aws INNOVATE

MODERN APPLICATIONS EDITION

27&28 October 2021

AWS Innovate

Modern Applications

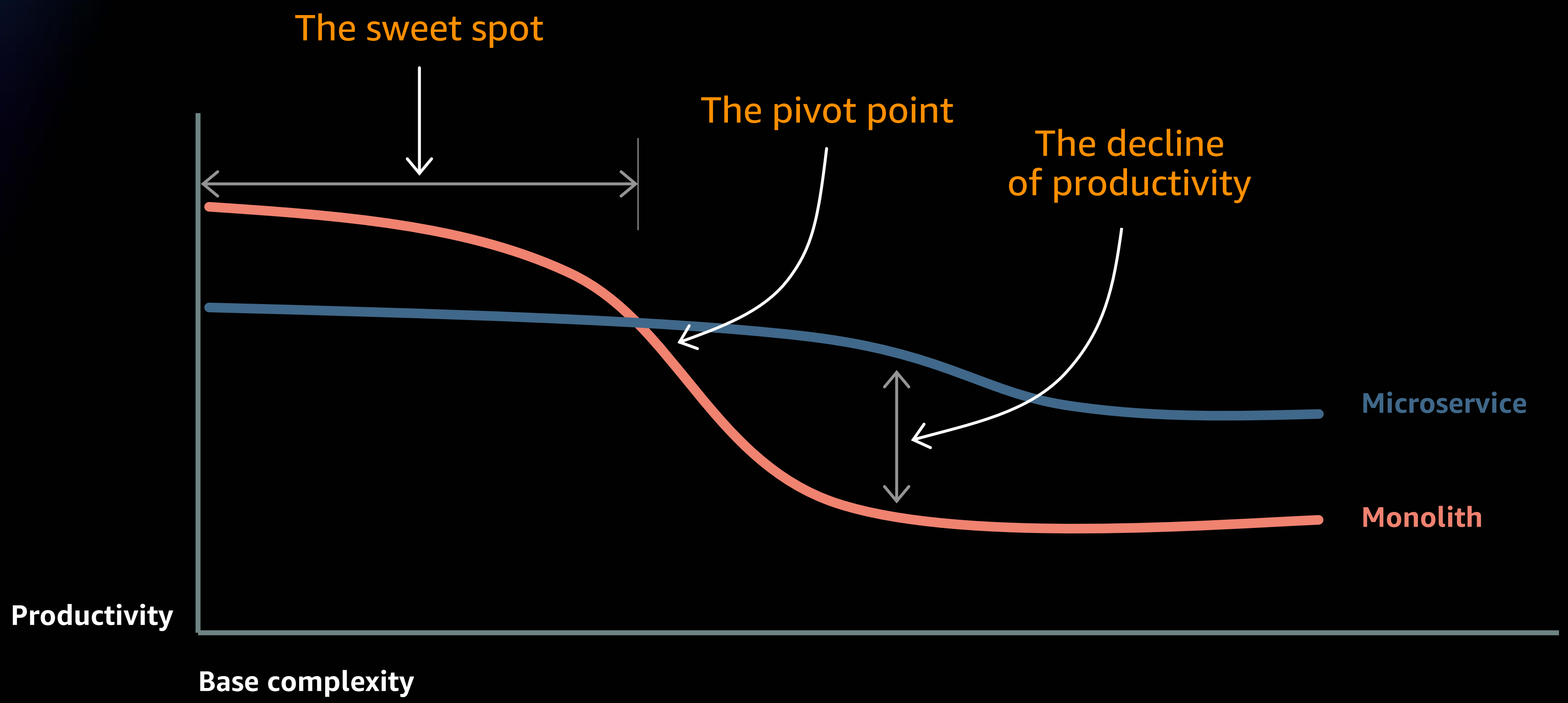
AGENDA AT A GLANCE - (DAY 1: CORE CONCEPTS & FUNDAMENTALS)

60 mins	**Opening Keynote: Accelerate modern applications: Unlock new business opportunities with rapid innovation**					
	Accelerate modern applications	Move and modernize your applications	Design and build new modern applications	Transform to a Dev+Ops model & innovate with modern apps	Modernize your applications	Experiential showcase
30 mins	The transformative power of modern applications LEVEL 100	Move containerized applications to AWS LEVEL 200	Evolving monolith to microservices — architecture patterns, software delivery & operational models LEVEL 200	Modern applications need modern operations LEVEL 200	Save costs by migrating and modernizing SQL Server workloads LEVEL 200	• Ask the Experts • Hands-on labs / Digital training • Resource center • Customer stories
30 mins	Modernization with containers and serverless technologies LEVEL 200	Build, run, and manage containerized application on AWS Fargate LEVEL 300	Modern applications design patterns: Implementing microservice architectures LEVEL 200	Architecting Kubernetes for seamless deployments and upgrades with Amazon EKS LEVEL 300	Rapidly modernize your Microsoft .NET applications on AWS LEVEL 300	
30 mins	Building a smarter, faster business with modern applications LEVEL 100	Developing container apps to building release pipeline with AWS Copilot LEVEL 300	Getting started with serverless applications LEVEL 200	Selecting the right container logging solution for your application LEVEL 200	Accelerate your journey to SAP S/4HANA on AWS LEVEL 200	
30 mins	Amazon's approach to running service-oriented organizations LEVEL 200	Breaking down the monoliths with containers LEVEL 200	Building scalable, serverless event-driven architectures LEVEL 200	Increase availability with AWS observability solutions LEVEL 200	Application containerization patterns with VMware Cloud on AWS LEVEL 200	
30 mins	Effective security for modern applications LEVEL 200	AWS App Runner: Deploy and run your web applications in minutes LEVEL 200	Building CI/CD workflows for serverless applications LEVEL 200	Embracing chaos for improved resilience with AWS Fault Injection Simulator LEVEL 200	Architecting for high availability and disaster recovery on AWS Outposts LEVEL 200	
30 mins	Build modern applications with purpose-built databases LEVEL 200	Scale and operate microservices with AWS Proton LEVEL 200	Machine Learning Inference with AWS Lambda and Amazon EFS LEVEL 200	Persistent storage on containers using Amazon EFS LEVEL 200	Cost optimization on AWS journey - from MVP to production-scale workload LEVEL 100	
45 mins	**Closing**					

Moving a legacy application from monolith to microservices is not a straight forward, overnight task - it can be complex. What are some of the strategies to slowly get there?

Constant live rollouts sound daring, how can we make sure to build resilient services? Any best practices?

