



# TypeScript for Cloud Infrastructure: AWS CDK

Martin Müller

# Who am I?

MartinMueller.dev/Resume



A screenshot of a web browser displaying a resume page. The header reads "Martin Mueller's Blog || Resume || Projects". Below the header, there is a "Translate To German" button. The main section is titled "Martin Mueller Resume" and features three images: a couple smiling, a man running in a race, and a decorated Christmas tree. At the bottom, there is a sidebar with social media links for LinkedIn, GitHub, a website, and email.

LinkedIn: linkedin.com/in/martinmueller88

Github: mmuller88

Website: martinmueller.dev

Email: office@martinmueller.dev



## Summary

office@martinmueller.dev

Passionate Full Stack Developer. I like to have a broad collection of skills. From developing the backend and frontend applications written in Java, JavaScript, or any other language, to developing a cost-optimized cloud infrastructure solution. An enthusiastic agile player with strong communication skills. Looking for taking on new challenges and learning new technologies.

"What I don't know, I will learn"

## Highlights

- AWS Professional Solution Architect certified 
- AWS Community Builder
- TypeScript, Java, JavaScript, Angular, React
- AWS Lambda, EC2, CDK, DynamoDB and many more
- Maven, Gradle, SQL, ElasticSearch
- Docker, Kubernetes, Helm
- Spring, GitHub (Actions), Travis, GitLab, BitBucket

## Experience

AWS Community Builder

Mar 2022 - current

AWS Consultant

Nov 2020 - current

- Helping startups into the AWS Cloud
- Leveraging AWS CDK to manage AWS resources

Senior Cloud Architect - www.kreuzwerker.de, GER

Jan 2022 - May 2022

- Together with the customer building awesome AWS cloud solutions

# Co-Founder and CTO at [HalloCasa.com](#)

The screenshot displays the homepage of the HalloCasa website. At the top, there is a navigation bar with the HalloCasa logo, menu items for "Propiedades", "Agentes", "Precios", "Iniciar Sesión", and "Español", and a search bar. Below the navigation, there are four smartphone mockups showing different features of the app: "My Properties" (listing a property), "Available" (showing a map of available properties), "Where I operate" (map of operating areas), and a video player. To the right, there is a profile card for "Anna Schmidt" from Berlin, Germany, listing her as a Lawyer/Broker and showing her contact information. The main headline reads "El Creador de Página Web Inmobiliaria más Fácil" (The easiest way to create a real estate website). A large orange button labeled "EMPIEZA YA!" (Start Now!) is prominently displayed. Below this, a video thumbnail shows a man named Juan and the text "Mira el Video: Solo necesitas 5 Minutos..". At the bottom, there is a contact form with fields for "Book an Appointment!", a phone number (+54234234325), and an email address (vewihis319@iucake.com), along with a small social media icon.

**01**

# Agenda

**02**

**Overview of AWS CDK**

**Introduction**

**03**

**Why I love AWS  
CDK**

**05**

**Example**

**04**

**Comparison with  
other IaC Tools**

**06**

**Reflecting & QA**





# 01 Introduction

# Introduction

Cloud computing:

- Allows user to access and store data and utilize computing resources on remote servers / cloud infrastructure
- Many cloud provider out there: AWS, Azure, GCP, ...

AWS (Amazon Web Services):

- Part of Amazon 
- Offers services for Storage, Compute, Content Delivery and many more



