I didn't know AWS Lambda could do that!



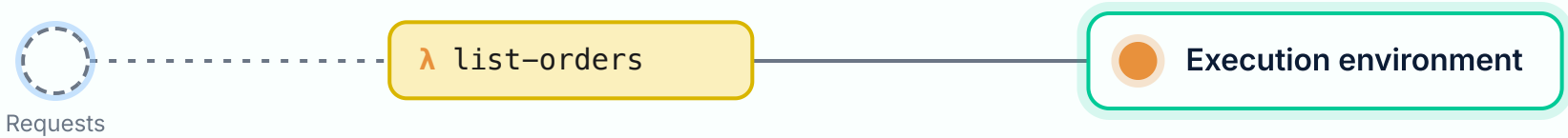
Erlend Ekern

Cloud architect

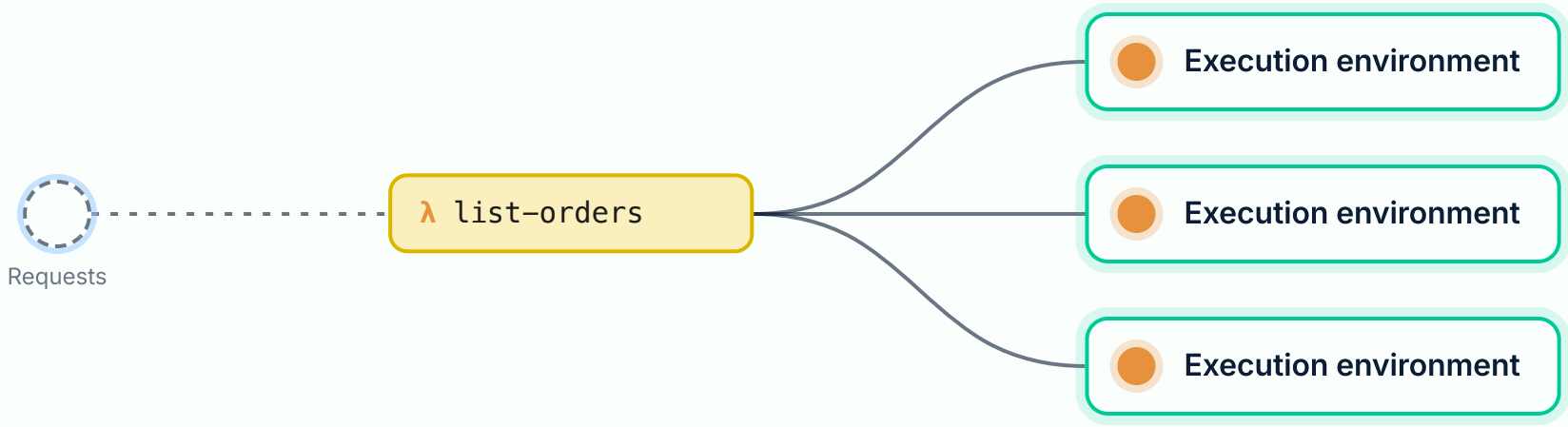
AWS Community Builder

The Lambda we know


API Gateway
GET
/orders
λ list-orders
POST
/orders
λ create-order
GET
/orders/{id}
λ get-order
DELETE
/orders/{id}
λ delete-order



1 request, 1 execution environment



3 requests at once, 3 execution environments

PROS

- No servers to manage
- Scale to zero
- Scales out fast
- Fine-grained architecture

CONS

- Cold starts
- One request at a time
- A new programming model
- 15 minutes at most

12 years of Lambda

2014

Lambda launches

Run code for each event. No servers to manage.

