

AWS re:Invent

NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

SVS310

From serverful to serverless Java with AWS Lambda

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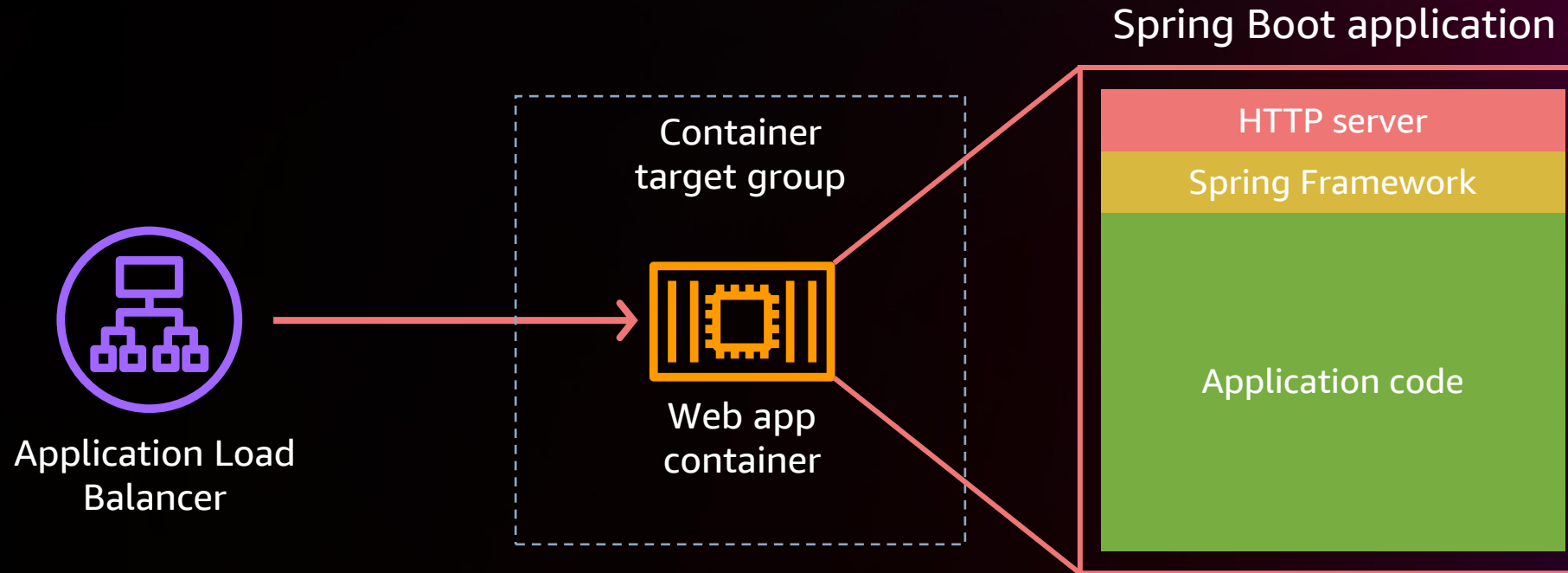
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Serverful Spring Boot overview



What is serverless?