Monolith vs. microservice



Source: https://martinfowler.com/bliki/MicroservicePremium.html

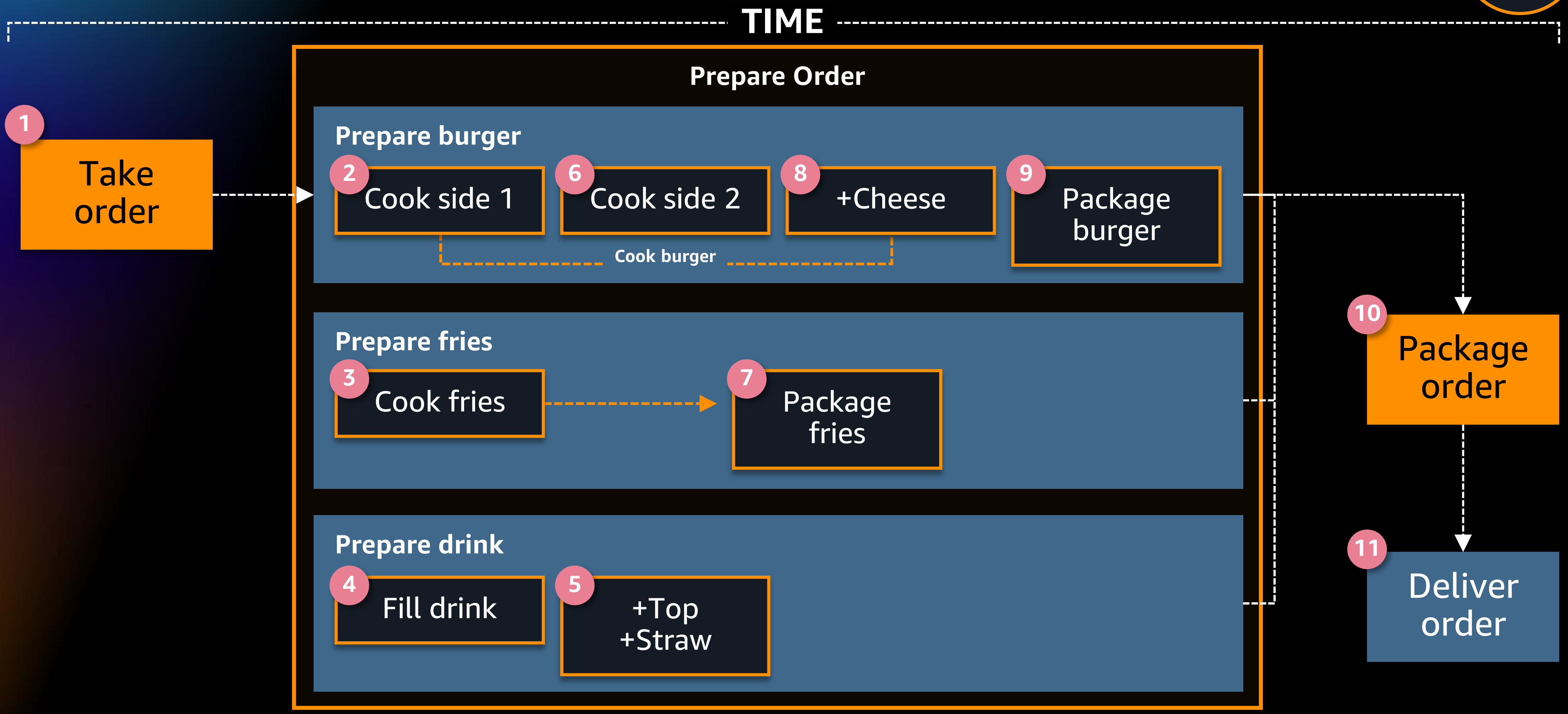
Patterns for decomposition

Event decoupling

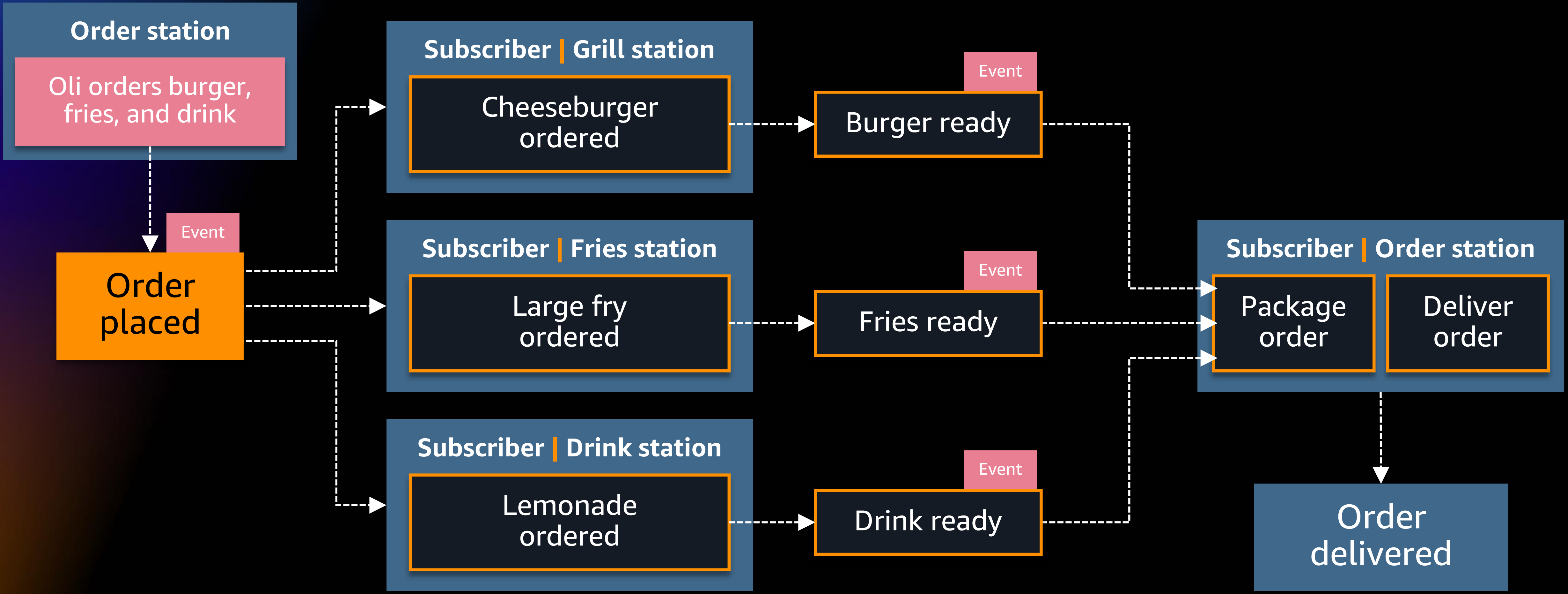
Strangler pattern

Domain-driven design

Events as decouplers

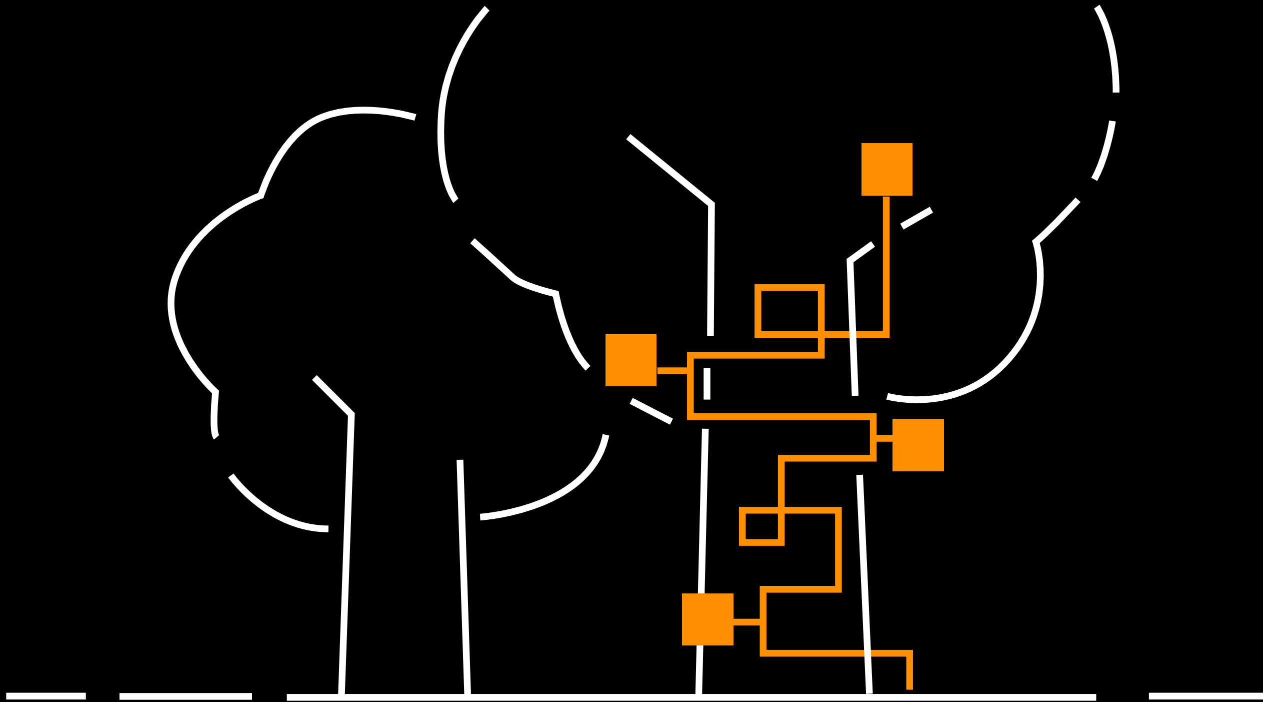


Events as decouplers



The strangler pattern

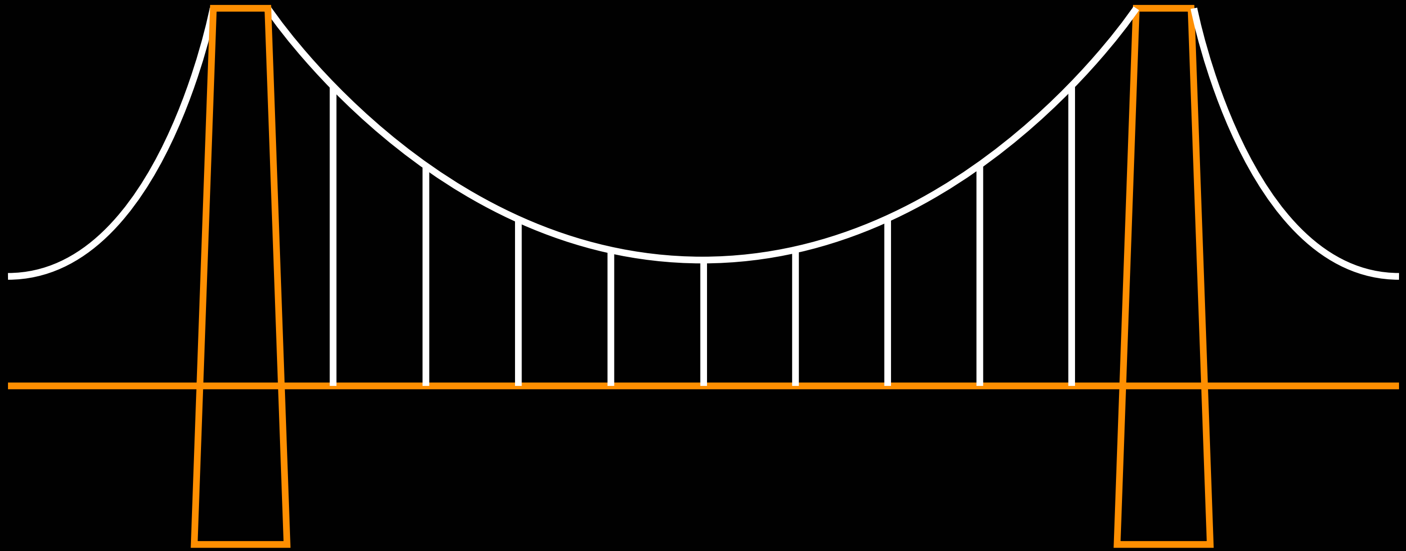
Moving **monolithic** applications to **microservices** by gradually creating events and **APIs** for various components on of the legacy application



