
AWS
re:Invent

SVS302

How LEGO.com accelerates innovation with serverless

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Agenda

Last year at re:Invent

Accelerating with AWS Step Functions

Accelerating with Amazon EventBridge

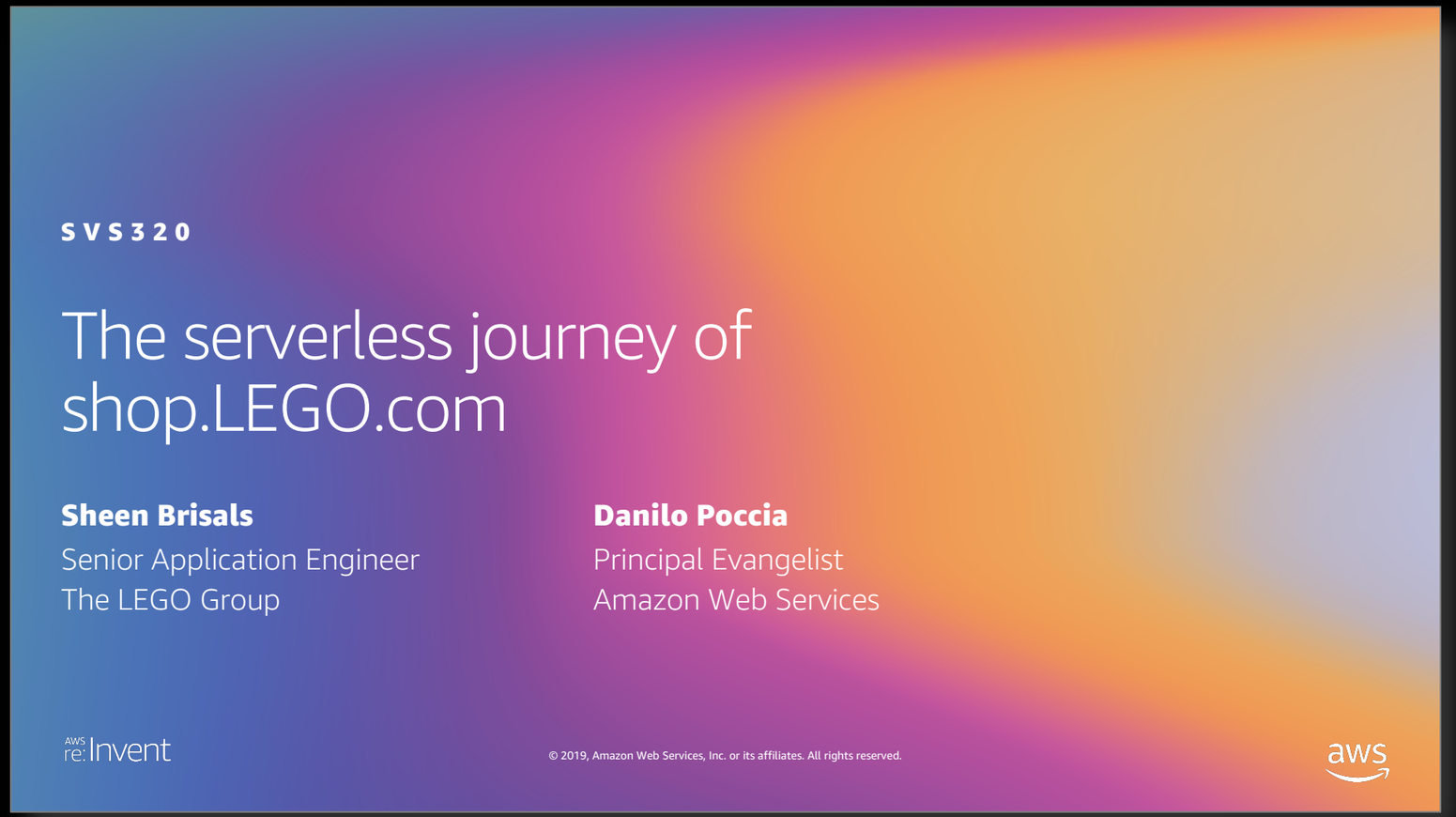
Serverless team growth

Business value acceleration

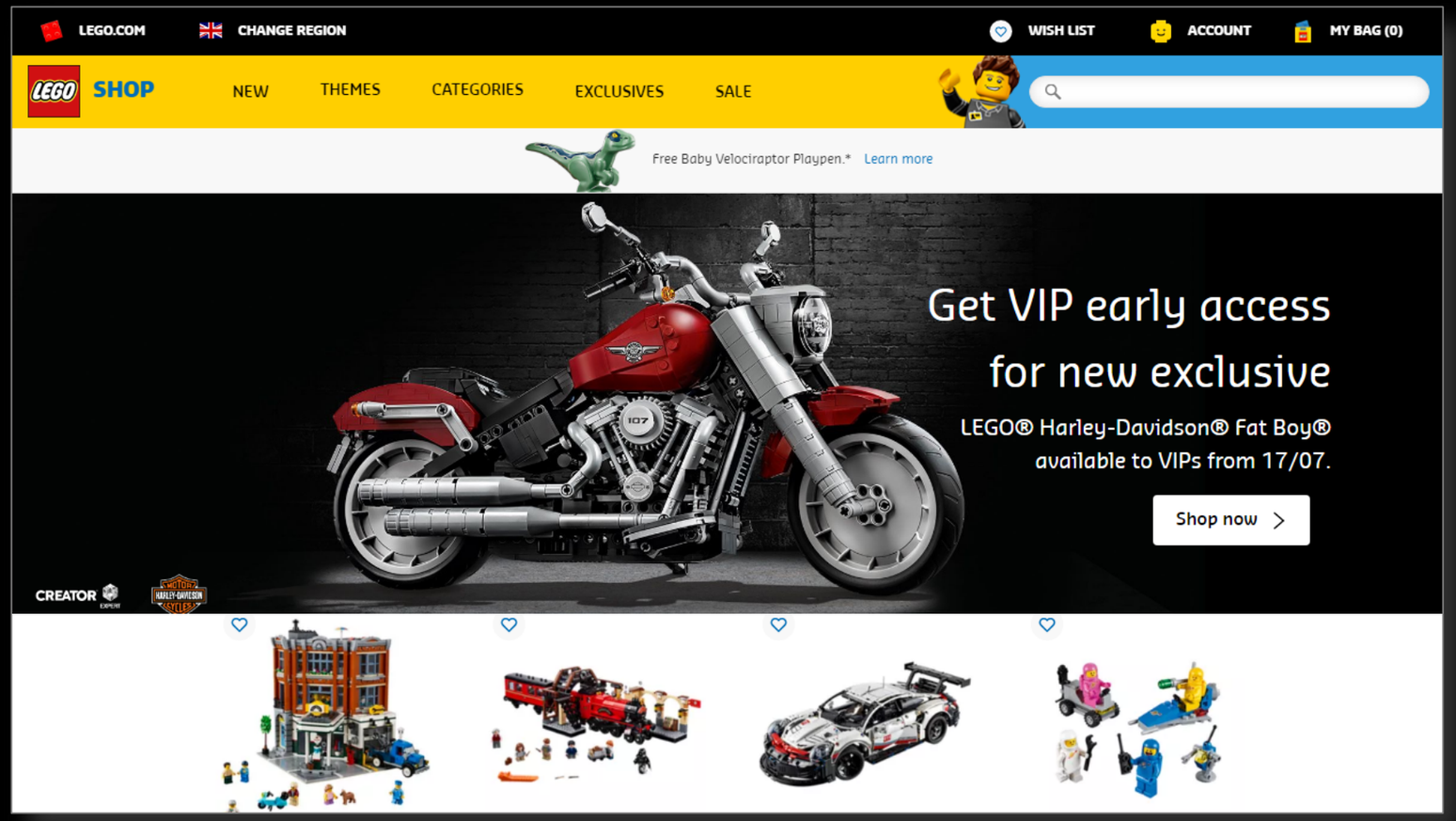


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Last year at re:Invent



Last year at re:Invent



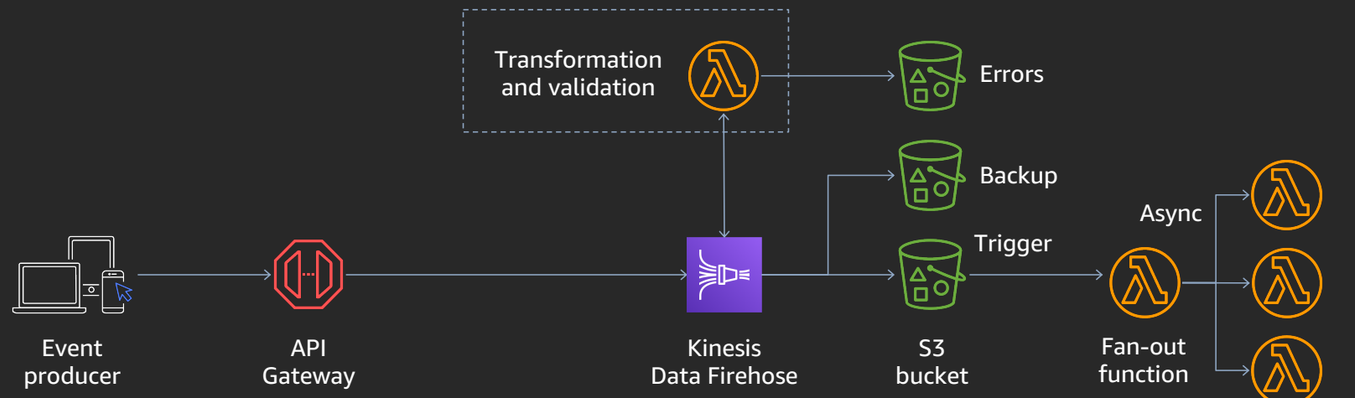
Last year at re:Invent

A journey through patterns

	Use case	Pattern
✓	Add item to shopping basket	Atomic request-response API
✓	Status polling for long-running processes	CQRS with status cache
✓	Voucher codes generation and notification	Email notification with signed URL
✓	User identity lookup in different systems	API authorizer with identity lookup
✓	On-demand customer data migration	Publish-subscribe sync
✓	Product catalog import and update	Event-driven data pipeline with buffering
✓	API-driven data ingestion	Codeless data ingestion
✓	Unique order number generation	Codeless sequence generator
✓	Website migration with URL changes	URL redirects cached by CDN
✓	Keeping website sitemaps updated	Scheduled workflow
✓	Checkout event processing	Hub-and-spoke event bus

