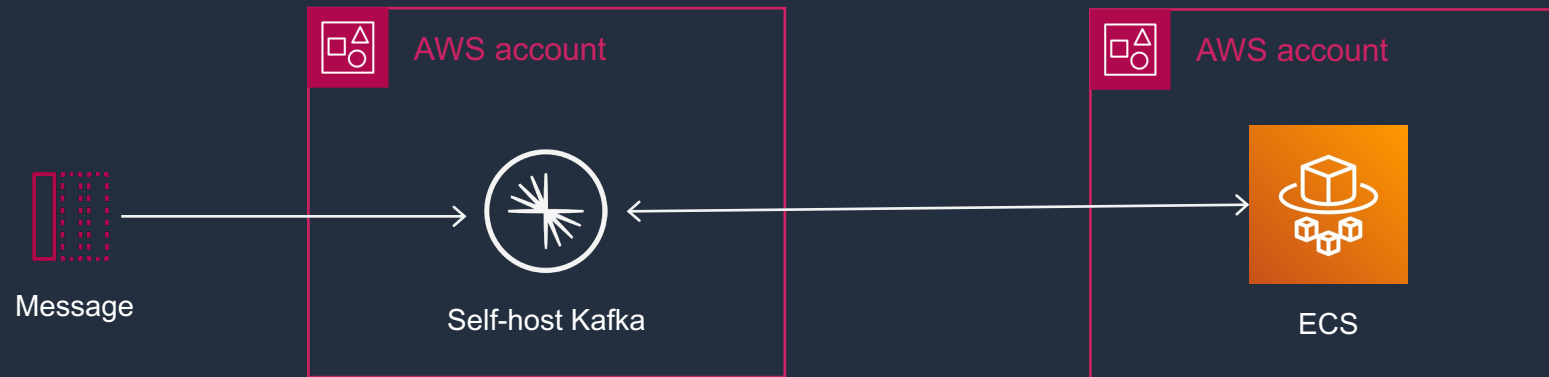


Content Discovery

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- Image
- Bookmark
- Entitlement
- Lookup
- Query
- Search
- GeoIP
- WatchNext
- Redirect



Architecture at a Glance



Why Kafka?



What is Kafka



Is it like a Service Bus?

{ **REST:API** }

Is It like REST but Async?

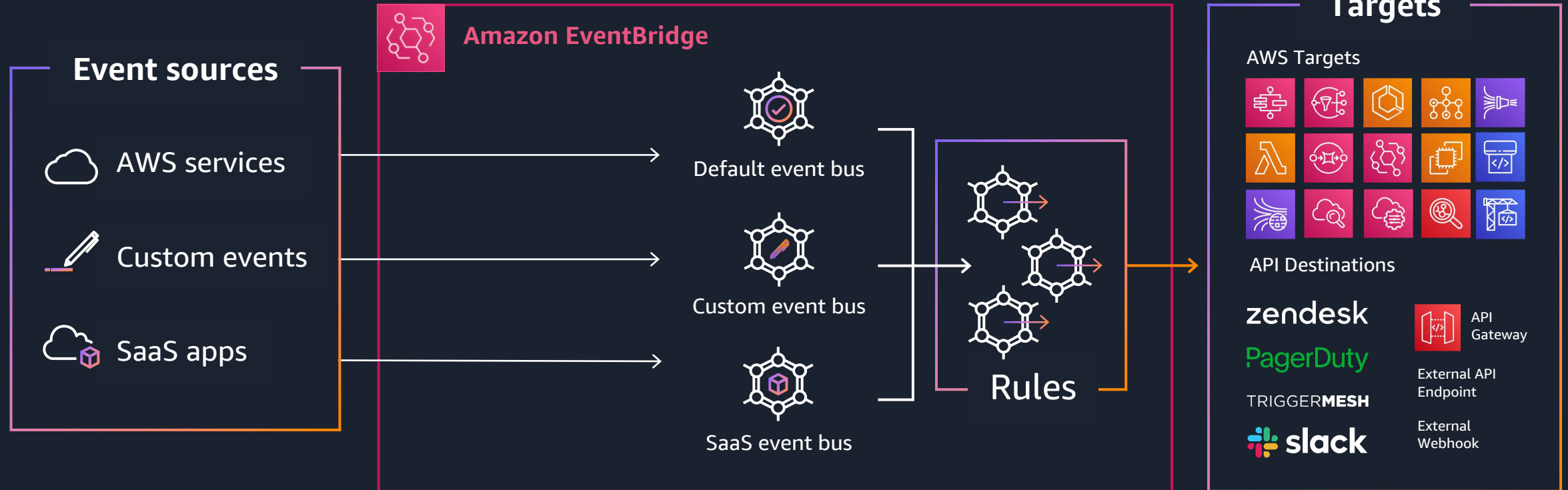


Is it like a Database?