https://martinfowler.com/bliki/StranglerFigApplication.html

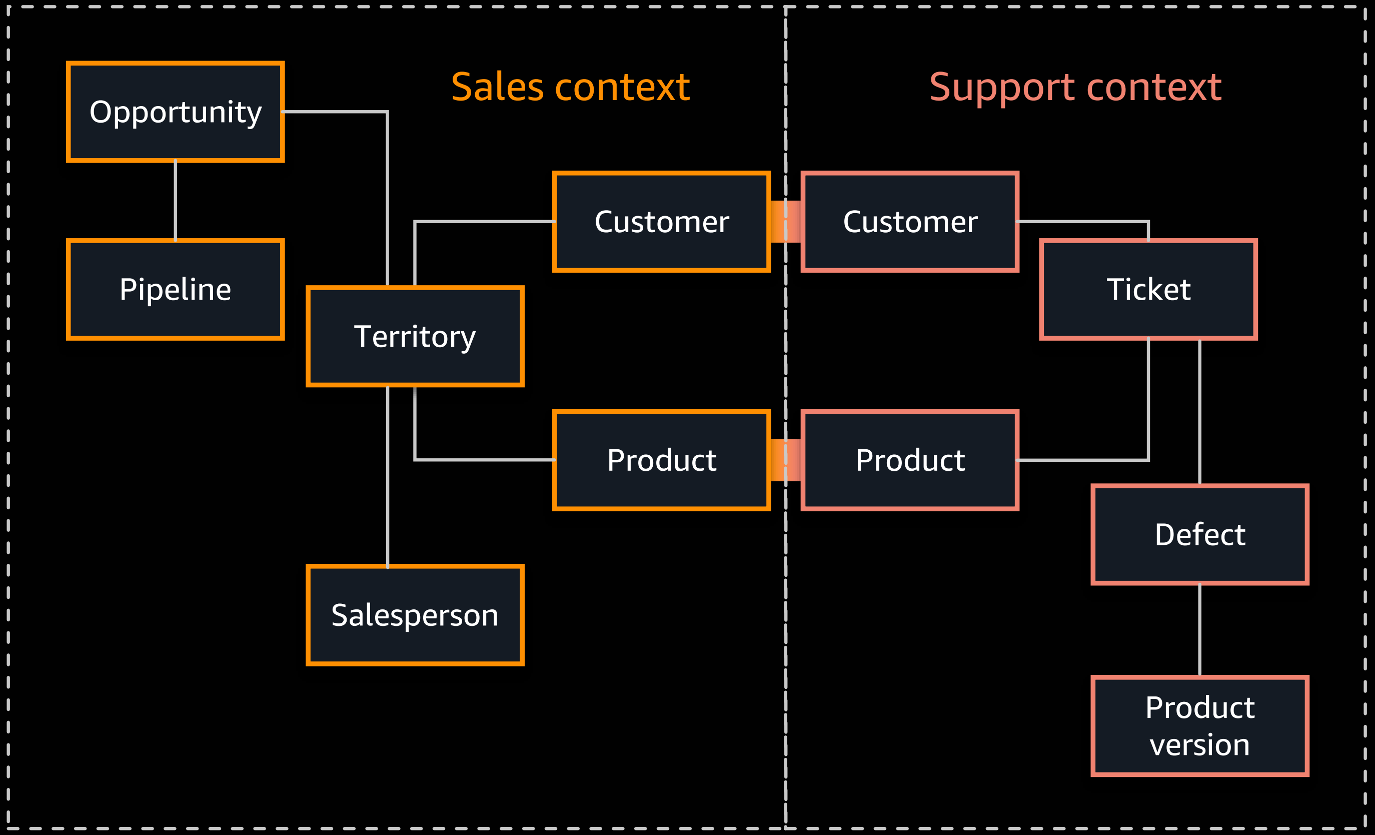
Domain-driven design

Domain-driven design (DDD) takes core business concepts and applies a framework to break down software systems and align them more closely to the business.

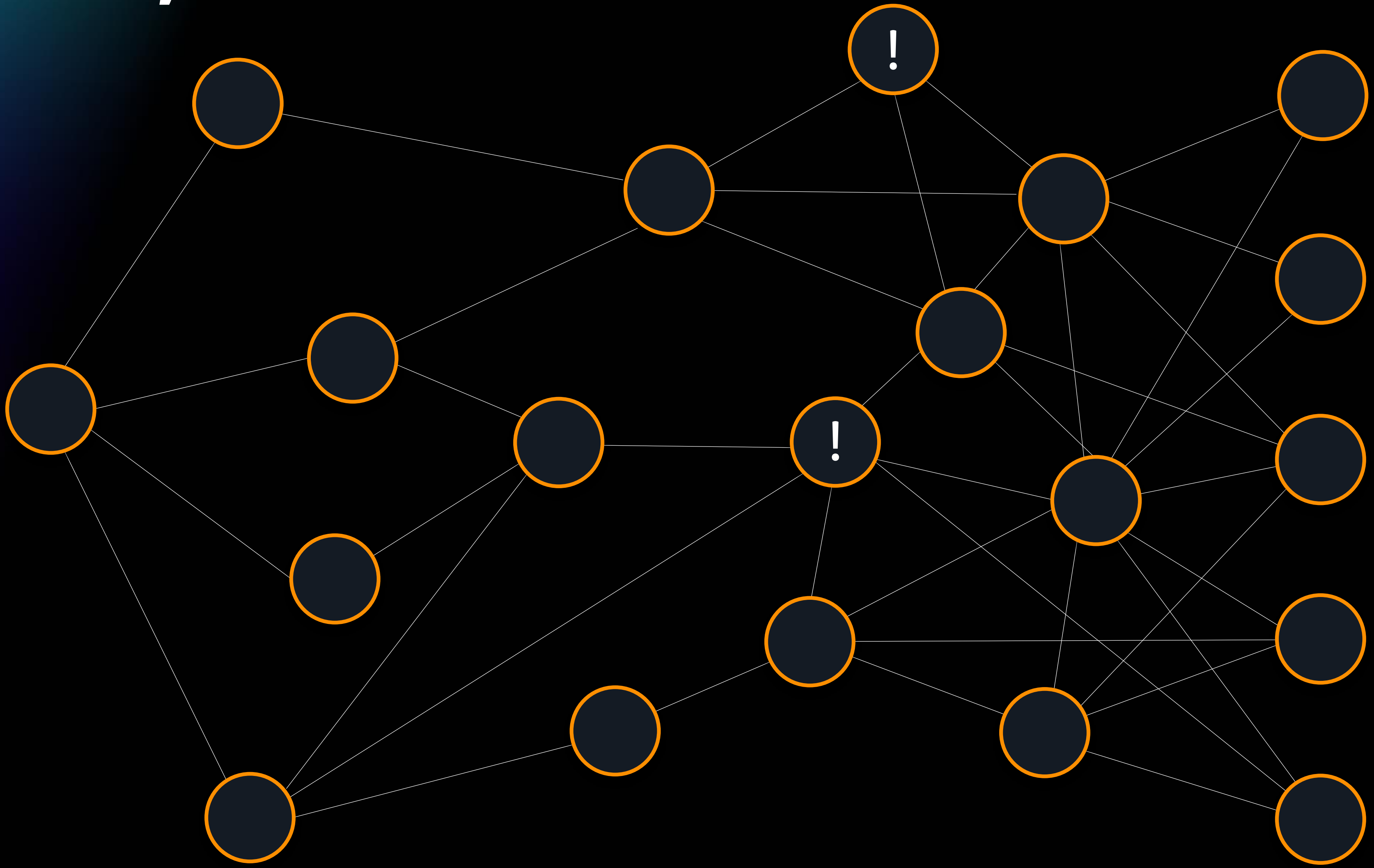


Domain-driven design

Bounded contexts are used to simplify complex models and teams. Multiple bounded contexts results in smaller, easier to manage components.



Build it in, don't bolt it on



Build for failure

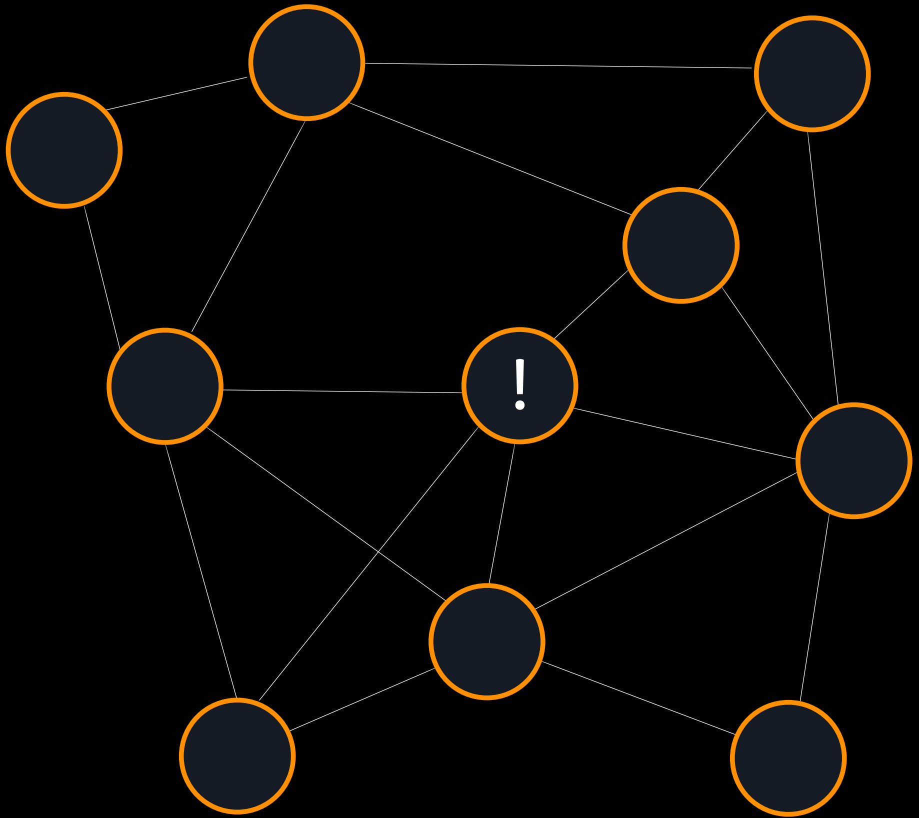
Circuit breaker

Service mesh

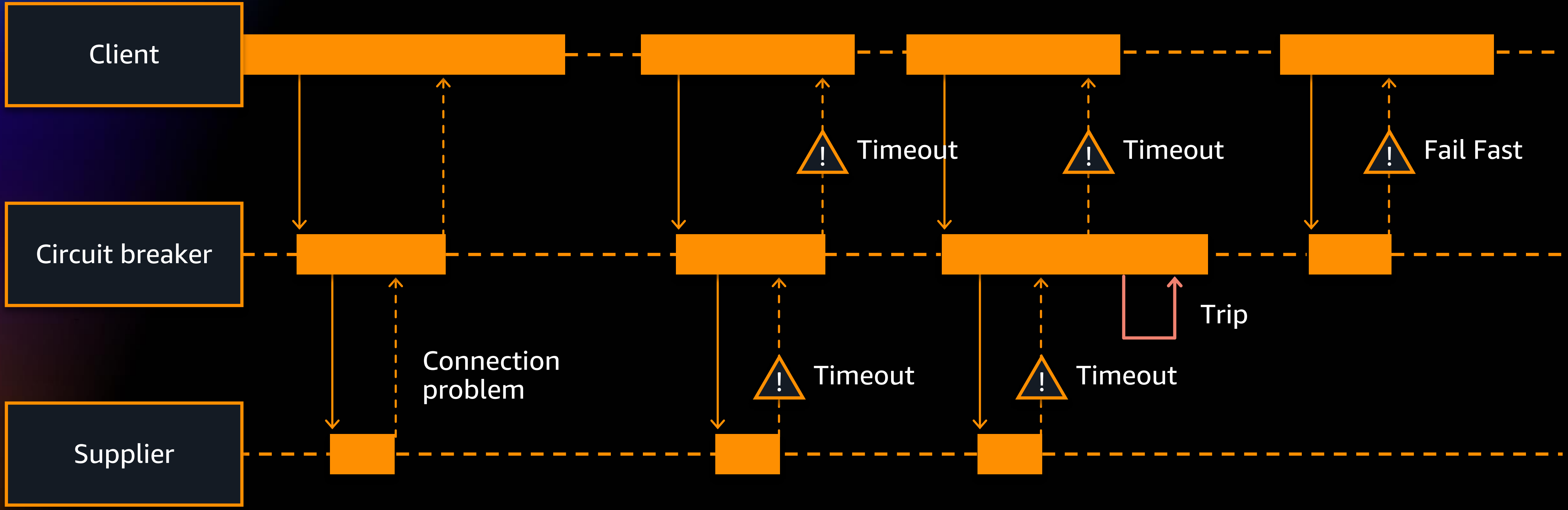
If it's going to fail, fail fast and in control!