Last year at re:Invent

Pattern – Codeless data ingestion



- API to stream directly
- Less point of failures
- Native integration
- Less compute costs
- Less code to maintain
- Fully managed and scalable

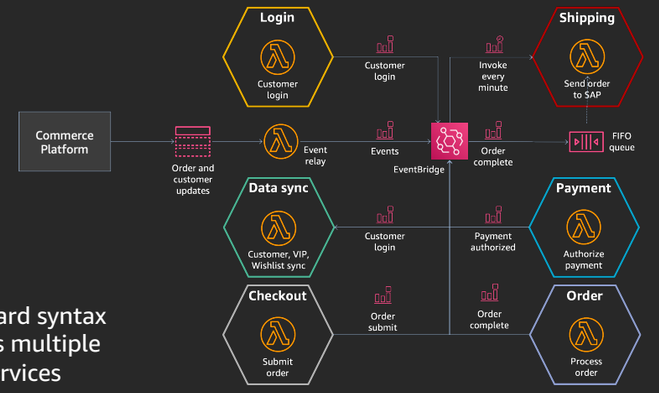
Last year at re:Invent

Pattern – Hub-and-spoke event bus

```
{
 "version": "0",
  "id": "6a7e8feb-b491-4cf7-a9f1-bf3703467718",
  "detail-type": "State change Notification",
  "source": "service-order-submit-dev",
  "account": "123456789012",
  "time": "2019-08-29T12:10:21z",
  "region": "eu-central-1",
  "resources": ["arn:aws:events:event-bus/checkout-bus"],
   "detail": {
     "event": {
       "meta_data": {
         "site_id": "LEGO Shop",
         "type": "CHECKOUT",
         "subtype": "ORDER",
         "status": "COMPLETE"
       },
       "data": {
         "order_number": "T123456789",
         "customer_id": "bf3703467718-29T12-6a7e8feb"
       }
     }
   }
}
```

Standard syntax across multiple services

Custom for each service



Accelerating with serverless

Accelerating with AWS Step Functions

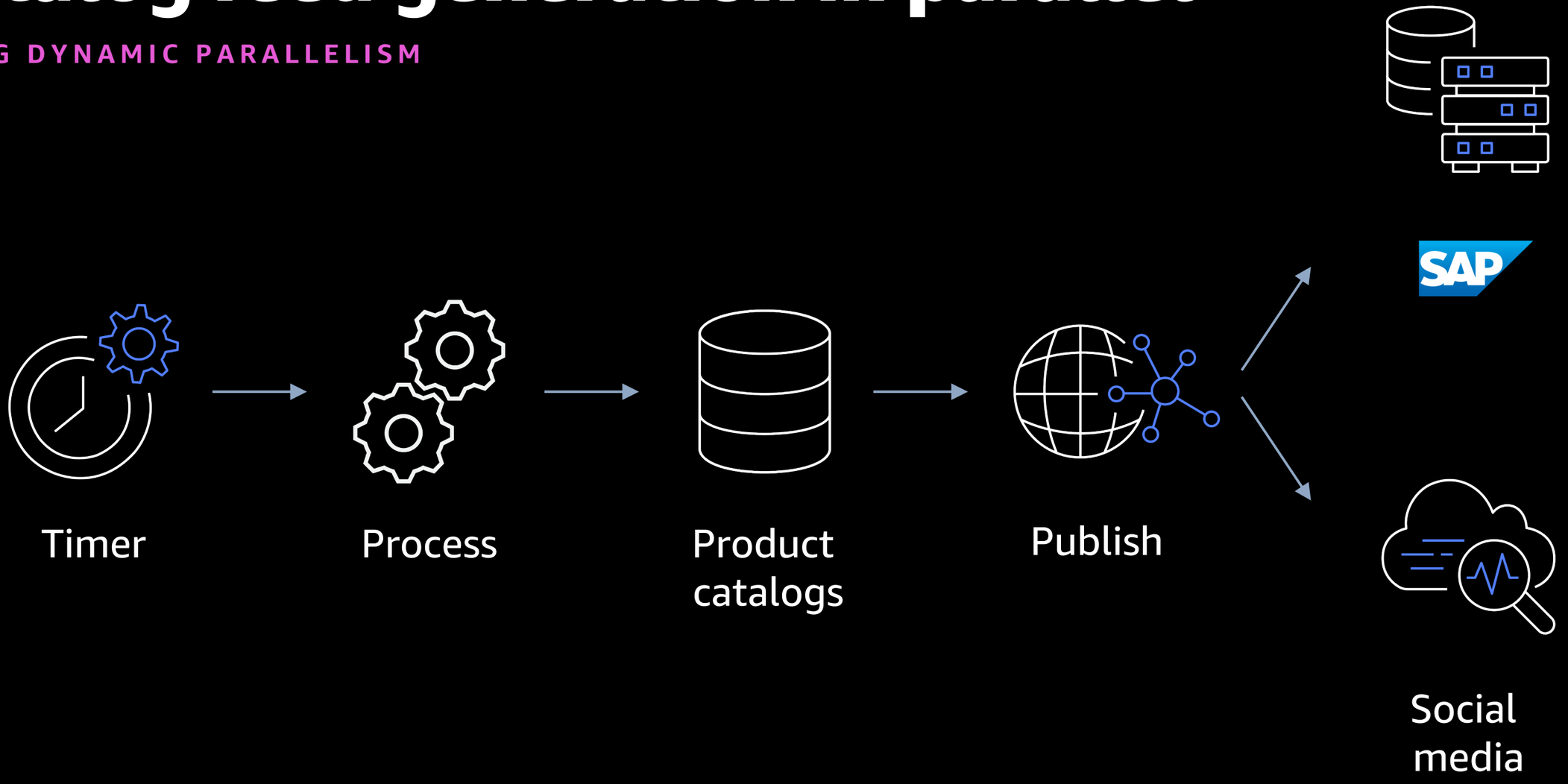


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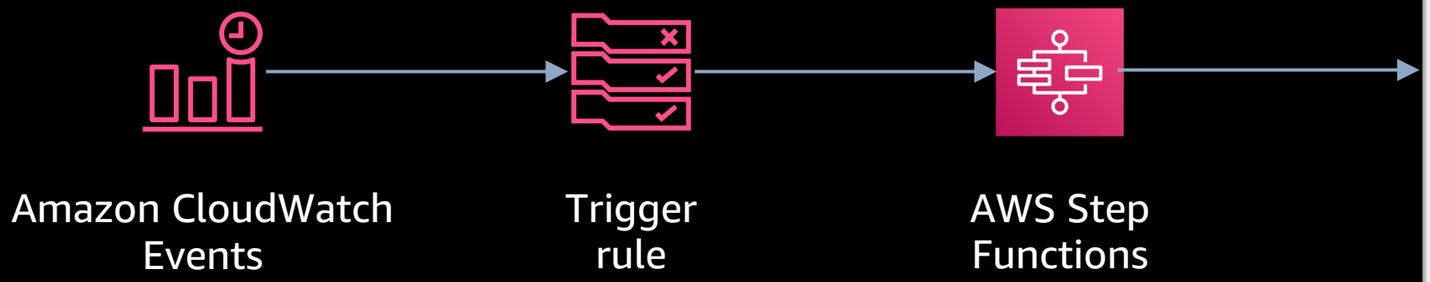
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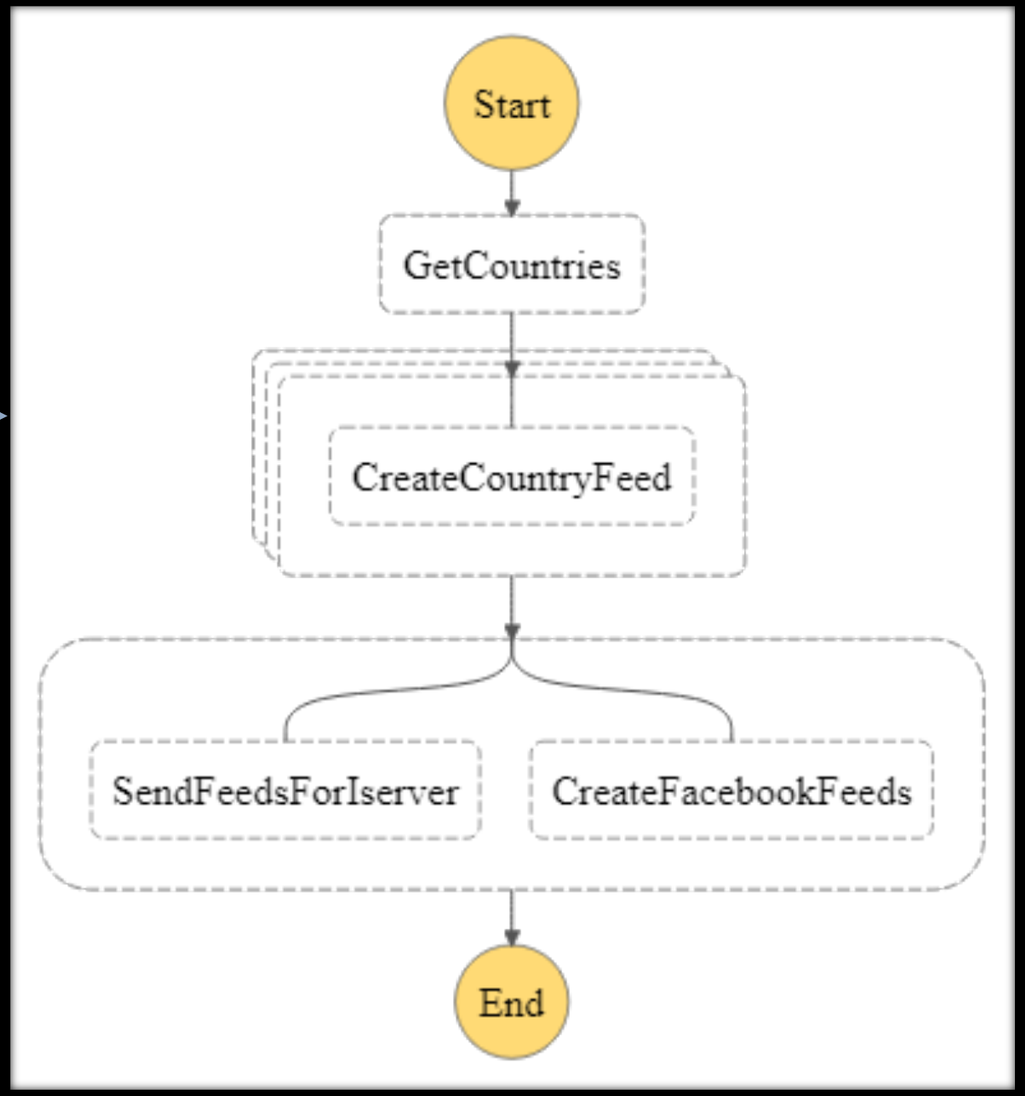
Catalog feed generation in parallel

