Analysis of Version Control Workflows

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Abstract: *Version control systems (VCS) are essential for modern software development. They help maintain code quality, track changes, and enable collaboration among distributed teams. Of the various systems available, Git has become popular because of its flexibility and distributed structure. Over time, different workflows have emerged, such as Git Flow, GitHub Flow, and Trunk-Based Development, to meet diverse project needs. This paper presents a study of version control workflows, focusing on their structure, merge management, collaboration styles, and suitability for different team sizes. Insights from recent studies highlight the strengths and weaknesses of each model regarding integration frequency, release stability, and conflict management. The findings show that while structured workflows like Git Flow ensure predictability and stability, lightweight models like GitHub Flow and trunk-based development improve speed and continuous integration. The paper wraps up with an evaluation of how adaptable these workflows are in modern DevOps environments and suggests future research directions for improving automated version control strategies.*

Keywords: Version Control System, Git Workflow, Git Flow, GitHub Flow, TrunkBased Development, Merge Conflicts, Continuous Integration