AWS re:Invent

DOP409-R

Faster Cryptography in Java with Amazon Corretto Crypto Provider (ACCP)

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Agenda

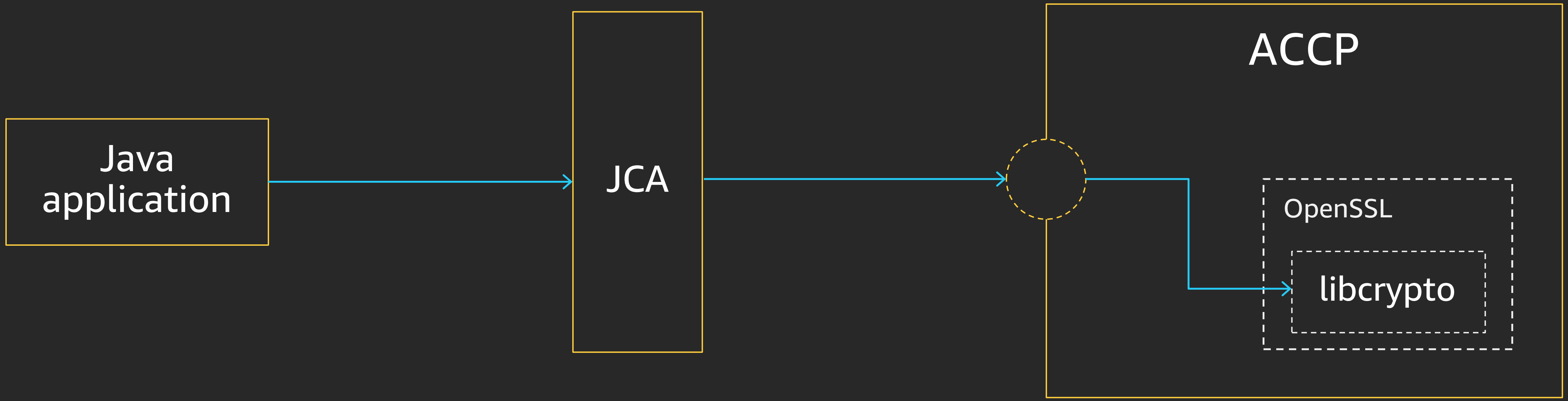
- What is Amazon Corretto
- What is ACCP
- Demo service
- Bonus: Reactive Streams

Amazon Corretto

- OpenJDK distribution from Amazon
- Same open-source license as OpenJDK
- Long-term support at no cost
    - Java 8 until at least June 2023
    - Java 11 until at least August 2024
- Production ready
    - Amazon runs Corretto internally on thousands of production services
- Runs anywhere, not just on AWS

