ALL DAY DEVOPS

NOVEMBER 12, 2020

Infrastructure as REAL code with AWS CDK

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#Cloud #DevOps #SRE
#AWS #K8S #Serverless
#Infrastructure #OSS

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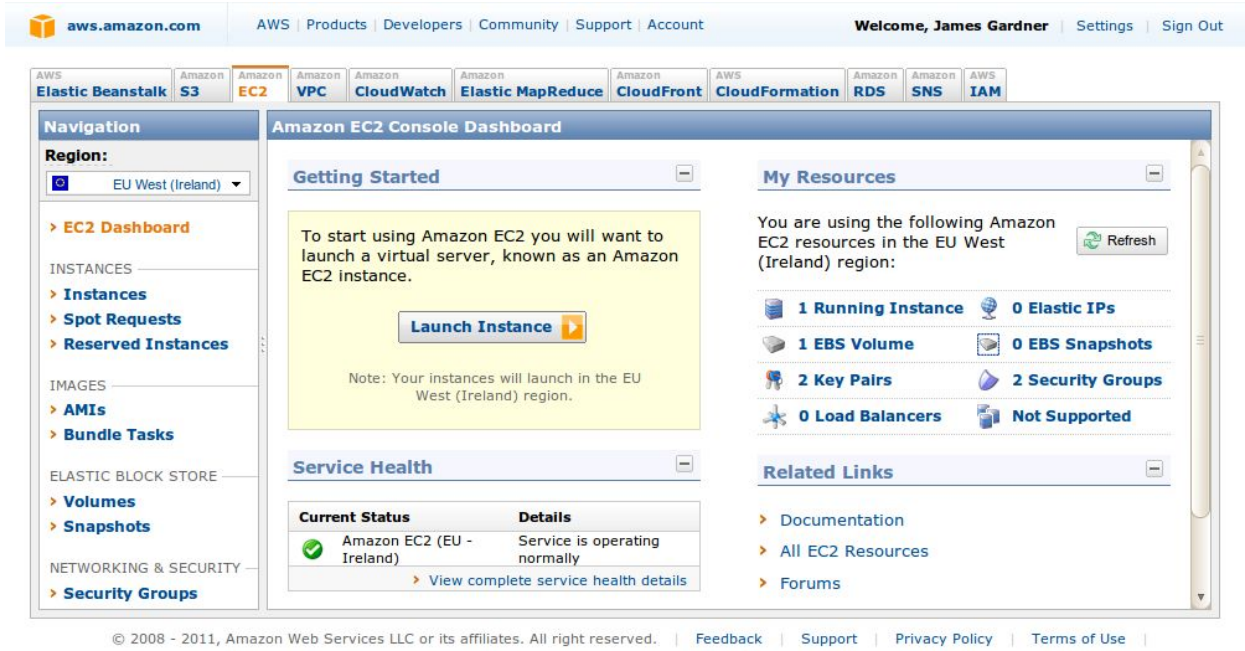
Infrastructure As REAL Code

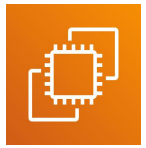
Starting POINT.

Infrastructure as Code

Manual Provisioning

- Easy provisioning
- Not reproducible
- Time consuming
- Multi Environnement
- Error prone





