Experiment-1

Introduction to Development Operations, Key concept of Automation and CD/CI, and its relevance to the modern software engineering practices like agile and lean.

Prepared By

NISARG PIPALIYA

Semester-7

Department of Information Technology
Faculty of technology,
Dharmsinh Desai University
College road, Nadiad- 387001

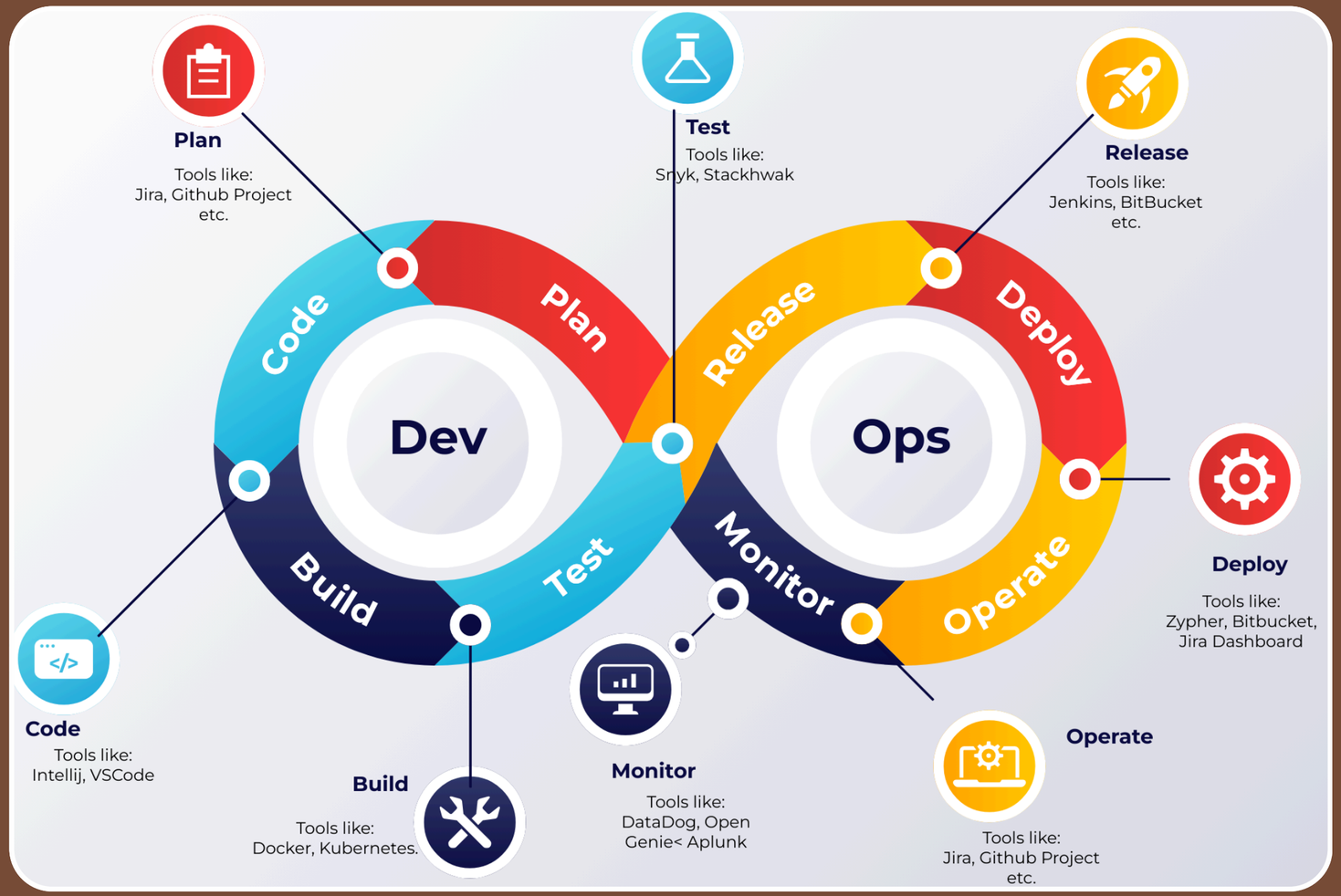
WHAT IS DEVOPS?