USING DYNAMIC PARALLELISM



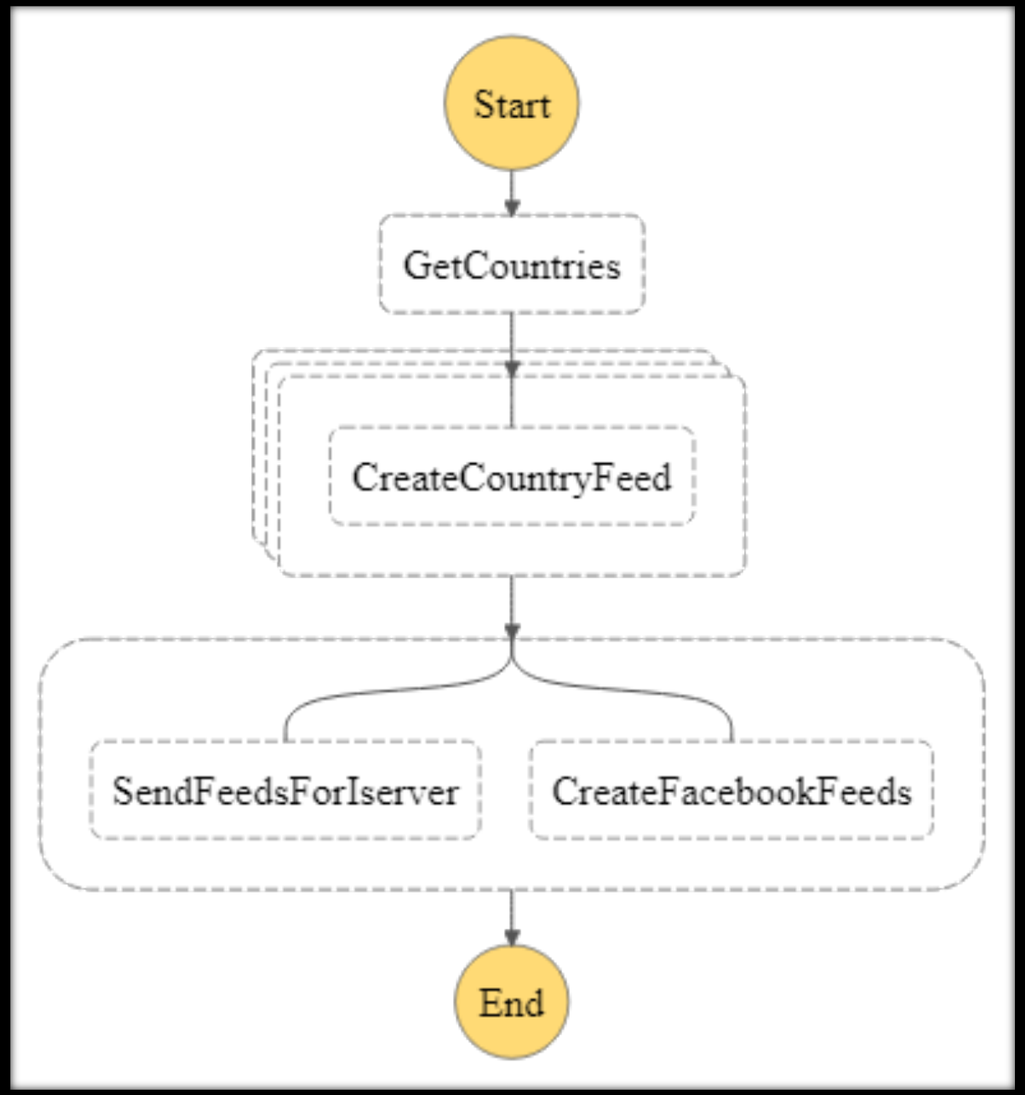
Dynamic parallelism



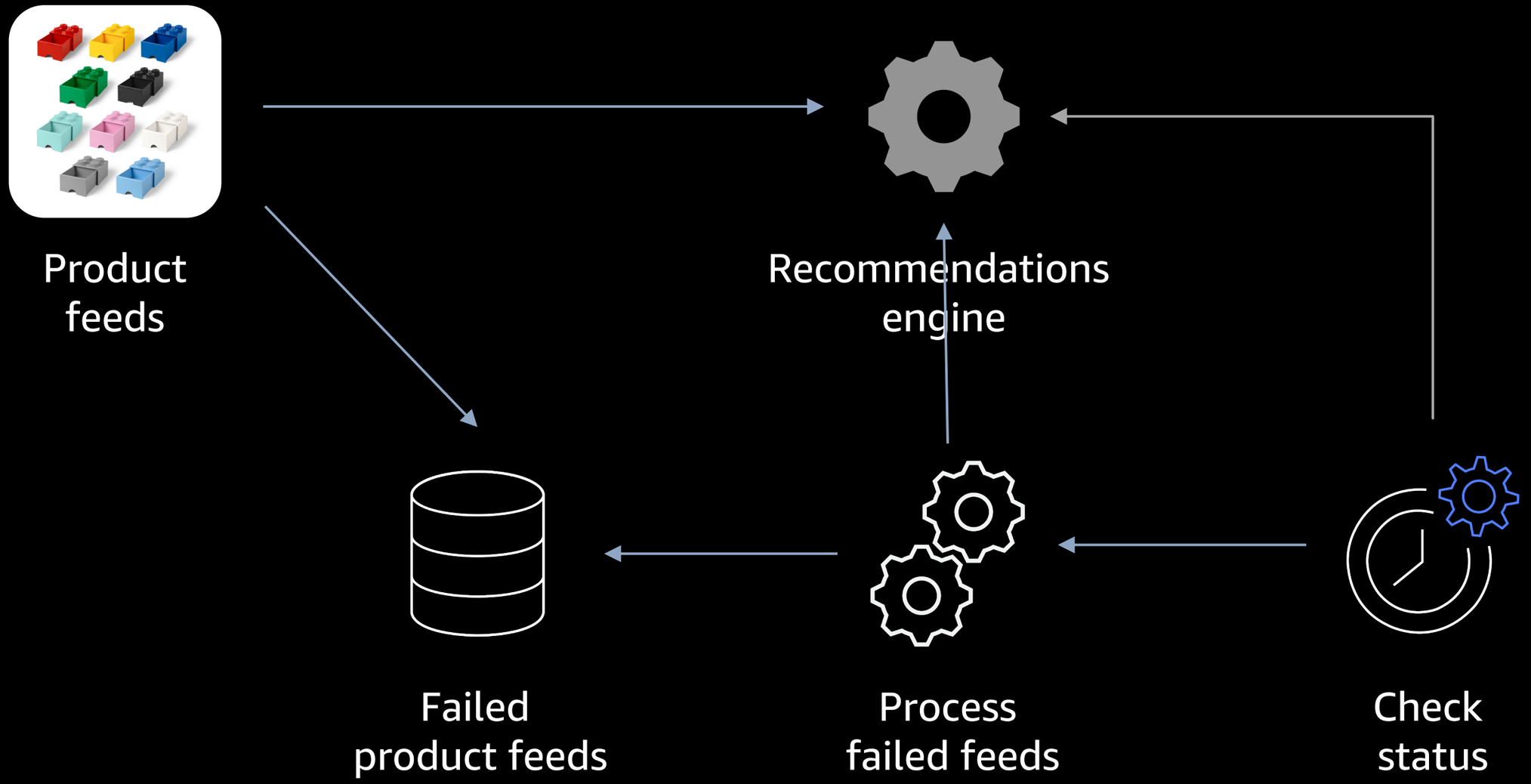


Dynamic parallelism

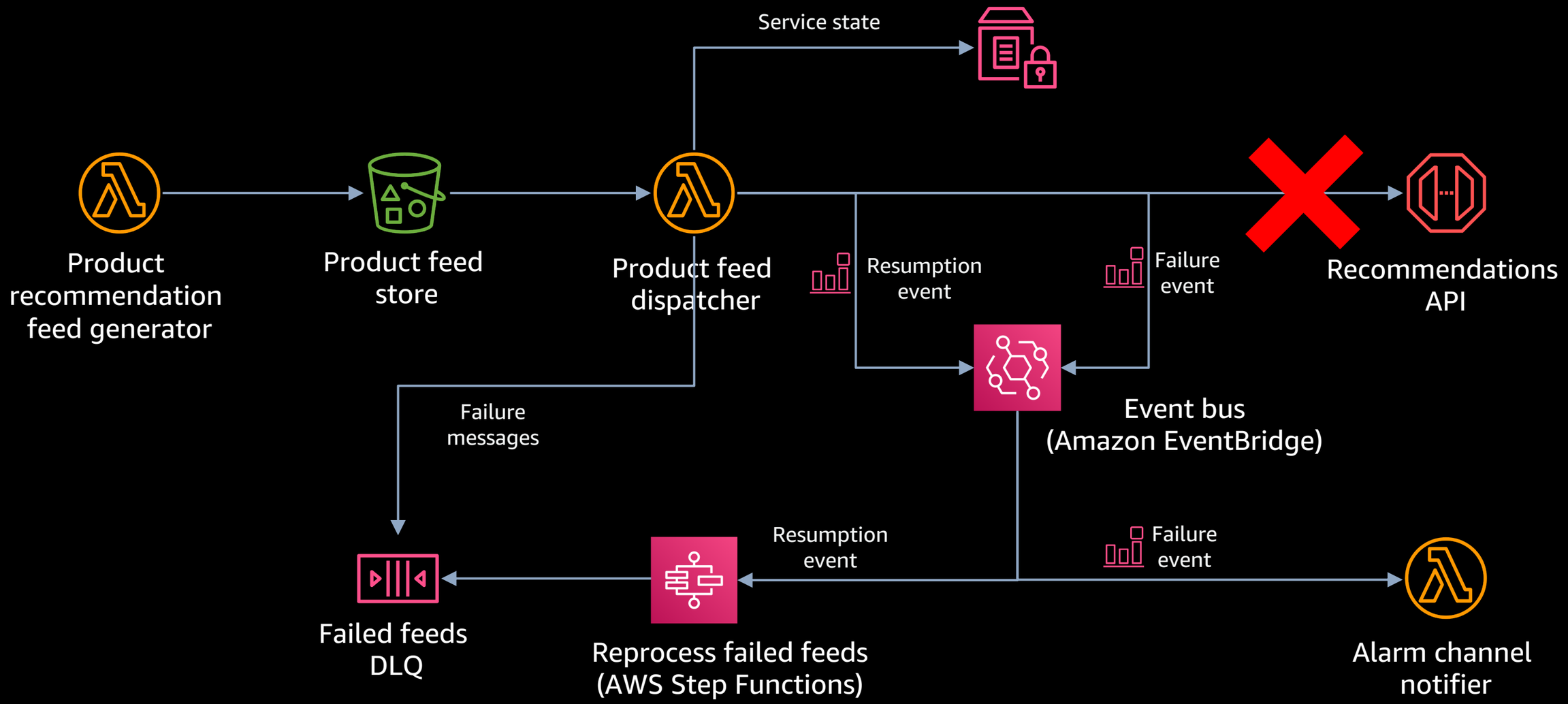
```
{
  "CreateFeedsForCountries": {
    "Type": "Map",
    "ItemsPath": "$.countryList",
    "MaxConcurrency": 5,
    "Iterator": {
      "StartAt": "CreateCountryFeed",
      "States": {
        "CreateCountryFeed": {
          "Type": "Task",
          "Resource": “feed-create",
          "End": true
        }
      }
    }
  }
}
```



Failure message replay with state machine

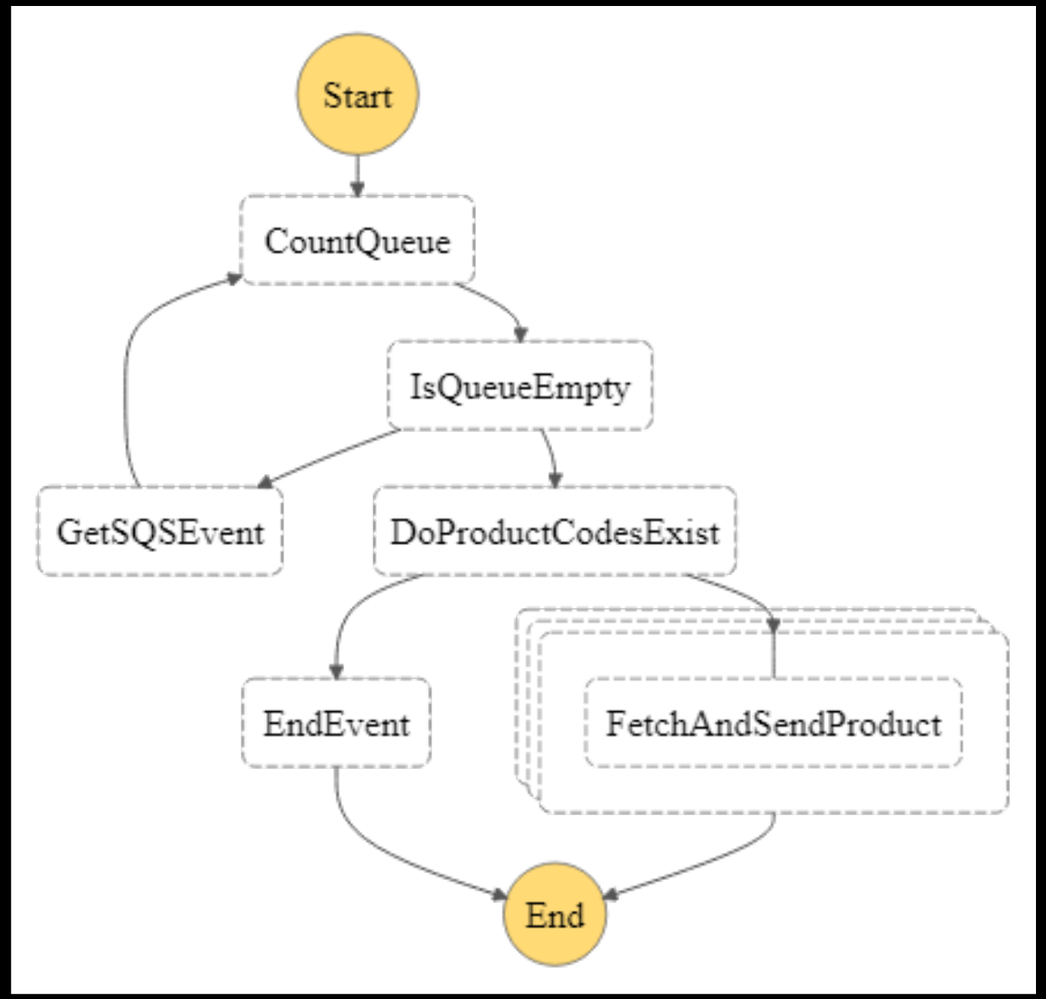


Failure message replay with state machine



Failure message replay with state machine

In a way, this is implementing the circuit breaker pattern using AWS Step Functions