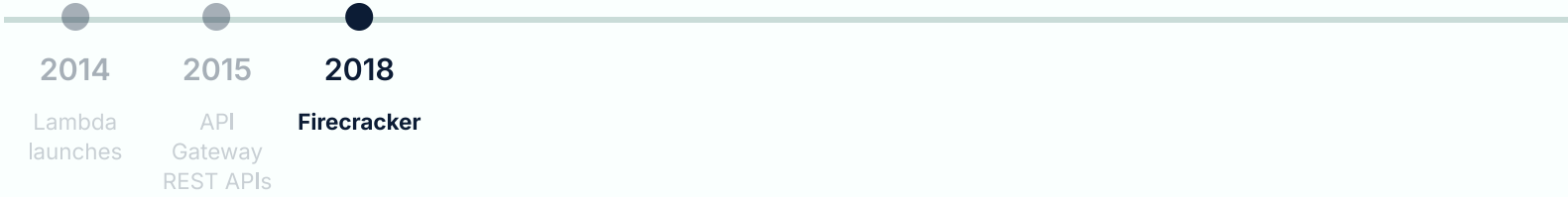
2014

Lambda launches

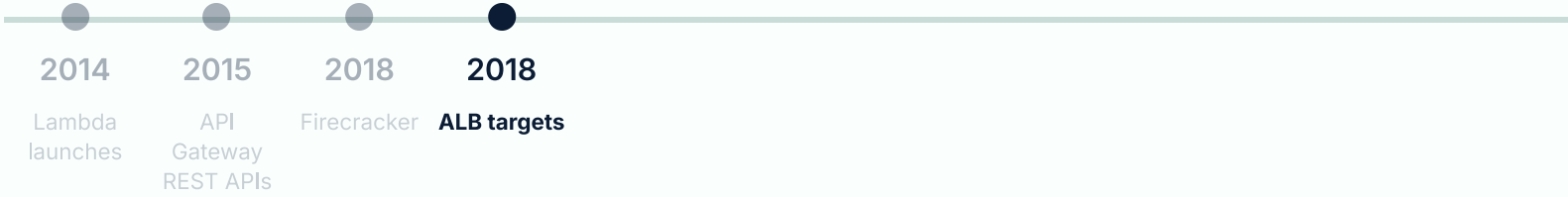
2015

API Gateway REST APIs

The first HTTP front door for Lambda: public endpoints, auth and throttling.



Lambda starts running on Firecracker for better isolation and performance.



A second way to put HTTP in front of Lambda, without API Gateway.



The new and better API Gateway! Cheaper and faster.



Open-source solution for running normal web frameworks on Lambda.



Built-in HTTPS endpoint on the function. No API Gateway or ALB required!



Run Lambda on EC2: cheaper at steady load, with concurrent requests (!)



Don't like Amazon States Language? Use this instead of Step Functions.


2014
Lambda launches
2015
API Gateway REST APIs
2018
Firecracker
2018
ALB targets
2020
API Gateway HTTP APIs
2021
Lambda Web Adapter
2022
Function URLs
2025
Managed Instances
2025
Durable Functions
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MicroVMs


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2026
MicroVMs
2026
Web Functions

We keep trying to run web servers on Lambda

We want serverless servers!

What options do we have?

REST API	Powerful, but convoluted
HTTP API	Simple, but lacks key features
ALB	Not very "serverless-y"
Function URL	Bare-bones

CloudFront + Function URL = 🧡 ?

Putting CloudFront in front of a Function URL is simple and a great idea!



I'll just set AuthType to AWS_IAM to ensure all requests go through CloudFront.



POST requests don't work because CloudFront doesn't add a required header. Maybe we add it client-side?



We don't control the clients.. Guess we'll have to add a Lambda@Edge function to do it instead.



Web Functions

12 October 2026

@erlendekern

```
1  // example/index.js
2
3  const { createServer } = require('node:http')
4
5  const server = createServer((req, res) => {
6    res.end('Hello, AWS User Group Oslo 👋\n')
7  })
8
9  const [host, port] = process.env.AWS_LAMBDA_HTTP_ENDPOINT.split(':')
10 server.listen(port, host)
```

SINGLE REGION

```
aws lambda-web deploy \
  --name example-webfn \
  --code ./example
```

🔒 https://k3x9q2mzt7.lambda-web.**eu-west-1**.on.aws

MULTI-REGION

```
aws lambda-web deploy \
  --name example-webfn \
  --endpoint-name prod \
  --endpoint-type MultiRegion \
  --regions eu-west-1,us-east-1
```

🔒 https://p8w4n6rjc2.lambda-web.**global**.on.aws

TRAFFIC SHIFTING

```
aws lambda-web update-web-function-endpoint \
  --function-name example-webfn \
  --endpoint-name prod \
  --revision-weights '[
    {"revisionId": "<old>", "weight": 90},
    {"revisionId": "<new>", "weight": 10}
  ]'
```

Bring-your-own web server

Concurrent requests

CPU time billing

Multi-region

Under the hood

- **Node.js** and Arm only
- **Shared** execution environments
- Cost and performance: **about the same**
- Plugs right into **CloudFront**!

