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CodePipeline Basics

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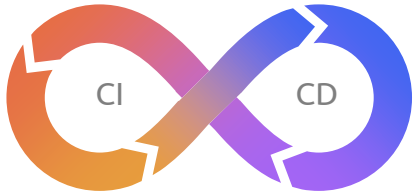
Features and Benefits of CodePipeline

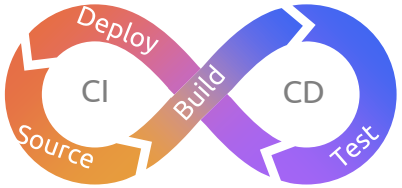
01

Continuous Integration and Continuous Delivery



02

Basic Components for CI/CD Pipeline



03

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Cody

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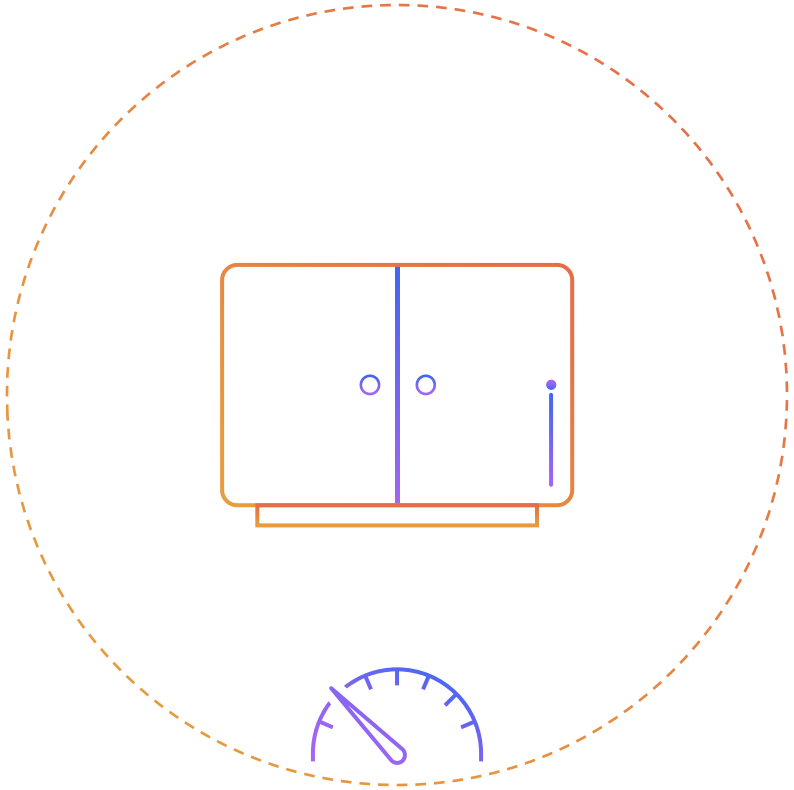

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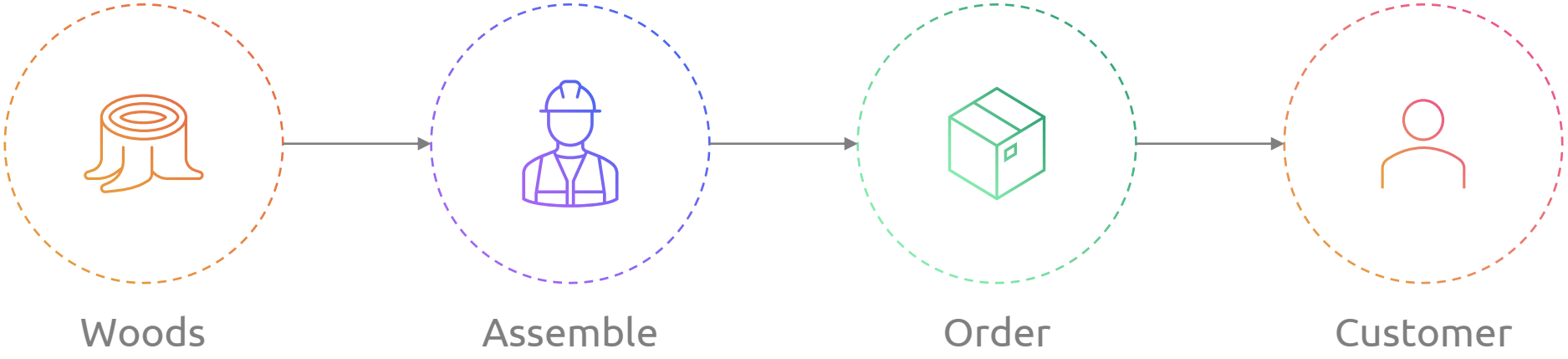

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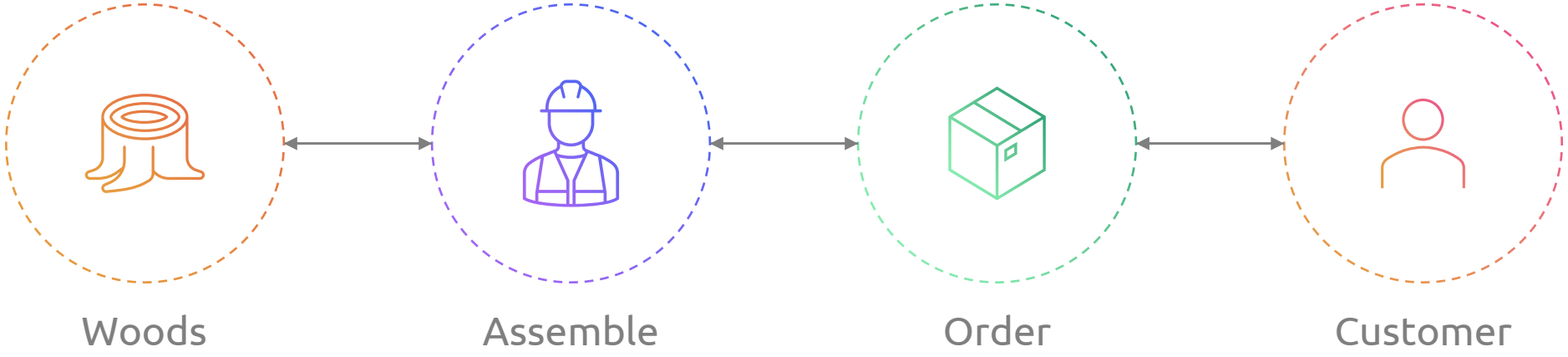

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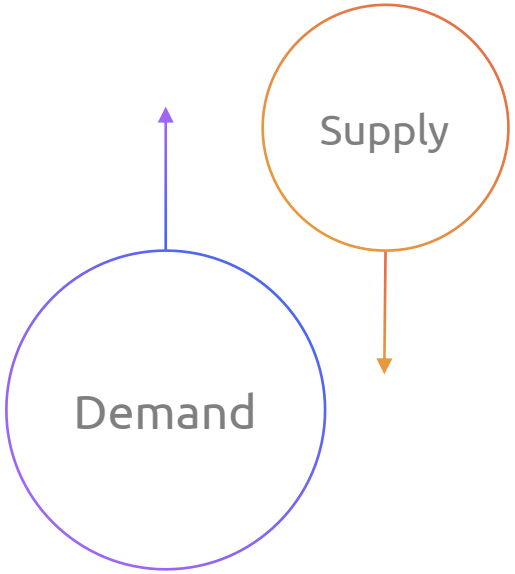

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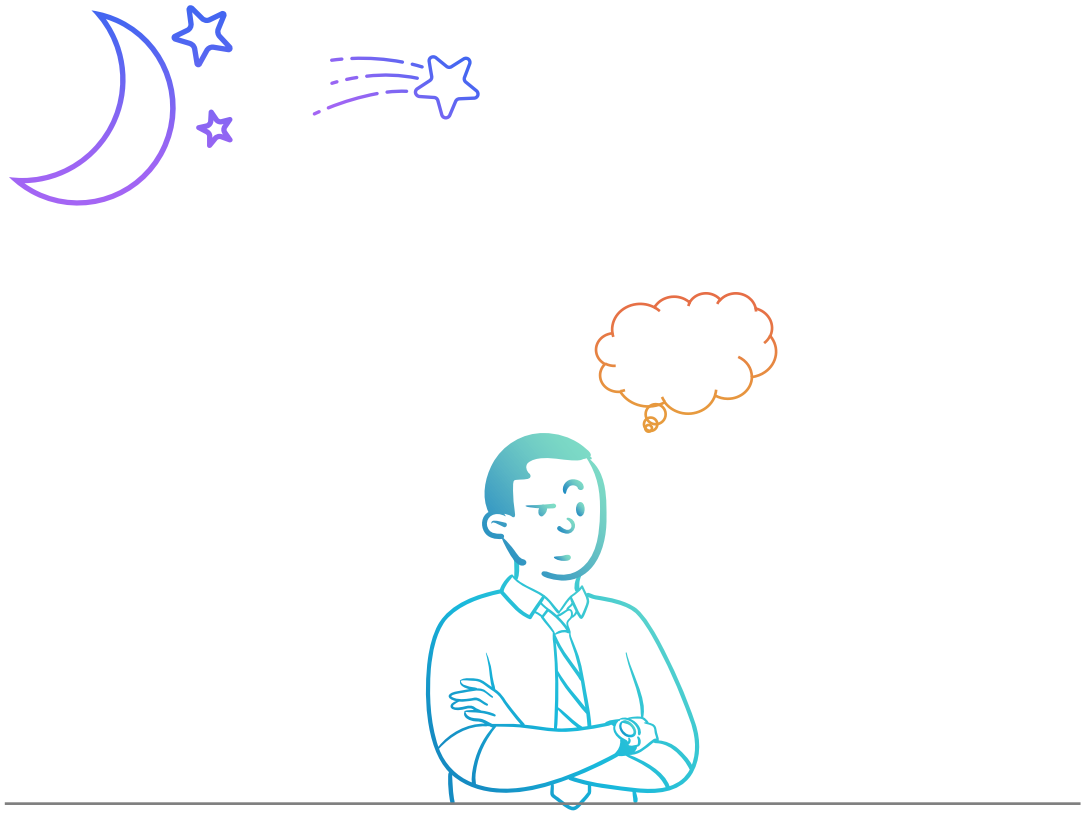

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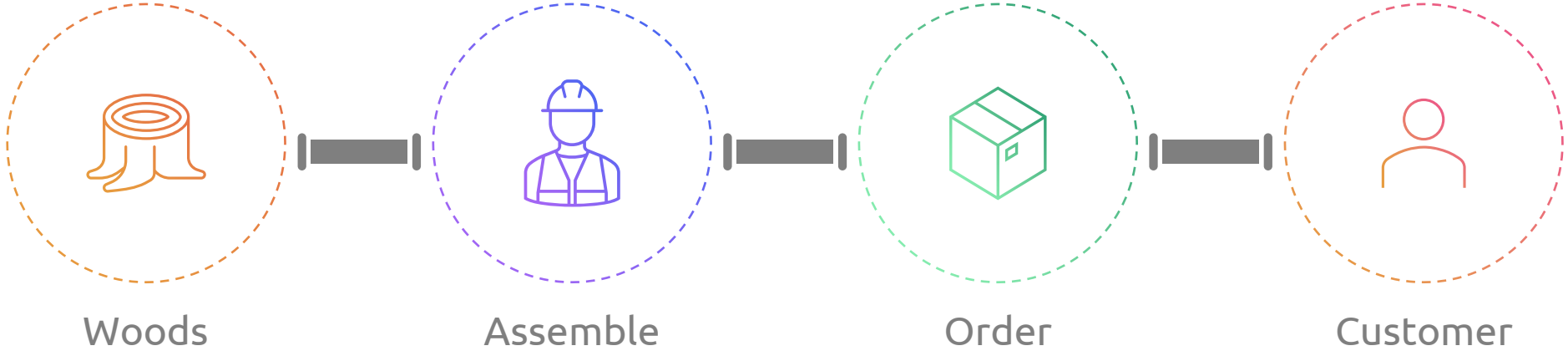

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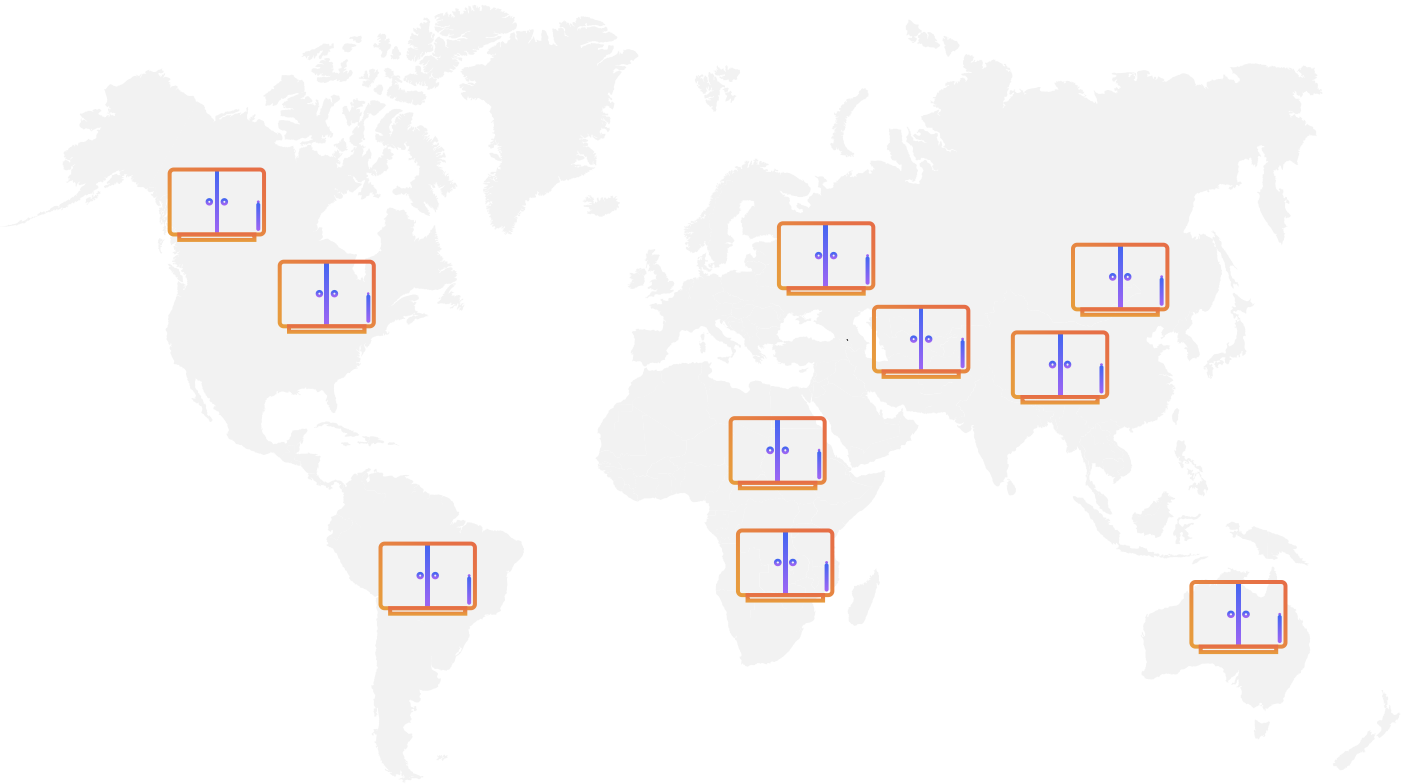

Named as Cody’s Pipeline

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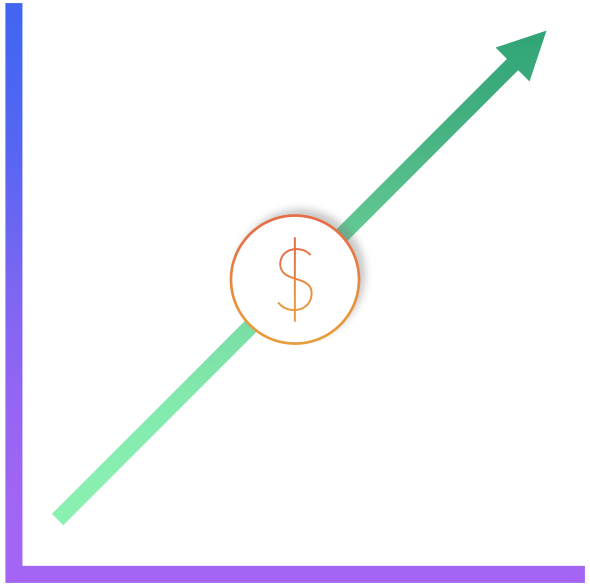

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Continuous Integration / Continuous Deployment

=

Non-Stop Integration / Non-Stop Deployment

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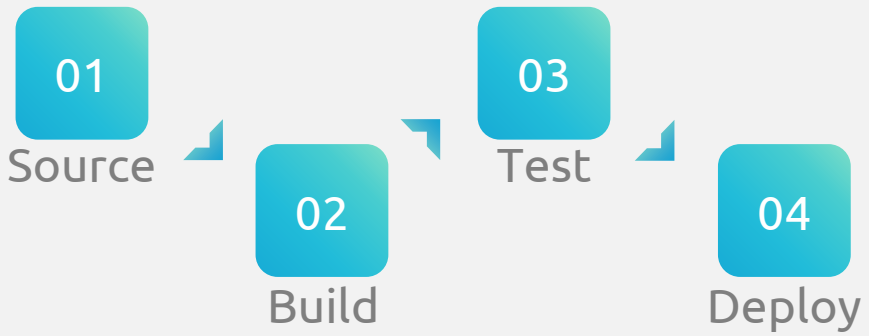

- Rapid deployment
- Maintaining high quality
- Approvals and Invocations
- Deployment management

Code Pipeline

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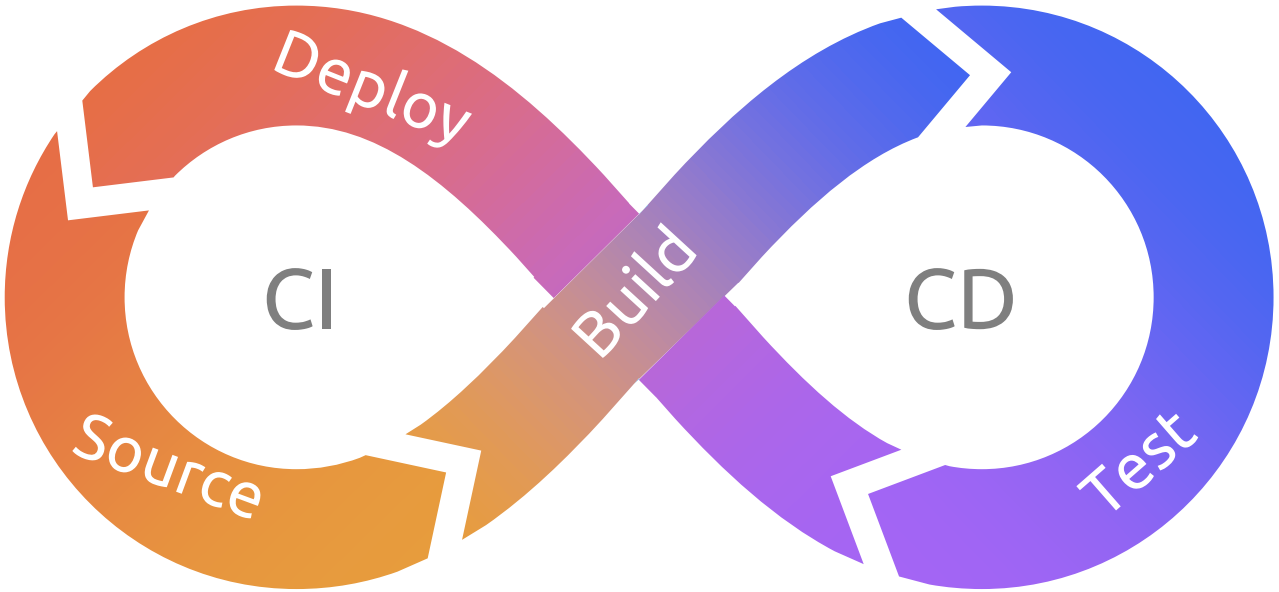

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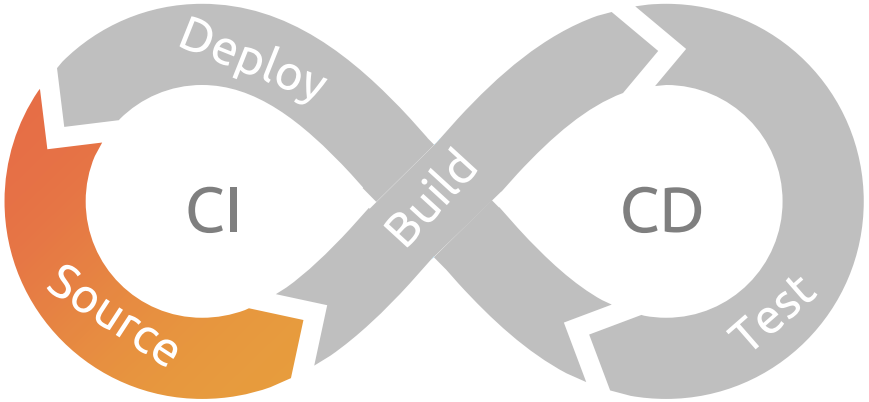

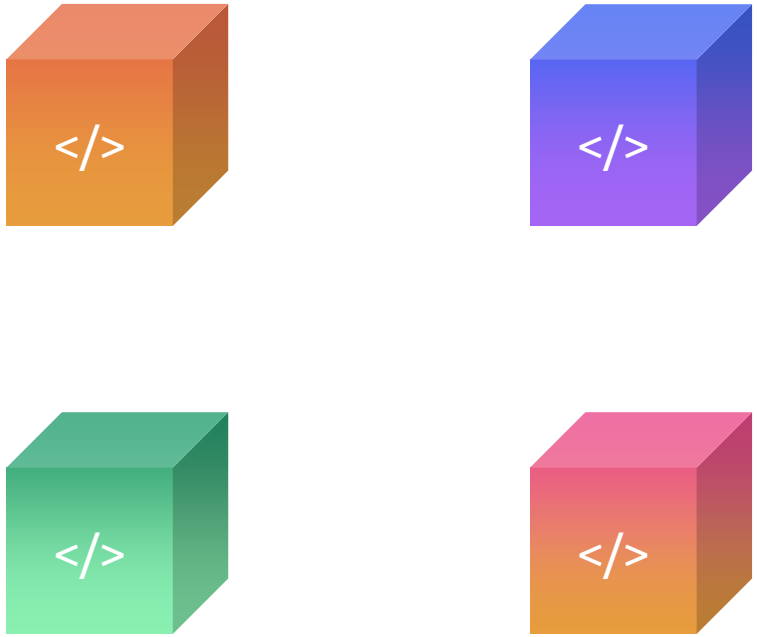

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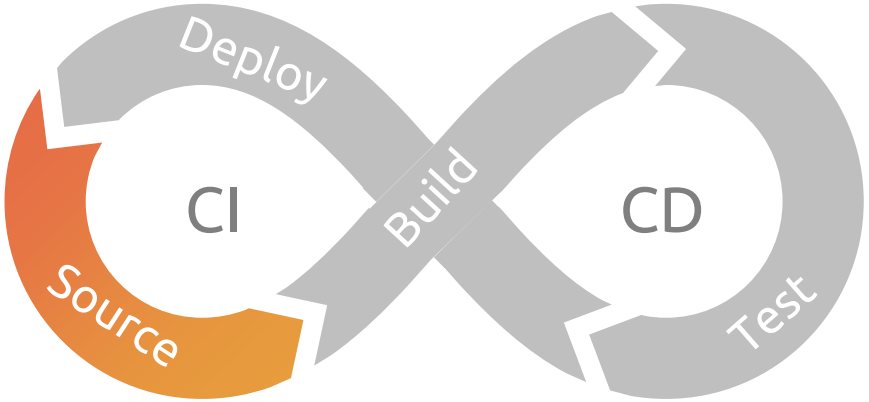