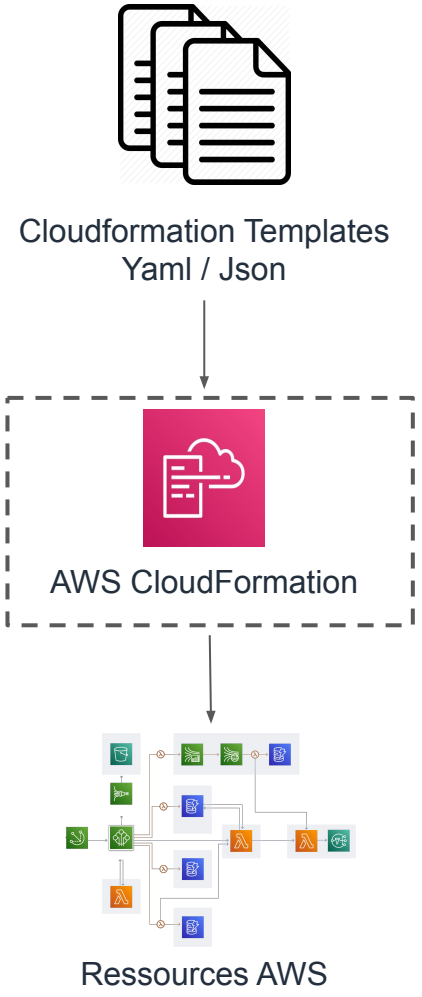
Amazon EC2

Amazon S3

Infrastructure as Code

CloudFormation

- Easy to automate
- Reproducible
- Syntax
- Lot of details

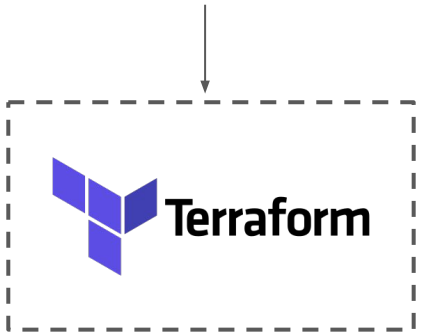


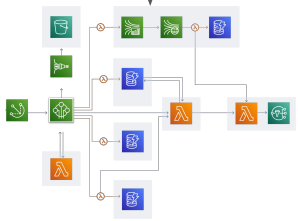
Infrastructure as Code

Terraform

- Easy to automate
- Reproducible
- HCL Syntax
- No Abstraction
- Lot of details

Fichiers TF (HCL)