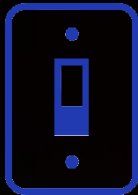


No infrastructure provisioning,
no management



Automatic scaling

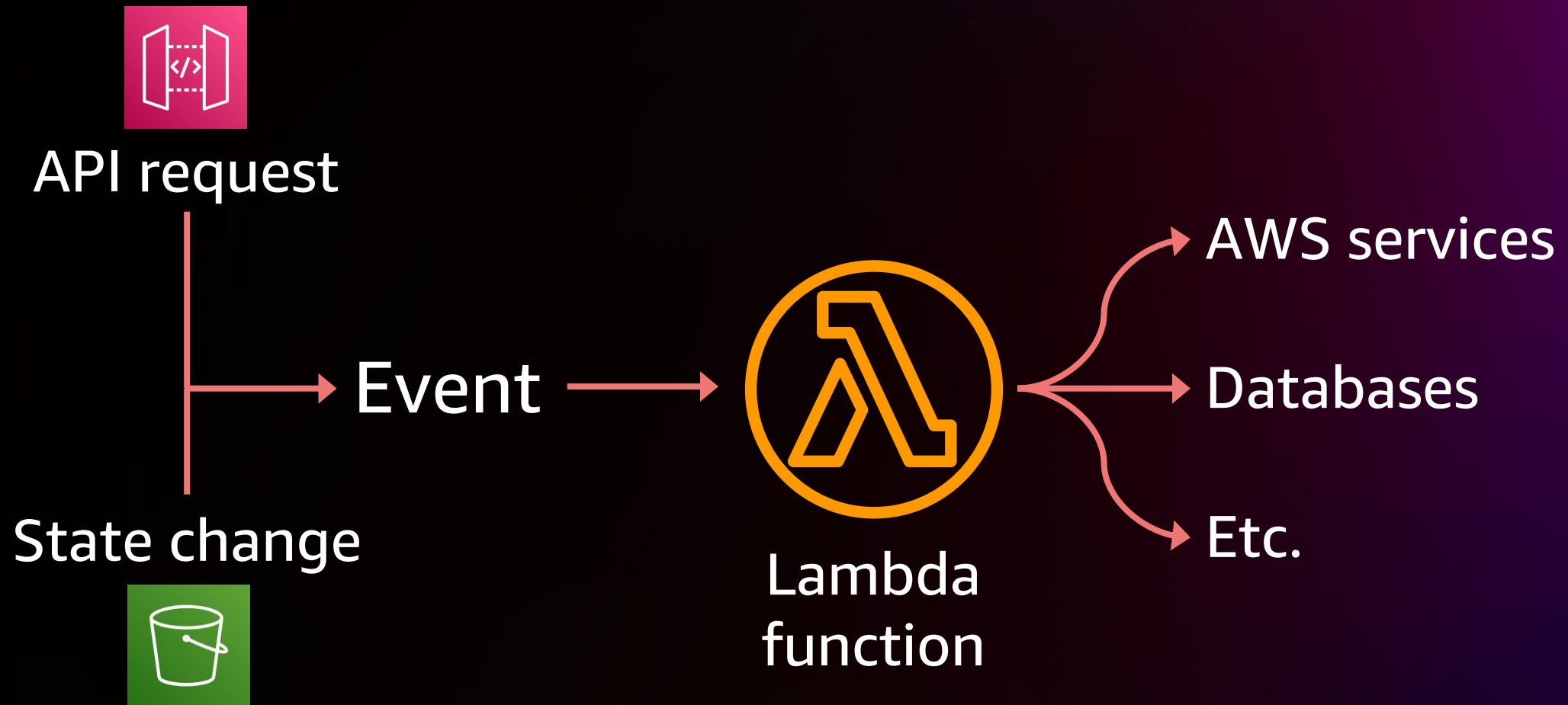
Pay for value



Highly available and secure



AWS Lambda is triggered by events



API Gateway invokes Lambda via events

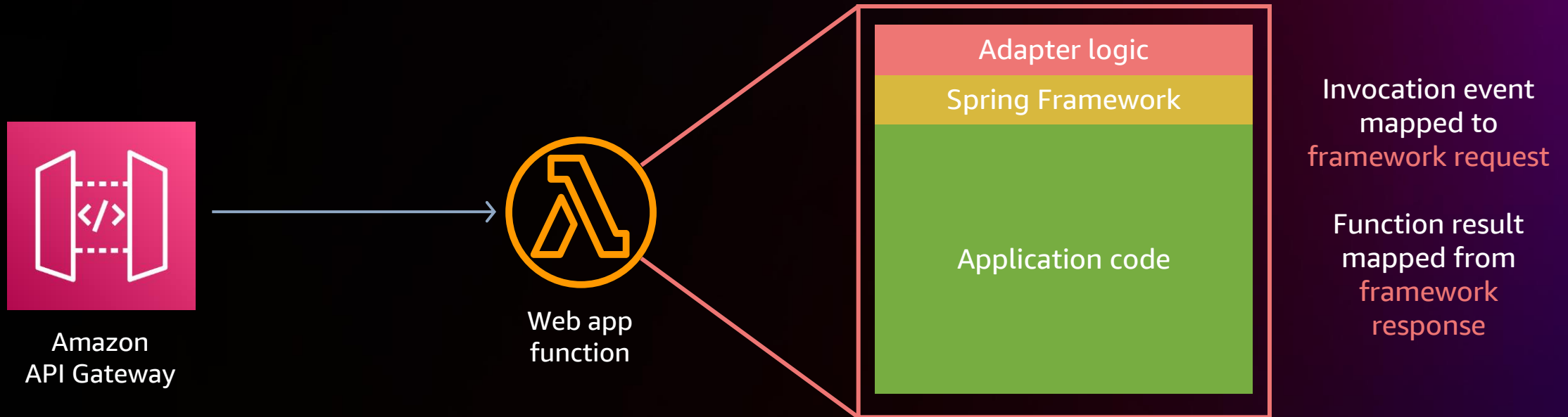
```
POST /v1/pets HTTP/2
Host: x.execute-api.eu-west-1..
User-Agent: curl/7.64.1
Accept: */*
Content-Type: application/json
Content-Length: 39
Body: {"data": "test"}
```



```
{
  "body": "{\"data\": \"test\"}" ,
  "resource": "/{proxy+}",
  "path": "/v1/pets",
  "httpMethod": "POST",
  "isBase64Encoded": true,
  "headers": {
    "Content-Type": "application/json",
    "Content-Length": "39"
  },
  "requestContext": {
    "accountId": "123456789012",
    "requestId": "c6af9ac6-7b61-...",
    ...
  }
}
```

Serverless Spring Boot overview

Web application wrapped in adapter logic. HTTP server removed.



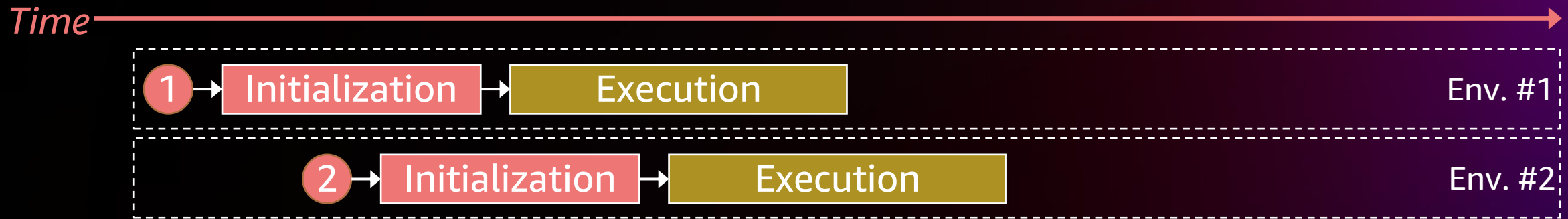
How Lambda scales: A primer on Lambda concurrency



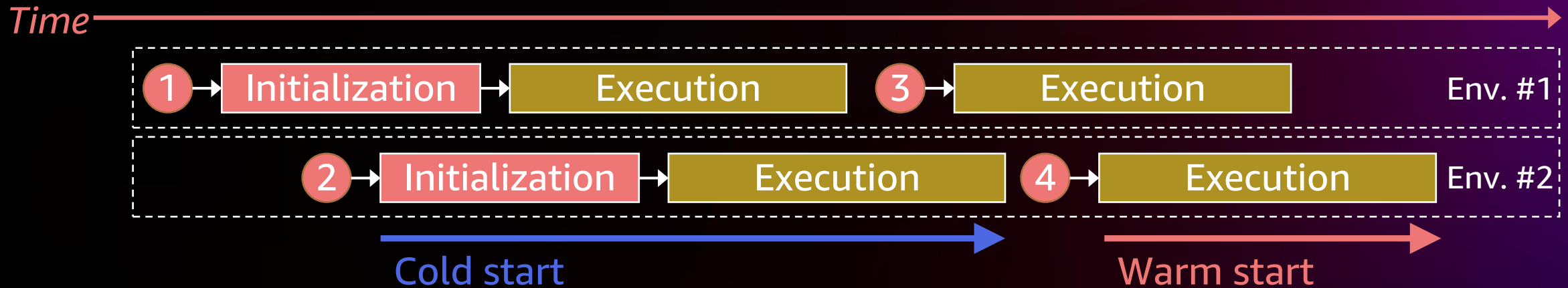
How Lambda scales: A primer on Lambda concurrency



