



Amazon EventBridge

Deep dive

Ricardo Marques (he/him)

Senior Solutions Architect

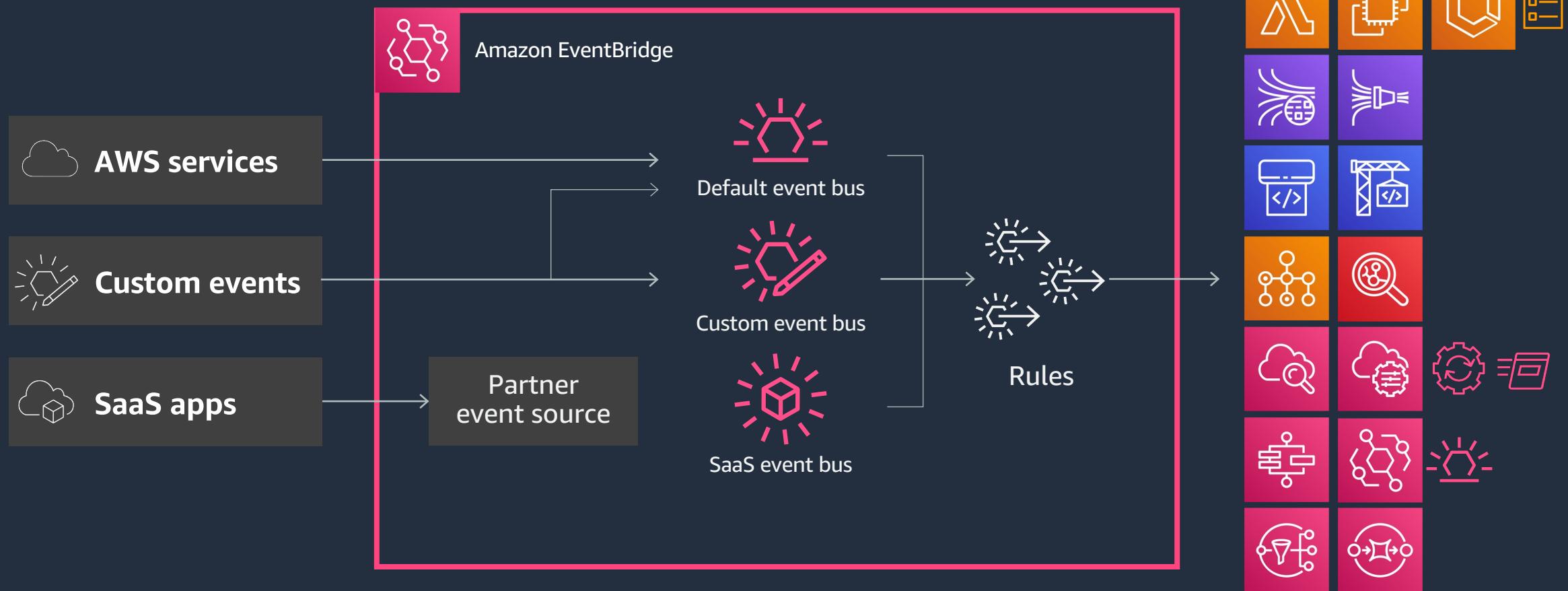


Amazon EventBridge

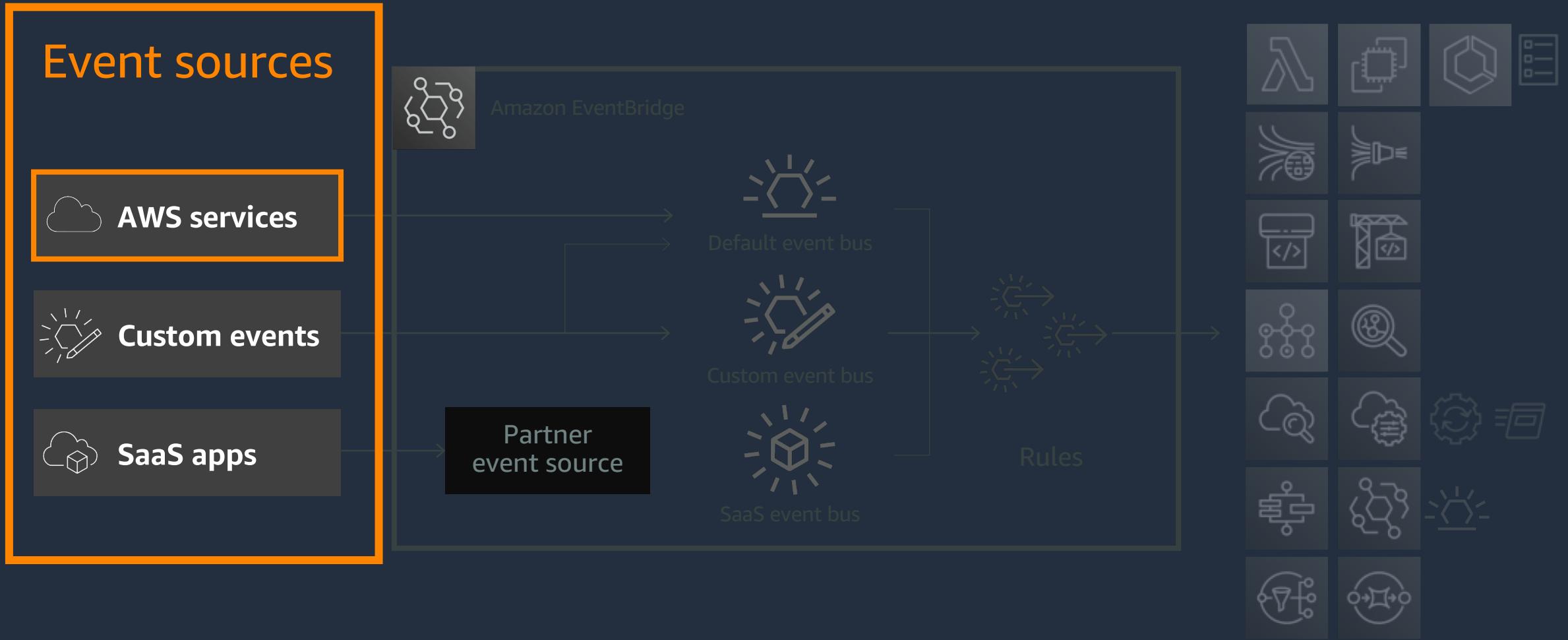
A serverless event bus service for AWS services, your own applications, and SaaS providers.

- Serverless. Pay only for the events you process
- Simplified scaling - avoids increasing costs to sustain and manage resources
- No upfront investments, ongoing licensing, or maintenance costs
- No specialist knowledge needed

EventBridge architecture



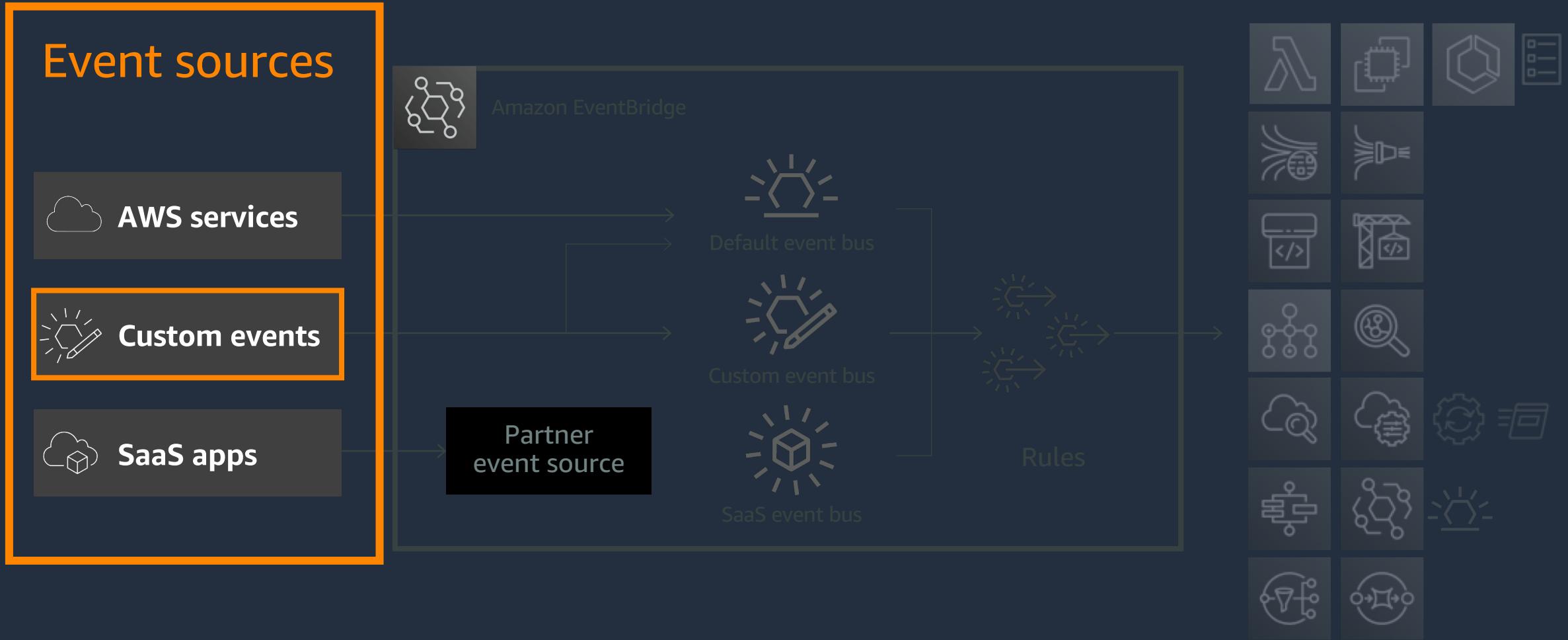
Event sources – AWS services



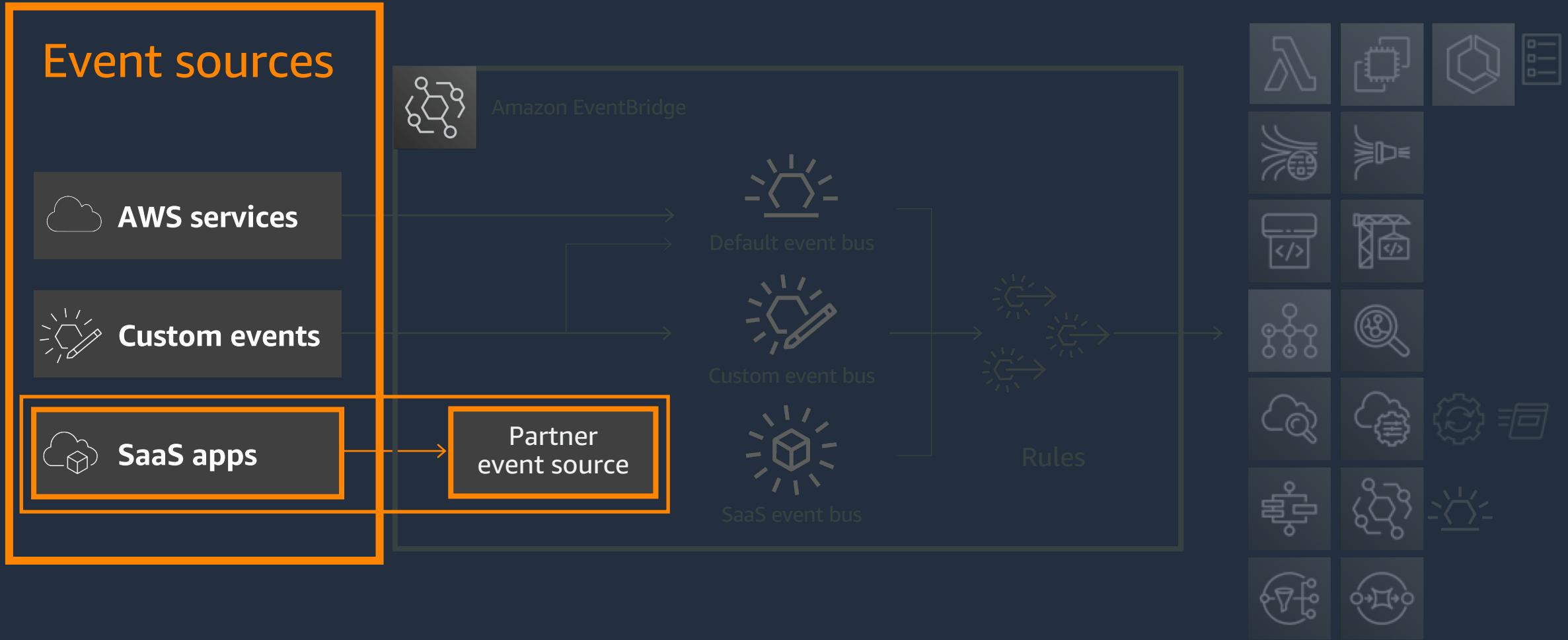
Consume events from over 115 AWS Services



