3.2. Student Handout

AWS DevOps Services: Student Handout

Overview

This handout provides a concise overview of AWS DevOps services, focusing on how they support the application lifecycle stages: Build, Test, Deploy, Operate, and Monitor. By understanding these services, you can automate and streamline your software development process.

What is DevOps?

DevOps is a set of practices that combines Development and Operations to shorten the software development lifecycle and deliver high-quality software continuously. It emphasizes collaboration, automation, and continuous monitoring.

Application Lifecycle Stages and AWS Services

1. Build and Test Services

AWS CodeCommit: Managed Git Repository Service

- **Description**: A fully managed source control service that hosts secure Git repositories.
- **Benefits**: Secure code storage, team collaboration, change tracking, and branch management.
- **Examples**:

1. Hosting a private Git repository for a web application project.
2. Collaborating on code changes with a distributed team.
3. Integrating with AWS CodePipeline for automated workflows.

AWS CodeBuild: Fully Managed Continuous Integration Service

- **Description**: A fully managed build service that compiles source code, runs tests, and produces deployable software packages.
- **Benefits**: Automates build and test processes, scales automatically, no need for managing build servers.
- **Examples**:

1. Running unit tests for a Java application.
2. Building Docker images for a microservices architecture.
3. Compiling a C++ project and generating executable files.

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2. Deployment Services

AWS CodeDeploy: Automating Software Deployments

- **Description**: Automates application deployments to various environments like EC2 instances, Lambda functions, or on-premises servers.
- **Benefits**: Consistent deployments, supports blue/green deployments and rolling updates.
- **Examples**:

1. Deploying a new version of a web application to EC2 instances.
2. Updating a Lambda function with new code.
3. Rolling out updates to an on-premises server farm.

AWS Elastic Beanstalk: Platform as a Service (PaaS)

- **Description**: A PaaS that allows you to deploy and manage applications without managing the underlying infrastructure.
- **Benefits**: Simplifies deployment, handles scaling and monitoring automatically.
- **Examples**:

1. Deploying a Node.js application with automatic scaling.
2. Hosting a PHP website with integrated monitoring.
3. Running a Python web service with minimal configuration.

AWS CloudFormation: Infrastructure as Code (IaC)

- **Description**: Allows you to define your infrastructure as code using templates.
- **Benefits**: Automates infrastructure setup, enables version control of infrastructure.
- **Examples**:

1. Creating a VPC with subnets and security groups.
2. Deploying a multi-tier application stack with EC2, RDS, and S3.
3. Setting up a serverless architecture with Lambda and API Gateway.

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3. Operate and Monitor Services

Amazon CloudWatch: Monitoring and Logging

- **Description**: A monitoring service that collects and tracks metrics, logs, and events from AWS resources and applications.
- **Benefits**: Set up alarms, visualize metrics, automate actions based on conditions.
- **Examples**:

1. Monitoring CPU usage of EC2 instances.
2. Setting up alarms for high memory usage.
3. Visualizing application logs for error tracking.

AWS X-Ray: Analyzing and Debugging Distributed Applications

- **Description**: Helps analyze and debug distributed applications by providing a visual representation of component interactions.
- **Benefits**: Trace requests, identify bottlenecks, debug errors in microservices architectures.
- **Examples**:

1. Tracing API requests through a microservices architecture.
2. Identifying latency issues in a distributed application.
3. Debugging errors in a serverless application workflow.

Conclusion

AWS provides a comprehensive set of DevOps services that support the entire application lifecycle:

- **Build and Test**: AWS CodeCommit and AWS CodeBuild
- **Deploy**: AWS CodeDeploy, AWS Elastic Beanstalk, and AWS CloudFormation
- **Operate and Monitor**: Amazon CloudWatch and AWS X-Ray

These services help automate tasks, improve team collaboration, and ensure efficient application deployment and monitoring.

Time Required to Read: Approximately 10-12 minutes

Feel free to reach out with any questions or for further clarification!