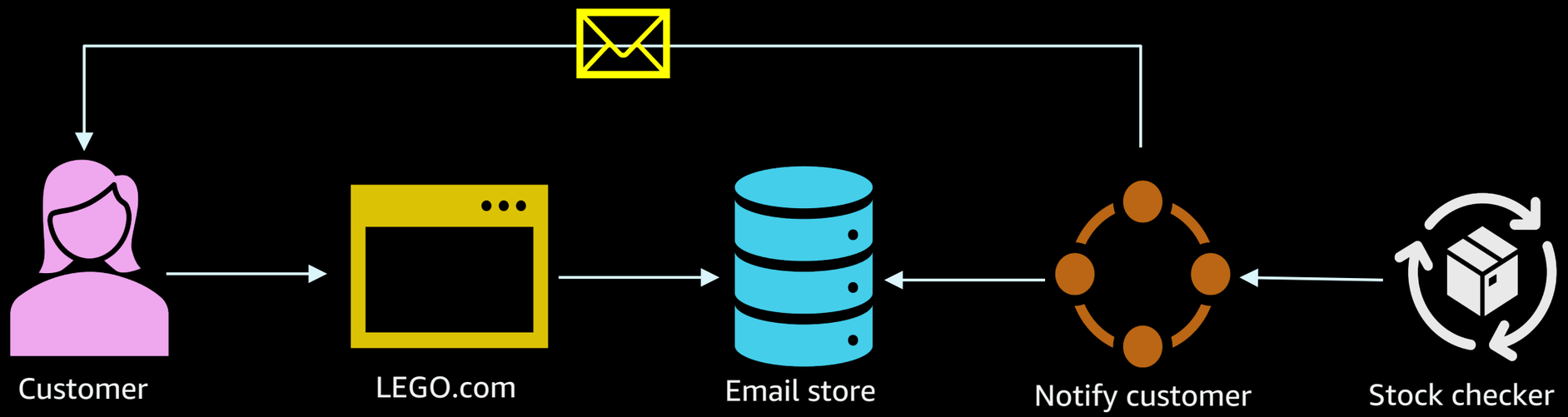
Accelerating with Amazon EventBridge



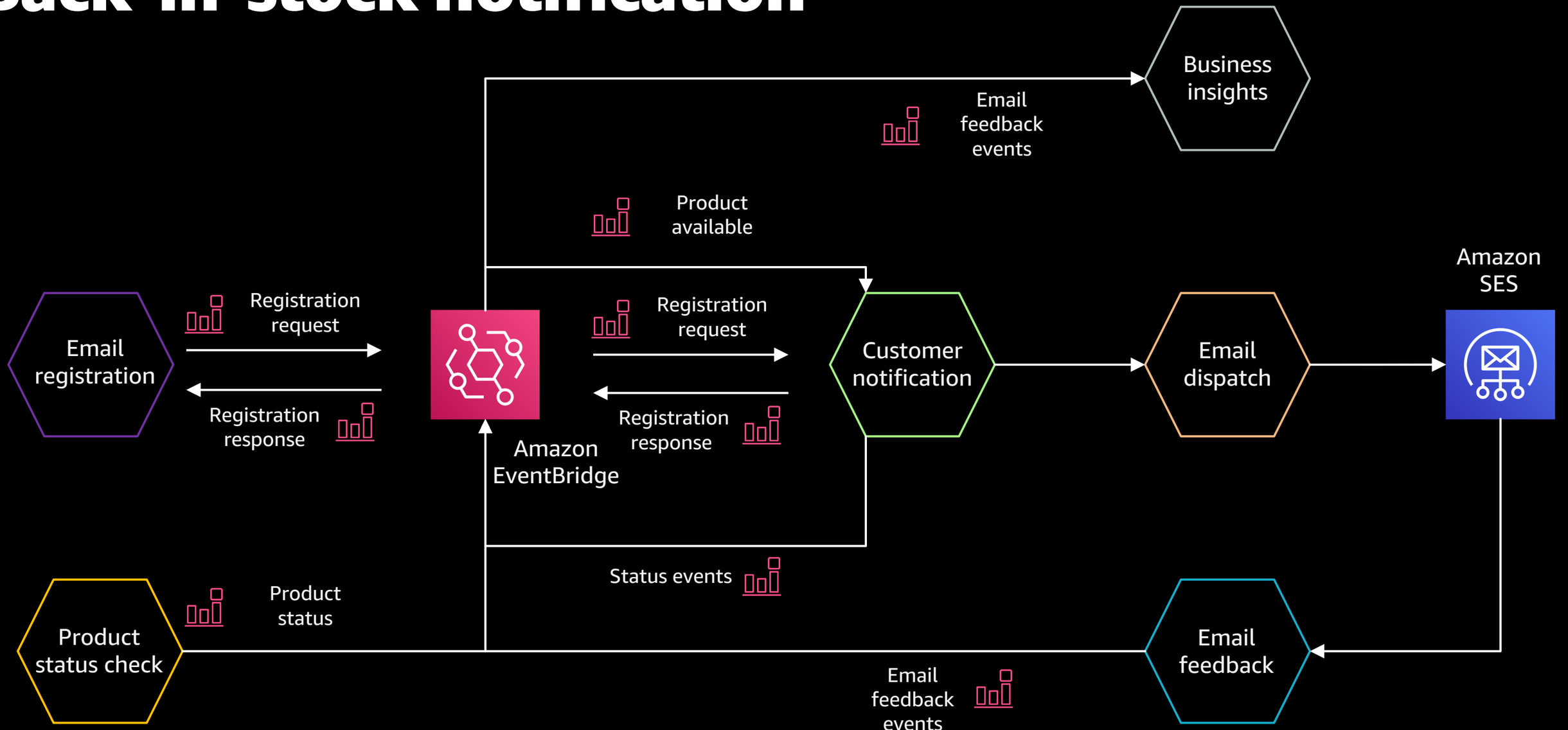
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Back-in-stock notification