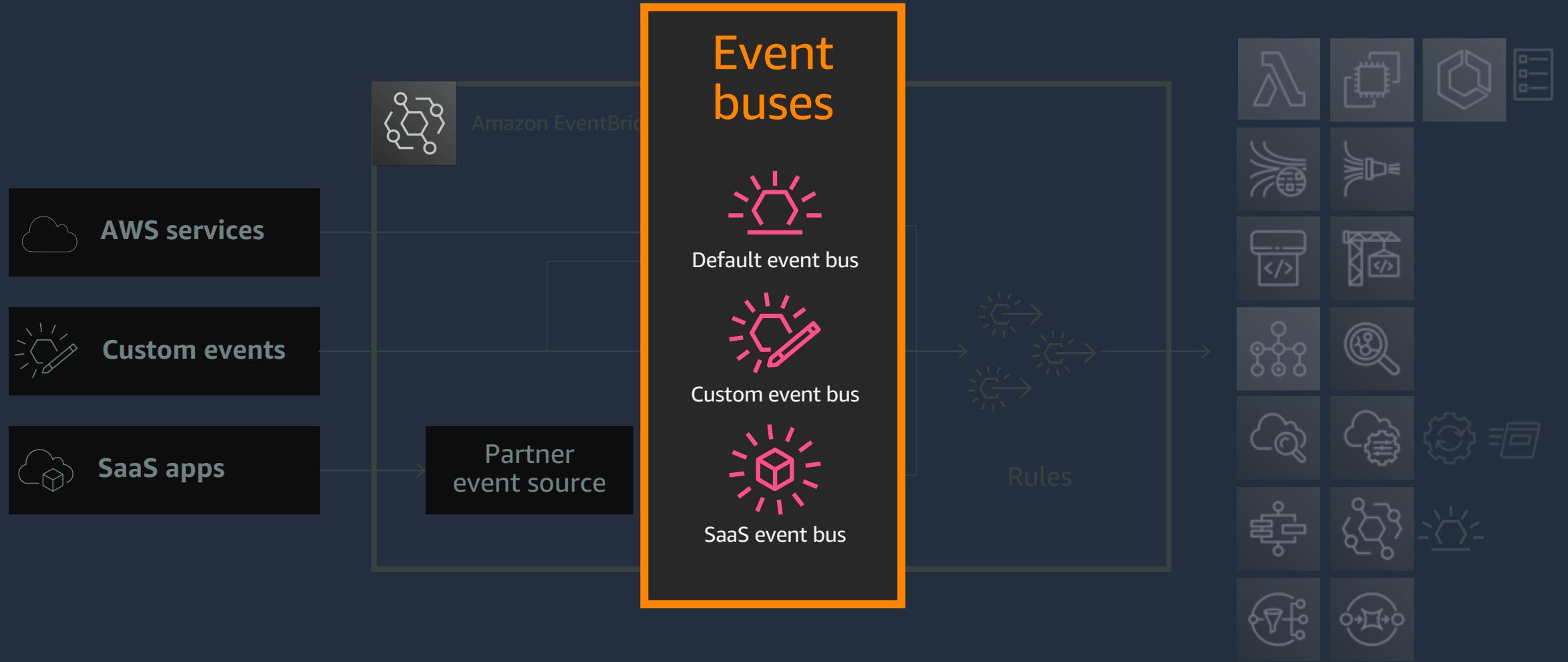
Event sources – Custom events



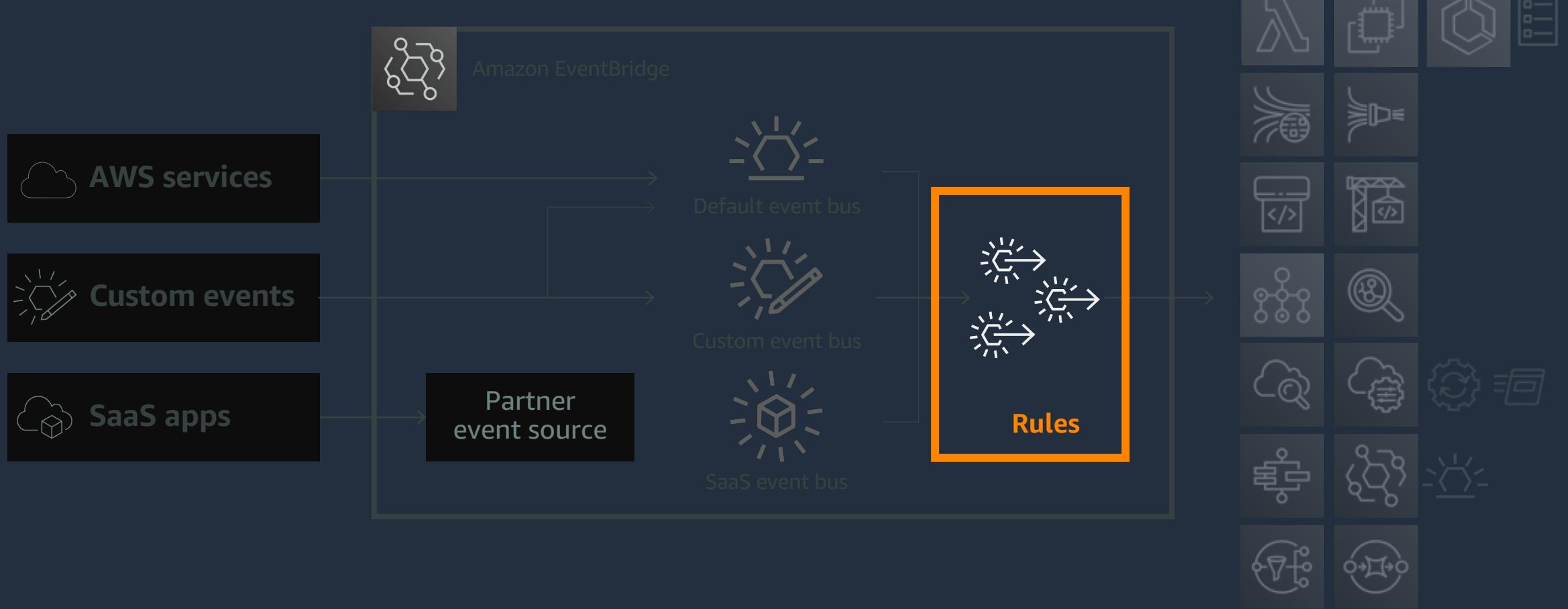
Event sources – SaaS partners



Event buses



Rules



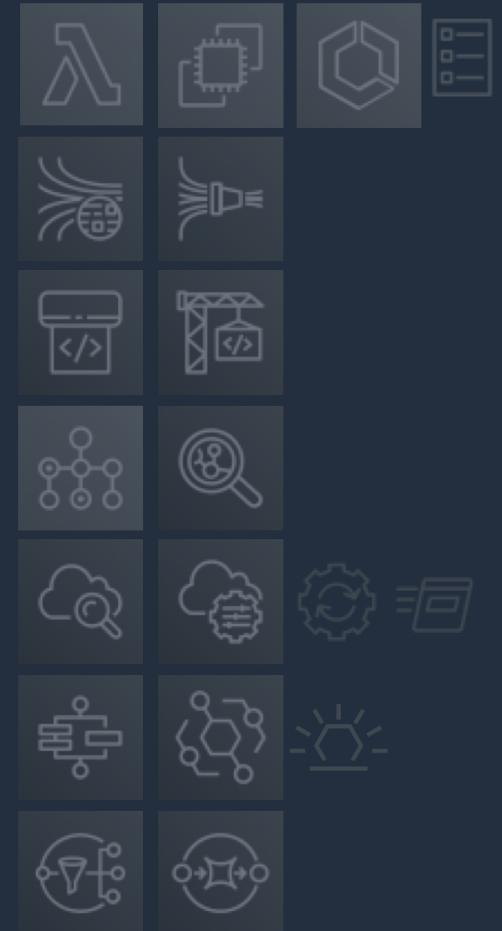
Event Structure

```
• {  
•   "version": "0",  
•   "id": "6a7e8feb-b491-4cf7-a9f1-bf3703467718",  
•   "account": "111122223333",  
•   "region": "us-west-1",  
•   "time": "2017-12-22T18:43:48Z",  
•   "source": "aws.ec2",  
•   "detail-type": "EC2 Instance State-change Notification",  
•   "resources": [ "arn:aws:ec2:us-west-1:123456789012:instance/i-1234567890abcdef0"  
],  
•   "detail": {  
•     "instance-id": " i-1234567890abcdef0",  
•     "state": "terminated"  
•   }  
• }
```

Rules

Example event:

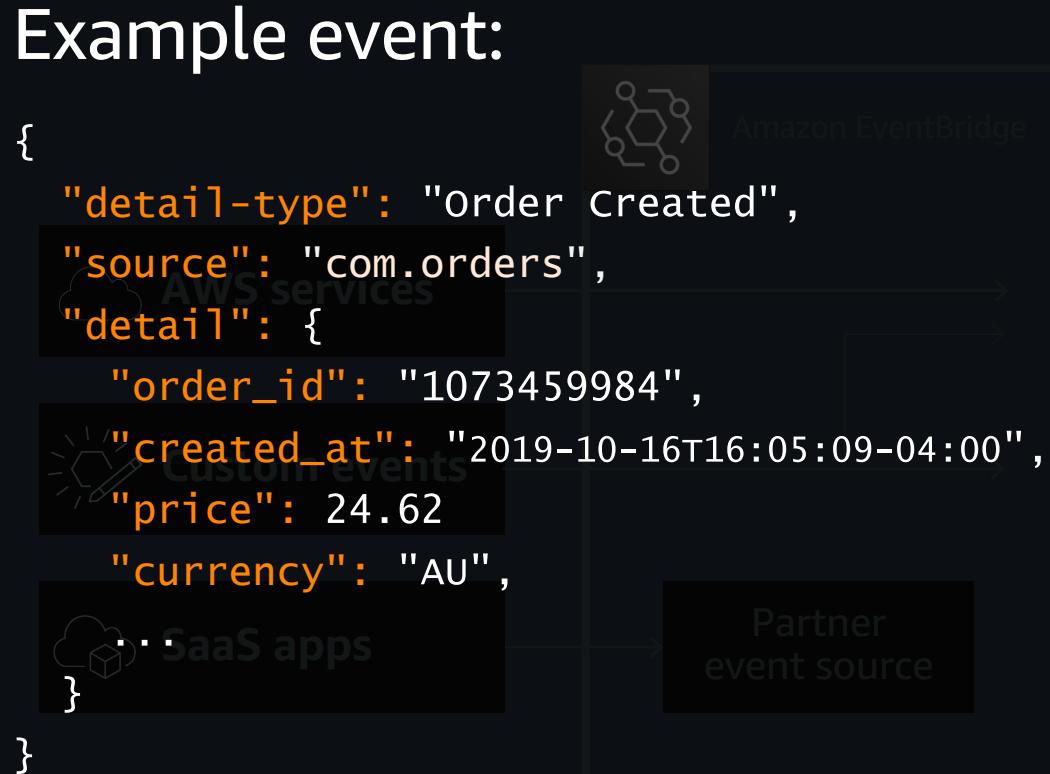
```
{  
  "detail-type": "Order Created",  
  "source": "com.orders",  
  "detail": {  
    "order_id": "1073459984",  
    "created_at": "2019-10-16T16:05:09-04:00",  
    "price": 24.62  
    "currency": "AU",  
  }  
}
```



