

AWS SUMMIT



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DEV101

Event-Driven Design on AWS: SQS, SNS, and EventBridge in Action

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Agenda

1. Why Event-Driven Architecture?
2. Overview of AWS Messaging Services
3. Design Patterns in Action
4. Reliability & Observability
5. Key Takeaways & Q&A

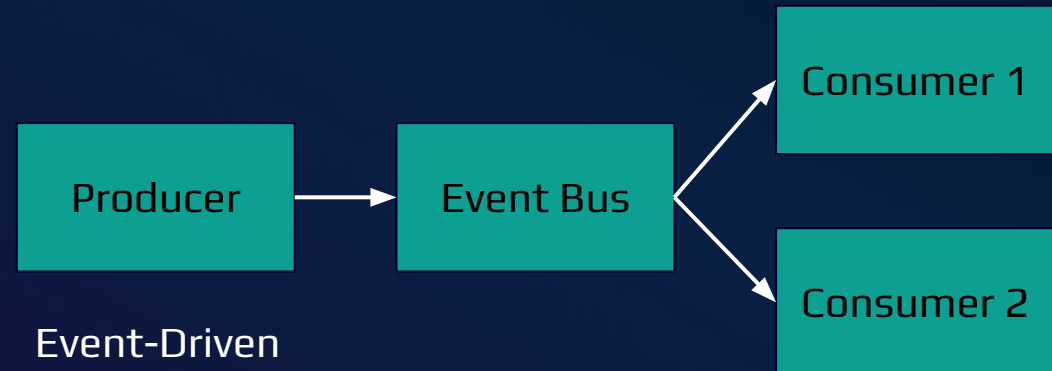
Why Event-Driven Architecture?

What is event-driven design?

- What is Event-Driven Architecture (EDA)?
 - Systems that react to events — changes in state, user actions, system signals
- Perfect Fit for Serverless
 - Functions run on-demand, triggered by events
- Key Benefits
 - Loose coupling between components
 - Built-in scalability & responsiveness
 - Resilience with retry and failover strategies








Tightly Coupled



Event-Driven

Overview of AWS Messaging Services

Core AWS Messaging Services

Service	Type	Delivery Model	Target Types	Ordering	Retry/DLO
SQS	Message Queue	Pull	Lambda, EC2, container apps	FIFO opt	
SNS	Pub/Sub Topic	Push	Lambda, SQS, HTTP endpoints		 *
EventBridge	Event Bus	Push	Lambda, Step Functions, etc.		

*SNS supports DLOs via subscription-based error handling (e.g., failed Lambda).



When to Use What

- Rule of Thumb:
 - Choose **SQS** for durability and retries
 - Choose **SNS** for quick broadcast
 - Choose **EventBridge** when you need smart routing, filtering, and service orchestration

Cheat Sheet

Scenario	Recommended Service	Why
You need to buffer and retry jobs	SQS	Pull model with retry & DLQ support
You need to notify multiple systems	SNS	Built-in fan-out to multiple subscribers
You want routing by event pattern	EventBridge	Flexible rules and rich filtering
You want strict ordering	SQS (FIFO)	FIFO queues preserve order
You want to integrate SaaS apps	EventBridge	Supports SaaS partners & custom buses
You want quick and simple fan-out	SNS	Lightweight and easy to integrate

