# AWS CLOUD DEVELOPMENT KIT

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## CALLISTA

- Infrastructure-as-Code and CloudFormation

- Intro to AWS Cloud Development Kit (CDK)

- Demo

- Reflections on pros and cons

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# INFRASTRUCTURE-AS-CODE

- Templates
- Avoid operations through CLI or GUI
- Facilitate set-up and recreation
- Overview
- Versioning

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- First release February 2011
- Offer templating in YAML and JSON
- Well documented

AWS::S3::Bucket - AWS CloudF

https://docs.aws.amazon.com/AWSCloudFormation/latest/UserGuide/aws-properties-s3-bucket.html

**aws**

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▼ **AWS::S3::Bucket**

AbortIncompleteMulti partUpload

AccelerateConfiguratio n

AccessControlTranslati on

AnalyticsConfiguratio n

BucketEncryption

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DataExport

DefaultRetention

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EncryptionConfigurati on

FilterRule

IntelligentTieringConfi guration

InventoryConfiguratio n

LambdaConfiguration

LifecycleConfiguration

LoggingConfiguration

Metrics

MetricsConfiguration

NoncurrentVersionTra nsition

NotificationConfigurat

# AWS::S3::Bucket

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The `AWS::S3::Bucket` resource creates an Amazon S3 bucket in the same AWS Region where you create the AWS CloudFormation stack.

To control how AWS CloudFormation handles the bucket when the stack is deleted, you can set a deletion policy for your bucket. You can choose to *retain* the bucket or to *delete* the bucket. For more information, see DeletionPolicy Attribute.

> ⚠ **Important**
>
> You can only delete empty buckets. Deletion fails for buckets that have contents.

## Syntax

To declare this entity in your AWS CloudFormation template, use the following syntax:

### JSON

```json
{
    "Type" : "AWS::S3::Bucket",
    "Properties" : {
        "AccelerateConfiguration" : AccelerateConfiguration,
        "AccessControl" : String,
        "AnalyticsConfigurations" : [ AnalyticsConfiguration, ... ],
        "BucketEncryption" : BucketEncryption,
        "BucketName" : String,
        "CorsConfiguration" : CorsConfiguration,
        "IntelligentTieringConfigurations" : [ IntelligentTieringConfiguration, ... ],
        "InventoryConfigurations" : [ InventoryConfiguration, ... ],
        "LifecycleConfiguration" : LifecycleConfiguration,
        "LoggingConfiguration" : LoggingConfiguration,
```