Rules

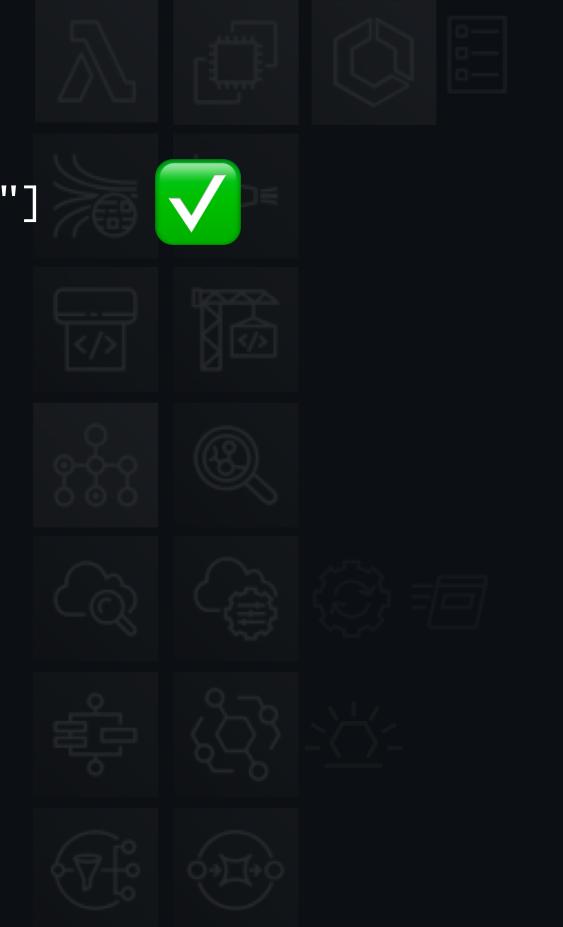
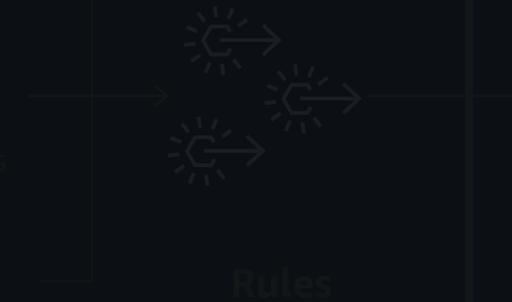
Example event:

```
{  
  "detail-type": "Order Created",  
  "source": "com.orders",  
  "detail": {  
    "order_id": "1073459984",  
    "created_at": "2019-10-16T16:05:09-04:00",  
    "price": 24.62  
    "currency": "AU",  
  }  
}
```



Example rule:

```
{  
  "source": ["com.orders"]  
}
```



Rules

Example event:

```
{  
  "detail-type": "Order Created",  
  "source": "com.orders",  
  "detail": {  
    "order_id": "1073459984",  
    "created_at": "2019-10-16T16:05:09-04:00",  
    "price": 24.62  
    "currency": "AU",  
  }  
}
```



Example rule:

```
{  
  "detail": {  
    "currency": ["AU", "NZ"]  
  }  
}
```



Rules

Example event:

```
{  
  "detail-type": "Order Created",  
  "source": "com.orders",  
  "detail": {  
    "order_id": "1073459984",  
    "created_at": "2019-10-16T16:05:09-04:00",  
    "price": 24.62  
    "currency": "AU",  
  }  
}
```

The diagram illustrates the flow of an event from a partner event source. The source is labeled "Partner event source". It publishes to three separate event buses: "Default event bus", "Custom event bus", and "SaaS event bus". Each bus is represented by a sunburst icon. The "Default event bus" has a single outgoing arrow. The "Custom event bus" has two outgoing arrows. The "SaaS event bus" has three outgoing arrows. To the left of the source, there are three categories: "AWS services" (represented by a cloud icon), "Custom events" (represented by a gear icon), and "SaaS apps" (represented by a cube icon). Arrows point from these categories to the source.

Example rule:

```
{  
  "detail-type": ["Ticket Resolved"]  
}
```

The diagram shows a rule definition. The rule is triggered by the "Ticket Resolved" event type. The rule itself is represented by a rectangular box with a red "X" button in the top right corner, indicating it can be deleted or disabled.

Advanced rules

	Example	Rule Syntax
Null	UserID is null	"UserID": [null]
Empty	LastName is empty	"LastName": [""]
Equals	Name is "Alice"	"Name": ["Alice"]
And	Location is "Sydney" and Day is "Monday"	"Location": ["Sydney"], "Day": ["Monday"]
Or	PaymentType is "Credit" or "Debit"	"PaymentType": ["Credit", "Debit"]



Advanced rules

	Example	Rule Syntax
Not	Weather is anything but "Raining"	"weather": [{ "anything-but": ["Raining"] }]
Numeric (equals)	Price is 100	"Price": [{ "numeric": ["=", 100] }]
Numeric (range)	Price is more than 10, and less than or equal to 20	"Price": [{ "numeric": [">", 10, "<=", 20] }]
Exists	ProductName exists	"ProductName": [{ "exists": true }]
Does not exist	ProductName does not exist	"ProductName": [{ "exists": false }]
Begins with	Region is in the Asia Pacific	"Region": [{ "prefix": "ap-" }]



Events vs. full-state descriptions

Order 123 was created at 10:47 AM by customer 456.



Events

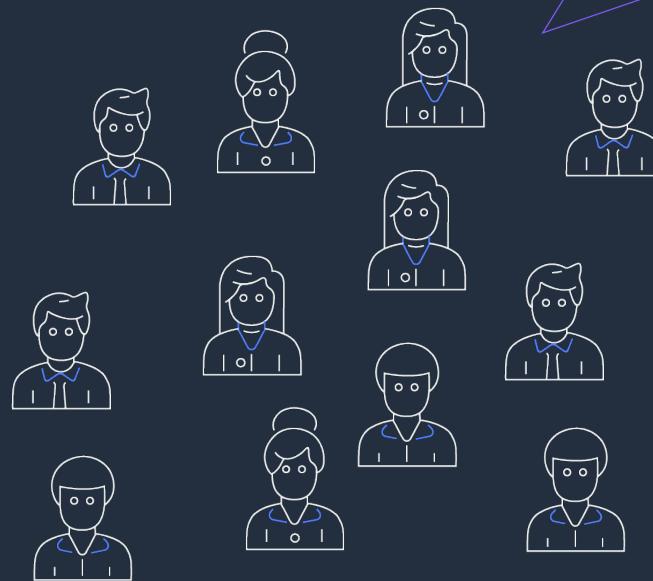
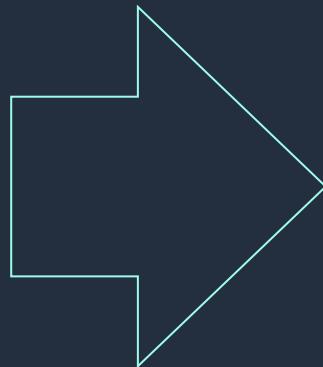
Order 123 was created at 10:47 AM by customer 456. The current status is Open, the total was \$237.51, the items were ...



Full-state description

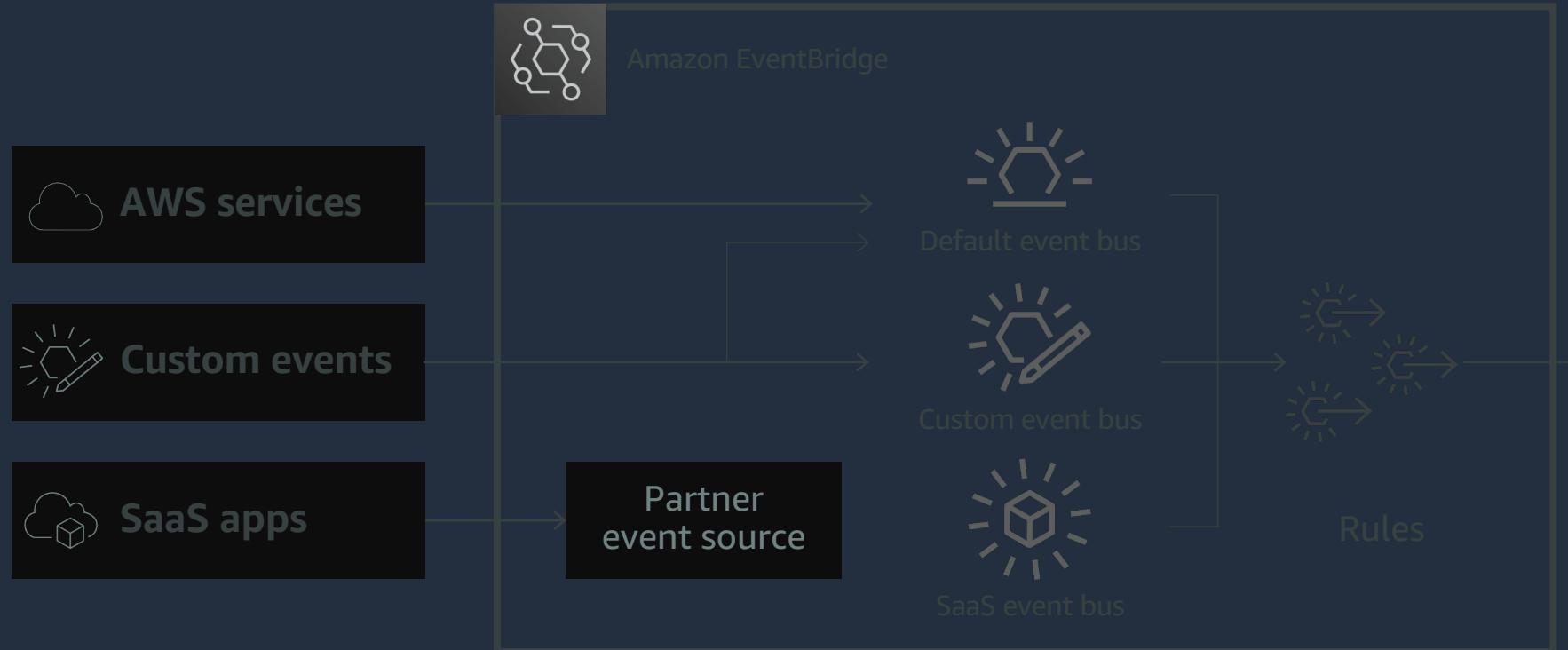
Considerations with sparse events

Order 123 was created by customer 456.

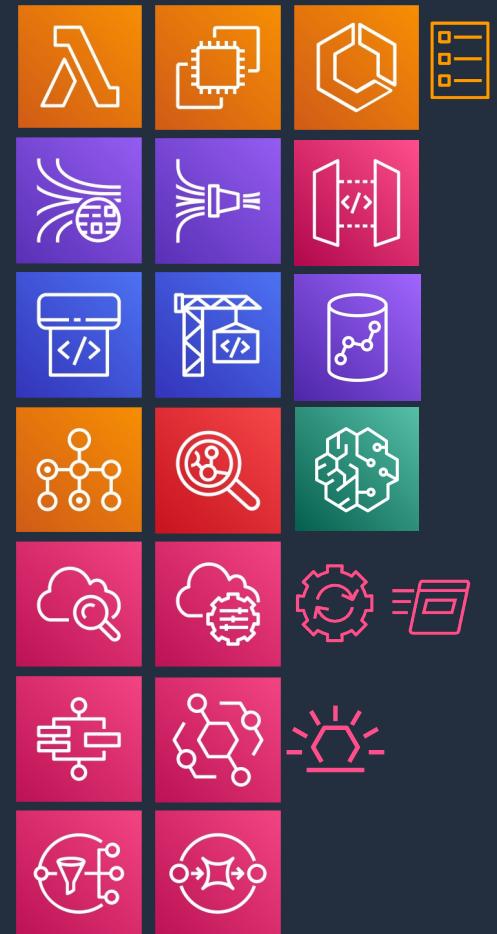


What are the details for order 123?