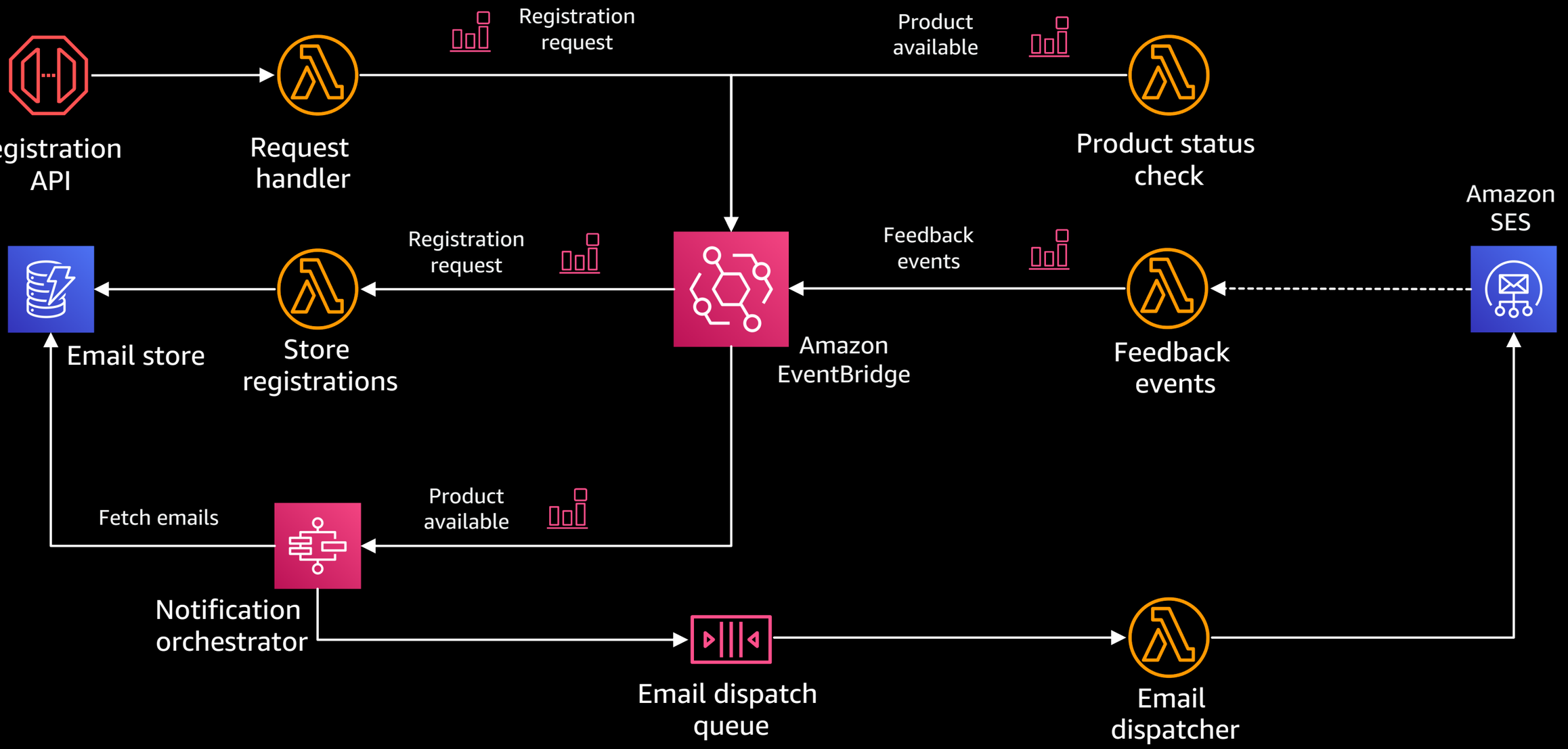


Back-in-stock notification

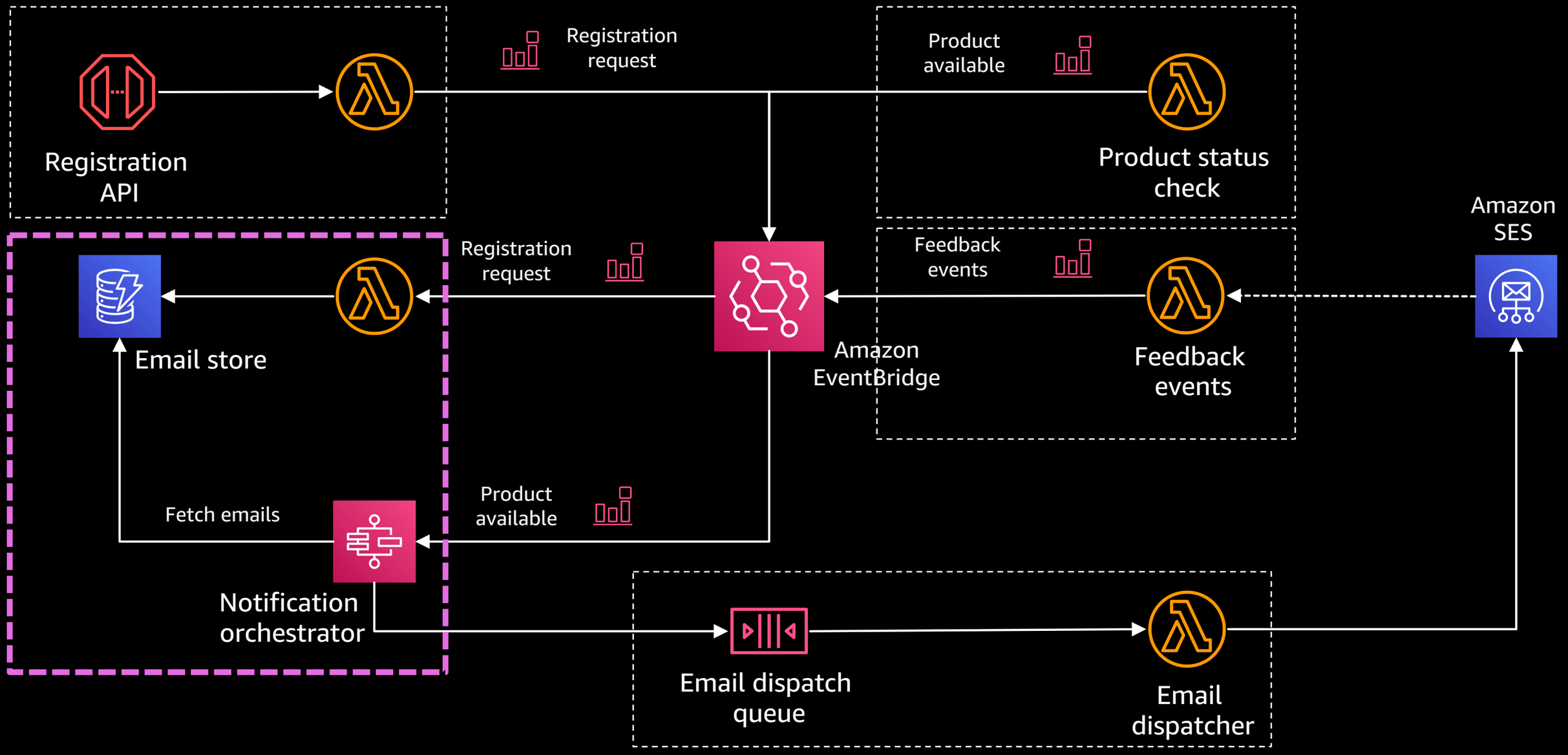


Choreographing back-in-stock notification

ADVANTAGES OF CHOREOGRAPHY VS. ORCHESTRATION



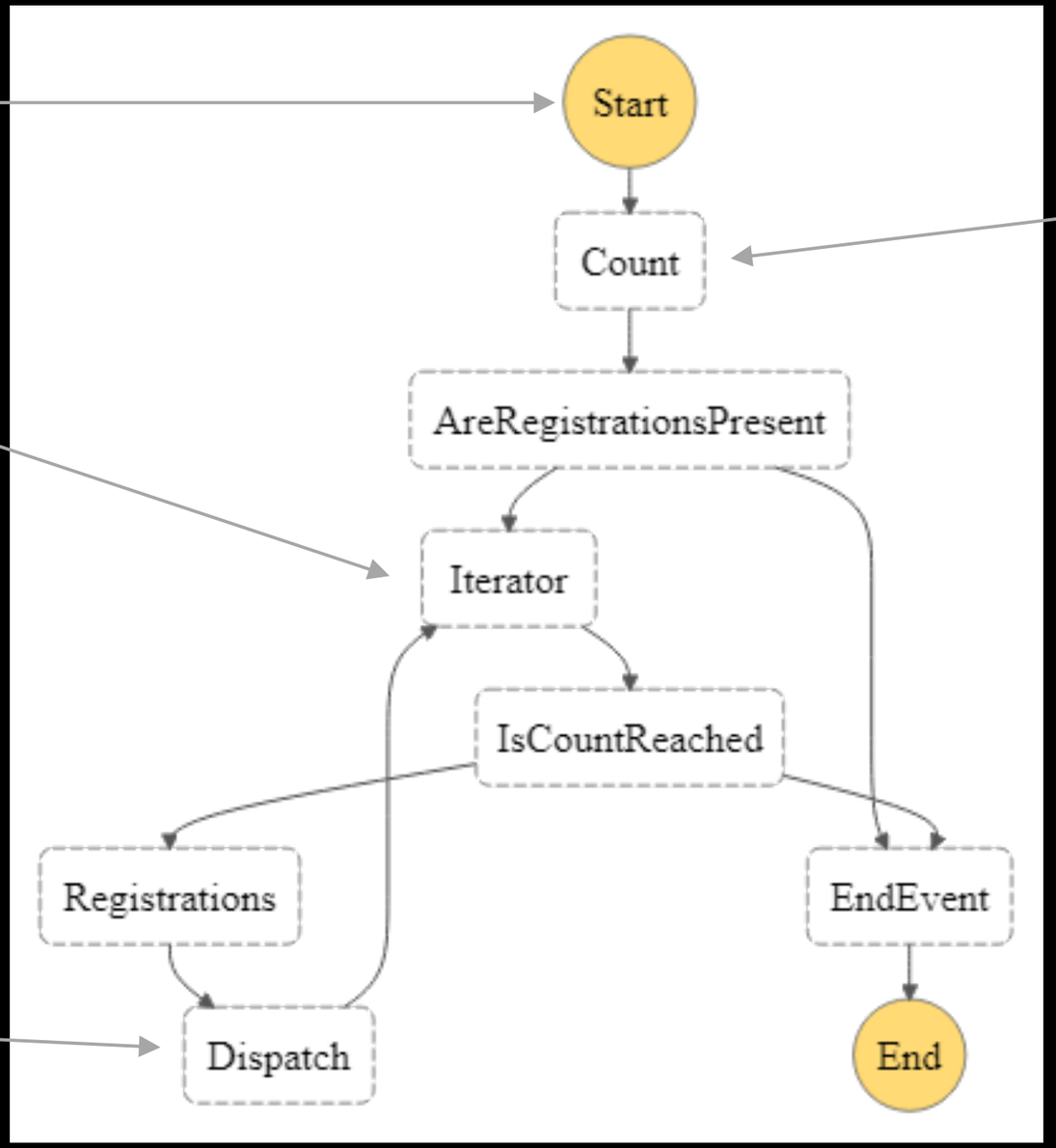
Choreographing back-in-stock notification