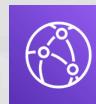
EC2



Lambda



S3



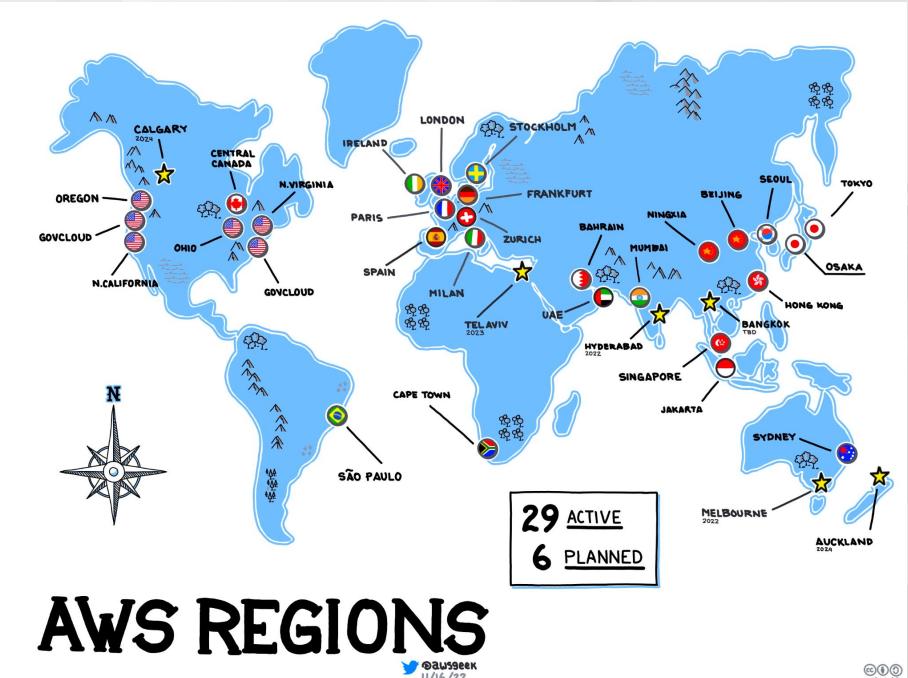
Cloudfront

# Introduction

- Big server buildings around the world



Frankfurt (Main) eu-central-1



## AWS REGIONS

# Introduction

## IaC (Infrastructure as Code):

- An important DevOps practice for managing and provisioning cloud infrastructure with code
- Can be script files like .yml, .tf or real programming languages like .ts or .py files

```
resource "aws_api_gateway_method" "proxy_root" {  
    rest_api_id      = "${aws_api_gateway_rest_api.this.id}"  
    resource_id       = "${aws_api_gateway_rest_api.this.root_resource_id}"  
    http_method       = "ANY"  
    authorization     = "NONE"  
}  
  
resource "aws_api_gateway_integration" "proxy_root" {  
    rest_api_id      = "${aws_api_gateway_rest_api.this.id}"  
    resource_id       = "${aws_api_gateway_method.proxy_root.resource_id}"  
    http_method       = "${aws_api_gateway_method.proxy_root.http_method}"  
    integration_http_method = "POST"  
    type              = "AWS_PROXY"  
    uri               = "${local.function_invoke_arn}"  
}
```

Terraform .tf file

```
export class RestApiStack extends core.Stack {  
    constructor(scope: Construct, id: string, props: RestApiStackProps) {  
        super(scope, id, props);  
  
        const restApi = new apigateway.RestApi(this, 'RestApi', {  
            restApiName: `RestApi-${props.stage}`,  
        });  
  
        const helloLambda = new lambdajs.NodejsFunction(this, 'lambda');  
  
        restApi.root  
            .addResource('hello')  
            .addMethod('GET', new apigateway.LambdaIntegration(helloLambda));  
    }  
}
```

AWS CDK .ts file

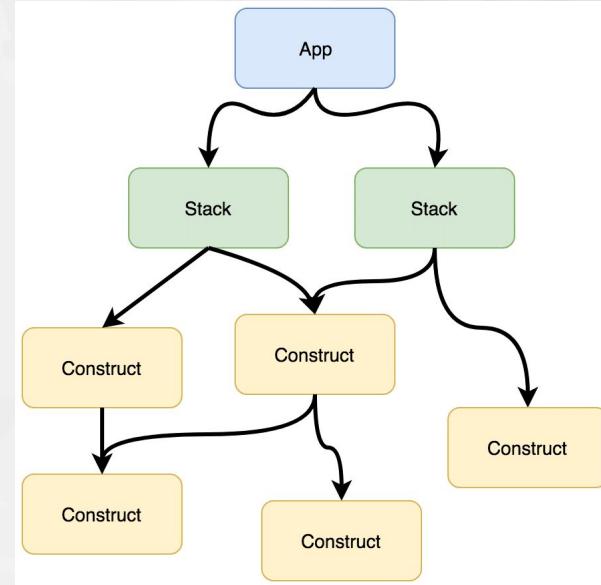


## 02 Overview of AWS CDK

# Overview of AWS CDK

What is AWS CDK?

