The AWS DevOps Toolset:

CI/CD, Microservices, and More

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Chapter 1

Introduction

More than a set of practices and technologies, DevOps is a culture that assists enterprises to deliver high-quality software quickly. The dogma of DevOps is strong cooperation and shared responsibility between developers and operations specialists for successfully deploying microservices.

With DevOps in the picture, the development and the operations team are no more isolated. They work together throughout the application lifecycle to develop, test, deploy and operate. These teams automate the processes that are known to be historically manual and slow. Some of the essential practices of DevOps include automating infrastructure with Infrastructure as Code (IaC), Continuous Integration that involves automating the build cycle using continuous integration tools, and Continuous Delivery including automating the deployment of the new releases to production.

This lets organizations improve and evolve their products faster than the ones using traditional methods of software development and infrastructure management. The speed gives organizations a better platform to compete in the market and lets them serve their customers better.

From **77%** in **2017**, the adoption of DevOps has gone up to **83%** in **2021** as IT decision-makers report to implementing DevOps practices to unlock better business potential. Moreover, according to International Data Corporation (IDC) the global DevOps industry is anticipated to grow by over **$12.85 billion** by **2025**.

Building DevOps infrastructure on the public cloud is becoming increasingly popular by the day and AWS is a common preference. The following segment shall help you understand why AWS is the right choice for you.

Chapter 2

Why AWS for DevOps?

There is no doubt in the fact that AWS is globally the most comprehensive and broadly adopted cloud platform. AWS offers more than 200 fully featured services from data via data centers across the world. AWS has not only helped millions of clients but countless startups also find themselves using AWS DevOps tools to lower costs, increase the agility of their business, and make quicker innovations to level up their cloud game.

1.Incomparable functionality

Although there are other cloud providers in the market, AWS gives users significantly more services and more features within those services than any other provider. Whether it is infrastructure technologies such as computing, storage, and databases, or emerging technologies like machine learning, artificial intelligence, data lakes and analytics, and the Internet of Things, AWS has got some solution for everything. It makes the processes faster, easier, and more cost-effective to shift existing applications to the cloud.

AWS also presents users with a broad range of functionality within its services. For instance, Amazon Web Services have a wide variety of databases tailor-made for different applications giving a range of options to choose from keeping your need and budget in mind.

2.AWS has the biggest community of customers and partners

With millions of active customers and tens of thousands of global partners, AWS makes the largest and the most dynamic community. This platform has customers from different industries of all sizes (startups, enterprises, public sector organizations) running all possible use cases on AWS. The AWS partner network has thousands of system integrators specializing in AWS services.

3.Top-notch security

AWS has a strong architecture making it one of the most flexible and secure cloud computing environments available in the market. The core infrastructure of AWS is capable to satisfy the requirements of the military, global banks, and other such organizations with high sensitivity. This is also supported by a number of deep-set security tools, and 300+ security, compliance, and governance service and features. The platform supports 98 security standards and compliance certifications, and the 117 AWS services storing customer data also have the ability to encrypt the data.

4. Latest technologies for faster innovation

AWS gives you the freedom to experiment and innovate faster. The platform is constantly accelerating to keep up with the pace of innovation, inventing new technology to help your business grow. AWS has a number of tools that let developers run their code without provisioning or managing servers. Moreover, there's also provision for a fully managed machine learning service supporting developers and scientists to use MI without prior experience.

5. Operational expertise like none other

This platform provides you with unparalleled security, performance, and experience that you can rely upon for your essential applications. AWS has been a top player in cloud services for more than 16 years, serving millions of customers across the globe. In 2021 Gartner has recognized AWS as the most extensive global cloud infrastructure and the recommended approach to run applications requiring high availability.

Chapter 3

DevOps tools by AWS

You have access to various services with AWS and these tools can be used to automate manual tasks to speed up the processes as well as reduce the margin of errors. This helps teams to manage complex environments at a large scale and gives engineers the control of a high velocity enabled by DevOps.

Continuous Integration:

Continuous integration is essential for the preparation and running of automated builds and tests. Software developers use continuous integration to merge codes changing them into a central code repository. This lets them locate and fix bugs quicker, enhancing software quality, and minimizing validation time before a new software release. The AWS suite of CI services includes AWS CodeCommit, AWS CodeBuild, and CodeArtifact.

CodeCommit is a managed source control service that hosts private, scalable, and secure git repositories. You can use it as a managed service without installing, configuring, or operating software.

