

DevOps

- DevOps is a set of practices and cultural philosophies that bring together **software development (Dev)** and **IT operations (Ops)**.
- The aim of DevOps is to shorten the development lifecycle and deliver high-quality software and by collaboration and communication between developers, testers, and operations.

Coming to the applications

Generally, any type of applications we go with,

They are two teams-

- Development Team (Dev)
- Operations Team (Ops)

Dev + Ops = DevOps

Development :-

- Development is more about creating the Software Products or Applications.
- Software Development team will create/design code Applications.

Example- Build the website/ Mobile Applications like Amazon, Flipkart, Hotstar or any other Applications.

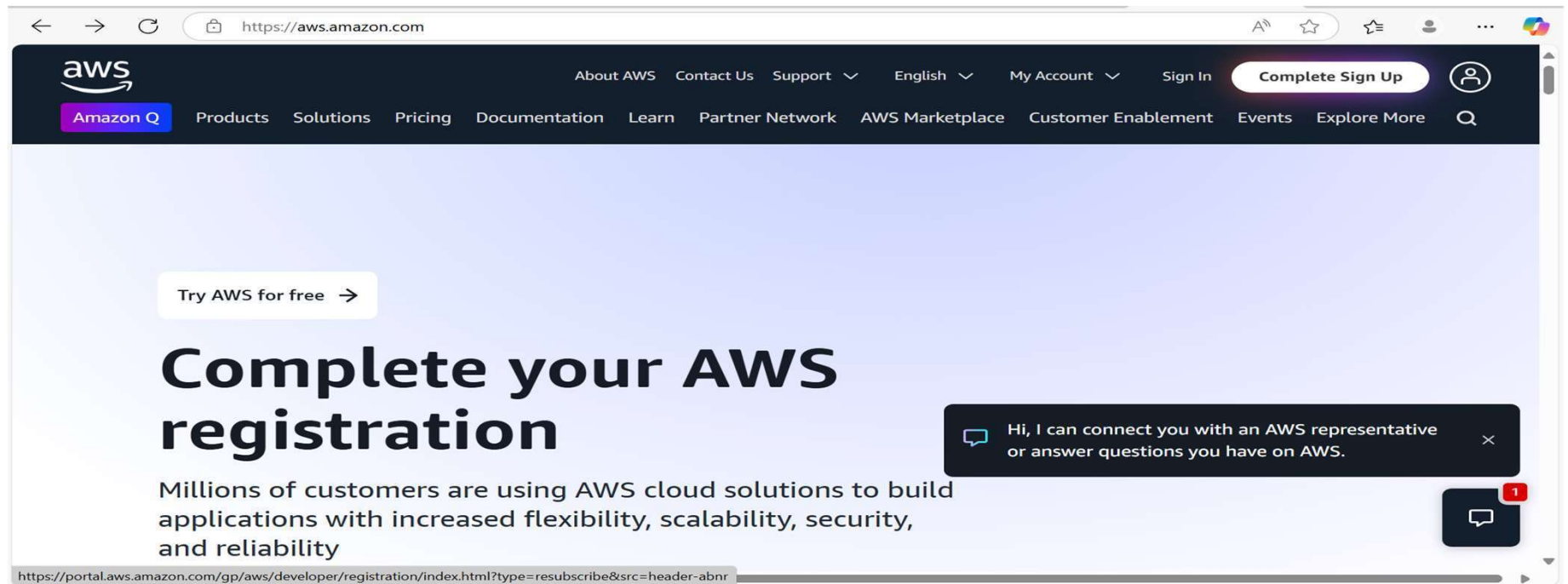
- Developers will write HTML/CSS/JAVA code and they the Build the Application in a code Format is the work of Development.

- Once the application is ready by the Development Team.
- Some one needs to maintain the Application not just Developing the Application and Deliver to customer.
- So, its needs to be maintained and check the Application is Functioning or not and having new features or not.
- So, Here comes the **Operations Team (Ops)** to maintained
- Its about the providing required infrastructure necessary for running software products or Application.
- In operations, will try to understand how do manage server ?
- How do you create a server?
- How do you create a server in cloud infra ?

- Cloud infra Means AWS or Azure.
- The difference between AWS and Azure, both are same end of the day.
- We can also setup the Application in both in AWS or Azure.
- AWS is a free for 1 year with limited data.
- Azure is free for One month after that we need to pay for that.
- So, lets go with AWS which is free for one Year so that will be easy to practice.

