

Building “serverless” Software with AWS Lambda

Jonathan Knapp
@acc_jonknapp



Hi, I'm Jon.

Code is Complicated



mongoDB®



ANSIBLE



PostgreSQL



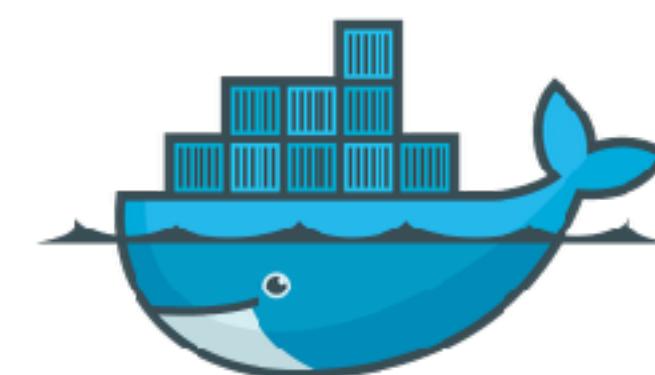
CHEF™



RVM



VAGRANT



docker

CO1DE

*“We’re paid to solve problems,
not by the number of lines of
code needed to maintain a
project.*

Me

What is Lambda?



- pay for what you use
- no servers to manage
- runs in response to AWS events
- integrates with AWS API Gateway
- runs Node, Java, Python, and C# natively
- automatic scaling and fault tolerance

Lambda is a
building block
for microservices.



What is “serverless”?



CODE

Serverless is a framework

The screenshot shows the official website for the Serverless Framework. The header features the "SERVERLESS" logo on the left and navigation links for "Framework", "Community", "Documentation", "Blog", "Enterprise", "Join Beta", and a search icon on the right. The main title "SERVERLESS FRAMEWORK VERSION 1.0" is prominently displayed in the center. Below it, a tagline reads "Build auto-scaling, pay-per-execution, event-driven apps on AWS Lambda". Two large, dark buttons with white text encourage users to "WATCH THE VIDEO" or "READ THE DOCS". At the bottom, a terminal window displays sample command-line code for setting up and deploying a Lambda function.

SERVERLESS

Framework Community Documentation Blog Enterprise Join Beta

SERVERLESS
FRAMEWORK
VERSION 1.0

Build auto-scaling, pay-per-execution, event-driven apps on AWS Lambda

► WATCH THE VIDEO

READ THE DOCS

```
# Install serverless globally
$ npm install serverless -g

# Create an AWS Lambda function in Node.js
$ serverless create --template aws-nodejs

# Deploy to live AWS account
$ serverless deploy

# Function deployed!
```

CODE

Serverless is a conference

the future will be

SERVERLESS

MAKE HISTORY IN NYC

May 26 & 27 2016

CODE

Serverless is a buzzword

 **kellan**
@kellan

Um, if it's **#serverless** why am I getting an
"IOError: No space left on device"?

RETWEETS LIKES

121 **247**



1:41 PM - 2 Jun 2016

Serverless is a mindset.

A blue spiral-bound notebook is positioned diagonally across the bottom left of the slide. The word "CODE" is printed in white capital letters on the front cover. The notebook has a spiral binding on the left side.

CODE

“You get to rent engineers from Google, AWS, Pagerduty, Pingdom, Heroku, etc for much cheaper than if you hired them in-house — if you could even get them, which you probably can't because talent is scarce.

Charity Majors, from “Operational Best Practices”

“But the flip side of this is that application engineers need to get better at thinking in traditionally operations-oriented ways about reliability, architecture, instrumentation, visibility, security, and storage.

Charity Majors, from “Operational Best Practices”



Serverless is not about a
lack of servers.

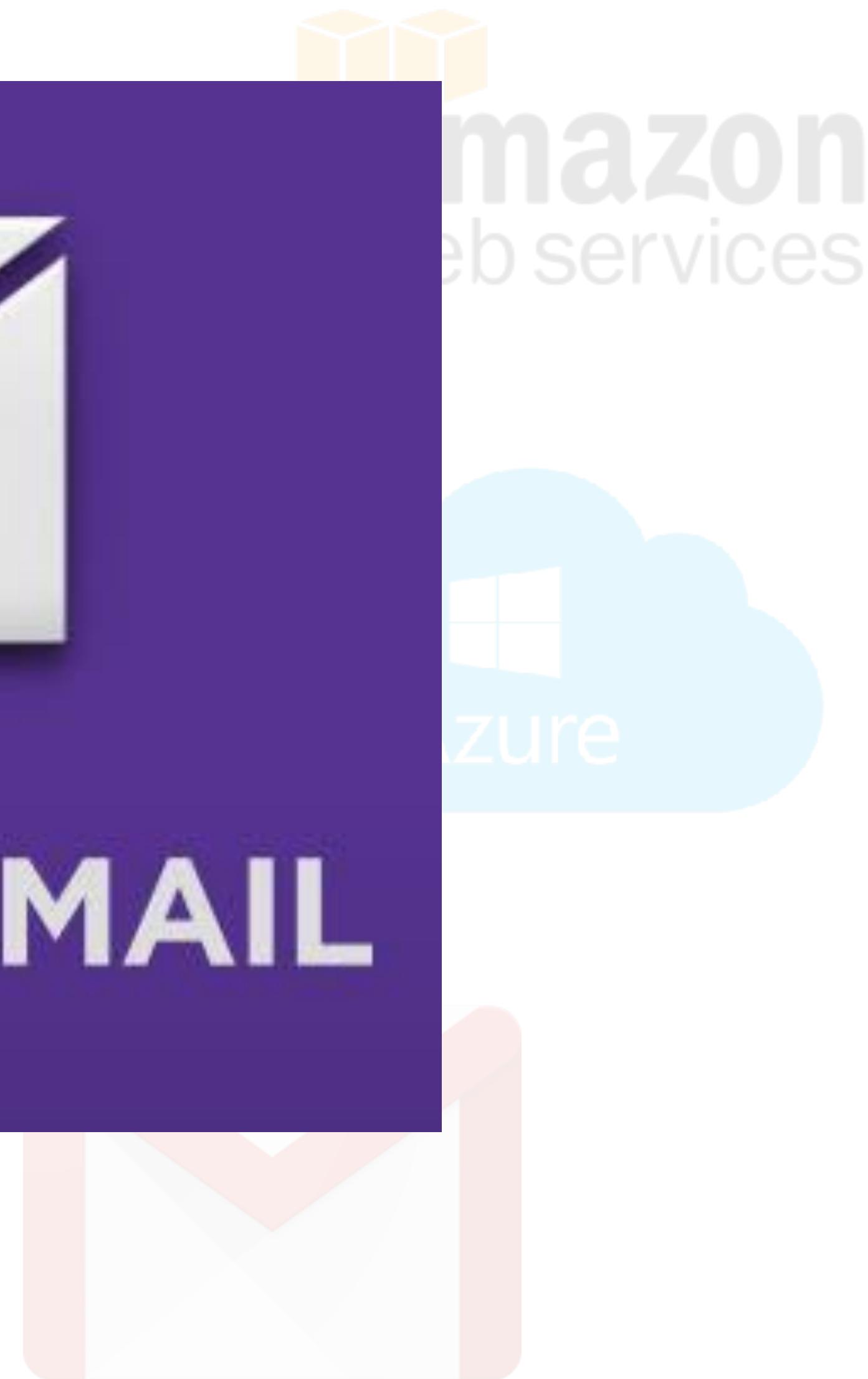
It's about not thinking
about them.