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**Syntax**

Properties

Return values

Examples

See also

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```yaml
MonitoringDashboard:
    Type: AWS::CloudWatch::Dashboard
    Properties:
      DashboardName: ServiceDashboard
      DashboardBody: !Sub
        - |
          {
            "start": "-PT12H",
            "periodOverride": "auto",
            "widgets":
            [
              {
                "type":"metric",
                "x":0,
                "y":0,
                "width":24,
                "height":6,
                "properties":{
                  "metrics":[
                    [{"expression": "SEARCH('{AWS/ApplicationELB,LoadBalancer,TargetGroup} MetricName
                  ],
                  "title":"Healthy Hosts",
                  "view": "timeSeries",
                  "stacked": true,
                  "period":300,
                  "stat":"Average",
                  "region":"eu-west-1"¢
                }
              }
            ]
          }
        - TargetGroupName: !GetAtt TargetGroup.TargetGroupFullName
```

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- Syntax of YAML and JSON
- Type safety
- Requires good knowledge of AWS services
- Testing

# AWS CLOUD DEVELOPMENT KIT

"A SOFTWARE DEVELOPMENT FRAMEWORK FOR DEFINING CLOUD INFRASTRUCTURE
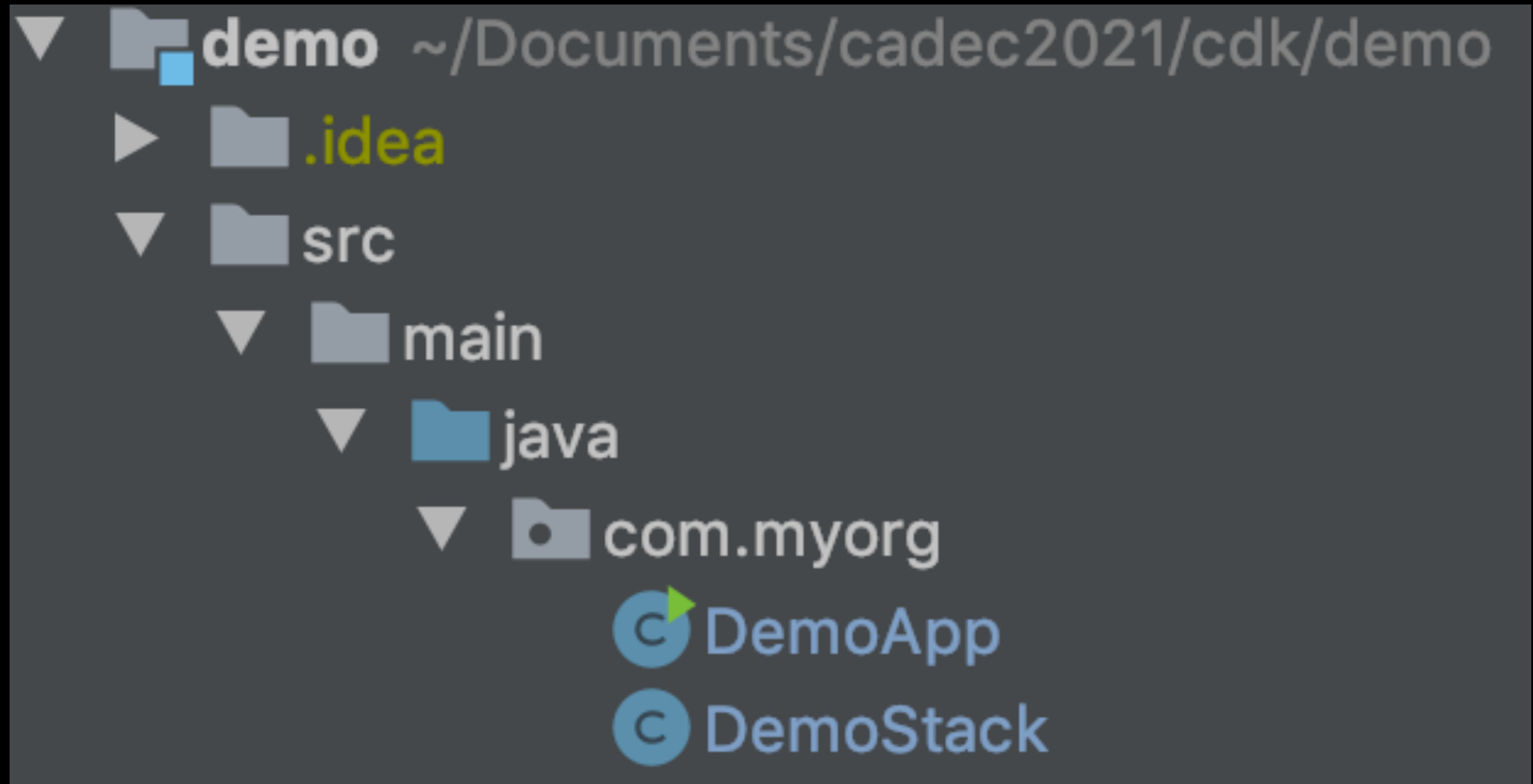IN CODE AND PROVISIONING IT THROUGH AWS CLOUDFORMATION."[1]

- First release July 2019

- Programming code -> CloudFormation

- JavaScript, TypeScript, Python, C#, Java

- Open source

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- Node.js
- AWS CLI (credential configuration)
- CDK CLI
- cdk init --language java

# PROJECT SET-UP

# AWS CLOUD DEVELOPMENT KIT