- Development Operations (DevOps) is a set of practices that combines software development (Dev) and IT operations (Ops) teams into a single team.

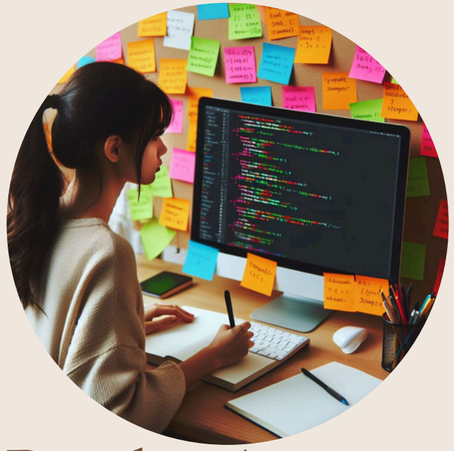
- DevOps practices aim to improve collaboration between development and operations teams, automate processes, and enhance the reliability and speed of software delivery.

- Read about DevOps Life-Cycle: Here

DEVOPS LIFE-CYCLE



LIFE BEFORE DEVOPS



Develop App using WaterFall Model

Operations Team, setting up servers manually for app

Hours of Manual Testing.

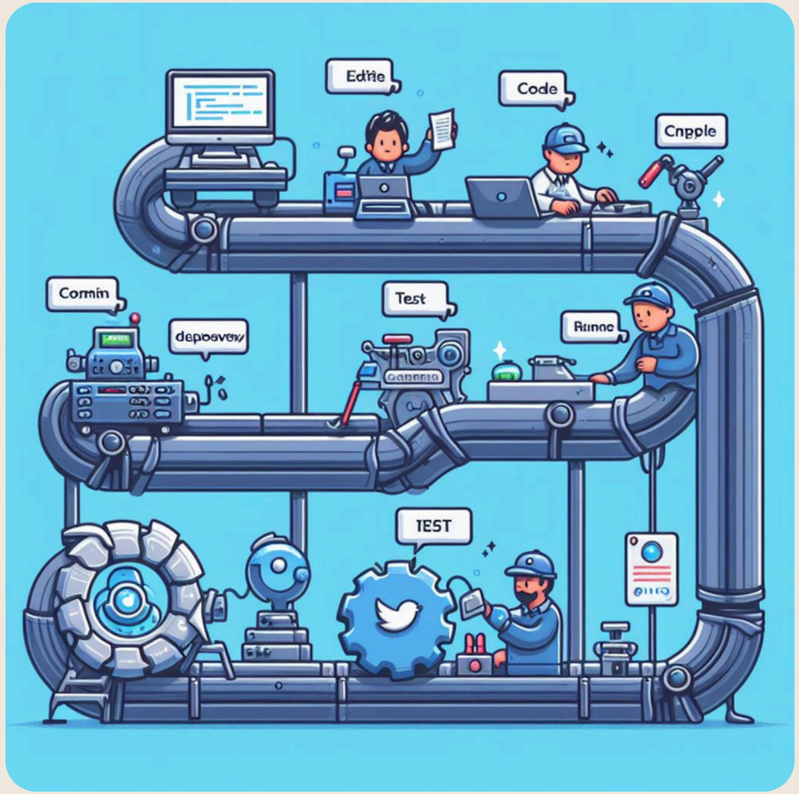
Risky Deployment, That may have downtime.

LIFE BEFORE DEVOPS

- Before DevOps, making software was slower and more difficult due to :
  - Waterfall Model and Long Release Time
  - Separate Teams:
    - Development Team: This group wrote the code and built the features of the software.
    - Operations Team: This group set up and managed the software on servers, making sure it ran smoothly.
  - Manual Work:
    - Manual Testing and Deployment.
- Read about it Here

WHY AUTOMATION IS REQUIRED?

- Automation in application development can help development teams improve their productivity and speed without increasing their numbers. It can also help businesses stay competitive and reduce time to market.