AWS Setup Account

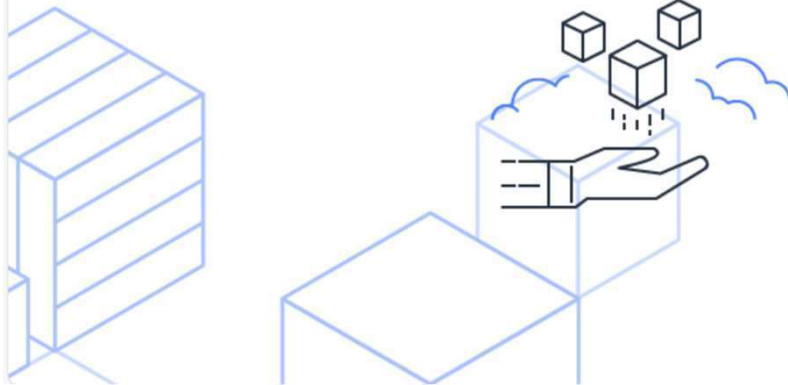
- To setup an Account in AWS
- Go to Google search- [Cloud Computing Services - Amazon Web Services \(AWS\)](#)





Explore Free Tier products with a new AWS account.

To learn more, visit aws.amazon.com/free.



Sign up for AWS

Root user email address

Used for account recovery and some administrative functions

AWS account name

Choose a name for your account. You can change this name in your account settings after you sign up.

Verify email address

OR

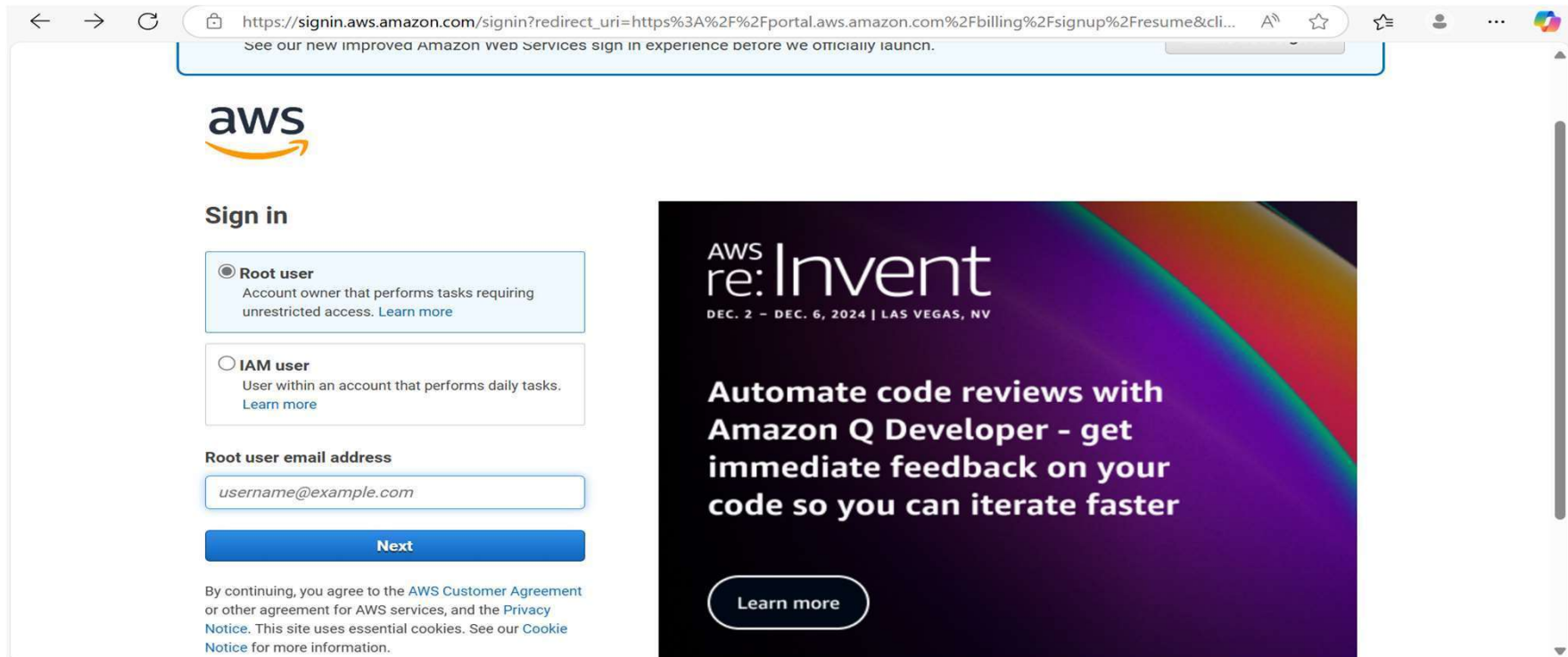
Sign in to an existing AWS account

- Click on the create a Free Account
- Give all the details for an account to create a AWS Free Account.
- Here, in login credentials it ask contact information address and card payment.

