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3.2 Assignment

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Version Control Guidelines

Version control is an essential principle of DevOps development as it keeps a project's workflow and team organized. The primary goal of version control is to manage and track changes to a project over time using a central point that stores the entire history of a project throughout its lifecycle. This allows developers to track workflows throughout the development process. Version control also helps development teams stay organized, as interacting with the repository forces developers to keep up-to-date on changes in the project and communicate with each other to decide which changes should be kept and which should be discarded. However, there are some key best practices developers should follow when using version control systems to ensure they are using them correctly and efficiently. The three sources discussed in the following paragraphs provide different guidelines for developers to keep in mind while utilizing version control systems in their development processes.

The first source, from CreateBytes, focuses on version control within the context of the DevOps pipeline. That said, it emphasizes frequent commits to avoid conflict and suggests utilizing branching strategies to decrease coupling between teams. It also advocates for the use of automated tools alongside version control. Automation can be used with version control to protect the main branch, to validate and deploy code within the repository, and to perform code reviews on previous versions generated from pull requests (CreateBytes, 2024). Because automation is a key aspect of modern DevOps, this article explains how it can enhance the benefits of version control systems.

The second set of guidelines, pulled from Radixweb.com, contains several best practices for keeping version control organized. It is quite easy for a repository to become cluttered and disorganized throughout the development process, as developers are often too busy working on the project to worry about the repository dedicated to it. Radwix offers some guidelines to prevent repositories from descending into chaos. For example, writing clear commit messages (Kansara, 2024). Commit messages function much like code documentation, as they help developers understand the project and how it changes over time. That said, clear commit messages are the foundation of an organized, efficient repository. Radix also discusses the importance of keeping feature branches and main branches up-to-date and relevant to their purpose and resolving conflicts in commits as soon as possible before they create significant technical debt (Kansara, 2024).

The third and final source from Perforce maintains a similar focus on repository organization. Yet, it delves a little more into organization relating to the structure of a repository in terms of commits, branches, and security. For example, the article suggests that commits should be atomic and consistent, with each dedicated to a single purpose, such as bug fixing, updating, or adding new features. Perforce also explains that Branches can be complicated, but if they are created with the goal of parallel development and productivity, they can become a lot easier to manage. Branches should display a clear path for updates, allowing for planned and structured releases. Furthermore, Perforce discusses methods for securing version control repositories through data encryption, authentication, and threat detection (Schiestl, 2024).

In conclusion, these three articles combined provide a strong foundation to build an efficient version control process. The first article combines DevOps principles and version control practices to offer a set of guidelines for using version control as efficiently as possible. The second article covers the importance of an organized repository and presents several methods for

keeping repositories comprehensive and clean. The final article then explains the best ways to approach committing and branching, as well as methods for maintaining secure repositories.

That said, combining the three sources, I've curated my own list of guidelines for using version control systems based on the principles I feel are most important:

- Frequent commits that represent individual tasks in the value stream.
- Clear commit messages for efficient communication within the team.
- Resolve conflicts as soon as possible to reduce technical debt.
- Automate validation and deployment to streamline version control processes.
- Organize branches with the purpose of increasing productivity.
- Keep repositories secure through data encryption, audits, and threat detection software.

Most of the guidelines I selected focus on organization and repository structure, as I believe that the most effective way to reach peak efficiency is by maintaining organized systems. Of course, security is still crucial, and automation can make certain processes easier. However, neither of those components can operate efficiently in a disorganized system.