CodeBuild, on the other hand, is a fully managed service for continuous integration. It compiles the source code, executes tests, and assists in creating ready-to-deploy software packages. CodeBuild is extremely scalable, processing several builds at the same time with pre-configured Windows and Linux environments.

CodeArtifact is a repository service that allows storage, publication, and sharing of software packages in development projects. This service gives you access to built-in controls ensuring only the latest versions of all tools are in use.

Continuous Delivery:

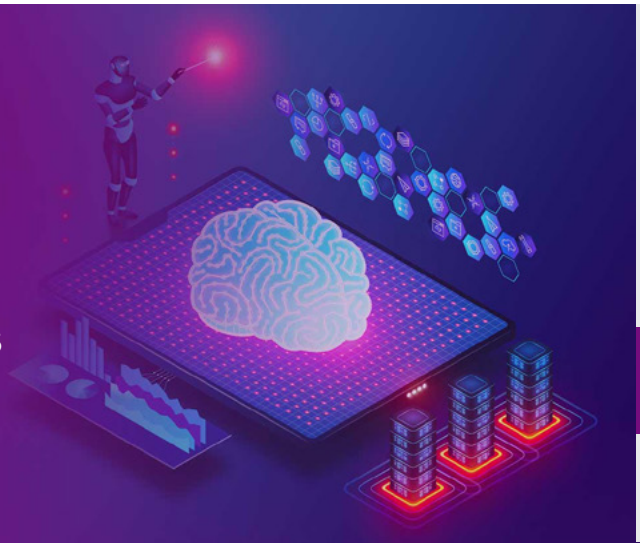
Continuous delivery is becoming mainstream in software development. It enables teams to rapidly deliver software releases and automatically deploy them to production. This enhances the velocity of the development and improves the quality by responding to customer queries whenever they arise.

Among the CICD tools that AWS provides CodeDeploy, and CodePipeline are popular among clients. AWS CodeDeploy automates software deployments as well as complex application updates, minimizing errors because of manual operations. It is a fully managed deployment service, scaling dynamically according to deployment requirements.

AWS CodePipeline allows modeling, visualizing, and automating software release pipelines. This lets you define the release process, which includes pre-production environment deployment, application testing, and production releases. Using CodePipeline builds you can integrate tools from AWS Partner Network (APN) as well as proprietary tools during any stage of the release process to form an end-to-end delivery solution.

Chapter 4

Performing common DevOps tasks using Amazon services



A few key practices go a long way to help organizations innovate faster by automating and streamlining software development and infrastructure management. This can be achieved by making small and frequent updates. Organizations also use microservices architecture to make more flexible and innovative applications. The following are a few best practices that can help an organization churn the most from their DevOps infrastructure on AWS.

Deploying microservices:

Microservices are essential components of most DevOps architectures. Microservices allow you to build applications as small, decoupled components making it easier to test, deploy, and maintain. Containers and serverless are the two primary ways to deploy microservices in AWS. Amazon Elastic Container Service (ECS) is an orchestrator that helps set up and manage containers. Serverless uses AWS Lambda to run functions and pay per execution time without managing servers.

Monitoring and logging:

It is essential to continuously monitor, alert, collect and analyze logs proactively to map out utilization. DevOps can assist you in measuring the impact of changes to software services and troubleshooting problems as soon as they are reported. Central AWS monitoring tools like CloudWatch, designed for DevOps can massively improve site reliability. By collecting data from your customer services or workloads, this tool allows you to not only visualize data via dashboards but also notifies the team of crucial changes using alerts and notifications.

Leveraging Infrastructure as Code:

Infrastructure as Code (IaC) is often used by DevOps teams to set up environments based on predefined and tested configurations automatically. The IaC model can be used to automate any deployment task and to stimulate production-like environments for deployment and testing. Amazon's central IaC platform CloudFormation allows you to define simple, user-friendly templates to form dummy complex environments, provision, and manage them consistently over time.

Chapter 5

Conclusion

The flexibility of AWS services enables companies to rapidly build reliable products that simplify provisioning and managing infrastructure, deploying code, automating procedures, and monitoring applications/infrastructure performance. AWS lets you take advantage of fully managed services, without any setup or software requirements. This allows you more time to focus on your core product. By simplifying provisioning, configuration, and scaling, you can manage one instance or scale thousands with AWS services.

You also have the option to use each service via AWS Command Line Interface/APIs/SDKs. This lets you model and provision AWS resources/infrastructure using declarative templates. With AWS you can build efficiently by automating manual tasks. Moreover, AWS also lets you purchase services as you need them, only for the time of your requirement.

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