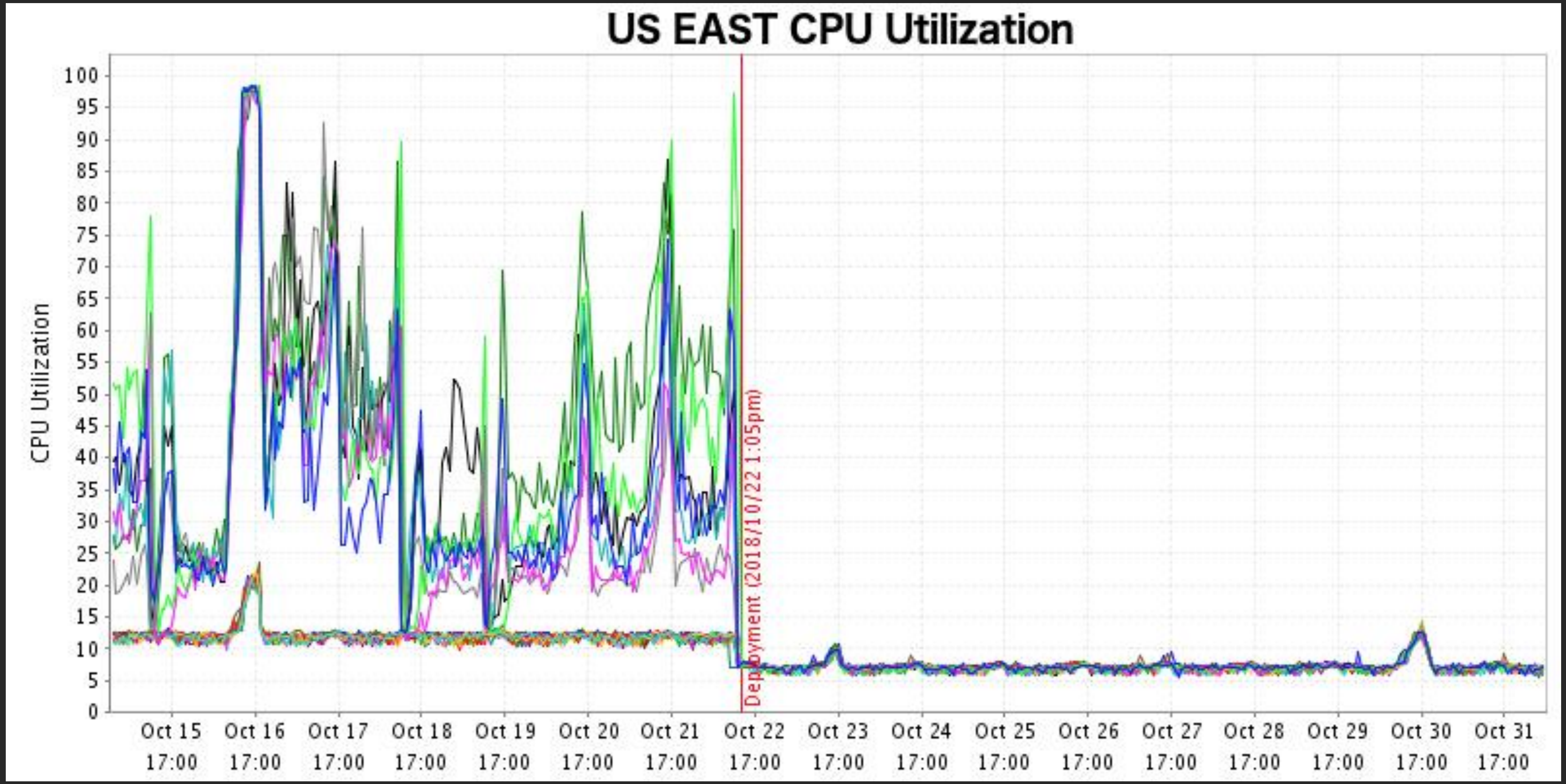
Amazon Corretto Crypto Provider (ACCP)

- Faster cryptography for Java on 64-bit Linux
- Implements Java Cryptography Architecture (JCA) interfaces
- Algorithms implementations from libcrypto (part of OpenSSL)
- AES-GCM, HMAC, SHA, MD5, RSA, DH, ECDSA, ECDH



ACCP

- AWS Snowball on ACCP
  - CPU utilization went from 30% to 85% to stable 8%
  - Doubled data transfer speed



ACCP

How do I use ACCP in my app?