(as much)



CO1DE





*“Create a custom search
interface to the SEC’s Reg A,
Form C, and Form D filing
information.*

The Client

Objectives

- Parse html & xml pages on Edgar
- Avoid IP traffic restrictions
- Store massaged information for searching
- Archive filing attachments

RAILS



ALL THE THINGS!

Example Setup

Our Application

Our Server



- ruby/rails
- database
- cron

Example Setup

Our Application

Our Server



- ruby/rails
- database
- cron
- solr

Example Setup

Our Application

App Server



- ruby/rails
- cron
- solr

Database Server



- database

Example Setup

Our Application

App Server



- ruby/rails
- cron
- solr

Database Server



- database

Utility Server



- ruby/rails
- cron
- redis/resque

Example Setup

Our Application

App Server



- ruby/rails
- cron
- solr

Database Server



- database

Utility Server



- ruby/rails
- cron
- redis/resque

Code is Complicated



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PostgreSQL



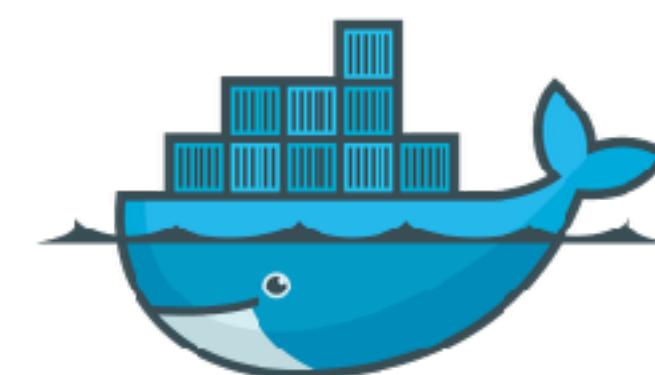
CHEF™



RVM



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docker

CO1DE

“Hidden” Objectives

- Edgar is a ~~horrible~~ piece of software not friendly to work with
- No tech team to hand off project to
- Unknown number of filings to process
- Insight into application errors
- Small, focused codebase
- Easy to maintain

Architecture



- Lambda - Background and async job processing
- ElasticSearch - Data storage and search interface
- S3 - Storage and web hosting of archived form filings
- SES - Email notifications and support requests
- SQS - Queueing of data processing requests
- CloudWatch - Logging and monitoring

