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Comparative Analysis of Continuous Software Delivery Tools Using Github Actions and Jenkins as Examples

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Continuous integration and continuous deployment (CI/CD) tools are fundamental to modern software development, enabling automated software delivery and deployment. While numerous CI/CD solutions exist, this study focuses on a comparative analysis of GitHub Actions and Jenkins, two widely used tools representing cloud-based and self-managed CI/CD solutions, respectively. The evaluation covers key aspects such as scalability, configuration complexity, integration capabilities, cost, stability, and resource consumption. Through empirical testing and case studies, the study examines their effectiveness in building, deploying, and testing software, as well as their ability to integrate with third-party platforms and optimize infrastructure usage. The results show that GitHub Actions offers seamless integration with the GitHub ecosystem, simplified setup, and cost-effective scalability, making it particularly suitable for small to mid-sized teams that rely on cloud-native workflows. Conversely, Jenkins offers extensive customization, advanced plugin support, and greater flexibility, making it the preferred choice for large enterprise environments requiring on-premises or hybrid infrastructure. This study highlights critical decision factors when choosing a CI/CD platform, including installation methods, infrastructure control, and long-term maintenance requirements. The findings contribute to a broader understanding of the trade-offs between cloud-native and self-managed CI/CD solutions, and provide insights applicable to evaluating other CI/CD tools in different development environments.

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