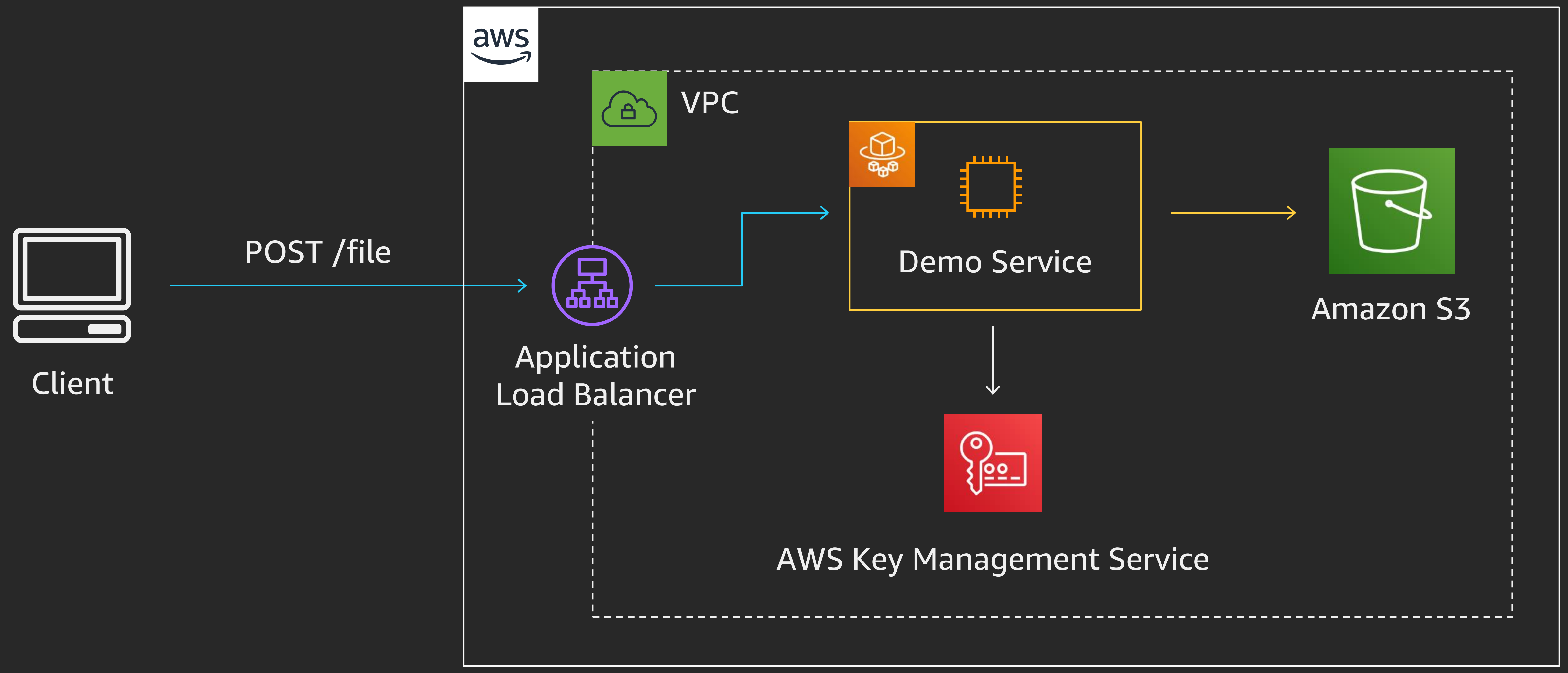
```
// build.gradle
dependencies {
    implementation 'software.amazon.cryptools:AmazonCorrettoCryptoProvider:1.+:linux-x86_64’
}

// Initialization of your app
AmazonCorrettoCryptoProvider.install()
```