- Rollbar - Error logging and alerting
- DigitalOcean - Public website hosting

CODE

Parser

website

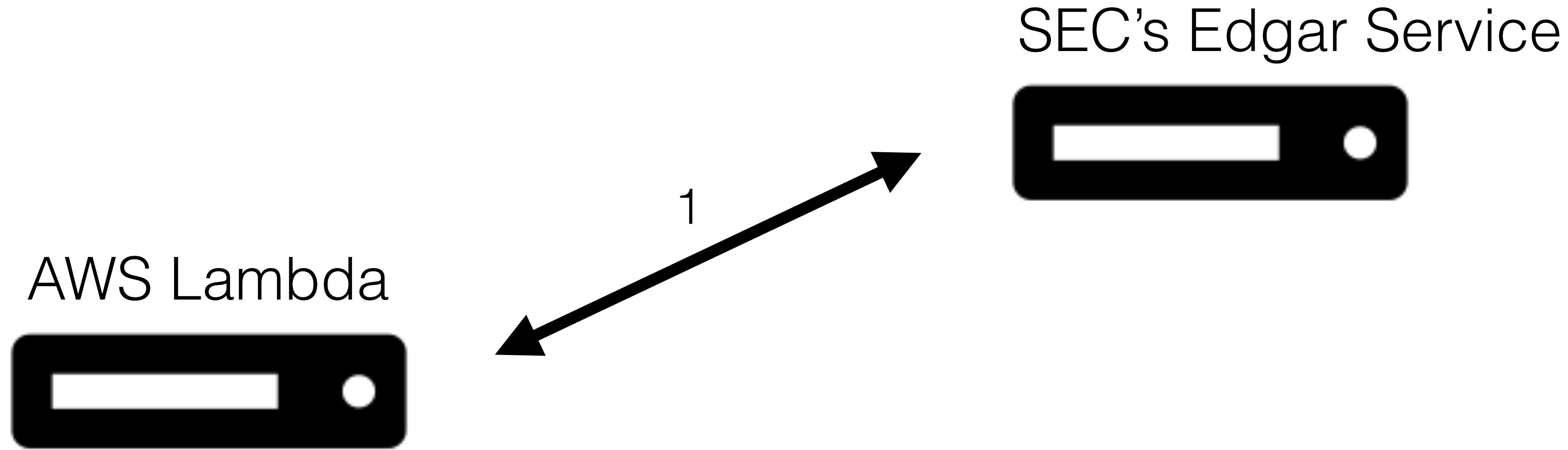
CODE

Lambda 1: Preparation

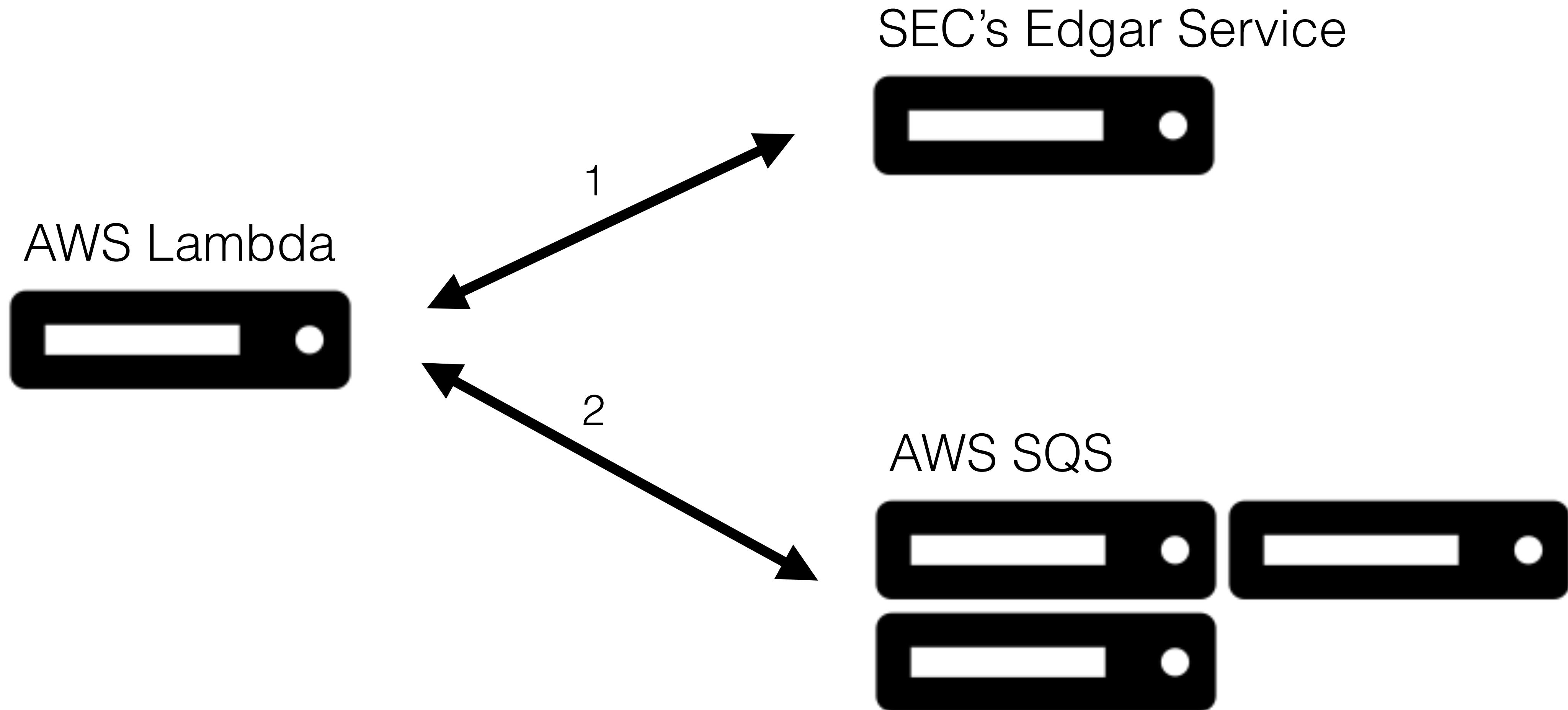
AWS Lambda



Lambda 1: Preparation



Lambda 1: Preparation

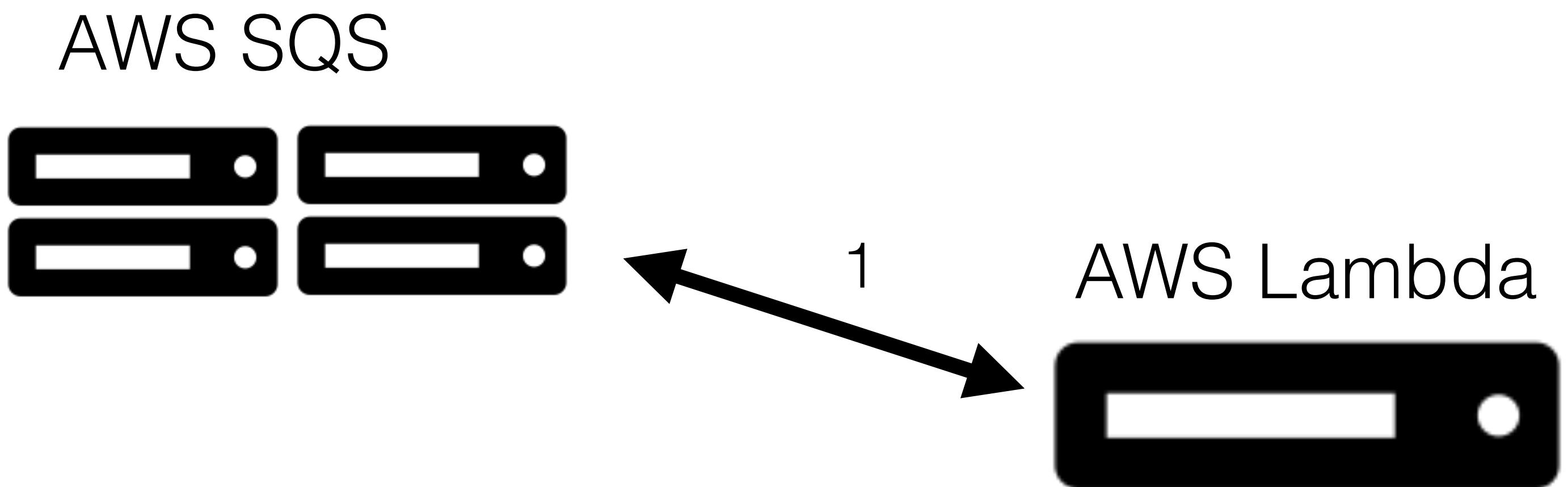


Lambda 2: Data Processing

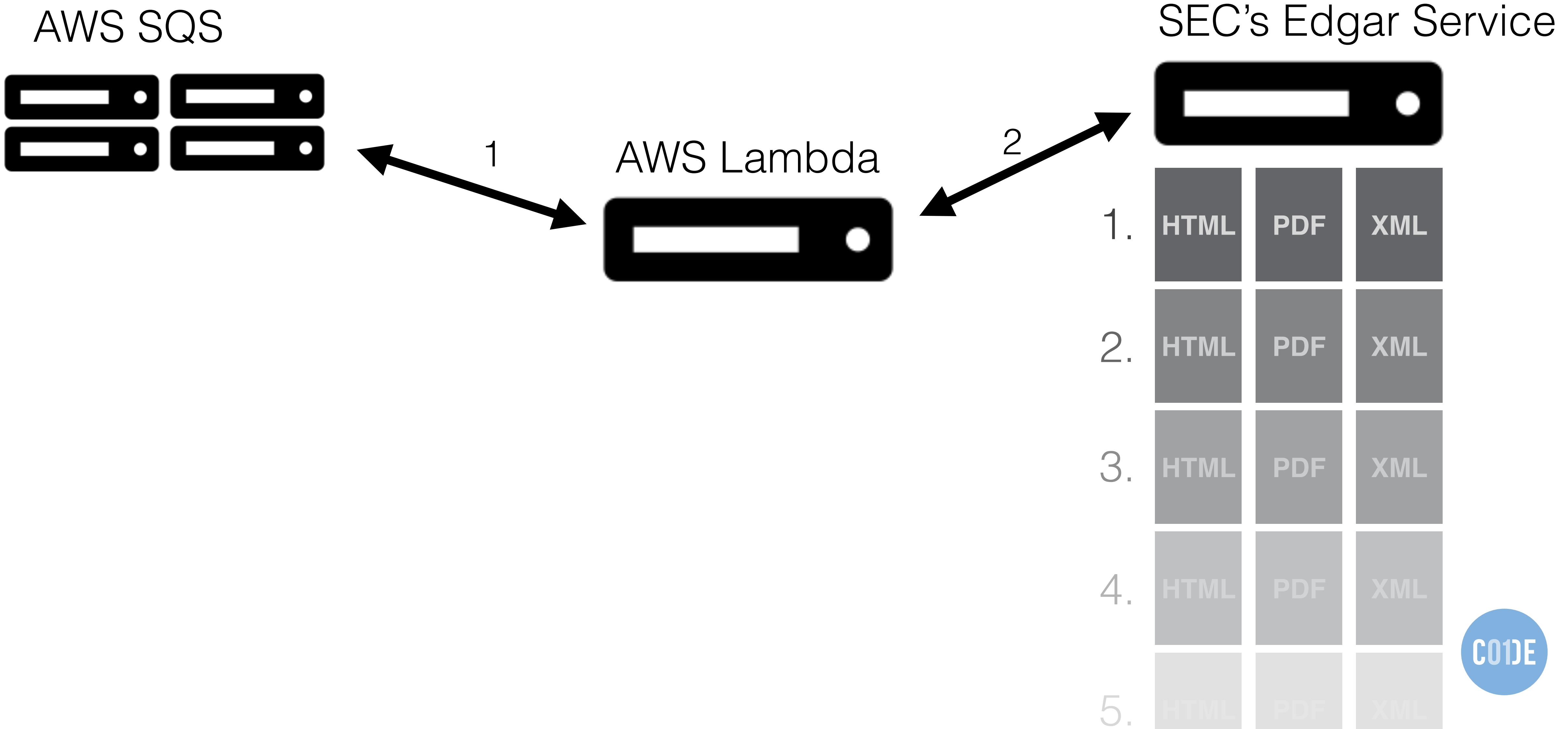
AWS Lambda



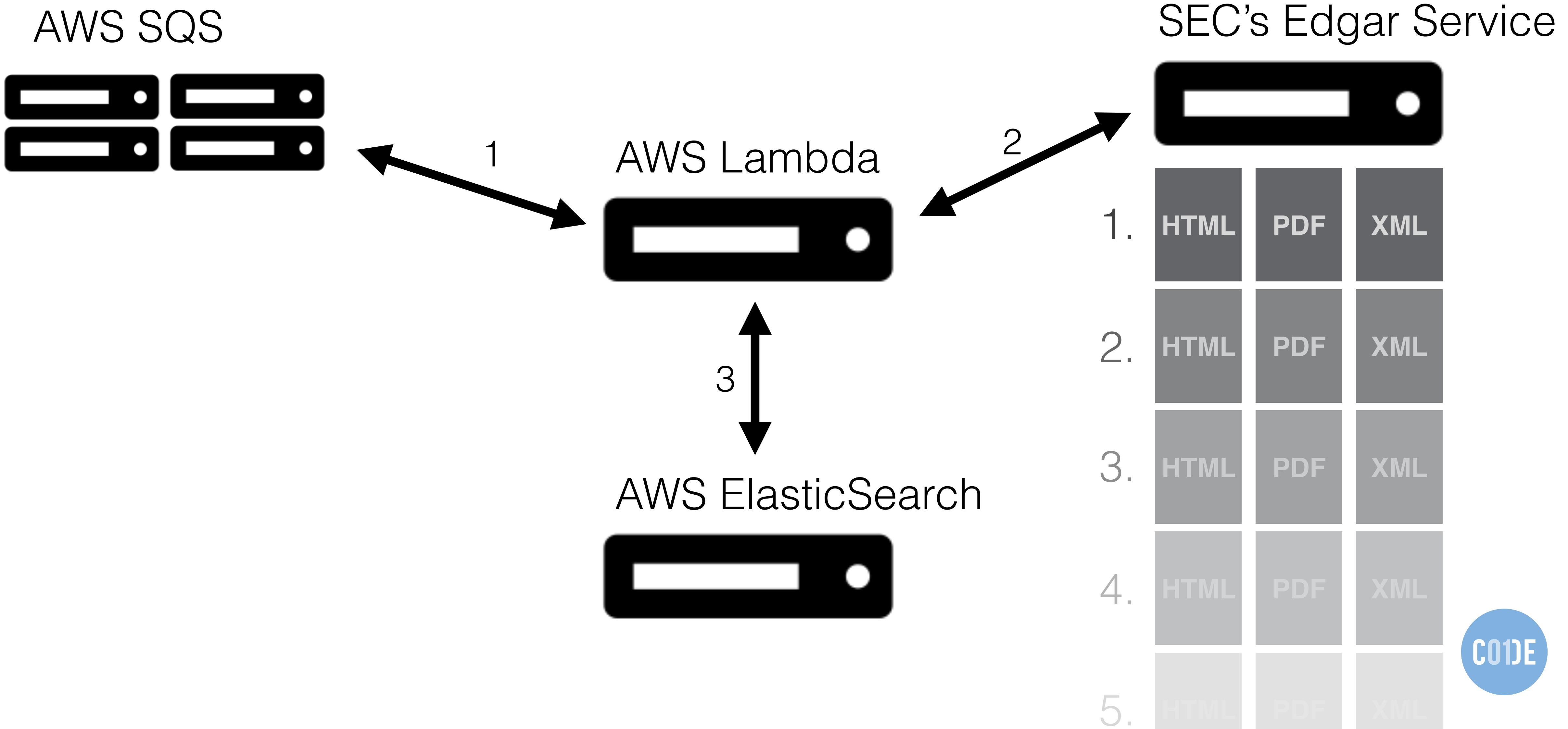
Lambda 2: Data Processing



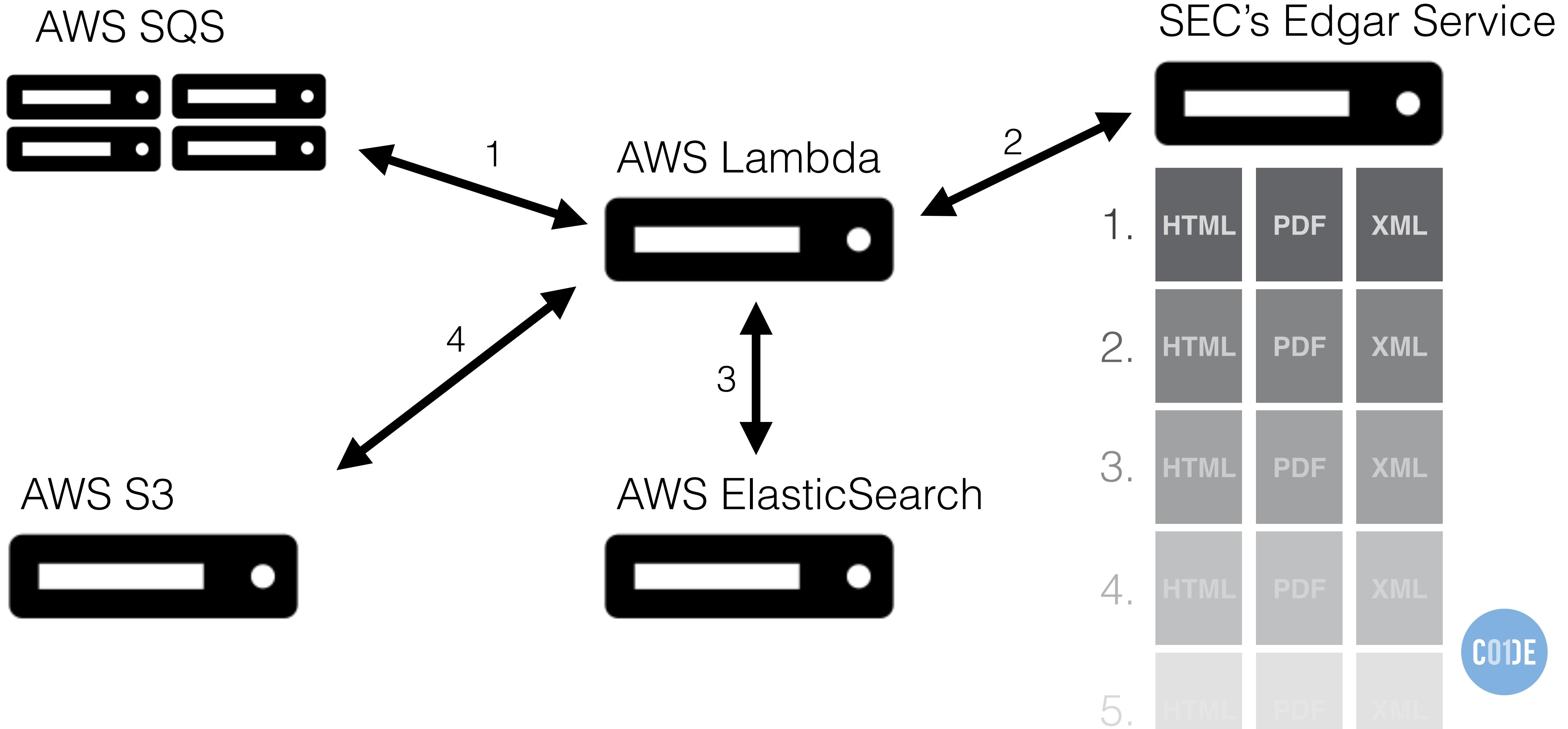
Lambda 2: Data Processing



Lambda 2: Data Processing



Lambda 2: Data Processing

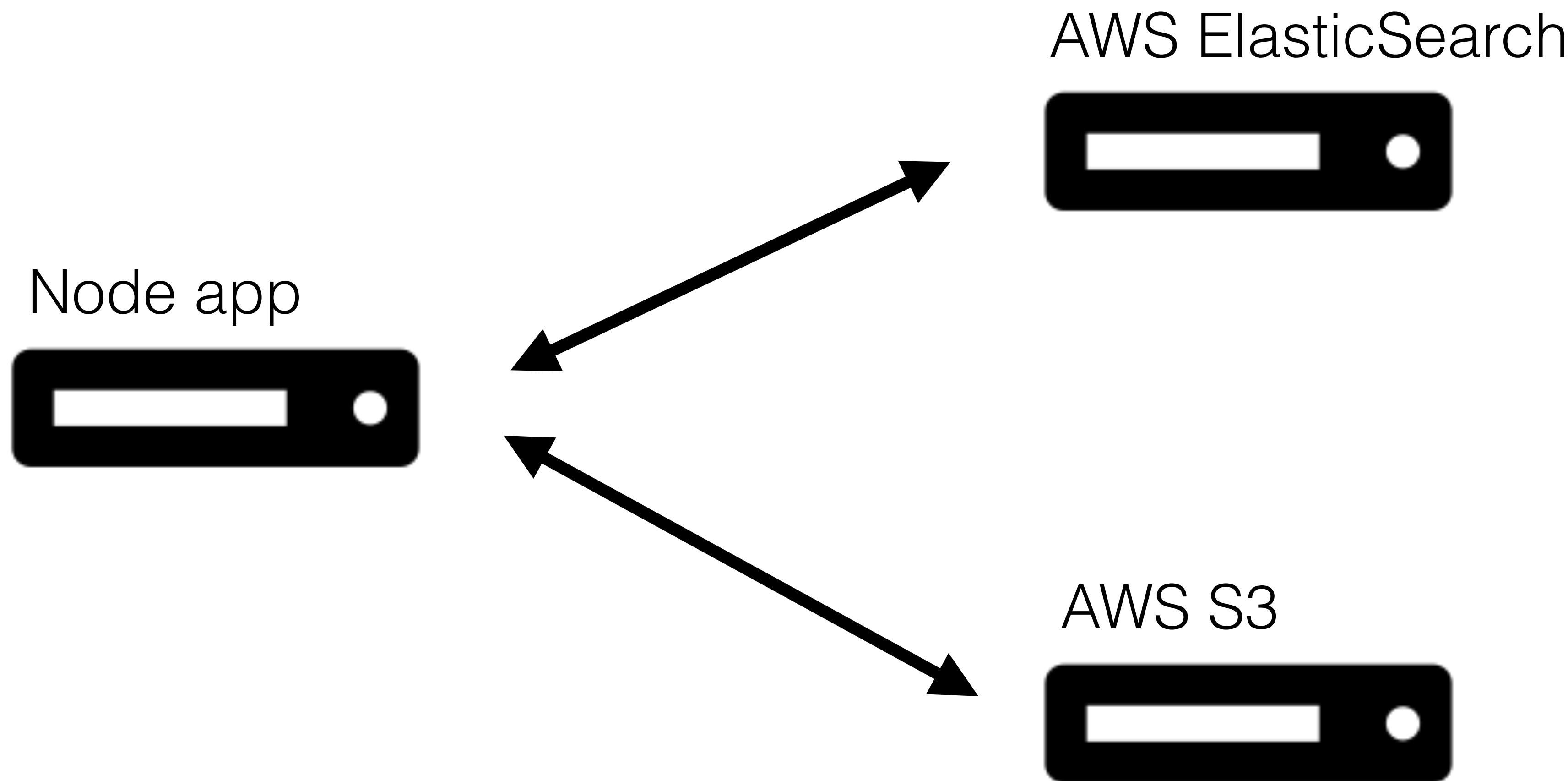


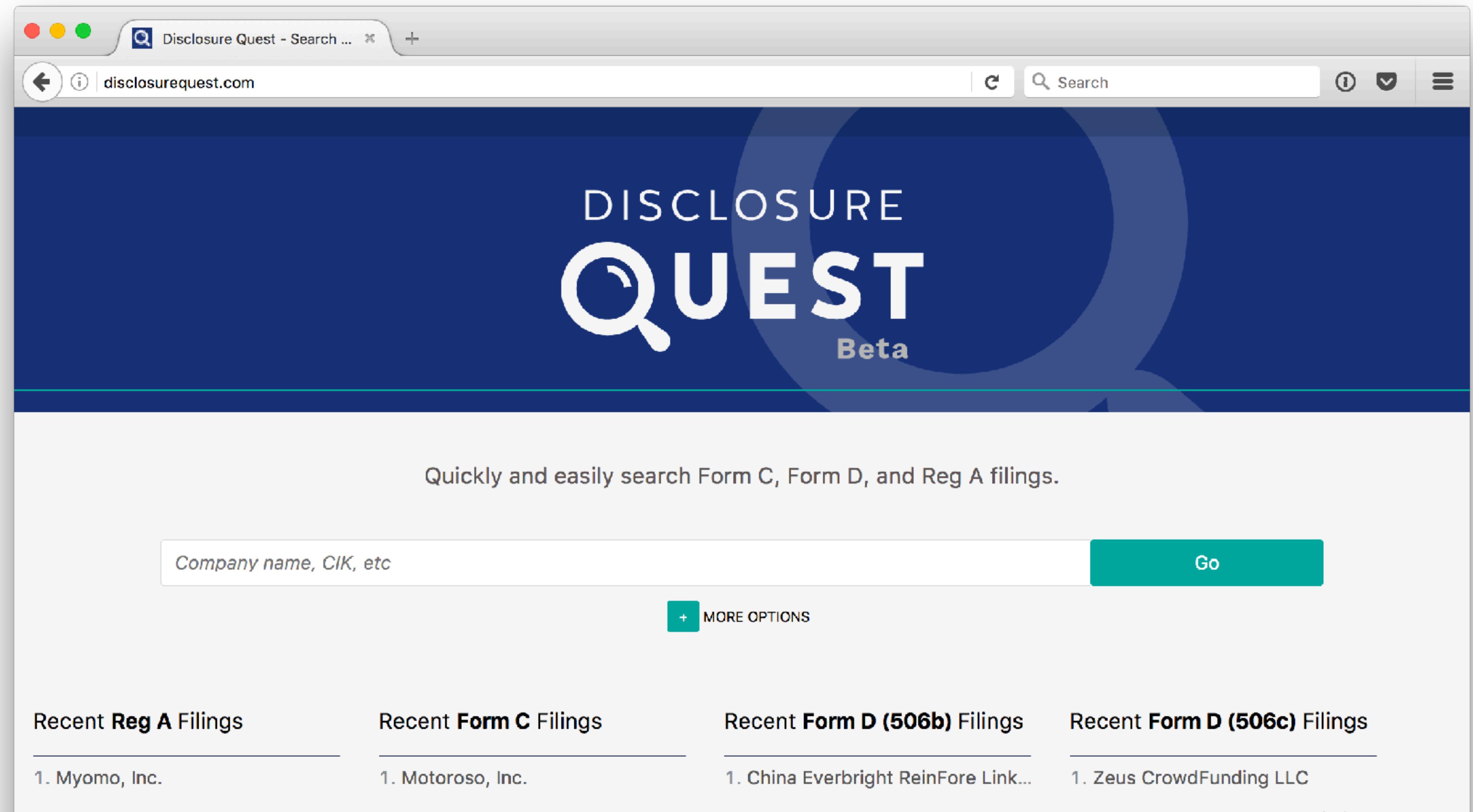
The Website

Node app



The Website





A screenshot of a web browser displaying the Disclosure Quest website. The title bar shows the URL "disclosurequest.com". The