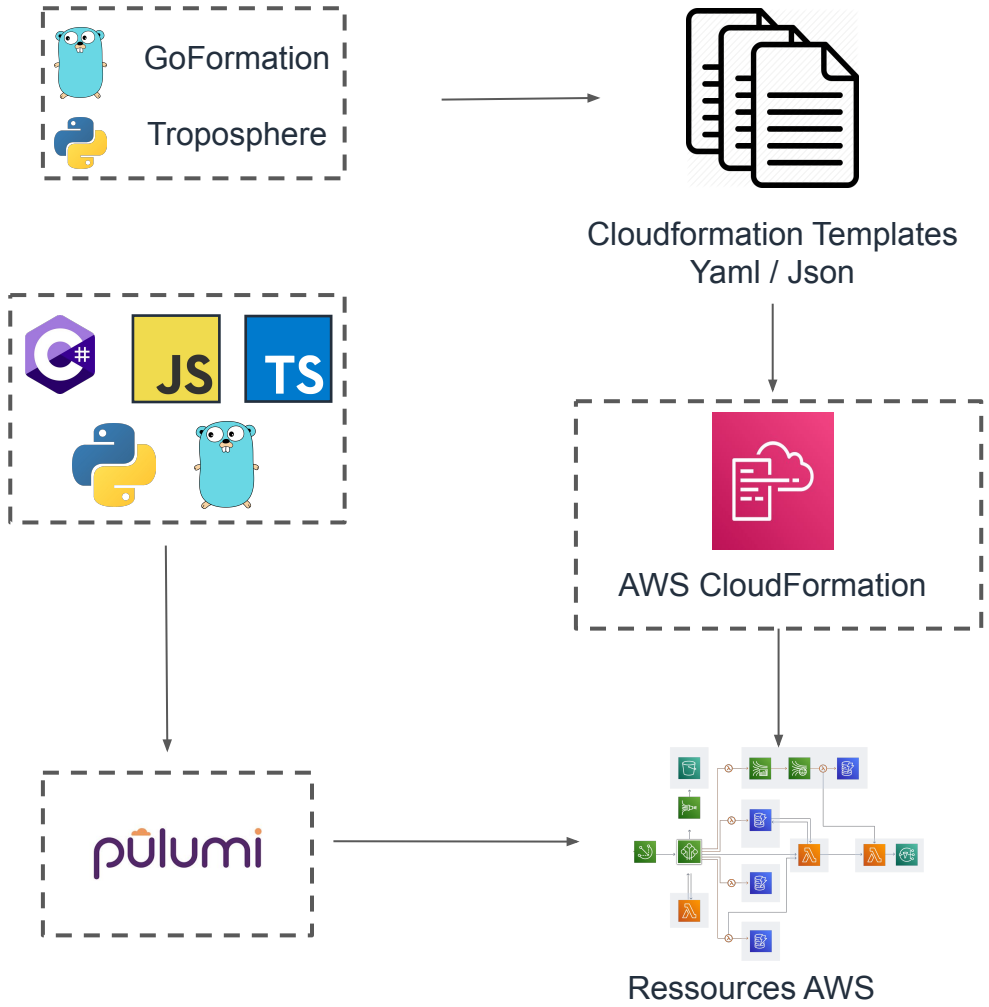


Ressources AWS

Infrastructure as Code

Document Object Models

- Real Code
- Desired State
- No abstraction

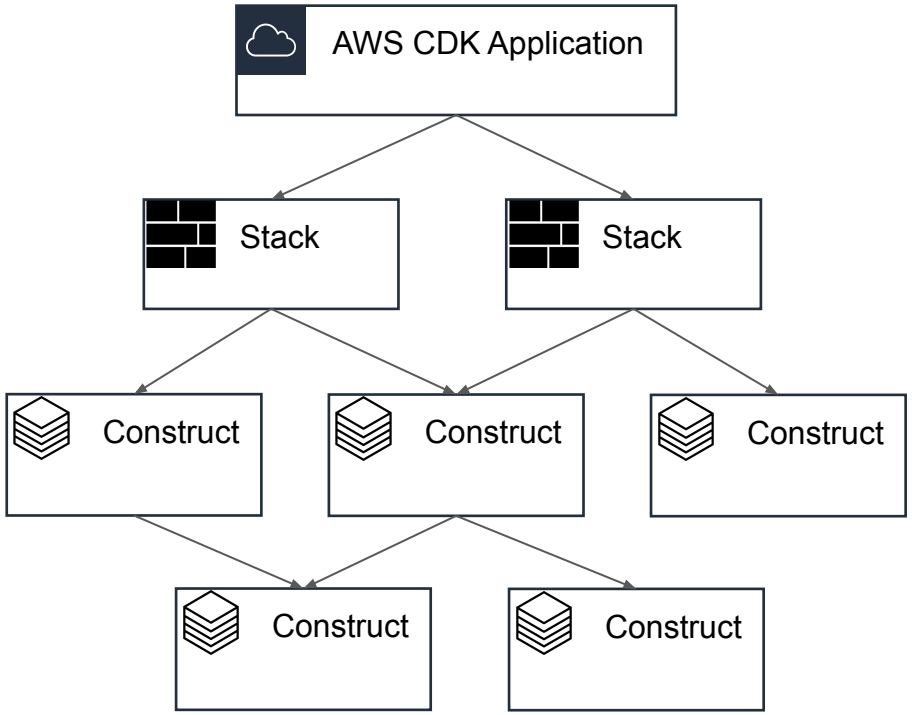


AWS CDK

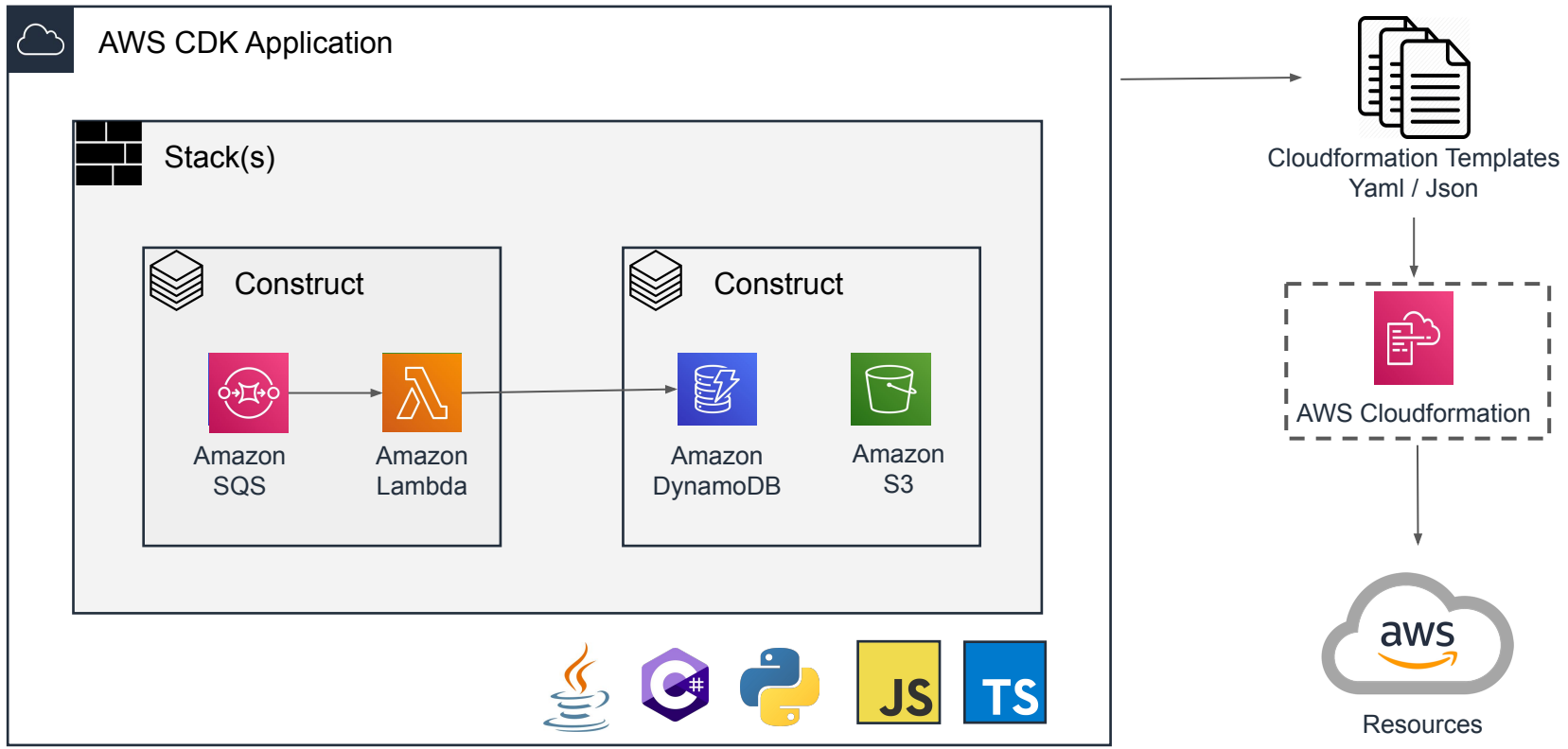
Cloud Development Kit

AWS Cloud Development Kit

CDK Application Structure

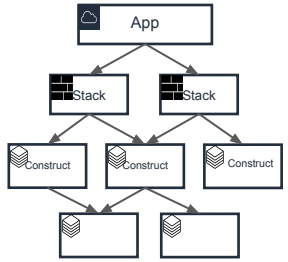


AWS Cloud Development Kit
Architecture



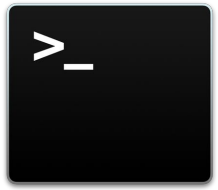
AWS Cloud Development Kit

Main Components