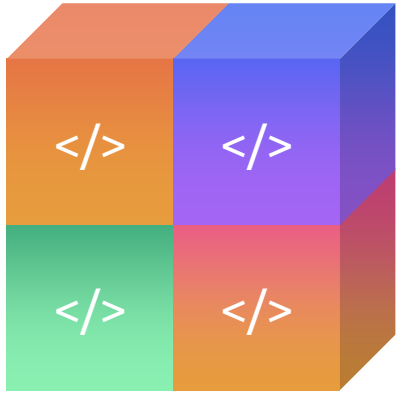

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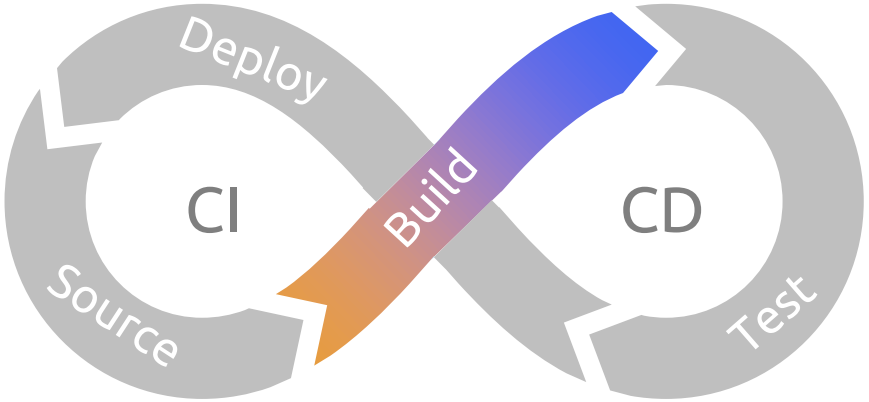

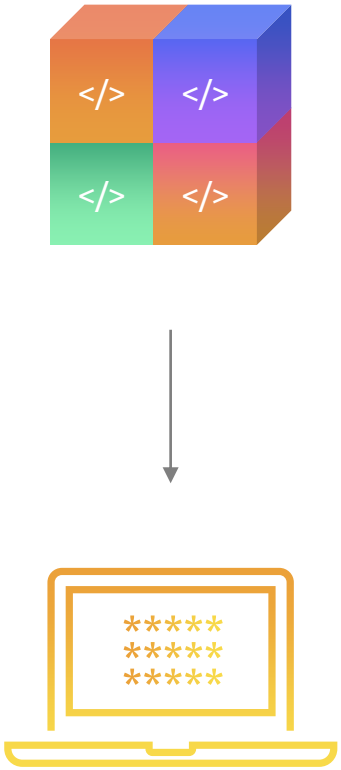

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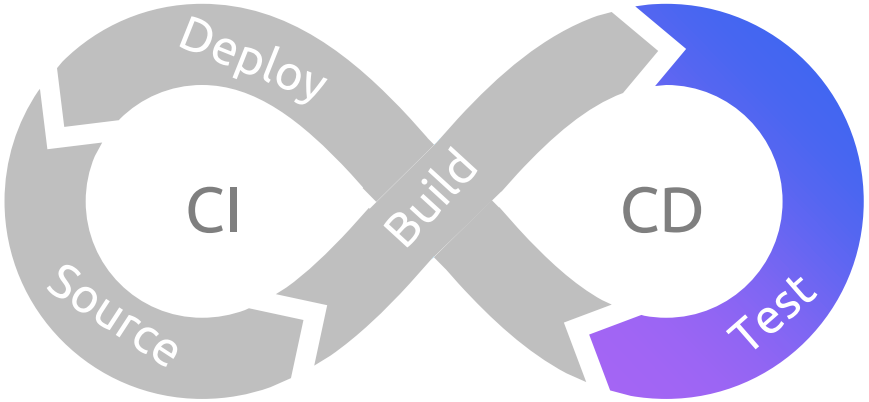

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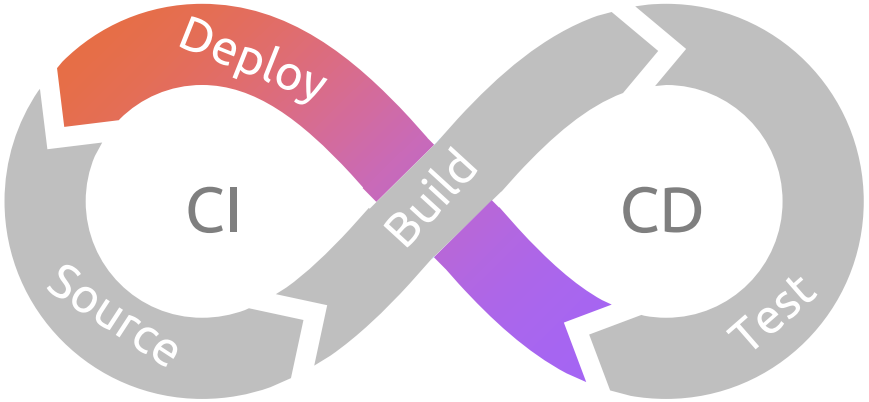

Container

Server

Serverless

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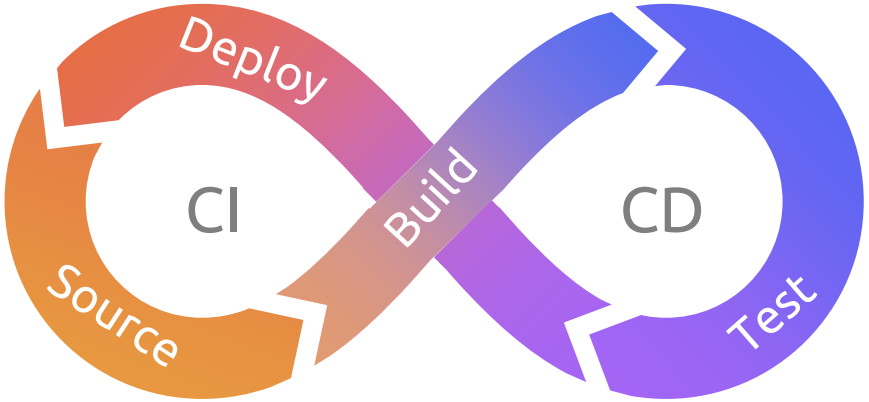

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AWS CodePipeline - Use Cases

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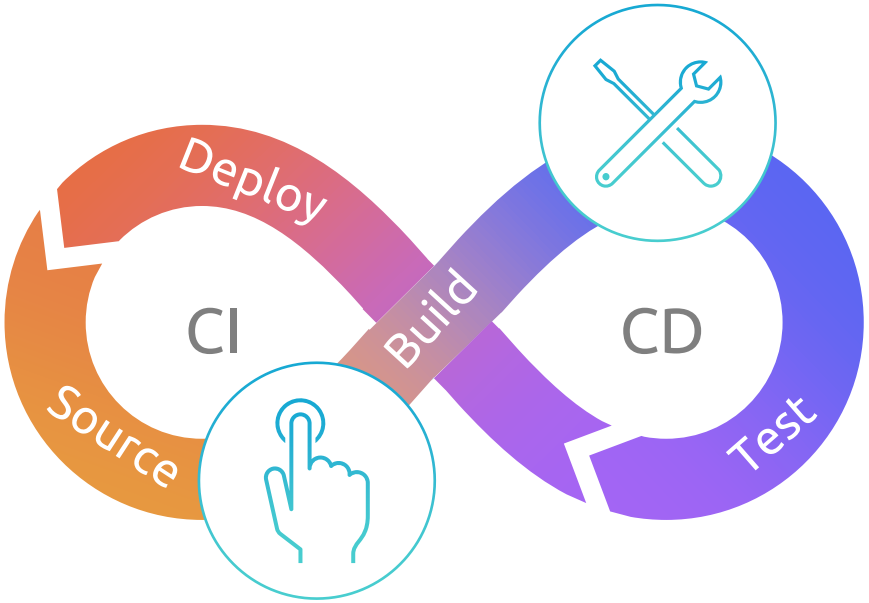

Code Pipeline

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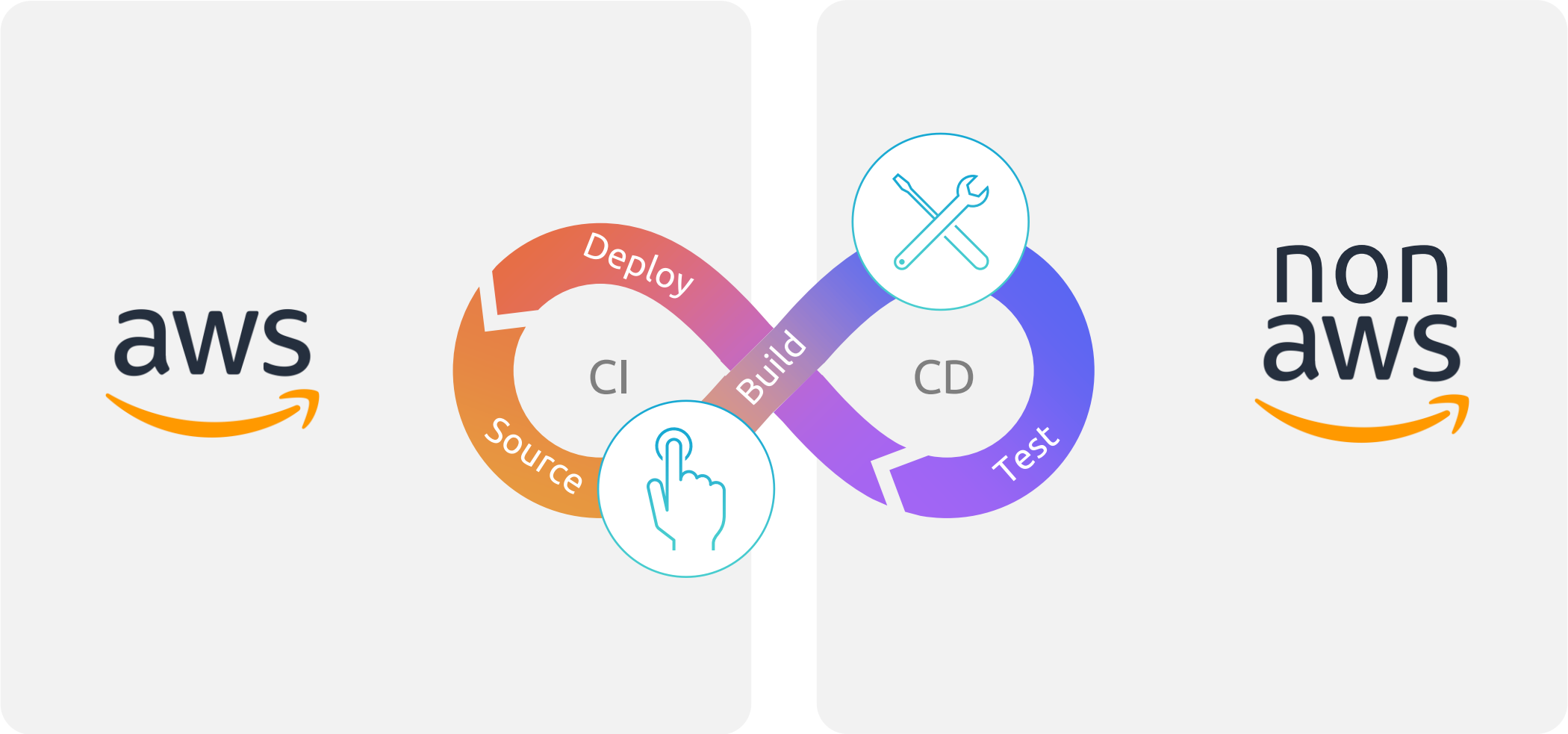

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Source

AWS CodeCommit

Amazon Simple Storage Service (Amazon S3)

Build

AWS CodeBuild

Deploy

AWS CodeDeploy

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Source

GitHub

Build

Jenkins

Deploy

AWS CodeDeploy

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Deploy

Amazon Elastic Container Service (Amazon ECS)

Amazon Elastic Kubernetes Service (Amazon EKS)

Amazon Elastic Compute Cloud (Amazon EC2)

AWS Lambda

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AWS CodePipeline

AWS CodeStar

AWS CodeCommit

AWS CodeBuild

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Integrations

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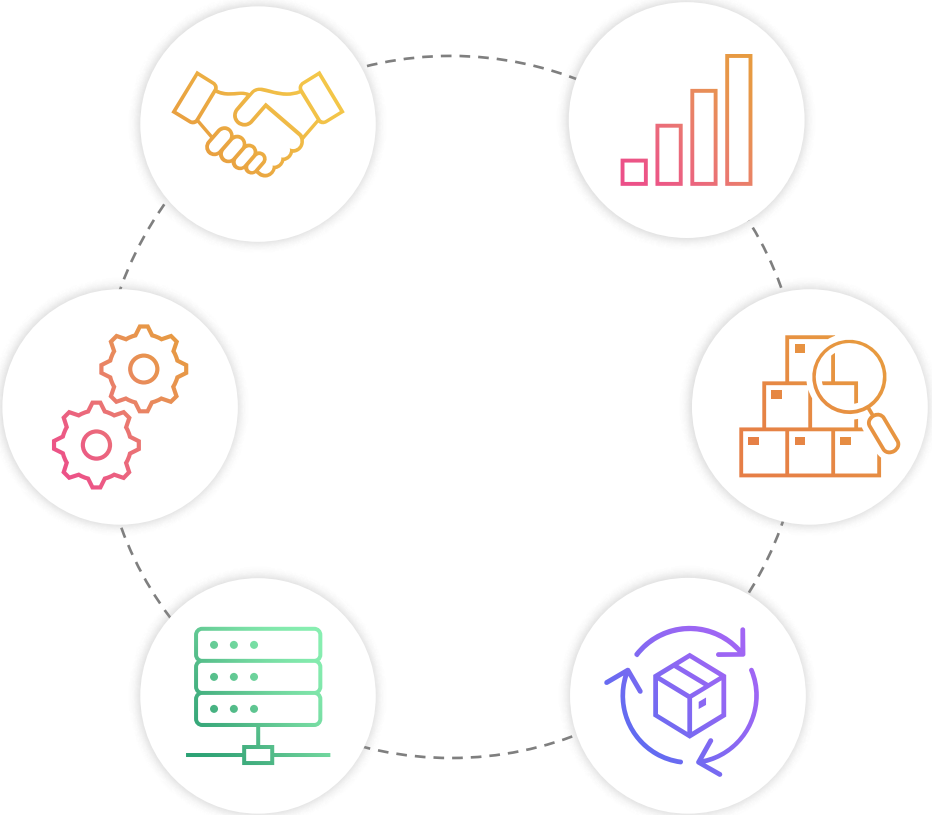

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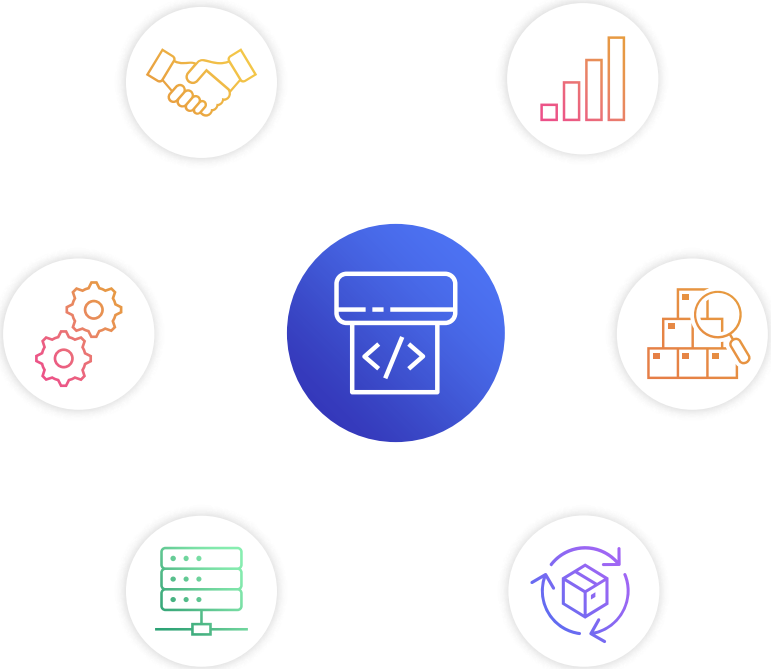

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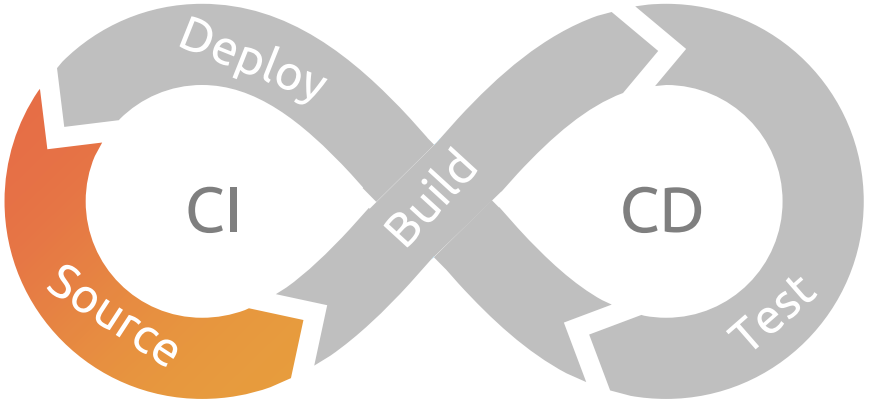

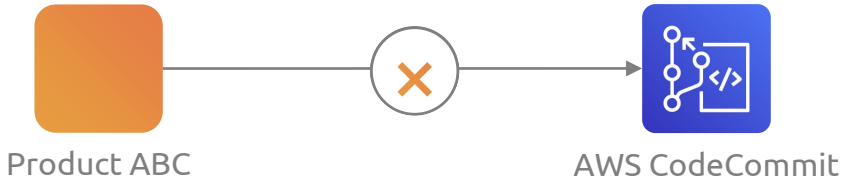

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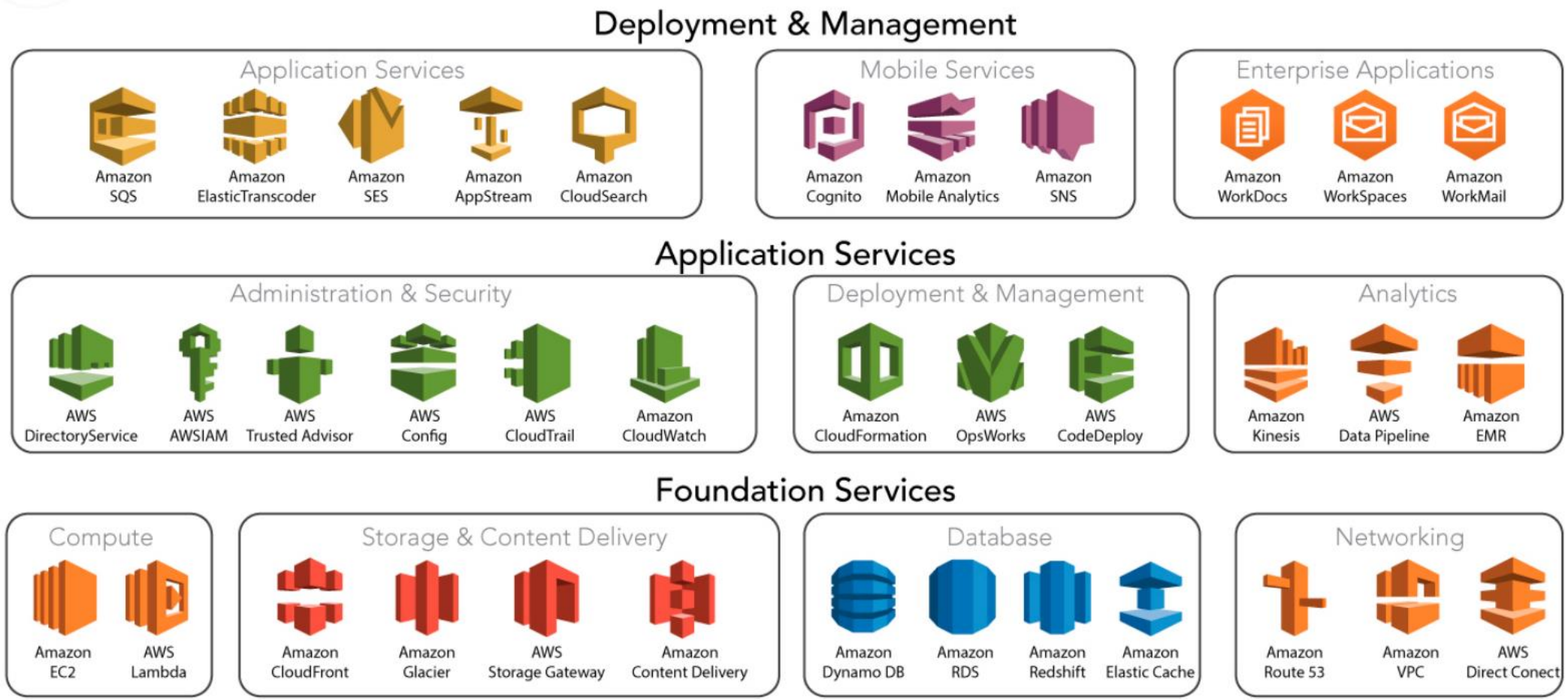
AWS Services



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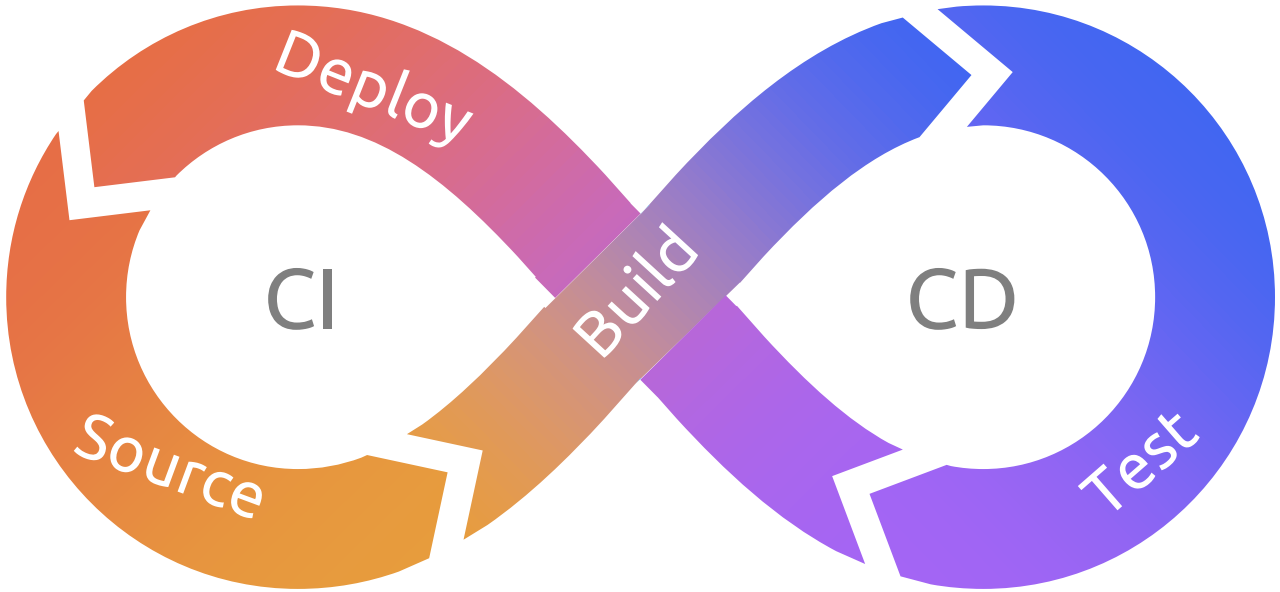

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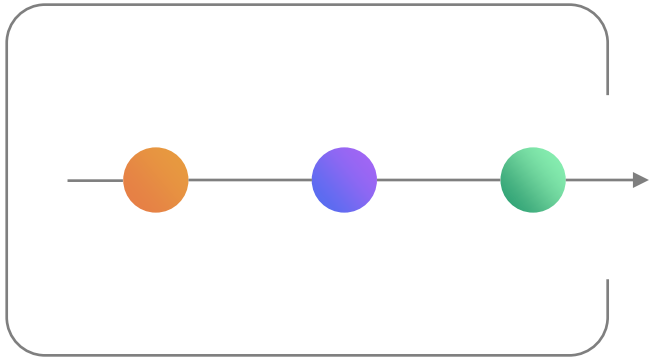
Additional Actions