main header features a large magnifying glass icon and the text "DISCLOSURE QUEST Beta". Below the header, a sub-header reads "Quickly and easily search Form C, Form D, and Reg A filings." A search input field contains the placeholder "Company name, CIK, etc" with a teal "Go" button to its right. A "MORE OPTIONS" button is located below the search field. At the bottom, four sections display recent filings: "Recent Reg A Filings" (1. Myomo, Inc.), "Recent Form C Filings" (1. Motoroso, Inc.), "Recent Form D (506b) Filings" (1. China Everbright ReinFore Link...), and "Recent Form D (506c) Filings" (1. Zeus CrowdFunding LLC).

DISCLOSURE
QUEST
Beta

Quickly and easily search Form C, Form D, and Reg A filings.

Company name, CIK, etc

Go

+ MORE OPTIONS

Recent **Reg A** Filings

1. Myomo, Inc.

Recent **Form C** Filings

1. Motoroso, Inc.

Recent **Form D (506b)** Filings

1. China Everbright ReinFore Link...

Recent **Form D (506c)** Filings

1. Zeus CrowdFunding LLC

The Website

CODE

Disclosure Quest - Search ... +

disclosurequest.com

Search

DISCLOSURE QUEST

Beta

Quickly and easily search Form C, Form D, and Reg A filings.

Company name, CIK, etc

Go

+ MORE OPTIONS

Recent Reg A Filings	Recent Form C Filings	Recent Form D (506b) Filings	Recent Form D (506c) Filings
1. Myomo, Inc.	1. Motoroso, Inc.	1. China Everbright ReinFore Link...	1. Zeus CrowdFunding LLC
2. CapWest Income, LLC	2. EVELO, Inc.	2. LoanStreet Inc.	2. InvestX SPV 45 - SPTFY Limite...
3. Dubuc Motors Inc.	3. MB Fantasy Football League, Inc	3. OXYS Corp	3. Roan Creek Investments, LLC
4. MogulREIT I, LLC	4. PT Motion Works, Inc.	4. Kasisto, Inc.	4. Parkerson Church Reserve Inv...