Pretty nice!

But we're still capped at 15 minutes...

What if the work takes hours?

MicroVMs

22 June 2026

@erlendekern

The life of a MicroVM

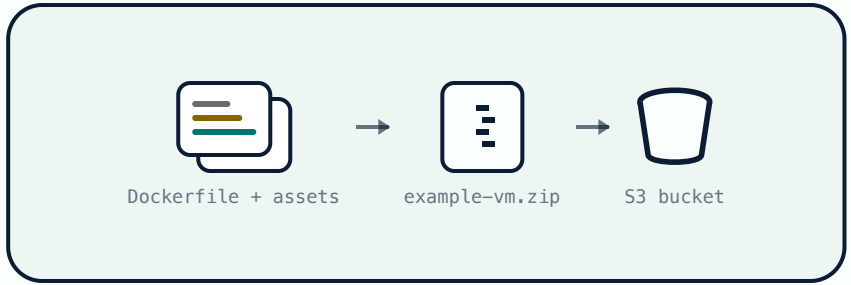



```
# Dockerfile
FROM python:3.13-alpine
CMD ["python", "-m", "http.server", "8080"]
```

It starts with a Dockerfile

The life of a MicroVM

Building — Running — Suspended — Terminated



Zip it and ship it to S3

The life of a MicroVM

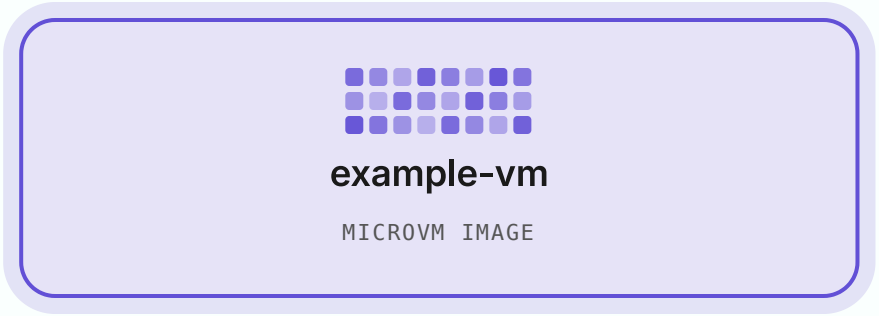



```
aws lambda-microvms create-microvm-image \
  --name example-vm \
  --code-artifact uri=s3://bucket/example-vm.zip …
```

Lambda builds your container in a VM, and starts your app

The life of a MicroVM





Lambda snapshots the memory and disk, and creates an image

The life of a MicroVM

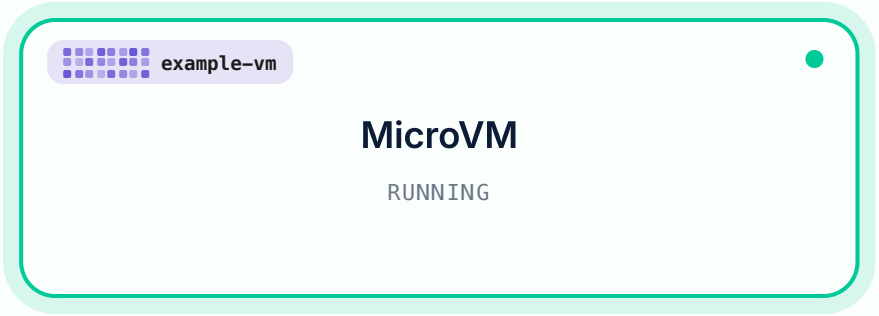
Building — **Running** — Suspended — Terminated

```
aws lambda-microvms run-microvm \
  --image-identifier example-vm …
```