Consider

- ? How we respond to failures in these remote systems
- ? How we manage downstream dependencies to keep systems performant and latency to a minimum



Circuit breaker pattern

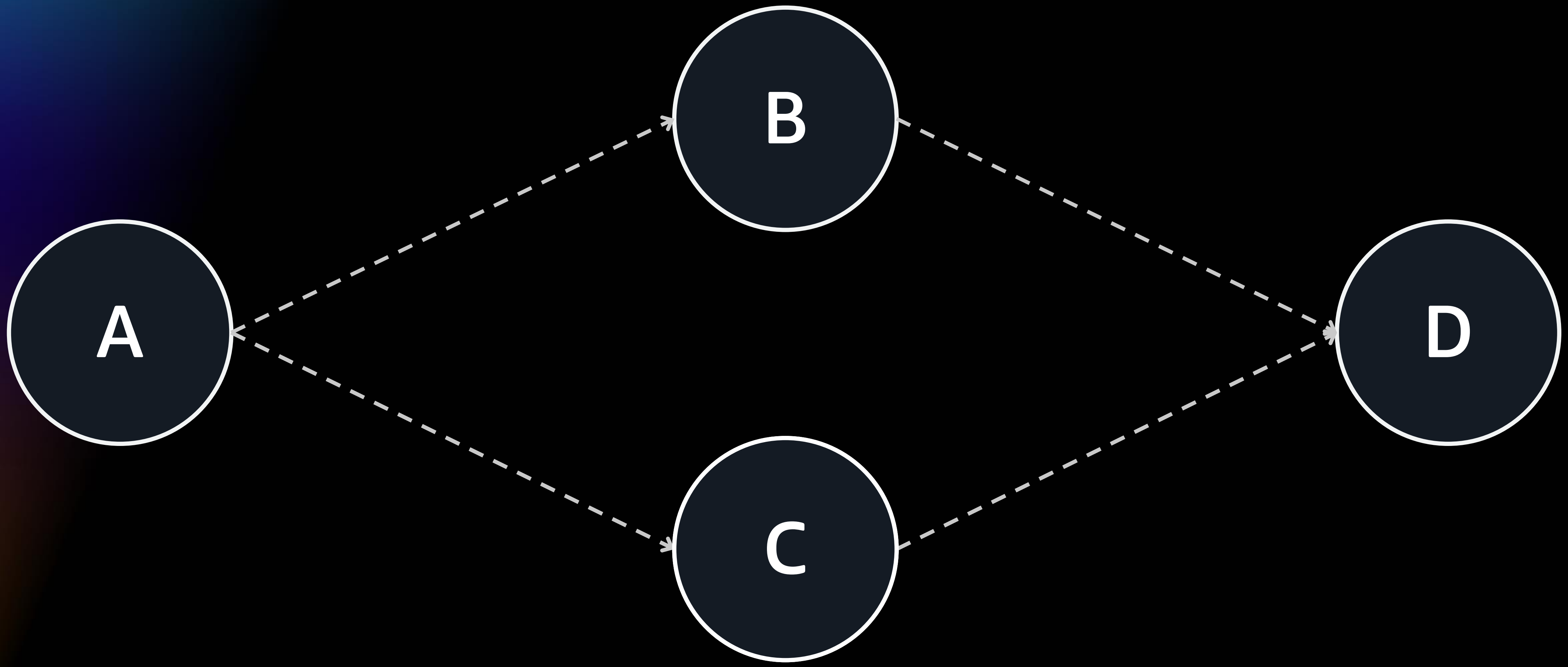


Build for failure

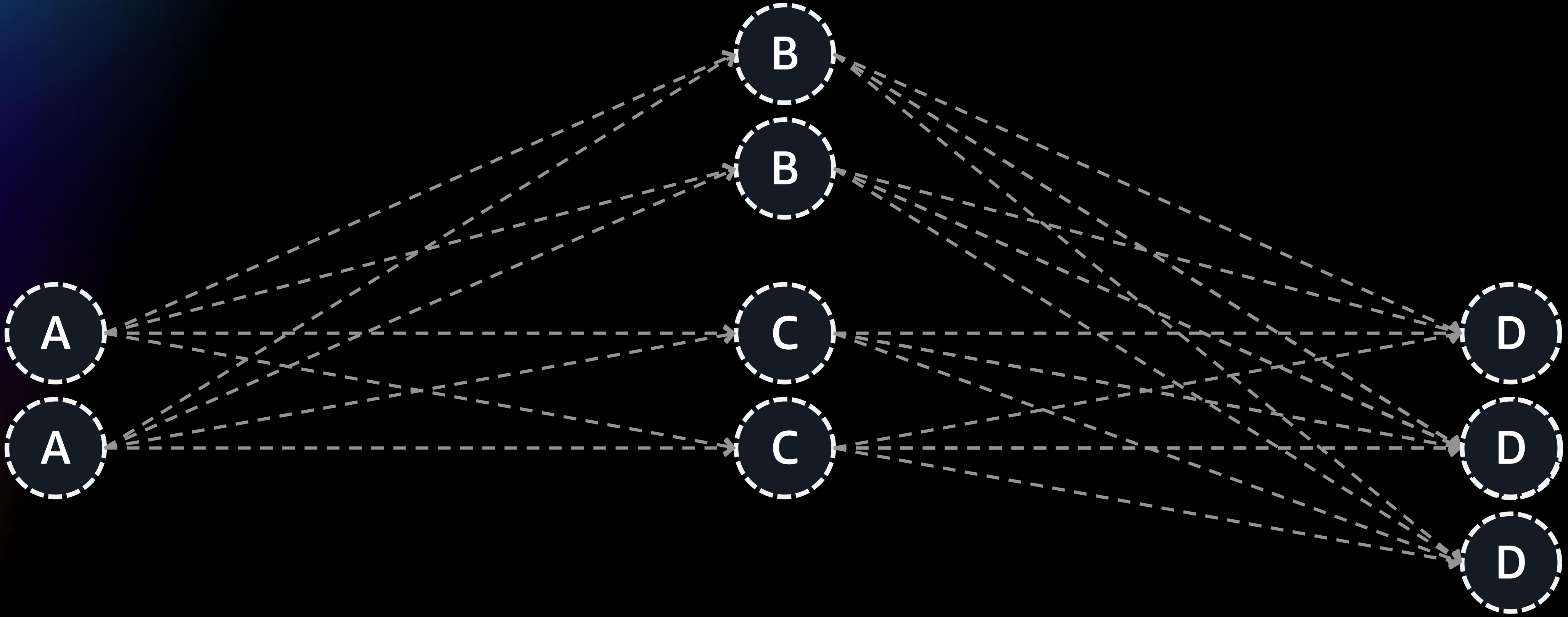
Circuit breaker

Service mesh

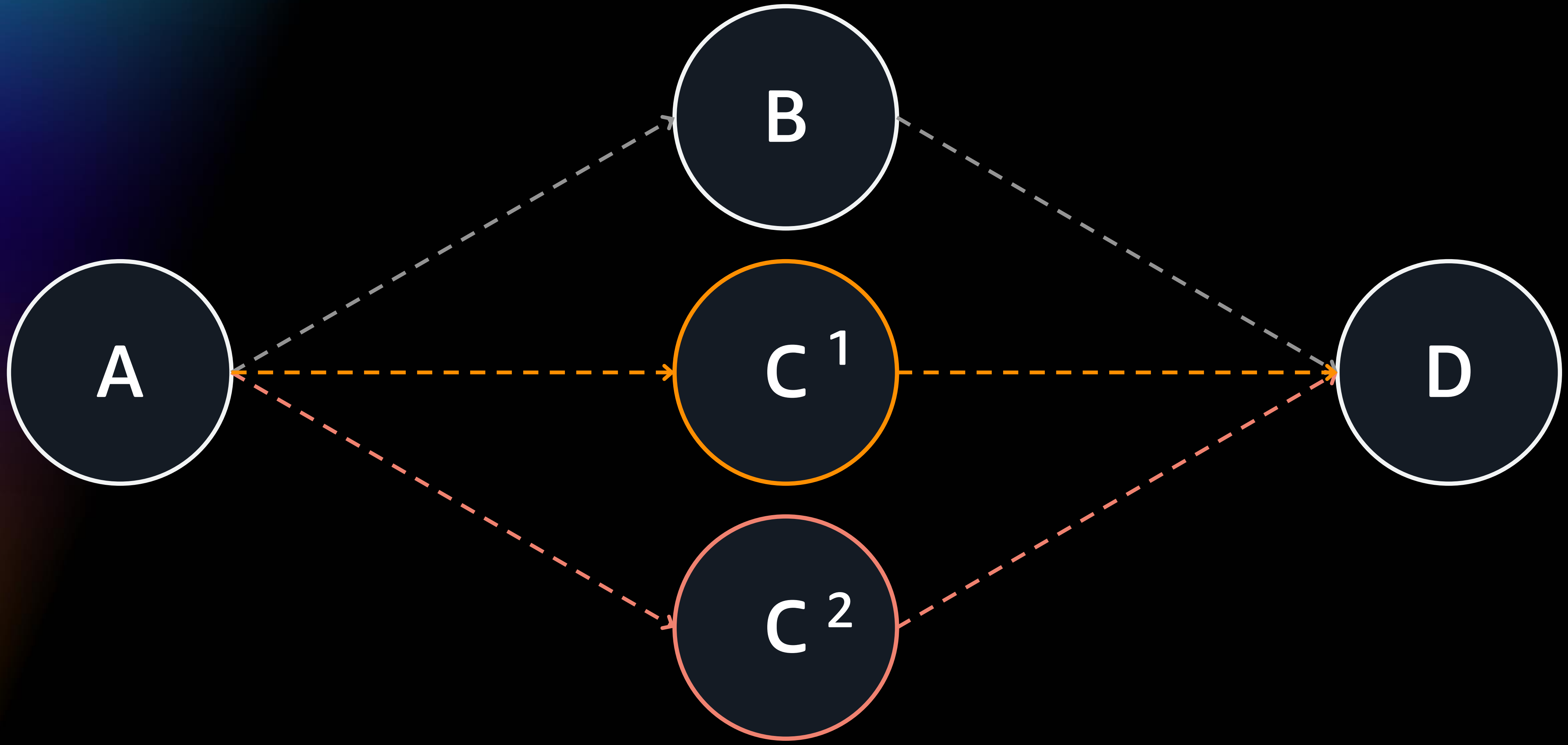
Dependency management with a service mesh