Core Framework

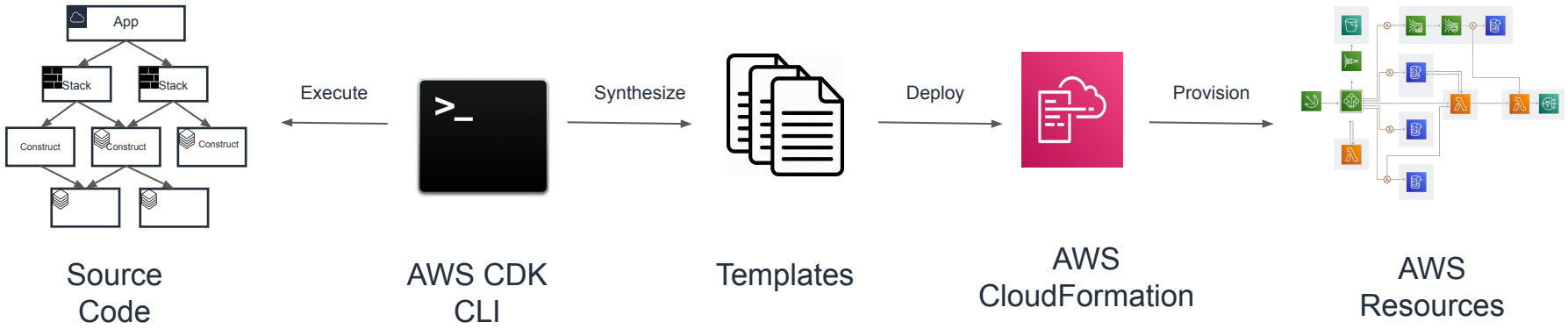
AWS Construct Library



AWS CDK CLI

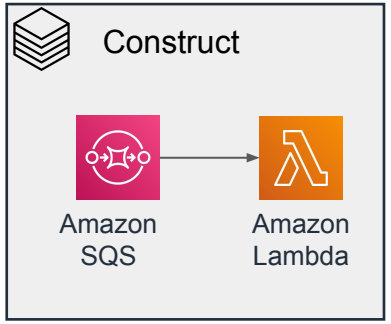
AWS Cloud Development Kit

From Constructs to the Cloud



AWS Cloud Development Kit
Concepts

- ★ Construct = AWS CDK Base component
- ★ Construct = 1 or Many AWS Resources
- ★ 3 Types de Construct
  - CFN Resources
  - L1 Constructs (AWS Services)
  - High level Constructs (patterns)
- ★ Examples
  - CfnInstance
  - Instance
  - ApplicationLoadBalancedFargateService