You now have a reusable MicroVM image you can run

The life of a MicroVM

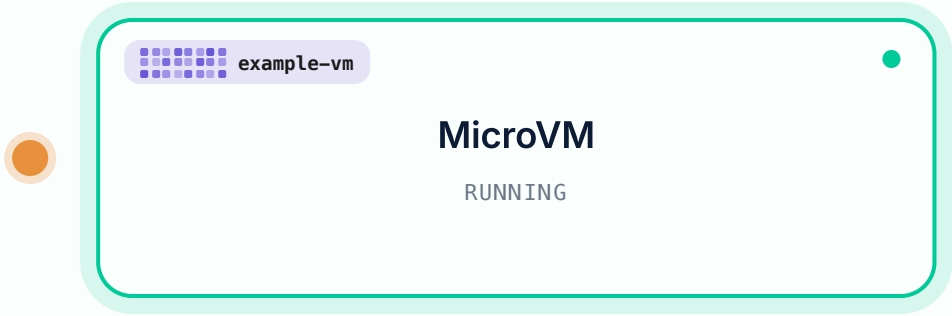
Building | **Running** | Suspended | Terminated



In seconds, a MicroVM is spun up

The life of a MicroVM

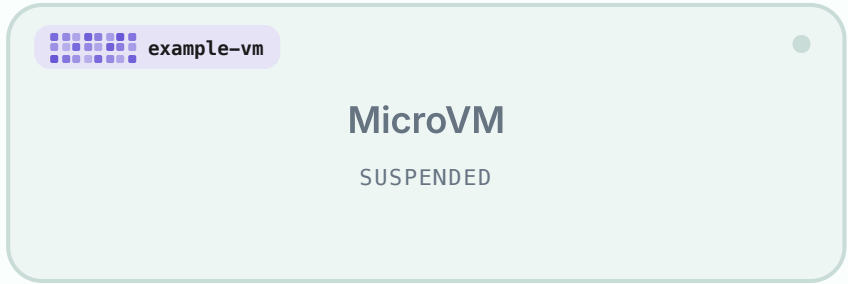




It gets its own public HTTPS URL behind authentication

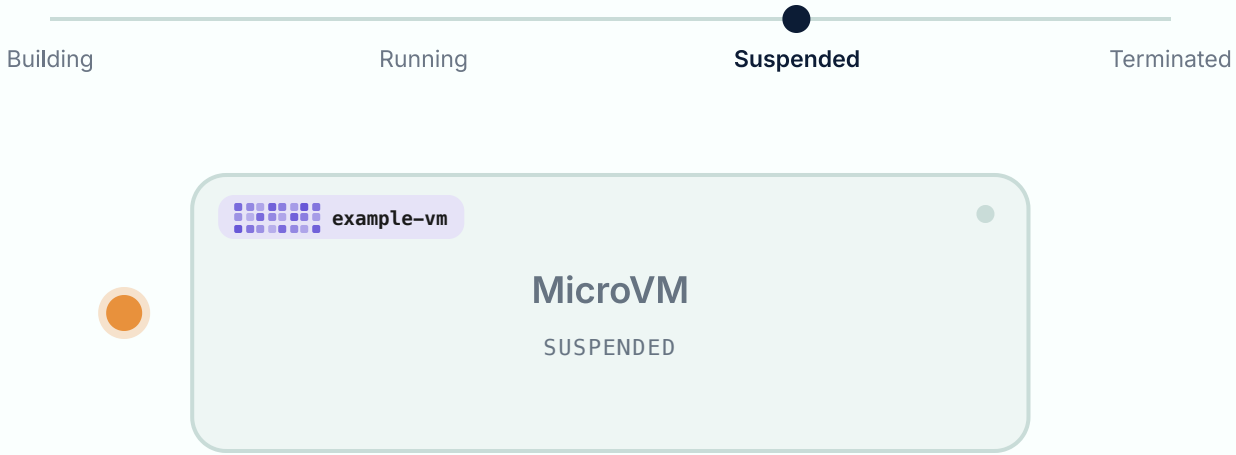
The life of a MicroVM





Idle? It suspends, while memory and disk are kept

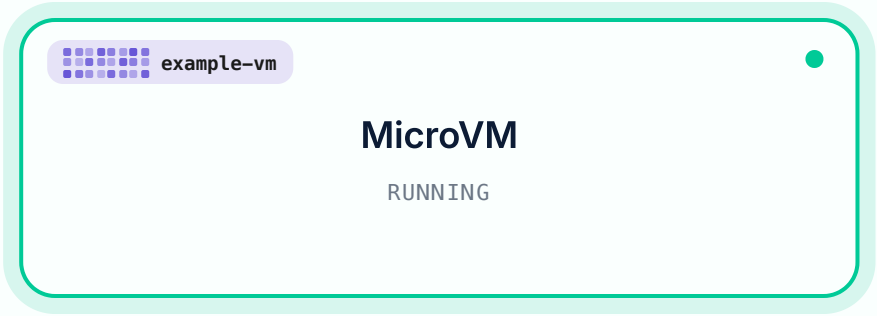
The life of a MicroVM



A new request wakes it up, and in seconds it's back in business

The life of a MicroVM





A new request wakes it up, and in seconds it's back in business

The life of a MicroVM



After 8 hours it's bye-bye 👋

Isolated