Targets

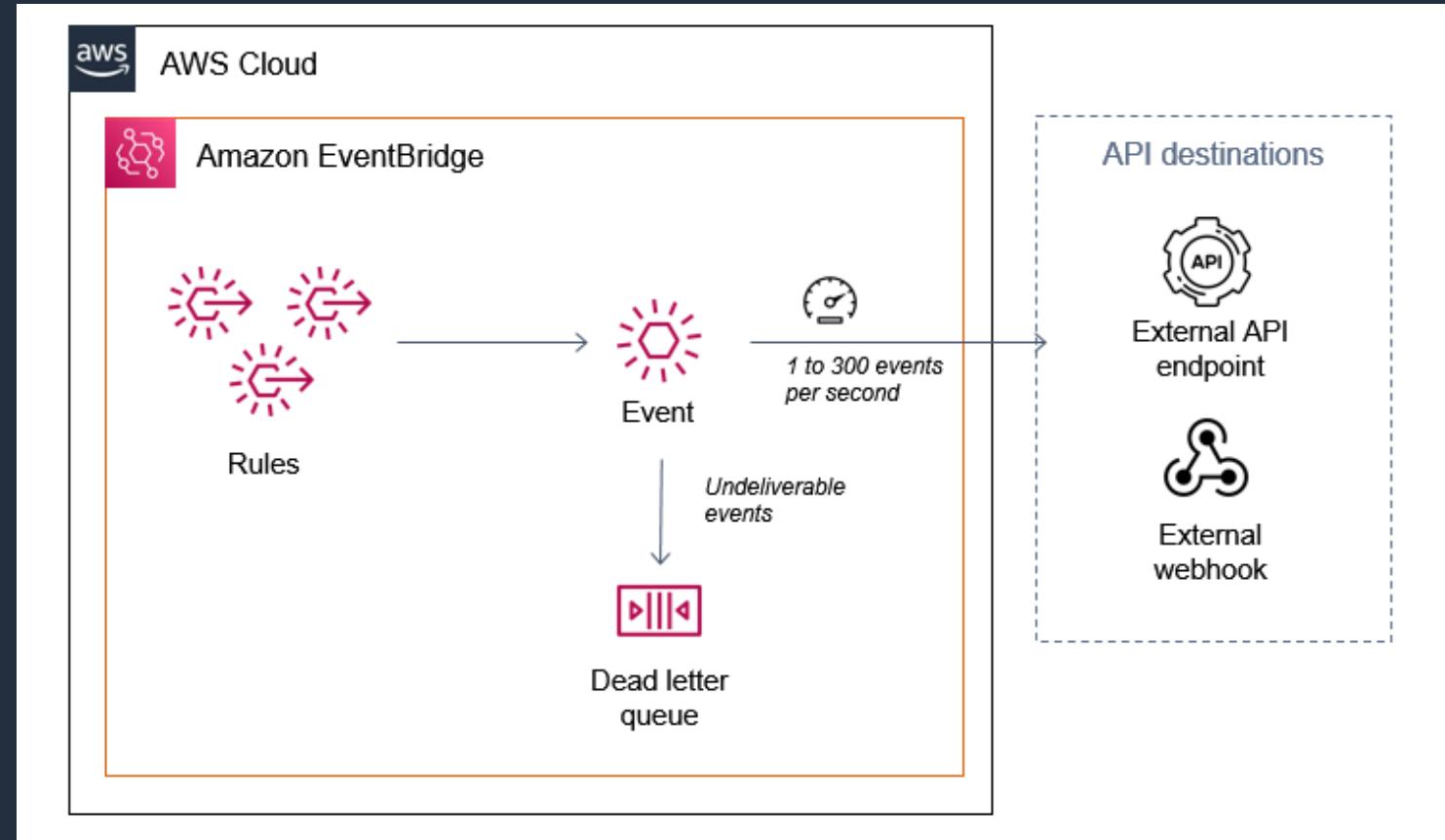


Targets



API destinations

- For Authorization Type
- Specifies the authorization type:
 - Basic (Username/Password)
 - OAuth
 - API Key
- Can be reused across API destinations
- HTTPS endpoint
- HTTP method
- Rate limit (per second)
- Must finish within 5 seconds



Event Transformation

- Matched Event
- Part of the Matched Event
 - `$.detail`
- Constant
- Input Transformer
 - **InputPath:**
 - {
 - "instance" : "\$.detail.instance",
 - "state" : "\$.detail.state"
 - }
 - **Template:**
 - "instance <instance> is <state>"
 - **Result:**
 - "instance i-0123456789 is RUNNING"



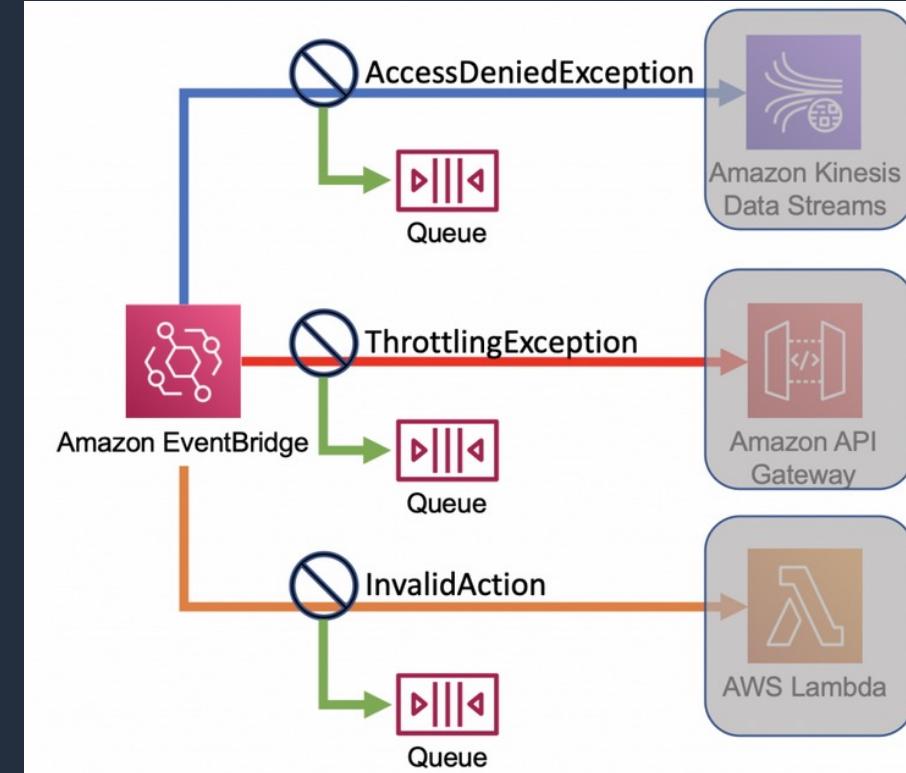
Error handling

- **Retries:**
- Events are retries for up to 24 hours or 185 times
- Can configure:
 - Max # of retries
 - Max age of event

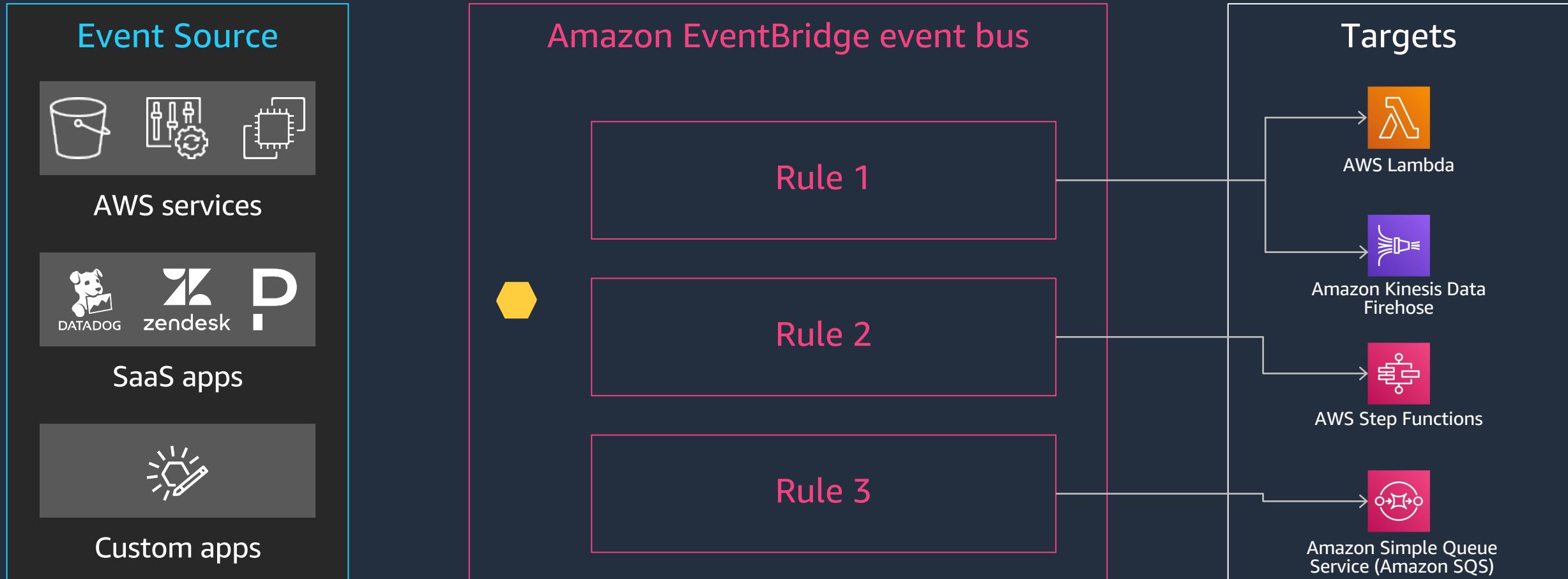


Error handling

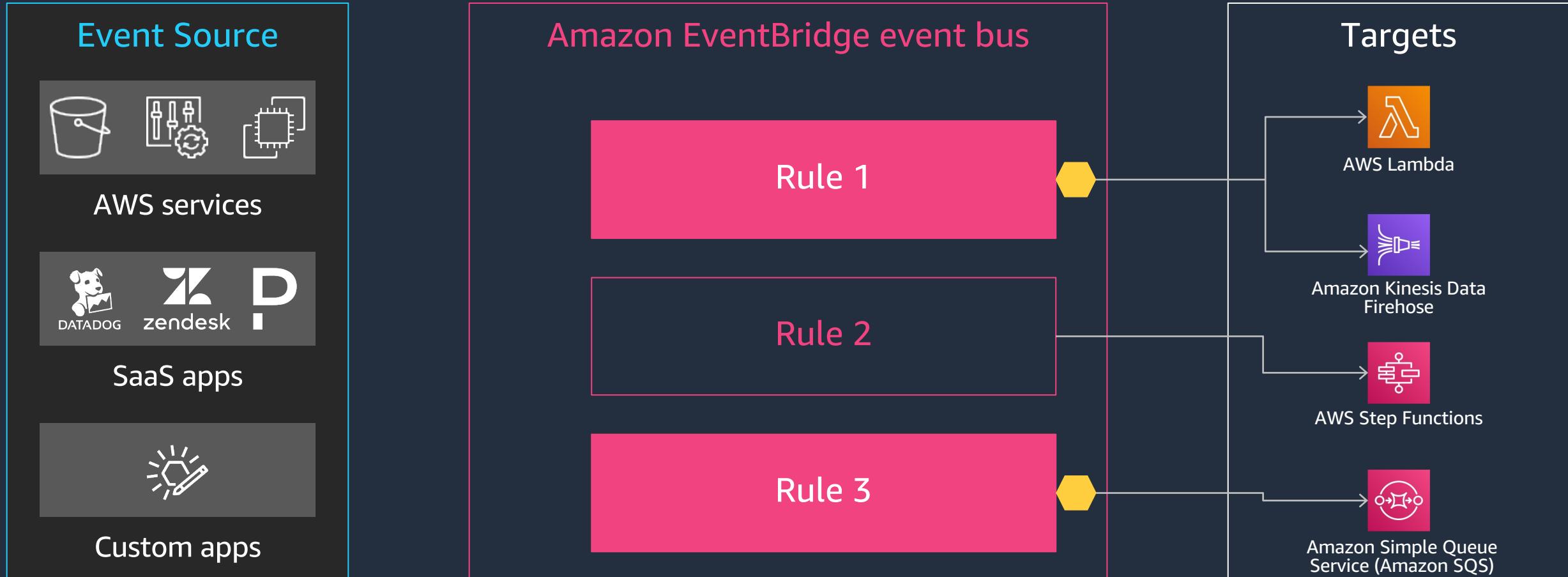
- **Dead Letter Queue:**
 - ERROR_CODE
 - ERROR_MESSAGE
 - RULE_ARN
 - TARGET_ARN