Approve

Invoke



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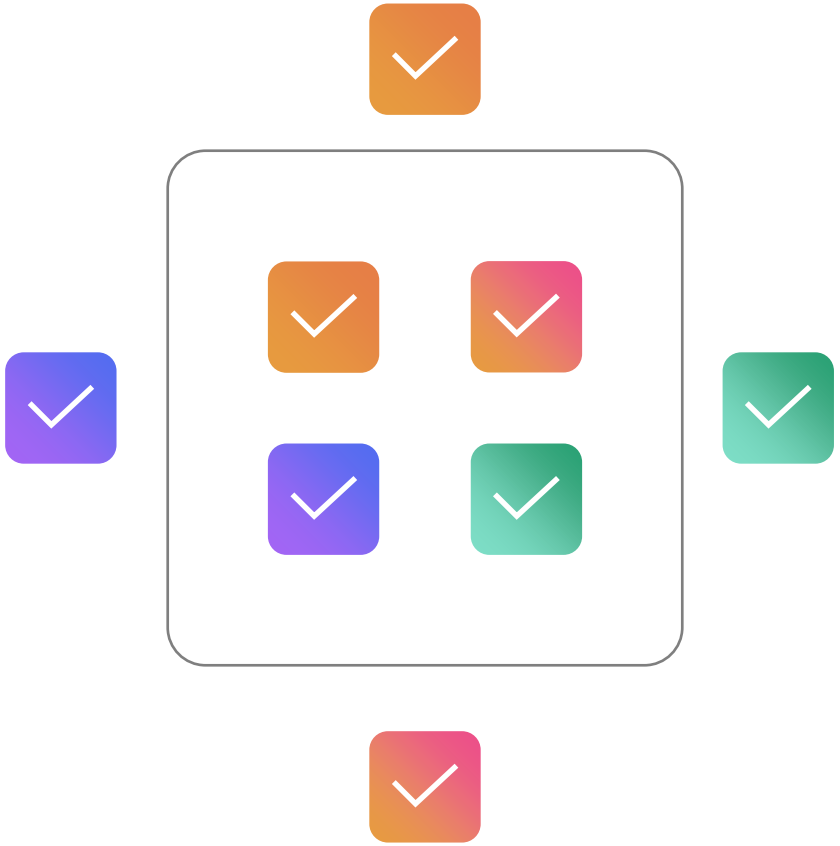

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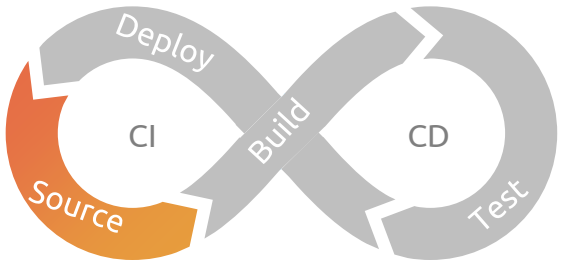

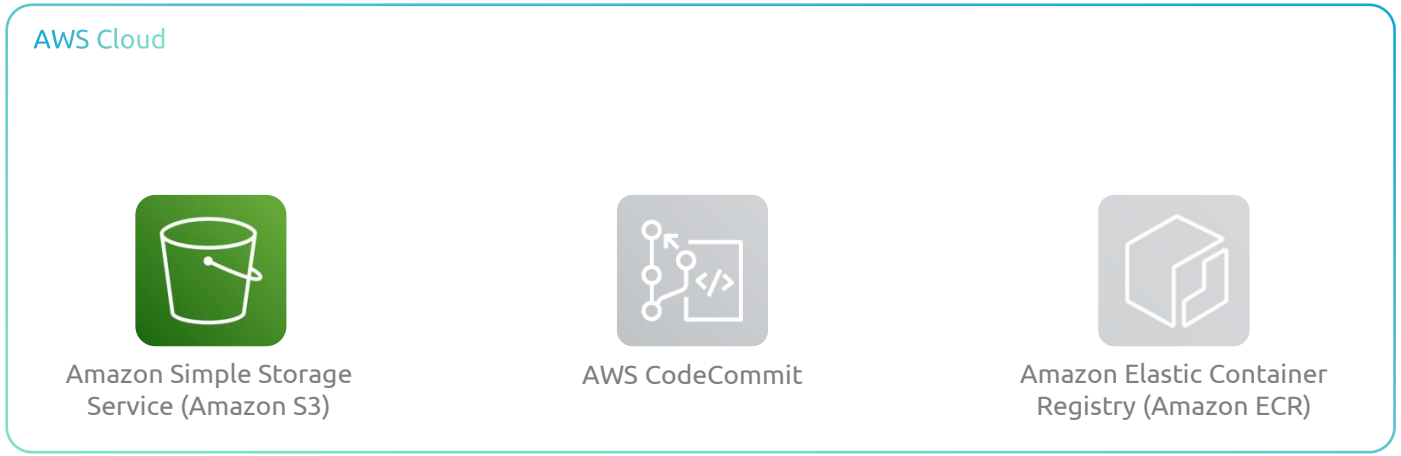

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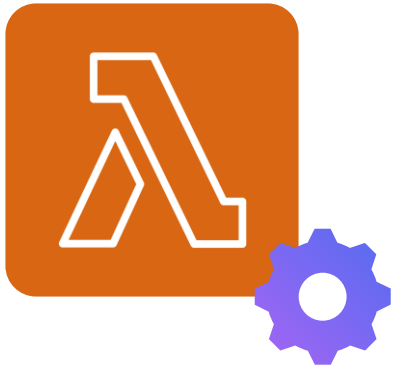

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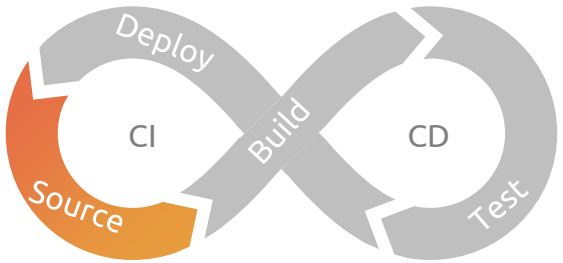

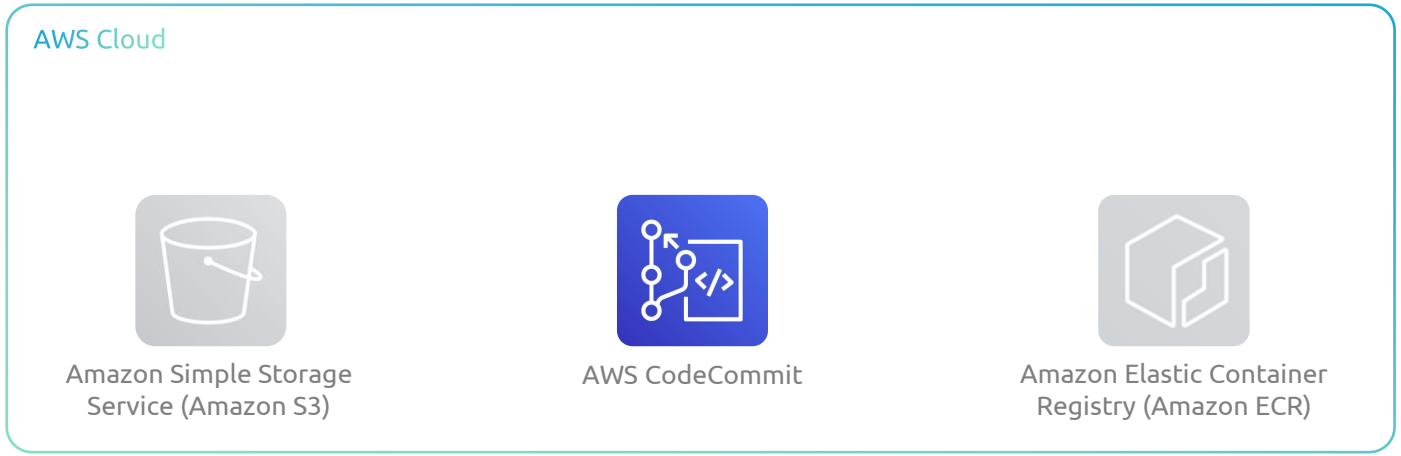

Version control service

Source branch

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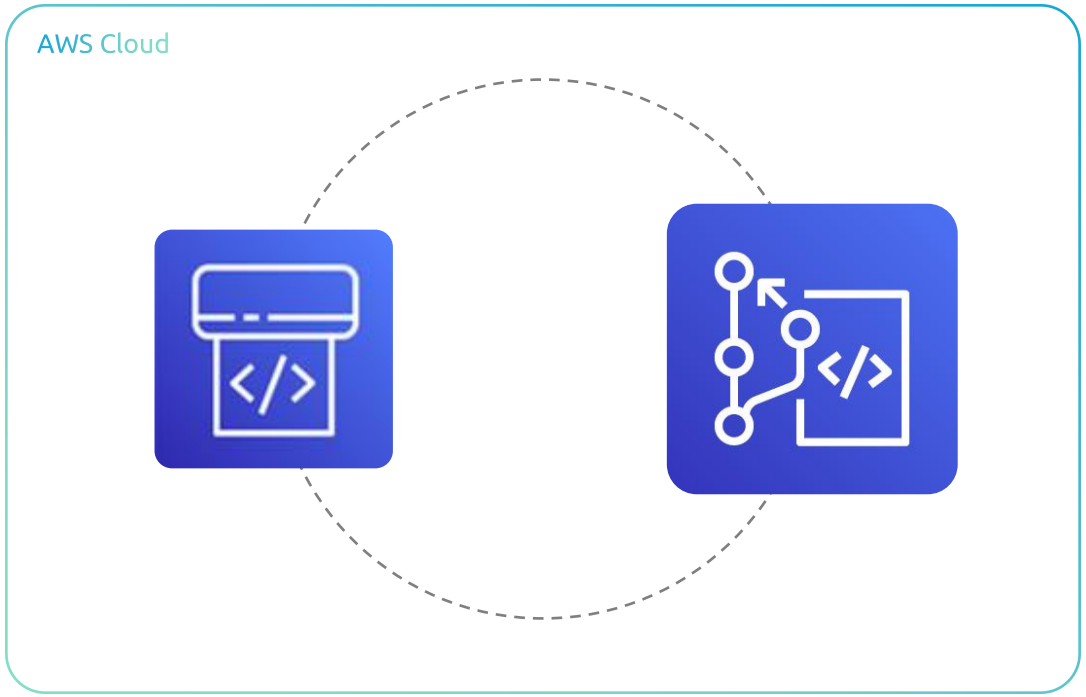

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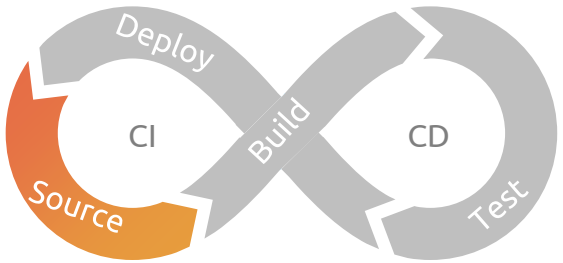

AWS Cloud

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

Amazon Elastic Container Registry (Amazon ECR)

Containers

Docker compatible

Integrates with ECS (Deploy)

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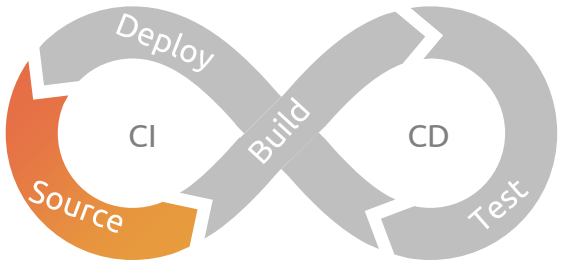

AWS Cloud

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

Amazon Elastic Container Registry (Amazon ECR)

Third party

GitHub

Bitbucket

Connections

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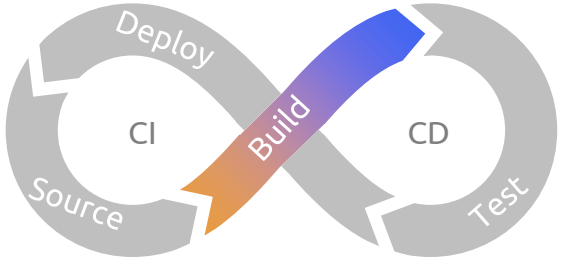

AWS Cloud

AWS CodeBuild

Fully managed

Run tests

Compile

Produce artifacts

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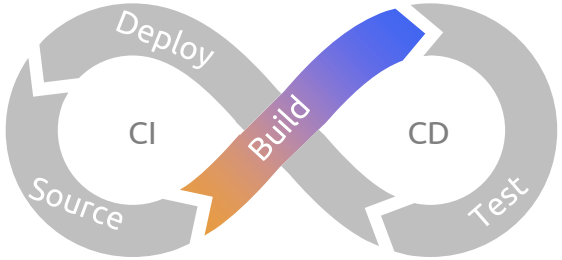

AWS Cloud

AWS CodeBuild

Third Party

Jenkins

TeamCity

CloudBees

CodePipeline plugins needed for Jenkins and TeamCity integration

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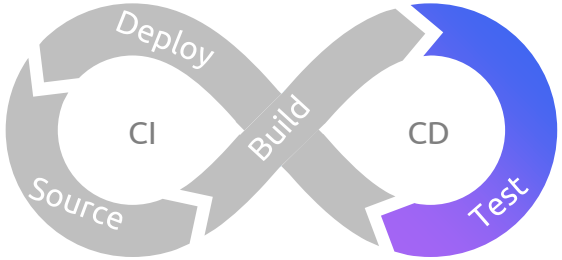

AWS Cloud

AWS CodeBuild

Third Party

Jenkins

TeamCity

CloudBees

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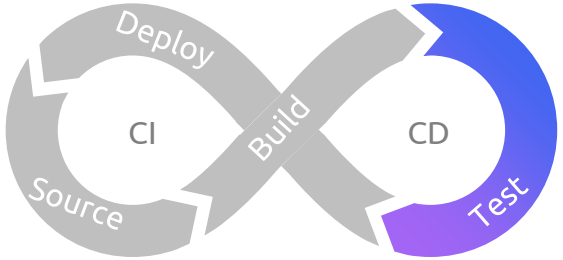

AWS Cloud

AWS Device Farm

Third Party

Runscope

BlazeMeter

MicroFocus

Ghost Inspector

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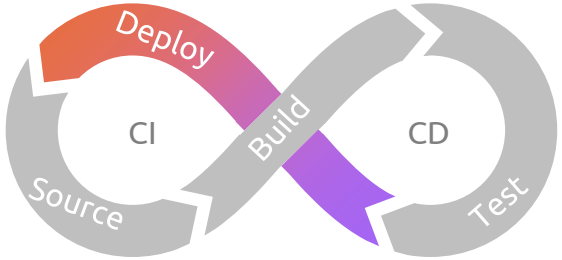

AWS Cloud

- Amazon Simple Storage Service (Amazon S3)
- AWS CodeDeploy
- AWS Elastic Beanstalk
- Amazon Elastic Container Service (Amazon ECS)
- AWS AppConfig
- AWS CloudFormation
- AWS Service Catalog
- Alexa for Business

Third Party

XebiaLabs

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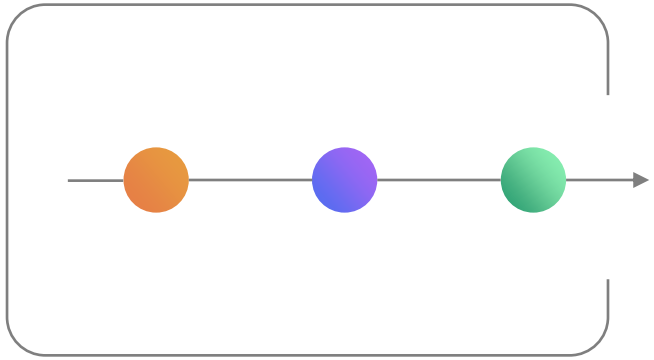

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Approvals

AWS Cloud

Amazon Simple Notification Service (Amazon SNS)

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Invocations

AWS Cloud

AWS Lambda

AWS Step Functions

Third Party

Snyk

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01 Integrations with Code Pipeline for both AWS and third-party products

02 AWS Suite with CI/CD flow

03 Approvals And Invocations

Code Pipeline

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CodePipeline Security

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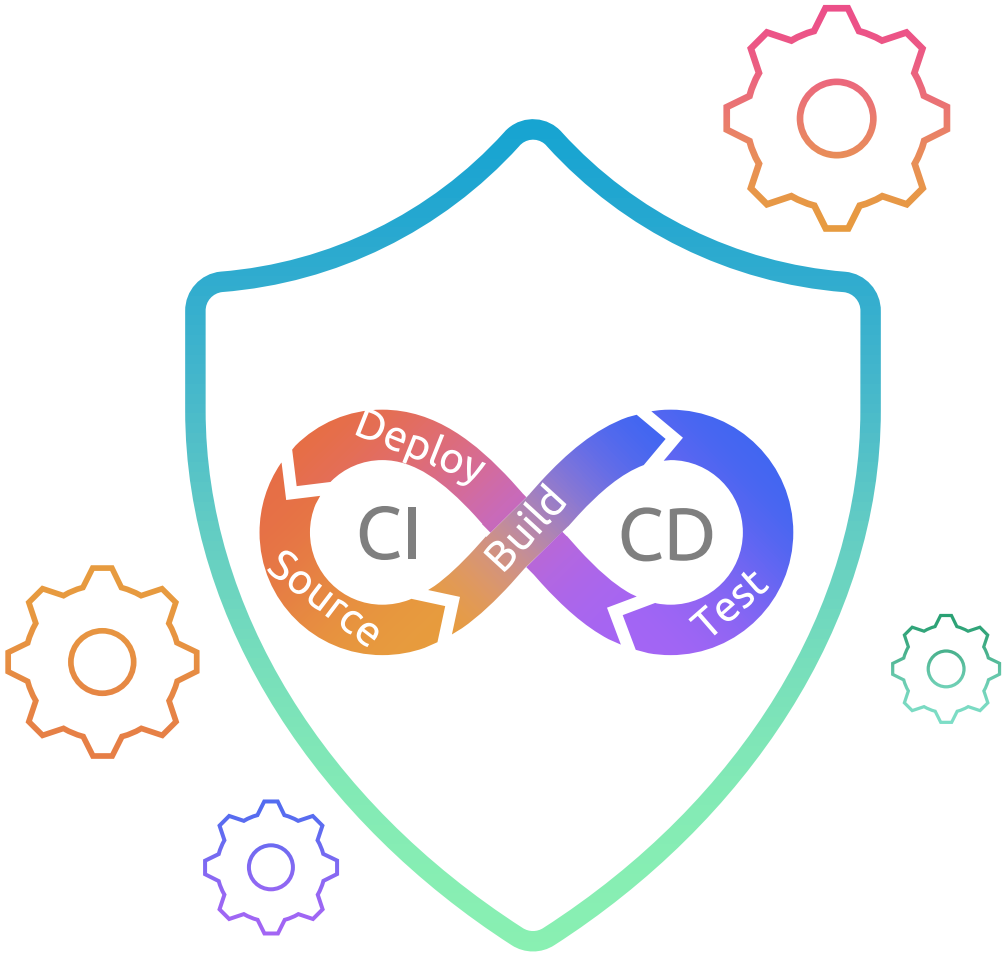

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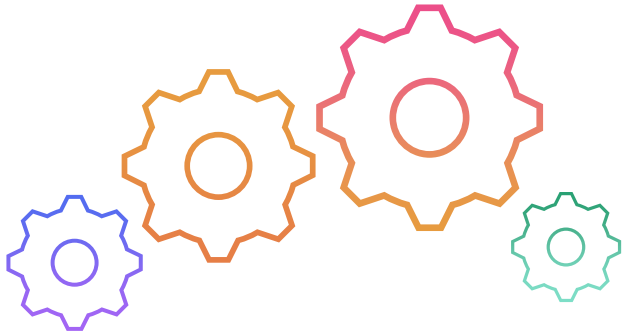

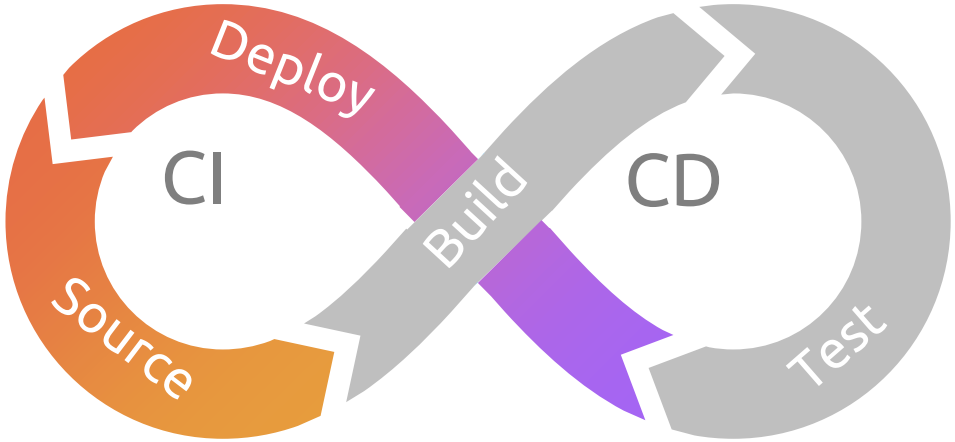

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Main Areas

- AWS Identity and Access Management (IAM)
- Authentication
- Authorization
- Encryption
- Secrets

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Authentication

Authorization

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AWS Identity and Access Management (IAM)

Authentication

1 Users and Groups

- Long-term credentials

2 Roles

- Temporary access
- Federated users
- Applications running on EC2 instances (virtual servers)

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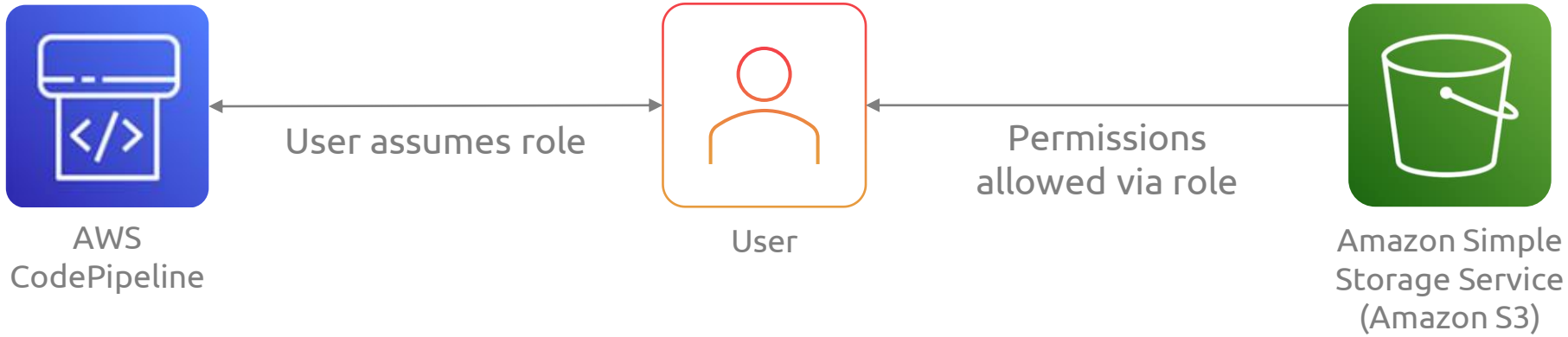

Policy:
S3 permissions allowed

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Authorization

- JSON
- Identity or Resource based

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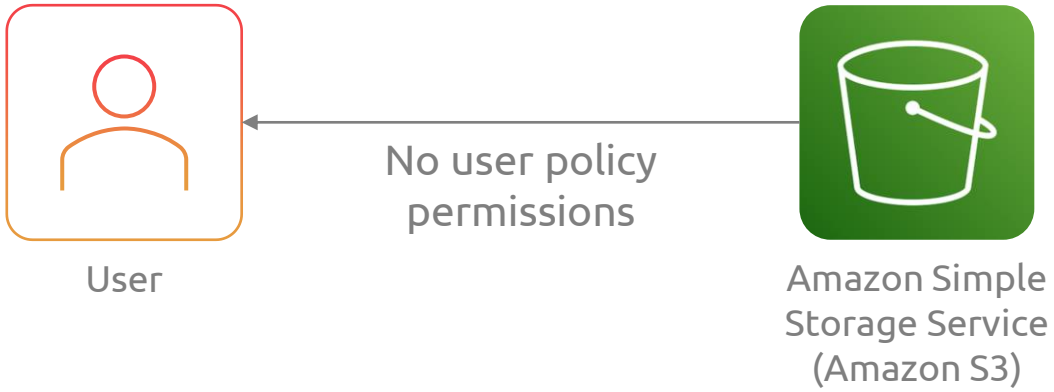

Resource Policy:
S3 delete permissions allowed to User A

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How can we solve this problem?

