The Benefits of CI/CD

To Achieve, Build, and Deploy Automation for Cloud-Based Software Products

When it comes to software development in the recent years, several changes have taken place.

Be it reviewing the code, testing it, ensuring confidentiality and security, and deployment, the automation process reduces the effort of development and deployment teams considerably.

The manual software testing by individuals forces organizations to choose between:
- cost,
- user experience, and
- time to market

Continuous integration (CI) and continuous delivery (CD) are essential practices in modern automated software development processes.

Automated testing can also drive the real cost of quality down.

How much does quality cost?

Every developer knows that no bug fix is free.
From the cost of labor to the costs of licensing, lab, energy, and deployment, ensuring the quality of an application can send thousands of dollars down the drain.
And we are not talking of hours of productivity.

Developing and releasing software can be a complicated process, especially as applications, teams, and deployment infrastructure grow in complexity.

To develop, test, and release software in a quick and consistent way, developers and organizations have created three related strategies to manage and automate these processes.

They are:

1. **Continuous integration (CI)** focuses on integrating work from individual developers into a main repository multiple times a day to catch integration bugs early and accelerate collaborative development.

2. **Continuous delivery (CD)** is concerned with reducing friction in the deployment or release process, automating the steps required to deploy a build so that code can be released safely at any time.

3. **Continuous deployment** takes this one step further by automatically deploying each time a code change is made.

In software engineering, CI/CD generally refers to the combined practices of continuous integration and continuous delivery or continuous deployment.
CI/CD bridges the gaps between development and operation activities and teams by enforcing automation in building, testing and deployment of applications.

What is continuous integration (CI)?

Continuous integration (CI) is a software development strategy that increases the speed of development while ensuring the quality of the code that teams deploy. Developers continually commit code in small increments.

The code is then automatically built and tested before it is merged with the shared repository.
Each check-in is then verified by an automated build, allowing teams to detect problems early.

From microservices to mobile apps, modern applications have lots of moving components required to deliver their services.

CI tools allow us to automate the entire process from development to production and test throughout the process.

Continuous Integration allows us to mitigate risk not only with testing, but also by enabling production parity.

Quality Assurance (QA) tasks, such as browser testing, can also be automated.
This also mitigates the risk of a bug.

CD
Continuous Delivery (CD) is the natural extension of Continuous Integration (CI).
It is an approach in which teams ensure that every change to the system is releasable, and that we can release any version at the push of a button.
Continuous Delivery (CD) aims to make releases boring, so we can deliver frequently and get fast feedback on what users care about.

Benefits of continuous integration-continuous deployment (CI-CD)

1. Smaller code changes are simpler and have fewer unintended consequences.
2. Fault isolation is simpler and quicker.
3. Meantime to resolution (MTTR) is shorter because of the smaller code changes and quicker fault isolation.

Testability improves due to smaller, specific changes.
These smaller changes allow more accurate tests.
Elapsed time to detect and correct production escapes is shorter leading to a faster rate of release.

The CI/CD and DevOps trends will continue to evolve, leaving space for the market to grow and improve.

References:

Powerful Continuous Integration out of the box
https://www.jetbrains.com/teamcity/
FREE FOREVER
Enterprise-level CI and CD at a $0 price tag.

An Introduction to Continuous Integration, Delivery, and Deployment
https://www.digitalocean.com/community/tutorials/an-introduction-to-continuous-integration-delivery-and-deployment

CI/CD: Reducing the Cost of Quality
https://www.testim.io/resources/ci-cd-software-quality-solution/
For smaller teams, or those trying AI-based test automation for their web applications.

Best 14 CI/CD Tools You Must Know | Updated for 2020
https://www.katalon.com/resources-center/blog/ci-cd-tools/

License: Free. Jenkins is an open-source tool with an active community.
Homepage: https://jenkins.io/

CircleCI
https://circleci.com/

TeamCity is a commercial tool with both free and proprietary licenses.
https://www.jetbrains.com/teamcity/

Bamboo
https://www.atlassian.com/software/bamboo

GitLab
https://about.gitlab.com/

Travis CI
https://travis-ci.com