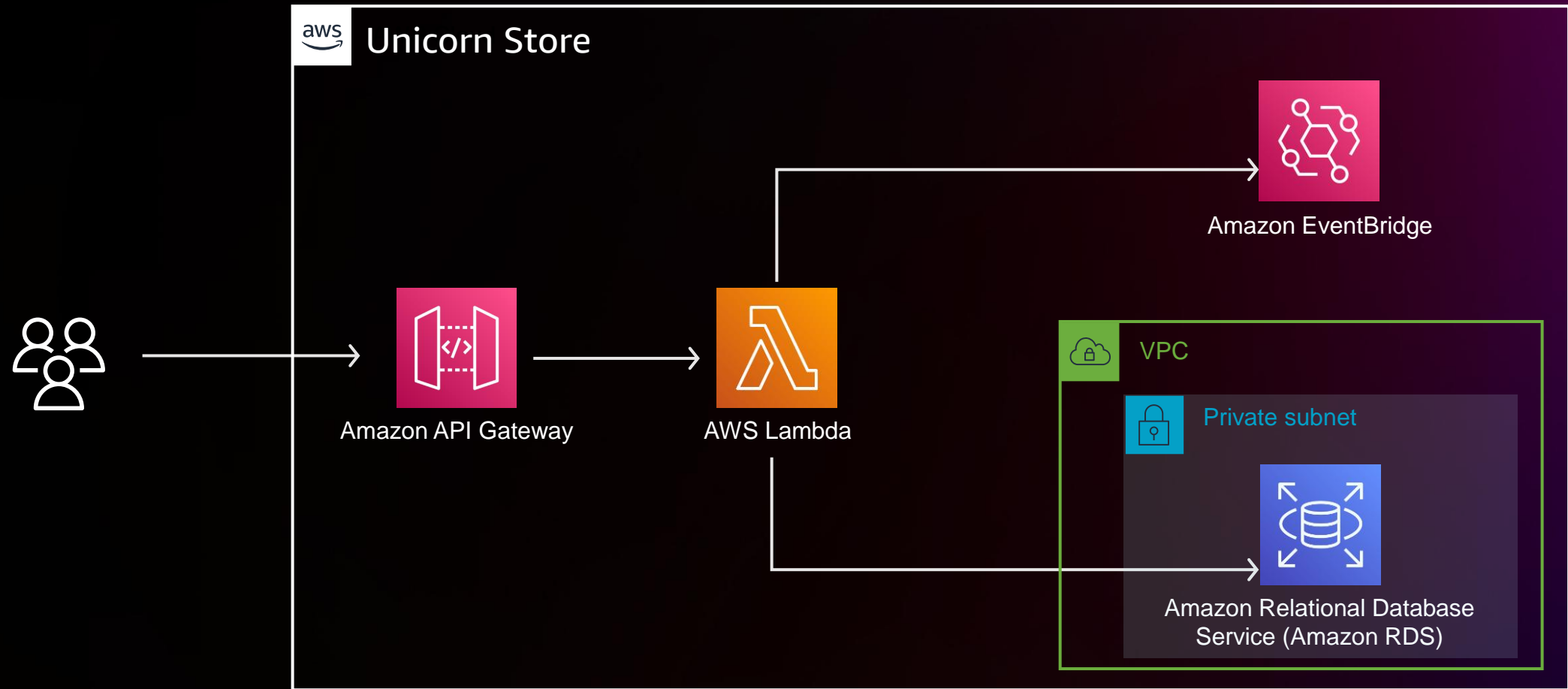
How Lambda scales: A primer on Lambda concurrency



How Lambda scales: A primer on Lambda concurrency



What are you going to build?



What are we going to optimize?

Memory configuration

JVM parameters

Lightweight dependencies

Spring Cloud Functions

Micronaut

GraalVM Native Image



AWS Cloud Development Kit (AWS CDK)



AWS CDK

```
var restApi = LambdaRestApi.Builder.create(this, "UnicornStoreBasicApi")
    .restApiName("UnicornStoreBasicApi")
    .handler(postLambda)
    .proxy(false)
    .build();

Resource unicornResource = restApi.getRoot().addResource("unicorns");
unicornResource.addMethod("POST", new LambdaIntegration(postLambda));

Resource unicornResourceById = unicornResource.addResource("{id}");
unicornResourceById.addMethod("GET", new LambdaIntegration(getLambda));
unicornResourceById.addMethod("PUT", new LambdaIntegration(putLambda));
unicornResourceById.addMethod("DELETE", new LambdaIntegration(deleteLambda));
```

Getting started with this workshop

- As a participant, you will have access to an AWS account with any optional pre-provisioned infrastructure and IAM policies needed to complete this workshop.
- The AWS account will only be available for the duration of this workshop. You will lose access to the account thereafter.
- The optional pre-provisioned infrastructure will be deployed to a specific Region. Check your workshop content to determine whether other Regions will be used.
- Be sure to review the terms and conditions of the event. Do not upload any personal or confidential information in the account.