Demo service

Demo service

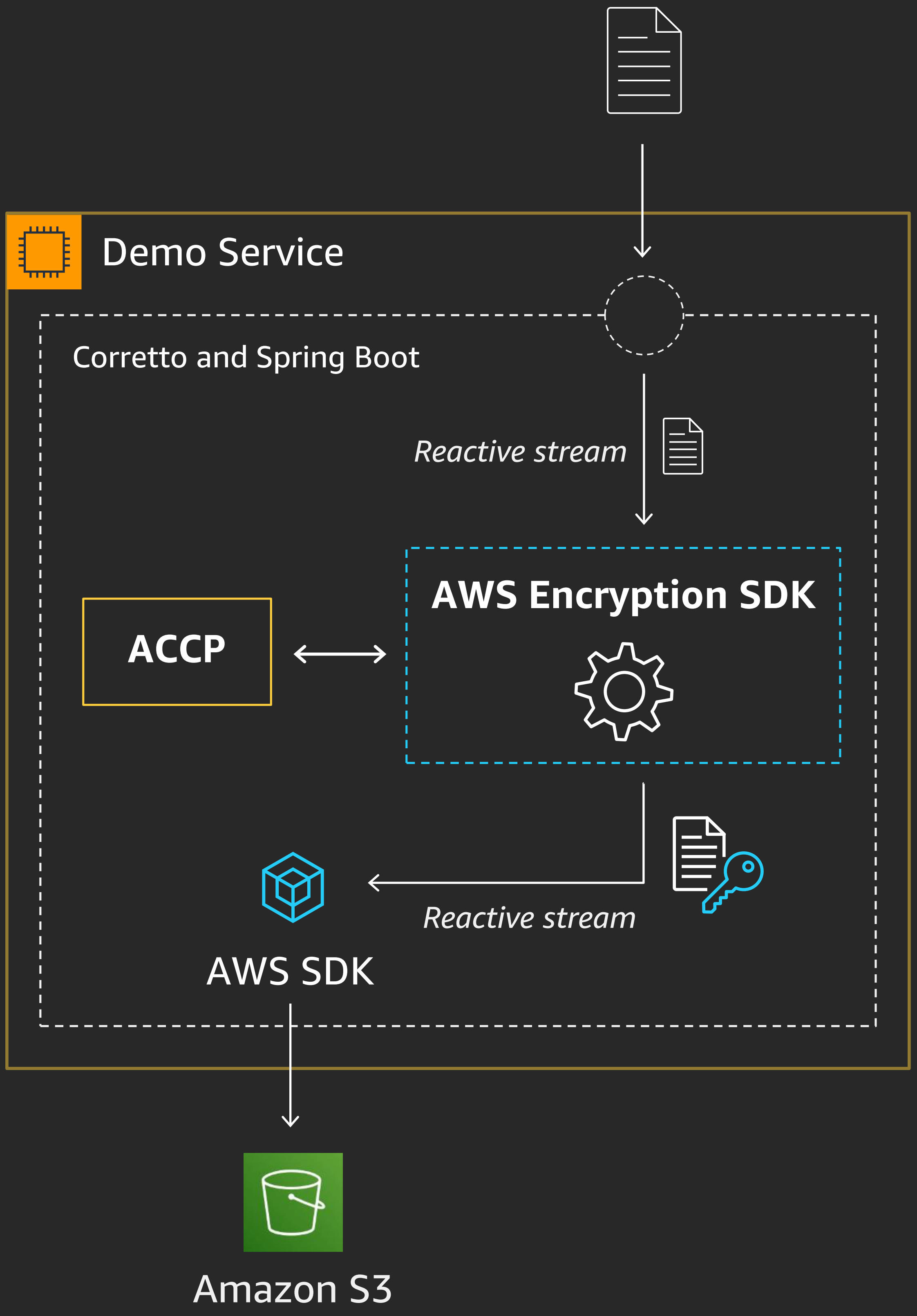
- Encrypts/decrypts *on the fly* using AWS Encryption SDK
- Encrypted files are stored in Amazon S3
- Each file has a unique ID
- Simple REST API
  - `POST /file`
    - Returns file ID and other metadata
  - `GET /file/{id}`
    - Finds file in Amazon S3 and streams the file back

Demo service: AWS architecture



Inside demo service

- Written in Java
- Corretto 8
- Spring Boot
- Reactive Streams and Spring WebFlux
- ACCP
- AWS Encryption SDK for Java