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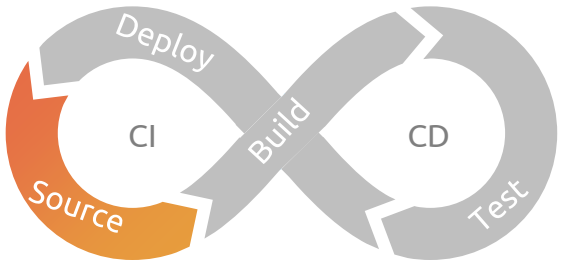

Authentication

Encryption

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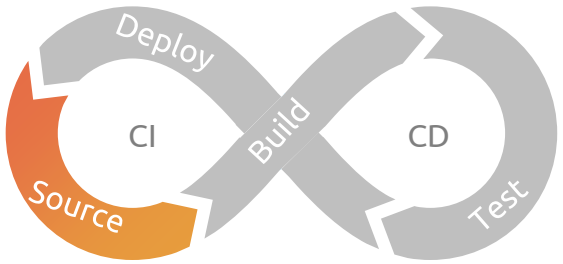

AWS Cloud

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

Amazon Elastic Container Registry (Amazon ECR)

Third Party

GitHub

Bitbucket

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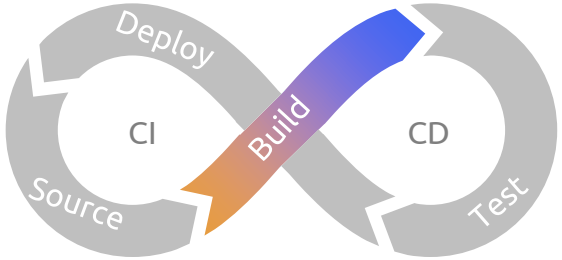

01 AWS Managed Keys

02 Customer Managed Keys

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```
{
  "Version": "2012-10-17",
  "Id": "SSEAndSSLPolicy",
  "Statement": [
    {
      "Sid": "DenyUnEncryptedObjectUploads",
      "Effect": "Deny",
      "Principal": "*",
      "Action": "s3:PutObject",
      "Resource": "arn:aws:s3:::codepipeline-us-west-2-
       89050EXAMPLE/*",
      "Condition": {
        "StringNotEquals": {
          "s3:x-amz-server-side-encryption": "aws:kms"
        }
      }
    },
```