Our IDE today: AWS Cloud9

The screenshot displays the AWS Management Console interface. At the top, the AWS logo and 'Services' menu are visible. A search bar contains the text 'Cloud9'. Below the search bar, the results for 'Cloud9' are shown. On the left, a sidebar lists various content types: Services (39), Features (21), Blogs (4,530), Documentation (35,822), Knowledge Articles (30), Tutorials (24), Events (251), and Marketplace (11). The main content area is divided into two sections: 'Services' and 'Features'. The 'Services' section lists three items: AWS Cloud9 (A Cloud IDE for Writing, Running, and Debugging Code), AWS Cloud Map (Build a dynamic map of your cloud), and Lightsail (Launch and Manage Virtual Private Servers). The 'Features' section lists one item: Account environments (Cloud9 feature). On the right side of the console, there is a 'Welcome to AWS' section with links to 'Getting started with AWS', 'Training and certification', and 'What's new with AWS?'. Below this is a 'Build a solution' section. On the far right, there is an 'AWS Health' section showing 'Open issues', 'Scheduled changes', and 'Other notifications', all with a count of 0. A 'Reset to default' button is visible at the top right of the AWS Health section.

aws Services Q Cloud9 X

Search results for 'Cloud9'

Services [See all 39 results ▶](#)

- AWS Cloud9** ☆
A Cloud IDE for Writing, Running, and Debugging Code
- AWS Cloud Map** ☆
Build a dynamic map of your cloud
- Lightsail** ☆
Launch and Manage Virtual Private Servers
- WorkSpaces** ☆
Desktops in the Cloud

Features [See all 21 results ▶](#)

- Account environments**
 - Cloud9 feature

Welcome to AWS

- Getting started with AWS** [↗](#)
Learn the fundamentals and find valuable information to get the most out of AWS.
- Training and certification** [↗](#)
Learn from AWS experts and advance your skills and knowledge.
- What's new with AWS?** [↗](#)
Discover new AWS services, features, and Regions.

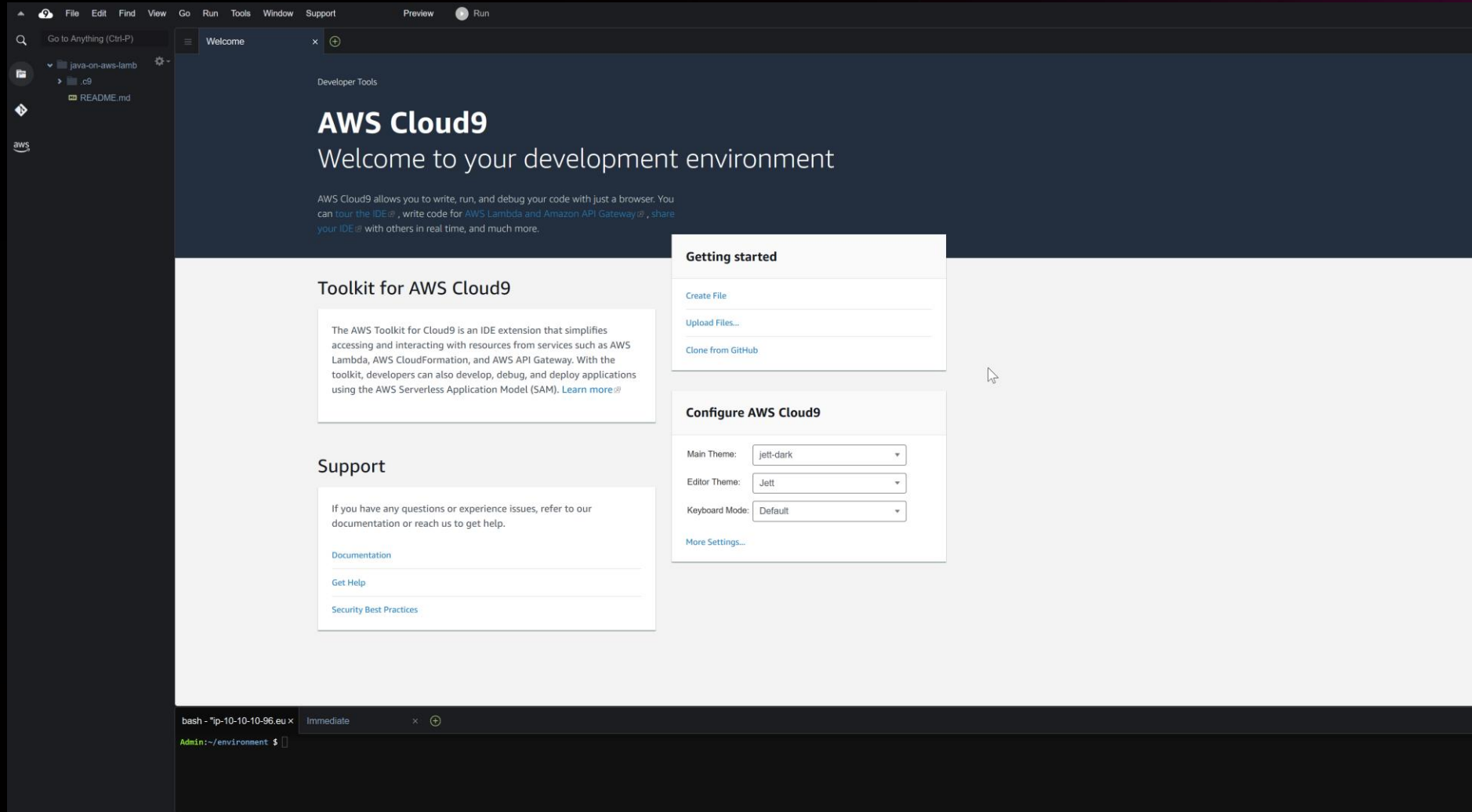
Build a solution [Info](#)