```java
public class S3Stack extends Stack {

    public S3Stack(Construct scope, String id, StackProps props){
        super(scope, id, props);

        Bucket.Builder.create(this, ”DemoBucket”)
                .publicReadAccess(true)
                .removalPolicy(RemovalPolicy.DESTROY)
                .websiteIndexDocument(”index.html”)
                .build();
    }

}
```

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# AWS CLOUD DEVELOPMENT KIT

```java
public class DemoApp {

    public static void main(final String[] args){
        App app = new App();

        new S3Stack(app, "S3Stack", StackProps.builder()
                .env(Environment.builder()
                        .region("eu-west-1")
                        .account("123412341234")
                        .build())
                .build();


        app.synth();
    }

}
```

# AWS CLOUD DEVELOPMENT KIT

```java
public MyEcsConstructStack(Construct scope, String id, StackProps props){
    super(scope, id, props);
    Vpc vpc = Vpc.Builder.create(this, "MyVpc")
        .maxAzs(3).build();

    Cluster cluster = Cluster.Builder.create(this, "MyCluster")
        .vpc(vpc).build();

    ApplicationLoadBalancedFargateService.Builder.create(this, "MyFargateService")
        .cluster(cluster)
        .cpu(512)
        .desiredCount(6)
        .taskImageOptions(
            ApplicationLoadBalancedTaskImageOptions.builder()
                .image(ContainerImage.fromRegistry("amazon/amazon-ecs-sample"))
                .build())
        .memoryLimitMiB(2048)
        .publicLoadBalancer(true).build();
}
```

*EXAMPLE FROM HTTPS://DOCS.AWS.AMAZON.COM/CDK/LATEST/GUIDE/HOME.HTML*

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# L1, CLOUDFORMATION ONLY

```java
CfnBucket.Builder.create(this, "DemoBucket")
    .websiteConfiguration(CfnBucket.WebsiteConfigurationProperty.builder()
        .indexDocument("index.html")
        .errorDocument("error.html")
        .build())
    .corsConfiguration(CfnBucket.CorsConfigurationProperty.builder()
        .corsRules(Collections.singletonList(
            CorsRule.builder()
                .allowedHeaders(Collections.singletonList("Authorization"))
                .allowedMethods(Collections.singletonList(HttpMethods.GET))
                .allowedOrigins(Collections.singletonList("*"))
                .build()
    ))
    .build())
.build();
```

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# L2, CURATED