```
    },
    {
      "Sid": "DenyInsecureConnections",
      "Effect": "Deny",
      "Principal": "*",
      "Action": "s3:*",
      "Resource": "arn:aws:s3:::codepipeline-us-west-2-
       89050EXAMPLE/*",
      "Condition": {
        "Bool": {
          "aws:SecureTransport": "false"
        }
      }
    }
  ]
}
```

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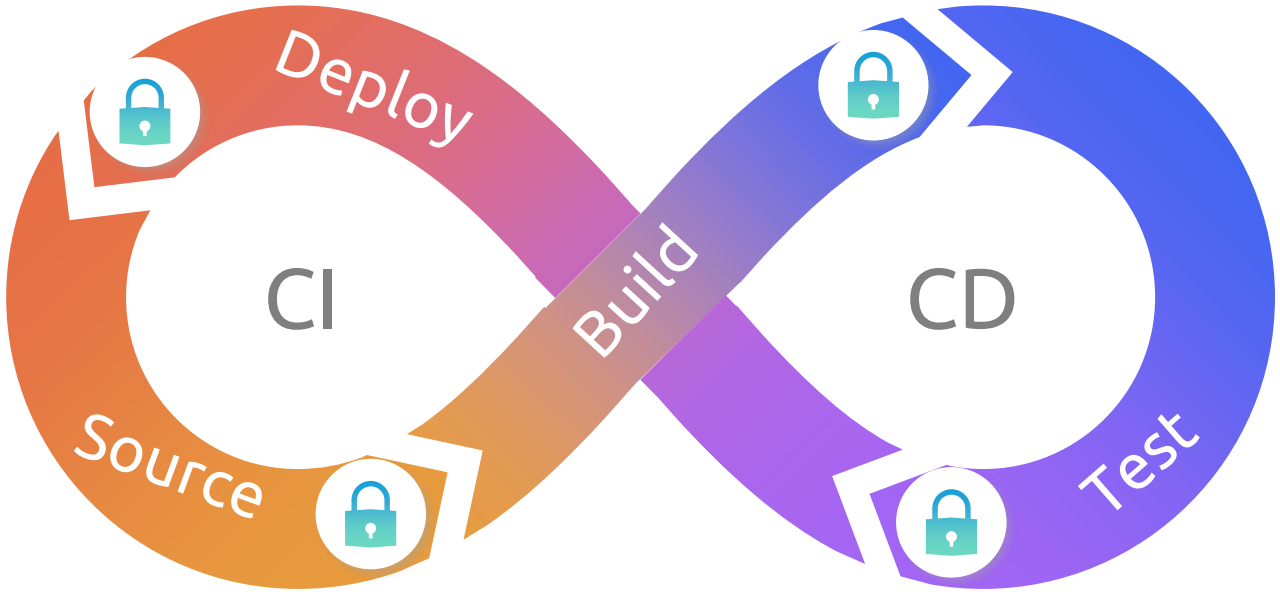

This type of encryption is called encryption of data at rest.

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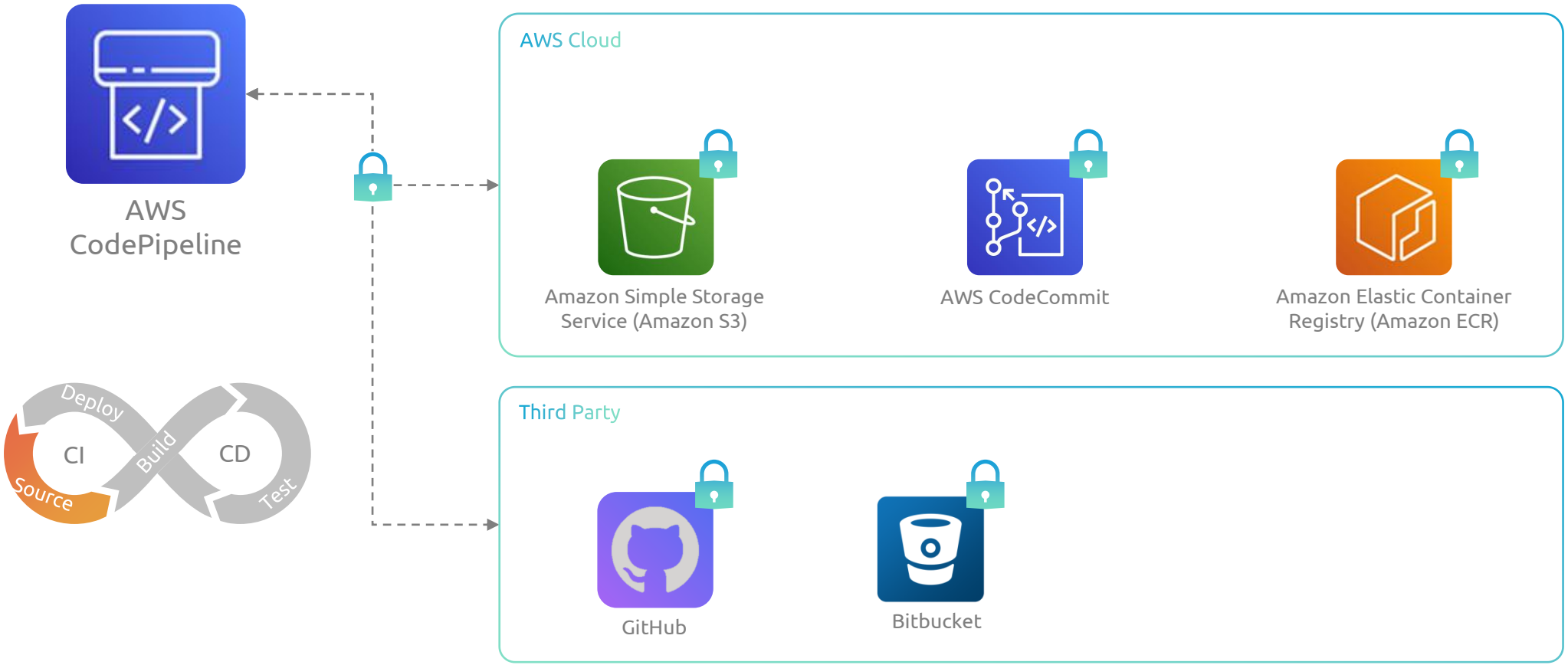

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- Passwords
- Server credentials
- API keys
- Hardcoded information

AWS Secrets Manager

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Summary

01 AWS Identity and Access Management (IAM)

02 Authentication

03 Authorization
- Identity-based
- Resources based

04 Encryption
- At Rest
- During communication

05 Secrets

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Costs

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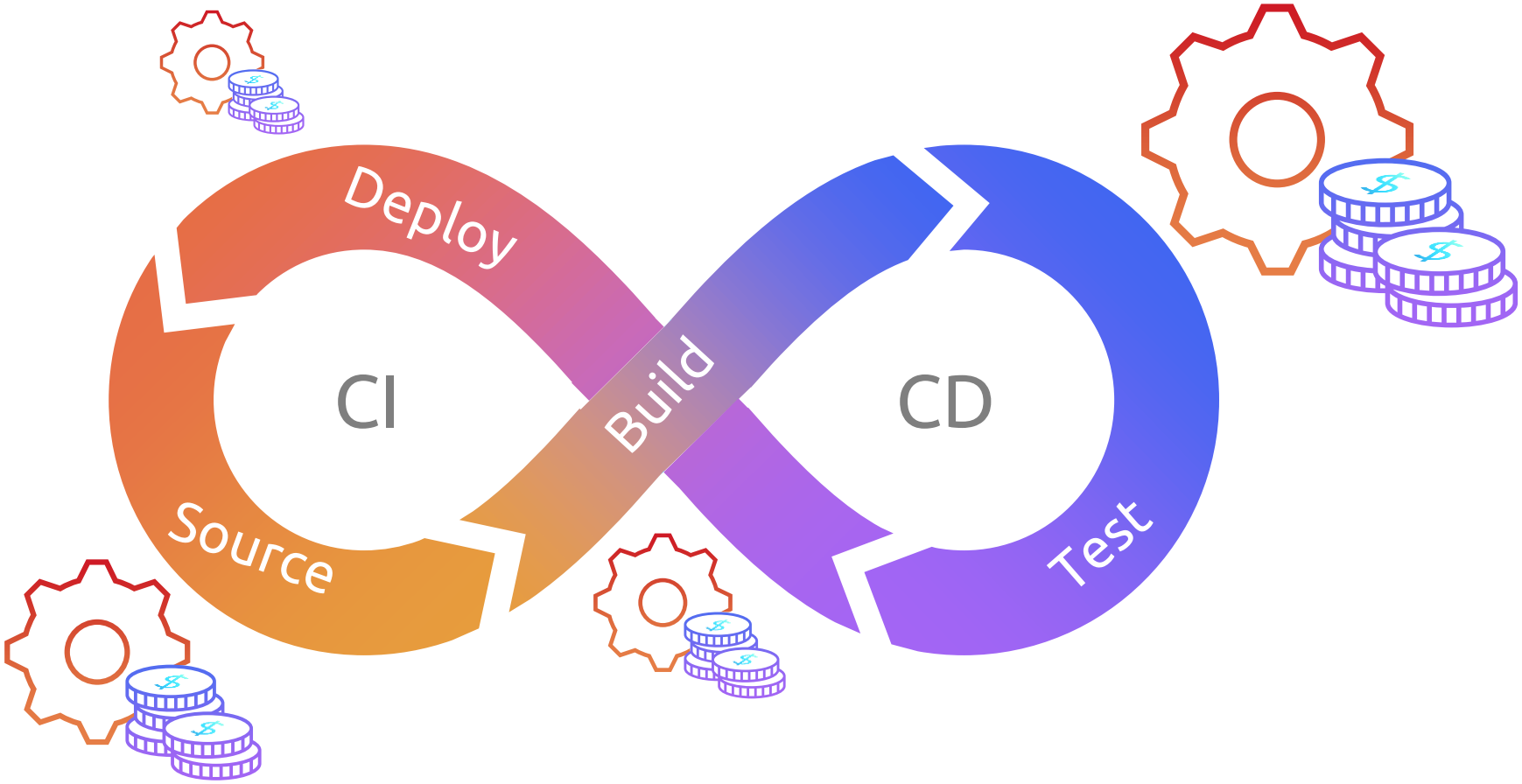

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aws

free tier

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Free Tier

1 Active pipeline / month

30 Days

1 Code change

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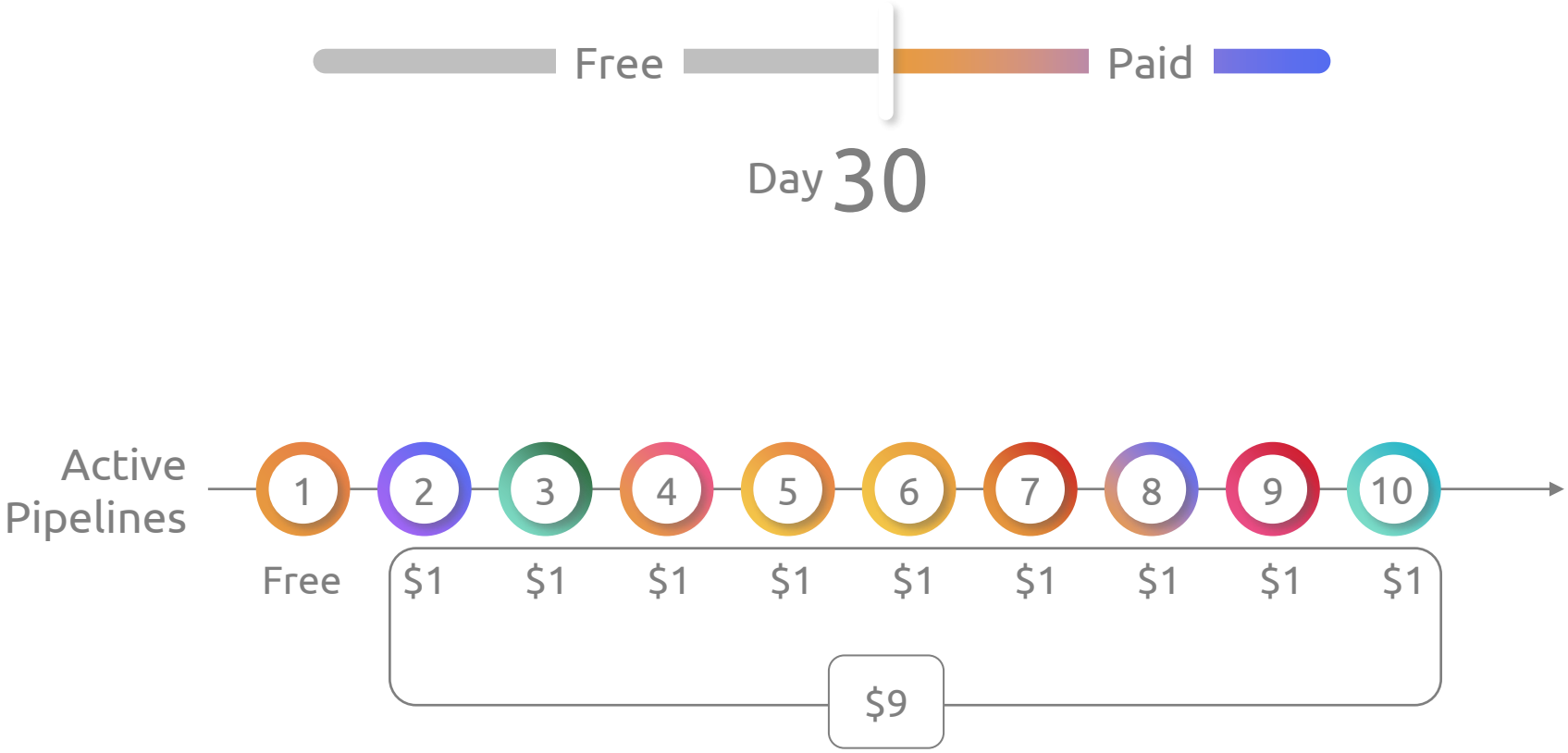

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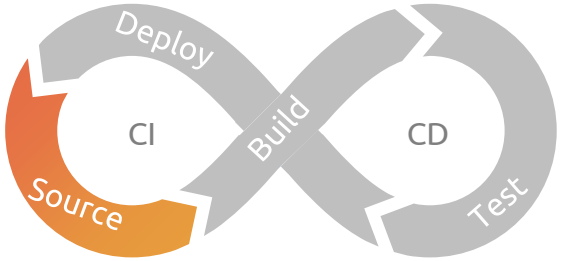

AWS Cloud

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

Amazon Elastic Container Registry (Amazon ECR)

Third Party

GitHub

Bitbucket

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Free Tier

- 5 active users
- 1,000 repositories
- 50 GB storage
- 10,000 Git requests

Additional Charges

- $1 per additional active user
- $0.06 per additional GB storage
- $0.001 per additional Git request

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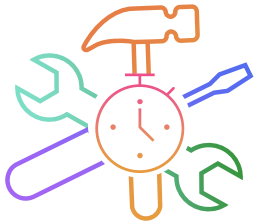
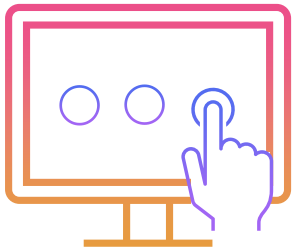


Build Duration

100 build minutes per month



Compute Type

general1.small or arm1.small instance type

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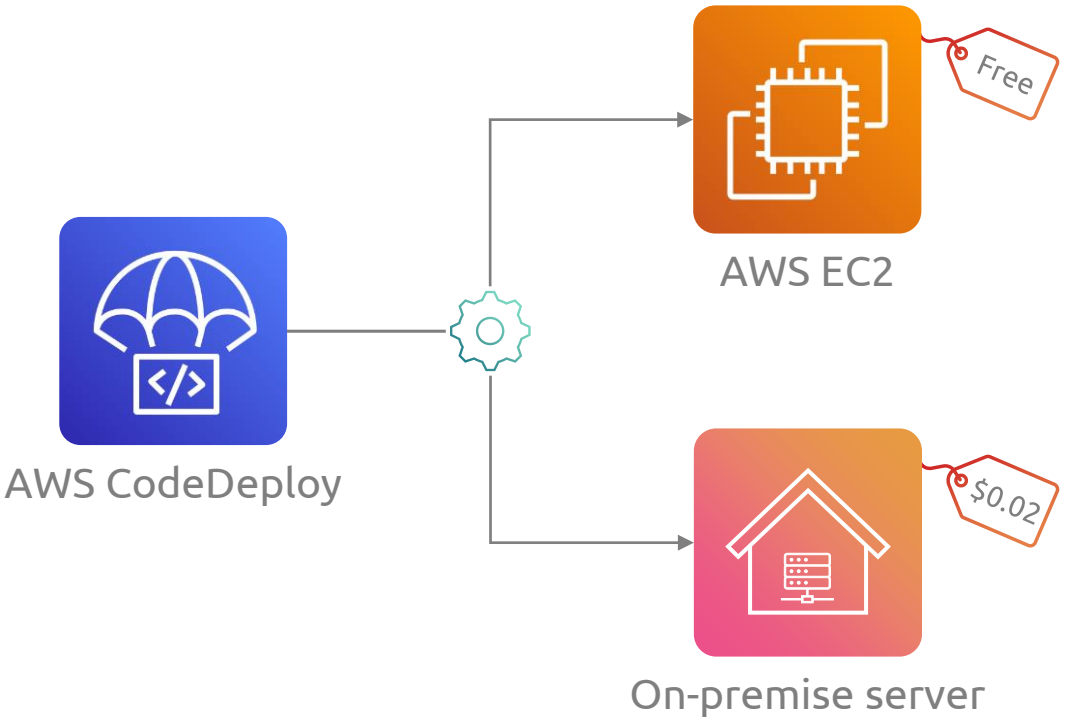

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AWS EC2

1 Type

2 Region

3 Software loaded

4 Pricing model

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1 Type

- CPU
- Memory
- Storage
- Networking
- Size

Examples

- c7g.medium - Compute optimized, medium size
- i3.xlarge - Storage optimized, extra-large size
- r7g.large - Memory optimized, large size

https://aws.amazon.com/ec2/instance-types/

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2 Region

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3 Software Loaded

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4 Pricing Models

- Free tier (micro instances only)
- On demand
- Spot
- Savings plan
- Dedicated host

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Summary

- $1 per pipeline
- First pipeline is free of cost

AWS Cloud

AWS CodeCommit

AWS CodeBuild

AWS CodeDeploy

AWS EC2

AWS Elastic Beanstalk

AWS ECS Container

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Monitoring

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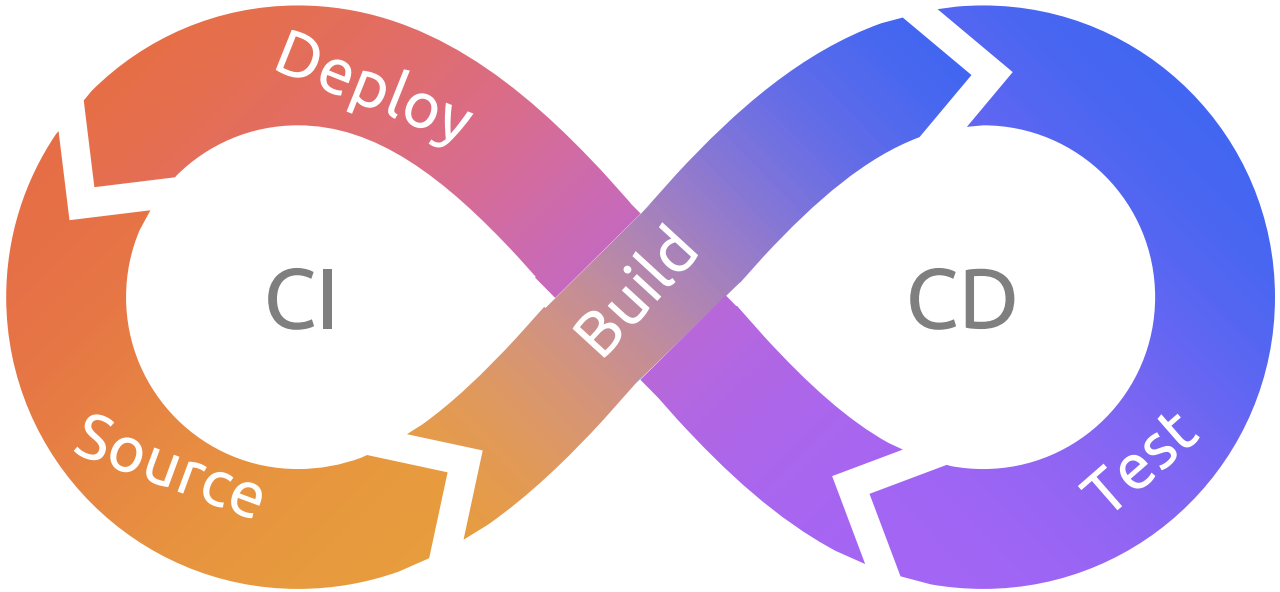

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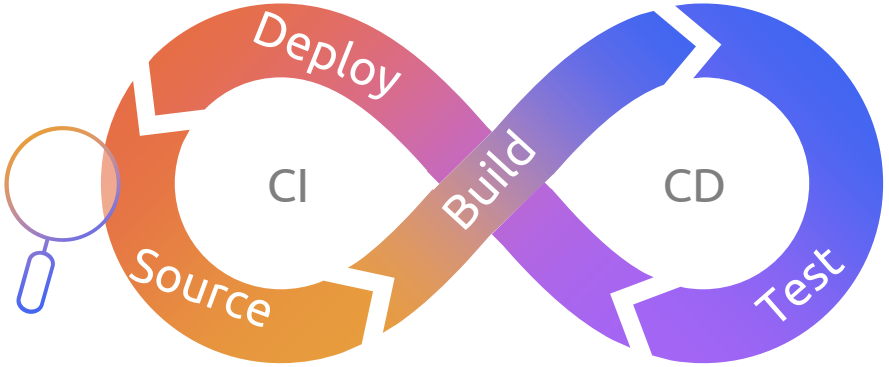

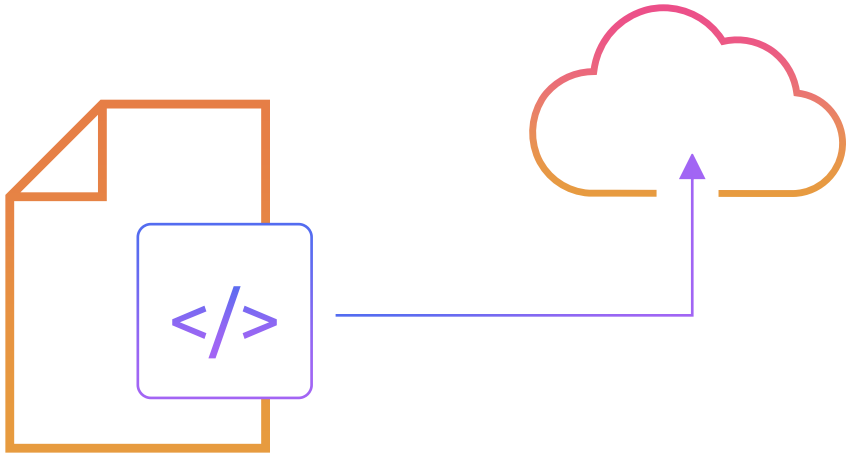

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What can be monitored?

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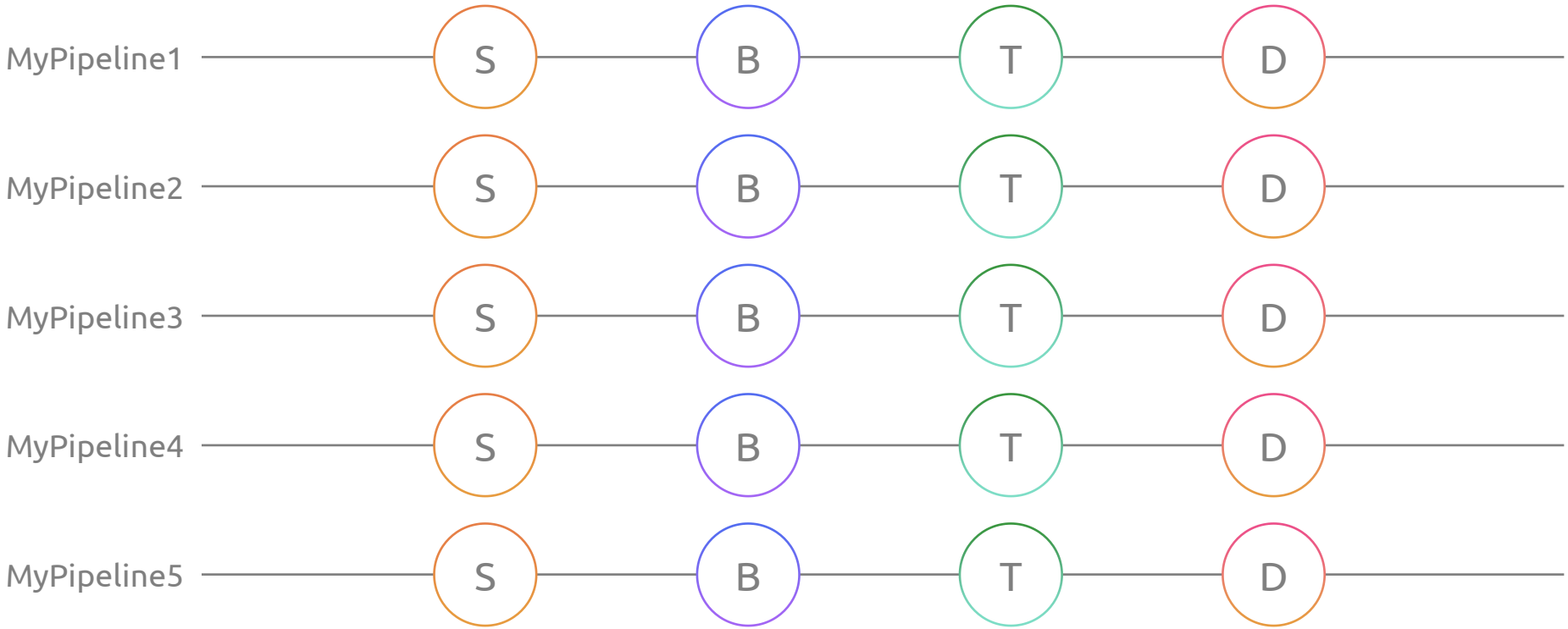

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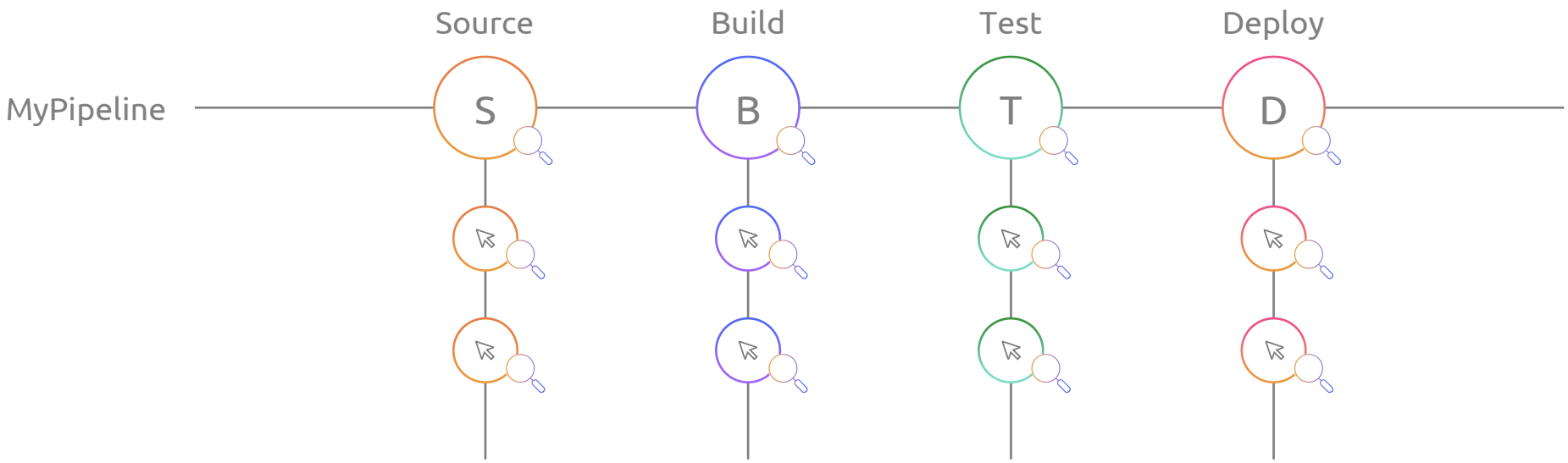

