III B.Tech I Sem CSE

23CS503 : DevOps

Unit-III

Introduction to Project Management

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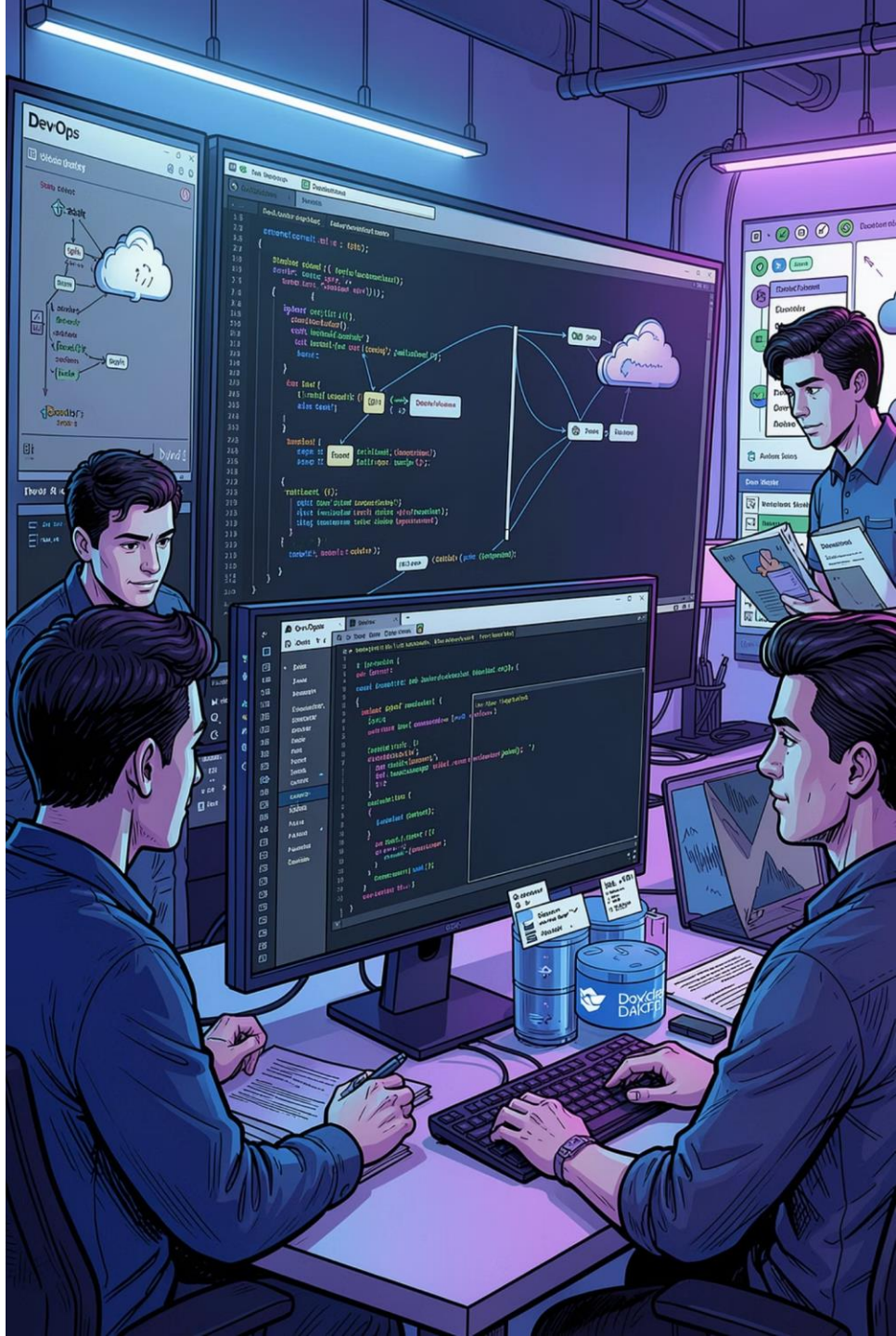
Introduction to Project Management

Source code control · Git · Git Servers · Docker · Gerrit · Pull Request Model · GitLab

Collaboration, automation, and version control at the core of modern software delivery.