Note: This is only for practice to create the account,
REAL TIME company will provide.

- Then verify your account they will charge some amount 2Rs for verification Account to activate and its free for one year.
- Select Basic Plan for Free Account.

- Now login into AWS Account
- Select Root user and give the Email and password.



The screenshot shows the AWS sign-in page in a web browser. The browser's address bar displays the URL: `https://signin.aws.amazon.com/signin?redirect_uri=https%3A%2F%2Fportal.aws.amazon.com%2Fbilling%2Fsignup%2Fresume&cli...`. A blue banner at the top of the page reads: "See our new improved Amazon web Services sign in experience before we officially launch." The AWS logo is positioned at the top left. Below it, the "Sign in" section contains two radio button options: "Root user" (selected) and "IAM user". The "Root user" option is described as "Account owner that performs tasks requiring unrestricted access." and includes a "Learn more" link. The "IAM user" option is described as "User within an account that performs daily tasks." and also includes a "Learn more" link. Below these options is a text input field labeled "Root user email address" containing the placeholder text "username@example.com". A blue "Next" button is located below the email field. At the bottom left, a small text block states: "By continuing, you agree to the AWS Customer Agreement or other agreement for AWS services, and the Privacy Notice. This site uses essential cookies. See our Cookie Notice for more information." On the right side of the page, there is a large promotional banner for "AWS re:Invent" with the dates "DEC. 2 - DEC. 6, 2024 | LAS VEGAS, NV". The banner features a colorful diagonal gradient and the text "Automate code reviews with Amazon Q Developer - get immediate feedback on your code so you can iterate faster". A "Learn more" button is located at the bottom of the banner.

aws

Sign in

☒ **Root user**
Account owner that performs tasks requiring unrestricted access. [Learn more](#)

☐ **IAM user**
User within an account that performs daily tasks. [Learn more](#)

Root user email address

username@example.com

Next

By continuing, you agree to the [AWS Customer Agreement](#) or other agreement for AWS services, and the [Privacy Notice](#). This site uses essential cookies. See our [Cookie Notice](#) for more information.

AWS re:Invent
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Learn more

- After Login into AWS Account First page, you see console Home page.
- It's a one web interface to access everything

For Example: Take a Myntra Application or any other Application

- So, in order to make Myntra application, I need some infrastructure,
- Infrastructure means for an application we need servers, storage networking, database, security etc.
- So here I want to manage storage in AWS we call it as EBS

- To manage Networking in AWS we call it as VPC (Virtual Private Cloud).
- Servers in AWS we call it as EC2 (Elastic computer cloud).
- Database in AWS we call it as RDS (Relation Database service).
- Security in AWS we call it as IAM (Identity Access Management).
- Take all this to combine them an Application.
- For Example:- Banking Application

Example:- Take a Banking Application

- It will have different services in Banking App
 - one service for customer help support
 - one service for net banking
 - one service for managing credit card
 - one service for Home loans... etc

AWS Services

AWS EC2: (Elastic Cloud Compute)

- It provides CPU, RAM, only
- We can create servers in EC2.

AWS RDS: (Relation Database service)

- It helps to manage Database and to run or use database for application.

For networking services

AWS VPC: (Virtual Private cloud)

- VPC provides a secure and isolated space in the cloud where you can place your services and applications, making it more like having your own private data center in the cloud.

VPC typically uses:

- **Subnets:** Dividing the VPC into smaller sections.
- **Route Tables:** Directing traffic between subnets or out to the internet.
- **Internet Gateways:** Allowing traffic to and from the internet if needed.
- **Security Groups and Network ACLs:** Controlling inbound and outbound traffic to resources.

AWS IAM: (Identity Access Management)