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- Comes with an AWS account
- Publisher/Subscriber model
- Default events published free of cost
- Cross-account access
- Third-party access

Amazon EventBridge

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Pipeline Events

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Stage Events

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Action Events

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- Comes with an AWS account
- Logs user and role activity
- Logs API calls to other services

Amazon CloudTrail

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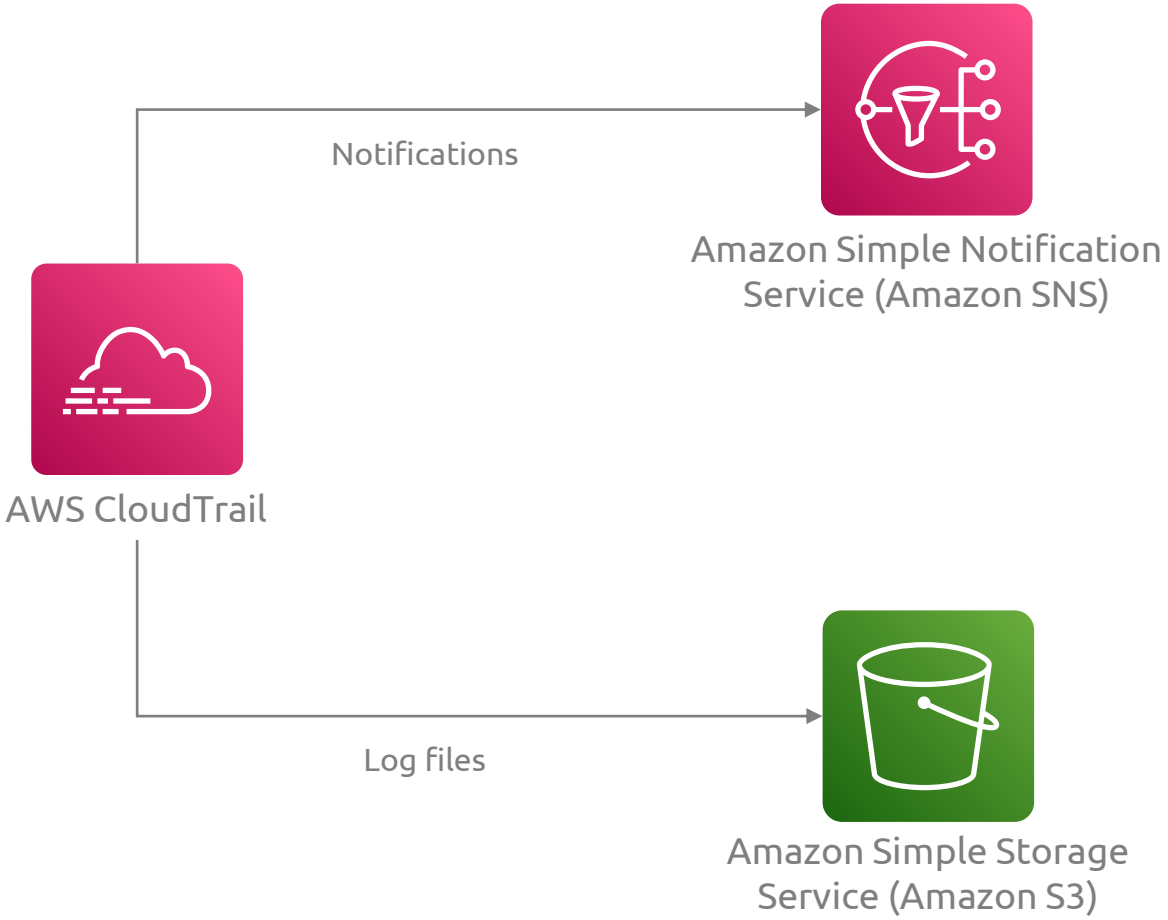

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Summary

AWS Cloud

AWS EventBridge

AWS CloudTrail

Amazon Simple Storage Service (Amazon S3)

Amazon Simple Notification Service (Amazon SNS)

We can configure

1 Pipeline-level

2 Stage-level

3 Action-level

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Repositories

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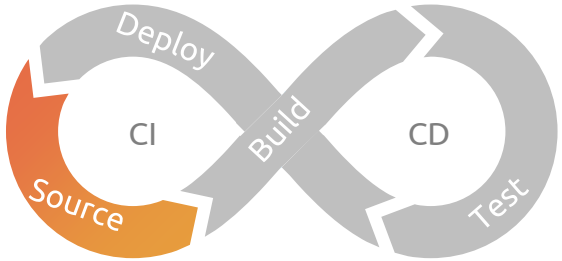

- What are repositories or repos?
- What are the benefits of repos?
- Is CodeCommit a repository?
- What about S3?

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- Track changes
- Change and resolve independently
- Work simultaneously
- Collaborate

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GitHub is a cloud-based, open-source repository system that comes with a set of standard commands and functions that allow developers to:

- Create a new repository or Clone an existing one to get started,
- Work on the changes locally and merge them into the main branch when ready,
- Commit or save the changes they have been working on and provide descriptions, and
- Review and approve changes that have been committed by other developers.

GitHub

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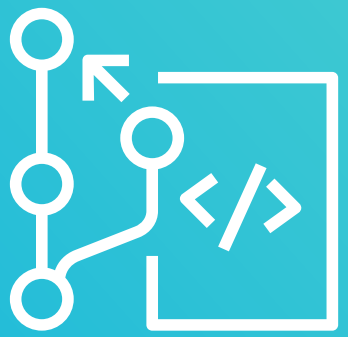
- AWS service
- Cloud based
- Supports Git commands such as
  - Clone
  - Branch
  - Merge
  - Commit
  - Pull
- GitHub compatible
- Can migrate repos from GitHub



AWS CodeCommit

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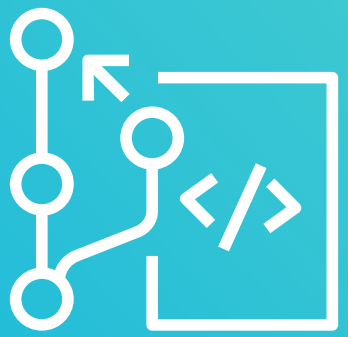
- Fully managed
- Scalable
- Secure
- Highly available
- Lives in the AWS cloud



AWS CodeCommit

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- Versioning
- Monitoring
- Not a Git-based version control system

Amazon Simple Storage Service (AWS S3)

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- Git-based tool
- Added enterprise and private options

Bitbucket

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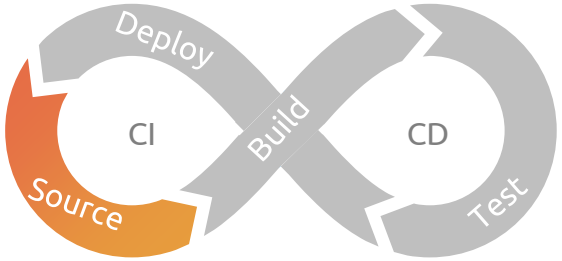

AWS Cloud

AWS CodeCommit

Third Party

GitHub

Bitbucket

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Summary

01 Repository and the benefits

02 GitHub

03 AWS CodeCommit

04 Amazon Simple Storage Service (AWS S3)

05 Bitbucket

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Introduction to CodeBuild

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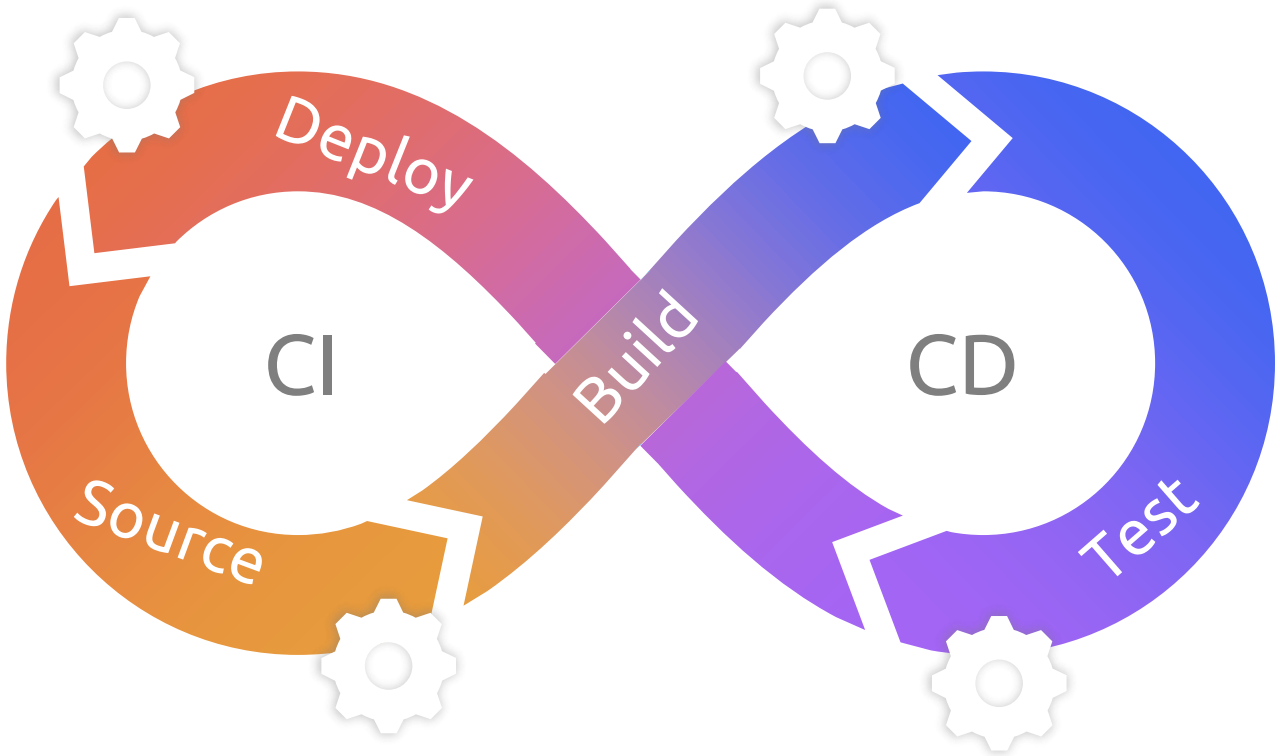

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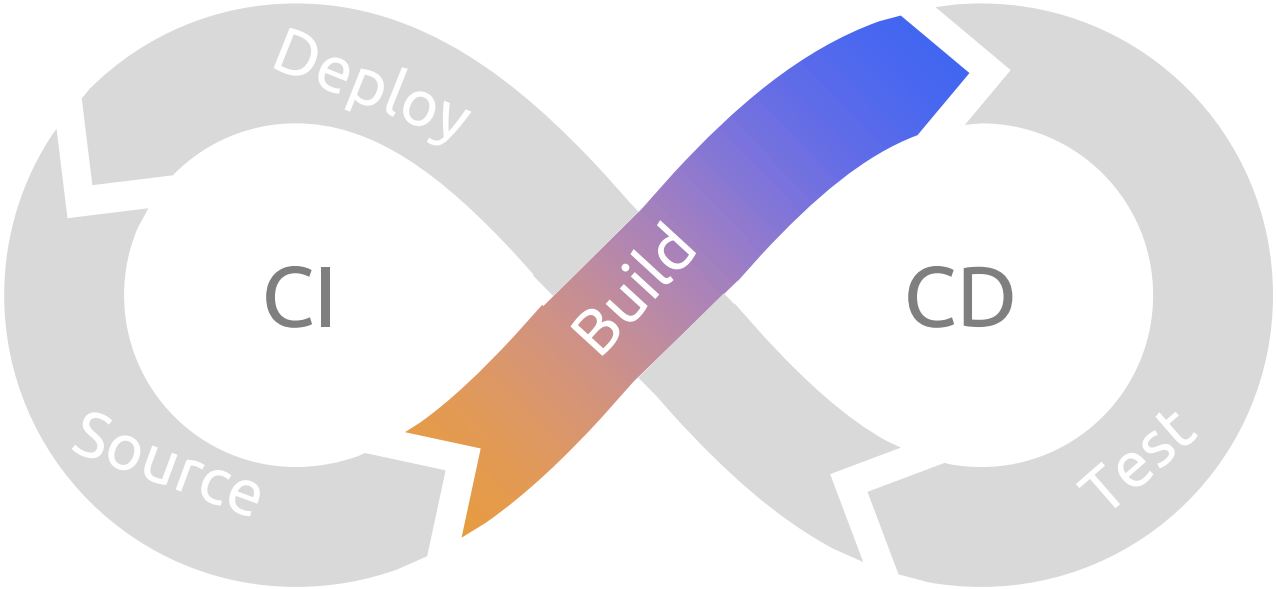

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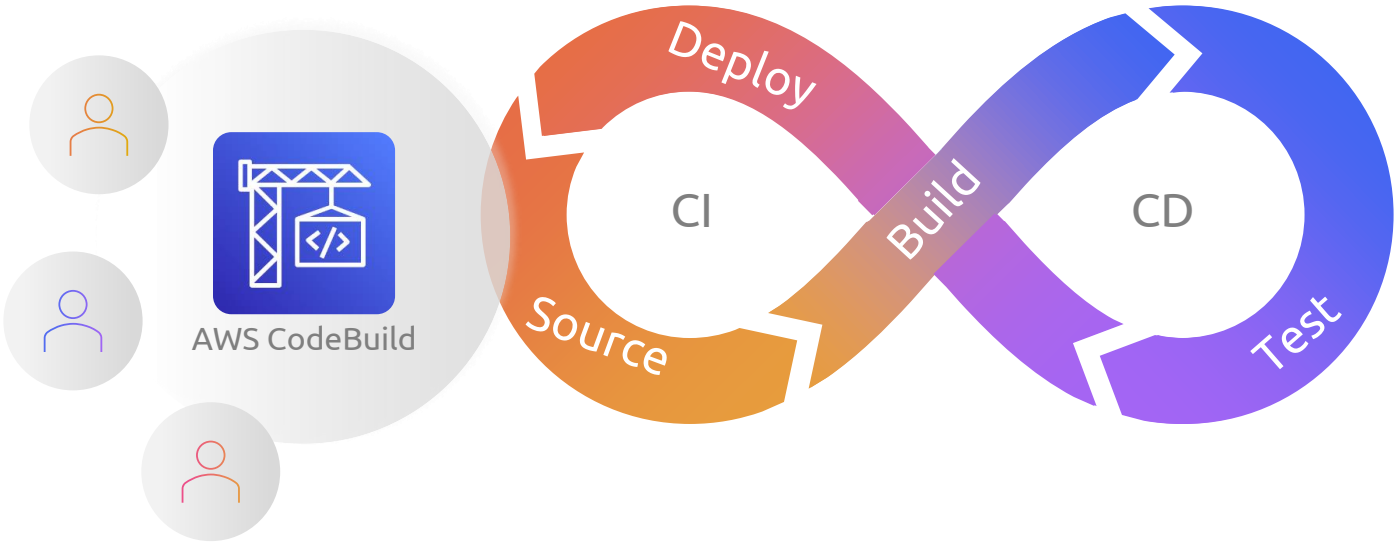
CI/CD Pipeline



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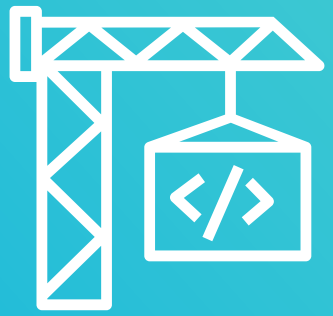
- Fully managed
- Scalable
- IAM
- Encryption



AWS CodeBuild

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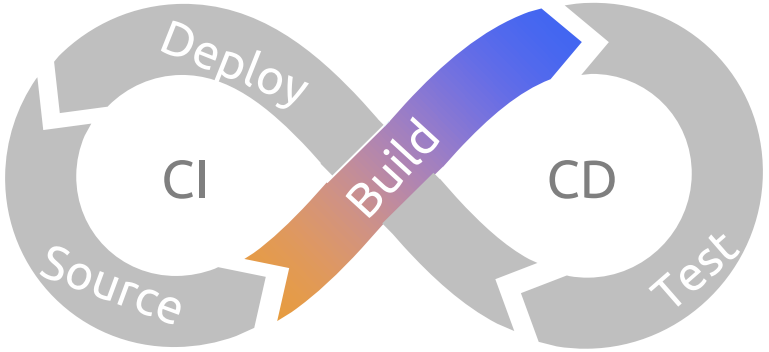

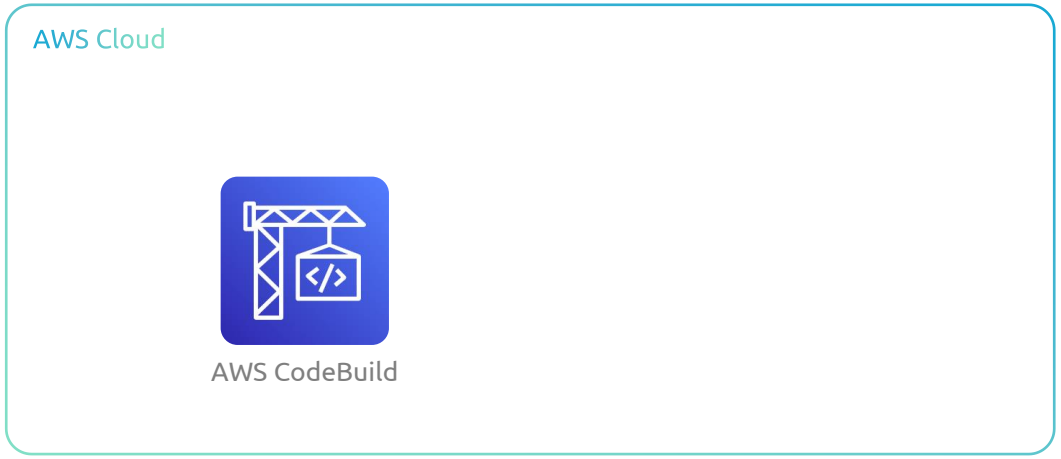

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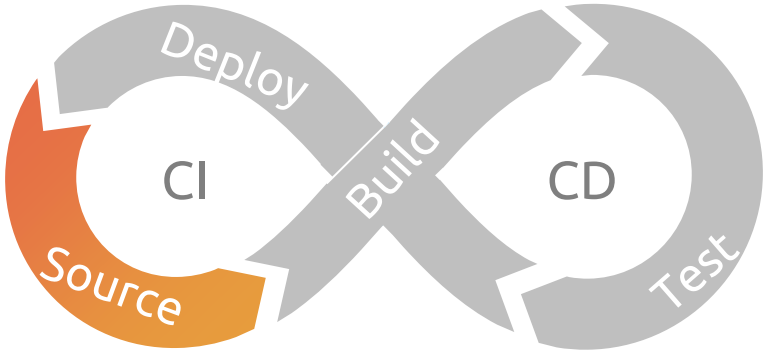