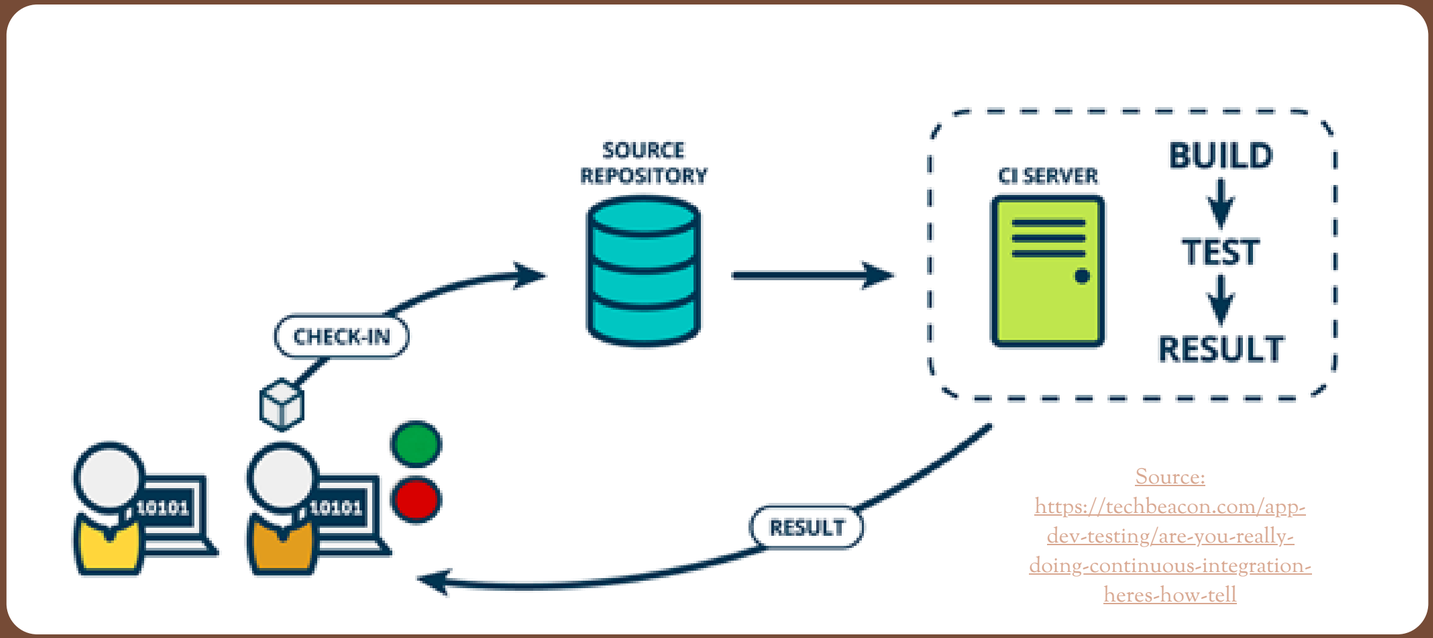
Key Concepts of Automation in DevOps

- Automation helps you accelerate processes and scale environments, as well as build continuous integration, continuous delivery, and continuous deployment (CI/CD) workflows.