Orchestrating the notification process



Product available

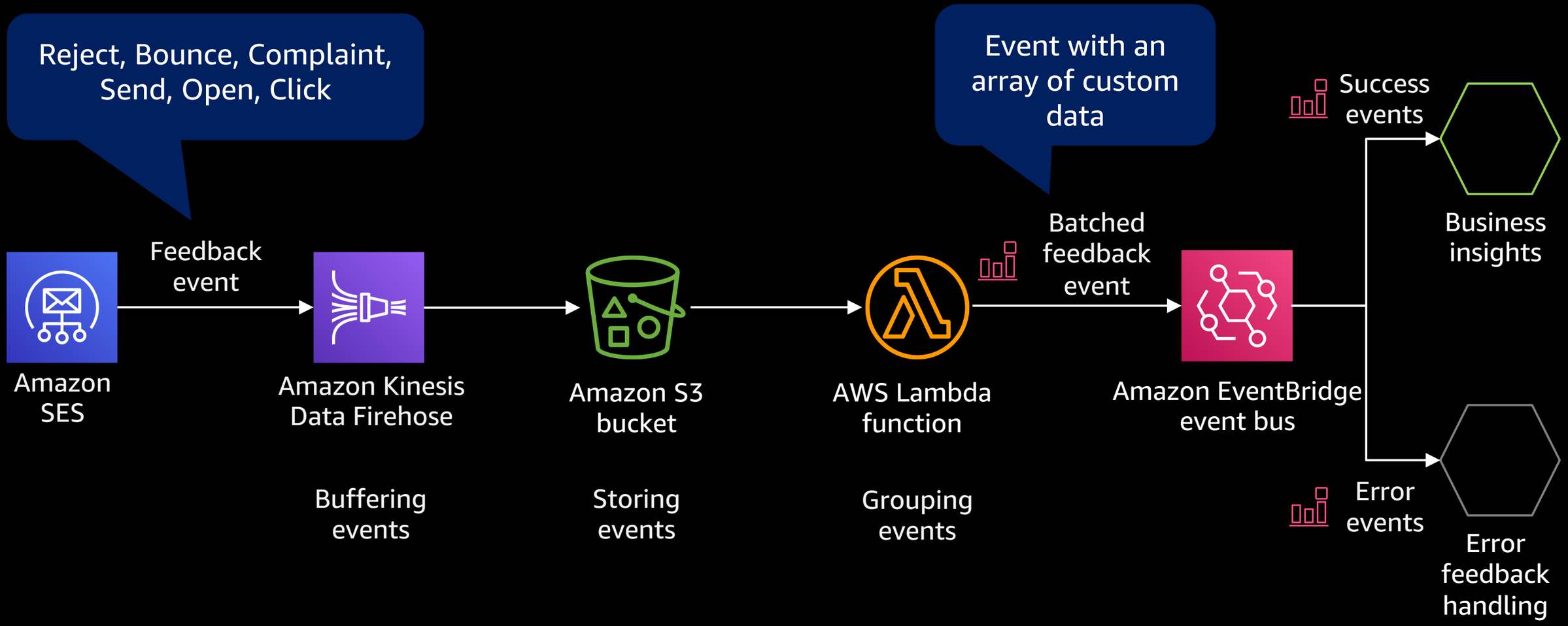


DynamoDB query

Loop

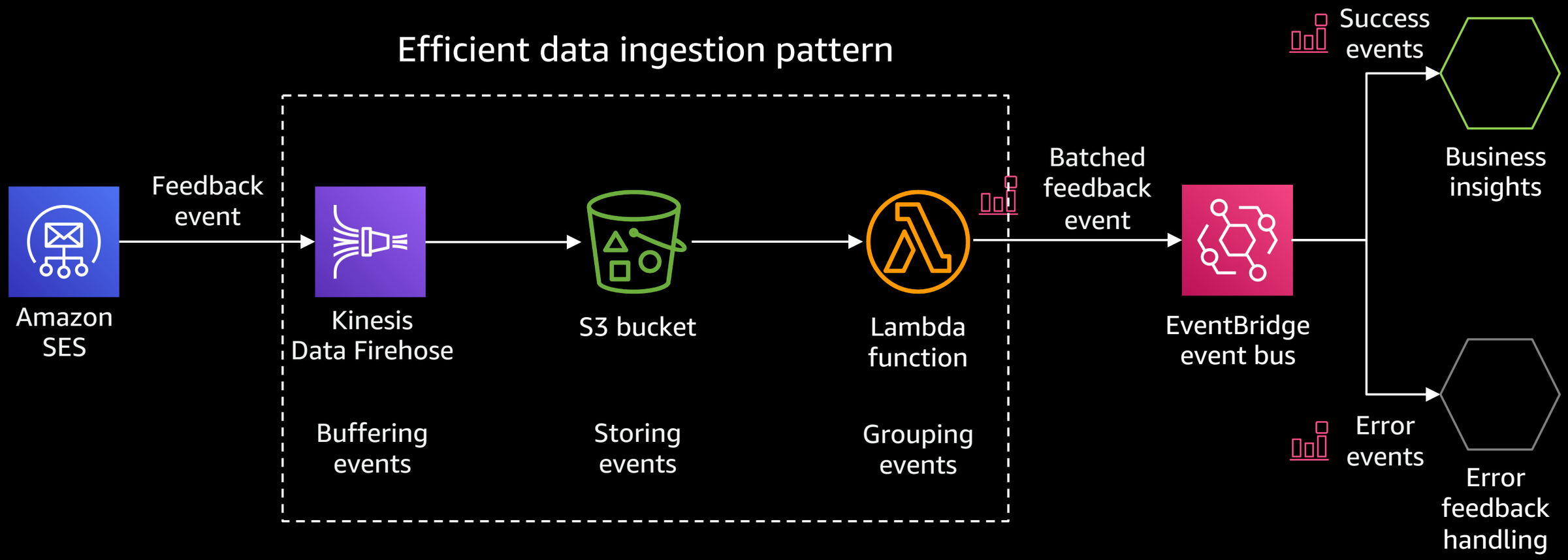
Send to SQS queue

Email feedback event stream with batching



A single EventBridge event contains multiple feedback events

Email feedback event stream with batching



Patterns help to accelerate your serverless adoption

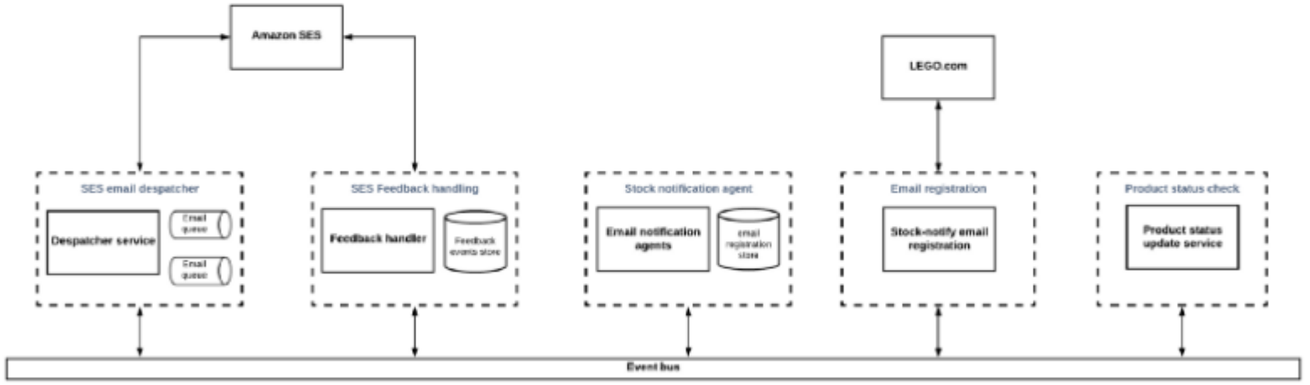


https://bit.ly/2FZ1b1a

Event-driven thinking

So far, I haven't discussed the interactions between the above services. Event-driven computing is at the core of serverless computing, more so with the *set-pieces* thinking and development.

The *Back-in-stock email notification* feature uses Amazon EventBridge as the event bus to enable event-driven computing.