Long-lived

Suspend/resume

Near-instant startup

Under the hood

- Use **hooks** (`/ready` , `/validate` , ...) for more control
- Endpoint requires an **auth token**
- Check your **randomness**
- Costs **~3x** Fargate

The Lambda primitives

Lambda

Web Functions

Pay-as-you-go
web server

Lambda

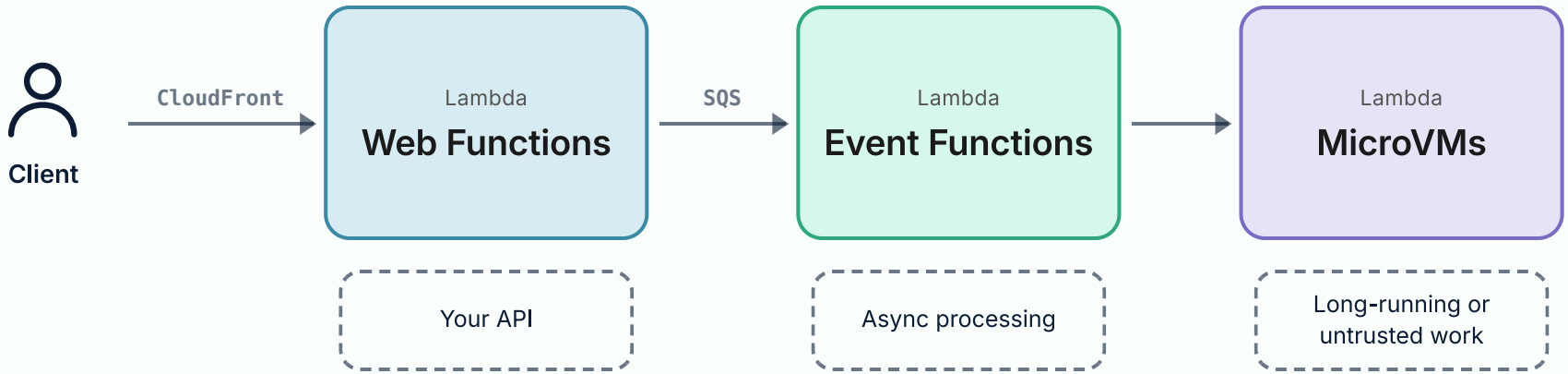
Event Functions

Event handling, glue code,
integrating AWS services

Lambda

MicroVMs

Isolated,
resumable VMs


Client
CloudFront
Lambda
Web Functions
SQS
Lambda
Event Functions
Lambda
MicroVMs
Your API
Async processing
Long-running or
untrusted work

Demo?

Useful, new primitives for the AI era™

@erlendekern

Capra

Thank you!

Slides at talks.ekern.me

@erlendekern



Capra