AUTOMATION PIPELINES IN DEVOPS

Key Concepts of Automation in DevOps

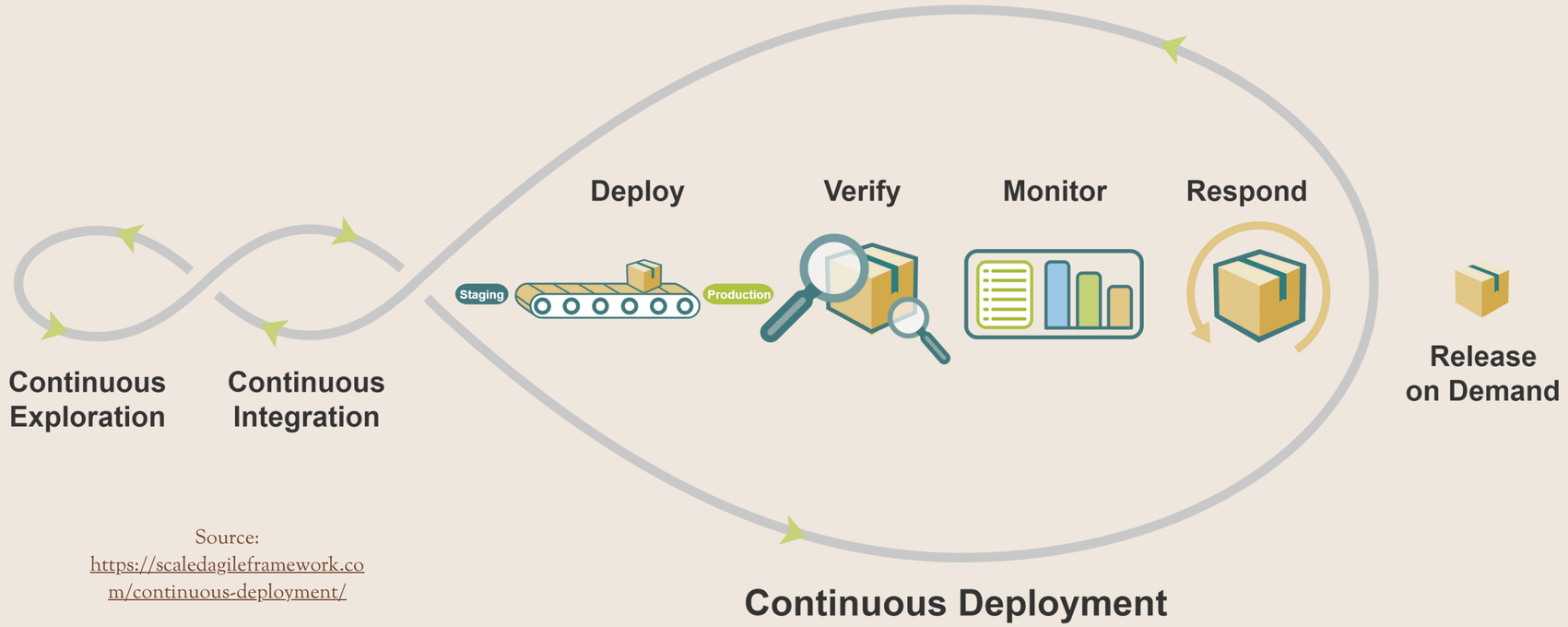
- Continuous Integration (CI) is a practice where developers frequently commit code to a shared repository. Each commit triggers an automated build and testing process, ensuring that new code integrates smoothly with the existing codebase.



Source: https://techbeacon.com/app-dev-testing/are-you-really-doing-continuous-integration-heres-how-tell