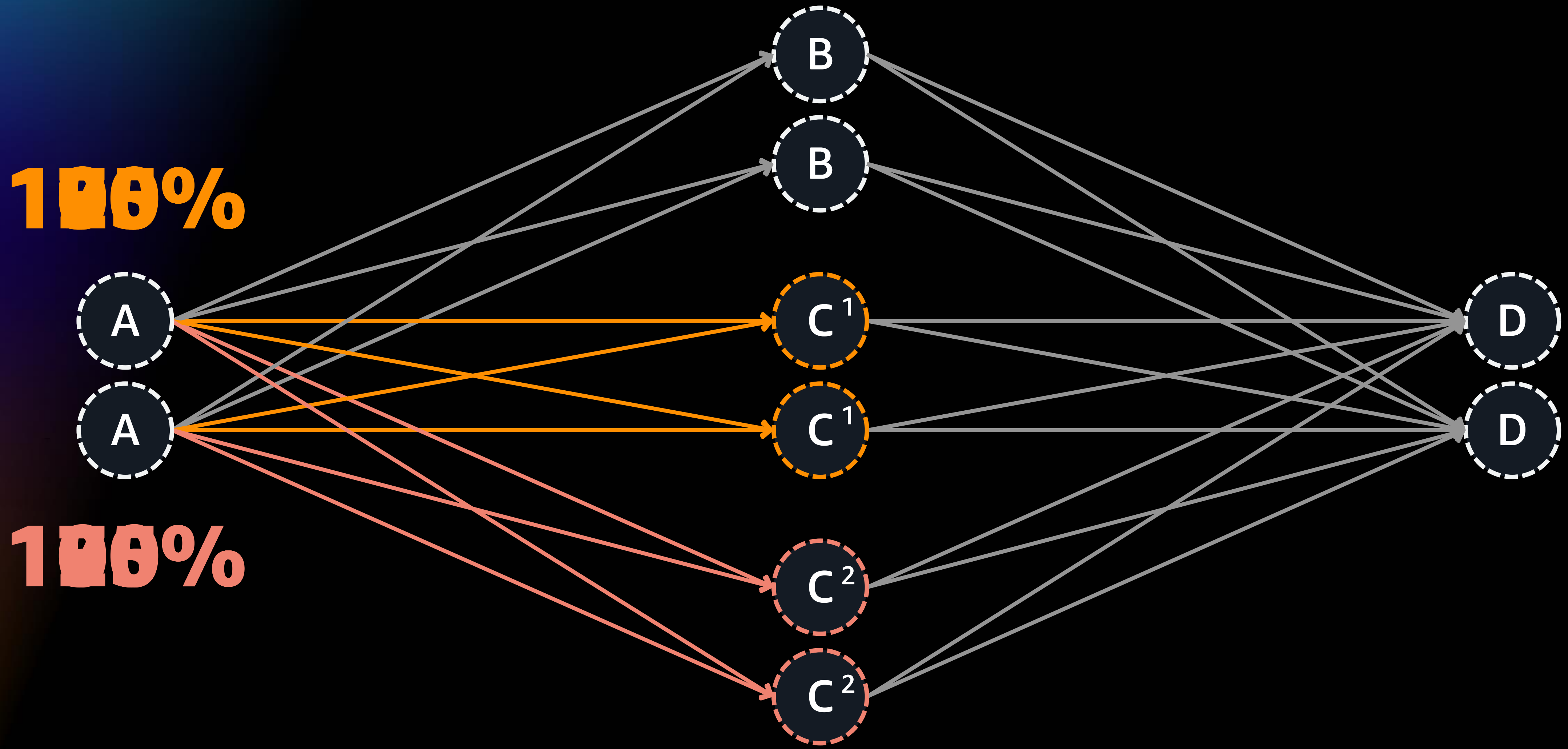
Automatically adapts to changing availability



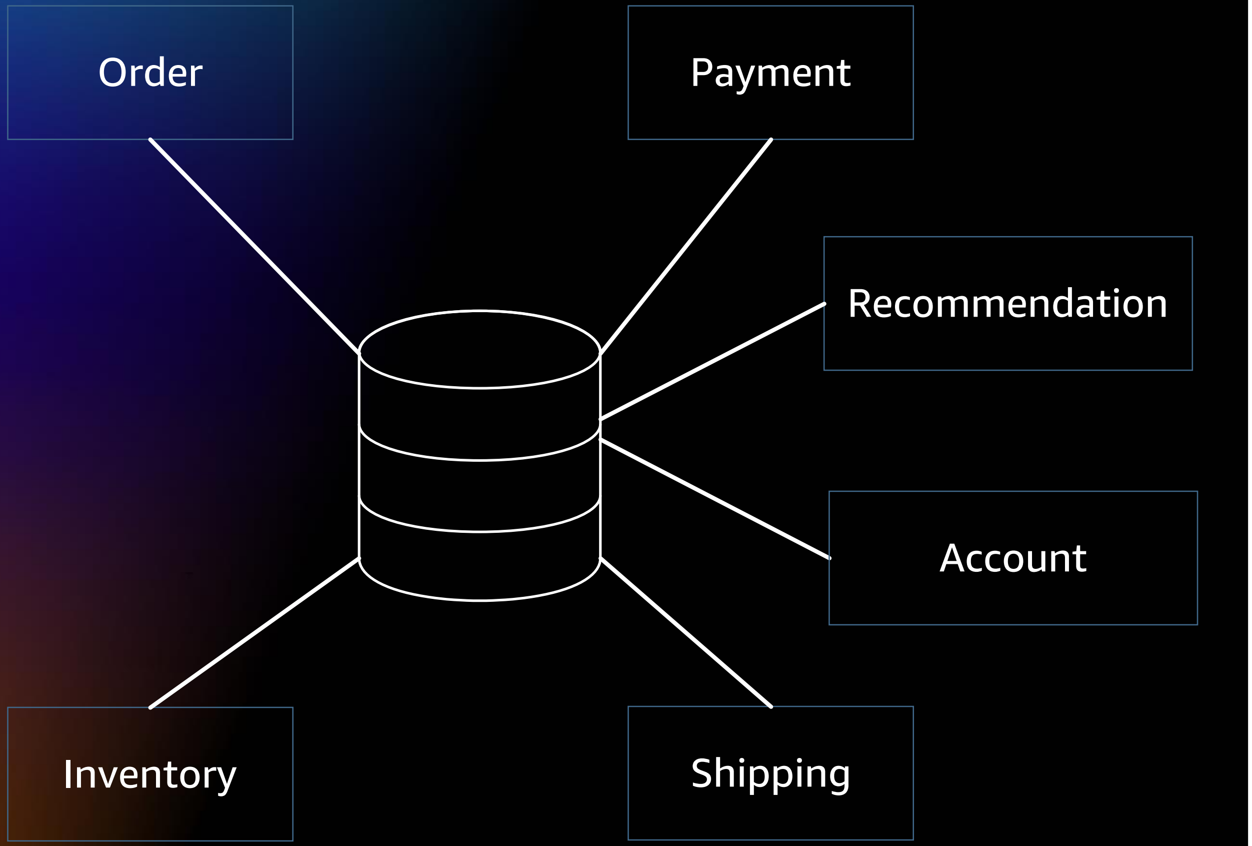
Allows for Canary Deployments



Slowly introduce new versions



There seems to be a clear theme that a central database, typically relational, is an anti-pattern with modern applications, and microservices should be using distributed data stores. However, wouldn’t having a single source of truth database be better and easier to manage. What about data persistence and consistency?