AWS Health

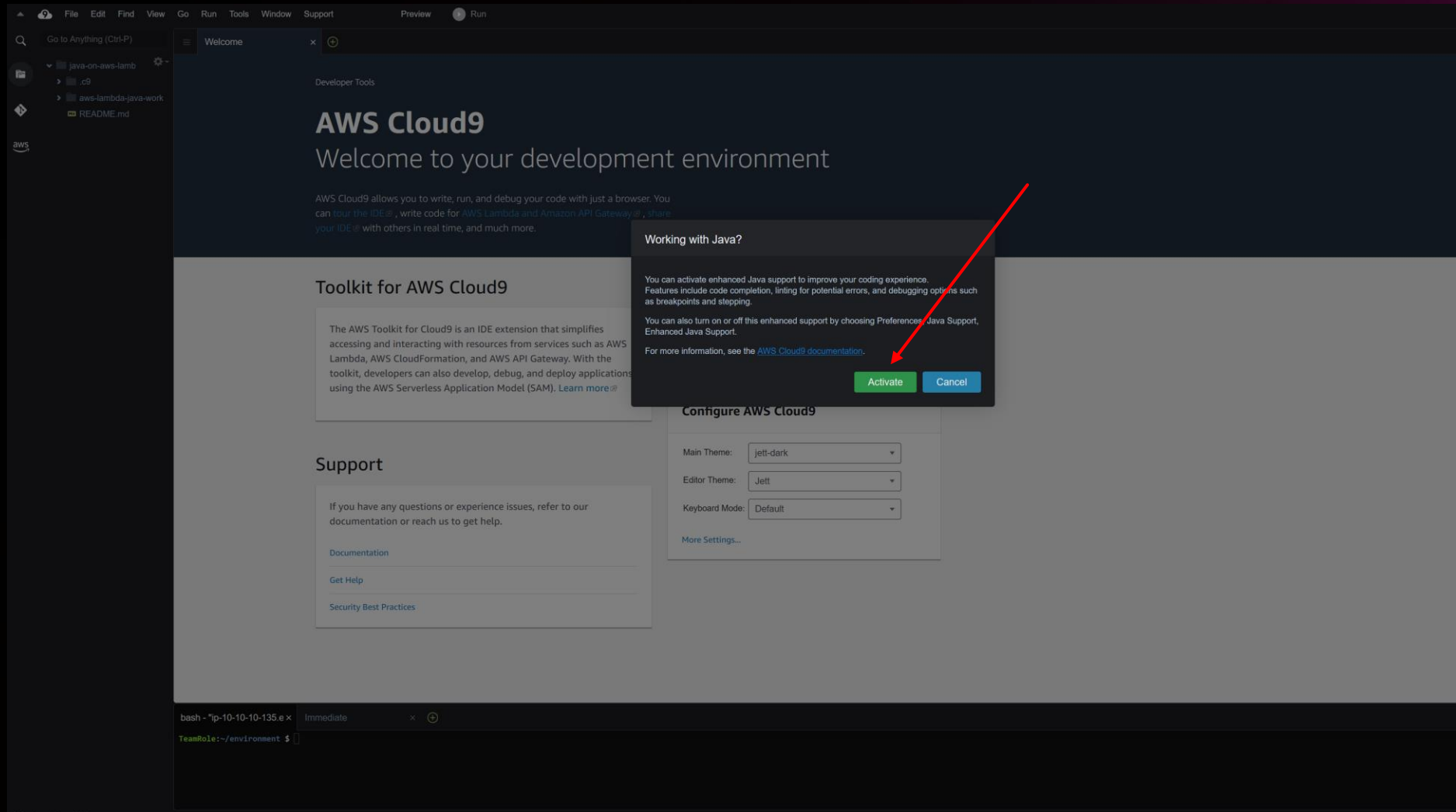
- Open issues: 0
- Scheduled changes: 0
- Other notifications: 0

[Reset to default](#)