Key Concepts of Automation in DevOps

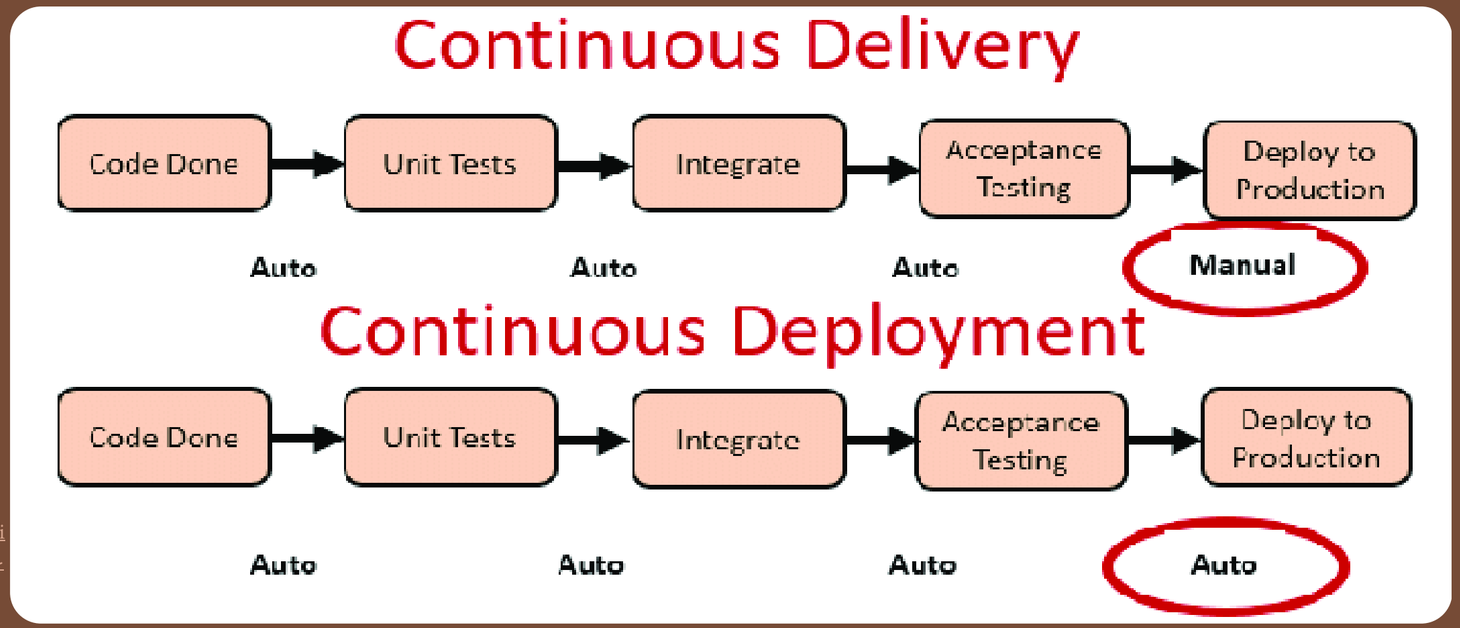
- Continuous Deployment (CD) extends CI by automatically deploying the code to production after it passes all tests. This ensures that new features and fixes are released to users as soon as they are ready.



Source: https://scaledagileframework.com/continuous-deployment/

Key Concepts of Automation in DevOps

- Continuous Delivery (CD) is a practice in software development where code changes are automatically prepared for release to production. This means that every change made by a developer is automatically tested and validated, ensuring that it can be released to users at any time.



Source: https://www.researchgate.net/figure/Continuous-delivery-and-deployment_fig2_342984146

DIFFERENCE BETWEEN DELIVERY AND DEPLOYMENT

Feature	Continuous Delivery	Continuous Deployment
Automated Testing	✓	✓
Automated Build	✓	✓
Staging Environment	✓	✓
Manual Approval Required	✓	✗
Automatic Production Deployment	✗	✓
Deployment Frequency	High	Very High
Human Intervention for Deployment	✓	✗
Risk of Manual Errors	Lower	Higher
Speed of Releasing Updates	Fast	Very Fast
Reliance on Automated Testing	High	Very High

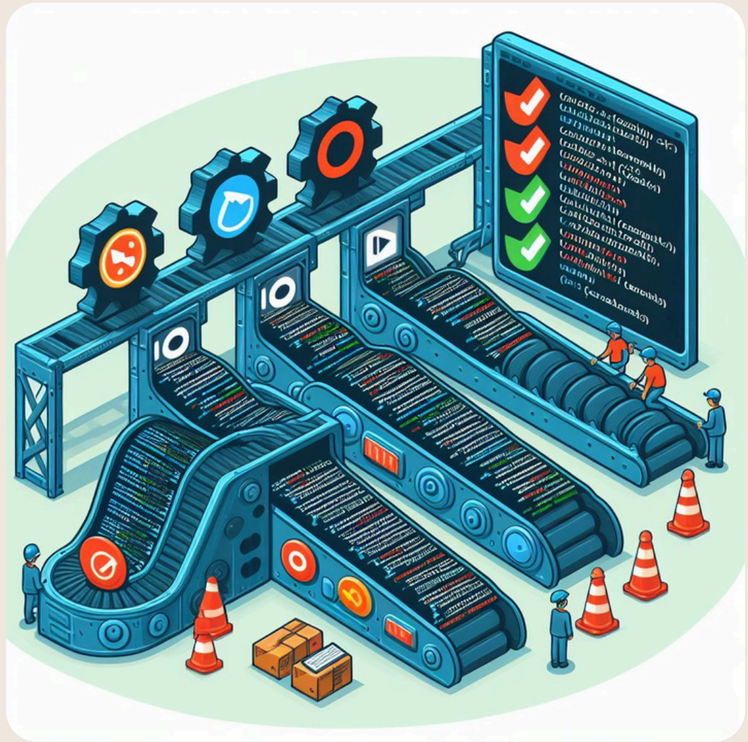
What DevOps processes can be automated?