Order

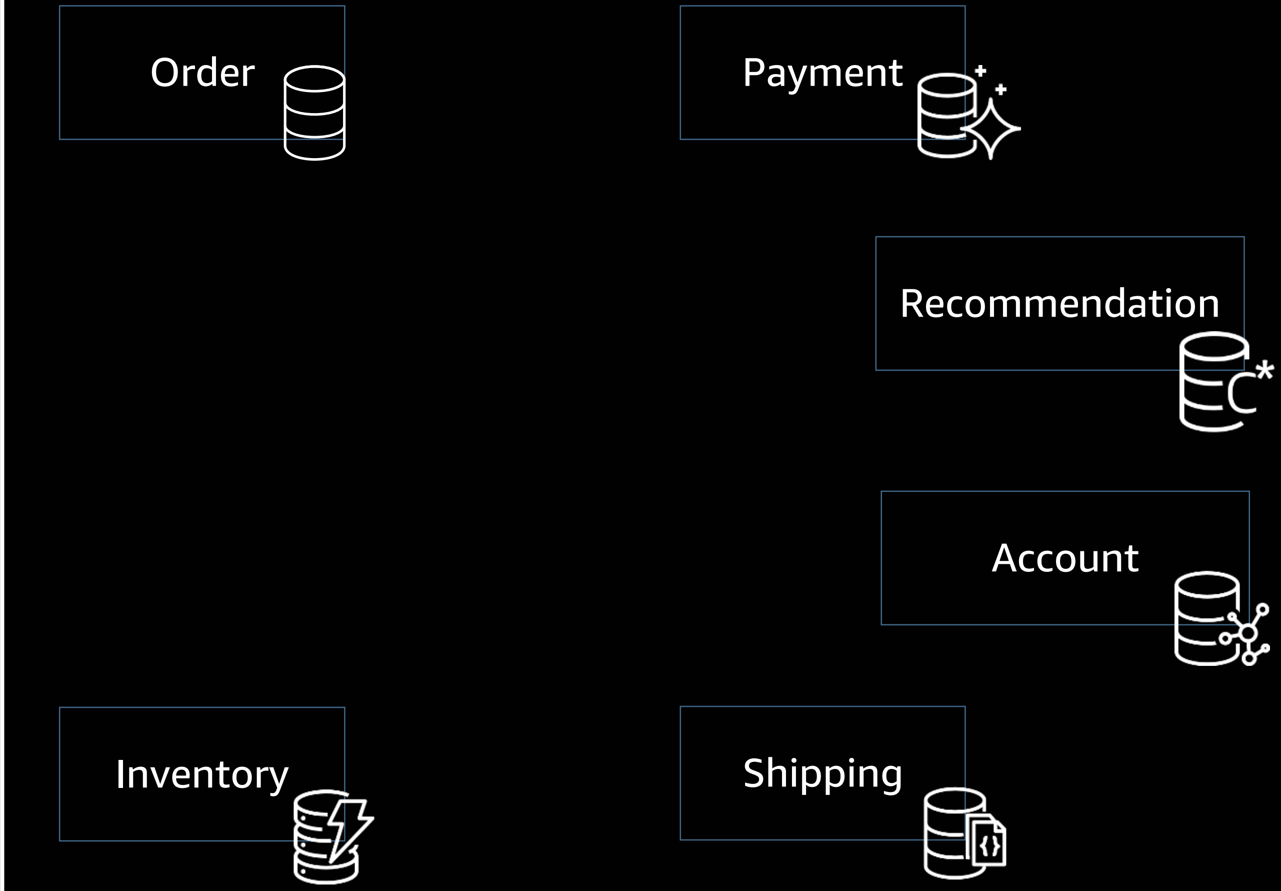
Payment

Recommendation

Account

Inventory

Shipping



Order

Payment

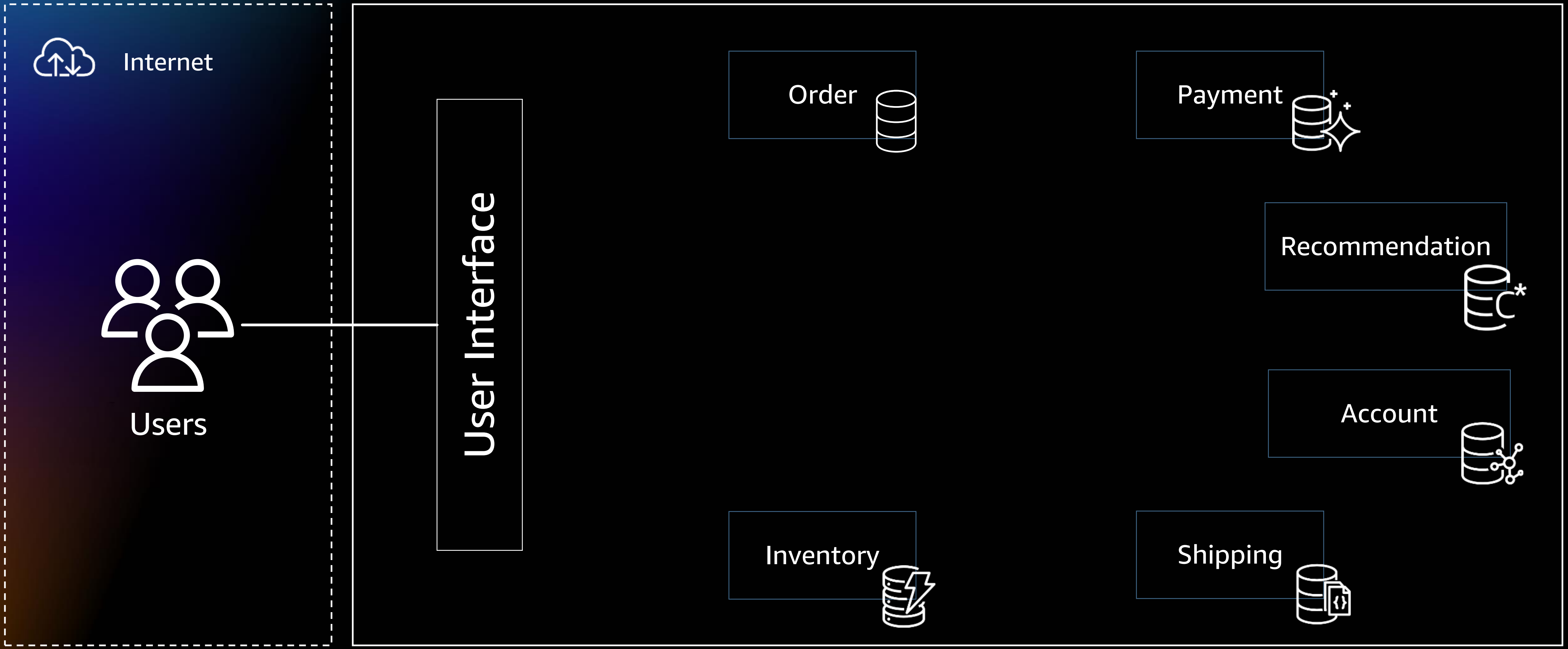
Recommendation

Account

Inventory

Shipping

Data Management – Event Sourcing & CQRS

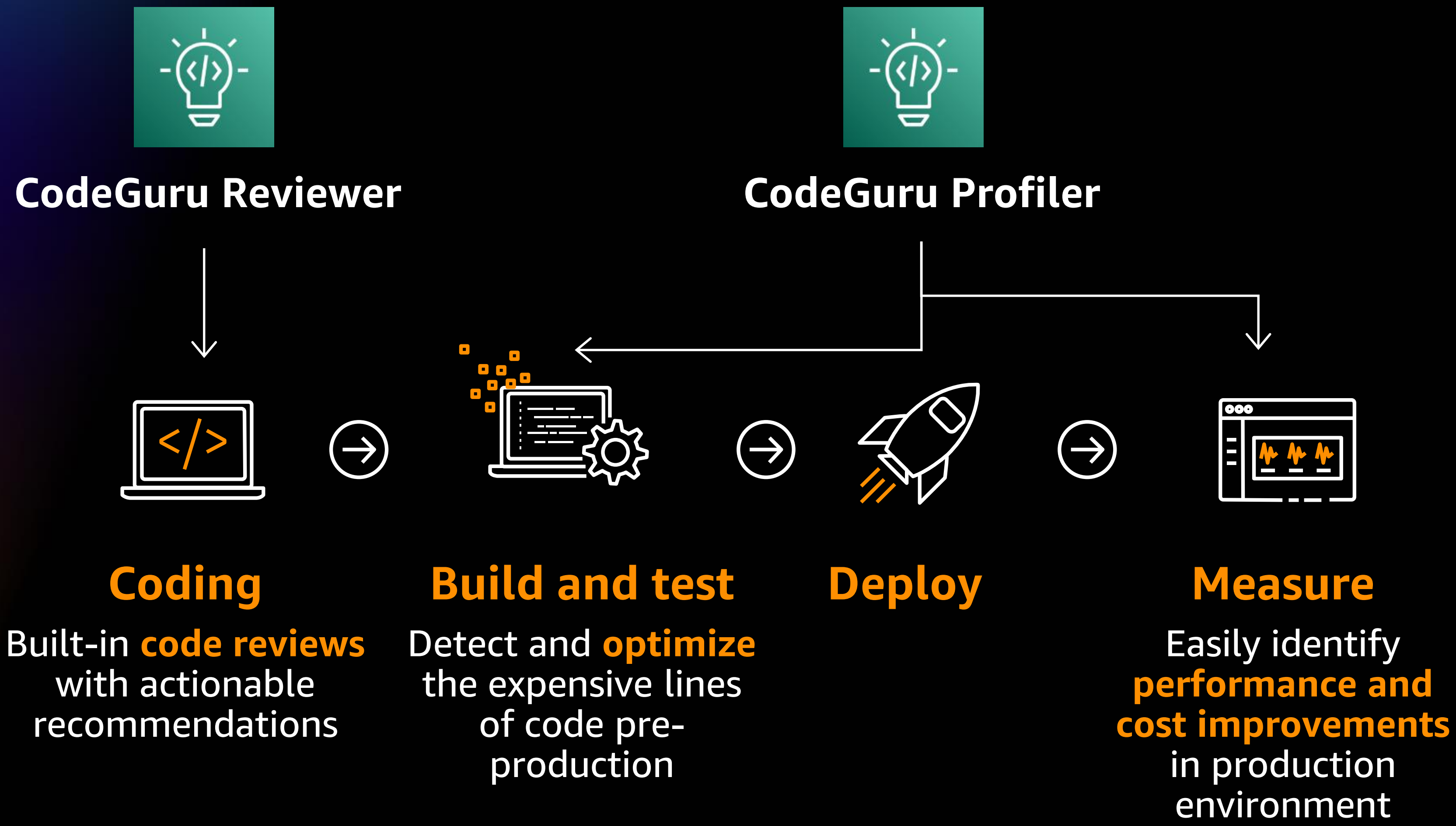


How do you provide more visibility and control to DevOps teams. I hear Machine Learning and using 'robots' is critical to handle the volume of operational data generated and the complexity of the moving parts – is this AIOps, does that mean it can be predictive?

Are there ways to be more pre-emptive in finding problems?

