

## Tasks Accomplished today

### Devops Introduction

06-02-2025

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#### Topics List:

1. What is devops?
2. Why do we need devops?.
3. What are the tools available in devops?.
4. What is the workflow of devops?

#### 1. What is devops:

- DevOps is a cultural and professional movement that emphasizes the bridge between software development (Dev) and IT operations (Ops) teams.
- Its primary goal is to shorten the software development lifecycle and deliver high-quality software continuously.
- It is the process of delivery by ensuring the automation in place, ensuring the quality by continuous monitoring and testing.

#### Key concepts of devops:

##### Automation:

Automating repetitive tasks such as code integration, testing, deployment, and infrastructure provisioning is central to DevOps.

This automation reduces manual errors, accelerates processes, and ensures consistency.

##### Continuous Integration and Continuous Delivery (CI/CD):

DevOps practices involve continuously integrating code changes into a shared repository and automating the deployment process.

##### Infrastructure as Code (IaC):

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Managing and provisioning computing infrastructure through machine-readable script files rather than physical hardware or interactive configuration tools is a DevOps practice.

#### **Monitoring and Feedback:**

Continuous monitoring of applications and infrastructure allows teams to gather feedback on performance and user experience.

This data-driven approach facilitates proactive issue resolution and continuous improvement.

## **2. Why do we need devops?.**

#### **Faster Software Delivery:**

DevOps integrates development and operations, enabling faster development cycles and more frequent software releases.

This agility allows businesses to respond quicker to market changes or customer needs.

#### **Increased Efficiency and Productivity:**

Automation of repetitive tasks like testing, deployment, and monitoring reduces manual errors and speeds up workflows, leading to higher productivity.

#### **Better Quality and Reliability:**

Continuous testing, integration, and monitoring ensure that software is of high quality and reliable.

DevOps helps identify issues earlier, preventing downtime and improving system stability.

#### **Scalability:**

DevOps practices like Infrastructure as Code (IaC) make it easier to scale infrastructure automatically in response to demand.

#### **Continuous Improvement:**

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The constant feedback loop in DevOps (through monitoring and testing) allows teams to iteratively improve the software and processes, resulting in better outcomes over time.

#### Cost Savings:

By reducing manual processes, minimizing downtime, and improving software quality, DevOps helps organizations reduce operational costs.

#### Agility and Flexibility:

DevOps supports agile methodologies, which allow teams to adapt quickly to changing business needs, improving overall responsiveness to customer requirements.

### 3. What are the tools available in devops?.

#### Version Control:

- **Git:** A widely used tool for tracking changes in code during development, enabling collaboration among team members.
- **GitHub/GitLab/Bitbucket:** Platforms that host Git repositories and offer features like code review, issue tracking, and collaboration.

#### Continuous Integration / Continuous Delivery (CI/CD):

- **Jenkins:** An open-source automation server for building, testing, and deploying code continuously.
- **GitLab CI:** Part of GitLab, a tool for automating the CI/CD process.

#### Configuration Management:

- **Ansible:** An open-source automation tool for configuration management, application deployment, and task automation.
- **Puppet:** An automation tool that allows you to define infrastructure as code to manage system configurations.
- **Chef:** A configuration management tool that automates infrastructure provisioning.

#### Containerization:

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- **Docker:** A platform that enables developers to package applications and their dependencies into containers for consistent and efficient deployment.
- **Kubernetes:** An open-source container orchestration platform used to manage containerized applications at scale.
- **OpenShift:** A Kubernetes-based container orchestration platform that helps automate deployment and scaling.

### Monitoring and Logging:

- **Prometheus:** An open-source monitoring and alerting toolkit designed for reliability and scalability.
- **ELK Stack (Elasticsearch, Logstash, Kibana):** A set of tools used for searching, analyzing, and visualizing log data in real time.

### Infrastructure as Code (IaC):

- **Terraform:** An open-source IaC tool used to provision, manage, and update infrastructure resources in a safe and predictable manner.
- **AWS CloudFormation:** A tool for provisioning and managing AWS infrastructure using templates written in JSON or YAML.

### Testing:

- **Selenium:** A tool for automating web applications for testing purposes.
- **JUnit:** A popular framework for testing Java applications, integrated into many CI/CD pipelines.
- **SonarQube:** A platform for continuous inspection of code quality to detect bugs, vulnerabilities, and code smells.

### Security:

- **Aqua Security:** A tool for securing containers and cloud-native applications.
- **Snyk:** A tool for finding and fixing vulnerabilities in dependencies, containers, and infrastructure.

## 4. What is the workflow of devops?

### 1. Planning:

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- The DevOps process begins with planning where teams define project goals, create backlogs, and decide on features and requirements for development.

### 2. Development:

- Developers write code based on the requirements and work collaboratively in version control systems (e.g., Git).
- Code is written in short, incremental cycles, making it easier to release small updates regularly.

### 3. Continuous Integration (CI):

- Developers frequently commit code to a shared repository (e.g., GitHub, GitLab).
- CI tools like Jenkins, CircleCI, or Travis CI automatically build and test the code as soon as changes are committed.

### 4. Continuous Delivery (CD):

- After successful integration and testing, the next step is Continuous Delivery (or Continuous Deployment), where code is automatically deployed to staging or production environments.

### 5. Testing:

- This can include unit tests, integration tests, security tests, performance tests, and user acceptance testing (UAT).

### 6. Release:

- Once the application passes testing and quality checks, it is released to the end users.

### 7. Monitoring:

- After deployment, DevOps teams continuously monitor the system's performance using monitoring tools like Prometheus, Grafana, or ELK Stack.

### 8. Feedback and Iteration:

- Feedback from stakeholders, users, and monitoring tools helps identify areas for improvement or fixes.
- The development cycle is continuously improved upon based on this feedback, making DevOps a never-ending loop of enhancement and innovation.

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