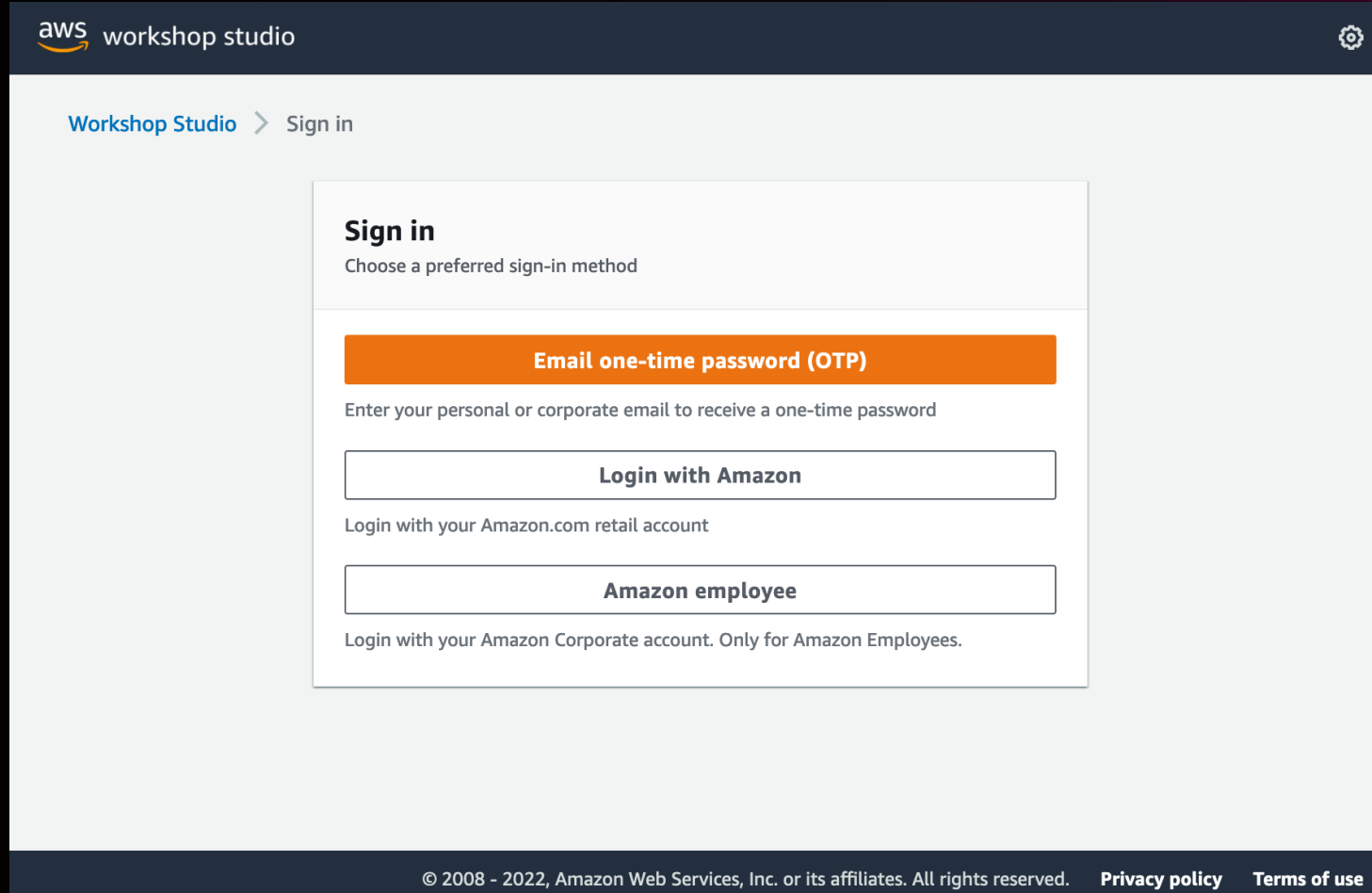
Our IDE today: AWS Cloud9



Our IDE today: AWS Cloud9



Step 1: Sign in with your preferred method



The screenshot shows the AWS Workshop Studio sign-in interface. At the top, the 'aws workshop studio' header is on the left and a settings gear icon is on the right. Below the header, a breadcrumb trail reads 'Workshop Studio > Sign in'. The main content area is a white box with a 'Sign in' heading and the instruction 'Choose a preferred sign-in method'. There are three sign-in options: 1) 'Email one-time password (OTP)' in an orange button, with the instruction 'Enter your personal or corporate email to receive a one-time password' below it. 2) 'Login with Amazon' in a white button, with the instruction 'Login with your Amazon.com retail account' below it. 3) 'Amazon employee' in a white button, with the instruction 'Login with your Amazon Corporate account. Only for Amazon Employees.' below it. The footer of the page contains the copyright notice '© 2008 - 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved.' and links for 'Privacy policy' and 'Terms of use'.

aws workshop studio

Workshop Studio > Sign in

Sign in
Choose a preferred sign-in method

Email one-time password (OTP)
Enter your personal or corporate email to receive a one-time password




Login with Amazon
Login with your Amazon.com retail account

Amazon employee
Login with your Amazon Corporate account. Only for Amazon Employees.

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Step 2: Review terms and join event

aws workshop studio

Workshop Studio > Join event

Step 1
[Enter event access code](#)

Step 2
Review and join

Review and join

Event details

Name	Start time	Duration	Level
AWS General Immersion Day	9/23/2022 01:13 AM	12 hours	-

Description
AWS General Immersion Day

Terms and Conditions

Read and accept before joining the event

1. By using AWS Workshop Studio for the relevant event, you agree to the AWS Event Terms and Conditions and the AWS Acceptable Use Policy. You acknowledge and agree that are using an AWS-owned account that you can only access for the duration of the relevant event. If you find residual resources or materials in the AWS-owned account, you will make us aware and cease use of the account. AWS reserves the right to terminate the account and delete the contents at any time.
2. You will not: (a) process or run any operation on any data other than test data sets or lab-approved materials by AWS, and (b) copy, import, export or otherwise create derivate works of materials provided by AWS, including but not limited to, data sets.
3. AWS is under no obligation to enable the transmission of your materials through Event Engine and may, in its discretion, edit, block, refuse to post, or remove your materials at any time.
4. Your use of AWS Workshop Studio will comply with these terms and all applicable laws, and your access to AWS Workshop Studio will immediately and automatically terminate if you do not comply with any of these terms or conditions.