Working with demo service

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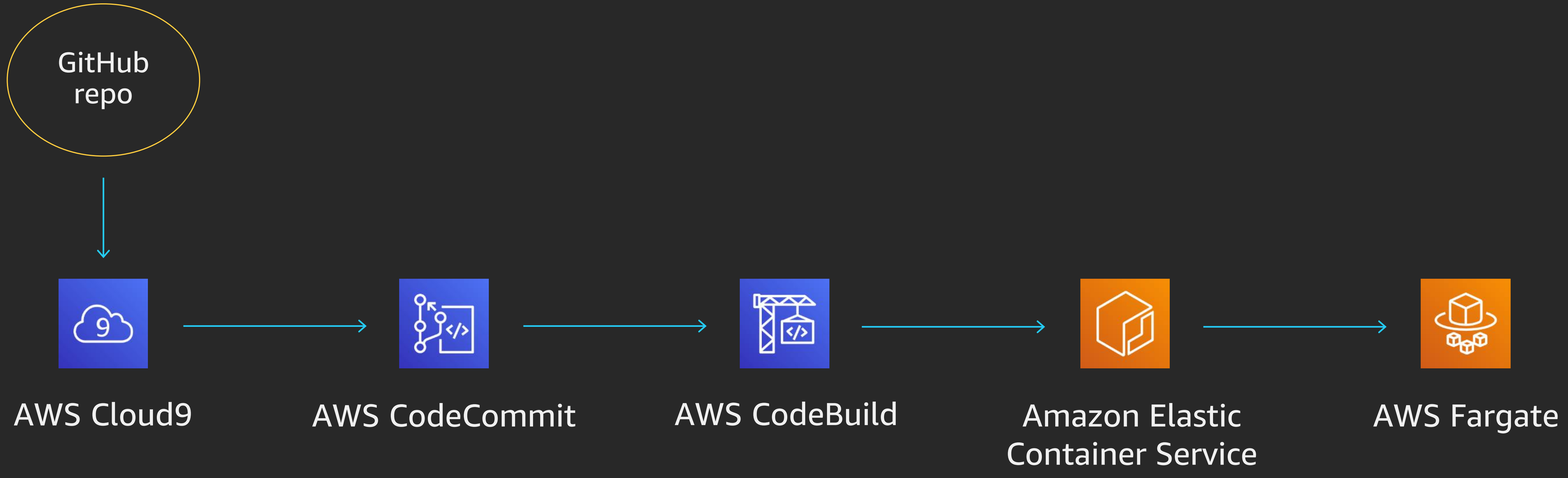
Demo service on GitHub