AWS Cloud

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

Third Party

GitHub

Bitbucket

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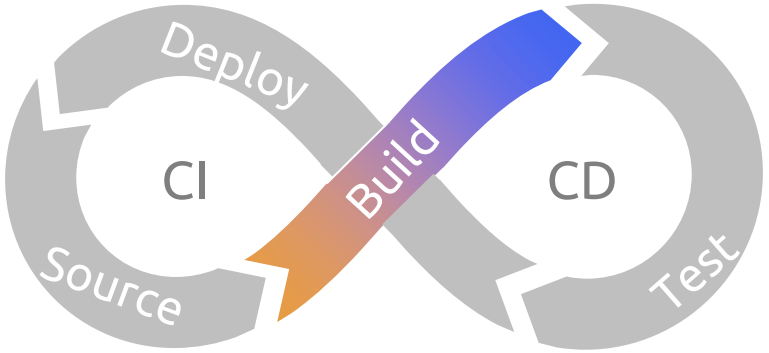

Third Party

Jenkins

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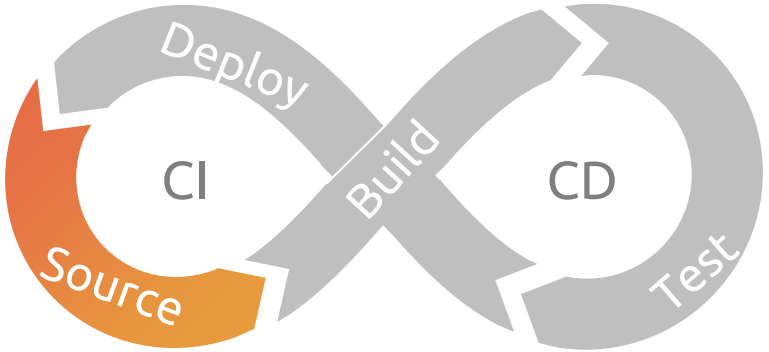

AWS Cloud

AWS CodeCommit

Third Party

Jenkins

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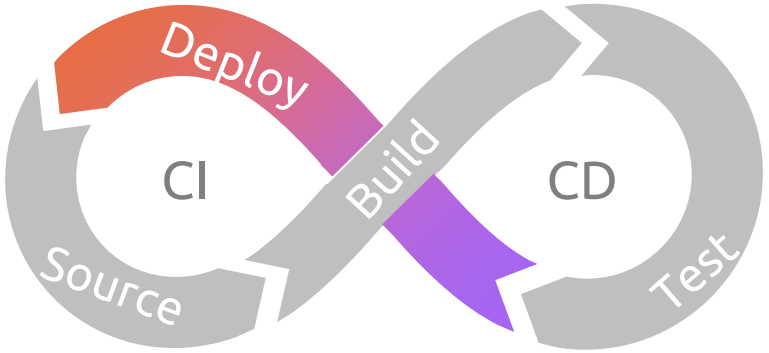

AWS Cloud

AWS CodeDeploy

Third Party

Jenkins

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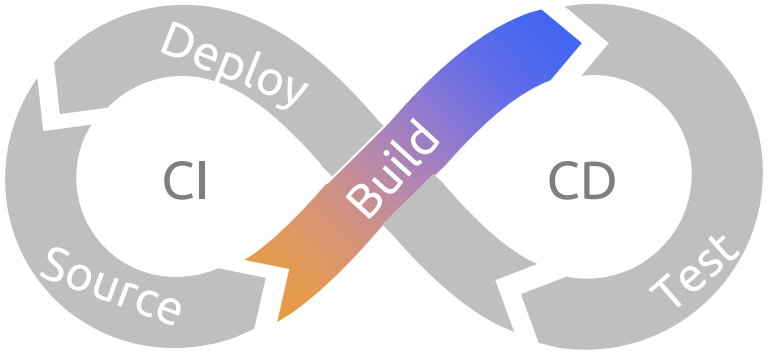

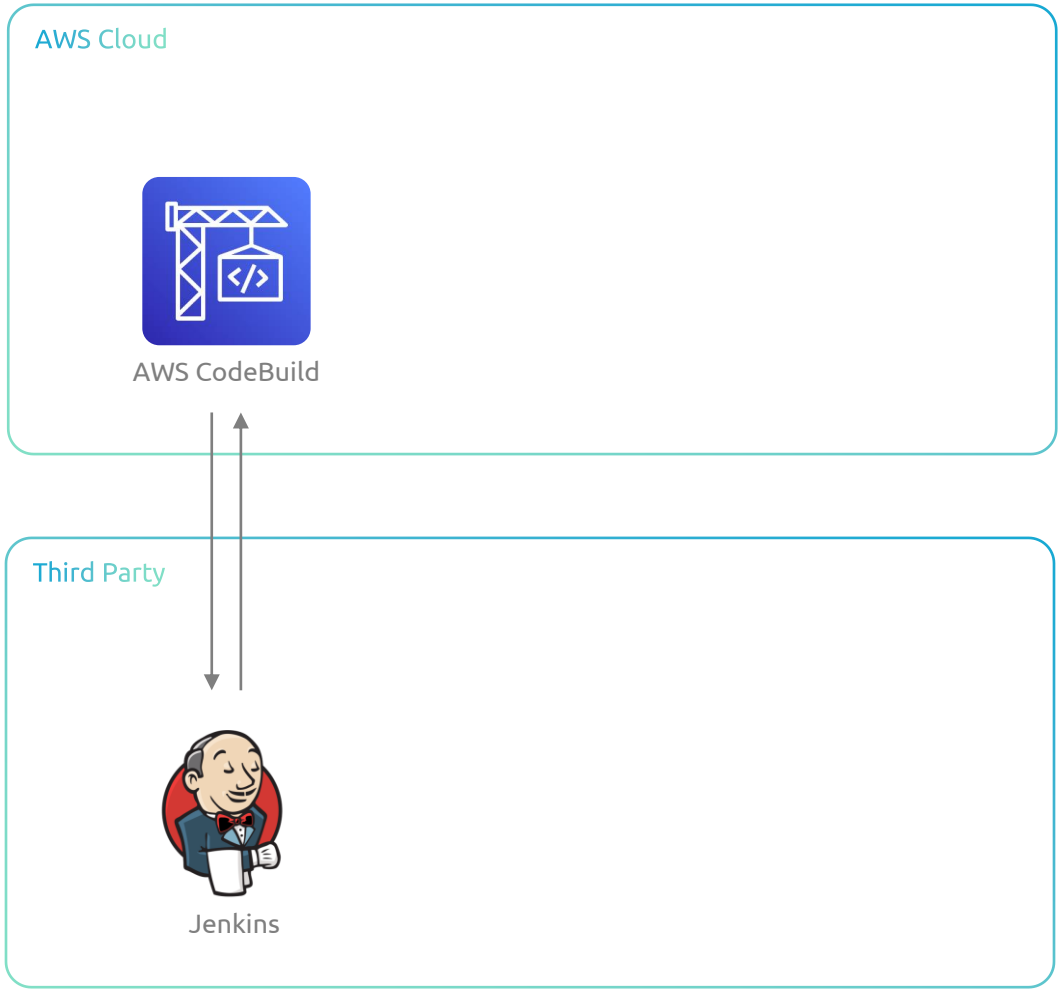

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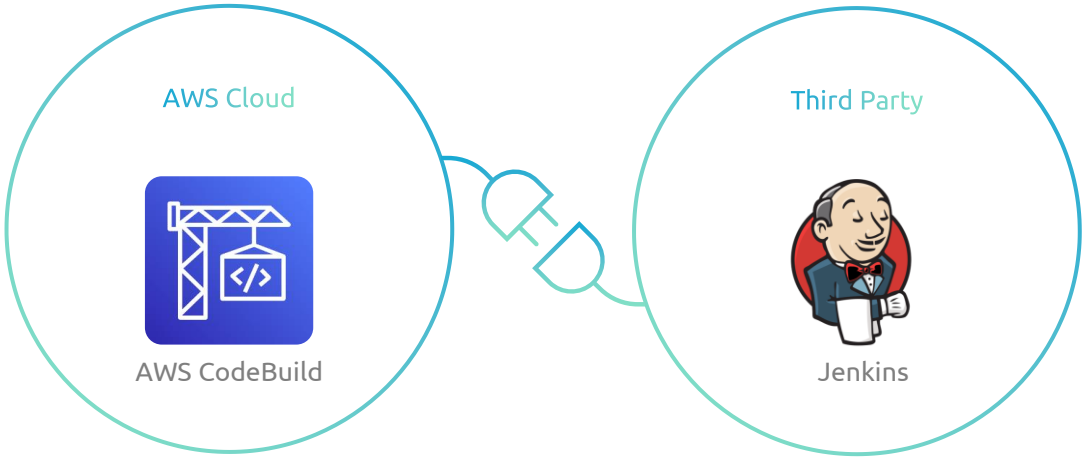

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Summary

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KodeKloud

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Build Stage with CodeBuild

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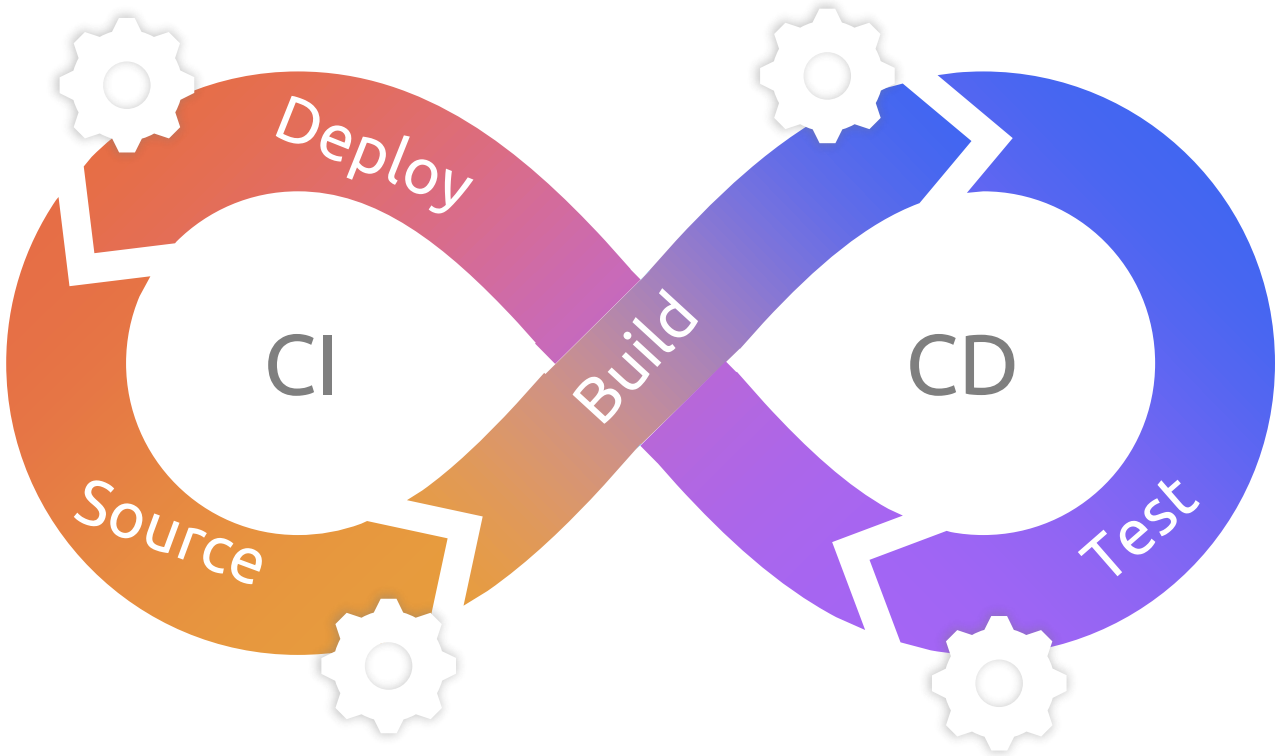

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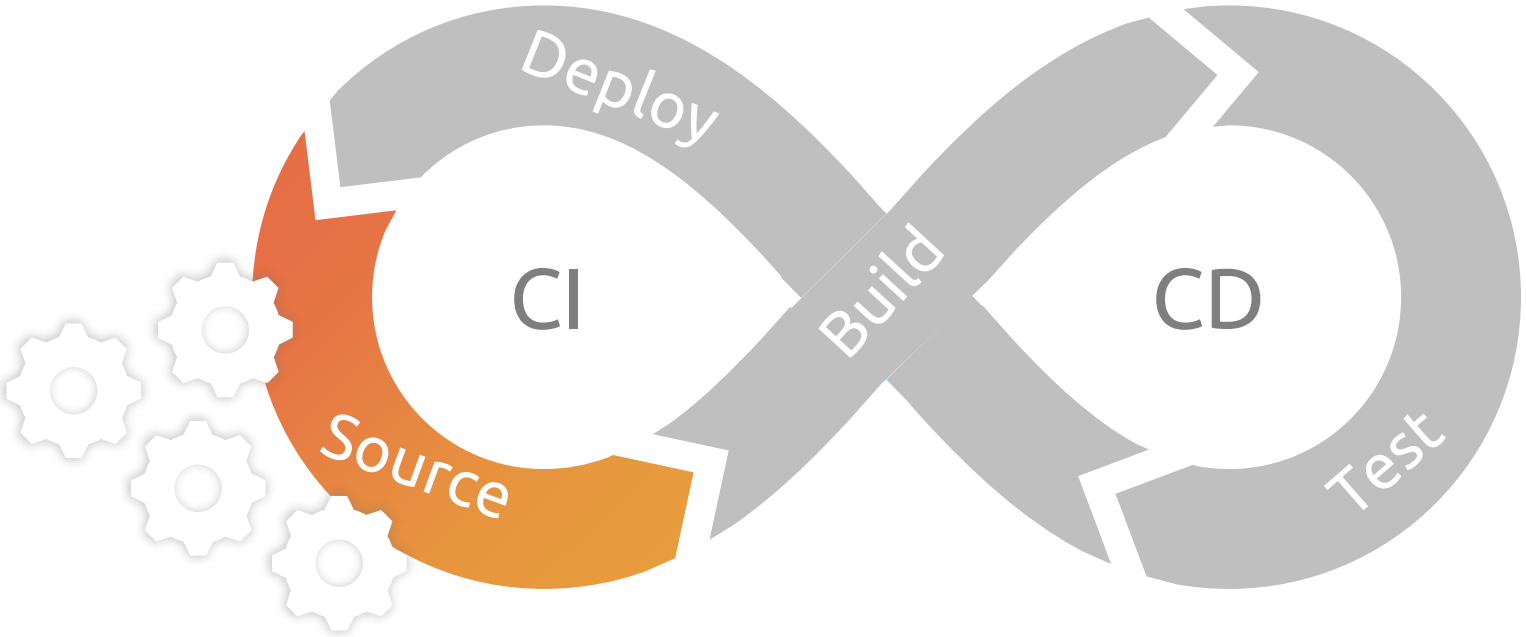

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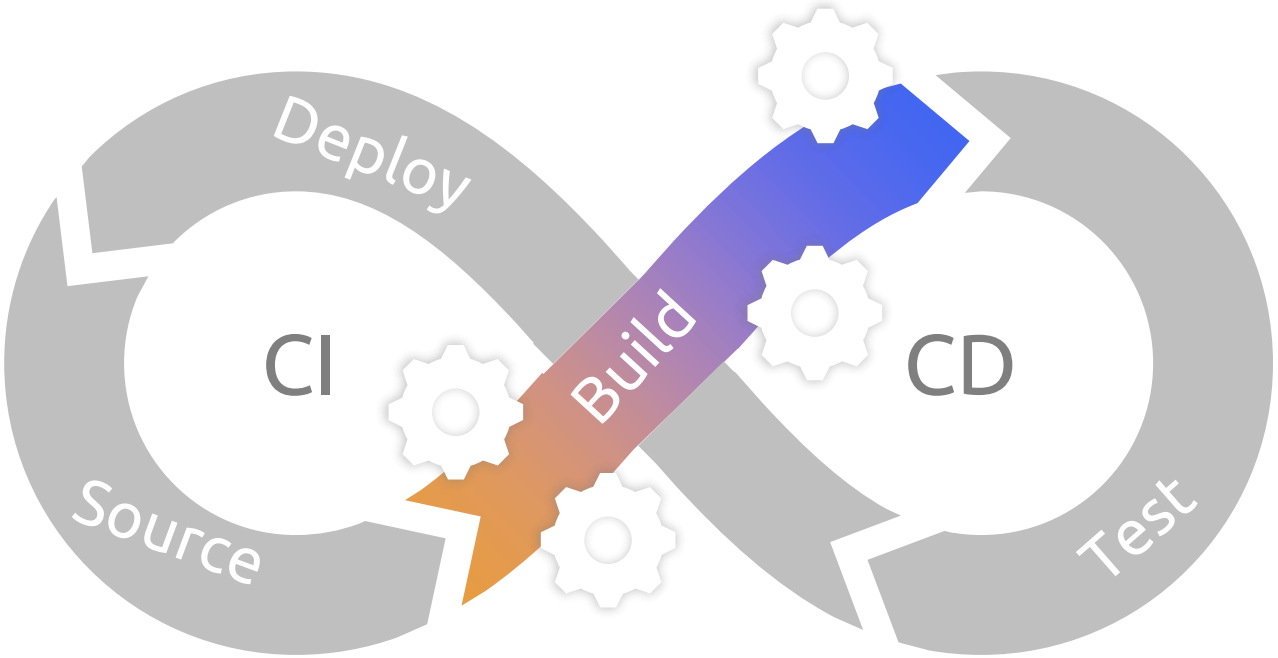

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Preconfigured Environments

- Java
- Ruby
- GoLang
- Node.js
- Android
- Microsoft.NET
- PHP
- Docker

*can also build custom environment

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CodeBuild Process

1. Create temporary compute container
2. Load runtime environment into temp container
3. Download source code
4. Execute project commands
5. Upload artifacts into S3
6. Remove temporary container

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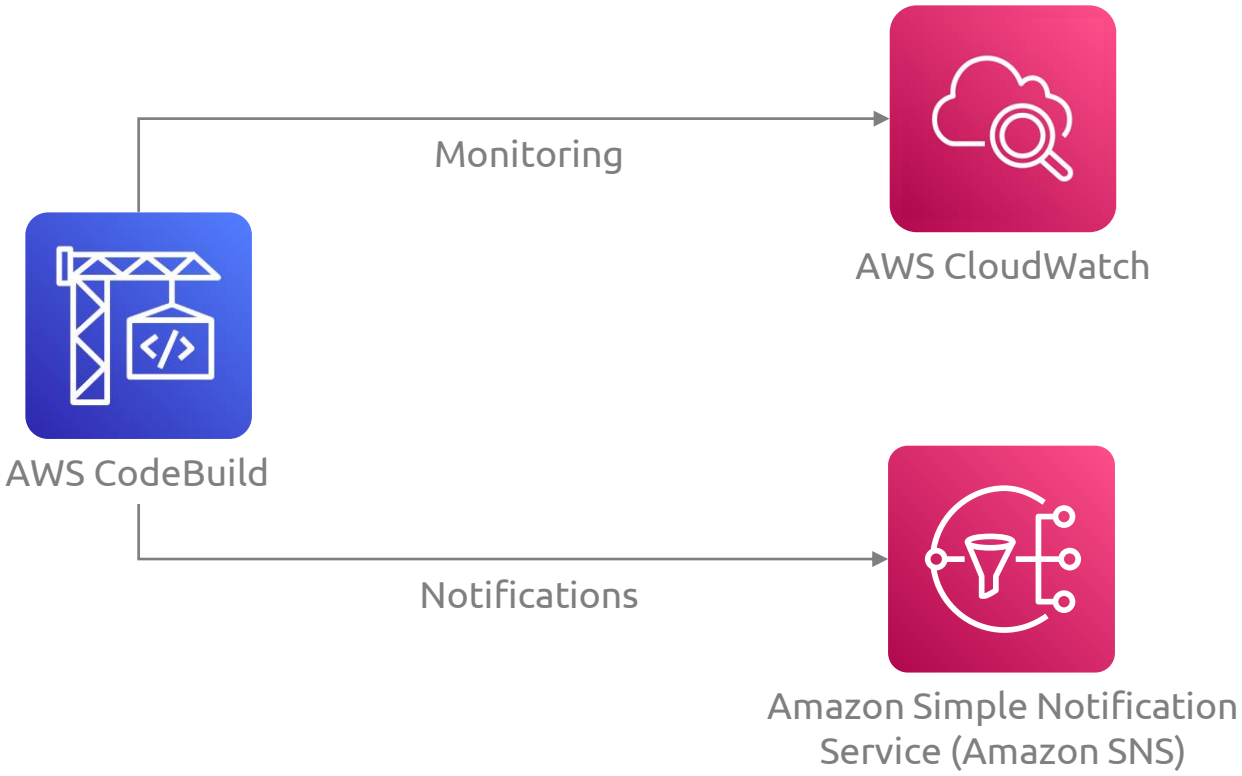

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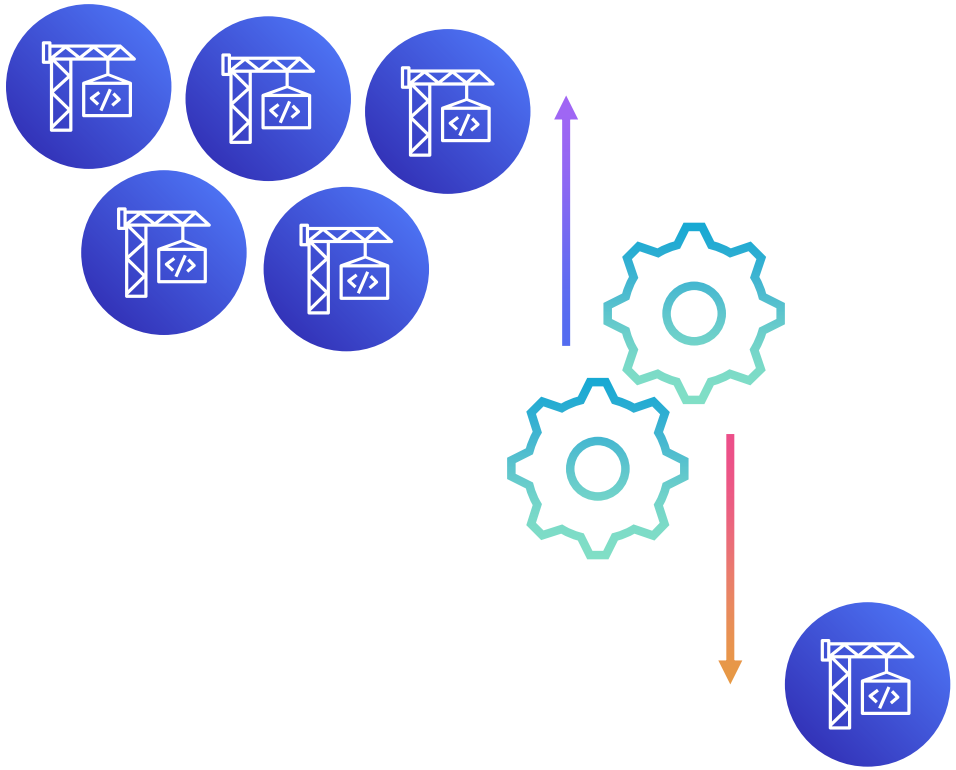
Automatic Scale-Up and Scale-Down



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Pricing

- Build Duration in minutes
- Compute Type
  - Arm1
  - General1
  - Gpu1

Free Tier

- 100 build minutes per month
- general1.small or arm1.small instance type

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Summary

- Building service
- Continuous integration
- Use it by itself
- IAM

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

GitHub

Bitbucket

Jenkins

AWS CodeBuild

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Introduction to CodeDeploy

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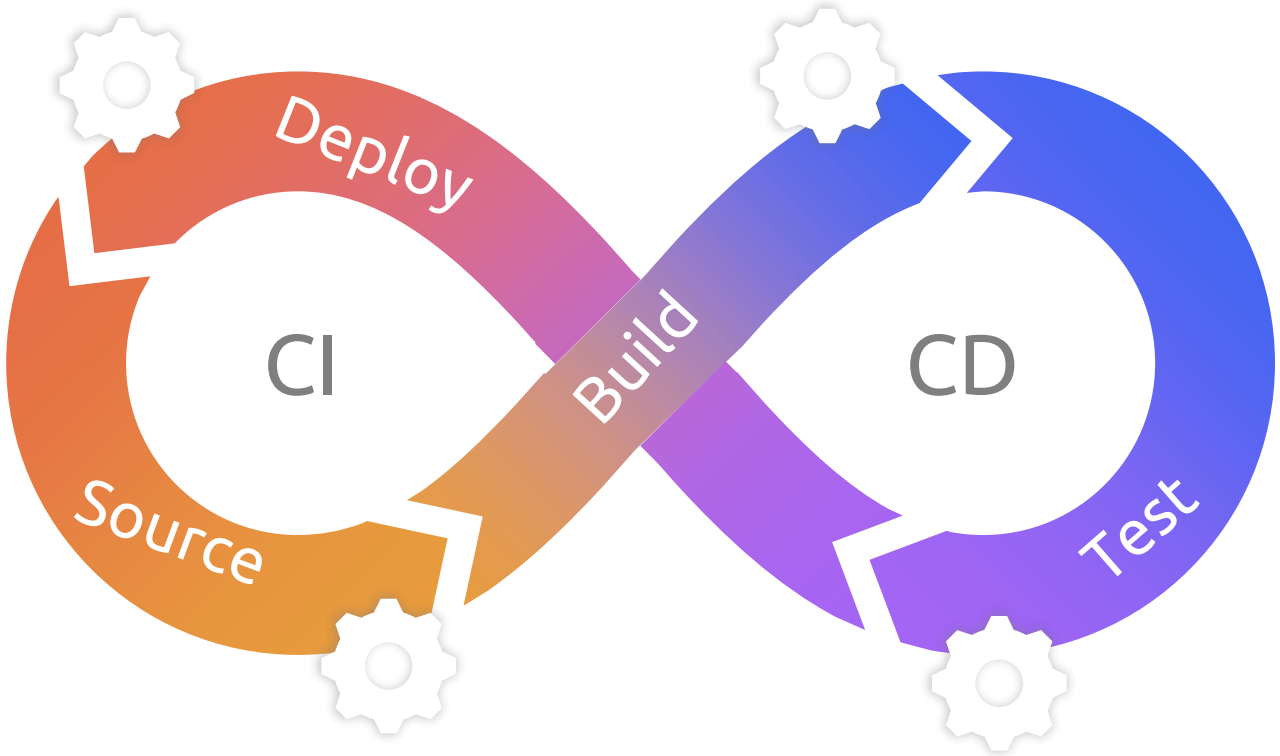

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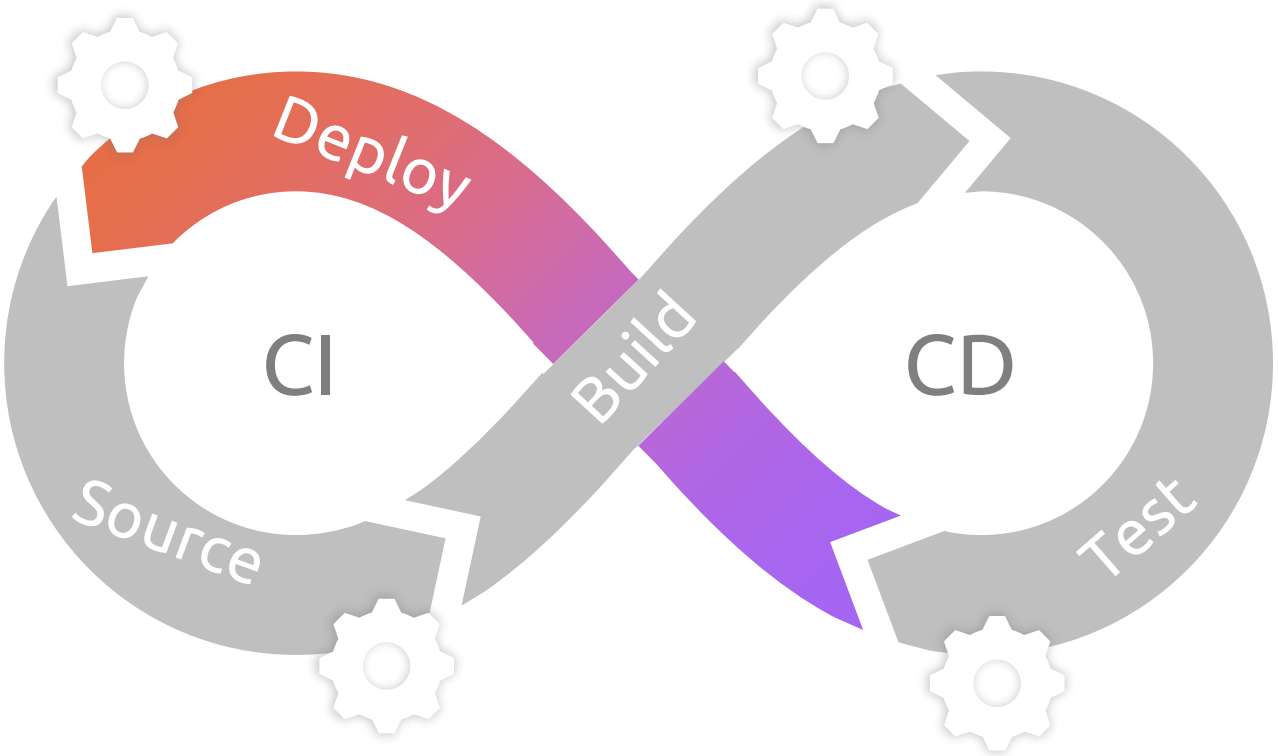

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- Amazon EC2 instances
- On-premise instance
- Lambda
- ECS
- Fargate

AWS CodeDeploy

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- Code
- Lambda functions
- Web files
- Configuration files
- Executables
- Packages
- Scripts
- Multimedia files

AWS CodeDeploy

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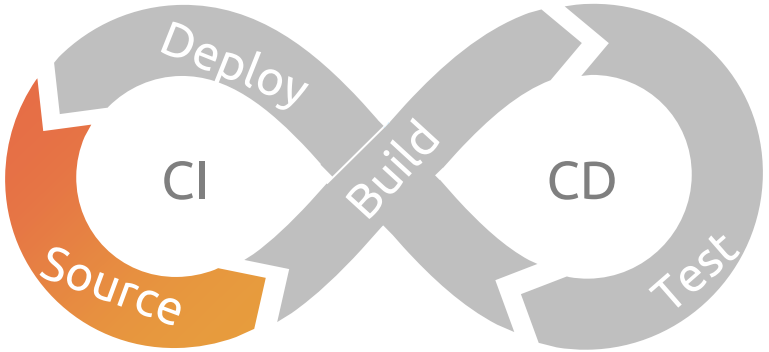

AWS Cloud

Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

Third Party

GitHub

Bitbucket

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Amazon Simple Storage Service (Amazon S3)

AWS CodeCommit

GitHub

Bitbucket

AWS CodeDeploy

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- Fully managed
- Scalable
- Minimizes downtime
- Centralized
- Automated deployments
- Simultaneous deployments

AWS CodeDeploy

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Deployment Types

In Place

Rolling

Immutable

Blue/Green

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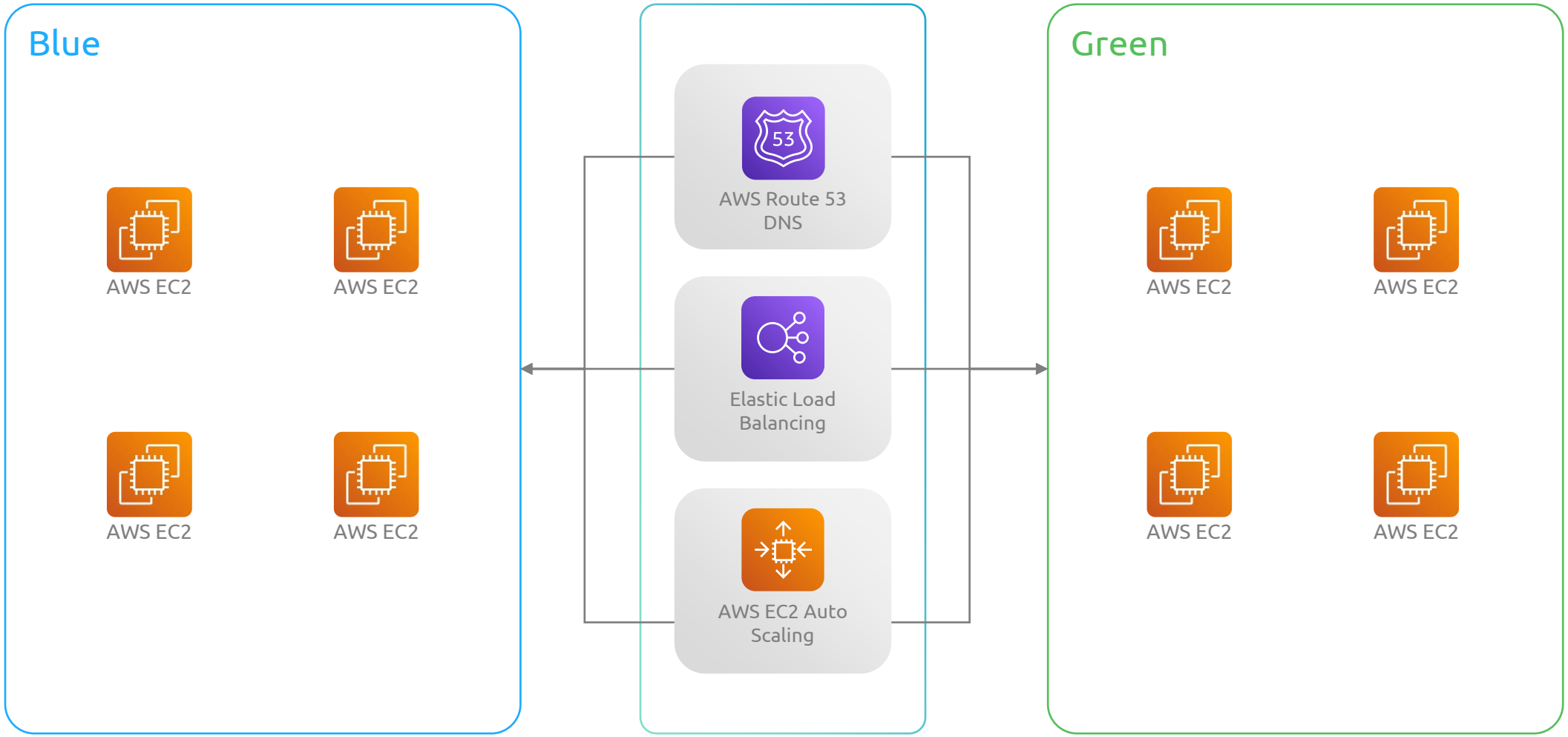