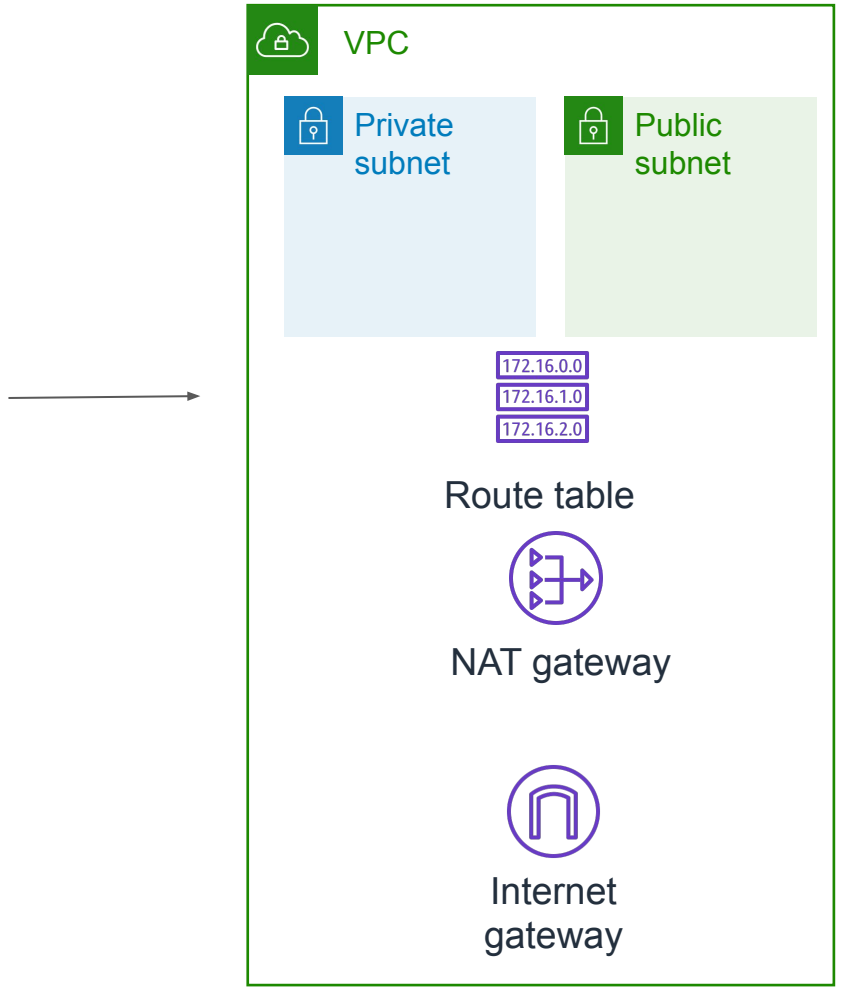


CFN Construct
Example

```
1  import * as cdk from '@aws-cdk/core';
2  import * as ec2 from '@aws-cdk/aws-ec2';
3
4  export class SimpleCDKdemoStack extends cdk.Stack {
5    constructor(scope: cdk.Construct, id: string, props?: cdk.StackProps) {
6      super(scope, id, props);
7
8      // Cloudformation VPC
9      new ec2.CfnVPC(this, "MyCfnVPC", {
10         cidrBlock: "10.0.0.0/16"
11     })
12
13   }
14 }
15
```

Basic Construct
Example

```
1  import * as cdk from '@aws-cdk/core';
2  import * as ec2 from '@aws-cdk/aws-ec2';
3
4  export class SimpleCDKdemoStack extends cdk.Stack {
5    constructor(scope: cdk.Construct, id: string, props?: cdk.StackProps) {
6      super(scope, id, props);
7
8      // VPC Construct
9      new ec2.Vpc(this, "MyCfnVPC", {
10         cidr: "10.0.0.0/16"
11     })
12
13   }
14 }
15
```