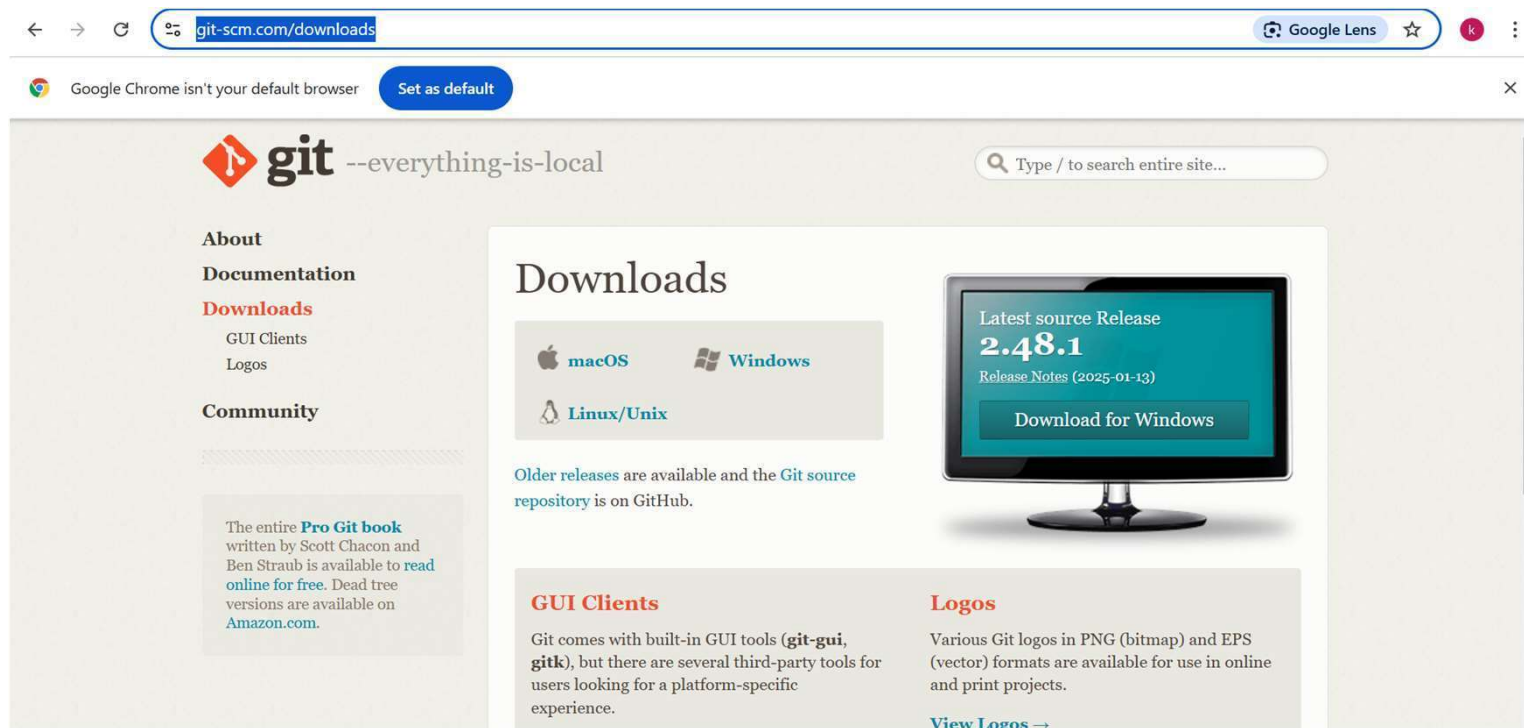
- In AWS IAM uses users, roles, policies, and permissions to control access to resources in a cloud environment, ensuring that only authorized individuals or systems can perform actions on specific resources.

List of SSH Client Software's

- An SSH Client is a software program which uses the secure shell protocol to connect to a remote computer (AWS or Azure server)
- If you want to use SSH we need SSH client software Tools,
 - Git Bash
 - Putty
 - Terminal (Visual studio code)