- Provisioning or Infrastructure Automation:
  - Infrastructure as Code (IaC): Tools like Terraform or Ansible allow teams to manage and provision infrastructure through code.

IAC WIZARD CREATING RESOURCES FROM CODE.

What DevOps processes can be automated?

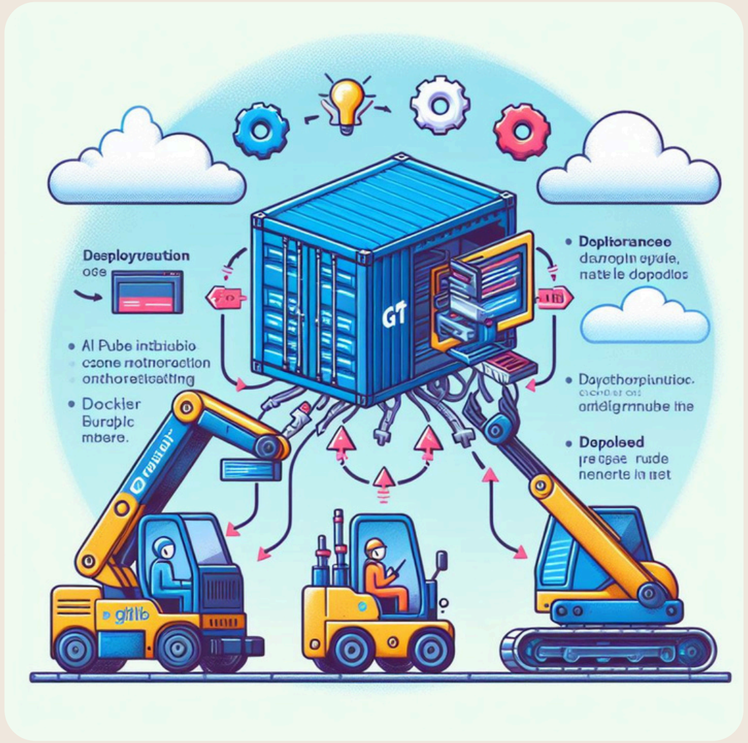
- Automated Testing: Continuous integration systems run automated tests on new code commits.



AUTOMATED
TESTING PIPELINE

WHAT DEVOPS PROCESSES CAN BE AUTOMATED?

- Deployment Automation: Tools like Jenkins, CircleCI, and GitLab CI/CD automate the deployment of applications to various environments.



RELEVANCE OF DEVOPS

- Iterative Development:
  - Agile Focus: Agile promotes developing software in small, incremental steps called iterations.
  - DevOps Support: DevOps enables rapid iterations through continuous integration (CI) and continuous delivery (CD), allowing new features and updates to be integrated and delivered quickly and reliably.

RELEVANCE OF DEVOPS

- Collaboration:
  - Agile Focus: Agile encourages collaboration among cross-functional teams, including developers, testers, and business stakeholders.
  - DevOps Support: DevOps breaks down silos between development and operations teams, fostering a culture of collaboration and shared responsibility.

RELEVANCE OF DEVOPS

- Eliminating Waste:
  - Lean Focus: Lean aims to maximize value by eliminating waste, such as unnecessary processes and delays, and seeks to streamline workflows and remove inefficiencies.
  - DevOps Support: Automation in DevOps eliminates manual, repetitive tasks, reducing waste and speeding up the software delivery process.

RELEVANCE OF DEVOPS: EXAMPLE

Agile + DevOps:

- Scenario: A team working on an e-commerce website uses Agile to develop new features in two-week sprints.
- DevOps Implementation: They use CI/CD to automate testing and deployment, allowing them to release updates at the end of each sprint. This rapid iteration cycle lets them respond quickly to customer feedback and improve the site continuously.