Learning Outcomes

After completing this unit, you will be able to:

01

Understand SCM

Explain Source Code Management and its role in software development.

02

Explain Version Control

Describe how Version Control Systems track and manage code changes.

03

Identify Git Server Implementations

Recognise and compare popular Git server platforms.

04

Understand Docker & GitLab

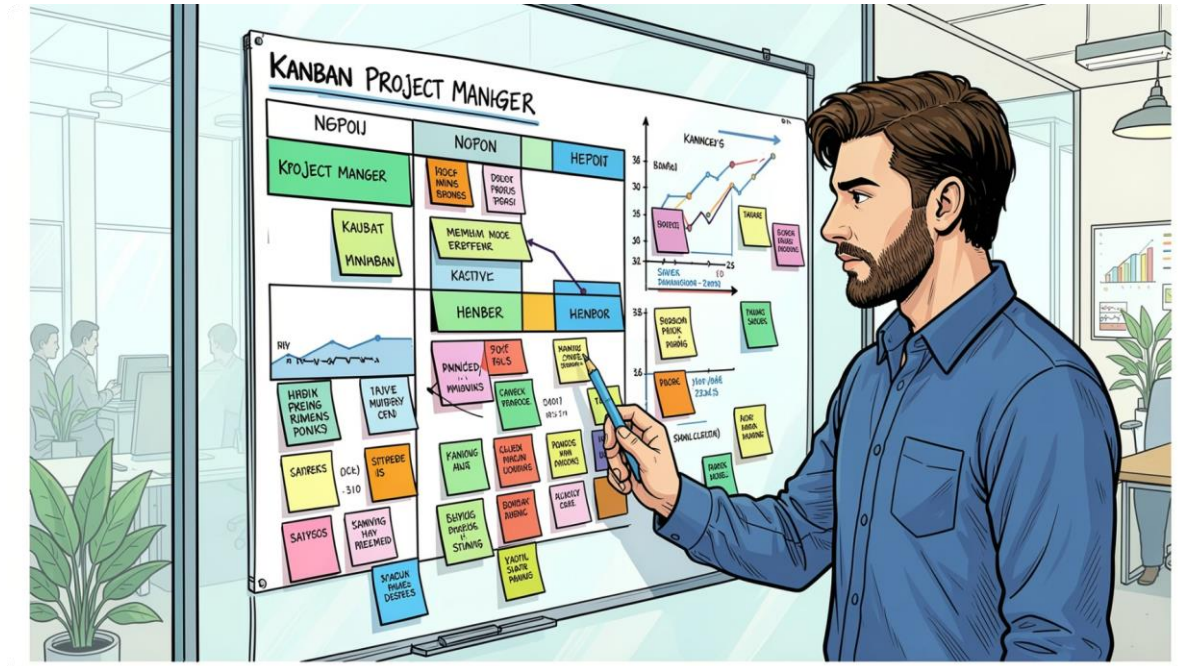
Explain containerisation with Docker and CI/CD workflows in GitLab.

05

Apply Pull Request Workflow

Use the Pull Request model in real-world collaborative projects.

What is Project Management?



Project Management is the process of planning, organising, monitoring, and controlling software development activities to achieve defined project objectives.

- ⏱ On-Time Delivery
- ✅ Quality Assurance
- ⚠ Risk Reduction
- 🤝 Team Collaboration
- 📦 Resource Management