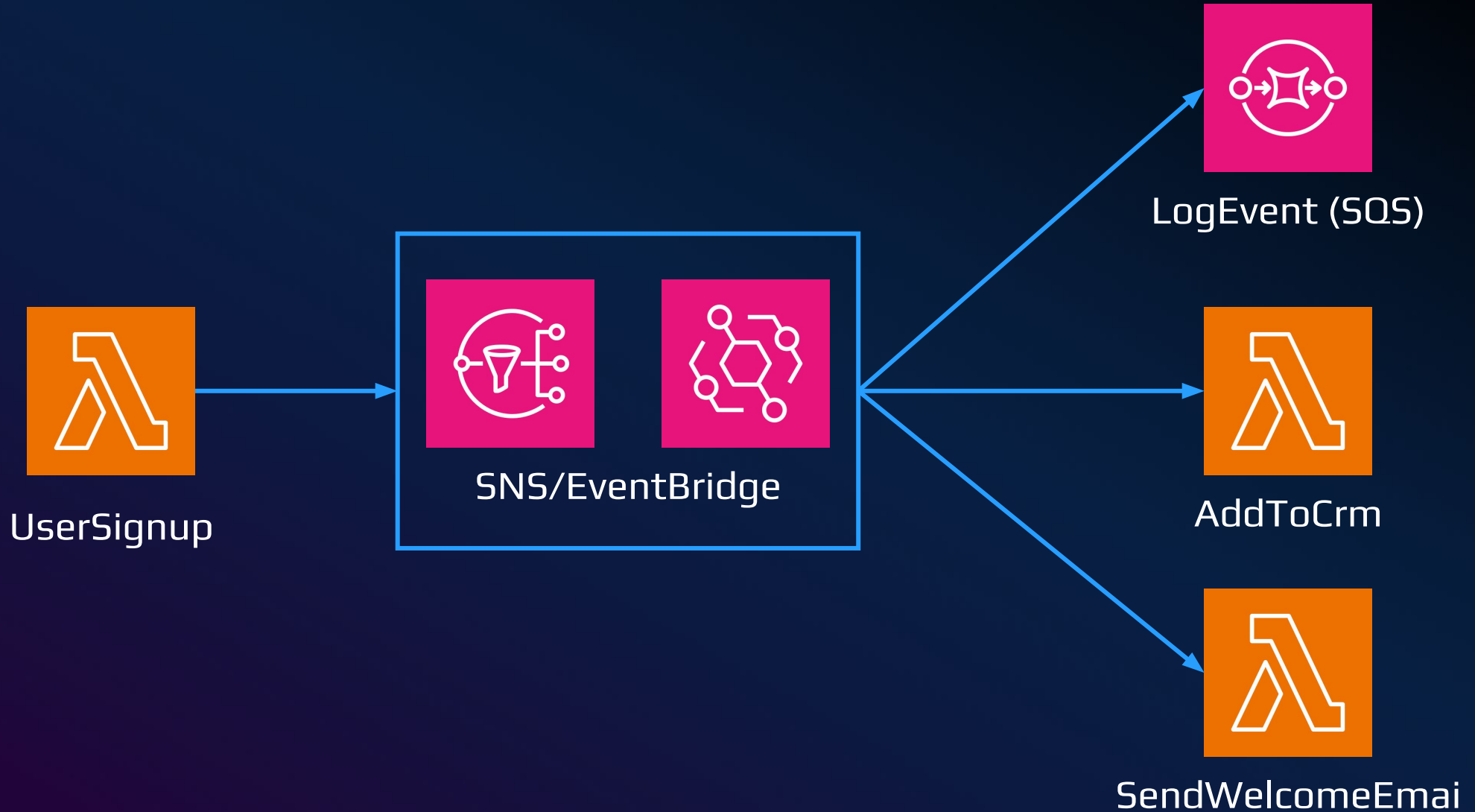
Design Patterns in Action

Anatomy of an Event

- Core Event Structure:
 - source
 - detail-type
 - detail
- Native Events:
 - Automatically formatted by AWS services
 - Useful for reacting to lifecycle changes or status updates
- Custom Events:
 - Defined by your applications or microservices
 - Use logical domains in source and consistent naming for detail-type

```
{  
  "source": "app.orders",  
  "detail-type": "OrderPlaced",  
  "detail": {  
    "orderId": "12345",  
    "customerId": "789",  
    "total": 89.99  
    "vipCustomer": true  
  },  
  "eventTime": "2025-05-24T14:00:00Z",  
  "region": "us-east-1"  
}
```

Pattern: Fan-Out Messaging

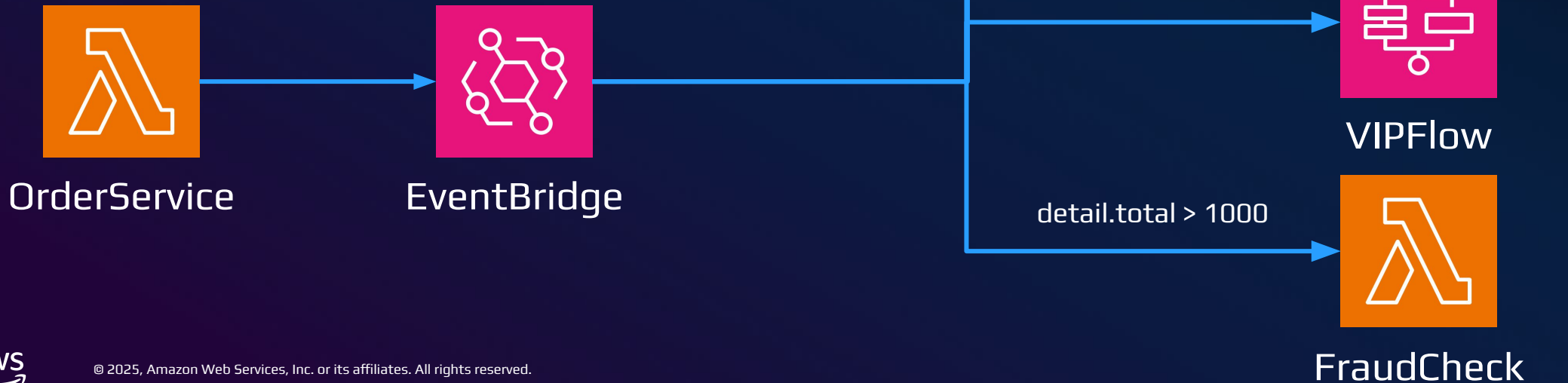


Pattern: Queued Background Processing



Pattern: Smart Event Routing with EventBridge

```
{
  "source": "app.orders",
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  "detail": {
    "orderId": "12345",
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    "vipCustomer": true
  },
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  "region": "us-east-1"
}
```



Reliability & Observability

Reliability & Failure Handling

- Automatic Retries
 - Built-in for Lambda, SQS, SNS, EventBridge
- Dead-Letter Queues (DLQs)
 - Capture failed messages for analysis
- Idempotency
 - Prevent duplicate processing on retries
- Lambda Error Destinations
 - Send failed async events to SQS, SNS, or Lambda

Observability in Event-Driven Architectures

- CloudWatch Logs & Metrics
 - Track Lambda invocations, errors, and SQS queue depth
- AWS X-Ray
 - End-to-end tracing across services and async calls
- CloudWatch Alarms
 - Trigger alerts on failures, latency, or DLQ spikes
- EventBridge Replay
 - Reprocess archived events for debugging or onboarding

Key Takeaways

Key Takeaways

- Know your tools
- Design for failures
- Think in events, not function calls

Modern cloud apps aren't built line-by-line; they're built event-by-event.

Thank you!

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