Continuous integration and continuous deployment/delivery for software systems

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Abstract

Continuous Integration (CI) and Continuous Deployment (CD) are software engineering techniques used to bring about rapid change to a software system or application. The main idea behind CI is to frequently integrate different developer copies of a code tree into the central source code repository. By frequently integrating disparate developer code bases, the actual integration process is easier and therefore less prone to conflicts and errors. CD compliments CI by building frequent releases of a code base, ensuring that the software is kept in a state that can always be released to users. This makes software development and deployment more rapid and responsive to user needs and enables the automation of software deployments.

By pairing continuous deployment with automated unit testing, the entire process of building, testing, and deploying software can be automated. This allows for more incremental changes to software, which in turn reduces the number of potential bugs or problems. Importantly, CI and CD can dramatically reduce the risk of introducing changes and new features in software. Because smaller, more incremental changes are made, the ability to find and correct mistakes is made easier. This leads to software that is easier to write, maintain, and deploy.

Our review will emphasize the CD portion of CI/CD since continuous integration has more to do with programming practice than with specific software engineering tools and techniques. Two tools that enable continuous delivery are the Jenkins CI/CD server and the Kubernetes container orchestrator. Jenkins builds, tests, and packages the software in the container and Kubernetes automatically pushes the updated containers to the application servers.

At the end of our review, we expect to gain a deep understanding and appreciation of the benefits and limitations of CI/CD.
References