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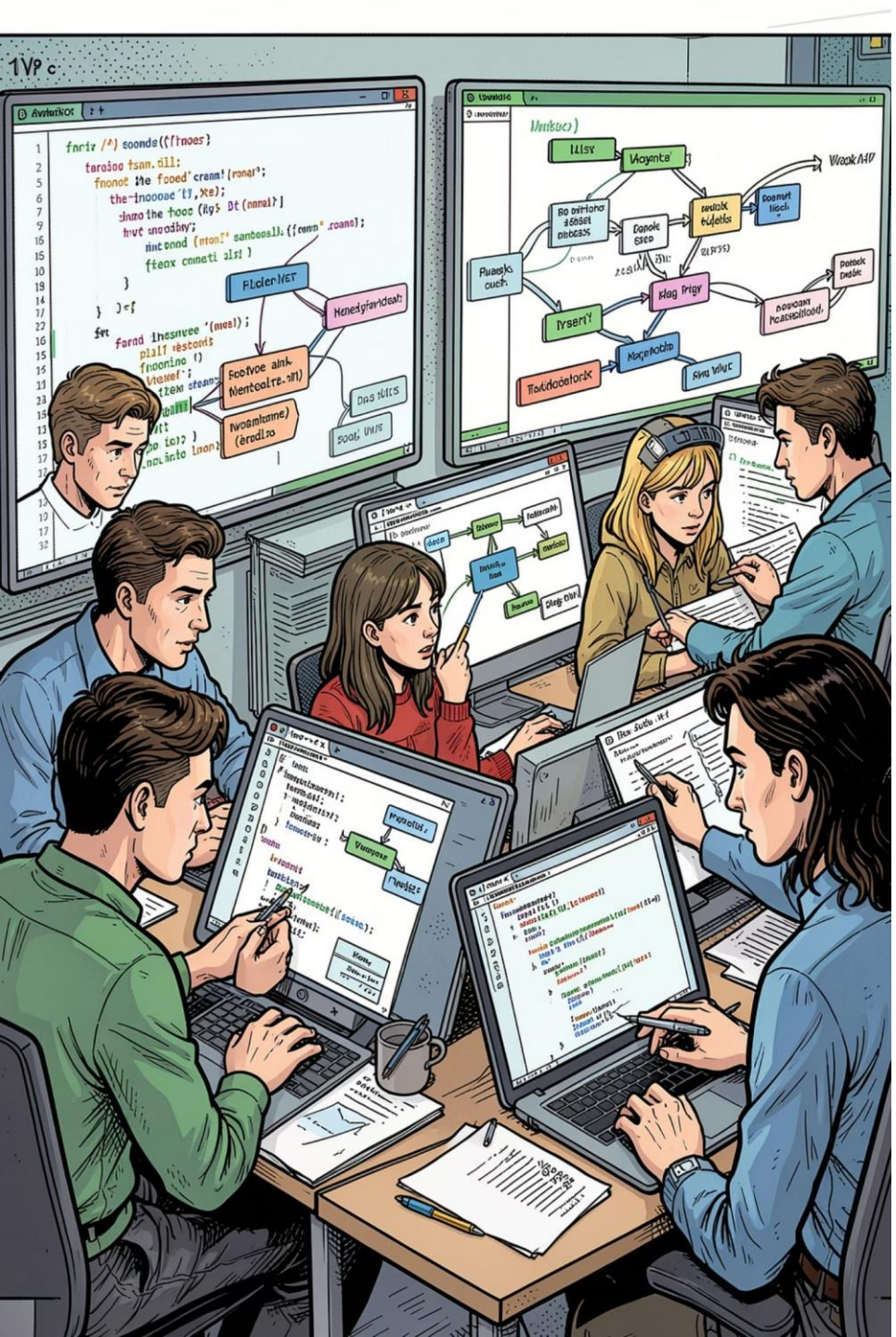

Why Source Code Control?

Track Changes

Every modification is recorded with who made it and when.

Prevent Conflicts

Multiple developers can work simultaneously without overwriting each other.

Enable Rollback

Revert to any previous version when bugs are introduced.

Support Collaboration

Teams share a single source of truth across locations.