```
Bucket.Builder.create(this, "CuratedBucket").build();
```

## accessControl?

*Type:* `BucketAccessControl` *(optional, default: BucketAccessControl.PRIVATE)*

Specifies a canned ACL that grants predefined permissions to the bucket.

## blockPublicAccess?

*Type:* `BlockPublicAccess` *(optional, default: false New buckets and objects don't allow public access, but users can modify bucket policies or object permissions to allow public access.)*
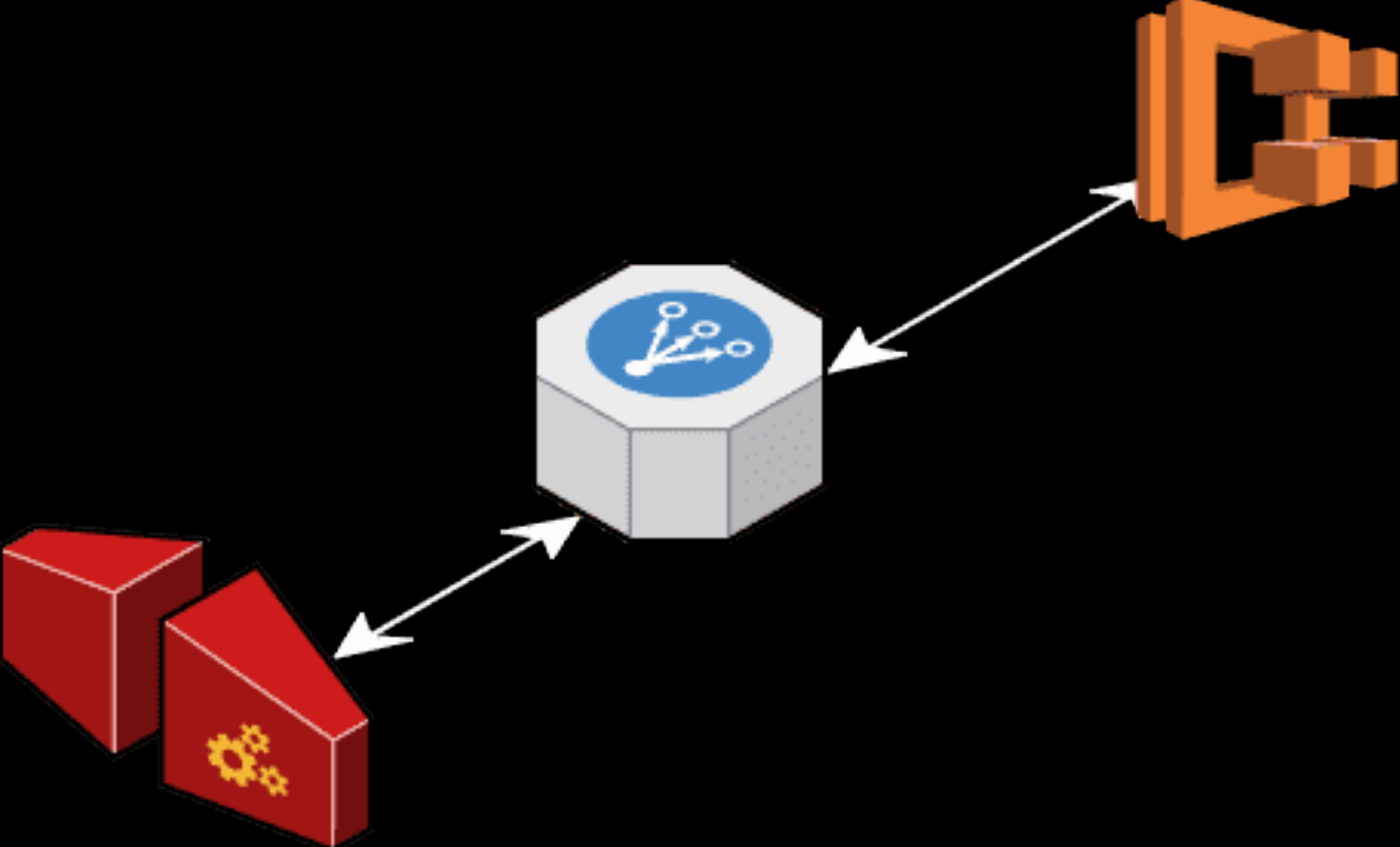
The block public access configuration of this bucket.

SOURCE: HTTPS://DOCS.AWS.AMAZON.COM/CDK/API/LATEST/DOCS/@AWS-CDK_AWS-S3.BUCKET.HTML (2020-12-13)

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# L3, PATTERNS

```
ApplicationLoadBalancedFargateService.Builder.create(this, "MyFargateService")
    .cluster(cluster)
    .cpu(512)
    .desiredCount(6)
    .taskImageOptions(
        ApplicationLoadBalancedTaskImageOptions.builder()
            .image(ContainerImage.fromRegistry("amazon/amazon-ecs-sample"))
            .build())
    .memoryLimitMiB(2048)
    .publicLoadBalancer(true).build();
```

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Documents/cadec2021/cdk using ☁ ew-dev
→

## CLOUDFORMATION

### +

General perks of Infrastructure-as-Code

### –

Syntax of YAML and JSON

No type safety

Demands good knowledge of underlying services

## CDK

### +

Existing IDE

Type safety

Abstraction

Export self-made constructs

Improved readability

Logical constructs

### –

Risk of erroneous configuration (abstraction)

Some constructs require work-arounds