Patterns
Example

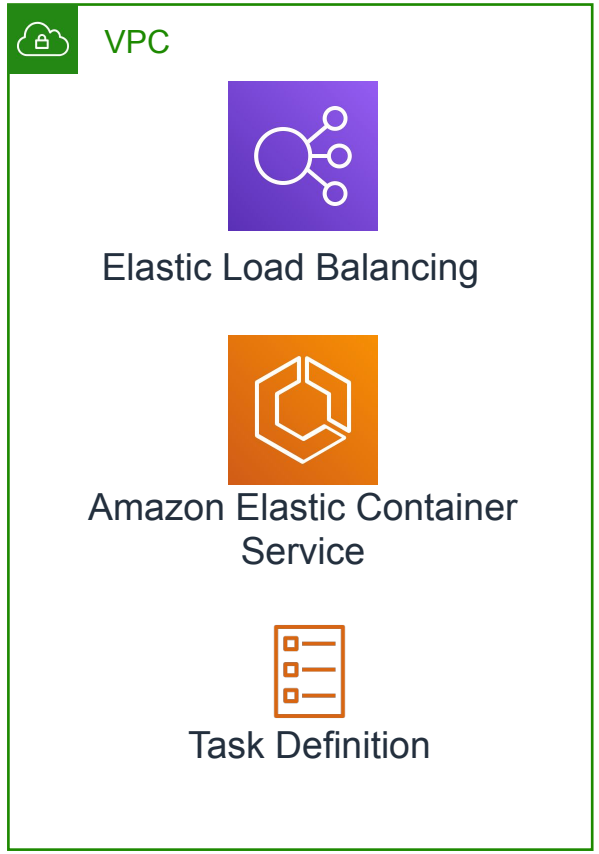
```
import * as cdk from '@aws-cdk/core';
import * as ecs from '@aws-cdk/aws-ecs';
import * as ecsPatterns from '@aws-cdk/aws-ecs-patterns';

export class SimpleCDKdemoStack extends cdk.Stack {
  constructor(scope: cdk.Construct, id: string, props?: cdk.StackProps) {
    super(scope, id, props);

    // Using Patterns
    const lbFargateService = new ecsPatterns.ApplicationLoadBalancedFargateService(this, "Service", {
      memoryLimitMiB: 1024,
      cpu: 512,
      taskImageOptions: {
        image: ecs.ContainerImage.fromRegistry("amazon/amazon-ecs-sample")
      }
    })

  }
}

```



AWS Cloud Development Kit

Unavailable specific feature

★ Unavailable Specific Feature you are looking for !! => 3 possible reasons:

- The feature is not yet available through AWS CloudFormation
- The AWS service feature is available through AWS CloudFormation

  BUT there are no Construct classes for the service.
- The AWS service feature is available through AWS CloudFormation

  There are Construct classes for the service

  BUT the Construct classes don't yet expose the feature.

★ **SOLUTION** => You can modify the CFN Resource that is encapsulated by the Construct.

What about Tests ?

AWS Cloud Development Kit

Tests

- ★ 3 Types of Tests available
  - **Snapshot Tests**

    Test the synthesized AWS CloudFormation template against a previously-stored "golden master" template
  - **Fine-grained assertions**

    Test specific aspects of the generated AWS CloudFormation template
  - **Validation tests**

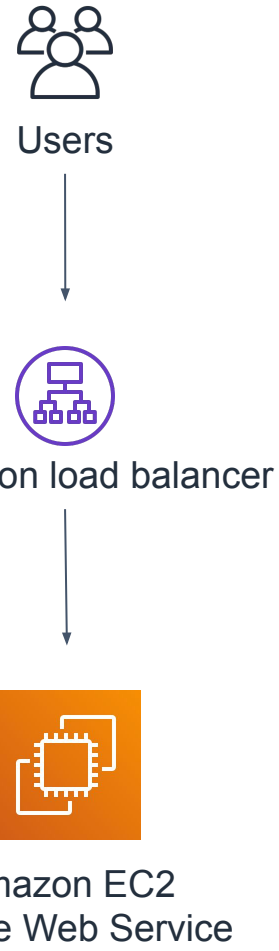
    AWS CDK constructs raise errors when you pass them invalid data

- ★ **Currently**, TypeScript is the only supported language for testing using JEST

AWS CDK Pros

- ★ No New syntax. Use your prefered Language
- ★ Use Real Code power, IDE, Tests ….
- ★ Powerful CLI
- ★ Extensibility & Modularity
- ★ Safe and Secure Defaults
- ★ Built-in support for multi-region, multi-account and multi-environment (dev, prod, etc) setups

Demo Time.


