Basic DevOps Concepts - Detailed Notes

# Introduction to DevOps

DevOps is a combination of Development and Operations. It represents a cultural shift that promotes collaboration, automation, and continuous improvement between development and operations teams to deliver high-quality software faster.

# Why DevOps Matters

DevOps bridges the gap between software development and IT operations, enabling faster delivery, higher quality, and more reliable releases. Benefits include faster software delivery, improved collaboration, reduced failures, and continuous improvement.

# Core Principles Explained

- Collaboration: Teams work together closely.  
- Continuous Integration & Delivery (CI/CD): Automate code integration and deployment.  
- Infrastructure as Code (IaC): Manage infrastructure using code.  
- Automated Testing: Run tests automatically to ensure quality.  
- Feedback & Monitoring: Track performance and issues in real-time.

# DevOps Lifecycle Detailed

1. Plan – Backlogs, feature planning (Jira, GitHub Issues)  
2. Develop – Version control with Git  
3. Build – Automated pipelines (Jenkins, GitHub Actions)  
4. Test – Unit/integration testing, security scans  
5. Release – Build artifacts, versioning  
6. Deploy – Cloud or on-prem delivery  
7. Operate – Managing servers, containers  
8. Monitor – Logs, alerts, uptime

# Popular DevOps Tools Overview

• Jenkins – CI/CD automation server  
• Git – Version control  
• Docker – Containerization  
• Kubernetes – Container orchestration  
• Terraform – Infrastructure as Code  
• Ansible – Configuration management  
• AWS – Cloud platform  
• Prometheus – Monitoring and alerting

# CI vs CD Explained

• Continuous Integration (CI): Frequent integration of code changes into a shared repository, allowing early detection of bugs.  
• Continuous Delivery/Deployment (CD): Automating the release process so that new changes can be deployed to production quickly and safely.

# Example Pipeline Walkthrough

1. Developer commits code to Git.  
2. Jenkins triggers a build.  
3. Automated tests run.  
4. Docker image created.  
5. Deployment to Kubernetes or AWS.

# Learning Resources

• AWS – What is DevOps?  
• Atlassian DevOps Lifecycle  
• DevOps Roadmap GitHub  
• YouTube: DevOps in 100 Seconds

# Key Takeaways

DevOps is not just a set of tools, but a mindset and cultural change. Adopting DevOps principles leads to faster delivery, better quality, and improved collaboration across teams.