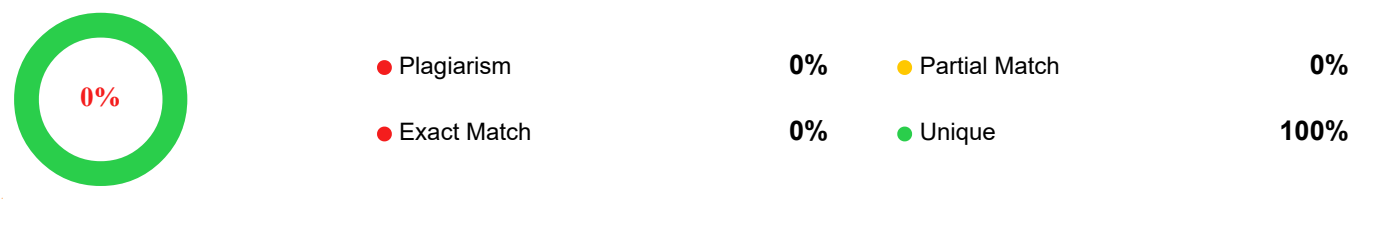


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Report on Software Management

Scenario: Online Shopping Application

Introduction

The development and maintenance of an online shopping application, which enables users to browse products, make purchases, track orders, and leave feedback, requires systematic software engineering practices. Such applications are critical for businesses aiming to provide seamless shopping experiences while reaching a broad audience. Coordinated efforts among developers, designers, testers, and operations teams are essential to ensure application stability, scalability, and continuous improvements. To achieve this, software development processes such as version control, build management, change management, and release management are employed, each addressing specific aspects of the application lifecycle. These processes ensure efficient collaboration, high-quality software delivery, and a smooth user experience in a competitive e-commerce environment.

Version Control

What is Version Control

Version control is a systematic method of managing changes to software code, documents, or configurations over time. It allows multiple developers to work on the same project simultaneously without overwriting each other's work and provides a complete history of modifications. This makes it possible to track changes, revert to previous versions when necessary, and maintain a stable codebase. In the context of an online shopping application, version control is crucial for coordinating development of features such as product catalogs, payment gateways, order tracking systems, and recommendation engines, while ensuring that updates do not disrupt the live application.

Previous Version Control

Earlier software development relied on manual or centralized version control systems, such as CVS (Concurrent Versions System) and early versions of Subversion (SVN). In these systems, all code changes were stored on a central server, and developers had to check out files to work on them. While this allowed basic tracking of changes, it had several limitations. Merging code from multiple developers was often difficult, server downtime could halt development, and branching was cumbersome. For online shopping applications, managing multiple simultaneous features or urgent bug fixes using these systems was slow and error-prone.

### Current Version Control

Modern version control systems, especially Git, are distributed, meaning each developer has a complete copy of the repository, including its history. This allows developers to work offline, create feature or bugfix branches, and merge changes efficiently. Tools like GitHub and GitLab enhance collaboration by offering pull requests, code review workflows, and integration with continuous integration/continuous delivery (CI/CD) pipelines. In an online shopping application, this enables teams to implement new features, test them in isolation, and merge them safely into the main branch, improving development speed and software reliability.

### Differences Between Previous and Current Version Control

## Build Management

### What is Build Management

Build management is the process of automating the creation, compilation, testing, and packaging of software into deployable versions. In the scenario of an online shopping application, build management ensures that every update—whether it is a new feature, bug fix, or performance enhancement—is compiled correctly and tested consistently before being deployed. For example, if the development team adds a flash sale module or integrates a new payment gateway, build management automates the compilation of these changes, runs automated tests to ensure they do not break existing functionality, and packages them into a deployable artifact. This reduces human error, ensures consistent builds, and allows developers to focus on writing code rather than manually preparing releases.

### Benefits of Build Management in the Scenario

For an online shopping application, build management provides several tangible benefits:

**Consistency and Reliability:** Every new feature or update, such as adding a new product category or improving the search functionality, is built and tested in a consistent environment. This ensures the application behaves predictably across development, staging, and production.

**Early Error Detection:** Automated tests run during the build process detect errors early, reducing the risk of deploying faulty features that could disrupt checkout processes or order tracking.

**Faster Deployment Cycles:** With automation, the team can quickly produce new builds and deploy updates, allowing features like seasonal promotions or mobile app enhancements to reach users faster.

**Improved Collaboration:** Developers can work simultaneously on different features, knowing that build management will integrate their changes safely and provide a stable build for testing.

**Traceability and Accountability:** Each build is logged and linked to the specific code changes and developer who committed

them. This allows the team to quickly trace issues back to their source, which is vital for resolving bugs in a live online shopping environment.

### Tools for Build Management

In this scenario, tools like Maven and Gradle can handle dependency management and code compilation, while Jenkins or GitHub Actions automate the entire build process, including testing and packaging. For instance, whenever a developer commits code to implement a new discount feature, Jenkins can trigger a build that compiles the code, runs unit tests, and prepares a deployable artifact for staging.

### Change Management

#### What is Change Management

Change management is the structured approach to handling modifications in a software system, ensuring that all changes are planned, reviewed, approved, implemented, and documented in a controlled manner. In the context of an online shopping application, change management ensures that any updates—such as adding a new feature, fixing a bug, or modifying system configurations—are executed without disrupting the existing functionality. For instance, if the development team introduces a flash sale feature or modifies the payment gateway integration, change management ensures that these updates are assessed for risk, tested in a staging environment, and deployed in a way that minimizes the impact on users. This process provides accountability, reduces errors, and ensures smooth coordination among developers, testers, and operations teams.

#### Benefits of Change Management

Implementing change management in an online shopping application provides multiple advantages:

**Reduced Risk of Errors:** By reviewing and approving changes before deployment, the team minimizes the chances of introducing bugs that could affect order processing, payment, or product catalog functionality.

**Improved Planning and Coordination:** Change management ensures that multiple teams—development, testing, operations, and marketing—are aligned regarding upcoming changes, deadlines, and impacts.

**Enhanced Traceability and Documentation:** Every change is recorded with details about the request, implementation, testing, and approval. This documentation allows teams to quickly identify and resolve issues if something goes wrong.

**Faster and Safer Deployment:** Structured change management allows for controlled implementation, making it possible to deploy updates quickly without compromising stability, which is crucial during

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