Users
Application load balancer
Amazon EC2
Simple Web Service

The Interesting PART

AWS Cloud Development Kit
Community

CDK Construct Catalog

aws CDK Patterns

★ CDK Community Construct catalog

https://awscdk.io/

★ AWS CDK patterns

https://cdkpatterns.com/

CDK Key Takeaways

- ★ AWS CDK is a developer-friendly version of CloudFormation
- ★ Real Code, Tests, IDE … Treat Infrastructure Code as any Code
- ★ Reusable Components
- ★ There is no PERFECT tool
  It all depends on your requirement, team, project and your company

Other CDK Projects

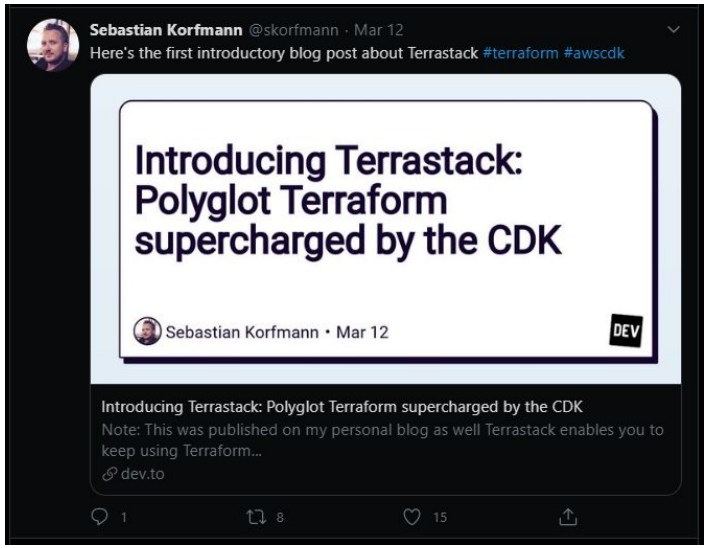
CDK Projects
Kubernetes

- ★ CDK8S (https://cdk8s.io/)
  - Define Kubernetes native apps and abstractions using object-oriented programming
  - Not Ready for Production (v0.26)

https://twitter.com/awswhatsnew/status/1260633796417736704?s=20

CDK Projects
Terraform

- ★ Terrastack (https://www.terrastack.io/)
  - Polyglot Terraform supercharged by the CDK
  - Built on Top of CDK & JSII
  - Still prototype



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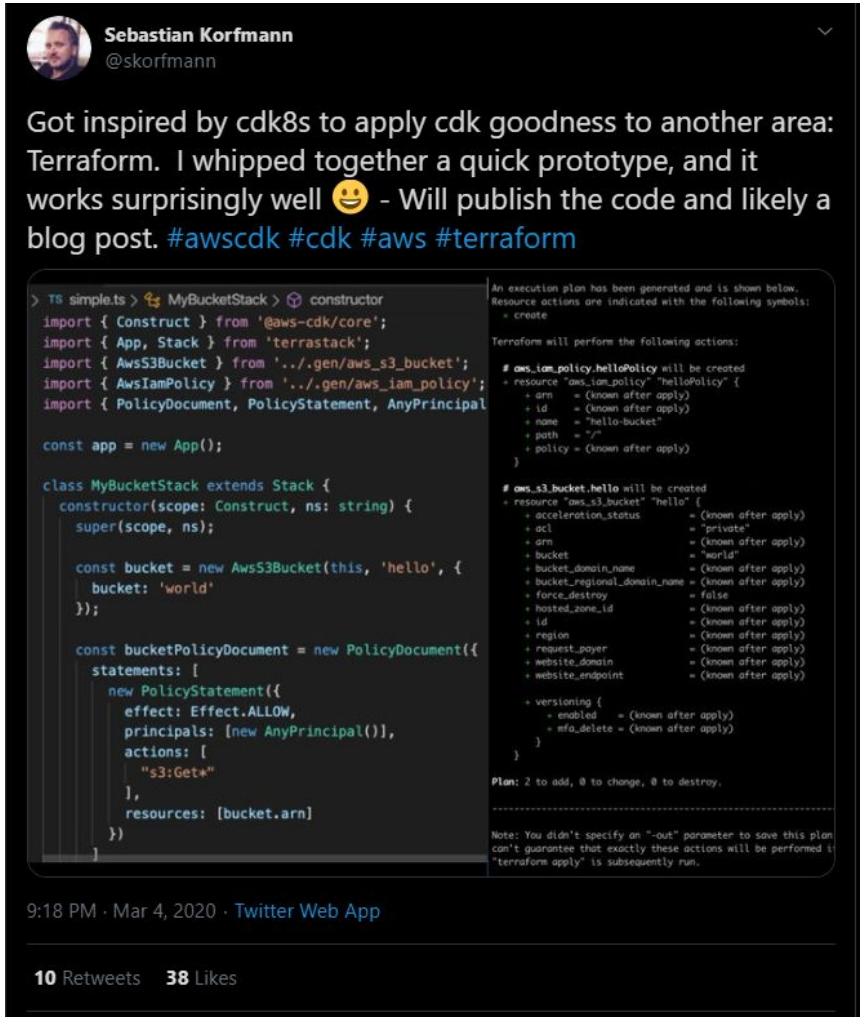