https://github.com/aws-samples/faster-cryptography-in-java-with-aws

Demo service: build system



GitHub repo

AWS Cloud9

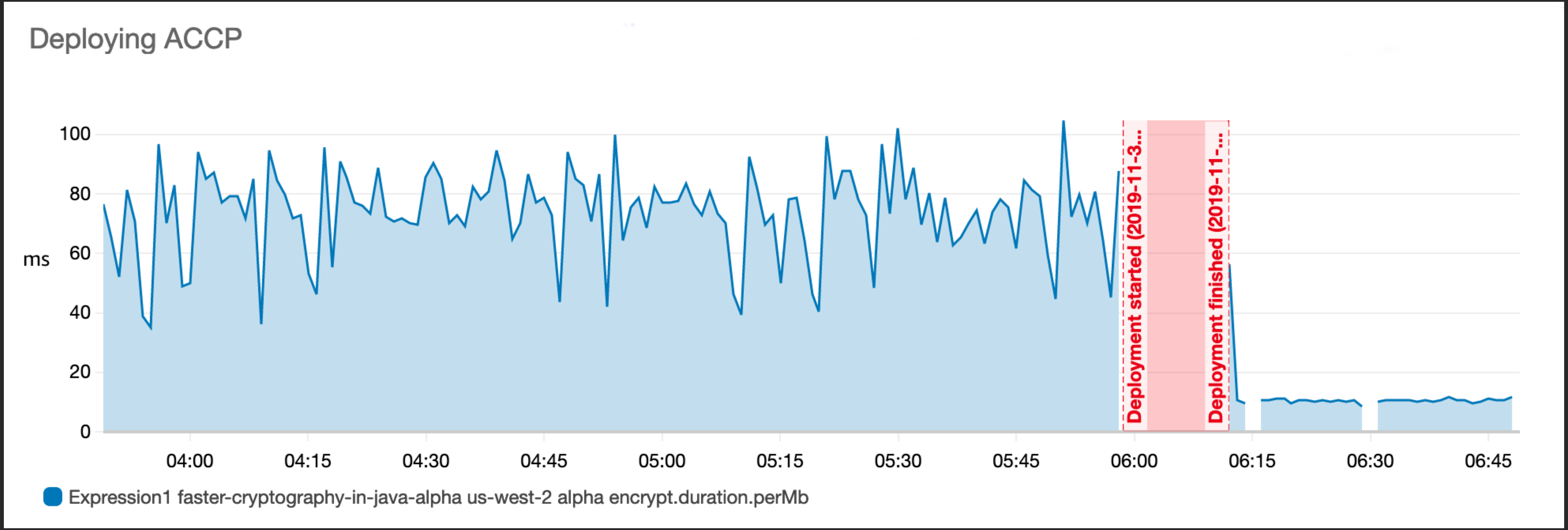
AWS CodeCommit

AWS CodeBuild

Amazon Elastic Container Service

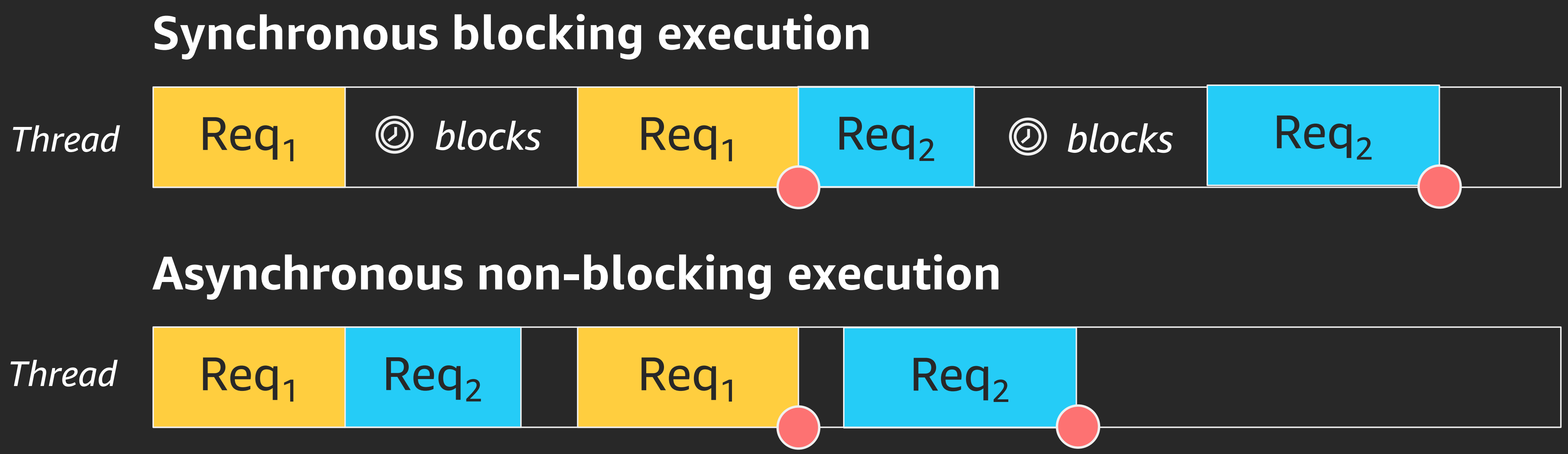
AWS Fargate

Deploying ACCP in demo service



Bonus: reactive streams

- **Problem:** Business logic makes a blocking call to a remote service
- **Typical solution:** Huge thread pools
- **Good solution:** Make the call but do something else until we get a response
- Hard to do in complex business applications (e.g., Spring)
- Reactive Streams brings this concept into mainstream Java development
- Work is divided into many small non-blocking tasks executed on real threads by a scheduler



Related breakouts

SEC401-R – Using the AWS Encryption SDK for multi-master key encryption

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