Streaming Platform

EventBridge Event Bus



Event stores vs event routers

Event stores(Kafka)

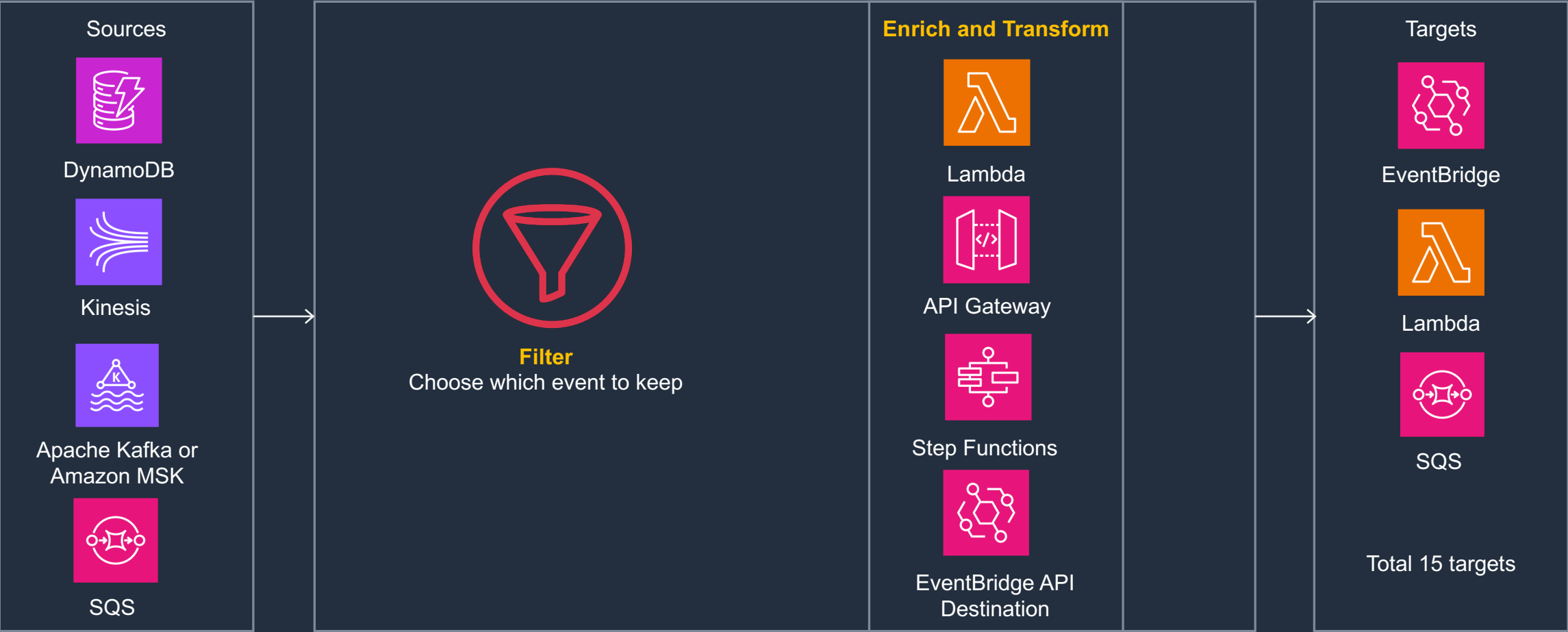
- Act as a **buffer** between producer and consumer
- Messages **pulled** by consumer
- **Persistence**
- Ability to invoke Lambda functions with a **batch** of events

Event routers(EventBridge)

- **Decouples** producers and consumers
- Fan-out events to multiple consumers
- Messages **pushed** to consumer
- Automatic **retries**
- Event **filtering**
- Ability to **chain** with event stores

EventBridge with Kafka

EventBridge Pipes: Connects sources and targets



Features/capabilities

Filter events

Adding filters to provide a subset of events for consumption ensures your applications process only the events they need.