Continuous code improvement

USING MACHINE LEARNING TO REVIEW CODES



CodeGuru Reviewer

CodeGuru Profiler

Coding

Built-in **code reviews** with actionable recommendations

Build and test

Detect and **optimize** the expensive lines of code pre-production

Deploy

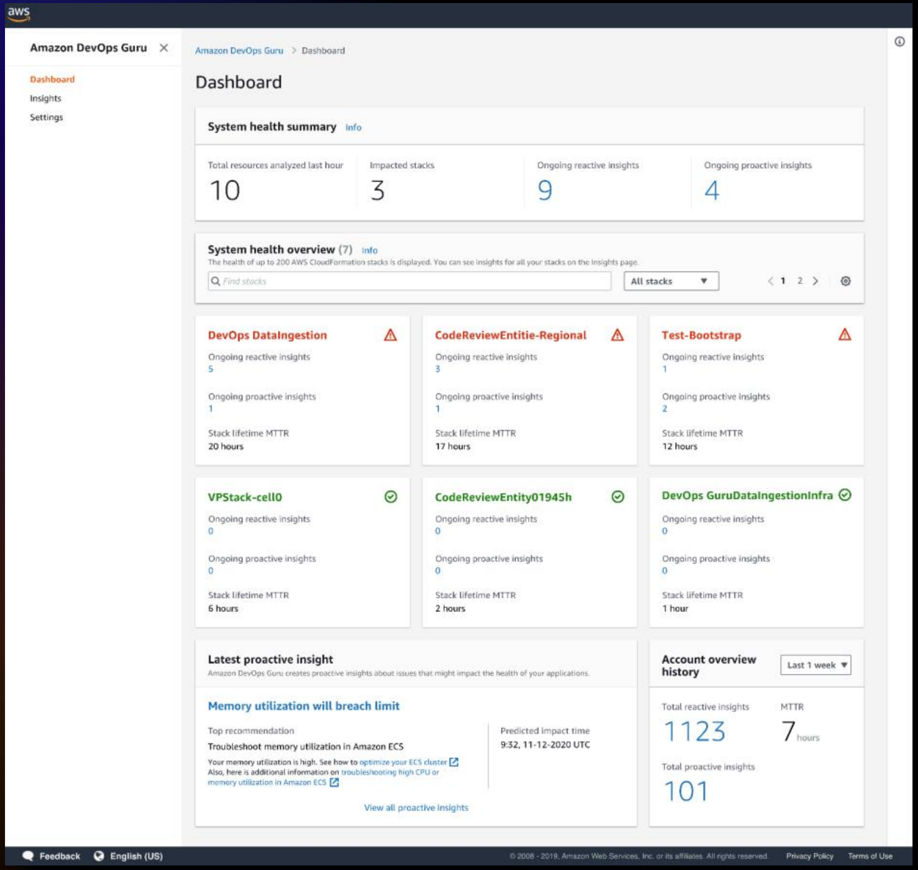
Measure

Easily identify **performance and cost improvements** in production environment

Continuous observability

WITH AMAZON DEVOPS GURU

Amazon DevOps Guru is an ML-powered service that makes it easy for developers and operators to automatically detect issues, improve application availability, and reduce expensive downtime.



Dashboard

System health summary Info

Total resources analyzed last hour	Impacted stacks	Ongoing reactive insights	Ongoing proactive insights
10	3	9	4

System health overview (7) Info

The health of up to 200 AWS CloudFormation stacks is displayed. You can see insights for all your stacks on the Insights page.

Stack	Ongoing reactive insights	Ongoing proactive insights	Stack lifetime MTTR
DevOps DataIngestion ⚠	5	1	20 hours
CodeReviewEntitie-Regional ⚠	3	1	17 hours
Test-Bootstrap ⚠	1	2	12 hours
VPStack-cell0 ✓	0	0	6 hours
CodeReviewEntity01945h ✓	0	0	2 hours
DevOps GuruDataIngestionInfra ✓	0	0	1 hour

Latest proactive insight

Amazon DevOps Guru creates proactive insights about issues that might impact the health of your applications.

Memory utilization will breach limit

Top recommendation
Troubleshoot memory utilization in Amazon ECS

Your memory utilization is high. See how to optimize your ECS cluster
Also, here is additional information on troubleshooting high CPU or memory utilization in Amazon ECS

Predicted impact time
9:32, 11-12-2020 UTC

View all proactive insights

Account overview history — Last 1 week

Total reactive insights
1123

MTTR
7 hours

Total proactive insights
101

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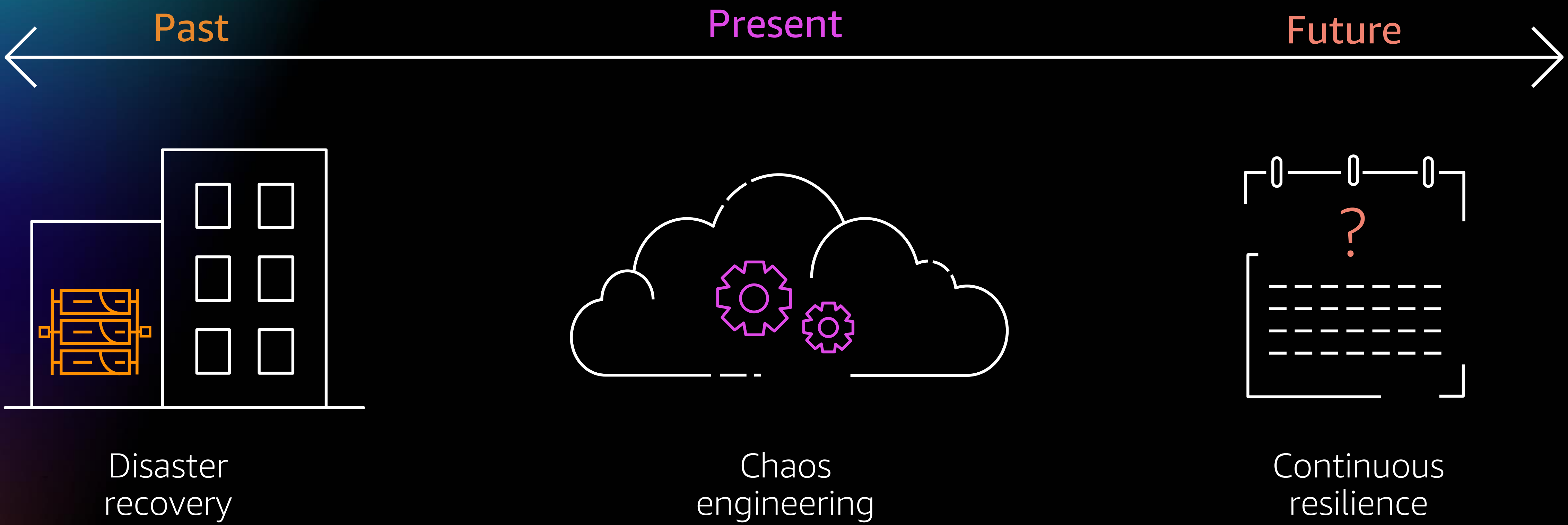
- ✓ **Consolidate operational data from multiple sources**
- ✓ **Leverage ML-powered insights**
- ✓ **Automatically configure alarms**
- ✓ **Detect the most critical issues with minimal noise**

> “Failures are a given and everything will eventually fail over time.”

Werner Vogels
CTO – Amazon.com



Past

Present

Future

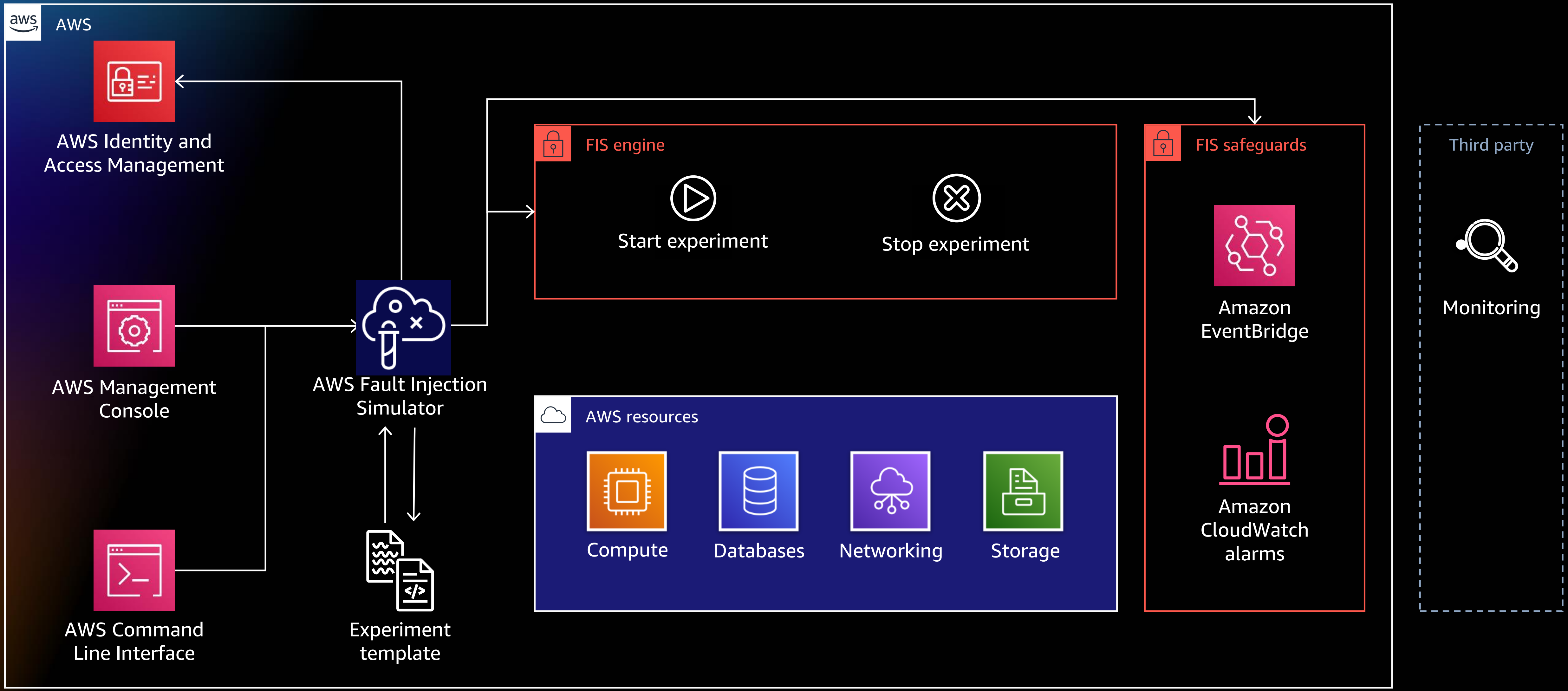
Disaster recovery

Chaos engineering

Continuous resilience

Discipline of **experimenting** on a distributed system in order to **build confidence** in the systems **capacity to withstand turbulent conditions** in production

AWS Fault Injection Simulator



With so many moving parts how to manage and scale the operational aspects in distributed architecture such as deployment, routing, discovery, and monitoring?