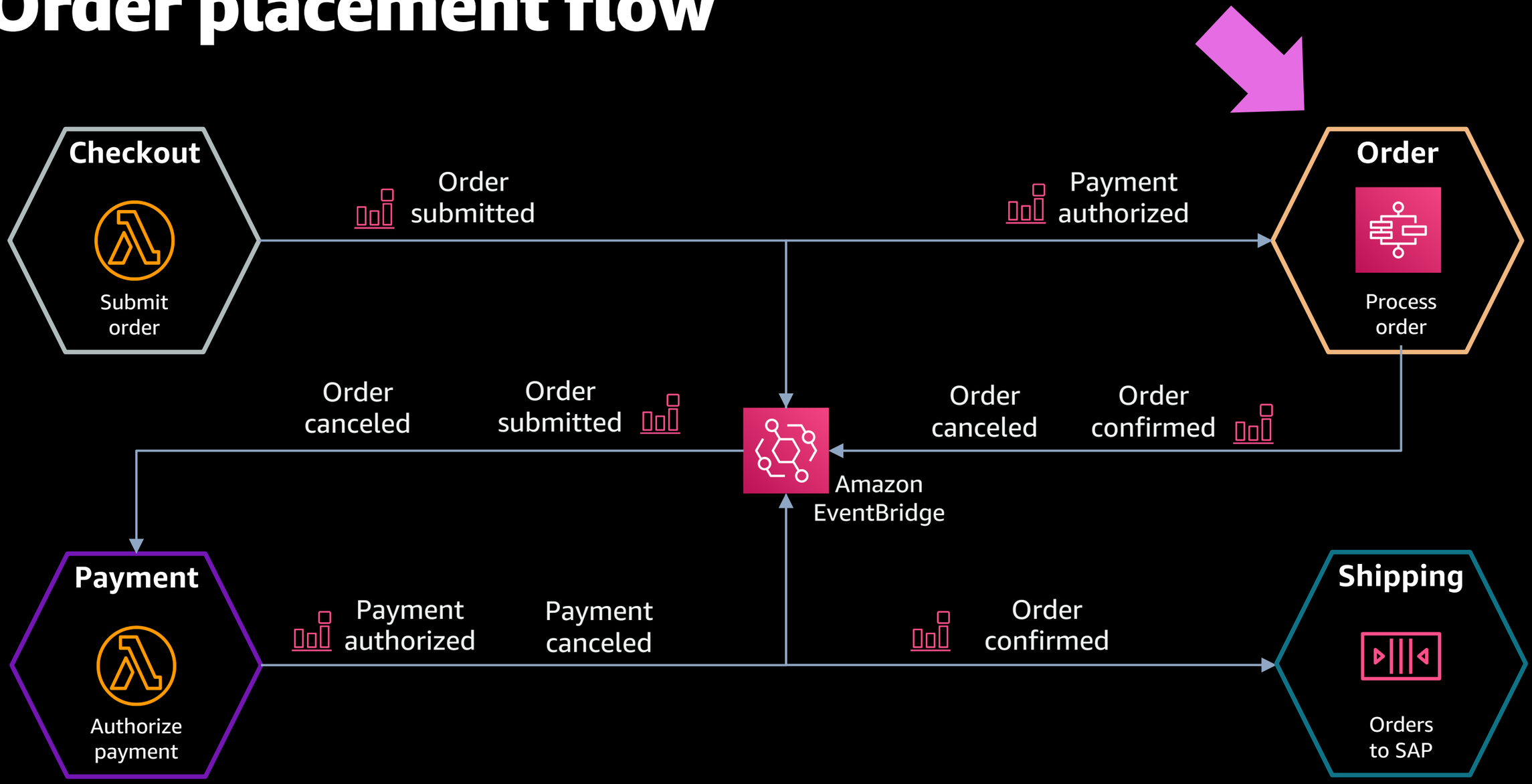


Even-driven view of Back-in-stock email notification feature

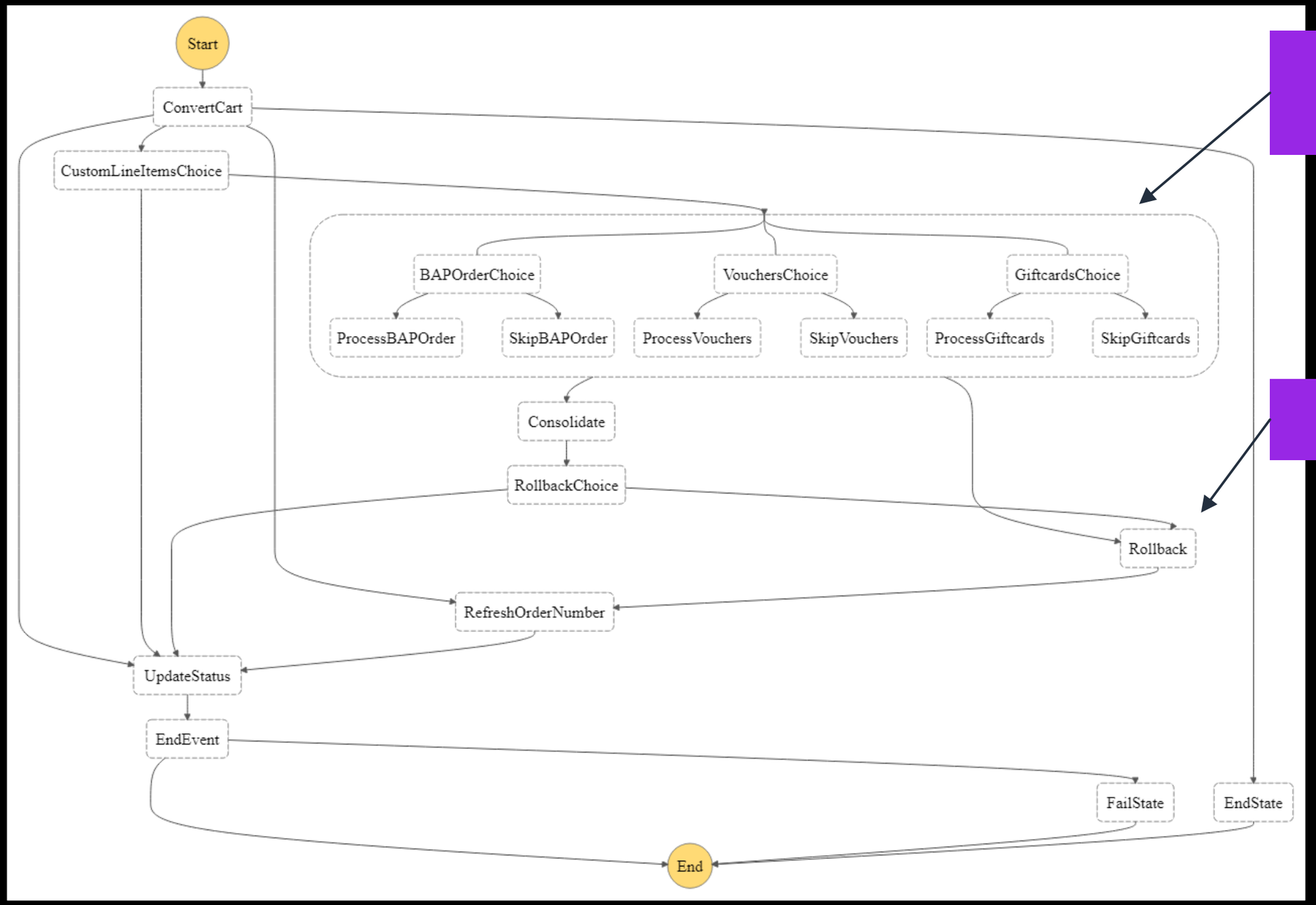
You might have noticed that the registration data store is shown as part of the *Stock notification agent*. I will explain the reason in the section below.

https://bit.ly/2FZ1b1a

Order placement flow



Orchestration inside order processing



Parallel state

Rollback

Choreography vs. orchestration

- Use choreography to coordinate different microservices
  - For example, with Amazon EventBridge
- Use orchestration inside microservices, or across different microservices if you need a distributed transaction
  - For example, using AWS Step Functions