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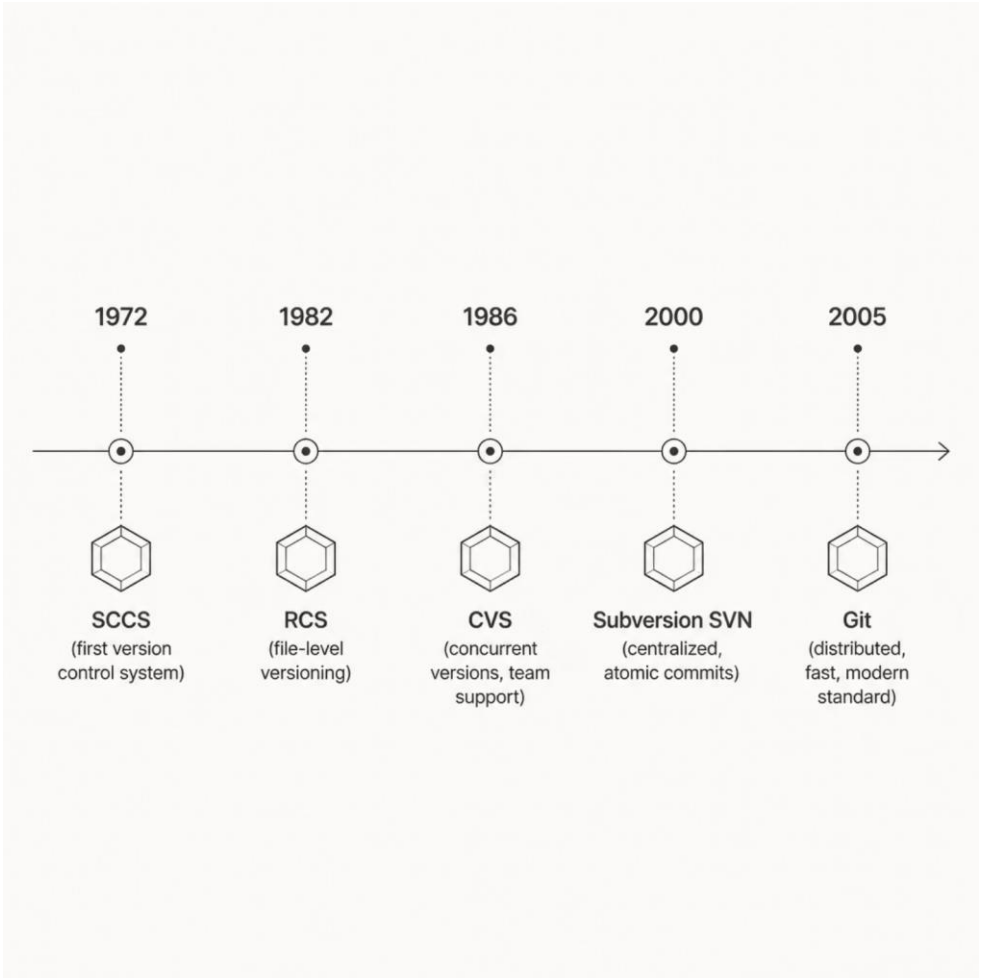
Evolution of Source Code Management



Key Milestones

- **1972 — SCCS:** The first version control system, enabling basic file tracking.
- **1982 — RCS:** Introduced file-level versioning for individual developers.
- **1986 — CVS:** Added team collaboration with concurrent version support.
- **2000 — SVN:** Centralized system with atomic commits and directory versioning.
- **2005 — Git:** Distributed model created by Linus Torvalds; now the industry standard.

> Today, Git is the most widely used distributed version control system worldwide.

Roles in a DevOps Team

Developer

Writes and maintains source code, implements features, and fixes bugs.

Tester

Validates functionality, writes test cases, and ensures quality standards.

DevOps Engineer

Automates build, test, and deployment pipelines using CI/CD tools.

Project Manager

Tracks progress, manages timelines, and coordinates team deliverables.

System Administrator

Maintains infrastructure, manages servers, and ensures system uptime.