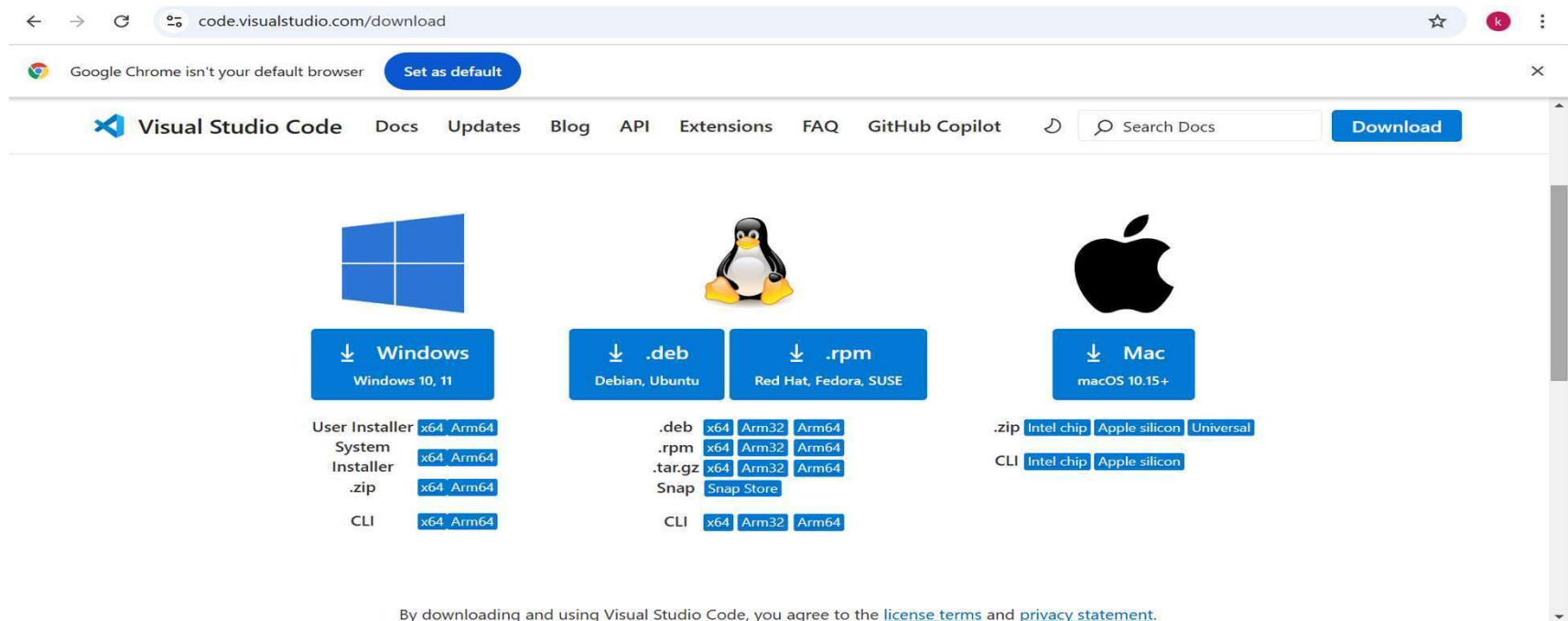
Install Git Bash Software

- Go to Google Search- Install Git Bash
- Link:- <https://git-scm.com/downloads>



Visual studio code download

- Link : <https://code.visualstudio.com/download>



DevOps Engineer and Their Role

- A **DevOps Engineer** bridges the gap between development and operations, bringing together the best practices from both worlds to improve the overall process. Here's a step-by-step explanation of how a DevOps Engineer handles the application:
- **Step 1: Collaboration and Planning**
- **Involvement in Development:** DevOps engineers work closely with developers from the start of the project, ensuring that the code is not only functional but also easily deployable and scalable.

- **Infrastructure as Code (IaC):** DevOps engineers help define the infrastructure requirements using code. This allows infrastructure to be versioned and automated, making it easier to replicate and scale.
- **Continuous Integration (CI)**
- **CI Pipeline:** DevOps engineers set up a continuous integration pipeline, which automates the process of merging code into a shared repository. The process includes:
 - Automatically running tests on the code.
 - Ensuring code quality is maintained.
 - Creating build artifacts (compiled files, container images, etc.).
 - This process reduces the chances of bugs in the code when it's deployed.

- **Continuous Deployment (CD)**

- **CD Pipeline:** DevOps engineers set up continuous deployment pipelines, ensuring that the application can be automatically deployed to any environment (development, staging, or production) after passing through tests in the CI pipeline.
 - **Deployment Automation:** The DevOps engineer writes scripts or uses tools like Jenkins to automate the deployment process, ensuring quick and reliable delivery of software updates.
 - **Rollback Mechanisms:** If a deployment fails, DevOps engineers ensure that there are rollback mechanisms in place to restore the previous working version of the application.

- **Monitoring and Logging**
 - **Application Monitoring:** After deployment, DevOps engineers set up monitoring systems (like Prometheus or Grafana) to track the application's performance, availability, and error rates.
 - **Alerting:** They set up alerting systems to notify teams when there are issues like downtime, high CPU usage, or failing tests.

Feedback Loop and Continuous Improvement

- **Collaborating for Feedback:** After deployment, DevOps engineers collaborate with both developers and operations teams to gather feedback. If any issues are found in production, they address them quickly by analyzing logs and monitoring data.
- Based on feedback and performance data, DevOps engineers work to improve the CI/CD pipelines, infrastructure, and automation scripts, leading to continuous improvements in the process.

- **Development Team** focuses on building and testing the code.
- **Operations Team** focuses on deploying and maintaining the infrastructure.
- **DevOps Engineer** is the key role that unifies these teams through continuous integration, deployment, monitoring, and automation, improving speed, quality, and collaboration throughout the software development lifecycle.