Service Discovery and Integration

Gateways

- Elastic Load Balancing
- Amazon API Gateway

Datastreams & Events

- Amazon Kinesis Data Streams
- Amazon Managed Streaming for Apache Kafka
- Amazon EventBridge

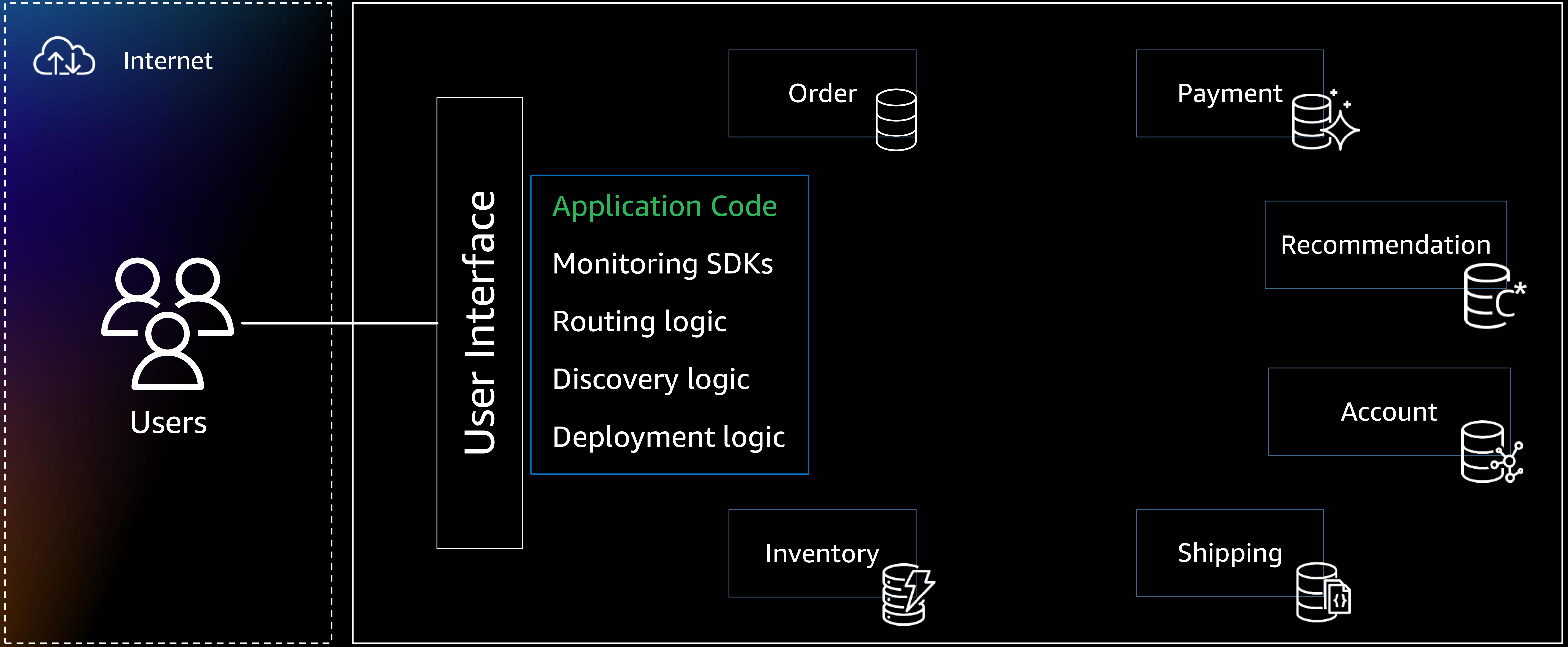
Message brokers

- Amazon SNS
- Amazon SQS
- Amazon MQ

AWS Cloud Map

AWS App Mesh

Decoupling operational logic from business logic



Application Code

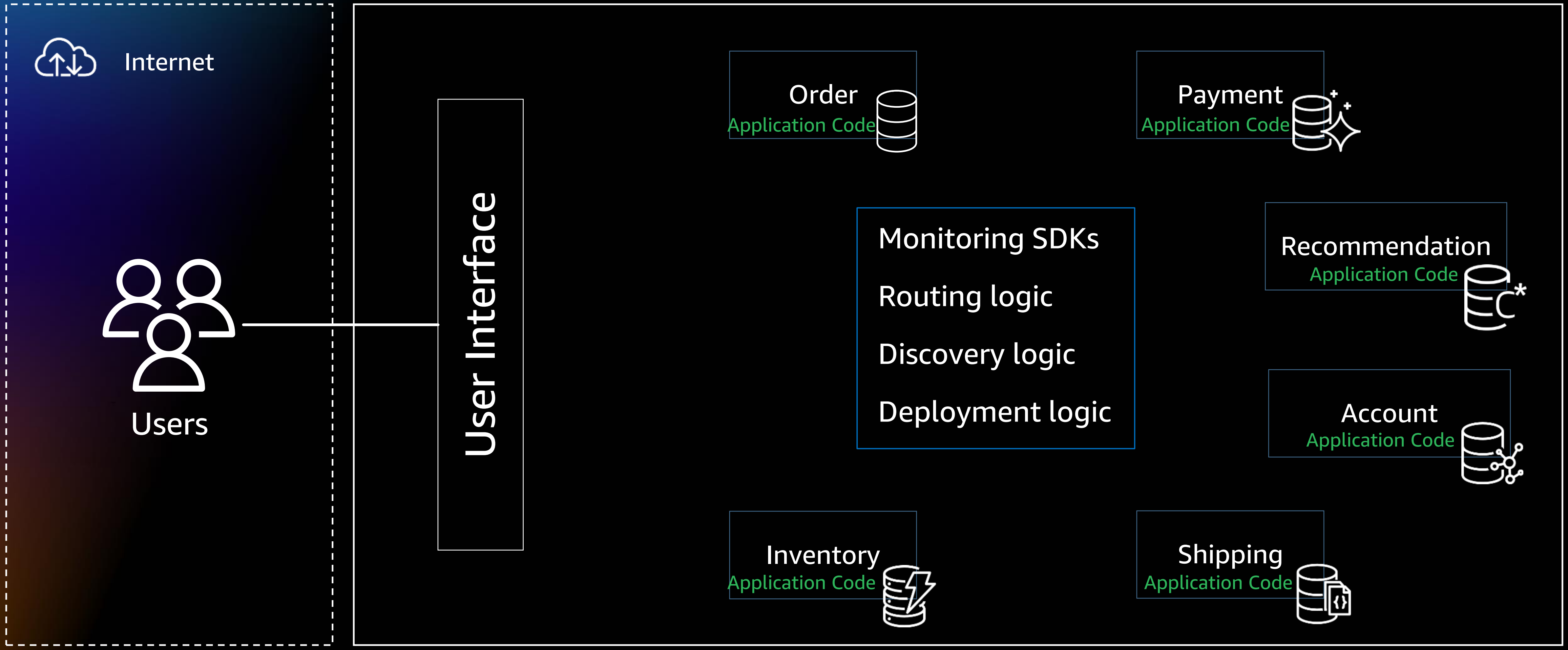
Monitoring SDKs

Routing logic

Discovery logic

Deployment logic

Decoupling operational logic from business logic



Live Q&A

AGENDA AT A GLANCE - (DAY 2: ADVANCED TECH & HANDS-ON)

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MODERN APPLICATIONS DEV EDITION

45 mins	**Opening Keynote**			
	Full-stack application development	Containers and services communication	Systems design	Experiential showcase
30 mins	Build an offline first cross-platform web and mobile apps with Flutter LEVEL 300	Develop, operate, and integrate best practices for Containers apps with AWS Copilot LEVEL 400	Reliability, consistency, and confidence through immutability LEVEL 300	• Ask the Experts • Hands-on labs / Digital training • Resource center • Customer stories
30 mins	Build a web application with geolocation functionalities LEVEL 300	Improving observability with AWS App Mesh and Amazon ECS LEVEL 400	How to design secure multi-tenant architectures (SaaS) LEVEL 400	
15 mins	**Break**			
30 mins	Building powerful Next.js applications with AWS Amplify LEVEL 300	Implementing event-based processing for asynchronous communication LEVEL 300	Five design patterns to build more resilient applications LEVEL 400	
30 mins	Implementing GraphQL API security best practices with AWS AppSync LEVEL 300	Handle errors and retries for event-driven applications and workflows LEVEL 400	Application integration patterns for microservices LEVEL 300	
45 mins	**Closing: Live Q&A and panel discussion on Twitch (Timing 2 only - 1.30pm IST | 4pm SGT | 7pm AEDT)**			

Visit the Modern Applications Resource Hub for more resources

Dive deeper with these resources to help you develop an effective plan for your modernization journey.

- Build modern applications on AWS e-book
- Build mobile and web apps faster e-book
- Modernize today with containers on AWS e-book
- Adopting a modern Dev+Ops model e-book
- Modern apps need modern ops e-book
- Determining the total cost of ownership: Comparing Serverless and Server-based technologies paper
- Continuous learning, continuous modernization e-book
- … and more!

https://bit.ly/3yfOvbK

Visit resource hub »

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Getting started with DevOps on AWS

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AWS Certified Developer – Associate
AWS Certified DevOps – Professional

Hands-on classroom training (available virtually) including:
Running containers on Amazon Elastic Kubernetes Service (Amazon EKS)
Advanced developing on AWS

Create a self-paced learning roadmap
AWS ramp-up guide - Developer
AWS ramp-up guide - DevOps

Take Developer and DevOps training today

Learn more about Modernization training for you and your team

Thank you for attending AWS Innovate Modern Applications Edition

We hope you found it interesting! A kind reminder to **complete the survey.** Let us know what you thought of today's event and how we can improve the event experience for you in the future.

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Thank you!