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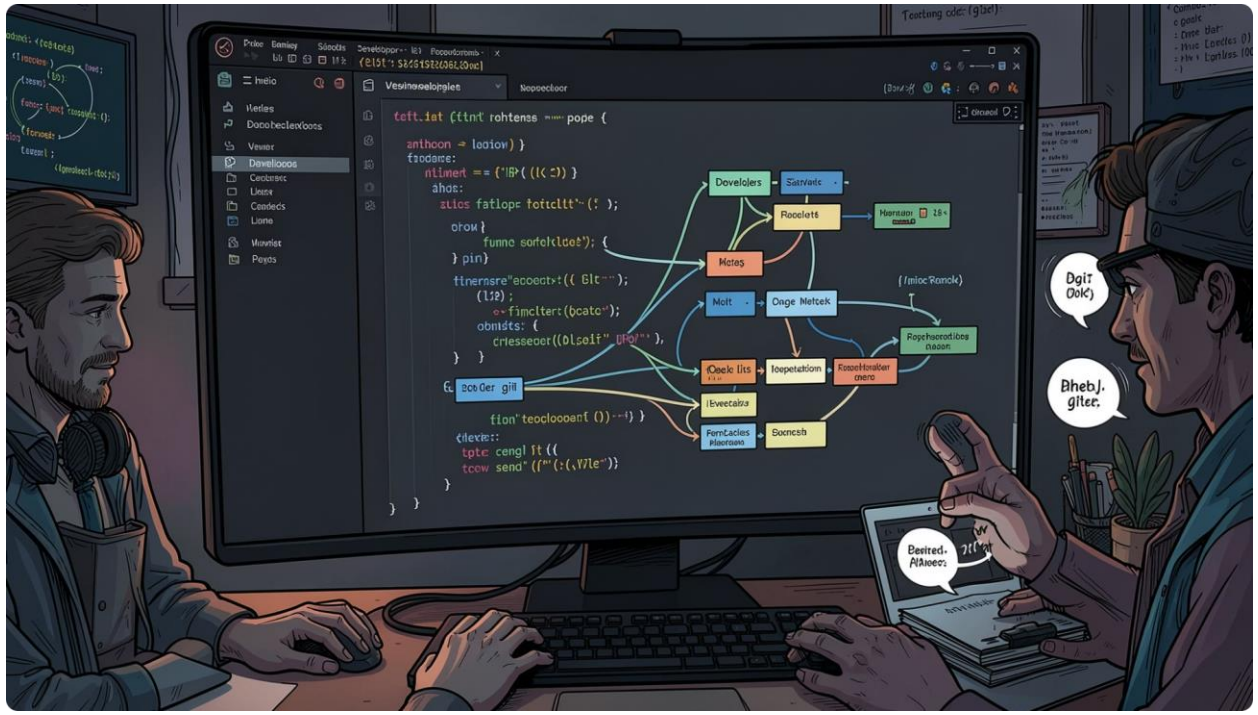
Source Code Management System



An SCM system manages source code and tracks all modifications over time, enabling teams to collaborate efficiently.

Core Features

Popular Tools

Git (distributed, dominant), SVN (centralized), Mercurial (distributed, Python-based)

- Version Tracking
- Branching & Merging
- Collaboration
- Backup & Recovery

Source Code Migrations & Shared Authentication

Source Code Migration

Moving repositories from one SCM tool to another — e.g., SVN → Git or CVS → Git.