☒ I agree with the Terms and Conditions

Cancel

Previous

Join event

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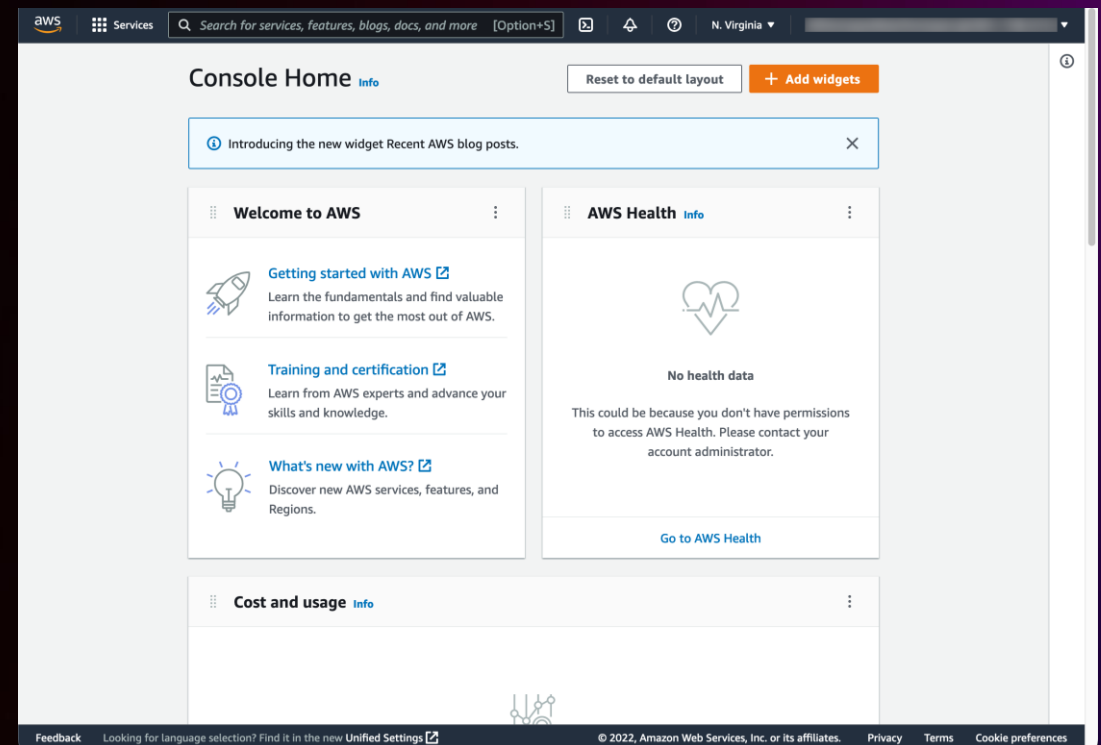
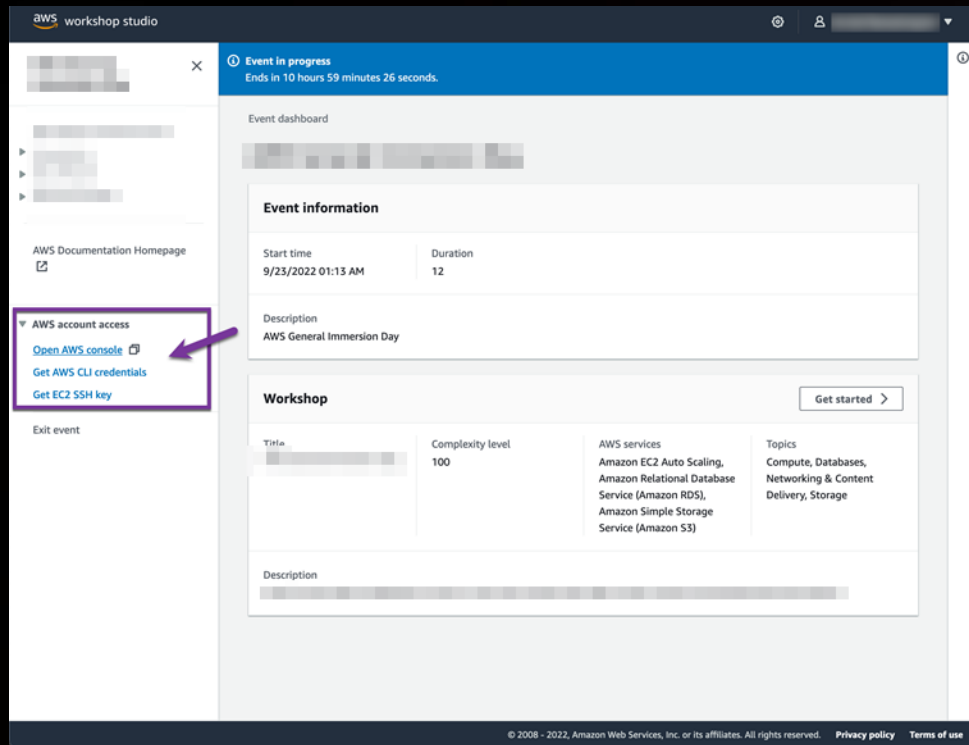
[Privacy policy](#)

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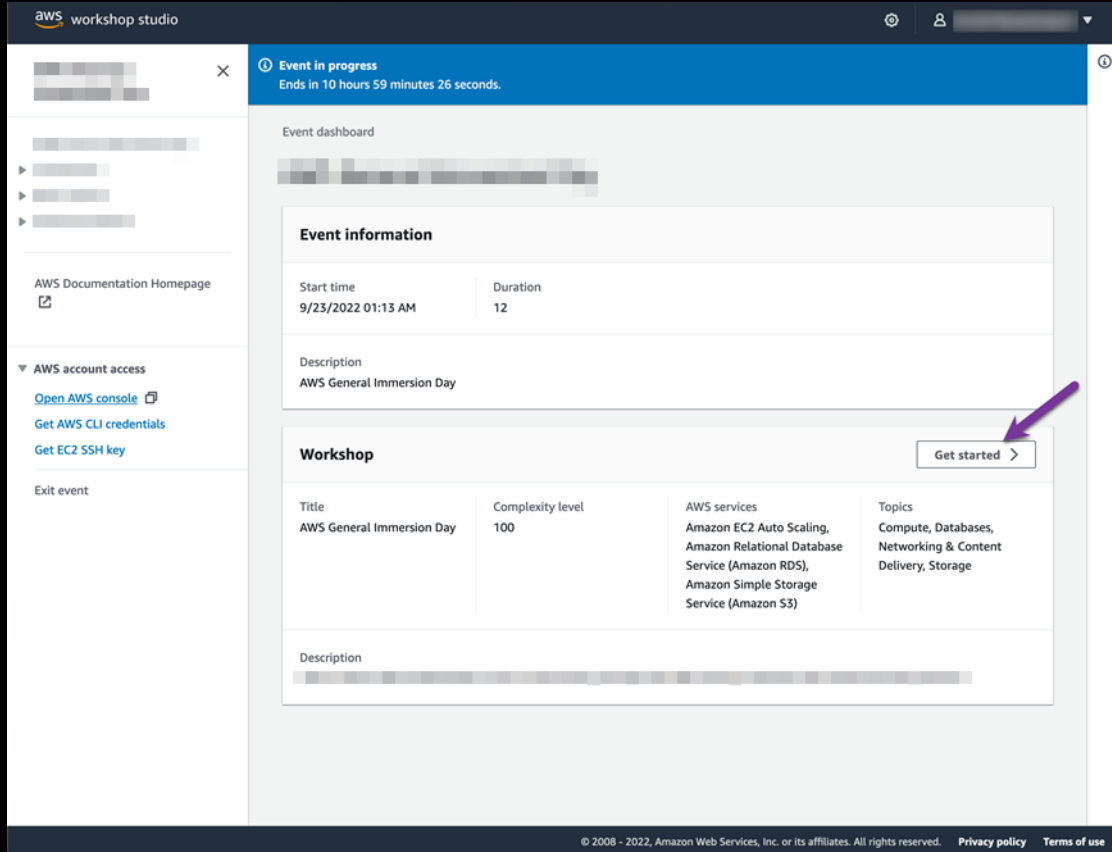