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Blue/Green Deployment Types

Canary

Linear

All-at-once

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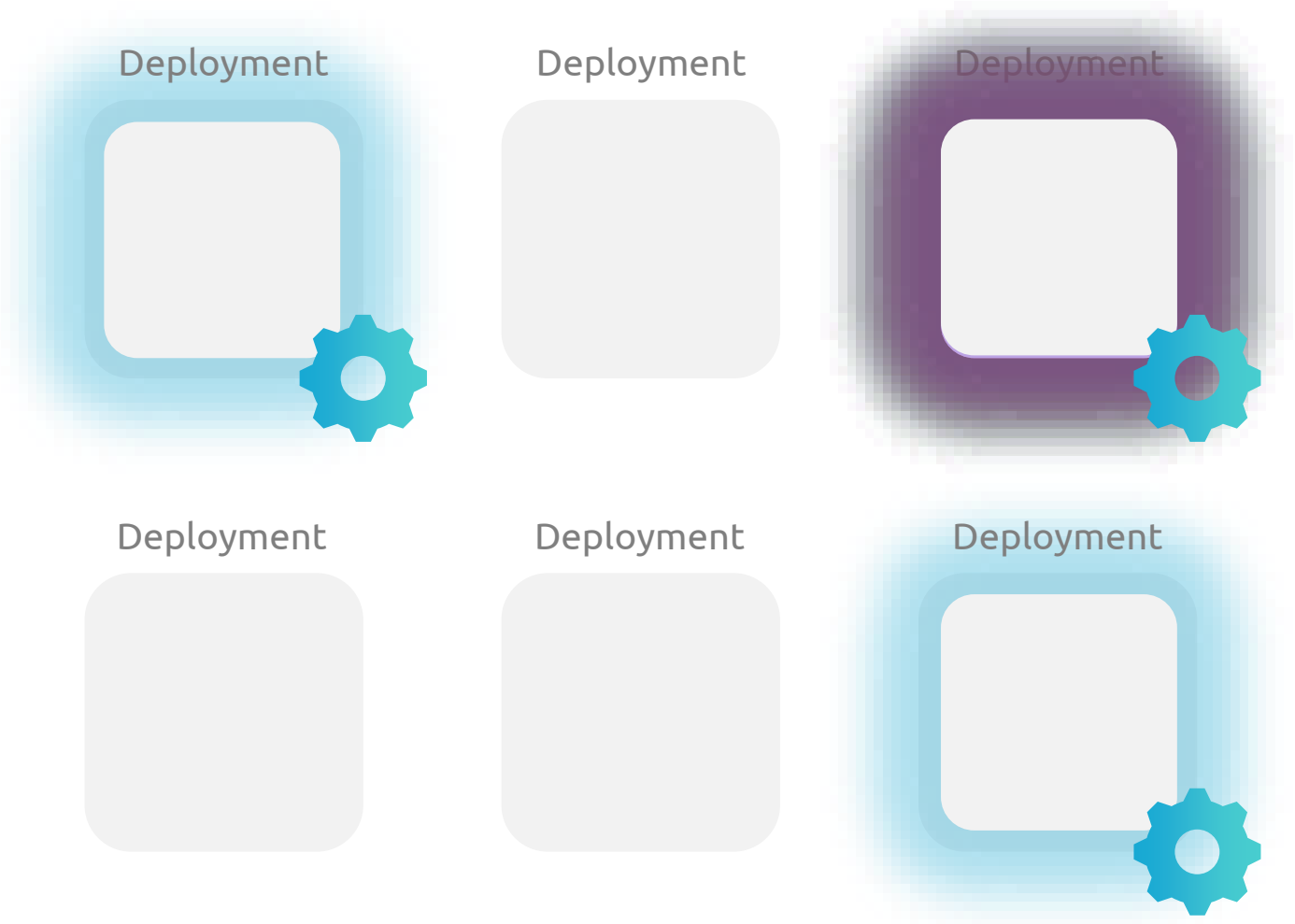

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Appspec.yml

AWS CodeDeploy

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Summary

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CodePipeline - Limitations

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01 Limitations and restrictions of Code Pipeline

02 Hard and soft quota limits as well as restrictions on naming and other actions in your pipeline

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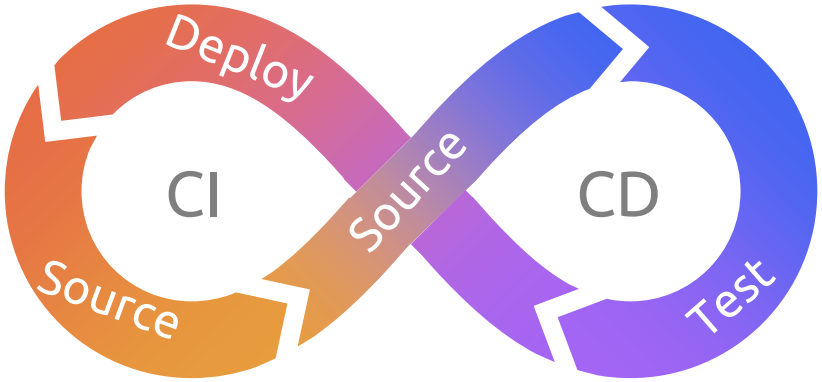
Naming Restrictions

- Each pipeline must have a unique name within an account
- Stage names within a pipeline must be unique
- Action names within a stage must be unique



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Quota

- Some quotas apply per region
- Request a quota increase through the Support Center console

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1,000 Maximum number of pipelines per region per AWS account	**Min 2, max 50** Number of stages per pipeline	**Min 1, max 50** Number of actions per stage
50 Number of parallel actions in a stage	**50** Number of sequential actions in a stage	**50** Maximum number of actions per pipeline

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7 Days
Length of time before approval action times out

100,000
Maximum number of files for an S3 object

300
Maximum number of pipelines polling for source changes per region

300
Maximum number of webhooks per region per account

50
Number of custom actions per region per account

Same Region
AWS services used in your pipeline must be enabled

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https://docs.aws.amazon.com/codepipeline/latest/userguide/limits.html

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Introduction to Sample Application

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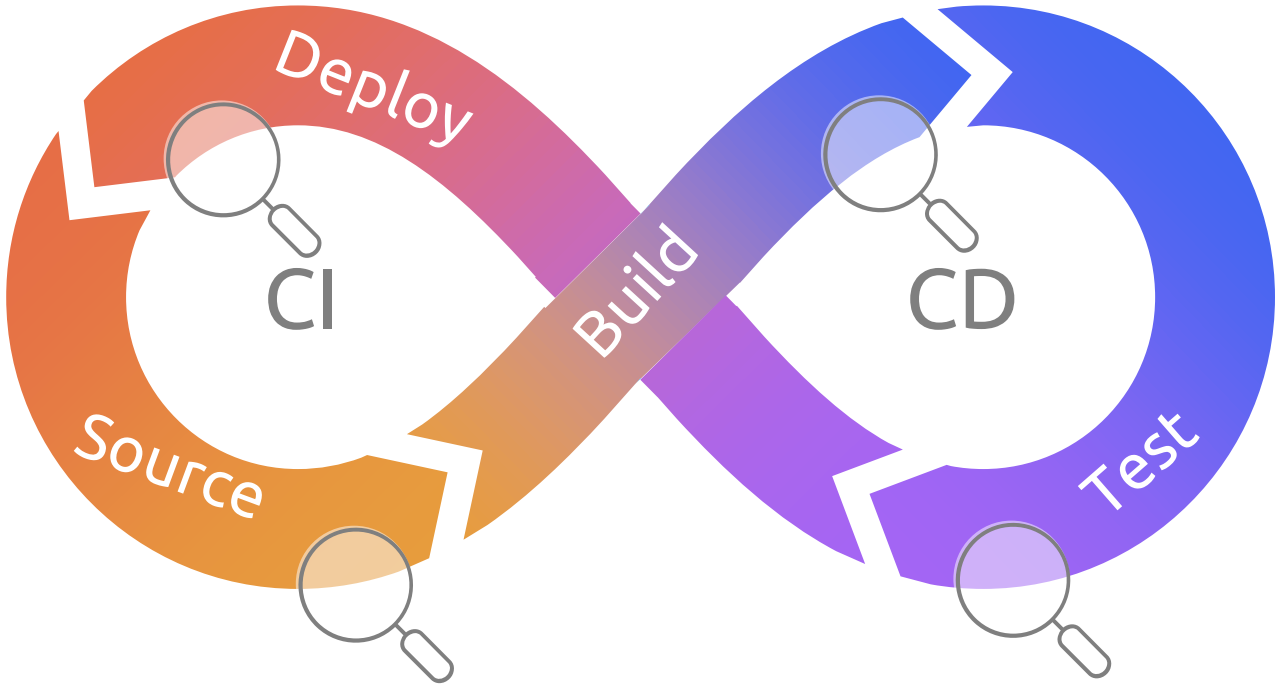

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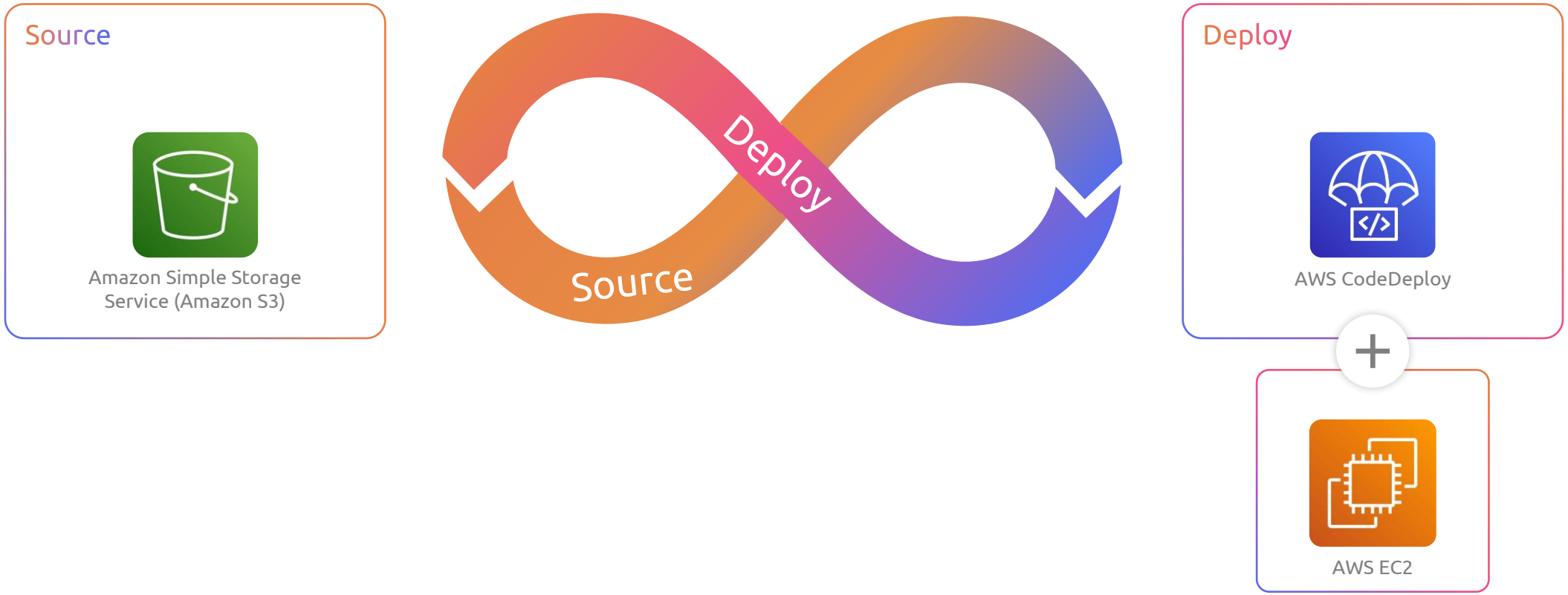
Demonstration 1



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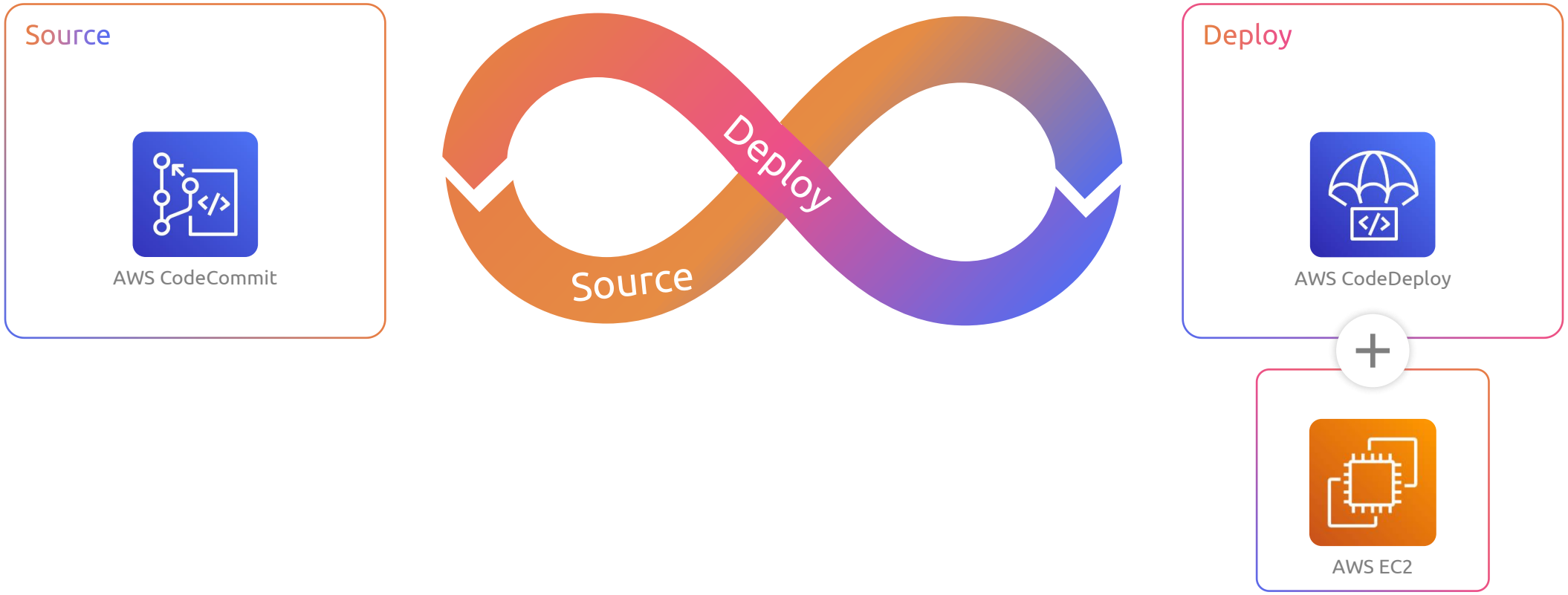
Demonstration 2



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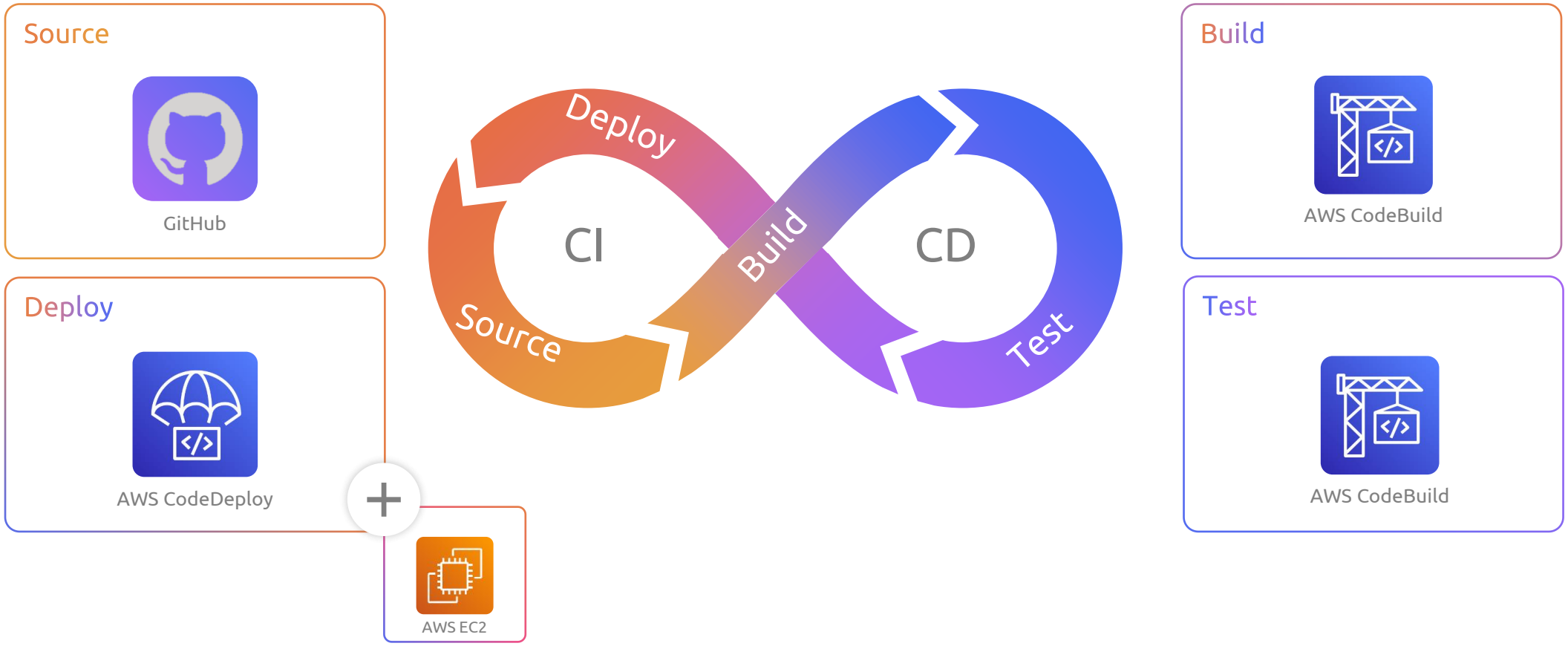
Demonstration 3



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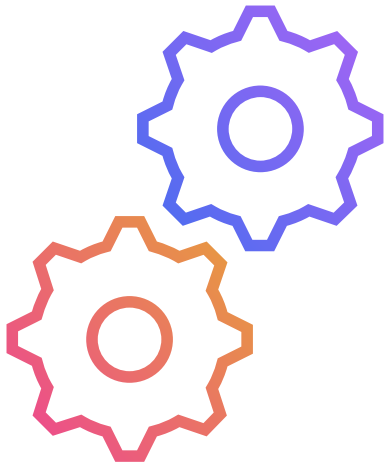

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Demonstration 1

Create 2 Stage Pipeline

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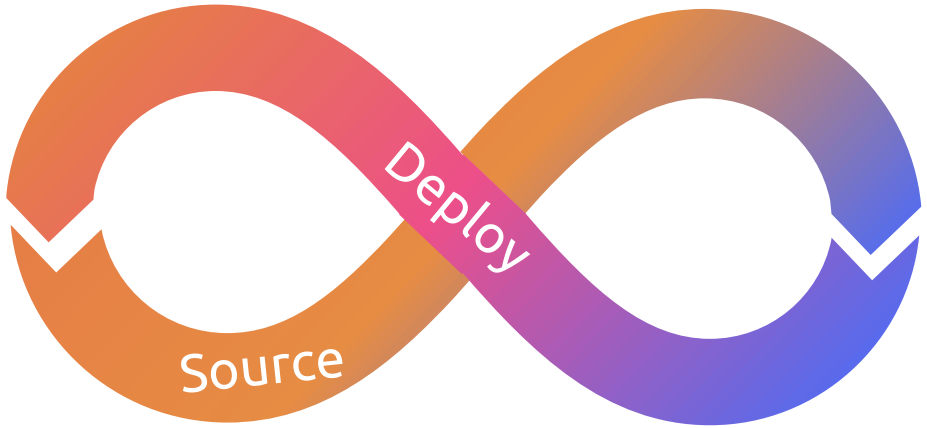

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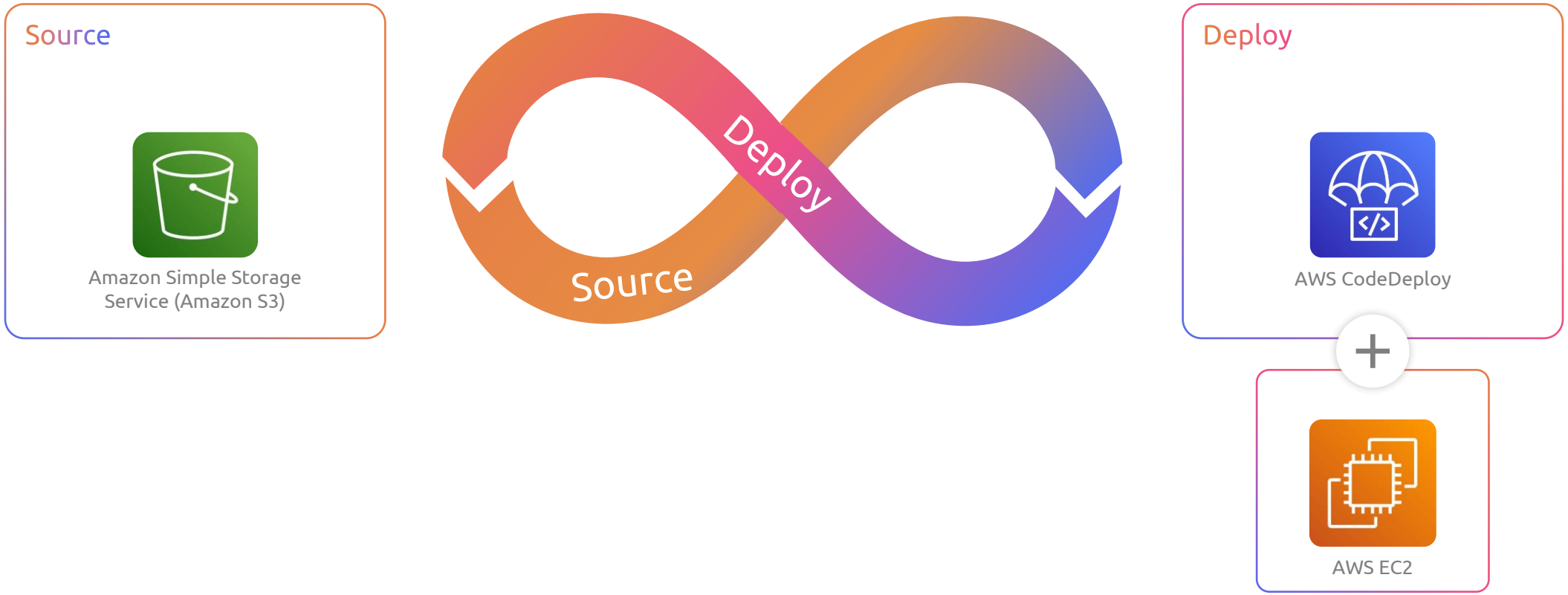

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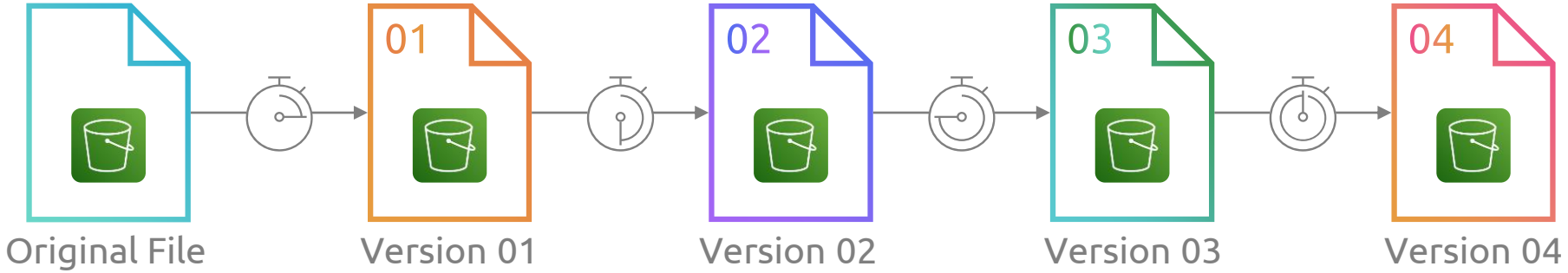

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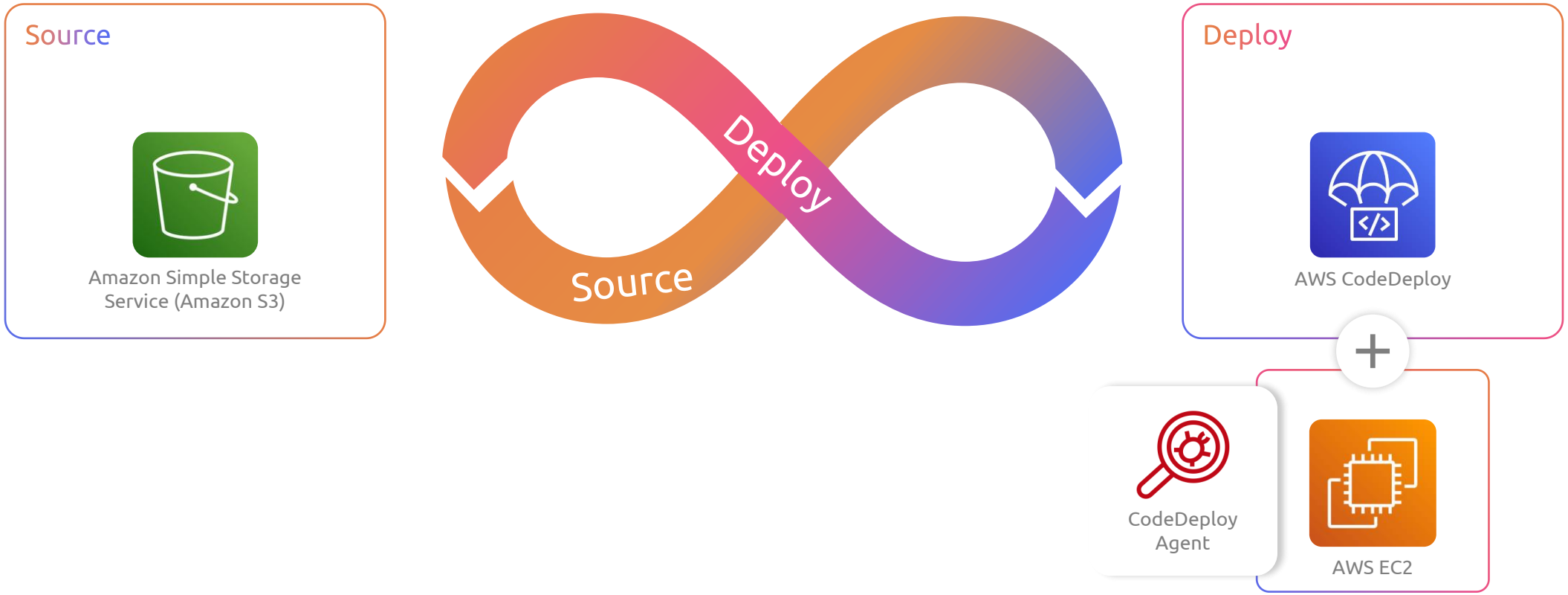
Demonstration 1



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Demonstration 2

Create 2 Stage Pipeline

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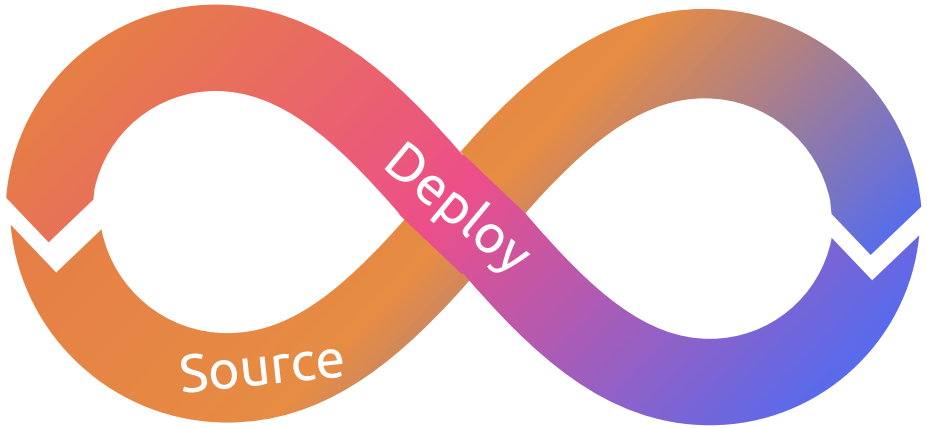

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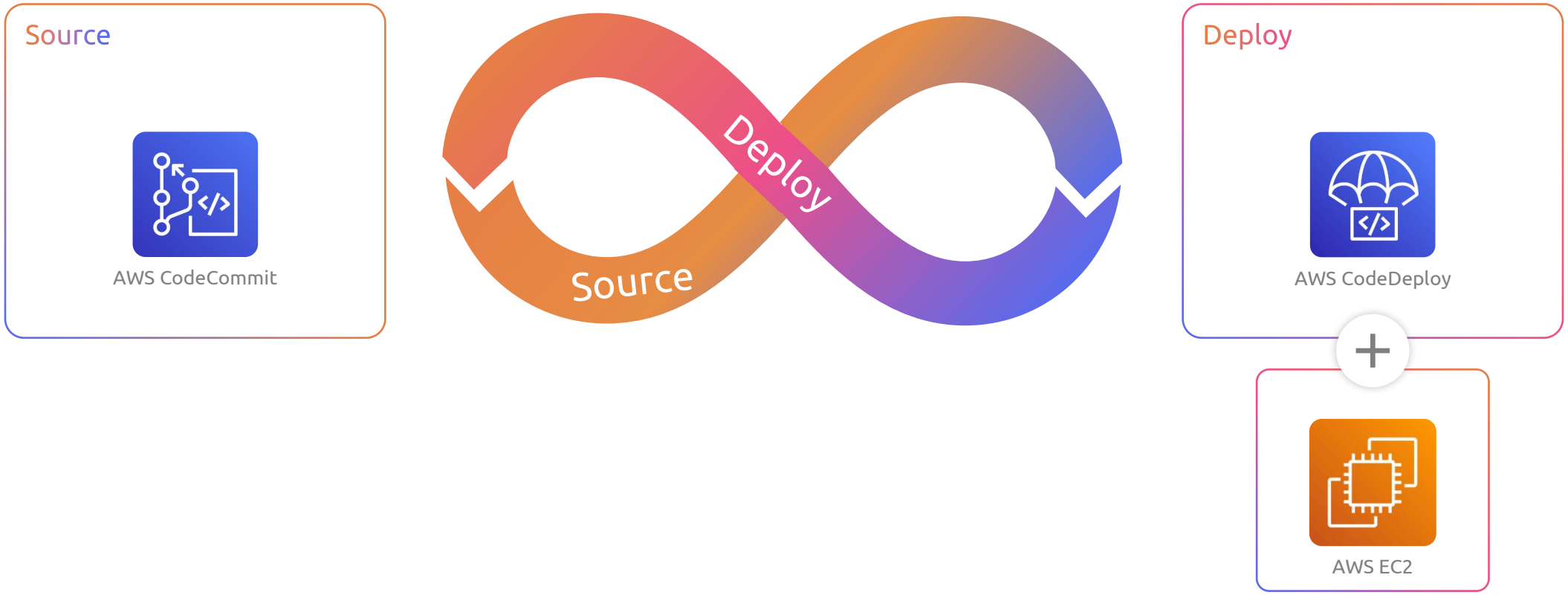

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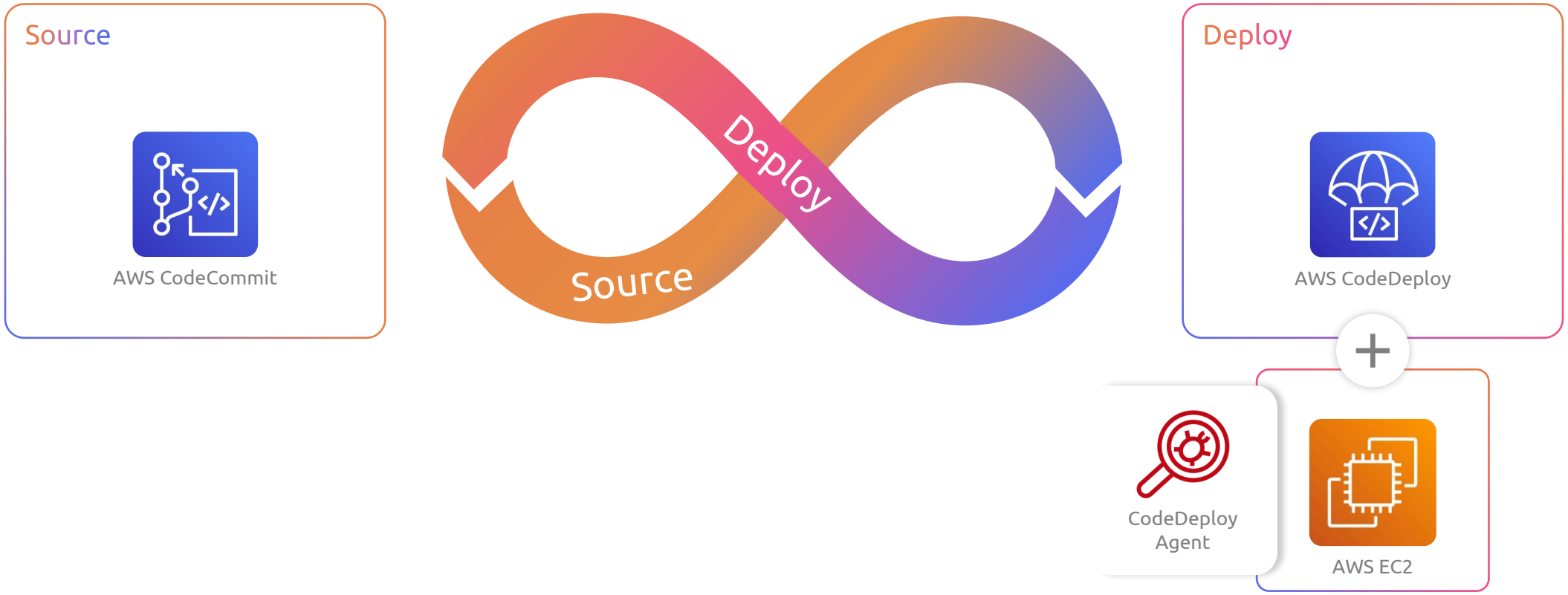

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Demonstration 3

Create 4 Stage Pipeline

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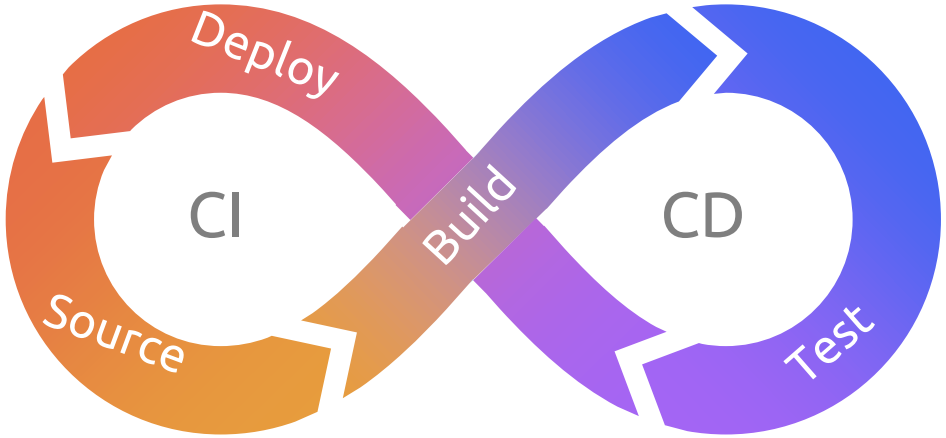

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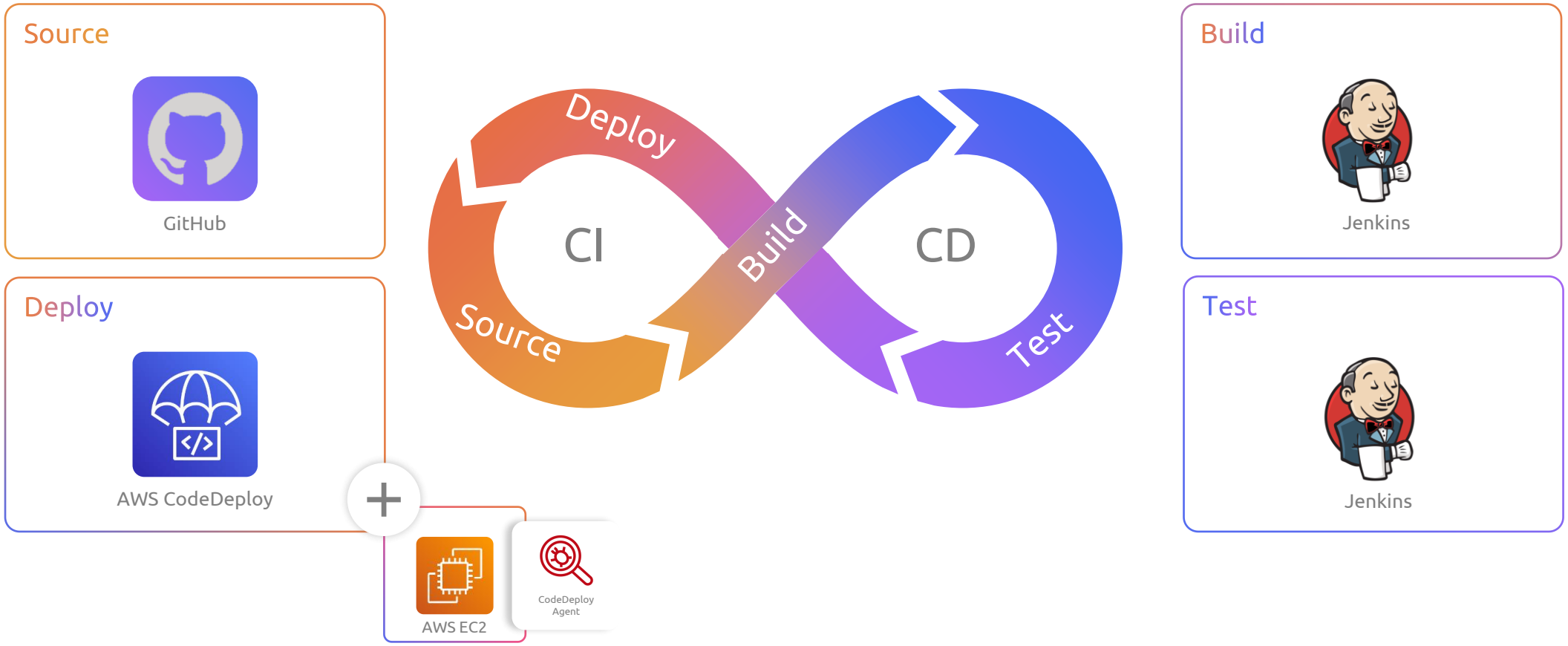
Demonstration 3



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