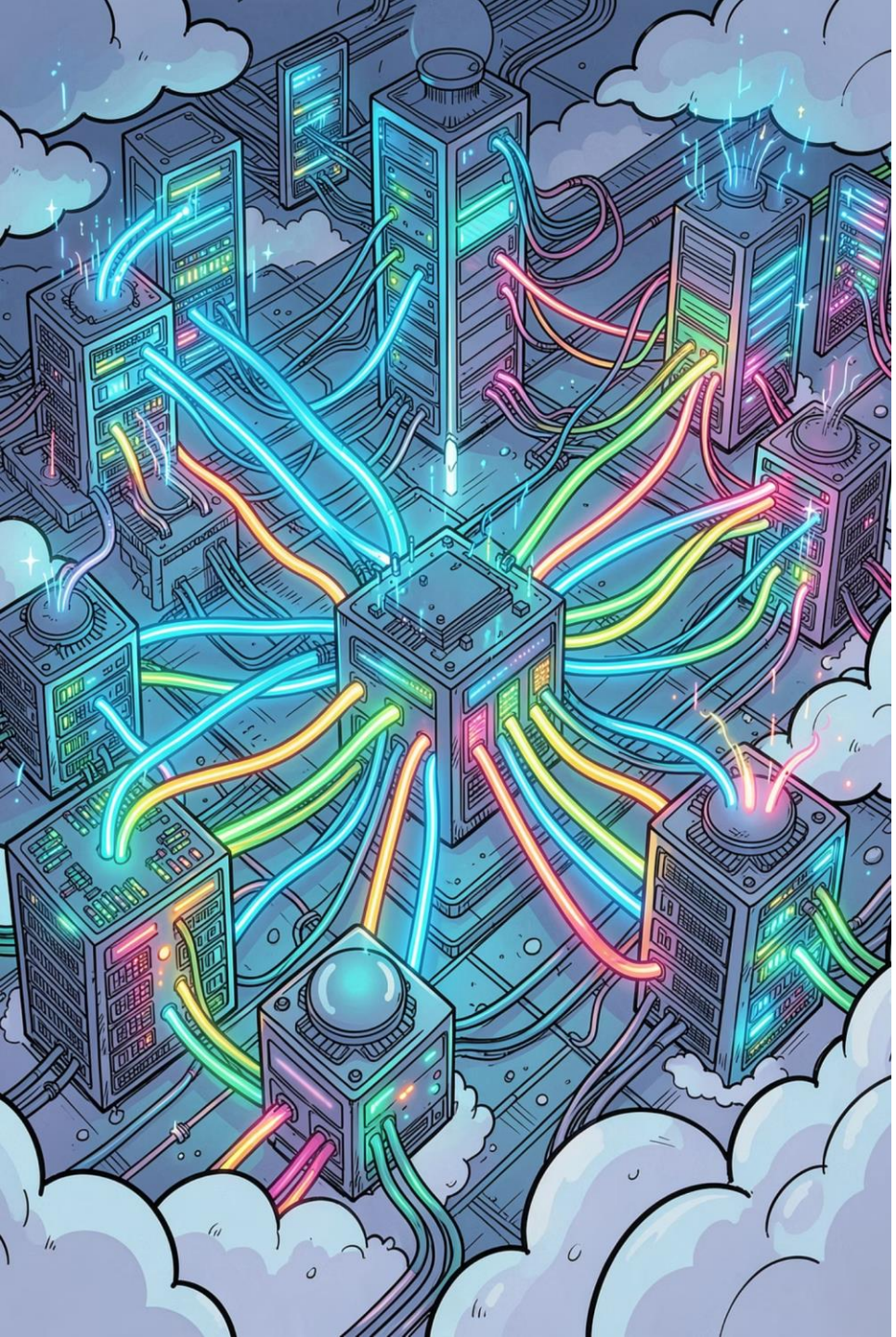
- Better performance and speed
- Improved team collaboration
- Modern workflow support (branches, PRs)

Shared Authentication

Allows users to access multiple DevOps tools with a single identity (single sign-on).

- LDAP — Directory-based authentication
- Active Directory — Windows enterprise identity
- OAuth — Token-based web authorisation

SSO improves security and simplifies access control across tools.



Hosted Git Servers

cloud platforms that store Git repositories, enabling remote collaboration, CI/CD integration, and secure access.

GitHub

The largest open-source community, owned by Microsoft.

GitLab

Full DevOps lifecycle platform with built-in CI/CD.

Bitbucket

Atlassian's Git solution, integrates with Jira.

Azure Repos

Microsoft's cloud-hosted repos within Azure DevOps.

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Key Takeaways

SCM is Essential

Version control systems like Git track changes, prevent conflicts, and enable team collaboration.

Git Dominates

Git's distributed model and speed make it the industry standard, with hosted services like GitHub and GitLab extending its power.

DevOps Roles are Specialized

Developers, testers, DevOps engineers, PMs, and sysadmins each play a critical role in the pipeline.

Modern Workflows Matter

Migration to Git, shared authentication (SSO), and Pull Request workflows are foundational to professional DevOps practice.

- Next up: Deep dive into Git commands, Docker containerisation, and the Pull Request model in practice.