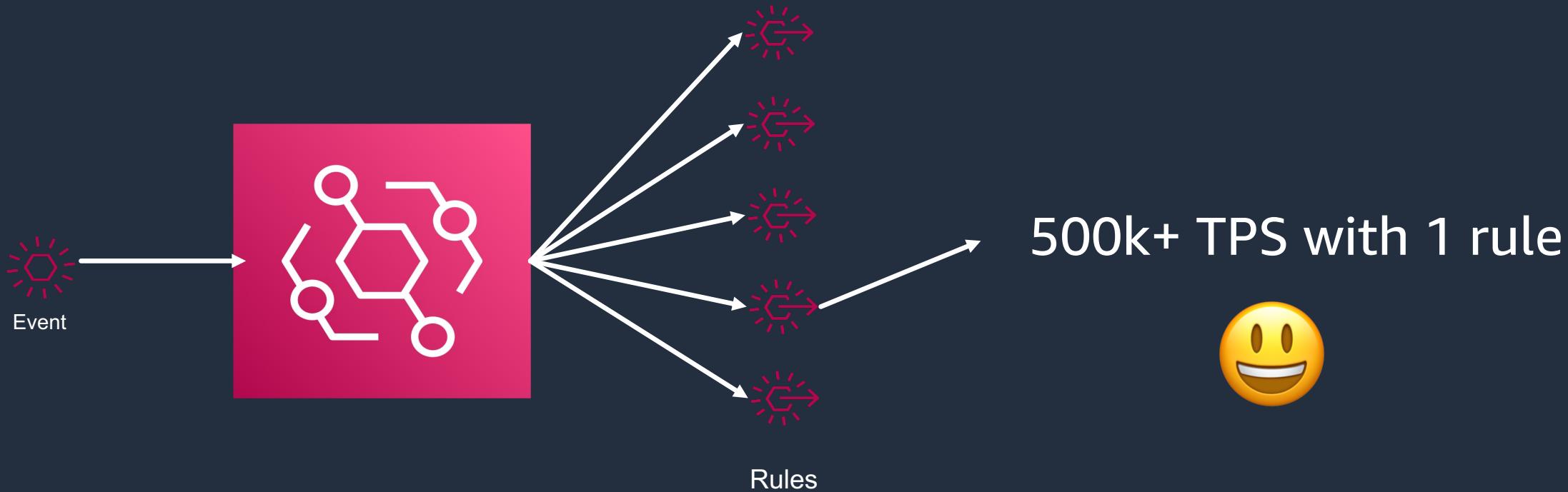
Router



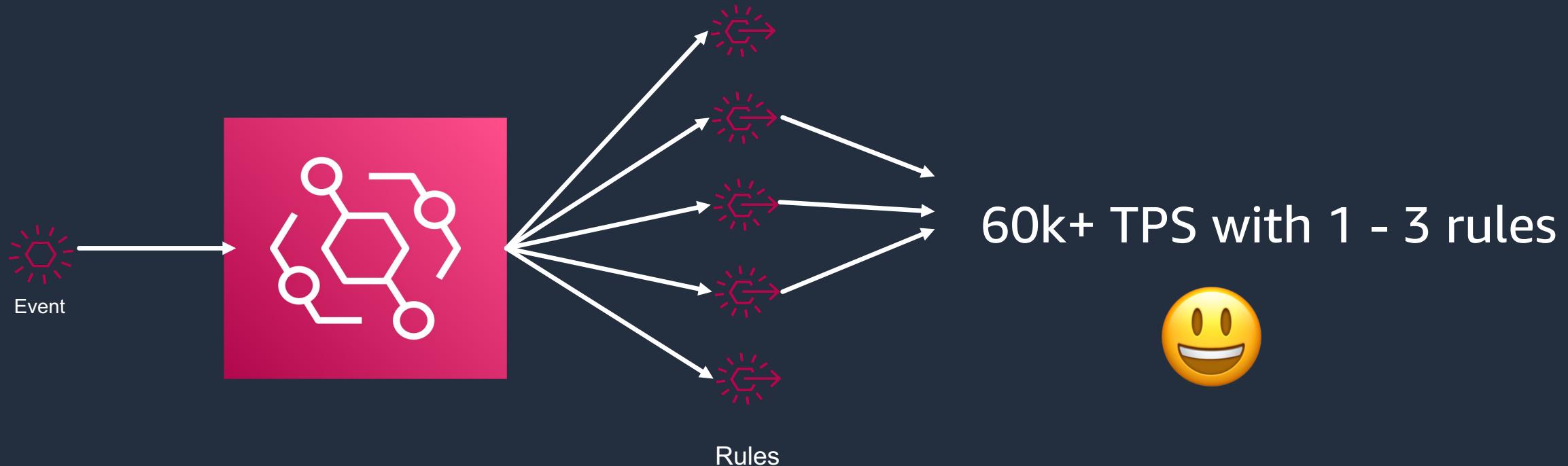
Router



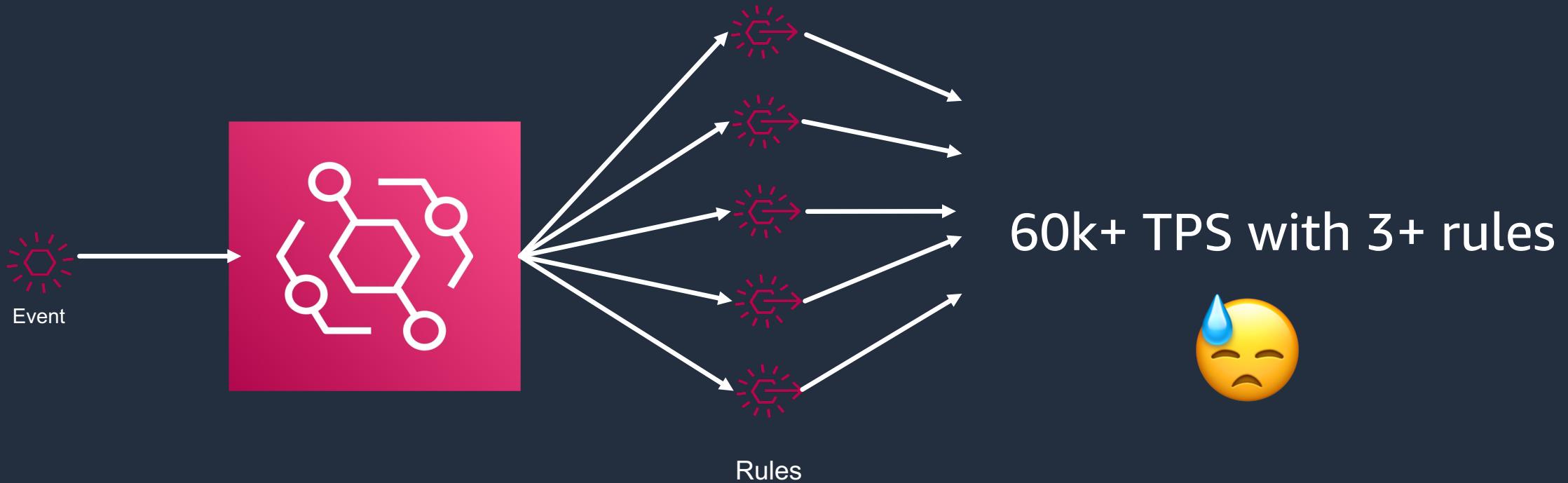
Delivery funout



Delivery funout



Delivery funout



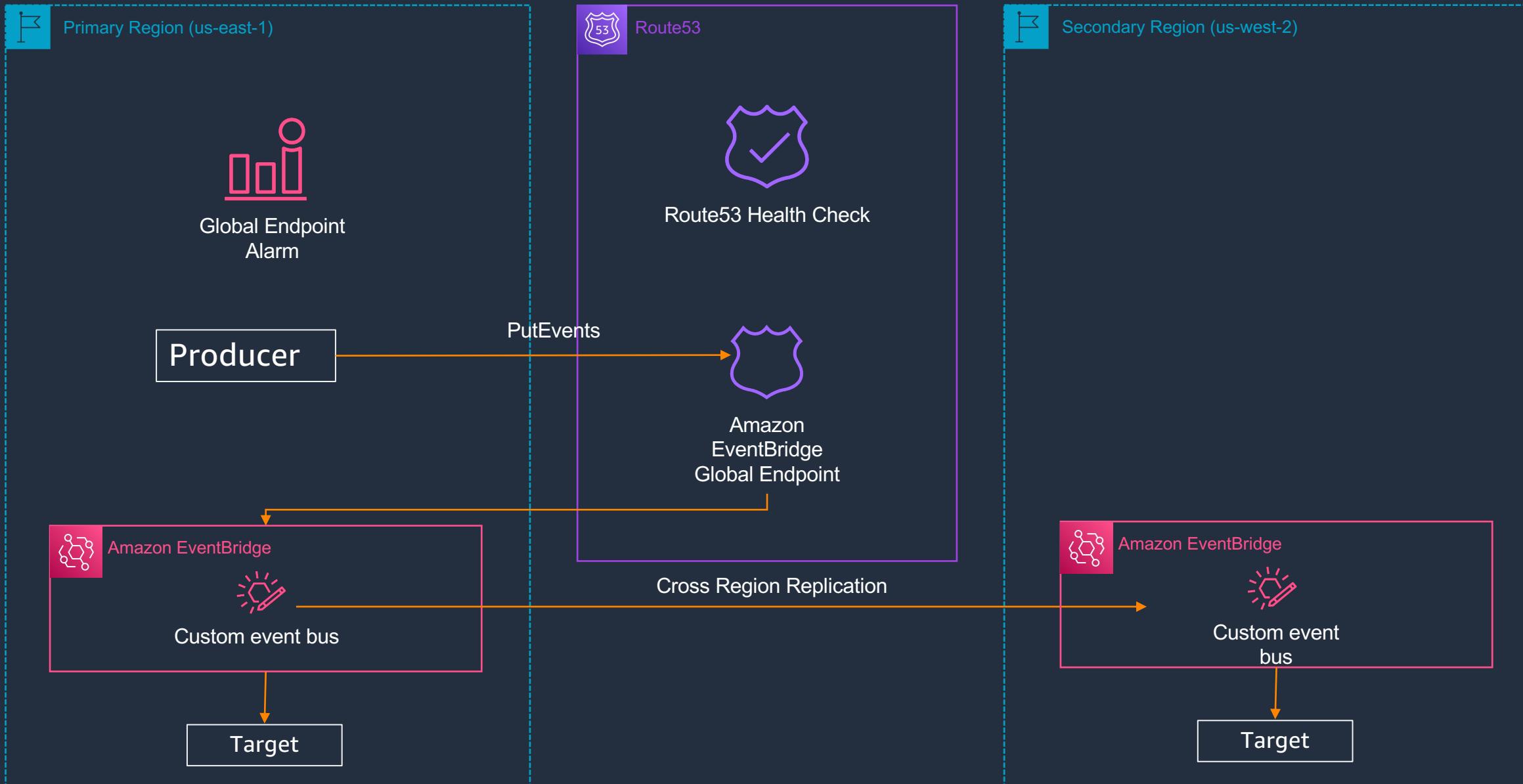
Other features

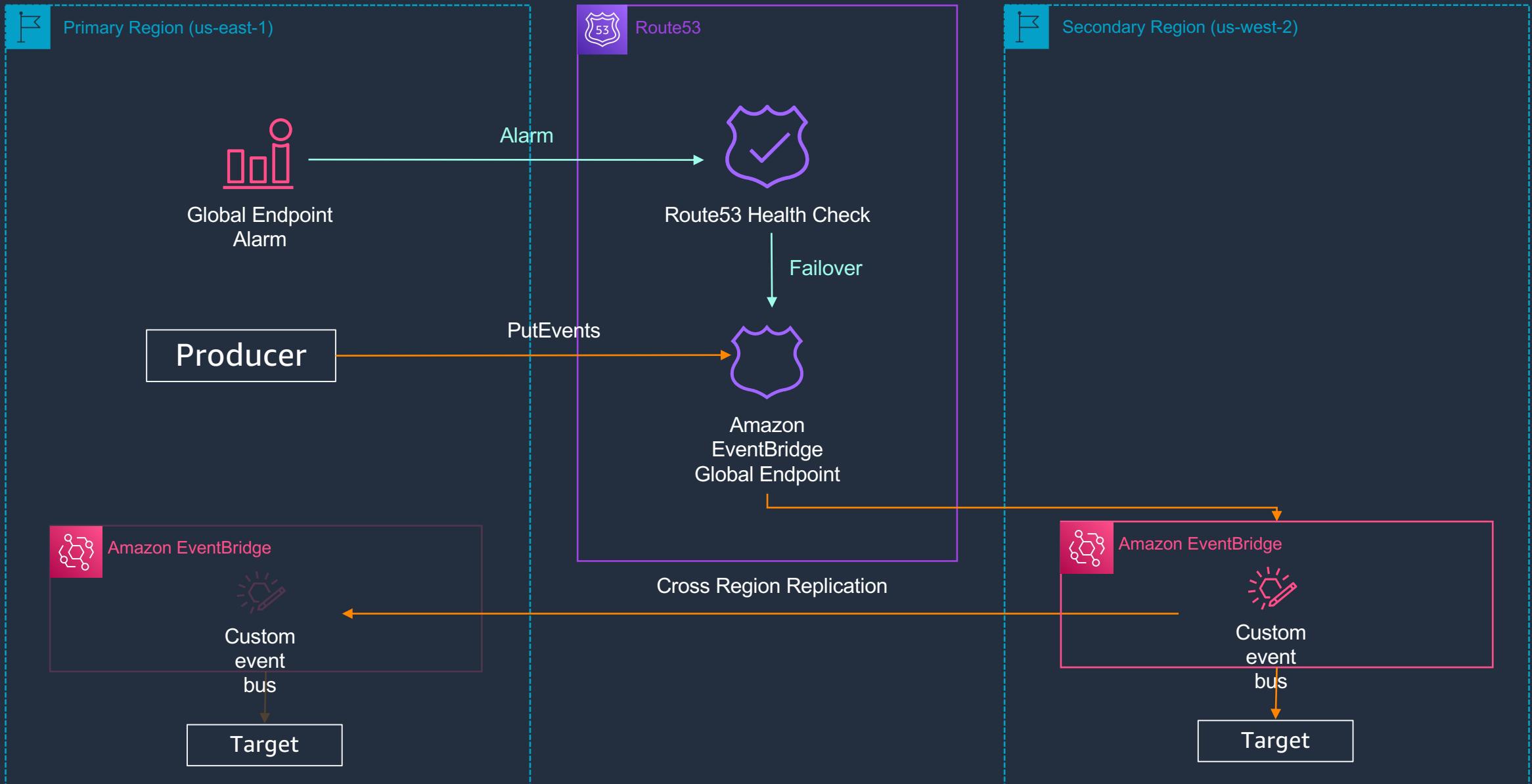


Global Endpoints

- Managed replication
- Automated failover and recovery
- Simplify multi-region HA
- Simplify disaster recovery

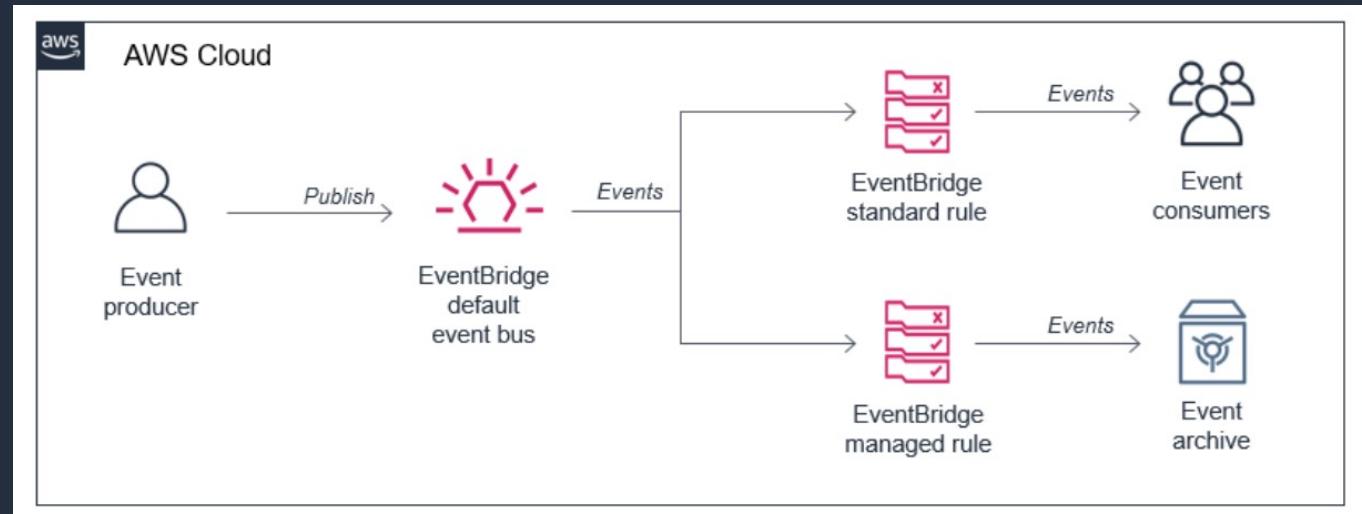