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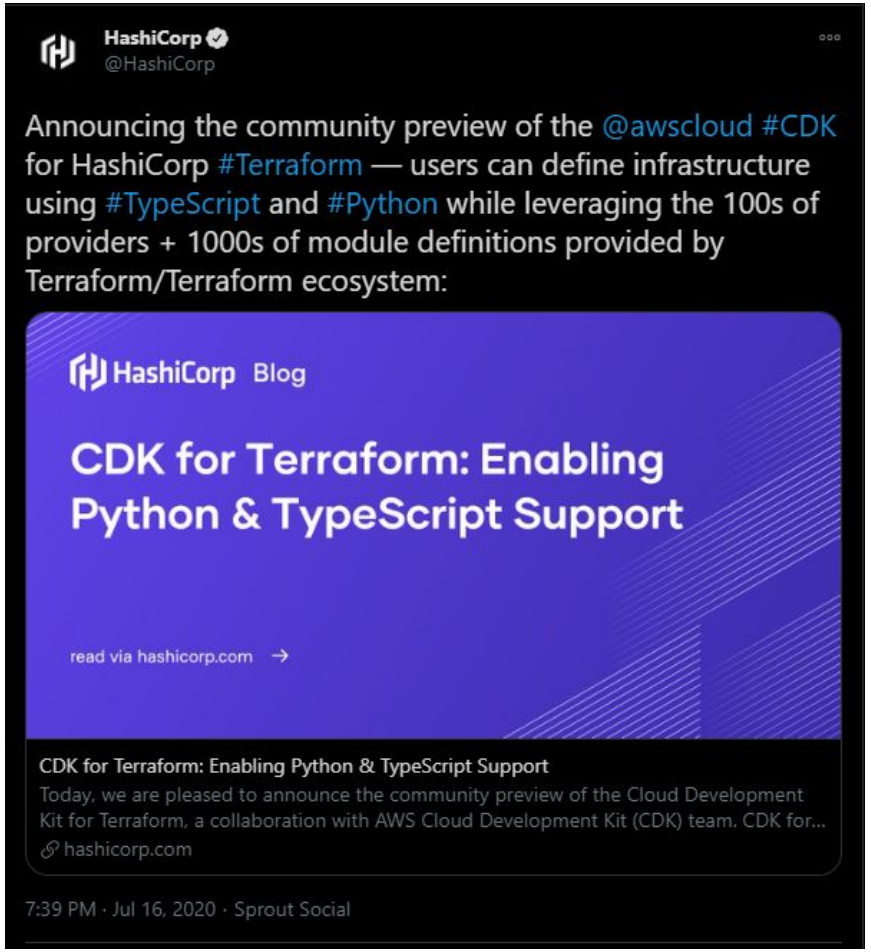
  - Polyglot Terraform supercharged by the CDK
  - Built on Top of CDK & JSII
  - Not Ready for Production



https://twitter.com/HashiCorp/status/1283818431784124417

AWS CDK
Get Started Today

- ★ Complete workshop using TS, JAVA, .NET et PYTHON

  https://cdkworkshop.com
- ★ AWS CDK Reference documentation
- ★ AWS CDK examples
- ★ AWS CDK Developer guide

THANK YOU

Questions ? => alldaydevops.slack.com #2020-modern-infrastructure

Slides => speakerdeck.com/aaitaazizi/addo-infrastructure-as-real-code-cdk

Demo Code => github.com/aaitaazizi/simple-aws-cdk-demo

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