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We'd love to hear your feedback! [+]

Disclosure Quest - Search ... +

disclosurerequest.com

Search

Quickly and easily search Form C, Form D, and Reg A filings.

Company name, CIK, etc

Go

- MORE OPTIONS

Type of Offering:

Form C X

Amount To Be Raised:

0 to 1000000000

Filing Date:

yyyy-mm-dd to yyyy-mm-dd

Type Of Security:

Equity X Option To Acquire X

Industry:

AGRICULTURAL SERVICES X

Business Services X

CIK Number:

0001231234

Principal Place Of Business:

OHIO X



Search Results - Disclosure... [×](#)

disclosurequest.com/results?sortColumn=&sortDirection=&searchBox=coffee+and+code&amountToBeRaisedMin=

coffee and code

Go

+ MORE OPTIONS

Found 128 results

↓ CSV

Page 1 of 3

Name	Type of Offering	Accepted Date
Code 3 Coffee, LLC	D	2016-02-16
Code On Network Coding, LLC	D	2011-12-27
RF Code, Inc.	D/A	2009-08-31
Code Holdings LLC	D	2010-04-09
RF Code, Inc.	D/A	2009-08-31
Code Green Networks Inc	D	2010-04-19
Deadly Codes Productions LLC	D	2013-10-29
Code Climate Inc.	D	2015-08-26
Code 42 Software, Inc.	D	2015-10-13
International Coding Technologies, Inc.	D	2011-02-25
code-laboration, llc	D	2011-08-18

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We'd love to hear your feedback! [+]

Artis Coffee Inc. Form D SE... +

disclosurerequest.com/form/0001192482-15-000106?returnURL=%2Fresults%3FsortColumn%3DcompanyName%26: C Search

DISCLOSURE
QUEST
Beta

← Back to search

Currently Viewing: DocumentHTML

The Securities and Exchange Commission has not necessarily reviewed the information in this filing and has not determined if it is accurate and complete.
The reader should not assume that the information is accurate and complete.