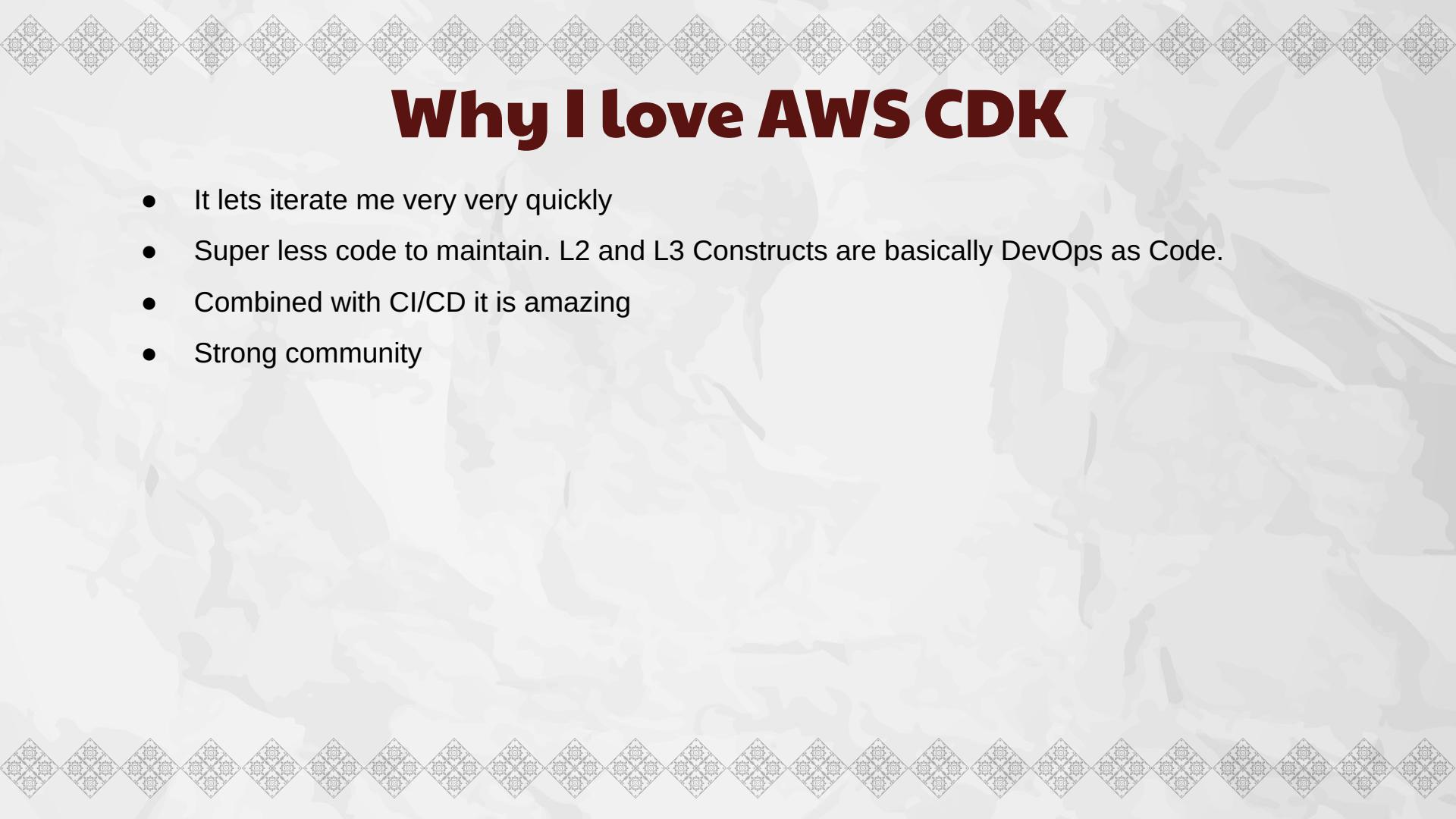
- IaC framework written in TypeScript
- Compiles to CloudFormation
- Open-source <https://github.com/aws/aws-cdk>
- Composite Pattern + L2 and L3 constructs
- L2 and L3 constructs are very opinionated