Batch events

Retrieve from event produces and deliver to event consumers in batches, making integrations more efficient.

Order events

Provide guaranteed ordering of events for applications where the ordering is critical.

High concurrency

Support high concurrency so that you can process large volumes of events quickly.

Advanced enrichment

Offers support for enrichments using AWS Lambda, AWS Step Functions, API Gateway, or an API call to a third-party API (using API Destinations).



Benefits

Write less integration code

Build fully managed integrations quickly with an easy to use interface that seamlessly connects event producers with event consumers.

Save costs with filtering and built-in integrations

Lower compute and usage costs by using event filters and built-in integrations – only process and pay for events that you need.

Source events in real time

Deliver events to over 14 AWS services with EventBridge Pipes seamlessly polling for new events.

Reduce operational load

Reliably connect services without worrying about scalability, security, patching, and provisioning your infrastructure.



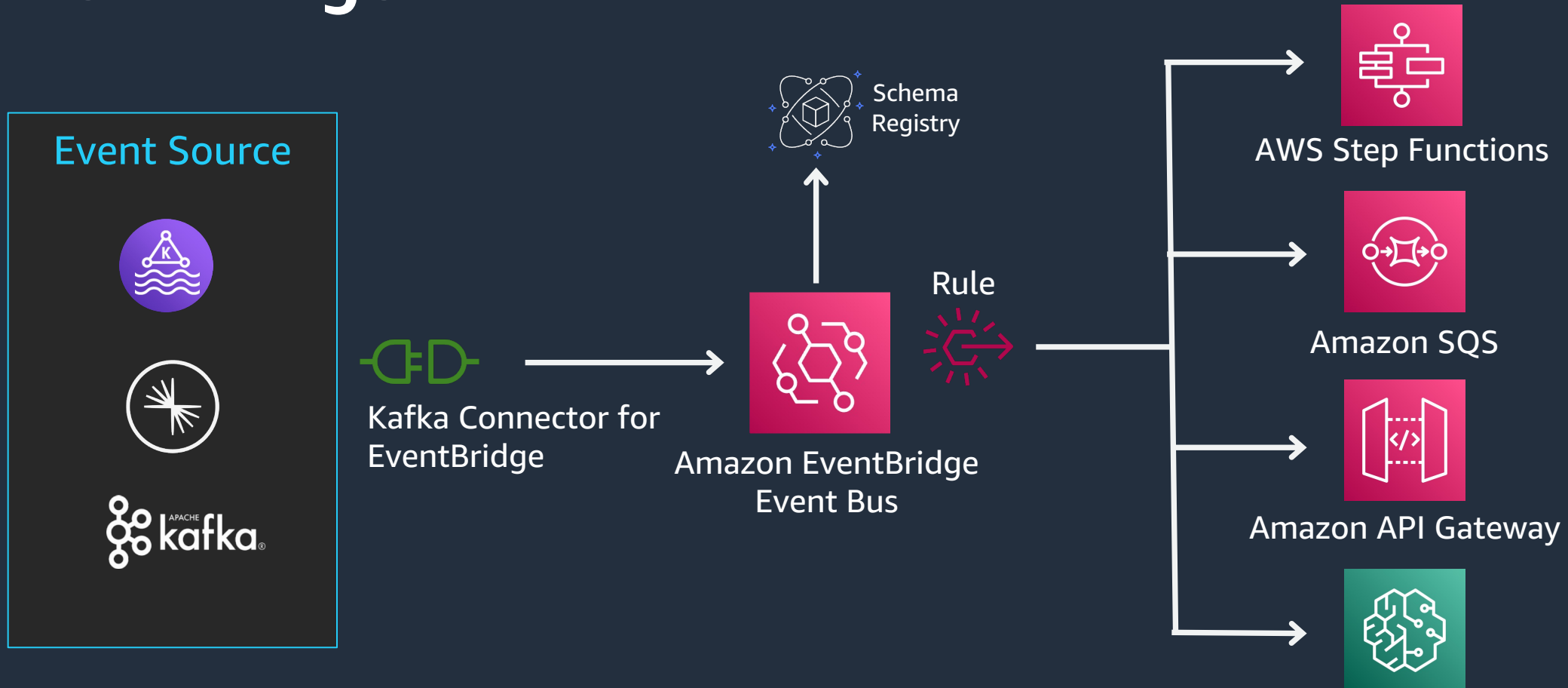
EventBridge with Kafka alternative

Amazon EventBridge open-source connector for Apache Kafka Connect

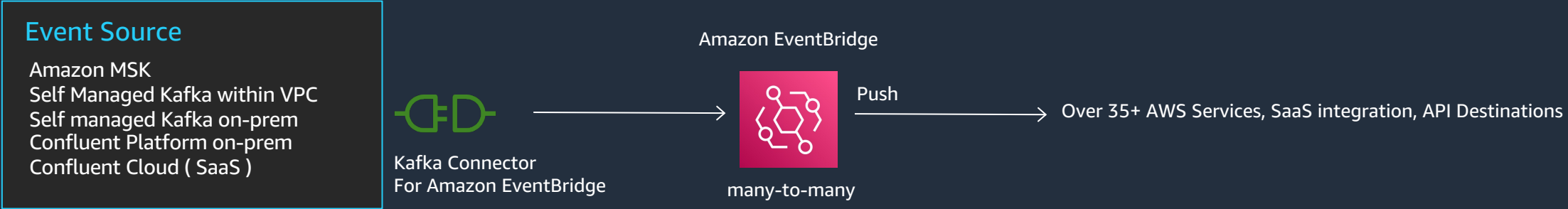
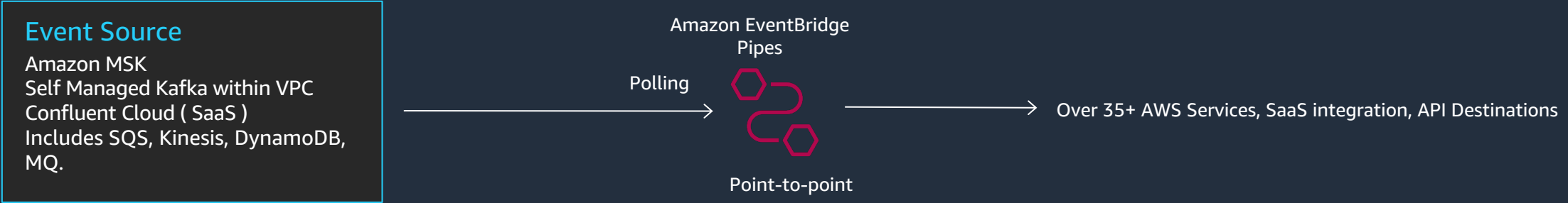


Apache Kafka Connect is an open source framework to stream data in and out of Apache Kafka