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM D

Notice of Exempt Offering of Securities

OMB APPROVAL
OMB Number: 3235-0076
Estimated average burden hours per response: 4.00

1. Issuer's Identity

CIK (Filer ID Number)
0001639233

Previous Names None

Entity Type
 Corporation
 Limited Partnership
 Limited Liability Company
 General Partnership
 Business Trust
 Other (Specify)

Name of Issuer
Artis Coffee Inc.

Jurisdiction of Incorporation/Organization
DELAWARE

Year of Incorporation/Organization
 Over Five Years Ago
 Within Last Five Years (Specify Year) 2013
 Yet to Be Formed

2. Principal Place of Business and Contact Information

Name of Issuer

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We'd love to hear your feedback! [+]

Success

CODE

Other Project Examples

- API Gateway to handle HTML form submissions
- Create one-off API endpoints w/out bloating codebase
- Manage web hook responses / send alerts to Slack
- Recreate static website from dynamic data on schedule

whatdoeslambdasupport.com

The screenshot shows a web browser window with the following details:

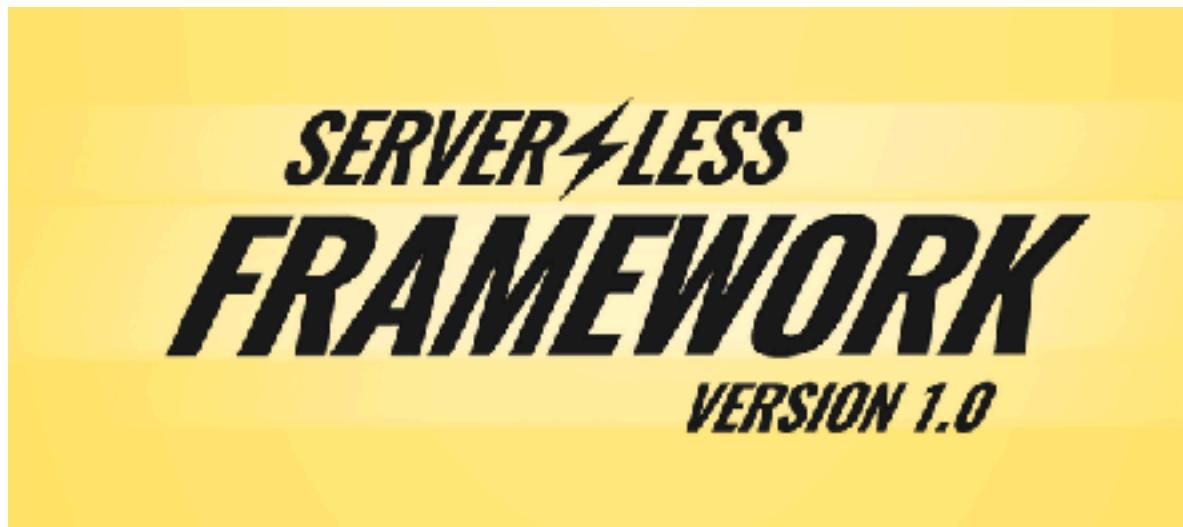
- Address Bar:** Shows the URL `whatdoeslambdasupport.com`.
- Content Area:**
 - A checkbox labeled `Display all test information` is unchecked.
 - A section titled **ES5 Features** is visible.
 - A sub-section titled **Object/array literal extensions** is expanded, indicated by a checked checkbox icon.
 - Under this section, four items are listed with checked checkboxes:
 - [+] Getter accessors
 - [+] Setter accessors
 - [+] Trailing commas in object literals
 - [+] Trailing commas in array literals
 - A note below states: *This test was not asynchronous and returned the following: true*.
 - A code block shows the following JavaScript code:

```
(function (){    return [1,].length === 1;})()
```
 - At the bottom, another item is partially visible: **Reserved words as property names**.

CODE

Tooling

Serverless (node)



- Most popular Node.js deployment library
- Working on a platform as a service
- Aspirations of running on other platforms

Apex (node/go/java/python)



- Built by TJ Holowaychuk of Node.js fame
- Uses Node.js shim to load Go code

AWS SAM (node/java/python)



- Simplified “application” YAML config
- Produced AWS CloudFormation file
- Uses Lambda, API Gateway, and DynamoDB
- Can utilize Swagger API definitions
- Requires multiple step deployment

Honorable Mentions

Tooling

- Zappa
- Gordon

Providers

- iron.io
- Azure Functions
- Google CloudFunctions

New and Shiny

- Environment variables
- Lambda dead letter queues
- API gateway routes with ANY and star routes
- Modify cloud front headers on requests at endpoint
- Upgrade of node.js environment (originally v0.10.4)
- AWS Serverless Application Model (SAM) file
- KMS integration to encrypt/decrypt env values

Lessons Learned

- Log vigorously
- Use error notification service and/or CloudWatch alerts
- AWS API Gateway could be much better
- API Gateway works with Swagger definition files (kind of)
- Think of your application in distinct parts (microservices)
- Learn IAM roles and how to tie services together

Questions?



Say hi!
coffeeandcode.com