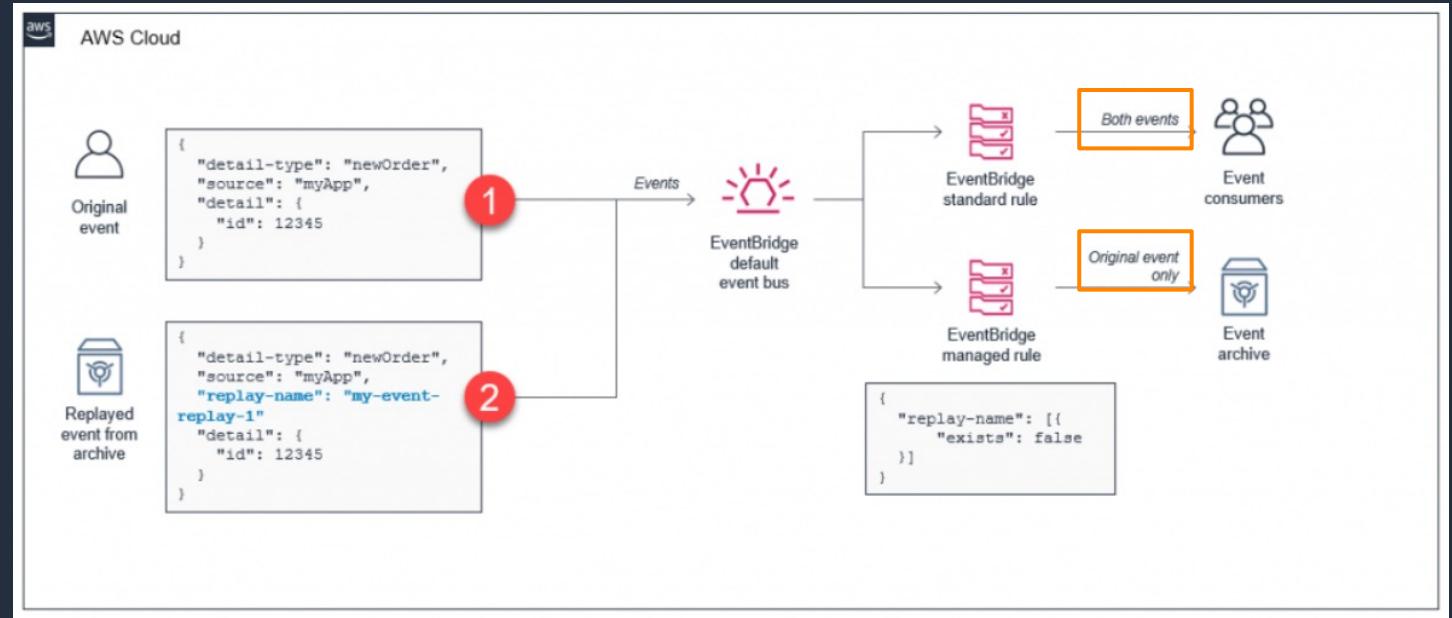
Archive and replay

- **Archive**
- Create an archive of events so that you can easily replay them at a later time
- Can choose between all events or only events that match an event pattern
- Set retention for the events

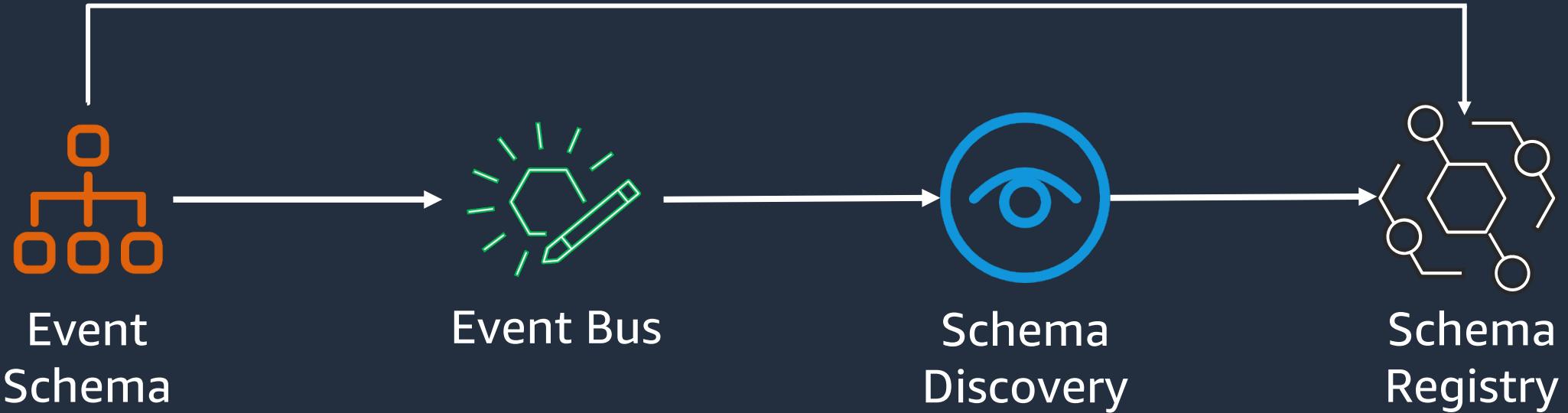


Archive and replay

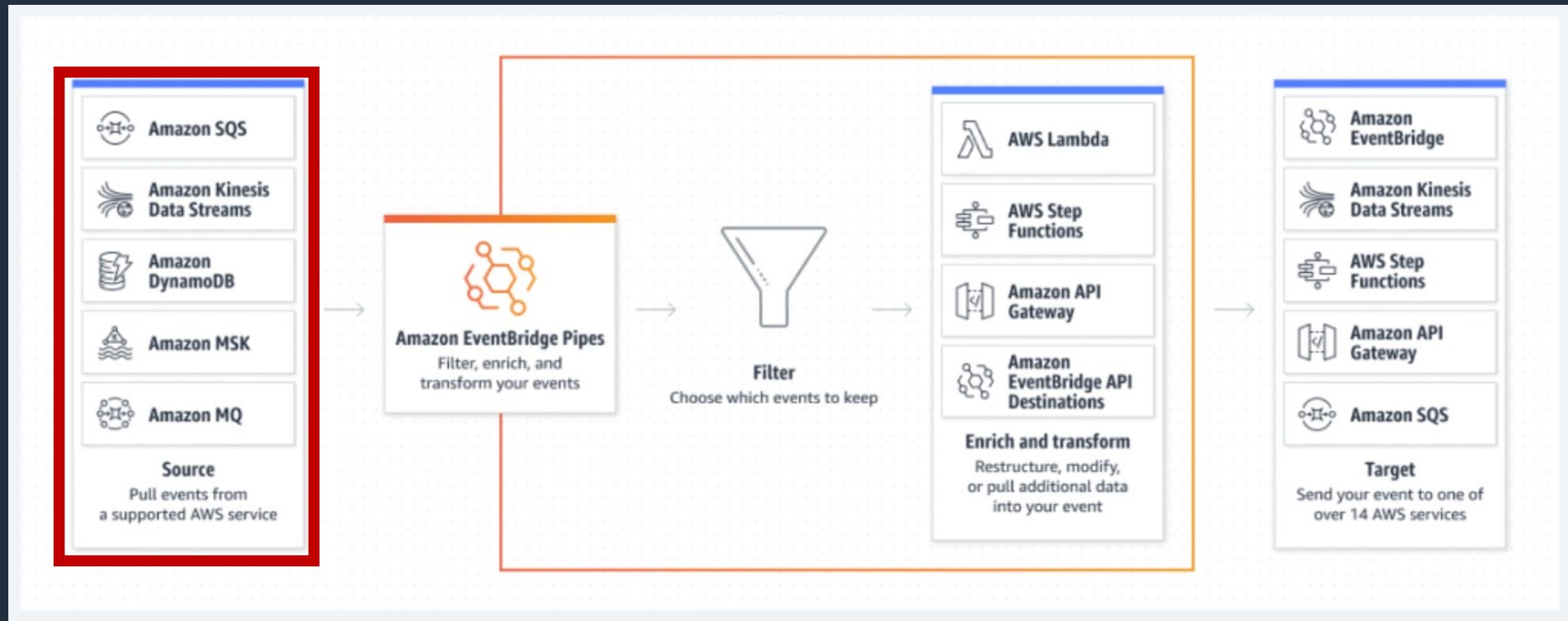
- **Replay**
- Replay events form the archive
- Specify time range
- Choose the bus and rules to replay to