Composite Pattern, L2 and L3 constructs  
<https://aws.amazon.com/blogs/aws/boost-your-infrastructure-with-cdk/>



## 03 Why I love AWS CDK



# Why I love AWS CDK

- It lets iterate me very very quickly
- Super less code to maintain. L2 and L3 Constructs are basically DevOps as Code.
- Combined with CI/CD it is amazing
- Strong community



## 04 Comparison with other IaC Tools

# Comparison with other IaC Tools

CloudFormation:

- Sucks as it is an awful developer experience
- Just use AWS CDK

Terraform:

- Sucks as no higher programming language concepts are available
- You need additional tools like Terragrunt to keep it DRY

CDKTF:

- Cool alternative but I'm missing sophisticated L2 and L3 constructs. Though community modules are close (<https://github.com/terraform-community-modules>)

Pulumi:

- Seems promising but I don't have experience with it.
- Probably missing of L2 and L3 constructs as well



## 05 Example

# Example

- API Gateway with Lambda Integration
- <https://github.com/mmuller88/cdk-pipeline>

# Reflecting & QA

- AWS CDK is an awesome IaC tool!
- How to start?
  - Use that for free <https://cdkworkshop.com> for free
  - Join the CDK Slack community
  - Buy the CDK book <https://thecdkbook.com>



## 06 QA



[linkedin.com/in/martinmueller88](https://www.linkedin.com/in/martinmueller88)



[mmuller88](https://github.com/mmuller88)



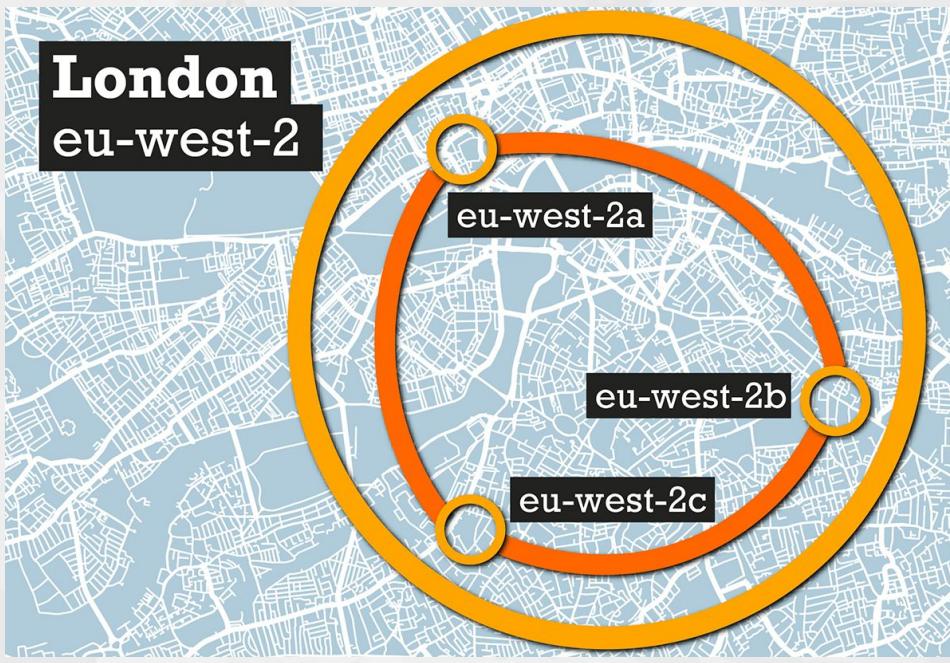
[martinmueller.dev](http://martinmueller.dev)



[office@martinmueller.dev](mailto:office@martinmueller.dev)

# What is AWS?

- Redundant buildings per region for better availability





# 01 Introduction

# What is AWS?

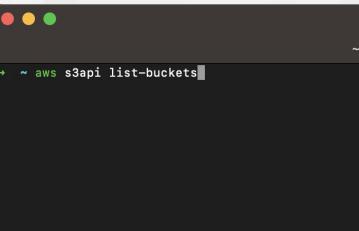


- Amazon Web Services
- Part of Amazon
- Offers services for Storage, Compute, Content Delivery and many more