Deliver Events from Kafka Topics to Amazon EventBridge



Amazon EventBridge Pipes or Connectors with Kafka



Amazon EventBridge

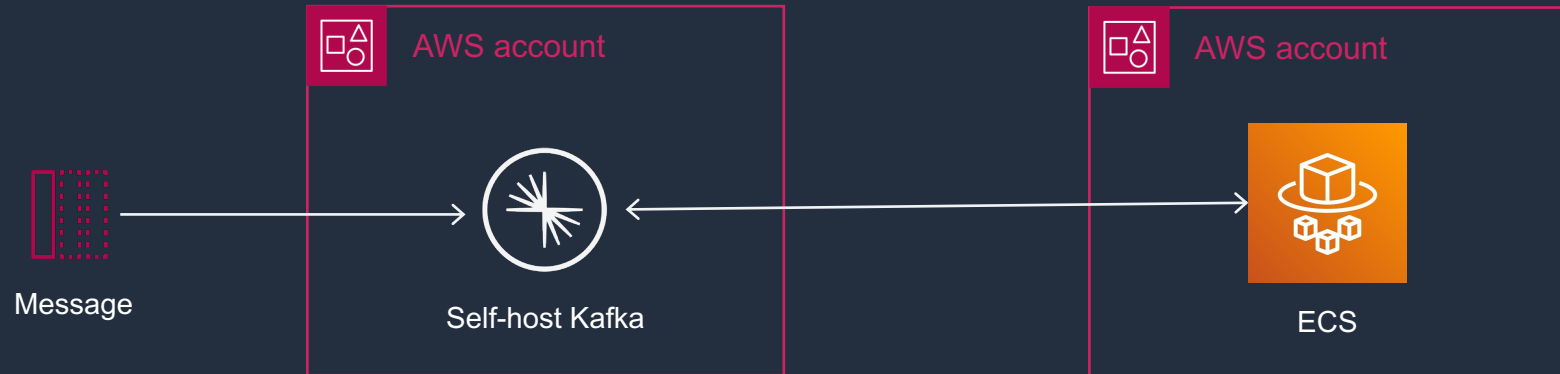


How we did this?



Architecture at a Glance – as it was

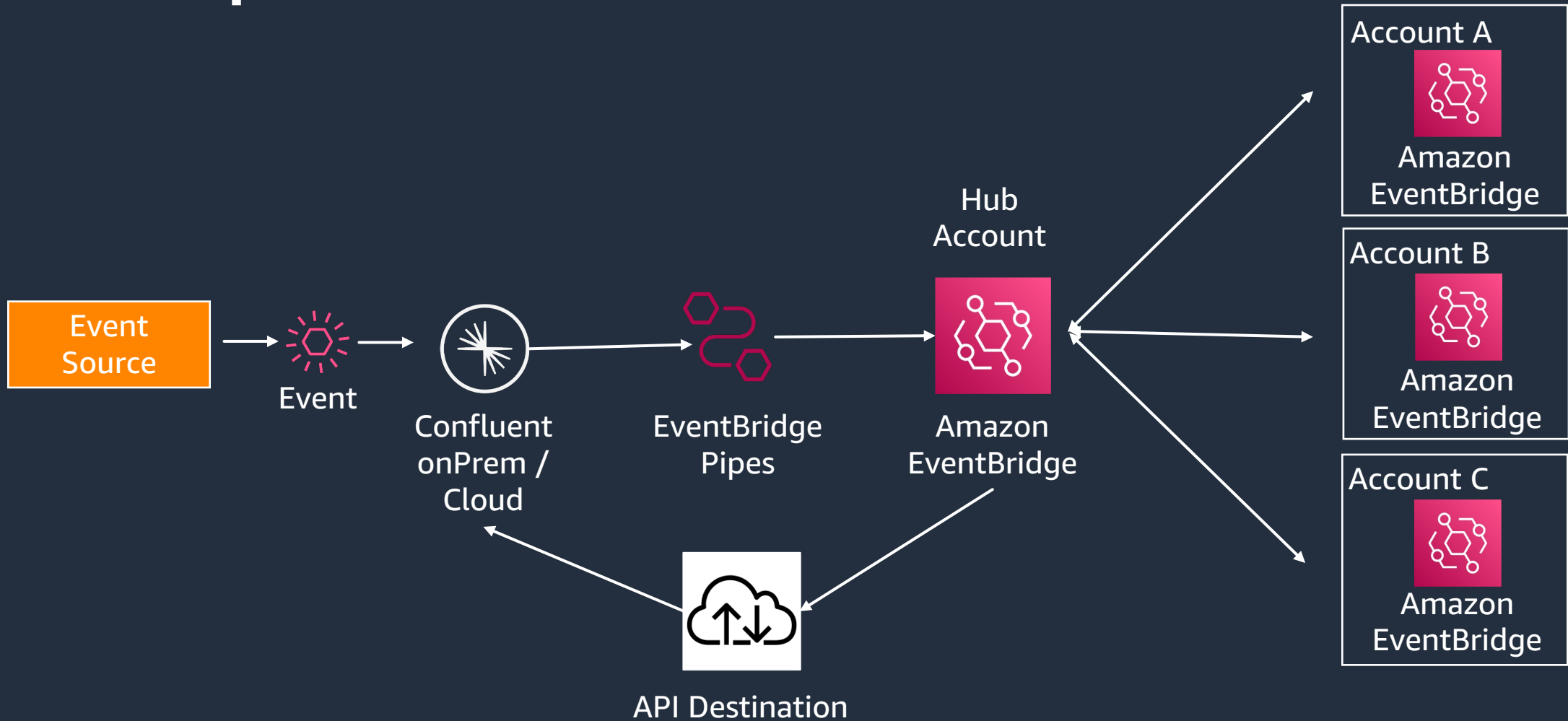
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How can I decouple it?