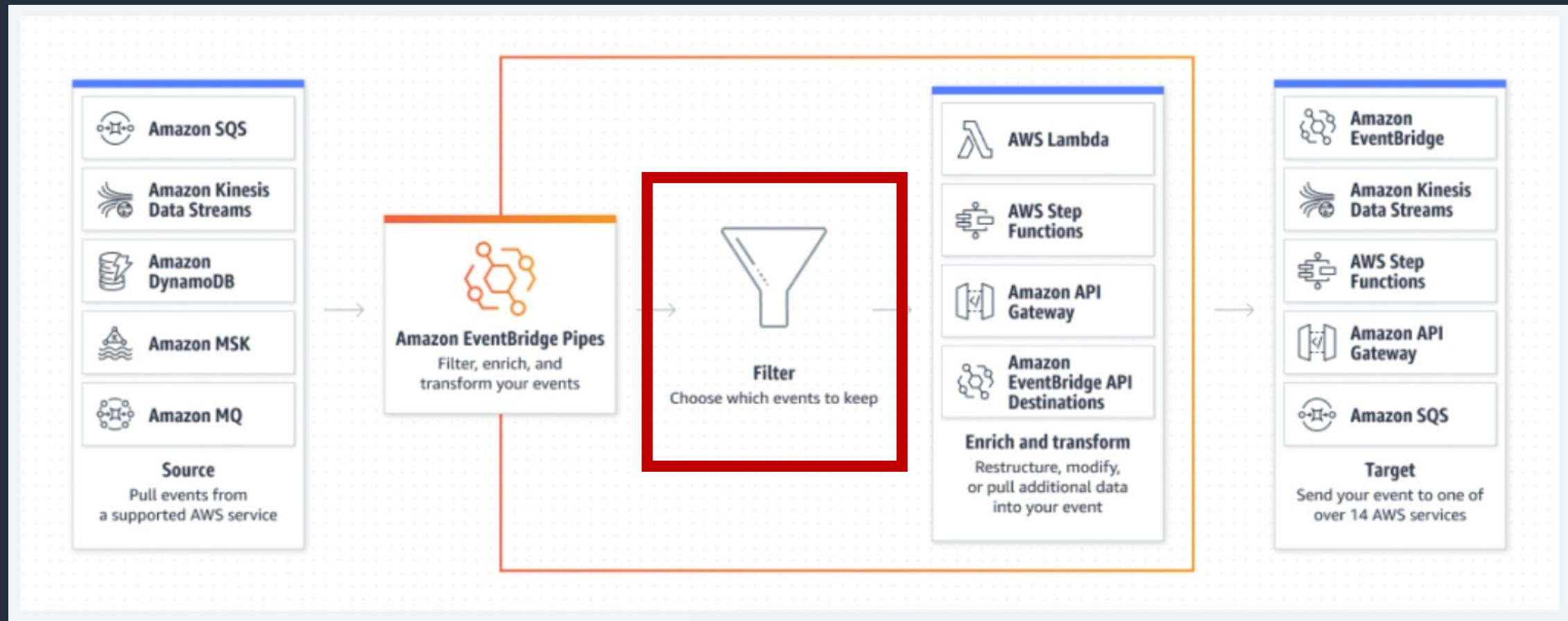
Schema Registry and Discovery



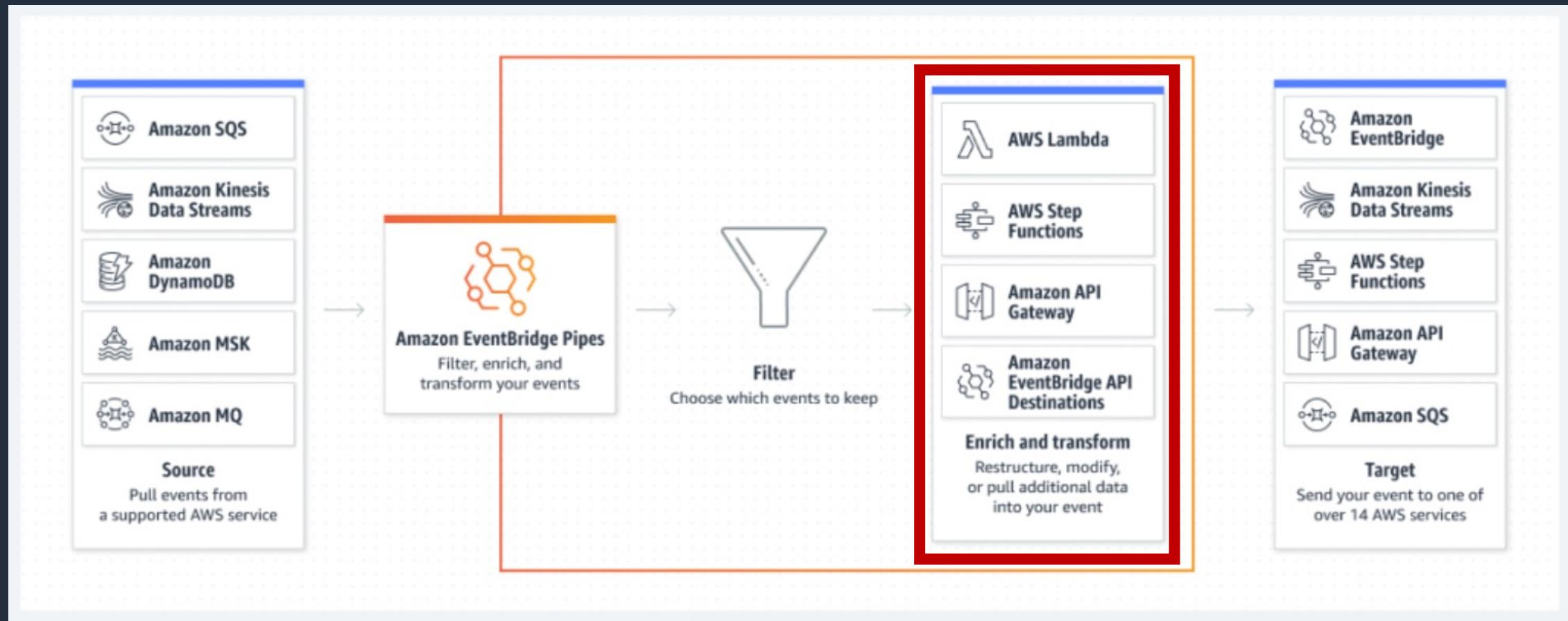
EventBridge Pipes



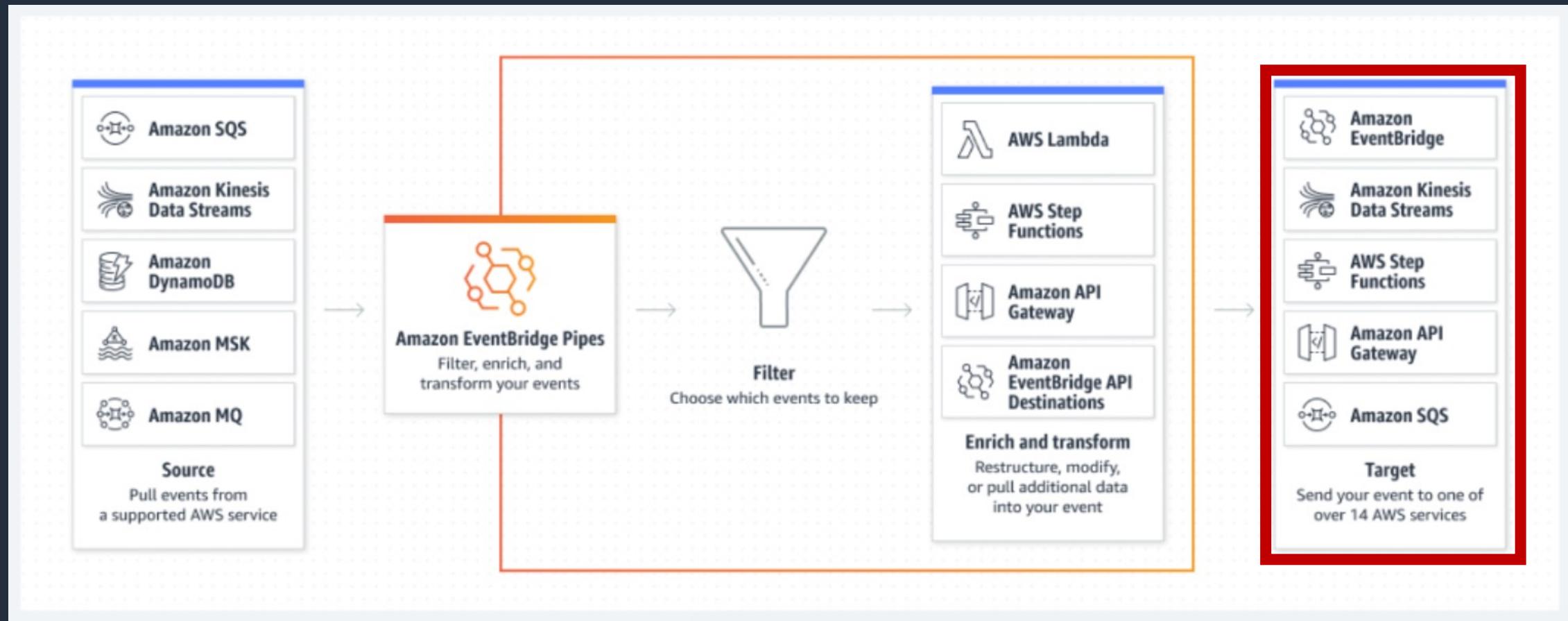
EventBridge Pipes



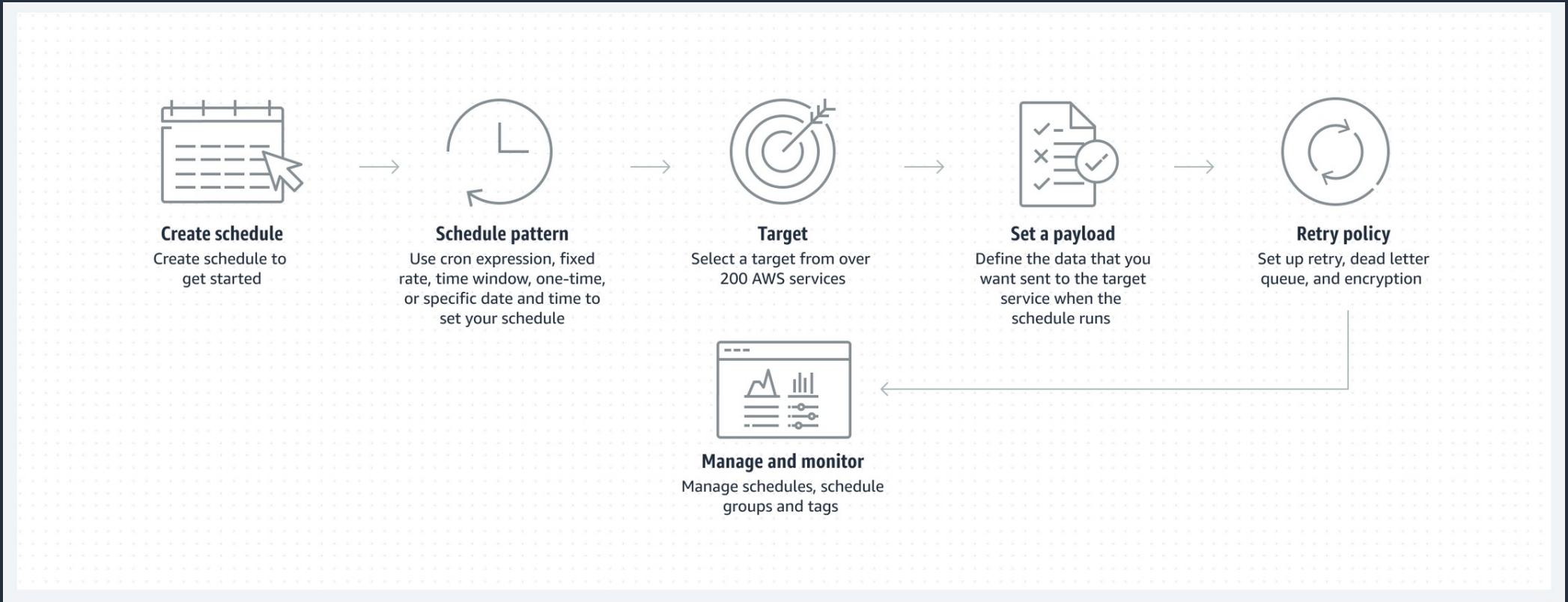
EventBridge Pipes



EventBridge Pipes



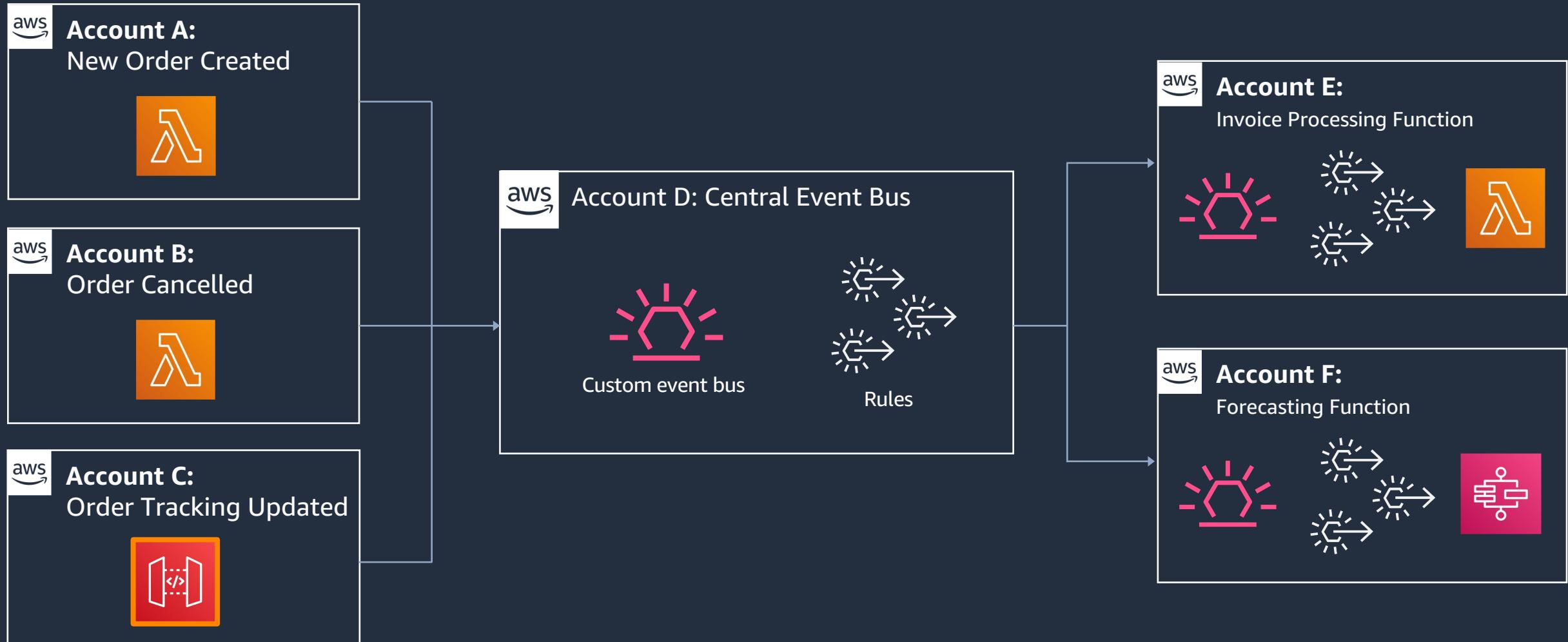
EventBridge Scheduler



Best practices



Multi-account / Region Architectures



Observability

- **Tracing with AWS X-Ray**
For end-to-end observability
- Only for Custom events (PutEvents) that contains the tracing header
- Trace headers are passed to the targets
- Monitor with **CloudWatch Metrics**
 - Invocations
 - TriggeredRule
 - MatchedEvents
 - FailedInvocations
 - DeadLetterInvocations
 - InvocationsSentToDlq
 - InvocationsFailedToBeSen
 - ToDlq, ThrottledRules

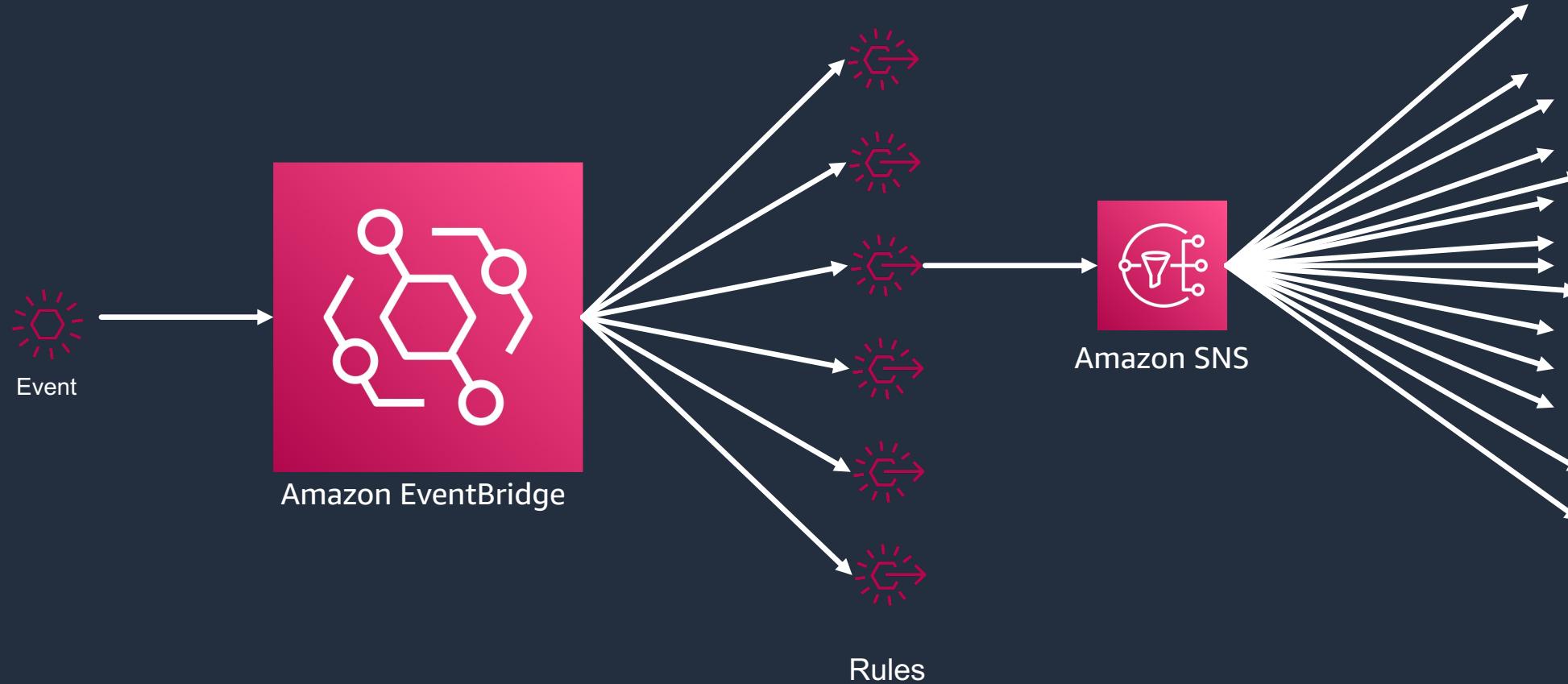


EventBridge vs. SNS

EventBridge	SNS
React to events from SaaS, custom events and 115 AWS Services	Application to person (A2P): SMS, e-mail, mobile push notifications.