EC2 Lambda S3 Cloudfront

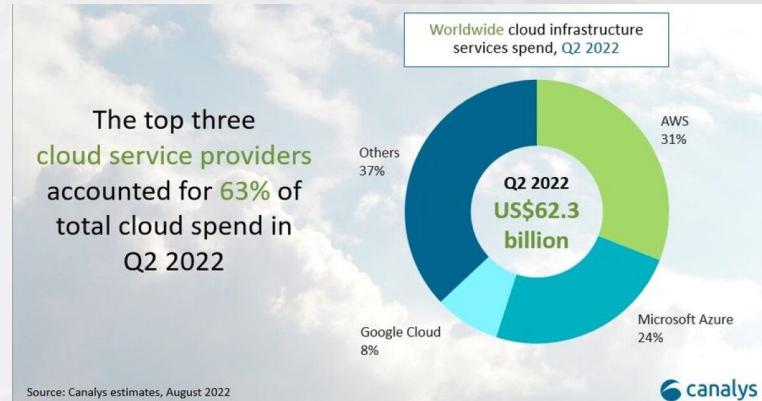
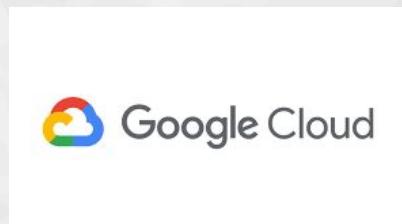
- Access with AWS Console, CLI, SDK (Python, TypeScript, ...)



```
You, 18 hours ago | 1 author (You)
1 import AppsyncClient from 'appsync-client';
2 import * as lambda from 'aws-lambda';
3
4 const { TABLE_NAME = '' } = process.env;
5
6 const USER_ID = 'd0a5517a-9088-487e-aec6-fbd7b3696363';
7
8 import * as AWS from 'aws-sdk';
9 import { CreateDeviceDocument, DeviceType } from './lib/api';
10 const docClient = new AWS.DynamoDB.DocumentClient();
11 const { APPSYNC_URL } = process.env;
12
13 const client = new AppsyncClient({ apiUrl: APPSYNC_URL });
14
15 /**
16  * @param event
17  * @returns
18  */
19 export async function handler(event: lambda.UserMigrationTriggerEvent) {
20   console.debug(`event: ${JSON.stringify(event)}`);
21
22   const params: AWS.DynamoDB.DocumentClient.QueryInput = {
23     TableName: TABLE_NAME,
24     KeyConditionExpression: `id = :id`,
25     ExpressionAttributeValues: {
26       ':id': `USER_${USER_ID}`,
27     },
28   };
29 }
```

# What is AWS?

- Alternative Cloud Provider are:



- BTW you are probably using AWS already indirectly  
The tool/service you are using is probably build in the cloud!



# Why use it? (Company)

Outsourcing:

- Almost every company has an IT department
- Outsource IT hardware for reducing cost
- Migrate to cloud native / serverless offers done correctly improves aspects of:
  - Performance
  - Security
  - Operational Excellence
  - Costs
  - Reliability
  - Sustainability



# Why use it? (Startup)

Greenfield:

- Having a cool SaaS business idea?
- AWS Cloud is the perfect place to implement it!
- Don't worry about IT hardware
- Pay as you go. If you use the cloud less you pay less

Startup friendly:

- Apply for AWS Active and get \$100k credits



# Why (not) use it?

- Lock-in
- Inexperience can cost you
  - Use AWS Courses to learn!
  - AWS certificates are super helpful

## Available AWS Certifications

### FOUNDATIONAL

Six months of fundamental AWS Cloud and industry knowledge



### PROFESSIONAL

Two years of experience designing, operating, and troubleshooting solutions using the AWS Cloud



### ASSOCIATE

One year of experience solving problems and implementing solutions using the AWS Cloud



### SPECIALTY

Technical AWS Cloud experience in the Specialty domain as specified in the exam guide



**aws certified**

Updated February 2022



## 03 Why I love it!

# Why I love it!

- I can offer my expertise to earn money as a freelancer to buy food
- Helps me to evaluate and implement my startup ideas
- The developer experience is amazing and super satisfying
- Having amazing AWS communities to help and learn from each other
- If you need help with the cloud look on:
  - hire in those communities!
  - Upwork.com
  - Ask me :)

