

Source Code Management (SCM)

■ Introduction

- Source Code Management (SCM) is the practice of tracking and controlling changes in software code.
- It helps teams collaborate, maintain history, and manage versions of the project.
- A key component of SCM is the Version Control System (VCS).

■ Distributed Version Control System (DVCS)

- DVCS allows every developer to have a full copy of the repository.
- Developers can work offline and commit changes locally before syncing.
- Popular DVCS tools: Git, Mercurial.
- Real-time Example: Using Git, a developer can commit locally on their laptop without internet, then push to GitHub later.

■ Key Characteristics of SCM

- Tracks history of changes through commits.
- Supports branching and merging for parallel development.
- Facilitates team collaboration with shared repositories.
- Provides rollback and recovery in case of errors.
- Real-time Example: If a bug is introduced, Git allows reverting to a previous commit instantly.

■ Comparison: Centralized vs Distributed VCS

| Aspect | Centralized VCS | Distributed VCS |
|--------------------|---|------------------------------------|
| Repository Storage | Single central repository | Each user has full repository copy |
| Network Dependency | Requires internet for most operations | Work offline with local repo |
| Performance | Slower for commits due to server dependency | Faster local commits |
| Failure Impact | Central server failure blocks work | Work continues locally, sync later |
| Examples | SVN, CVS | Git, Mercurial |