Hub & Spoke Pattern

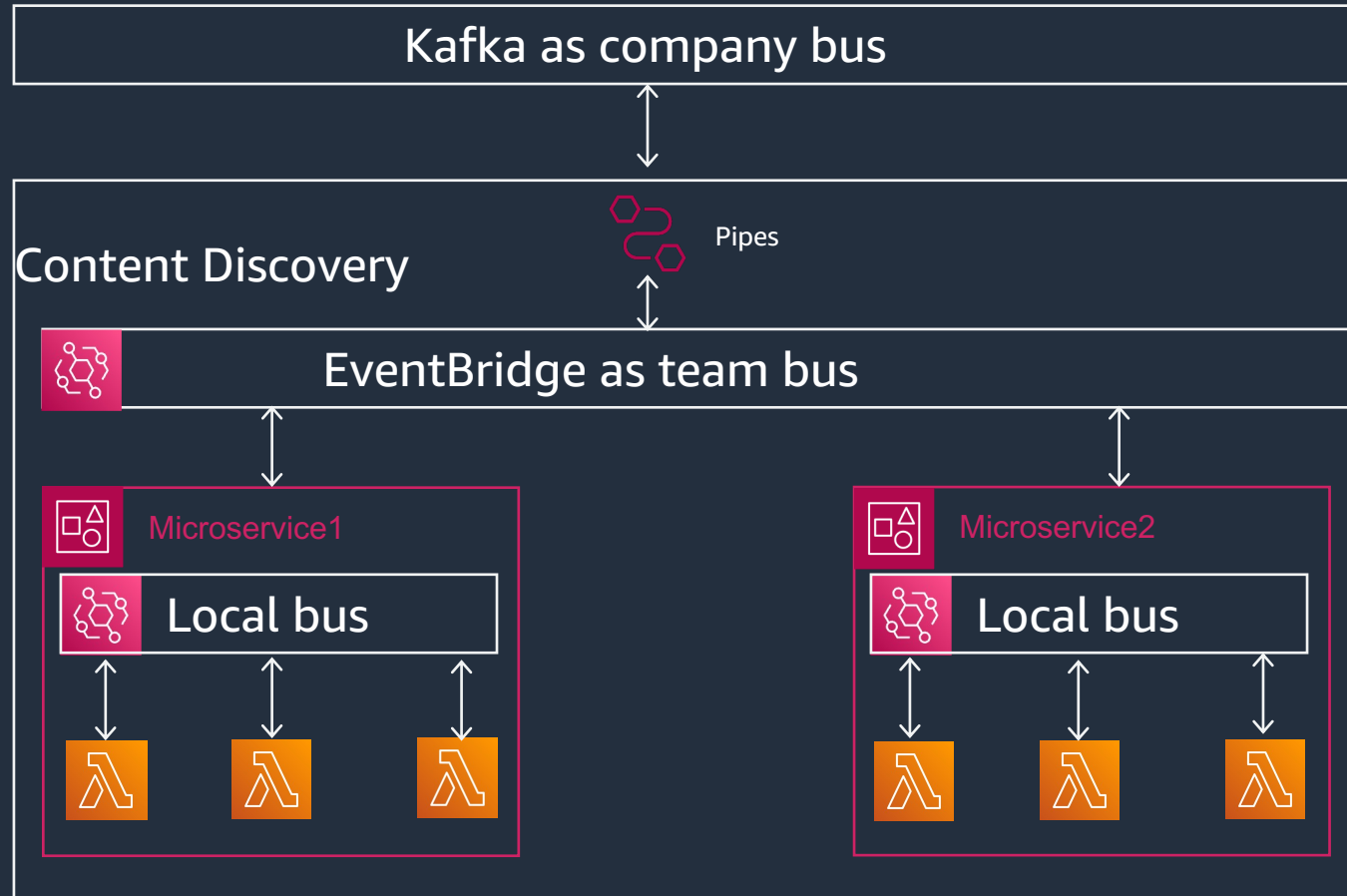


Implemented Solution



Architecture at a Glance – EventBus Mesh

- Layout
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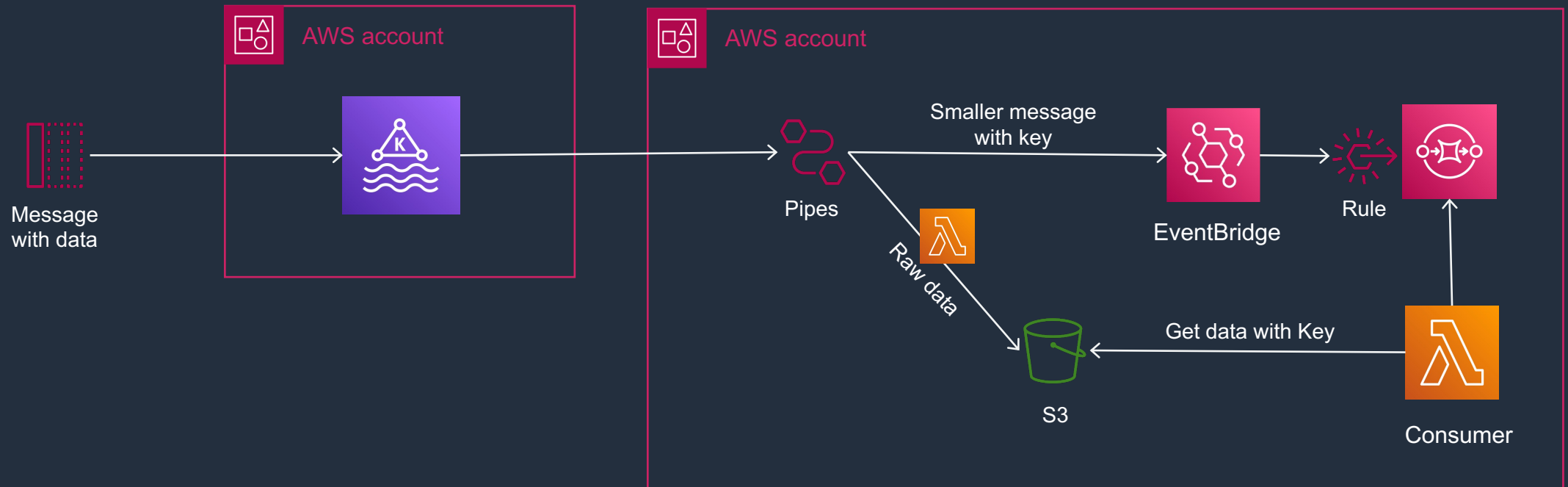
Sparse vs Full state description

```
{
  "source": "team1",
  "detail-type": "SomethingHappened",
  "detail": {
    "metadata": {
      "version": "0.1",
      "eventId": "1234-5678-9012"
    },
    "data": {
      "id": "value1"
    }
  }
}
```

VS

```
{
  "source": "team1",
  "detail-type": "SomethingHappened",
  "detail": {
    "metadata": {
      "version": "0.1",
      "eventId": "1234-5678-9012"
    },
    "data": {
      "id": "value1",
      "name": "value2",
      "description": "value3",
      "title": "value4",
      "status": "value5",
      "type": "value6",
      "priority": "value7",
      "createdBy": "value8",
      "createdDate": "value9",
      "updatedBy": "value10",
      "updatedAt": "value11"
    }
  }
}
```

