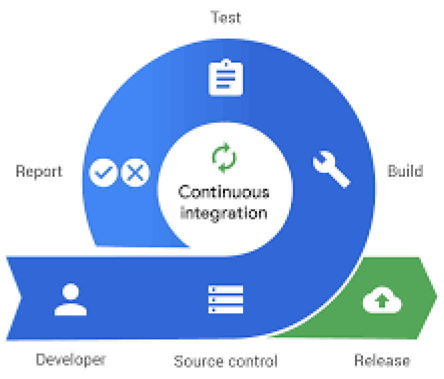
Continuous integration (**CI**) is the practice of automating the integration of code changes from multiple contributors into a single software project. It’s a primary DevOps best practice, allowing developers to frequently merge code changes into a central repository where builds and tests then run. Automated tools are used to assert the new code’s correctness before integration.



Continuous delivery is an extension of continuous integration since it automatically deploys all code changes to a testing and/or production environment after the build stage.

This means that on top of automated testing, you have an automated release process and you can deploy your application any time by clicking a button.

Continuous deployment goes one step further than continuous delivery. With this practice, every change that passes all stages of your production pipeline is released to your customers. There's no human intervention, and only a failed test will prevent a new change to be deployed to production.

What are the benefits of each practice?

Continuous integration

What you need (cost)

- Your team will need to write automated tests for each new feature, improvement or bug fix.
- You need a continuous integration server that can monitor the main repository and run the tests automatically for every new commits pushed.
- Developers will merge their changes as often as possible, at least once a day.

What you gain

- Less bugs get shipped to production as regressions are captured early by the automated tests.
- Building the release is easy as all integration issues have been solved early.
- Less context switching as developers are alerted as soon as they break the build and can work on fixing it before they move to another task.
- Testing costs are reduced drastically – your CI server can run hundreds of tests in the matter of seconds.
- Your QA team spends less time testing and can focus on significant improvements to the quality culture.

Continuous delivery

What you need (cost)

- You need a strong foundation in continuous integration and your test suite needs to cover enough of your codebase.
- Deployments need to be automated. The trigger is still manual but once a deployment is started there shouldn't be a need for human intervention.
- Your team will most likely need to embrace feature flags so that incomplete features do not affect customers in production.

What you gain

- The complexity of deploying software has been taken away. Your team doesn't have to spend days preparing for a release anymore.
- You can release more often, thus accelerating the feedback loop with your customers.
- There is much less pressure on decisions for small changes, hence encouraging iterating faster.

Continuous deployment

What you need (cost)

- Your testing culture needs to be at its best. The quality of your test suite will determine the quality of your releases.
- Your documentation process will need to keep up with the pace of deployments.
- Feature flags become an inherent part of the process of releasing significant changes to make sure you can coordinate with other departments (support, marketing, PR...).

What you gain

- You can develop faster as there's no need to pause development for releases. Deployments pipelines are triggered automatically for every change.
- Releases are less risky and easier to fix in case of problem as you deploy small batches of changes.
- Customers see a continuous stream of improvements, and quality increases every day, instead of every month, quarter or year.