Step 3: Access AWS account

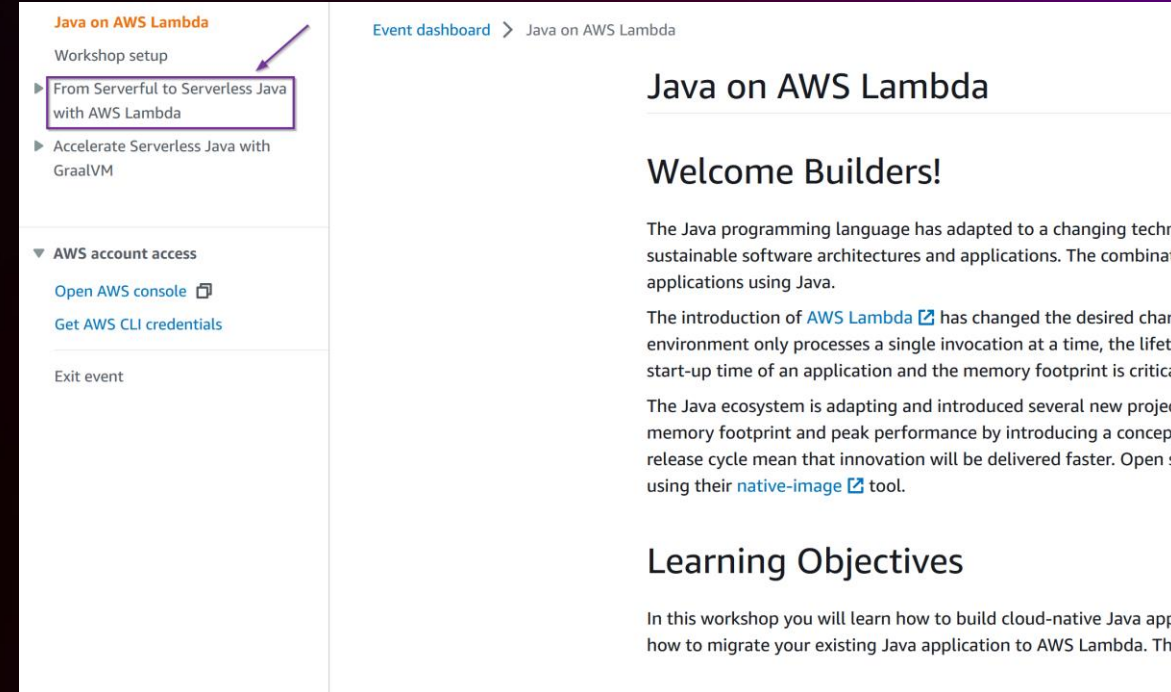
Access the AWS Management Console or generate AWS CLI credentials as needed



Step 4: Get started with the workshop



The screenshot shows the AWS Workshop Studio interface. At the top, a blue banner indicates 'Event in progress' and 'Ends in 10 hours 59 minutes 26 seconds.' Below this, the 'Event dashboard' is visible. The 'Event information' section shows the start time as 9/23/2022 01:13 AM and a duration of 12 hours. The 'Workshop' section lists the title 'AWS General Immersion Day', a complexity level of 100, and the AWS services involved: Amazon EC2 Auto Scaling, Amazon Relational Database Service (Amazon RDS), and Amazon Simple Storage Service (Amazon S3). A 'Get started >' button is highlighted with a purple arrow.



The screenshot shows the 'Java on AWS Lambda' workshop page. The left sidebar contains a 'Workshop setup' section with a link to 'From Serverful to Serverless Java with AWS Lambda', which is highlighted with a purple arrow. Below this, there are links for 'AWS account access', 'Open AWS console', 'Get AWS CLI credentials', and 'Exit event'. The main content area is titled 'Java on AWS Lambda' and 'Welcome Builders!'. It includes a paragraph about the Java programming language and its adaptation to cloud-native architectures, followed by a section on 'Learning Objectives'.

Help and hints

2. Navigate to the UnicornPostLocationHandler and define the logger according to the SLF4J API specification:

```
1 private final Logger logger = LoggerFactory.getLogger(UnicornPostLocationHandler.class);
```



▼ Imports

```
1 import org.slf4j.Logger;  
2 import org.slf4j.LoggerFactory;
```

1. Run the benchmark

1. Execute the following command to run the benchmark:

```
1 ./benchmark.sh spring
```



▼ Under the hood

The shell script executes the Artillery load test defined in `loadtest.yaml`. As a target it uses the API-Gateway Url that has been generated after the deployment.

```
1 artillery run -t $(cat infrastructure/cdk/output-basic.json | jq -r '.UnicornStoreBasicApp.apibasicendpoint') -v
```



Let's get started!

<https://s12d.com/reinvent22-SVS310>

Resources and examples

<https://serverlessland.com/reinvent2022/svs310>

Related sessions

SVS307: Easily add observability with AWS Lambda Powertools for Java

Wednesday, 30. November 1:00 PM – 2:00 PM

Level 1, Academy 417, Caesars Forum

SVS403: Effectively using Java on Serverless

Thursday, 1. December 3:30 PM – 4:30 PM

Convention Promenade, Palmer 2, Wynn



Thank you!

Maximilian Schellhorn

 @maschnetwork

Mark Sailes

 @MarkSailes3



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