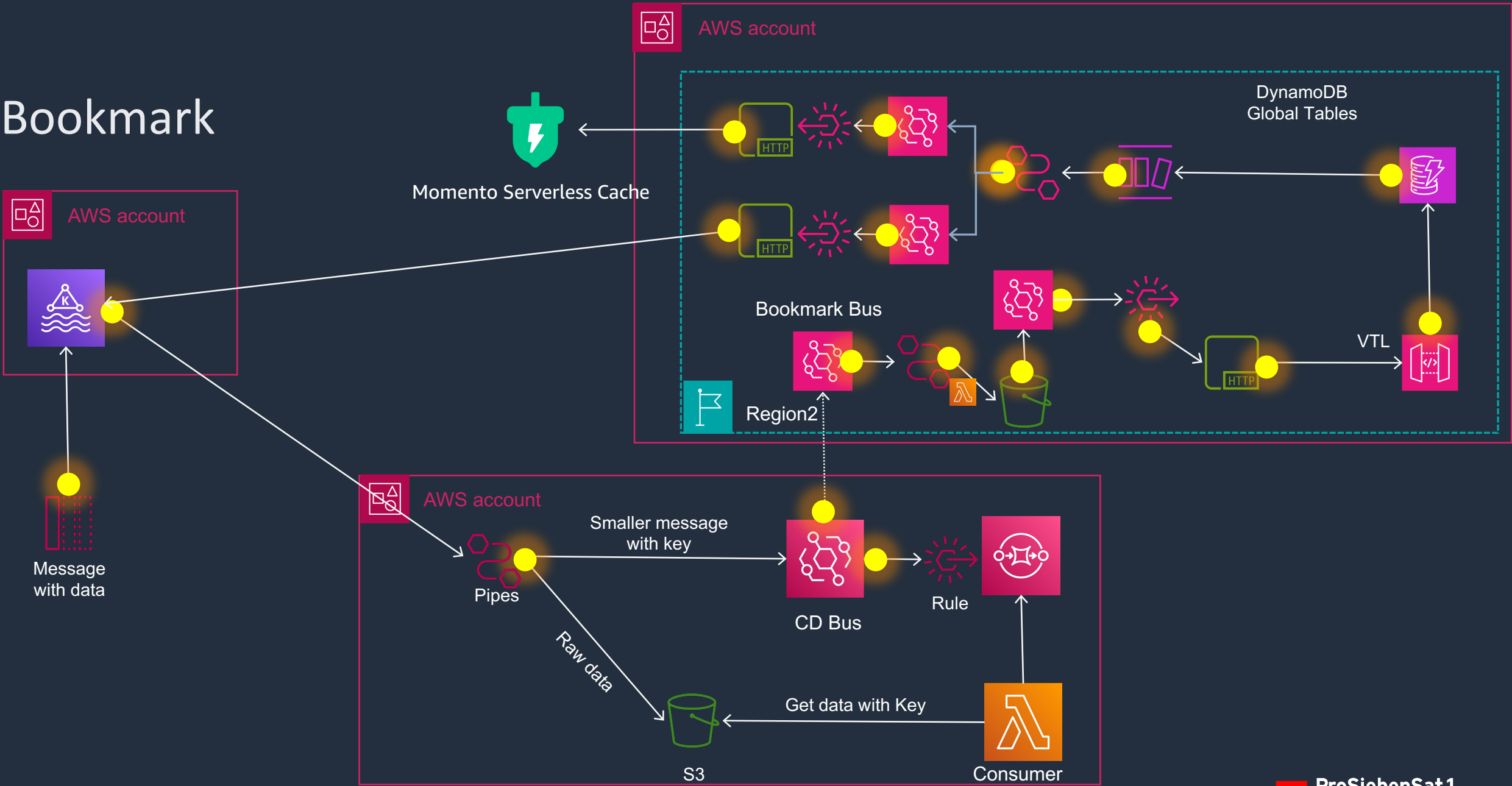
Claim check pattern



EDA: Bookmark

- Bus to Bus architecture
- EventBridge Pipes with the Claim Check Pattern to handle Kafka
- EventBridge Pipe Enrichment finds all the users that bookmarked a video
- S3 Event Notification with EventBridge
- API Gateway as a proxy with DynamoDB
- EventBridge API Destination to sync up with Kafka

Bookmark



AWS wishes

- Bigger payload size for EB, SNS, SQS -> 6MB like Lambda
- Better metrics for EventBridge Pipes and API Destination
- Higher quotas EventBridge API Destination
- Kafka as Target for EventBridge Pipes
- S3 as Target for EventBridge Pipes
- EventBridge global endpoints for EventBridge Pipes
- Redrive from EventBridge family DLQ

Summary

- **Integrated Kafka and EventBridge usage:** You can use both Kafka and EventBridge together, optimizing data flow and event management across different systems.
- **Reduced Complexity and Costs:** Serverless architecture minimizes the need for manual scaling and maintenance, significantly lowering operational costs.
- **Increased Scalability and Flexibility:** The use of AWS serverless solutions provides dynamic scalability and adaptability to changing workloads.
- **Less Code Writing:** The adoption of EventBridge Pipes enables developers to write less integration code, speeding up deployment and reducing errors.



Thank you!

Daniele Frasca



Roman Boiko



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