Really great at filtering	Not as great at filtering
Large number of target types (26 AWS services and API Destination)	Few types of targets
Not as great at fanout	Very High Fanout (millions of endpoints)



Filter with EventBridge, fanout with SNS



Best practices

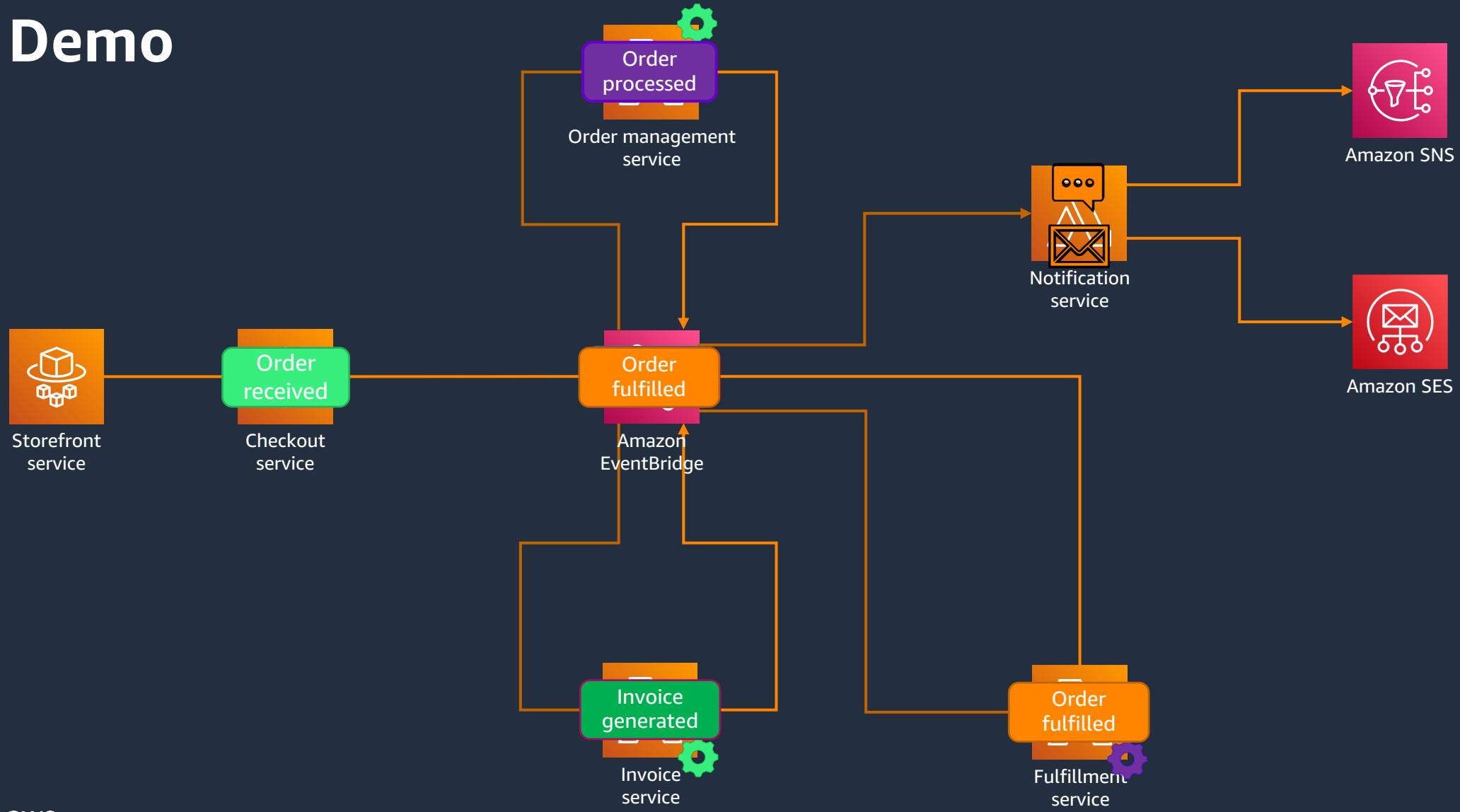
- Use a **single rule per subscriber**
- Avoid using the **default event bus** for custom application events
- Avoid using many event buses. **Just one can have up to 2000 rules**
- Utilize **CloudWatch Logs** for debugging
- Use **dead letter queues**
- Avoid **routing at the producer**



Event-driven architecture example



Demo



Schedule a follow up meeting with your Serverless team

Event-driven architecture best practices



Event-driven reference architecture



Digital Course: Architecting Serverless Solutions



Building event-driven architectures on AWS workshop





Por favor, respondam a pesquisa de satisfação:

Thank you!

Ricardo Marques (he/him)

 /ricardo-marques-45846425

