All about Data Engineering

CI/CD using AWS

by Sachin Chandrashekhar

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Introduction to CI/CD

Continuous Integration and Continuous Delivery: Streamlining Software Development and Deployment

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What is Continuous Integration (CI)?

CI is the practice of frequently merging code changes into a central repository, followed by automated builds and tests.

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Key Benefits of CI

Early bug detection, improved code quality, faster development cycles, and increased team collaboration

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CI Best Practices

Maintain a single source repository, automate builds, make builds self-testing, keep the build fast, test in a clone of the production environment

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What is Continuous Delivery (CD)?

CD is an extension of CI that automatically prepares code changes for release to production

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Continuous Delivery vs. Continuous Deployment

CD involves manual approval for production deployment, while Continuous Deployment automates the entire process

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Benefits of Continuous Delivery

Faster time to market, reduced deployment risks, improved product quality, and increased customer satisfaction

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CD Best Practices

Automate everything, version control all assets, build quality in, work in small batches, and pursue continuous improvement

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The CI/CD Pipeline

A series of automated steps that code changes go through from commit to production deployment

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Stages of a CI/CD Pipeline

Source, Build, Test, Deploy, and Monitor

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Introduction to AWS CI/CD Services

AWS offers a suite of tools to implement CI/CD: CodeCommit, CodeBuild, and CodePipeline

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AWS CodeCommit

A fully-managed source control service that hosts secure Git-based repositories

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Key Features of CodeCommit

Encrypted repositories, access control, high availability, and integration with other AWS services

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CodeCommit in CI/CD

Serves as the source stage in the CI/CD pipeline, triggering subsequent stages when changes are pushed

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AWS CodeBuild

A fully managed continuous integration service that compiles source code, runs tests, and produces software packages

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CodeBuild Features

Preconfigured build environments, custom build environments, build caching, and parallel builds

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CodeBuild in CI/CD

Represents the build and test stages of the CI/CD pipeline, ensuring code quality before deployment

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AWS CodePipeline

A fully managed continuous delivery service that helps automate release pipelines for fast and reliable application updates

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CodePipeline Features

Visual workflow editor, integration with AWS services and third-party tools, parallel actions, and manual approvals

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CodePipeline in CI/CD

Orchestrates the entire CI/CD process, connecting various stages and services into a cohesive pipeline

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Integrating CodeCommit, CodeBuild, and CodePipeline

Creating a complete CI/CD solution using AWS services

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CI/CD Workflow with AWS Services

1. Commit code to CodeCommit 2. CodePipeline detects changes 3. CodeBuild compiles and tests 4. CodePipeline manages deployment

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Benefits of Using AWS CI/CD Services

Fully managed, scalable, integrated with AWS ecosystem, pay-per-use pricing model

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Security in AWS CI/CD

IAM integration, encryption at rest and in transit, VPC support, and audit trails

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Monitoring and Logging

CloudWatch integration for metrics and logs, SNS notifications for pipeline events

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Extending the CI/CD Pipeline

Integrating third-party tools, custom actions, and cross-account deployments

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CI/CD Best Practices with AWS

Use infrastructure as code, implement blue/green deployments, utilize staging environments

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Challenges in Implementing CI/CD

Cultural resistance, legacy systems integration, maintaining test quality and coverage

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Future of CI/CD

AI/ML integration, increased automation, shift-left security practices

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Conclusion

CI/CD with AWS services enables faster, more reliable software delivery, driving innovation and customer satisfaction

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I teach Real-world AWS Data Engineering. Go to the link below

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