Serverless team growth

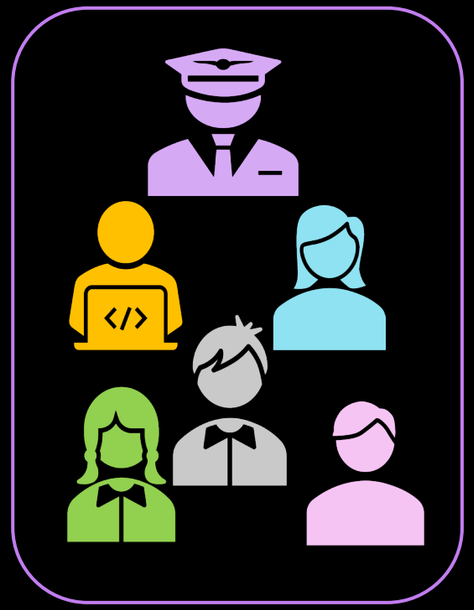


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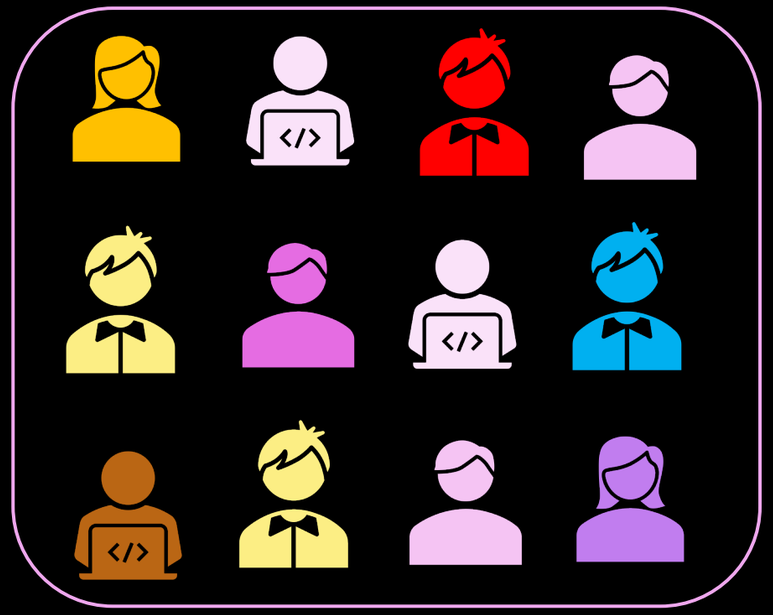
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Start of our serverless journey

- Small focus team
- Build skills and expertise
- Expand incrementally



Serverless team



Front-end team

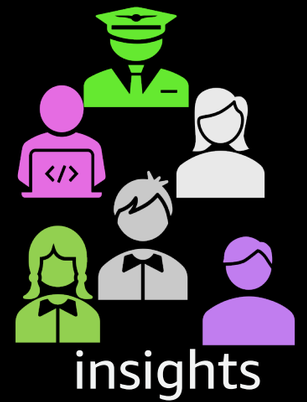
Feature-driven and full-stack squads

- Feature squads
- Full stack
- Distributed skills

















- Feature squads with growing serverless knowledge
- Engineers become architecture-aware
- Engineers are part of the DevOps process
- Adapting best practices, including Serverless Lens
- Service ownership – we build, we run!
- Sharing knowledge with the community

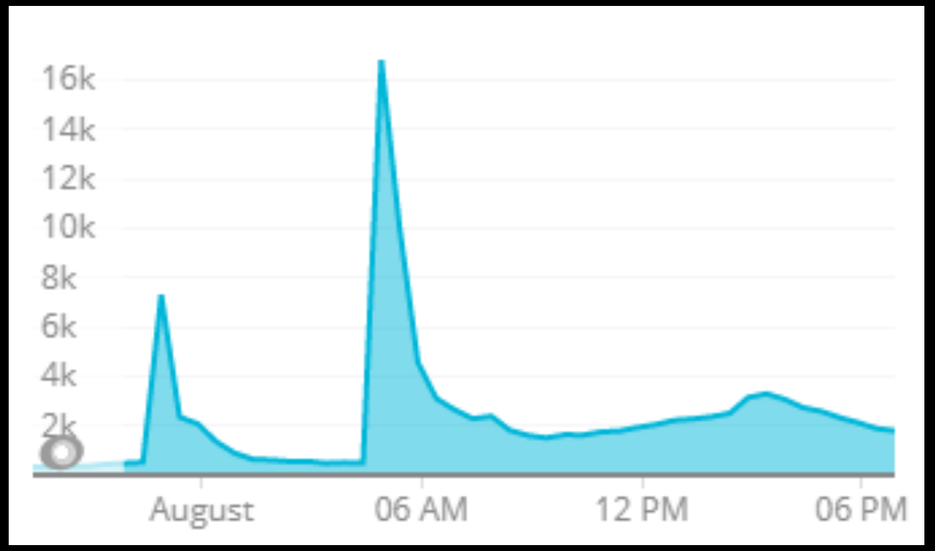
Business value acceleration

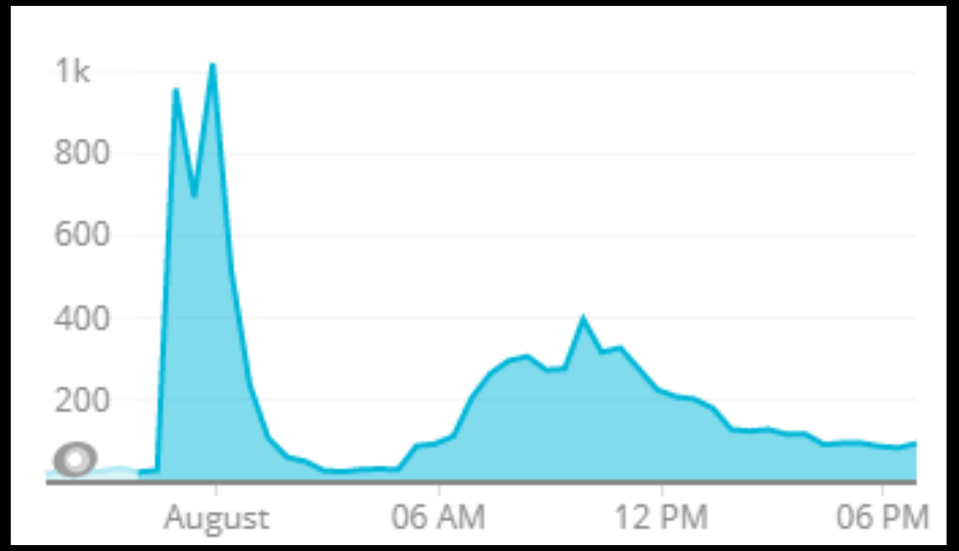


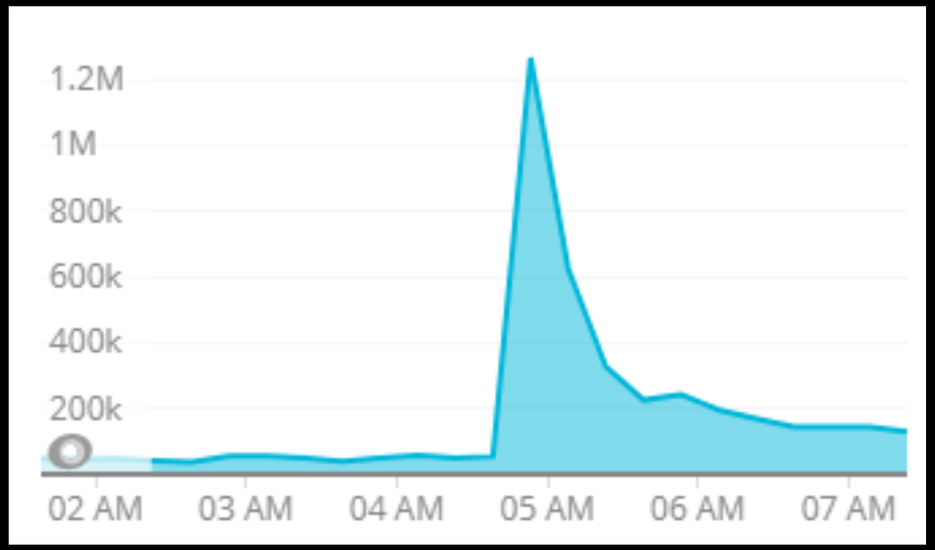
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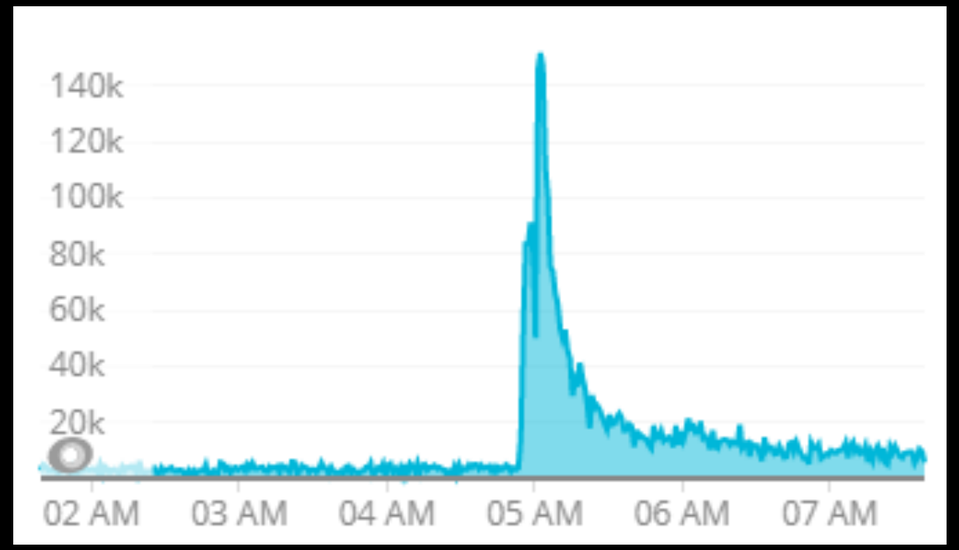
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Scalability gives business value too









Business value acceleration

- Faster feature development
- Stakeholder trust in delivering value
- Increased operational visibility
- Scalable, serverless platform that serves more customers

Thank you!

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